DEVELOPMENT APPLICATION AND ENVIRONMENTAL IMPACT STATEMENT
EXPANSION OF BEEF CATTLE FEEDLOT FROM 999 TO 3,000 HEAD

"Springfield"
2513 Getta Getta Road
NORTH STAR NSW 2408

GWYDIR SHIRE COUNCIL
DEVELOPMENT APPROVAL
Approved subject to the provision of the EP & A Act 1979 and any conditions contained in the attached written approval.
Development Application No: DA 2025/10
Date: 31/07/2025
Booklet of 1717 pages
Council Officer: ...
This is a development approval only and a Construction Certificate must still be obtained for any building work.

Doolin Farming Pty Ltd
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[February 2025]

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1. Certification

Submission of an environmental impact statement for the proposed expansion of beef cattle feedlot on the property “Springfield”. Prepared under Part 5 of the Environmental Planning and Assessment Act 1979 for approval of the proposed development.

Environmental Impact Statement prepared by:	
Name:	Rod Davis
Qualifications:	B.Eng (Agricultural), M.Eng (Agricultural), CP Eng, FIEAust, RPEQ, C.Dec,
Address:	7 Prospect Terrace HIGHFIELDS, QLD 4352
Contact details:	rod.davis@rdcengineers.com.au
Description of the infrastructure to which the statement relates:	The expansion of a beef cattle feedlot on the property “Springfield”, located in northern New South Wales.
Address of the land on which the infrastructure to which the statement relates is to be carried out:	2513 Getta Getta Road NORTH STAR 2408 Lot/Section/Plan no: 8/-/DP756018 and 1/-/DP1212915 Parish of Staplyton County of Staplyton The land is owned by Jennifer Susan Doolin a related entity of Doolin Farming Pty Ltd.
Environmental Impact Statement	An environmental impact statement is attached addressing all matters in accordance with Part 5 of the Environmental Planning and Assessment Act 1979 and Part 8 Division 5 Environmental impact statements of the Environmental Planning and Assessment Regulation 2021.
Declaration	I certify that I have prepared the contents of this environmental impact statement in accordance with the NSW Department of Planning Director General’s environmental assessment requirements dated 23 May 2024. The environmental impact statement contains all available information that is relevant to the environmental assessment of the development, activity or infrastructure to which the statement relates. To the best of my knowledge, the information contained in the environmental assessment is not false or misleading. R.J. Davis Rod Davis
	21 February 2025

2. List of abbreviations

AADT	Annual Average Daily Traffic
AASS	Actual Acid Sulfate Soils
ABS	Australian Bureau of Statistics
ACS	Animal Care Statement
AHC Act	Australian Heritage Commission Act 1975
AHD	Australian Height Datum
AHIMS	Aboriginal Heritage Information Management Systems
ARI	Average Recurrence Interval
AS	Australian Standard
ASM	Acid Sulphate Materials
AUSVETPLAN	Australian Veterinary Emergency Plan
BOD	Biochemical Oxygen Demand
BCA	Biodiversity Conservation Act 2016
BCR	Biodiversity Conservation Regulation 2017
BSAL	Biophysical Strategic Agricultural Land
BoM	Bureau of Meteorology
BFDB	Bush Fire Design Brief
CEC	Cation Exchange Capacity
CEMP	Construction Environmental Management Plan
CL	Crown Lands of the DCCEEW NSW
CL Act	Crown Lands Management Act 2016
DA	Development Application
DCP	Development Control Plan
DCCEEW	Department of Climate Change, Energy, the Environment and Water NSW
DPE	Department of Planning and Environment
DPI	Department of Primary Industries
DPHI	Department of Planning, Housing and Infrastructure
EAR's	Environmental Assessment Requirements
EPBC	Environment Protection and Biodiversity Conservation Act 1999
EAT	Emerson Aggregate Test
EC	Electrical Conductivity
EHG	Environment and Heritage Group of the DCCEEW
EIS	Environmental Impact Assessment
EMP	Environmental Management Plan
EMS	Environmental Management System
ENCM	Environmental Noise Control Manual
EP&A Act	Environmental Planning and Assessment Act 1979
EP&A Regulation	Environmental Planning and Assessment Regulation 2021
EPA	NSW Environment Protection Authority
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
EPI	Environmental Planning Instrument
EPL	Environment Protection Licence
ESD	Ecologically Sustainable Development
FMA	Fisheries Management Act 1994
GAB	Great Artesian Basin
GHG	Greenhouse Gases

GLEP	Gwydir Local Environmental Plan 2013
HASP	Health and Safety Plan
H:V	Horizontal Units in Proportion to Vertical Units
IGAE	Intergovernmental Agreement on the Environment 1992
INP	Industrial Noise Policy
IPM	Integrated Pest Management
LEP	Local Environment Plan
LGA	Local Government Area
LLS	Local Land Service
LLSA	Local Land Services Act 2013
Ltd	Limited
MLA	Meat and Livestock Australia
NES	National Environmental Significance
NFAS	National Feedlot Accreditation Scheme
NLWRA	National Land and Water Resources Audit
NP&W Act	National Parks and Wildlife Act 1974
NENWRP	New England North West Regional Plan 2041
NSW	New South Wales
OEH	Office of Environment and Heritage DCCEEW NSW
OEMP	Operational Environmental Management Plan
OH&S	Occupational Health and Safety
OU	Odour Unit
PASS	Potential Acid Sulfate Soils
PFM	Planning Focus Meeting
PEAA	Protection of the Environment Administration Act 1991
PBP	Planning for Bush Fire Protection 2019
POEO Act	Protection of the Environment Operations Act 1997
POEO (clean air) Regulation	The Protection of the Environment Operations (Clean Air) Regulation 2021
POEO (Noise) Regulation	Protection of the Environment Operations (Noise Control) Regulation 2017
POEO (Waste) Regulation	Protection of the Environment Operations (Waste) Regulation 2014
Pty	Proprietary
QDAF	Queensland Department of Agriculture and Fisheries
REP	Regional Environmental Plan
RFA	Rural Fires Act 1997
RMRP	New England North West Regional Plan 2041
RMS	Roads and Maritime Services
SCU	Standard Cattle Unit
SFPP	Special Fire Protection Purposes
TAPM	The Air Pollution Model
TfNSW	Transport for New South Wales
WMGR	Water Management (General) Regulation 2018
WA	Wildlife Atlas
WAL	Water Access Licence
WNSW	Water New South Wales
WHSA	Work Health and Safety Act 2011
WSP	Water Sharing Plan

3. Glossary of terms

Aboriginal archaeological site (Aboriginal site)	A place where physical remains or modification of the natural environment indicate past and "traditional" activities by Aboriginal people. Site types include artefact scatters, isolated artefacts, burials, shell middens, scarred trees, quarries and contact site.
Aboriginal scarred tree	Scars are wounds on trees by the deliberate removal of bark or wood by Aborigines for the manufacture of containers, watercraft or shelters. A toehold tree or possum tree also falls under this category as it is a tree which has had small patches of bark chopped out to provide hand and foot holds for climbers after possums or vantage.
Aerobic	Associated with the presence of free oxygen.
Alluvium	Sediment deposited by a stream, consisting of unconsolidated material such as gravel, sand, silt and clay.
Ambient	Surrounding environment.
Anaerobic	A condition in which no free oxygen nitrates are present.
Annual Return	A statement of compliance with the licence conditions and reports the pollutant loads generated by the development.
Applicant	The entity making a formal application for consent of the proposed development. In the case of this EIS, Doolin Farming Pty Ltd is the applicant.
Aquifer	Geological formation, group of formations, or part of a formulation capable of transmitting and yielding significant quantities of water.
Artefact	An item of human manufacture normally applied only to the products of previous culture. Examples are bone or stone tools, engraving, paintings.
Atf	As Trustees for
AHD	The standard reference level used to express the relative elevation of various features. A height given in metres AHD is essentially the height above sea level.
Biochemical Oxygen Demand (BOD_5)	The decrease in oxygen content in mg/L of a sample of water in the dark at a certain temperature over a certain period of time, which is caused by the bacterial breakdown of organic matter. The oxygen demand is measured after 5 days (BOD_5) at which time 70% of the final value has usually been reached.
Biodiversity	First coined in 1988 as a contraction of biological diversity; traditionally referring to species richness and species abundance. Biodiversity has been defined subsequently as encompassing biological variety at genetic, species and ecosystem scales (DASETT 1992). The maintenance of biodiversity, at all levels, is acknowledged internationally as a high conservation priority, and is protected by the International Convention on Biological Diversity 1992.
Bunds	An earthwork or wall to contain and control spillages, normally associated with tank farms, fuelling and chemical storage facilities.
Burial Site	Usually a subsurface pit containing human remains and sometimes associated artefacts.
Catchment	The area in which water collects to form the supply of a river stream or drainage area.
Cation exchange capacity	The capacity of soil to hold and exchange cations.
Conservation	The management of natural resources in a way that will benefit both present and future generations.

Construction Environmental Management Plan	An element of an Environmental Management Plan that addresses the control, training and monitoring measures to be implemented during the construction phase of a project in order to avoid, minimise or ameliorate potentially adverse impacts identified during environmental assessments.
Contaminants	Polluting substances.
Contaminated Runoff	Any stormwater runoff that is generated from within the controlled drainage area of the complex.
Controlled Drainage Area	A dedicated catchment surrounding those parts of the feedlot complex from which stormwater runoff would constitute an environmental hazard if allowed to flow uncontrolled into the surrounding environment.
Cultural Heritage	Is the legacy of physical artefacts and intangible attributes of Aboriginal or non-Aboriginal society that are inherited from past generations, maintained in the present and bestowed for the benefit of future generations.
Cumulative effect	Refers to the accumulation of effects over time.
dB(A)	The most common measurement of environmental noise – measured using a simple sound level meter having an Aweighting filter to simulate the subjective response of the human ear.
Diversity	The abundance in numbers of species in a given location.
Designated Development	Development for which a development application is to be submitted to Council in conjunction with an Environmental Impact Statement (EIS).
Ecologically Sustainable Development	Development that aims to meet the needs of the present generation without compromising the ecological processes on which life depends for the benefit of future generations.
Ecosystem	An interdependent system of interacting plants, animals and other organisms together with the non-living (physical and chemical) components of their surroundings.
Effluent	Effluent means: (a) wastewater from sewage collection or treatment plants; or (b) wastewater from collection or treatment systems that are ancillary to processing industries involving livestock, agriculture, wood, paper or food, being wastewater that is conveyed from the place of generation by means of a pipe canal or other conventional method used in irrigation (but not by means of tanker or truck); or (c) wastewater from collection or treatment systems that are ancillary to intensive livestock, aquaculture or agricultural industries, being wastewater that is released by means of a pipe, canal or other conventional method used in irrigation as part of day-to-day farming operations.
Electrical Conductivity	A measure of the conduction of electricity through water or a water extract (1-part soil to 5 parts water) of soil. Used to determine the soluble salts content.
Emergency response	The reaction by emergency services such as Fire, Police, Ambulance, Rural Fire Brigades, etc, to an emergency.
Emission	The release of constituents into the atmosphere (e.g. gas, steam or noise).
Endangered species	Those plants and animal species likely to become extinct unless action is taken to remove or control the factors that threaten their survival.
Environment	The physical, biological, cultural, economic and social characteristics of an area, region or site.

Environmental Impact Assessment	The orderly and systematic evaluation of a proposal, including alternatives and objectives, and its effects on the environment, including the mitigation and management of those effects.
Environmental management	That part of the overall management system which includes organisational structure, planning activities, responsibilities, procedures, processes and resources for developing, implementing, achieving, reviewing and maintaining environmental policy.
Environment Protection Licence	A licence to undertake an activity listed on Schedule 1 of the Protection of Environment Operations Act 1997. In the case of a beef cattle feedlot, the licence would be issued by EPA.
Feed bunk	An open trough in which the feed ration is placed, and cattle eat from.
Feed road	Road used to access feed bunk.
Feedlot Class	There are four feedlot classes defined within the draft policy *Assessment and Management of Odour from Stationary Sources in NSW*: Class One: This represents the highest standard of design, operation, maintenance, pad management and cleaning frequency. Class Two: This is the generally accepted standard for a well-designed, constructed and maintained feedlot, which has a high standard of operation. This is the reference standard for all classes. Class Three: Well-designed, well-constructed and operated with higher standards than Class Four for pad preparation and maintenance and pen cleaning. Well removed from impact locations. Class Four: Generally, a small feedlot in an isolated situation with basic management and development standards, well separated from any residential situations and having fewer than 1000 head of cattle.
Geotechnical	Relating to the form, arrangement and structure of the geology.
Greenhouse Gas	Greenhouse gases include water vapour, carbon dioxide, methane, nitrous oxide, ozone and some artificial chemicals such as chlorofluorocarbons (CFCs).
Groundwater	Subsurface water contained within the saturated zone.
Habitat	The particular local environment occupied by an organism.
Hydrogeology	The study of subsurface water in its geological context.
Hydrology	Surface water and groundwater and their interaction with earth materials.
Impervious	A material that does not allow another substance to pass through or penetrate it.
Integrated Development	Development that requires development consent and one or more of the approvals listed within section 91 of the Environmental Planning and Assessment Act 1979.
Infiltration	The process of surface water soaking into the soil.
Intergenerational equity	A concept that says that humans 'hold the natural and cultural environment of the Earth in common both with other members of the present generation and with other generations, past and future' .
Integrated Pest Management	An ecosystem-based strategy that focuses on long-term prevention of pests or their damage through a combination of techniques such as biological control, habitat manipulation, modification of cultural practices, and use of chemical control agents.
Katabatic Drift	Katabatic drainage flow (or valley drainage flow) occurs under light winds and stable meteorological conditions. Air, as it cools at night, falls and tends to move downhill in areas of significant topographic relief. As this air moves it tends to create a bulk movement of air, which can cause winds to blow in areas influenced strongly by topography.

Liquid waste	Stormwater run-off from the controlled drainage area. Also referred to as effluent. Liquid waste is high in nutrients because it has been in contact with manure and has the potential to pollute surface water and groundwater. Liquid waste is valued as a source of nutrients for fertilising crops.
Manure	Manure is the solid waste produced by cattle. Manure is the faeces and urine excreted by the cattle.
Mitigation	Reduce the severity of impact.
National Feedlot Accreditation Scheme	An independently audited quality assurance scheme to develop a Quality System for beef feedlots that impacts positively on product quality and acceptability and for which the lot feeders maintain responsibility.
Native vegetation	Species of vegetation being either trees (including any sapling, shrub or scrub), understorey plants, groundcover (being any herbaceous vegetation) that existed before European settlement.
Operational Environmental Management Plan	The control, training and monitoring measures to be implemented during the operation phase of the development in order to avoid, minimise or ameliorate potentially adverse impacts (being socio-economic, cultural, physical, biological) identified during environmental assessments.
Particulates	These include any solid material suspended in the atmosphere.
Pathogen	An organism capable of eliciting disease symptoms in another organism.
Permeability	The property or capacity of a porous rock, sediment, clay or soil to transmit a fluid.
PM_{10}	Particulate matter less than 10µm in size, the respirable fraction.
Precautionary principle	The principle that if there are threats of serious or irreversible environmental damage, lack of scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.
Rating Background Level (RBL)	The RBL (L90) is defined as the overall single figure background level representing each assessment period (i.e. day/evening/night).
Recycling	The return of waste materials to the production system so that the need for raw materials is reduced.
Register of the National Estate	A list of the National Estate developed under the provisions of the Commonwealth's Australian Heritage Commission Act 1975. The Register of the National Estate now falls under the provisions of the Environment Protection and Biodiversity Conservation Act.
Rehabilitation	The process of restoring the land in a given area to some degree of its natural state, after some process (industry, natural disasters, etc.) has resulted in its damage.
Relic	Any item greater than 50 years of age.
Revegetation	The process of re-establishing a vegetative cover.
Riparian zone	The vegetated corridor along streams and rivers.
Risk	Likelihood of a specific undesirable event occurring within specified period or in specified circumstances. Listed as frequency or probability.
Risk assessment	A process used to determine whether people and the environment are at risk (e.g. health and safety) from exposure to hazardous substances used or produced (mainly in an industrial or work place) so that appropriate control measures or management practices can be introduced to prevent or minimise the risk.
Salinity	The concentration of water-soluble salts, mainly sodium, calcium and magnesium, which may be chlorides, sulphates or carbonates. Measured as conductivity in dS/m, or as dissolved solids in mg/L.
Sorption	General term for the interaction (binding or association) of a solute ion or molecule with a solid. E.g. Subsurface drain - A shallow drain installed in

	an irrigated field to intercept the rising ground-water level and maintain the water table at an acceptable depth below the land surface.
Sound Power Level	The amount of acoustic energy (per second) emitted by a noise source. Sound Power Level is expressed in decibels (dB) and cannot be directly measured.
Sound Pressure Level (SPL)	The "Noise Level", in decibels (dB), heard by our ears and/or measured with a sound level meter. The sound pressure level generally decreases with increasing distance from a source. Noise levels are often written as dB(A) rather than dB. The "A-weighting" is a correction applied to the measured noise signal to account for the ear's ability to hear sound differently at different frequencies.
Solid Waste	Special wastes (e.g. tyres), General solid (putrescible) (e.g. domestic litter and food waste, animal wastes), General solid (non-putrescible) (e.g. glass, paper, building demolition waste, concrete, sharps). Animal wastes produced within the feedlot include solids excreted by the cattle, solids that have settled from the stormwater runoff in the sedimentation basin, spoilt feed and composted mortalities. Manure is the predominant solid waste generated. Animal solid waste is valued as a source of nutrients for fertilising crops.
SCU	A Standard Cattle Unit is equivalent to an animal with a liveweight of 600kg.
Statutory authority	An authority set up as a requirement of legislation.
Sustainable use	Use of an organism, ecosystem or their renewable resource at a rate within its capacity for renewal.
The Air Pollution Model	TAPM is a three-dimensional meteorological and air pollution model (Hurley P, 2008).
Temperature inversion	An atmospheric state in which the air temperature increases with altitude.
Terrestrial	Of or pertaining to the land as distinct from the water.
Threatened species	Animals and plants that are in danger of extinction or may now be considered extinct but have been seen in the wild in the last 50 years.
Visibility	Measure of extent to which particular components of a project may be visible from surrounding areas.
Visual absorption capacity	An estimation of the capacity of the landscape to visually absorb a project without creating a significant change in visual character or producing a reduction in scenic quality.
Vulnerable species	A species which population is decreasing because of threatening processes, or its population has been seriously depleted and its protection is not secured, or its population, while abundant, is at risk because of threatening processes, or its population is low or localised or depends on limited habitat that is at risk because of threatening processes.
Wastewater	Water which is collected and transported to a treatment area. Wastewater normally includes water from both domestic and industrial use.
Wet-weather storage	A system for temporarily storing wastewater generated during periods when irrigation is not possible, such as during periods of wet-weather, or when evaporation is very low.
Wind climate	A description of the meteorological conditions created by the wind involving measurements of wind speed, direction and frequency of gusts for average, seasonal and annual conditions.

4. Executive summary

Background

Doolin Farming Pty Ltd own and operate a 10,000 ha mixed farming operation across properties at North Star some 27 km east of Yetman and 45 km south-southeast of Goondiwindi (QLD) in NSW.

Doolin Farming Pty Ltd primarily engage in dryland and irrigated cropping and beef production. Doolin Farming Pty Ltd produces wheat, barley, oats and chickpeas in winter and cotton and maize in summer under pivot irrigation systems and dryland sorghum cropping. Doolin Farming Pty Ltd also have onsite storage to accommodate almost the entire grain produced and operate a fleet of trucks to transport their grain.

Central to the beef production enterprise is the breeding, growing and lot feeding of quality cattle for the domestic market. Currently the beef supply chain includes breeding and fattening of beef cattle on land less suitable for dryland and irrigated cropping and grazing of stubble and lot feeding of cattle within a feedlot on the property “Springfield”.

“Springfield” comprises some 1,713 ha (~4,231 acres) and currently, a dryland and irrigated cropping business is undertaken on a large proportion of the property with extensive cattle breeding and grazing of beef cattle on the remaining land which is unsuitable for cropping and lot feeding. In the last few years, beef cattle bred on several adjoining properties have been walked into a grain-based feeding program on “Springfield” upon weaning. “Springfield” has built infrastructure such as a dwelling, machinery sheds, silos, cattle yards, feedlot etc to support the feeding program.

There has been a beef cattle feedlot on “Springfield” for over three years after approval was granted for a 999 head feedlot by the Gwydir Shire Council in 2021 (DA 31/2020). Under Schedule 3, Part 1 Item 27 of the *Environmental Planning and Assessment Regulation 2021*, as the capacity of the existing beef cattle development does not exceed 1000 head it is not a designated development and an environmental licence from NSW EPA is not required.

Doolin Farming Pty Ltd wish to expand the existing beef cattle feedlot from the current approved capacity of 999 head by gaining development approval for intensive livestock agriculture to operate as a 3,000 head beef cattle feedlot on the site.

“Springfield” is within the Gwydir Shire Council local government area and relevant environmental planning instrument is the *Gwydir Local Environmental Plan 2013* (GLEP).

Doolin Farming Pty Ltd have access to a secure and appropriately licensed water supply provided by groundwater from the NSW Great Artesian Basin Eastern recharge groundwater source for irrigation and stock intensive use on the subject land under access licence 90AL834721.

Regional Description

The subject land on which the development is proposed is located in northern New England North West region on the north western slopes of the Great Dividing Range west of the Northern Tablelands in north-central NSW, approximately 550 km north-northwest of Sydney and approximately 300 km south west of Brisbane (QLD) as shown in Figure 1. The area is part of the Brigalow Belt bioregion.

The northern New England North West includes the towns of Warialda, Boggabri, Mungindi, Narrabri, Moree and Wee Waa; and many villages.

The region is dominated by a persistently warm and dry climate and characterised by a distinct summer rainfall with severe thunderstorms a frequent occurrence and mild sunny winters. A great diurnal range in seasonal temperatures are experienced across the region, although in the north both summer and winter temperatures tend to be higher.

Principal rivers in the region are the Namoi and Gwydir Rivers and their major tributaries, the Pell, Manilla, Mooki, Horton and Mehi Rivers, which rise in the Great Dividing Range country to the east and flow generally in a westerly direction across the western plains to the Barwon River a tributary of the Darling River.

A variety of landscapes within the New England North West region supports a diverse range of agricultural industries. Dryland cropping, mixed farming and grazing systems support key agricultural enterprises such as broadacre cropping (cereal, oilseed and pulses), beef and sheep rangeland grazing, intensive cattle, pigs and poultry, and irrigation of pastures and maize for example. Consequently, agriculture is a vital part of the economy. Intensive animal production is considered a high value use of water.

Alternatives Sites Considered

The proposed development must be appropriately sited to ensure its economic viability and environmental sustainability.

The proposed development is the expansion of an existing beef cattle feedlot. The existing development site was assessed against various criteria, which included factors such as having an adequate area, compatible surrounding land uses, access to transport, access to a local workforce, separation from sensitive receptors and an available water and power supply.

Project Description

The proposed development is a 3,000 head beef cattle feedlot located on the property "Springfield", which is approximately 30 km west of Yetman and 12 km east of North Star in northern New South Wales. The proposed development would include the following components in a functional configuration:

- Water Supply/Storage & Reticulation – A reliable and uninterrupted supply of clean water of the required volume to sustain feedlot operations is required.

- Pens - Fenced areas are required for housing production cattle (production pens), cattle arriving to or being dispatched from the feedlot (induction/dispatch pens), and sick cattle (hospital pens). Shade structures over the pen area shall also be constructed.
- Livestock handling – Infrastructure and facilities are required for the arrival, processing and dispatch of cattle.
- Feed processing and commodity storage - Feed rations are prepared on-site in a facility, with associated commodity storage, handling and ration delivery infrastructure.
- Access and internal roads - Access to the site and the layout of internal road systems are critical to the efficient and safe functioning of the feedlot.
- Administrative/Maintenance infrastructure - Facilities are required for conducting management, maintenance and administrative functions at the feedlot. This includes office, machinery workshop and associated facilities, for example.
- Controlled drainage area - Stormwater runoff from areas such as pens, livestock handling areas has a high organic matter and therefore a high pollution potential. This runoff is controlled within a system that collects and conveys this runoff to a sedimentation basin and holding pond prior to environmentally acceptable utilisation.
- Drainage system - The controlled drainage area contains a system including catch drains, sedimentation system and holding pond for conveying stormwater, allow entrained sediment to ‘settle out’ and capture and storage of the stormwater from the controlled drainage area until it can be sustainably utilised.
- Solid and liquid waste management areas – Solids wastes such as manure, mortalities and sludge (from the holding pond) are temporarily stockpiled and processed within the solid waste storage area prior to utilisation on-site or removed off-site. Effluent is stored in the holding pond pending application to the effluent utilisation area.
- Effluent and solid waste utilisation areas – Solid wastes generated are applied to an on-site utilisation area. Any solid wastes not utilised on-site are removed off-site. Effluent is shandied with clean water and applied to land via irrigation within a dedicated effluent utilisation area.

Construction

The construction phase shall commence after development consent and any other relevant permits are obtained and detailed design and component specifications have been completed.

The construction of the proposed development would consist of the following activities:

- Area set out;
- Implementation of erosion and sediment control measures;
- Construction of new site entrance and access road;
- Clearance of vegetation in the development complex area;
- Cut and fill bulk earthworks to design levels for pens, drainage system, sedimentation basin and holding pond;
- Construction of pen infrastructure such as feed bunks, aprons, water troughs, fencing and shade structures;
- Construction of roads; and

- Construction of cattle handling, feed processing, administrative infrastructure and buildings.

The subject land currently has existing service infrastructure in the form of electricity, water and communications. The proposed development does not require extension of these services.

Construction would be undertaken over a period of approximately 6 months depending on weather conditions. All traffic associated with construction would utilise Getta Getta Road.

Operation

The proposed development has been designed to accommodate about 3,000 head of beef cattle at a stocking density of 17.9 m^2/head.

The majority of cattle would be steers of *Bos Taurus or Bos Taurus cross* genotypes. Breed composition is expected to change with time as market signals develop.

The proximity of the proposed development to the New England grazing district leaves it well positioned for livestock procurement. It is expected that cattle would be sourced locally as far as possible from areas such as the northern NSW (northern and central tablelands, Dumaresq Valley, western slopes etc.) and southern Queensland (Darling Downs, Granite Belt, Goondiwindi). A proportion of cattle shall be bred on properties owned and operated by Doolin Farming Pty Ltd.

Cattle would be transported to the proposed development at about the entry weight of the target market. The cattle would be fed a ration specific to that market type until they reach the exit weight of the respective market when they would be transported from the site to an abattoir in Inverell for processing.

Typically, cattle would enter the feedlot at around 9 to 12 months of age and an average of some 300-400 kg liveweight. The cattle would be fed for approximately 70 to 300 days to achieve an average of 455 to 750 kg liveweight.

Rations are prepared on-site in a dedicated facility, with associated commodity storage, handling and ration delivery infrastructure.

The ration contains grain, roughage (fibre), and minerals. Roughage is essential in the diet to enable normal rumen activity, and shall be provided by silage, hay or straw commodities. Commercial mineral/vitamin premixes shall be added to the ration. These may contain calcium, urea, sulphur, salt and various trace minerals and vitamins (or just the trace minerals and vitamins) required for achieving satisfactory growth rates.

The proximity of the proposed development to the northern NSW wheat belt and Southern QLD grain producing region leaves it well positioned for grain and commodities procurement.

The majority of grain and hay/straw for the feedlot would be transported from the local region to the site from sites located within the northern New South Wales and Southern Queensland.

A variable proportion of the annual grain requirement (~7,000t) may be produced on the subject land within the effluent and/or solid waste utilisation areas depending on seasonal conditions.

All silage would be produced on the subject property within the effluent utilisation areas or on adjoining irrigated cropping properties owned by Doolin Farming Pty Ltd or related entities.

The proposed development would be designed, constructed and maintained as a Class One standard, the highest standards of design, construction and management.

Approvals

Local Planning Matters

The primary local planning instrument applying to the proposed development is the Gwydir Local Environmental Plan 2013 (GLEP). Use of land for a beef cattle feedlot according to the GLEP is defined as "Intensive Livestock Agriculture" and is only permitted with consent. The proposed development is located in the Rural Zone - RU1 Primary Production under GLEP 2013. Intensive Livestock keeping establishments are permissible with consent in the RU1-Primary Production zone.

The proposed development falls within the definition of "Intensive Livestock Agriculture". The proposed development meets the objectives associated with this definition and the LEP zoning.

State Planning Matters

State Environmental Planning Policies can specify planning controls for certain areas and/or types of development. They can also identify the development assessment system that applies and the type of environmental assessment that is required. State Environmental Planning Policies which apply to this property include:

- State Environmental Planning Policy (Biodiversity and Conservation) 2021:
- State Environmental Planning Policy (Exempt and Complying Development Codes) 2008
- State Environmental Planning Policy (Housing) 2021
- State Environmental Planning Policy (Industry and Employment) 2021
- State Environmental Planning Policy (Planning Systems) 2021
- State Environmental Planning Policy (Primary Production) 2021
- State Environmental Planning Policy (Resilience and Hazards) 2021
- State Environmental Planning Policy (Resources and Energy) 2021
- State Environmental Planning Policy (Sustainable Buildings) 2022
- State Environmental Planning Policy (Transport and Infrastructure) 2021

The proposed development comprises a beef cattle feedlot with a capacity of 3,000 head. Hence, in accordance with Schedule 4 Part 3 SEPP (Primary Production) 2021, this EIS accompanies a development application made to Gwydir Shire Council seeking development consent for the establishment and operation of the cattle feedlot. This EIS addresses the policy aims of State Environmental Planning Policy (Primary Production) 2021.

This EIS has been prepared in accordance with the requirements of the EP&A Act and Regulation and provides a detailed description and environmental assessment of the proposed beef cattle feedlot including potential impacts in terms of odour, surface and groundwater and soils and recommends mitigation and management measures to minimise potential adverse impacts.

State Legislation

Protection of the Environment Operations Act 1997 (POEO Act): Under section 48 of the POEO Act, the proposed development requires an Environment Protection Licence (EPL) as it is a scheduled activity.

Roads Act 1993: The proposed development involves the establishment of a new subject land entrance and private access road to an unclassified local road being Getta Getta Road. The proponent has consulted with Transport for New South Wales (TfNSW) for consideration against the State Environmental Planning Policy (Transport and Infrastructure) 2021.

Biodiversity Conservation Act 2016: The proposed development involve the clearing of native vegetation.

The *Biodiversity Conservation Act 2016* provides a framework for providing a healthy, productive and resilient environment for the greatest well-being of the community. In particular to conserve biodiversity and to maintain the diversity and quality of ecosystems and enhance their capacity to adapt to change and provide for the needs of future generations, and to support biodiversity conservation in the context of a changing climate.

Water Management Act 2000: The object of the *Water Management Act 2000* is the sustainable and integrated management of the state's water for the benefit of both present and future generations and is based on the concept of ecologically sustainable development.

The concept of ecologically sustainable development has been considered throughout the planning and design phases of the proposed development. Beef cattle feedlots require a secure and reliable supply of water and of sufficient quality to operate.

The proposed development is located within the Water Sharing Plan for the Gwydir Regulated River Water Source 2016. The subject property ("Springfield") already benefits a ground water allocation from the Eastern Recharge Groundwater Source of 1,558 unit shares. Pursuant to Clause 32 of the Water Management (General) Regulation 2018 and section 91A (1) of the Water Management Act 2000, when development consent is granted for the proposed development, it shall be permissible to use existing surface water entitlements or part thereof for stock intensive use within the proposed development.

The proposed development is also located within the Water Sharing Plan for the NSW Border Rivers Unregulated and Alluvial Water Sources 2016 area. The Lower Border Rivers subregion (Croppa Creek and Whalan Creek water source) represents the alluvial riverine floodplain at the western end of the catchment. Large scale irrigation enterprises are common in this area, which utilise unregulated river flows, regulated water releases from the upstream dams and also groundwater sources. Irrigated agriculture accounts for 23 per cent of the gross value of agricultural production in the lower border rivers sub-region. The predominant enterprise is cotton, along with cereals for grain and seed, and hay (DPI, 2016). The development will not utilise any surface waters in the operation of the activity.

Statutory and non-statutory authority consultation

Throughout the planning and EIS preparation process, there has been extensive consultation with various local government and state government agencies. These include:

- Department of Planning and Environment (NSW DPE);
- Gwydir Shire Council (GSC);
- NSW Department of Primary Industries – Agriculture;
- NSW Environmental Protection Authority;
- Transport for NSW;
- WaterNSW;
- NSW Rural Bushfire Service; and
- Toomelah LALC.

Community Consultation

Consultation was also undertaken with the local community who may be impacted by the proposed development. The overall objective of the community consultation program was to inform the community about the proposed development and to ensure clear, transparent, two-way communication by listening, recording and responding to the issues as they arose.

A letter with accompanying proposed development information was distributed to residents living within 5 km of the subject land. The community was encouraged through the letter to make submissions on the proposed development and several took up the opportunity to comment. However, no responses from the community were received.

Issues Identification

Identification of the environmental issues relevant to the proposed development involved a combination of background investigation, research, and consultation. The key issues arising from the consultation process and priority rating are outlined in the table below.

Issue	Sub-Issue	Rating
Air Quality	Odour	High
	Dust	Medium
	GHG	Low
Soils		Medium
Water	Groundwater	Medium
	Surface	Medium
Flooding, Stormwater and Coastal Erosion		Low
Cultural Heritage		Low
Biodiversity		Low
Protected and conservation areas		Low
Waste Generation		Low
Land Capability		Medium
Traffic and Transport		Medium
Noise and Vibration		Low
Visual Amenity		Low
Pest animals and Weeds		Low
Hazards and Risk		Low
Land Use		Low

The issues listed in the above table have been addressed within this EIS and are summarised below.

Environmental issues and assessment of impacts

Air quality

Odour

Odour emissions generated from the proposed development complex are expected to be the primary impact to air quality as a result of the proposed development. An odour impact assessment was undertaken to determine the likely odour impacts to receptors in the local area.

The proposed development has been sited to provide adequate separation distances between the odour and dust generating sources and sensitive receivers.

It is concluded that sufficient separation exists between the proposed development complex and sensitive receptors to limit any adverse impacts and unreasonable interference with the amenity of neighbours as a result of odour.

Dust

The proposed development site is located in a rural area. Air quality in the local area would be considered to be of good quality and is unlikely to be influenced by dust emissions from current agricultural activities (irrigated and dryland cropping, beef cattle grazing).

The introduction of a development such as a beef cattle feedlot in areas previously bereft of intensive livestock facilities would have the potential to reduce local air quality from dust emissions.

Dust emissions from the proposed development are unlikely to cause impacts unless receptors are located nearby. The distance emissions generally disperse from the source depend on topographic and climatic factors.

Subsequently, as the separation distance is suitable to mitigate against odour impacts, dust impacts are also not expected by default.

Greenhouses gases

GHG Emissions from the proposed development can be broken into three sources; direct methane emissions to the atmosphere (enteric methane) from the livestock themselves, methane and nitrous oxide emissions resulting from the breakdown of organic matter during solid/liquid waste storage, treatment and handling and utilisation and those resulting from the use of fossil fuels for energy usage.

Potential impacts to air quality from GHG emissions were considered based on the type of infrastructure proposed, construction techniques and machinery to be utilised and management techniques to be employed.

GHG emissions from the proposed development are unlikely to cause impacts due to productivity improvements over extensively grazed systems and the mitigation and management measures proposed.

Soils

A geotechnical assessment of the soils within the vicinity of the proposed development complex site was undertaken. The geotechnical assessment identified that the soils are low plasticity, silty medium to heavy clays soils with no dispersion and low shrinkage potential.

Based on recommended suitability criteria from National and QLD state feedlot guidelines, these soils have engineering properties (with the exception of dispersion) that are well suited to the construction and operation of a beef cattle feedlot.

Further, appropriate design and construction measures are proposed to mitigate the high degree of dispersion to ensure that any potential risks to the environment, in particular groundwater are mitigated.

It is concluded that provided appropriate design and construction measures are implemented, the in-situ soils within the proposed development complex area are suitable for the design and construction of the relevant infrastructure, such as roads, pen foundations, water retaining structures (drains, sedimentation basin, holding dams), building footings, compacted earthworks, excavations etc.

The proposed development complex is located at an elevation between 310 m to 320 m AHD. Therefore, as the subject land is not located in a coastal lowlands region (<10m AHD), it is therefore very unlikely that ASS would be found on the subject land or within the proposed development complex site.

Water

Groundwater

Activities associated with the construction and operation of the proposed development have the potential to generate impacts to groundwater.

Various mitigation measures have been adopted in the design and siting of the proposed development to prevent or minimise adverse impacts to groundwater. Various mitigation measures shall be implemented to prevent or minimise adverse impacts to groundwater during construction and operation of the proposed development such as:

- Areas within the controlled drainage area where the permeability of underlying soil/rock strata exceeds the design permeability, a clay lining to prevent soil leachate movement shall be engineered to the design permeability by mixing and compacting on-site material;
- Solid waste stockpiles established within controlled drainage area to prevent contaminated leachate into groundwater resources;
- Clean water runoff external to the controlled drainage area shall be diverted away from the controlled drainage area;
- Effluent and solid waste utilisation areas are sited and designed to enable the sustainable use of liquid waste and any solid waste that is utilised on-site; and
- Development and implementation of emergency and contingency plans within the IMP detailing methods to manage spills or other emergencies on site, such as pipe breakages, pond overflows, pump failures etc.

The subject land has regulated groundwater entitlements of 1,558 unit shares in the Eastern Recharge Groundwater Source. Pursuant to Clause 32 of the Water Management (General) Regulation 2018 and section 91A (1) of the Water Management Act 2000, when Development Consent is granted for the proposed development, it shall be permissible to use existing groundwater entitlements or part thereof for stock intensive use within the proposed development. Therefore, no additional groundwater entitlement is required.

Due to the design, siting and mitigation measures proposed and depth to groundwater (60-70m), no adverse impacts to groundwater quantity or quality are predicted as a result of the proposed development.

Surface water

Activities associated with the construction and operation of the proposed development have the potential to generate impacts to surface waters.

Various mitigation measures have been adopted in the design and siting of the proposed development to prevent or minimise adverse impacts to surface waters. Various mitigation measures shall be implemented to prevent or minimise adverse impacts to surface waters during construction and operation of the proposed development such as:

- The proposed development complex is sited above the height of a 100-year average recurrence interval (Q_{100}) flood level;
- Site selection considered the natural attributes and general suitability of the site for draining and capturing runoff from the proposed development;
- Any soils proposed to be exposed during construction shall be assessed for the potential to be acid sulfate soils prior to disturbance;
- Access roads sited on flood prone does not impact the hydrology of the area;
- A controlled drainage area designed to an acceptable hydrological standard that prevents unauthorised discharges of runoff from areas such as pens, livestock handling, solid waste storage and processing area and silage storage area which have high organic matter and therefore a high pollution potential;
- Effluent and solid waste utilisation areas are designed to enable the sustainable use of effluent and any solid waste that is utilised on-site;
- Any facilities to store hazardous materials (e.g. fuel) are designed to meet relevant guidelines and Australian Standards for the storage of hazardous and dangerous goods and spill management;
- A holding pond is designed to store runoff from the controlled drainage area without spilling or overtopping at an unacceptable frequency; and
- Existing riparian areas to the drainage lines shall be retained and buffers to drainage lines implemented, thus minimising adverse impacts to preserving stream bank stability.

Due to the design, siting and mitigation measures proposed, no adverse impacts to surface water quantity or quality are predicted as a result of the proposed development.

Flooding, stormwater and coastal erosion

The proposed development has the potential to generate impacts to the receiving environment from stormwater along with implications of flooding.

Various mitigation measures have been adopted in the design, siting, construction and operation of the proposed development to prevent or minimise these potential impacts such as:

- The proposed development complex is sited above the level of a 100-year average recurrence interval (Q_{100}) flood (1% AEP) level;
- A controlled drainage area designed to an acceptable hydrological standard that prevents unauthorised discharges of runoff from areas such as pens, livestock handling, solid waste storage and processing area which have high organic matter and therefore a high pollution potential.
- Effluent and solid waste utilisation areas are sited so that they do not pose an unacceptable risk to surface water quality as a result of flood events.

- Effluent and solid waste utilisation areas are designed to enable the sustainable use of liquid waste and any solid waste that is utilised on-site.
- Preparation and implementation of a construction Erosion and Sediment Control plan prior to commencement of construction activities.
- Separation of 'clean water' and 'dirty water' during construction and operation with diversion banks and/or other relevant control structures diverting 'clean water' from undisturbed areas around disturbed areas.
- A holding pond is designed to store runoff from the controlled drainage area without spilling or overtopping at an unacceptable frequency.
- There are no aspects of the proposed development such as infrastructure on floodplains that shall adversely impact flood behaviour or increase risk to life from flood.

The flood impact assessment has demonstrated that the proposed development complex site is not inundated by a 1 in 100 year ARI event from the unnamed tributary of Back Creek and Back Creek.

Due to the design, siting and mitigation measures proposed, no adverse impacts to the receiving environment from stormwater and no implications as a consequence of flooding.

Heritage

A heritage assessment was undertaken to identify any Aboriginal and non-aboriginal cultural heritage issues associated with the proposed development, an assessment of the potential impacts to Aboriginal and non-aboriginal cultural heritage as a result of the proposed development, and development of recommendations to minimise, manage and mitigate these potential impacts. This included proposed road upgrades. The assessment followed a due diligence process in accordance with relevant OEH guidelines.

The level of human impact, through land disturbance (land clearing, timber harvesting, grazing, cultivation etc.) has substantially affected the most culturally sensitive areas on the subject property on which solid and liquid waste utilisation areas are proposed. Subsequently, it seems highly unlikely that evidence of previous occupation by Aboriginal people remains within these areas. Construction activities associated with the proposed development shall be undertaken with caution and include a *Chance Find* procedure.

Subsequently, the proposed development would not impact on any Aboriginal heritage sites, objects or places, or areas of archaeological potential or Aboriginal sensitivity.

Prior to any construction activities, all contractors on site shall be advised of the potential for scarred trees, stone artefacts, buried archaeological deposits-specifically burials, and the protocols that should be undertaken in the unlikely event that objects or items of Aboriginal heritage are encountered.

The non-Aboriginal Heritage Assessment and site assessment identified no non-Aboriginal sites on the land on which the development is proposed development. Therefore, it is considered that the proposed development would not impact on the non-aboriginal heritage fabric of the land on which the development is proposed.

Biodiversity

The biodiversity assessment of potential biodiversity impacts from the proposed development was undertaken. The test of significance takes into account other relevant Commonwealth and NSW legislation and environmental planning instruments.

The subject land is not in a declared area of outstanding biodiversity value, the proposed development area is not mapped as *Vulnerable or Sensitive Regulated Land* according to the Section 60F of the *Local Land Services Act 2013*, and is also not mapped as an area of Biodiversity Value, and a BDAR is not triggered on the basis of this mechanism.

As clearing of a small amount of native vegetation is proposed, a BDAR is triggered on the basis of this mechanism.

After likelihood assessment, given the highly disturbed and modified condition of the proposed development area and the poor landscape connectivity of the site, it is considered that none of the threatened flora and fauna species were likely to utilise the proposed development complex area.

The BDAR identified matters which are relevant to the assessment of impacts to threatened species, populations and ecological communities including direct and indirect impacts. The proposed development would require the clearing of about 0.21 ha of PCT 429 White Cypress Pine - Poplar Box - Silver-leaved Ironbark viney shrub woodland of the Brigalow Belt South Bioregion.

As there would be residual impacts on native vegetation as a result of the proposed development, the BAM and online BAM tool were used to calculate the quantum of offsetting requirements for the proposed development. A total of 3 ecosystem credits need to be retired.

The assessments of significance concluded no threatened species would be significantly affected by the proposal. A Species Impact Statement and/or Referral to the Federal Minister for the Department of Climate Change, Energy, the Environment and Water (DCCEEW) is not required.

State Significant Agricultural Land

A map of SSAL is an essential component of agricultural land use planning, enabling clearer local planning with informed prioritisation of future land uses.

The SSAL mapping has identified that the proposed existing and proposed development complex and waste utilisation areas are mapped as SSAL.

Protected and conservation areas

The likely impacts (both indirect and indirect) on any nearby protected areas and conservation areas were assessed.

The proposed development complex shall be sited some 18 km from the closest conservation area.

Further, the operation of the proposed development will generate effluent and solid waste which can be wholly or partly sustainably utilised on the subject land.

It is expected that, with the implementation of the outlined mitigation measures, the proposed development would not create significant impacts to adjacent or nearby conservation areas.

Waste Generation

The proposed development will involve the generation of various types of waste streams such as:

- Special (e.g. tyres)
- General solid (putrescible) (e.g. general litter, domestic food waste, animal wastes)
- General solid (non-putrescible) (e.g. glass, paper, building demolition waste, concrete)
- Liquid (e.g. oil, fuels, animal wastes, effluent)
- Hazardous (e.g. lead-acid batteries).

A majority of these wastes shall be generated in small quantities. However, the operation of the proposed development shall significant levels of effluent and organic solid waste which can be wholly or partly sustainably utilised on the subject land.

Impacts from waste generation have been considered throughout the design process and various management and mitigation measures shall be implemented during the construction and operation stages of the proposed development to minimise impacts from waste generation such as:

- All wastes as far as reasonably practicable managed in a manner which reduces adverse impact to the environment based on the hierarchy of waste materials management (elimination, reduction, reuse or recycling and treatment and disposal);

- All waste to be transported off-site shall be assessed to determine whether the waste requires tracking under the Protection of the Environment Operations (Waste) Regulation 2014;
- No burying of solid waste relating to the construction and/or operation of the proposed development is to be conducted on the subject land with the exception of mass deaths of beef cattle in such an event;
- All waste that cannot be sustainable utilised on the subject land shall be removed from the subject property by an operator licensed to remove that waste removal and transported to a suitably licensed disposal site;
- Wastes will be stored appropriately for its type. Different waste types will not be mixed to increase the potential for re-use or recycling of waste. Separate waste storage areas will be designated;
- Records or a material register shall be retained detailing the quantity, classification method of transport of waste material removed from the site. The register will record the waste type, quantity, classification, contractor, licence details and details of the licensed receiving facility; and
- Any excavated material that is known or are suspected to comprise ASM, shall be managed in accordance with relevant NSW ASM guidelines.

It is expected that, with the implementation of the outlined mitigation measures, the proposed development would not create significant impacts to the environment from waste generation.

Land Capability

The proposed development would produce effluent and solid waste during its operation and would require licensing approvals for utilisation of liquid and solid waste on land. An Environment Protection Licence (EPL) would be required from the Environmental Protection Authority (EPA).

The characteristics of the soils in the proposed effluent and solid waste utilisation areas are well suited for waste application as they are suitable for irrigated and dryland cropping, have moderate to high water holding capacity, not prone to waterlogging within the root zone, can withstand cultivation without incurring significant erosion and are deep and well drained.

The proposed development and associated effluent and solid waste utilisation areas have been sited and designed to minimise any adverse impacts to groundwater and surface waters. Various mitigation measures include riparian buffers and sustainable utilisation of applied nutrients.

The proposed development incorporates on-site utilisation of effluent from the holding pond to land via irrigation. Therefore, a land capability assessment was undertaken to ensure that the utilisation system is sustainable over the long-term. The assessment methodology incorporated a water and nutrient balance approach using the daily time-step model MEDLI.

The assessment determined that a holding pond with a minimum size of 20.0 ML is required to ensure that that overtopping events occur no more frequently than one in 10 years.

The assessment investigated the soil characteristics and concluded that the soil is capable of absorbing the level of salts and nutrients contained within the liquid waste. The assessment also confirmed the size of the irrigation area (approximately 120 ha) is adequate to sustainably irrigate the effluent.

Overall, the assessment concluded that there is sufficient land available with characteristics suitable for the sustainable application of all the liquid and the majority of solid waste and that a minimum holding pond capacity of 20.0 ML is required to ensure that overtopping of the holding pond occurs at an acceptable frequency.

Traffic and Transport

Increased traffic can create concerns around road maintenance; road safety; and noise and dust. The proposed development requires the transport of equipment to the site for construction activities, transport of cattle to and from the site, transport of feed commodities to the site and transport of staff, suppliers, representatives and service contractors during operation.

The construction and operation of the proposed development would involve additional traffic movements on the local road network but these can be accommodated by the existing road geometry.

The subject land is situated along Getta Getta Road, which currently experiences little traffic movements but of a similar nature to the traffic associated with the proposed development.

The primary haulage route shall be Getta Getta Road onto North Star Road onto Warialda Road.

The sight distances of the proposed development entrance were deemed to be safe and acceptable in accordance with Austroad standards.

The various receival areas (livestock/feedstuffs), access road and entrance would be able to accommodate Type 1 road train vehicles as well as employee light vehicles. The proposed development provides sufficient car parking facilities for employees.

The expected traffic generated by the proposed development, both light and heavy vehicles is not expected to have adverse impacts on the surrounding local road network with respect to road safety and performance.

Noise and Vibration

Activities associated with the construction and operation of the proposed development has the potential to generate noise impacts. Traffic noise on Getta Getta Road would also be generated from the light vehicle traffic movements associated with the operational phase.

There are several residential (sensitive) receptors in the vicinity of the noise sources of the proposed development. The nearest residential receptor is located approximately 1,275 m away from the proposed development complex.

Subsequently, due to the large separation distances from the proposed development complex and sensitive receptors, the topography and landform and lack of certain vibration generating activities (blasting, jack-hammering, piling), it is predicted that no receptor shall be potentially impacted by vibration as a result of the construction and/or operation of the proposed development.

Construction and operation traffic associated with earthworks and livestock and feedstuffs to and from the development has the potential to result in vibration impacts at residential dwellings adjacent to Getta Getta Road. All construction traffic must use Getta Getta Road and then N Star Road for north south access, Croppa Creek Road for southern access and I B Bore Road for access to the Newell Highway to the west from North Star village.

No adverse noise impacts are expected at the closest sensitive receptors during the noisiest construction activity, which is bulk earthworks. Further, the activities generating these noise impacts would be temporary in nature and predicted noise levels from these activities meet the NSW DEHP Interim Construction Noise Guideline.

Operational activities involve noise generating equipment such as feed storage and processing equipment (electric motors, conveyors, roller mills) and mobile plant (feed trucks, tractors, front-end loaders etc) on-site. Due to the significant distance to the nearest sensitive receptor and as the operational activities of the proposed development are consistent with the activities of the existing agricultural activities of the surrounding area, the noise generated from the proposed development is not expected to create a significant impact on the surrounding environment.

As there will be no variation in vehicle types and relatively low increase in traffic volumes using the existing road corridor compared to the volumes currently utilising the Getta Getta Road, any local receptors on the route will not experience a significant increase in total traffic noise above that set out in the NSW Road Noise Policy.

Visual

The landscape surrounding the subject land on which the development is proposed is gently undulating.

There are sensitive receptors on neighbouring land parcels comprising single rural dwellings. The closest residential sensitive receptors are located some 1,275 m west and 1,625 m west from the proposed development complex. Other receptors are over 2,300 m away. Due to the undulating topography and setback, no residential sensitive receptor has direct close views to the proposed development complex.

The proposed development complex is setback some 150m from Getta Getta Road and a vegetative buffer has been established to screen the proposed development from road users.

As a result, the viewpoint assessment indicated that there was expected to be no visual impact from the proposed development apart from travellers along Getta Getta Road. However, visual impacts for users along these roads will be temporary.

The assessment deemed that the nature of the proposed development would be consistent with the existing agricultural activities in the surrounding area although on a larger scale. It is considered that the proposed development would assimilate into the local landscape due to the nature of the development and the high visual absorption capacity of the surrounding landscape.

Overall, it is expected that the proposed development would not create any visual impacts to receivers in the surrounding area.

Pest Animal and Weeds

Pest animals and weeds are a constant risk for the primary producers, as they can have a serious impact on agricultural production and market access.

Pest animals can be defined as native or introduced, wild or feral, non-human species of animal that is currently troublesome locally, or over a wide area, to one or more persons, either by being a health hazard, a general nuisance, or by destroying food, fibre, or natural resources.

An integrated approach to weed and pest animal management shall be implemented based around the important elements of weed hygiene, operational hygiene, prevention of infestations, arresting weed outbreaks using effective reporting and physical or chemical control procedures, documenting weed and pest animal infestations and auditing management programs.

In summary, the proposed development is not expected to impact the surrounding environment including soils, waterways or loss of biodiversity from the introduction and/or spread of pest animals and/or weeds provided the proposed mitigation measures are implemented.

Hazards and Risk

There are potential risks to human health and safety, potential risks to animal health and potential risks to the biophysical environment associated with the construction and operation of the proposed development.

The main human risk is the potential for contracting a zoonootic disease (such as Q-fever and Leptospirosis) which may be acquired by workers coming into contact with airborne particles created from tissue, waste and dust from infected animals.

The preparation and implementation of a Health and Safety Management Plan for the operational activities at the proposed development would manage the risks for employees such as general safety for working with machinery and cattle, including methods of managing the potential to acquire a zoonootic disease.

The proposed development also has the potential to impact upon the health of the animals through injury, infections and/or heat stress created from the climatic conditions. Mismanagement of the proposed development would also adversely impact upon the welfare of the animals and thus their productivity.

The proposed development would seek NFAS accreditation once operational. NFAS accreditation incorporates third-party audits of management measures aimed at preserving the welfare of the animals.

The biophysical environment would also be potentially impacted by the proposed development, in particular odour, liquid and solid wastes. However, various management and mitigation measures have been proposed to minimise adverse impacts to these biophysical elements.

In summary, the proposed development is not expected to create significant hazards or risks to humans, animals or the biophysical environment provided the management and mitigation measures proposed are implemented.

Land Use

Rural land uses dominate the surrounding area and include land used for beef cattle and sheep grazing and irrigated and dryland. The area is also scattered with infrastructure that supports these activities such as sheds, livestock handling facilities, shearing sheds and rural residences.

The operation of the proposed development would intensify the agricultural activities on the site, with some 3,000 head of cattle to be located within the proposed development at one time.

The construction of the proposed development complex and elements such as access roads, production pens, cattle handling and feed storage and processing infrastructure, sedimentation basin and holding pond and associated buildings is not expected to adverse impact surrounding land uses. There is the potential for dust and noise to be generated during construction, however potential impacts to air quality and implementation of prescribed mitigation measures shall ensure that sensitive receivers, would not be adversely impacted from the construction activities.

Noise, odour and traffic have the potential to affect surrounding land users. Measures would be implemented to minimise noise and odour and increases in traffic are not expected to significantly affect receivers.

The proposed development would not require water in addition to that already permitted by entitlements held in accordance with the Eastern Recharge Groundwater Source.

It is considered that the proposed development is consistent with the surrounding land uses of the area. The construction and operation of the proposed development is not expected to create significant impacts to the surrounding land uses. The implementation of management measures to mitigate air quality, noise, biodiversity, pest animals and weeds would minimise the potential for the proposed development to adversely affect the surrounding environment.

Bushfire and Incidents

The proposed development area is located within bushfire prone land, including surrounding the development complex area where habitable buildings would be constructed as confirmed by a search of the online bush fire prone land mapping tool. Buildings in the development complex area are be designed and constructed to protect human life and reduce the impact from a bushfire.

Management measures such as separation distances, fire suppression systems etc are proposed to prevent a fire or explosion in the development complex area igniting a bushfire. The impact of an existing bushfire shall be mitigated through the provision of appropriately sized protection zones for habitable assets, fire protection systems and emergency and incident management procedures.

Therefore, the risks associated with the proposed development being damaged by, igniting or contributing to the severity of a bushfire are expected to be appropriately managed.

At this preliminary design stage of the proposed development, potential incidents and adequate precautions have been identified to manage and resolve incidents and for emergency response. Ongoing design processes would further consider these issues and any conditions of approval would need to be achieved before construction could commence.

The recommended mitigation measures would reduce hazards and risk from bushfires and incidents during construction and operation of the proposed development.

Cumulative Impact

There are no existing or proposed intensive livestock developments in the locality surrounding the subject land on which the development is proposed.

Subsequently, there are no cumulative impacts of the proposed development with other developments currently operating or proposed.

Commitments

Doolin Farming Pty Ltd commit to conducting activities associated with the construction and operation of the proposed development in an environmentally responsible manner; and aim to implement best practice environmental management as part of a program of continuous improvement. This will be achieved by addressing issues systematically, consistent with an environmental management strategy (EMS).

Environmental management during the proposed development would be in accordance with an environmental management strategy (EMS). The EMS would contain a suite of environmental management plans which detail the site specific management measures and procedures to be implemented during construction and operation of the proposed development, as specified in this EIS, for mitigating and managing impacts including noise, air quality, biodiversity, heritage, water resources, land resources, traffic, social, hazards and risks, bushfire and visual.

The EMS would be developed to be consistent with the conditions of the proposed development, Development Consent and other planning approvals, should they be granted. A Construction Environmental Management Plan (CEMP) and an Operational Environmental Management Plan (OEMP) would form an integral part of the EMS.

Project justification

The assessment of the proposed development undertaken in the development of this EIS has incorporated biophysical, economic and social considerations. The potential biophysical impacts associated with the proposed development include examination of the following impacts:

- Air quality
- Biodiversity and habitat
- Landform and soils (primarily for suitability for waste utilisation and protection of groundwater)
- Groundwater and surface water quantity and quality.

The assessment of the impact of the proposed development on each of the biophysical elements of the environment has concluded that providing management measures and monitoring systems are implemented to mitigate potential impacts, the proposed development would not have a significant impact and is therefore justifiable on environmental grounds.

The economic impact assessment demonstrates that the proposed development would provide both direct and indirect economic benefits to the local and regional economies. Given these benefits, the proposed development is justifiable on economic grounds.

The potential social impacts of the proposed development include consideration of the following key issues:

- Odour;
- Dust;
- Traffic and Transport;
- Noise;
- Amenity;
- Landscape character and visual impact;
- Heritage – Aboriginal and non-aboriginal; and
- Hazard and risks.

The assessments of each of these factors have shown that the proposed development would not have a significant impact provided mitigation measures are implemented, and that the proposed development is justifiable on social grounds.

Part A - Introduction

5. Introduction

Doolin Farming Pty Ltd own and operate a 10,000 ha mixed farming operation across properties at North Star some 27 km east of Yetman and 45 km south-southeast of Goondiwindi (QLD) in NSW.

Doolin Farming Pty Ltd primarily engage in dryland and irrigated cropping and beef production. Doolin Farming Pty Ltd produces wheat, barley, oats and chickpeas in winter and cotton and maize in summer under pivot irrigation systems and dryland sorghum cropping. Doolin Farming Pty Ltd also have onsite storage to accommodate almost the entire grain produced and operate a fleet of trucks to transport their grain.

Central to the beef production enterprise is the breeding, growing and lot feeding of quality cattle for the domestic market. Currently the beef supply chain includes breeding and fattening of beef cattle on land less suitable for dryland and irrigated cropping and grazing of stubble and lot feeding of cattle within a feedlot on the property "Springfield".

"Springfield" comprises some 1,713 ha (~4,231 acres) and currently, a dryland and irrigated cropping business is undertaken on a large proportion of the property with extensive cattle breeding and grazing of beef cattle on the remaining land which is unsuitable for cropping and lot feeding. In the last few years, beef cattle bred on several adjoining properties have been walked into a grain-based feeding program on "Springfield" upon weaning. "Springfield" has built infrastructure such as a dwelling, machinery sheds, silos, cattle yards, feedlot etc to support the feeding program.

There has been a beef cattle feedlot on "Springfield" for over three years after approval was granted for a 999 head feedlot by the Gwydir Shire Council in 2021 (DA 31/2020). Under Schedule 3, Part 1 Item 27 of the *Environmental Planning and Assessment Regulation 2021*, as the capacity of the existing beef cattle development does not exceed 1000 head it is not a designated development and an environmental licence from NSW EPA is not required.

Doolin Farming Pty Ltd wish to expand the existing beef cattle feedlot from the current approved capacity of 999 head by gaining development approval for intensive livestock agriculture to operate as a 3,000 head beef cattle feedlot on the site.

The proposal is to develop additional production pens, and associated infrastructure such as cattle lanes, catch drains, feed and water systems, cattle handling facility and increased capacity of the existing sedimentation basin and holding pond.

The proposed development shall comprise one controlled drainage area with associated production pens and drainage system which includes catch drains, sedimentation basin and holding pond. Existing infrastructure such as the grain storage and processing facility has sufficient capacity to cater for the demands of the proposed development.

The proposed development shall utilise the existing approved manure and effluent utilisation areas on the property. The proposed development does not propose to reconfigure the existing waste utilisation areas.

"Springfield" is within the Gwydir Shire Council local government area and relevant environmental planning instrument is the *Gwydir Local Environmental Plan 2013* (GLEP).

Doolin Farming Pty Ltd have access to a secure and appropriately licensed water supply provided by groundwater from the NSW Great Artesian Basin Eastern recharge groundwater source for irrigation and stock intensive use on the subject land under access licence 90AL834721 for 1500 shares.

Beef cattle feedlots which exceed 1,000 head capacity are defined as designated development under Schedule 3 (Part 1 section 21a) of the Environmental Planning and Assessment Regulation 2000 and therefore require a full Environmental Impact Statement (EIS) to accompany the development application.

This Environmental Impact Statement has been prepared in support of a Development Application from the Gwydir Shire Council for the proposed development and provides an examination of the existing environment, an overview of the design, layout, operation and construction of the proposed development and an environmental assessment.

5.1 Development overview

The proposed development is a beef cattle feedlot with a capacity of 3,000 head. A beef cattle feedlot is an intensive livestock production system in which beef cattle are finished on a grain-based ration in a confined land area with watering and feeding facilities. The proposed development shall include the following components:

- Access road;
- Site office;
- Controlled drainage area incorporating:
    - production pens including feed bunk, water trough and associated infrastructure (fences/aprons etc);
    - induction and hospital pens and associated infrastructure (crush/veterinary facility);
    - cattle lanes and pen catch drains;
    - sedimentation basin;
    - effluent holding pond; and
    - solid waste storage/processing area.
- Feed roads;
- Water storage and reticulation system (e.g. tanks and pipelines);
- Feed storage and feed preparation area (e.g. grain silos, hay pad, silage pad);
- Feed processing infrastructure;
- Maintenance workshop; and

- Effluent and solid waste utilisation area.

5.2 Proponent details

The proponent for the proposed development is Doolin Farming Pty Ltd. The details of the proponent is provided in Table 1.

Table 1 – Proposed development – Proponent details

Entity		Doolin Farming Pty Ltd
ABN:		28 137 603 064
Physical address:		2513 Getta Getta Road, NORTH STAR, NSW 2408
Postal address:		"Glenhoma" 3202 Getta Getta Road NORTH STAR NSW 2408
Contact:		Mr Angus Doolin
Contact details:	Mobile	0428 889 994 (Angus Doolin)

5.3 Environmental impact assessment process

The Environmental Planning and Assessment Act 1979 No 203 (EP&A Act) and the Environmental Planning and Assessment Regulation 2021 (EP&A Regulation) provide a framework for environmental planning in NSW.

Prior to any decision to proceed with a proposed development that may have an impact on the environment, a detailed assessment of the likely impacts of the development must be undertaken. Part 4 of the EP&A Act establishes the processes and matters for consideration by approval authorities when determining the impact of a development and whether the development should be approved.

Development applications are assessed with regard to Part 4 Division 4.3 Sub-division 4.15-Evaluation (cf previous s 79C) of the Environmental Planning and Assessment Act 1979.

Cattle feedlots which exceed 1,000 head capacity are defined as designated development under Schedule 3 (Part 1 Designated development section 4) of the EP&A Regulation and therefore require a full Environmental Impact Statement (EIS) to accompany the development application. An extract from Schedule 3 is contained in Appendix A.

Further, the proposed development is defined as Integrated Development in Part 4 - Division 4.8 of the EP&A Act as development consent and one or more other approvals, such as an Environment protection licence is required to authorise the carrying out of scheduled activities at the site.

5.3.1 Environmental assessment requirements

An EIS in respect of a designated development must be prepared for the purposes of an environmental assessment under s 4.12 (8) of the EP&A Act. “(8) A development application for State significant development or designated development is to be accompanied by an environmental impact statement prepared by or on behalf of the applicant in the form prescribed by the regulations.”

A written application to the Director-General for the Secretary’s Environmental Assessment Requirements (SEARs) was made 27 January 2022. The form of an Environmental Impact Statement (EIS) is determined by the Environmental Planning and Assessment Regulation 2021 [NSW], Division 5 Environmental impact statements as per the Act ss 4.12(8), 5.7(1) and 5.16(2). An EIS must be prepared in accordance with the environmental assessment requirements of the Director-General of the Department of Planning and Environment (DPE).

The Secretary's Environmental Assessment Requirements (SEARs), were issued on 2 June 2022 under Part 4 of the EP&A Act. A copy is presented in Appendix B to this EIS.

A written application to the Director-General for a request for updated Secretary’s Environmental Assessment Requirements (SEARs) was made 7 May 2024. The updated Secretary's Environmental Assessment Requirements (SEARs) were issued on 31 May 2024 under Part 4 of the EP&A Act. A copy of the updated SEAR(s) is presented in Appendix B to this EIS.

5.3.2 Consultation

During the preparation of the EIS consultation with relevant local, State and Commonwealth government authorities, service providers and community groups has been undertaken and issues that have been raised have been addressed in the EIS. These issues are outlined in section 11.1 of this EIS. A copy of consultation undertaken is enclosed as Appendix B to this EIS.

5.3.3 Environmental assessment and public consultation

This EIS has been prepared in accordance with the environmental assessment requirements of the Director-General which specifically lists the matters to be addressed in the EIS with respect to the proposed development under Section 4.12(8) of the *EP&A Act* and Schedule 3 of the *EP&A Regulation*. The *EP&A Act* requires that the EIS be made publicly available for at least the minimum exhibition period, being not less than 30 days. During the exhibition period, any person (including a public authority) may make a written submission to the Secretary concerning the matter.

5.4 EIS study team

This EIS has been prepared by RDC Engineers Pty Ltd in association with a series of technical specialists. Table 2 lists the EIS components and the study team members. The curriculum vitae of each member of the study team is provided in Appendix D.

Table 2 – Proposed development – Study team

EIS Component	Company	Team Member
Development outline, Community consultation, hazards and risk, visual impact, animal welfare, biosecurity and disease management	RDC Engineers Pty Ltd	Rod Davis BEng (Ag), MEng (Ag) CP Eng, RPEQ, FIE Aust
Air quality and odour	RDC Engineers Pty Ltd	Rod Davis BEng (Ag), MEng (Ag) CP Eng, RPEQ, FIE Aust
Heritage (Aboriginal and Non-Aboriginal)	Artefact and Aspect	Tony Sonter BA, Dip(Hum), MLitt (Archaeology)
Biodiversity	Birdwing Environmental Services	Dr Tom Pollard PhD, BSci (Hons 1), BSci (Botany), (Accredited BAM assessor BAAS18071)
Operational Environmental Management Plan and sub-plans	RDC Engineers Pty Ltd	Rod Davis BEng (Ag), MEng (Ag) CP Eng, RPEQ, FIE Aust Mitch Furness (BAppSci Rural Technology Hons)
Waste management / soil and water	RDC Engineers Pty Ltd	Rod Davis BEng (Ag), MEng (Ag) CP Eng, RPEQ, FIE Aust
Soils, Effluent and solid waste utilisation	JG Environmental Pty Ltd	Justin Galloway B.App.Sci., CPSS, MASSSI
Traffic and Transport	RDC Engineers Pty Ltd	Rod Davis BEng (Ag), MEng (Ag) CP Eng, RPEQ, FIE Aust

5.5 Document structure

This EIS has been prepared in accordance with the requirements of the *EP&A Act* and the *EP&A Regulation*. It has also been prepared in accordance with the Secretary's Environmental Assessment requirements (SEARs), issues raised by relevant government agencies and non-government organisations, issues raised by the community and relevant planning and national and/or state guidelines for beef cattle feedlot developments.

The EIS is divided into 10 parts as shown in Table 3. Table 3 outlines the sections within each part and a brief description of each Part.

Table 3 – Document structure

Part	Section	Description
Part A - Introduction	5	Outlines the environmental assessment process, describes the background to the proposed development and provides an outline of the proposed development.
Part B - Location and Context	6	The regional and local context of the subject property, subject property history and land use context of the proposed development site.
Part C – Development Needs and Alternatives	7	The needs and objectives of the proposed development are described in this part.
Part D – Development Description, Statutory Planning Framework and Guidelines	8, 9 and 10	This part provides a detailed description of the proposed development, an overview of the relevant statutory planning requirements including Commonwealth and State legislation, outlines the various licences required for the proposed development and relevant guidelines for developments of this nature.
Part E – Consultation and Issues Identification	11 and 12	This part summarises the issues raised during the consultation with the statutory and other relevant authorities, and the local community. The issues raised during the consultation process are then prioritised for assessment of impacts.
Part F – Environmental Issues and Assessment of Impacts	13 and 14	Part F of the EA provides an overview of the existing environment, an assessment of the likely impacts of the proposed development and the identification of the appropriate mitigation measures to safeguard the environment. This part addresses the biophysical environment which examines impacts on air quality, surface water and groundwater, biodiversity, soils; and the sociocultural environment including hazards and risks, cultural heritage, noise, traffic, planning, land use, energy, visual amenity and waste management. A summary of key planning issues is also addressed.
Part G – Commitments	15	This part outlines the environmental management strategy and provides a consolidated summary of the management measures that would be implemented during the construction and operation of the proposed development to manage, mitigate and/or monitor potential impacts identified.
Part H – Justification	16	This part addresses the principles of Ecologically Sustainable Development (ESD) and provides justification for the proposed development.
Part I – References	17	Part J provides a list of literature referenced during preparation of the EIS.
Part J - Appendices	Appendix A Appendix B Appendix C	This part provides further detail and supporting information for various sections within the EIS.

	Appendix D
	Appendix F
	Appendix G
	Appendix H
	Appendix I
	Appendix J
	Appendix K
	Appendix L
	Appendix M
	Appendix N
	Appendix O
	Appendix P
	Appendix Q
	Appendix R
	Appendix S

Part B – Location and Context

6. Location and context

6.1 Regional and Local context

6.1.1 Regional context

The subject land on which the development is proposed is located in northern New England North West region on the north western slopes of the Great Dividing Range west of the Northern Tablelands in north-central NSW, approximately 550 km north-northwest of Sydney and approximately 300 km south west of Brisbane (QLD) as shown in Figure 1. The area is part of the Brigalow Belt bioregion.

The northern New England North West includes the towns of Warialda, Boggabri, Mungindi, Narrabri, Moree and Wee Waa; and many villages.

The region is dominated by a persistently warm and dry climate and characterised by a distinct summer rainfall with severe thunderstorms a frequent occurrence and mild sunny winters. A great diurnal range in seasonal temperatures are experienced across the region, although in the north both summer and winter temperatures tend to be higher.

Principal rivers in the region are the Namoi and Gwydir Rivers and their major tributaries, the Pell, Manilla, Mooki, Horton and Mehi Rivers, which rise in the Great Dividing Range country to the east and flow generally in a westerly direction across the western plains to the Barwon River a tributary of the Darling River.

A variety of landscapes within the New England North West region supports a diverse range of agricultural industries. Dryland cropping, mixed farming and grazing systems support key agricultural enterprises such as broadacre cropping (cereal, oilseed and pulses), beef and sheep rangeland grazing, intensive cattle, pigs and poultry, and irrigation of pastures and maize for example. Consequently, agriculture is a vital part of the economy. Intensive animal production is considered a high value use of water.

Tourism based around the river environment and water activities are also economically important to the region. Recreational and tourism activities provide income for the area. With mountains, scenic rivers and national parks tourism is providing increasing economic diversification opportunities for the region.

6.1.2 Local context

The subject land on which the development is proposed is located in the northern part of the Gwydir Shire Council Local Government area (LGA) in the North Star Region approximately 15 km by road east of North Star and some 95 km north of Warialda as shown on Figure 2.

The Gwydir Shire Council was formed in 2004 by the amalgamation of the Bingara and Yallaroi Shires and a northern portion of the Barraba shires were merged. Gwydir Shire Council occupies an area of approximately 9,452 km^2 with a population of about 5,258 (2016 census). The Gwydir Shire Council includes the townships of Bingara and Warialda and several rural villages including North Star, Croppa Creek, Coolatai and Gravesend in the northern part of the Shire, and Upper Horton in the south.

The Gwydir Shire Council extends from the Nandewar Range in the south and north to the Queensland border and is bound by the LGAs of Inverell and Uralla to the east, Moree Plains and Narrabri to the west and Tamworth Regional Council to the south and the Queensland Border to the north. The major waterways of the region include the Macintyre, Gwydir and Horton Rivers. The southern areas of the Shire are hilly with pockets of highly fertile river flats along the Gwydir River and its main tributaries. Mt Kaputar National Park forms the western edge of the Shire, with rugged remnant volcanic peaks and landforms rising above the Gwydir Valley. The northern part of the Shire lies within the 'Golden Triangle'. Built on the black soils from basalt outflows of the New England, it is one of the most productive agricultural areas in Australia.

Bingara is the main service centre and the largest town in the area. Warialda is located on the Gwydir Highway, midway between Inverell and Moree. The town is a service centre for both the surrounding rural area and highway travellers. Gwydir Shire has a diverse agricultural sector with beef cattle and sheep production dominating the southern areas and dryland and irrigated cropping along the major waterways and on the great black soil plains on the northern part of the shire. Cereals such as wheat, barely, sorghum, maize and legumes including faba beans, mung beans and cow peas, maize, and oil seeds such as canola are important crops. There are several large beef cattle feedlots in the northern part of the Gwydir Shire.

The North Star region is a prime agricultural area. The locality has historically been utilised for a variety of agricultural enterprises, including wool production, beef cattle grazing and dryland and irrigated broadacre cropping, and a small number of intensive animal industries such as beef cattle feedlots. Agricultural production continues to dominate the current land use practices in the locality.

The North Star region is often described as the 'Golden Triangle' , comprising land bounded by the area some 20 km west of North Star, 50 km south of Goondiwindi and 100 km north of Moree. The soils types range Sandstone derived red loam country basalt derived black soil plains. These soils and climate are well suited to growing both winter and some cereal crops.

LEGEND

- SUBJECT LAND BOUNDARY
- LAND PARCEL BOUNDARY

NOTES:

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STATUS

FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION PURPOSES

RPEQ

RDC ENGINEERS
AGRICULTURAL
ENVIRONMENTAL
PROJECT MANAGEMENT

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REV.	DATE	REVISION DESCRIPTION	DRAWN	CHECK	APPROVED
A	24/01/25	DRAFT ISSUE TO CLIENT	RJD	RJD	RJD
B	21/02/25	FINAL ISSUE FOR SUBMISSION TO GSC	RJD	RJD	RJD

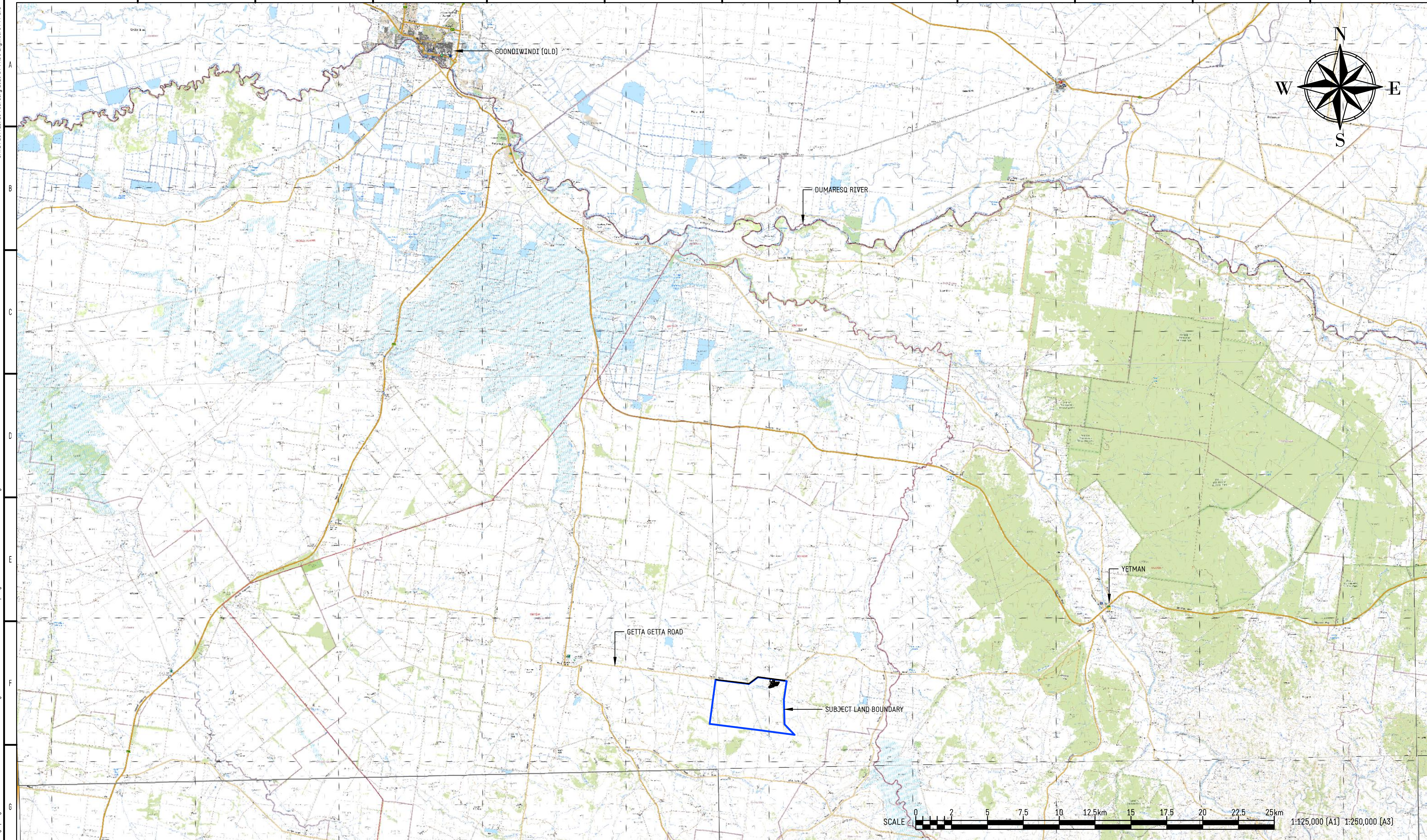
SCALE	1:250,000 (A3)
DRAWN	RJD
DATE	21/02/2025
CHECKED	RJD
DATE	21/02/2025
APPROVED	RJD
DATE	21/02/2025

CLIENT: DOOLIN FARMING PTY LTD

PROJECT: PROPOSED 3,000 HEAD BEEF CATTLE FEEDLOT

TITLE: DEVELOPMENT APPLICATION FOR INTENSIVE LIVESTOCK AGRICULTURE
ENVIRONMENTAL IMPACT STATEMENT
SUBJECT LAND - REGIONAL CONTEXT PLAN

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 1		A3	E2-103-00-01	B



LEGEND

- SUBJECT LAND BOUNDARY
- LAND PARCEL BOUNDARY

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PROJECT: PROPOSED 3,000 HEAD BEEF CATTLE FEEDLOT

TITLE: DEVELOPMENT APPLICATION FOR INTENSIVE LIVESTOCK AGRICULTURE
ENVIRONMENTAL IMPACT STATEMENT
SUBJECT LAND - LOCAL CONTEXT PLAN

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 2		A3	E2-103-00-02	B

DATE PLOTTED: 19 February 2025 BY : RDC Engineers PTY LTD
FILE PATH: C:\RDC Engineers\RDCE - Projects\E2-103 Doolin Farming Springfield EIS\05 - ACAD MasterPlan\05.1 Drawings - CURRENT FILE NAME: E2-103 DF Springfield MASTERPLAN-00-20250108vB.dwg

6.2 Site description and history

6.2.1 Site location

The proposed development is to be located on two land parcels which form the property known as "Springfield".

"Springfield" is located on Getta Getta Road, North Star approximately 15 km by road east of North Star and some 27 km west-southwest of Yetman in the North Star region of New South Wales.

The subject land has primary frontage to Getta Getta Road (sealed) of approximately 5 km in length. Getta Getta Road intersects with North Star Road some 14 km west of and with Warialda Road which intersects with the Bruxner Way some 25 km east of the site access for the proposed development site respectively.

Figure 2 is a locality plan highlighting the subject land to roads and the nearby townships of North Star and Yetman.

6.2.2 Real property description

The subject land comprises of two (2) cadastral portions. The description of the subject land is provided in Table 4. The total area of the subject land is about 1,713.2 ha (~4,231 acres). The subject land is in the Gwydir Shire.

Figure 3 is a cadastral plan highlighting the cadastral parcels that comprise the subject land.

Table 4 – Subject land – Description

Property name	Lot no.	Plan no.	Easements	Area Ha	Local government area
"Springfield"	8	DP756018	DP1237694	~883.3	Gwydir Shire
"Springfield"	8	DP756018	DP1237694	~792.7	Gwydir Shire
"Springfield"	1	DP1212915	DP1237694	~37.2	Gwydir Shire
Total area				~1,713.2	

6.2.2.1 Limitations/Interests/Encumbrances

The subject land does contain an easement DP1237694 for overhead power lines(s) 20 metre(s) wide affecting the part(s) shown so burdened in DP1237694 as outlined in Table 4 and Appendix E.

The subject land is not subject to reservations and interests in favour of the crown.

6.2.2.2 Road reserve

The subject land does not contain a road reserve under the *Roads Act 1993* as shown in Figure 3.

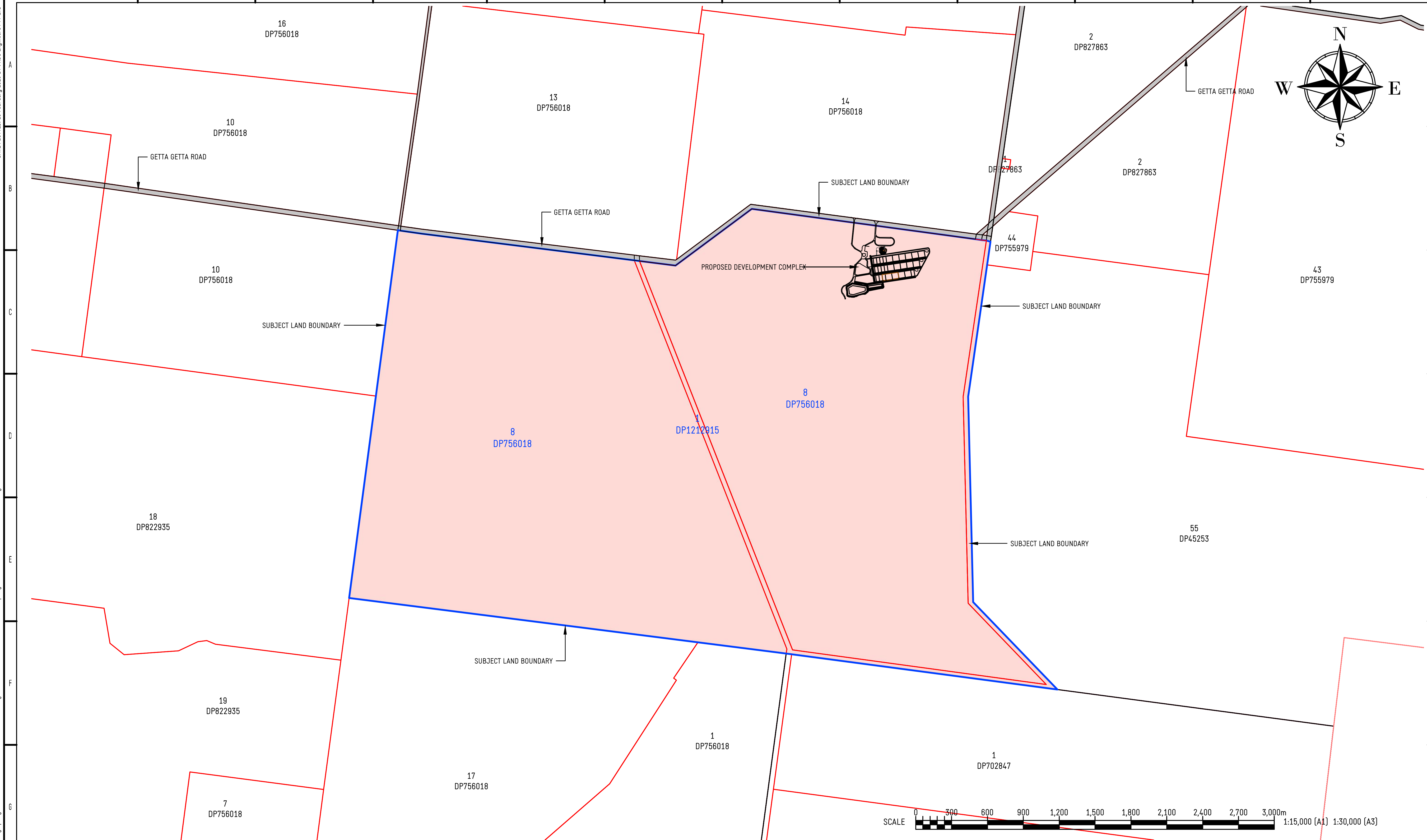
6.2.2.3 Travelling Stock Reserve

There are no Travelling Stock Reserves (TSR) declared on or adjoining the subject land or along or adjoining Getta Getta Road on parcels of Crown land reserved under the Crown Land Management Act 2016.

6.2.3 Ownership

The subject land is owned by Jennifer Susan Doolin (ABN 48 278 018 042) in freehold land tenure.

The certificate of title for the subject land on which the development is proposed is provided in Appendix F.



LEGEND

- SUBJECT LAND BOUNDARY
- LAND PARCEL BOUNDARY
- SUBJECT LAND AREA
- ROAD RESERVE
- EASEMENT

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CLIENT DOOLIN FARMING PTY LTD

PROJECT PROPOSED 3,000 HEAD BEEF CATTLE FEEDLOT

TITLE DEVELOPMENT APPLICATION FOR INTENSIVE LIVESTOCK AGRICULTURE
ENVIRONMENTAL IMPACT STATEMENT
SUBJECT LAND - CADASTRAL PLAN

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 3		A3	E2-103-00-03	B

DATE PLOTTED: 19 February 2025 BY : RDC Engineers PTY LTD

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6.2.4 Site history

The undulating highlands adjoining the low ridges of the Macintyre River floodplain were mainly utilised for pastoral purposes predominantly wool production until the start of the 20th century. Several pastoral leaseholds were taken up in the district in 1840's by settlers who followed Allan Cunningham's trail to the north. These pastoral holdings ran cattle and grazed sheep. Parts of these large pastoral leaseholds were resumed for free selection in the 1870's. The invasive weed species Prickly Pear had colonised much of the area since European settlement rendering the land progressively worthless for agricultural pursuits until it was brought under control in the early 1900's and the district became home to many returned servicemen after World War I.

The subject land is in a landscape that has experienced significant modification by past land uses. The soils of the subject land proved ideal for cereals and dryland cropping began to dominate in the mid 1900's with the development of the more productive brigalow and belah land towards Getta Getta Road. By 1956, about 50% of the subject land had been developed for dryland cropping with the majority of the clearing and development of the remaining areas occurring between 1960 and 1980.

Today the majority of remnant vegetation has been cleared on the subject land for agricultural development and the land developed for dryland cropping of cereals ((wheat, barley), cotton and pulses and native and improved pasture. In the 1990's, water was secured for irrigation and irrigated cropping commenced with low pressure overhead centre pivot irrigation systems implemented in the mid 1990's. In the early 2020's a beef cattle feedlot was established.

Steeper, less fertile and stony areas towards the southern boundary previously cleared since the 1970's has been allowed to naturally regenerate with native and introduced species.

6.2.5 Current land use

The subject land is in a landscape that has experienced significant modification by past land uses. Figure 4 is an aerial photograph showing the subject land and evidence of the current land use. These include clearing to allow for extensive broadacre agricultural activities including extensive grazing of beef cattle on native and improved pastures, intensive finishing of beef cattle and seasonal dryland and irrigated cropping. These uses will continue alongside the proposed development.

The subject land has infrastructure improvements to support these land uses, including:

- Homestead and outbuildings;
- Beef cattle feedlot complex;
- Water supply, distribution and infrastructure for irrigation; and
- Stock-proof fencing.

The subject land has a mosaic of man-made biogeographical islands of native vegetation remnants.

Photograph 1 illustrates the existing low intensity beef cattle grazing on the subject land.

The intensive livestock agriculture development (beef cattle feedlot) is located in the northeast of the subject land. The existing beef cattle feedlot development complex is shown in Photograph 2.

Although the subject land has been subject to widespread clearing for dryland (Photograph 3) and irrigated (Photograph 4) cropping, there are a number of mature trees and a mosaic of man-made biogeographical islands of native vegetation remnants that have survived since colonial settlement for use as shade for livestock and on those areas less suited to livestock grazing such as along drainage lines and watercourses. The larger areas of native vegetation are found on the eastern portion of the subject land as shown in Figure 4. The native vegetation comprises a diverse mix of trees, shrubs and ground covers (creepers, grasses and herbs) as shown in Photograph 4. The remainder of the subject land is predominantly pasture with a few scattered remnant paddocks trees.

There are no resource activities currently occurring on the land.

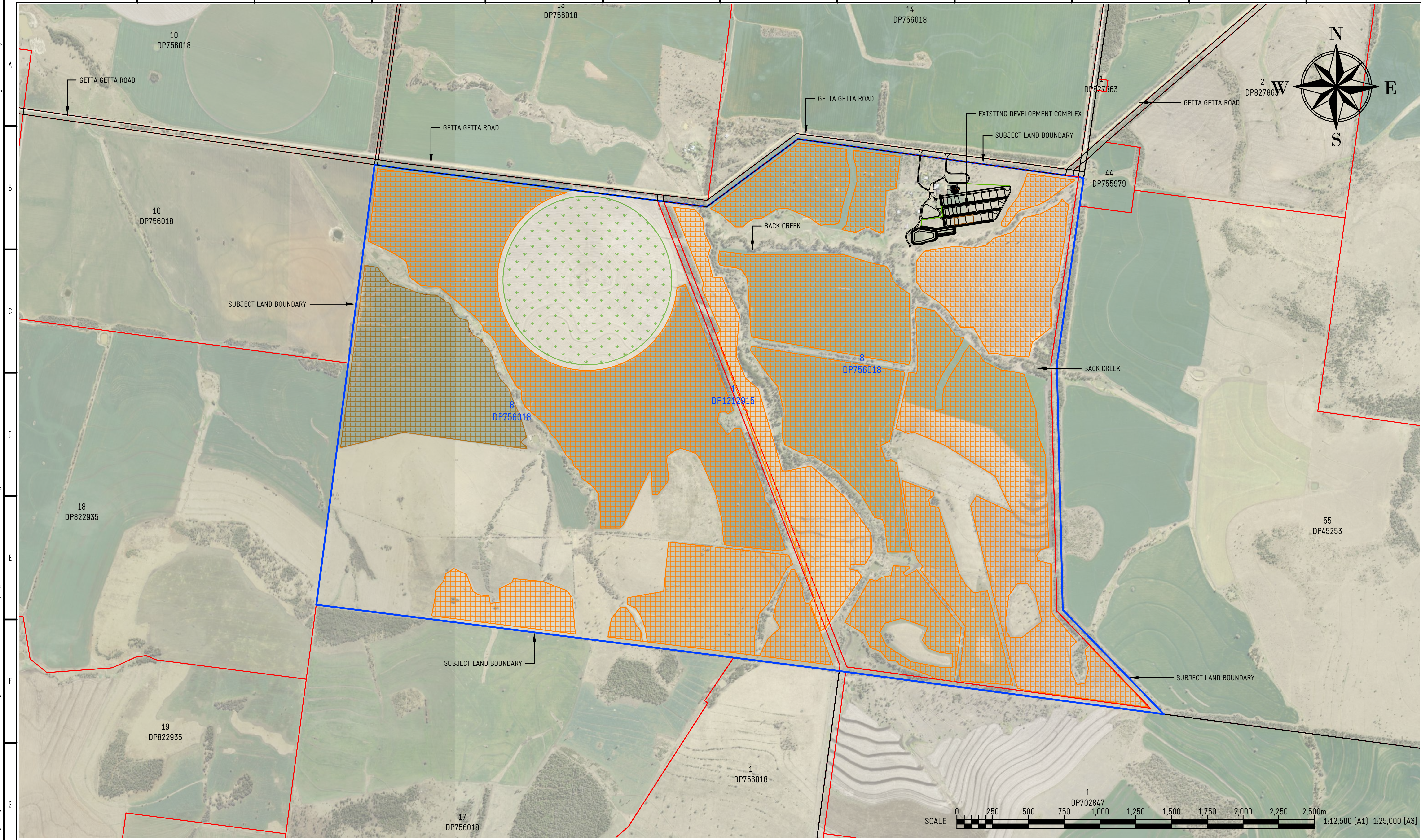
Photograph 1 , Photograph 2, Photograph 3 and Photograph 4 further illustrate the current land use of the subject land.

Photograph 1 – Subject land – Current land use – Low intensity beef cattle grazing

Photograph 2 – Subject land – Current land use – beef cattle feedlot

Photograph 3 – Subject land – Current land use – Dryland cropping

Photograph 4 – Subject land – Current land use – Irrigated cropping



LEGEND

- SUBJECT LAND BOUNDARY
- LAND PARCEL BOUNDARY
- EXISTING EFFLUENT UTILISATION AREA
- EXISTING SOLID WASTE UTILISATION AREA

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DATE	21/02/2025

CLIENT: DOOLIN FARMING PTY LTD

PROJECT: PROPOSED 3,000 HEAD BEEF CATTLE FEEDLOT

TITLE: DEVELOPMENT APPLICATION FOR INTENSIVE LIVESTOCK AGRICULTURE
ENVIRONMENTAL IMPACT STATEMENT
SUBJECT LAND - AERIAL PLAN

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 4		A3	E2-103-00-04	B

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6.2.6 Existing services and infrastructure

The subject property on which the development is proposed currently has existing service infrastructure in the form of electricity and communications. Existing water supply is by way of domestic and irrigation bores. The proposed development does not require the extension and upgrade of electricity services from the existing property overhead supply to service the electricity demand of the proposed development.

Similarly, extensions to existing communications services are also not required. Potable water supply would be from rainwater and supplemented from bore water supply as required.

The subject land currently supports infrastructure for the existing development and other agricultural activities on the land such as homestead, cottage, office machinery/storage sheds and silos in the northern portion of the property as shown in Photograph 5 and Photograph 6.

Photograph 5 – Subject land – Existing infrastructure – Overhead electricity supply

Photograph 6 – Subject land – Existing infrastructure – Homestead and outbuildings

Part C – Development Needs and Alternatives

7. Development needs and alternatives

7.1 Objectives and development demand

7.1.1 Development objectives

The primary objective of the proposed development is to consistently supply market or customer requirements with grain-fed beef in terms of quality and quantity to compete with the US product on a global market, with a particular focus on the Asian market.

Doolin Farming Pty Ltd have formed a strategic alliance with organisations which have considerable experience in the lot feeding industry providing an integrated production and processing system for grain-fed beef. As a result, the proposed development has a number of objectives which are listed below and are focussed on providing sustainable environmental, social and economic outcomes.

The proposed development has a number of objectives which are listed below and are focussed on providing sustainable environmental, social and economic outcomes.

- To produce consistent quality grain-fed beef for the domestic and export market using best practice and sustainable animal welfare, environment, food safety and product integrity management systems
- To provide dedicated feeding programs for cattle to meet specific market requirements
- To provide a source of employment in the local area
- To enhance the agri-business operations of Doolin Farming Pty Ltd by finishing cattle their own cattle using a grain-based ration
- To provide a local market for feeder cattle as the development would aim to source feeder cattle from local producers
- To provide a local market for feed commodities (grain/hay/silage etc) as the development would aim to source a proportion of these commodities from local producers;
- To implement procedures, practices and processes that ensure compliance with the relevant industry standards and legislative, policy and planning requirements; and
- To sustainably utilise solid and liquid wastes.

7.1.2 Development demand

The productivity of Australian beef production has significantly improved over time. The Australian grain fed cattle industry was the primary driver for this change. The main reasons why the cattle feedlot industry has grown over the last 30 years is;

- Because it fulfils the market need to supply a consistent quantity and quality of beef throughout the year (regardless of seasons and climatic variation) and
- Because of the increasing consumer demand for grain fed beef.

Specifically, Australia's variable climate means that pastures are insufficient during seasonal dry periods or drought and finishing cattle on grain enables beef to have a more consistent eating quality. The emergence of markets such as Japan and Korea have also greatly assisted industry growth whilst the exclusion of US beef into world markets due to BSE concerns has ensured that this growth has been sustained.

Currently, cattle numbers in Australian feedlots are at record levels. Importantly, despite high feeder cattle prices, strong demand for Australian beef overseas continues to encourage lot feeders to maintain cattle numbers on feed. Industry research has shown that demand for beef from Asian has grown consistently over recent years and demand is considered to be in excess of supply.

Additional cattle feedlots are therefore necessary to meet the market demand for the beef products currently being supplied to the domestic and export markets.

The proposed development would implement the highest standards of maintenance and operation to ensure that the development produces safe, wholesome, consistent-quality beef

7.2 Alternatives considered

7.2.1 Site selection criteria

The proposed development must be appropriately sited to ensure its economic viability and environmental sustainability.

The identification of a location for the proposed development was undertaken over a period of several months. The location selection process involved consideration of regional and local issues. These included:

- Regional issues
    - climatic and seasonal conditions;
    - proximity to road networks, other feedlots or intensive livestock facilities, processing facilities, livestock exchanges and infrastructure services;
    - access to a local workforce for the operation of the feedlot; and
    - access to suitable grain and other feed components feedstuffs.

- Site-specific issues
    - suitable topography for site drainage to minimise construction cost;
    - suitability of in-situ soil for underlying pens, drains, sedimentation basin, holding pond;
    - separation from sensitive receivers for odour, dust, noise or visual amenity;

- distance to nearest potable water supplies (i.e. artesian, reservoirs, water catchment areas);
- secure, reliable and adequate supply of water;
- risk of impacts on groundwater and surface water;
- access to construction materials (e.g. clay and gravel);
- absence of cultural heritage sites or artefacts;
- likely impact on threatened or endangered species or ecological communities;
- risk of flood or bushfire;
- site access in respect to traffic and road safety; and
- availability of land and suitability of soil for by-product utilisation.

7.2.2 Alternative site locations

Doolin Farming Pty Ltd own and operate a number of rural properties in the North Star area including “Glenhoma”, “Millroy”, “Springfield”, “Myall Downs” and “Yetman West”. Each of these properties was assessed against each criterion outlined in section 7.2.1 in relation to the establishment of the proposed development.

The proposed development would not have been economically viable if a site on the existing property did not meet all the assessment criteria.

7.3 Preferred site location

The preferred location of the proposed development on the property “Springfield” within the Gwydir Shire Council was selected as the site satisfied both the regional and site-specific selection criteria. The subject land has the following characteristics:

- The subject land is well serviced by a local and state road network.
- Access to a local workforce for the operation of the proposed development from surrounding properties;
- The subject land is located in close proximity to properties owned by the proponent on which commodities shall be sourced;
- The subject land has an area of some 1,713 ha currently utilised for beef cattle grazing, dryland and irrigated cropping and pasture;
- Due to the size of the property, there are few close neighbouring rural residences, thus mitigating potential impacts from odour, noise, dust and visual amenity. The subject land has a relatively large separation distance to the villages of North Star (~10 km), Yetman (~22 km) and major towns such as Warialda (~62 km) and Goondiwindi (QLD) (~50 km) for example;
- The subject land has existing licensed water supply of suitable quality and quantity;
- The subject land has an existing power supply available;
- The proposed development site is located out of the 1 in 100-year flood level and comprises suitable low permeability soil suitable for beef cattle feedlot construction;

- The proposed development complex site and areas for by-product utilisation have no registered cultural heritage sites and have been extensively disturbed from previous agricultural activities thus minimising the potential impact on cultural heritage;
- The proposed development complex site is not located in a threatened or endangered ecological community; and
- The subject land has suitable areas of land for effluent and solid waste utilisation.

The above characteristics of the subject land demonstrate the suitability of the location for the proposed development.

Part D – Development Description, Statutory Planning Framework and Guidelines

8. Development description

8.1 Development outline

Doolin Farming Pty Ltd wish to develop a beef cattle feedlot on the subject land. The proposed development shall have a maximum capacity of 3,000 head. The proposed development shall be designed and constructed in a manner that will allow flexibility of use with the ability to increase or decrease the number of animals within the development in line with market and economic factors.

The proposed development complex would occupy a footprint of approximately 14.5 ha and includes the following components in a functional configuration:

- Water Supply/ Storage and Reticulation – A reliable and uninterrupted supply of clean water of the required volume to sustain feedlot operations is required;
- Pens - Fenced areas are required for housing production cattle (production pens), cattle arriving to or being dispatched from the feedlot (induction/dispatch pens), and sick cattle (hospital pens);
- Livestock handling – Infrastructure and facilities are required for the arrival, processing and dispatch of cattle and stabling for horses;
- Feed processing and commodity storage – Feed rations are prepared on-site in a facility, with associated commodity storage, handling and ration delivery infrastructure;
- Access and Internal roads – Access to the site and the layout of internal road systems are critical to the efficient and safe functioning of the feedlot;
- Administrative/Maintenance Infrastructure – Facilities are required for conducting management, maintenance and administrative functions at the feedlot. This includes office, machinery workshop and associated facilities for example;
- Controlled drainage area - Stormwater runoff from areas such as pens, cattle lanes, and livestock handling areas has a high organic matter and therefore a high pollution potential. This runoff is controlled within a system that collects and conveys this runoff to a sedimentation basin and holding pond prior to environmentally sustainable utilisation;
- Drainage system – The controlled drainage area contains a system including catch drains, sedimentation system and holding pond for conveying stormwater, allow entrained sediment to ‘settle out’ and capture and storage of the stormwater from the controlled drainage area until it can be sustainably utilised;
- Effluent and solid waste management areas – Solids wastes such as manure and mortalities are temporarily stockpiled and processed within the solid waste storage area prior to utilisation on-site or removed off-site. Effluent is stored in the holding pond pending application to the effluent utilisation area.

The proposed development also includes on-site effluent and solid waste utilisation areas. Solid wastes generated are applied to an on-site utilisation area. There is approximately 1,020 ha of cropping land on-site suitable for effluent and solid waste utilisation. Any solid wastes not utilised on-site are removed off-site. When available effluent wastes are applied to land via irrigation within a dedicated effluent utilisation area.

Further description of the various elements is provided in sections 8.4 to 8.4.11.

The proposed development shall be designed, constructed and managed as a Class One feedlot. A Class One feedlot has highest standard of design, operation, maintenance, pad management and cleaning frequency. A Class One feedlot is defined in section 8.2.

8.2 Design philosophy

The design philosophy of the proposed development enables ecological and economic sustainability to be integrated into the design, construction and management (when approved) of the development.

The *National Guidelines for Beef Cattle Feedlots in Australia* (MLA, 2012b), *National Beef Cattle Feedlot Environmental Code of Practice* (MLA, 2012a) and The New South Wales Feedlot Manual (NSW Agriculture, 1997) have been used as the guiding reference for the siting, design and management of the proposed development.

The design, construction and management of the proposed development shall be consistent with relevant legislation, environmental standards, codes of practice and guidelines as outlined in section 9 and consistent with its scale and intensity. The overarching design philosophy is to provide best practice animal welfare and to utilise the latest innovations to ensure optimal production efficiency.

8.3 Capacity

In NSW, the capacity of beef cattle feedlots is defined in terms of the number of animals or head. The proposed development has been designed to accommodate up to 3,000 head of beef cattle.

The proposed development shall feed beef cattle predominantly for the domestic market. Consequently, cattle are younger in age (weaners) and lighter in weight compared to cattle fed for the export market. The typical specifications for the cattle to be fed are provided in Table 17 in section 8.7.1. All beef cattle fed shall be owned by the applicant.

The term 'Standard Cattle Unit' (SCU) is used in the *National Beef Cattle Feedlot Environmental Code of Practice* (MLA, 2012a) to describe the stocking capacity of a beef cattle feedlot in accordance with the average liveweight of cattle in the facility, rather than the number of head. A standard cattle unit is equivalent to an animal of 600 kg liveweight (MLA, 2012a). This term enables the stocking capacity of beef cattle feedlots to be expressed in line with the weight of cattle in the facility, rather than the number of head. This concept is based on the understanding that manure production increases with cattle liveweight.

Each animal can be converted to a SCU equivalent based on their metabolic liveweight and the following formula:

SCU scaling factor = (Animal liveweight/600)$^{0.75}$ ----------------------------Equation 1

The SCU scaling factor for various average liveweight for beef cattle is provided in Table 5.

Table 5 – Standard Cattle Unit conversion factor

Average liveweight (kg)	SCU Scaling factor
350	0.68
400	0.74
450	0.81
500	0.87
550	0.94
600	1.00
650	1.06
700	1.12

The SCU scaling factor applied to lot fed cattle with an average liveweight of 500 kg (Table 17) can be determined from Equation 1 as follows.

SCU scaling factor = (500/600)$^{0.75}$
= 0.874

Consequently, the proposed development shall have a total capacity equivalent to 873 standard cattle units (SCUs) once fully developed.

8.4 Layout, design and specification

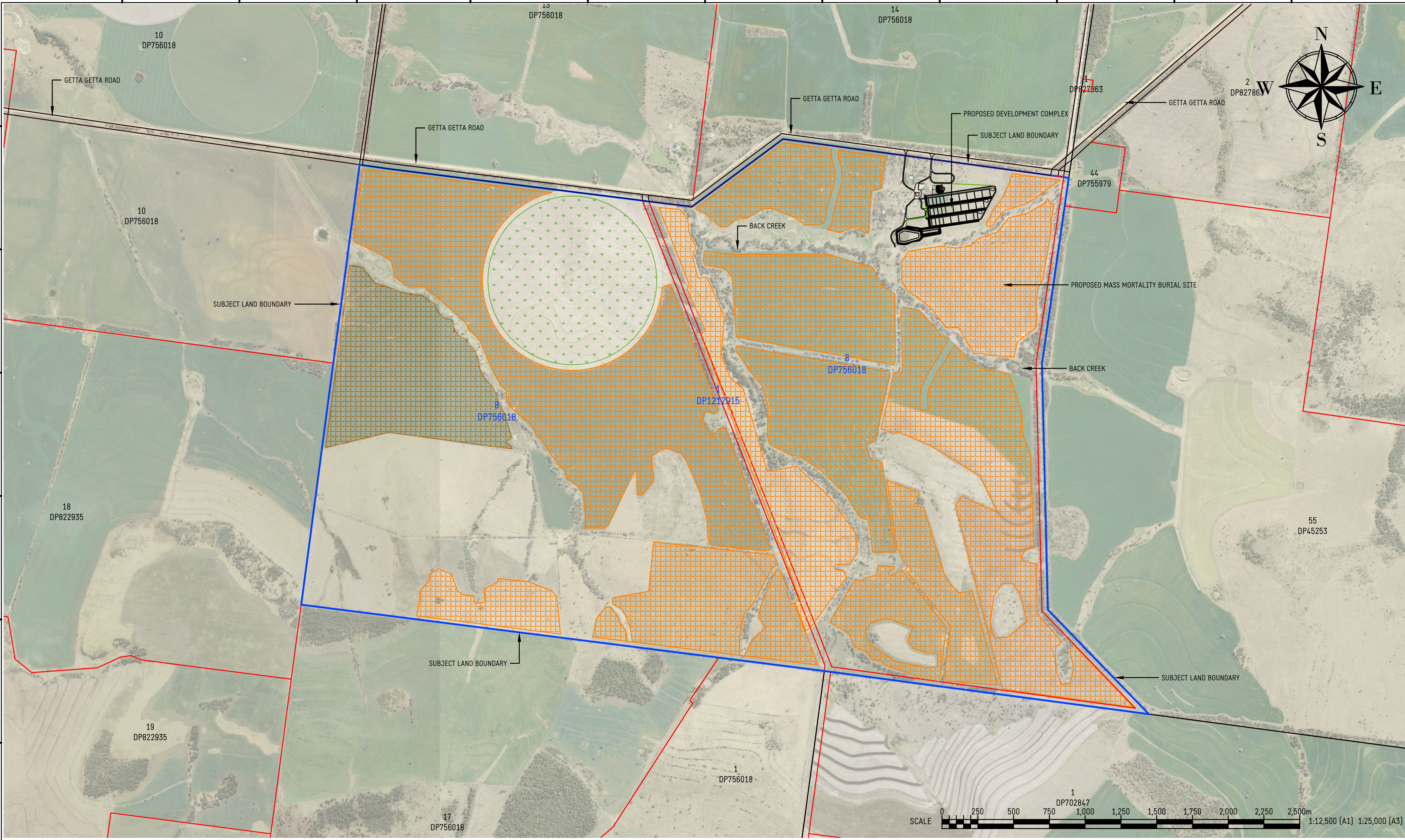
The layout of the proposed development infrastructure area is shown in Figure 6. Figure 6 shows that the proposed development shall be located in the north-east of the subject land adjacent to the existing development.

The proposed development has been designed to:

- maximise utilisation of the existing feedlot infrastructure (roads, drainage system etc);
- maximise operational efficiency;
- maximise cattle performance;
- maximise cattle welfare;
- maximise worker health and safety;

- minimise environmental impact;
- minimise waste; and
- minimise capital and operational costs.

A description of the various functional elements of the proposed development is outlined in the following sections.



LEGEND

- SUBJECT LAND BOUNDARY
- LAND PARCEL BOUNDARY
- EXISTING AND PROPOSED EFFLUENT UTILISATION AREA
- EXISTING AND PROPOSED SOLID WASTE UTILISATION AREA

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TITLE: DEVELOPMENT APPLICATION FOR INTENSIVE LIVESTOCK AGRICULTURE
ENVIRONMENTAL IMPACT STATEMENT
PROPOSED DEVELOPMENT - DEVELOPMENT LAYOUT

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 5		A3	E2-103-00-05	B

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- LAND PARCEL BOUNDARY

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REV.	DATE	REVISION DESCRIPTION	DRAWN	CHECK	APPROVED	SCALE	1:5,000 (A3)
A	24/01/25	DRAFT ISSUE TO CLIENT	RJD	RJD	RJD	DRAWN	RJD
B	21/02/25	FINAL ISSUE FOR SUBMISSION TO GSC	RJD	RJD	RJD	DATE	21/02/2025
						CHECKED	RJD
						DATE	21/02/2025
						APPROVED	RJD
						DATE	21/02/2025

CLIENT: DOOLIN FARMING PTY LTD

PROJECT: PROPOSED 3,000 HEAD BEEF CATTLE FEEDLOT

TITLE: DEVELOPMENT APPLICATION FOR INTENSIVE LIVESTOCK AGRICULTURE
ENVIRONMENTAL IMPACT STATEMENT
PROPOSED DEVELOPMENT - DEVELOPMENT COMPLEX LAYOUT

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 6		A3	E2-103-00-06	B

8.4.1 Water supply/storage and reticulation

Water for the proposed development will be sourced from a licensed groundwater allocation.

Water shall be pumped from the existing water supply sources to storage tank(s) located towards the highest elevation at the proposed development complex site. Water storage of about 250,000 litres total capacity in two or more tanks is proposed. This will provide about two days (2) days emergency supply in the event of supply interruption. The proposed location of the water storage infrastructure is shown on Figure 6.

Water shall then be reticulated around the proposed development via a gravity and/or a pressurised system.

Water shall be reticulated to the relevant areas of the proposed development using an underground polyethylene pipe network. The reticulation system shall be designed to supply water throughout the proposed development during peak demand periods.

8.4.2 Pens

Pens are required for holding production cattle (production pens), cattle arriving to or being dispatched from the feedlot (induction/dispatch pens), and sick cattle (hospital pens). Apart from pen slope and pen floor permeability, there are no specific design requirements for pen layout and design.

The dimensions of pens depend on the capacity of the pen, stocking density and the amount of feed bunk required.

8.4.2.1 Stocking density

Stocking density will have a significant influence on the environmental performance of the proposed development since it partly determines the average moisture content of the surface of the pen. Every day, beef cattle add moisture to the pen surface by depositing manure (faeces and urine).

The National Feedlot Code of Practice (MLA, 2012a) recommends a maximum stocking density of 25 m^2 per Standard Cattle Unit (SCU) for beef cattle feedlots. Stocking densities higher than 20 m^2 per SCU can lead to increased pen dust loads and require higher capacity for drainage system infrastructure such as sedimentation basins and holding ponds.

The proposed development shall have an average stocking density of ~17.9 m^2/head for the proposed beef cattle production pens for the total capacity of 3,000 head. This equates to a stocking density in the order of about 20.5 m^2/SCU when the SCU scaling factor is applied.

8.4.2.2 Feed bunk

The beef cattle shall be provided with their daily feed requirements and water.

As the feed ration shall generally be processed on-site and fed-out once a day an open feed bunk (trough) system shall be used. Pre-cast 6 m length open feed bunks set in a continuous line shall be located on the outside, along the entire length of the higher end of the pen with frontage to the feed road.

The feed bunks will have a 3 m wide concrete apron that extends into the pen as shown in Figure 7. A concrete apron prevents wearing of the pen surface within this high-use area. The apron will slope away from the bunk to facilitate drainage at the same slope as the pen slope.

As the feed ration shall generally be processed on-site and fed out more than once a day, an open feed bunk (troughs) system shall be used. Further, all types of rations, including those moist or containing large amounts of coarsely chopped fibre, can be fed in troughs.

An open feed bunk shall be located on the outside, along the entire length of the fence at the higher end of the pen with frontage to the feed road. All types of rations, including those moist or containing large amounts of coarsely chopped fibre, can be fed in troughs.

Typically, the length of bunk space required per head ranges from 250 mm to 300 mm. A bunk space of 360 mm per head was selected as a shorter feed bunk space may restrict the opportunity of shy feeders to feed, particularly at the commencement of the feeding period.

The feed bunks will have a 3.0 m wide concrete apron that extends into the pen (see Figure 7). A concrete apron prevents wearing of the pen surface within this high-use area. The apron will slope away from the bunk to facilitate drainage. The concrete apron shall be constructed to withstand the loading of cleaning equipment.

8.4.2.3 Pen capacity

The capacity of the beef cattle production pens is sized to match multiples of deck sizes of livestock transport vehicles. A B-double of three decks would carry about twenty seven (27) 370 kg cattle per deck giving a total load of 82 head. A B-double of three decks would carry about 50 head of 630 kg cattle.

8.4.2.4 Pen area

Typically, there will be two sizes of feeding pens with an area to accommodate 150 head or 75 head.

For the proposed 150 head feeding pens, the combination of a nominal feed bunk length (width) of 54 m, design depth of pen and allowance for herringbone and feed bunk gate arrangements translates into a pen area in the order of 2,687 m^2.

For the proposed 75 head feeding pens, the combination of a nominal feed bunk length (width) of 27 m, design depth of pen and allowance for herringbone and feed bunk gate arrangements translates into a pen area in the order of 1,337 m^2. The depth of each pen will be about 50 m depending on final pen layout and cattle lane and drain design.

Figure 7 shows the layout of a proposed beef cattle feeding pen.

8.4.2.5 Pen orientation

The orientation of the beef cattle feeding pens has been dictated by the site layout and natural surface topography. The longitudinal axis of the feed alley and adjoining pen row shall run east-northeast to west southwest as shown in Figure 6.

Excessive heat load in feedlot cattle during summer months can result in significant production losses, animal welfare problems and, under extreme conditions, the death of cattle. Shade structures shall be implemented to reduce the impact of heat wave conditions on cattle.

Orientation of the shade structure will determine the pattern of the shade underneath and also the amount of shade available to the cattle. Hence, pen orientation is an important design criterion. Rows of pens running north-south (with shade structures orientated north-south) with the shade material oriented in an east-west direction maximises the amount of shade and provides optimal drying of the pen floor.

Subsequently, the proposed development has been designed with rows of pens running north-northeast-south-southwest as shown in Figure 6.

8.4.2.6 Pen configuration

The proposed development shall have a sawtooth pen configuration as shown in Figure 7. The sawtooth design has a feed alley servicing a single row of pens falling away from the road to a cattle lane and catch drain as shown in Figure 7.

The sawtooth configuration was selected, as this layout is a cost-effective layout best suited to the site with its steeper natural slope (i.e. >2%) and pen slope matches the natural slope.

8.4.2.7 Pen slope

Pen slope is the fall of the pen surface perpendicular to the feed bunk. A pen also has down-slope because of the lateral slope of the catch drain. Hence, as there is a combined pen and drain slope across the site, the maximum pen slope is not perpendicular to the feed bunk. The magnitude of this slope and its angle from perpendicular to the bunk will depend on the relative magnitude of each of the pen and drain slopes.

The existing natural slope of the development site (3-4%) provides good drainage and is well suited to the proposed development as shown in Figure 7.

Pen slope is the fall of the pen surface perpendicular to the feed bunk. A pen also has down-slope resulting from the lateral catch drain slope. Hence, where there is a combined pen and drain slope across the site, the maximum pen slope is not perpendicular to the feed bunk. The magnitude of this slope and its angle from perpendicular to the bunk will depend on the relative magnitude of each of the pen and drain slopes.

A pen slope of between 2.5% and 6% will ensure quick drainage of rainfall, but without runoff scouring excessive amounts of manure from the pen surface.

The pens have been designed with a pen slope of 3% which falls to lateral catch drains with a slope in the order of 0.5-0.75%, depending on final design. The pens slope from east to west.

The relative levels of the pens have been designed to provide an approximate balance of cut and fill earthworks on the site.

Figure 7 shows the layout of a typical feedlot pen.

8.4.2.8 Water trough

Prefabricated concrete water troughs will be installed in the centre of each pen on the bottom fence line near the cattle lane/drain. The troughs will be situated at the drain-end of the pens to allow dirty water released during trough cleaning or as a result of spills to be directed out of the pen and into the catch drains by underground pipes. This will prevent the pen floors from being wetted during trough cleaning. Troughs are also likely to have less feed deposited. Water troughs in this location can be located easily by new cattle traversing the perimeter of the pen.

Concrete aprons at least 3 m wide will be constructed around all water troughs as shown in Figure 7. The aprons will be reinforced to withstand the loading of pen cleaning equipment.

Prefabricated concrete water troughs will be installed along the dividing fence lines between two pens. The troughs will be situated towards the drain-end of the pens. This will allow dirty water released during trough cleaning or as a result of spills to be directed out of the pen and into the catch drains by underground pipes. This will prevent the pen floors from being wetted during trough cleaning.

Concrete aprons at least 3.0 m wide will be constructed around all water troughs (see Figure 7). The aprons will be reinforced to withstand the loading of pen cleaning equipment.

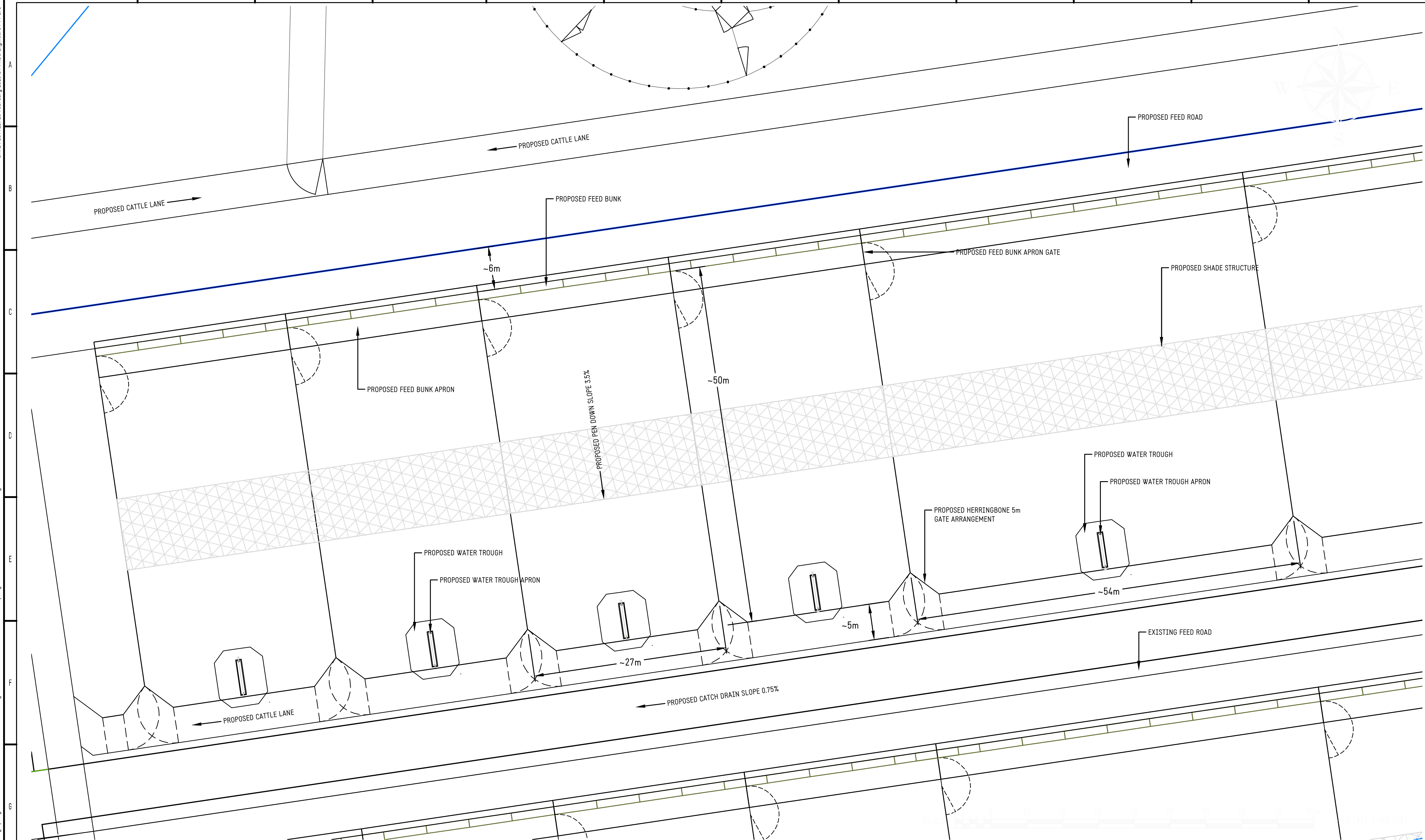
8.4.2.9 Shade

Whilst beef cattle have a remarkable ability to cope with environmental stress, a combination of high temperature and humidity, with high levels of solar radiation and minimal air movement, can exceed the animal's ability to dissipate body heat. Therefore, excessive heat load (EHL) in feedlot cattle during summer months can result in significant production losses, animal welfare problems and, under extreme conditions, the death of cattle.

The Australian lot feeding industry has recently launched an initiative to encourage all feedlots to provide cattle with access to shade by 2026.

Shade structures comprising steel support structures and woven cloth are installed over all of the existing pens to reduce the impact of heat load conditions on the cattle as shown on Figure 7.

Consequently, shade structures similar to the existing configuration shall be installed over all of the additional production pens.



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B	21/02/25	FINAL ISSUE FOR SUBMISSION TO GSC	RJD	RJD	RJD

SCALE	1:500 (A3)
DRAWN	RJD
DATE	21/02/2025
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DATE	21/02/2025
APPROVED	RJD
DATE	21/02/2025

CLIENT: DOOLIN FARMING PTY LTD

PROJECT: PROPOSED 3,000 HEAD BEEF CATTLE FEEDLOT

TITLE: DEVELOPMENT APPLICATION FOR INTENSIVE LIVESTOCK AGRICULTURE
ENVIRONMENTAL IMPACT STATEMENT
PROPOSED DEVELOPMENT - PRODUCTION PEN DETAILS

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 7		A3	E2-103-00-07	B

8.4.3 Livestock handling

The cattle handling facility servicing the existing development shall be decommissioned and a new dedicated cattle handling facility shall be constructed in the centre north of the proposed development complex as shown on Figure 6. The cattle handling facility will include holding, drafting and crowd pens, race, crush and loading ramp elements as shown in Figure 8.

Typically, the crush area is located inside a building or partly covered to improve the environment for cattle and handlers who can work and manage cattle during inclement weather in a timely and low stress manner.

A functional building (or structure) shall be erected over the crush area. The building shall as a minimum, cover the race and crush area and provide a relatively clean, dedicated area for housing electronic or electrical equipment associated with the feedlot integrated management system.

The form of the building shall be a free-standing structure with a pitched roof and no walls as shown in Photograph 7. A typical plan of the cattle handling facility is provided in Figure 8.

Photograph 7 – Proposed development – Cattle handling facility

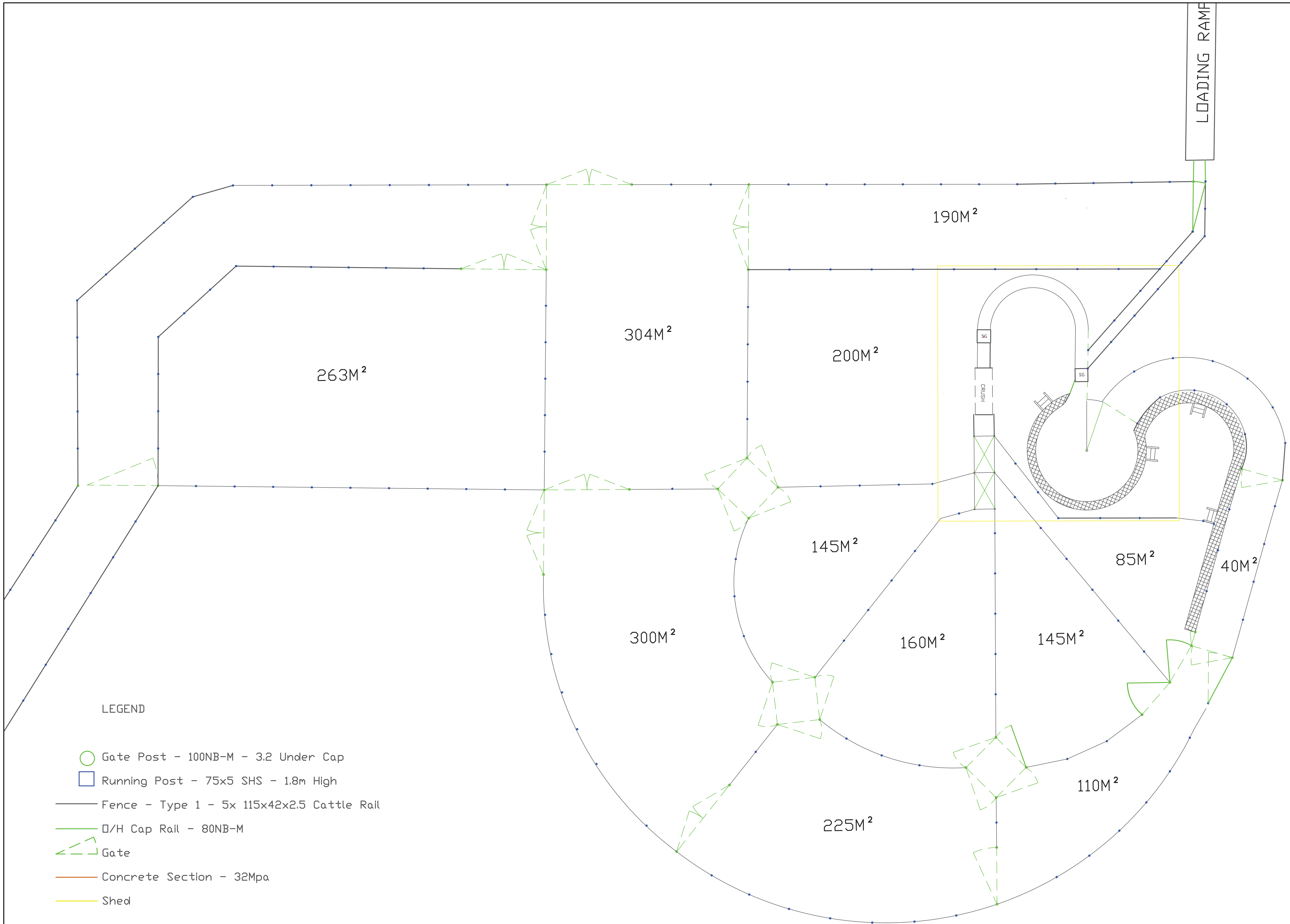

FIGURE 8

REV	DESCRIPTION	INITIAL	DATE
A	ISSUED FOR CONSTRUCTION	JT	18/01/24

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TITLE	Cattle Handling Facility - Overview
PROJECT	Northstar Cattle Handling Facility
CLIENT	Angus Doolin
ADDRESS	Springfield Feedlot
DRAWN	JT
CHECKED	JT
SCALE	NTS
DATE	18/01/24
PROJECT №	1005
DRAWING №:	NS-01
SIZE	A3
REV:	A

8.4.4 Feed processing and commodity storage

The beef cattle in the proposed development require a nutritionally and scientifically formulated ration.

Due to the scale of the proposed development and quantities of forage and grain required each day, rations shall be prepared on-site in a facility, with associated commodity storage, handling and ration delivery infrastructure.

The subject land and existing development has built infrastructure for grain and roughage storage which has sufficient capacity to accommodate the proposed development as shown in Photograph 8, Photograph 9 and Photograph 10.

The grain and commodity storage infrastructure servicing the existing development has sufficient capacity to meet the demands of the proposed development. Consequently, no upgrades are proposed.

An additional shed may be constructed for storage of commodities such as hay, proteins and supplements etc. The style and type of shed proposed for commodity storage has not been decided. However, it is expected to be similar to the plan and elevation of a typical farm storage shed.

Photograph 8 – Existing development – Grain and supplement storage

Photograph 9 – Existing development – Silage storage

Photograph 10 – Existing development – Commodity storage shed

8.4.5 Access and internal roads

Access to the site and the layout of internal road systems are critical to the efficient and safe functioning of the proposed development.

Access to the proposed development shall be from a new dedicated subject land entrance off Getta Getta Road as shown in Figure 9. The existing subject land entrance shall be maintained for vehicles associated with the existing agricultural operations on the subject land.

To provide efficient, functional and safe access to the proposed development site, a turn-in and turn-out onto Getta Getta Road shall be constructed to Gwydir Shire Council standard design specifications for the type of traffic generated by the proposed development. The proposed site entrance shall be some 200 m east of the existing subject land entrance as shown on Figure 6.

The subject land entrance shall have an internal connection road from Getta Getta Road to the proposed development complex designed to accommodate the number of vehicle movements and type of vehicles servicing the proposed development. The internal road network shall be a well-formed durable gravel surface road with a width of approximately 8 m that shall provide access and cater for the traffic demands of the proposed development in all weather conditions. The access road shall accommodate vehicles, including Type 1 road trains, B-doubles, semi-trailers, body trucks delivering and transporting feed commodities, cattle and solid waste.

All signs shall be fully contained within the subject land. Sufficient on-site car parking shall be provided commensurate with the scale and use. Due to the nature of the development and rural character of the site, the provision of a formal car parking area is unnecessary. However, any gravel hardstand areas used as car parking areas such as adjacent to the site office shall be designed in accordance with relevant Australian Standards (e.g. Standards Australia, 2890.1-2004) where relevant.

Sufficient on-site manoeuvring area shall be provided to enable all vehicles to enter and exit the site in the forward direction. The proposed layout of internal roads is shown on Figure 9.

To ensure good traffic flow at the site, heavy vehicles travel to either the grain and commodity storage/processing area or to the cattle handling facility. The cattle handling and feeding systems are managed separately and both operate independently with little operational interference.

Feed delivery roads shall be established along each row of pens in the saw tooth configuration. These roads would be approximately 5 m wide to enable vehicles to deliver feed to the feed bunks of the pens. Feed roads shall be constructed to:

- slope away from the feed bunk with a cross fall of approximately 2% towards the edge to ensure adequate drainage away from the feed bunk. The road will be constructed to also act as a clean water diversion bank to direct clean water from above the pen area away from the feedlot pen area below;
- produce a smooth finish to minimise wear and tear on feedout wagon and reduce feed spillage;

- withstand high traffic volumes and wheel loadings;
- provide reliable all-weather access to the feed bunks.

A fit-for-purpose internal road system shall be established with adequate road width, turning radii, drainage, all-weather surface, adequate sight distance through intersections, curves and crests to provide good traffic flow around the site.

DATE PLOTTED: 20 February 2025 BY : RDC Engineers PTY LTD

FILE PATH: C:\RDC Engineers\RDCE - Projects\E2-103 Doolin Farming Springfield EIS\05 - ACAD MasterPlan\05.1 Drawings - CURRENT FILE NAME: E2-103 DF Springfield MASTERPLAN-00-20250108vB.dwg

LEGEND

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TITLE: DEVELOPMENT APPLICATION FOR INTENSIVE LIVESTOCK AGRICULTURE
ENVIRONMENTAL IMPACT STATEMENT
SUBJECT LAND - INTERNAL ROADS AND VEHICLE MANEUVERING

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 9		A3	E2-103-00-09	B

8.4.6 Administrative/Maintenance infrastructure

The proposed development shall utilise existing facilities for conducting management, maintenance and administrative functions. This includes administration office, machinery workshop, and associated facilities for example.

The site office is located in the existing cottage dwelling on the subject land and is used for conducting management and administrative functions at the proposed development as shown in Photograph 11. The site office includes employee amenities including a toilet, shower, hand-washing facilities, first aid station and car parking and meets minimum Workplace Health and Safety standards.

Existing subject land infrastructure adjacent to the grain storage and processing facility shall be utilised for repairs and maintenance of machinery and for light engineering as required.

The location of the existing administrative infrastructure on the proposed development site is shown in Figure 6.

Photograph 11 – Existing development – Site office

8.4.7 Washdown facilities

8.4.7.1 Cattle

Due to the climatic conditions at the site, the washing of cattle before dispatch for slaughter will not be required.

Consequently, a dedicated cattle washing facility is not required and not provisioned for in the proposed development complex.

8.4.7.2 Vehicle

Vehicle and machinery hygiene are important for biosecurity, maintaining operational efficiency, maintaining aesthetic appearance and facilitating mechanical servicing.

A vehicle washing facility may be constructed to facilitate cleaning of the various types of vehicles, mobile plant and machinery that may require cleaning. These may include front-end loaders, skid steers or bobcats, excavators, feed wagons, manure cartage and spreader wagons, tractors and tillage equipment and livestock transport vehicles.

A site for a vehicle washdown facility has been provisioned for within the controlled drainage area so that the wastewater is directed towards the sedimentation basin and holding pond as shown in Figure 6.

8.4.8 Lighting

No lighting is proposed around the beef cattle production pens or the drainage systems as the proposed development shall typically operate during daylight hours only.

Lighting is desired mainly for the convenience of the operator, for inspecting feed processing, handling cattle and administrative activities. Security and predator control are other advantages. Subsequently, the proposed development requires illumination of a number of elements within the complex. For example:

- Lighting shall be required around the cattle handling facilities (receivals/dispatch/processing) to allow for night loading and unloading of cattle.
- Internal and external lighting shall be required within the administrative/maintenance infrastructure for general illumination and safety for night activities.
- Lighting shall be required within the feed storage and processing for illumination for feed preparation activities undertaken outside of daylight hours.

No lighting is proposed around the production pen area or the drainage systems.

Any outdoor lighting installed will comply with Australian Standard AS1158.1.1 (2022 – Road Lighting) (Standards Australia, 2022) and AS4282 (2023 – Control of the Obtrusive Effects of Outdoor Lighting) (Standards Australia, 2023).

8.4.9 Controlled drainage area

Stormwater runoff from areas such as pens, livestock handling, solid waste storage and processing area and silage storage area has a high organic matter and therefore a high pollution potential. This runoff is controlled within a system that collects and conveys this runoff to a sedimentation basin and holding pond prior to environmentally acceptable utilisation.

The controlled drainage area of the proposed development includes the following elements:

- production pens
- cattle handling facilities including receival/dispatch facilities
- hospital facility, treatment and recovery pens
- solid waste storage and processing area
- cattle and vehicle washdown facilities
- cattle lanes
- feed lanes or alleys
- silage pits
- run-off catch drains
- sedimentation system
- holding pond.

The controlled drainage area is divided into three main sub-component areas, each of which has different runoff characteristics. These areas are:

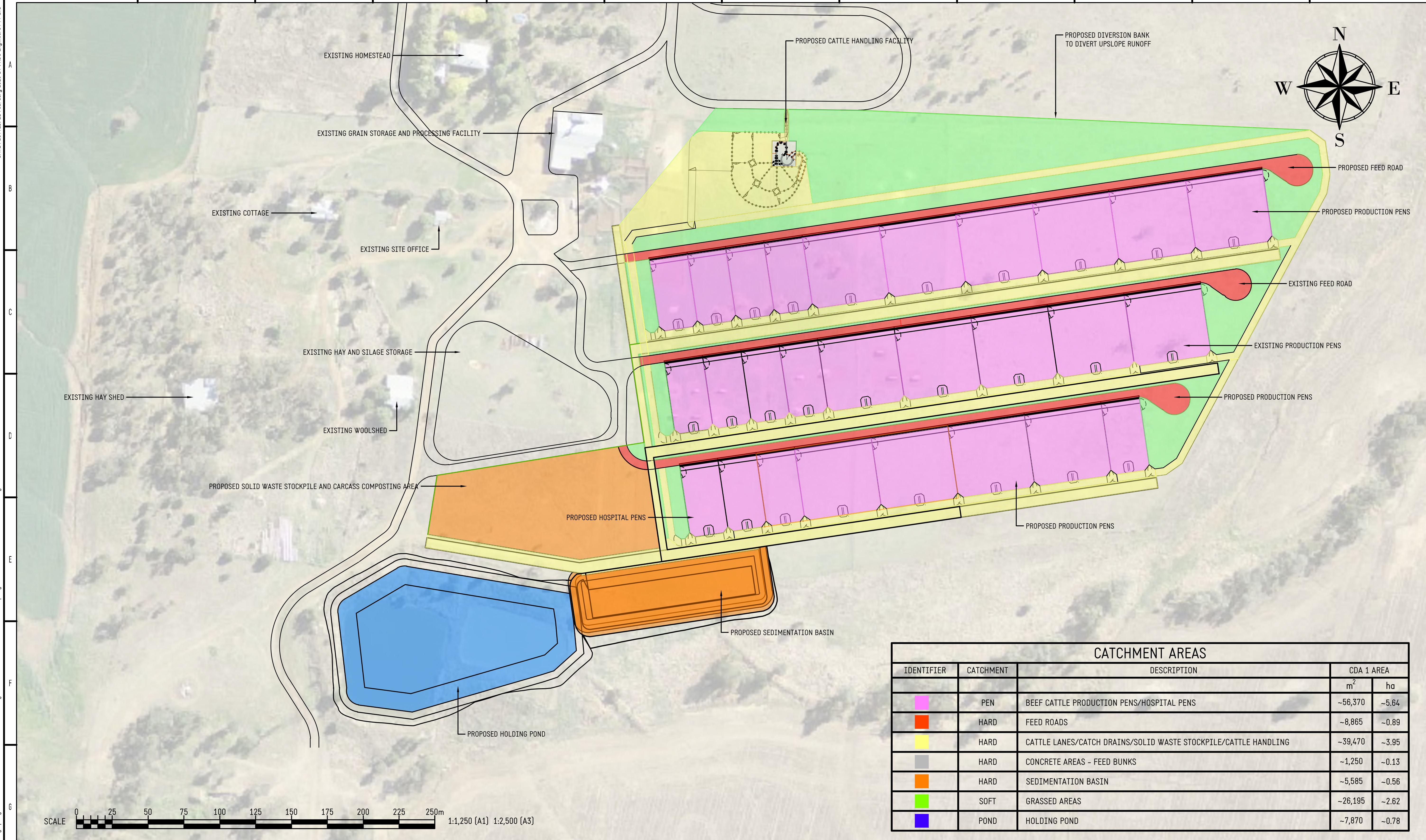
- pen area – areas containing cattle and covered with manure e.g. production pens, holding pens, hospital pens etc.
- hard catchment – areas with a high runoff yield including access roads, feed roads, cattle lanes, catch/main drains, roofed areas, truck wash and solid waste storage/carcass composting area, sedimentation basin etc.
- soft catchment – areas with a low runoff yield such as grassed and other vegetated areas within the controlled drainage area.

The controlled drainage area along with pen, hard and soft areas are shown on Figure 10.

Figure 10 shows the controlled drainage area plan for the proposed development. Table 6 summaries the areas of the sub-catchments shown in Figure 10. The sub-component catchment areas are needed to calculate the design volumes for the sedimentation basin and holding pond (sections 8.4.10.1 and 8.4.10.2). Varying runoff coefficients are applied to the different sub-catchments depending on surface characteristics.

Table 6 – Proposed development - Controlled Drainage Area catchment details

	Runoff coefficient	Catchment area Area m²
Pens – production pens, holding pens, hospital pens	0.8	~56,360
Hard – feed roads, cattle lanes, catch drains, solid waste stockpile and carcass composting area	0.8	~49,580
Hard – sedimentation basin	0.8	~5,585
Soft – grassed areas	0.4	~26,195
Holding pond – inside crest surface area	1.0	~7,735
Total		~145,455



CATCHMENT AREAS

IDENTIFIER	CATCHMENT	DESCRIPTION	CDA 1 AREA m²	CDA 1 AREA ha
(pink)	PEN	BEEF CATTLE PRODUCTION PENS/HOSPITAL PENS	~56,370	~5.64
(red)	HARD	FEED ROADS	~8,865	~0.89
(yellow)	HARD	CATTLE LANES/CATCH DRAINS/SOLID WASTE STOCKPILE/CATTLE HANDLING	~39,470	~3.95
(grey)	HARD	CONCRETE AREAS - FEED BUNKS	~1,250	~0.13
(orange)	HARD	SEDIMENTATION BASIN	~5,585	~0.56
(green)	SOFT	GRASSED AREAS	~26,195	~2.62
(blue)	POND	HOLDING POND	~7,870	~0.78

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CLIENT: DOOLIN FARMING PTY LTD
PROJECT: PROPOSED 3,000 HEAD BEEF CATTLE FEEDLOT
TITLE: DEVELOPMENT APPLICATION FOR INTENSIVE LIVESTOCK AGRICULTURE
ENVIRONMENTAL IMPACT STATEMENT
PROPOSED DEVELOPMENT - CONTROLLED DRAINAGE AREA

REPORT REFERENCE: FIGURE 10
SUPPLIED DRAWING NUMBER:
A3
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8.4.10 Drainage system

The controlled drainage area contains a system including catch drains, sedimentation system and holding pond for conveying stormwater, allow entrained sediment to 'settle out' and capture and storage of the stormwater from the controlled drainage area respectively.

Uncontaminated upslope runoff shall be diverted away from the controlled drainage area in order to minimise the quantity of contaminated runoff requiring treatment. An earthen diversion bank shall be constructed upslope of the controlled drainage area (north of the development complex) to direct clean stormwater around the development complex into existing drainage lines (Figure 10).

The specifications outlined in the NSW Feedlot manual (NSW Agriculture, 1997) shall be used to design the diversion bank(s). The diversion bank(s) design specifications include:

- carry peak flow rates resulting from a design storm event with an average recurrence interval of 20 years at non-scouring velocities
- provide embankment batters of 1V:3H or greater
- provide embankment freeboard of 0.5 m above the peak flow height.

Stormwater runoff from the controlled drainage area shall initially drain into a collection drain system, discharging into a sedimentation system and, finally, through to the holding pond.

Catch drains are located along bottom of each row of pens. Catch drains flow into a main drain that flows into the sedimentation basin. Drains shall be designed to produce velocities sufficient to transport manure without the solids settling, but not sufficient to produce scouring and erosion.

The specifications outlined in the NSW Feedlot manual (NSW Agriculture, 1997) shall be used to design the catch drains. The catch drains design specifications include:

- carry peak flow rates resulting from a design storm event with an average recurrence interval of 20 years at non-scouring velocities
- provide embankment batters of 1V:3H or greater
- provide embankment freeboard of 0.3 m above the peak flow height

The catch and main drains shall be designed with a slope between 0.5% and 0.75% at a width of 5 m. The final drain slope will be finalised during detailed design. These design parameters ensure a non-scouring velocity at the design storm event and wide enough to be easily maintained.

The main drain directs stormwater runoff into a sedimentation basin. The aim of the sedimentation basin is to allow the entrained manure and other solids to 'settle' from the stormwater runoff before it enters the holding pond.

8.4.10.1 Sedimentation system

The controlled drainage area shall have a dedicated sedimentation basin. Sedimentation basins are typically wide, shallow storages, with a maximum water ponding depth no greater than 1 m and are designed to drain completely (down to bed level) following a runoff event. Solids are deposited in a relatively thin layer over a large area, facilitating rapid drying after the liquid material has drained. Once dried the solids are removed at the earliest possible opportunity and stockpiled in the solid waste stockpile and carcass composting area.

The controlled drainage area has an existing dedicated sedimentation basin with an as-constructed capacity of 1,650 m^3 with a depth of 1.0 m.

The specifications outlined in the *National Guidelines for Beef Cattle Feedlots in Australia* (MLA, 2012b) were used to determine the minimum volume of the sedimentation basin. The sedimentation basin design specifications include:

- cater for the peak flow rate from a design storm having an average recurrence interval of 1 in 20 years; using runoff coefficients of 0.8 from production pens, roadways and other hard stand areas and 0.4 for grassed areas within the controlled drainage area;
- include a maximum flow velocity in the sedimentation system of 0.005 m/s;
- have the flow from the sedimentation system should be regulated by a control weir;
- provide embankment freeboard of 0.9 m above the top water level; and
- provide embankment batters of 1V:3H or greater.

The formula for determining the minimum volume of the sedimentation basin that services the controlled drainage area is:

$$V = Q_p \times (L/W) \times (\lambda/v)$$

Where:

V = sedimentation system volume (m^3);
Q_p = peak inflow for a design storm with an average recurrence interval of 20 years and duration equal to the time of concentration of the catchment (m^3/s);
L/W = length to width ratio, where l is the length in direction of flow;
λ = a scaling factor (2.5 for a basin);
v = flow velocity (m/s), <0.005 m/s

The sedimentation basin has a control outlet designed to temporarily retain stormwater within the sedimentation system. The control outlet regulates the discharge from the sedimentation system into the holding pond allowing the stormwater to drain freely from the entire depth of the settled sediment down to the bed of the basin and safely discharges flows in excess of the design flow.

Table 7 summarises the input parameters used to determine the minimum required volume of the sedimentation basin.

Table 7 – Proposed development – Sedimentation Basin design details

Parameter	Units		National Guidelines
Time of concentration	hours	T_c	0.49
Time of concentration	minutes	T_c	29.68
Rainfall Intensity	mm/hr	$I_{tc,20}$	81.30
Peak flow rate	m^3/s	Q_p	2.25
Lambda		λ	2.5
Length:Breadth ratio at TWL		L/W	2.5
Design flow velocity	m/s	v	0.005
Minimum required volume	m^3	V	2,814
Volume proposed (minimum)	m^3	V	**3,000**

There are several acceptable methods for determining the time of concentration of a small catchment. The time of concentration (Tc) is the time taken for rain that has fallen in the farthermost part of a catchment to flow to the discharge point. Thus, after Tc, the whole of the catchment is contributing to the discharge and the peak flow (Q) will only occur after this time.

The design for the sedimentation basin includes a length to width ratio (L/W) of about 2.5 at top water level, a minimum area of 5,585 m^2 at inside crest level, design side slopes of 1V:4H, a maximum stormwater storage depth of around 0.75 m and a freeboard of 0.9 m.

The rainfall intensity was selected from Intensity-Frequency-Duration (IFD) design rainfalls for the site for an average recurrence interval of 20 years and duration equal to the time of concentration of the catchment. The ARI design rainfalls for the site were obtained from the Bureau of Meteorology (BOM, 2024a) and are shown in Table 50 in section 13.1.3.2.

The minimum volume required for the sedimentation basin is 3,000 m^3 (Table 7) as calculated by the method outlined in the *National Guidelines for Beef Cattle Feedlots in Australia* (MLA, 2012a). The sedimentation basin has an as-constructed volume of 1,650 m^3 and therefore will need to be enlarged to cater for the proposed development.

The sedimentation basin shall have a control outlet designed to temporarily retain stormwater within the sedimentation system. The control outlet regulates the discharge from the sedimentation system into the holding pond allowing the stormwater to drain freely from the entire depth of the settled sediment down to the bed of the basin and safely discharges flows in excess of the design flow. An illustration of a horizontal slat control outlet weir is shown in Photograph 12.

Photograph 12 – Sedimentation basin horizontal slat control outlet weir

8.4.10.2 Holding pond

A holding pond shall be located at the lower end of the controlled drainage area, immediately below the sedimentation basin. The holding pond shall be designed to temporarily store stormwater runoff (effluent) from major storms (design storm method) and/or when extended wet periods prevent irrigation of wastewater so that pond overtopping events are prevented and / or limited to an acceptable frequency.

Effluent will be irrigated onto cropping land where it will be sustainably utilised by crops and soil to ensure storage capacity is available for future runoff events. The criteria outlined in the *NSW Feedlot Manual* (NSW Agriculture, 1997) were used to calculate the required holding pond volume and design parameters for the design storm.

The *NSW Feedlot manual* (NSW Agriculture, 1997) states that holding ponds should:

- be able to accommodate the greater volume produced from either:
  - a design storm having an average recurrence interval of 1 in 20 years; 24-hour duration and using runoff coefficients of 0.8 from production pens, roadways and other hard stand areas and 0.4 for grassed areas within the CDA; or
  - the balance of runoff from the CDA (making allowance for evaporative losses and withdrawals for irrigation) in a 90th percentile wet year. Volumetric runoff coefficients of 0.3-0.5 should be applied.
- provide embankment freeboard of 1 m above the top water level
- provide embankment batters of 1V:3H or greater and embankment width of at least 5 m for safe machinery access during construction and cleanout
- incorporate a spillway to cater for the peak flow rate from a design storm having an average recurrence interval of 1 in 50 years at non-scouring velocity.

The design approach outlined in *The National Guidelines for Beef Cattle feedlots* (MLA, 2012a) was used to calculate the required holding pond volume and design parameters for extended wet periods so that spills occur no more frequently than an average of one in 10 years.

The *National Guidelines for Beef Cattle feedlots* (MLA, 2012a) states that holding ponds should comply with the following design standard:

- Holding ponds should have sufficient storage capacity so that:
  - Normal holding ponds (i.e. those from which wastewater is routinely extracted for land application) spill no more frequently than an average of one in 10 years.
  - Evaporation ponds (i.e. those from which there is normally no land application of captured wastewater) spill no more frequently than an average of one in 20 years.
- The holding pond should have a weir and bywash capable of discharging the peak flow from the controlled drainage area from a 50-year ARI design storm.
- A minimum freeboard of at least 0.9 m should be provided between the crest of the discharge weir and the crest of the holding pond embankment.
- The holding pond should be underlain by a minimum of 300 mm clay or other suitable compactable soil, or by a synthetic liner able to provide a design permeability of <1 x 10^{-9} m/s (~0.1 mm/d).

Method 1 – Major storm event

The design volume of the holding pond during a 1 in 20 year (Average Recurrence Interval); 24-hour duration storm event was calculated in accordance with the NSW Feedlot Manual (NSW Agriculture, 1997).

For this approach, the design calculation requires catchment area, 24 hr rainfall at an average recurrence interval of 20 years and runoff coefficients from each catchment area.

The area of each sub-component area was determined from the proposed site layout as outlined in section 8.4.9. These data are shown in Table 6. Initially, an approximate surface area for the holding pond was assumed, then an iterative approach used to determine the holding pond volume and design surface area.

The 1 in 20 year, 24 hr rainfall for the development site was obtained from BoM Intensity-Frequency-Duration data as outlined in section 13.1.3.

Runoff coefficients were 0.8 for the feedlot pens and other hard catchment (balance) areas, 0.4 for grassed areas and 1.0 for rainfall falling on the holding pond surface.

The runoff volume in Table 8 is calculated by multiplying the catchment area by the runoff depth. The minimum required holding pond volume is the cumulative total of the runoff volumes for each sub-component catchment area. The minimum holding pond volume required using the Major Storm Event method is 13,016 m^3 (13.02 ML).

Table 8 – Proposed development – Holding pond design - Method 1 (Major storm event)

Parameter	Units	Pen area	Hard area	Soft area	Pond area	Total
Catchment area	m^2	~56,370	~55,170	~26,195	~7,870	~145,520
Rainfall event	mm	121	121	121	121	121
Runoff co-efficient		0.8	0.8	0.4	1	-
Runoff depth	mm	96.8	96.8	48.4	121	-
Runoff volume	m^3	~5,456	~5,340	~1,268	~952	~13,016
Runoff volume	ML	~5.46	~5.34	~1.27	~0.94	~13.02

Method 2 – Annual water balance

The *National Guidelines for Beef Cattle feedlots* (MLA, 2012a) annual water balance method requires effluent holding ponds to be able to retain the balance of runoff from the CDA, while making allowances for irrigation in a 90th percentile wet year.

A site-specific small catchment daily-time-step hydrological model (Model for Effluent Disposal via Land Irrigation (MEDLI)) was used to size the holding pond using the annual water balance method (Gardner et al, 1996); Department of Environment and Science, 2023)).

The annual water balance was run through a number of times to determine a holding pond capacity that notionally spills at the required frequency (i.e. no more often than an average of one in 10 years). The *National Guidelines for Beef Cattle feedlots* (MLA, 2012a) state that once a pond has 'spilled' in this type of modelling, the likelihood of another modelled spill occurring within the next few days is quite high; thus, modelled spill events within 30 days of one another should be treated as a single spill for the purpose of annual water balance calculations. Subsequently, any spills within 30 days have been considered as a single spill in the annual water balance calculations. Operationally, it is likely that the feedlot manager would be able to intervene in these circumstances, and possibly avert secondary spills.

The sustainability of the effluent utilisation system is dependent on balanced hydraulic and nutrient loads.

Table 9 shows a monthly summary of the daily-step water balance for the period (1924-2023) for Holding Pond 1 with the modelled scenarios for the existing controlled drainage area.

Table 9 – Proposed development – Holding Pond 1 – Water Balance

	Rainfall	Evaporation	Pond inflow		Pond outflow	
			Rain in	Runoff	Evaporation	Effluent irrigated
	mm	mm	ML	ML	ML	ML
January	80.0	247.8	0.6	3.0	0.9	2.6
February	73.5	201.3	0.6	3.2	0.8	2.0
March	59.6	186.0	0.5	2.3	0.7	2.5
April	31.8	130.6	0.2	1.1	0.5	1.0
May	38.3	87.8	0.3	1.4	0.3	1.2
June	37.0	62.9	0.3	1.1	0.2	0.3
July	39.1	69.0	0.3	1.3	0.3	0.9
August	32.8	97.7	0.3	0.9	0.4	0.9
September	34.7	139.6	0.3	0.9	0.5	1.2
October	55.3	187.7	0.4	1.7	0.7	1.7
November	65.5	217.9	0.5	2.1	0.8	0.9
December	69.7	246.8	0.5	2.0	0.9	2.3
Total	617.2	1,875.7	4.9	21.2	7.2	18.0

Table 9 shows that the annual inflow to the pond was estimated by the MEDLI feedlot model to be 26.1 ML which includes rainfall on the pond surface and runoff from the pen, hard and soft catchment areas. Table 9 shows that the annual outflow from the pond was estimated by the MEDLI feedlot model to be 25.2 ML which includes evaporation and irrigation. The balance comprises overtopping, sludge accumulation and seepage.

The volume of Holding Pond 1 over the modelling period is shown in Figure 11. The MEDLI model predicts that a holding pond with a volume of 20.0 ML and a surface area of about 7,870 m^2 (0.77 ha) will restrict any overtopping events to a frequency of less than once every 10 years as shown in Figure 12. In accordance with the *National Guidelines for Beef Cattle Feedlots* (MLA, 2012a), the number of spills within 30 days of one another has been treated as a single spill event for the purpose of these model calculations.

The holding pond shall have a bywash capable of discharging the peak flow from the controlled drainage area from a 50-year ARI design storm.

A minimum freeboard of at least 0.9 m shall be provided between the bywash level and the crest of the holding pond embankment.

During operation, various mitigation measures shall be implemented to mitigate the potential environmental impact of additional overflows within a 30-day period. These measures are outlined in section 8.7.5.1.1 and included in the Operation Solid and Liquid Waste Management Plan presented in Appendix P.

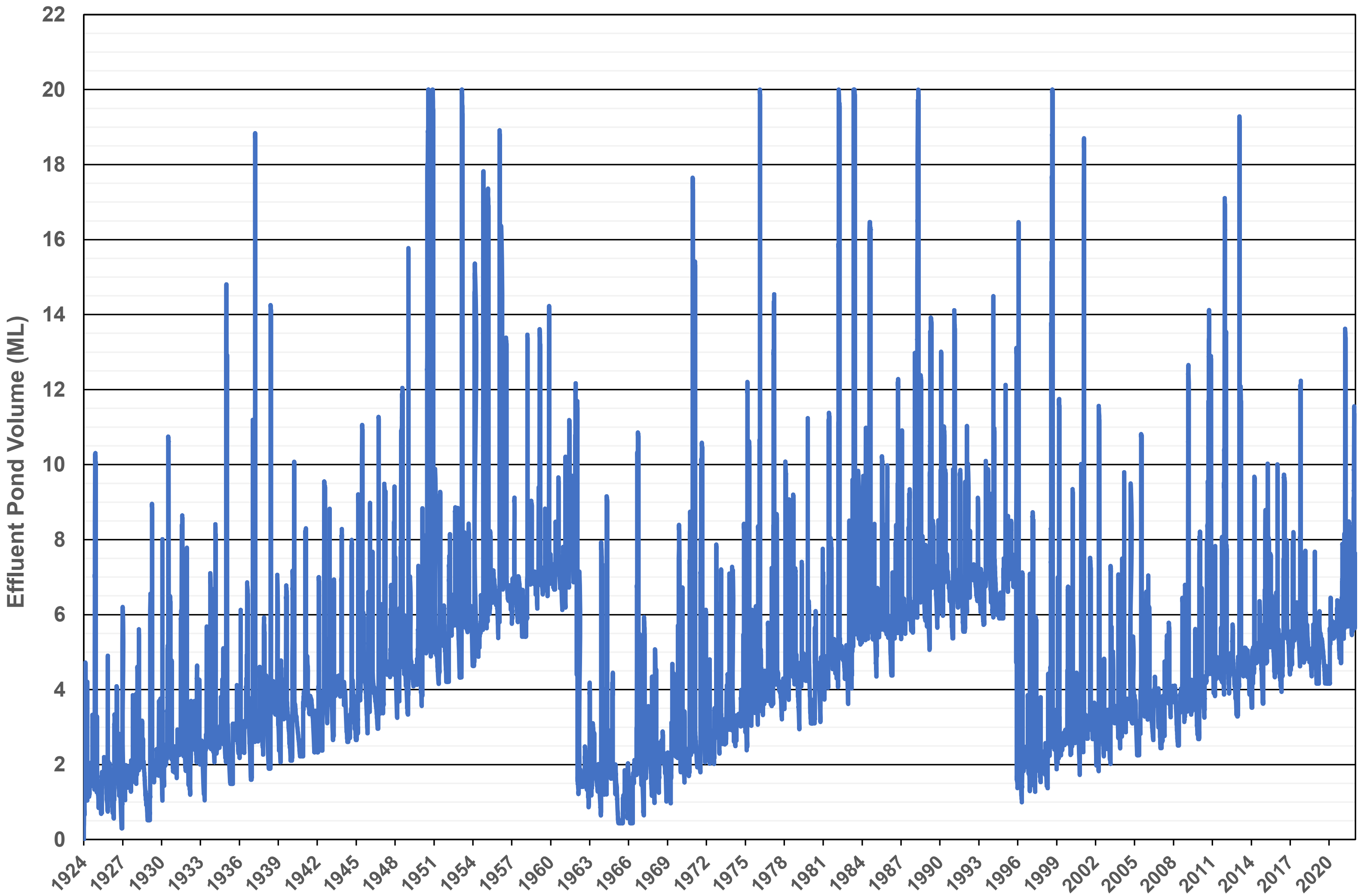

Figure 11 – Proposed development – CDA 1 – Holding Pond 1 volume

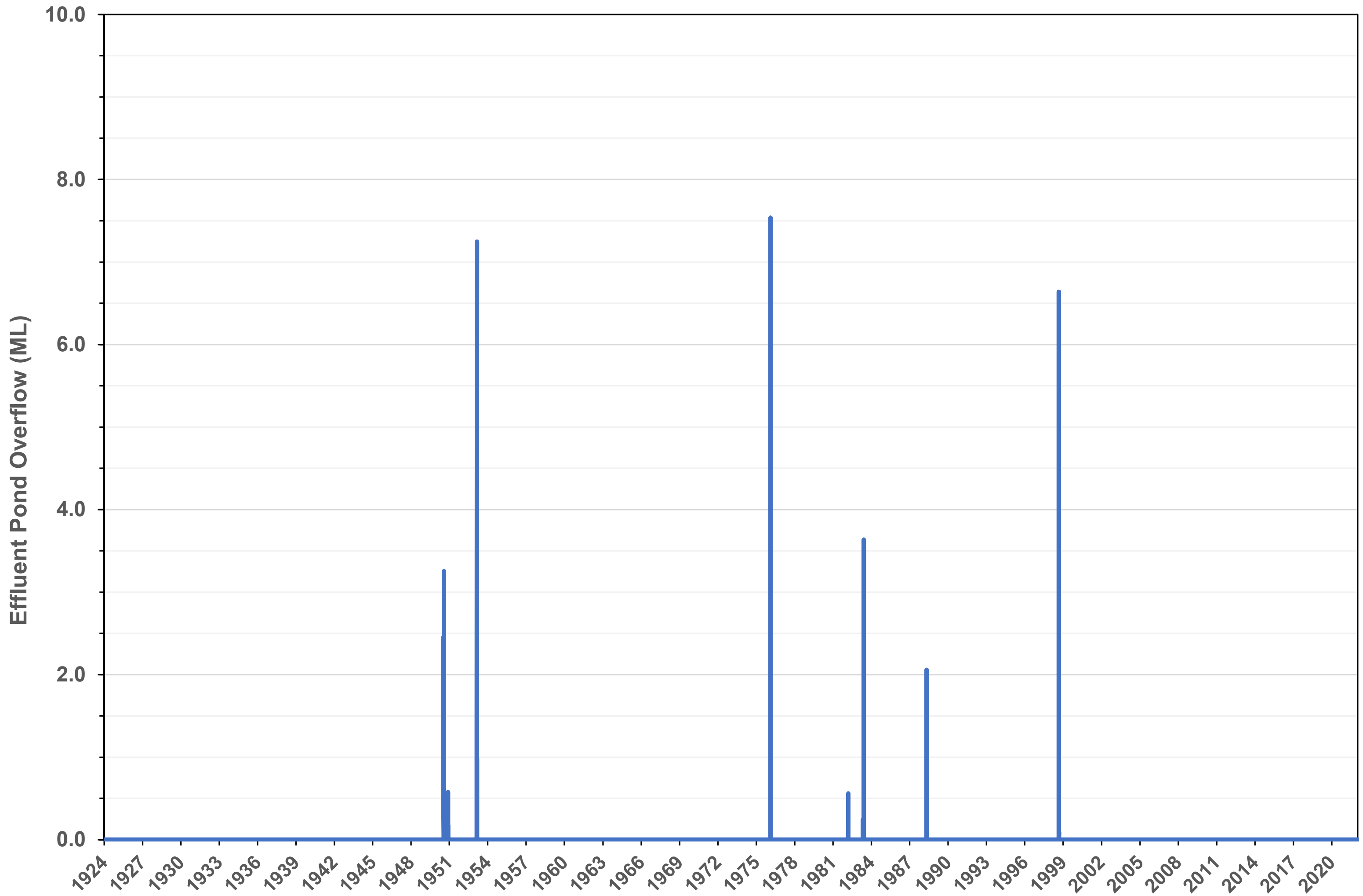

Figure 12 – Proposed development – CDA 1 – Holding Pond 1 overflow

8.4.11 Solid and liquid waste management system

The disposal of solid and liquid waste (effluent) is a major consideration in the siting, structure and management of a beef cattle feedlot. The proposed development shall produce significant amounts of putrescible solid and liquid waste (effluent) as outlined below.

All other non-putrescible and domestic putrescible solid wastes shall be removed off-site for recycling, recovery or disposal at a suitable facility. Domestic sewage shall be disposed of on-site through via approved treatment and land disposal as discussed in section 13.10.7.4.3.

8.4.11.1 Solid wastes

The types of putrescible solid waste generated by the proposed development are outlined in the following sections. All other non-putrescible and domestic putrescible solid wastes shall be removed off-site for recycling, recovery or disposal at a suitable facility. The proposed development is expected to generate negligible quantities of non-putrescible and domestic putrescible solid wastes.

8.4.11.2 Manure

Manure is the solid waste produced by cattle. Manure is the faeces and urine excreted by the cattle. Manure also includes those solids that have settled from the stormwater runoff in the sedimentation basin and which are removed after drying. Manure is the principal solid waste for management.

Manure is the solid waste produced by cattle. Manure is the faeces and urine excreted by the cattle. Since manure includes both faeces and urine, freshly excreted manure has a moisture content of around 90%. However, it usually dries quickly once deposited on the pen surface.

Excreted manure consists of:

- total solids (TS) – the dry matter content of the manure made up of volatile and fixed solid components
- volatile solids (VS) – the organic fraction of TS
- fixed solids (FS) or ash – the inorganic fraction of TS
- moisture – determined from the weight of the material less TS.

Manure also includes those solids that have settled from the stormwater runoff in the sedimentation basin and which are removed after drying. Manure is the major solid waste for management.

8.4.11.3 Waste feed

Typically, in well managed feedlots, very low levels of feed commodities or rations are wasted through spillage or spoilage. However, feed rations in feed bunks may become wet and unpalatable in rainy weather and cattle may go off their feed. Under these circumstances the ration is spoiled and removed from the bunk and deposited within the pen or taken directly to the solid waste storage area.

8.4.11.4 Mortalities

Very few mortalities are anticipated with the proposed development as the proposed development shall predominantly feed the applicants own cattle. Any mortalities are composted within the solid waste stockpile and carcass composting area. Composting shall continue to be the method used for disposal of carcasses as composting yields a product for utilisation and is ecologically sustainable when compared to other methods of disposal such as burial and incineration. Most Australian beef cattle feedlots use composting for managing mortalities (MLA, 2012b).

Carcass composting will be undertaken in line with the principles outlined in the Waste Management and Utilisation Guidelines (MLA, 2015b).

The mortality rate in beef cattle feedlots is generally low and constant (less than 1%). Carcasses are removed from the pens following the daily pen inspection. Losses tend to be higher in those operations receiving cattle purchased from saleyards compared to those receiving backgrounded cattle. Cattle from saleyards take longer to adjust the lot feeding environment and thus more susceptible to disease during this time. Most mortalities occur relatively early in the feeding period.

The overall number of mortalities is greater when feeding short-fed cattle when compared to long-fed cattle as the turnover is higher.

Composting shall be the method used for disposal of carcasses as composting yields a product for utilisation and is ecological sustainable when compared to other methods of disposal such as burial and incineration. Most Australian feedlots use composting for managing mortalities (MLA, 2012b).

Whilst carcasses of the estimated numbers of mortalities shall be composted, a contingency plan to manage the disposal of large numbers of unexpected mortalities shall be developed in accordance with relevant guidelines and form part of the proposed developments quality assurance and NFAS standards. Section 8.7.14 outlines the process for the emergency disposal of mass mortalities.

8.4.11.5 Solid waste storage

A dedicated area is required to temporarily store manure after it has been removed from the pens, sedimentation basin and sludge from the holding pond when agricultural land is not ready for the application of manure or when it may not be possible to directly remove it from the subject land.

The composting of mortalities shall be undertaken within the solid waste stockpile and carcass composting area.

The storage, processing and/or composting of solid wastes shall be undertaken on a suitably designed and constructed area within Controlled Drainage Area 1.

The solid waste stockpile and carcass composting area shall be constructed using the specifications outlined in 8.6.1.15 and have a floor slope of 3% towards the sedimentation basin servicing the controlled drainage area to ensure drainage. Figure 6 shows the location of the solid waste stockpile and carcass composting area and Controlled Drainage Area 1.

As outlined in section 8.7.4, BEEFBAL (V10.01) (DAF, 2019) estimates some 1,490 t of manure on a dry matter basis harvested from the pens per year. Based on a scraped manure moisture content of 40%, this translates into some 2,485 t of wet scraped manure per year to the stockpile.

The area of the solid waste storage area was estimated based on the estimated volume of solid waste produced from BEEFBAL (DAF, 2019) and assuming each solid waste windrow is triangular shaped, with 1 vertical to 4 horizontal batters (1V:4H) and no higher than 2.5 m and a bulk density of solid waste of about 0.6 t/m^3.

With the assumed windrow dimensions some 4,150 m^2 of pad area is required to store and process harvested manure. An area for composting of carcasses has been allowed adjacent to the manure stockpiles. A total area of about 9,475 m^2 (~0.948 ha) has been allowed for solid waste stockpile and carcass composting.

8.4.11.6 Liquid waste

Stormwater run-off from the controlled drainage area is described as ‘effluent’. Because it has been in contact with manure, the effluent is high in nutrients and has the potential to pollute surface water and groundwater. Effluent shall be collected, temporarily held in the sedimentation basin and then stored in the holding pond until it can be used as outlined in section 8.4.10.

An existing underground mainline shall be used to convey effluent stored in the holding pond to the effluent utilisation area. No additional infrastructure is required.

8.4.11.7 Waste utilisation area

Solid waste (e.g. manure, carcass compost, holding pond sludge) is valued as a source of nutrients for fertilising crops or pasture and therefore, shall be applied to land where it can be sustainably utilised by crops or pasture and soil. The application rates depend on factors such as the solid waste chemical characteristics, physical and chemical characteristics of the soils, type of crops grown and climate.

Utilisation of solid wastes will substitute a percentage of the synthetic fertilisers that would otherwise be trucked-in for use in the cropping program on the subject land. Various crops or pasture shall be grown on the solid waste utilisation area. Crops will be harvested for grain and straw to use as feed commodities in the proposed development.

Solid waste shall be applied sustainably to cropping land using a tractor drawn moving bed manure spreader or similar equipment on the subject land or removed off-site to be used as a soil conditioner and organic fertiliser on cropping and pasture operations on adjoining land leased by the proponent or other cropping land in the local region.

Effluent is valued as a source of nutrients for fertilising crops and therefore, shall be applied to land where it can be sustainably utilised by crops and soil. Land is required for the long- term application of water, nutrients, salts and organic loads in the effluent and solid wastes.

The effluent and solid waste utilisation areas have been selected and sized to be ecologically sustainable to prevent environmental harm, especially to soils, groundwater and surface water and to avoid impacts to native vegetation and aboriginal heritage.

The effluent utilisation system is a full utilisation system. In this system, the effluent is fully used (thereby no discharges to surface waters), with the area required for irrigation determined by calculating the limiting land area using a water and nutrient balance.

The amount of water, nutrients and organic matter for optimum sustainable production of the cropping system is a function of the crop, the agronomic system employed, and site-specific factors such as climate, topography and soil type.

The methodology for sizing the effluent utilisation area is provided in section 13.11. Figure 13 shows the effluent utilisation area for the proposed development. The amount of land proposed to be irrigated is approximately 120 ha. The details of the irrigation system proposed are discussed in section 13.11.6.

Similarly, solid waste (manure, spoilt feed, sludge) is valued as a source of nutrients for fertilising crops or pasture and therefore, shall be applied to land where it can be sustainably utilised by crops or pasture and soil. The application rates depend on factors such as the solid waste chemical characteristics, physical and chemical characteristics of the soils, type of crops grown and climate. The land area required for solid waste application was determined by calculating the limiting land area using a nutrient balance.

The methodology for sizing the solid waste utilisation area is provided in section 13.11. Figure 13 shows the solid waste utilisation area for the proposed development. The amount of land available on the subject land to be applied with solid wastes is approximately 900 ha. The balance of solid wastes generated by the proposed development will be exported off-site to adjoining land owned by the applicant for sustainable use. The details of the application system proposed are discussed in section 13.11.4

LEGEND

- SUBJECT LAND BOUNDARY
- LAND PARCEL BOUNDARY
- EXISTING AND PROPOSED EFFLUENT UTILISATION AREA
- EXISTING AND PROPOSED SOLID WASTE UTILISATION AREA

NOTES:

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FIGURE 13		A3	E2-103-00-13	B

DATE PLOTTED: 20 February 2025 BY: RDC Engineers PTY LTD

8.4.11.8 Environmental buffers

When planning the effluent utilisation area, consideration of the separation of these areas from neighbours and sensitive environments was considered. The rationale for separating these land uses is to protect the locality's ground and surface waters, other environmental and social values as well the long-term future of the effluent utilisation area.

A buffer distance shall also be applied where the application of effluent takes place within proximity to areas likely to be used by the public at that time. The appropriateness of the applied buffer distance has been determined having consideration for the qualities of the materials being applied, weather conditions and other environmental factors; as well as the anticipated level of public usage or exposure at those times.

The adopted buffer distances between effluent utilisation areas and water resources and public areas are provided in Table 10.

When planning the waste utilisation areas, consideration of the separation of these areas from neighbours and sensitive environments was considered. The rationale for separating these land uses is to protect the locality's ground and surface waters, other environmental and social values as well the long-term future of the waste utilisation areas.

A buffer distance shall also be applied where the application of effluent and/or solid wastes takes place within close proximity to Getta Getta Road, or other areas likely to be used by the public at that time. The appropriateness of the applied buffer distance has been determined having consideration for the qualities of the materials being applied, weather conditions and other environmental factors; as well as the anticipated level of public usage or exposure at those times.

The buffer zones are the final strategy to provide a margin of safety to the range of impact mitigation designed throughout the system and are not a substitute for effective waste utilisation system design.

The adopted buffer distances between effluent and solid waste utilisation areas and water resources and public areas are provided in Table 10. These buffer distances are based on recommended buffer distances in the NSW Feedlot Guidelines (NSW Agriculture, 1997), the NSW Effluent Guidelines (Department of Environment and Conservation (NSW), 2004) and site-specific assessment. The proposed buffer distances to water resources and public areas are shown on Figure 14.

Table 10 – Proposed development – Proposed buffer distances to water resources and public areas

Sensitive area	Minimum separation distance		Impact of concern/comments
	Effluent m	Solid waste m	
Watercourses*	100	50	Protection of water quality and aquatic ecosystems.
Drainage lines#	50	25	Protection of water quality for most sensitive water uses of the potentially affected waterbody.
Bore – Domestic supply	50	50	Groundwater quality for domestic human uses protected.
Roads	25^	25	Avoidance of spray drift of effluent containing pathogens offsite.
Public spaces	50^	50	Avoidance of spray drift of effluent containing pathogens offsite.

*Watercourses – Stream Order 3 or higher.
#Drainage line – Stream Order 1 and Stream Order 2
^Where irrigation gives rise to aerosols.

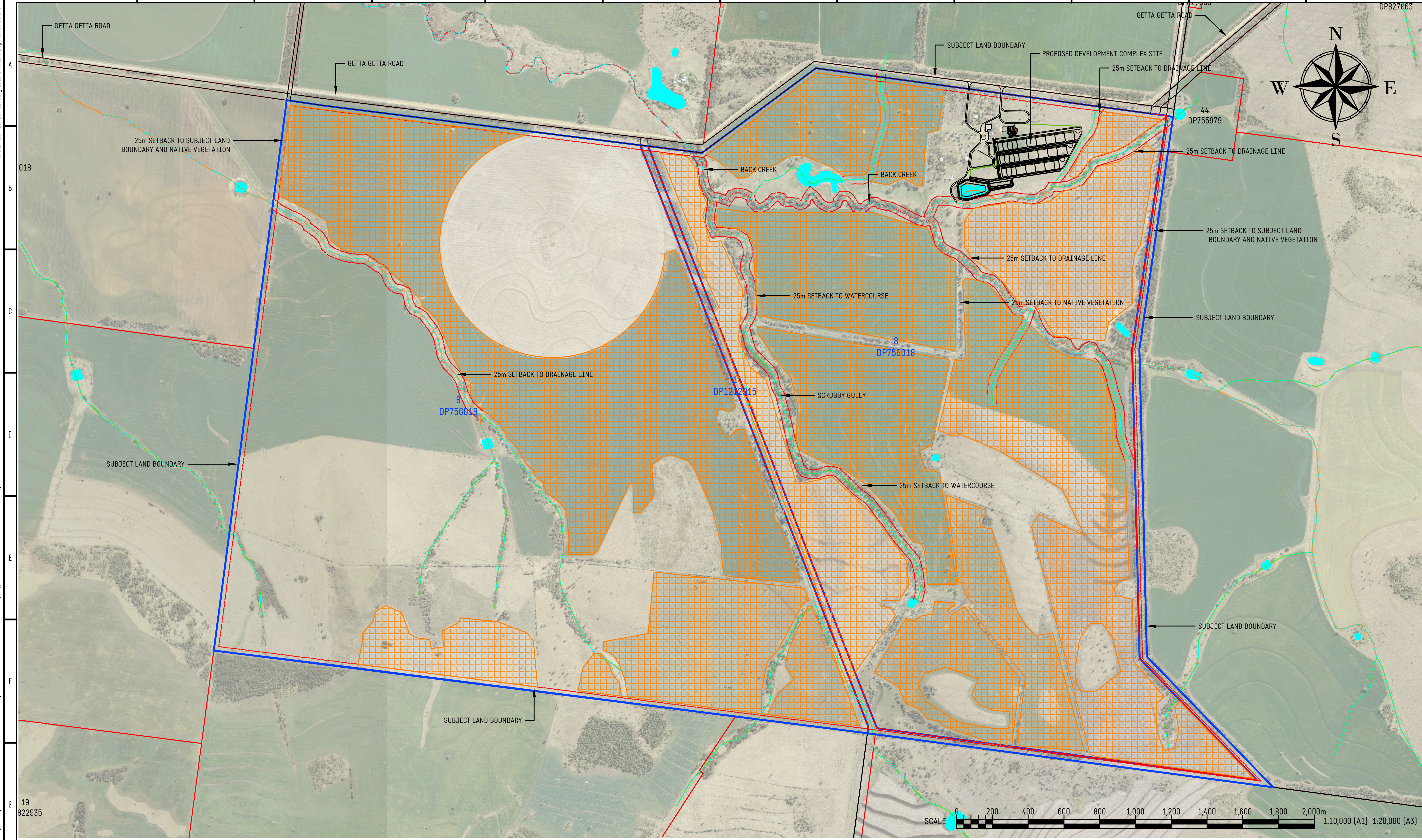
When determining the size of a separation distance the nature of the buffer zone and techniques to avoid impacts must be considered. Where a buffer zone for a spray irrigation proposal is characterised by flat, open country where ground cover is predominantly pasture separation distances may need to be in the order of hundreds of metres to protect sensitive receptors. The same irrigation scheme may require a separation distance of only tens of metres if impact mitigation strategies such as tree and shrub planting in the buffer zone, lower height and pressure of sprayers and larger droplet sizes are incorporated (DEC, 2004).

A review of relevant State and National Guidelines for environmental buffers between sensitive sites and cattle feedlot waste utilisation areas has identified the recommendations shown in Table 11.

Consequently, a buffer of 25 m for solid waste utilisation to roads and internal drainage lines has been adopted and solid waste shall be incorporated into the soil after application. Similarly, a buffer of 25 m for effluent utilisation to roads and 50 m to internal drainage lines has been adopted as effluent shall be applied via low pressure overhead spray and spray drift is not anticipated.

Table 11 – Proposed development – Consideration of feedlot waste utilisation and appropriate buffers

Cattle Feedlot-EIS Guideline - New South Wales (DUAP, 1996)	Describes feedlot waste as a key issue due to amenity and environmental impacts. Discusses the need to consider climate, land capability, flood prone nature of the site, feedlot design and management, the existing landscape and environment features such as surface and ground water proximity. No specific setbacks or buffers are described.
NSW Feedlot manual (NSW Agriculture, 1997)	Recommends a 30 m buffer to surface water for manure if incorporated within 48hours
Effluent reuse management – strategic environmental compliance and performance review (DECCW, 2010)	When selecting a site for effluent irrigation, consider the potential impacts on surrounding land uses and sensitive environments. These include neighbouring properties, public roads, surface and groundwater and environmentally sensitive areas such as drinking-water catchments, wetlands and native vegetation. Does not prescribe buffers for waste reuse areas related to feedlots.
NSW Beef Cattle Feedlot Guidance Note (DCCEEW, 2024)	Describes feedlot waste utilisation as a risk for offsite odour impacts. The potential for air emissions to impact on receptors depends largely on the proximity of receptors to the application area and the dispersion conditions at the time of application. The document also recommends timing waste management activities to reduce the risk of down wind impacts. Makes no specific buffer recommendations.
MLA Beef Cattle Feedlots: Waste Management and Utilisation (MLA, 2016)	Makes no specific recommendations on buffers other than stating that buffers need to be suitable to reduce the risk of impacts to sensitive sites, surface and ground waters and to provide adequate separation between nearby residences to reduce the likelihood of odour nuisance.
Victorian Code for Cattle Feedlots (Victoria, 1995)	Specifies a minimum site boundary buffer for liquid and solid waste from feedlots of 20 m and 100m to a public area.
National Guidelines for Beef Cattle Feedlots in Australia 3rd Edition (MLA, 2012a), the	The National Feedlot Guideline (3rd edition) does not specify buffers between sensitive sites and waste reuse areas. The document focus on performance based management measures to reduce the risk of offsite impacts from the management of feedlot waste products.
National Beef Cattle Feedlot Environmental Code of Practice, 2nd Edition (MLA, 2012b),	The National Feedlot Code (2nd edition) does not specify buffers between sensitive sites and waste reuse areas. The document focuses on performance based management measures to reduce the risk of offsite impacts from the management of feedlot waste products.



LEGEND

- SUBJECT LAND BOUNDARY
- LAND PARCEL BOUNDARY
- EXISTING AND PROPOSED EFFLUENT UTILISATION AREA
- EXISTING AND PROPOSED SOLID WASTE UTILISATION AREA

NOTES:

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4. HORIZONTAL DATUM - UTM ZONE 56.

STATUS
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REV.	DATE	REVISION DESCRIPTION	DRAWN	CHECK	APPROVED
A	24/01/25	DRAFT ISSUE TO CLIENT	RJD	RJD	RJD
B	21/02/25	FINAL ISSUE FOR SUBMISSION TO GSC	RJD	RJD	RJD

SCALE	1:20,000 (A3)
DRAWN	RJD
DATE	21/02/2025
CHECKED	RJD
DATE	21/02/2025
APPROVED	RJD
DATE	21/02/2025

CLIENT: DOOLIN FARMING PTY LTD
PROJECT: PROPOSED 3,000 HEAD BEEF CATTLE FEEDLOT
TITLE: DEVELOPMENT APPLICATION FOR INTENSIVE LIVESTOCK AGRICULTURE
ENVIRONMENTAL IMPACT STATEMENT
PROPOSED DEVELOPMENT - ENVIRONMENTAL BUFFERS

REPORT REFERENCE: FIGURE 14
SUPPLIED DRAWING NUMBER:
A3
DRAWING NUMBER: E2-103-00-14
REV. B

DATE PLOTTED: 20 February 2025 BY : RDC Engineers PTY LTD
FILE PATH: C:\RDC Engineers\RDCE - Projects\E2-103 Doolin Farming Springfield EIS\05 - ACAD MasterPlan\05.1 Drawings - CURRENT FILE NAME: E2-103 DF Springfield MASTERPLAN-00-20250108vB.dwg

8.4.12 Utilities

The proposed development will not require any extension and or upgrade of electricity services from the existing property overhead supply to service the electricity demand of facilities such as the office, feed storage and processing, water pumping, lighting and ancillary services etc.

Feed processing is the largest single consumer of electricity within the development and requires require considerable power for conveying and processing grains. Existing infrastructure will meet the energy requirements of the proposed infrastructure.

Communications services to the existing office and ancillary buildings are in place and adequate for the proposed expansion.

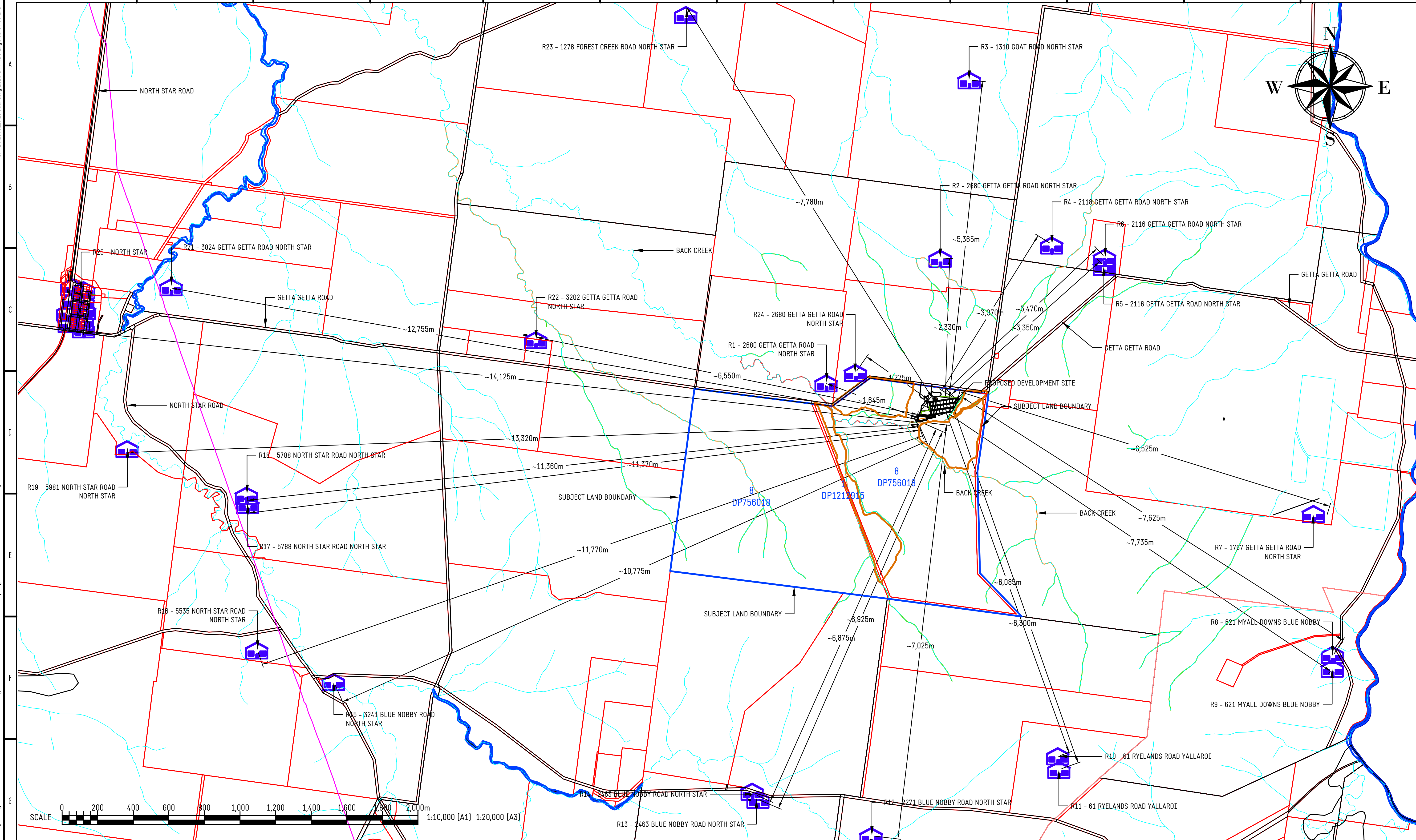
The proposed development also requires a reliable source of water to service the water demands of livestock drinking water and sundry uses such as staff amenities. The proposed water supply would be from existing surface water and groundwater allocations. Potable water would be from rainwater and supplemented from groundwater supply as required.

8.5 Separation distances

The proposed development shall be sited and designed to prevent or minimise adverse impacts on the amenity of the surrounding community.

The proposed development is relation to existing residential development, rural-residential development, rural residences and other sensitive land uses is shown on Figure 15.

Section 13 demonstrates that the proposed development has the capability for sustained compliance with relevant dust, noise and odour, does not detract from visual amenity, does not comprise a site of cultural heritage value, away from incompatible land uses and does not impact on road safety and traffic levels.



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LEGEND

- SUBJECT LAND BOUNDARY
- LAND PARCEL BOUNDARY
- RURAL RESIDENTIAL RECEPTOR
- SMALL TOWN RECEPTOR
- STREAM ORDER 1
- STREAM ORDER 2
- STREAM ORDER 3
- STREAM ORDER 4
- STREAM ORDER 5
- STREAM ORDER 6
- STREAM ORDER 7
- STREAM ORDER 8

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4. HORIZONTAL DATUM - MGA 94 (UTM ZONE 56).

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CLIENT: DOOLIN FARMING PTY LTD

PROJECT: PROPOSED 3,000 HEAD BEEF CATTLE FEEDLOT

TITLE: DEVELOPMENT APPLICATION FOR INTENSIVE LIVESTOCK AGRICULTURE
ENVIRONMENTAL IMPACT STATEMENT
SUBJECT LAND - SEPARATION TO SENSITIVE RECEPTORS

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 15		A3	E2-103-00-15	B

8.6 Construction

The construction phase shall commence after development consent and any other relevant permits are obtained and detailed design and component specifications have been completed.

The proposed development involves the phased construction of the development complex in up to two stages.

8.6.1 Construction process

The process of constructing the proposed development involves a number of steps. A brief outline of these steps is provided in the following sections.

8.6.1.1 Area set-out

The layout of the proposed development must be transferred from design to on-ground at the site with precision and detail. The approach shall include the traditional method of pegging the physical position as well as using GPS-guided machinery.

GPS-guided (machine control) plant provides independent operation and less survey pegging resulting in significant cost benefits, improved accuracy, easy design updates, the inclusion of unplanned works and increased safety. All construction machinery shall be equipped with machine-control.

The proposed development layout must be transferred from design to on-ground at the site with precision and detail. The approach shall include the traditional method of pegging the physical position as well as using GPS-guided machinery.

GPS-guided (machine control) plant provides independent operation and less survey pegging resulting in significant cost benefits, improved accuracy, easy design updates, the inclusion of unplanned works and increased safety. All construction machinery can be equipped with machine-control.

8.6.1.2 Clearing and grubbing

Clearing is carried out in advance of any earthwork operations on areas affected by earthworks or other areas to be cleared as designated on the approved construction plans.

The area to be cleared is that required by site works, including the area occupied by the production pens, access and feed roads, drains, sedimentation basin, holding pond and solid waste stockpile and carcass composting area plus appropriate clearance of some 5 m beyond tops of cuts and toes of embankments.

The absolute minimum area for construction of site works shall only be cleared. Before clearing commences, the limits of clearing shall be marked by pegs placed at 25 m intervals around the area to be cleared.

Clearing consists of the removal of vegetation both living and dead, all minor man-made structures, all rubbish and other materials unsuitable for use in the works except where such trees, vegetation, structures etc are designated for preservation. Any vegetation or man-made structures to remain shall be appropriately marked.

Trees that shall be preserved shall be protected during site works by the erection of barricades, generally at a distance of 4 m from the trunk of the tree.

The material to be cleared shall include, but not be limited to, trees, stumps (parts above ground), logs, bushes, undergrowth, grasses, large rocks and fences.

Grubbing consists of the removal of vegetation, the bases of stumps, roots and other obstructions to a depth not less than 300 mm below the natural surface or 1.5 m below the finished surface level whichever is the lower in areas where bulk earthworks will be required unless otherwise specified in the earthworks specifications.

Holes remaining after trees and stumps have been grubbed shall be backfilled with sound material to prevent the infiltration and ponding of water. The backfilling material shall be compacted to at least the relative density of the material existing in the adjacent ground.

8.6.1.3 Bulk earthworks

Bulk earthworks create the foundations of the engineering works on the site such as beef cattle production and hospital pens, runoff and drainage control, feed and access roads, sedimentation basin, holding pond and buildings and structures that are to be erected.

The standard of the bulk earthworks will have a profound effect on protection of the environment and the ongoing maintenance costs of the proposed development.

Bulk earthworks create the foundations of the engineering works on the site such as pens, runoff and drainage control, drains, feed and access roads, sedimentation basin, holding pond and buildings and structures that are to be erected.

The standard of the bulk earthworks will have a profound effect on protection of the environment and the ongoing maintenance costs of the proposed development.

8.6.1.4 Blasting

Due to the material strata, no blasting is expected to be required during the construction of the proposed development.

8.6.1.5 Topsoil stripping

Topsoil is surface soil which is normally high in organic material and contaminated by residual grass seed and grass roots and reasonably free from subsoil, refuse, clay lumps and large stones.

Topsoil is unsuitable for use in bulk earthworks due to the high organic matter and contamination by other materials (e.g. rocks and timber).

Topsoil can only be removed once clearing and grubbing and disposal of materials have been completed and sediment and erosion control measures have been implemented on that section of the works.

Topsoil shall be stripped to a minimum depth of around 100 mm with the stripped material to be stockpiled in areas outside of the area to be covered by the works for subsequent spreading on areas marked for revegetation upon completion of construction.

Topsoil shall be placed in layers not exceeding 200 mm to a maximum height of 2.5 m and a maximum batter slope of 1V:2H.

To minimise erosion, stockpile batters shall be track rolled or stabilised by other acceptable means. Temporary erosion and sedimentation control measures to protect the stockpiles shall be installed and maintained.

8.6.1.6 Material suitability

The suitability of material for construction is assessed on the basis of its geotechnical qualities. Soil testing, during site investigations, determines the nature of the material on the site of the proposed development.

Soils may need to be mixed or engineered to produce a material that meets the foundation, sub-base or lining specifications. The parameters of interest include permeability (for protecting groundwater) and strength (for trafficability).

Even though soil investigations may indicate that materials are suitable for construction, unsuitable materials may still be encountered below the designed level of excavation. Unsuitable material shall be excavated and disposed of as directed to spoil or as fill in areas in which it would be deemed suitable.

Material excavated and suitable for placement in the beef cattle production and hospital pens foundation or clay lining shall be subject to the suitability requirements outlined in the National Guidelines for Beef Cattle feedlots (MLA, 2012b).

A representative sample of the strata to be encountered during bulk earthworks was submitted to a laboratory with NATA accreditation for the tests to be undertaken. A summary of the geotechnical test results is provided in Table 12. The complete test results are provided in Appendix L.

Table 12 – Proposed development – Summary geotechnical soil results

Test pit	Sample depth	Description	Liquid limit	Plastic limit	Plasticity index	LS	MDD	EAT	% passing 75µm
	m		%	%	%	%	kg/m³		
TP1	0.25-0.75	Silty Clay (CH)	33	17	16	11.0	1.70	5	60
TP2	0.5-1.0	Silty Clay (CH)	43	22	21	13	1.70	4	60
TP3	1.0-1.5	Silty Clay (CH)	51	23	28	13	1.62	6	53

The geotechnical test results confirm the presence of medium plasticity silty clay. This material is well suited as an underlying material for the construction of the proposed development complex as it has low permeability when compacted and good shearing strength.

8.6.1.7 Excavation and fill

All excavation and filling shall be carried out to produce a smooth, uniform surface in accordance with the design grades, levels and dimensions of the proposed works.

Material for filling shall be obtained from excavations within the site, supplemented by borrow material if necessary.

The fill material shall be free of tree stumps and roots and be capable of being compacted in accordance with the earthworks specification. In general, fill materials will be well-graded suitable material such as soil or gravel. A well graded soil is a soil that contains particles of a wide range of sizes and has a good representation of all sizes.

Fill materials shall be generally placed in layers with a minimum thickness of 200 mm before compaction and uniformly compacted to the design (dry density at optimum moisture content) specification before the next layer is applied. Typically, compaction shall achieve at least 95 per cent of the standard maximum laboratory dry density determined in accordance with AS1289.

The National Guidelines for Beef Cattle feedlots (MLA, 2012b) state that clay lining material should be placed in layers of 150 mm (±50 mm). Each layer should be tined, wetted to ±2% of optimum moisture content and compacted to the required compaction (relative to the Maximum Dry Density) that is needed to achieve the required permeability of ~0.1 mm/day. The minimum depth recommended for the clay liner is 300 mm after compaction.

The finished surface of the clay liner or pen surface shall be durable and trafficable for cattle and equipment.

8.6.1.8 Pen infrastructure

After completion of the bulk earthworks, the feed bunks, water troughs, aprons, fences and gates shall be installed.

The feed bunks for each row shall be pre-cast 6 m concrete sections. The feed bunks shall be placed over part of the concrete apron and compacted gravel road base to provide a level and stable foundation. The concrete apron along the feed bunk shall extend some 3 m into the pen and will be cast in-situ (see Figure 7) using formwork and suitably reinforced to withstand the loading of pen cleaning equipment.

Pre-fabricated concrete water troughs shall be placed in the rear fenceline of each pen. Concrete aprons will be cast in-situ around all water troughs (see Figure 7) using formwork and suitably reinforced to withstand the loading of pen cleaning equipment.

For the production pens, the fences shall be constructed using steel posts with steel top and belly rail to provide the required strength similar to the existing development complex fencing as shown in Photograph 13. Wire cables will be strung along the fence between the top rail and belly rail and under the belly rail to securely contain the cattle and facilitate under-fence cleaning.

Photograph 13 – Existing development – Production pen fencing

Steel gates shall be installed at the rear of each pen for movement of stock and pen cleaning equipment and across the feed bunk apron at the top of each dividing fence between pens to facilitate cleaning of feed bunk aprons between pens.

Water reticulation and water trough drainage pipelines shall be installed in-ground to maintain the water at a relatively constant temperature year round and to prevent wet spots in the pens respectively. Water pipeline material shall be HDPE, polyethylene or PVC depending on the location within the proposed development.

8.6.1.9 Roads

The design and construction road surfaces are important for their long-term performance. Roads are complex engineering structures upon which feed delivery and reliable access to the proposed development depend.

Typically, the road formation shall include a compacted gravel base of a minimum of 200 mm and a strong and stable underlying subgrade. The subgrade is the prepared surface (foundation) on which the road surface is constructed and provides support to the road surface. The subgrade for the feed roads is the layer of soil (cut or fill) prepared during bulk earthworks.

Access and feed roads shall be designed and constructed with careful consideration given to correct shape of the cross section.

For feed roads, the design objective is to keep water drained away from the roadway. In a sawtooth layout, the feed road falls away at 2% from the feed bunk with a longitudinal fall along the length of the road equivalent to the slope of the catch drains servicing each row of pens.

For access roads, the design objective is to keep water drained away from the roadway. The access road cross section has three components – a crowned driving surface, a shoulder area that slopes away from the edge of the driving surface and a drain to remove the water away from the road.

Typically, the feed and access road surfaces shall be unbound natural material such as gravel without surface sealing.

8.6.1.10 Buildings and structures

The proposed development shall utilise existing infrastructure for feed storage and processing, maintenance, administrative and livestock handling functions. This includes office, machinery workshop, grain silos, feed processing equipment, commodity storage and associated facilities for example.

8.6.1.11 Drainage system

Runoff from the pen area contains organic and mineralised manure constituents that could pose a significant impact to soil and water resources if they were released, uncontrolled, into the environment.

A low-permeability barrier shall be needed on those areas within the controlled area where the permeability of underlying soil/rock strata exceeds 0.1 mm/day (3.5 cm/year). This barrier shall be created by using a liner made of compacted clay (clay liner).

For a given soil, permeability is related to soil particle composition, moisture content and level of compaction; and there are limits to the permeability that can be achieved at any level of compaction. In-situ and laboratory measurement of permeability is difficult, and relatively inaccurate (MLA, 2012b).

For these reasons, feedlot design guidelines provide guidance on specifications for materials and construction methods to be used for clay lining rather than relying on permeability standards.

Table 13 and Appendix F outline the characteristics of suitable clay lining material and provides guidance on the selection of the correct materials for use in the liner. Soils may need to be mixed or engineered to produce a material that meets the specifications.

Because of the formation of a low permeability soil-manure interface layer, clay lining is not generally required on the production pen area (MLA, 2012b).

Table 13 – Specifications for clay liner materials (MLA, 2012b)

Soil characteristic	Acceptability criterion	Test method
Percentage fines	More than 25% passing a 75 µm sieve More than 15% passing a 2 µm sieve	AS 1289 3.6
Liquid Limit	Less than 70	AS 1289 3.1.2
Plasticity Index	More than 15	AS 1289 3.3.1
Emerson Class	Number 5 to 6	AS 1289 3.8.1

8.6.1.12 Drains

Catch drains are located along bottom of each row of pens. Catch drains flow into a main drain that flows into the sedimentation basin. The catch drains and main drains convey stormwater runoff to the sedimentation basin. Catch drains and main drains shall be constructed by clearing vegetation and undertaking bulk earthworks as outlined in sections 8.6.1.2 and 8.6.1.3 to achieve the design geometry.

To mitigate the potential for contamination of underground water resources because of leaching of contaminants through permeable, underlying soil, a low-permeability barrier shall be constructed on the floor of the drains.

Hence, the base of the catch and main drain shall be underlain by a minimum of either 300 mm clay or other suitable soil, able to provide a design permeability of $<1 \times 10^{-9}$ m/s (~ 0.1 mm/day) (MLA, 2012b).

The specification for clay lining is provided in Appendix F.

8.6.1.13 Sedimentation basin

An existing sedimentation basin is sited downslope of the pen area. The sedimentation basin shall be enlarged by undertaking bulk earthworks as outlined in section 8.6.1.3 to achieve the design capacity for the proposed development. The sedimentation basin shall have a minimum nominal working capacity of 3,000 m^3 (3.0 ML).

The general method of protecting groundwater is to ensure that a low-permeability barrier exists between the stored effluent and any underlying groundwater resources. Hence, the base and embankment of the sedimentation basin shall be underlain by a minimum of either 300 mm clay or other suitable soil, able to provide a design permeability of $<1 \times 10^{-9}$ m/s (~ 0.1 mm/day) (MLA, 2012b).

As shown in Appendix L, the in-situ soil material has a remoulded permeability of less than 1×10^{-9} m/s (~ 0.1 mm/day).

Embankment slopes shall be stabilised as soon as possible after construction to minimise erosion.

8.6.1.14 Holding pond

A holding pond is located downslope of the sedimentation basin as shown on Figure 10. The holding pond shall be reconfigured by undertaking bulk earthworks as outlined in section 8.6.1.3 to achieve the design geometry. The holding pond shall have a nominal working capacity of 20.0 ML.

The general method of protecting groundwater is to ensure that a low-permeability barrier exists between the stored effluent and any underlying groundwater resources. The holding pond base and embankment shall be underlain by a minimum of either 300 mm clay (or other suitable soil), able to provide a design permeability of $<1 \times 10^{-9}$ m/s (~ 0.1 mm/d) (MLA, 2012b).

As shown in Appendix L, the in-situ soil material has a remoulded permeability of less than 1×10^{-9} m/s (~ 0.1 mm/day).

Earthen embankment slopes and holding pond bywash returns shall be stabilised as soon as possible after construction to minimise erosion.

Excavation of the holding pond would be performed to a depth of some 3-4 m below natural surface.

8.6.1.15 Solid waste storage area

Solid wastes contain organic and mineralised manure constituents that could have adverse impacts on the environment if they were released uncontrolled from the site. Therefore, the storage of solid wastes shall take place on a suitably constructed area that is within the controlled drainage area.

Runoff external to the solid waste stockpile and carcass composting area is diverted away from the solid waste stockpile and carcass composting area by the provision of diversion banks upslope of the area that prevent upslope runoff from entering the area.

Any groundwater resources underlying the solid waste stockpile and carcass composting area shall be protected by implementing a low-permeability barrier on the base of the area. Hence, the solid waste stockpile and carcass composting area shall be underlain by a minimum of either 300 mm clay (or other suitable material), able to provide a design permeability of less than 1 x 10^{-9} m/s (~ 0.1 mm/day) (MLA, 2012b).

8.6.1.16 Decommissioning existing infrastructure

As outlined in section 8.4.3, the existing cattle handling facility shall be decommissioned. Any reusable materials such as posts, steel panels etc, shall be maintained and repurposed for general use fencing materials on the subject land. The site of the production pens and new cattle handling facility site is a brownfield site and there is no infrastructure to be decommissioned. All infrastructure associated with the existing development shall be maintained and utilised.

8.6.2 Hours of construction

The construction of the proposed development shall occur within the hours specified in the conditions contained in the development consent for the proposed development issued by the Gwydir Shire Council.

Due to the rural location, the hours would be between 6:30 am and 6:30 pm for Monday to Friday and between 7 am and 5 pm on Saturdays and Sundays with no construction activities undertaken on Public Holidays.

However, there are some situations, where construction work may need to be undertaken outside of these hours, including for example:

- the delivery of oversized plant or structures that police or other authorities determine require special arrangements to transport along public roads;
- emergency work to avoid the loss of life or damage to property, or to prevent environmental harm; and
- maintenance and repair of public infrastructure where disruption to essential services and/or considerations of worker safety do not allow work within standard hours.

8.6.3 Staging and timing

The proposed development involves a staged construction in up to two stages. The timing and duration of each stage maybe contiguous or discrete periods depending on operational requirements, market demand for beef and other considerations.

Each stage shall be tailored to match operational requirements and required market levels, with the basic philosophy being able to ensure that maximum use is made of existing infrastructure in subsequent development stages.

Indicative staging to reach full capacity of the proposed development (3,000 head) is shown in Table 14. Figure 16 and Figure 17 illustrate the layout plan for each stage respectively.

8.6.3.1 Timing

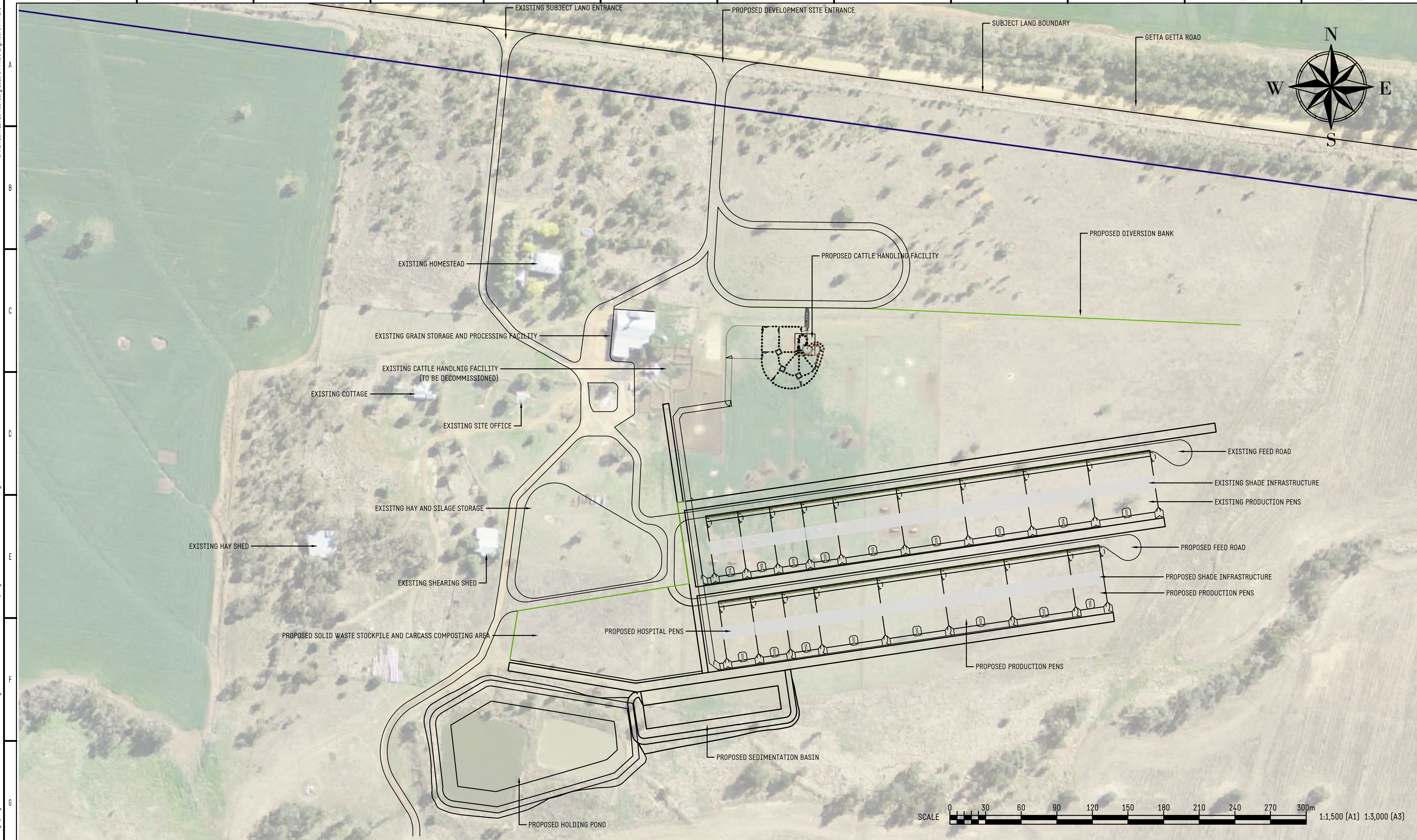
There is no proposed commencement date as the proposed development is subject to approvals. As far as practical, ground disturbance works will be scheduled during the dry season (March-September) to minimise erosion and sediment control and delays in construction.

At this stage, it is proposed to develop all of the first stage within 1-2 years. Stage 2 is anticipated to be developed within 5-7 years. However, this will depend on financing and other considerations. Infrastructure and cattle capacity of each stage up to full capacity of 3,000 head are shown in Table 14.

Table 14 – Proposed development – Staging

Stage	Total Capacity	Description	Timeframe
1	2,250 head	Controlled Drainage Area 1. Production pen area for 1,251 head with associated drainage system, feed bunks, water troughs, fencing, feed roads, shade structures, internal connection roads, solid waste and carcass composting area, expanded grain storage and processing facility, expanded sedimentation basin and holding pond for CDA 1 when fully developed.	After development approvals
2	3,000 head	Controlled Drainage Area 1. Production pen area for 1,000 Head with associated drainage system, feed bunks, water troughs, fencing, feed roads, shade structures, internal connection roads.	5-7 years

The layout of each stage of the proposed development is shown in Figure 16 and Figure 17 respectively.



LEGEND

- SUBJECT LAND BOUNDARY
- LAND PARCEL BOUNDARY

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REV.	DATE	REVISION DESCRIPTION	DRAWN	CHECK	APPROVED
A	24/01/25	DRAFT ISSUE TO CLIENT	RJD	RJD	RJD
B	21/02/25	FINAL ISSUE FOR SUBMISSION TO GSC	RJD	RJD	RJD

SCALE	1:3,000 (A3)
DRAWN	RJD
DATE	21/02/2025
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DATE	21/02/2025
APPROVED	RJD
DATE	21/02/2025

CLIENT: DOOLIN FARMING PTY LTD

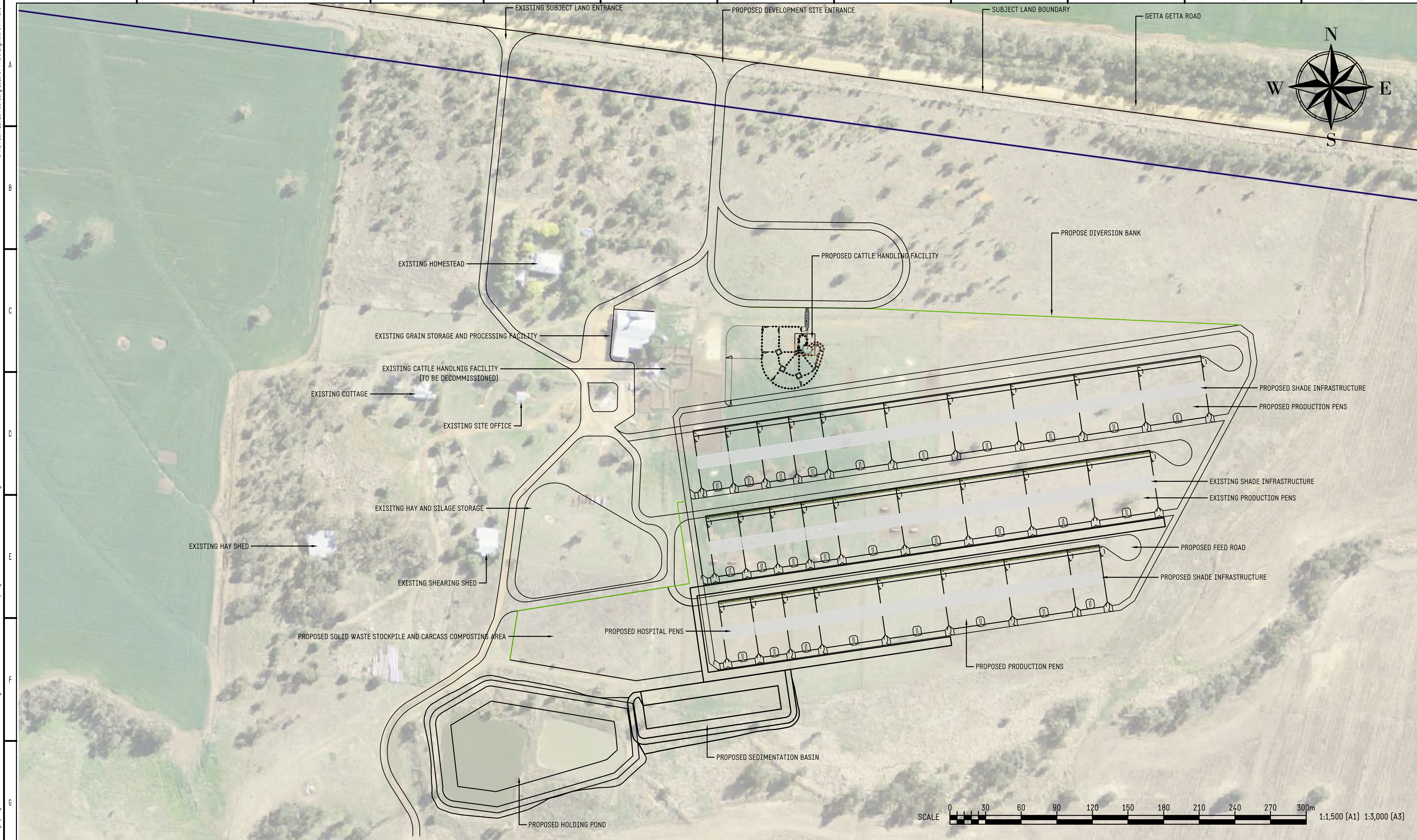
PROJECT: PROPOSED 3,000 HEAD BEEF CATTLE FEEDLOT

TITLE: DEVELOPMENT APPLICATION FOR INTENSIVE LIVESTOCK AGRICULTURE
ENVIRONMENTAL IMPACT STATEMENT
PROPOSED DEVELOPMENT - STAGE 1 LAYOUT

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 16		A3	E2-103-00-16	B

DATE PLOTTED: 20 February 2025 BY : RDC Engineers PTY LTD

FILE PATH: C:\RDC Engineers\RDCE - Projects\E2-103 Doolin Farming Springfield EIS\05 - ACAD MasterPlan\05.1 Drawings - CURRENT FILE NAME: E2-103 DF Springfield MASTERPLAN-00-20250108vB.dwg



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CLIENT: DOOLIN FARMING PTY LTD

PROJECT: PROPOSED 3,000 HEAD BEEF CATTLE FEEDLOT

TITLE: DEVELOPMENT APPLICATION FOR INTENSIVE LIVESTOCK AGRICULTURE
ENVIRONMENTAL IMPACT STATEMENT
PROPOSED DEVELOPMENT - STAGE 1 AND STAGE 2 LAYOUT

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 17		A3	E2-103-00-17	B

DATE PLOTTED: 20 February 2025 BY : RDC Engineers PTY LTD

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8.6.4 Construction period

The construction period for the proposed development, if undertaken in one contiguous program, is estimated to take approximately 5-6 months depending on weather conditions.

8.6.5 Construction materials

Various materials are required for the construction of the proposed development. These include:

- Concrete aggregates and products – cement, sand, rock, blocks etc;
- Pre-cast concrete structures – water troughs, culverts, tanks etc;
- Steel – fencing, shade structure, reinforcing mesh, building frame, cladding etc; and
- Subgrade/base materials – clay, gravels etc.

All materials, with the exception of those able to be legally sourced from the subject land such as subgrade materials shall be imported onto the development site.

Various materials are required for the construction of the proposed development. These include:

- Concrete aggregates and products - cement, sand, rock, blocks etc.
- Steel – fencing, shaded structure, reinforcing mesh, infrastructure, building cladding.

Material suitable for use as concrete aggregates shall be sourced from within the proposed development complex area during bulk earthworks. Alternatively, if suitable material cannot be sourced from this area, materials may be imported or sourced from adjoining properties owned by the applicant. All relevant approvals shall be obtained prior to excavation of any materials.

8.6.6 Traffic and access arrangements

The proposed development site would be accessed from the new subject land entrance off Getta Getta Road.

All heavy vehicles associated with the construction of the proposed development originating from the north or east would be routed along the Bruxner Way to North Star Road to Getta Getta Road to the proposed development site. All vehicles associated with the construction of the proposed development originating from the south and west would be routed along Warialda Road to North Star Road to Getta Getta Road to the proposed development site. Typically, a low-loader type vehicle would deliver the construction equipment to the site as required and backload with equipment that has completed operations and is to be demobilised from the site. Delivery of items of construction equipment would be staggered throughout the construction period in line with sequencing of activities.

Table 15 – Proposed development – Construction phase - Expected traffic movements

Activity	Vehicle Type	No of Units	Movements per stage	Movements per day	Movements per week
Earthworks / Road construction / Drainage / infrastructure	Dozer (CAT D7)*	1	-	-	-
	Tractor and laser bucket	1	2	-	-
	Excavator (CAT 20t)	1	2	-	-
	Water truck (13,000L)	1	2	-	-
	Roller – (12t) flat drum / sheeps foot	1	2	-	-
	Grader – (CAT 140G)	1	-	-	-
	Compact track loader (Kubota 75-2SVL)	1	-	-	-
	Fuel supply – Semi-trailer	1	-	-	0.5
	Service vehicle	1	2	-	-
	Material supply (semi-trailer) (Steel, pre-cast concrete)	-	-	-	0.5
Workforce	Light vehicles (Landcruiser/Hilux)	5	-	10	-

*Equipment on-site

8.6.7 Security and lighting

Access control to the construction area will be maintained at the subject land entrances off Getta Getta Road. The construction area shall be fenced with standard cattle-proof fencing for livestock control during works.

Construction activities shall only be conducted during daylight hours. Hence, no illumination lighting will be required.

8.6.8 Vehicles and equipment

The anticipated construction vehicles and equipment required for the construction of the proposed development are shown in Table 16. The make and model of vehicles and equipment is based on the typical fleet composition of the construction contractor who constructed the existing development and subject to change.

Material would be excavated by laser-bucket and then moved to feed pens and roads. Compactors, rollers, water carts and graders would be involved to achieve the required compaction and design grades.

Table 16 – Proposed development – Construction vehicles and equipment

Activity	Vehicles / Equipment
Bulk Earthworks – cut/fill	Bulldozer (~CAT D7); Laser bucket
Drains / trimming embankments	Excavator (~CAT 20t)
Trimming/ gravel placement	Grader (~CAT 140G)
Dust suppression	Medium vehicle – Rigid (16t)
Fill compaction	Roller – sheeps foot (CAT CS56)
Water reticulation lines	Compact track loader (Kubota 75-2SVL)
Equipment servicing/repairs	Medium vehicle – Rigid 10t
Fencing structures	Truck mounted pipe cutting and welding equipment
Post holes	Compact track loader (Kubota 75-2SVL)
Concrete placement	Concrete agitator trucks 6 wheel – Rigid 12t
Equipment delivery	Heavy vehicle - Semi-trailer low loader
Material delivery – steel	Heavy vehicle - Semi-trailer / B-double
Fuel delivery	Heavy vehicle – Semi-trailer
Personnel	Light vehicle

8.6.9 Workforce requirements

At this stage it is anticipated that construction of each stage of the proposed development shall involve a construction workforce in the order of 4-5 personnel on-site at any one time. Typically, a different workforce would undertake the various discrete activities such as earthworks, fencing, building work, concrete works, water reticulation, for example. The construction workforce shall be accommodated locally within the townships of Yetman, North Star, Warialda, Goondiwindi for example. No on-site accommodation shall be provided for the construction workforce.

8.6.10 Hazardous chemical storage

All hazardous materials required to be stored on-site during construction shall be kept in designated bunded areas or stored in transportable bunded vessels. This includes fuels (diesel, petrol), lubricants (oils, grease) and chemicals (concrete plasticisers) etc.

Fuel used during construction of the proposed development will be stored in a truck or trailer mounted bunded facility constructed in accordance with Australian Standard AS 1940-2004: The Storage and Handling of Flammable and Combustible Liquids. The Construction Contractor will be responsible for servicing their equipment and management of their waste products. Minor maintenance of construction equipment may be conducted on site such as tyre replacement, repairs of leaks etc if required.

The estimated capacity of fuel stored on-site for construction activities is expected to be less than 5,000 L.

All hazardous chemicals required to be stored on-site during construction shall be kept in designated bunded areas or stored in transportable bunded vessels. This includes fuels (diesel, petrol), lubricants (oils, grease) and chemicals (concrete plasticisers) etc.

8.6.11 Environmental management

In accordance with the requirements under Part 3A of the EP&A Act, Doolin Farming Pty Ltd commit to the environmental management and monitoring of the construction of the proposed development. The proposed site preparation and construction works would commence only after all relevant licenses, permits and approvals have been received and a Construction Environmental Management Plan (CEMP), and a Health and Safety Management Plan (HSMP) have been prepared by the Construction Contractor.

The CEMP would provide information on the methods and safeguards that would be used for carrying out the construction of the proposed works. The methods adopted and the implemented safeguards would be aimed at ensuring that workers, the local community and the environment are protected.

The CEMP would also contain certain details on the monitoring programs and reporting procedures associated with the implemented environmental safeguards. Monitoring requires an on-going commitment and continual maintenance of records, both prior to (baseline) and during the proposed works. Should routine monitoring and/or external parties identify a potential issue relating to the proposed works, the potential issue would be recorded, validated, and as appropriate, management programs would be rectified.

The CEMP is described in further detail in section 15.2.1.1.

8.7 Operation

8.7.1 Cattle management

When fully developed, the proposed development shall have about 53,685 m^2 of constructed outdoor beef cattle production pens within the controlled drainage area which equates to a cattle capacity of 3,000 head at an average stocking density of about 17.9 m^2/head.

The proposed development is designed to accommodate some 3,000 head of cattle at the design stocking density. The majority of cattle would be steers of *Bos Taurus or Bos Taurus cross* genotypes. Breed composition is expected to change with time as market signals develop.

The proximity of the proposed development to the New England grazing district leaves it well positioned for livestock procurement. It is expected that cattle would be sourced locally as far as possible from areas such as the northern NSW (northern and central tablelands, Dumaresq Valley, western slopes etc.) and southern Queensland (Darling Downs, Granite Belt, Goondiwindi). A proportion of cattle shall be bred on properties owned and operated by Doolin Farming Pty Ltd.

The wide range of beef markets (i.e. domestic, export – Korea, Japan etc.) available to the feedlot industry means that there is a broad spectrum of market specifications for cattle. Each market may require different specifications for delivery of each of its products. Factors determining market specifications include a wide range of carcase and eating quality criteria including liveweight, fat score, marbling and age. Subsequently, it is expected that the proposed development shall have cattle targeted to a range of market types on feed at any point in time. This is also a risk minimisation strategy to provide flexibility for market conditions, such as cattle and commodity availability, buying and selling price of cattle, buying price of commodities and consumer demands.

The estimated market type composition of the proposed development is shown in Table 17. The market composition is based on expected target markets, market growth and opportunities and feeding of predominantly *Bos Taurus* all straightbred high-performance black angus steers. However, the composition may change seasonally and from year to year depending on the previously mentioned factors.

Cattle would be transported to the proposed development at about the entry weight of the target market. The cattle would be fed a ration specific to that market type until they reach the exit weight of the respective market when they would be transported from the site to an abattoir for processing.

Typically, cattle would enter the feedlot at around 9 to 12 months of age and an average of some 360-380 kg liveweight. The cattle would be fed for approximately 150 days to achieve an average liveweight of around 630kg.

Table 17 – Proposed development – Market type composition

Parameter	Units	Market Type
		Mid Fed
Days on feed	days	~150
Entry weight	kg	~360-380
Exit weight	kg	~620-640
SCU scale factor	-	0.87
Net gain	kg	~260
Average daily gain	kg gain/head/day	~1.75
Dry matter intake	kg DM/head/day	~10.3
Feed conversion efficiency	kg DM/kg gain	~6.1
Mortality rate (No in/No Out)	%	0.25
Percent in lot	%	100.0

Upon arrival at the feedlot, all cattle shall be counted to ensure that the number, breed and sex of cattle unloaded, balances with accompanying documentation. The cattle are inspected for signs of stress and general health and held in holding yards prior to induction. Any cattle with health problems are drafted-off and treated accordingly. All details of arrival cattle are recorded in the feedlot herd management system.

Within 2-3 days of arrival at the feedlot, each animal is inducted whereby the necessary health treatments (e.g. 7 in 1, vitamins, parasite treatments etc) and identification (e.g. ear-tags etc) are applied and cattle weighed.

After induction, cattle are allocated to a production pen ensuring that appropriate stocking densities are maintained, and pen allocation details are recorded in the feedlot herd management system.

All sick or injured cattle are carefully removed from the pens and taken to the hospital facility for treatment according to veterinary advice. If necessary, they are retained in the hospital pens. Once treated cattle recover, they are returned to an appropriate production pen. Low-stress handling techniques shall be employed to minimise stress, bruising and hide damage. Excessive noise and movement of cattle within the feeding period is avoided along with handling of cattle during adverse weather conditions (e.g. very hot and humid weather).

Shade shall be provided in all pens to reduce environmental stresses such as temperature and solar radiation on cattle.

Cattle are provided with an adequate supply of feed and water.

After approximately the required days on feed, cattle are individually weighed and drafted according to weight. Cattle in each drafting group are designated a dispatch date.

On the dispatch date, cattle are loaded onto the livestock transport vehicle at a suitable density, the vehicle weighed-out over the weigh bridge and the weight of cattle recorded. The cattle shall then be transported to a processing facility.

Cattle are transported in a manner that protects their welfare, which maximises meat quality and which considers climatic conditions. Transport operators would adhere to the Australian Standards and Guidelines for the Welfare of Animals — Land Transport of Livestock (AHA, 2008).

8.7.1.1 Incoming/outgoing cattle numbers

The number of cattle turned off from the proposed development is dependent on the following factors:

- intake weight
- days on feed
- average daily gain
- required turnoff weight
- occupancy levels
- mortality rates.

The specifications for each market type are outlined in Table 17. Based on these data the estimated number of incoming and outgoing cattle from the proposed development is shown in Table 18. Total cattle throughput would be approximately 6,936 head of cattle annually when fully developed.

Table 18 – Proposed development – Estimated cattle throughput

Parameter	Units	Market Type		
		Mid Fed	**Mid Fed**	**Mid Fed**
Development stage		Existing	Stage 1	Stage 2
Development capacity	Head	999	2,250	3,000
Entry weight	kg	~360-380	~360-380	~360-380
Exit weight	kg	~620-640	~620-640	~620-640
Days on fed	Days	~150	~150	~150
Occupancy	%	95.0	95.0	95.0
Mortality rate (No in/No out)	%	0.25	0.25	0.25
Head-on-feed	No head per year	~950	~2,137	~2,851
Incoming cattle	No head per year	~2,312	~5,200	~6,936
Outgoing cattle	No head per year	~2,306	~5,187	~6,918

8.7.2 Feed management

The feed ration for the beef cattle shall be prepared on-site in a dedicated facility, with associated commodity storage, handling and ration delivery infrastructure.

As outlined in section 6.2.6, the subject land has existing infrastructure to accommodate the grain storage, feed processing and commodity storage requirements for the proposed development.

Lot fed cattle are fed a predominantly grain based diet. Winter cereals such as wheat and barley shall be the predominant grains used in the ration. The level of each grain in the ration depends on the availability and cost of the grain sourced from the subject land or adjacent properties owned by the applicant.

The location of the proposed development within the northern NSW cropping region known as the 'Golden Triangle' leaves it well positioned for grain and commodities procurement. The applicant is a large producer of cereal and pulse crops on their cropping aggregation at North Star.

A typical ration composition is outlined in Table 19. The percentage of each commodity within a ration is dependent on commodity availability and the buying price and therefore the composition often changes seasonally and from year to year. The dry matter content of beef cattle rations is usually formulated to be 70–80%.

Table 19 – Proposed development – Typical ration composition (As-fed)

			Starter	Grower	Finisher
Parameter	**Type**	**Units**	**Value**	**Value**	**Value**
Grain	Winter (barley)	%	45.0	57.0	70.0
Protein	Whole cottonseed	%	8.0	9.0	11.0
Roughage	Silage (barley)	%	30.0	22.0	14.0
	Hay (oat)	%	14.0	8.0	0
Supplements	-	%	3.0	4.0	5.0

All grain shall be processed on-site through the grain processing facility. The facility consists of storage silos to store grain, a grain movement system and a grain processing system. Grain is processed by dry rolling.

Straw and/or hay shall not be pre-processed by tub-grinding or similar equipment prior to being added to the mixer-wagon.

The commodities are loaded into a tractor-drawn feed wagon by front-end loader. The tractor-drawn feed wagon has on-board mixing equipment. The ration is then dispensed into the feed bunks directly from the tractor-drawn feed wagon.

The approximate annual amount of feed commodities required for the proposed development are listed in Table 20. The proposed development when fully developed shall accommodate up to 3,000 head of cattle and shall require about 8,530 t of grain, 4,485 t of silage and other commodities annually.

The subject land can produce about 3,150 t of grain and 3,500 t of silage per year. The balance grain requirements shall be sourced locally from adjoining properties owned by related entities of the applicant.

Table 20 – Proposed development – Estimated annual commodity usage

Parameter	Type	Units	Value	Value	Value
Development stage			Existing	Stage 1	Stage 2
Development capacity		Head	999	2,250	3,000
Grain	Winter (barley)	t/year	~2,850	~6,395	~8,530
Protein	Whole cottonseed	t/year	~450	~1,010	~1,350
Roughage	Silage (barley)	t/year	~730	~1,650	~2,180
	Hay (oat)	t/year	~115	~260	~350
Supplements	Liquid	t/year	~200	~450	~605

8.7.3 Water management

Water is a vital resource for the proposed development and is also a significant expense. Most of the water used is for cattle to drink; it is also used for cleaning machinery and other general hygiene practices around the feedlot, and in amenities for people working at the development. Water is not used in feed processing as it is a dry based grain processing system.

Water is also lost through evaporation and seepage from open storages.

The proposed development's water supply, storage and reticulation shall be managed to:

- meet the total annual water requirement of the proposed development;
- provide an unrestricted, reliable supply of water to livestock at all times of the year;
- provide water that is clean, fresh and free from contamination for livestock;
- meet the peak water intake requirement for the cattle, especially during the summer period;
- minimise losses and maximise water use efficiency;
- ensure that the quality of the water (which includes temperature, salinity and impurities) does not affect cattle performance or welfare; and
- provide water that is clean, fresh and free from contamination for people.

The water consuming activities within the proposed development other than irrigation of crops are outlined in Table 21.

Table 21 – Proposed development – Water use activities

Activity	Water use
Livestock management	
Drinking water	Yes
Water trough cleaning	Yes
Feed management	
Grain processing	No – Dry rolling only
Vehicle cleaning	Yes
Cattle management	
Cattle washing	No requirement for washing of beef cattle prior to slaughter
Sundry uses	
Potable	Yes
Evaporative losses	
Turkeys Nest storage	No (Water stored in tanks)
Water troughs	Yes
Dust control/leakages	Yes

8.7.3.1.1. Drinking water

Davis et al (2009) found drinking water to be in the order of 90% of total water consumption in feedlots where cattle are not washed. Hicks et al. (1988) relate ambient temperature, dry matter intake (DMI) and dietary sodium to water intake. Table 22 shows the average monthly predicted water intake per head per day. The average daily intake is 39.4 L/head/day. With about 3,000 head-on-feed at the maximum capacity, this equates to about 41.0 ML/year for livestock drinking water.

Table 22 – Proposed development – Estimated drinking water usage

Month	Mean daily water intake	Market type	Market type
		Mid Fed	Mid Fed
		2,250 head	3,000 head
	L/head/day	ML	ML
January	40.5	2.68	3.58
February	47.9	2.87	3.82
March	43.1	2.86	3.81
April	38.3	2.45	3.27
May	35.9	2.37	3.17
June	35.0	2.24	2.99
July	34.8	2.30	3.07
August	35.1	2.32	3.10
September	36.2	2.32	3.09
October	38.6	2.55	3.41
November	42.0	2.69	3.59
December	46.1	3.05	4.07
Average	39.4		
Total		30.7	41.0

8.7.3.1.2. Sundry uses

The estimated sundry water usage for the proposed development is outlined in Table 23. Potable water usage is based on 4 persons per day at 100 L/person/day. Evaporative loss is based on a pan factor of 0.8 and average monthly evaporation taken from climatic data for the site presented in Table 48.

Vehicle cleaning is based on washdown of 1 feed vehicle per fortnight using 5,000 L of water for general hygiene based in the same geographical region reported by Davis et al. (2010).

Table 23 – Proposed development – Estimated sundry water usage

Month	Potable 100 L/person/day L/month	Evaporative / Cleaning losses Water Troughs L/month	Vehicle cleaning / dust control L/month
January	12,400	48,260	10,000
February	12,400	48,143	10,000
March	12,400	48,108	10,000
April	12,400	47,967	10,000
May	12,400	47,859	10,000
June	12,400	47,798	10,000
July	12,400	47,812	10,000
August	12,400	47,878	10,000
September	12,400	47,980	10,000
October	12,400	48,095	10,000
November	12,400	48,179	10,000
December	12,400	48,256	10,000
Total L/year	148,800	576,334	120,000
Total ML/year	0.149	0.6	0.12

8.7.3.1.3. Total water usage

The total annual water demand for the proposed development is estimated to be about 42 ML when at a full capacity of 3,000 head.

The National Guidelines for Beef Cattle Feedlots (MLA, 2012a) state that as a guide, a proposed feedlot would normally need to demonstrate access to approximately 24 ML of high-security water per annum per 1,000 SCU of feedlot capacity. This equates to about 58 ML.

The proposed development has 1,558 ML unit shares of groundwater entitlements under the NSW Great Artesian Basin Eastern recharge groundwater source for irrigation and stock intensive use on the subject land under access licence 90AL834721. At 1ML per share this equates to a total water availability of 1,558 ML which is able to meet the demands of the proposed development.

8.7.3.1.4. Water supply contingency plan

In the event of severe drought conditions the development would be destocked.

8.7.4 Solid waste management

8.7.4.1 Generation

8.7.4.1.1. Manure

McGahan and Tucker (2003) recommend using a mass balance approach to estimate the quality and quantity of solid waste generated by intensive livestock developments. One such method is the predictive model known as BEEFBAL (QPIF, 2004; DAF, 2019). BEEFBAL can be used to estimate waste characteristics from a beef cattle feedlot. BEEFBAL is a Microsoft Excel® worksheet model.

BEEFBAL (DAF, 2019) was used to estimate the weight and nutrient content for solid waste from the proposed development. Input data for BEEFBAL was taken from Table 17 and Table 19 for herd data, quantity fed and feed ingredients respectively. The estimated solid waste generated from the proposed development is shown in Table 24.

The BEEFBAL inputs and outputs for the scenarios modelled are provided in Appendix O.

BEEFBAL (DAF, 2019) estimates some 1,490 t of manure (dry matter) harvested from the pens per year when developed to its full capacity. Based on a scraped manure moisture content of 40%, this translates into some 2,485 t of wet scraped manure per year to the stockpile. Based on a stockpiled manure moisture content of 20%, this translates into some 1,805 t of manure available for spreading per year.

Table 24 – Proposed development – Estimated manure generated

Parameter	Units	Market Type	
		Mid Fed	Mid Fed
Development stage		1	2
Development capacity	Head	2,250	3,000
		t/year	t/year
Fresh manure excreted	Dry mass	~1,628	~2,170
	t DM/SCU/year	0.872	0.872
	Wet mass (85%MC)	~10,850	~14,470
Manure scraped from pad	Dry mass*	~1,120	~1,490
	Wet mass (40%MC)	~1,865	~2,485
Manure removed from stockpile	Dry mass	~1,085	~1,445
	Wet mass (20%MC)	~1,355	~1,805

*50% dry matter loss on the pad

8.7.4.1.2. Mortalities

The average mortality rate in beef cattle feedlots is around 0.1-1.0% expressed as a percentage of cattle throughput. A mortality rate of about 0.25% expressed as a percentage of cattle throughput as outlined in Table 18 has been used for the proposed development which is consistent with the mortality rate in the existing development.

BEEFBAL (DAF, 2019) was used to estimate the mass of mortalities which was then converted to a dry matter basis based on an average carcass moisture content of 60% (Michell et al, 1989). Table 25 the estimated mass of mortalities generated in the proposed development.

BEEFBAL (DAF, 2019) estimates some 3.6 t of mortalities (dry matter) are produced when the proposed developed is operating at its full capacity. Based on a carcass compost moisture content of 20%, this translates into some 4.3 t of carcass compost available for spreading per year.

Table 25 – Proposed development – Estimated typical mortalities generated

Parameter	Units	Market Type	
		Mid Fed	Mid Fed
Development stage		1	2
Development capacity	Head	2,250	3,000
		t/year	t/year
Mortalities	Dry mass	~2.60	~3.60
	Wet Mass (60%MC)	~6.52	~9.00
Carcass compost removed from stockpile	Dry mass	~2.48	~3.43
	Wet mass (20%MC)	~3.10	~4.29

*The fluid content, including water, comprise an average of 60% of the total body weight of a beef animal (Michell et al., 1989).

8.7.4.2 Management

Regular cleaning and maintenance in and around the development complex, in accordance with Class 1 specifications minimises odour emissions and reduce the risk of any amenity impacts on neighbouring sensitive receptors. Regular cleaning:

- reduces manure build up within the pens;
- reduces odours emanating from the proposed development; and
- eliminates wet spots in the pens (production/induction/hospital), which reduces fly breeding areas and also reduces odour.

8.7.4.2.1. Pen cleaning and maintenance

Pen cleaning refers to the removal of built up manure from the pens and drains. Small amounts of spoilt feed thrown into the pen during bunk cleaning, is also removed with manure during pen cleaning. Pen cleaning and maintenance is not viewed as a cost, but as a method of minimising potential impacts to the environment and the potential to return income to the proposed development by the sale or sustainable utilisation of the manure harvested from the pens.

The pens shall be regularly cleaned to minimise the depth of manure on the pen surface. Consequently, pen cleaning becomes a major on-going part of operational management. Regular pen cleaning is necessary to:

- promote free pen drainage;
- optimise cattle performance and welfare;
- reduce dags on cattle;
- provide a safe work environment for staff;
- maintain low odour levels;
- minimise dust; and
- minimise pen maintenance costs.

Free drainage of pens is essential in optimising conditions for animals and staff (particularly pen riders), preventing odour nuisance and minimising pen maintenance costs.

Ideally, pen cleaning shall occur when the manure is moist but not wet since moist manure is more easily scraped from the surface. However, regular cleaning may occur even when conditions are not ideal.

As manure is deposited on the pen surface it dries and is compacted by the action of the cattle hooves. It is typically laid down in layers. In some cases, the lowest layer may be an “interface layer” – a compacted mixture of manure and pen surface material (clay/gravel). The interface layer has a low permeability and offers additional production against nutrient leaching through the pen surface (Lott et al. 1994) and shall not be removed during pen cleaning.

As the proposed development shall be designed, constructed and managed in accordance with Class 1 standards as described by Skerman, (2000) and DEC (2006b), the pen cleaning and maintenance schedule shall be in accordance with Table 26. Class 1 represents the highest level of management standards.

The machinery to be used for pen and drain cleaning and maintenance activities includes:

- skid steer loader – under fence cleaning and removal of solids from around feed and water troughs;
- front-end loader to remove manure out of the pens/drains and stockpile area;
- rigid and articulated tip trucks for removing manure from the pens to the solid waste stockpile / carcass composting area, loading manure and compost for transport to the utilisation areas; and
- front-end loader for mixing and aerating the manure windrows and carcass compost.

8.7.4.2.2. Under-fence cleaning

The removal of manure from under fence lines is important for two reasons. Accumulated manure acts as a fly breeding area and a trap that prevents run-off leaving the pen. Removal of accumulated manure under fence lines shall be undertaken at the same time as pen cleaning.

Table 26 summarises the proposed under-fence cleaning interval for the proposed development.

8.7.4.2.3. Pen maintenance

General pen maintenance activities shall be conducted after each pen cleaning event and the manure from the pens and under fence lines has been removed. General pen maintenance activities include:

- Depressions/potholes within the pen are filled and compacted
- Elimination of wet spots in the pen surface
- Removal of split feed residues from around feed bunks.

Attention shall be given to the area behind the feed bunk apron, as that area tends to become worn and hollowed out and, if not maintained, retains water, remains boggy and quickly becomes worn.

Table 26 summarises the proposed pen maintenance interval for the proposed development.

8.7.4.2.4. Drain cleaning

To work effectively, drains need to be maintained. Poorly maintained drains such as when vegetation is allowed to grow in them or if manure builds up, restricts the flow of stormwater allowing, manure in the runoff from pens to be deposited in the drains rather than flowing to the sedimentation basin.

Manure in drains is difficult to remove and tends to stay wet, thus creating an odour problem.

When practical, drains shall be cleaned after each rainfall event. Cleaning includes removal of manure and vegetation.

Table 26 summarises the proposed drain cleaning interval for the proposed development.

Table 26 – Proposed development – Schedule for pen and drain cleaning and maintenance

Activity	Frequency and / or Action
	Class One (1)
Removal of spilt feed /feed residues	Weekly
Elimination of wet patches in pens	Weekly
Repairs to potholes in pens	Weekly
Clean water troughs	Weekly
Under fence cleaning	Monthly (or after manure obstructs pen drainage)
Pen cleaning	At intervals not exceeding 13 weeks
Pen surface inspections	After runoff events and repaired as required
Diversion banks and drains	After runoff events and repaired as required

8.7.4.2.5. Manure stockpile / processing

The manure collected from the pens shall be stored adjacent to the production pens on the western side of the proposed development, in the solid waste storage area as shown in Figure 6. The solid waste storage area is within the controlled drainage area, and therefore, runoff from the storage area is prevented from flowing uncontrolled into the natural environment.

A solid waste storage area is needed to stockpile harvested manure so that pen cleaning can regularly occur even though it may not be possible to continually spread the manure or remove it from the site. Very few feedlots spread manure directly after pen cleaning, although a number send manure off-site immediately after cleaning if possible. Manure stockpiling and passive or active composting reduces the bulk and sometimes the moisture content of the manure. It also improves the handling properties of the manure by breaking up lumps. The solid waste storage area is also used to store composting mortalities until the compost is cured.

Typically, manure removed from the pens, drains and sedimentation basin will be laid out in windrows with the long axes perpendicular to the area contours to ensure free drainage. Each windrow shall be approximately 2 to 2.5 m in height, with base widths ranging from 16 to 20 m with a triangular cross-section geometry. The top of the windrow shall be shaped to an apex to shed rainfall.

Manure may also be temporarily placed in a stockpile prior to placement in windrows. If this is required, manure shall be added to the stockpile in thin even layers. Each layer shall be dry (25% moisture content) otherwise spontaneous combustion may occur. Following the addition of each layer, the stockpile shall be compacted if the stockpile is to be stacked deeper than about 1.8 m.

The stockpiled manure will decompose anaerobically. Anaerobic bacteria break down the organic matter, reducing the total dry weight of the manure. The nitrogen content is reduced by its conversion to gaseous forms that are released to the atmosphere during the decomposition process. The concentration of other less volatile and less soluble nutrients such as phosphorus, increase in the stockpile as the volume of manure decreases. The anaerobic decomposition process generates considerable heat. Temperatures up to 54°C are commonly experienced. The heat generated in well-managed stockpiles may be sufficient to sterilise any weed seeds and a significant proportion of potentially harmful pathogens contained in the manure.

To accelerate the decomposition process, further aeration of the windrows may be achieved by regularly turning the windrows using equipment or machinery (Skerman, 2000). Aerobically composting allows the manure to be stored or spread with little odour or fly breeding potential and eliminates most of the weed seeds and pathogens within the manure. Actively composting the manure stockpiles reduces moisture content, odour and makes the manure more friable for spreading.

Following anaerobic/aerobic composting, the manure would typically undergo a screening process which shall remove any rocks/gravel in the accumulated solids and very large particles (including slabs of dry feedlot manure) prior to spreading.

Manure from the stockpile area would be removed in line with cropping program demands and placed directly onto the available solid waste utilisation area, as shown in Figure 13, when possible and favourable weather conditions permitting, which would reduce the risk of odours.

8.7.4.2.6. Mortalities

8.7.4.2.6.1. Typical

The average mortality rate in beef cattle feedlots is well less than 0.5% expressed as a percentage of cattle throughput. Losses tend to be higher in cattle sourced from saleyards and lower for backgrounded cattle. Most mortalities occur relatively early in the feeding period.

Based on an average mortality of 0.25%, the expected number of mortalities per year is approximately 17 animals which equates to about 9.0 t of carcasses based on the herd data in Table 17. Carcasses are taken to the solid waste stockpile and carcass composting area for disposal.

The construction and management of a carcass compost windrow shall generally comprise the following:

- A bed of at least 300 mm of the material being used as the carbon source (e.g. sawdust or straw) is placed on the base of the composting area. This bed of material absorbs leachate from the carcass;
- A carcass is placed on the straw or sawdust bed and covered with at least 500 mm of manure on all sides;
- The carcass windrow shall be no more than two levels of carcasses high. The second level of carcasses shall be placed on top of 50 mm of manure covering the first level of carcasses and covered with at least 500 mm of manure;
- The top of the windrow shall be shaped to an apex to shed rainfall;
- The windrow shall be periodically checked, and any exposed carcasses recovered. The carcasses must be covered to facilitate the composting process by adding a carbon source, and to control odours and in deterring vermin from disturbing the windrow;
- The carcasses are allowed to decompose for around 4 weeks before turning. Typically, a front-end loader shall be used for turning carcass compost;
- Active composting may last for up to 4-8 months. The windrow shall be turned every 2-3 months;
- After active composting the composted windrow is left to mature for at least 3-4 months; and
- The carcass composting area shall be monitored from scavenging animals and livestock.

Since effective aerobic composting of carcasses is a low odour process, the carcass composting area is not expected to be a significant odour source.

8.7.4.2.6.2. Mass events

Emergency animal disease outbreak and / or mass mortality contingency plans shall be developed as part of the quality assurance program of the proposed development.

In the event of a high number of mortalities at the proposed development, state and local government authorities would be called to investigate the cause of the mortalities and advise and assist with the most suitable disposal method. The following entities will be contacted:

- Emergency Animal Disease hotline (1800 675 888) and NSW Department of Primary Industries (1800 680 244) if there is a suspected reportable or trade-sensitive disease outbreak;
- North West Local Land Services (1300 795 299);
- Consultant veterinarian (Border Veterinary Surgery 07 4671 3688); and
- Gwydir Shire Council (02 6724 2000) / EPA Armidale (02 6773 7000) to assist in the disposal of the cattle (burial, composting) on or off-farm (land fill site) if required.

All development personnel shall be made aware of the signs of emergency diseases in cattle.

A suitable site for mass burial of mortalities has been identified on the subject land as shown on Figure 5.

The burial pits shall be established in low permeability soils on a site well removed from surface waters, drainage lines, gullies, groundwater bores and the proposed development site. The soils in this location are low permeability black vertosols, thus lining of the pits with clay shall not be required. If lining is required, then the pits shall be lined with at least 600 mm of clay.

The site where mass mortalities are buried shall be recorded for future reference.

8.7.4.2.7. Sedimentation basin

The sedimentation basin has been designed to separate larger solids in the stormwater runoff from the liquid component. Solids should settle in the basin while the liquid drains into the holding pond.

Over time, solids build up in the sedimentation basin and, if not removed, will begin to flow into the holding pond. The sedimentation basin shall be checked for efficacy after each runoff event.

Where practical, the sedimentation basin shall be allowed to dry out prior to removal of sediment.

Typically, sediment shall be removed using a front-end loader or similar equipment.

The sedimentation basin incorporates a timber weir, which may clog up. If left clogged, the sedimentation basin will quickly fill with sediment that remains wet and creates odour. For this reason, the timber weir shall be kept clean.

Cleaning the timber weir involves removing, cleaning and then replacing timber slats.

8.7.4.3 Utilisation

Solid waste shall be applied sustainably to cropping land using a tractor drawn moving bed manure spreader or similar equipment on the subject land or removed off-site to be used as a soil conditioner and organic fertiliser on cropping and pasture operations on adjoining land leased by the applicant or other cropping land owned by the applicant in the local region.

The minimum land area required was determined by a nutrient mass balance on the removal of the nutrients in the solid waste (manure, sludge, carcass compost) by the types of crops to be grown within the solid waste utilisation area.

The typical composition of aged beef cattle feedlot manure is shown in Table 27.

Table 27 – Typical characteristics of cattle feedlot manure (MLA, 2015b)

Parameter		Units	Average	Range
Total Nitrogen	N	%	2.18	1-3
Ammonium Nitrogen	NH_4^+ - N	mg/kg	1,430	0 – 3,800
Nitrate Nitrogen	NO_3^- - N	mg/kg	307	1-1,115
Total Phosphorous	P	%	0.8	0.5 – 1.1
Potassium	K	%	1.9	0.75 – 3.2
Sodium	Na	%	0.3	0.04 – 0.7
Acidity/Alkalinity	pH		7.2	6.3 – 8.7
Electrical Conductivity	EC	dS/m	8.26	0.16 – 17.2

Winter cereal crops shall be grown under dryland conditions within the solid waste utilisation area and harvested and reused as grain and roughage in the proposed development's feed ration. The predominant cereals used will be a combination of barley and wheat. Cereals are grown in abundance throughout the North Star region with great success.

The typical crops proposed to be grown on the solid waste utilisation areas are outlined in Table 28. The typical yields are based on on-farm averages over the last few years and supplied by the applicant. The typical nutrient analyses of each crop have been sourced from the Feedlot Assessment Spreadsheet V8.4 (DAF, 2019).

Table 28 – Proposed development – Solid waste utilisation area – Typical crops and yields

Crop	Typical DM yield t/ha	N DM %	P DM %	K DM %
Barley (grain)	3-4	1.6	0.29	0.44
Barley (straw)	1.0-1.5	0.7	0.10	4.2

8.7.4.3.1. Nutrient Limited Application Rates

The *National Guidelines for Beef Cattle Feedlots in Australia* (MLA, 2012a) express a mass balance equation in the form of a Nutrient Limited Application Rate (NLAR) equation. Solid waste is applied to the solid waste utilisation area where the biomass accumulation and the quantities of N and P that are removed from the area through crop growth and the export of harvested material are determined.

The mass balance equation in the form of a nutrient limited application rate (NLAR) equation, denoted as:

$$NLAR = \frac{CR+SS+EL}{NW\ x\ 10^{-3}} \quad \text{.......Equation 2}$$

where:
NLAR = nutrient limited application rate of solid waste (t/ha)
CR = crop requirement for the applied nutrient (kg/ha)
SS = soil storage (kg/ha)
EL = allowable nutrient losses to the environment (kg/ha)
NW = available nutrient concentration in the solid waste feedlot manure (mg/kg).

In the assessment of the NLAR, soil storage (SS) and allowable nutrient losses (EL) are ignored as the intention is to only apply nutrients to match crop requirements. The predicted solid waste nutrient concentrations are summarised in Table 27.

The annual application rate for the nitrogen and phosphorus contained in the solid waste were calculated using the NLAR approach.

The typical crops grown on the solid waste utilisation areas and nutrient analyses are outlined in Table 28.

The NLAR was calculated based on a winter barley crop which was harvested for grain and straw. A 3.5 t/ha winter barley crop could remove about 80 kg/ha N, 12 kg/ha P and 162 kg ha K as shown in Table 29.

Table 29 – Proposed development – Solid waste utilisation – NLAR summary

Parameter	Units	Code	N	P	K
Crop requirement	kg/ha	CR	66.5	11.2	78.4
Soil storage	kg/ha	SS	0	0	0
Allowable losses	kg/ha	EL	0	0	0
Nutrient concentration	mg/kg	NW	21,800	8,000	19,000
NLAR	t/ha	NLAR	3.05	1.40	4.13
Area required	ha	-	475	1,036	351

The minimum area required for solid waste utilisation will be the largest calculated for any individual nutrient constituent (MLA 2012a).

The quantity of solid waste able to be applied for nitrogen, phosphorus and potassium removal on the solid waste utilisation area was calculated by dividing the solid waste land area by the NLAR for each nutrient.

Hence, with 1,450 t/year of solid waste about 1,036 ha of land would be needed for solid waste utilisation. Phosphorus was found to be the limiting nutrient when growing cereal grain in winter and this corresponds to a maximum solid waste application rate of about 1.4 t/ha (dry).

Consequently, there is insufficient land available on-site to sustainably utilise all the solid waste generated each year. Any solid waste not utilised on-site shall be removed off-site for utilisation on other land owned by the applicant.

8.7.5 Liquid waste management

8.7.5.1 Effluent

8.7.5.1.1. Holding pond

The holding pond has been designed to store stormwater runoff prior to application to land. The following general maintenance practices shall be implemented:

- Embankments shall be checked for evidence or indications that erosion has or will take place, for leaks etc;
- All fences shall be maintained in satisfactory condition and livestock proof;
- All inlet and outlet pipework, structures and pumps shall be checked regularly to ensure adequate functioning, e.g. flow rates, leaks;
- Tree and shrubs on the embankments shall be removed to ensure the integrity of the embankments are maintained and prevent drying out of the embankment core; and
- Grass cover shall be established and regularly mowed to prevent erosion of embankment slopes and a resting site for flies or habitat for other vermin.

Despite the pre-treatment of settling the suspended solids, the stormwater runoff may still contain a proportion of suspended solids entering the holding pond. Subsequently, after a number of years the holding pond will need to be desludged.

The holding pond shall be desludged when it is apparent that sludge level in the holding pond is causing loss of detention in the holding pond and degeneration of the effectiveness of treatment. Therefore, the following maintenance practices shall be implemented:

- Sludge levels shall be measured annually;
- Sludge levels shall never exceed more than 10% of the holding pond capacity; and
- Clay lining of the holding pond shall be checked after each desludging to ensure its structure and integrity has not been damaged or compromised. Any damage to lining will need to be repaired before wastewater is reintroduced into the holding pond.

As discussed in section 8.4.10.2, holding pond spills within 30 days have been considered as a single spill in the annual water balance calculations. During operation, various mitigation measures shall be implemented to mitigate the potential environmental impact of additional overflows within a 30-day period. The mitigation measures shall include:

- Maintaining the holding pond at a low level. At the start of the wet season, the holding pond shall be pumped out in readiness for anticipated inflows, although, at least 500 mm of effluent shall be retained in the pond to maintain its biological function. Irrigation will reduce the effluent volume in the pond, thereby maximising the capacity available to store further inflows while reducing the risk of pond spills.
- If the holding pond fills during wet weather and an overflow is imminent or spills, it is generally preferable to irrigate effluent onto a wet irrigation area (upstream of terminal ponds) rather than allow the pond to further spill. Irrigation will assist in dispersing the effluent over a large area and provide a greater opportunity for filtering by vegetation and dilution from stormwater.
- The sludge level within the holding pond shall be measured annually and the holding pond desludged once the accumulated sludge takes up a maximum of 10% of the design capacity of the holding pond.

The Operation Solid and Liquid Waste Management plan (Appendix P) includes specific measures to mitigate the potential environmental impact of additional overflows within a 30-day period.

8.7.5.2 Utilisation

Land has been identified on the subject land as being suitable for application of liquid wastes as shown in Figure 13 along with the proposed buffers to sensitive areas (e.g. watercourses, vegetation communities, drainage lines and property boundaries). The amount of land proposed for irrigation of effluent is approximately 120 ha.

Utilisation of effluent will substitute a percentage of the synthetic fertilisers that would otherwise be trucked-in for use in the existing cropping program on the subject land. Various crops shall be grown on the effluent utilisation area with these crops will be harvested hay, silage and / or grain to use as feed commodities in the proposed development.

A sustainable effluent irrigation management system will achieve a balance between the use of effluent for irrigation with the nutrient requirements of the crop while protecting the environment from potential pollution. Additionally, the amenity of the surrounding environment and meeting the needs on a social and ecological level are important considerations in sustainability.

Utilisation of effluent would involve the following principles:

- Effluent applied only to the nominated effluent utilisation area;
- Annual application rates shall be based on annual soil tests and would not exceed nutrient recommendations for a particular crop, soil type or yield goal;

- Application of liquid wastes shall occur over the crop growing period with timing and application rates based on soil moisture deficit levels and in accordance with an Irrigation Management Plan;
- A minimum 25 m buffer zone shall be maintained between effluent utilisation areas and property boundaries;
- Neighbouring landholders are not subjected to odour and aerosol nuisance because of poorly timed and managed liquid waste application practices;
- The application method adopted ensures that no ponding occurs on the soil surface or runoff occurs from the utilisation areas to drainage lines or watercourses; and
- The irrigation system used has a high uniformity of application and the overall management is of a high standard.

Effluent shall be applied using a low-pressure overhead centre-pivot irrigation system as outlined in 13.11.6. The existing entre pivot irrigator on the subject land is shown in Photograph 4.

8.7.6 Hours of operation

The proposed development shall operate 12 hours per day between 6.00 am and 6.00 pm, 7 days per week including public holidays. Operating hours will be applied with any noise limitations and requirements taken into consideration. Staff shall be on-site 24 hours a day, 7 days a week.

Typically, cattle shall be inducted between 7:00 am and 5:00 pm on weekdays. As far as practical, cattle are transported out of the development to slaughter five days per week between 6:00 am and 3:00 pm on Monday to Friday inclusive.

Periodically, heavy vehicle movements do occur outside of normal operating hours (e.g. in summer), as it is desirable to transport cattle either at night or in the early hours of the morning for animal welfare reasons.

As far as practical, delivery of feed commodities occurs between 7:00 am and 5:00 pm on Monday to Friday.

8.7.7 Vehicles and equipment

The anticipated vehicles and equipment required during operation of the proposed development are shown in Table 30. The make and model of vehicles and equipment is based on those currently in use at the existing development and are subject to change.

Table 30 – Proposed development – Typical vehicles and equipment

Activity	Vehicles / Equipment
Livestock transport	Heavy vehicle – B-double / Type 1 road-train
Incoming feed commodities	Semi-trailer/B-Double/Type 1 road train
Solid waste processing/removal off-site	Front-end loader/semi-trailer
Pen Cleaning	Bobcat / 4WD tractor / front-end loader
Feed Processing/Ration delivery	Front-end loader/4WD tractor & feed wagon
Personnel	Light vehicle

8.7.8 Operational workforce requirements

The proposed development shall provide employment for four (4) full time personnel when fully developed. This includes staff undertaking administrative, livestock handling, feed storage, preparation and delivery and waste management activities.

Two staff shall reside on-site in the existing homestead and cottage. No additional accommodation shall be provided on-site for staff. All staff shall be trained to uphold strong guidelines in animal health and welfare and the environment.

8.7.9 Traffic and access arrangements

All traffic would access the development site from Getta Getta Road. A dedicated safe and convenient access from Getta Getta Road to the proposed development site shall be constructed during the construction phase of the development. The proposed entrance would be sited some 200 m east of the existing subject land entrance.

A purpose built internal road shall be constructed to connect the new development entrance to the infrastructure of the existing and proposed development.

The existing subject land entrance shall be maintained for light and heavy vehicles servicing the subject land homestead and agricultural commodities produced on the subject land and not destined for the proposed development.

All livestock and commodity delivery vehicles associated with the proposed development shall be required to enter the site via the proposed development entrance. The proposed development entrance shall be designed to provide an efficient, functional and safe access to the proposed development site for the type of traffic generated by the proposed development. The proposed entrance shall accommodate vehicle up to a Type 1 road train configuration.

An assessment of the impacts to the safety and function of the road network; and the details of any road upgrades required for the development has been completed and presented in the Traffic Impact Assessment provided in Appendix Q.

8.7.10 Hazardous chemical storage

To minimise the risk of environmental harm from liquid spills and leaks, all hazardous chemicals required to be stored on-site shall have a spill containment system appropriate for the nature and pollution risk of that liquid in accordance with relevant guidelines and Australian Standards. Liquids that may be stored during the operation of the proposed development include:

- agricultural chemicals – herbicides, pesticides etc
- cleaning agents
- detergents and their by-products
- engine coolant
- oil, grease, lubricants
- diesel, petrol fuels
- solvents.

All spill containment systems shall be routinely inspected to ensure maintenance of their integrity. A routine inspection and maintenance program shall be tailored to suit the specific installation.

8.7.11 Fire management strategy

A fire is an emergency that causes the greatest concern for personnel. A fire management strategy shall be developed for fire developing from a range of sources. These include bushfires (e.g. planned controlled burning that escapes the original burn zone, embers from a cigarette or unattended campfire, lightning strikes, or deliberate arson), fires originating from the development such as from flammable hazardous material storage, machinery use, electrical faults, maintenance activities or feed storage and processing where hay and/or grain dust is present etc.

The risk of fire is offset by strategies that reduce fire risk. Suitable access and adequate infrastructure to support suppression of fire is provided by way of adequate water supply (storage tanks, irrigation pumps), fire breaks and portable extinguishers.

A grassed fire break shall be maintained around the proposed development outside of the controlled drainage area that will also provide access for fire-fighting vehicles. The grass shall be regularly slashed and a height of no greater than 5 cm maintained.

The water supply storages (tanks) shall be used as fire-fighting water in the event of fire.

A grassed fire break shall be maintained around the proposed development outside of the controlled drainage area that will also provide access for fire-fighting vehicles. The grass shall be regularly slashed or grazed and a height of no greater than 5 cm maintained.

There will be a graded road around the development complex (outside the controlled drainage area) that will act as a firebreak and also provide access for fire-fighting vehicles.

All flammable chemicals stored on-site shall be kept in designated bunded areas or stored in transportable bunded vessels. This includes machinery chemical, fuel and water treatment products.

The chemical register shall include details of dangerous goods stored, or used in quantities, which could conceivably be a subject of concern in an emergency and which may have the potential to act as a pollutant causing environmental harm under certain circumstances.

The Rural Fire Service will be contacted in the event of a fire. Staff will fight the fire, if it is reasonably safe to do so. The following on-site infrastructure/equipment shall be utilised for fire-fighting purposes as required:

- on-site water storages - tanks;
- portable fire extinguishers, located around the site for various classes of fire;
- a water truck (used for dust suppression);
- front-end loader; and
- grader.

If any fire cannot be controlled or attempts for control too dangerous, all staff would be evacuated to a safe area and the livestock let out of the pens into the surrounding paddocks.

8.7.12 Lighting

All outdoor lighting shall me managed in accordance with AS4282 (2023 – Control of the Obtrusive Effects of Outdoor Lighting) (Standards Australia, 2023).

8.7.13 Vermin and disease control measures

Vermin such as flies, rodents (rats/mice), pest birds may become a problem at the proposed development during operation, irritating stock and workers and carrying infectious diseases.

The major nuisance flies in feedlots are house flies, stable flies, bush flies and blowflies. House and stable flies breed in non-compacted solid wastes often under fence lines, in drains and in the sedimentation basin. Blowflies breed in animal carcasses. Bush flies rarely breed in feedlots but can fly in from external breeding sites.

Rodents, such as mice and rats may become a problem at the development complex during operation by consuming and contaminating stored/processed feed, cause structural damage such as undermining feed bunk aprons, chewing holes in silage covers, cabling etc and carry infectious diseases including leptospirosis etc.

Pest birds such as ducks or parrots may become a problem at the development complex during operation by consuming and contaminating the livestock feed, cause structural damage such as chewing communication cabling etc.

Vermin can be difficult to control when populations have become established. Hence, an Integrated Pest Management (IPM) program that incorporates good hygiene, physical methods, biological agents and the focused use of insecticides to prevent and reduce vermin populations shall be implemented, rather than relying on insecticidal control methods alone or control of a large infestation.

The management practices adopted to minimise vermin populations shall include:

- Good hygiene practices are implemented at feed storage and preparation areas and feed bunks such as cleaning up and disposing of spoilt/spilled grains and commodities and rations;
- Ensuring grassed areas are kept short by regular mowing and trimming to reduce fly habitat;
- Ensuring weeds are controlled by physical or chemical means;
- Regular inspection of the development complex for signs of vermin infestation and pressure levels; and
- Timely implementation of appropriate control methods.

8.7.14 Emergency animal disease and mass mortality contingency plans

Emergency animal diseases (EADs) include diseases that are exotic to Australia, new and emerging diseases that are of national significance and include serious outbreaks of prohibited matter, for example foot and mouth disease.

A few serious animal diseases can be transmitted to people (e.g. rabies and bovine spongiform encephalopathy). These are known as zoonoses.

The Department of Primary Industries under the NSW State Emergency Management Plan (EMPLAN) is responsible for the management of an emergency animal disease in New south Wales. Prohibited matter animal diseases are listed in Schedule 2 of the Biosecurity Act 2015.

All emergency animal diseases must be reported to the Local Land Services or the EAD hotline on 1800 675 88 as soon as they are suspected. All development personnel involved in the daily monitoring and handling of livestock should be aware of unusual signs or signs of emergency animal diseases of concern to beef cattle.

AUSVETPLAN Enterprise Manual for beef cattle feedlots and other supporting AUSVET documents provide guidelines on the responsibilities and actions during an EAD outbreak, as required by the relevant government authorities, and the strategies that may be adopted to improve preparedness for, or to handle, a suspected EAD.

Standard operating procedures for each government jurisdiction, agency support plans for the involvement of other areas of emergency management (e.g. police, local government), diagnostic resources and training materials also support the AUSVETPLAN core materials. All these documents can be accessed from the Animal Health Australia website.

If an emergency disease is identified within the proposed development, the requirements of the AUSVETPLAN and any directions from the relevant authority shall be followed as far as relevant to the proposed development.

Emergency animal disease outbreak and / or mass mortality contingency plans will be developed as part of the operational environmental management plan (if development consent is granted). A suitable site for mass burial of mortalities has been identified on the subject property as shown in Figure 6.

The burial pits shall be established in low permeability soils (brown/grey dermosol) on a site well removed from surface waters, drainage lines, gullies, groundwater bores and the development complex. The soils in this location are low permeability, thus lining of the pits with clay is unlikely to be required. If lining is required, then the pits shall be lined with at least 600 mm of clay.

The pit shall be located so that all water runoff is directed away from the pit. Use of diversion bunds or trenches may be required. Pits shall be deep but relatively narrow and excavated using an excavator.

The carcass of each animal shall be opened at the time of placing in the pit and the carcass immediately covered by at least 500 mm of soil to reduce odour and exclude flies and vermin.

Each pit shall be progressively filled with carcasses until sufficient pit capacity remains for the pit to be sealed with clay and compacted to a minimum depth of 1 m.

Soil shall be mounded over the top and replenished should the pit subside to below ground level.

The site where mass mortalities are buried shall be recorded for future reference.

Where the mortalities are suspected to be caused by an emergency/infectious disease AUSVETPLAN procedures shall be implemented and disposal managed under the AUSVETPLAN. In this case, advice shall be sought from NSW Department of Primary Industries and/or the Environment Protection Authority.

8.7.15 Environmental management and monitoring

Doolin Farming Pty Ltd is committed to conducting activities associated with the operation of the proposed development in an environmentally responsible manner and aim to implement best practice environmental management as part of a program of continuous improvement. This will be achieved by addressing issues systematically and consistent with a range of environmental procedures.

Doolin Farming Pty Ltd intends to apply for accreditation under the Aus-meat National Feedlot Accreditation Scheme (NFAS).

In accordance with the requirements under Part 6 of the EP&A Act, Doolin Farming Pty Ltd commit to the environmental management and monitoring of the operation of the proposed development. An outline of an environmental management plan (EMP) has been developed for the construction and operation of the proposed development, as shown in section 15.2.1.

A draft Operational Environmental Management Plan (OEMP) and relevant sub-plans has been prepared as part of the assessment process and provided in Appendix P. The OEMP has been drafted with consideration to the latest industry guidelines published in relation to the reuse of feedlot wastes generated on-site (Tucker et al 2015).

Environmental monitoring, including using sustainability indicators to interpret results, is critical to the overall environmental management of the proposed development. It provides a mechanism to assess the effectiveness of strategies chosen to minimise environmental harm and allows adjustment of management practices to prevent those impacts from reaching unacceptable levels.

A preliminary environmental monitoring program for the proposed development has been developed as part of the OEMP. The key environmental parameters to be monitored would include but not limited to:

- Solid and liquid waste management systems e.g. efficacy of collection and storage systems, utilisation performance measures
- Climatic variables that influence solid and liquid waste storage and utilisation systems or odour nuisance e.g. rainfall, evaporation, wind speed, wind direction
- Surface water quality
- Groundwater quality
- Social impacts e.g. Odour, dust and noise complaints.

The OEMP and associated sub-plans provides details and justification for the proposed monitoring program for soil characteristics, composted solid waste quality and quantity, liquid waste quality and quantity, surface and groundwater quality and air quality. The OEMP and sub-plans provide details of the locations of all monitoring sites and the parameters that will be monitored.

Where relevant, the monitoring program aligns with the recommendations in the guidelines ‘Development of Indicators of Sustainability for Effluent Reuse in the Intensive Livestock Industries: Piggeries and Cattle Feedlots’ (McGahan and Tucker, 2003) and ‘Use of Effluent by irrigation’ (DEC, 2004). A summary of the proposed parameters to be monitored for various environmental aspects are outlined in the following sections.

8.7.15.1 Effluent and solid waste management systems

Detailed investigation of effluent, solid waste, soil, surface waters and groundwater shall be conducted prior to the commencement of effluent and solid waste application, to identify the size of environmental risks as outlined in section 13.11 and to provide baseline data for future operational monitoring.

8.7.15.2 Effluent

As soon as practicable after commencing operation, effluent shall be characterised for various constituents likely to be present to determine irrigation application rates and management of application. The composition of effluent depends on such factors as the class of animal being fed and hence ration(s) being used, the cattle drinking water quality, pen cleaning practices, occupancy and stocking density, climatic effects (e.g. rainfall) and the length of time the effluent is stored prior to utilisation. Table 31 provides a summary of the recommended monitoring parameters for liquid waste. The Solid and Liquid Waste Management Plan contained within the OEMP (Appendix P) provides details of all liquid waste monitoring sites and the parameters that will be monitored. Additional parameters may also be required by the development's Environment Protection Licence or local council requirements.

Table 31 provide recommended monitoring parameters for effluent.

Table 31 – Proposed development – Recommended effluent analysis parameters

Test parameter	Frequency	Justification
pH	3 months	Influences nutrient availability
Total Suspended Solids	3 months	Operational behaviour of treatment system
Total nitrogen or TKN	3 months	Measure of nitrogen applied for mass balance calculations
Ammonium-nitrogen	3 months	Measure of nitrogen available or potentially lost as ammonia volatilisation
Nitrate-nitrogen	3 months	Measure of nitrogen immediately available for plant uptake
Total phosphorus	3 months	Measure of phosphorus applied for mass balance calculations
Exchangeable cations and CEC (potassium, sodium, magnesium, calcium)	3 months	Important implications for soil structure
SAR	3 months	Measure of liquid waste sodicity
Electrical conductivity and chloride	3 months	Measure of solids salinity

TKN = Total Kjeldahl Nitrogen; SAR = sodium absorption ratio

8.7.15.3 Solid waste

As soon as practicable after commencing operation, solid waste shall be characterised for various constituents likely to be present to determine application rates. The composition of solid waste depends on such factors as the class of animal being fed and hence ration(s) being used, the cattle drinking water quality, pen cleaning practices, occupancy and stocking density, climatic effects (e.g. rainfall) and the length of time the solid wastes are stored prior to utilisation. Table 32 provides a summary of the recommended monitoring parameters for solid waste. The Effluent and Solid Waste Management Plan contained within the OEMP (Appendix P) provides details of all solid waste monitoring sites and the parameters that will be monitored. Additional parameters may also be required by the development's Environment Protection Licence or local council requirements.

Table 32 – Proposed development – Recommended solid waste analysis parameters

Test parameter	Frequency	Justification
pH	12 months	Influences nutrient availability
Dry matter	12 months	To calculate nutrient applied
Total nitrogen or TKN	12 months	Measure of nitrogen applied for mass balance calculations
Ammonium-nitrogen	12 months	Measure of nitrogen available or potentially lost as ammonia volatilisation
Nitrate-nitrogen	12 months	Measure of nitrogen immediately available for plant uptake
Total phosphorus	12 months	Measure of phosphorus applied for mass balance calculations
Exchangeable Cations and CEC (potassium, sodium, magnesium, calcium)	12 months	Important implications for soil structure
Organic carbon	12 months	Influences soil stability
Sulfur	12 months	Influences nutrient availability
Moisture Content	12 months	To calculate nutrient applied
Electrical conductivity and chloride	12 months	Measure of solids salinity

TKN = Total Kjeldahl Nitrogen

8.7.15.4 Soils of utilisation area

Soil characteristics and nutrient levels of the effluent and solid utilisation area have been established when designing the requirements for a sustainable solid and liquid utilisation system as described in section 13.11. The initial characterisation of the soil shall be used as a benchmark against which any future operational monitoring results can be measured.

Monitoring soil samples shall be taken in close proximity to the initial site characterisation soil sampling locations.

Table 33 provides a summary of the recommended monitoring parameters for soils of the effluent and solid waste utilisation areas. The Soil and Water Quality Management Plan contained within the OEMP (Appendix P) provides details of all soil monitoring sites and the parameters that will be monitored. Additional parameters may also be required by the development's Environment Protection Licence or local council requirements.

Table 33 – Proposed development – Recommended soil analysis parameters

Soil test parameter	Depth (down profile)	Frequency	Justification
pH		Every 3 years	Influences nutrient availability
EC_{se} (Can measure $EC_{1:5}$ and convert to EC_{se})	0-10cm 20-30 cm 50-60 cm OR base of root zone	Yearly	Measure of soil salinity
Total Nitrogen	0-30 cm 20-30 cm 50-60 cm	Yearly	Measure of nitrogen applied for mass balance calculations
Nitrate-nitrogen	0-10 cm 20-30 cm 50-60 cm	Yearly	Measure of nitrogen available for plant uptake, levels of nitrates at the base of the root zone
Available phosphorus (Colwell)	0-10 cm 50-60 cm	Yearly	Measure of phosphorus available for plant uptake
Phosphorus sorption capacity	0 –60 cm	Yearly	Measure of the soils ability to safely store phosphorus - essential if applying more than plant uptake
Organic carbon	0-10 cm	Yearly	Influences soil stability and consequently soil erosion
Exchangeable cations and CEC (Calcium, sodium, potassium, magnesium).	0-10 cm 50-60 cm	Yearly	Needed to calculate ESP, EKP and Ca: Mg, which have important implications for soil structure
Chloride	0-30 cm 50-60 cm	Yearly	Influences plant functions

EC = electrical conductivity; CEC = cation exchange capacity; ESP = exchangeable sodium percentage; EKP = exchangeable potassium percentage.

8.7.15.5 Climatic variables

Climatic variables, such as rainfall, evaporation, wind speed, wind direction may influence solid and liquid waste storage and utilisation systems or odour nuisance.

Subsequently, installation of an automatic weather station to continuously monitor wind direction and speed, along with other climatic conditions is generally a requirement of the development's Environment Protection Licence. These data can also be useful for complaint validation. Table 34 provides a summary of the recommended climate monitoring parameters. The Air Quality Management Plan contained within the OEMP (Appendix P) provides details of the climate monitoring sites and the parameters that will be monitored. Additional parameters may also be required by the development's Environment Protection Licence.

Table 34 – Proposed development – Recommended climate analysis parameters

Test parameter	Frequency
Air Temperature	Continuous
Wind Direction	Continuous
Sigma Theta	Continuous
Wind Speed	Continuous
Rainfall	Continuous

8.7.15.6 Groundwater

Groundwater may be monitored if the existing groundwater quality is at risk from the liquid waste utilisation system. Monitoring any potential impacts on groundwater drinking water supplies may also be required.

Table 35 provides a summary of the recommended key quality monitoring parameters for groundwater. The Soil and Water Quality Management Plan contained within the OEMP (Appendix P) provides details of all groundwater monitoring sites and the parameters that will be monitored. Additional parameters may also be required by the development's Environment Protection Licence or local council requirements.

Table 35 – Proposed development – Recommended groundwater analysis parameters

Test parameter	Frequency	Justification
pH	6 months	Water quality protection
Total Suspended Solids	6 months	Water quality protection
Total nitrogen or TKN	6 months	Water quality protection
Ammonium-nitrogen	6 months	Water quality protection
Nitrate-nitrogen	6 months	Water quality protection
Total phosphorus	6 months	Water quality protection
Exchangeable Cations and CEC (potassium, sodium, magnesium, calcium)	6 months	Water quality protection
SAR	6 months	Water quality protection
Electrical conductivity and chloride	6 months	Water quality protection
Standing Water Level	6 months	Water quality protection

TKN = Total Kjeldahl Nitrogen

Water quality monitoring shall be undertaken in accordance with Approved methods for the sampling and analysis of water pollutants in NSW (NSW Environment Protection Authority, 2022).

8.7.15.7 Surface water

Surface waters shall be analysed following rainfall runoff events occurring within 48 hours of irrigation of effluent (upstream and downstream of the effluent utilisation area).

Water monitoring shall provide data that is representative of adjoining surface waters and is able to indicate contributions of any pollutants as a result of the proposed development (compared to contributions of similar pollutants from upstream sources).

Key quality indicators both upstream and downstream of the point where surface runoff discharges from the property shall be measured. Table 36 provides a summary of the recommended monitoring parameters for surface waters. The Soils and Water Quality Management Plan contained within the OEMP (Appendix P) provides details of all surface water monitoring sites and the parameters that will be monitored. Additional parameters may also be required by the development's Environment Protection Licence or local council requirements.

Table 36 – Proposed development – Recommended surface waters analysis parameters

Test parameter	Frequency	Justification
pH	Event	Water quality protection
Total Suspended Solids	Event	Water quality protection
Total nitrogen or TKN	Event	Water quality protection
Ammonium-nitrogen	Event	Water quality protection
Nitrate-nitrogen	Event	Water quality protection
Total phosphorus	Event	Water quality protection
Exchangeable Cations and CEC (potassium, sodium, magnesium, calcium)	Event	Water quality protection
SAR	Event	Water quality protection
Electrical conductivity and chloride	Event	Water quality protection

TKN = Total Kjeldahl Nitrogen

8.7.15.8 Social impacts

8.7.15.9 Community liaison

Open communication between the neighbours and regulators from the inception of the proposed development application through construction and operation can help to identify social impact issues and identify and address these issues to minimise the impact of the development (when approved) on neighbours. Once operational, community liaison practices may include:

- informing neighbours in advance of any unusual events/problems/emergency practices that may cause an unavoidable increase in odour, dust or noise, including practices to mitigate the issue and the expected duration of the issue;
- participation and cooperation in dispute resolution;
- gathering relevant evidence, and identifying and implementing strategies to remedy the issue; and
- informing the complainant of the outcome of any investigations and any actions taken to avoid future associated issues and seeking feedback to ascertain if the issue has been resolved.

8.7.15.10 Handling Complaints

The number of complaints received is one measure of the impact of the development (when approved) on community amenity. While this measure is imperfect, it helps to identify when sensitive receptors perceive that the development is unreasonably affecting their enjoyment of life and property. Many community amenity impacts are closely related to weather conditions, so daily weather data can assist in assessing the validity of complaints.

Details of any complaints received, results of investigations, and corrective actions taken shall be recorded in a ‘complaints register’. The Operation Environmental Management Plan (Appendix P) outlines the compliant handling process.

8.8 Animal care statement

Doolin Farming Pty Ltd will manage the proposed development to ensure a very high standard of animal welfare and health.

The operation and practices for the proposed development will comply with following national legislation, guidelines and standards:

- Prevention of Cruelty to Animals Act 1979 (NSW);
- Prevention of Cruelty to Animals Regulation 2012 (NSW);
- Model Code of Practice for the Welfare of Animals: Cattle (SCARM, 2004);
- Australian Animal Welfare Standards and Guidelines — Land Transport of Livestock (Animal Health Australia (AHA) 2012);
- Queensland Code of practice for land transport of livestock (QLD) - *Animal Care and Protection Act 2001 (QLD);*
- The Prevention of Cruelty to Animals (Land Transport of Livestock) Standards 2013 No 1 (NSW);
- Prevention of Cruelty to Animals (Land Transport of Livestock) Standards 2013 No 2 (NSW); and
- NFAS Rules and Standards (August 2021) (AUS-MEAT NFAS 01/2021).

9. Relevant statutory planning

The development application and associated EIS for the proposed development will be assessed in accordance with the framework established by the Environmental Planning and Assessment Act 1979 and the Environmental Planning and Assessment Regulation 2021.

As part of the assessment, a number of local and State planning instruments and policies are required to be addressed, together with relevant Commonwealth and NSW legislation. This section provides an outline of the environmental planning framework and assesses the proposed development in the context of that framework. It describes how the proposed development will address and / or comply with local planning policies; and state and federal legislation. The applicable policy and / or objects of each piece of legislation is provided, followed by a statement outlining how the development will address and / or comply with the planning policies; and state and federal legislation.

9.1 Local planning matters

9.1.1 Gwydir Local Environmental Plan 2013

The primary local planning instrument applying to the proposed development is the Gwydir Local Environmental Plan 2013. The framework of the Gwydir LEP is derived from the Environmental Planning and Assessment Act 1979 No 203. The particular aims of the Gwydir LEP include:

(a) to encourage the proper management, development and conservation of environmental, economic and social resources in Gwydir,
(b) to facilitate economic growth and development consistent with the aim specified in paragraph (a) and that:
  (i) minimises the cost to the community of fragmented and isolated development, and
  (ii) facilitates the efficient and effective delivery of amenities and services, and
  (iii) facilitates stimulation of demand for a range of residential, enterprise and employment opportunities and promotes agricultural diversity, and
  (iv) utilises, where feasible, existing infrastructure and roads when considering new development and future potential development,
(c) to facilitate development in accordance with flood management planning,
(d) to facilitate development that is compatible with adjoining and nearby uses,
(e) to facilitate development that is appropriate in scale and type to the characteristics of the zone,
(f) to identify, protect and conserve places of European heritage significance and Aboriginal heritage and cultural significance,
(g) to identify, protect, conserve and enhance natural assets.

The proposed development of a beef cattle feedlot retains the existing agricultural use of the land and has been carefully assessed through this EIS in terms of its potential effect on soils, water, heritage, waterways, flora and fauna and surrounding ecosystems. Provided that the management and mitigation measures recommended in this EIS are implemented on the site, the effect of the development upon these valuable resources would be properly managed and, the proposed development shall be consistent with the general aims of Gwydir Local Environmental Plan 2013.

9.1.1.1 Development control plans

Gwydir Shire Council (Patsy Cox pers comms 18 December 2023) have confirmed that the Shire does not have a published Development Control Plan (DCP). The Shire confirmed that the proposed development is a type of development that is "permitted with consent" and that

development consent must first be obtained by way of a development application or application for a complying development certificate.
Consequently, the proposed development will not be assessed against any development control plan.

9.1.1.2 Land use definition

Use of land for a beef cattle feedlot according to the Gwydir Local Environmental Plan 2013 is defined as an "Intensive Livestock Agriculture". The definition of "Intensive Livestock Agriculture" under the Gwydir Local Environmental Plan 2013 is:

intensive livestock agriculture *means the keeping or breeding, for commercial purposes, of cattle, poultry, pigs, goats, horses or other livestock that are fed wholly or substantially on externally-sourced feed, and includes any of the following:*
(a) dairies (restricted),
(b) feedlots,
(c) piggeries,
(d) poultry farms,
but does not include extensive agriculture, aquaculture or the operation of facilities for drought or similar emergency relief.

Note – Intensive livestock agriculture is a type of **agriculture.** Agriculture under the Gwydir Local Environmental Plan 2013 is defined as –

agriculture *means any of the following:*
(a) aquaculture,
(b) extensive agriculture,
(c) intensive livestock agriculture,
(d) intensive plant agriculture.

9.1.1.3 Zoning

Under the Gwydir Local Environmental Plan 2013, the proposed development is located in the Rural Zone - RU1 Primary Production as shown in Figure 18. Intensive livestock keeping establishments are permissible with consent in the RU1-Primary Production zone. The LEP states that the objectives of this zone are:

- To encourage sustainable primary industry production by maintaining and enhancing the natural resource base;
- To encourage diversity in primary industry enterprises and systems appropriate for the area
- To minimise the fragmentation and alienation of resource lands; and
- To minimise conflict between land uses within this zone and land uses within adjoining zones.

The proposed development would result in the sustainable, productive use of agricultural land on the subject land. An assessment of land capability, including soil types, water resources, vegetation and other physical attributes indicates that the land is suitable for the proposed development. Further, the proposed development provides diversification of primary industry enterprises and systems appropriate for the area.

The proposed development has been assessed in terms of its potential environmental impacts and management and mitigation measures recommended to mitigate potential adverse impacts to an acceptable level.

The proposed development will include the sustainable use of water resources in line with the requirements of the *Water Management Act 2000* and avoids environmentally sensitive areas such that these would be protected and preserved in accordance with relevant LEP and zone objectives.

The proposed development is consistent with the objectives of the RU1 Primary Production zone.

9.1.1.4 Contribution plans

The subject land is subject to the Gwydir Shire Council section 94 development contribution plan no.1 – traffic generating development plan.

Gwydir Local Environmental Plan 2013

GWYDIR SHIRE COUNCIL

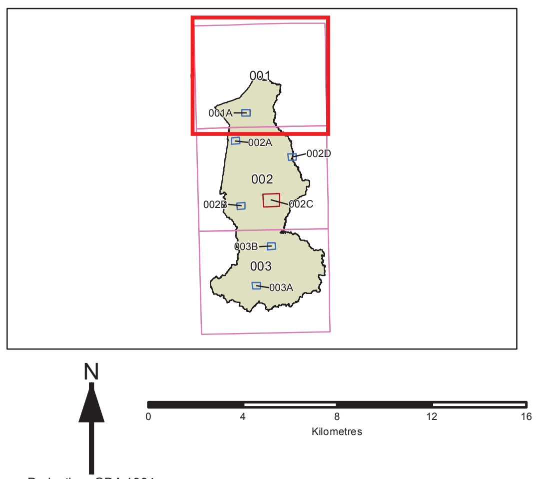
Land Zoning Map - Sheet LZN_001

Zone

- E1 National Parks and Nature Reserves
- IN1 General Industrial
- R5 Large Lot Residential
- RE1 Public Recreation
- RE2 Private Recreation
- RU1 Primary Production
- RU5 Village

Cadastre

Cadastre 01/08/2013
© Land and Property Information (LPI)



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MGA Zone 56

Scale: 1:320,000 @ A3

Map identification number:
3660_COM_LZN_001_320_20130806

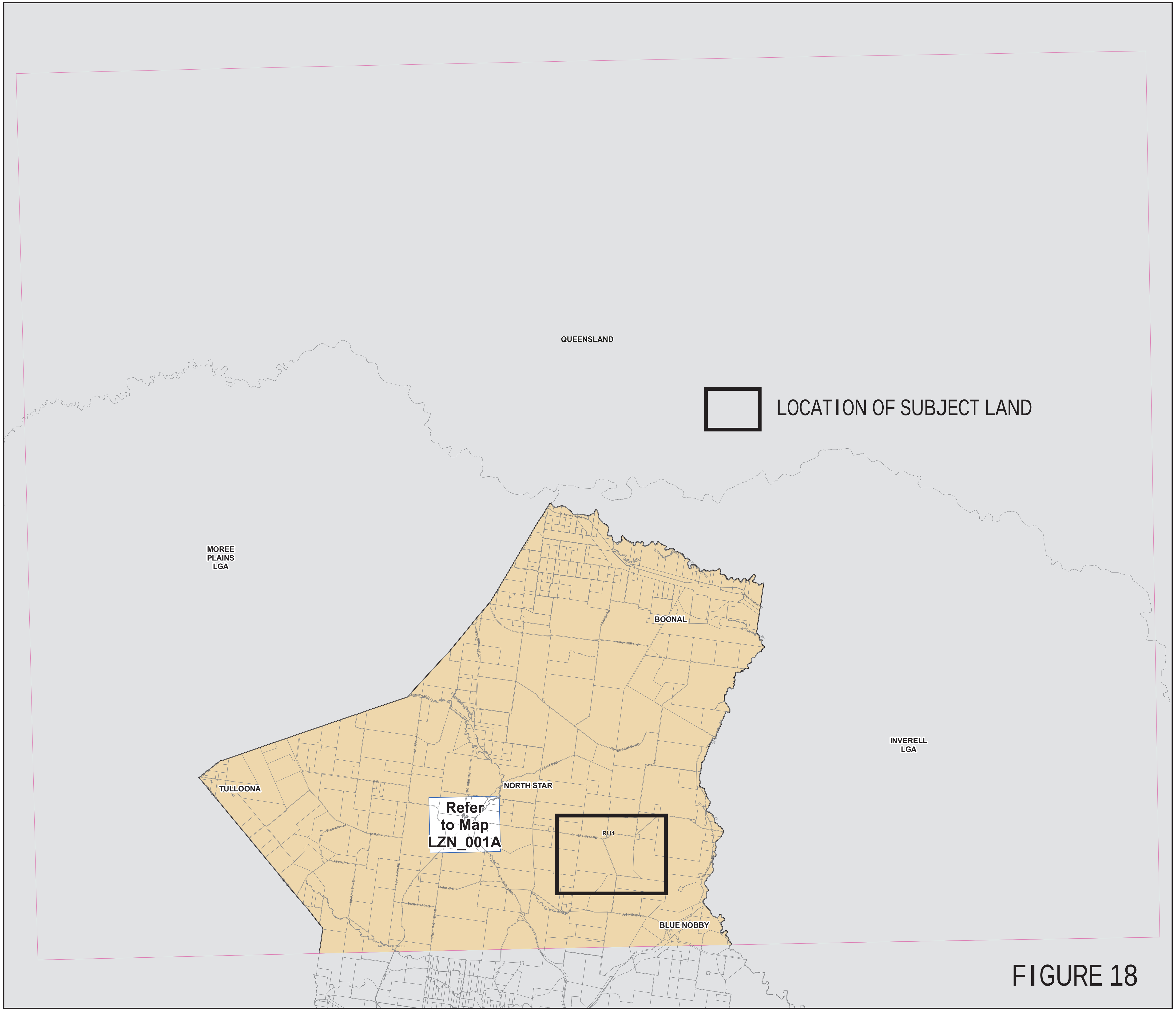


FIGURE 18

9.2 Regional Plans

NSW is covered by a suite of strategic land-use plans referred to as Regional Plans which set a 20-year framework, vision and direction for strategic planning and land use.

The New England North West Regional Plan 2041 (NSW Planning and Environment, 2022) was adopted in September 2022 and covers the local authority areas of Gunnedah, Glen Innes Severn, Gwydir, Inverell, Liverpool Plains, Moree Plains, Narrabri, Tenterfield, Uralla, Walcha and the Regional Councils of Armidale and Tamworth.

The New England North West Regional Plan 2041 sets a 20-year strategic land use planning framework for the region, aiming to protect and enhance the region's assets and plan for a sustainable future. It covers all facets of land use planning, including employment areas, town centres, housing and related infrastructure, the natural environment and future hazards .

The subject land on which the development is proposed is located within the Gwydir Shire Council and therefore subject to the provisions of the New England North West Regional Plan 2041 (NENWRP).

The NENWRP defines intensive agriculture and agribusiness as including Agriculture activities such as horticulture, irrigated crops, glasshousing, feedlots, poultry farms that rely on high levels of inputs such as labour and capital to increase yield.

The NENWRP describes the New England North West is home to some of Australia's most efficient and productive farming and grazing land. The region boasts a range of agricultural production based on high quality soils, good rainfall and a temperate climate which is conducive to cropping and livestock production year-round. Beef, sheep and wool, poultry, broadacre crops, vegetables and fruits and nuts are produced throughout the region, with almost 50% of the State's cotton produced in the Moree and Narrabri LGAs alone. The New England and North West region produces around a fifth of NSW's agricultural output and is home to 16% of all farm businesses in NSW. The most important agricultural commodities are cattle, followed by cotton and wool. Agriculture, forestry and fishing employs more than 13,000 people – or 14% of the region's workforce. Intensive agribusiness relates to agriculture activities such as horticulture, irrigated crops, glass housing, feedlots and poultry farms that rely on high levels of inputs such as water, labour and capital to increase yield. Agricultural diversification, innovation and value-adding leverages advanced and automated technologies to maximise agribusiness diversification. The expansion of intensive agriculture and food processing has attracted new families to a diverse and expanding economy, with flow-on demand and benefits for population-focused business and services.

The NENWRP sets a 20-year strategic land use planning framework for the region, aiming to protect and enhance the region's assets and plan for a sustainable future. It covers all facets of land use planning, including employment areas, town centres, housing and related infrastructure, the natural environment and future hazards .

The policies contained in the regional plan contribute towards the continued growth of the agricultural sector, protection of strategic areas of priority agricultural land use from potentially incompatible resource activities, maximise opportunities for co-existence of resources and agricultural land use and ongoing development of strategic centres and regional cities.

The key goals for the NENWRP 2041 are to:

- Coordinate land use planning for future growth, community need and regional economic development;
- Protect the viability and integrity of rural land;
- Expand agribusiness and food processing sectors;
- Responsibly manage mineral resources;
- Enhance the diversity and strength of Central Business Districts and town centres;
- Coordinate the supply of well-located employment land;
- Support a diverse visitor economy;
- Adapt to climate change and natural hazards and increase climate resilience;
- Lead renewable energy technology and investment;
- Support a circular economy;
- Sustainably manage and conserve water resources;
- Protect regional biodiversity and areas of High Environmental Value;
- Provide well located housing options to meet demand;
- Provide more affordable and low cost housing;
- Understand, respect and integrate Aboriginal culture and heritage;
- Support the aspirations of Aboriginal people and communities in local planning;
- Celebrate local character;
- Public spaces and green infrastructure support connected, inclusive and healthy communities;
- Leverage new and upgraded infrastructure;
- Improve state and regional freight connectivity;
- Improve active and public transport networks; and
- Utilise emerging transport technology.

The key priorities for the Gwydir Shire in the NENWRP of relevance to the proposed development are to:

- encourage diversification in agriculture, horticulture and agribusiness to grow these sectors and harness domestic and international opportunities
- attract a vibrant, youthful, flexible and mobile workforce

Council’s priorities for the LGA are:

- promote development that contributes to the unique character of Gravesend, Cobbadah, Upper Horton, Croppa Creek, North Star, Coolatai and Warialda Rail;
- continue to develop access and logistics infrastructure on appropriate sites to encourage new industry opportunities, throughout the region and also within the Namoi Regional Job Precinct;

- promote the development of employment lands, including those associated with the Namoi Regional Job Precinct;
- enhance visitor experiences and expand nature-based, adventure and cultural tourism places;
- promote the region's rivers and waterways, including for tourism;
- provide services for the ageing population;
- implement place-based planning principles to build more liveable communities for residents; and
- identify and promote wind, solar and other renewable energy production opportunities.

The proposed development has been sited and designed in accordance with relevant aspects of state and national guidelines for the establishment and operation of beef cattle feedlots.

The proposed development is appropriately located to provide sufficient separation distances to sensitive receptors as shown in Figure 15 and the Odour Impact Assessment presented in Appendix G.

Biodiversity issues are addressed appropriately in the proposed development so that natural environment values are maintained or enhanced as a result of the proposed development.

The proposed development has been sited, designed and shall be operated to ensure there are no adverse impacts to riparian areas and water quality from off-site transfer of sediment as demonstrated in section 13.4 and 13.8 and Figure 6, Figure 10 and Figure 14.

The proposed development is sited on land that is not contaminated and result in no increase to the risk to human health or to the environment. Refer to section 13.2.

The proposed development involves an "Intensive Animal Livestock" use for the purposes of a beef cattle feedlot and therefore supports diversification in agriculture and agribusiness within the local region and higher intensity agricultural production within the area.

The proposed development offers opportunities and diversification for the applicant's workforce.

Accordingly, the proposed development as the expansion of a beef cattle feedlot does not compromise the goals sought under or conflict with New England North West Regional Plan 2041 or priorities for the Gwydir Shire under the plan.

9.3 State planning matters

9.3.1 Environmental Planning and Assessment Act 1979

The *Environmental Planning and Assessment Act 1979* and the *Environmental Planning and Assessment Regulation 2021* provide the framework for environmental planning in NSW and include provisions to ensure that proposals which have the potential to impact the environment are subject to detailed assessment and provide opportunity for public involvement.

The *Environmental Planning and Assessment Act 1979* provides the framework for NSW Planning Legislation. Under this Act, local councils prepare Local Environmental Plans (LEPs) that specify planning controls for specific parcels of land.

The Environmental Planning and Assessment Act 1979 also provides for State Environmental Planning Policies (SEPPs) and Regional Environmental Plans (REPs). Applicable SEPPs are discussed in section 9.3.2.

The objectives of EP&A Act are:

(a) to encourage:
  (i) the proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment,
  (ii) the promotion and co-ordination of the orderly and economic use and development of land,
  (iii) the protection, provision and co-ordination of communication and utility services,
  (iv) the provision of land for public purposes,
  (v) the provision and co-ordination of community services and facilities, and
  (vi) the protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats, and
  (vii) ecologically sustainable development, and
  (viii) the provision and maintenance of affordable housing, and
(b) to promote the sharing of the responsibility for environmental planning between the different levels of government in the State, and
(c) to provide increased opportunity for public involvement and participation in environmental planning and assessment.

9.3.2 State Environmental Planning Polices (SEPPs)

State Environmental Planning Policies (SEPPs) deal with matters of state or regional environmental planning significance. The following sections outline SEPPs of relevance to the proposed development.

The NSW Planning Portal Spatial Viewer indicates that the following State Environmental Planning Policies (SEPPS) are applicable to the subject land:

- SEPP (Biodiversity and Conservation) 2021
- SEPP (Exempt and Complying Development Codes) 2008
- SEPP (Housing) 2021
- SEPP (Industry and Employment) 2021
- SEPP (Planning Systems) 2021
- SEPP (Primary Production) 2021
- SEPP (Resilience and Hazards) 2021
- SEPP (Resources and Energy) 2021

- SEPP (Sustainable Buildings) 2022
- SEPP (Transport and Infrastructure) 2021
- SEPP No 65—Design Quality of Residential Apartment Development

State Environmental Planning Policies can specify planning controls for certain areas and/or types of development. They can also identify the development assessment system that applies and the type of environmental assessment that is required.

The following sections outline SEPPs of relevance to the proposed development.

9.3.2.1 State Environmental Planning Policy (Biodiversity and Conservation) 2021

The State Environmental Planning Policy (Biodiversity and Conservation) 2021 (Biodiversity and Conservation SEPP) contains:

- planning rules and controls for the clearing of native vegetation in NSW on land zoned for urban and environmental purposes that is not linked to a development application;
- the land use planning and assessment framework for koala habitat;
- provisions which establish a consistent and co-ordinated approach to environmental planning and assessment along the River Murray;
- provisions seeking to protect and preserve bushland within public open space zones and reservations;
- provisions which aim to prohibit canal estate development;
- provisions to support the water quality objectives for the Sydney drinking water catchment;
- provisions to protect the environment of the Hawkesbury-Nepean River system;
- provisions to manage and improve environmental outcomes for Sydney Harbour and its tributaries;
- provisions to manage and promote integrated catchment management policies along the Georges River and its tributaries; and
- provisions which seek to protect, conserve and manage the World Heritage listed Willandra Lakes property.

The Biodiversity and Conservation SEPP has consolidated and repealed:

- SEPP (Vegetation in Non-Rural Areas) 2017
- SEPP (Koala Habitat Protection) 2020
- SEPP (Koala Habitat Protection) 2021
- Murray Regional Environmental Plan No 2—Riverine Land
- SEPP No 19—Bushland in Urban Areas
- SEPP No 50—Canal Estate Development
- SEPP (Sydney Drinking Water Catchment) 2011
- Sydney Regional Environmental Plan No 20 – Hawkesbury – Nepean River (No 2 – 1997)
- Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005
- Greater Metropolitan Regional Environmental Plan No 2 – Georges River Catchment

- Willandra Lakes Regional Environmental Plan No 1 – World Heritage Property (Willandra Lakes REP)

The subject land on which the development is proposed is zoned RU1 Primary Production and located in the North Star region in the north of the state and is not located:

- on land zoned for urban and environmental purposes that is not linked to a development application;
- along the River Murray;
- within public open space zones and reservations;
- within the Sydney drinking water catchment;
- within the Hawkesbury-Nepean River system
- within Sydney Harbour and its tributaries
- along the Georges River and its tributaries;
- on the World Heritage listed Willandra Lakes property.

As the proposed development is not located within areas listed above the only chapter of relevance in the SEPP (Biodiversity and conversation) 2021 is Chapter 3 Koala habitat protection 2020 and Chapter 4 Koala habitat protection 2021.

The statewide Koala Habitat Information Base (KHIB) shows that the proposed development site has no likely koala habitat, no koala preferred trees and no koala sightings. Consequently, the direct impact to Koalas is considered to be low or absent as no native woody vegetation is not being impacted and no koala trees are proposed to be removed by the proposed development.

Consequently, the provisions of the SEPP do not apply or have been addressed in the biodiversity assessment presented in Appendix J.

9.3.2.2 State Environmental Planning Policy (Exempt and Complying Development Codes) 2008

The State Environmental Planning Policy (Exempt and Complying Development Codes) 2008 aims to provide streamlined assessment processes for development that complies with specified development standards by –

(a) providing exempt and complying development codes that have State-wide application; and
(b) identifying, in the exempt development codes, types of development that are of minimal environmental impact that may be carried out without the need for development consent; and
(c) identifying, in the complying development codes, types of complying development that may be carried out in accordance with a complying development certificate as defined in the Act; and
(d) enabling the progressive extension of the types of development in this Policy, and
(e) providing transitional arrangements for the introduction of the State-wide codes, including the amendment of other environmental planning instruments.

Division 1 General Exempt Development Code of the SEPP lists the following relevant items for this development:

Part 2 Exempt Development Codes

- Subdivision 16 Farm buildings (other than stock holding yards, grain silos and grain bunkers);
- Subdivision 16A Stock holding yards not used for sale of stock;
- Subdivision 16B Grain silos and grain bunkers.

The proposed development includes development that is not exempt under provisions of the State Environmental Planning Policy (Exempt and Complying Development Codes) 2008. Consequently, development approval is not subject to streamlined assessment processes.

9.3.2.3 State Environmental Planning Policy (Housing) 2021

The principles of the State Environmental Planning Policy (Housing) 2021 include –

(a) enabling the development of diverse housing types, including purpose-built rental housing,
(b) encouraging the development of housing that will meet the needs of more vulnerable members of the community, including very low to moderate income households, seniors and people with a disability,
(c) ensuring new housing development provides residents with a reasonable level of amenity,
(d) promoting the planning and delivery of housing in locations where it will make good use of existing and planned infrastructure and services,
(e) minimising adverse climate and environmental impacts of new housing development,
(f) reinforcing the importance of designing housing in a way that reflects and enhances its locality,
(g) supporting short-term rental accommodation as a home-sharing activity and contributor to local economies, while managing the social and environmental impacts from this use,
(h) mitigating the loss of existing affordable rental housing.

Provisions of this SEPP will not be enacted as the proposed development does not involve new housing.

9.3.2.4 State Environmental Planning Policy (Industry and Employment) 2021

The State Environmental Planning Policy (Industry and Employment) 2021 consolidates various planning policies to ensure a more efficient and consistent approach to environmental planning across the state.

This Policy has several chapters including:

- Chapter 2 – Western Sydney Employment Area; and

- Chapter 3 – Advertising and signage.

Chapter 2 aims to protect and enhance the Western Sydney Employment Area) for employment purposes. The particular aims of this Chapter are as follows –

(a) to promote economic development and the creation of employment in the Western Sydney Employment Area by providing for development including major warehousing, distribution, freight transport, industrial, high technology and research facilities,
(b) to provide for the co-ordinated planning and development of land in the Western Sydney Employment Area,
(c) to rezone land for employment, environmental conservation or recreation purposes,
(d) to improve certainty and regulatory efficiency by providing a consistent planning regime for future development and infrastructure provision in the Western Sydney Employment Area,
(e) to ensure that development occurs in a logical, environmentally sensitive and cost-effective manner and only after a development control plan (including specific development controls) has been prepared for the land concerned,
(f) to conserve and rehabilitate areas that have a high biodiversity or heritage or cultural value, in particular areas of remnant vegetation.

The SEPP (Industry and Employment) 2021 is listed as applicable to the land on which the development is proposed. This SEPP aims to protect and enhance the land within the Western Sydney Employment Area for employment purposes. However, it is not considered relevant as the subject land is not included in section 2.2 of the SEPP which describes the land to which the SEPP applies.

The particular aims of Chapter 3 as follows –

(a) to ensure that signage (including advertising) –
  (i) is compatible with the desired amenity and visual character of an area, and
  (ii) provides effective communication in suitable locations, and
  (iii) is of high quality design and finish, and
(b) to regulate signage (but not content) under Part 4 of the Act, and
(c) to provide time-limited consents for the display of certain advertisements, and
(d) to regulate the display of advertisements in transport corridors, and
(e) to ensure that public benefits may be derived from advertising in and adjacent to transport corridors.

This Chapter does not regulate the content of signage and does not require consent for a change in the content of signage.

The proposed development does not involve the establishment of advertising and signage as outlined in section 8.

Consequently, the provisions of SEPP (Industry and Employment) 2021 are not relevant to the proposed development.

9.3.2.5 State Environmental Planning Policy (Planning Systems) 2021

The State Environmental Planning Policy (Planning Systems) 2021 aims to streamline and consolidate various planning policies to ensure a more efficient and consistent approach to environmental planning across the state.

This Policy has several chapters including:

- Chapter 2 – State and Regional Development;
- Chapter 3 – Aboriginal Land; and
- Chapter 4 – Concurrences and Consents

The proposed development does not have an estimated development cost of more than $30 million. Consequently, for the purpose of intensive livestock agriculture the proposed development is not State Significant Development.

The proposed development being a beef cattle feedlot is not State significant infrastructure and critical State significant infrastructure as defined under Schedule 3, 4 or 5 of the SEPP (Planning Systems) 2021 as the estimated development cost is not more than $30 million as shown in cost estimate presented in Appendix T.

The proposed development being a beef cattle feedlot does not meet the criteria for Regionally Significant Development is accordance with Schedule 6 of the SEPP (Planning Systems) 2021 as the estimated development cost is not more than $30 million as shown in cost estimate presented in Appendix T.

The subject land on which the development is proposed is not owned by an Aboriginal Land Councils. Consequently, Chapter 3 of the SEPP (Planning Systems) 2021 does not apply.

The proposed development is subject to the provisions outlined in Chapter 4 of the SEPP (Planning Systems) 2021. This EIS demonstrates that the proposed development is suitably sited, designed and managed. The main waste products of the proposed development are solid (manure/split feed/carcasses) and liquid (effluent). However, these can be sustainably utilised on-site as an alternative to inorganic fertilisers. The proposed development will not produce hazardous waste products.

9.3.2.6 State Environmental Planning Policy (Primary Production) 2021

State Environmental Planning Policy (Primary Production) 2021 aims to require development consent for cattle feedlots above a defined capacity and to ensure that the consent authority takes into account certain criteria such as the potential for odour, water pollution and soil degradation in determining applications for such development.

The specific aims of SEPP (Primary Production) 2021 are:

(a) to facilitate the orderly economic use and development of lands for primary production,

(b) to reduce land use conflict and sterilisation of rural land by balancing primary production, residential development and the protection of native vegetation, biodiversity and water resources,
(c) to identify State significant agricultural land for the purpose of ensuring the ongoing viability of agriculture on that land, having regard to social, economic and environmental considerations,
(d) to simplify the regulatory process for smaller-scale low risk artificial waterbodies, and routine maintenance of artificial water supply or drainage, in irrigation areas and districts, and for routine and emergency work in irrigation areas and districts,
(e) to encourage sustainable agriculture, including sustainable aquaculture,
(f) to require consideration of the effects of all proposed development in the State on oyster aquaculture,
(g) to identify aquaculture that is to be treated as designated development using a well-defined and concise development assessment regime based on environment risks associated with site and operational factors.

The NSW Department of Primary Industries is undertaking a mapping program across NSW to assist state and local government, other organisations and industries to recognise and value State Significant Agricultural Land (SSAL). A review of the SSAL Mapping portal indicates that the subject land is mapped as SSAL as shown as cyan shading on Figure 19.

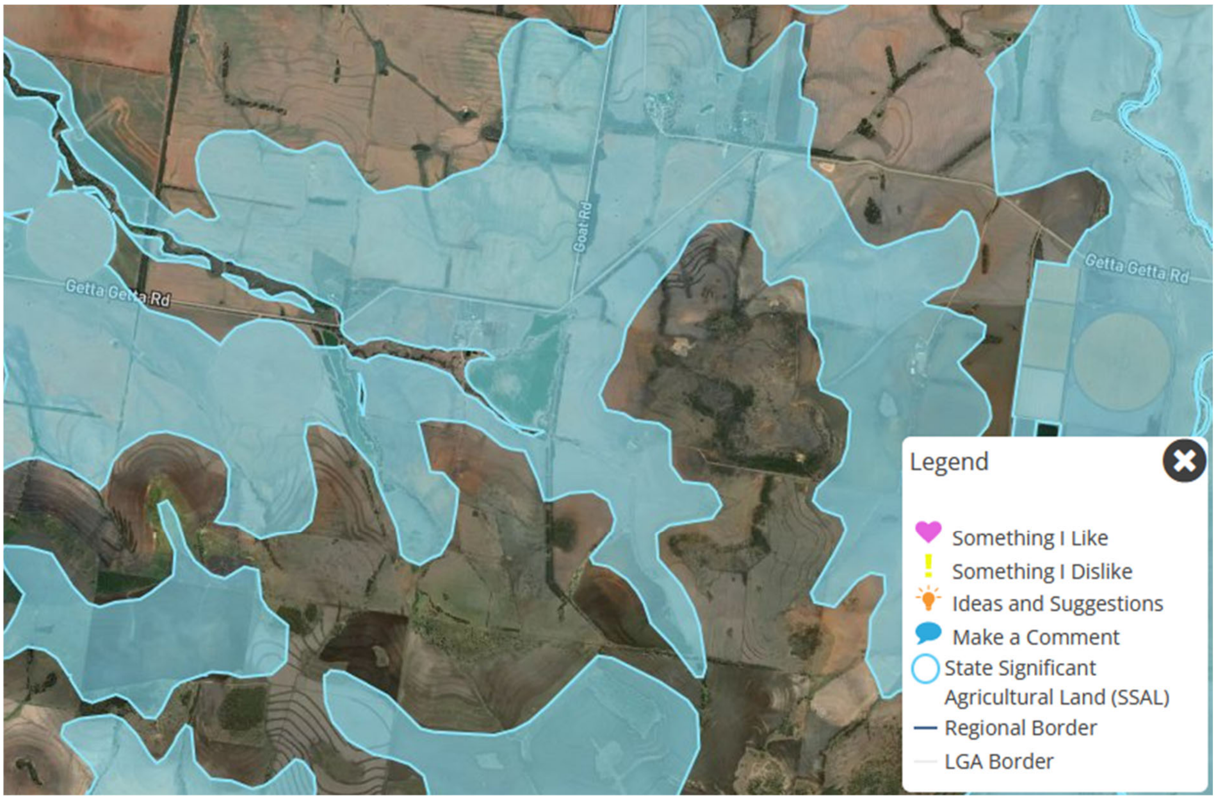


Figure 19 – Subject land – Preliminary draft SSAL map

The mapping indicates that the subject land is mapped as SSAL mapped land. However, the proposed development is considered a compatible land use with SSAL mapped lands for the following reasons:

- The development is existing and is an agricultural use;
- The commodities produced and consumed are generated and disposed of in the local area;
- The waste products generated onsite are reused onsite or on nearby lands to improve the productivity of the surrounding landscape in terms of nutrients and carbon;
- The activity is not considered to be beyond remediation with all infrastructure including waste storage areas fully remediated upon ceasing activity.

The proposed development comprises a beef cattle feedlot with a capacity exceeding 50 head. Hence, in accordance with Part 2.4 Livestock Industries section 2.17 *Development on land in Western Division for purpose of intensive livestock agriculture that exceeds stock capacity threshold* of SEPP (Primary Production) 2021, this EIS accompanies a development application made to Gwydir Shire Council seeking development consent for the establishment and operation of the cattle feedlot. This EIS addresses the policy aims of SEPP (Primary Production) 2021.

This EIS has been prepared in accordance with the requirements of the EP&A Act and Regulation and provides a detailed description and environmental assessment of the proposed development including potential impacts in terms of odour, surface and groundwater and soils and recommends mitigation and management measures to minimise potential adverse impacts. These issues are addressed in section 13. The proposed development will seek accreditation under the National Feedlot Accreditation Scheme (NFAS). The NFAS scheme addresses all relevant animal welfare matters through a Quality Assurance scheme subject to both off-site and field audits.

This EIS demonstrates that the proposed development is suitably sited and designed and will be managed to meet the aims of the SEPP (Primary Production) 2021. Land use conflicts have been mitigated through careful selection of the site and minimising the impacts on biodiversity. The main waste products of the proposed development are solid (manure/split feed/carcasses) and effluent which will be sustainably utilised on-site as an alternative to inorganic fertilisers. The proposed development will not produce hazardous waste products. While all feedlot developments produce some odour, at this development, odour impact will be minimised through appropriate siting (separation distances between the site, the closest sensitive residences and other areas with sensitive land uses), good design (pen layout, drainage) and management (pen cleaning, solid and liquid wastes), thus minimising amenity conflicts with residential receptors.

9.3.2.7 State Environmental Planning Policy (Resilience and Hazards) 2021

State Environmental Planning Policy Resilience and Hazards aims to amend the definitions of hazardous and offensive industries where used in environmental planning instruments and to ensure that the consent authority has sufficient information to assess whether the development is hazardous or offensive and to ensure that any measures proposed to be employed to reduce the impact of the development are taken into account.

The State Environmental Planning Policy (Resilience and Hazards) 2021 consolidates, transfers and repeals provisions of the following 3 SEPPs:

1. SEPP (Coastal Management) 2018;
2. SEPP 33 – Hazardous and Offensive Development; and
3. SEPP 55 – Remediation of Land

As the proposed development is not located with a Coastal management area the only chapters of relevance in the SEPP (Resilience and Hazards) 2021 are Chapter 3 Hazardous and Offensive Development and Chapter 4 Remediation of Land.

SEPP Resilience and Hazards applies to proposed developments falling under the definition of "potentially hazardous" industry or "potentially offensive" industry. A beef cattle feedlot is a "potentially offensive" industry as when in operation if no measures to reduce or minimise its impact on the locality have been implemented, a polluting discharge (for example, odour, solid/liquid waste management) may be emitted in a manner which would have a significant adverse impact in the locality or on the existing or likely future development on other land in the locality.

The specific aims of Chapter 3 of SEPP Hazardous and Offensive Developments (Resilience and Hazards) 2021 are:

(a) to amend the definitions of hazardous and offensive industries where used in environmental planning instruments, and
(b) to render ineffective a provision of any environmental planning instrument that prohibits development for the purpose of a storage facility on the ground that the facility is hazardous or offensive if it is not a hazardous or offensive storage establishment as defined in this Policy, and
(c) to require development consent for hazardous or offensive development proposed to be carried out in the Western Division, and
(d) to ensure that in determining whether a development is a hazardous or offensive industry, any measures proposed to be employed to reduce the impact of the development are taken into account, and
(e) to ensure that in considering any application to carry out potentially hazardous or offensive development, the consent authority has sufficient information to assess whether the development is hazardous or offensive and to impose conditions to reduce or minimise any adverse impact, and
(f) to require the advertising of applications to carry out any such development.

A development considered potentially hazardous and requires a Preliminary Hazard Analysis (PHA) if the storage or transport of dangerous goods exceeds screening thresholds specified in SEPP (Resilience and Hazards) 2021. A preliminary risk screening assessment for the proposed development in accordance with section 3.11 of SEPP (Resilience and Hazards) 2021 was undertaken and confirms that dangerous goods stored on site do not exceed screening thresholds specified in SEPP (Resilience and Hazards) 2021. The preliminary risk screening assessment report is presented in Appendix N.

Therefore, the proposed development is not considered to be a potentially hazardous industry.

Under SEPP Resilience and Hazards the permissibility of potentially offensive industry developments is linked to safety and pollution control performance. The SEPP aims to ensure the merit of proposed developments is properly assessed before being determined. It aims to ensure that developments can only proceed if they are suitably sited and can demonstrate that they will be built and operated with an adequate level of safety.

This EIS demonstrates that the proposed development is suitably sited, designed and managed. The main waste products of the proposed development are solid (manure/split feed/carcasses) and liquid (effluent). However, these can be sustainably utilised on-site as an alternative to inorganic fertilisers. The proposed development will not produce hazardous waste products. While all feedlot developments produce some odour, at this development, odour impact will be minimised through appropriate siting (separation distances between the site, the closest sensitive residences and other areas with sensitive land uses), good design (pen layout, drainage) and management (pen cleaning, solid and liquid wastes). Hence, nuisance odours are not expected at nearby sensitive residences or other surrounding areas with sensitive land uses.

Chapter 4 of the SEPP (Resilience and Hazards) 2021 relates to the remediation of contaminated land. The policy states that land must not be developed if it is unsuitable for a proposed use because it is contaminated. If the land is unsuitable, remediation must take place before the land is developed. The policy makes remediation permissible across the State, defines when consent is required, requires all remediation to comply with standards, ensures land is investigated if contamination is suspected and requires councils to be notified of all remediation proposals.

The subject land has historically been used for agricultural activities being beef cattle grazing, dryland and irrigated cropping and intensive livestock agriculture and is land categorised in Clause 4.6 (4) of SEPP (Resilience and Hazards) 2021. Based on the site history and no potential sources of contamination related to previous or current land uses on the subject land as outlined in section 13.2.3, no additional site investigation is deemed warranted.

The proposed development satisfies the aims and provisions of SEPP (Resilience and Hazards) 2021.

9.3.2.8 State Environmental Planning Policy (Resources and Energy) 2021

The State Environmental Planning Policy (Resources and Energy) 2021 recognises the importance to NSW of mining, petroleum production and extractive industries –

(a) to provide for the proper management and development of mineral, petroleum and extractive material resources for the purpose of promoting the social and economic welfare of the State, and
(b) to facilitate the orderly and economic use and development of land containing mineral, petroleum and extractive material resources, and
(c) to promote the development of significant mineral resources, and
(d) to establish appropriate planning controls to encourage ecologically sustainable development through the environmental assessment, and sustainable management, of development of mineral, petroleum and extractive material resources, and

(e) to establish a gateway assessment process for certain mining and petroleum (oil and gas) development—
 (i) to recognise the importance of agricultural resources, and
 (ii) to ensure protection of strategic agricultural land and water resources, and
 (iii) to ensure a balanced use of land by potentially competing industries, and
 (iv) to provide for the sustainable growth of mining, petroleum and agricultural industries.

The proposed development is for Intensive livestock agriculture (beef cattle feedlot) and does not comprise a mining, petroleum production or extractive industry and is not located within close proximity to a mining, petroleum production and extractive industry activity.

The SEPP (Resources and Energy) 2021 defines BSAL as meaning the following:

> *(a) land identified on the Strategic Agricultural Land Map as "biophysical strategic agricultural land" (other than land certified by a site verification certificate as not being biophysical strategic agricultural land), and*
> *(b) any other land that is certified by a site verification certificate as being biophysical strategic agricultural land.*

BSAL mapping has been conducted by the NSW Government to identify land that is essential to managing competing land uses proposed for high quality agricultural land. Land that is mapped as BSAL is land that has the best quality soil and water resources and is critical in sustaining agricultural industries. Any State significant mining or coal seam gas proposal on BSAL will be scrutinised through the Gateway process. As the proposed development is not mining or coal seam gas related it by default complies with the BSAL mapping policies.

Review of the NSW Planning Portal Spatial Viewer overlay confirms that the subject land on which the development is proposed land contains biophysical strategic agricultural land (BSAL) as shown in Figure 20.

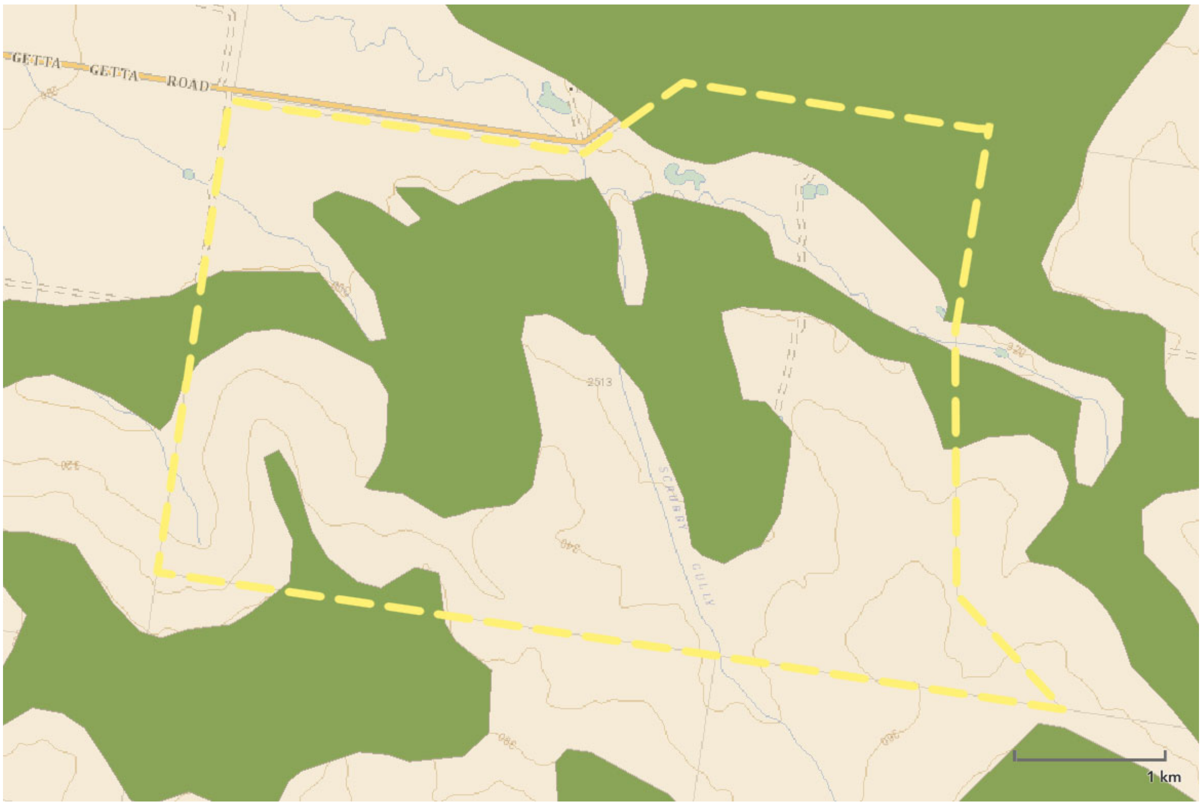


Figure 20 – Subject land – BSAL overlay

The proposed development will not have a detrimental impact on any resources or interests of the relevant SEPP (Resources and Energy) 2021. Consequently, the provisions of the SEPP (Resources and Energy) 2021 are not relevant to the proposed development.

9.3.2.9 State Environmental Planning Policy (Sustainable Buildings) 2022

The State Environmental Planning Policy (Sustainable Buildings) 2022 encourages the design and construction of more sustainable buildings across NSW.

The aims of this Policy are as follows –

(a) to encourage the design and delivery of sustainable buildings,
(b) to ensure consistent assessment of the sustainability of buildings,
(c) to record accurate data about the sustainability of buildings, to enable improvements to be monitored,
(d) to monitor the embodied emissions of materials used in construction of buildings,
(e) to minimise the consumption of energy,
(f) to reduce greenhouse gas emissions,
(g) to minimise the consumption of mains-supplied potable water,
(h) to ensure good thermal performance of buildings.

As no new buildings will be constructed as part of the proposed development the provisions of the SEPP (Sustainable Buildings) 2022 are not relevant.

9.3.2.10 State Environmental Planning Policy (Transport and Infrastructure) 2021

The aims of the State Environmental Planning Policy (Transport and Infrastructure) 2021 are to facilitate the effective delivery of infrastructure across the State by:

(a) improving regulatory certainty and efficiency through a consistent planning regime for infrastructure and the provision of services, and
(b) providing greater flexibility in the location of infrastructure and service facilities, and
(c) allowing for the efficient development, redevelopment or disposal of surplus government owned land, and
(d) identifying the environmental assessment category into which different types of infrastructure and services development fall (including identifying certain development of minimal environmental impact as exempt development), and
(e) identifying matters to be considered in the assessment of development adjacent to particular types of infrastructure development, and
(f) providing for consultation with relevant public authorities about certain development during the assessment process or prior to development commencing, and
(g) providing opportunities for infrastructure to demonstrate good design outcomes.

SEPP (Transport and Infrastructure) 2021 establishes that Transport for NSW is responsible for the administration of transport services , including roads, public transport, and maritime services in New South Wales and must be consulted in circumstances where a proposal is likely to impact the transport network.

Schedule 3 of the policy also includes development for the purposes of (Column 1) commercial premises, (Column 2) 20,000m^2 in site area or (if the site area is less than the gross floor area) gross floor area, Column 3 5,000m^2 in site area or (if the site area is less than the gross floor area) gross floor area.

The proposed development is not considered a commercial premises for the reasons:

NSW Planning and Environment LEP practice note planning system PN 11-003 issued 10 March 2011 defines a commercial premises as “ commercial premises is a new group term including ‘retail,’ ‘office’ and ‘business premises.’ This provides an efficient term to describe the mix of uses in centres” . PN 11-003 refers to The Standard Instrument (Local Environmental Plans) Amendment Order 2011 for further definitions of retail, office and business premises.
The activity is not considered a business premises as the activity in question is defined as agriculture, specifically, intensive livestock agriculture. Intensive livestock agriculture includes a feedlot as per the Standard Instrument (Local Environmental Plans) Amendment Order 2011definition. The proposed development is for a 3,000 head feedlot.

The Standard Instrument also defines commercial premises as including an office premises. The office premises definition in the Standard Instrument is not considered to include such activities as a feedlot office as any office onsite would not have dealing with any members of the public except where such dealing is a minor activity (by appointment) and a feedlot office is ancillary to the main purpose for which the building or place is used. Additionally, the existing onsite office for the currently approved 999 head feedlot will remain unchanged in nature and extent. The operation of the existing office involves minor dealings with the public and is ancillary to the main purpose for which the place is used, that is lot feeding of cattle.

The proposed development has a gross floor area greater than 5,000 m². However, does not have direct access to an arterial road (Bruxner Way), or a road connecting with an arterial road within 90 m of the alignment of an arterial road. The proposed development shall be referred to Transport for New South Wales as part of the assessment process.

9.3.3 Capital investment value

Details of the cost of carrying out the proposed development must be provided at the time of lodgement of the development application.

The genuine estimated cost of the proposed development is about $1.28 million. A cost breakdown of the proposed development is provided in Table 37. The final cost shall be dependent on various factors including earthworks quantities, pen surfacing (gravel v clay), road surfacing (gravel v bitumen sealed), type of shade infrastructure etc.

The genuine cost of the proposed development was estimated based on the methodology contained in the Planning Circular PS13-002 (Department of Planning, Industry and Environment (NSW), 2021) and based on costs for beef cattle feedlot construction projects undertaken by RDC Engineers Pty Ltd between 2023 and 2024.

A detailed cost report prepared by a RDC Engineers Pty Ltd verifying the cost of the development is provided in Appendix T.

Table 37 – Proposed development – Estimated capital investment value

Item	$/Head	$ Value
Preliminaries	~50.0	100,000
Bulk earthworks / roads / drainage structures	~130.0	260,510
Feed bunks and aprons	~102.0	203,900
Pen fencing and gates	~120.0	240,625
Water storage, reticulation, troughs	~99.0	198,190
Shade infrastructure	~137.5	275,000
Total (ex GST)	-	$1,278,225
GST	-	$127,822
Total (incl GST)	-	$1,406,047

9.4 State legislation

9.4.1 Biodiversity Conservation Act 2016

The aim of the *Biodiversity Conservation Act 2016* is to maintain a healthy, productive and resilient environment for the greatest well-being of the community, now and into the future, consistent with the principles of ecologically sustainable development (described in section 6 (2) of the *Protection of the Environment Administration Act 1991*), and in particular:

(a) to conserve biodiversity at bioregional and State scales, and
(b) to maintain the diversity and quality of ecosystems and enhance their capacity to adapt to change and provide for the needs of future generations, and
(c) to improve, share and use knowledge, including local and traditional Aboriginal ecological knowledge, about biodiversity conservation, and
(d) to support biodiversity conservation in the context of a changing climate, and
(e) to support collating and sharing data, and monitoring and reporting on the status of biodiversity and the effectiveness of conservation actions, and
(f) to assess the extinction risk of species and ecological communities, and identify key threatening processes, through an independent and rigorous scientific process, and
(g) to regulate human interactions with wildlife by applying a risk-based approach, and
(h) to support conservation and threat abatement action to slow the rate of biodiversity loss and conserve threatened species and ecological communities in nature, and
(i) to support and guide prioritised and strategic investment in biodiversity conservation, and
(j) to encourage and enable landholders to enter into voluntary agreements over land for the conservation of biodiversity, and
(k) to establish a framework to avoid, minimise and offset the impacts of proposed development and land use change on biodiversity, and
(l) to establish a scientific method for assessing the likely impacts on biodiversity values of proposed development and land use change, for calculating measures to offset those impacts and for assessing improvements in biodiversity values, and
(m) to establish market-based conservation mechanisms through which the biodiversity impacts of development and land use change can be offset at landscape and site scales, and
(n) to support public consultation and participation in biodiversity conservation and decision-making about biodiversity conservation, and
(o) to make expert advice and knowledge available to assist the Minister in the administration of this Act.

The proposed for effluent and solid waste utilisation areas are cropped areas currently used for utilisation of effluent and solid waste generated by the existing development and no clearing of vegetation is proposed.

A Biodiversity Development Assessment Report by Birdwing Ecological Services (2024) concluded that the BOS applies to the proposed development as native vegetation removal for the proposal exceeds the clearing threshold for the minimum lot size shown in the Gwydir LEP 2012 applicable to the subject land.

The subject land supports 9.41 ha of PCT 429 White Cypress Pine - Poplar Box - Silver-leaved Ironbark viney shrub woodland of the Brigalow Belt South Bioregion.

PCT 429 vegetation on the subject land is not consistent with the characteristics of a state-listed threatened ecological community (TEC) or commonwealth-listed endangered community (EC).

The BDAR (Birdwing Ecological Services, 2024) concluded that the direct impacts of the proposal consist of removal of 0.21 ha of PCT 429 with no direct impacts on species credit species occurring.

Furthermore, the results of the BAM targeted surveys indicate that removal of native vegetation for the proposal would be unlikely to impact on threatened species and their habitat.

Buffers distances have been proposed to ensure that there is no impact from effluent and solid waste utilisation on existing native vegetation on the subject land.

9.4.2 Crown Land Management Act 2016

The Crown Land Management Act 2016 *(CL Act)* an Act to make provision for the ownership, use and management of the Crown land of New South Wales; to repeal certain legislation consequentially; and for other purposes. The subject land on which the development is proposed does not include Crown Land as outlined in section 6.2.2 and Figure 3.

9.4.3 Dams Safety Act 2015

The Dams Safety Act 2015 is an act of the New South Wales Parliament that aims to ensure that any risks that may arise in relation to dams (including any risks to public safety and to environmental and economic assets) are of a level that is acceptable to the community, promote transparency in regulating dams safety, encourage proper and efficient management in matters relating to dams safety, and encourage the application of risk management and the principles of cost-benefit analysis in relation to dams safety. The act establishes Dams Safety, an independent regulator responsible for ensuring the safety of declared dams.

Dams are man-made structures that store liquids (usually water). They come in many forms and sizes, including water supply dams, irrigation, tailings and industrial dams, and stormwater detention & retarding dams.

Dams Safety NSW 'declares' dams that can potentially endanger life downstream, cause major damage or loss to infrastructure, the environment or have major health and social impacts. Each dam is given a consequence category that reflects this potential.

According to Part 2 Section 4 of the Dams Safety Regulation 2019 this includes:

- a dam with a wall that is more than 15 metres high;

- an existing or proposed dam that Dams Safety NSW is reasonably satisfied would endanger the life of a person, or result in a major or catastrophic level of severity of damage or loss if it failed;
- dams that were 'prescribed' under the old Dams Safety Act (1978) became declared dams under the new Act.

The proposed development will reconfigure the existing sedimentation basin and holding pond in which effluent is temporarily held pending irrigation to land when available. The existing and proposed effluent storage structure does not meet the criteria for a declared dam as the wall is not greater than 15 m or endanger the life of a person, or result in a major or catastrophic level of severity of damage or loss if it failed due to its capacity (20.0 ML) and as the majority of effluent is held below-ground level.

9.4.4 Fisheries Management Act 1994

The *Fisheries Management Act 1994* is administered by NSW Fisheries. The *Fisheries Management Act 1994* includes provisions for licensing, regulating commercial and recreational fishing activities, and the protection of threatened species and their habitats.

The objects of the *Fisheries Management Act 1994* are to conserve, develop and share the fishery resources of the State for the benefit of present and future generations. In particular, the objects of this act include:

a) to conserve fish stocks and key fish habitats,
b) to conserve threatened species, populations and ecological communities of fish and marine vegetation,
c) to promote ecologically sustainable development, including the conservation of biological diversity, and, consistently with those objects:
d) to promote viable commercial fishing and aquaculture industries,
e) to promote quality recreational fishing opportunities,
f) to appropriately share fisheries resources between the users of those resources,
g) to provide social and economic benefits for the wider community of New South Wales,
h) to recognise the spiritual, social and customary significance to Aboriginal persons of fisheries resources and to protect, and promote the continuation of, Aboriginal cultural fishing.

Part 7 of the *Fisheries Management Act 1994* deals with the protection of aquatic ecosystems. Permits are required to be obtained for certain works, including the following:

- dredging or reclamation work;
- cutting, removing, damaging or destroying marine vegetation on public water land or an aquaculture lease, or on the foreshore of any such land or lease; and
- setting a net, netting or other material, constructing or altering a dam, floodgate, causeway or weir, or creating an obstruction across or within a bay, inlet, river or creek, or across or around a flat.

The proposed development does not involve works within an aquatic ecosystem. Further, no threatened species, populations and ecological communities of fish and/or marine vegetation within adjoining watercourses would be adversely affected as a result of the proposed development as discussed in section 13.4.

9.4.5 Heritage Act 1977

The purpose of the *Heritage Act 1977* is to conserve the environmental heritage of New South Wales. Environmental heritage means those places, buildings, works, relics, moveable objects, and precincts, of State or local heritage significance.

State heritage significance is defined as, in relation to a place, building, work, relic, moveable object or precinct, means significance to the State in relation to the historical, scientific, cultural, social, archaeological, architectural, natural or aesthetic value of the item.

Local heritage significance is defined as, in relation to a place, building, work, relic, moveable object or precinct, means significance to an area in relation to the historical, scientific, cultural, social, archaeological, architectural, natural or aesthetic value of the item.

The objects of the *Heritage Act 1977* are as follows:

(a) to promote an understanding of the State's heritage,
(b) to encourage the conservation of the State's heritage,
(c) to provide for the identification and registration of items of State heritage significance,
(d) to provide for the interim protection of items of State heritage significance,
(e) to encourage the adaptive reuse of items of State heritage significance,
(f) to constitute the Heritage Council of New South Wales and confer on it functions relating to the State's heritage,
(g) to assist owners with the conservation of items of State heritage significance.

There are no known items of heritage significance under the *Heritage Act 1977* on the subject land on which the development is proposed as outlined in section 13.7.

9.4.6 Local Land Services Act 2013

The Local Land Services Act 2013 aims to improve the delivery of agricultural production, biosecurity, natural resource management and emergency management services to farmers, landholders and communities.

The objects of this Act are as follows:

(a) to establish a statutory corporation (to be known as Local Land Services) with responsibility for management and delivery of local land services in the social, economic and environmental interests of the State in accordance with any State priorities for local land services,
(b) to establish a governance framework to provide for the proper and efficient management and delivery of local land services,
(c) to establish local boards for the purpose of devolving operational management and planning functions to regional levels to facilitate targeted local delivery of programs and services to meet community, client and customer needs,
(d) to require decisions taken at a regional level to take account of State priorities for local land services,
(e) to ensure the proper management of natural resources in the social, economic and environmental interests of the State, consistently with the principles of ecologically sustainable development (described in section 6 (2) of the *Protection of the Environment Administration Act 1991*),
(f) to apply sound scientific knowledge to achieve a fully functioning and productive landscape,
(g) to encourage collaboration and shared responsibility by involving communities, industries and non-government organisations in making the best use of local knowledge and expertise in relation to the provision of local land services,
(h) to establish mechanisms for the charging of rates, levies and contributions on landholders and fees for services,
(i) to provide a framework for financial assistance and incentives to landholders, including, but not limited to, incentives that promote land and biodiversity conservation.

The Local Land Services Regulation 2014 is a regulation made under the Local Land Services Act 2013. The regulation provides for the establishment of local land services, which is a statutory corporation responsible for management and delivery of local land services.

The subject land is in the North West Local Land Services area.

9.4.7 National Parks and Wildlife Act 1974

The National Parks and Wildlife Act 1974 aims to conserve the natural and cultural heritage of the state of NSW, foster public appreciation, understanding and enjoyment of its natural and cultural heritage, and manage any lands reserved for the purposes of conserving and fostering public appreciation and enjoyment of its natural and/or cultural heritage. The act defines national parks as areas of land reserved for the purpose of protecting habitats, ecosystems, biological diversity, landforms, landscapes, and natural features, including wilderness. The act also establishes the National Parks and Wildlife Service (NPWS), which is responsible for the management of national parks and other protected areas in New South Wales.

The *National Parks and Wildlife Act 1974* (*NP&W Act*) governs the establishment, preservation and management of national parks, historic sites and certain other areas, and the protection of certain fauna, native plants and Aboriginal relics.

The objects of the *NP&W Act* include:

(1) (a) the conservation of nature, including, but not limited to, the conservation of:
- (i) habitat, ecosystems and ecosystem processes, and
- (ii) biological diversity at the community, species and genetic levels, and
- (iii) landforms of significance, including geological features and processes, and
- (iv) landscapes and natural features of significance including wilderness and wild rivers,

(b) the conservation of objects, places or features (including biological diversity) of cultural value within the landscape, including, but not limited to:
- (i) places, objects and features of significance to Aboriginal people, and
- (ii) places of social value to the people of New South Wales, and
- (iii) places of historic, architectural or scientific significance,

(c) fostering public appreciation, understanding and enjoyment of nature and cultural heritage and their conservation,

(d) providing for the management of land reserved under this Act in accordance with the management principles applicable for each type of reservation.

(2) The objects of this Act are to be achieved by applying the principles of ecologically sustainable development.

(3) In carrying out functions under this Act, the Minister, the Director-General and the Service are to give effect to the following:

(a) the objects of this Act,

(b) the public interest in the protection of the values for which land is reserved under this Act and the appropriate management of those lands.

The NP&W Act is relevant to the protection of Aboriginal artefacts and the protection of native flora and fauna. Part 6 of the *NP&W Act* identifies certain aboriginal objects to be crown property and offences relating to Aboriginal objects, including disturbing land to discover an artefact. Section 87(1) of the *NP&W Act* requires a permit to be obtained to remove any artefacts, while section 90 (1) of the *NP&W Act* requires consent from the Director-General of the Department of Planning, Industry and Environment to knowingly destroy, deface or damage a relic or Aboriginal place.

Part 7, Part 8, Part 8a and Part 9 are relevant to the protection of fauna; native plants and threatened species, populations and ecological communities, and their habitats, and critical habitat respectively.

An assessment of the impact of the proposed development on aboriginal heritage and flora and fauna is included in sections 13.7.2 and 13.8. This assessment concluded that there are unlikely to be significant impacts on recorded Aboriginal sites and therefore recommends that no section 90 consent is required for the proposed development.

9.4.8 Protection of the Environment Operations Act 1997

The *Protection of the Environment Operations Act 1997* is administered by the EPA and prohibits any person from causing pollution of waters or air, and provides penalties for pollution offences relating to water, air and noise.

The objects of the *Protection of the Environment Operations Act 1997* are as follows:

(a) to protect, restore and enhance the quality of the environment in New South Wales, having regard to the need to maintain ecologically sustainable development,
(b) to provide increased opportunities for public involvement and participation in environment protection,
(c) to ensure that the community has access to relevant and meaningful information about pollution,
(d) to reduce risks to human health and prevent the degradation of the environment by the use of mechanisms that promote the following:
  (i) pollution prevention and cleaner production,
  (ii) the reduction to harmless levels of the discharge of substances likely to cause harm to the environment,
  (iii) the elimination of harmful wastes,
  (iv) the reduction in the use of materials and the re-use or recycling of materials,
  (v) the making of progressive environmental improvements, including the reduction of pollution at source,
  (vi) the monitoring and reporting of environmental quality on a regular basis
(e) to rationalise, simplify and strengthen the regulatory framework for environment protection,
(f) to improve the efficiency of administration of the environment protection legislation,
(g) to assist in the achievement of the objectives of the Waste Avoidance and Resource Recovery Act 2001.

The *POEO Act* requires the submission of an Environmental Impact Statement (EIS) for feedlots with a capacity greater than 1,000 head. The *POEO Act* provides a regulatory framework for the regulation of all activities listed in Schedule 1 to the Act (scheduled activities) that have the potential to impact on the environment.

Under Schedule 1 of the *POEO Act*, livestock intensive industries are defined as scheduled activities if the following thresholds are exceeded:

- *feedlots that are intended to accommodate in a confinement area and rear or fatten (wholly or substantially) on prepared or manufactured feed more than 1,000 head of cattle, 4,000 sheep or 400 horses (excluding facilities for drought or similar emergency relief)*

The proposed development exceeds the threshold of feeding more than 1,000 head of cattle under Schedule 1 of the *POEO Act* definition. Section 48 of the Protection of the Environment Operations Act 1997 pertains to licensing requirements for scheduled activities (premises-based). The section applies to scheduled activities where Schedule 1 indicates that a license is required for premises at which the activity is carried on.

The proposed development has the potential to impact water and air quality. Development siting, design and sufficient erosion and sediment controls, along with appropriate drainage management, will mitigate potential sediment impacts to waterways as far as practicable as outlined in sections 13.1, 13.3, 13.4 and 13.5.

Stormwater discharge from the works area, shall be retained in a sediment basin and holding pond prior to discharge. Erosion control measures shall be implemented on site such as revegetation of disturbed areas as soon as practical after completion of works, vegetated areas shall remain between disturbed areas and waterways will minimise as far is reasonable and practical the potential for contaminated runoff exiting the site. Clean water diversions are proposed to be installed to direct these external catchments around the proposed development site.

Diversion drains are proposed to be installed to convey internal catchments through the proposed development site to direct flows to the sediment basin and holding pond.

Development siting and dust control measures will mitigate potential impacts to air as far as practicable as outlined in section 13.1. The development is sited some 1,500 m from the closest rural dwelling and watering of disturbed areas and revegetation of disturbed areas will minimise wind blown dust.

9.4.9 Roads Act 1993

The *Roads Act 1993*, commenced on 1 July 1993 and superseded the roads provisions of the Crown and Other Roads Act 1990, the State Roads Act 1986, the Local Government Act 1919, the Public Gates Act 1901 the Width of Roads and Lanes Act 1902 and the Traffic Safety (Lights and Hoardings) Act 1951.

The *Roads Act 1993* sets out procedures for carrying out of certain activities on roads, provides a classification of roads, establishes procedures for opening and closing public roads and the authorities responsible for roads i.e. the Transport for New South Wales (TfNSW), the council of a local government area etc.

Section 138 of the *Roads Act 1993* requires the consent of the appropriate roads' authority for the following works:

- erecting a structure or carrying out a work in, on or over a public road, or
- digging up or disturbing the surface of a public road, or
- removing or interfering with a structure, work or tree on a public road, or
- pumping water into a public road from any land adjoining the road, or
- connecting a road (whether public or private) to a classified road.

The local council is the roads authority for all public roads within its local government area, except for any freeway, crown public road, or any public road declared to be under the control of some other authority.

Whilst, the proposed development is accessed from Getta Getta Road a local controlled road, the development application would be referred to Transport for NSW in conjunction with the assessment of the EIS by the Gwydir Shire Council in accordance with Division 4.3 of the Environmental Planning and Assessment Act 1979.

9.4.10 Rural Fires Act 1997

The *Rural Fires Act 1997* was established to make provision for the prevention, mitigation and suppression of rural fires.

The objects of the *Rural Fires Act 1997* are to provide:

a) for the prevention, mitigation and suppression of bush and other fires in local government areas (or parts of areas) and other parts of the State constituted as rural fire districts, and
b) for the co-ordination of bush firefighting and bush fire prevention throughout the State, and
c) for the protection of persons from injury or death, and property from damage, arising from fires, and
d) for the protection of the environment by requiring certain activities referred to in paragraphs (a)–(c) to be carried out having regard to the principles of ecologically sustainable development described in section 6 (2) of the Protection of the Environment Administration Act 1991.

Section 63(2) of the *Rural Fires Act 1997* imposes a duty on the owner or occupier of land to take the notified steps, being any steps advised by the Bush Fire Co-ordinating Committee or any steps in a bush fire risk management plan, to prevent the occurrence of bushfires on, and to minimise the danger of the spread of bush fires on or from that land.

Division 8 of the *Rural Fires Act 1997* relates to development of bush fire prone land and for bush fire hazard reduction. Section 100B(3) requires a bush fire safety authority to be obtained prior to developing bushfire prone land for the following types of development:

- subdivision that could lawfully be used for residential or rural residential purposes; or
- development for special fire protection purposes, which include schools, childcare centres, hospitals, hotel, motel or other tourist accommodation, homes or other establishments for mentally incapacitated persons, housing for older people or people with disabilities, group, homes, retirement villages or other purposes prescribed by the regulations.

The proposed development does not involve subdivision for residential or rural residential purposes or development for special fire protection purposes.

A firebreak will be maintained around the proposed development infrastructure. All weather access roads will provide access for firefighting and the firebreak will provide access around the proposed development. Water from on-site clean water storages will provide an adequate supply for fire-fighting purposes. The proposed development site (and suitable firebreak distance from infrastructure) will be cleared of vegetation and other readily flammable materials stored in accordance with relevant Australian standards.

9.4.11 Water Management Act 2000

Water in NSW is managed under several acts including the *Water Management Act 2000, Water Management Amendment Act 2014 and* the *Water Act 1912*.

The *Water Act 1912* is being progressively phased out and replaced by the *Water Management Act 2000.* However, some provisions are still in force.

The object of the *Water Management Act 2000* is the sustainable and integrated management of the state's water for the benefit of both present and future generations and is based on the concept of ecologically sustainable development.

The *Water Management Act 2000* recognises:

- the fundamental health of our rivers and groundwater systems and associated wetlands, floodplains, estuaries has to be protected
- the management of water must be integrated with other natural resources such as vegetation, soils and land
- to be properly effective, water management must be a shared responsibility between the government and the community
- water management decisions must involve consideration of environmental, social, economic, cultural and heritage aspects
- to protect, enhance and restore water sources, their associated ecosystems, ecological processes and biological diversity and their water quality
- social and economic benefits to the state will result from the sustainable and efficient use of water, including:
  - (i) benefits to the environment, and
  - (ii) benefits to urban communities, agriculture, fisheries, industry and recreation, and
  - (iii) benefits to culture and heritage, and
  - (iv) benefits to the Aboriginal people in relation to their spiritual, social, customary and economic use of land and water,
- to recognise the role of the community, as a partner with government, in resolving issues relating to the management of water sources,
- to provide for the orderly, efficient and equitable sharing of water from water sources,
- to integrate the management of water sources with the management of other aspects of the environment, including the land, its soil, its native vegetation and its native fauna,
- to encourage the sharing of responsibility for the sustainable and efficient use of water between the Government and water users,
- to encourage best practice in the management and use of water.

As a result, the *Water Management Act 2000* recognises the need to allocate and provide water for the environmental health of our rivers and groundwater systems, while also providing licence holders with more secure access to water and greater opportunities to trade water through the separation of water licences from land. The main tool the Act provides for managing the state's water resources are water sharing plans.

The watercourses and groundwater in the vicinity of the proposed development will be protected through appropriate design and management practices, including vegetated buffers, controlled drainage area, a low permeability base for the controlled drainage area as outlined in section 8.4.9 and 8.6.1.11.

A controlled activity approval is required for controlled activities on waterfront land. 'Waterfront land' means the bed of any river, lake or estuary, and the land within 40 metres of the river banks, lake shore or estuary mean high water mark.

There is no waterfront land on the subject land as outlined in section 13.4. The access to the proposed development complex will be via an existing road network. Consequently, a controlled activity approval is not required in accordance with s91 of the *Water Management Act 2000.*

9.4.12 Waste Avoidance and Resource Recovery Act 2001

The *NSW Waste Avoidance and Resource Recovery Act 2001* reflects the importance the community places on minimising waste and maximising resources.

The objects of the *NSW Waste Avoidance and Resource Recovery Act 2001* are as follows:

a) to encourage the most efficient use of resources and to reduce environmental harm in accordance with the principles of ecologically sustainable development;
b) to ensure that resource management options are considered against a hierarchy of the following order:
   i) avoidance of unnecessary resource consumption,
   ii) resource recovery (including reuse, reprocessing, recycling and energy recovery), and
   iii) disposal,
c) to provide for the continual reduction in waste generation;
d) to minimise the consumption of natural resources and the final disposal of waste by encouraging the avoidance of waste and the reuse and recycling of waste;
e) to ensure that industry shares with the community the responsibility for reducing and dealing with waste;
f) to ensure the efficient funding of waste and resource management planning, programs and service delivery;
g) to achieve integrated waste and resource management planning, programs and service delivery on a State-wide basis;
h) to assist in the achievement of the objectives of the *Protection of the Environment Operations Act 1997*.

The waste hierarchy is a set of priorities for the efficient use of resources; this underpins the objectives of the Act.

The waste hierarchy is:

1) **avoidance** including action to reduce the amount of waste generated by households, industry and all levels of government;
2) **resource recovery** including re-use, recycling, reprocessing and energy recovery, consistent with the most efficient use of the recovered resources; and
3) **disposal** including management of all disposal options in the most environmentally responsible manner.

The proposed development involves the use of various resources within the design, construction and operation phases. The proposed development shall adopt various strategies to ensure the most efficient use of resources and to reduce environmental harm in accordance with the principles of ecologically sustainable development. Section 13.16 outlines the various resource management options and strategies for the proposed development.

The proposed development involves the use of site-won virgin excavated materials and various measures such as erosion and sediment control shall be put in place to ensure earthworks are undertaken in a manner that prevents or limits sediment discharge, thereby mitigating environmental harm.

The proposed development involves the use of various resources within the operation phase. The proposed development shall adopt various strategies to ensure the most efficient use of resources and to reduce environmental harm in accordance with the principles of ecologically sustainable development. Section 13.16 outlines the various resource management options and strategies for the proposed development.

9.5 Commonwealth matters

9.5.1 Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (*EPBC Act*) provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places — defined in the *EPBC Act* as matters of national environmental significance (NES). Approval from the Commonwealth is in addition to any approvals under NSW legislation.

The objectives of the *EPBC Act* are to:

- provide for the protection of the environment, especially matters of national environmental significance;
- promote ecologically sustainable development through the conservation and ecologically sustainable use of natural resources;
- conserve Australian biodiversity;
- provide a streamlined national environmental assessment and approvals process;
- enhance the protection and management of important natural and cultural places
- control the international movement of plants and animals (wildlife), wildlife specimens and products made or derived from wildlife
- to recognise the role of indigenous people in the conservation and ecologically sustainable use of Australia's biodiversity; and
- to promote the use of indigenous people's knowledge of biodiversity with the involvement of, and in co-operation with, the owners of the knowledge.

Approval under the *EPBC Act* is triggered by a proposal which has the potential to have a significant impact on a matter of NES or by a proposal which has the potential to have a significant impact on the environment which involves the Commonwealth. The EPBC Act lists nine matters of NES which must be addressed when assessing the impact of a proposal.

The nine matters of NES are:

- world heritage properties;
- national heritage places;
- wetlands of international importance (often called 'Ramsar' wetlands after the international treaty under which such wetlands are listed);
- nationally threatened species and ecological communities;
- migratory species;
- Commonwealth marine areas;
- the Great Barrier Reef Marine Park;

- nuclear actions (including uranium mining); and
- a water resource, in relation to coal seam gas development and large coal mining development.

The *EPBC Act* also identifies approval requirements involving Commonwealth land and activities undertaken by Commonwealth agencies.

The proposed development does not involve Commonwealth land and is not an activity proposed by a Commonwealth agency, and therefore, the relevance of the EPBC Act relates to matters of NES.

Under section 68 of the *EPBC Act*, a proposal must be referred to the Commonwealth Minister for Environment and Heritage if the applicant believes an approval under the EPBC Act is required.

The Commonwealth Minister for the Environment and Heritage would subsequently decide whether the proposal requires approval under the *EPBC Act*.

An assessment of the proposed development in relation to the listed matters of NES is provided below. A search of the Department of Environment and Heritage (DEH) EPBC Online Database was undertaken for the subject land and a 2 km buffer and the results of which are included in Appendix J.

9.5.1.1 World heritage properties

There are no declared world heritage properties on the subject land or within a 2 km buffer. Consequently, there are no declared world heritage properties in proximity to the proposed development, or that would potentially be affected by the proposed development.

9.5.1.2 National heritage places

There are no declared national heritage properties on the subject land or within a 2 km buffer. Consequently, there are no declared national heritage properties in proximity to the proposed development, or that would potentially be affected by the proposed development.

9.5.1.3 Wetlands of international importance (Ramsar wetlands)

A search of the Department of Climate Change, Energy, the Environment and Water protected matters search tool under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) indicates the following:

Wetlands of International Importance (Ramsar Wetlands) site and proximity

- Banrock station wetland complex - 1100-1200km upstream from Ramsar site.
- Riverland - 1000 - 1100km upstream from Ramsar site.

- The Coorong, and lakes Alexandrina and Albert wetland - 1200-1300km upstream from Ramsar Site.

The Environmental Planning and Assessment Regulation 2021 [NSW] Schedule 3 , Part 1 Definitions describes an environmentally sensitive area of State significance to include *(d) a declared Ramsar wetland or declared World Heritage property within the meaning of the Environment Protection and Biodiversity Conservation Act 1999 of the Commonwealth.*

There are no wetlands of international importance within 1,000 km of the subject land and proposed development as outlined in the EPBC Report presented in Appendix J.

9.5.1.4 Nationally threatened species and ecological communities

A search for Commonwealth-listed threatened ecological communities (EC's) has returned six (6) listed EC's and that may occur in, or relate to, a buffer of 2 km surrounding the subject land.

The six (6) listed threatened ecological communities that are likely to occur within or surrounding the subject land are;

- Brigalow (Acacia harpophylla dominant and co-dominant)
- Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions
- Natural grasslands on basalt and fine textured alluvial plains of northern New South Wales and southern Queensland
- Poplar Box Grassy Woodland on Alluvial Plains
- Weeping Myall Woodlands
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland

The Natural Grasslands on basalt and fine textured alluvial plains of northern New South Wales and southern Queensland and White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland EC's are critically endangered EC's.

Impacts to native vegetation have been considered in the BDAR report summarised in section 13.8 and presented in Appendix J. The BDAR concluded that the proposed development would require the removal of some 0.21 ha of PCT 429 (White Cypress Pine - Poplar Box - Silver-leaved Ironbark viney shrub woodland of the Brigalow Belt South Bioregion) which is not a TEC or commonwealth-listed endangered community (EC). Furthermore, the results of the BAM targeted surveys indicate that removal of native vegetation for the proposal would be unlikely to impact on threatened species and their habitat. The proposed effluent and solid waste utilisation area are proposed on land that has been previously cropped.

Consequently, the proposed development is unlikely to have any adverse impacts on endangered ecological communities.

A search for Commonwealth-listed threatened species within a 2 km buffer area of the subject land has returned 33 listed species.

Three of these species are birds listed as critically endangered. These are the Regent Honeyeater (*Anthochaera phrygia*), Curlew Sandpiper (*Calidris ferruginea*) and Swift Parrot (*Lathamus discolor)* which may occur within the search area to forage or feed.

The Curlew Sandpiper is a migratory shorebird. The proposed development will not affect the life cycle of this critically endangered species therefore there will be no decline in a population. The proposed development site does not provide suitable habitat for the Curlew Sandpiper breeding. Consequently, the proposed development will not affect the life cycle of these bird species and there will be no decline in a population.

The Regent Honeyeater is a generalist forager, although it feeds mainly on the nectar from a relatively small number of eucalypts that produce high volumes of nectar. Key eucalypt species include Mugga Ironbark, Yellow Box, White Box and Swamp Mahogany.

The Swift Parrot breeds in Tasmania during the summer and the entire population migrates north to mainland Australia for the winter. They occupy habitats across all tenures, with the majority of habitats occurring outside formal conservation reserves. Whilst on the mainland the swift parrot disperses widely to forage on flowers and psyllid lerps in Eucalyptus species, with the majority being found in Victoria and New South Wales. In Victoria, swift parrots are predominantly found in the dry forests and woodlands of the box-ironbark region on the inland slopes of the Great Dividing Range. In New South Wales, swift parrots forage in forests and woodlands throughout the coastal and western slopes regions each year. Coastal regions tend to support larger numbers of birds when inland habitats are subjected to drought (Saunders & Tzaros 2011).

The proposed development is unlikely to have any adverse impacts on critically endangered species as the land has been previously cleared and is predominantly irrigated and dryland cropping land or improved pasture with no native grasslands. Further, no remnant vegetation is proposed to be impacted by the proposed development. No remnant vegetation on the subject land is proposed to be disturbed or cleared as part of the proposed development.

9.5.1.5 Migratory species

A search for migratory species within a 2 km buffer area of the subject land has returned 8 listed migratory species.

One of these species, the Curlew Sandpiper is a migratory wetlands bird species listed as critically endangered and may occur within the search area to forage or feed. The Curlew Sandpiper is listed as endangered under the *Biodiversity Conservation Act 2016*.

The Curlew Sandpiper is a shorebird that mainly occurs on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. They are also recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand. They occur in both fresh and brackish waters.

As the subject land is not located in a coastal area or contain habitat favoured by the Curlew Sandpiper, it is unlikely that the Curlew Sandpiper will occur within the area or species habitat will occur on the subject land.

The proposed development will not disturb or clear any watercourses, drainage features or impact ephemeral and permanent lakes, dams, waterholes and bore drains. Consequently, the proposed development will have minimal impact on the Curlew Sandpiper.

9.5.1.6 Commonwealth marine areas

There are no Commonwealth marine areas in proximity to the subject land. Consequently, no Commonwealth marine areas would be affected by the proposed development.

9.5.1.7 The Great Barrier Reef Marine Park (GBRMP)

The subject land is not located in the Great Barrier Reef Marine Park or in an area that drains into the GBRMP. Consequently, the GBRMP would not be affected by the proposed development.

9.5.1.8 Nuclear actions

The proposed development would not involve a nuclear action, as defined under the EPBC Act 1999.

9.5.1.9 A water resource, in relation to coal seam gas development and large coal mining development

The proposed development is not a coal seam gas or large coal mining development.

9.5.1.10 EPBC Act Referrals

The EPBC Protected Matters Report includes an extra information section that lists EPBC Act referrals for the subject land and a 2 km buffer area. This report has identified one EPBC Act referral being a non controlled action referral. The non controlled action refers to improving rabbit bio control and the assessment status is listed as completed.

There are no controlled actions listed. Consequently, the development application will not be referred to the Minister responsible for the EPBC 1999 Act under section 68 of the EPBC Act 1999.

9.5.1.11 Actions prescribed by the regulations

The proposed development would not involve actions as prescribed by the *EPBC Regulations 2000*.

This EIS includes an assessment of measures designed to protect the environment, promote the conservation and ecologically sustainable use of natural resources, promote biodiversity conservation and provide for the protection and conservation of heritage.

The proposed development is not expected to impact on matters of NES, and as a consequence the EPBC Act is not triggered and referral to, and approval from, the Commonwealth Minister for Environment and Heritage is not required.

9.5.2 Aboriginal and Torres Strait Islander Heritage Protection Act 1984

The Aboriginal and Torres Strait Islander Heritage Protection Act 1984 (Heritage Protection Act) is the principal Commonwealth legislation protecting Indigenous heritage. The Act complements state/territory legislation and is intended to support state/territory laws and processes.

Under the Heritage Protection Act the responsible Minister can make temporary or long-term declarations to protect areas and objects of significance under threat of injury or desecration. The Heritage Protection Act also encourages heritage protection through mediated negotiation and agreement between land users, developers and Indigenous people.

The subject land does not contain any indigenous heritage areas or objects of significance as outlined in section 13.7 and the Aboriginal and non-Aboriginal cultural heritage Aboriginal Due Diligence report presented in Appendix K.

9.6 Conclusion

This EIS has been prepared pursuant to the provisions of the *EP&A Act* and the EPIs created under the *EP&A Act*, together with relevant NSW legislation. The EIS has also taken into account the Commonwealth EPBC Act 1999.

Under the *Environmental Planning and Assessment Act 1979*, local Councils prepare Local Environmental Plans (LEPs) that specify planning controls for specific parcels of land. The subject property on which the development is proposed is located in the Gwydir Shire Council. The proposed development is located in the Rural Zone - RU1 Primary Production under the Gwydir Local Environmental Plan 2013. Intensive livestock keeping establishments are permissible with consent in the RU1 -Primary Production zone. Consent from the Gwydir Shire Council is required to construct and operate the proposed development.

Under Schedule 3, Clause 21 of the *EP & A Regulation 2021*, beef cattle feedlots that will accommodate more than a 1000 head in a confinement area and rear or fatten them (wholly or substantially) on prepared or manufactured feed are considered a designated development and an EIS must be submitted with the development application.

The proposed beef cattle feedlot development is considered an integrated designated development due its scale (3,000 head). As part of the integrated assessment process the

Gwydir Shire Council must refer the development application and EIS the relevant state agencies for assessment and feedback.

Livestock intensive activities are scheduled activities under Schedule 1 of the *Protection of the Environment Act 1997*. The proposed development will require an environment protection licence to operate. This will be sought once development consent is granted.

The proposed development requires a secure, reliable source of water. The subject land on which the development is proposed has existing groundwater and surface water entitlements of sufficient quantity (1,500 ML) and quality for the proposed development.

9.7 Summary of licence, approvals and permits

Table 40 contains a summary of the licences, approvals and permits that are likely to be required for the proposed development.

Table 38 – Proposed development – Summary of licences, approvals and permits

Legislation	Authorisation	Consent or Approval Authority
Biodiversity Conservation Act 2016	Clearing of native vegetation	Department of Planning and Environment
EP&A Act 1979	Development Consent	Gwydir Shire Council
	Construction certificate required prior to construction of certain structures in the proposed development complex	Gwydir Shire Council
	Occupation certificate required prior to construction of certain structures in the proposed development complex	Gwydir Shire Council
POEO Act 1997	EPL for Livestock intensive activities – Cattle Feedlot	EPA
Roads Act 1993	Section 138 permit for road and intersection improvements*	Gwydir Shire Council
Water Management Act 2000	Licencing of monitoring bores**	WaterNSW
Water Management Act 2000	Controlled Activity Approval	WaterNSW
Work Health and Safety Act 2011	Licensing of dangerous goods (e.g. diesel, gas)*	WorkCover SNW

* If required

** EPA licence conditions may require groundwater monitoring bores (piezometers) upstream and downstream of the proposed development complex site. An application shall be made for a groundwater licence for these monitoring bores prior to their installation.

10. Relevant guidelines

The Australian beef cattle lot feeding industry and various states including NSW have prepared codes of practice, guidelines and reference manuals to be used as a resource for guiding the siting, design and preventing adverse impacts on the environment for beef cattle developments.

It should be emphasised that these guidelines, code of practice and reference manuals do not override or replace federal, state or local government legislation, regulation, plans or policies.

The aim of these reference documents is to ensure that those planning to construct a beef cattle feedlot, or operate one, comply with all relevant regulatory requirements.

The following guidelines have been used to plan and design the proposed development and provide best practice methods for siting, design, operation and management (in the event development consent is granted) of the proposed development.

10.1 State guidelines

The following state documents have been used as a resource when preparing this EIS. These guidelines provide a broad framework of generally acceptable principles for establishing and operating feedlots within NSW.

- *NSW Feedlot Manual* (NSW Agriculture, 1997). The NSW Feedlot Manual contains information on the establishment and operation of feedlots in NSW including the starting a feedlot, feedlot operation, financial aspects and technical issues.
- EIS Guideline for Cattle Feedlots (Department of Urban Affairs and Planning, 1996). The EIS Guideline identifies some important factors to be considered when preparing an EIS for cattle feedlots.
- Effluent Guidelines, Use of Effluent by Irrigation (Department of Environment and Conservation (NSW), 2004). This guideline encourages the beneficial use of effluent where it is safe and practicable to do so and where it provides the best environmental outcome.
- *Assessment and Management of Odour from Stationary Sources in NSW – Technical Framework* (DEC 2006a). The NSW Odour Assessment Framework promotes ongoing environmental improvement and best management practices to prevent or minimise odours. While recognising the changing needs of industry and society, it also promotes sustainable land-use planning and management to avoid odours and associated conflicts.
- *Assessment and Management of Odour from Stationary Sources in NSW – Technical Notes* (DEC 2006b). The NSW Odour Assessment Notes provide guidance on classifying odour sources, odour assessment criteria, odour sampling and analysis and dispersion modelling.
- *Reference Manual for the Establishment and Operation of Beef Cattle Feedlots in Queensland (Skerman, 2000)*. The QLD Feedlot Manual contains information on the establishment and operation of feedlots in QLD including the key site selection parameters, the major design components of a feedlot and feedlot construction techniques.

- Planning Guidelines, Intensive Livestock Agriculture Development (Department of Planning and Environment, 2019). These guidelines assist applicants and planning authorities to understand the assessment requirements for intensive livestock developments, such as feedlots and identify appropriate levels of assessment and relevant approvals.

10.2 National guidelines

The Australian beef cattle lot feeding industry considers that the protection of the environment is essential for ecologically and economically sustainable agricultural production. To this end the industry has been pro-active developing and adopting appropriate guidelines and codes of practice for best practice siting, design, construction and operation for beef cattle feedlots. The following documents have been used as a resource when preparing this EIS. These documents provide a framework of acceptable principles for the establishment and operation of feedlots in Australia.

- The National Guidelines for Beef Cattle Feedlots in Australia (MLA, 2012a) contains information on the establishment and operation of feedlots including the major design components of a feedlot, key site selection parameters, development application and approval process, and feedlot construction.
- The National Beef Cattle Feedlot Environmental Code of Practice (MLA, 2012b) addresses the environmentally relevant aspects of the site, design, construction and operation of a beef cattle feedlot. It defines a series of outcomes that should prevent or minimise adverse impacts on environmental values.
- The Beef Cattle Feedlots: Design and Construction (MLA, 2015a) handbook provides a reference document that outlines current best practice design and construction of feedlot facilities including site selection and layout, site infrastructure, site earthworks, cattle handling, shade structures, pen design and layout, feed storage, preparation and delivery, water supply and usage, cattle washing, runoff control and storage, feedlot construction.
- The Beef Cattle Feedlots: Waste Management and Utilisation (MLA, 2015b) handbook provides a reference document that outlines current best practice for waste management and utilisation including types of wastes, waste storage and processing and utilisation.

Part E – Consultation and issues identification

11. Consultation

Throughout the planning and EIS preparation process, there has been extensive consultation with various local government and state government agencies. These include:

- Gwydir Shire Council (GSC);
- NSW Department of Planning and Environment (DPE);
- NSW Department of Planning, Housing and Infrastructure (DPHI);
- NSW Department of Regional NSW - Department of Primary Industries (DPI);
- WaterNSW;
- NSW Environment Protection Authority (EPA);
- Transport for NSW;
- NSW Rural Fire Service'
- Environment and Heritage Group of the DPE; and
- Toomelah Local Aboriginal Land Council.

11.1 Formal consent process

This EIS has been prepared in accordance with section 4.12 Application (cf previous s 78A) of the EP&A Act 1979 and with the requirements in Part 8 Division 5 Environmental impact statements—the Act, ss 4.12(8), 5.7(1), 5.16(2), 5.16(4) and in accord with Division 2 s 191 and s 192 of the EP&A Regulation 2021 made for the purposes of this section. Section 4.12 Application of the EP&A Act 1979 ensures that the potential environmental effect of the proposed development is properly assessed and considered in the decision-making process.

There are three main elements to the legislative scheme which regulates planning and development in NSW. These are:

- the Environmental Planning and Assessment Act 1979 (NSW) (EP&A Act), which sets out the major concepts and principles, including Part 4 which deals with development applications;
- the Environmental Planning and Assessment Regulation 2021 (NSW) (EP&A Regulation), which contains many of the details for the various processes set out under the Act, and;
- environmental planning instruments (EPIs), i.e., LEPs and SEPPs, which set out when development consent is required, and which often nominate the consent authority for specific types of development.

Before preparing this EIS, a written application was made to the Director-General for the environmental assessment requirements with respect to the proposed statement as required under Schedule 2 Part 2 Clause Part 4 of the EP&A Regulation.

Each of the matters raised by the Director-General for consideration in the EIS is outlined in Table 39, together with the relevant section of the EIS which addresses that matter. A copy of the Director-General's Requirements is provided in Table 39.

Table 39 – Proposed development – Director-General's requirements (SEARs 1687)

Aspect	Reference in EIS
Strategic and statutory context	
• a detailed justification for the proposal and suitability of the site for the development	section 7 section 13
• a demonstration that the proposal is consistent with all relevant planning strategies, environmental planning instruments, development control plans (DCPs), or justification for any inconsistencies	section 9 section 13
• a list of any approvals that must be obtained under any other Act or law before the development may lawfully be carried out.	section 9.7
• a description of how the proposed expansion integrates with existing on-site operations	section 8
• a description of any amendments to and/ or additional licence(s) or approval(s) required to carry out the proposed development.	section 9.7
Waste management	
• details of waste handling including, transport, identification, receipt, stockpiling and quality control including off-site reuse and disposal;	section 8.7.4.2 section 8.7.5 section 13.10
• detail of waste management including manure and disposal of dead cattle for the proposal, including in the event of a mass mortality event	section 13.11
• the measures that would be implemented to ensure that the proposed development is consistent with the aims, objectives and guidelines in the NSW Waste Avoidance and Sustainable Materials Strategy 2041.	section 13.10 Appendix P
Animal welfare, biosecurity and disease management	
• details of how the proposed development would comply with relevant codes of practice and guidelines	section 8
• a heat load assessment in accordance with Department of Primary Industries guidelines	NFAS Manual
• details of all pest, weed and disease control measures	section 13.17.3 section 13.17.6 section 8.7.14
• a detailed description of the contingency measures that would be implemented for the mass disposal of livestock in the event of disease outbreak.	section 8.7.14
Air quality	
• a description of all potential sources of air and odour emissions during operation, including consideration of cumulative impacts associated with existing on-site operations	section 13.1

• an air quality impact assessment in accordance with relevant Environment Protection Authority guidelines	section 13.1.5
• a description and appraisal of air quality impact mitigation and monitoring measures.	section 13.1.6 Appendix G
Noise and vibration	
• a description of all potential noise sources during operation, including road traffic noise and consideration of cumulative impacts associated with existing on-site operations	section 13.12 section 13.13 Appendix Q
• a noise and vibration assessment in accordance with the relevant Environment Protection Authority guidelines	section 13.13.4
• a description and appraisal of noise and vibration mitigation and monitoring measures.	section 13.13.7
Soil and water	
• a description of local soils, topography, drainage and landscapes	section 13.2 section 13.3 section 13.4 section 13.5 section 13.10 section 13.11
• details of water usage for the proposed expansion including existing and proposed water licencing requirements in accordance with the Water Act 1912 and/or the Water Management Act 2000	section 13.3.1.4
	section 13.4.1.4
• an assessment of potential impacts on floodplain and stormwater management and any impact to flooding in the catchment	section 13.6.1.1
• details of any changes to sediment and erosion controls	section 15.2.1
• details of increases and/or changes to the site water balance	section 8.7.3
• a contingency plan for water supply in the event of drought conditions	section 8.7.3
• an assessment of potential impacts on the quality and quantity of surface and groundwater resources	section 13.2.7 section 13.3.1.7 section 13.3 and 13.4
• assessment of the site's capacity to sustain an increase in solid waste and effluent irrigation and an assessment of potential impacts to any nearby terrestrial waterways and groundwater	section 8.4 section 8.6 section 8.7 section 13.11
• details of how the proposed expansion integrates with existing on-site stormwater and wastewater management systems (including sewage), water monitoring program and other measures to mitigate surface and groundwater impacts	section 8.7.15 section 13.3.3 section 13.4.3
• a description and appraisal of impact mitigation and monitoring measures.	section 13.3.3 Appendix F Appendix H Appendix L Appendix M

	Appendix P
traffic and transport	
• details of road transport routes and access to the site	section 8.7.9 Appendix Q
• details of road traffic volumes, including consideration of cumulative impacts associated with existing on-site operations	Appendix Q
• an assessment of impacts to the safety and function of the road network and the details of any road upgrades required for the development.	Appendix Q
biodiversity	
• including a description of any potential vegetation clearing needed to undertake the proposal and any impacts on flora and fauna.	section 13.8 Appendix J

In addition to the above, the EIS must include the general requirements for an EIS as stated in Division 5 Environmental impact statements sections 190 and 192 of the *Environmental Planning and Assessment Regulation 2021*. These requirements are outlined in Table 40.

Table 40 – Proposed Development - General EIS requirements

Aspect	Document Reference
• A summary of the environmental impact statement	Executive Summary
• A statement of the objectives of the development	section 7.1.1
• An analysis of any feasible alternatives to the carrying out of the development, having regard to its objectives, including the consequences of not carrying out the development.	section 7.2
• Description of the proposal, including construction, operation and staging	section 8
• A general description of the environment likely to be affected by the development together with a detailed description of those aspects of the environment that are likely to be significantly affected	section 13
• The likely impact on the environment of the development with particular focus on the key assessment requirements listed in Table 39.	section 13
• A description of the measures proposed to mitigate any adverse effects of the development on the environment compiled into a single section.	section 15
• a list of any approvals that must be obtained under any other Act or law before the development, activity or infrastructure may lawfully be carried out	section 9.4.8
• Justification for carrying out of the development in the manner proposed, having regard to biophysical, economic and social considerations, including the principles of ecologically sustainable development.	section 16.5
• declaration by the person by whom the statement is prepared to the effect that: • the statement has been prepared in accordance with Schedule, and • the statement contains all available information that is relevant to the environmental assessment of the development to which the statement relates, and • (iii) that the information contained in the statement is neither false nor misleading.	section 1
• A draft Statement of Commitments for environmental mitigation, management and monitoring for the development	section 15

A copy of the NSW Department of Planning and Environment response is provided in Appendix B.1.

11.2 Consultation with stakeholders and other relevant authorities

11.2.1 Local government

11.2.1.1 Gwydir Shire Council

Gwydir Shire Council were contacted on the 27th January 2022 and 8th January 2024 regarding the expansion of the existing beef cattle feedlot.

A response was received from Gwydir Shire Council on the 28th January 2022 and 15th April 2024 advising that as the application will be designated development, the SEARS will outline what is to be included in the EIS.

A summary of the specific issues raised by the Gwydir Shire Council and how they are adequately addressed within the EIS are provided in Table 39 and Table 40. The details of the consultation process are provided in Appendix B.

11.2.2 Other relevant authorities

11.2.2.1 Environment Protection Authority (EPA)

The NSW EPA (Armidale) provided their response within the SEARs applicants package.

A summary of the specific issues raised by the NSW EPA and how they are adequately addressed within the EIS are provided in Table 41. The details of the consultation process are provided in Appendix B.3.

Table 41 – Proposed development – NSW EPA EIS requirements

Issue	EIS section
Air	
Odour and dust generation and management of potential impacts on adjacent residences	section 13.6 and Appendix J
Water	
Water management systems and the protection of surface and groundwater from runoff from feedlot pens, effluent storage, evaporation and terminal ponds, and the application of effluent and/or manure to soils on the premises.	section 8
Sustainable effluent and manure utilisation	
Ensure that any proposed application to site soils are sustainable in relation to hydraulic, nutrient and salt loads to prevent land, groundwater or surface water pollution and potential offsite impacts.	section 8, Appendix M
Irrigation Method	
Provide details of irrigation methods for effluent including consideration of pivot spray irrigation system to allow better control of irrigated effluent. This may also effect the size needed for terminal ponds to capture run-off from the irrigation areas after rainfall.	section 13.11, Appendix M
Noise	
Proximity to sensitive receptors and the impact of any noise sources associated with the project.	section 13.13
Disposal of mortalities	
Management of mortalities under normal operating conditions and in the event of a mass death scenario, to prevent odour emissions, contain pathogens, control vermin and disease vectors, and protect surface water and groundwater from pollution.	section 8

11.2.2.2 Water NSW

Water NSW were contacted on the 8th January 2024 regarding the proposed development which involves the expansion of the existing 999 head beef cattle feedlot located on the property "Springfield" at 2513 Getta Getta Road, North Star. Water NSW did not respond specifically to this request but the EIS will address the matters outlined in Table 42 as relating to the management of water under the Water Management Act 2000.

Table 42 – Proposed development – WaterNSW general requirements

Issue	EIS section
• Annual volumes of surface water and groundwater proposed to be taken by the activity (including through inflow and seepage) from each surface and groundwater source as defined by the relevant water sharing plan.	section 8.7.3
• Assessment of any volumetric water licensing requirements (including those for ongoing water take following completion of the project).	section 13.3 and 13.4
• Assessment of the impact and approvals (Works and Use Approvals under the WMA 2000) required for the taking or storage of water.	section 13.3
• The identification of an adequate and secure water supply for the life of the project.	section 13.3
• Confirmation that water can be sourced from an appropriately authorised and reliable supply. This is to include an assessment of the current market depth where water entitlement is required to be purchased.	section 13.3 and 13.4
• A detailed and consolidated site water balance.	section 8.7.3
• Assessment of impacts on surface and ground water sources (both quality and quantity), related infrastructure, adjacent licensed water users, basic landholder rights, watercourses, riparian land, and groundwater dependent ecosystems, and measures proposed to reduce and mitigate these impacts.	section 13.3 and 13.4
• Proposed surface and groundwater monitoring activities and methodologies.	section 8.7.15
• Proposed management and disposal of produced or incidental water.	Not relevant
• Identification of "waterfront land" (as defined in the WMA 2000) and an assessment of impacts of works and activities on waterfront land. (Works on waterfront land may be subject to Controlled Activity Approval (CAA) under the Water Management Act 2000.)	Appendix R

11.2.2.3 NSW Rural Fire Service

The NSW Rural Fire Service were contacted on the 4th August 2023 and 8th January 2024 regarding the proposed development which involves the expansion of the existing 999 head beef cattle feedlot located on the property "Springfield" at 2513 Getta Getta Road, North Star. The NSW Rural Fire Service provided the following summary of matters that should be addressed in any EIS response for the proposed development. The details of the consultation process with NSW Rural Fire Service are provided in Appendix B.

The Planning portal only identifies if a lot is mapped bushfire prone.

The attached letter references the actual site of the expanded development complex, which is not mapped BFPL.

The subject land is mapped bushfire prone land. However, the NSW RFS have advised that the actual site of the proposed development is not mapped BFPL. NSW RFS is the primary response agency for structural fires within the facility.

In recognition of the potential for the development to increase the level of bush fire risk within the landscape and be impacted upon during a bush fire event, the following matters should be addressed in the environmental assessment:

- the aim and objectives of Planning for Bush Fire Protection 2019;
- identification of potential ignition sources during construction and operation of the development;
- storage of fuels and other hazardous materials;
- details on access and water supply for fire fighting purposes;
- proposed bush fire protection measures for the development, including vegetation management and fire suppression capabilities;
- operational access for fire fighting appliance to the site; and
- emergency and evacuation planning.

The enclosed EIS addresses all matters raised by the NSW Rural Fire Service.

11.2.2.4 Department of Primary Industries – DPI Agriculture

The NSW Department of Primary Industries – DPI Agriculture were contacted on the 8th January 2024 regarding the proposed beef cattle feedlot at 2513 Getta Getta Road North Star. The Department of Primary Industries provided the following summary of matters that should be addressed in any EIS response for the proposed beef cattle feedlot. A summary of the specific issues raised by DPI Agriculture and how they are adequately addressed within the EIS are provided in Table 43. The details of the consultation process with DPI Agriculture are provided in Appendix B.

Table 43 – Proposed Development – NSW DPI Agriculture EIS requirements

Issue	EIS section
Site Selection including access to waters, soils, drainage, shelter, impacts on neighbours, vehicle access and chemical residues	
• An assessment of the soils on the site to indicate its appropriateness for the proposed feedlot pens and there-use of effluent/manure.	section 13.2.3 and 13.11 and Appendix M
• Detail the potential impacts from the proposed development on agricultural land and agricultural land uses, support services, processing and value adding industries on the site and in the locality.	section 13, Appendix M
• Demonstrate that all significant impacts on neighbouring properties from an odour, visual, noise and dust and any impacts on current and potential agricultural developments and resources can be reasonably avoided or adequately mitigated.	section 13
• A Land Use Conflict Risk Assessment is expected to be prepared to identify potential impacts on neighbouring properties, both residential and agricultural, and vice versa. DPI's latest factsheet is at https://www.dpi.nsw.gov.au/agriculture/lup/development-assessment/development-assessment2/lucra	section 8 Appendix U
• Demonstrate that a power supply which is reliable, adequate, and sufficient for farm requirements will be available or detail the necessary infrastructure required to achieve this. This includes access to 3 phase power, back up arrangements in the event of power failure and sufficient power for potential future farm expansion.	section 6.2.6
• Detail the estimated water demand and water availability and the source of water and any sanitisation methods proposed. Water must meet standards detailed in the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2000) and the National Guidelines for Beef Cattle Feedlots in Australia, 3rd Edition. NSW DPI recommends backup of at least 2 days total water requirement in case of breakdown or loss of supply with a stronger preference for seven days' supply.	section 8 and 13.3
• Outline any impacts to water use for agriculture on nearby land, particularly key water resources and measures to mitigate against these impacts.	section 8, 13.3 and 13.4
Stock density and management of impacts	
• Detail of stocking density and effluent disposal which are critical considerations in terms of land use and impacts on water resources.	section 8 and Appendix M
Pen Construction	
• The proposal should demonstrate that pens are located, designed, and managed to meet animal welfare standards and Best Practice Management as outlined in the industry guidelines.	section 8
Feed and Water Management	
• Detail of where feed will be obtained, either on site or imported and if imported the traffic movements required and how the facility will satisfy industry nutrition standards.	section 8
Yard Management	

• Detail how effluent and waste will be effectively stored, handled, and recycled or disposed of in a lawful manner to protect environmental values and biosecurity.	section 8
• Where the proposed development is located within 100m of an intermittently flowing creek the potential for deposition and movement of nutrients in the production area (including range area) is to be addressed.	section 8
• Provide details of any proposed reuse areas. Design of reuse areas is to include a reuse management plan based on a nutrient budget that considers proposed annual volumes and nutrient loads, soil types, current soil nutrient levels and pasture use rates. This is considered to be important given the more than 3-fold increase in the size of the facility.	section 8, Appendix M
Animal Health and Welfare	
• Demonstrate how the proposed development will: o comply with the Animal Welfare Standards: Land transport, Cattle and Loading o provide all weather access or provisions on site to provide adequate food for the livestock for the duration of a flood event if applicable o manage sick livestock or disease o suitably manage and mitigate the heat loading risk after undertaking a heat loading risk assessment using ALFA Risk Assessment Program.	section 8, NFAS Manual
Dead Animal Management	
• Details of dead animal management and disposal must be fully detailed. If onsite disposal is proposed the management facility and operations must be fully documented.	section 8
Biosecurity Matters Generally and Specifically as they relate to the Feedlot	
• Detail a biosecurity response plan to deal with identified risks as well as contingency plans for any failures as described in the National Biosecurity Manual for Beef Cattle Feedlots. Including monitoring and mitigation measures in disease (in particular Q Fever), weed and pest management plans.	section 8

The development application matters mentioned above will be addressed in the EIS in accord with the principles practices as outlined in the are based on the National guidelines for beef cattle feedlots in Australia, 3rd edition (MLA, 2012a).

11.2.2.5 Transport for NSW

TfNSW (Development North) were contacted on the 8th of January 2024 regarding the proposed development which involves the expansion of the existing 999 head beef cattle feedlot located on the property "Springfield" at 2513 Getta Getta Road, North Star. The Development Services | Regional and Outer Metropolitan section of TfNSW responded via email on the 22nd of January 2024 with their requested Traffic Impact Assessment considerations.

TfNSW advised that their key interests are the safety and efficiency of the transport network, the needs of our customers and the integration of land use and transport in accordance with the Future Transport Strategy. TfNSW also advised that Tamworth-Yetman Road (MR63) is a classified (Regional) road and Getta Getta Road is a local road. Council is the roads authority for both roads and all other public roads in the area, in accordance with Section 7 of the Roads Act 1993.

A summary of the specific issues raised by TfNSW and how they are adequately addressed within the EIS are provided in Table . The details of the consultation process are provided in Appendix B.5.

Table 38 – Proposed Development – TfNSW EIS requirements

Issue	EIS section
Traffic Impact Assessment (TIA) be prepared	
A map of the proposed transport route/s identifying all public roads proposed to obtain access from the classified (State) road/s to the development site.	Traffic Impact assessment Appendix Q
The total impact of existing and proposed development on the road network with consideration for a 10-year horizon. This should include; • Identify Annual Average Daily Traffic (AADT) volumes with percentage heavy vehicles along the transport route/s and diagrammatically demonstrate AM and PM peak hour movements at key intersections. • Background traffic data from published sources and/or recent survey data. The source of data and any assumptions are to be clearly explained and justified, including the growth rate applied to the future horizon. • The volume and distribution of existing and proposed trips to be generated by the construction, operational and decommission phases of the development. This should identify the maximum daily and hourly demands generated by the development, particularly where they coincide with the network peak hour. • The type and frequency of design vehicles accessing the development site.	Traffic Impact assessment Appendix Q
Details of the road geometry and alignment along the identified transport route/s, including existing formations, crossings, intersection treatments and any identified hazards. This should include; • Available sight distances at intersections along the proposed transport routes and any constraint to achieving the required sight distance for the posted speed limit. • An assessment of turn treatment warrants in accordance with the Austroads Guide to Traffic Management Part 6 and Austroads Guide to Road Design Part 4A for intersections along the identified transport route/s, identifying the existence of the minimum basic turn	Traffic Impact assessment Appendix Q

treatments and addressing the need for any warranted higher order treatments. • Swept path analysis demonstrating the largest design vehicle entering and leaving the development, and moving in each direction through intersections along the proposed transport route/s.	
Capacity analysis using SIDRA or other relevant application, to identify an acceptable Level of Service (LOS) at intersections with the classified (State) road/s, and where relevant, analysis of any other intersections along the proposed transport route/s.	Traffic Impact assessment Appendix Q
A review of crash data along the identified transport route/s for the most recent 5 year reporting period and an assessment of road safety along the proposed transport route/s considering the safe systems principles adopted under Future Transport 2056.	Traffic Impact assessment Appendix Q
Strategic (2D) design drawings of all proposed road works and the site access demonstrating scope, estimated cost and constructability of works required to mitigate the impacts of the development on road safety, traffic efficiency and the integrity of transport infrastructure. Works must be appropriately designed for the existing posted speed limit.	Traffic Impact assessment Appendix Q
Site plan demonstrating site access, internal manoeuvring, servicing and parking areas consistent with the relevant parts of AS2890 and Council requirements.	Traffic Impact assessment Appendix Q
Details of measures to address impacts and/or provide connections for public transport services and active transport modes, such as, public and school bus services, walking and cycling.	Traffic Impact assessment Appendix Q
Details of measures to ameliorate the impacts of road traffic noise, dust, and/or glare generated along the proposed transport route/s.	Traffic Impact assessment Appendix Q
Details of any Traffic Management Plan (TMP) proposed to address the construction and operation phases of the proposed development. The TMP should be prepared and implemented in accordance with Australian Standard 1742.3 and the Work Health and Safety Regulation 2017. It is recommended that any TMP include, but not necessarily limited to, the following; • A map of the primary transport route/s highlighting critical locations. • An induction process for vehicle operators and regular toolbox meetings. • Procedures for travel through residential areas, school zones and/or bus route/s. • any proposed temporary measures such a Traffic Guidance Scheme (TGS) • A Driver Code of Conduct for heavy vehicle operators. • A complaint resolution and disciplinary procedure.	Traffic Impact assessment Appendix Q

Community consultation measures proposed for peak periods.	Traffic Impact assessment Appendix Q

11.2.2.6 Department of Planning and Environment - Biodiversity and Conservation Division

The NSW Department of Planning and Environment – Biodiversity and Conservation Division (BCD) provided their response within the SEARs applicants package.

A summary of the specific issues raised by the BCD and how they are adequately addressed within the EIS are provided in Table 44. The details of the consultation process are provided in Appendix B.

Table 44 – Proposed Development – Department of Planning and Environment - Biodiversity and Conservation Division

Issue	EIS section
Biodiversity	
Biodiversity impacts related to the proposal are to be assessed in accordance with the Biodiversity Assessment Method 2020 and documented in a Biodiversity Development Assessment Report (BDAR). The BDAR must include information in the form detailed in the Biodiversity Conservation Act 2016 (s6.12), Biodiversity Conservation Regulation 2017 (s6.8) and Biodiversity Assessment Method.	Appendix J
National Park estate: land reserved or acquired under the National Parks and Wildlife Act 1974	
If the proposed development is within, adjacent to, or in close proximity to, NPWS managed conservation estate (e.g. a national park, nature reserve, state conservation area, land which is declared wilderness under the Wilderness Act 1987), or is within, adjacent to, or in close proximity to, a watercourse that flows directly into NPWS managed conservation estate, then the EIS must address impacts upon such area/s.	section 13.9
Water	
The EIS must map features relevant to water, including: • Rivers, streams, estuaries (as described in s4.2 of the Biodiversity Assessment Method) • Wetlands (as described in s4.2 of the Biodiversity Assessment Method) • Groundwater • Groundwater dependent ecosystems.	section 13.3, 13.4 and 13.5
Flooding	
The EIS must map the following features relevant to flooding as described in the Flood Risk Management Manual (NSW Government 2023) including:	Appendix S

• Flood prone land (i.e. land susceptible to the probable maximum flood event). • Flood planning area, the area below the flood planning level. • Hydraulic categorisation (floodway and flood storage areas). • Flood hazard.	
The EIS must describe flood assessment and modelling undertaken in determining the design flood levels for events, including a minimum of the 10% Annual Exceedance Probability (AEP), 1% AEP flood levels and the probable maximum flood, or an equivalent extreme event.	Appendix S
The EIS must model the effect of the proposal (including fill) on the current flood behaviour for a range of design events as identified above, and the 0.5% AEP and 0.2% AEP year flood events as proxies for assessing sensitivity to an increase in rainfall intensity of flood producing rainfall events due to climate change.	Appendix S
All site drainage, stormwater quality devices and erosion / sedimentation control measures should be identified in the EIS and the onsite treatment of stormwater and effluent runoff and predicted stormwater discharge quality from the proposal should be detailed.	Appendix S

BCD further states that if impacts cannot be avoided, further detailed assessment in accord with Attachment A should be provided. The EIS will describe all site design and management strategies that will mitigate impacts to the immediate environment.

11.2.2.7 Toomelah Local Aboriginal Land Council

The Toomelah Local Aboriginal Land Council (TLALC) via Rex Weribone (Chief Executive Officer TLALC) was contacted by Tony Sonter (Consulting Archaeologist) with respect to briefing the relevant Aboriginal people on the proposed development and the land on which the development is proposed.

The details of the consultation process with the local Aboriginal community are provided in the Aboriginal Due Diligence Report (Artefact & Aspect, 2023) presented in Appendix K.

The details of the consultation process are provided in Appendix B.7.

11.2.3 Community

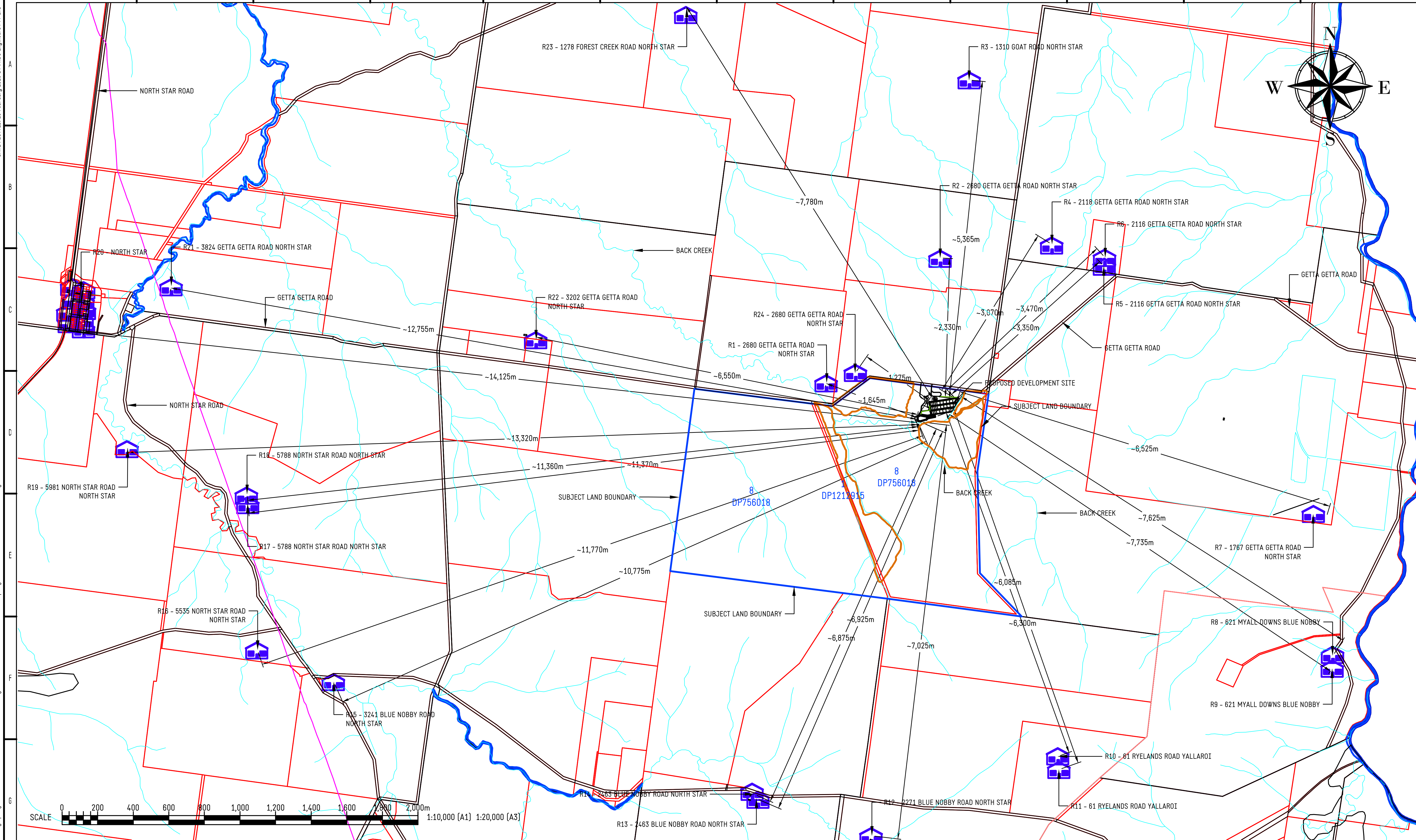
The overall objective of the community consultation program was to secure broad community support and acceptance in order to gain and protect our “social licence to operate” through clear, open and transparent communication and understanding and addressing community issues as they arose.

This objective was achieved through the following activities:

- Dissemination of information about the proposed development and the development approval process to key stakeholders and the surrounding community;
- Raising community awareness and understanding of the proposed development and the associated planning process;
- Providing stakeholders and members of the community with adequate opportunities through the consultation process to communicate feedback and voice concerns;
- Accurately reporting of community and stakeholder issues and views;
- Building community confidence in the EIS and approval process;
- Facilitating information exchange from the onset between the proponents and the community to enable joint understanding of issues raised;
- Conforming to relevant NSW and Commonwealth legislation; and
- Working co-operatively with the relevant authorities.

11.2.3.1 Stakeholder identification

The key community stakeholders were identified as those who may be affected positively or negatively by the proposed development. The key community stakeholders of concern are those residents or landholders geographically located within a radius of 10 km of the proposed development. Figure 21 shows the geographic area of community consultation.



LEGEND

- SUBJECT LAND BOUNDARY
- LAND PARCEL BOUNDARY
- RURAL RESIDENTIAL RECEPTOR
- SMALL TOWN RECEPTOR
- HYDROLINE

NOTES:

1. CADASTRAL INFORMATION BASED ON THE NSW GOVERNMENT SPATIAL SERVICES DIGITAL CADASTRAL DATABASE (DCDB) 2022, PROVIDED BY THE NSW DEPARTMENT OF FINANCE, SERVICES AND INNOVATION (DFSI) SPATIAL INFORMATION eXCHANGE AND ACCURACY IS LIMITED.
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STATUS

FOR APPROVAL

NOT TO BE USED FOR CONSTRUCTION PURPOSES

RPEQ

RDC ENGINEERS

AGRICULTURAL ENVIRONMENTAL PROJECT MANAGEMENT

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REV.	DATE	REVISION DESCRIPTION	DRAWN	CHECK	APPROVED
A	24/01/25	DRAFT ISSUE TO CLIENT	RJD	RJD	RJD
B	21/02/25	FINAL ISSUE FOR SUBMISSION TO GSC	RJD	RJD	RJD

SCALE	1:20,000 (A3)
DRAWN	RJD
DATE	21/02/2025
CHECKED	RJD
DATE	21/02/2025
APPROVED	RJD
DATE	21/02/2025

CLIENT: DOOLIN FARMING PTY LTD

PROJECT: PROPOSED 3,000 HEAD BEEF CATTLE FEEDLOT

TITLE: DEVELOPMENT APPLICATION FOR INTENSIVE LIVESTOCK AGRICULTURE
ENVIRONMENTAL IMPACT STATEMENT
PROPOSED DEVELOPMENT - COMMUNITY CONSULTATION AREA

REPORT REFERENCE: FIGURE 15 | SUPPLIED DRAWING NUMBER | A3 | DRAWING NUMBER: E2-103-00-21 | REV. B

DATE PLOTTED: 20 February 2025 BY : RDC Engineers PTY LTD

FILE PATH: C:\RDC Engineers\RDCE - Projects\E2-103 Doolin Farming Springfield EIS\05 - ACAD MasterPlan\05.1 Drawings - CURRENT FILE NAME: E2-103 DF Springfield MASTERPLAN-00-20250108vB.dwg

11.2.3.2 Consultation methodology

The primary aim of the community involvement process was to provide information to the residents or landholders about the proposed development, and approval process and obtain responses which would be addressed during the preparation of the EIS.

A letter and information on the proposed development was distributed to residents and landholders living within 10 km of the proposed development. A copy of this letter, proposed development information and distribution area is attached in Appendix C.

The community was encouraged through the letter to make submissions on the proposed development. There were no responses received from the local community as a result of the consultation program.

12. Identification and prioritisation of issues

12.1 Overview and methodology

Identification of the environmental issues relevant to the proposed development involved a combination of background investigation, research, and consultation including the following:

- Consultation with stakeholders and other relevant statutory authorities (section 11.2);
- Reference to the relevant legislation and planning instruments (section 9);
- Reference to The Director-General's requirements (section 11.1 and Table 39); and
- Review of environmental guidelines for beef cattle feedlots (section 10).

12.2 The issues and prioritisation

The key issues identified were assessed for their significance and rated to determine their priority for assessment.

As with all environmental assessments, the assessment of issues needs to recognise that the higher the significance of a particular attribute and the potential for adverse environmental impact, the higher the degree of analysis required. Thus, the higher the risk or level of concern of the issue, the higher priority for assessment. Subsequently, a priority level has been placed on each issue, either being low, medium or high, which considers the potential for impact and the level of concern for this issue.

A summary of the issues and their priority rating is shown in Table 45.

Table 45 – Proposed development – Issues for consideration

Issue	Sub-Issue	Rating	Justification
Air Quality	Odour	High	Beef cattle feedlots are a known source of odour and can result in adverse impacts to sensitive receivers.
	Dust	Medium	Dust generation during construction and operation may result in adverse impacts to sensitive receivers.
	GHG	Low	Despite the inputs required to produce grain fed beef, beef cattle feedlots actually produce significantly less GHG emissions than grass fed cattle. Australian life cycle research concludes that grain fed cattle produce 38% less CO_2 equivalent emissions per kg of beef production compared to grass fed cattle (Peters et al., 2009)
Soils		High	The proposed development has the potential to adversely impact the physical or chemical properties of soils, at or in the vicinity of the proposed development site through the release of contaminants commonly found in effluent and/or solid waste streams and erosion.
Water	Groundwater	Medium	The operation of the proposed development above vulnerable groundwater resources or in salinity hazard areas may adversely impact on those resources. Further, unregulated use of groundwater may result in impacts to resource levels.
	Surface	Medium	The operation of the proposed development may adversely impact on surface water resources. Further, unregulated use of surface water may result in impacts to resource levels.
Flooding, Stormwater and Coastal erosion		Low	The proposed development has the potential to generate impacts to the receiving environment from stormwater along with implications of flooding.
Cultural Heritage		Low	The operation of the proposed development may have adverse impacts on culture heritage, through disturbance to Aboriginal or non-Aboriginal sites and artefacts.
Biodiversity		Medium	The proposed development has the potential to have adverse impacts on biodiversity values by loss and modification of native vegetation and habitat.
Conservation estate		Low	The proposed development may impact on the uniqueness, biodiversity and/or culturally significant values of adjoining or nearby land managed by NSW National Parks & Wildlife Service.
Waste Generation		Low	The construction and operation of the proposed development shall produce varying levels of inorganic and organic waste that may adversely impact on the environment if inappropriate mitigation measures are not implemented.
Land Capability		High	The proposed development would produce effluent and solid waste during its operation. The characteristics of

		the soils in the proposed utilisation areas will impact on the suitability of the land for sustainable utilisation.
Traffic and Transport	Medium	The proposed development shall result in an increase in traffic on the local road network.
Noise and Vibration	Low	Significant distances to sensitive receivers and as the operational activities of the proposed development are consistent with the activities of the existing agricultural activities of the surrounding area, the noise generated from the proposed development is not expected to create a significant impact on the surrounding environment.
Visual Amenity	Low	Significant distances to sensitive receivers along with surrounding topography, landforms and vegetation, provide visual screening of the proposed development from sensitive receivers.
Pest animals and weeds	Low	Pest animals and noxious weeds have the potential to become established and/or proliferate as a result of the proposed development.
Hazards and Risk	Low	The proposed development has the potential to have adverse impacts to human health and safety, animal health and the biophysical environment.
Bushfire and Incident Management	Medium	Uncontrolled bushfire has the potential to impact on human safety and animal welfare and damage to infrastructure.
Land Use	Low	Incompatible developments may lead to land use conflicts and adversely impact community values. The proposed development is consistent with the surrounding land uses of the area.

Part F – Environmental issues and assessment of impacts

13. Environmental issues and assessment of impacts

13.1 Air quality

13.1.1 Introduction

This section discusses the potential impacts on air quality and the emissions of greenhouse gases (GHG) associated with the proposed development; including mitigation measures when practicable.

The main emissions of concern are odour and dust, and to a lesser extent GHG emissions associated with the livestock, vehicles, feed processing operations.

The main impacts on air quality in regard to the proposed development include:

- odours from the surface of pens, feed storage, solid waste and liquid waste storage, handling and utilisation
- impacts of dust from operations associated with construction and operation such as bulk earthworks, movement of cattle within the pens, vehicle movement etc
- vehicle exhaust emissions
- livestock and manure GHG emissions.

Potential impacts to air associated with the proposed development are expected to be minimal based on the implementation of a number of mitigation measures, the location of the proposed development and the absence of nearby residential facilities will limit any adverse impacts.

Odour is considered the key potential air quality impact of the proposed development and therefore a detailed Odour Impact Assessment was undertaken to quantitatively assess odour impacts resulting from the proposed operation of the development. The Odour Impact Assessment report is attached in Appendix G.

There are limited potential sources of particulate emissions from the existing environment as the environment is considered undisturbed. Existing particulate emissions include primarily vehicle emissions from local traffic, smoke from bushfires and wind-blown dust.

This section of the EIS includes a summary of this assessment as well as addressing other relevant matters relating to air quality such as climate, meteorology, dust and greenhouse gases.

13.1.2 Air quality guidelines

The *Protection of the Environment Operations Act 1997* (*POEO Act*) and associated regulation The *Protection of the Environment Operations (Clean Air) Regulation 2021* provides the statutory framework for managing air emissions in NSW.

In addition, other guidelines have been used for assessing impacts of the proposed development on air quality. The following sources have been used:

- Local Government Air Quality Training Toolkit (DECC, 2013)
- Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales (NSW EPA, 2016)
- Development of an Odour Emissions Model for Australian Feedlots, Part F: Emissions Estimation and Model Application, Project No. B.FL T.0369 Final Report (Omerod et al. 2014)
- Development of an Odour Emissions Model for Australian Feedlots, Part C: Feedlot Odour Sampling and Testing Techniques Project No. B.FL T.0369 Final Report (Omerod, 2014)
- Guideline: Odour Impact Assessment from Developments (DEHP, 2013).

13.1.3 Existing environment

13.1.3.1 Climate

The closest meteorological station to the subject land is the Bureau of Meteorology (BoM) station at North Star (Wolonga) located about 13 km south-west of the subject land. The North Star (Wolonga) (Site number: 053095) (BoM, 2024a) has been recording rainfall since 1972. A summary of the rainfall data from the North Star (Wolonga) (Site number: 053095) BoM site (BoM, 2024a) is provided in Table 46.

The closest meteorological station with climatic data to the subject land is the Bureau of Meteorology (BoM) station at Goondiwindi located about 40 km north of the subject land. The Goondiwindi station (Site number: 041560) (BoM, 2024a) has been recording rainfall since 2021. Previous weather stations for this locality were Goondiwindi Post Office , station number 041038 March 1891 to June 1991 and Goondiwindi Airport , station number 041521 June 1991 to July 2015. A summary of the climatic data from the Goondiwindi Post Office (Site number: 041038) BoM site (BoM, 2024a) is provided in Table 47.

Interpolated long-term daily climate data for the proposed development site (Latitude 28°95"S, Longitude 150°55"E) were derived from the Department of Environment and Science (DES) Silo Data Drill database (Department of Science, Information Technology and Innovation (DES, 2024). The Data Drill accesses original meteorological station data. The data are supplied as an individual file of daily rainfall, maximum and minimum temperature, potential evapotranspiration and radiation at the nominated point location for the period 1/1/1924 to 31/12/2023 (DES, 2024). A summary of the data used is included in Table 48.

The climate of the region is between the tropical and temperate climatic zones. Under the Köppen-Geiger climate classification system this climate is classified as humid subtropical climate (Cfa), and experiences typical cool to mild dry winters and very warm to hot dry summers.

The climate is characterised by dry stable winters with sporadic, unreliable rainfall and warm to hot summers with moderate to heavy rainfall. The annual evaporation potential (as determined by pan evaporation) exceeds annual precipitation. The maximum and minimum temperatures of the higher altitude eastern region contrast with the maximum and minimum temperatures of the lower altitude of the western region.

Rainfall varies with time of year due to the latitude of the region (-28.9^0) and tends to be summer dominant. Rainfall patterns are linked to high pressure systems over northern parts of Australia and rainfall typically occurs as thunderstorms or short and intense storm events during summer with the occasional cold fronts that brings periods of prolonged light rainfall. Table 46 shows that the long-term average rainfall recorded at the North Star (Wolonga) for the period 1972 to 2020 was 636 mm with approximately 55% falling in the five months between November and March. Monthly rainfall over the autumn and winter months averages between 30 and 40 mm per month. The lowest rainfall totals are in June and August (Table 46). Table 47 shows that the long-term average rainfall recorded at the Goondiwindi Post Office for the period 1879 to 1991 was 621 mm.

There is a large degree of variability in rainfall between years and there has been a drying climate with lower rainfall since about 1975.

Table 48 shows that the average annual rainfall interpolated by SILO for the period 1924 to 2023 is approximately 617 mm/year less than that measured by BoM at the North Star (Wolonga) site. The annual evaporation is approximately 1,876 mm/year. The region has nett deficit rainfall with rainfall less than the evaporation and transpiration rates.

The climatic influence on temperatures results in warm to hot summers and cool winters, regularly reaching single digit temperatures. Table 48 shows that the mean maximum temperature derived by SILO for the period 1924 to 2023 is 33.2^0C in January and a mean minimum temperature of about 3.3^0C for July.

Relative humidity in the area is higher during the winter months when temperatures are lower. Average relative humidity 9 am readings range from 48% in June to 39% in November.

Table 46 – Regional rainfall data – North Star (Wolonga) (1972-2020) (BoM, 2024a)

	Units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Rainfall														
Mean rainfall	mm	78.7	73.4	65.0	35.0	39.0	31.9	39.3	30.7	33.0	55.4	72.4	73.1	636.0
Median rainfall	mm	55.4	61.8	55.0	17.4	28.5	25.4	33.0	23.7	22.5	46.4	59.7	71.8	612.8
Lowest rainfall	mm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	337.5
90% years at least rainfall	mm	10.4	11.8	8.6	0.0	2.3	8.6	3.2	2.1	1.8	20.8	19.8	14.0	475.1
10% years at least rainfall	mm	185.2	137.9	128.0	83.9	73.8	58.6	74.8	57.8	73.7	104.2	127.7	120.3	875.5
Highest rainfall	mm	337.0	369.4	197.4	282.0	168.2	162.0	177.0	183.2	103.0	133.3	219.0	212.0	1,006.4

Table 47 – Regional climatic data – Goondiwindi Post Office (1879-1991) (BoM, 2024a)

	Units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Rainfall														
Mean rainfall	mm	78.5	69.0	59.5	38.7	42.9	40.3	41.9	33.1	39.0	48.7	59.8	69.8	621.4
Median rainfall	mm	64.7	52.8	38.9	26.4	33.0	29.2	35.5	26.7	33.9	42.6	48.2	61.3	-
Lowest rainfall	mm	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	1.6	0.0	266.1
90% years at least rainfall	mm	17.3	10.3	5.8	1.6	4.1	5.6	6.5	4.1	2.8	11.4	11.2	13.1	-
10% years at least rainfall	mm	159.9	140.2	130.7	88.1	87.8	91.1	85.1	66.1	84.0	95.4	116.8	132.4	-
Highest rainfall	mm	289.2	374.2	296.8	301.0	218.6	177.4	158.8	150.3	172.1	147.9	236.3	263.4	1,033.7

Table 48 – Proposed development site - Climatic data derived from SILO (1924-2023) (DES, 2023)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Rainfall													
Mean rainfall (mm)	80.0	73.5	59.6	31.8	38.3	37.0	39.1	32.8	34.7	55.3	65.5	69.7	617.2
Median rainfall (mm)	63.9	57.1	49.4	20.6	32.0	28.1	36.2	28.8	26.9	44.6	54.3	65.2	598.6
Lowest rainfall (mm)	2	0	0	0	0	0	0	0	0	1	0.2	1.1	139.4
90% years at least rainfall (mm)	18.5	14.1	5.4	0.7	3.3	8.3	3.5	2.4	3.0	12.3	12.0	13.1	441.6
10% years at least rainfall (mm)	166.2	147.3	142.2	69.6	81.0	76.6	78.7	64.7	72.5	109.2	129.5	127.3	801.0
Highest rainfall (mm)	330.1	329	198.4	263	194.9	175.9	169.4	172.2	132.2	187.1	230.3	255.8	1,118.6
Temperature, Humidity and Pan evaporation													
Mean pan evaporation (mm)	247.8	201.3	186.0	130.6	87.8	62.9	69.0	97.7	139.6	187.7	217.9	246.8	1,875.7
Mean maximum temperature (deg C)	33.2	32.6	30.4	26.5	22.0	18.5	17.9	19.7	23.4	27.0	30.0	32.2	26.1
Mean minimum temperature (deg C)	18.8	18.5	16.1	11.6	7.4	4.7	3.3	4.5	7.5	11.8	14.9	17.4	11.4
Relative Humidity (%)	43.5	46.3	46.2	46.0	48.0	48.7	45.5	42.1	40.1	40.0	39.8	41.4	44.0

13.1.3.2 Design rainfalls

Annual Exceedance Probability (AEP) and Intensity-Frequency-Duration (IFD) design rainfalls for the proposed development site were obtained from the Bureau of Meteorology (BoM, 2023c; BoM, 2023d). The rainfall intensity per hour over a given duration and probability that it will be exceeded in any one year (AEP) is provided in Table 49. The rainfall intensity per hour for durations and average recurrence interval are shown in Table 50. The probability that a given rainfall total accumulated over a given duration will be exceeded in any one year when the ARI is expressed in years, is given by the relationship:

$$AEP = 1 - \exp\left(\frac{-1}{ARI}\right)$$

Consequently, a one in 20-year, 24-hour storm event correlates to an AEP of 5%.

Table 49 – Proposed development site – AEP design rainfalls (BoM, 2023c)

Duration	Annual Exceedance Probability						
	63.2%	50%	20%	10%	5%	2%	1%
5 min	85.6	97.2	134.0	160.0	185.0	219.0	245.0
10 min	67.6	76.8	106	126	146	174	196
15 min	56.2	63.8	88.1	105	122	145	164
30 min	38.1	43.2	59.8	71.4	83	99	112
1 hour	24	27.2	37.7	45	52.4	62.3	70
2 hours	14.6	16.5	22.7	27.1	31.5	37.3	41.9
3 hours	10.9	12.3	16.8	19.9	23.1	27.4	30.8
6 hours	6.6	7.4	10.0	11.8	13.7	16.2	18.3
12 hours	4.1	4.5	6.1	7.1	8.2	9.8	11.1
24 hours	2.5	2.8	3.7	4.4	5.1	6.1	6.9
48 hours	1.5	1.7	2.3	2.7	3.1	3.8	4.3
72 hours	1.1	1.2	1.7	2.0	2.3	2.8	3.2

Table 50 – Proposed development site – ARI design rainfalls (BoM, 2023d)

Duration	Annual Return Interval						
	1	2	5	10	20	50	100
5 mins	79.2	103	134	154	181	219	249
6 mins	73.7	96	125	143	169	204	232
10 mins	60.3	78.5	102	117	137	165	188
20 mins	44.5	57.8	74.7	85.5	100	120	137
30 mins	36.1	46.9	60.5	69.1	80.8	97	110
1 hour	24	31.1	40	45.6	53.3	63.8	72.3
2 hours	15.1	19.6	25	28.5	33.2	39.7	44.9
3 hours	11.3	14.7	18.7	21.3	24.8	29.6	33.5
6 hours	6.87	8.87	11.3	12.8	14.9	17.8	20
12 hours	4.16	5.37	6.83	7.75	8.99	10.7	12.1
24 hours	2.52	3.25	4.14	4.69	5.46	6.51	7.34
48 hours	1.48	1.91	2.44	2.77	3.23	3.86	4.37
72 hours	1.04	1.34	1.72	1.96	2.29	2.74	3.1

*Design storm event

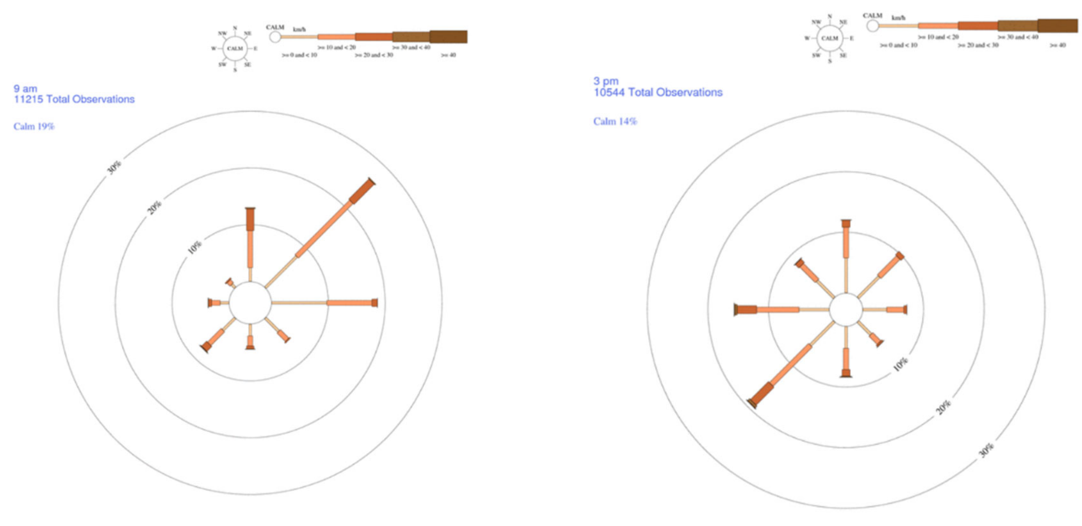
13.1.3.3 Wind direction and frequency

The wind direction, frequency and intensity at the site are influenced by several factors including the local terrain and land use. On a relatively small scale, winds would be largely affected by the local topography. At larger scales, winds are affected by synoptic scale winds, which are modified by sea breezes near the coast in the daytime in summer (also to a certain extent in the winter) and by a complex pattern of regional drainage flows that develop overnight.

As no meteorological data exists for the proposed development site, data was obtained from the closest meteorological record station that holds wind direction statistics to the subject land. However, the closest station is the Moree Comparison (1995-2024) (BoM, 2020a) which is located approximately 90 km south-west of the subject land. Given the distance and terrain, these data can be used to provide a general indication of wind speed and direction at the proposed development site.

Wind speed and direction information obtained from climate data is presented in the form of wind roses. Wind roses are a way of presenting a summary of wind speed and directional data for a particular time and location and show the frequency of occurrence of winds by direction and strength.

Figure 22 shows the 9 am and 3pm wind rose for the Moree Comparison (BoM, 2024a). Each bar shown on the wind rose represents winds blowing from that direction. The length of the bar represents the frequency of occurrence of winds from that direction, and the colour and width of the bar sections correspond to wind speed categories as outlined in the legend. During the year, the 9 am observations are dominated by winds from the east through to a south-easterly direction. The prevailing wind direction is north through to east in the morning and tending south westerly in the afternoon.



9am **3pm**

Figure 22 – Regional wind direction – Wind rose Moree Comparison (BoM, 2024a) 1964-1995.

However, a more representative local wind speed and direction data was obtained using the meteorological model – The Air Pollution Model (TAPM) (Version 4).

TAPM, developed by the Commonwealth Scientific and Industrial Research Organisation (CSIRO) is a prognostic model which is used to predict three-dimensional meteorological data and air pollution concentrations. A detailed description of the TAPM model can be found in Hurley (2008).

TAPM software allows users to generate synthetic observations by referencing in-built databases (e.g. terrain information, synoptic scale meteorological observations, vegetation and soil type etc.) which are subsequently used in generating site-specific hourly meteorological observations.

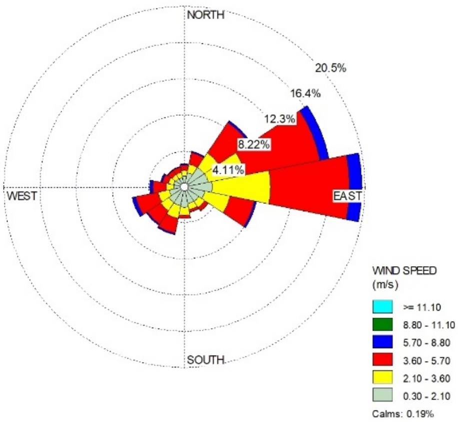
The modelling was centred on the closest grid point to the proposed development site being 28°57.0'S; 150° 33.0'E and was configured with a 30 x 30 grid. In total, five domains were set up with grid spacings of 30km, 10 km, 3 km, 1 km and 0.3 km. Five (5) years data were modelled from 2016 to 2020. This setup is consistent with good practice and the guidance detailed in the Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales (NSW EPA, 2022).

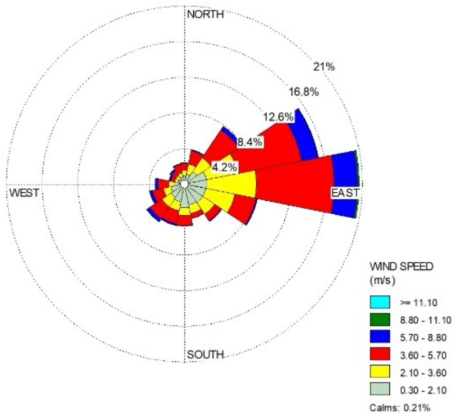
Wind speed and direction information obtained from TAPM modelling is presented in the form of wind roses. Wind roses are a way of presenting a summary of wind speed and directional data for a particular time and location and show the frequency of occurrence of winds by direction and strength.

The annual wind roses developed for the proposed development site from TAPM in years 2016 to 2020 inclusive are shown in Figure 23. All years modelled result in similar wind directions. Each bar shown on the wind rose represents winds blowing from that direction. The length of the bar represents the frequency of occurrence of winds from that direction, and the colour and width of the bar sections correspond to wind speed categories as outlined in the legend.

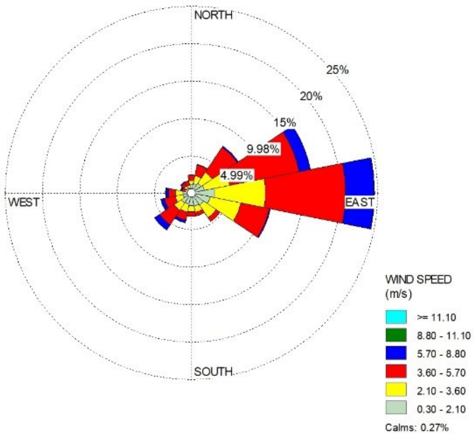
The composite wind rose developed for the proposed development site from TAPM in all five years (2016 to 2020) is shown in Figure 24. Figure 24 shows that wind direction is predominantly from the northeast to east southeast with light to moderate wind speeds (3.8 – 5.7 m/s) observed for most of the year.

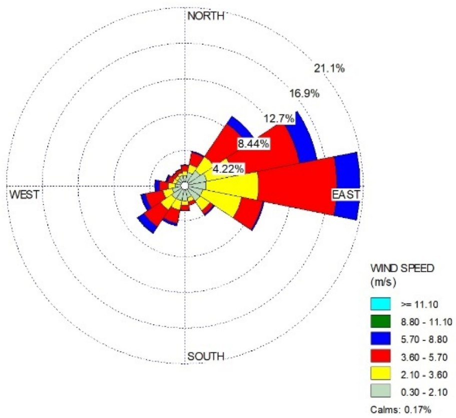
Analyses of the TAPM data shows that about 50% of the winds blow from ±40° from the general direction of east.



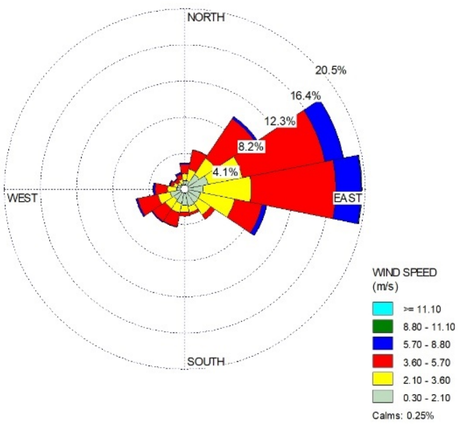


2016 **2017**





2018 **2019**



2020

Figure 23 – Proposed development site – Annual windroses (TAPM)

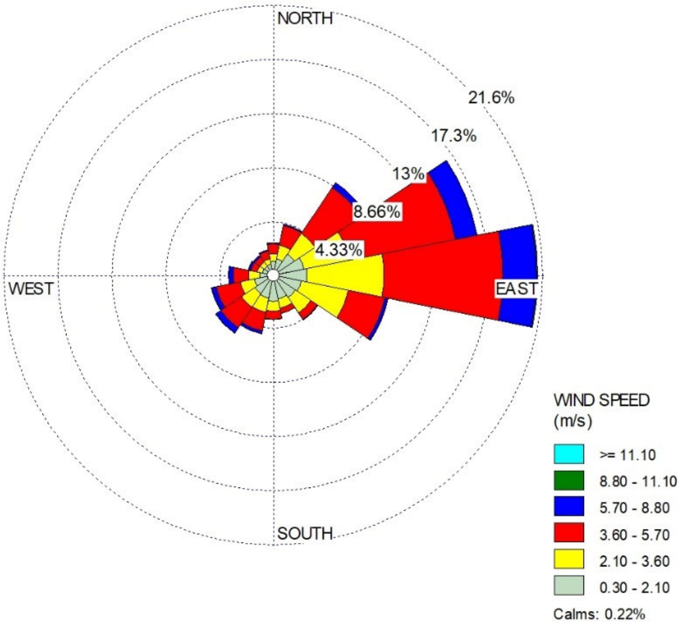


Figure 24 – Proposed development site – Composite annual windrose (TAPM 2016-2020)

13.1.3.4 Sensitive receptors

The proposed development is located within the North Star region, which is a well developed irrigated and dryland cropping region in northern NSW comprising sparsely located rural homesteads and villages. The nearest communities to the proposed development are the village of North Star some 15 km by road to the west and Yetman some 27 km to the east northeast of the proposed development site.

The nearest potentially affected sensitive receptors have been identified from examination of aerial imagery (Google Earth™) and a site inspection and are shown in Figure 15.

Figure 15 shows that the closest sensitive receptor is a rural residence located some 1,275 km to the north-north-east of the proposed development complex.

13.1.3.5 Existing emission sources

As requested by the Director Generals requirements (Table 39), the air quality assessment should account for cumulative impacts associated with existing emission sources as well as currently approved developments linked to the receiving environment.

There are no existing emission sources, nor any currently approved quarry or intensive livestock facilities developments linked to the receiving environment in the locality of the proposed development. The closest intensive livestock facility is Tullin Tulla feedlot and Myola feedlot located some 17 km and 24 km southwest of the proposed development.

Consequently, there are no cumulative effects of the proposed development with any existing development or emission source.

13.1.4 Air quality impacts

13.1.4.1 Odour

The Australian feedlot industry expanded significantly about 25 years ago and is currently experiencing further expansion. Many aspects of the siting, design, construction, management and monitoring of Australian feedlots have improved substantially in the past 25 years. Overall, these factors have led to a significant improvement in environmental performance. The improvements include:

- Significant investment in research into environmental aspects of feedlots, including recent odour studies (Atenzi et al, 2014, Nicholas et al, 2014, Omerod et al, 2014).
- The introduction of best practice guidelines to provide industry with tools to design and manage feedlots, including environmental aspects such as pen and manure management (MLA, 2012a, 2012b).
- The adoption of National Feedlot Guidelines and Code of Practice by industry and regulators (MLA, 2012a, 2012b).
- The adoption of the National Feedlot Accreditation Scheme (NFAS) (AUS-MEAT, 2011).
- Major improvements in feedlot nutrition, feed management and feed processing that have minimised manure production.

Odour is considered the key potential air quality impact of the proposed development and is important from a community amenity perspective. Various design and management measures can be implemented to minimise the generation of odour, but it is not possible to completely eliminate this nuisance source.

The accepted solution to limit any adverse impacts and unreasonable interference with the amenity of neighbours is to provide an adequate buffer between the nuisance source and the sensitive receptor. Experience with cattle feedlots is that, if the buffer distance is adequate for odour, then dust and noise nuisance is unlikely to occur.

For an intensive beef cattle feedlot development, there are two possible approaches to determining the appropriate buffer distance between the facility and sensitive receptors. These approaches are either:

1) A conservative assessment using a simple formula; and
2) A detailed assessment using odour dispersion modelling.

This two-level approach is recognised in both the National Guidelines for Beef Cattle Feedlots in Australia (MLA 2012a) and the NSW technical framework for odour assessment. The simple formula approach is sufficient to broadly identify whether the proposed development complex site is suitable or if further assessment of odour impact is necessary or worthwhile. In NSW, this is described as a Level 1 assessment and is completed using the S-Factor formula.

13.1.4.2 Odour objectives

The objective of the assessment was to determine the potential odour impact from the proposed development in accordance with:

- Technical Framework - Assessment and management of odour from stationary sources in NSW, Sydney: DECC (Department of Environment and Conservation (NSW), 2006a)
- Technical Notes: assessment and management of odour from stationary sources in NSW (Department of Environment and Conservation (NSW), 2006b).

13.1.4.3 Odour generation processes

Simplistically, odour at a beef cattle feedlot is generated when organic matter breaks down anaerobically in the presence of water. The predominant organic matter generated is solid waste including manure, animal carcasses and spilt feed. Water generally comes from rainfall but can also come from the water reticulation system via leaks, overflows, cleaning of water troughs and the moisture added to the pen surface via manure (faeces and urine).

Subsequently, the pen area, manure stockpile and processing area, sedimentation basin and holding pond are the principle sources of odour at the proposed development.

Australian research (Atenzi et al, 2014, Nicholas et al, 2014, Omerod et al, 2014), has shown that very little odour is emitted from dry pens or any other dry organic material. However, when the pen manure is wetted due to rainfall or spilt water, the odour emission rate can increase 100-fold. This means that even small wet patches in pens can contribute large amounts of odour.

13.1.4.4 Odour control processes

The basic principles of odour control at beef cattle feedlots are to:

- Minimise the amount of organic matter available for decomposition.
- Minimise the amount of water that mixes with organic matter.
- Maximise the rate of drying of wet organic matter.

13.1.4.5 Assessment methodology

The assessment has been performed in line with the Technical Notes (Department of Environment and Conservation (NSW), 2006b) and the Technical Framework (Department of Environment and Conservation (NSW), 2006a).

The framework revers to Level 1, 2 and 3 assessments which range from screening level techniques (Level 1) to refined dispersion modelling techniques using site specific input data (Level 3).

An odour impact assessment was undertaken based on the s-factor separation distance assessment and is presented in Appendix G. The methodology used included:

- The Level 1 beef cattle feedlot technique detailed in the Technical Notes - as it is most appropriate for assessing beef cattle feedlots with suitable separation distances. Level 1 odour assessments for beef cattle feedlots use a simple method to determine the separation distance between the proposed development and the nearest receptor.
- The National Guidelines for Beef Cattle Feedlots in Australia (3rd Edition) (MLA, 2012b) – which is the most recently published beef cattle feedlot guideline.

13.1.4.6 Dust

The proposed development site is located in a rural area. Air quality in the local area would be considered to be of good quality and is likely to be characterised by dust emissions from current agricultural activities (dryland cropping, beef cattle grazing, unsealed on-farm roads).

The proposed development is an expansion of an existing development which utilises existing cropping land as waste utilisation areas.

Dust emissions from the proposed development are unlikely to cause impacts unless receptors are located nearby. The distance emissions generally disperse from the source depend on topographic and climatic factors. Further, as outlined in the odour impact assessment if the buffer is suitable to mitigate against odour impacts, dust impacts are also not expected by default.

13.1.4.7 Greenhouse gases

Greenhouse gases (GHGs) are a natural part of the atmosphere, they act to absorb and re-emit infrared radiation from the sun, trapping heat and warming the Earth's atmosphere, a process similar to that occurring in a greenhouse. However, human activities are increasing the concentrations of these heat-absorbing gases, which allows the atmosphere to warm up, resulting in global warming thus the name Greenhouse Gas. The most significant greenhouse gases include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (NO_x) and various forms of fluorocarbons.

Methane is a colourless, odourless gas released into the atmosphere from many human-related activities and natural sources such as wetlands, oceans, freshwater, fossil-fuel production, livestock, landfills, and is the main constituent of natural gas. Methane is the second most abundant greenhouse gas (GHG) after carbon dioxide (CO_2), accounting for about 14 per cent of global emissions (Global Methane Initiative, 2011).

Global warming potential (GWP) indicates the amount of heat trapped per mass of gas and the time the gas remains in the atmosphere. It is expressed relative to carbon dioxide which has a GWP of 1. GWP is used to convert the impact of different greenhouse gases into a single metric, carbon dioxide-equivalent (CO_2-e). Methane is more efficient at trapping heat than carbon dioxide and therefore has a current GWP of 25 (Lines-Kelly, 2014).

The digestive processes of ruminants (cattle, sheep, camels, deer etc), rice cultivation, animal manures, biomass burning, and waste decomposition in landfills are some of the major sources of agricultural methane emissions.

Nitrous oxide is also produced from urine deposited by livestock on soils and from manure and liquid waste during storage and treatment (Eckard, et al, 2010). Of the dietary nitrogen consumed by ruminants, less than 30% is utilised for production, with the majority (over 70%) being excreted.

Agriculture generated about 15% of Australia's total direct greenhouse gas (GHG) emissions in 2010 (DCCEE, 2012) with beef cattle including feedlot cattle contributing the largest proportion of these emissions at around 7%.

Hence, the introduction of a development such as a beef cattle feedlot has the potential to impact on local area GHG emissions.

13.1.4.8 Assessment of impacts

Potential air quality impacts from the proposed development have been assessed by:

- identifying the nearest sensitive receptors describing existing air quality and defining the prevailing wind direction
- reviewing legislative requirements and ambient air quality goals
- identifying mitigation measures to assist with the management of the potential air quality impacts from the proposed development.

13.1.5 Air quality assessment

13.1.5.1 Odour

A Level 1 odour impact assessment for the proposed development in accordance with section 7 of the Technical Notes (Department of Environment and Conservation (NSW), 2006b) and The National Guidelines for Beef Cattle Feedlots in Australia (3rd Edition) (MLA, 2012b) was undertaken and presented in Appendix G.

The Level 1 odour impact assessment for the proposed development concludes that the existing separation distances exceed the minimum separation calculated by the NSW Level 1 requirements and the requirements of The National Guidelines for Beef Cattle Feedlots in Australia (3rd Edition) (MLA, 2012b) for the proposed development with a capacity of 3,000 head (2,620 SCUs) at 20.5 m^2/SCU.

As the proposed development can demonstrate a clear 'pass' at Level 1 odour impact assessment and there are no special risk factors such as katabatic drift or a populated area located just outside the calculated separation distance, there is no need to undertake Level 2 or 3 assessment.

13.1.5.2 Dust

Potential impacts to air quality from dust emissions were considered at a local level based on the type of infrastructure proposed, construction techniques to be employed, temporal duration of construction, operational occurrences of dust and the spatial extent of the individual sensitive receptors.

During construction of the proposed development there is potential for impacts to air quality caused by the generation of dust during bulk earthworks involved in creating the design surface, access roads, infrastructure areas etc. Dust emissions will be influenced by the moisture content and particle size of the materials being moved.

Once operational there is also potential for dust generation, particularly during prolonged dry periods. Dust arises from:

- movement of cattle within the pens. Dust problems are likely to develop when the water evaporated from the pen surface exceeds the water added by rainfall and manure;
- feed storage and processing;
- movement of vehicles around the development complex in particular, trucks delivering ration to the cattle;
- storage and processing of solid wastes; and
- land application of solid wastes.

Less obvious is the time of day when dust is generated. Observations of feedlots in the United States and Australia have found that increased dust levels develop during the late afternoon and dusk when temperatures drop and cattle become more active (Skerman, 2000). When temperatures drop, cattle that have been resting during the heat of the day become active and apart from feeding and drinking, younger cattle tend to become playful. This creates considerable dust that 'hangs' in the cool still evening air. However, it is considered that the potential for dust can be minimised by the implementation of measures outlined in section 13.1.6.

Dispersion conditions (separation from sensitive receptors) adequate for managing off-site odour impacts are usually also adequate for managing off-site dust impacts (DECC, 2013). Subsequently, due to separation from sensitive receptors combined with the mitigation and management measures proposed, dust is not expected to impact on air quality of the local area.

13.1.5.3 Greenhouse gases

Beef cattle produce methane (CH_4) as a by-product of their anaerobic digestive process (enteric fermentation) as the rumen breaks down cellulose in grasses and other forages to obtain energy and nutrients for growth. Most of the methane (enteric methane) that accumulates in the rumen is expelled via the mouth through belching and breathing. About 2% of total emission is also produced in the intestine and emitted through the rectum as flatulence.

Methane emissions from beef cattle have been estimated at about 200g per head per day (Charmley et al 2011). Subsequently, the longer an animal takes to get to market and the more often a cow does not get bred, then that animal is producing methane with very little beef being marketed in return (Charmley et al., 2008). Consequently, this methane intensity, is markedly higher for extensive grazing systems than cattle raised in more intensive grain-based feedlot production systems.

Cattle manure contains in the order of 16 to 24 kg nitrogen per tonne. Nitrogen can occur as organic nitrogen, ammonium and nitrate with a range of transformations possible after deposition to land (Wiedemann et al. 2013).

Energy is fundamental to the proposed development. Indirect sources arise mainly from the transport of cattle in and out of the development, commodity delivery and solid waste removal. Energy is used directly in the construction of the proposed development – through plant and equipment fuel usage and in the operation of the proposed development for the production of beef – feed processing, feed delivery, water supply, office etc.

In GHG terms, grain finishing beef cattle has a number of key differences from grass finishing; GHG emissions from enteric methane are lower (Dong et al. 2006) while emissions from manure management may be higher (Department of the Environment 2015) though to date the Australian inventory has not based estimates of manure emissions on Australian research.

GHG Emissions from the proposed development can be broken into three sources; direct methane emissions to the atmosphere (enteric methane) from the livestock themselves, methane and nitrous oxide emissions resulting from the breakdown of organic matter during solid/liquid waste storage, treatment and handling and utilisation and those resulting from the use of fossil fuels for energy usage.

Potential impacts to air quality from GHG emissions were considered based on the type of infrastructure proposed, construction techniques and machinery to be utilised and management techniques to be employed.

GHG emissions from the proposed development are unlikely to cause impacts due to productivity improvements over extensively grazed systems and the mitigation and management measures proposed.

13.1.6 Mitigation and management measures

As discussed in 13.1.4.8, a number of air quality impacts were identified. The implementation of the following management and mitigation measures would minimise potential odour sources and the identified impacts to air quality as a result of the proposed development.

13.1.6.1 Odour

13.1.6.2 Design and siting

The implementation of the following management and mitigation measures would minimise identified potential odour impacts to air quality as a result of the proposed development:

- Provision of adequate separation distances between the proposed development and sensitive receptors as shown in Figure 15;
- The pens are designed with adequate slope to maximise drainage and encourage rapid drying of the pen surface after rainfall;
- The grain treatment process maximises digestibility and minimises the amount of starch in faeces;
- The sedimentation basin is designed to maximise the removal of solids and drain free of water after a runoff event;
- Design and siting of water troughs so that excess water released during trough cleaning or from a broken float valve does not enter the pen area, thus minimising wet areas in pens;
- The catch and main drains designed with adequate and uniform slope to maximise drainage and encourage rapid drying after rainfall;
- Design of shade structures that optimise pen drying by moving cattle (and their excretions) around the pen as the shade moves; and
- Provision of vegetative screen around proposed development as a wind break and vegetative filter.

13.1.6.3 Operation

The implementation of the following management and mitigation measures would minimise identified potential odour impacts to air quality as a result of the proposed development:

- Ensure the air quality and meteorological monitoring network is maintained and results are routinely analysed, assessed and reported;
- Minimisation of wet areas in pens by fixing leaks from water troughs;
- Utilising the best animal production genetics - Improved production traits such as growth rate and carcass weight will contribute significantly to reducing emissions intensity;
- Maximise feed energy by eliminating parasites and nutrient deficiencies;
- Generating and maintaining best practice management for solid and liquid waste storage, processing and utilisation;
- Frequent removal of manure from the pens/drains and under-fences;
- Elimination of wet areas within the pens;

- The sedimentation basin control weir is maintained in operational order to ensure that complete drainage occurs;
- Solids from the sedimentation basin are removed as soon as practical after runoff;
- Manure stockpiles are not turned to release emissions generated from the anaerobic decomposition process;
- Controlled aeration of solid waste composting windrows;
- Dewatering of the holding pond by irrigation to crops or pastures as soon as possible after rainfall;
- Receiving, reporting and responding to any complaints in relation to air quality through the 24-hour community response line;
- Report the results of any air quality monitoring in accordance with the conditions of the Development Approval; and
- Ensure that all employees and contractors are given adequate training in environmental awareness, legal responsibilities, and air quality control methods.

13.1.6.4 Dust

As it is not practical to remove dust from the air, management and mitigation measures shall be directed towards preventing dust from being created as outlined in the following sections.

13.1.6.5 Design and siting

The implementation of the following management and mitigation measures would minimise identified potential dust impacts to air quality as a result of the proposed development:

- Provision of adequate separation distances between the proposed development and sensitive receivers as shown in Figure 15; and
- Provision of vegetative screen around proposed development as a wind break and vegetative filter.

13.1.6.6 Construction

The implementation of the following management and mitigation measures shall minimise identified potential dust impacts to air quality as a result of the construction of the development:

- Construction environmental management plans (CEMPs) and sub-plans shall be developed and implemented for any construction works as outlined in section 15.2.1.1;
- Vegetation clearing minimised to the extent necessary for construction of the development complex and access tracks;
- Dust suppression measures, such as watering exposed soil and ceasing dust generating activities during periods of high wind, shall be implemented; and

- As soon as practical at the completion of construction works any disturbed areas required to be revegetated shall be.

13.1.6.7 Operation

The implementation of the following management and mitigation measures shall minimise identified potential dust impacts to air quality as a result of the operation of the development:

- Adapting the cattle stocking density in pens to maintain manure on pen surface at 25-35% moisture content to minimise dust generation. For example, stocking density may change from lighter rates in winter to heavy rates in summer;
- Daily application of small amounts (<5mm) of water to the pen surface during the early evening hours when the heat load on the cattle is reduced during excessively dry periods;
- Setting and enforcing speed limits on internal road network;
- Dust suppression measures, such as watering access and feed roads and solid waste stockpiles as required;
- Any operations involving the movement of dusty materials such as hay processing, grain movement, solid waste turning and spreading shall be timed and managed where possible when materials have adequate moisture content;
- Ceasing dust generating activities such as hay processing, pen cleaning, solid waste stockpiling, screening, spreading during periods of high wind, shall be implemented;
- Minimising the accumulation of manure in pens and cattle lanes by cleaning more frequently that Class 1 requirements;
- Application of solid wastes to land when wind conditions and dispersion conditions are favourable;
- Ensure the air quality and meteorological monitoring network is maintained and results are routinely analysed, assessed and reported;
- Receiving, reporting and responding to any complaints in relation to air quality through the 24-hour community response line;
- Report the results of any air quality monitoring in accordance with the conditions of the Development Approval; and
- Ensure that all employees and contractors are given adequate training in environmental awareness, legal responsibilities, and air quality control methods.

13.1.6.8 Greenhouse gas emissions

13.1.6.9 Design

The implementation of the following management and mitigation measures at the design stage of the proposed development shall minimise identified potential GHG impacts to air quality as a result of the proposed development:

- The pens designed with adequate slope to maximise drainage and encourage rapid drying of the pen surface after rainfall;

- Proposed grain treatment process maximises digestibility and minimises the amount of starch in faeces;
- Sedimentation basin designed to maximise the removal of solids and drain free of water after a runoff event;
- Appropriately sized solid and liquid waste utilisation area for sustainable application of nutrients; and
- Exploring the use of biofuels at the site.

13.1.6.10 Construction

The implementation of the following management and mitigation measures shall minimise identified potential GHG impacts to air quality as a result of the construction of the development:

- Use of appropriately sized plant and equipment for respective processes to ensure machines are operating at peak efficiency and activities completed in a timely manner;
- Routine service and maintenance of mobile equipment used to ensure efficient operation; and
- Review and further evaluation of all construction vehicles against current industry fuel efficiency benchmarks.

13.1.6.11 Operation

The implementation of the following management and mitigation measures shall minimise identified potential GHG impacts to air quality as a result of the operation of the development:

- Sourcing livestock from as close to the development as practical as well as on-site production to minimise fugitive emissions during transport;
- Utilising the best animal production genetics - Improved production traits such as growth rate and carcass weight will contribute significantly to reducing emissions intensity;
- Rations formulated to minimise enteric methane emissions;
- Maximise feed energy by eliminating parasites and nutrient deficiencies;
- Use of appropriately sized plant and equipment for respective processes;
- Generating and maintaining best practice management for solid and liquid waste storage, processing and utilisation;
- Frequent removal of manure from the pens/drains and under-fences;
- Elimination of wet areas within the pens;
- Sedimentation basin control weir maintained in operational order to ensure that complete drainage occurs;
- Remove solids from the sedimentation basin as soon as practical;
- Manure stockpiles are not turned to release emissions generated from the anaerobic decomposition process;

- Controlled aeration of solid waste composting windrows;
- Dewatering of the holding pond by irrigation to crops or pastures should occur as soon as possible after rainfall;
- Utilisation of solid and liquid wastes on-site to minimise inorganic fertiliser requirements;
- Matching fertiliser to plant nutrient requirements to maximise crop growth;
- Sourcing feed commodities from as close to the development as practical as well as on-site production to minimise fugitive emissions during transport;
- Where practical, solid wastes incorporated directly into the soil;
- Incorporate energy and GHG awareness into training of managers and supervisors;
- Routine service and maintenance of mobile equipment used on-site to ensure efficient operation;
- Continuous improvement of GHG intensity of production by identifying and controlling energy intensive processes;
- Regular reviews and monitoring of GHG emissions and energy usage; and
- Ongoing research into cleaner technologies and energy minimisation practices, leading to implementation where practicable.

13.1.7 Conclusion

Odour emissions generated from the proposed development are expected to be the primary impact to air quality as a result of the proposed development. A Level 1 odour impact assessment was undertaken against the Technical Notes (Department of Environment and Conservation (NSW), 2006b) and The National Guidelines for Beef Cattle Feedlots in Australia, 3rd Edition (MLA, 2012b) to determine the likely odour impacts to sensitive receptors in the local area.

The proposed development has been sited to provide adequate separation distances between the odour and dust generating sources and sensitive receivers as shown in Figure 15.

It is concluded that sufficient separation exists between the proposed development complex and sensitive receptors to limit any adverse impacts and unreasonable interference with the amenity of neighbours as a result of odour. Further, as the separation distance is suitable to mitigate against odour impacts, dust impacts are also not expected by default.

Other issues relating to air quality such as greenhouse gases are not expected to create significant air quality impacts to the local area.

Management measures outlined in section 13.1.6 shall be implemented as part of the proposed developments and Operational Environmental Management Plan (OEMP), as detailed in section 15.2.1, to manage these issues.

13.2 Geology, landform and soils

13.2.1 Geology

The subject land is located in the Surat Basin. The Surat Basin of northern New South Wales is part of the Great Artesian Basin, a large Jurassic–Cretaceous intra-cratonic basin that covers an area of 270 000 km^2 in NSW and has a maximum thickness of approximately 1.8 km in northern NSW. The large, mature, Early Jurassic to Albian Surat Basin contains up to 2.5 km of nonmarine and marine siliciclastics.

The basin unconformably overlies the early to late Palaeozoic Lachlan Orogen in the western to central part of the basin, and in the east overlies the Permian to Triassic Sydney–Gunnedah–Bowen Basin system. Palaeozoic basement highs, the Nebine Ridge and Kumbarilla Ridge respectively, mark the basin's boundaries with the Eromanga Basin to the west and the Clarence–Moreton Basin to the east.

The region's bedrock comprises horizontally bedded Jurassic and Triassic quartz sandstone and shale with limited areas of conglomerate or basalts. These sedimentary rocks are the fingers' edge of the Surat Basin and the alluvial plains derived from them are important water intake beds for the Great Australian Basin, a large Jurassic-Cretaceous basin covering a large part of eastern Australia.

The geology underlying the subject land consists of two quaternary layers being quaternary alluvium mainly derived from the Keelindi Beds and Pilliga Sandstone. Geological mapping identified two dominant geological units. The first is the Keelindi Beds (JKlk), consisting of off-white, fine to coarse grained, poorly to well sorted quartzose sandstone, pebbly sandstone and conglomerate interbedded with minor shale, siltstone and coal.

The Pilliga Sandstone (Jps) consists of medium to very coarse-grained, well sorted, angular to subangular quartzose sandstone and conglomerate, with minor interbeds of mudstone, siltstone and fine grained sandstone and coal. Carbonaceous fragments and iron staining are common, whilst lithic fragments are rare.

Alluvium deposits in the region will potentially result in deposits of sand, silt or silty clay on low ridges along floodplains (DSITIA, 2012).

Overall, the Surat Basin's geological history is characterized by millions of years of sedimentation, tectonic activity, and erosion, contributing to its geological diversity and economic significance as a source of natural resources, including coal and natural gas.

13.2.2 Landform

The geologic history and its climate contrasts are reflected in the landforms of the region. The subject land is located in the Surat Basin a structural trough extending from central New South Wales to central Queensland. It is bounded by a regional unconformity surface over the Central Fold Belt to the south and by the New England Orogen to the southeast and it connects to the Clarence-Moreton Basin through the Kumbarilla Ridge. The basin contains sediments of Permian and Triassic age. The Permian sediments have low resistance to weathering and consequently have deep weathering profiles. Consequently, outcrop is generally poor or absent over large areas with only the more resistant sandstone and conglomerate form isolated hills and ridges, particularly those with Tertiary volcanic capping.

The subsurface conditions of the Gunnedah Basin are dominated by Quaternary and Tertiary aged river plain sediments, including black and red clayey silt, and black and yellow brown clay soils (Pinetown et al. 2014).

These components have determined the landforms of the region and the overall pattern of drainage and relief. The region extends westward from the lower slopes of the New England Tablelands onto the low-lying riverine plains of the Barwon-Darling system. The region lies entirely within the Murray–Darling Basin and is made up of a group of waterways that straddle the NSW/QLD border. The main rivers in the region are the Gwydir, Macintyre and Barwon rivers which start at the Great Dividing Range and run westward, gradually merging to become the Barwon River.

The landform of the region is typically gently undulating to low hilly landscape with some higher areas covered by Tertiary lava flows.

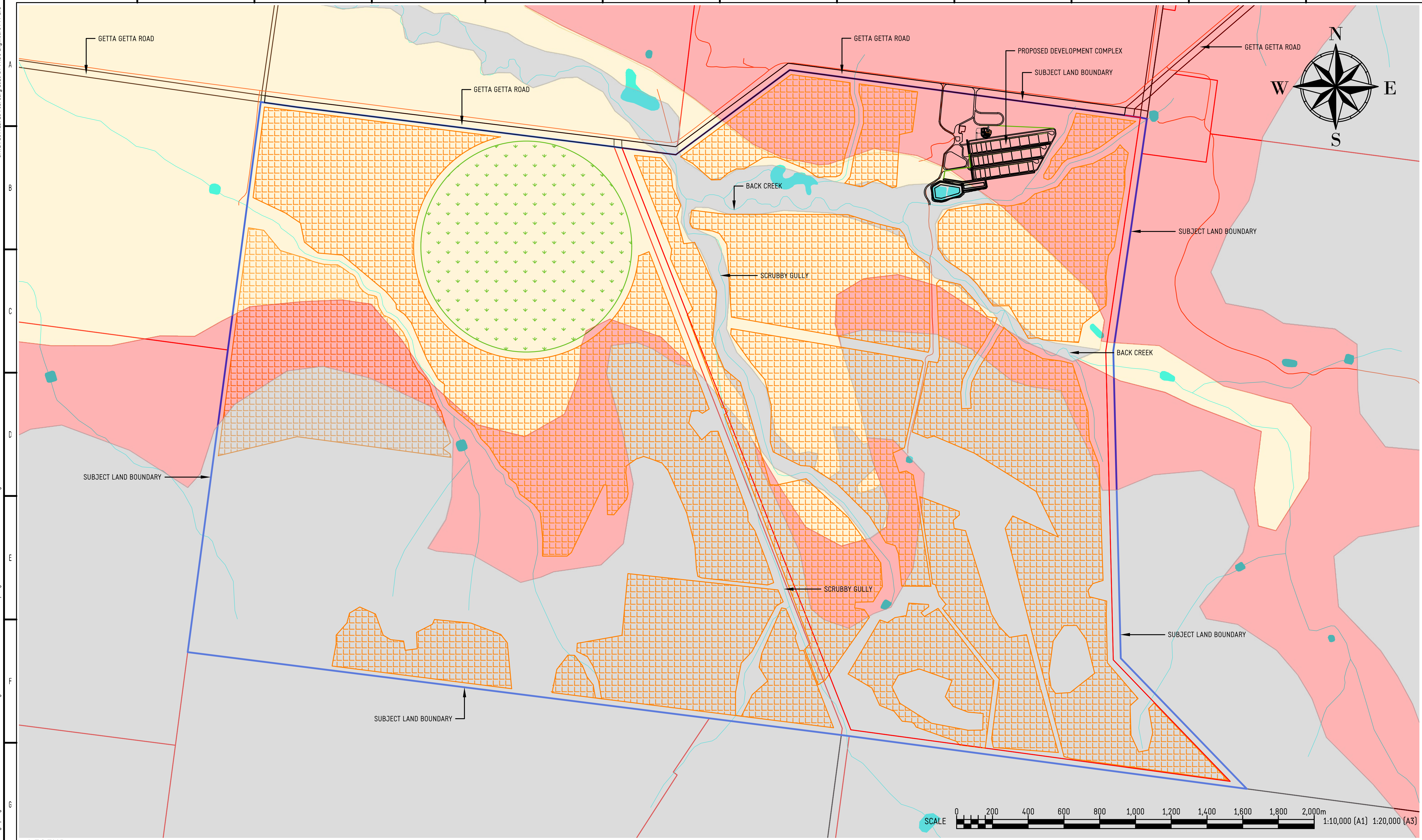
13.2.3 Soils

13.2.3.1 Soil type

13.2.3.1.1. Broadscale assessment

A broadscale soil assessment through a review of the eSPADE v2.2 mapping (NSW Department of Planning and Environment, 2024) shows the soil types across the subject land. *The Australian Soil Classification* map (1:250,000) for NSW (Department of Climate Change, Energy, the Environment and Water, 2016) revealed several soil types to exist within the subject land including vertosols, chromosols and ferrosols (Isbell, 2002) as shown on Figure 25. The long history of erosion of the landscape of the area has resulted in the development of a variety of soils types.

These soils fall roughly into two groups lighter, texture contrast non-cracking chromosol soils and heavy cracking clay vertosols. Chromosols are amongst the most widespread soils used for agriculture in Australia, particularly chromosols with red subsoils, because they have moderate chemical fertility and water-holding capacity.



LEGEND

- SUBJECT LAND BOUNDARY
- LAND PARCEL BOUNDARY
- EXISTING AND PROPOSED EFFLUENT UTILISATION AREA
- EXISTING AND PROPOSED SOLID WASTE UTILISATION AREA
- AUSTRALIAN SOIL CLASSIFICATION - CHROMOSOLS
- AUSTRALIAN SOIL CLASSIFICATION - FERROSOLS
- AUSTRALIAN SOIL CLASSIFICATION - VERTOSOLS
- HYDROLINE
- HYDROAREA

NOTES:

1. CADASTRAL INFORMATION BASED ON THE NSW GOVERNMENT SPATIAL SERVICES DIGITAL CADASTRAL DATABASE (DCDB) 2022, PROVIDED BY THE NSW DEPARTMENT OF FINANCE, SERVICES AND INNOVATION (DFSI) SPATIAL INFORMATION eXCHANGE AND ACCURACY IS LIMITED.
2. TOPOGRAPHIC INFORMATION BASED ON THE NSW GOVERNMENT SPATIAL SERVICES DIGITAL TOPOGRAPHIC DATABASE (DTDB) 2022, PROVIDED BY THE NSW DEPARTMENT OF FINANCE, SERVICES AND INNOVATION (DFSI) SPATIAL INFORMATION eXCHANGE AND ACCURACY IS LIMITED.
3. LAND RESOURCE UNIT MAPPING FROM THE SOIL AND LAND RESOURCES OF THE MOREE PLAINS (OFFICE OF ENVIRONMENT AND HERITAGE)
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REV.	DATE	REVISION DESCRIPTION	DRAWN	CHECK	APPROVED
A	24/01/25	DRAFT ISSUE TO CLIENT	RJD	RJD	RJD
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CLIENT: DOOLIN FARMING PTY LTD

PROJECT: PROPOSED 3,000 HEAD BEEF CATTLE FEEDLOT

TITLE: DEVELOPMENT APPLICATION FOR INTENSIVE LIVESTOCK AGRICULTURE
ENVIRONMENTAL IMPACT STATEMENT
SUBJECT LAND - AUSTRALIAN SOIL CLASSIFICATION OVERLAY

REPORT REFERENCE: FIGURE 25 | SUPPLIED DRAWING NUMBER: | A3 | DRAWING NUMBER: E2-103-00-25 | REV. B

DATE PLOTTED: 20 February 2025 BY : RDC Engineers PTY LTD

FILE PATH: C:\RDC Engineers\RDCE - Projects\E2-103 Doolin Farming Springfield EIS\05 - ACAD MasterPlan\05.1 Drawings - CURRENT FILE NAME: E2-103 DF Springfield MASTERPLAN-00-20250108vB.dwg

Broad scale soil and land resources of a portion of the subject land have been previously mapped as part of natural resource mapping for the Moree Plains at a scale of 1:250 000 by the Department of Climate Change, Energy, the Environment and Water 2016. The survey by the Office of Environment and Heritage (2015) is considered high data quality, midscale or imprecise mapping. The mapping provides an inventory of soil and landscape properties of the area and identifies major soil and landscape qualities and constraints. It integrates soil and topographic features into single units with relatively uniform land management requirements, allowing major soil and landscape qualities and constraints to be identified. Soils are described using the Australian Soil Classification (Isbell, 2002) and the Great Soil Groups systems (Stace et. al., 1968).

The Soil and Land Resources of the Moree Plains (Office of Environment and Heritage (NSW), 2015) soil landscape assessment mapping was used to gain a general understanding of the soils of the subject land. A Soil and Land Resources of the Moree Plains soil landscape units Moree Plains overlay of the subject land was prepared based on digital data obtained from The Central Resource for Sharing and Enabling Environmental Data in NSW (SEED) portal. An overlay of cadastral, soil landscape units and the proposed development was prepared and is shown in Figure 26. There are two (2) soil landscape units mapped within the subject land as shown in Figure 26.

Table 51 provides a description of the landform, major soils, typical vegetation and land use associated with each landscape unit identified on the subject land.

Table 51 provides a description of the landform, major soils, typical vegetation and land use associated with each landscape unit identified on the subject land.

As shown on Figure 26, the proposed development site shall be located on the Ferrosols soil landscape unit. The predominant soil type is a dark reddish brown sandy clay as shown in Photograph 14. These soils are well suited to the intended purpose.

As shown on Figure 26, the proposed effluent utilisation area and solid waste utilisation area shall be located on the Vertosols and Mungle (mgh) soil landscape unit. The predominant soil type is a grey to black dermosol medium to heavy clay as shown in Photograph 15 and Photograph 16. These soils are well suited to dryland and irrigated cropping.

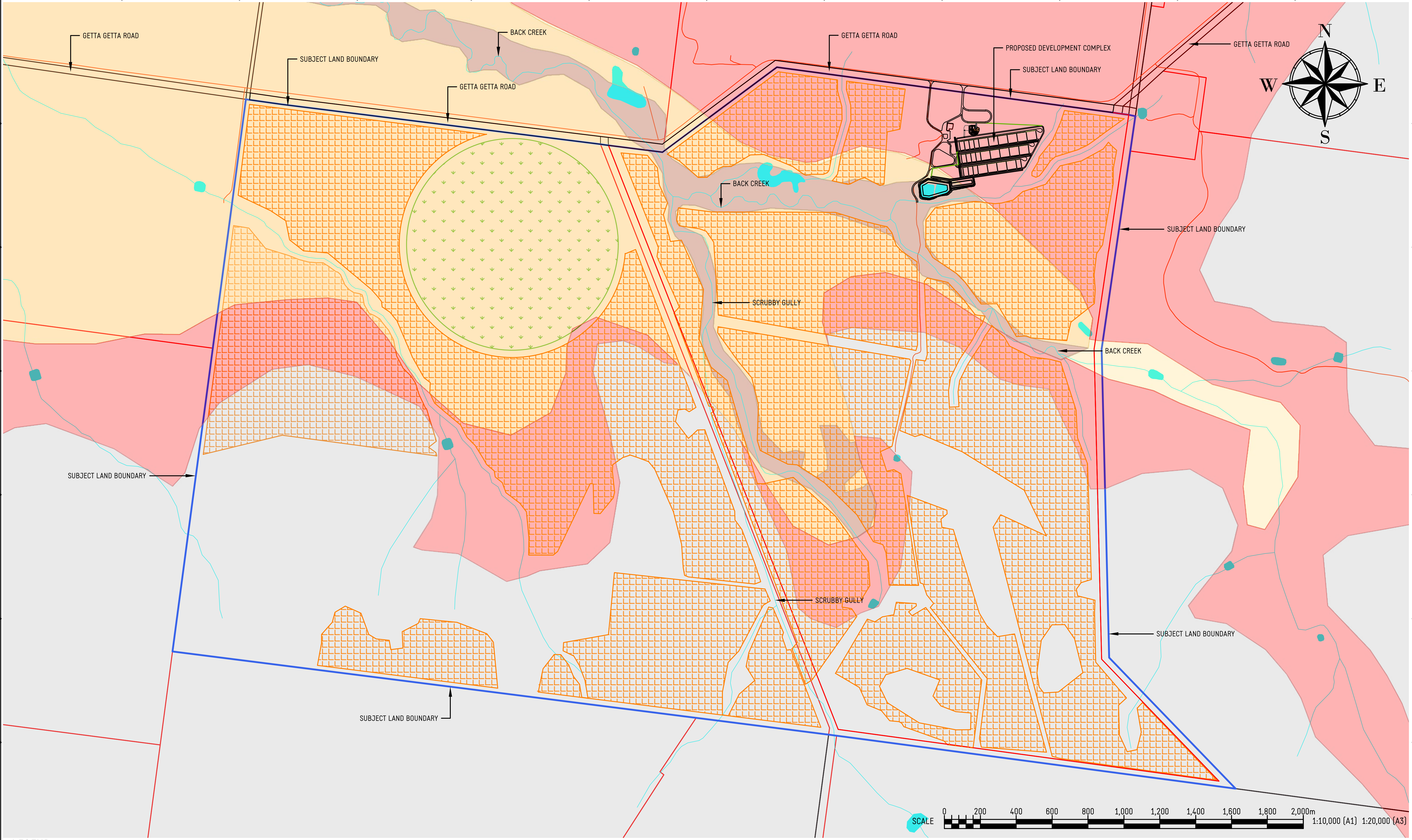
Photograph 14 – Proposed development complex site – Characteristic soils

Photograph 15 – Proposed solid waste utilisation area – Characteristic soils

Photograph 16 – Proposed liquid waste utilisation area – Characteristic soils

Table 51 – Subject land – Soil Landscape units

Soil Landscape	Location and topography	Description of major soils
Erosional		
Mungle (mgh)	Gently undulating rises to hills mainly on sandstones forming the western margin of bedrock-based ranges along the eastern border of the Moree Plains. Slopes 3 - 10%, local relief 10 - 50 m, elevation 200 - 320 m. Extensively cleared grasslands to woodlands.	Deep to very deep (>150 cm), moderately well-drained Red Ferrosols, Red and Brown Dermosols (Red-brown Earths), Red Chromosols (Red Podzolic Soils), and Brown Chromosols (Yellow Podzolic Soils) on hillcrests to upper slopes. Deep to very deep (>150 cm), moderately well-drained Red Ferrosols, Red and Brown Dermosols (Red-brown Earths), Red Chromosols (Red Podzolic Soils), and Brown Chromosols (Yellow Podzolic Soils) on slopes
Alluvial		
Mobbindry Creek (mkt)	Narrow, high-energy drainage lines and narrow alluvial flats usually draining basalt-influenced catchments in the eastern Moree Plains. Slopes 0 - 2%, local relief 0 - 5 m, elevation 160 - 340 m. Extensively cleared tall open-forest, woodland and grassland.	Soils include very deep (>150 cm), imperfectly drained to poorly-drained Black Vertosols (Black Earths), Grey Vertosols (Grey Clays) and Brown Dermosols (Alluvial Soils) on alluvial flats.



LEGEND

- SUBJECT LAND BOUNDARY
- LAND PARCEL BOUNDARY
- EXISTING AND PROPOSED EFFLUENT UTILISATION AREA
- EXISTING AND PROPOSED SOLID WASTE UTILISATION AREA
- SOIL LANDSCAPE UNIT - MUNDLE (mgh)
- SOIL LANDSCAPE UNIT - MOBBINDRY CREEK (mkt)
- SOIL LANDSCAPE UNIT - VERTOSOLS
- HYDROLINE
- HYDROAREA

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TITLE: DEVELOPMENT APPLICATION FOR INTENSIVE LIVESTOCK AGRICULTURE
ENVIRONMENTAL IMPACT STATEMENT
SUBJECT LAND - SOIL LANDSCAPE UNIT OVERLAY

REPORT REFERENCE: FIGURE 26 | SUPPLIED DRAWING NUMBER: | A3 | DRAWING NUMBER: E2-103-00-26 | REV. B

DATE PLOTTED: 20 February 2025 BY : RDC Engineers PTY LTD

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13.2.3.1.2. Site-specific assessment

A site-specific soil assessment was undertaken by JG Environmental Pty Ltd in the current effluent and manure utilisation areas to validate the soil mapping information and provided physical and chemical data for input to the hydraulic and nutrient balance modelling.

A total of 18 sites were described to a depth of up to 120 cm using a 5 cm diameter soil push tube that removed intact soil cores. The soil assessment confirmed the alluvial and flat plains are dominated by deep dark clay soils (Dermosols or Vertosols). These soils have been utilised for successfully growing irrigated/dryland cotton and various fodder and grain crops.

The dominant soils observed in the mid and lower slope positions were deep brown Dermosols (some Chromosols). Once again, these soils are currently being utilised for growing irrigated/dryland cotton and various fodder and grain crops. The mid to upper slope positions also contain deep reddish soils similar to the red and brown Ferrosols and Dermosols described in OEH (2015).

In the high crests and upper landscape positions, also observed were shallow to moderately deep soils (Tenosols and Rudosols). These soils are used for grazing only and have not been developed. These unsuitable soils have been excluded from the existing solid waste utilisation areas.

The site-specific soil assessment provides photographs of the various typical soil profiles observed within the current effluent and manure utilisation areas and typical profile descriptions of the dominant soil types.

A copy of the site-specific soil assessment is provided in Appendix M.

13.2.4 Contaminated land

Land contamination can occur as a result of poor environmental management and waste disposal practices or accidental spills in industrial, agricultural or mining activities. In some cases, land was contaminated in the past by activities now known to be hazardous. Often these cases involve chemicals which have since been banned or are now subject to stricter controls.

Contamination can be present in one or more environmental media at a site (such as soil, soil gas, ambient air, groundwater and surface water). It may be present in the solid, liquid or gaseous phases (for example soil or groundwater contamination giving rise to contaminant vapours in soil pore spaces).

In New South Wales, contaminated land is managed under and regulated by the *Contaminated Land Management Act 1997*.

The Environment Protection Authority (EPA) regulates the investigation, remediation, and ongoing monitoring of contaminated land to protect human health and the environment.

Section 5 of the *Contaminated Land Management Act 1997* defines *'contaminated' as the presence in, on or under the land of a substance at a concentration above the concentration at which the substance is normally present in, on or under (respectively) land in the same locality, being a presence that presents a risk of harm to human health or any other aspect of the environment".*

The EPA contaminated land public record of notices is a searchable database of contaminated land notified under section 60 of the *Contaminated Land Management Act 1997.* These have been assessed by the EPA as being contaminated but may not always require regulation under the *Contaminated Land Management Act 1997.*

A search of the EPA contaminated land public record was undertaken for the Gwydir Local government area. There is no EPA contaminated land record of notices within the Gwydir Shire.

The current and historical activities on the subject land include sheep and beef cattle grazing and cropping. Consequently, the subject land has not been used or is currently used for any activity which may cause contamination. Therefore, it is high unlikely that the subject land contains unidentified contaminated sites.

13.2.5 Acid sulfate materials

13.2.5.1 Acid sulfate soils

Soils and sediments containing iron sulphides, most commonly pyrite, are called acid sulphate soils (ASS). ASS which have not been oxidised by exposure to air are known as potential acid sulfate soils (PASS). When exposed to air due to drainage or disturbance, these soils produce sulphuric acid, often releasing toxic quantities of iron, aluminium and heavy metals and are known as Actual Acid Sulfate soils (AASS). ASS are harmless when left in a waterlogged, undisturbed environment.

ASS commonly occur on coastal wetlands as layers of Holocene marine muds and sands deposited in protected low-energy environments such as barrier estuaries and coastal lakes. In similar environments, they are still being formed. In New South Wales, ASS frequently occur in low-lying and groundwater dependent wetlands, backswamps, former seashores, estuaries, salt marshes and tidal flats, although they are not limited to coastal regions. Due to their estuarine origin, ASS are usually found at elevations less than 5 m above sea level. ASS also underlie floodplains and levees.

When ASS are exposed to air (that is, no longer in a waterlogged anaerobic state), the iron sulphides in the soil react with oxygen and water to produce a variety of iron compounds and sulphuric acid. These compounds may contaminate land and adjacent waterways.

The subject land is located within the Border Rivers catchment in the northern area of the Northwest Slopes and Plains region, approximately 250 km from the coast at an elevation of 310-320 m AHD as shown on Figure 1 and Figure 43 respectively. There has been little history of acid generation from regolith material within this region.

There is no Potential Acid Sulfate Soil (PASS) mapping available over the subject land.

As estuaries, wetlands and shallow groundwater conditions do not occur within the subject land, and the physiography and geology are not conducive to the presence of ASS it is unlikely that the proposed development area will contain PASS. However, as the proposed development involves works excavating and filling of soil, any PASS leachate, can potentially have significant adverse effects on surrounding natural environments.

Consequently, the *Acid Sulfate Soils Manual 1998* (Stone et al. 1998) will be used as a source of general advice on the level of investigation, level of treatment and management of ASS should PASS be disturbed.

13.2.6 Geotechnical assessment

A geotechnical assessment that focused on the investigation and determination of the subsurface conditions and potential risks that may exist within the site of the proposed development complex was undertaken. The geotechnical assessment was undertaken to determine the suitability of the site for the proposed development complex and to enable the design and construction of the relevant infrastructure, such as roads, pen foundations, water retaining structures (drains, sedimentation basin, holding dams), building footings, compacted earthworks, excavations etc. in the detailed design phase.

An assessment of the capability of the land on which effluent and solid waste utilisation is proposed was also undertaken. This assessment is provided in section 13.11.

13.2.6.1 Methodology

The geotechnical assessment involved the following steps:

- Desktop review – prior to conducting fieldwork, discussions with relevant government stakeholders and the farm manager were undertaken, and collection and collation of land resource information covering the area. This allowed soil test pits to be targeted within representative areas of the various soil groups;
- Field work - a series of test pits were excavated at strategic locations across the proposed development complex site to characterise the subsurface morphology. A selection of soil samples were taken from various horizons within the test pits. The fieldwork was undertaken in July 2024;
- Soil analysis – Soil samples that characterised the representative soil horizons were forwarded to a NATA accredited laboratory for testing for a range of engineering properties. A summary of the geotechnical test results is provided in Table 52. The complete test results are provided in Appendix L.

13.2.6.2 Subsurface conditions

Four test pits were excavated across the proposed development complex site. Two where the production pens are proposed and two adjacent to the existing holding pond.

In general terms, the investigation confirmed the presence of suitable material for construction of the development. The suitability of material for construction was assessed on the basis of its geotechnical qualities.

Table 52 – Proposed development complex – Geotechnical soil results

Sample	Sample Depth	Description	Liquid Limit	Plastic Limit	Plasticity Index	LS	MDD	EAT	% passing 75µm
	m		%	%	%	%	kg/m^3		
1	1.0	Silty Clay	52	16	36	17.5	1.69	4	67
2	0.5	Silty Clay	33	17	16	11.0	1.70	5	70
3	0.5	Silty Clay	43	21	22	13.0	1.70	4	87
4	1.0	Silty Clay	51	23	28	13.0	1.63	6	70

The geotechnical test results confirm the presence of medium to high plasticity silty clay. This material is well suited as an underlying material for the construction of the proposed development complex as it is well graded, has low permeability when compacted, good shearing strength and workability. A brief discussion of the geotechnical test results follows.

13.2.6.3 Dispersion

The soils from are Class 4 to Class 6 Emerson soils. These soils have high aggregate stability with no dispersion in the existing or remoulded states.

Non-dispersive soils are not susceptible to tunnelling ("piping failure") of water-retaining earth embankments, such as dams and ponds. Consequently, are well suited for construction.

13.2.6.4 Atterberg limits and soil plasticity

Atterberg Limit (Liquid Limit, Plastic Limit and Plasticity Index) and Linear Shrinkage tests were undertaken to assess the plasticity and shrinkage potential of the soils within the proposed development complex site.

The moisture content at which the soil has a small plasticity, is defined as the Plastic Limit. The Plastic Limit of the soils was in the range of 17% to 23%, indicating that the clay soils at the site have medium to high plasticity.

The moisture content at which a soil passes from a plastic to a liquid state is defined as the Liquid Limit. It is directly proportional to the compressibility of a soil and hence its ability to support a load and its trafficability when wet. The Liquid Limit of the soils was in the range of 33% to 51%, indicating that the clay soils at the site vary from medium to high plasticity.

These soils comply with MLA, (2012b) and Skerman (2000) requirements for clay lining material, by having a Liquid Limit <70. From a plasticity index perspective, all soils meet the criteria for clay lining material from Skerman (2000) and MLA (2012b) with a PI > 10% and 15% respectively.

The Linear Shrinkage results were in the range of 11% to 13%. The plasticity results indicate that the soils have a low shrink / swell capacity with wet and dry cycles, thus reducing the potential for shrinkage cracks. The soil plasticity results are presented in Appendix L.

13.2.6.5 Soil compaction and field moisture content

Soil compaction refers to the process of obtaining increased density of soil in a fill by reduction of its pore space by the expulsion of air. Compaction tests (maximum dry density and optimum moisture content) were undertaken as part of the assessment of the suitability of the soils for the proposed development complex. The standard maximum dry density (MDD) results ranged from 1.6 to 1.70 t/m^3 and the optimum moisture content (OMC) from 18-19.5%. These results are typical of silty clay soils. The geotechnical results are presented in Appendix L.

The bearing capacity of any soil usually increases with increasing dry density and decreasing moisture content. High density assures high shear strength and greater imperviousness.

13.2.6.6 Soil permeability

The permeability of the in-situ soils has been confirmed with hydraulic conductivity testing on samples of soil taken from two soil test pits. The measured permeability of the remoulded samples was less than 5 x 10^{-10} m/s which exceeds the design standard of 1 x 10^{-9} m/s. The permeability results are presented in Appendix L.

13.2.7 Assessment of impacts

The proposed development complex has the potential to impact the environmental values of the soils, groundwater and surface water at or in the vicinity of the site through the release of contaminants commonly found in effluent and/or solid waste streams.

The in-situ soils may need to be mixed or engineered to produce a material that ensures that any significant risks to the environment, in particular groundwater are mitigated.

Contamination of groundwater has been shown to occur wherever three main components exist; a potential source of contamination, an underlying aquifer, and a pathway for transfer between the two. This pathway can be either indirectly through the soil or directly through man-made structures which intersect the water table, such as drains, sedimentation basins and holding pond.

13.2.7.1 Engineering properties

The engineering characteristics of the in-situ soils determine the suitability of these materials for construction of the engineering works on the site. These include pens, runoff and drainage control, drains, roads, buildings, sedimentation basin, holding pond and foundations of buildings and structures that are to be erected such as grain storages and cattle handling facilities.

Soil materials for construction purposes may be available on-site or borrowed from near-by sites.

The key engineering properties include permeability (for protecting groundwater), strength (for trafficability) and shrink-swell potential (for cracks/foundation movement etc).

The key engineering properties of representative in-situ soil samples were assessed by testing remoulded specimens in a laboratory with NATA accreditation for those tests undertaken. The geotechnical assessment identified few constraints with the engineering properties of the in-situ soils as discussed in the following sections.

13.2.7.2 Soil dispersion

The soils within the proposed development complex site are non-dispersive and therefore do not require modification or replacement with less dispersive material, which will then render them more appropriate for construction, in particular for the proposed water retaining structures. Non-dispersive soils have been successfully used for construction of water retaining structures.

13.2.7.3 Soil plasticity

The silty clay soils encountered typically have high plasticity and low linear shrinkage. Therefore, these soils have low shrink/swell capacity movements with variations in moisture content, reduces potential for shrinkage cracks.

13.2.7.4 Compaction and moisture content

Soil compaction refers to the process of obtaining increased density of soil in a fill by reduction of its pore space by the expulsion of air.

Compaction of earthworks is not expected to be a significant constraint to the proposed development due to the implementation of appropriate specifications to earthwork design and procedures.

13.2.7.5 Soil permeability

It is expected that due to the grading and classification of the in-situ soils, that the design permeability (1×10^{-9}m/s) shall be achieved on compaction at or close to the optimum moisture content in the field. This was confirmed with laboratory testing of remoulded samples which recorded a permeability ess than the design criteria of 1×10^{-9} m/s.

13.2.7.6 Excavation

The excavation of in-situ soils is achievable using conventional earthmoving equipment such as excavators, backhoes and scrapers. Therefore, blasting shall not be required, and excavation of material is not expected to be a significant constraint to the proposed development.

During the detailed design process, further geotechnical investigations would be undertaken as the precise location of each component of the proposed development complex shall be known along with the depth of cut and fill at the location. The additional geotechnical investigation would ensure that appropriate geotechnical design input is incorporated into the detailed design process.

13.2.7.7 Acid sulfate soils

The subject property is located at an elevation between 300 m to 320 m AHD. The proposed development complex is sited at an elevation of 310 m AHD.

As the property is not located in a coastal lowlands region (<10m AHD), it is therefore very unlikely that ASS would be found on the subject property or within the proposed development site. Further, groundwater levels are estimated to be greater than 20 m below the surface (based on depth to groundwater on the alluvial plains) and soil disturbance is not proposed at these depths, it is unlikely that ASS would be exposed or drained.

The effluent and solid waste utilisation area of the proposed development does not involve disturbance to soils (other than conventional cultivation operations).

The site of the proposed development complex shall require disturbance to soils during bulk earthworks required to obtain the required grades for drainage. Subsequently, these works have the potential to expose ASS if they are present in that location. The oxidation of exposed ASS allows production of sulphuric acid.

13.2.8 Mitigation measures

13.2.8.1 Engineering properties

The implementation of the following management and mitigation measures shall mitigate identified potential issues associated with the engineering properties of the in-situ material during the construction and operation of the proposed development.

13.2.8.2 Dispersive soils

Whilst, the soils are non-dispersive, to ensure the dispersivity impact is mitigated as far as possible, the following techniques shall be employed:

- Stipulation of an appropriate construction specification for bulk earthworks with respect to both compaction, moisture content and placement, such as, placed in thinner layers and at a moisture content on the wet side (+2% - 0%) of optimum moisture content; and
- Controls and verification during construction to ensure the adopted construction specification and design is followed.

13.2.8.3 Unsuitable material

Generally, all materials from excavated areas, shall be placed as fill. However, some material encountered in excavation may be unsuitable as fill, such as:

- logs, stumps and perishable materials;
- clays or silts with a Liquid Limit exceeding 90 or Plasticity Index exceeding 60;
- soft or saturated material which cannot be moisture conditioned to achieve the required compaction;
- stripped topsoil; and
- large rocks.

13.2.8.4 General

- An appropriate earthworks specification shall be prepared for the bulk earthworks.
- The disturbance area of the proposed development complex area shall be cleared and all trees, roots, stumps, small rocks, artificial obstructions, etc grubbed to a depth of 300 mm below the surface of the ground.
- The topsoil shall be removed from all borrow areas and water retaining embankment foundation areas and from all other areas, which are to be filled or excavated as outlined in the Earthworks specifications.
- If any rock or beds of gravel, sand or other pervious materials are exposed during excavation, then an additional 600 mm shall be excavated and replaced by covering the exposed rock or pervious material with at least 600 mm of impervious material thoroughly compacted to prevent seepage along the rock plane or through the pervious material.
- Topsoil is to be conserved for top dressing of embankments.
- Suitable material won from the borrow area shall be used to form the design grades. This material, at the correct moisture content, shall be placed in progressive layers of uniform loose thickness of not more than 200 mm before compaction, preferably by rolling.
- Filling shall be compacted to a field dry density of at least 98% maximum dry density as determined by AS 1289 5.1.1 (Standard Compaction). The material shall be compacted at a moisture content of within (+2% - 0%) of OMC as determined by AS 1289.5.1.1 (Standard Compaction).
- Field dry density tests, according to AS 1289.5.1.1 (Standards Australia, 2003), shall be undertaken to ensure that adequate compaction is being achieved.
- To ensure stability, fill batters shall be constructed:
    - at a slope of 2:5:1 (horizontal: vertical)
    - no steeper that a slope of 3:1 (horizontal: vertical) on the interior side of the water retaining embankment
- Suitably experienced on-site personnel to:
    - Inspect and approve stripped areas for the placement of fill

- Confirmation that the earthworks construction techniques are in accordance with specification
- Inspection of excavated areas for unsuitable fill material such as rocks, sand layers and bands.

13.2.8.5 Acid sulfate soils

As discussed in section 13.2.7.7, as soils shall be disturbed within the proposed development site, the following management and mitigation measures shall be implemented to prevent, control, abate or minimise the potential impacts from the disturbance of ASS:

- The geotechnical assessment shall include a preliminary visual assessment for ASM. This will be based on material type, colour and consistency. Dark grey and black, very soft to soft, occasionally firm clays and sandy and dark grey to grey clayey sands and sands will be classified as suspected ASS. It should be noted that sands, with only minor amounts of silt and clay, can contain pyrite and therefore acidify upon exposure;
- A field screening test using hydrogen peroxide (H_2O_2) will be performed on excavated soils during the geotechnical assessment in areas where ASM are anticipated, or on suspect soils. The field sampling procedure for peroxide screening outlined in Appendix I of the Acid Sulfate Soils Assessment Guidelines (Stone et al, 1998) will be followed;
- Soils that record a pH of below 4, following oxidation with H_2O_2, shall be managed as ASS;
- Based on the results of pH monitoring, visual assessment and field screening, selected soil samples may be sent for laboratory analysis. Where laboratory testing is required, the Action Criteria outlined in Table 4.4 of the Acid Sulfate Soil Manual (Stone et al, 1998) will be used to assist in determining if the material is to be managed as ASS;
- In the event that areas of the development site are known or are suspected to, or comprise ASM, a Construction Acid Sulfate Material Management Plan shall be prepared to describe how any Acid Sulfate Materials (i.e. Actual Acid Sulphate Soils (ASS), potential ASS (PASS), MBO) shall be assessed and managed;
- Project personnel are required to undergo general environmental induction prior to commencing work on site. This will include an ASM component to reinforce the importance of management and the measures that will be implemented to address ASM issues if any areas of the development site are known or are suspected to, or comprise ASM;
- Erosion and sediment control measures such as sediment ponds shall be implemented during construction to contain surface runoff thus preventing the release of acid into the environment;
- A controlled drainage area designed to an acceptable hydrological standard that prevents unauthorised discharges of runoff from areas such as pens, livestock handling, solid waste storage and processing area and silage storage area which have high organic matter and therefore a high pollution potential; and
- Runoff external to the controlled drainage area is diverted away from the controlled drainage area.

13.2.9 Conclusion

A geotechnical assessment of the soils within the vicinity of the proposed development complex site was undertaken. The geotechnical assessment identified that the soils are low plasticity, sandy clay to light to medium clays soils with a high degree of dispersion and low shrinkage potential.

Based on recommended suitability criteria from National and QLD state feedlot guidelines, these soils have engineering properties (with the exception of dispersion) that are well suited to the construction and operation of a beef cattle feedlot.

Further, appropriate design and construction measures are proposed to mitigate the high degree of dispersion to ensure that any potential risks to the environment, in particular groundwater are mitigated.

It is concluded that that provided appropriate design and construction measures are implemented, the in-situ soils within the proposed development complex area are suitable for the design and construction of the relevant infrastructure, such as roads, pen foundations, water retaining structures (drains, sedimentation basin, holding dams), building footings, compacted earthworks, feed storage and processing areas, excavations etc.

13.3 Groundwater

13.3.1 Existing environment

At a regional scale, the subject land is located within the Great Artesian Basin (GAB) one of the largest groundwater systems in the world. The GAB underlies parts of New South Wales, Queensland, South Australia and the Northern Territory. The New South Wales portion of the GAB covers some 207,000 km^2, which represents about 12% of the basin and about 20% of New South Wales (Herczeg, 2008).

The GAB is also acknowledged to have interactions with river systems in NSW which overly the Basin. It is highly likely that 'rejected recharge' water associated with the GAB is providing base-flow to rivers such as the Dumaresq, Macintyre, Castlereagh, Namoi, and Gwydir in their eastern reaches. Rejected recharge occurs where the potential recharge rate exceeds the rate at which water can enter the permeable aquifers, is rejected via springs or through the bases of streams that are in connection with the intake beds (NSW Department of Water and Energy, 2009).

Groundwater recharge in NSW takes place chiefly along the eastern fringe of the GAB where the via the Pilliga and Mooga sandstone aquifers are exposed at the surface. In these areas the quality of the water is high and suitable for most purposes.

Groundwater extraction in the GAB is used for towns, stock, domestic use and irrigation. Agriculture is the largest user of GAB groundwater through pastoral (stock) and irrigation agricultural uses. In the past two decades an irrigation industry reliant on GAB water has been developed in the eastern recharge area where water quality is suitable.

The primary aquifers in the northern and central parts of the GAB are hosted in the Mooga, Gubberamunda, and Hutton sandstones. The main confining beds include the Wallumbilla, Bungil, Orallo, and Western Formations, Walloon Coal Measures and Evergreen Formation. The primary aquifer in the southern portion of the Surat Basin is the Pilliga Sandstone and permeable layers of the Keelindi Beds. Confining beds for this portion of the Surat Basin include all or parts of the Wallumbilla, Bungil, Orallo and Purlawaugh formations.

At a local scale, the subject land is located at North Star within the Eastern Recharge Groundwater Source. The Eastern Recharge Groundwater Source covers an area of some 5,600 km^2 extending about 150 km south from the Dumaresq River to north of Bingara, east to the Great Dividing Range and west to Boggabilla.

The intake beds for the Eastern Recharge Groundwater Source on the eastern margins of the GAB in New South Wales are predominantly comprised of outcrops and subcrops of the Pilliga Sandstone and Keelindi Beds. These are described as:

- Pilliga Sandstone (late Jurassic): medium to course grained, well sorted quartzose sandstone and conglomerate with minor interbeds of mudstone, siltstone and fine grained sandstone and coal. Maximum thickness of 300 m. The unit was deposited as extensive high energy braided alluvial systems and thick channel sequences, with finer grained material indicative of channel filled and inter-channel facies.

- Keelindi Beds (early Cretaceous to late Jurassic): fine to course grained, poorly sorted to well sorted quartzose sandstone, pebbly sandstone, and conglomerate interbedded with minor shale, siltstone, and coal. Represents a transition to lower energy fluvial systems including meandering stream and flood plain deposition (Department of Planning, Industry and Environment (NSW), 2020b).

The Eastern Recharge Groundwater Source is characterised by better quality groundwater than other zones. Parts of these areas have been developed for high volume irrigation extraction at two main locations: North Star and Croppa Creek at the northern end of the Eastern Recharge.

Most bores in this groundwater source are sub artesian (non-flowing). A few artesian (flowing) bores are confined to the north western area. The aquifers are found predominantly in Pilliga Sandstone and to a lesser extent in Hutton Sandstone at depths between 60 m and 380 m. The low salinity and low sodium content of the groundwater make it suitable for irrigation where sufficient yields can be obtained. High yielding aquifers capable of large-scale irrigation have been developed near Croppa Creek and North Star with bores yielding up to 100 L/s in this area.

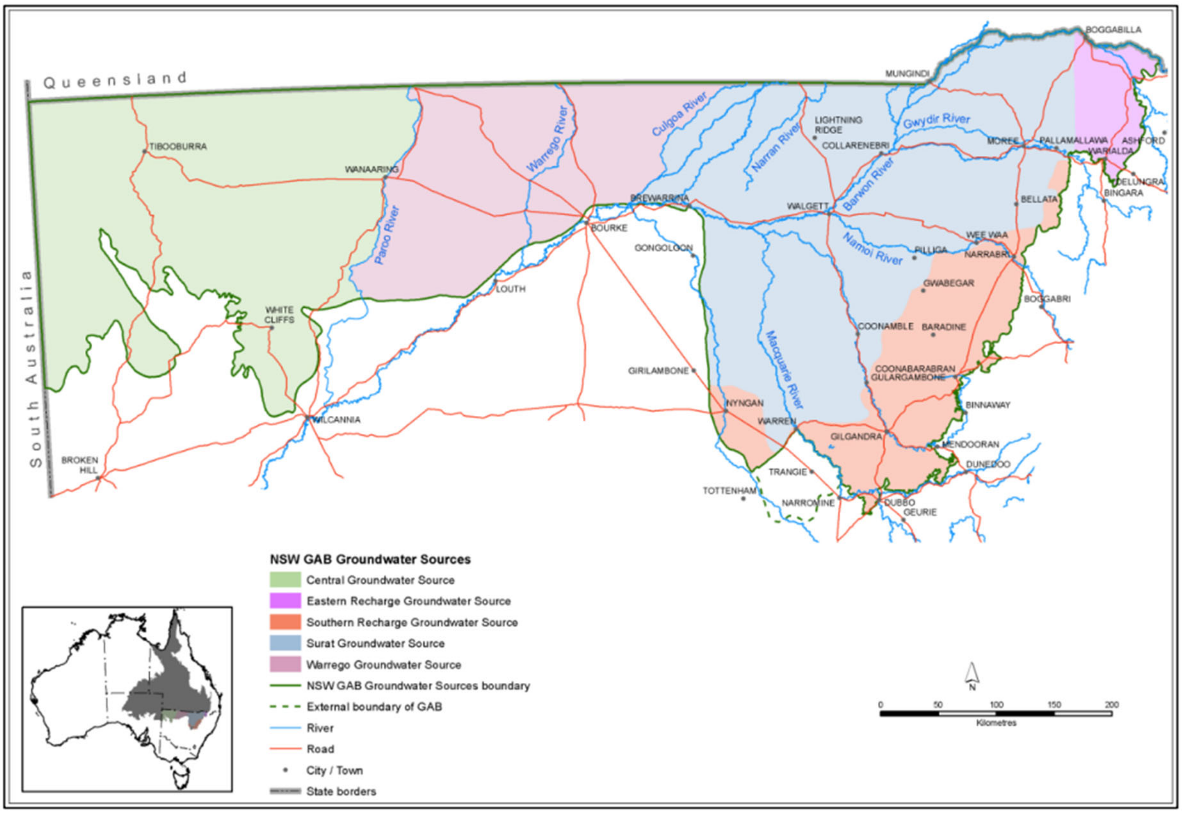


Figure 27 – NSW GAB Southern and Eastern Recharge Groundwater Sources (Department of Planning, Industry and Environment (NSW), 2020b)

13.3.1.1 Water sharing plan

In NSW the GAB is managed as five groundwater sources under the *Water Management Act 2000* through the Water Sharing Plan for the NSW Great Artesian Basin Groundwater Sources 2008 (Department of Planning, Industry and Environment (NSW), 2020a). The waters of these groundwater sources include all groundwater contained in the sandstone aquifers of Cretaceous and Jurassic Age and the intake beds of the NSW Great Artesian Basin. Two of these (the Eastern and Southern Recharge Groundwater Sources) are in the non-artesian part of Basin.

The Eastern Recharge Groundwater Sources is a significant non-artesian aquifer system in the Border Rivers catchment with some 3,200 ML of entitlement set aside for basic landholder rights. The ERGS aquifer includes 83 licences with a total volume available of 34,974 Megalitres licenced (Department of Planning, Industry and Environment (NSW), 2020b).

The overall basis for water sharing in the Eastern Recharge Groundwater Sources is the long-term average annual net recharge to the respective groundwater source which is estimated to be 19,000 ML/year.

The Water Sharing Plan for the NSW Great Artesian Basin Groundwater Sources 2008 recognises the effect of climatic variability on recharge in the groundwater sources by having provisions that manage:

(a) the sharing of water in these groundwater sources within the limits of water availability on a long-term basis, and
(b) water extraction to a volume that ensures both the protection of groundwater dependent ecosystems and water quality of these groundwater sources.

13.3.1.2 Groundwater monitoring

NSW Water monitors groundwater level and quality through its network of groundwater monitoring bores across New South Wales (WaterNSW, 2024). There are two monitoring bores located nearby to the subject land and proposed development which have been monitoring groundwater levels since 2008. Driller’s logs are available for these monitoring bores.

GW093553 is located on Getta Getta Road some 3.8 km west of the intersection with Myall Road and some 4.4 km east of the proposed development complex site as shown in Figure 30. The bore hydrograph data is presented in Figure 28. This monitoring bore has been drilled to a depth of 293 m.

GW036586.3.3 is located at near the intersection of Getta Getta Road and Peates Road some 8 km west of the proposed development complex site as shown in Figure 30. The bore hydrograph data is presented in Figure 29. This monitoring bore has been drilled to a depth of 357 m.

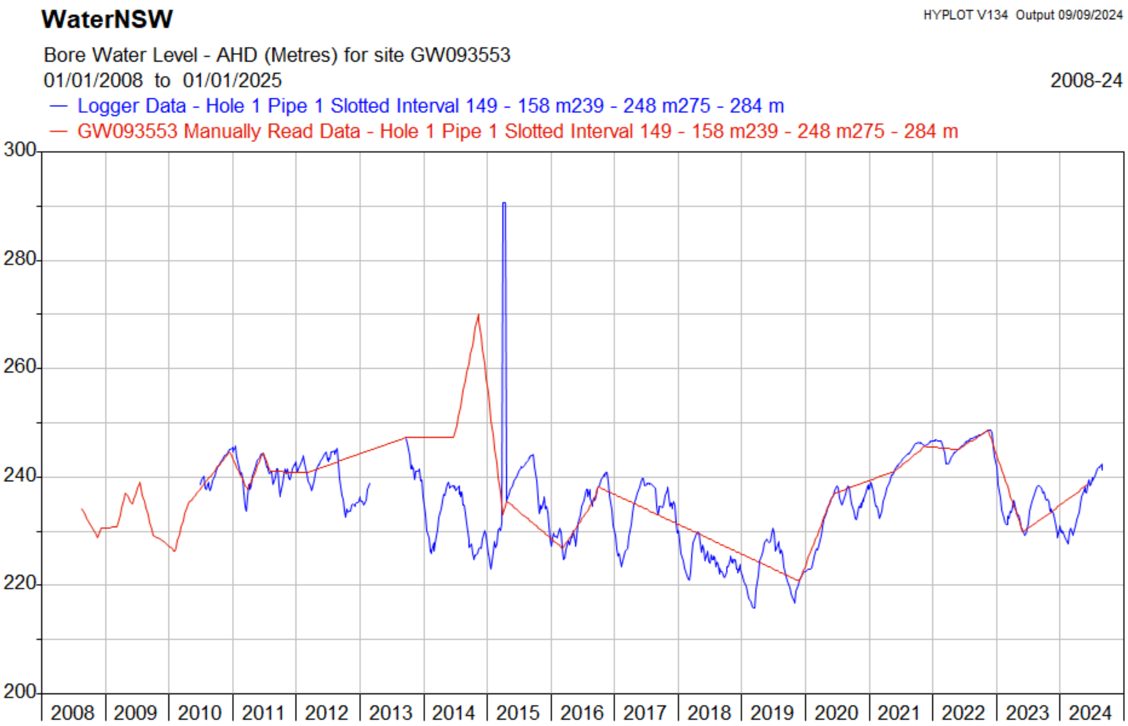


Figure 28 – Groundwater observation bore – GWMA16 – GW093553 – Bore water level

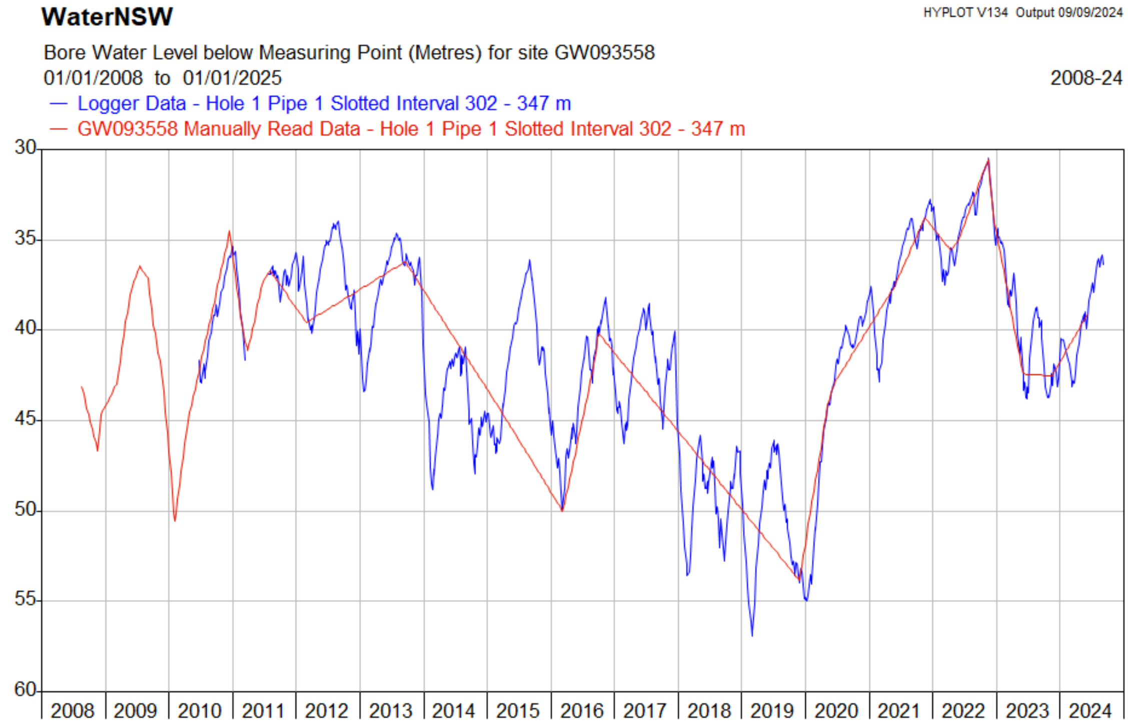


Figure 29 – Groundwater observation bore – GWMA16 – GW093558 – Bore water level

Review of Figure 28 and Figure 29 shows the seasonal nature of the groundwater levels. The hydrograph suggests the bores are monitoring a relatively thick water bearing zone which is predominantly recharged by rainfall. Generally the water levels in the bores range between 40-230 m below ground level since monitoring commenced in 2008 with recharge occurring in spring/summer and drawdown (assumed due to irrigation extraction) occurring throughout the summer/autumn. The impacts to groundwater levels due to dry and wet winter/spring periods and above average rainfall since 2021 (2015 and 2016; 2019 and 2020) are clearly seen.

13.3.1.3 Existing bores

The subject land is located within an established irrigation area with the aquifers supporting considerable consumptive use. As such, there are numerous bores in the local area. There are groundwater work records both within and nearby to the subject land. Details of the bores on the subject land are given in Table 53 and Figure 30.

Bore logs were obtained from bores on the subject land. NSW Water hold records for groundwater bores in the Eastern Recharge Groundwater Sources in the WaterNSW Hydstra Web Portal (WaterNSW, 2024). A search of the NSW Groundwater database was undertaken for data on the location, casing details, strata logs, aquifer details, water levels (by date) and water analysis (lab and field) for all registered groundwater works on the subject land. Five existing sub-artesian groundwater bores have been installed and registered on the subject land as shown in Table 53. The bore log for each existing registered bore is provided in Appendix I. Figure 30 shows the location of the groundwater bores in relation to the location of the proposed development and natural drainage lines.

Table 53 – Subject land – Registered bores

Groundwater works	Location			Status	Depth
	Easting* mE	Northing* mS	Lot on Plan		m
GW503638	257806	6794939	8/DP756018	Stock intensive/Irrigation	378
GW005873	258965	6793879	8/DP756018	Stock	207
GW006427	259864	6793719	8/DP756018	Stock	223
GW016679	257627	6793148	8/DP756018	Stock	152

*UTM Zone 56

Examination of the strata listed on the bore log for each groundwater works reveals that the topsoil is typically a brown/black sandy clay ranging in depth from 0.6 to 1.2 m which overlies some 15-17m of medium to heavy clay. The depth of each bore ranges from 152 to 378 m with the shallowest water bearing zone at around 55-65m, this yields very low flows however (0.01-0.4 L/s). The strata at greater depths is typically characterised by layers of sandstone, siltstone, mudstone interspersed with thin layers of shale.

Due to the impermeable insitu clay material under the proposed development complex area and depth above the aquifer, it is unlikely that the proposed development shall have adverse impacts to the quality of groundwater resources in the area.

13.3.1.4 Quantity

The applicant has a water access licence (WAL 41169; Works approval 90AL834721) for 1,558 unit shares which authorises the use of groundwater on the subject land for any purpose. A copy of WAL 90AL834721 is provided in Appendix I. Each unit share is equivalent to 1.3 ML/unit share of the access licence share component. The maximum amount of water that can be debited from an aquifer access licence account in any one water year cannot exceed 1.3 ML per unit share component (annual use limit), plus any allocation transferred in (temporary trade), minus any allocation transferred out. This means that metered extraction plus transfers out cannot exceed 130% of the of share component, unless water is transferred in. (DPIE, 2021)

Due to the impermeable insitu clay material under the proposed development infrastructure area and depth above the aquifer, it is unlikely that the proposed development shall have adverse impacts to the quality of groundwater resources in the area. Further, as the proposed development has a licensed allocation for groundwater use, it is unlikely that the proposed development shall have adverse impacts to the quantity of groundwater resources in the area.

The subject land has regulated groundwater entitlements. These groundwater entitlements also have a water supply work approval which authorises the use of groundwater entitlements at the specified location. The groundwater entitlements and associated works approval are shown in Appendix I.

The land on which the ground water entitlements are attached forms part of the proposed development.

Pursuant to Clause 32 of the Water Management (General) Regulation 2018 and section 91A (1) of the Water Management Act 2000, when Development Consent is granted for the proposed development, it shall be permissible to use existing groundwater entitlements or part thereof for stock intensive use within the proposed development.

13.3.1.5 Quality

There is no routine monitoring of groundwater quality in the NSW GAB groundwater sources in the last 20 years other than ad hoc sampling of electrical conductivity (EC) of the artesian water of a few bores. The real time EC of the flowing artesian bores is also monitored at 13 artesian bore sites.

The bore owner is responsible for monitoring water quality from the water supply work to ensure it is suitable for its intended purpose for the duration of the approval. Testing and treatment are the responsibility of the water user (Department of Planning, Industry and Environment (NSW), 2021).

Water quality testing of water obtained from bore GW503638 indicates an EC level of 1.122 ms/cm which is good to fair quality for irrigation and good quality for stock (<4.7 ms/cm). Water quality results are presented in Appendix I.

13.3.1.6 Water quality objectives

The relevant water quality objectives for ground waters of the Eastern Recharge Groundwater Source are detailed in the NSW Great Artesian Basin Shallow Water Quality Management Plan (Department of Planning and Environment (NSW), 2022). The NSW Great Artesian Basin Shallow Water Resource Plan area covers the uppermost groundwater systems that overlie or are partly within the confining beds of the Great Artesian Basin. It includes all groundwater contained within the unconsolidated sediments regardless of depth and all other geological formations to a maximum depth of 60 m below the surface of the ground.

Water quality objectives presented in Table 4 of the NSW Great Artesian Basin Shallow Water Quality Management Plan apply to the waters of the NSW Great Artesian Basin shallow sustainable diversion limit (SDL) resource units. They contribute to the overall objective for the Murray– Darling Basin to maintain appropriate water quality, including salinity, for environmental, social, cultural, and economic activity (Basin Plan s5.02 - s5.04).

NSW Great Artesian Basin Shallow Water Quality Management Plan (Department of Planning and Environment (NSW), 2022) water quality objectives for the NSW Great Artesian Basin shallow groundwater SDL resource units are as follows:

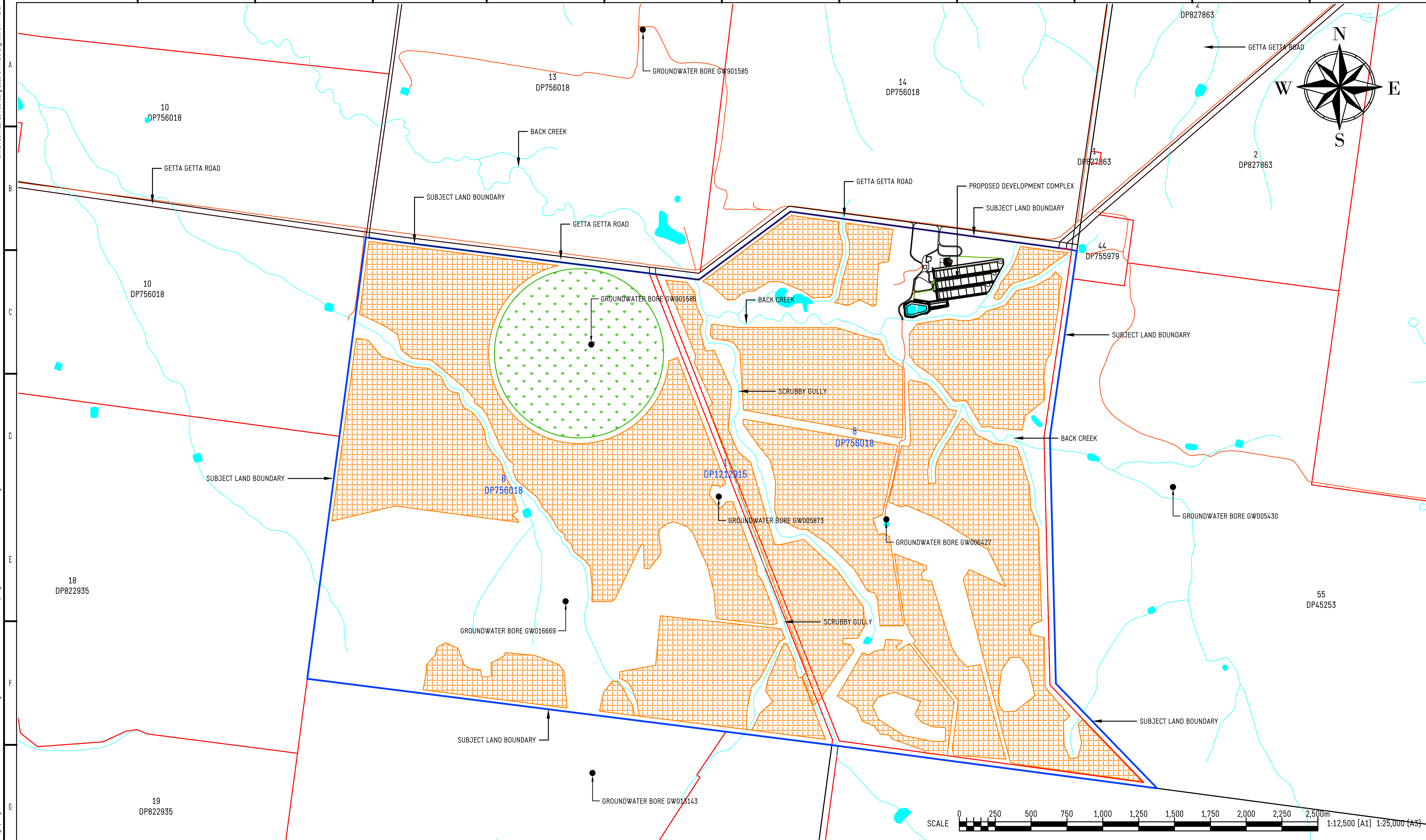
- Maintain water quality to protect First Nations people's water dependent values and uses;
- Maintain water quality to protect and restore water dependent ecosystems;
- Maintain the quality of raw groundwater for treatment for human consumption;
- Maintain the quality of groundwater for irrigation use;
- Maintain good levels of water quality.

Groundwater specific water quality targets are not included in Schedule 11 of the Basin Plan. Therefore, NSW has adopted alternative water quality targets to fulfil the requirements of the Basin Plan (s10.35B(3)).

NSW has adopted beneficial use categories outlined in The NSW Groundwater Quality Protection Policy 1998 (Department of Land & Water Conservation, 1998) and determined in accordance with procedures set out in ANZECC (2000) guidelines for:

- tolerances of plants to salinity in irrigation water;
- suitability of water for stock watering; and
- the World Health Organisation (2004) drinking water guideline to fulfil the water quality objectives s9.05 - 9.08 of the Basin Plan.

Monitoring of groundwater as outlined in section 8.7.15 and comparison against the ANZECC (2000) guidelines shall assess the suitability of the groundwater for use and any decline in quality.



LEGEND

- SUBJECT LAND BOUNDARY
- LAND PARCEL BOUNDARY
- GROUNDWATER BORE
- EXISTING AND PROPOSED EFFLUENT UTILISATION AREA
- EXISTING AND PROPOSED SOLID WASTE UTILISATION AREA
- HYDROLINE
- HYDROAREA

NOTES:

1. CADASTRAL INFORMATION BASED ON THE NSW GOVERNMENT SPATIAL SERVICES DIGITAL CADASTRAL DATABASE (DCDB) 2022, PROVIDED BY THE NSW DEPARTMENT OF FINANCE, SERVICES AND INNOVATION (DFSI) SPATIAL INFORMATION eXCHANGE AND ACCURACY IS LIMITED.
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3. GROUNDWATER BORE LOCATIONS OBTAINED FROM WATER NSW GROUNDWATER PORTAL.
4. INFORMATION MAY HAVE BEEN CAPTURED AT DIFFERENT ACCURACIES AND SCALES. IMAGERY OBTAINED FROM NSW DEPARTMENT OF LANDS.
5. SITE SURVEY CONDUCTED BY ANTHONY GRAHAM VERTICAL DATUM AHD DERIVED
6. HORIZONTAL DATUM - MGA 94 (UTM ZONE 56).

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STATUS

FOR APPROVAL

NOT TO BE USED FOR CONSTRUCTION PURPOSES

RPEQ

RDC ENGINEERS

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REV.	DATE	REVISION DESCRIPTION	DRAWN	CHECK	APPROVED
A	24/01/25	DRAFT ISSUE TO CLIENT	RJD	RJD	RJD
B	21/02/25	FINAL ISSUE FOR SUBMISSION TO GSC	RJD	RJD	RJD

SCALE	1:25,000 (A3)
DRAWN	RJD
DATE	21/02/2025
CHECKED	RJD
DATE	21/02/2025
APPROVED	RJD
DATE	21/02/2025

CLIENT: DOOLIN FARMING PTY LTD

PROJECT: PROPOSED 3,000 HEAD BEEF CATTLE FEEDLOT

TITLE: DEVELOPMENT APPLICATION FOR INTENSIVE LIVESTOCK AGRICULTURE ENVIRONMENTAL IMPACT STATEMENT SUBJECT LAND - GROUNDWATER AREA AND GROUNDWATER BORES

REPORT REFERENCE: FIGURE 30 | SUPPLIED DRAWING NUMBER | A3 | DRAWING NUMBER: E2-103-00-30 | REV. B

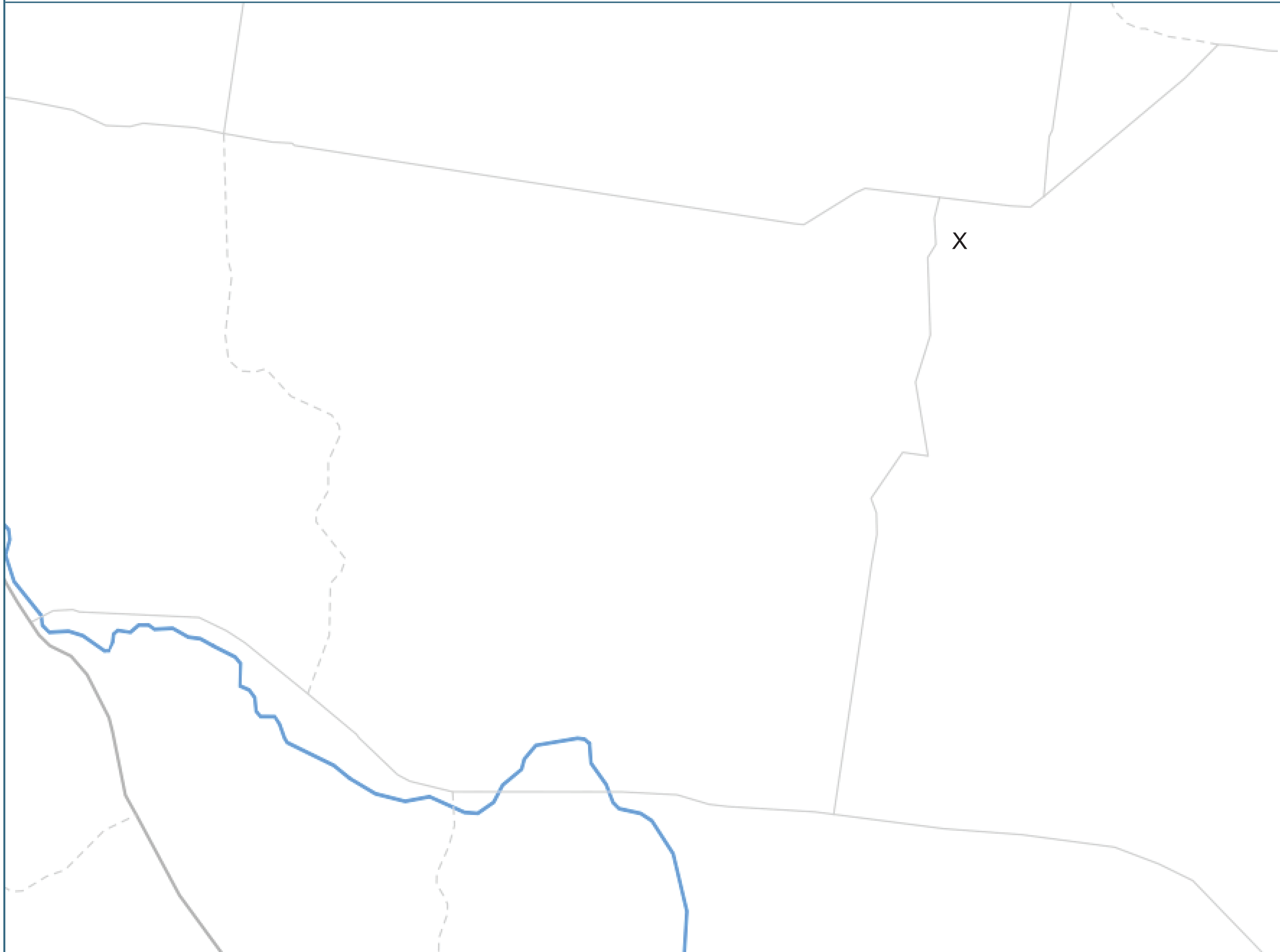
DATE PLOTTED: 20 February 2025 BY : RDC Engineers PTY LTD

FILE PATH: C:\RDC Engineers\RDCE - Projects\E2-103 Doolin Farming Springfield EIS\05 - ACAD MasterPlan\05.1 Drawings - CURRENT FILE NAME: E2-103 DF Springfield MASTERPLAN-00-20250108v8.dwg

13.3.1.7 Groundwater Dependent Ecosystems

A search of the Bureau of Meteorology's (BOM) Groundwater Dependent Ecosystem Atlas (Bureau of Meteorology, 2024) indicates that there are no aquatic Groundwater Dependent Ecosystems on or in the vicinity of the subject land as shown on Figure 31. Figure 32 shows that there are terrestrial Groundwater Dependent Ecosystems on the subject land correlating with remnant vegetation along drainage lines. Figure 33 shows that there is no data for subterranean Groundwater Dependent Ecosystems for the area.

The proposed development is not sited within areas mapped as Groundwater Dependent Ecosystems.



Aquatic GDE

- Known GDE (regional study)
- High potential GDE (regional study)
- Moderate potential GDE (regional study)
- Low potential GDE (regional study)
- Unclassified potential GI (regional study)
- High potential GDE (national assessment)
- Moderate potential GDE (national assessment)
- Low potential GDE (national assessment)
- Unclassified potential GI (national assessment)

Islands

- Islands

N

1:71,045

Kilometres 1 2 3

Data Source: Bureau of Meteorology, Geoscience Australia and State/Territory lead water agencies. Refer to metadata for further information: Click here

FIGURE 31

Australian Albers GDA94

X - PROPOSED DEVELOPMENT COMPLEX SITE

Date: 30 December, 2024

Australian Government
Bureau of Meteorology

Groundwater Dependent Ecosystems Atlas

Data Source: Bureau of Meteorology, Geoscience Australia and State/Territory lead water agencies. Refer to metadata for further information: Click here

FIGURE 32

Australian Albers GDA94

X - PROPOSED DEVELOPMENT COMPLEX SITE

Date: 30 December, 2024

Australian Government
Bureau of Meteorology

Groundwater Dependent Ecosystems Atlas

Subterranean GDE (no data)

No ecosystems analysed

Subterranean GDE

Known GDE (regional study)

High potential GDE (regional study)

Moderate potential GDE (regional study)

Low potential GDE (regional study)

Unclassified potential GI (regional study)

Islands

Islands

Mainland

Mainland

N

1:71,045

Kilometres 1 2 3

Data Source: Bureau of Meteorology, Geoscience Australia and State/Territory lead water agencies. Refer to metadata for further information: Click here

FIGURE 33

Australian Albers GDA94

X - PROPOSED DEVELOPMENT COMPLEX SITE

Date: 30 December, 2024

13.3.2 Assessment of impacts

13.3.2.1 Design and siting

Inappropriate design, siting and operation of the proposed development above vulnerable groundwater resources or in salinity hazard areas may adversely impact on those resources unless suitable measures can be put in place to protect those resources.

13.3.2.2 Construction

Site preparation and construction activities would involve clearing of vegetation, cut and fill bulk earthworks to design levels, infrastructure construction etc. The excavation of soil exposing acid sulfate materials or allowing groundwater seepage to enter the cut area requiring dewatering may result in impacts to groundwater.

Storage of fuels and lubricants has the potential to impact ground water if not stored and handled appropriately. There is considered to be minimal potential for contamination of ground water from fuel spills or leaking equipment during construction of the proposed development. However, measures shall be implemented to ensure fuels are stored appropriately and any accidental leaks or spills are minimised and managed.

13.3.2.3 Operation

The following activities associated with the operation of the proposed development have the potential to adversely impact on groundwater:

- Leachate of effluent through the liner underlying the controlled drainage area as a result of integrity failure or exceedance of design criteria;
- Spills or leaks of hazardous chemicals or substances stored or used on-site such as fuels, chemicals etc;
- Inappropriate storage of solid wastes such as outside of the controlled drainage area; and
- Inappropriate utilisation of effluent and solid waste on-site such as high application rates and ponding of effluent.

13.3.3 Mitigation measures

13.3.3.1 Design and siting

The implementation of the following management and mitigation measures minimise identified impacts to groundwater as a result of the proposed development:

- Site selection considered the natural attributes and general suitability of the site with respect to soil characteristics (texture, depth, permeability), groundwater depth, and hydrogeological formation;
- Geotechnical investigation conducted to determine those areas within the controlled drainage area where the permeability of underlying soil/rock strata exceeds the design permeability, thus requiring lining to prevent soil leachate movement;
- The liner shall be capable of remaining effective when subject to the physical effects of livestock, machinery and water flow;
- Runoff external to the controlled drainage area is diverted away from the controlled drainage area;
- Effluent and solid waste utilisation areas are sited so that they do not pose an unacceptable risk to groundwater quality as a result of leaching;
- Solid and liquid waste utilisation areas are designed to enable the sustainable use of liquid waste and any solid waste that is utilised on-site; and
- Facilities to store hazardous materials are designed to meet relevant guidelines and Australian Standards for the storage of hazardous and dangerous goods and spill management.

13.3.3.2 Construction

The implementation of the following management and mitigation measures minimise identified impacts to groundwater during construction of the proposed development:

- A CEMP would be prepared for the construction of the proposed development and the following measures would be employed (where relevant) within that plan to minimise impacts to groundwater:
  - Erosion and sediment control measures implemented and maintained to minimise erosion and the release of sediment;
  - Construction of diversion banks to separate contaminated stormwater from clean water;
  - Where soil lining materials are used in areas subject to traffic (including pen surfaces and parts of the drainage system subject to mechanical cleaning), or in drains exposed to flow velocities that would otherwise cause scouring, then:
    - Sufficient depth of these materials is laid to prevent failure of the lining under the normal conditions; and
    - The liner is constructed to achieve the specified design permeability.
  - Fuels and lubricants are stored in appropriately bunded areas;
  - Maintenance of vehicles and equipment to minimise leaks of oil or fuel; and
  - Provision and implementation of procedures to manage spills on site.

13.3.3.3 Operation

The implementation of the following management and mitigation measures minimise identified impacts to groundwater during operation of the proposed development:

An Operational Environmental Management Plan (OEMP) and an Irrigation Management Plan (IMP) would be prepared for the operation of the proposed development. The IMP would detail the management and monitoring requirements for liquid waste treatment and utilisation. Further details on this plan are provided in section 13.11. The following measures would also be employed as part of these plans to minimise impacts to groundwater:

- Development and implementation of emergency and contingency plans within the IMP detailing methods to manage spills or other emergencies on site, such as pipe breakages, holding pond overflows, pump failures etc;
- Sustainable use of groundwater in accordance with allocation and entitlements under the Water Sharing Plan for the NSW Border Rivers Unregulated and Alluvial Water Sources 2012;
- Extraction of clean water managed to ensure sustainable drawdown rates;
- Solid waste stockpiles established within controlled drainage area to prevent contaminated leachate into groundwater resources;
- The land application of solid and liquid wastes is made at rates consistent with the ability of soils and crops grown in the on-site utilisation areas to sustainably utilise the applied nutrients, salts and organic matter, under the climatic conditions prevailing at the site;
- Soil condition is monitored according to licence conditions and soil tests are used where there is potential for deterioration of soil condition;
- Application rate of liquid waste is controlled to ensure that excessive ponding does not occur;
- The liner of all elements of the controlled drainage area such as drains, sedimentation basin, flow control structures etc is maintained to ensure the integrity and ongoing compliance with specified design criteria;
- Implementation of groundwater monitoring bores (piezometers) upstream and downstream of the proposed development complex site. An application shall be made for a groundwater licence for these monitoring bores prior to their installation; and
- Effluent shall be stored, treated and sustainably applied to land on-site by irrigation. section 13.11 details the measures which would be used to manage and treat liquid wastes from the site.

13.3.4 Conclusion

Activities associated with the construction and operation of the proposed development have the potential to generate impacts to groundwater.

Various mitigation measures have been adopted in the design and siting of the proposed development to prevent or minimise adverse impacts to groundwater. Various mitigation measures shall be implemented to prevent or minimise adverse impacts to groundwater during construction and operation of the proposed development.

Due to the design, siting and mitigation measures proposed and strata characteristics to groundwater (clay/cementitious sand bands), no adverse impacts to groundwater quantity or quality are predicted as a result of the proposed development.

13.4 Surface water

13.4.1 Existing environment

13.4.1.1 Murray Darling Basin

The Murray–Darling Basin is one of the world's largest drainage systems. It has a catchment over a million square kilometres and covers parts of Queensland, New South Wales, Victoria and South Australia. The Basin is Australia's most significant agricultural region, accounting for 70% of irrigated agriculture and more than 40% of the gross value of agricultural production nationally. Most of the Basin is arid or semi-arid, and most of its flow comes from a small region near the headwaters of the River Murray.

The subject land is located in the NSW Murray basin within the Border Rivers (NSW) catchment. The Border Rivers catchment covers around 24,000 km^2 in southern Queensland and north eastern NSW, with roughly an equal area in each state. The rivers of the Border River catchment rise on the western slopes of the Great Dividing Range and run westward, gradually merging with one another to become the Barwon River on the floodplains upstream of Mungindi. The upper catchment is based around the Macintyre and Dumaresq rivers, which merge upstream of Boggabilla and continue as the Macintyre River (Figure 34). The Dumaresq River, Macintyre River and the part of the Barwon River downstream of the junction of the Weir River to Mungindi (the end of the Border Rivers system) forms the border between NSW and Queensland for approximately 470 kilometres.

At a regional scale, the subject land is in the Barwon River catchment from the confluence of the Boomi River downstream of Mungindi. The Barwon River is formed through the confluence of the Macintyre River and Weir River (part of the Border Rivers system), north of Mungindi, in the Southern Downs region of Queensland. The Barwon River generally flows south and west, joined by 36 tributaries, including major inflows from the Boomi, Moonie, Gwydir, Mehi, Namoi, Macquarie, Bokhara and Bogan rivers. During major flooding, overflow from the Narran Lakes and the Narran River also flows into the Barwon. The confluence of the Barwon and Culgoa rivers, between Brewarrina and Bourke, marks the start of the Darling River.

At a local scale, the subject land is in the Back Creek catchment which is a subcatchment of the Mobbindry Creek catchment, Whalan Creek catchment and the Boomi River catchment upstream of the Barwon River. The Back Creek catchment is comprised of ephemeral waterways. This is a resultant of the size of the contributing catchment area, rainfall pattern experienced in the region and no base flow resulting from groundwater expression. The majority of waterways in the area are ephemeral and only flow during periods of prolonged rainfall.

The headwaters of Back Creek and Scrubby Gully rise on adjoining properties to the east and south of the subject land respectively. Back Creek and Scrubby Gully merge in the centre north of the subject land some 280 m from the boundary. Back Creek flows generally in a north-westerly direction to its confluence with Mobbindry Creek some 9.7 km north of North Star.

Mobbindry Creek flows north then northwest to its confluence with Whalan Creek some 21.5 km downstream of the confluence with Back Creek.

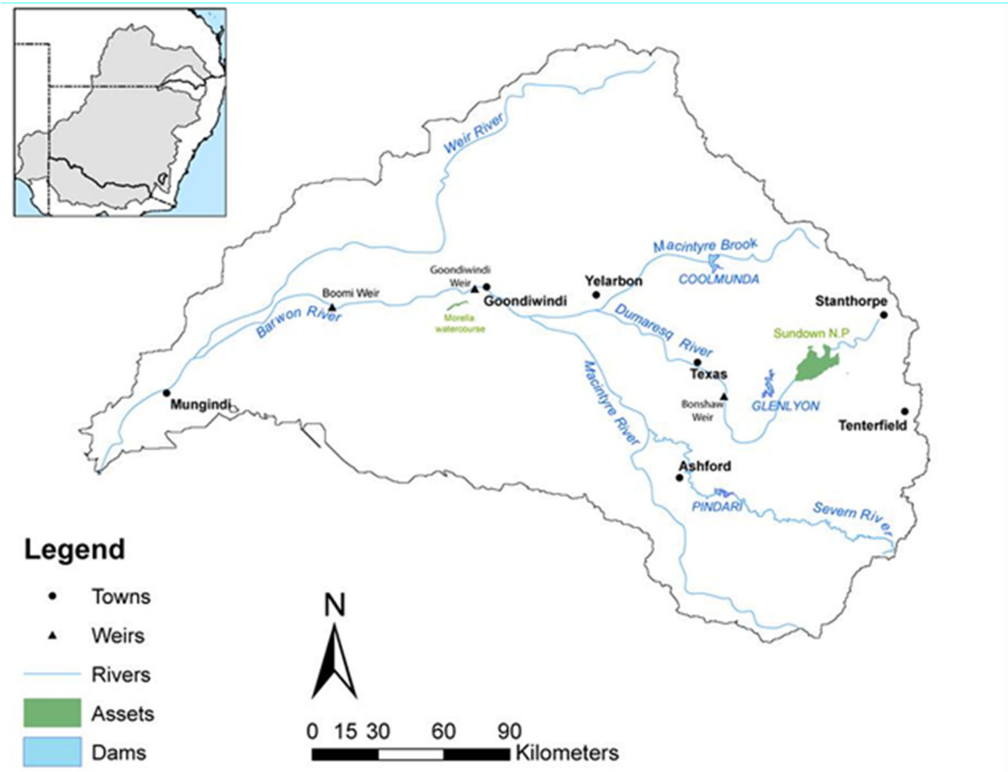


Figure 34 – Border Rivers catchment

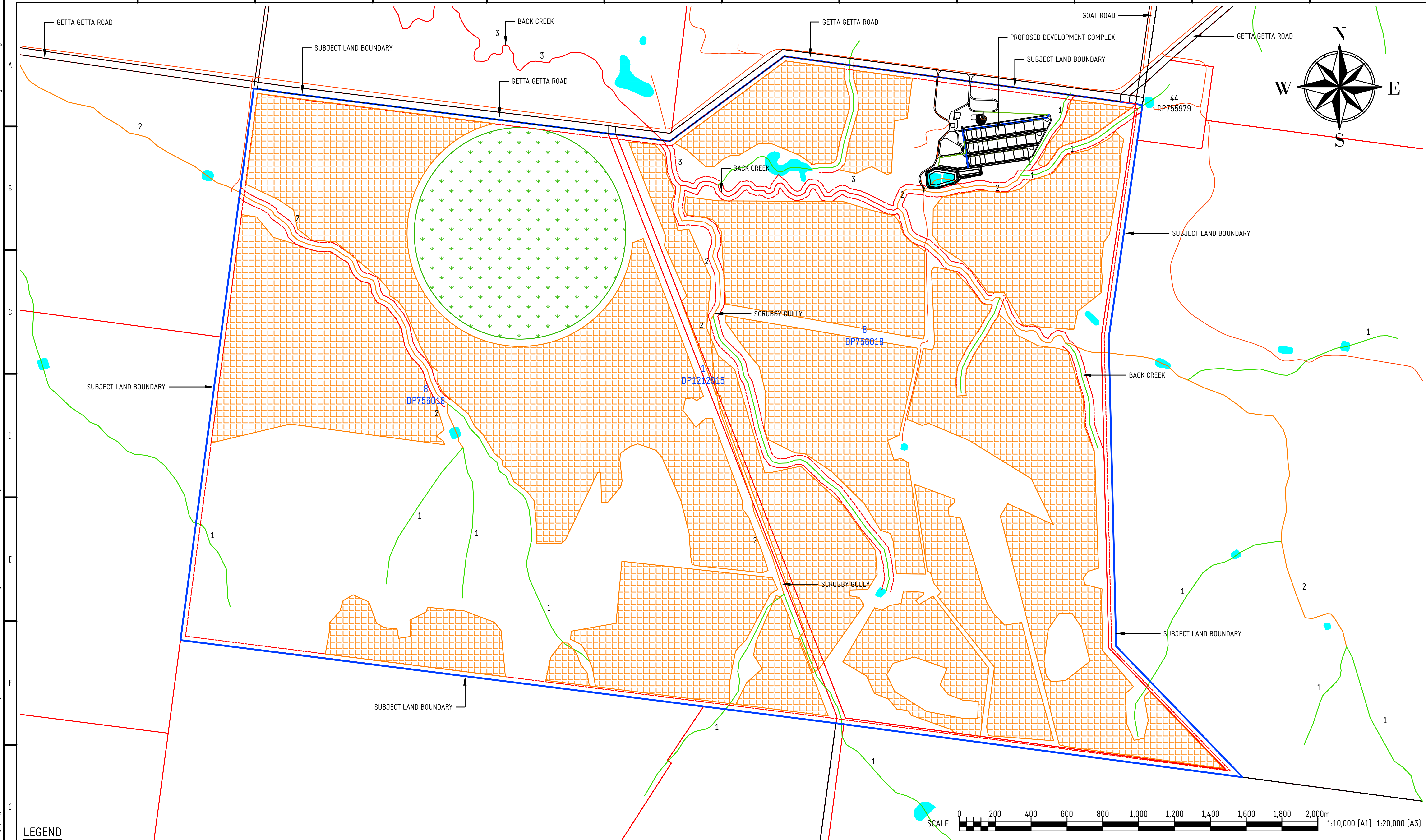
The NSW Hydrography web service provides access to topographic data of New South Wales showing hydrography-related features and drainage. An overlay of hydrography-related features relating to the subject land was obtained from The Central Resource for Sharing and Enabling Environmental Data in NSW (SEED) Open Data portal. An overlay of cadastral, hydrolines and hydrography-related features, and the proposed development was prepared and is shown in Figure 35.

As shown in Figure 35, surface runoff from the subject land drains predominantly to the north-west in one of two general directions:

- South to south-west to Back Creek via unnamed flow paths; or
- North and east to Back Creek, a tributary of the Mobbindry Creek via unnamed flow paths.

Figure 35 shows that Back Creek flows through the centre of the subject land in a general north-westerly direction. The various overland flow paths and drainage lines originating from the upper slopes of the subject land drain towards the alluvial plains.

There are no waterbodies on the site apart from the drainage infrastructure servicing the existing development and a stock and domestic dam.



LEGEND

- SUBJECT LAND BOUNDARY
- LAND PARCEL BOUNDARY
- HYDROAREA
- EFFLUENT UTILISATION AREA
- SOLID WASTE UTILISATION AREA
- 25m BUFFER TO HYDROLINE
- STREAM ORDER 1
- STREAM ORDER 2
- STREAM ORDER 3
- STREAM ORDER 4
- STREAM ORDER 5
- STREAM ORDER 6
- STREAM ORDER 7
- STREAM ORDER 8

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REV.	DATE	REVISION DESCRIPTION	DRAWN	CHECK	APPROVED
A	24/01/25	DRAFT ISSUE TO CLIENT	RJD	RJD	RJD
B	21/02/25	FINAL ISSUE FOR SUBMISSION TO GSC	RJD	RJD	RJD

SCALE	1:20,000 (A3)
DRAWN	RJD
DATE	21/02/2025
CHECKED	RJD
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APPROVED	RJD
DATE	21/02/2025

CLIENT: DOOLIN FARMING PTY LTD

PROJECT: PROPOSED 3,000 HEAD BEEF CATTLE FEEDLOT

TITLE: DEVELOPMENT APPLICATION FOR INTENSIVE LIVESTOCK AGRICULTURE
ENVIRONMENTAL IMPACT STATEMENT
SUBJECT LAND - STREAM ORDER OVERLAY

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 35		A3	E2-103-00-35	B

13.4.1.2 Water sharing plan

Water resources in the NSW Border Rivers catchment are managed under the *Water Management Act 2000* through the NSW Border Rivers Unregulated and Alluvial Water Sources 2012 and NSW Border Rivers Regulated River Water Source 2009 being water sharing plans established under NSW legislation (Water Management Act 2000).

As there are no watercourses within or adjoining the subject land and the land is not subject to floodplain flows, the subject land does not benefit from any high security or general security water access licences or floodplain harvesting licences directly under the NSW Border Rivers Unregulated and Alluvial Water Sources 2012 plan.

13.4.1.3 Quantity

The subject property has no surface water entitlements.

13.4.1.4 Quality

The condition of the riverine ecosystems in the Border Rivers–Gwydir region have been previously assessed by the DECCW (2010) using water quality, macroinvertebrate, fish and hydrology indicators.

DECCW (2010) described water quality as the percentage of samples exceeding the ANZECC water quality guidelines for turbidity and total phosphorus (ANZECC & ARMCANZ 2000) and presented trend information for electrical conductivity. DECCW (2010) described the condition for macroinvertebrates, fish and hydrology using a five-point scale (Davies et al 2008).

In the Dumaresq River at the property “Mauro”, some 3 km downstream of the Cunningham Weir DECCW (2010) found stable trends in water quality. Further, they found Turbidity and Total Phosphorous levels above ANZECC guidelines.

DECCW (2010) found fish condition, with both nativeness (the proportion of the fish assemblage that is native versus introduced fish) and expectedness (the proportion of species collected during sampling that were expected to have occurred in each basin zone before European colonisation) to be moderate.

The Border Rivers Valley was in moderate to good hydrological condition with the flow regime characterised by reductions in the magnitude of high-flow events and annual volumes, as well as small shifts in seasonality (DECCW, 2010).

13.4.1.5 Water quality objectives (WQOs)

The most stringent water quality trigger values apply to the protection of aquatic ecosystems. There are no locally specific objectives, criteria or targets which have been endorsed by the

NSW Government for the Back Creek catchment. Subsequently, the water quality objectives for the Border Rivers (NSW) catchment are relevant. Designing and mitigating impacts to aquatic ecosystems will provide protection for other WQOs; therefore, the following outline on potential impacts focuses on the protection of the WQOs of aquatic ecosystems. Potential impacts to surface water quality WQOs are outlined for construction and operational works.

13.4.2 Assessment of impacts

13.4.2.1 Design and siting

Inappropriate design and siting of the proposed development may adversely impact surface waters external to the development site such as changes to hydrology including drainage patterns, surface runoff yield, flow regimes and groundwater.

13.4.2.2 Construction

Site preparation and construction activities would involve clearing of vegetation, cut and fill bulk earthworks to design levels, infrastructure construction etc. The soil exposed during these activities has the potential to erode during rainfall events, resulting in sediment transportation and impacts to surface waters.

Further, disturbance and exposure of acid sulfate soils and potential acid sulfate soils has the potential to generate acid water impacting water chemistry. There is considered to be minimal potential for disturbance of potential acid sulfate soils.

Storage of fuels and lubricants has the potential to impact surface water if not stored and handled appropriately. There is considered to be minimal potential for contamination of surface water from fuel spills or leaking equipment during construction of the proposed development. However, measures shall be implemented to ensure fuels are stored appropriately and any accidental leaks or spills are minimised and managed.

The sedimentation basin to the south of the production pens shall be utilised as a part of the erosion and sediment control plan. All stormwater runoff from the disturbed areas shall be directed to this point using diversion banks as required.

13.4.2.3 Operation

The following activities associated with the operation of the proposed development have the potential to adversely impact on surface waters:

- Uncontrolled release of effluent from the controlled drainage area as a result of overflows, integrity failure or exceedance of design criteria;
- Spills or leaks of hazardous chemicals or substances stored or used on-site such as fuels, chemicals etc;

- Surface runoff from the inappropriate application of liquid wastes to land impacting water chemistry, clarity, nutrient and toxicants, for example;
- Inappropriate storage of solid wastes such as outside of the controlled drainage area; and
- On-site utilisation of effluent and solid wastes.

13.4.3 Mitigation measures

13.4.3.1 Design and siting

The implementation of the following management and mitigation measures minimise identified impacts to surface water as a result of the proposed development:

- The proposed development is sited above the height of a 100-year average recurrence interval (Q_{100}) flood level;
- Site selection considered the natural attributes and general suitability of the location for draining and capturing runoff from the proposed development complex;
- Any soils proposed to be exposed during construction shall be assessed for the potential to be acid sulfate soils prior to disturbance;
- Access roads sited on flood prone land does not impact the hydrology of the area;
- A controlled drainage area designed to an acceptable hydrological standard that prevents unauthorised discharges of runoff from areas such as pens, livestock handling, solid waste storage and processing area and silage storage area which have high organic matter and therefore a high pollution potential;
- Runoff external to the controlled drainage area is diverted away from the controlled drainage area;
- Effluent and solid waste utilisation areas are sited so that they do not pose an unacceptable risk to surface water quality as a result of flood events;
- Effluent and solid waste utilisation areas are designed to enable the sustainable use of liquid waste and any solid waste that is utilised on-site;
- Any facilities to store hazardous materials are designed to meet relevant guidelines and Australian Standards for the storage of hazardous and dangerous goods and spill management;
- Elements of the controlled drainage area are designed to capture contaminated runoff from within those areas which have high organic matter and therefore a high pollution potential and safely divert it to a sedimentation system as discussed in section 8.4.10;
- A sedimentation system is designed to provide flow velocities less than 0.005 m/s, and discharge to a holding pond as discussed in section 8.4.10.1;
- A holding pond is designed to store runoff from the controlled drainage area without spilling or overtopping at an unacceptable frequency as discussed in section 8.4.10.2;
- Appropriately designed weirs and by-washes are used to discharge excess runoff during overtopping or spill events in the sedimentation system and holding pond; and

- Existing riparian areas to the unnamed tributary of Back Creek shall be retained and buffers to drainage lines implemented, thus minimising adverse impacts to preserving stream bank stability and water quality.

13.4.3.2 Construction

The implementation of the following management and mitigation measures minimise identified impacts to surface water during construction of the proposed development:

- A CEMP would be prepared for the construction of the proposed development and the following measures would be employed (where relevant) within that plan to minimise impacts to surface water:
  - Erosion and sediment control measures implemented and maintained to minimise erosion and the release of sediment;
  - Appropriately designed culverts shall be installed at any points that the access road crosses existing drainage lines;
  - Construction of the sedimentation basin in the north of the site during early works on the site in order to retain stormwater runoff on-site and minimise release of sediment off-site;
  - Construction of diversion banks to separate contaminated stormwater from clean water and prevent contaminated runoff from entering surface water;
  - Fuels and lubricants are appropriately stored in bunded areas;
  - Maintenance of vehicles and equipment to minimise leaks of oil or fuel; and
  - Provision and implementation of procedures to manage spills on site.

13.4.3.3 Operation

The implementation of the following management and mitigation measures minimise identified impacts to surface water during operation of the proposed development:

- An Operational Environmental Management Plan (OEMP) and an Irrigation Management Plan (IMP) would be prepared for the operation of the proposed development. The IMP would detail the management and monitoring requirements for wastewater treatment and irrigation. Further details on this plan are provided in section 15.2.1. The following measures would also be employed as part of these plans to minimise impacts to surface water:

  - Development and implementation of emergency and contingency plans within the IMP detailing methods to manage spills or other emergencies on site, such as pipe breakages, pond overflows, pump failures etc;
  - Maintenance of buffer zones around drainage lines and riparian zones to prevent contamination of surface waters;
  - Solid waste stockpiles would be established within controlled drainage area to prevent contaminated runoff into clean water areas;

- Sustainable use of surface water in accordance with entitlements;
- The land application of solid and liquid wastes is made at rates consistent with the ability of soils and crops grown in the on-site utilisation areas to sustainably utilise the applied nutrients, salts and organic matter, under the climatic conditions prevailing at the site;
- Soil condition is monitored periodically, and soil tests are used where there is potential for deterioration of soil condition;
- Application rates of effluent are controlled to ensure that excessive runoff does not occur;
- All elements of the controlled drainage area such as drains, sedimentation basin, flow control structures etc are cleaned and maintained to ensure their integrity and ongoing compliance with specified design criteria;
- Effluent shall be stored, treated and sustainably applied to land on-site by irrigation. section 8.7.5 details the measures which would be used to manage effluent from the proposed development; and
- Design discharge events from the holding pond shall be directed to a natural grassed discharge area. This grassed area shall filter and disperse the effluent whilst allowing some infiltration. As the design discharge events are at a frequency of one in 10 years the concentration of nutrients shall be sustainably adsorbed and utilised by vegetation in between events.

13.4.4 Conclusion

Activities associated with the construction and operation of the proposed development have the potential to generate impacts to surface waters.

Various mitigation measures have been adopted in the design and siting of the proposed development to prevent or minimise adverse impacts to surface waters. Various mitigation measures shall be implemented to prevent or minimise adverse impacts to surface waters during construction and operation of the proposed development.

Due to the design, siting and mitigation measures proposed, no adverse impacts to surface water quantity or quality are predicted as a result of the proposed development.

13.5 Wetlands

Wetlands are distinctive ecosystems and a critical part of the environment and deliver many ecosystem services such as coastal protection, water and food supply, reducing the impacts of floods, absorb pollutants, improve water quality. They provide habitat for animals and plants and many contain a wide diversity of life.

Broadly, wetlands are areas of land that are wet by surface water or groundwater, or both, for long enough periods that the plants and animals in them are adapted to, and depend on, moist conditions for at least part of their lifecycle. They are neither just land, nor just water and can be both at the same time, or seasonally aquatic, or terrestrial. They include areas that are inundated cyclically, intermittently or permanently with fresh, brackish or saline water, which is generally still or slow moving.

New South Wales has unique and diverse wetlands from seagrass beds, lagoon estuaries and billabongs, to lakes, floodplains, swamps and marshes which are rich in ecological and cultural values and form an integral part of the natural environment of the state.

The responsibility for the protection, conservation and management of wetlands in New South Wales is shared between various government agencies. The Department of Biodiversity, Conservation and Attractions is responsible for managing wetlands under the Ramsar Convention.

The conservation of wetlands is guided by the NSW Wetlands Policy, the Ramsar Convention and state and national programs. The Department of Planning, Industry and Environment is the lead agency for managing most wetlands.

The Department of Planning, Industry and Environment coordinates mapping of New South Wales wetlands. Wetlands within NSW have been mapped digitally at a scale of 1:100,000-250,000 using a combination of classification of spectral classes of Landsat MSS and TM imagery and ancillary wetland information to create information classes of broad wetland groups (floodplain wetlands, freshwater lakes, saline lakes, reservoirs, estuarine wetlands and coastal lagoons and lakes) (Kingsford, et al, 2004). These data are provided in the NSW Wetlands dataset.

The Directory of Important Wetlands in Australia dataset contains wetlands cited in the "A Directory of Important Wetlands in Australia" Third Edition (Environment Australia, 2001), plus various additions for wetlands listed after 2001.

The Ramsar Wetlands of NSW dataset contains the boundaries of wetlands designated under the Ramsar Convention in NSW.

The NSW Wetlands, Directory of Important Wetlands in Australia and Ramsar Wetlands of NSW datasets were obtained from the SEED Open Data portal in ESRI shapefile format. An overlay of the subject land, NSW wetlands, Important Wetlands in Australia, Ramsar Wetlands of NSW and the proposed development was prepared and is shown in Figure 37.

Figure 37 confirms that there are no floodplain wetlands mapped on and adjacent to the subject land under the NSW Wetlands mapping. The closest wetlands to the subject land are the Gwydir Wetlands which are located over 100 km southwest of the subject land as shown in Figure 36. These wetlands are not in the same drainage catchment as the subject land.

The Gwydir Wetlands are located downstream of Moree and were listed under the Ramsar Convention in 1999 as shown in Figure 36. The Gwydir Wetlands are an example of terminal delta wetlands, which are found when a river delta occurs in an inland valley. They are among the few inland wetlands of this kind remaining in the Murray–Darling Basin.

The Ramsar site consists of four separate subsites around the Gingham Watercourse and Lower Gwydir (also known as the Big Leather Watercourse). These subsites within the Gwydir Wetlands are:

- Crinolyn;
- Goddard's Lease;
- Old Dromana; and
- Windella.

Together, the whole Ramsar site covers 823 hectares. It is part of a wider area of wetlands that originally covered 220,000 hectares but has been substantially reduced due to land use change and river regulation.

Consequently, the proposed development will not be located within or adjacent to any wetlands. The proposed development infrastructure shall be sited over 8.5 km from the closest mapped geomorphic wetland along Seery's Creek and Ottleys Creek and over 100 km from a Ramsar Wetland.

Further, the proposed development site is located within the Whalan Creek catchment which drains to the northwest. The Gwydir Wetlands are not located within the Whalan Creek catchment and not at risk as a result of the proposed development.

The proposed development is not expected to have an impact on mapped NSW Wetlands as described above.

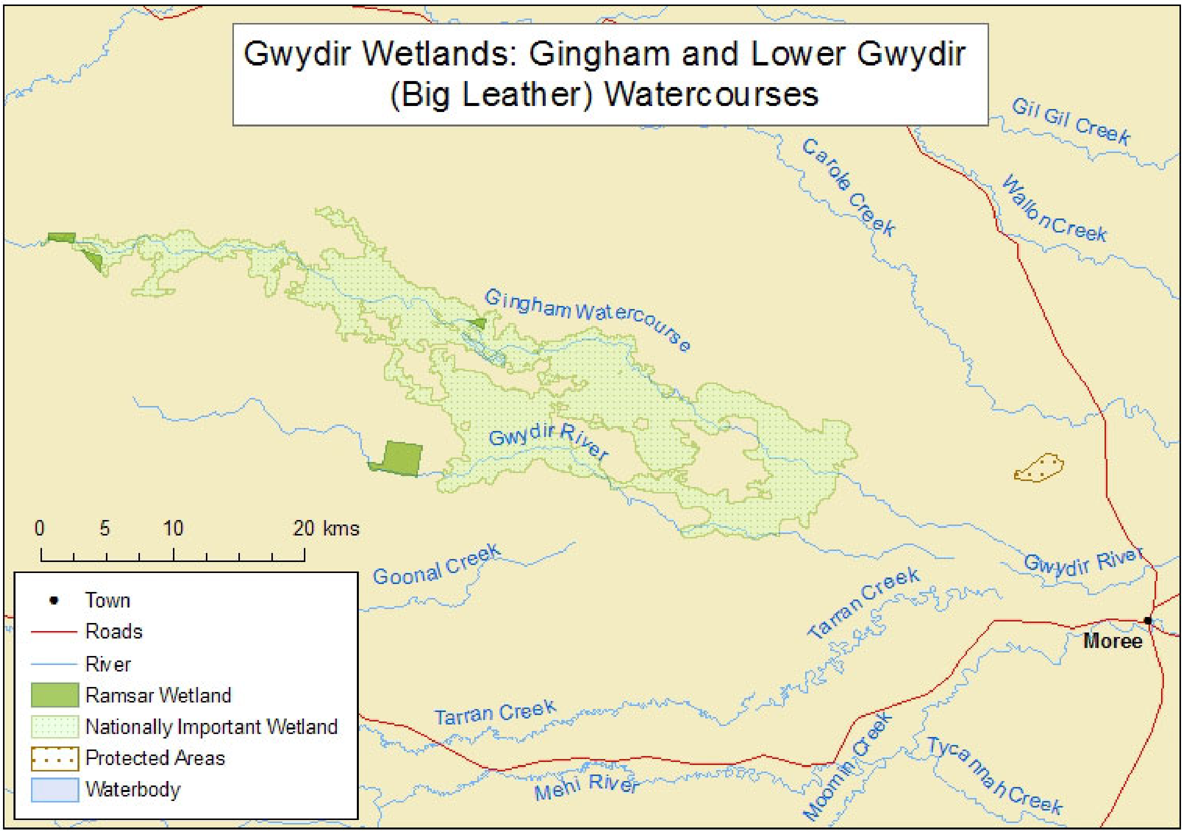
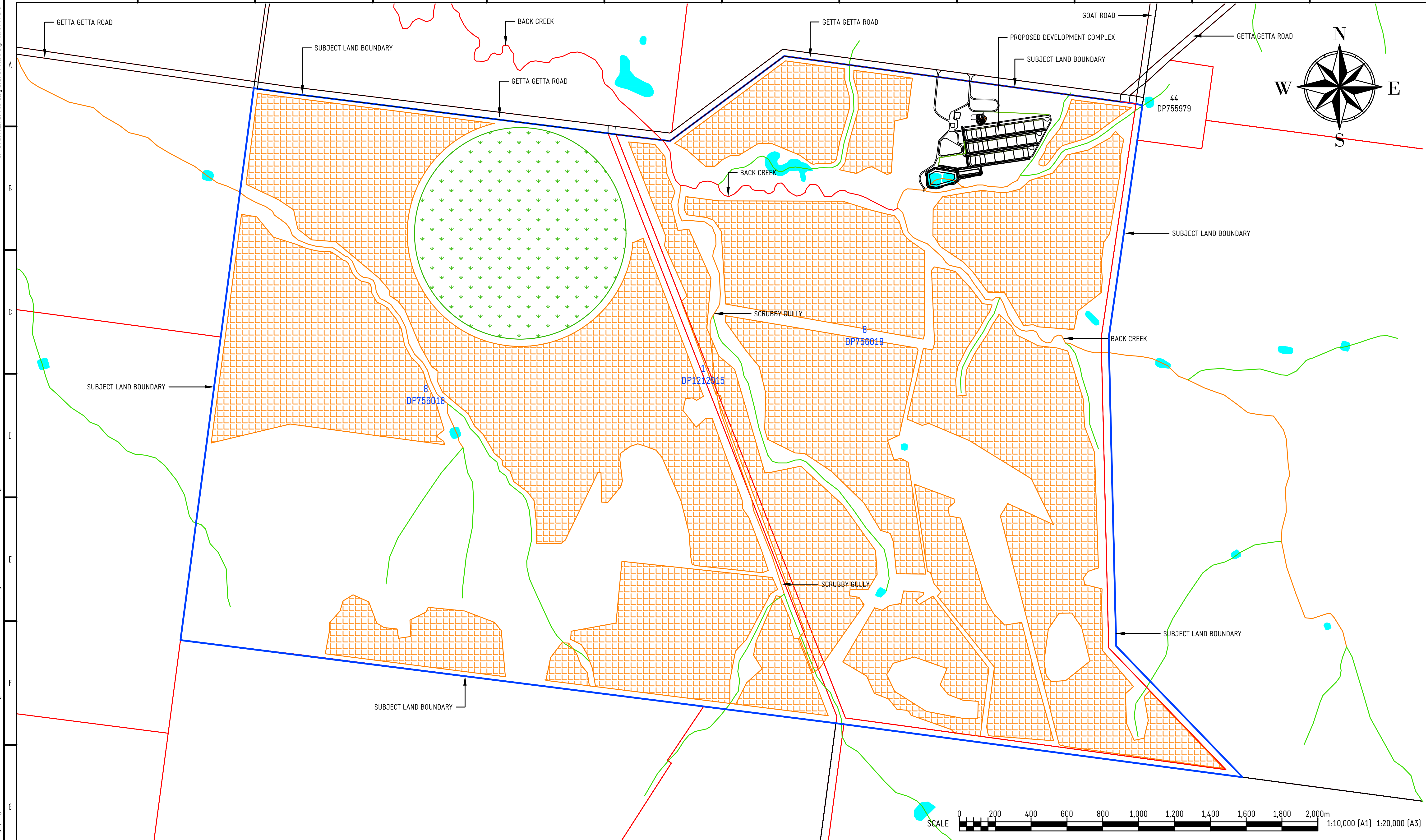


Figure 36 – Gwydir Wetlands (DCCEEW, 2022)



LEGEND

- SUBJECT LAND BOUNDARY
- LAND PARCEL BOUNDARY
- EFFLUENT UTILISATION AREA
- SOLID WASTE UTILISATION AREA
- NSW WETLANDS
- STREAM ORDER 1
- STREAM ORDER 2
- STREAM ORDER 3
- STREAM ORDER 4
- STREAM ORDER 5
- STREAM ORDER 6
- STREAM ORDER 7
- STREAM ORDER 8

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REV.	DATE	REVISION DESCRIPTION	DRAWN	CHECK	APPROVED
A	24/01/25	DRAFT ISSUE TO CLIENT	RJD	RJD	RJD
B	21/02/25	FINAL ISSUE FOR SUBMISSION TO GSC	RJD	RJD	RJD

SCALE	1:20,000 (A3)
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DATE	21/02/2025

CLIENT: DOOLIN FARMING PTY LTD

PROJECT: PROPOSED 3,000 HEAD BEEF CATTLE FEEDLOT

TITLE: DEVELOPMENT APPLICATION FOR INTENSIVE LIVESTOCK AGRICULTURE
ENVIRONMENTAL IMPACT STATEMENT
SUBJECT LAND - WETLANDS OVERLAY

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 37		A3	E2-103-00-37	B

DATE PLOTTED: 20 February 2025 BY : RDC Engineers PTY LTD
FILE PATH: C:\RDC Engineers\RDCE - Projects\E2-103 Doolin Farming Springfield EIS\05 - ACAD MasterPlan\05.1 Drawings - CURRENT FILE NAME: E2-103 DF Springfield MASTERPLAN-00-20250108vB.dwg

13.6 Flooding, stormwater and coastal erosion

13.6.1 Existing environment

13.6.1.1 Flooding

The climate and topography of the region results in some degree of flooding in all streams during heavy or prolonged rain events.

Flooding may be influenced by floods from two sources (or a combination of these sources):

- Riverine flooding caused by high flows in the major river (Macintyre) or its tributaries. These flood events inundate the riverine plains a complex distributary channel system some 50 km to the north west of the subject land. These events only result from rainfall over a significant portion of the respective river basin catchment.

- Local catchment flooding due to rainfall over the local catchment draining to drainage infrastructure (e.g. bridges, culverts, causeways etc) in isolation of regional flooding behaviour.

The subject land is not located on the riverine plains and not subject to riverine flooding as shown in Figure 38. Figure 38 shows that the closest floodplain inundation is along Ottley's Creek over 6 km from the proposed development complex site.

Consequently, the proposed development complex site will not be affected by the 1%AEP riverine flood event.

The proposed development complex site is located within the Back Creek catchment. Back Creek is located some 190 m to the southwest of the proposed development complex site.

Back Creek and its tributaries incorporate a significant catchment to the east of the proposed development complex.

A minor tributary of Back Creek meanders past the eastern side of the proposed development complex at a distance of approximately 25 m from the closest infrastructure of the proposed development complex.

A stormwater impact assessment has been undertaken by Tahlee Consulting Services (Tahlee Consulting Services Pty Ltd, 2025) on Back Creek and its tributaries in the vicinity of the proposed development site. The modelling indicates that the 1 in 100 year rainfall event does not inundate the proposed development complex site. The stormwater impact assessment is presented in Appendix S.

The NSW Floodplain Development Manual (2005) recognises three hydraulic categories for flood prone land. The proposed development complex is not located on flood prone land and therefore none of these categories apply in relation to Back Creek or its tributaries.
The Manual presents two Hazard categories, mainly high hazard and low hazard. The proposed development complex site is above flood and therefore neither Hazard category applies.

The flood impact assessment has demonstrated that the risk of flood inundation of the proposed development site from Back Creek or its tributaries is considered negligible.

There is no urban floodplain risk management plan or rural floodplain management plan (under Part 8 of the Water Act 1912) for the area in which the development is proposed.

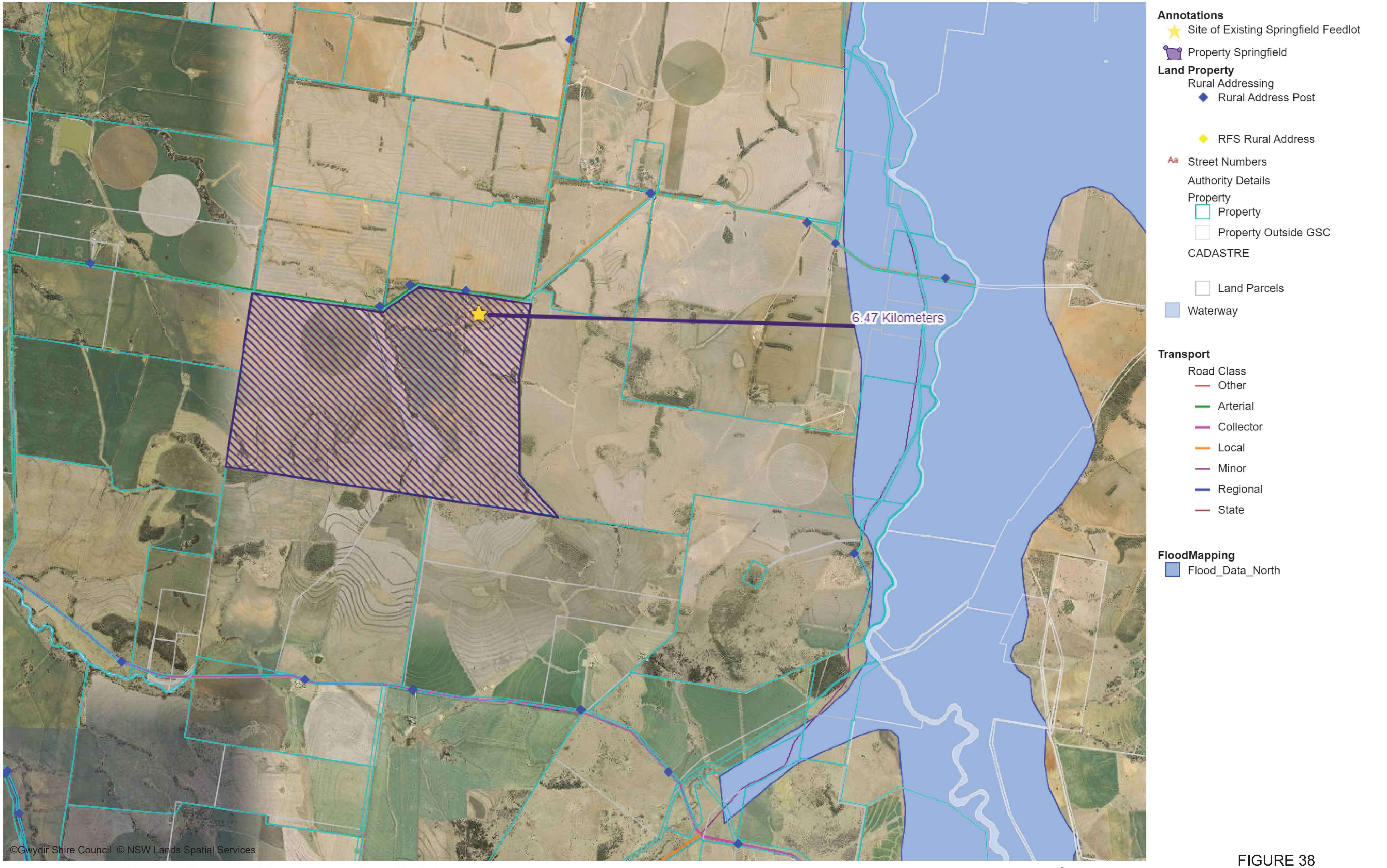


FIGURE 38

Flood Prone Map - Springfield

GWYDIR SHIRE COUNCIL

3-Nov-2023

OFFICE USE ONLY

N

2 km

Scale = 1:63246.960

13.6.1.2 Stormwater

The subject land has several stormwater catchment areas, which eventually discharge to natural drainage lines and eventually Back Creek or to land (infiltration/evaporation). There is no existing reticulated stormwater system due to the undeveloped nature of the site and its rural character.

Topography within the proposed development site is generally sloping to the north-west towards Whalan Creek with on property stream Scrubby Gully converging with Back Creek immediately west of the feedlot development site. Back Creek exits the property in a north westerly direction.

The propose development complex is contained within a controlled drainage area as shown in Figure 10.

13.6.1.3 Coastal erosion

The subject land on which the proposed development shall be sited, is located in an inland area (NSW Border-Rivers Region) of NSW some 280 km from the coastline and not adjacent to the NSW coastline as shown in Figure 1. The subject land is located at an elevation between 315 m to 320 m AHD.

Subsequently, the proposed development shall not be impacted by any potential effects of coastal processes and coastal hazards or sea level rise nor shall the proposed development impact on these processes.

The subject land is not impacted by any coastal zone management plan.

Hence, no further consideration of the potential effects of coastal processes and coastal hazards is deemed warranted.

13.6.2 Assessment of impacts

13.6.2.1 Flooding

Inappropriate design and siting of the proposed development may adversely impact flood prone land or on flood behaviour resulting in:

- detrimental increases in the potential flood affectation of other development or properties;
- cause avoidable erosion, siltation, destruction of riparian vegetation or a reduction in the stability of riverbanks or watercourses;
- risk to life; and
- unsustainable social and economic costs to the community.

The proposed development complex which comprises the built environment of production pens, cattle handling infrastructure, feed storage and preparation infrastructure etc is not located on flood prone land.

There is no infrastructure proposed on flood prone land, including the access road from the site entrance to the proposed development complex. Further, the stormwater runoff from the controlled drainage area shall be contained and sustainably utilised on-site via irrigation to land.

The access road level shall be at existing natural surface level and shall not form a levee or impediment to surface water flood events. It will not impact surface water levels, velocities or flow distributions. The road shall be compacted and surfaced with gravel. It is concluded that the access road would not adversely affect the environment or cause avoidable erosion, siltation during flood events due to small footprint, vegetative buffers exist on each side of the access road and construction material.

The effluent and solid waste utilisation areas are not located on flood prone land. No built infrastructure such as levees, buildings, banks or channels are proposed as part of the utilisation system. The effluent utilisation system will incorporate a centre pivot irrigator which is currently used on the subject land. The centre pivot irrigator has a small ground level surface area (tyres) and present an insignificant obstruction to any stormwater flows.

The design and management of the effluent and solid waste utilisation areas shall be consistent with existing farm practices and sustainable nutrient application (Refer section 13.11) and therefore it is concluded that the utilisation areas shall not adversely affect the environment or cause avoidable erosion or siltation during flood events as a result of their location on flood prone land.

Therefore, the proposed development is consistent with the flood hazard of the land and shall not adversely affect flood behaviour resulting in detrimental increases in the potential flood affectation of other development or properties.

Further, it is concluded that there is no risk to life from flood, nor unsustainable social and economic costs to the community, as a consequence of flooding as a result of the proposed development due to the location and nature of the proposed development.

Existing riparian areas between the effluent and solid waste utilisation areas and Scrubby Gully and Back Creek drainage lines shall not be disturbed thus resulting in no adverse impacts to riparian vegetation or a reduction in stability of riverbanks or watercourses.

The implications of regional flooding in the area may include restricted access to the proposed development over one or more days. This potential affect shall be mitigated by ensuring adequate on-site storage of drinking water and feedstuffs to maintain livestock health.

Due to the regional location and siting of the proposed development a sensitivity analysis of the potential impacts of an increase in rainfall intensity, rainfall runoff and sea level rise is not deemed warranted.

13.6.2.2 Stormwater

During the construction phase, construction activities will include stripping of topsoil and excavation to proposed design grade levels. The primary risk occurs when soils are exposed during earthworks. During this time, if adequate erosion and sediment control measures are not adopted suspended sediment and associated pollutants can be mobilised and transported into the downstream receiving environment. A series of erosion and water quality control structures and good site practices would be needed to minimise the potential for adverse impacts during construction.

Once the proposed development is operational, surface runoff quantities have the potential to increase due to the impervious surfaces and concentration of runoff. The main pollutants of concern will be those associated with livestock manure.

Build-up of pollutants from vehicles such as hydrocarbons and combustion derivatives, lubricating oil, rubber and heavy metals such as lead, zinc, copper, cadmium, chromium, and nickel on unsealed road surfaces is predicted to be negligible and are unlikely to disperse in rainfall events.

The stormwater runoff shall be retained in the controlled drainage system and sustainably utilised on-site. The controlled drainage and treatment system is outlined in section 8.6.1.11 and 8.7.5 and the predicted stormwater runoff discharge quality sustainably utilised on-site is outlined in section 13.10.7.4.2.

The recommended mitigation measures for the management of stormwater during construction and operation are outlined in section 13.6.3.

13.6.3 Mitigation measures

13.6.3.1 Flooding

The implementation of the following management and mitigation measures minimise identified impacts from flooding or to flood behaviour and stormwater as a result of the proposed development:

- The proposed development is sited above the height of a 100-year average recurrence interval (Q_{100}) flood level;
- Site selection considered the natural attributes and general suitability of the site for draining and capturing runoff from the proposed development;
- Effluent and solid waste utilisation areas are sited so that they do not pose an unacceptable risk to surface water quality as a result of flood events; and
- Effluent and solid waste utilisation areas are designed to enable the sustainable use of effluent and any solid waste that is utilised on-site.

13.6.3.2 Stormwater

The implementation of the following management and mitigation measures minimise identified impacts from stormwater as a result of the proposed development:

- Preparation and implementation of a construction Erosion and Sediment Control plan prior to commencement of construction activities;
- The ESCP shall outline all site drainage, stormwater quality devices and erosion / sedimentation control measures and the onsite treatment of stormwater;
- Separation of 'clean water' and 'dirty water' during construction and operation with diversion banks and/or other relevant control structures diverting 'clean water' from undisturbed areas around disturbed areas;
- Implementation of erosion control techniques based upon effective use of construction practices, structural controls and vegetative measures. Erosion control measures would be temporary for the construction phase of the proposed development;
- Require regular maintenance of erosion control measures;
- The installation of appropriate sediment control measures to ensure that any eroded material is trapped and retained prior to leaving the construction site;
- Require regular maintenance and cleaning of sediment control measures;
- A controlled drainage area designed to an acceptable hydrological standard that prevents unauthorised discharges of runoff from areas such as pens, livestock handling, solid waste storage and processing area and silage storage area which have high organic matter and therefore a high pollution potential;
- Runoff external to the controlled drainage area is diverted away from the controlled drainage area to existing natural drainage lines;
- Elements of the controlled drainage area are designed to capture contaminated runoff from within those areas which have high organic matter and therefore a high pollution potential and safely divert it to a sedimentation system as discussed in section 8.4.10;
- A sedimentation system is designed to provide flow velocities less than 0.005 m/s, and discharge to a holding pond as discussed in section 8.4.10.1;
- A holding pond is designed to store runoff from the controlled drainage area without spilling or overtopping at an unacceptable frequency as discussed in section 8.4.10.2;
- Appropriately designed weirs and by-washes are used to discharge excess runoff during overtopping or spill events in the sedimentation system and holding pond; and
- Vehicles are maintained to minimise leaks of hydrocarbons, lubricating oil etc.

13.6.4 Conclusion

The proposed development has the potential to generate impacts to the receiving environment from stormwater along with implications of localised storm water runoff events.

Various mitigation measures have been adopted in the design and siting of the proposed development to prevent or minimise these potential impacts. There are no aspects of the proposed development that shall adversely impact flood behaviour or increase risk to life from flood.

Similarly, various mitigation measures have been adopted in the design, construction and operation of the development to mitigate any potential impacts from stormwater. For example, erosion and sediment control techniques based upon effective use of construction practices, structural controls and vegetative measures shall be implemented along with a controlled drainage system.

Due to the design, siting and mitigation measures proposed, no adverse impacts to the receiving environment from stormwater and no implications as a consequence of flooding.

13.7 Heritage

13.7.1 Introduction

As outlined in section 9.3.1, under the EP&A Act 1979, the proposed development is listed in Schedule 3 of the (Environmental Planning and Assessment Regulation 2021) and is therefore a Designated Development. For Designated Development, it is required that a development application (DA) be accompanied by an Environmental Impact statement (EIS). Part of the legislative requirements for an EIS is a Heritage Assessment. The aim of this assessment is to identify the archaeological sensitivity of the proposed development site, through identification of known Aboriginal or non-Aboriginal sites, areas of archaeological potential and the subsequent development impacts upon them. Management strategies and mitigation measures are then provided to minimise potential impacts.

13.7.2 Aboriginal

The Aboriginal heritage assessment has been undertaken by relevant personnel experienced in aboriginal due diligence assessments. The curriculum vitae for each personnel who participated in the assessment are provided in Appendix D. The aboriginal due diligence assessment report is attached in Appendix K.

The assessment of Aboriginal heritage involved identification of heritage places and cultural values in the proposed development area, an assessment of the potential impacts to Aboriginal heritage as a result of the proposed development, and development of recommendations to minimise, manage and mitigate these potential impacts. The assessment followed a due diligence process and involved the following:

- An aboriginal site search of the NSW Environment and Heritage Aboriginal Heritage information Management System (AHIMS). The possible existence of previously recorded Aboriginal Cultural Heritage Sites within a wider regional area, surrounding the proposed development were examined to develop an awareness and predictive model of what site types may be within the proposed development site;
- Consultation with the local land council (Toomelah Local Aboriginal Land Council);
- Assessment of Landscape – Assess the subject land for the presence of potentially culturally significant landscapes, based primarily on topography, nature and level of disturbance, nature of soils, proximity to water;
- Walkover of the site to assess the potential for Aboriginal cultural heritage significance; and
- Identification and provision of management measures on future Aboriginal cultural heritage issues within the proposed development area.

The following guidelines and documents were used as advisory documents and guidelines for the assessment:

- Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010 (DECCW, 2010a);
- Due Diligence Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales (DECCW, 2010b);
- Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW (Office of Environment and Heritage (NSW), 2011);
- Code of Practice for the Archaeological Investigation of Aboriginal Objects in New South Wales (DECCW, 2010c); and
- Aboriginal Cultural Heritage: Standards and Guidelines Kit (NSW National Parks and Wildlife Service, 1997).

13.7.2.1 Existing environment

A search of the NSW AHIMS register indicated that there are no recorded sites on the proposed development site or within 1 km of the subject land. This may reflect the lack of survey on the subject land rather than a lack of aboriginal history on the subject land. A copy of the search results are provided in Appendix K.

The proposed development site does not contain landscape features such as rock outcrops, caves, rock shelters and or rock carvings, estuarine or coastal dunes, sand hills, waterholes and or natural springs, wetlands and/or floodplains that are considered likely to contain Aboriginal objects.

The magnitude and extent of previous disturbance when cleared from woodland to open grazing area affects the likelihood of discovering intact heritage deposits, with significant deposits more likely to be found in undisturbed areas.

Remnant woodland within the wider subject land area may contain artefacts; however, these areas will not be disturbed.

Although the proposed development site has previously been extensively cleared and developed, all reasonable and practical measures shall be undertaken to ensure the activity does not harm any Aboriginal heritage.

A precautionary approach shall be applied to the assessment of risk to Aboriginal heritage to ensure that all aspects of potential risk is considered, and appropriate steps are applied to avoid or minimise damage to Aboriginal heritage.

13.7.2.2 Assessment of impacts

In accordance with the Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW (Office of Environment and Heritage (NSW), 2011), the principles of ecologically sustainable development (ESD) were considered in assessing the likely harm of the proposed development to Aboriginal objects.

The proposed development could potentially directly and indirectly impact the Aboriginal cultural heritage of the site and local area. Potential negative direct and indirect impacts may result from the destruction of the sites via ground disturbance or indirect physical affects (e.g. dust deposition) or aesthetic affects.

The proposed development does not involve disturbance of previously undisturbed land as the development complex site and effluent and solid waste utilisation areas are highly disturbed areas.

As the proposed activities for the proposed development would not involve significant ground disturbance, impacts may be limited to minor surface disturbance and no significant alteration of the landscape context. The potential indirect impacts to archaeological sites could include the following:

- deposition of dust generated by activities;
- accidental disturbance by peripheral activities; and
- inappropriate visitation including the unauthorised removal of Aboriginal objects.

There are no known Aboriginal cultural heritage sites identified during the due diligence assessment.

The degree of past disturbance from land clearing, drainage works, removal of native vegetation and soil disturbance for pastoralism and cropping, means that in-situ subsurface cultural deposits are not likely.

The proposed development area does not contain culturally sensitive landforms such as lunettes or source-bordering sand dunes where subsurface Aboriginal cultural deposits (e.g. burials) have been recorded previously.

No Aboriginal archaeological sites, objects or places, or areas of archaeological potential or Aboriginal sensitivity have been recorded within the subject land.

The site inspection conducted confirmed extensive disturbance from agricultural development and associated ongoing agricultural activities, and it is therefore considered highly unlikely that evidence of previous occupation by Aboriginal people remains within the subject land.

The Aboriginal due diligence assessment (Artefact & Aspect, 2024) concluded that;

- No items of Aboriginal and or non-Aboriginal cultural heritage are recorded on any available data base;
- No items of Aboriginal and or non-Aboriginal cultural heritage were observed on the site;
- All proposed developments associated with the feedlot expansion are sited on disturbed land; and
- Several of the activities necessary for the proposed development to proceed are deemed low impact activities.

13.7.2.3 Mitigation measures

This section presents proposed strategies for the management of cultural heritage values within the subject land that may be subject to direct impacts by the proposed development.

Based on the known and predicted Aboriginal heritage values within the proposed development area, it is concluded that impacts to Aboriginal heritage as a result of the proposed development can be effectively managed or mitigated through the following actions and strategies:

- An aboriginal due diligence assessment by suitably qualified and experienced personnel has been completed as part of the environmental impact statement;
- Erosion and sediment control works be undertaken in accordance with the requirements of the development approval and in consideration of other Aboriginal cultural heritage management measures; and
- Any new Aboriginal heritage sites identified during the operation of the proposed development shall be registered with the NSW Office of Environment and Heritage (via Aboriginal site Impact Recording Form on AHIMS) in consultation with the Aboriginal community;

13.7.3 Non-Aboriginal

Under the *Heritage Act 1977*, items of "environmental heritage" include places, buildings, works, relics, moveable objects and precincts identified as significant based on historical, scientific, cultural, social, archaeological, architectural, natural or aesthetic values.

The non-Aboriginal heritage assessment of the proposed development area involved a desktop review of known heritage sites and objects in the proposed development area, an assessment of the potential impacts to non-Aboriginal heritage as a result of the proposed development, and development of recommendations to minimise, manage and mitigate these potential impacts. The assessment involved the following:

- Previously identified heritage items in the proposed development area through a search of heritage registers including:
    - National Heritage List;
    - Commonwealth Heritage List;
    - State Heritage Register (HHIMS); and
    - State Heritage Inventory.
- Site survey to assess the potential for heritage significance and any locally significant heritage sites, historic items of significance.

13.7.3.1 Existing environment

The proposed development site is not listed on the National Heritage List. Further, there are no listed historic heritage places owned or controlled by the Australian Government as listed on the Commonwealth Heritage List within 5 km of the subject land as shown on the EPBC Act Protected Matters Report provided in Appendix J.

A search of the Historic Heritage Information Management System (HHIMS) register for post-contact heritage items and places managed by the Environment and Heritage Group (EHG) within the Department of Planning and Environment (DPE) was conducted to assess the broader historic heritage environment, including heritage items in the vicinity of the proposed development that could also be affected by the proposed development.

HHIMS is a catalogue of post-contact heritage items and places managed by EHG, such as collections of heritage items and individual buildings, most of which are located in national parks and reserves. HHIMS aids in the protection and management of these sites by maintaining and providing information concerning the nature, current status and location of sites.

A search of the State Heritage Inventory was undertaken for the Gwydir Shire Council area. There are no items listed by the heritage council under the NSW Heritage Act or by the Gwydir Shire council and state government agencies on the subject land on which the development is proposed.

No items of historic heritage are located within the proposed development site as shown in Table 54 and Table 55 and evidenced by:

- A search of Schedule 5 Environmental heritage of the Gwydir Shire Council Local Environment Plan (LEP) 2013. (www.legislation.nsw.gov.au – accessed 23rd December 2023); and
- A search of the State Heritage Inventory as specified in Division 2 section 21 of the NSW Heritage Act – (State Heritage Inventory | NSW Environment and Heritage – accessed 23rd December 2023) returned two records in the Gwydir local government area being the Myall Creek Massacre and Memorial Site and Roxy Theatre and Peters Creek Café Complex located at Bingara.

Table 54 – NSW Heritage Act – Listed Items – Gwydir Shire

Item name	Address	Suburb	LGA	SHR
Myall Creek Massacre and Memorial Site	Bingara Delungra Road (Myall Creek)	Bingara	Gwydir	01844
Roxy Theatre and Peters Creek Café Complex	74 Maitland Street	Bingara	Gwydir	01990

The Listed Items in Schedule 5 Environmental Heritage of the Gwydir Local Environmental Plan 2013 are outlined in Table 55. There are no Listed Items on or adjoining the subject land. The closest Listed Items are located in Warialda some 65 km south of the subject land.

Table 55 – Gwydir Local Environmental Plan 2013 – Listed Items

Item name	Address	Suburb	LGA
Bridge over Halls Creek	Between Copeton Dam Road and Finch Street	Bingara	Gwydir
Former police station and residence	32 Finch Street	Bingara	Gwydir
Bridge over the Gwydir River	Between Gwydir Street and Copeton Dam Road	Bingara	Gwydir
Stamper battery	All Nations Hill, Hill Street	Bingara	Gwydir
Bingara District Historical Society (formerly Salter's Inn)	16–18 Maitland Street	Bingara	Gwydir
Courthouse	24 Maitland Street	Bingara	Gwydir
Area near Windsor, site of Myall Creek massacre	Whitlow Road	Bingara	Gwydir
Isolated graves	390 metres north of Horton Road	Cobbadah	Gwydir
Capel family private cemetery	Piedmont Station	Cobbadah	Gwydir
Myall Creek Massacre and Memorial site	Bingara/Delungra Road	Myall Creek	Gwydir
Chinese cemetery and European cemetery	Upper Bingara Road	Upper Bingara	Gwydir
Cemetery	Apollo Avenue	Warialda	Gwydir
Yallambar Durkin residence	22 Geddes Street	Warialda	Gwydir
Warialda Roman Catholic Convent School of St Joseph	56 Geddes Street	Warialda	Gwydir
Courthouse, police residence and station, including palm trees in front of station	Corner of Hope and Stephen Streets	Warialda	Gwydir
Crithary's Building	Hope Street	Warialda	Gwydir
Memorial hall	Hope Street	Warialda	Gwydir
National Bank	Hope Street	Warialda	Gwydir
Post office	Hope Street	Warialda	Gwydir
Shire chambers	Hope Street	Warialda	Gwydir
Single storey shop	Hope Street	Warialda	Gwydir
Warialda Primary School	Hope Street	Warialda	Gwydir
Warialda Royal Hotel	Hope Street	Warialda	Gwydir
Warialda store	Hope Street	Warialda	Gwydir
Carinda House	Stephen Street	Warialda	Gwydir
Commercial Hotel	Stephen Street	Warialda	Gwydir

Consequently, the proposed development will not impact on a place or area of local or State heritage significance.

13.7.3.2 Field assessment

An assessment of the potential heritage sensitivity of the proposed development site was undertaken during an inspection of the subject land by Artefact & Aspect (2023).

As shown in the Due Diligence Assessment (Artefact & Aspect, 2024), there is no evidence of historic heritage on the proposed development site. Consequently, the proposed development will not impact on a place or area of local or State heritage significance.

13.7.3.3 Assessment of impacts

No non-Aboriginal archaeological sites, objects or places, or areas of archaeological potential or non-Aboriginal sensitivity, were identified within the proposed development site. The results of the field assessment confirmed extensive disturbance from agricultural development including vegetation clearing, grazing, irrigated cropping and built infrastructure. It is therefore considered highly unlikely that items or places of heritage significance remain (if any existed) within the proposed development site.

The proposed development site does not involve the disturbance, demolition or removal of any known sites of heritage significance.

13.7.3.4 Mitigation measures

The following mitigation measures have been implemented to minimise potential impacts on non-Aboriginal Heritage.

- The proposed development has been sited, designed and constructed to avoid disturbance of heritage sites; and
- Should previously unidentified heritage sites/objects be found during operation activities, work will immediately cease, and the sites will be reported to the Feedlot Manager who will arrange for the appropriate assessment to be undertaken.

13.7.4 Conclusion

The Aboriginal Heritage Assessment identified no Aboriginal artefacts within the proposed development site.

The level of human impact, through land disturbance (land clearing, grazing, cultivation, built infrastructure etc.) has substantially affected the most culturally sensitive areas on the subject property. Subsequently, it seems highly unlikely that evidence of previous occupation by Aboriginal people remains within these areas. Measures have been prepared to mitigate any impacts to possible Aboriginal heritage sites and objects.

Subsequently, the proposed development shall not impact on any Aboriginal heritage sites, objects or places, or areas of archaeological potential or Aboriginal sensitivity.

Prior to any construction activities, all contractors on site shall be advised of the potential for stone artefacts, buried archaeological deposits, specifically burials, and the protocols that should be undertaken in the unlikely event that objects or items of Aboriginal heritage are encountered ('Çhance Find' procedure).

The non-Aboriginal Heritage Assessment and site assessment identified no non-Aboriginal sites on the land on which the development is proposed. Therefore, it is considered that the proposed development would not impact on the non-aboriginal heritage fabric of the land on which the development is proposed.

Subsequently, the proposed development shall not impact on any Aboriginal heritage sites, objects or places, or areas of archaeological potential or Aboriginal sensitivity.

13.8 Biodiversity (Flora and Fauna)

13.8.1 Introduction

An assessment of potential biodiversity impacts from the proposed development has been undertaken by relevant specialists in flora and fauna assessments and accredited biobanking assessors from Birdwing Ecological Services. The purpose of this assessment was to examine the likelihood of the proposal having a significant effect on any native vegetation and threatened species, populations or ecological communities listed under the *NSW Threatened Species Conservation Act 1995* (TSC Act).

This report recognises the relevant requirements of the EP&A Act 1979 as amended by the *NSW Environmental Planning and Assessment Amendment Act 1997*. Assessment has also made with regard to those threatened entities listed under the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Threatened biodiversity listed under the TSC Act and EPBC Act of potential relevance to the subject land was initially identified from database searches and followed by field assessment to validate the likelihood of occurrence analysis and preliminary vegetation typing and boundary definition. Key constraints were identified and mapped. Impact avoidance, minimisation and mitigation principles were applied, as required by the Biodiversity Assessment Method 2020 (DPIE, 2020).

The curriculum vitae for each personnel who participated in the biodiversity assessment are provided in Appendix D. The biodiversity assessment report (BDAR) is attached in Appendix J.

13.8.2 Existing environment

13.8.2.1 Bioregions and subregions

Biogeographically, at a regional scale, the subject land is situated within the Brigalow Belt South Bioregion within the North West Local Land Services region and Gwydir Shire Council.

The Brigalow Belt South Bioregion lies in northern NSW and southern Qld, extending from south of Dubbo in central-western NSW to the mid-QLD coast within the eastern subhumid region of Australia. The bioregion has a total area of 27,196,933 ha, of which 5,333,469 ha (19.61%) falls within NSW (Environment Australia 2000), occupying 6.7% of the state. The bioregion shares its borders with five other bioregions; the Nandewar and North Coast bioregions in the east, the Sydney Basin and South Western Slopes bioregions to the south and the Darling Riverine Plains Bioregion on its western border (NSW NPWS, 2003).

The Brigalow Belt South Bioregion contains mixed landscapes, including undulating to hilly areas with low ridges and deep valleys, as well as flat alluvial plains in the south. There is a large distance between the extreme southern sections in northern New South Wales (NSW) and those parts in rangeland Queensland. Vegetation is predominantly mixed eucalypt woodland with areas of brigalow scrubs and open Mitchell grasslands. There are 3 endangered ecological communities within the bioregion listed under Schedule 1 of the TSC Act. These are the semi-evergreen vine thicket Cadellia pentastylis (poline or scrub myrtle) and carbeen open forest communities. Several significant wetlands occur in the bioregion. Lake Goran is considered to be significant as it provides an important refuge for waterbirds and other species during times of drought (ANCA 1996).

On a local scale, the proposed development is located in the Northern Basalts sub-region. The Northern Basalts sub-region is characterised by undulating low stony hills, long slopes with sandy wash and heavy clays on the basalt flats.

The subject land is located within the undulating low stony hills and valleys and is described as a tertiary basalt profile. The soils of the tertiary basalts is black loams on basalt ridges and heavy grey clay on flats.

The ecological vegetation class is brigalow scrubs with understoreys of mixed softwood, with complex pure softwood patches. The common species include Brigalow, Belah, Whitewood, Wilga, Budda and Poplar Box on basalt hills. Silver-leaved Ironbark, Spotted Gum and Smooth-barked Apple on stony hills. River Red Gum, Belah, Myall and Poplar Box on basalt flats. Silver-leaved Ironbark and White Cypress Pine in sandstone rocks, Smooth-barked Apple, White Cypress, Blakely's Red Gum, Moreton Bay Ash, Poplar Box, Wilga, Rough-barked Apple, Bull Oak, on lower sandstone slopes. White Box, with Silver-leaved Ironbark, White Wood, Bull Oak and Brigalow on alluvial clays. River Red Gum on all streams (NSW NPWS, 2003).

13.8.2.2 Rivers, streams, estuaries and wetlands

There are several ephemeral waterways on the subject land. These waterways comprise first, second and third order waterways under the Strahler stream ordering classification. The third order waterway is named as Back Creek. One of the second order waterways is an unnamed minor tributary of Back Creek and is located within proximity to the proposed development complex site. The other second order waterway is named as Scrubby Gully which is also a tributary of Back Creek with its confluence located downstream of the subject land, however.

No other rivers, estuaries or wetlands occur on the subject land. Back Creek and tributaries of Forest Creek occur in the local area.

No important local wetlands, national wetlands (i.e. as listed in The Directory of Important Wetlands of Australia (Environment Australia 2001)) or international wetlands (e.g. Ramsar listed) are located within the vicinity of the subject land as outlined in section 13.5.

The proposed development will not result in any impacts on these waterways or wetlands.

13.8.2.3 Native vegetation

The subject land has largely been cleared of native vegetation, except for along drainage lines, land designated as road and areas less favourable for cropping. The majority of the subject land has been cleared for cropping.

13.8.2.4 Plant community types

Native vegetation within the subject land does not readily translate to any plant community type (PCT) as the residual/remnant native vegetation is limited to a series of patches of trees and scattered paddock trees.

Potential PCTs and TECs occurring on the subject land were determined using photograph interpretation and available vegetation mapping (State Government of NSW and Department of Planning and Environment 2022).

Several potentially occurring vegetation types were identified, consisting of:

- PCT 589 - White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion;
- PCT 429 - White Cypress Pine - Poplar Box - Silver-leaved Ironbark viney shrub woodland of the Brigalow Belt South Bioregion;
- PCT 441 - Carbeen - White Box +/- Silver-leaved Ironbark grassy tall woodland on basalt hills, Brigalow Belt South Bioregion;
- PCT 56 - Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW; and
- PCT 36 - River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion.

13.8.2.5 Threatened species

A desktop assessment was undertaken to identify threatened flora and fauna species, populations and ecological communities listed under the NSW *Biodiversity Conservation Act 2016 (BC Act)* the NSW *National Parks and Wildlife Act 1974* (NPW Act) and the NSW *Fisheries Management Act 1994* (FM Act), in addition to MNES listed under the EPBC Act that may be affected by the proposed development. Biodiversity databases pertaining to the proposed development area and locality (i.e. within 5 km of the proposed development site) were reviewed.

The results of the database searches are summarised below with further detail provided in Appendix J. Table 56, Table 57 and Table 58 show the results of searches and the status of each species identified as locally occurring, under the *Biodiversity Conservation Act 2016 (BC Act)* and the Environment Protection and Biodiversity Conservation (EPBC) Act.

Database search results indicated two critically endangered ecological communities are likely to occur within 5 km of the development area, specifically Natural Grasslands on basalt and fine- textured alluvial plains of northern New South Wales and southern Queensland and White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland.

The protected matters search presented in Appendix J identified the existence of five threatened ecological communities and seven flora species as listed under the EPBC Act as known or likely to occur in the vicinity of the proposed development.

Table 56 – Listed Threatened Ecological Communities in the region

Name	Status Biodiversity and Conservation Act NSW	Status EPBC Commonwealth
Brigalow (Acacia harpophylla) dominat and co-dominant)	Endangered	Endangered
Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions	Endangered	Endangered
Natural grasslands on basalt and fine- textured alluvial plains of northern New South Wales and southern Queensland	Critically Endangered	Critically Endangered
Poplar Box Grassy Woodland on Alluvial Plains	Endangered	Endangered
Weeping Myall Woodlands	Endangered	Endangered
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Critically Endangered

No endangered or critically endangered ecological communities were identified on the subject land during the field assessment by Birdwing Ecological Services, 2024 (Appendix J).

Table 57 – Threatened flora species recorded in the region

Scientific Name	Common Name	Status BC Act NSW	Status EPBC
Cadellia pentastylis	Ooline	Vulnerable	Vulnerable
Dicanthium setosum	Bluegrass	Vulnerable	Vulnerable
Homopholis belsonii	Belson’s Panic	Vulnerable	Vulnerable
Lepidium aschersonii	Spiney Pepper-cress	Vulnerable	Vulnerable
Lepidium monoplocoides	Winged Pepper-cress	Endangered	Endangered
Thesium australe	Austral Toadflax, Toadflax	Vulnerable	Vulnerable
Swainsona murrayana	Slender Darling-pea	Vulnerable	Vulnerable
Vincetoxicum forsteri listed as Tylophora linearis	-	Endangered	Endangered

Database search results indicate that 23 threatened fauna species (17 birds, three mammals, two Amphibians and one reptile) listed under the EPBC Act as potentially occurring within 5 km of the proposed development site as listed in Table 58.

Table 58 – Threatened fauna species recorded in the region

Scientific Name	Common Name	Status TSC	Status EPBC
Reptiles			
Anomalopus mackayi	Five-clawed Worm-skink, Long-legged Worm-skink	Endangered	Vulnerable
Hemiaspis damelii	Grey Snake	Not listed	Endangered
Uvidicolus sphyrurus	Border Thick-tailed Gecko	Not listed	Vulnerable
Birds			
Anthochaera phrygia	Regent Honeyeater	Not listed	Critically endangered
Aphelocephala leucopsis	Southern Whiteface	Not listed	Vulnerable-
Neophema Chrysostoma	Blue-winged Parrot	Not listed	Vulnerable
Calidrus ferruginea	Curlew Sandpiper	Not listed	Critically endangered
Climacteris picumnus victoriae	Brown Treecreeper (south-eastern)	Not listed	Vulnerable
Falco hypoleucos	Grey Falcon	Vulnerable	Vulnerable
Grantiella picta	Painted Honeyeater	Vulnerable	Vulnerable
Hirundapus caudacutus	White-throated Needletail	Not listed	Vulnerable
Lathamus discolor	Swift Parrot	Vulnerable	Critically Endangered
Polytelis swainsonii	Superb Parrot	Vulnerable	Endangered
Melanodryas cucullata cucullata	South-eastern Hooded Robin, Hooded Robin	Not listed	Endangered
Neophema chrysostoma	Blue-winged Parrot	Not listed	Vulnerable
Rostratula australis	Australian Painted Snipe	Not listed	Endangered
Stagonopleura guttata	Diamond Firetail	Not listed	Endangered
Mammal			
Nyctophilus corbeni	Corben's Long-eared Bat, South-eastern Long-eared Bat	Not listed	Vulnerable
Chalinolobus dwyeri	Large-eared Pied Bat, Large Pied Bat	Vulnerable	Endangered
Phascolarctos cinereus	Koala	Vulnerable	Endangered
Dasyurus maculatus maculatus (SE mainland population)	Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population)	Vulnerable	Endangered
Pteropus poliocephalus	Grey-headed Flying-fox	Not listed	Vulnerable
Fish			
Maccullochella peelii	Murray Cod	Not listed	Endangered

The field assessment did not identify or observe any rare, endangered, vulnerable or threatened flora or fauna species (Birdwing Ecological Services, 2024).

13.8.2.6 Biodiversity values map

The Biodiversity Values Map is one of the Biodiversity Offsets Scheme thresholds. The Biodiversity Values Map identifies land with high biodiversity value that is particularly sensitive to impacts from development and clearing. The scheme automatically applies to proposals on land mapped on the Biodiversity Values Map.

Prepared by the Department of Planning and Environment (DPE) under Part 7 of the Biodiversity Conservation Act 2016 (BC Act), the Biodiversity Values Map includes a range of mapping layers.

A review of the Biodiversity Values Mapping tool indicates that the subject land does contain land with high biodiversity value that may be sensitive to impacts from development and clearing as shown in Figure 39. These areas are confined along Back Creek and Scrubby Gully. The proposed development complex site is not located within close proximity to Back Creek or Scrubby Gully as shown in Figure 35.

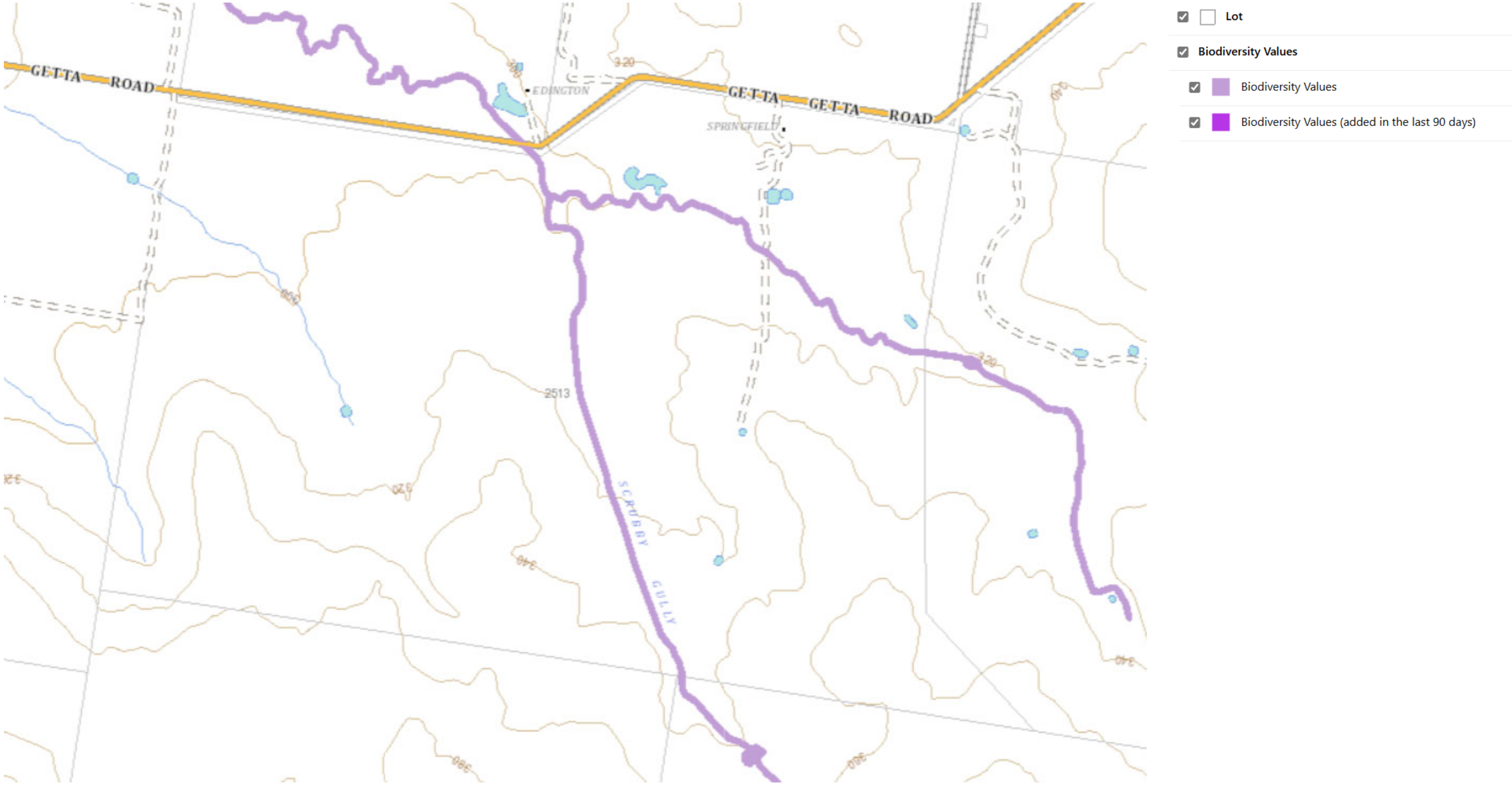


Figure 39 – Subject land – Biodiversity Values Map and Threshold Tool

13.8.2.7 Biodiversity Offsets Scheme thresholds

The Biodiversity Offsets Scheme applies to proposals that exceed the area-clearing threshold. The area clearing threshold varies according to the relevant minimum lot size at the proposal site (shown in the lot size maps made under local environment plans) or the actual lot size (where there is no minimum lot size provided for in the relevant local environmental plan). If there are multiple relevant minimum lot sizes, the smallest one applies.

The generation of a Biodiversity Offset Scheme Entry Threshold Report (BOSET Report) (NSW DCCEEW, 2024) reveals that the minimum lot size according to the Gwydir Local Environmental Plan 2013 is 200 ha, and that the Area Clearing Threshold required to enter the Biodiversity Offset Scheme (BOS), and for a Biodiversity Development Assessment Report (BDAR) to be completed, is 1.0 ha.

Therefore, for development to avoid entering the BOS and requiring a BDAR to be undertaken, native vegetation clearance must be < 1 ha.

The proposed clearing of native vegetation is greater than 1 ha, the total native vegetation loss is greater than the clearance threshold of 1 ha, and a BDAR is triggered by this mechanism (Birdwing Ecological Services, 2024).

The proposed development is in compliance with all criteria for NSW Environment and Heritage Biodiversity Offsets Scheme.

13.8.3 Fish Habitat areas

One of the objectives of the *Fisheries Management Act 1994* is to 'conserve key fish habitats'. A Key Fish Habitat Area (KFH) has been defined as those aquatic habitats (freshwater and marine) which has been identified as having particular values for the sustainability of the recreational and commercial fishing industries, the maintenance of fish populations generally and the survival and recovery of threatened aquatic species. Not all aquatic habitats are important for the conservation of fish populations and the sustainability of fishing activities.

KFHs are managed by the Department of Primary Industries – Fisheries. The Department of Primary Industries – Fisheries has developed statewide mapping for each local government area to define and identify KFHs within each jurisdiction. KFHs are defined to include all marine and estuarine habitats up to highest astronomical tide level ('king' tides) and most permanent and semi-permanent freshwater habitats including rivers, creeks, lakes, lagoons, billabongs, weir pools and impoundments up to the top of the bank. Small headwater ephemeral creeks and gullies (known as first and second order streams) are generally excluded, as are farm dams constructed on such systems. Wholly artificial waterbodies such as irrigation channels, urban drains and ponds, salt and evaporation ponds are also excluded except where they are known to support populations of threatened fish or invertebrates (NSW Department of Industry, 2019)

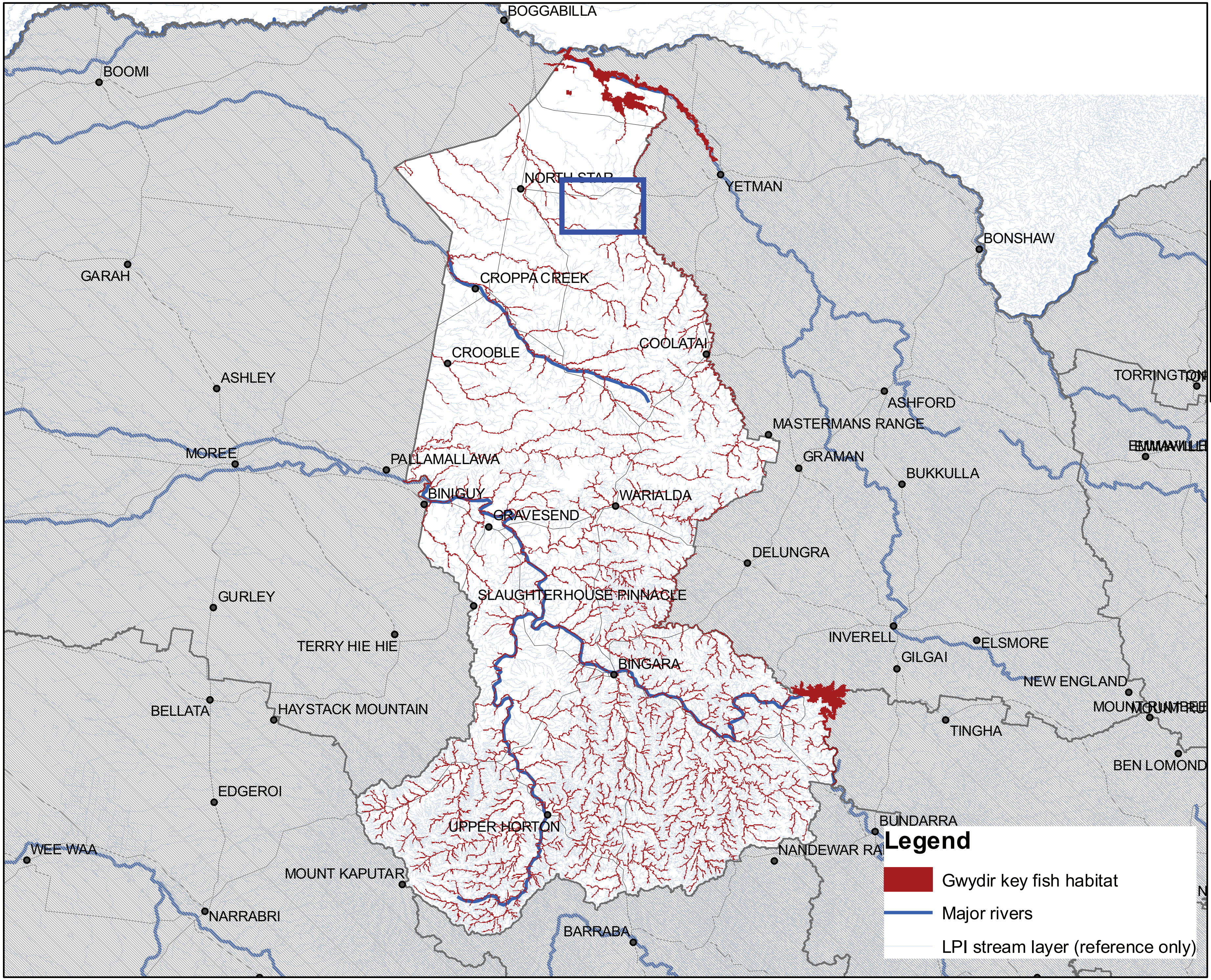
The KFH area map for the Gwydir Shire Council local government area was obtained from the Department of Primary Industries-Fisheries and is provided in Figure 40.

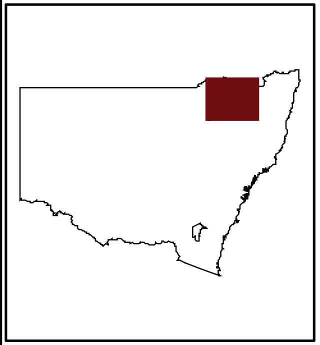
As shown in Figure 40, the lower reach of Back Creek to the confluence with Scrubby Gully on the subject land is mapped as a KFH area. The proposed development site shall be located some 1,500 m upstream and outside of the KFH area. The proposed effluent and solid waste utilisation areas are not located within a KFH area respectively.

Consequently, the proposed development will not be located within or adjacent to any KFH. The proposed development infrastructure shall be sited some 1,500 m from the closest mapped KFH on Back Creek.

Key Fish Habitat

GWYDIR LGA





Source: data from the Australian Geoscience, NSW DPI, NSW DECC and NSW LPI
Datum: Geocentric Datum of Australia (GDA)
Grid: Mapping Grid of Australia (MGA94)

The State of New South Wales, the Department of Primary ndustries, its employees, officers, agents or servants are not esponsible for the result of any actions taken on the basis of the information contained on the map, or for any errors, omissions or inaccuracies that may occur on this map.

Prepared by GIS section, Fisheries Ecosystems Branch, Division of Agriculture & Fisheries, NSW DPI.

0 5 10 20
Kilometres

N

NSW DEPARTMENT OF PRIMARY INDUSTRIES

LOCATION OF SUBJECT LAND

FIGURE 40

13.8.4 Assessment of impacts

13.8.4.1 Direct impacts

The majority of the subject property on which the development is proposed has been previously cleared, primarily for cattle grazing and cultivation purposes and has been impacted to varying degrees by weed invasion and overgrazing by stock and feral species. The impact of this action is that the remnant vegetation communities are now largely confined to small areas fringing draining lines and clusters, with consequential habitat fragmentation effects on the indigenous biota.

A consequence of the intensive land-use activities is that pasture grasses and to a lesser extent weeds have colonised much of the subject land. In addition to these impacts, feral animals have also colonised the subject property with frequent observations made during the field assessment phase of evidence of feral pigs (sus scrofa) and European red foxes (*vulpes vulpes*).

A site-specific overlay of native vegetation communities and the proposed development on the subject land has been prepared and shown on Figure 41. The native vegetation communities mapping is based on field assessments which has amended OEH mapped data errors or other inadequacies identified.

The proposed development shall have no direct impacts on the riparian areas fringing watercourses and drainage lines as no clearing of this vegetation is required and buffers from effluent and solid waste utilisation have been allowed.

The proposed development shall have no direct impacts on vegetation communities within grazing areas as these areas have already been significantly modified from their native state for cropping and grazing and isolated and clusters of trees to be used as shade trees shall not be removed.

The proposed development complex has been deliberately sited so that no clearing of the native vegetation is minimised as shown on Figure 41.

The site of the proposed development complex comprises White Cypress Pine - Poplar Box - Silver-leaved Ironbark viney shrub woodland. Therefore, the proposed development would result in direct impacts to some 0.21 ha of remnant woodland vegetation to enable the construction of the production pens, feed roads and cattle handling infrastructure.

Direct impacts to biodiversity shall be mitigated by offsetting (as per BAM Subsection 9.2.2(2.)) identified impacts (ecosystem credits). No impacts to species credit require an offset.

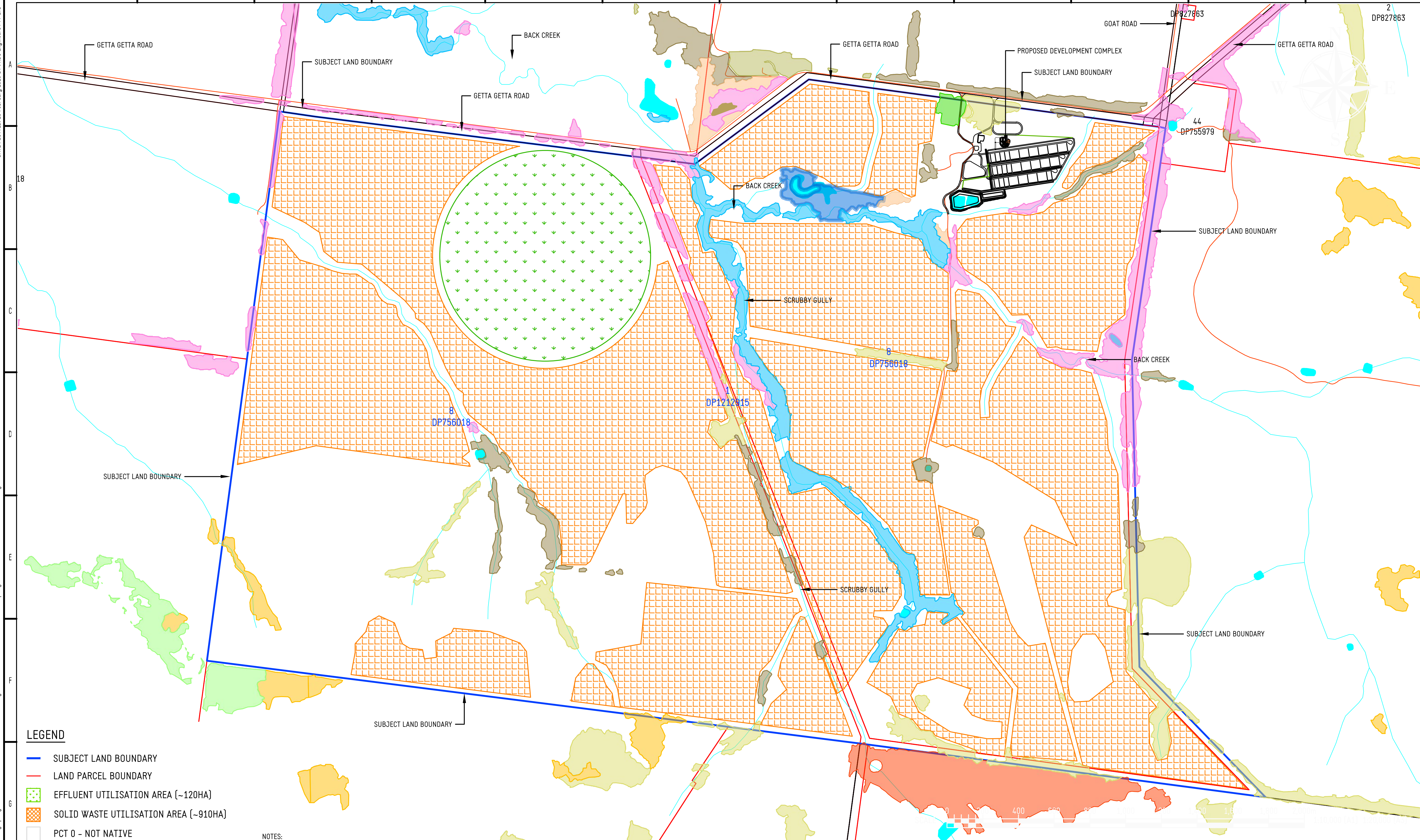
Effluent and solid waste utilisation would primarily impact areas that are currently used for grazing and cropping activities.

13.8.4.2 Indirect impacts

Indirect impacts may be experienced on areas outside of or adjacent to the proposed development site as a result of the construction and/or operation. Such impacts would largely operate on a short to medium timeframe and would be minimised where possible through management procedures.

A range of indirect impacts are likely to, or could occur as a result of the proposed development, these include:

- Increased spreading of weed propagules;
- Erosion or sedimentation in areas adjoining construction and operational activities;
- Increased noise, dust and light from construction and operational activities;
- Loss of connectivity and fragmentation of habitats at a regional scale through clearing of intact areas of native vegetation within the disturbance area; and
- Increased edge effects for surrounding vegetated areas.



LEGEND

- SUBJECT LAND BOUNDARY
- LAND PARCEL BOUNDARY
- EFFLUENT UTILISATION AREA (~120HA)
- SOLID WASTE UTILISATION AREA (~910HA)
- PCT 0 - NOT NATIVE
- PCT 35 - BRIGALOW BELAH
- PCT 36 - RIVER RED GUM
- PCT 56 - POPLAR BOX BELAH WOODLAND
- PCT 378 - BELAH - WILGA
- PCT 429 - WHITE CYPRESS PINE - POPLAR BOX
- PCT 441 - CARBEEN - WHITE BOX
- PCT 589 - WHITE BOX - WHITE CYPRESS PINE

NOTES:

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3. PLANT COMMUNITY TYPE DATA BASED ON STATE VEGETATION TYPE MAP: BORDER RIVERS GWYDIR / NAMOI REGION VERSION 2.0 VIS_ID 4467. THIS DATASET WAS DEVELOPED AS PART OF THE OEH STATE VEGETATION MAP TO PROVIDE GOVERNMENT AND COMMUNITY WITH REGIONAL-SCALE INFORMATION ABOUT NATIVE VEGETATION.
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REV.	DATE	REVISION DESCRIPTION	DRAWN	CHECK	APPROVED
A	24/01/25	DRAFT ISSUE TO CLIENT	RJD	RJD	RJD
B	21/02/25	FINAL ISSUE FOR SUBMISSION TO GSC	RJD	RJD	RJD

SCALE	1:20,000 (A3)
DRAWN	RJD
DATE	21/02/2025
CHECKED	RJD
DATE	21/02/2025
APPROVED	RJD
DATE	21/02/2025

CLIENT DOOLIN FARMING PTY LTD

PROJECT PROPOSED 3,000 HEAD BEEF CATTLE FEEDLOT

TITLE DEVELOPMENT APPLICATION FOR INTENSIVE LIVESTOCK AGRICULTURE
ENVIRONMENTAL IMPACT STATEMENT
SUBJECT LAND - PLANT COMMUNITY TYPE OVERLAY

REPORT REFERENCE FIGURE 41 | SUPPLIED DRAWING NUMBER | A3 | DRAWING NUMBER E2-103-00-41 | REV. B

DATE PLOTTED: 20 February 2025 BY : RDC Engineers PTY LTD

FILE PATH: C:\RDC Engineers\RDCE - Projects\E2-103 Doolin Farming Springfield EIS\05 - ACAD MasterPlan\05.1 Drawings - CURRENT FILE NAME: E2-103 DF Springfield MASTERPLAN-00-20250108vB.dwg

13.8.4.3 Biodiversity Conservation Act 2016 considerations

State legislation requires consideration of threatened species of fauna and flora, endangered populations and endangered ecological communities under the Biodiversity Conservation Act 2016, the Environmental Planning & Assessment Act, 1979 (EP& A Act) and the Fisheries Management Act 1994) (FMA). Where it is considered that threatened species, endangered populations or endangered ecological communities occur or are likely to occur, then a Seven Part Test of Significance (section 7.3 of the EP&A Act, 1979) must be applied.

It is considered that no threatened species, endangered populations or endangered ecological communities are likely to occur in the area proposed to be cleared, therefore a seven-part test of significance has not been undertaken. Refer to the BDAR report presented in Appendix J.

13.8.4.4 EPBC considerations

The proposed development area does not contain any threatened species listed under the EPBC Act as occurring in the region.

13.8.4.5 Koala Habitat Protection

Koala habitat protection is contained in two chapters of State Environmental Planning Policy (Biodiversity and Conservation) 2021 as outlined below:

- **Chapter 3 'Koala habitat protection 2020'** applies to rural zoned land (RU1 Primary Production, RU2 Rural Landscape and RU3 Forestry) in 74 local government areas (LGAs).
- **Chapter 4 'Koala habitat protection 2021'** applies to the remaining zones in 74 LGAs, and to all zones in Metropolitan Sydney (Blue Mountains, Campbelltown, Hawkesbury, Ku-ring-gai, Liverpool, Northern Beaches, Hornsby, Wollondilly) and the Central Coast.

Chapter 3 of the Koala habitat protection of State Environmental Planning Policy (Biodiversity and Conservation) 2021 applies to the subject land as it is Zone RU1 Primary Production.

Chapter 3 describes the steps that must be followed to determine the koala assessment pathway.

Step 1 of Chapter 3 Is the land potential koala habitat?

1. Before a council may grant consent to a development application for consent to carry out development on land to which this Part applies, the council must be satisfied as to whether or not the land is a potential koala habitat.
2. The council may be satisfied as to whether or not land is a potential koala habitat only on information obtained by it, or by the applicant, from a person who is qualified and experienced in tree identification.
3. If the council is satisfied—

(a) that the land is not a potential koala habitat, it is not prevented, because of this Chapter, from granting consent to the development application, or
(b) that the land is a potential koala habitat, it must comply with section 3.7.

The proposed development site qualifies as 'potential Koala habitat' under the terms of State Environmental Planning Policy (Koala Habitat Protection) 2021 as:

- the proposed development is located within local government area listed in Schedule 2 Local government areas – Chapter 4 of State Environmental Planning Policy (Biodiversity and Conservation) 2021
- The land is in relation to which a development application has been made; and
- The development application applies to the whole, or only part, of the land—
  (i) has an area of more than 1 hectare, or
  (ii) has, together with adjoining land in the same ownership, an area of more than 1 hectare

Step 2 Is the land core koala habitat?

- Before a council may grant consent to a development application for consent to carry out development on land to which this Part applies that it is satisfied is a potential koala habitat, it must satisfy itself as to whether or not the land is a core koala habitat.

- The council may be satisfied as to whether or not land is a core koala habitat only on information obtained by it, or by the applicant, from a person with appropriate qualifications and experience in biological science and fauna survey and management.

- If the council is satisfied—
  (a) that the land is not a core koala habitat, it is not prevented, because of this Chapter, from granting consent to the development application, or
  (b) that the land is a core koala habitat, it must comply with section 3.8.

Step 3 Can development consent be granted in relation to core koala habitat?

- Before granting consent to a development application for consent to carry out development on land to which this Part applies that it is satisfied is a core koala habitat, there must be a plan of management prepared in accordance with Part 3 that applies to the land.
- The council's determination of the development application must not be inconsistent with the plan of management.

Schedule 3 of State Environmental Planning Policy (Biodiversity and Conservation) 2021 lists koala use tree species for all regions in NSW that koala inhabit.

The subject land on which the for the development is proposed contains several areas of native vegetation fringing drainage lines to the southwest of the existing development complex.

The field assessment by Birdwing Ecological Services (2024) identified areas containing:

- PCT 589 - White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion
- PCT 429 - White Cypress Pine - Poplar Box - Silver-leaved Ironbark viney shrub woodland of the Brigalow Belt South Bioregion
- PCT 441 - Carbeen - White Box +/- Silver-leaved Ironbark grassy tall woodland on basalt hills, Brigalow Belt South Bioregion
- PCT 56 - Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
- PCT 36 - River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion

White Box (*Eucalyptus albens)*, Poplar Box (*Eucalyptus populnea)* and River Red Gum (*Eucalyptus camaldulensis)* are listed as koala food tree species in the State Environmental Planning Policy (Biodiversity and Conservation) 2021. White Cypress-pine (*Callitris glaucophylla*) is listed as a koala use tree species in the State Environmental Planning Policy (Biodiversity and Conservation) 2021

The proposed development complex site does not contain any White Cypress-pine (*Callitris glaucophylla*), White Box (*Eucalyptus albens)*, Poplar Box (*Eucalyptus populnea)* or River Red Gum (*Eucalyptus camaldulensis)* trees.

Consequently, the proposed development will not result in an adverse effect on the life cycle of the Koala. There is no new or additional infrastructure that will be interfering with the remnant vegetation on-site. The proposed development will not require the removal of any remnant vegetation on-site. Although there is designated Koala use tree species present as woodland White Cypress pine (*Callitris glaucophylla)* no evidence had been located to indicate that the proposed development complex site is of any significant importance to the Koala. The subject land owners or field assessment have not identified the existence of any koalas on-site even though there is vegetation on-site that may be considered koala habitat.

In accord with Step 1 of Chapter 3 of the SEPP (Biodiversity and Conservation) 2021 the applicant recommends to the Gwydir Shire Council that the subject land includes potential koala habitat but that the proposed development includes no current or proposed uses that would impact or interfere with both the mapped vegetation community and any koalas that may frequent the vegetation community. The proposed development complies with Step 1 of Chapter 3 by not interfering with any koala communities that may exist in the mapped vegetation. The Council should be satisfied that the development footprint has no impact on the koala communities that may be present and should therefore consider the intent of the relevant SEPP complied with.

13.8.5 Mitigation measures

Impacts to biodiversity have been considered throughout the site selection and design process. Where possible, impacts to species and habitat of conservation significance have been avoided.

Management and mitigation measures would be implemented to minimise impacts on biodiversity during the construction and operation stages of the proposed development. These include:

- Protection of the existing White Cypress-pine woodland, White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland, Poplar Box - Belah woodland and River Red Gum woodland;
- Clearing restricted to those areas required for infrastructure and firebreaks;
- Communications protocols for employee and contractor education;
- Provisions to limit heavy vehicle speeds and for signage along access roads;
- Methods and communication tools to monitor road strike and mortality of wildlife; and
- Any areas to be rehabilitated with species of local providence.

13.8.6 Conclusion

An assessment of potential biodiversity impacts from the proposed development has been undertaken by Birdwing Ecological Services (2024) and is presented in Appendix J. The biodiversity assessment takes into account other relevant Commonwealth and NSW legislation and environmental planning instruments.

The subject land is not in a declared area of outstanding biodiversity value, the proposed development area is not mapped as *Vulnerable or Sensitive Regulated Land* according to the Section 60F of the *Local Land Services Act 2013*, and is also not mapped as an area of Biodiversity Value and a BDAR is not triggered on the basis of this mechanism.

Clearing of native vegetation is proposed, and accordingly a BDAR is triggered on the basis of this mechanism.

After likelihood assessment, given the highly disturbed and modified condition of the proposed development area and the poor landscape connectivity of the site, it is considered that none of the threatened flora and fauna species were likely to utilise the proposed development complex area.

The biodiversity assessment concluded no threatened species would be significantly affected by the proposed development. A Species Impact Statement and/or Referral to the Federal Minister for the Department of Climate Change, Energy, the Environment and Water (DCCEEW) is not required.

Further, recommendations and environmental safeguards have been provided to minimise impacts to biodiversity.

13.9 Protected and conservation areas

13.9.1 Introduction

Protected areas are areas specially set aside under law for the protection and conservation of biodiversity and/or natural or cultural heritage values within them. Protected areas of land and water in original or close to original natural condition are the cornerstone of nature conservation efforts in NSW.

For the terrestrial environment, nearly all of such land is in the state's public reserve system. This is a substantial network of protected areas that:

- conserves representative areas of the full range of habitats and ecosystems, plant and animal species, and significant geological features and landforms in NSW;
- protects areas of significant cultural heritage; and
- provides opportunities for recreation and education.

As well as the protected area system, NSW also conserves the environment through other measures. Conservation of natural values across the whole is increasingly being focused on public and privately owned areas outside the reserve system such as:

- Conservation agreements;
- Wildlife refuges;
- Incentive property vegetation plans;
- Nature Conservation Trust agreements; and
- BioBanking agreements / Stewardship sites; etc

Conservation reserves are managed and protected under the *National Parks and Wildlife Act 1974*. Flora reserves are managed by the Forestry Corporation under the *Forestry Act 2012*. State parks which cover significant natural areas of bush and wetlands are managed by various trusts under the *Crown Lands Act 1989*. Travelling stock routes (TSRs) are managed as a trust by Local Land Services or leaseholders by private landholders under the Crowns Land Act 1989.

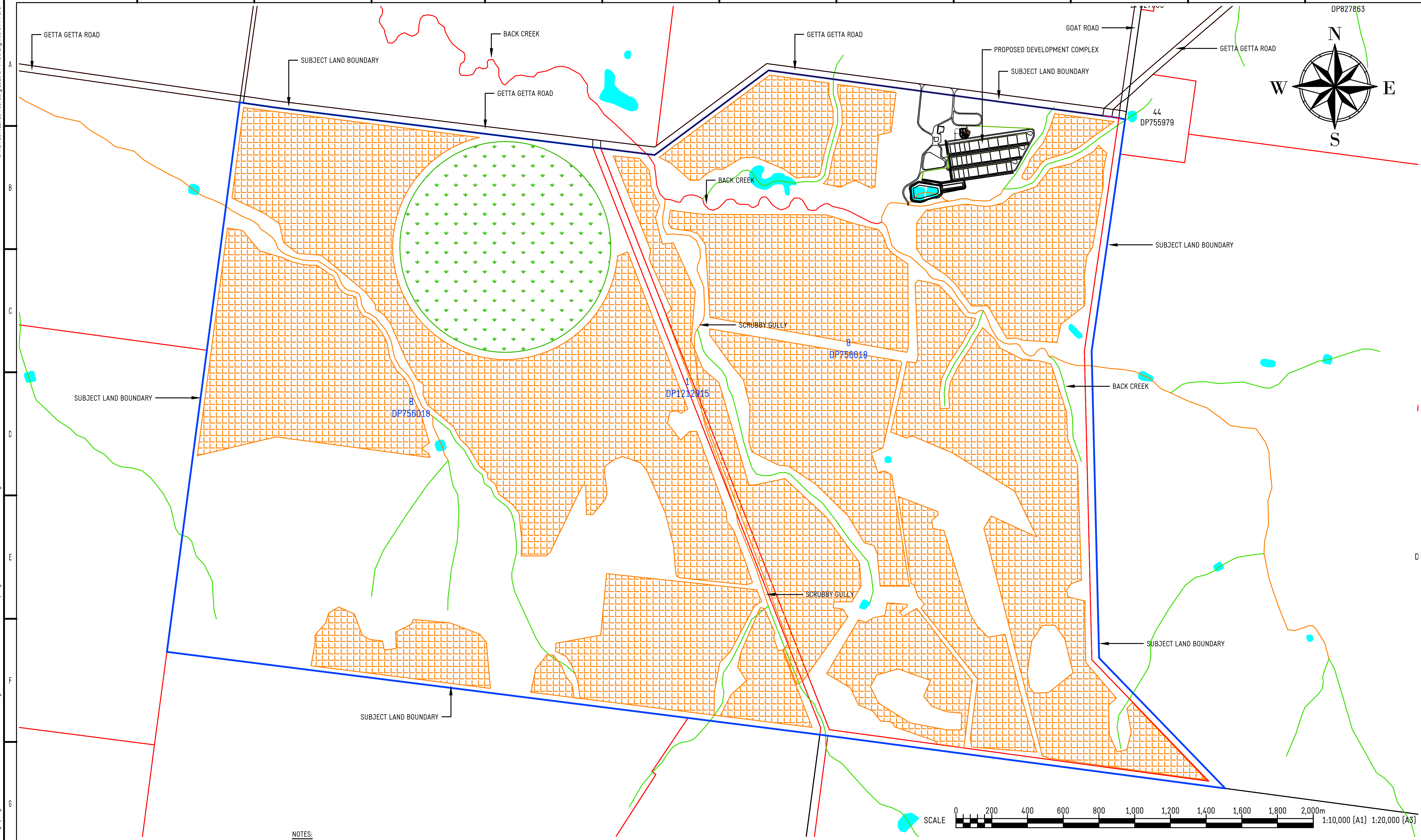
13.9.2 Existing environment

An overlay of National Parks, NSW State Forests, Flora Reserves and Timber Reserves relating to the subject land was obtained from the SEED NSW Government's central resource for Sharing and Enabling Environmental Data Open Data portal and shown in Figure 42.

As shown in Figure 42, there are no State Forests, Flora Reserves and Timber Reserves within the subject land. The closest conservation estates to the subject land are the Yetman State Forest, Planchonella Nature Reserve, Burral Yurral Nature Reserve and Dthinna Dthinnawan National Park and Nature Reserve which are located some 17.5 km east, 16 km to the south southeast, 24 km east southeast and 24 km northeast respectively.

All drainage from the subject land flows north-west to Back Creek, then to Whalan Creek and the Barwon River, away from the closest conservation areas as shown on Figure 42.

The subject land does not contain any other conservation areas managed outside of the reserve system such as conservation agreements; wildlife refuges, Nature Conservation Trust agreements, biobanking agreements or stewardship sites.



LEGEND

- SUBJECT LAND BOUNDARY
- LAND PARCEL BOUNDARY
- EFFLUENT UTILISATION AREA
- SOLID WASTE UTILISATION AREA
- CONSERVATION RESERVE
- PROTECTED AREA
- STREAM ORDER 1
- STREAM ORDER 2
- STREAM ORDER 3
- STREAM ORDER 4
- STREAM ORDER 5
- STREAM ORDER 6
- STREAM ORDER 7
- STREAM ORDER 8

NOTES:

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3. PROTECTED AREAS AND CONSERVATION RESERVES BASED ON STATE FORESTS NSW FOREST TYPES, FLORA RESERVES AND TIMBER RESEARVES DATA PROVIDED BY NSW DEPARTMENT OF PLANNING, INDUSTRY AND ENVIRONMENT VIA SEED (THE CENTRAL RESOURCE FOR SHARING AND ENABLING ENVIRONMENTAL DATA) PORTAL.
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REV.	DATE	REVISION DESCRIPTION	DRAWN	CHECK	APPROVED
A	24/01/25	DRAFT ISSUE TO CLIENT	RJD	RJD	RJD
B	21/02/25	FINAL ISSUE FOR SUBMISSION TO GSC	RJD	RJD	RJD

SCALE	1:20,000 (A3)
DRAWN	RJD
DATE	21/02/2025
CHECKED	RJD
DATE	21/02/2025
APPROVED	RJD
DATE	21/02/2025

CLIENT: DOOLIN FARMING PTY LTD

PROJECT: PROPOSED 3,000 HEAD BEEF CATTLE FEEDLOT

TITLE: DEVELOPMENT APPLICATION FOR INTENSIVE LIVESTOCK AGRICULTURE
ENVIRONMENTAL IMPACT STATEMENT
SUBJECT LAND - PROTECTED AREAS AND CONSERVATION RESERVES OVERLAY

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 42		A3	E2-103-00-42	B

13.9.3 Assessment of impacts

13.9.3.1 Erosion and sediment control

Removal of vegetation and disturbance of groundcover from construction activities will expose the soil and increase the risk of erosion. However, erosion and sediment controls shall be implemented during construction and during operation to prevent erosion and the movement of sediment.

Due to the separation of the subject land from the closest protected and conservation areas and being located in a different catchment, it is considered that erosion of and sediment deposition on protected and conservation areas shall not occur.

13.9.3.2 Stormwater runoff

Due to the separation of the subject land from the closest protected and conservation areas and being located in a different catchment, it is considered that stormwater flow regimes on protected and conservation areas shall not be affected by the proposed development.

The proposed development shall be contained within a controlled drainage area and the effluent and solid waste sustainably applied to the proposed effluent and solid waste utilisation areas.

13.9.3.3 Effluent and solid waste management

As outlined in section 8.4.9, 8.4.10, 8.4.11 and Figure 13 the proposed development shall be sited, designed, constructed and operated to ensure that effluent and solid waste is sustainably utilised on-site and on land sufficiently separated from protected and conservation areas. Consequently, no adverse impacts on protected and conservation areas due to waste utilisation from the proposed development are likely.

13.9.3.4 Management implications relating to pests, weeds and edge effects

As outlined in section 13.15, an integrated approach to weed and pest animal management shall be implemented based around the important elements of weed hygiene, operational hygiene, prevention of infestations, arresting weed outbreaks using effective reporting and physical or chemical control procedures, documenting weed and pest animal infestations and auditing management programs.

Subsequently, the proposed development is not expected to impact the soils, waterways and loss of biodiversity of the nearby protected and conservation areas from the introduction and/or spread of pest animals and/or weeds provided the mitigation measures outlined in section 13.15.4 are implemented.

No activities or infrastructure are proposed as part of the proposed development that shall impede access to protected and conservation areas for management purposes.

13.9.3.5 Fire and the location of asset protection zones

As outlined in section 8.7.11, a fire management strategy shall be developed for fire developing from a range of sources. These include bushfires (e.g. planned controlled burning that escapes the original burn zone, embers from a cigarette or unattended campfire, lightning strikes, or deliberate arson) and fires originating from the proposed development such as from flammable chemical storage, machinery use, electrical faults, maintenance activities or feed storage and processing where hay and/or grain dust is present etc.

Appropriate fire management measures shall be implemented within the proposed development complex such as fire breaks. Further, there is no expectation that NSW NPWS change its fire management regime for the closest protected and conservation areas.

13.9.3.6 Boundary encroachments and access

No pre-construction, construction or post-construction activity shall occur within or through protected and conservation areas. All access to the proposed development shall be via the site entrance on Getta Getta Road as shown in Figure 6.

13.9.3.7 Visual, odour, noise, vibration, air quality and amenity impacts

As outlined in sections 13.1, 13.13 and 13.14, and shown in Figure 15, the proposed development complex is not located on land adjacent to protected and conservation areas and is sufficiently separated such that no reduction of amenity on the closest protected and conservation areas shall result.

13.9.3.8 Threats to ecological connectivity and groundwater dependent ecosystems

As outlined in sections 13.8, and shown in Figure 15, any clearing associated with the proposed development complex shall not reduce connectivity, linkages or refuge hole for any native vegetation and other flora and fauna habitats. Land adjacent to protected and conservation areas shall remain unaffected by the proposed development.

13.9.3.9 Cultural heritage

As outlined in section 8 and Figure 15, no impacts to the Aboriginal heritage values on protected and conservation areas, and areas and sites of heritage value that are World Heritage listed, on the National Heritage Register, or the State Heritage Register shall result due to the siting, construction and operation of the proposed development.

Land adjacent to protected and conservation areas shall be unaffected by the proposed development.

13.9.4 Mitigation measures

The implementation of the following management and mitigation measures shall mitigate identified potential issues associated with impacts to adjacent or nearby protected and conservation areas:

- Provision of adequate separation distances between the proposed development and protected and conservation areas as shown in Figure 15;
- Preparation and implementation of a construction Erosion and Sediment Control plan prior to commencement of construction activities;
- A controlled drainage area designed to an acceptable hydrological standard that prevents unauthorised discharges of runoff from areas such as pens, livestock handling and solid waste storage and processing area which have high organic matter and therefore a high pollution potential;
- Runoff external to the controlled drainage area is diverted away from the controlled drainage area to existing natural drainage lines downstream of protected and conservation areas;
- Elements of the controlled drainage area are designed to capture contaminated stormwater runoff from within the development complex and safely divert it to a sedimentation system as discussed in section 8.4.10;
- A sedimentation system is designed to provide flow velocities less than 0.005 m/s, and discharge to a holding pond as discussed in section 8.4.10.1;
- A holding pond is designed to store runoff from the controlled drainage area without spilling or overtopping at an unacceptable frequency as discussed in section 8.4.10.2;
- Appropriately designed weirs and by-washes are used to discharge excess runoff downstream of protected and conservation areas during overtopping or spill events in the sedimentation system and holding pond;
- Construction of a dedicated entrance for the proposed development based on relevant engineering standards;
- Earthmoving machinery shall be cleaned down prior to entering the proposed development site;
- Timely control of initial weed populations around the proposed development, such as, around sheds and buildings, along roadsides, cattle receival facilities/holding yards, along fence lines, drainage structures, in tree plantings etc. Weeds in these areas experience little competition and can produce large quantities of seed;
- Control of weeds around the proposed development also reduces any potential fire hazard. Control shall be achieved by regular mowing or herbicide application. Knockdown or residual herbicides (or a combination of the two) shall be used depending on whether the weeds have emerged, the time of year and the weeds present;

- Prior to importing livestock and /or feed commodities (grains, roughages) from known weed infestation areas (e.g. parthenium weed), confirmation from the supplier the weed status of materials and vehicles;
- A pest management program shall be implemented to control animal pest species already present, using acceptable methods as well as identify potential pest species, their likely distribution and methods to prevent their spread;
- Wild dog, feral pig, fox and vermin pest species populations near the proposed development shall be monitored;
- Established pest animals shall be controlled, and their spread prevented;
- Mice and rat populations will be mitigated:
  - primarily through the solid waste management schedule outlined in Table 26 (i.e. minimise feed wastage and spillage to minimise likelihood of attracting vermin);
  - implementing a baiting program if the vermin population reaches a nuisance level; and
- Human waste shall be managed appropriately and in accordance with any relevant statutory requirements.

13.9.5 Conclusion

The proposed development complex shall be sited at least 16.0 km from the closest protected and conservation areas, that being the Planchonella Nature Reserve to the south southeast, the Burral Yurral Nature Reserve to the east southeast and the Dthinna Dthinnawan National Park to the north east. Land adjacent to protected and conservation areas shall not be impacted by the proposed development. All drainage from the subject land flows north-west to Whalan Creek then to the Boomi River downstream of the closest protected and conservation areas.

Further, the operation of the proposed development shall significant levels of organic effluent and solid waste which can be wholly or partly sustainably utilised on the subject land as outlined in section 13.11.

It is expected that, with the implementation of the outlined mitigation measures, the proposed development would not create significant impacts to the closest protected and conservation areas.

13.10 Waste materials

The objectives of the Waste Avoidance and Resource Recovery Act 2001 (WARR Act) are to encourage the most efficient use of resources, to reduce environmental harm, and to provide for the continual reduction in waste generation in line with the principles of Ecologically Sustainable Development (ESD). To meet the objectives of the Act, waste management options are considered against a hierarchy, comprising:

- Avoiding unnecessary resource consumption
- Recovering resources through the re-use and recycling of waste
- Disposal (as a last resort).

The approach taken on waste management for the proposed development will be consistent with the waste management hierarchy outlined above.

Waste management and reuse strategies will be considered and implemented where practical and cost-effective. On-site reuse opportunities will be maximised, with efforts made to implement reuse and recycling initiatives.

13.10.1 Waste sources

Construction and operation of the proposed development will involve the generation of various types of waste streams. All wastes generated on-site will be classified in accordance with the NSW DECC Waste Classification Guidelines (2014), which classifies wastes into the following streams:

- Special (e.g. tyres);
- General solid (putrescible) (e.g. general litter and food waste);
- General solid (non-putrescible) (e.g. glass, paper, building demolition waste, concrete, veterinary sharps);
- Restricted solid (currently no wastes pre-classified as restricted by EPA);
- Liquid (e.g. oil, effluent); and
- Hazardous (e.g. lead-acid batteries).

Table 59 lists the waste generating aspects of the proposed development and identifies the range of solid, hazardous, special and liquid wastes that are likely to be generated by various activities. It also outlines the proposed reuse, recycling or disposal method.

During construction and operation on the proposed development various wastes shall be generated. Each type of waste has been classified in accordance with the EPA's Waste Classification Guidelines (NSW Environment Protection Authority (EPA), 2014).

Table 59 – Proposed development – Potential waste streams

Waste Aspect	Types	Classification	Proposed Reuse/Recycling /Disposal Method
Construction phase			
Excavation	VENM (Virgin Excavated Natural Material)	Classification based on soil tests carried out pre-construction and in accordance with EPA Waste Classification Guidelines (EPA, 2014)	Beneficial reuse on-site
	Acid sulfate soil		On-site treatment
Building and Construction	Steel Reinforcing	General solid waste (non-putrescible)	Off-site recycling
	Concrete	General solid waste (non-putrescible)	Off-site recycling
	Tyres	Special waste	Off-site disposal at an approved facility
	Batteries	Hazardous waste	Off-site disposal at an approved facility
	Packaging materials, including wood, plastic, cardboard and metals	General solid waste (non-putrescible)	Off-site recycling
	Metals and electrical cabling	General solid waste (non-putrescible)	Off-site recycling
	Oils, grease	Liquid waste	Off-site disposal at an approved facility
	Empty oil and other drums	General solid waste (non-putrescible)	Off-site recycling
General Waste	Domestic waste generated by workers	General solid waste (putrescible)	Off-site disposal at an approved facility
	Sewage	Liquid waste	Off-site disposal at an approved facility
	Glass bottles and Aluminium cans	General solid waste (non-putrescible)	Off-site recycling
Operation phase			
	Tyres	Special waste	On-site reuse e.g. silage cover weight.
	Batteries	Hazardous waste	Off-site disposal at an approved facility
	Oils, grease	Liquid waste	Off-site disposal at an approved facility
	Drained oil filters, oil drums and other drums	General solid waste (non-putrescible)	Off-site recycling
	Oil rags, oil-absorbent materials	General solid waste (non-putrescible)	Off-site disposal at an approved facility

	Sewage	Liquid waste	On-site disposal via approved treatment and disposal.
	Wastewater from controlled drainage area	Liquid waste	Beneficial reuse on-site to designated land areas
	Animal wastes (manure/carcass compost)	General solid waste (putrescible)	Beneficial reuse on-site to designated land areas
Office Waste			
	Domestic waste generated by workers	General solid waste (putrescible)	Beneficial reuse on-site to designated land areas
	Glass bottles and Aluminium cans	General solid waste (non-putrescible)	Off-site recycling
	Ink cartridges	General solid waste (non-putrescible)	Off-site recycling
	Paper, plastic and cardboard	General solid waste (non-putrescible)	Off-site recycling

No restricted solid waste shall be generated during the construction or operation of the development.

During operation liquid and solid waste shall be produced. The predominant organic liquid and solid waste sources have been outlined in section 8.7.4.2 and 8.7.5 respectively. In addition, to these a small quantity of in-organic solid wastes such as product packaging, paper etc shall be generated.

13.10.2 Waste storage

All waste will be removed progressively with the minimum amount feasible stored on-site. Waste not removed immediately will be stored in designated areas within the proposed development complex site in proprietary storage facilities until it is reused or removed.

Various components of the waste stream shall be kept separate. All organic waste such as food scraps and other similar material is considered general solid waste (putrescibles and non-putrescible). This material will be separated on site and retained in enclosed ‘Sulo’ or front-lift bins to prevent rainfall ingress and leachate egress.

Storage receptacles shall be located within the controlled drainage areas in areas away from flow paths to minimise stormwater impacts.

Recyclable material such as ferrous and non-ferrous metals, timber, paper, cardboard, and comingled waste shall also be kept separate in a designated area for later disposal at the appropriate recycling facility.

Waste oils, hazardous chemicals and/or hazardous waste (e.g. lead-acid batteries) required to be stored on-site shall have a spill containment system appropriate for the nature and pollution risk of that liquid in accordance with relevant guidelines and Australian Standards. An emergency response spill kit shall be located adjacent to the spill containment system.

13.10.3 Waste transport and tracking

Section 143 of the *Protection of the Environment Operations Act 1997* requires waste to be transported to a place that can lawfully accept it.

All waste shall be transported in accordance with local council and EPA regulations for the type and volume of waste transported.

All loads of waste removed from the proposed development site will be covered to prevent spillage.

Licensed waste contractors will be made responsible for collection and appropriate disposal of waste as required.

Records or a material register shall be retained detailing the quantity, classification method of transport of waste material removed from the site. The register will record the waste type, quantity, classification, contractor, licence details and details of the licensed receiving facility.

Hazardous waste such as lead-acid batteries shall be transported in bunded compartments on service vehicles or by licensed waste contractors.

Further, the transport of some wastes presents a high risk to the environment. These wastes must be tracked when transported into, within or out of NSW. Tracking requirements for waste being transported solely within NSW and between NSW and other states and territories are legislated under the Protection of the Environment Operations (Waste) Regulation 2014.

13.10.4 Waste disposal

Where excess material requires disposal, the preferred hierarchy of disposal options is:

1. Re-use on site;
2. Re-use off-site;
3. Recycle at an off-site facility; and
4. Disposed to landfill.

Each excess material type will be assessed against the above hierarchy. Disposal to landfill, will be the last option if Options 1 to 3 are not feasible.

Prior to being disposed, waste shall be classified in accordance with the NSW Waste Classification Guidelines (EPA, 2014) and POEO (Waste) Regulation 2014, including resource recovery general exemptions.

The EPA grants resource recovery orders and resource recovery exemptions where the application of a waste material to land, its use as a fuel, or use in connection with a process of thermal treatment is a bona-fide, fit-for-purpose, re-use opportunity rather than a means of waste disposal. Recovery General Exemptions enable the use of these waste materials outside some of the requirements of the waste regulatory framework, such as the need to hold an environment protection licence.

13.10.5 Contingency planning

Pre-construction estimates of the volume of surplus material to be generated by the proposed development may be exceeded. Further, unforeseen events may impact on construction and/or operation activities and may result in adverse impacts to the environment.

Therefore, the Environmental Management Strategy (section 15.2) and associated management plans shall include contingency planning for these events. For example, for the possibility of additional waste material being generated, contingency sites where additional volumes of surplus material can be managed shall be identified.

13.10.6 Construction

13.10.6.1 Excavated soil

Excavated soil generated during site preparation activities would be stockpiled for reuse in landscaping activities surrounding the proposed development complex.

Any excavated material that is known or are suspected to comprise ASM, shall be managed in accordance with ASM procedures outlined in section 13.2.4. This includes storage, stockpiling and management of any leachate.

13.10.6.2 Special waste

Waste tyres shall be generated from the construction phase of the proposed development. The tyres would be damaged tyres (uneconomical to repair) taken from rubber-tyred plant and equipment on-site. It is estimated that only a small number of these tyres would be generated (<20) and of various sizes (truck tyres, grader tyres, scraper tyres). All tyres would be removed off-site for recycling. It is anticipated that tyres would be removed from site progressively as they are replaced.

All requirements under the Protection of the Environment Operations (Waste) Regulation 2014 for tracking loads of waste tyres greater than 20 tyres, or 200 kg within NSW or interstate shall be met.

13.10.6.3 Liquid waste

The construction phase shall generate small quantities of used motor oil from the servicing of plant and equipment. A transportable ablution block with associated tankage shall accommodate and retain all liquid sewage wastes. The sewage shall be removed off-site on an as-required basis by an EPA licensed operator for treatment at an EPA-approved wastewater treatment facility.

13.10.6.4 Solid waste (putrescible)

The construction phase shall generate negligible quantities of putrescible solid waste.

Putrescible solid waste shall be placed into covered receptacle bins and transported to a local licensed landfill in line with regulatory requirements. It is most likely that putrescible solid waste would be taken to landfill sites.

13.10.6.5 Solid waste (non-putrescible)

The construction phase shall generate negligible quantities of non-putrescible solid waste. It is estimated that some 200 kg of non-putrescible solid waste shall be generated.

Non-putrescible solid waste able to be recycled and not required for the operational phase, such as, metal, paper, cardboard shall be placed into skip bins for collection by a waste contractor and transported to a recycling facility. It is most likely that some metal and polyethylene materials (fence post offcuts, rails, water pipeline etc) shall be stored on-site for use as repairs/maintenance during the operational phase.

Concrete waste shall be crushed and utilised on-site as a base for access/feed roads or other road base material, for example. Any concrete waste not able to be utilised on-site shall be placed into skip bins for collection by a waste contractor and transported to a recycling facility.

13.10.6.6 Hazardous waste

It is expected that only a small quantity (<10) of spent lead-acid batteries shall be generated and be removed individually from the site as-replaced. Lead acid batteries shall not be stored on-site during construction.

13.10.7 Operation

13.10.7.1 Special waste

Waste tyres shall be generated from the operation of the proposed development. The tyres would be damaged tyres (uneconomical to repair) taken from rubber-tyred plant and equipment on-site, such as tractors, feed trucks etc. It is anticipated that these tyres would be utilised on-site to weigh down silage covers, for example.
All requirements under the Protection of the Environment Operations (Waste) Regulation 2014 for tracking loads of waste tyres greater than 20 tyres, or 200 kg within NSW or interstate shall be met if any tyres and removed off-site.

13.10.7.2 Solid waste (putrescible)

As shown in Table 24 and Table 25, it is expected that approximately 1,495 tonnes of solid waste on a dry matter basis would be scraped from the production pens each year during the operation of the proposed development. This translates into some 1,450 t of dry matter available for utilisation after stockpiling.

13.10.7.3 Solid waste (non-putrescible)

The operation of the proposed development shall generate negligible quantities of non-putrescible solid waste. These wastes shall be classified in accordance with the EPA's Waste Classification Guideline (NSW Environment Protection Authority (EPA), 2014).

Non-putrescible solid waste shall include paper, cardboard etc. from office/administrative and shall be placed into skip bins for collection by a waste contractor and transported to a recycling facility.

All veterinary waste (sharps) from animal medication shall be placed in a sharps container that complies with 'AS/NZS 4261:1994 - Reusable containers for the collection of sharp items used in human and animal medical application'. The sharps container shall be a rigid-walled, puncture-proof and sealable receptacle intended for the collection and disposal of sharps.

Once full, the sharps container shall be dropped off at nominated collection/disposal sites, such as the Warialda Landfill Rubbish Depot Road or the Warialda Multipurpose Centre Hospital or Supervised collection sites.

Other types of non-putrescible solid waste such as metal, polyethylene materials (fence post offcuts, rails, water pipeline) etc shall be stored on-site and used in repairs/maintenance of infrastructure.

13.10.7.4 Liquid waste

13.10.7.4.1. Effluent

The volume of effluent generated from the operation of the proposed development is dependent on the runoff from the controlled drainage area and thus is dependent on climatic factors such as rainfall and evaporation and pen surface conditions (manure depth).

A water balance approach using a daily time-step hydrologic model was used to estimate the volume of effluent generated. The water balance methodology is outlined in Appendix M and section 13.11.5.

The average annual volume of effluent generated was estimated to be about 20 ML.

13.10.7.4.2. Effluent characteristics

Effluent from beef cattle feedlots is a rather concentrated wastewater with high levels of nitrogen and phosphorus and considerable colour. The concentrations of both inorganic and organic nutrients are high. Salinity (EC) can also be quite high.

Table 60 shows the typical composition of beef cattle feedlot effluent based on data from MLA (2015b). These data were collected from holding ponds and evaporation ponds at various cattle feedlots.

Table 60 – Typical effluent characteristics (MLA, 2016b)

Parameter	Units	Avg.	Min.	Max.
pH	-	8	7	10
Total nitrogen	mg/L	220	25	1,025
Total Kjeldahl nitrogen	mg/L	218	23	1,025
Ammonia nitrogen	mg/L	89	0.1	670
Nitrate nitrogen	mg/L	2.3	0.1	68.8
Nitrite nitrogen	mg/L	0.5	0	5.1
Total phosphorus	mg/L	71	2	387
Phosphate-P	mg/L	17	1.5	133
Potassium	mg/L	665	1.2	9100
Total dissolved solids	mg/L	4,915	1,002	18,644
Calcium	mg/L	126	13	597
Chloride	mg/L	1,261	95	12,839
Magnesium	mg/L	118	2	805
Sodium	mg/L	494	12	6,700
Sulphate	mg/L	74	1	378
EC	dS/m	7.8	0.1	37.8

DEC (2004) provides a classification of liquid waste (effluent) as low, medium or high strength according to its concentration of nitrogen, phosphorus, BOD_5, TDS and other potential contaminants. This is shown in Table 3.1 of DEC (2004) and reproduced in Table 61 .

Table 61 – Classification of effluent for environmental management (DEC, 2004)

Constituent	Strength (average concentration mg/L)[1] Low	Medium	High
Total Nitrogen	<50	50-100	>100
Total phosphorus	<10	10-20	>20
BOD	<40	40-1,500	>1,500
TDS	<600	600-1,000	>1,000-2,500
Other pollutants (e.g. metals, pesticides)	Effluent with more than five times the ANZECC and ARMCANZ (2000) long-term water quality trigger values for irrigation waters must be considered high strength for the purpose of establishing a strength class for runoff and discharge controls and will require close examination to ensure soil is not contaminated.		
Grease and Oil	Effluent with more than 1,500 mg/L of grease and oil must be considered high strength and irrigation rates and practices must be managed to ensure soil and vegetation is not damaged.		

[1] Average concentration established from a minimum of 12 representative samples, collected at regular intervals over a year.

Based on Table 60 and Table 61 effluent from the proposed development is classified as high strength as defined by DEC (2004).

13.10.7.4.3. Sewage

There is no sewer reticulation to the subject land. Each of the existing dwellings on the subject land has an existing domestic wastewater treatment system with a capacity to cater for the proposed development.

13.10.7.5 Hazardous waste

A small quantity of spent lead-acid batteries (2-5) shall be generated per year during the operation of the proposed development. Spent lead-acid batteries shall be destined for recycling.

The spent batteries shall be stored on-site in accordance with Australian Standards where relevant, in particular AS 3780:2023 The storage and handling of corrosive substances (Standards Australia, 2023). Once a quantity of batteries required for economical shipment is reached, an appropriately licensed waste contractor shall transport the waste and in compliance with any exemption granted by the EPA in relation to the transportation and tracking of such waste.

No batteries shall be disposed of at landfill sites.

13.10.8 Assessment of impacts

Waste generated as a result of construction of the proposed development will range from construction waste to general waste, as outlined in Table 59. The mismanagement of these waste streams has the potential to result in the following impacts:

- Excessive waste being directed to landfill;
- Various types of waste being generated and stored onsite, with the potential for misclassification; and
- Various wastes being inappropriately disposed or handled on site resulting in possible contamination of land and groundwater.

13.10.8.1 Construction

In accordance with definitions in the POEO Act and associated waste classification guidelines, most waste generated during the construction of the proposed development would be classified as building and demolition waste within the class general solid waste (non-putrescibles).

Ancillary facilities in the site compound would also produce sanitary wastes classified as general solid waste (putrescibles) in accordance with the POEO Act.

During construction, all waste materials would be removed from the site and recycled or otherwise disposed of at approved facilities.

Low levels of non-putrescible and putrescible wastes are predicted during construction. Subsequently, no adverse impact is predicted as a consequence of waste generation during construction of the proposed development.

13.10.8.2 Operation

During operation effluent and solid waste shall be the predominant wastes produced from the livestock themselves. The effluent and solid waste sources have been outlined in section 8.7.4.2 and 8.7.5 respectively and shall be sustainably utilised on-site or off-site on adjoining properties.

Low levels of solid wastes (non-putrescible) such as product packaging, paper etc shall be generated and removed from the site and recycled or otherwise disposed of at approved facilities.

Sewage waste shall be disposed of on-site via an appropriately designed on-site sewage treatment system.

As the predominant waste streams generated on-site are to be sustainably utilised and other sources are generated at low levels and are to be recycled, no adverse impact is predicted as a consequence of waste generation of the proposed development.

13.10.9 Mitigation measures

Impacts from waste generation have been considered throughout the design process. Management and mitigation measures would be implemented to minimise impacts from waste generation during the construction and operation stages of the proposed development. These include:

- Ensure that all wastes (includes but not limited to liquid, air emissions, and solid material) generated by the proposed development, as far as reasonably practicable managed in a manner which reduces adverse impact to the environment. This approach is based on the hierarchy of waste materials management (elimination, reduction, reuse or recycling and treatment and disposal.);
- Ensure the correct quantities are ordered and delivered to the site;
- Cut and fill works would be balanced where possible;
- Clean excavated fill material would be used as construction fill and for road works where suitable;
- Excavated material not suitable for re-use as fill would be re-used for mounding for visual amenity and landscaping where practicable;
- All waste to be transported off-site shall be assessed to determine whether the waste requires tracking under the Protection of the Environment Operations (Waste) Regulation 2014;
- All waste requiring tracking shall only be transported after all necessary documentation such as consignment authorisation and transport certificates have been obtained from the relevant authorities;
- Ensure procedures are implemented to minimise any adverse environmental impacts associated with the storage, management and disposal of waste materials;
- Inspections of the waste management areas would be constructed on a weekly basis to ensure that correct waste management practices are being followed, in that all waste materials are appropriately separated and stored;
- No burying of waste relating to the construction and/or operation of the proposed development is to be conducted on the subject property with the exception of mass deaths of beef cattle if required;
- No burning of waste relating to the construction and/or operation of the proposed development is to be conducted on the subject property;
- Inductions to construction personnel outline measures on how to deal with suspected contaminated soil;
- All waste that cannot be sustainable utilised on the subject property shall be removed from the subject property by an operator licensed to remove that waste removal and transported to a suitably licensed disposal site;
- Putrescible domestic waste will be stored in a protected area away from vermin and inclement weather;
- Wastes will be stored appropriately for its type. Different waste types will not be mixed to increase the potential for re-use or recycling of waste. Separate waste storage areas will be designated;

- Quantities of waste stored onsite will be kept to a minimum. Maximum volume of each waste stored will be consistent with regulations and guidelines;
- All sampling and classification results shall be retained for the life of the proposed development in accordance with EPA's Waste Classification Guidelines;
- All waste shall be transported in accordance with local council and EPA regulations for the type and volume of waste transported;
- All loads of waste removed from the proposed development will be covered to prevent spillage;
- Licensed waste contractors will be made responsible for collection and appropriate disposal of waste as required;
- Silage storage and solid waste storage and processing areas shall be contained in the controlled drainage area;
- Records or a material register shall be retained detailing the quantity, classification method of transport of waste material removed from the site. The register will record the waste type, quantity, classification, contractor, licence details and details of the licensed receiving facility; and
- Any excavated material that is known or are suspected to comprise ASM, shall be managed in accordance with the ASM plan.

13.10.10 Conclusion

The construction and operation of the proposed development shall generate a small quantity of in-organic solid wastes such as product packaging, paper etc. Further, the operation of the proposed development shall significant levels of organic solid waste and effluent which can be wholly or partly sustainably utilised on the subject land as outlined in section 13.11.

It is expected that, with the implementation of the outlined mitigation measures, the proposed development would not create significant impacts to the environment from waste generation.

13.11 Land capability for waste utilisation

13.11.1 Introduction

The proposed development would produce solid and liquid waste during its operation and would require licensing approvals for utilisation of liquid and solid waste onto land. An Environment Protection Licence (EPL) would be required from the Environmental Protection Authority (EPA) as outlined in section 9.7.

The characteristics of the waste utilisation areas and their location relative to residences, surface waters, and groundwater need to be known. Assessment of these characteristics will identify the constraints to effluent and solid waste utilisation and assist with adopting and implementation of mitigation measures. The key factors governing the suitability of a site for effluent and solid waste utilisation are:

- Topography;
- Soil considerations;
- Proximity of surface and groundwater; and
- Proximity of residences.

This section provides a review of the areas proposed for effluent and solid waste utilisation based on topography, soil, groundwater and surface water characteristics, together with an assessment of the suitability of the liquid waste utilisation area for irrigation.

13.11.2 Existing environment

13.11.2.1 Climate

Beef cattle feedlots can be located in a wide range of climates. However, climatic factors impact on a diverse range of issues. These include:

- heat and cold stress and animal welfare;
- water requirements (drinking, cattle washing);
- animal productivity and feed conversion;
- odour;
- dust;
- noise;
- drainage; and
- waste management and utilisation.

The National Guidelines for Beef Cattle Feedlots in Australia (MLA, 2012a) and New South Wales Feedlot Manual (NSW Agriculture, 1997) recommends that feedlots be sited in areas of less than 750 mm rainfall.

The climatic characteristics are important factor in the design of the effluent utilisation area system and the storage requirements for wet weather. The regional climate, and annual water deficit (the difference between rainfall and evaporation) are used to determine the irrigation requirement and the wet-weather storage capacity.

The annual water deficit is a useful guide to determining the irrigation requirement. However, during periods when the evaporation is lower than the rainfall, this does not necessarily mean that irrigation will not occur. For example, a large amount of rainfall could fall over a very short period of time, that is, it may be intense storm bursts with extended dry periods in between when irrigation can occur.

Therefore, a more detailed analysis using a water balance approach at the daily scale is more effective in determining the irrigation requirement and the optimal wet-weather storage capacity. The water balance methodology is outlined in section 13.11.5.1.

Daily climatic data for the proposed development site was obtained from SILO. SILO is an enhanced climate database hosted by the Queensland Department of Environment and Science, (DES). SILO contains Australian climate data from 1889 to date. A data drill was undertaken for the location of the proposed development complex site. The data drill accesses daily time series of data interpolated from point observations by the Bureau of Meteorology.

Table 48 presents data sourced from SILO from 1924-2023. The data indicates that the area has a summer dominant rainfall pattern with an annual average of some 617 mm with average monthly maximum temperatures range from a maximum of 33.2ºC in January (summer) to a minimum of 3.3ºC in July (winter).

13.11.2.2 Topography

The subject land is located within the Yetman (9040) 1:100,000 and Goondiwindi (8940) 1:100,000 topographic map sheets within the north east of the North West slopes and Plains region of NSW. The topography at a regional scale is generally flat to gently undulating, with elevations from 310 m to 360 m AHD. The subject land is on the eastern margins of the plains with slopes in the order of 1-2%.

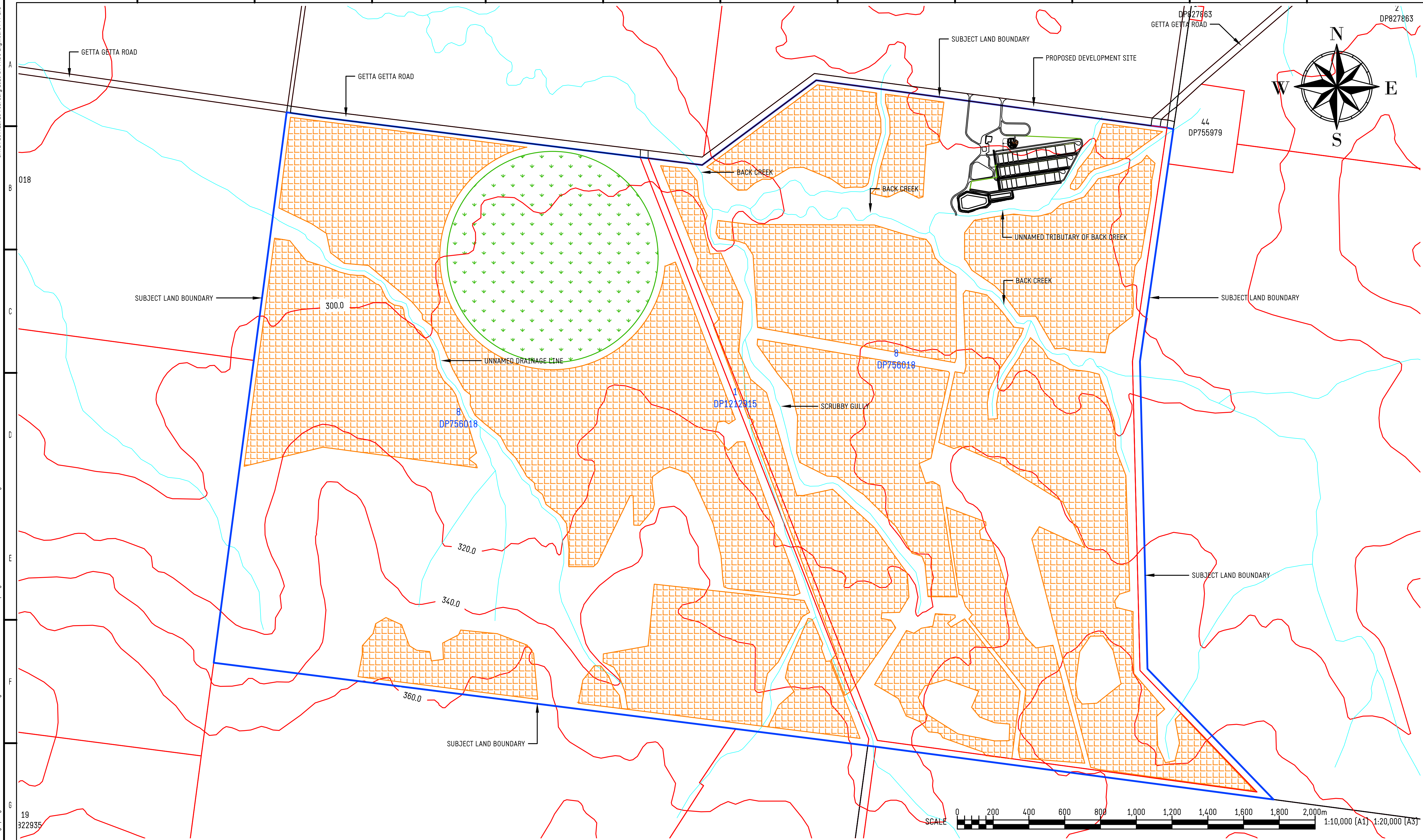
A topographic plan of the subject land was prepared from topographic data at a scale of 1:20,000 with a 5 m contour interval and is shown in Figure 43. This shows that the subject land has low relief landforms gently rising from the alluvial plains in the north west from approximately 300 m AHD towards the south – southeast to approximately 360 m AHD. There are few topographic highs.

Drainage is confined to a north-north westerly direction towards the alluvial plains and to Back Creek. The higher elevations occur to the south of the subject land resulting in a generally northerly aspect across the subject land . The proposed development site is located on a very gently sloping area with a southerly aspect and drains to a tributary of Back Creek.

The proposed development infrastructure shall be located geographically to the north-east of the subject land where the land is gently sloping and falls towards internal drainage lines. The site is inherently well drained due to the impermeable, predominantly clay soils and gradients of 2-3%.

The proposed effluent utilisation area is located in the west of the subject land on relatively flat land as shown on Figure 43. The solid waste utilisation areas are located across the subject land where the land is relatively flat to gently sloping as shown on Figure 43.

The subject land has retained its historical topography. There has been no modification to the natural landform from mining, quarrying or other groundworks which may have altered its topography through the removal of soil or other materials other than vegetation clearing.



LEGEND

- SUBJECT LAND BOUNDARY
- LAND PARCEL BOUNDARY
- HYDROAREA
- HYDROLINE
- EXISTING AND PROPOSED EFFLUENT UTILISATION AREA
- EXISTING AND PROPOSED SOLID WASTE UTILISATION AREA

NOTES:

1. CADASTRAL INFORMATION BASED ON THE NSW GOVERNMENT SPATIAL SERVICES DIGITAL CADASTRAL DATABASE (DCDB) 2022, PROVIDED BY THE NSW DEPARTMENT OF FINANCE, SERVICES AND INNOVATION (DFSI) SPATIAL INFORMATION eXCHANGE AND ACCURACY IS LIMITED.
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REV.	DATE	REVISION DESCRIPTION	DRAWN	CHECK	APPROVED
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PROJECT: PROPOSED 3,000 HEAD BEEF CATTLE FEEDLOT

TITLE: DEVELOPMENT APPLICATION FOR INTENSIVE LIVESTOCK AGRICULTURE
ENVIRONMENTAL IMPACT STATEMENT
SUBJECT LAND - TOPOGRAPHIC PLAN

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 43		A3	E2-103-00-43	B

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13.11.2.3 Soil characteristics

The characteristics of the soils in the proposed effluent and solid waste utilisation areas will impact on the suitability of the land for effluent irrigation, the irrigation system and level of management required.

As the effluent from the proposed development shall be high in nutrients and possibly salts, it is important that the physical and chemical properties of the soil are assessed to determine the management requirements for protecting against soil degradation which could result in:

- degraded soil structure;
- restricted plant growth;
- erosion;
- salinity; and
- release of contaminants to surface or groundwaters.

The New South Wales Feedlot Manual (NSW Agriculture, 1997) contains a table regarding soil suitability and is reproduced in Table 62.

Table 62 – Soil suitability for feedlot components (Table 3.1 NSW DPI, 1997)

Component	Minimum desirable soil requirements
Effluent irrigation area (Liquid waste utilisation area)	Deep well drained soil, suitable for irrigation pasture production and at least an occasional irrigated crop, moderate to high water holding capacity, not prone to waterlogging within the root zone.
Manure application area (Solid waste utilisation area)	Soils well suited to improved pasture or dryland cropping; able to withstand cultivation without incurring significant erosion or major soil structural degradation; not prone to surface waterlogging or frequent inundation.

Soil testing is conducted on the cropping soils of the subject land on a routine basis for agronomic purposes.

A site-specific soil assessment was undertaken by JG Environmental in the existing effluent and solid waste utilisation areas to validate the soil mapping information and provided physical and chemical data for input to the hydraulic and nutrient balance modelling.

A total of 18 sites were described to a depth of up to 120 cm using a 5 cm diameter soil push tube that removed intact soil cores. The soil assessment confirmed the alluvial and flat plains are dominated by deep dark clay soils (Dermosols or Vertosols). These soils have been utilised for successfully growing irrigated/dryland cotton and various fodder and grain crops.

The dominant soils observed in the mid and lower slope positions were deep brown Dermosols (some Chromosols). Once again, these soils are currently being utilised for growing irrigated/dryland cotton and various fodder and grain crops. The mid to upper slope positions also contain deep reddish soils similar to the red and brown Ferrosols and Dermosols described in OEH (2015

A copy of the soil analyses results are presented in Appendix M.

13.11.2.4 Surface water and groundwater

The proposed development is required to be sited, designed, constructed and operated to prevent or minimise adverse impacts on groundwater and surface waters external to the developments' controlled drainage area and external to effluent and solid waste utilisation areas (MLA, 2012a, NSW Agriculture, 1997).

Potential impacts on current and future groundwater users and downstream surface water users and resources need to be considered. These risks can be minimised by ensuring:

- careful selection of suitable sites for effluent and solid waste utilisation;
- selection of areas where the presence of one or more impervious geological strata (for example, a thick layer of compacted clay) above the groundwater aquifer can prevent deep percolation from reaching the aquifer;
- irrigation of effluent in close proximity to surface waters is well designed and managed;
- annual application rates would be based on annual soil tests and not exceed nutrient recommendations for a particular crop, soil type or yield goal;
- application of effluent would occur over the crop growing period with timing and application rates based on soil moisture deficit levels and in accordance with an Irrigation Management Plan;
- the plant/soil mantle within and down-gradient of the effluent utilisation area is capable of immobilising any potential contaminants in the effluent; and
- an adequate buffer zone between effluent and solid waste utilisation areas and surface water and groundwater bores used as a domestic water source.

The proposed development and associated effluent and solid waste utilisation areas have been sited and designed to minimise any adverse impacts to groundwater and surface waters. section 8.4 outlines the siting and design considerations to minimise any adverse impacts to groundwater and surface waters. Further, sections 13.3 and 13.4 outline the potential risks and mitigation measures proposed to minimise adverse impacts to groundwater and surface waters.

Review of strata log details for various groundwater bores on the subject property identifies the presence of one or more impervious geological strata such as compacted clay, cemented clay bands above the groundwater aquifer. These layers shall minimise deep percolation from reaching the aquifer.

The groundwater bores strata log details have shown that the aquifer to be deep, located in the Eastern Recharge Groundwater Source of the Great Artesian Bason.

13.11.3 Soil suitability assessment

The key soil properties which govern the suitability of a site for effluent and solid waste utilisation are soil sodicity, soil salinity, saturated hydraulic conductivity, available water holding capacity, pH, cation exchange and dispersion.

A site-specific soil assessment was undertaken by JG Environmental in the existing effluent and solid waste utilisation areas with the results presented in Appendix M. A summary of the results is presented in the following sections.

13.11.3.1 Land and soil capability

The land and soil capability (LSC) assessment scheme has been developed for NSW. Land capability is the inherent physical capacity of the land to sustain a range of land uses and management practices in the long term without degradation to soil, land, air and water resources. The LSC assessment scheme uses the biophysical features of the land and soil including landform position, slope gradient, drainage, climate, soil type and soil characteristics to derive detailed rating tables for a range of land and soil hazards. These hazards include water erosion, wind erosion, soil structure decline, soil acidification, salinity, waterlogging, shallow soils and mass movement. Each hazard is given a rating between 1 (best, highest capability land) and 8 (worst, lowest capability land). The final LSC class of the land is based on the most limiting hazard

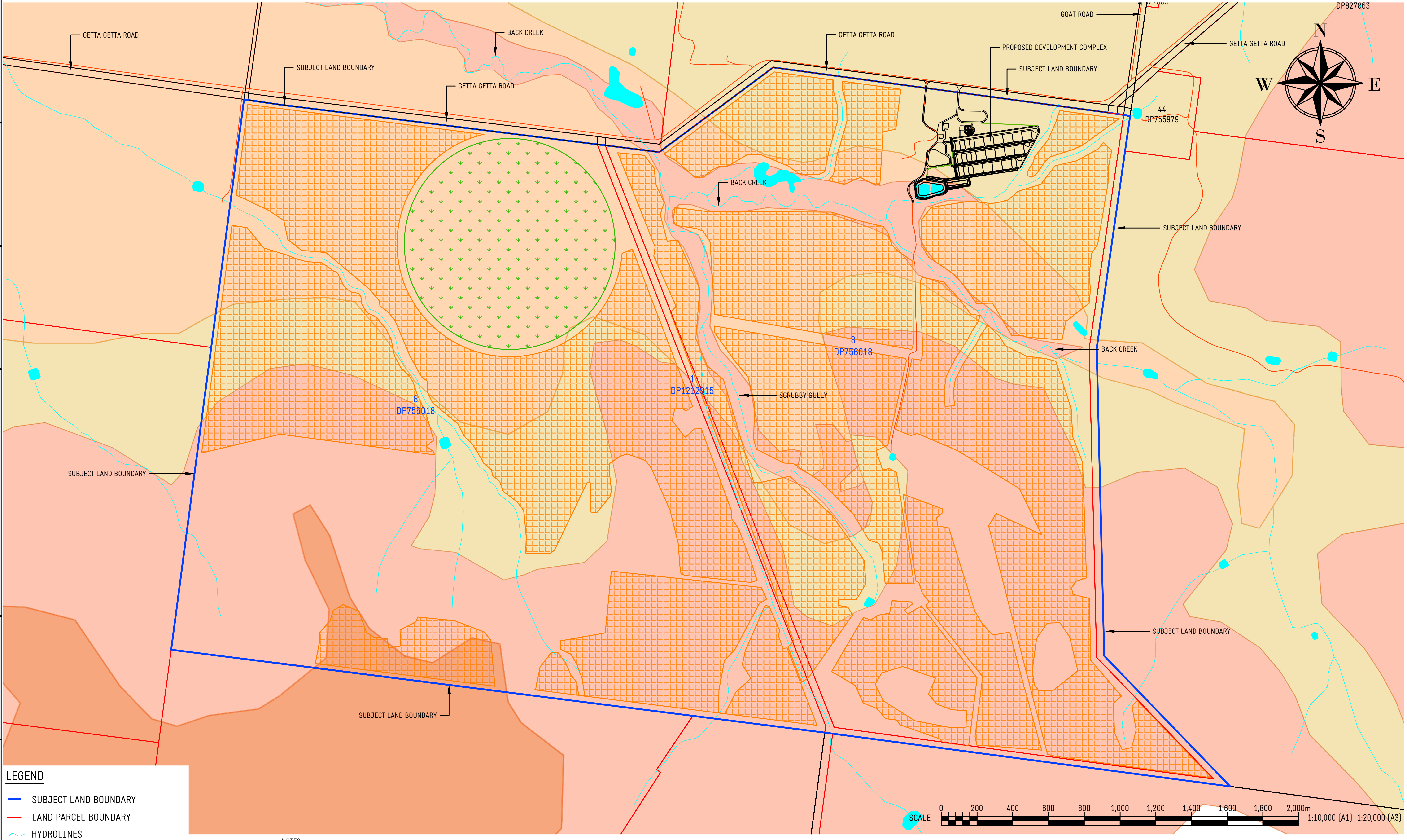
Land and soil capability mapping as per the SEED mapping portal NSW and presented as Figure 44 indicates that the subject land is mapped as Class 2 – Very high capability land, Class 4 – Moderate capability land and Class 5 – Moderate–low capability land (NSW Department of Climate Change, Energy, the Environment and Water (DCCEEW), 2024).

Land Suitability Class 2 general definition: Very high capability land: Land has slight limitations. These can be managed by readily available, easily implemented management practices. Land is capable of most land uses and land management practices, including intensive cropping with cultivation.

Land Suitability Class 4 general definition: Moderate capability land: Land has moderate to high limitations for high-impact land uses. Will restrict land management options for regular high-impact land uses such as cropping, high-intensity grazing and horticulture. These limitations can only be managed by specialised management practices with a high level of knowledge, expertise, inputs, investment and technology.

Land Suitability Class 5 general definition: Moderate–low capability land: Land has high limitations for high-impact land uses. Will largely restrict land use to grazing, some horticulture (orchards), forestry and nature conservation. The limitations need to be carefully managed to prevent long-term degradation.

The effluent utilisation area is located on Class 4 land suitability. The solid wase utilisation area is located on class 2, 4 and 5 land suitability.



LEGEND

- SUBJECT LAND BOUNDARY
- LAND PARCEL BOUNDARY
- HYDROLINES
- HYDROAREA
- EXISTING AND PROPOSED EFFLUENT UTILISATION AREA
- EXISTING AND PROPOSED SOLID WASTE UTILISATION AREA
- 2 - SLIGHT BUT SIGNIFICANT LIMITATIONS
- 3 - MODERATE LIMITATIONS
- 4 - MODERATE TO SEVERE LIMITATIONS
- 5 - SEVERE LIMITATIONS

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SUBJECT LAND - LAND AND SOIL CAPABILITY

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FIGURE 44		A3	E2-103-00-44	B

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13.11.3.2 Soil texture and particle size distribution

Particle size distribution describes the relative amounts of gravel, sand, silt and clay within the soil. These are the building blocks for the soil and can have a large effect on the soil properties. There is also an approximate relationship between field texture and particle size distribution, as shown in Figure 45.

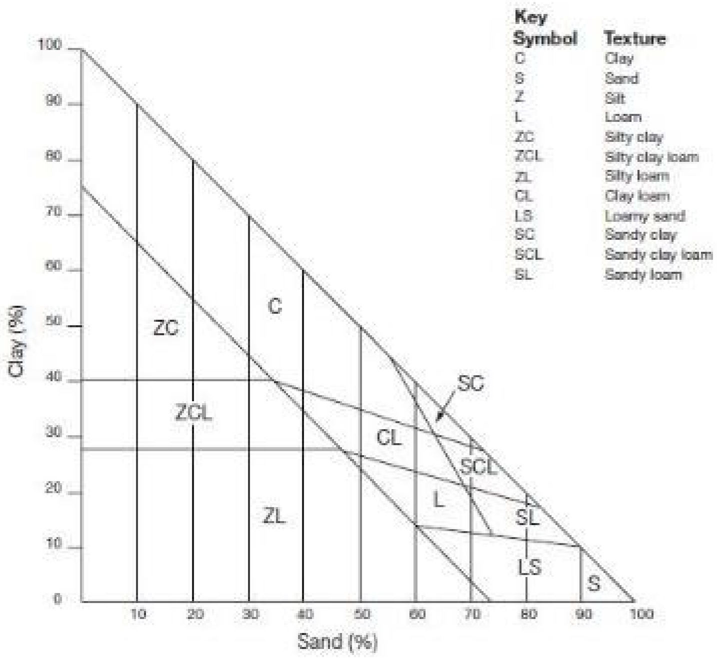


Figure 45 – Soil texture triangle (Hazelton and Murphy, 2016)

The soils have been classified as having a sandy clay texture. The soils of the subject land cropping areas are characterised by some 30-40% (clay) and some 15-30% silt particles as shown in the soil test results in Appendix L.

13.11.3.3 Aggregate stability

Aggregate stability refers to the stability of soil structural units (aggregates) when immersed in water. Instability may be indicated by slaking or clay dispersion. A soil with low aggregate stability is likely to be compact and poorly structured.

The aggregate stability results indicate that the soils have a high degree of dispersion with Emerson Aggregate Test results of Class 4,5 and 6. Class 4, 5 and 6 soils are not dispersive on wetting dry or remoulded.

13.11.3.4 pH (1:5 Water)

The pH of the soils ranges from neutral (pH 6.9) to strongly alkaline (pH 8.7) in the surface and are strongly alkaline (pH 8.8) to very strongly alkaline (pH 9.4) in the subsoil (70-100 cm) (Hazelton and Murphy, 2016). These results are typical values expected for the medium to heavy clay soils encountered.

Soil pH is considered acceptable for pasture and crop growth and should not affect the availability of nutrients, toxic elements and chemical species to plant roots.

13.11.3.5 Total nitrogen

Total nitrogen results from the soils show total N ranges from 0.09% to 0.17% in the surface (0-20cm) to 0.05% to 0.09% at 40-70cm. These values are considered low (Hazelton and Murphy, 2016). This also indicates that Nitrogen is not accumulating in the soil profile and crops will require additional nitrogen.

Whilst the majority of the total nitrogen is not immediately available to plants, adequate concentrations will ensure soil microbes can mineralise the reserves to plant-available forms such as ammonium and nitrate.

13.11.3.6 Phosphorus

The available phosphorus (Colwell) concentrations range from 8 mg/kg to 35 mg/kg in the surface (0-20cm). Suggested upper limits by Skerman (2000) in the surface soil are 85 mg/kg for a soil with a clay percentage greater than 30 (when pH >7.0). These concentrations phosphorus are considered low (Hazelton and Murphy, 2016).

13.11.3.7 Exchangeable cations

Cation exchange capacity (CEC) is the measure of the total capacity of a soil to hold exchangeable cations. It provides a buffering effect to changes in pH, available nutrients, calcium levels and soil structural changes. The major cations are calcium (Ca^{2+}), magnesium ($Mg^{2+)}$, potassium (K^+), sodium (Na^+) and aluminium (AL^{3+}). In most soils, Ca^{2+}, Mg^{2+}, Na^+ and K^+ comprise the bulk of the cations in exchangeable form. The CEC is a major controlling agent of stability of soil structure, nutrient availability for plant growth and soil pH (Hazelton and Murphy, 2016).

The CEC is considered moderate to high in the surface (22-47 cmol+/kg) a reflection of the silty clay surface and medium clay subsoil. In general, high CEC soils generally have greater water holding capacity than low CEC soils. The CEC levels indicates good natural fertility and suggests nutrients can be supplied to the soil solution at a rate suitable for plant extraction.

The exchangeable calcium levels in the topsoil (0-20cm) and at 20-40cm are considered moderate to high (17-36 cmol+/kg). Similarly, the exchangeable magnesium levels are considered high (2-13 cmol+/kg). This suggests that the soils are not strongly leached, and that plant growth would not be limited as a result.

13.11.3.8 Salinity

Salinity refers to the total dissolved salts in a liquid or in a soil solution. Salts are mostly added to the soil through soil formation, hydrologic processes and rainfall (DNR, 1997). However, irrigation, especially with liquid waste can add significant quantities of salt to the soil. Electrical conductivity ($EC_{1:5}$) and chloride levels were examined in the results from the soil sampling in the irrigation areas to establish current salinity levels.

The $EC_{1:5}$ levels in the soils indicate non-saline soils with very low to low (0.046-0.265 dS/m) at 0-20cm to 0.096-0.268 dS/m at 20-40cm. Crops that are moderately sensitive to salinity are not affected.

The NSW State of Environment overall salinity hazard assessment 2020 mapping indicates that the local landscape in which the subject land is located is considered to be moderate to very high risk salinity hazard as shown on Figure 46. The proposed effluent and solid waste utilisation areas are considered moderate salinity risk.

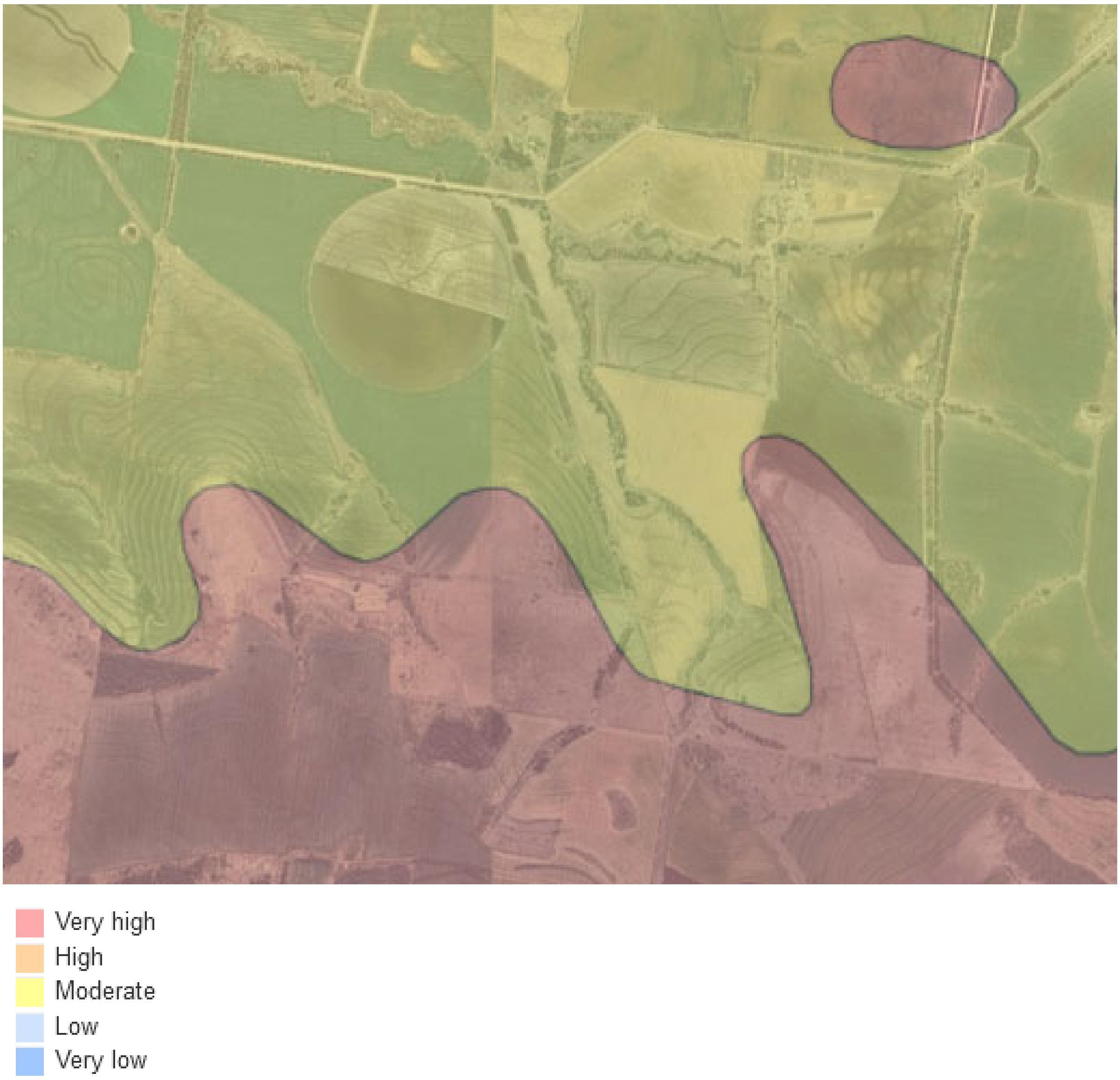


Figure 46 – Subject land – Salinity hazard assessment (NSW State of Environment, 2020)

Annual monitoring of soil and groundwater salinity shall identify any trends in soil salinity and potential accumulation of salts in the soils as a result of salts applied in the effluent.

13.11.3.9 Sodicity

Soil sodicity occurs when the ratio of exchangeable sodium ions to other exchangeable cations is sufficient to influence the swelling and dispersion behaviour of soils (Rengasamy and Churchman, 1999). A sodic soil surface can reduce water infiltration and is prone to hardsetting, while a strongly sodic subsoil reduces internal drainage, restricts plant rooting depth and may accumulate salts and nutrients. The exchangeable sodium percentage (ESP) is often used as an indicator of soil sodicity. A soil is considered non-sodic if ESP is less than 6 %, marginally sodic to sodic if ESP is between 6 and 14 % and strongly sodic if ESP is greater than 14 % (Northcote and Skene 1972).

The surface soil (0-20 cm) ESP results range from <1 % to 4.5 %. The subsoil ESP results range from <1 % to 17 %. All surface soils are considered non-sodic. The majority of the deep subsoil (70-100cm) sites are considered sodic or strongly sodic which is typical for these clay soil types under natural conditions.

13.11.3.10 Phosphorus sorption capacity

Phosphorus is mostly applied in a water soluble form which can be taken up by plants, retained by soil and lost through erosion and leaching. The behaviour of labile inorganic phosphorus in soils is dominated by sorption and desorption processes. The amount of phosphorus that a soil will remove from solution (be absorbed) over a standard period of time is related to phosphate buffering capacity and controls the availability of native soil phosphorus and the effectiveness of phosphorus applied (as a fertiliser) (Hazelton and Murphy 2016).

The amount of phosphorus that a soil will remove from solution (be absorbed) is critical for effluent disposal, to ensure long term sustainability. The phosphorus adsorption capacity is the ability of a soil material to sorb phosphorus compounds onto soil particles thereby rendering the phosphorus unavailable to plants and immobilising it within the soil itself.

The surface soil (0-20 cm) phosphorus sorption results range from 131 up to 381 mg/kg. As for the subsoil (70-100 cm), phosphorus sorption results range from 90 up to 487 mg/kg. The phosphorus sorption levels are good to excellent and suggest a good capacity to safely store excess phosphorus.

13.11.4 Solid waste utilisation

The subject land has existing dryland and irrigated cropping areas. Due to the suitability of soil types on the subject property (Refer section 13.2.3) and the on-site generation of solid waste (manure, sludge, carcass compost) suitable for use as a soil conditioner and fertiliser, additional area may be developed for dryland and irrigated cropping and/or improved pasture that is not currently developed for that purpose.

The subject land has an area of at least 900 ha of land suitable for solid waste utilisation as shown on Figure 13.

The minimum land area required was determined by a nutrient mass balance on the removal of the nutrients in the solid waste (manure, sludge, carcass compost) by the types of crops to be grown within the solid waste utilisation area using the NLAR approach as outlined in the *National Guidelines for Beef Cattle Feedlots in Australia* (MLA, 2012a)

The nutrient mass balance is presented in section 8.7.4.3. With some 1,450 t/year of solid waste about 1,036 ha of land would be needed for solid waste utilisation. Phosphorus was found to be the limiting nutrient when growing cereal grain in winter and this corresponds to a maximum solid waste application rate of about 1.4 t/ha (dry).

Consequently, there is insufficient land available on-site to sustainably utilise all the solid waste generated each year. Any solid waste not utilised on-site shall be removed off-site for utilisation on adjoining land in the owned by the applicant.

13.11.5 Effluent utilisation

There are a number of commercially available tools to assist with water and nutrient balance calculations. The model used in this assessment was the Model for Effluent Disposal via Land Irrigation (MEDLI) (Department of Environment and Science (DES), 2023). MEDLI is a Windows® based computer model for designing and analysing effluent reuse systems for intensive rural industries, agri-industrial processors (e.g. abattoirs), sewage treatment plants and other effluent producers using land irrigation. MEDLI was developed jointly by the CRC for Waste Management and Pollution Control, the Queensland Department of Natural Resources and the Queensland Department of Primary Industries in the mid 1990's (Gardner et al, 1996) and has been upgraded since that time.

The MEDLI feedlot module simulates runoff from the controlled drainage area of the proposed development on a daily basis.

A summary of the MEDLI assessment is provided in the following sections. The full MEDLI report is provided in Appendix M.

13.11.5.1 Water balance

Table 63 shows the water balance of the holding pond calculated over the 100-year modelling period using climate data from Table 48 and the characteristic soil type for the effluent utilisation area (brown/grey dermosol). Table 63 shows that there is some 26.1 ML/year on average of effluent runoff from the controlled drainage area and rainfall inflow into the holding pond. The existing capacity of the holding pond is 9.5 ML. The existing holding pond shall be enlarged to a capacity of 20.0 ML to ensure that that overtopping events occur no more frequently than one in 10 years as shown in Figure 11 and Figure 12.

The location of the holding pond within the proposed development complex is shown in Figure 10.

Table 63 – Proposed development – Holding pond water balance

Water Movement	Units	Scenario 1 Clean water + Effluent
Runoff inflow	ML/year	4.9
Rain	ML/year	21.2
TOTAL IN	ML/year	26.1
Evaporation	ML/year	7.2
Seepage (estimated at 0.1 mm/d)	ML/year	0.18
Sludge accumulated	ML/year	0.17
Irrigation	ML/year	18.0
Overtopping	ML/year	0.48
TOTAL OUT	ML/year	25.2
Overtopping Events (no. per 10 yrs)		0.8
Percentage of reuse	%	92

13.11.5.2 Nutrient

Effluent typically has 100 – 350 mg/L of nitrogen, i.e. 300 mm of irrigation will provide 300-1,050 kg/ha/year of nitrogen. Most crops and pastures have a limit to the amount of nitrogen that can be taken up by plants, therefore, often the main issue is to manage the amount of nitrogen, not the amount of water.

Table 64 shows the water and nutrient balance of the effluent utilisation area over the 100-year modelling period for a utilisation area of 120 ha. Table 64 shows that there is some 655 mm/year (Scenario 1) on average of irrigation water (effluent and shandying clean water) applied to land.

Table 64 – Proposed development – Effluent utilisation area water and nutrient mass balance

Parameter	Units	Scenario 1 Clean water + liquid waste
Water Balance		
Rainfall	mm/year	617.3
Irrigation	mm/year	655.0
Soil evaporation	mm/year	671.1
Transpiration	mm/year	514.9
Irrigation runoff	mm/year	0.0
Drainage	mm/year	15.8
Crop yield (2 crops)	kg DM/ha/year	12,479
Nutrient Application and Losses		
N applied in irrigation	kg/ha/year	103.5
N volatilised	kg/ha/year	7.7
N removed by crop	kg/ha/year	108.4
N Leached	kg/ha/year	0.05
P applied in effluent	kg/ha/year	9.6
P removed by crop	kg/ha/year	9.7
P leached	kg/ha/year	0.0016
Change in adsorbed P	kg/ha/year	-0.38
Average phosphate-P concentration in rootzone	mg/L	0.02
Nutrient Concentration in Deep Drainage		
Nitrogen	mg/L	0.29
Phosphorus	mg/L	0.00
Salt		
Average salinity of infiltrated water	dS/m	0.40
Average salinity at base of root zone	dS/m	1.56
Reduction in crop yield due to salinity	-	0.0

NB: All data are means over 100-year simulation period.

13.11.5.3 Nitrogen

The behaviour of nitrogen in plant-soil systems is complex and includes additions and losses to the system as well as transformations of the forms of nitrogen. The capacity of an irrigation system to use nitrogen can be maintained and restored over time as the removal of nitrogen from effluent largely depends on biological processes. To calculate the nitrogen balance nitrogen inputs are compared with nitrogen losses.

Table 64 shows that about 95.8 kg/ha/year of nitrogen would be available for crop uptake after some losses on nitrogen as a result of volatilisation with Scenario 1. The crop would remove some 108.4 kg/ha/year of nitrogen per year with Scenario 1.

Subsequently, the plant uptake of nitrogen is in excess of the nitrogen added in irrigation. The nitrogen deficit and this will need to be met by existing soil reserves and/or additional applications of nitrogen.

Therefore, the irrigation area is considered to be sustainable with respect to nitrogen as required by relevant guidelines.

13.11.5.4 Phosphorus

Phosphorus (P) is removed from the wastewater through biological, chemical and physical processes in the soil. The existing P sorption capacity of the soil and the P uptake by plants to be grown determines how much P can be introduced before the site is saturated.

Table 64 shows that about 9.6 kg/ha/year of phosphorus would be applied through irrigation of effluent with Scenario 1. The crop would remove some 9.7 kg/ha/year phosphorus with the remaining phosphorus adsorbed by the soil and no phosphorus leached.

Subsequently, the majority of phosphorus added in irrigation will be removed by crop uptake. The balance is assimilated into the soil store with an average decrease of adsorbed phosphorus -0.38 kg/ha/year. The phosphorus concentration in the root zone is very low (0.00 mg/L) which is considered acceptable.

Therefore, the irrigation area is considered to be sustainable with respect to phosphorus as required by relevant guidelines.

13.11.5.5 Salinity

The quantity of salt in the effluent is important to ensure irrigation does not result in soil degradation by increasing soil salinity. The main requirement for salinity control in irrigation systems is to ensure there is adequate leaching to prevent salt accumulation in the soil.

The proposed crops for the irrigation area are summer crops (maize – forage) and winter crops (barley – grain and hay). These crops are currently grown on the subject land. These species are moderately sensitive to moderately tolerant to salinity levels.

The long-term nutrient balance modelling predicts that with this salinity content (of the irrigation water) there would be no reduction in crop yield due to salinity because the crops are moderately salt tolerant.

To ensure that effluent to be used in irrigation has sustainable levels of salt, the effluent and clean water used for dilution would be tested on an annual basis and clean water would be added (shandied).

13.11.6 Irrigation system

13.11.6.1 Wet-weather storage

Due to the variation in climate and weather patterns, there will be periods of wet weather when irrigation is not possible. Therefore, to prevent discharge of effluent from the site, during periods of wet weather the effluent shall be temporarily held in the holding pond (as a (balancing or wet-weather storage) until conditions are suitable for irrigation.

As discussed in section 8.4.10.2, a water balance approach has been used to size the holding pond such that an acceptable overtopping frequency is achieved.

13.11.6.2 "Clean" runoff diversion

As shown in Figure 13, the proposed effluent utilisation area is located on an existing irrigated field. Water management in the effluent utilisation area is well controlled with contour banks which reduces the possibility of contaminated stormwater runoff from leaving the site.

13.11.6.3 Application method

Application of effluent to land shall be via low pressure overhead spray system such as centre pivot system as is currently used for irrigation on the subject land.

This type of system provides uniform application of the effluent and at a rate less than the permeability of the soil, suitability for the range of soil types on the subject land and crops to be grown, ease of management and avoids the need for a tailwater collection system.

An example of the existing centre pivot irrigation system is shown in Photograph 4.

13.11.6.4 Stormwater runoff considerations

One of the key objectives of managing the irrigation system is to protect the environment from harm caused by contaminants in the effluent. Therefore, to ensure that surface drainage from the irrigation area does not contaminate surface waters a range of strategies for managing stormwater runoff have been implemented. These include:

- Provision of well-maintained grassed buffers to surface waters and drainage lines; and
- Scheduling of irrigation to meet the moisture demand.

13.11.6.5 Wet-weather discharge

Wet-weather discharge from a site is defined as the discharge of effluent from the subject land boundary.

Whilst the holding pond has been designed with an acceptable overtopping frequency in accordance with relevant guidelines, wet-weather discharge may occur particularly during periods of extended wet weather.

Therefore, during wet weather if discharge from the holding pond is necessary, it shall be engineered and managed to occur in a controlled and organised manner. Ideally, during wet weather, a steady discharge at a uniform depth across the irrigation area shall be considered.

13.11.6.6 Irrigation system management

13.11.6.7 Dilution

To more effectively use the nutrient value of the effluent, effluent shall be shandied with clean irrigation water.

13.11.6.8 Scheduling

Irrigation scheduling of effluent is dependent on three main factors:

- the quality of the effluent and nutrient requirements of the crops being irrigated;
- the moisture content of the soil and the amount of water needed to water the root zone; and
- weather considerations – wind rainfall and temperature.

Irrigation would occur only on suitable, selected areas within the proposed effluent utilisation area in any year. Irrigation scheduling would be closely supervised by the Farm Manager. The irrigation schedule would be established to sustainably manage the application of effluent and holding pond volume. Effluent would be irrigated primarily during the months of October to April, with irrigation in the colder months being based on effluent availability, rainfall, soil moisture and crop requirements. More detailed irrigation scheduling would be included in the Irrigation Management Plan (IMP) which would be prepared upon approval of the proposed development.

13.11.7 Mitigation measures

Sustainable management of effluent utilisation will involve measures which include the operation, monitoring, and reporting for the systems. Annual review of the performance of the irrigation management system from data collected on operation and environmental performance will assist with identifying areas of risk and potential improvements to the system. Elements of the measures are outlined below.

13.11.7.1 Irrigation management plan

Irrigation management is an important factor in ensuring the sustainability of the effluent utilisation area. The operation would employ best management measures to ensure long term sustainability of the operation. An Irrigation Management Plan (IMP) for the effluent utilisation area shall be prepared and implemented for the operation of the proposed development.

The Irrigation Management Plan (IMP) would provide measures to identify potential environmental impacts from the proposed development and provide measures to minimise these impacts.

13.11.7.2 Monitoring and reporting

The most important aspect of meeting environmental requirements as well as satisfying licence conditions is monitoring of the effluent and solid waste utilisation system. Annual reporting is a statutory requirement of the EPL.

Monitoring of the effluent irrigation system can be broken down into operational and environmental performance.

13.11.7.3 Operational monitoring

On the operational side, data needs to be collected to assist with day to day decisions regarding:

- irrigation scheduling;
- system management during irrigation to prevent over watering; and
- maintenance of the irrigation system, i.e. regular checking for leaks, blockages, pressure testing etc.

To keep track of operational activities as they occur and of the nutrient balance for the site records shall be kept such as volume irrigated, crop type, mass harvested and removed, stocking rates where applicable.

13.11.7.4 Environmental performance monitoring

The systematic collection of data to quantify the levels of potential pollutants in the receiving environment shall be undertaken to monitor environmental performance. These data provide essential information regarding environmental performance and non-conformances trigger the review of management strategies to ensure that environmental objectives are met.

To ensure that remedial action can be taken early, a suite of sampling and records are recommended as outlined in section 8.7.15. In summary, these include:

- volume of effluent stored and applied;
- effluent quality monitoring;
- soil monitoring;
- groundwater monitoring; and
- climate – rainfall.

Monitoring would be undertaken in accordance with the requirements outlined in the EPL and using techniques outlined in EPA guidelines.

13.11.8 Conclusion

The proposed development shall generate substantial volumes of effluent and solid waste. Effluent would be collected in the controlled drainage area and drain into the sedimentation basin and then into the holding pond. Solid waste shall be scraped from the pen surface and stockpiled in a dedicated storage area within the controlled drainage area.

The characteristics of the waste utilisation areas and their location relative to residences, surface waters, and groundwater have been assessed to identify the constraints to solid and liquid waste utilisation and assist with adopting and implementation of mitigation measures. The key factors governing the suitability of a site for solid and liquid waste utilisation are:

- Topography;
- Soil considerations;
- Proximity of surface and groundwater; and
- Proximity of residences.

It is concluded that topography of the utilisation areas is well-suited to the method of application proposed. The effluent utilisation area has well-graded, uniform slope and effluent shall be applied via surface irrigation.

The characteristics of the soils in the proposed effluent and solid waste utilisation areas are well suited for waste application as they are suitable for irrigated cropping, have moderate to high water holding capacity, not prone to waterlogging within the root zone, can withstand cultivation without incurring significant erosion and are deep well drained. Further, the subject land has been an irrigation property for some time.

The proposed development and associated effluent and solid utilisation areas have been sited and designed to minimise any adverse impacts to groundwater and surface waters. Various mitigation measures include riparian buffers and sustainable utilisation of applied nutrients.

The proposed development has some 900 ha of land available for the utilisation of solid waste. Based on the estimated generation of some 1,450 tonnes (dm) of solid waste per year, some 87% is able to be utilised on-site. The remaining solid waste shall be transported off-site for utilisation on adjoining properties.

The proposed development incorporates on-site utilisation of effluent from the holding pond to land via irrigation. Therefore, a land capability assessment was undertaken to ensure that the utilisation system is sustainable over the long-term. The assessment methodology incorporated a water and nutrient balance approach using the daily time-step model MEDLI.

A sustainable effluent utilisation system will achieve a balance between the use of effluent for irrigation with the nutrient requirements of the crop while protecting the environment from potential pollution. Additionally, the amenity of the surrounding environment and meeting the needs on a social and ecological level are important considerations in sustainability.

The assessment determined that the existing holding pond with a capacity of 20.0 ML is required to ensure that that overtopping events occur no more frequently than one in 10 years.

The effluent would be shandied with clean water and pumped from the holding onto the effluent utilisation area.

The assessment investigated the soil characteristics and concluded that the soil is capable of absorbing the level of salts and nutrients contained within the liquid waste. The assessment also confirmed the size of the irrigation area (approximately 120 ha) is adequate to sustainably irrigate the effluent.

Overall, the assessment concluded that there is sufficient land available with characteristics suitable for the sustainable application of all the effluent and a proportion of solid waste and that a minimum holding pond capacity of 20.0 ML is required to ensure that overtopping of effluent occurs at an acceptable frequency.

13.12 Traffic and transport

TfNSW requests that a Traffic Impact Assessment (TIA) be prepared by suitably qualified person/s in accordance with the Austroads Guide to Traffic Management Part 12, the complementary TfNSW Supplement and RTA Guide to Traffic Generating Developments. The TfNSW requirements are included within Appendix B.5.

A TIA of the proposed development has been undertaken by RDC Engineers Pty Ltd, 2024.

The purpose of the TIA was to determine the potential traffic impacts resulting from the proposed development and to recommend treatments to mitigate these impacts. The Traffic Impact Assessment is presented in Appendix Q.

The TIA is to identify the impacts of the development and the proposed on-site and off-site measures proposed to mitigate the impacts of the development on any road or rail related infrastructure. The TIA must explain and justify all inputs informing the proposed mitigation measures and TIA conclusions.

The TIA was undertaken in accordance with the following regulations, methods and guidance documents:

- Austroads Guide to Traffic Management;
    - Part 3: Traffic Studies and Analysis;
    - Part 5: Road Management;
    - Part 6: Intersections, Interchanges and Crossings;
    - Part 12: Traffic Impacts of Development.
    - The complementary TfNSW Supplement
- RTA Guide to Traffic Generating Developments
- NSW Road Noise Policy; and
- Queensland Government, Transport Noise Management Code of Practice.

The curriculum vitae for each personnel who participated in the Traffic Impact Assessment are provided in Appendix D.

13.12.1 Existing environment

The proposed development is located approximately 15 km by road east of North Star and some 27 km by road west southwest of Yetman in northern NSW some 30 km south of the QLD/NSW border.

Subsequently, an existing local and state road network services these townships and rural properties from both NSW and Queensland as shown in Figure 1 and Figure 47.

The subject land is accessed via Getta Getta Road from the west via North Star Road or the east via Warialda Road.

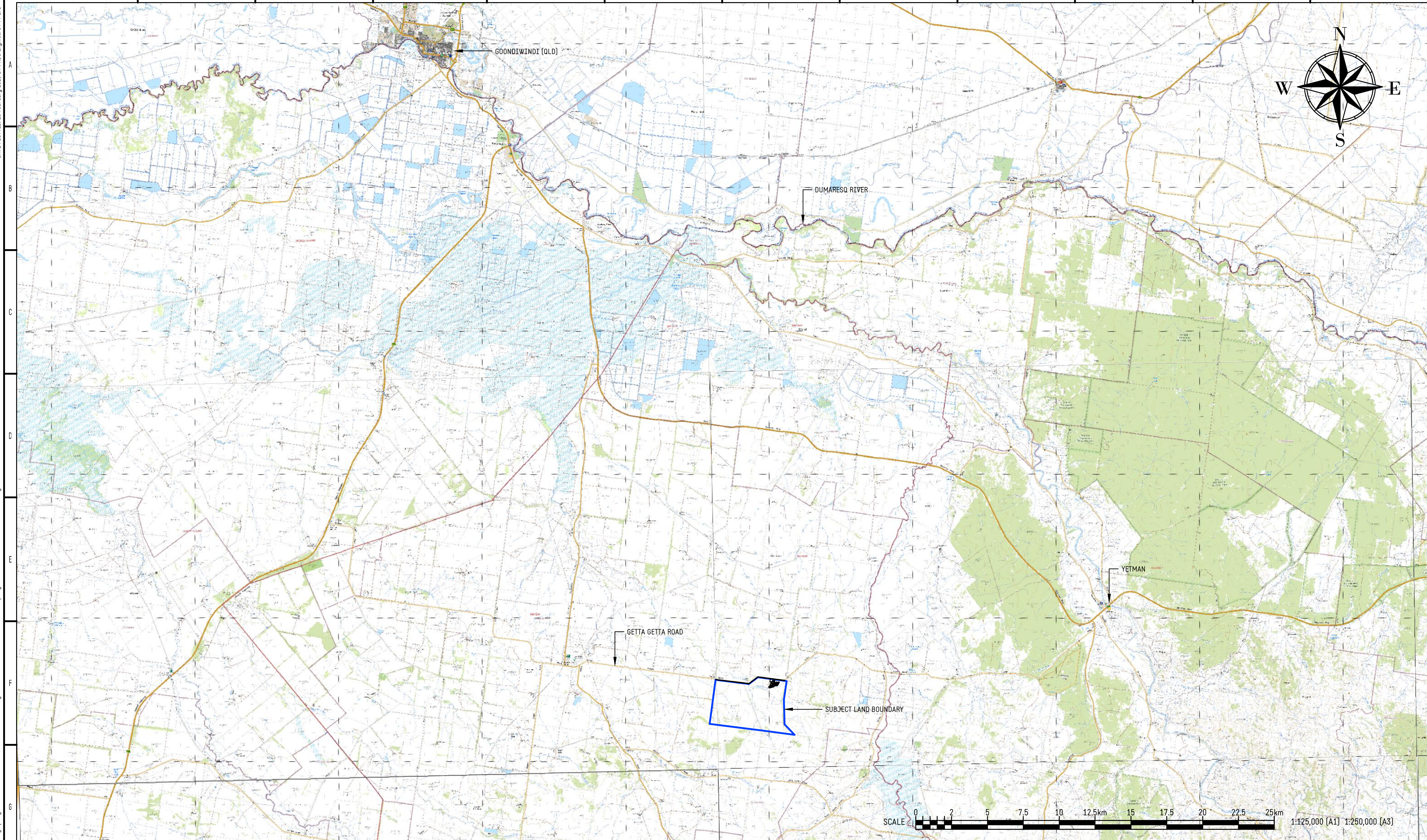
The principal haulage route to the proposed development by light and heavy vehicles is via Getta Getta Road to North Star Road.

No heavy vehicles access the subject land from the east on Getta Getta Road as there is a 10 t load limit on the Ottley's Creek bridge.

The existing road network are shown on and are well-maintained local roads.

To access the wider road network, the proposed development traffic would use the Warialda Road/Getta Getta Road or Getta Getta Road/North Star Road intersections, which are uncontrolled t-intersections with good visibility in all directions.

Getta Getta Road is two-lane, two-way undivided local road about 38.75 km long. Getta Getta Road provides connection from Warialda Road (CH0 km) to North Star Road at North Star (CH38.75 km). Getta Getta Road is unsealed from Warialda Road (CH 0 km) to the eastern abutment of the bridge crossing over Ottleys Creek (CH15 km) and is bitumen sealed from the western abutment to North Star Road (CH38.75 km).



LEGEND

- SUBJECT LAND BOUNDARY
- LAND PARCEL BOUNDARY

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REV.	DATE	REVISION DESCRIPTION	DRAWN	CHECK	APPROVED
A	24/01/25	DRAFT ISSUE TO CLIENT	RJD	RJD	RJD
B	21/02/25	FINAL ISSUE FOR SUBMISSION TO GSC	RJD	RJD	RJD

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DATE	21/02/2025
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CLIENT: DOOLIN FARMING PTY LTD

PROJECT: PROPOSED 3,000 HEAD BEEF CATTLE FEEDLOT

TITLE: DEVELOPMENT APPLICATION FOR INTENSIVE LIVESTOCK AGRICULTURE
ENVIRONMENTAL IMPACT ASSESSMENT
SUBJECT LAND - EXISTING ROAD NETWORK

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 47		A3	E2-103-00-47	B

13.12.2 Traffic movements and road capacity

13.12.2.1 Traffic generation

13.12.2.1.1. Existing operations

The subject land is currently used for lot feeding of cattle and dryland and irrigated cropping. The existing traffic generation for the subject land site comprises the following:

- Several residential dwellings;
- Beef cattle feedlot (999 head); and
- Cropping operations – irrigated and dryland winter and summer cropping (grain / hay / silage).

The type and configuration of vehicles currently utilising the existing development comprise light and heavy vehicles as outlined in section 13.12.2.1.1. Getta Getta Road is an approved Type 1 Road Train or B-double route. Heavy vehicles in Type 1 road-train and B-double configuration regularly access the existing development.

The estimated existing traffic movements generated by the existing intensive livestock operations on the subject land is some 1vpd comprising 1 heavy vehicle movement.

A detailed breakdown of existing traffic movements is provided in the Traffic Impact Assessment (Appendix Q).

13.12.2.1.2. Construction traffic

As discussed in section 8.6, the proposed development shall require the construction of additional infrastructure. All construction related vehicles would enter the proposed development site via the dedicated entrance on Getta Getta Road.

All heavy vehicles would unload their cargo or load their cargo within the proposed development complex site where there is sufficient space to enable these vehicles to turn around and travel along the access road and exit the proposed development complex site onto Getta Getta Road in a forward direction.

13.12.2.1.3. Operational traffic

As discussed in section 8.7, the operation of the proposed development would require deliveries of cattle and feed commodities. Both cattle and feed commodity heavy vehicles would enter the proposed development site via the dedicated entrance on Getta Getta Road.

The trucks would unload their cargo or load their cargo within the receivals/dispatch area in the case of livestock transport vehicles or at the feed storage/processing area in the case of feed commodities. There would be sufficient space within these areas to enable these vehicles to turn around and travel along the access road and exit the proposed development site onto Getta Getta Road in a forward direction.

It is expected that cattle would be delivered to the site in B-double vehicles and feed commodities in either B-double or Type 1 road train vehicles.

Additionally, any solid wastes generated from the operation of the proposed development and not utilised on-site would be transported off-site to adjoining land owned by the applicant. The solid wastes shall be stockpiled in the solid waste stockpile area within the controlled drainage area.

It is estimated that the operation of the proposed development would generate on an average daily traffic basis approximately 1.0 livestock transport vehicle movements and some 0.7 vehicle movements for transporting feed commodities.

As discussed in section 8.7.8, it is expected that approximately 4 staff would be employed during the operation of the proposed development. It has been estimated that there would be some 3 light vehicle movements (inbound and outbound trips) by development personnel on an average daily traffic basis with 2 staff living on-site in the existing dwellings.

A detailed breakdown of existing traffic movements is provided in the Traffic Impact Assessment (Appendix Q).

13.12.3 Potential traffic impacts

13.12.3.1 Site access

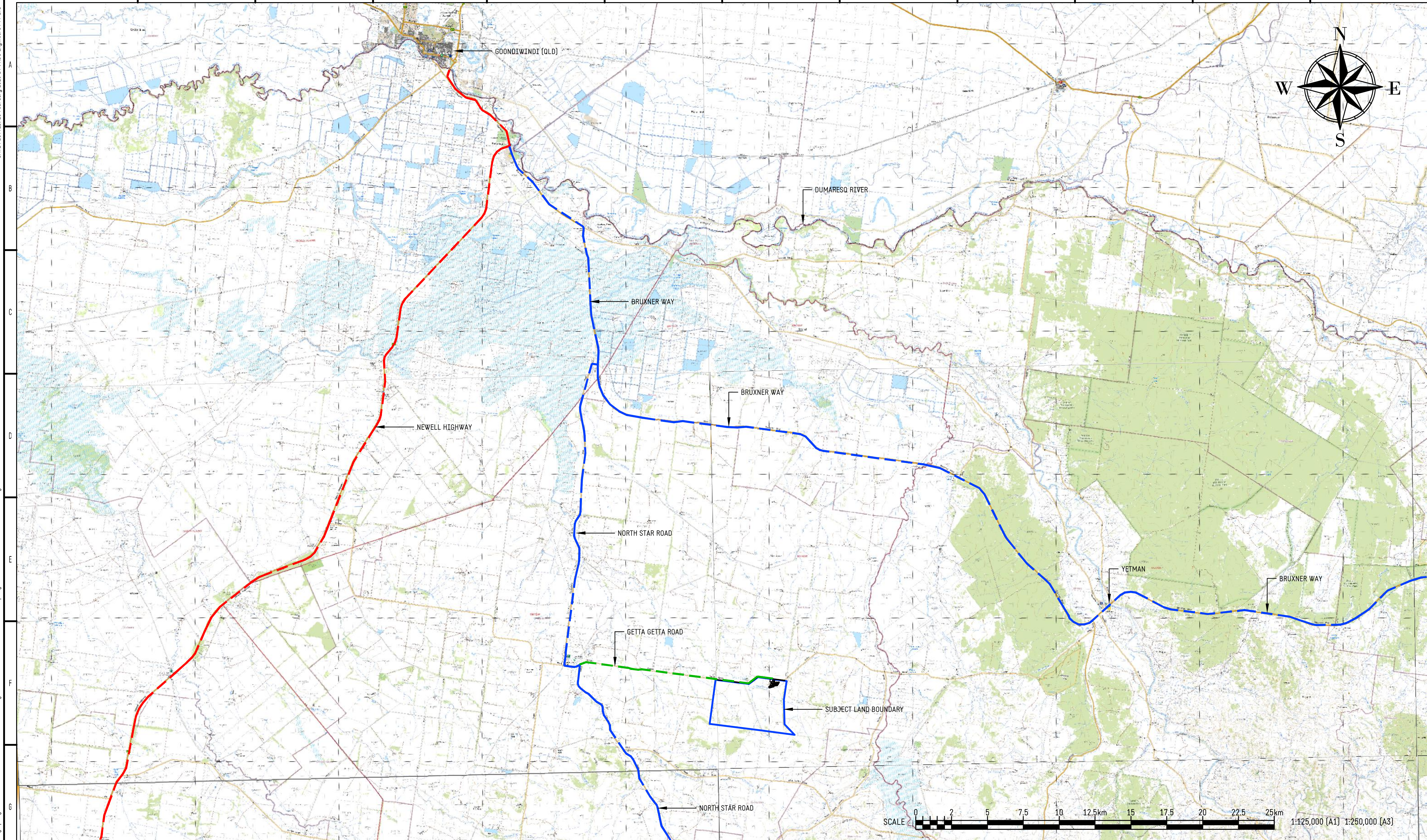
The proposed development shall utilise a new dedicated entrance off Getta Getta Road as shown in Figure 9. The proposed entrance shall be designed and constructed to accommodate the number and type of vehicles servicing the proposed development. An internal all-weather access road connects the subject land entrance to the proposed development complex site.

13.12.3.2 Haulage routes

The proposed development shall continue to utilise exactly the same haulage route as the existing development and agricultural enterprise on the subject land. The principal haulage route to the proposed development shall be:

- Route A - from the Bruxner Way to North Star Road to the proposed development via Getta Getta Road. Route A is used by heavy vehicles transporting agricultural enterprise inputs (seed, fertiliser) onto the subject land and grain off the subject land. North Star Road is an arterial road. Getta Getta Road is a split road classification and is an arterial road from North Star to the subject land under the control of Gwydir Shire Council and is frequently used by B-Double and Type 1 road-train vehicles carrying livestock and grain from the subject land.

- Route B - from Warialda Road to the proposed development via Getta Getta Road. Route B is used by heavy vehicles transporting agricultural enterprise livestock, grain etc off the subject land. Warialda Road is an arterial road. Getta Getta Road is a split road classification and is an arterial road from North Star to the subject land under the control of Gwydir Shire Council and is frequently used by B-Double and Type 1 road-train vehicles carrying livestock and grain from the subject land.



LEGEND

- SUBJECT LAND BOUNDARY
- LAND PARCEL BOUNDARY
- HAULAGE ROUTE - LOCAL ROAD
- HAULAGE ROUTE - REGIONAL ROAD
- HAULAGE ROAD - STATE ROAD

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REV.	DATE	REVISION DESCRIPTION	DRAWN	CHECK	APPROVED
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TITLE: DEVELOPMENT APPLICATION FOR INTENSIVE LIVESTOCK AGRICULTURE
ENVIRONMENTAL IMPACT STATEMENT
PROPOSED DEVELOPMENT - HAULAGE ROUTES

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 48		A3	E2-103-00-48	B

DATE PLOTTED: 20 February 2025 BY : RDC Engineers PTY LTD

FILE PATH: C:\RDC Engineers\RDCE - Projects\E2-103 Doolin Farming Springfield EIS\05 - ACAD MasterPlan\05.1 Drawings - CURRENT FILE NAME: E2-103 DF Springfield MASTERPLAN-00-20250108vB.dwg

13.12.3.3 Construction

As discussed in section 8.6, infrastructure shall be developed as part of the proposed development and therefore earthworks, pen infrastructure and internal roads shall be constructed.

All heavy vehicles associated with the construction of the proposed development travelling from the west would be routed along the Bruxner Way from Boggabilla to North Star Road to Getta Getta Road. All heavy vehicles associated with the construction of the proposed development travelling from the south would be routed from Warialda along the Warialda Road to North Star Road to Getta Getta Road. Typically, a low-loader type vehicle would deliver the construction equipment to the site as required and backload with equipment that has completed operations and is to be demobilised from the site. Delivery of items of construction equipment would be staggered throughout the construction period in line with sequencing of activities.

The proponent owns several items of equipment that shall be used for construction.

It is expected that there would be a maximum of 10 movements per day comprising light vehicles and 22 movements per stage for heavy vehicles for the construction activities of the proposed development based on Table 15.

13.12.3.4 Operational

Operating hours will be applied with any conditions of approval taken into consideration. Staff shall be on-site 24 hours a day, 7 days a week.

Typically, cattle shall be inducted between 7:00 am and 5:00 pm on weekdays. As far as practical, cattle are transported out of the development to slaughter five days per week between 6:00 am and 3:00 pm on Monday to Friday inclusive.

The livestock and commodity deliveries to and from the site would occur between 6:30 am and 4 pm and are expected to be spread over this period to avoid congestion on the site as feed commodities are being unloaded at the feed storage and processing area. Additionally, livestock transport vehicles to and from the site would be scheduled to avoid queuing as cattle are being loaded into the receivals area and inducted into the proposed development.

The calculations for the traffic impact assessment have been based on daily totals of the operation of the proposed development. The majority of operational traffic would be in the form of heavy vehicles transporting cattle and feed commodities.

It is expected that there would be about 5.25 movements per day for the operational activities of the proposed development based on site personnel of 4 full-time equivalents. This is an additional 4.6 movements per day when compared to the existing development.

13.12.4 Road safety

All heavy vehicles entering the proposed development would access via the site entrance on Getta Getta Road. Heavy vehicles would then unload/load at the relevant area. Thereafter, the vehicle would turn around utilising the available space, capable of supporting Type 1 road-trains and B-double, and exit the site in a forward direction via the access road and exit point on Getta Getta Road.

In relation to the new subject land entrance, adequate sight distance is available looking to and from the east and west for left and right turning traffic entering from Getta Getta Road.

Possible improvements to increase driver awareness would be the installation of additional advanced warning road users of traffic entering the site off Getta Getta Road. This would assist with increasing awareness of the possibility of entering traffic and reduce the risk of collision. This signage should be compliant with AS1742 and AS1906.

13.12.5 Mitigation of impacts

Management and mitigation measures would be implemented to minimise impacts to local and regional road network during the operation phase of the proposed development. These include:

- Access for light vehicles and heavy vehicles be maintained via a new dedicated subject land entrance off Getta Getta Road approximately 405 m east of the existing subject land entrance to provide sufficient sight distances to and from the development complex site.
- Advisory signage (Truck crossing or entering) be implemented on each approach to ?/ Getta Getta Road in accordance with AS1742.2 to advise motorists of truck turning movements.
- A Traffic Management Plan and Driver Code of Conduct shall be implemented to ensure heavy vehicles utilise either Haulage Route A or Haulage Route B.

13.12.6 Conclusion

The operation of the proposed development would generate additional traffic movements on the local and regional road network. The proposed development complex site is accessed from Getta Getta Road.

No upgrades are recommended under proposed additional traffic within the sealed section of Getta Getta Road, North Star Road, Warialda Road or the Bruxner Way as these roads meet the minimum standard commensurate with existing and proposed traffic volumes. No intersection upgrades to the local or state controlled road network would be warranted due to the low additional volume of development traffic.

13.13 Noise and vibration

13.13.1 Introduction

This section discusses the potential impacts from noise and vibration associated with the proposed development; including mitigation measures when practicable.

The sources of noise emissions from the proposed development include:

- Plant and machinery used to construct the proposed development
- Feed storage and processing equipment (electric motors, conveyors, roller mills) and mobile plant (feed trucks, tractors, front-end loaders etc) during operation of the proposed development.
- Livestock
- Livestock, feed commodity and solid waste transport vehicles both on-site and off-site.

Potential noise impacts are expected to be minimal based on the implementation of a number of mitigation measures, the location of the proposed development and the absence of nearby residential facilities will limit any adverse impacts.

The sources of vibration from the construction and operation of the proposed development include:

- Continuous construction activities such as bulk earthworks machinery, vibrating compactors
- Infrequent activities such as occasional dropping of heavy equipment, loading and unloading steel.
- Feed processing equipment such as the grain movement and milling system
- Livestock, feed commodity and solid waste transport vehicles.

No blasting, impact pile driving, or jack hammers shall be used during the construction.

13.13.2 Noise and vibration assessment guidelines

The *Protection of the Environment Operations Act 1997* (POEO Act) and associated regulation *Protection of the Environment Operations (Noise Control) Regulation 2017* provides the statutory framework for managing noise and vibration pollution in NSW.

In addition, potential noise and vibration impacts associated with the proposed construction and operational activities are assessed in accordance with the following guidelines:

- NSW EPA *Noise Policy for Industry 2017* (EPA, 2017) for the assessment of the operational noise of the proposed development;

- NSW *Environmental Criteria for Road Traffic Noise* (EPA, 1999) for the assessment of the off-site traffic noise on public roads;
- NSW *Interim Construction Noise Guidelines* (DECC, 2009) for the assessment of the noise from construction of the proposed development;
- NSW *Assessing Vibration: a technical guideline* (DECC, 2006) for the assessment of the vibration from the proposed development; and
- NSW *Road Noise Policy* (Department of Environment, Climate Change and Water NSW (DECCW), 2011) for the assessment of the noise from traffic generated by the proposed development; and
- NSW Environment Protection Authority Draft Construction Noise Guideline (2020) sets out a framework for the management of construction noise that ensures all feasible and reasonable mitigation measures are used to manage impacts.

EPA guidelines not applicable to the development include:

- Interim Guideline for the Assessment of Noise from Rail Infrastructure Projects (2007)

13.13.3 Understanding noise

Sound may be defined as any pressure variation that the human ear can detect. As the ear responds logarithmically to stimuli, it is more practical to express acoustic parameters as a logarithmic ratio of the measured value to a reference value. This logarithmic ratio is called a decibel or dB. The smallest perceptible change is about 1 dB.

The most common frequency weighting in current use is “A-weighting” providing results often denoted as dB(A), which conforms approximately to the response of the human ear.

For context, Table 65 presents the sound pressure levels of some common sources.

Table 65 – Sound pressure levels of some common sources (Bies and Hansen, 2003)

Sound Pressure Level (dB)	Sound Source	Typical Subjective Description
140 120	Propeller aircraft; artillery fire rock concert, wood chipper, jack hammer	Deafening, Human pain limit
110	Large aircraft (150 m over head), Chainsaw (1 m)	Threshold of Discomfort
100	Lawn mower; vehicle horns	Very Loud
80 70 60	Road with busy traffic; shouting; Loud radio or TV Inside a car, restaurant, voice conversation	Loud
50	Quiet street, whispered speech	Moderate
40	Private office; Quiet residential area	Quiet
20 10	Unoccupied recording studio; Leaves rustling Virtual silence audiometric test room	Very Quiet
0	Hearing threshold, quietest audible sound for persons with excellent hearing under laboratory conditions	

The most important factors affecting the way noise travels through the air and how it arrives at the receiver are:

- type of source (point or line);
- distance from source;
- atmospheric absorption;
- wind;
- temperature and temperature gradient;
- obstacles such as barriers and buildings;
- ground absorption;
- reflections;
- humidity; and
- rainfall.

13.13.4 Noise assessment criteria

13.13.4.1 Construction

The NSW EPA Draft Construction Noise Guideline (EPA, 2020) sets out ways to deal with the impacts of construction noise on residences and other sensitive land uses by presenting various assessment approaches rather than focusing only on achieving numeric noise levels.

The noise criteria set out in the Draft Construction Noise Guideline (EPA, 2020) have been used to assess the potential construction noise impact.

Table 66 summarises the criteria for construction noise for the proposed development.

Table 66 – Proposed development – Applicable noise criteria during construction

	Recommended standard hours	Outside recommended standard hours
Maximum Construction Noise Levels	Background Noise Level + 10 dB(A) and LAeq 75 dB(A)	Background Noise Level + 5 dB(A) and LAeq 75 dB(A)

The Interim Construction Noise Guideline has been reviewed and will inform the selection and application of work practices to minimise noise impacts based on the level and extent of impact expected taking into account site-specific considerations. Noise impacts to neighbouring residences will be minimised and also be mitigated by the existing separation between the site and the neighbours. The possibility of exceeding maximum construction noise levels at sensitive receptors within and or outside of standard hours has been considered. Noise generating activities onsite will be minimised.

13.13.4.2 Operation

The NSW Industrial Noise Policy (NSW EPA, 2017) provides acceptable ambient noise levels that can be received by rural receptors within an industrial area. The NSW Industrial Noise Policy (EPA, 2017) is designed to assess "industrial noise" using the more stringent of the following two approaches. These are:

- intrusive noise impacts in the short term for residences
- amenity for particular land uses such as residences.

The intrusiveness of a noise source is generally considered acceptable if the equivalent continuous (energy average) A-weighted level of noise from the source measured over a 15 minute period does not exceed the background noise level measurement by more than 5dB(A) for each time period (daytime, evening or night time) of interest.

The amenity criterion is established to limit continuing increases in noise levels, the maximum ambient noise level within an area from industrial noise sources should not normally exceed the acceptable noise levels specified in the New South Wales Industrial Noise Policy (EPA, 2000). Table 67 is a summary of the noise levels from EPA (2017) applicable to the sensitive receptors within the area of the proposed development.

Table 67 – Recommended L_{Aeq} noise levels from industrial noise sources (EPA, 2017)

Type of Receptor	Indicative Noise Amenity Area	Time of Day	Recommended L_{Aeq} Noise Level dB(A)	
			Acceptable (ANL)	Recommended Maximum
Residence	Rural	Day	50	55
		Evening	45	50
		Night	40	45

Notes: Day: 7.00 am – 6.00 pm / Evening: 6.00 pm – 10.00 pm / Night: 10.00 pm – 7.00 am.

To put this in context, 40 dB is approximately equivalent to the noise from a refrigerator, 45 dB to a quiet conversation (EPA Victoria 2008a; EPA Victoria 2008b).

Where there exists the possibility that instantaneous, short-duration, high-level noise events may occur during night-time hours (10.00pm – 7.00am), consideration should be given to the potential for the disturbance of sleep within residences.

As there exists little possibility of instantaneous, short-duration, high-level noise events occurring during night-time hours (10.00 pm – 7.00 am) an assessment of sleep disturbance for the potentially affected noise sensitive receptors has not been considered.

13.13.4.3 Off-site traffic

Criteria for off-site road traffic noise are specified in the NSW Environmental Criteria for Road Traffic Noise (ECRTN) (NSW EPA, 1999). The criteria applicable are summarised in Table 68. The location of the worst potentially affected receptor locations falls under the category of:

- Land use developments with potential to create additional traffic on local road.

Table 68 – Environmental criteria for road traffic noise

Type of Development	Day $L_{Aeq,1hr}$ dB(A)	Night $L_{Aeq,1hr}$ dB(A)	Where criteria are already exceeded
Land use developments with potential to create additional traffic on local roads	55	50	Where feasible and reasonable, existing noise levels should be mitigated to meet the noise criteria. Examples of applicable strategies include appropriate location of private access roads; regulating time of use; using clustering; using 'quiet' vehicles; and using barriers and acoustic treatments. In all cases, traffic arising from the development should not lead to an increase in existing noise levels of more than 2 dB.

Notes: Day: 7.00 am – 10.00 pm / Night: 10.00 pm – 7.00 am.

13.13.4.4 Vibration

Vibration impacts of the construction and operation of the proposed development have not been assessed. Generally, the main activities that could create vibration during construction are driven piling and blasting. These activities are unlikely to be required for the proposed development. No activities during operation of the proposed development are likely to cause vibration impacts.

13.13.5 Existing environment

The proposed development is in a rural area dominated by agricultural activities such as beef cattle grazing and cropping. The subject land is a large land holding and the nearest potentially affected noise sensitive receptor locations have been identified from examination of aerial imagery (Google Earth™) and a site inspection. The closest sensitive receptors are rural dwellings located on the neighbouring property some 1,275 m and 1,625 m from the proposed development respectively , whilst other sensitive receptors being rural dwellings are separated by over 2,300 m. These locations are shown on Figure 15 and listed in Table 70. The proposed development is setback a minimum of 150 m from the subject land boundary as shown in Figure 9.

The main sources of noise in the vicinity of the proposed development are from agricultural activities (tractors, cropping, irrigation pumping etc.) and traffic on Getta Getta Road.

Indicatively, Table 69 presents typical background noise levels extracted from AS1055.3–1997 (Standards Australia, 1997). These are representative of background levels in rural areas and are considered applicable to the proposed development.

Table 69 – Estimated background noise levels (Standards Australia, 1997)

Description of neighbourhood	Average background A-weighted sound pressure level, L_{A90}					
	Monday to Saturday			Sunday and public holidays		
	7 am-6pm	6 pm- 10 pm	10 pm-7 am	7 am-6pm	6 pm-10 pm	10 pm-7 am
Area with low density transportation	40	35	30	40	35	30

As shown in Table 70 and Figure 15, the nearest residential noise sensitive receptor is approximately 1,275 m to the west-north-west of the proposed development.

The main sources of noise in the vicinity of the proposed development are from agricultural activities (tractors, cropping, irrigation pumping etc.) and traffic on Getta Getta Road.

Due to the nature of the proposed development and separation distances to sensitive receptors, no noise monitoring was undertaken to define the existing background noise levels in the vicinity of the proposed development.

As such, the following assumptions have been used in the noise assessment:

- There are no significant noise sources in the locality; and
- Existing background levels would be comparable to those of a typical rural environment.

The minimum background level for rural areas of 40 dB(A) (EPA, 2020) has been used for assessment of noise impacts.

Table 70 – Proposed development – Noise sensitive receptors

Identifier	Type	Direction from Development Complex	Distance to edge of Development Complex m	Indicative Noise Amenity Area[1]
R1	2680 Getta Getta Road, North Star	West by North	~1,625	Rural Residence
R2	2680 Getta Getta Road, North Star	North	~2,330	Rural Residence
R3	1310 Goat Road, North Star	North by East	~5,365	Rural Residence
R4	2118 Getta Getta Road, North Star	North northeast	~3,070	Rural Residence
R5	2116 Getta Getta Road, North Star	North east	~3,350	Rural Residence
R6	2116 Getta Getta Road, North Star	North east	~3,470	Rural Residence
R24	2680 Getta Getta Road, North Star	Northwest	~1,275	Rural Residence

Notes: 1. According to the NSW Industrial Noise Policy (EPA, 2017).

13.13.6 Assessment of impacts

There is potential for impacts of noise on nearby residences and other sensitive land uses as a result of the construction and operation of the proposed development.

Due to the large separation distances from the proposed development and sensitive receptors (single rural residences being a minimum of some 1,275 m), the topography and landform and lack of certain vibration generating activities (blasting, jack-hammering, piling), it is predicted that no sensitive receptor shall be potentially impacted by vibration as a result of the construction and/or operation of the proposed development.

Construction and operation traffic associated with earthworks and livestock and feedstuffs to and from the development has the potential to result in vibration impacts at residential dwellings adjacent to Getta Getta Road. This risk is considered low due to the setback from the road of the residences.

13.13.6.1 Construction

The construction of the proposed development is expected to take approximately 3-4 months depending on weather conditions. The primary equipment that may be used during the construction of the proposed development is shown in Table 71. Jack hammers, pile-drivers and blasting shall not be used during construction.

Table 71 – Proposed development – Proposed typical equipment used in construction

Type	Purpose
Bulldozer (small)	Vegetation Clearing, topsoil clearing, bulk earthworks
Scraper	Bulk earthworks, sedimentation basin / holding pond construction
Excavator	Embankment trimming, catch drains, sedimentation basin / holding pond construction
Grader	Finish grading, road base preparation, trimming roads
Truck	Haulage of materials to site, material supply
Concrete truck	Placement of concrete for feed aprons, structural foundations etc

Table 72 outlines the range of equipment that may be used during the construction of the proposed development along with typical sound pressure levels. The sound pressure levels shown in Table 72 are generalised values of construction machinery and equipment that have either been reproduced from Department of Planning Transport and Infrastructure (SA) (2014) or Australian Standard 2436 (Australian Standards, 2010).

Table 72 – Typical sound power level from construction equipment (Department of Planning Transport and Infrastructure (SA), 2014)

Equipment	Source *	7m		20m		50m		100m		200m	
		Sound Pressure Level dB(A)									
		$L_{eq\ (15min)}$	L_{max}	$L_{eq\ (15min)}$	L_{max}	$L_{eq\ (15min)}$	L_{max}	$L_{eq\ (15min)}$	L_{max}	$L_{eq\ (15min)}$	L_{max}
Asphalt Truck/Sprayer	106	81	81	72	72	64	64	58	58	52	52
Backhoe	104	79	83	70	74	62	66	56	60	50	54
Batch Plant	116	91	90	82	81	74	73	68	67	62	61
Bobcat (skid-steer loader)		85		76		68		62		56	
Bulldozer (large)	108	92	95	83	86	75	78	69	72	63	66
Bulldozer (small)	106	90	93	81	84	73	76	67	70	61	64
Chainsaw (4-5hp)	110	89	92	80	83	72	75	66	69	60	63
Cherry picker		80		71		63		57		51	
Compactor	113	88		79		71		65		59	
Compressor (silenced)	101	76		67		59		53		67	
Concrete Truck	109	84	85	75	76	67	68	61	62	55	56
Concrete Vibrator	103	78	80	69	71	61	63	55	57	49	51
Delivery Truck	107	83	88	74	79	66	71	60	65	54	59
Dump Truck	117	83	90	74	81	66	73	60	67	54	61
Dump Truck (50t) - loaded	110	76	90	67	81	59	73	53	67	47	61
Dump Truck (50t) - unloaded	117	83	90	74	81	66	73	60	67	54	61
Tracked Excavator (5t)	100	77		68		60		54		48	
Tracked Excavator (45t)	107	83	90	74	81	66	73	60	67	54	61
Forklift	106	81		72		64		58		52	
Front-end loader	113	88	90	79	81	71	73	65	67	59	61
Generator	99	78	81	69	72	61	64	55	58	49	52
Grader	110	85	90	76	81	68	73	62	67	56	61
Hand tools (electric)	102	77		68							
Hand tools (pneumatic)	116	91		82							
Hand-held vibrating compactor		83		74		66		60		54	
Jackhammer	121	96		87		79		73		67	
Loader moving with full bucket	105	76		67	70	59		53		47	
Mobile Crane	104	88	91	79	82	71	74	65	68	59	62
Road Truck	107	83	88	74	79	66	71	60	65	54	59
Roller		82	88	73	79	65	71	59	65	53	59
Scraper	116	85	98	76	89	68	81	62	75	56	69
Tub Grinder & Mulcher (40-50hp)	116	91	95	82	86	74	78	68	72	62	66
Vibratory Roller	108	84	85	75	76	67	68	61	62	55	56
Water Cart	107	82	83	73	74	65	66	59	60	53	54
Welding Equipment	105	80	85	71	76	63	68	57	62	51	56

*A-weighted sound power levels - Typical mid-point

Due to the rural location, construction activities would be limited to between 6 am and 6 pm for Monday to Friday and between 7 am and 5 pm on Saturdays and Sundays with no construction activities undertaken on Public Holidays.

There are several residential receptors in the vicinity of the proposed development potentially impacted from construction noise. The maximum construction noise level at these receptors is shown in Table 73 using a minimum background level for rural areas of 30 dB(A) (Standards Australia, 1997).

During construction, it is expected that the use of bulldozers and scrapers would occur together. Subsequently, predicted noise levels at these receptors have been calculated from noise attenuation data for combined sources and are shown in Table 74.

Table 73 – Proposed development – Applicable noise criteria during construction

Maximum Construction Noise Levels	Recommended standard hours dB(A)	Outside recommended standard hours dB(A)
Background	40	30
LAeq	75	75

Table 74 – Proposed development – Predicted sound power levels at nearby residential receptors

Receptor	Distance to edge of Development Complex m	Nearest Activity A-weighted Sound Power Level at Source db(A)	Deduction from A-weighted Sound Power Level[1] db(A)	Predicted A-weighted Sound Power Level db(A)	Compliance with Standard Hours
R1	~1,625	117	79	38	Yes
R2	~2,330	117	83	34	Yes
R3	~5,365	117	92	25	Yes
R4	~3,070	117	86	31	Yes
R5	~3,350	117	87	30	Yes
R6	~3,470	117	88	30	Yes
R24	~1,275	117	77	40	Yes

Notes: 1. Deduction from A-weighted Sound Power Level obtained from Figure B1 and Table D1 in AS2436-2010 – Guide to Noise Control on Construction, Maintenance and Demolition Sites.

The predicted construction noise levels presented in Table 74 show that no exceedance of the noise limit is expected at any receptor locations. All receptors in the vicinity of the proposed development are located a considerable distance from the proposed development complex site. As a result, there are expected to be minimal adverse noise impacts from construction activities on residential receptors.

13.13.6.2 Operation

Noise generated from the operation of the proposed development would be from the infrequent operation of machinery and equipment on the site and from animal noise.

The proposed development would operate between 6 am and 7 pm seven days per week, fifty-two weeks a year. Activities including the receipt and dispatch of cattle, feeding, cleaning and maintenance would occur throughout the day. Pens would be periodically cleaned using a front-end loader and the manure placed into compost stockpiles.

Increased noise from cattle would generally occur during loading and unloading of cattle and any situations where cattle may be distressed. Stress impacts upon cattle growth and would therefore be minimised to ensure cattle are healthy and well thereby ensuring optimum growth.

Table 75 below indicates the predicted noise levels during various operational activities associated with the proposed development. Traffic noise and vibration has been considered in the Traffic Impact Assessment (Appendix Q).

Table 75 – Typical sound power level from operational equipment (Department of Planning Transport and Infrastructure (SA), 2014)

Type	Activity	Typical Sound Power Level db(A)
Feed processing plant	Grain movement, processing	95
Truck (<20t)	Ration delivery, solid waste transport	107
Front-end loader	Ration preparation, pen cleaning, solid waste stockpiling/processing	105
Tractor	General activities /	100
Trucks (>20t)	Incoming/outgoing cattle, feed commodities	107

Based on data from Table 75 and predicted A-weighted Sound Power Level at residential receptors (Table 74), noise generation from the operational activities of the proposed development at residential receptors does not exceed the background noise level measurement by more than 5dB(A) for intrusive noise for daytime, evening or night time periods.

Further, noise generation from the operational activities of the proposed development at residential receptors is not expected to exceed the acceptable noise levels for amenity criterion due to the considerable distance between the development site and receivers shown in Table 76, the typical sound power levels of operational equipment (Table 75) and the relatively short periods of continuous activity.

Table 76 – Proposed development - Predicted sound power levels at residential receptors

Receptor	Distance to sensitive receptor m	Nearest Activity A-weighted Sound Power Level at Source db(A)	Deduction from A-weighted Sound Power Level[1] db(A)	Predicted A-weighted Sound Power Level db(A)	Compliance with Acoustic Quality Objectives – Day time <40 db(A)
R1	~1,625	111	79	32	Yes
R2	~2,330	111	83	28	Yes
R3	~5,365	111	92	19	Yes
R4	~3,070	111	86	25	Yes
R5	~3,350	111	87	24	Yes
R6	~3,470	111	88	24	Yes
R24	~1,275	111	79	32	Yes

Notes: 1. Deduction from A-weighted Sound Power Level obtained from Figure B1 and Table D1 in AS2436-2010 – Guide to Noise Control on Construction, Maintenance and Demolition Sites.

13.13.6.3 Off-site traffic

Increased traffic generation on Getta Getta Road may result in an associated increase in traffic noise. The proposed development is expected to generate an additional 3.4 light and 1.2 heavy vehicle movements along Getta Getta Road per day as outlined in section 13.12 when operational. However, due to the low numbers of existing traffic on this road, the type and configuration of vehicles generated by the proposed development being similar to the existing development and the few sensitive receptors within close proximity to the road, the potential increase in traffic noise is not expected to impact upon surrounding receptors. Consequently, traffic arising from the development should not lead to an increase in existing noise levels of more than 2 dB at sensitive receptor locations.

13.13.7 Mitigation measures

As discussed in 13.13.6, noise generation from construction or operational activities of the proposed development at residential receptors is not expected to exceed the acceptable noise levels. However, the implementation of the following management and mitigation measures would further minimise the potential for noise as a result of the proposed development.

13.13.7.1 Construction

While the proposed construction activities have limited potential for impact on the local ambient noise environment, noise management strategies can be applied which would further reduce the potential for noise issues during the construction period. A Construction Noise Management Plan is to be developed as part of the CEMP to confirm assumptions made in the assessment and to investigate reasonable and feasible noise mitigation measures if necessary. The Construction Noise Management Plan shall consider measures such as:

- Carrying out all noisy construction works during the standard daytime construction hours;
- Scheduling construction to minimise multiple use of the noisiest equipment or plant items near noise sensitive receptors;
- Strategic positioning of plant items to reduce the noise emission to noise sensitive receptors where possible;
- Awareness training for staff and contractors in environmental noise issues;
- Minimising the use of horn signals and consideration of alternative methods of communication;
- Switching off any equipment not in use for extended periods during construction work;
- Minimising heavy vehicles' entry to site and departure from site outside the nominated construction hours;
- Consideration of the positioning of construction plant / processes;
- All plant and equipment required would be well maintained and regularly serviced;
- All plant and equipment would be installed with the appropriate noise attenuation apparatus;
- Retrofitting reversing alarms that are quieter and display fewer annoying characteristics;
- Community consultation with local residents to assist in the alleviation of community concerns;
- Maintaining a suitable complaint register. Should noise and/or vibration complaints be received, undertake noise and/or vibration monitoring at the locations concerned; and
- Heavy vehicles shall be restricted to Getta Getta Road for deliveries of materials, plant and equipment.

13.13.7.2 Operation

The implementation of the following management and mitigation measures would minimise identified potential noise impacts as a result of the proposed development:

- Low-stress cattle handling techniques employed to manage cattle to ensure they are handled quietly and efficiently;
- Carrying out all noisy activities such as feed processing during the standard daytime operational hours;
- Awareness training for staff and contractors in environmental noise issues;
- Minimising the use of horn signals and consideration of alternative methods of communication;
- Switching off any equipment not in use for extended periods;
- Minimising heavy vehicles' entry to site and departure from site outside the nominated operational hours;
- All plant and equipment required would be well maintained and regularly serviced;

- All plant and equipment would be installed with the appropriate noise attenuation apparatus;
- Retrofitting reversing alarms that are quieter and display fewer annoying characteristics;
- Community consultation with local residents to assist in the alleviation of community concerns;
- Maintaining a suitable complaint register. Should noise complaints be received, undertake noise monitoring at the locations concerned. Reasonable and feasible measures would need to be implemented to reduce noise impacts;
- Selection of machines that are inherently free of or have low vibration;
- Vibration-producing machinery shall be supported on stiff structural components, and be provided with efficient vibration isolation systems;
- Maintenance of plant and equipment machinery – ensuring rotating parts are balanced, vibration isolators are functioning as intended etc.; and
- Limiting speed of heavy vehicles along Getta Getta Road and reducing the occurrence of surface irregularities such as potholes.

13.13.8 Conclusion

Activities associated with the construction and operation of the proposed development have the potential to generate noise impacts. Traffic noise on Getta Getta Road would also be generated from the light vehicle traffic movements associated with operation of the proposed development.

There are very few residential (sensitive) receptors in close vicinity of the noise sources of the proposed development. These residential receptor locations are shown in Figure 15, with the closest residential receptor located approximately 1,275 m away from the proposed development complex.

Subsequently, due to the large separation distances from the proposed development and sensitive receptors, the topography and landform and lack of certain vibration generating activities (blasting, jack-hammering, piling), it is predicted that no receptor shall be potentially impacted by vibration as a result of the construction and/or operation of the proposed development.

No adverse noise impacts are expected at any sensitive receiver during the noisiest construction activities, which is bulk earthworks. Further, the activities generating these noise impacts would be temporary in nature and predicted noise levels from these activities meet the EPA construction noise criteria.
Operational activities involve noise generating equipment such as feed storage and processing equipment (electric motors, conveyors, roller mills) and mobile plant (feed trucks, tractors, front-end loaders etc) on-site. Due to the significant distance to the nearest sensitive receptor and as the operational activities of the proposed development are consistent with the activities of the existing agricultural activities of the surrounding area and existing development, the noise generated from the proposed development is not expected to create a significant impact on the surrounding environment.

As there will be no variation in vehicle types and relatively low increase in traffic volumes using the existing road corridor compared to the volumes currently utilising the Getta Getta Road, any local receptors on the route will not experience a significant increase in total traffic noise above that set out in the NSW Road Noise Policy.

13.14 Visual

This section provides an assessment of the potential visual impacts of the proposed development on the existing landscape and visual values of the surrounding area, specifically in relation to impacts on the community and scenic and landscape values of the area. The SEARs 1687 issued 2 June 2022 does not require a visual impact assessment for the proposed development at private receptors and public vantage points.

The visual impacts of the proposed development, including both short-term and long-term impacts, have been assessed with methodologies developed in accordance with best practice as guided by Guidelines for Landscape and Visual Impact Assessment (The Landscape Institute, 2002). Such methodologies are not provided in any formal regulatory guideline but for the purposes of this assessment, include:

- An assessment of the existing visual settings created by various landscapes in and around the proposed development;
- Establishing the visual character and visual effect created by the proposed development;
- A consideration of the visibility of the proposed development from sensitive receptors;
- The likely visual impacts created by the proposed development giving regard to visual effect and sensitivity;
- The development of available preliminary mitigation strategies to ameliorate adverse visual impacts; and
- Consideration of cumulative visual impacts in the locality and includes a consideration of night light effects.

13.14.1 Assessment methodology

13.14.1.1 Introduction

The methodology to determine the level of visual impact of the proposed development on the scenic and landscape values of locality and region involves four stages as follows:

1. The identification and evaluation of the existing visual environment. This stage involves a review of existing landscape settings and how they are seen from various viewing locations. In this way, the visual character of the landscape (as well as visual sensitivity of the various viewing locations) can be determined.

Developing an understanding of proposed development's landscape character will help to ensure that development is well situated, sensitive to its location, and the potential impacts associated with the proposed development are mitigated where possible.

2. The identification and evaluation of the visual effect and the visual sensitivity of the proposed development on the existing visual environment. Visual effect and visual sensitivity are assessed by considering the visual characteristics of the proposed development in the context of the landscape within which it is seen.

3. A combined consideration and analysis of both the visual sensitivity of the visual environment and visual effect of the proposed development on that visual environment.

2. A consideration of the impact on landscape values based on the total perception of landscape, including sight, smell, sound, touch, as well as knowledge and personal perceptions based on a wide range of input factors. In this step, evaluation of these components includes a consideration of the landscape of the locality and its context in the region and how the relationship of the landscapes and the proposed development may be perceived in the broader context of perceptions of the Dumaresq River region.

3. An overview of mitigation strategies and the objectives of reduced visual effects, sensitivity and visual impacts.

4. A description of how the study method is implemented which includes evaluation of plans and reports, using a joint consideration of all the analysis techniques summarised to outline view sheds, sensitive receptors, visual sensitivity and visual effect.

13.14.1.2 Evaluation of the existing visual environment

The evaluation of the existing visual environment consists of the assessment of both the existing landscape setting and viewing locations within it that may be impacted by the proposed development. The visual sensitivity assessment area extended some 5 km radius from the proposed development. The assessment area is based on the extent of the closest sensitive receptors in relation to the proposed development complex site.

13.14.1.3 Landscape setting

The landscape setting of the proposed development in terms of topography, vegetation, hydrology and land use features. These elements define the existing visual character of the landscape that the proposed development is located within and that it visually interacts with. Within any landscape there are areas of similar visual features that are defined as a Landscape Character Unit (LCU). Characterising the landscapes in terms of these units assists in understanding the visual character of the landscape as a whole. The LCUs are defined within the Primary Visual Catchment (PVC), which is the area from which there may be potential views of proposed development elements.

The scenic amenity of the various LCUs is defined as 'distinctive', 'common', 'minimal', or 'disturbed'.

Distinctive LCUs are of regional significance and have unique scenic amenity values in terms of topography, vegetation, geology, hydrology and /or various cultural or heritage features. In addition, these areas would have a high visual integrity with no detracting features. These landscapes will also have unique form, shape, line and / or colour, geological, vegetation or hydrological features.

Common LCUs are areas that have visual integrity but are not uncommon or unique. These landscapes will have visually pleasing patterns, shapes, lines and / or colours (e.g. rural areas).

Minimal LCUs can have a high integrity but often lack visual interest. These landscapes will be common but will also lack visual variety of form, shape, line or colour (e.g. open grassland with scattered trees).

Disturbed landscapes lack visual integrity with intrinsic values of form, shape, line colour and texture significantly compromised (e.g. open-cut mining areas, industrial infrastructure). Disturbed landscapes are those that have been modified and would require some form of management to reinstate scenic amenity and restore integrity to surrounding landscapes (e.g. open-cut mining areas).

13.14.1.4 Viewing locations

The viewing locations are those areas where people are likely to obtain a view of the proposed development. These viewing locations have different significance based on numerous factors, collectively evaluated through land use, landscape characteristics and viewing distance to the proposed development. Viewing locations could include residences, roads, commercial and recreational areas as well as urban and rural areas.

13.14.1.5 Visual effect

Visual effect is a measure of the level of visual contrast and integration of the proposed development with the existing landscape. The degree of this contrast with the existing landscape will determine the level of visual effect. A new development will have a higher visual effect due to strong contrast with the existing visual environment. Extensions to the operations of an existing development will have a lesser visual effect due to elements of the development being present in the landscape.

13.14.1.6 Visual sensitivity

Visual sensitivity is a measure of how critically a change to the existing landscape is viewed by people from different land use areas in the vicinity of a development.

In this regard, residential, tourist and / or recreation areas generally have a higher visual sensitivity than other land use areas including industrial, agricultural or transport corridors. This is because land uses with a higher visual sensitivity, such as residential, use the scenic amenity values of the surrounding landscape and may be used as part of a leisure experience and often over extended viewing periods (such as a regional tourist drive). Table 77 indicates the levels of visual sensitivity associated with land uses relevant to the proposed development.

Table 77 – Proposed development – Visual sensitivity

Land Use	Visual Sensitivity Levels			
	Nearest visible development element less than 2.5km away	Nearest visible development element 2.5km – 5km away	Nearest visible development element less than 5-7.5km away	Nearest visible development element more than 7.5km away
Rural dwellings	High Sensitivity	High / Moderate Sensitivity	Moderate Sensitivity	Low Sensitivity
Designated picnic areas, lookouts and walking trails in recreation reserves, e.g. North Star, Dthinna Dthinnawan National Park	High Sensitivity	Moderate sensitivity	Low Sensitivity	Low Sensitivity
Minor local roads in rural zone e.g. Getta Getta Road	Moderate/Low sensitivity	Low Sensitivity	Low Sensitivity	Low Sensitivity
Broad acre rural lands	Low Sensitivity	Low Sensitivity	Low Sensitivity	Low Sensitivity

The visual sensitivity of individual viewing locations may range from high to low, depending on the following additional factors:

- Screening effects of any intervening topography, buildings or vegetation. Viewing locations with well screened views of the proposed development will have a lower visual sensitivity than those with more open views;

- Viewing distance from the viewing location to visible areas of the proposed development. The longer the viewing distances, the lower the visual sensitivity; and
- General orientation of residences to landscape areas affected by the proposed development. Viewing locations with strong visual orientation towards the proposed development (i.e. those residences with areas such as living rooms and/or verandas orientated towards it) will have a higher visual sensitivity than those not orientated towards the proposed development, and which do not make use of the views toward the proposed development.

For any area to be given a sensitivity rank, it must have views to the proposed development. This visibility was determined based on field assessment and analysis of topographic and vegetation data.

13.14.1.7 Visual impact

The visual impact of the proposed development has been determined by considering both visual effect and visual sensitivity. The way in which the parameters of visual sensitivity and visual effect are utilised to determine visual impacts is illustrated in Table 78.

Table 78 – Proposed development – Visual impact

Visual Effect	Visual Sensitivity High	Moderate	Low
High	High visual impact	High / Moderate visual impact	Moderate/Low visual Impact
Moderate	High / Moderate visual impact	Moderate visual impact	Moderate/Low visual Impact
Low	Moderate / Low visual impact	Moderate / Low visual impact	Low visual impact

13.14.1.8 Mitigation

Visual and landscape impact mitigation strategies are typically recommended for both within the proposed development boundary (on-site) and outside of the proposed development boundary (off-site) as required. This ensures that either visual effects and or visibility/visual sensitivity factors are decreased in appropriate time frames to achieve mitigation of impacts. General strategies to reduce visual impacts that may be recommended are outlined below.

13.14.1.9 Reduce visual effects

Rehabilitation of disturbed areas associated with the proposed development will decrease the visual contrast created by development construction to the existing landscape. Rehabilitation strategies that emulate patterns, shapes, line and colour of the existing landscape can reduce the contrast between the proposed development and the existing landscape, reducing visual effect.

13.14.1.10 Reduce visual sensitivity

Reducing visual sensitivity is achieved by carrying out treatments to minimise the visibility to the proposed development. Due to the nature and scale of the proposed development, element screening, if required, would best be completed at or close to the point of viewing. Such screening treatments can also be used to redirect views to areas not affected by development activities as well as generally enhancing the landscape at the viewing point.

13.14.1.11 Reduce visual impacts

Reducing visual impacts is also achieved by the proposed development design and siting that maximises screening of elements of the proposed development by utilising existing topographic and vegetative features. Maintaining high significant points and topographic and vegetation features also contributes to a reduction of visual impact.

13.14.2 Existing environment

13.14.2.1 Topography

The south and centre of the region is characterised by gently undulating topography. The northern area is characterised by the Border Rivers Valley Floodplain. Low ridges and rolling hills are dissected with numerous drainage lines. The Macintyre River and anabranch streams such as Whalan Creek are the major waterways. In addition, there are several smaller local creeks in the region including Forest Creek, Back Creek and Mobbindry Creek.

The topography of the subject land ranges from some 300 to 360 m above Australian Height Datum (mAHD) with a general north-easterly slope towards Back Creek.

13.14.2.2 Drainage

The proposed development is located within the Border Rivers (NSW) catchment. The surface water environment in the surrounding area drains immediately to Back Creek. The confluence of Scrubby Gully and Back Creek is located on the subject land immediately to the west of the proposed development complex. These waterways drain to Mobbindry Creek and then to Whalan Creek located some 32 km to the north-west of the proposed development complex. Whalan Creek drains to the Boomi River and then the Barwon River south west of Mungindi. The Barwon–Darling catchment takes in the Barwon River, from upstream of Mungindi at the confluence of the Macintyre and Weir rivers, to where the Barwon River meets the Culgoa River. At this point the river channel becomes the Darling River and the Barwon–Darling system extends downstream to the Menindee Lakes.

13.14.2.3 Land uses

Rural land uses dominate the surrounding area and includes beef cattle grazing and irrigated and dryland cropping lands. The area is also scattered with infrastructure that supports these activities such as machinery/hay storage sheds, grain storage facilities and rural residences.

The surrounding land holdings are of similar size in area to the subject land on which the development is proposed. These land holdings are generally partitioned and identifiable due to the different types of rural infrastructure, including unsealed roads, native vegetation fringing boundaries and fencing.

The visual character of these land uses is representative of the undulating topography with minimal settlement or views to other land use activities. Farm residential settlement is sparse but continuous with most properties including one or more land parcels. Views are considered to be consistently similar in all directions and involve land uses of a similar nature to the subject land, that being irrigated and dryland cropping and livestock grazing

Dense undisturbed vegetation is limited to the slopes and ridges and along drainage lines and roadways. The woodland vegetation within the valleys has been largely disturbed, with total or partial tree clearing for agricultural and pastoral land uses.

13.14.2.4 Towns

Townships in the locality including North Star and Yetman are approximately 10 km and 22 km respectively from the site and are screened from views of the proposed development by elevated intervening topography and vegetation.

13.14.2.5 Rural residences

Rural residences are spread out, reflecting the larger land holdings in this region. The residences are generally setback from the road frontage are not often orientated to long distance views. Rather, most residences are surrounded by homestead gardens that to various extents limit some long distant views. These residences are spread along all major and minor roads in the locality.

13.14.2.6 Roads, rail, industry

Major and minor roads surrounding the proposed development comprise Getta Getta Road. North Star Road is located some 10 km to the west northwest, the Bruxner Way is located some 22 km to the east and accessed via Getta Getta Road to Warialda Road. The Newell Highway is located some 28 km to the north west and accessed via Getta Getta Road to North Star Road to the Bruxner Way.

The Narrabri to North Star corridor of the Inland Rail passes through the village of North Star which is located 10 km to the west northwest of the subject land.

13.14.3 Primary visual catchment

The distinctly vast and open landscape character of area results in a locale with a significantly broad visual catchment. The dominance of agricultural development and infrastructure has resulted in a characteristic linear composition of the landscape and a distinct landscape character of the surrounding area as shown in Photograph 17.

Photograph 17 – Surrounding area – Landscape character

13.14.3.1 Visual character of subject land

The landscape of subject land has been shaped by impacts commonly associated with historical agricultural development in the area. These impacts are primarily the almost complete clearing of remnant vegetation communities and the establishment of an extensive area of cropping land as shown in Photograph 18 and Photograph 19. This development allowed for the growth in irrigated and dryland cropping in the area. This disturbance includes tree clearing, pasture improvement, weed invasion and edge effects. The current vegetation pattern comprises very scattered stands and isolated remnants of mature native trees within an otherwise extensively developed agricultural landscape with remnant vegetation remaining on land less suitable for agricultural; pursuits including drainage lines and roadways.

The visual character of the northern area of the subject land is characterised by the built infrastructure of the existing beef cattle feedlot development as shown in Photograph 19.

Due to the topography of the surrounding land and remaining vegetation, the proposed development would be visible from Getta Getta Road. The proponent has established a vegetative buffer along Getta Getta Road comprising plantings of local providence trees as shown in Photograph 20.

Photograph 18 – Subject land – Visual character

Photograph 19 – Subject land – Visual character of existing development complex

Photograph 20 – Subject land – Vegetative buffer along Getta Getta Road

13.14.4 Proposed development

This section evaluates the various elements of the proposed development and considers the potential visual effects in terms of how these elements contrast with the existing landscapes. Each of the development elements will have varied visual effects on the surrounding landscapes based on their location, visual character, scale and their interaction with the adjoining landscape units and their visibility, especially to sensitive viewing areas.

From a visual perspective, the development elements outlined in section 8.1 can be divided into major and minor elements. Major elements have the potential for significant visual effect in relation to external views. Minor elements, although not necessarily insignificant in horizontal scale have a less significant visual effect due to lack of vertical scale and potential for visual projection beyond their immediate boundaries.

With reference to Figure 6, major development elements include:

- Production pen area;
- Effluent and solid waste management infrastructure; and
- Feed storage and processing infrastructure.

With reference to Figure 6, minor development elements include:

- Water supply, storage and reticulation infrastructure;
- Cattle handling infrastructure;
- Administration/Maintenance infrastructure;

- Development entry and access road;
- Communications and electricity reticulation infrastructure.

The location of these elements is illustrated in Figure 6, with the physical and visual character of each and their construction and / or operational requirements discussed below.

13.14.4.1 Major development elements

13.14.4.1.1. Production pen area

Physical Character

The production pen area is a major visual element of the development. The production pen area is the main livestock housing system in the development and comprises an open cleared area divided into a series of pens where beef cattle are confined and supplied with feed and water.

All vegetation within the proposed pen area is removed to facilitate bulk earthworks which are required to reshape the landform to provide runoff and drainage control.

Prior to bulk earthworks commencing, suitable topsoil material will be recovered and stockpiled for use in rehabilitation that will facilitate reinstatement of vegetative buffers and landscaping within and around the proposed development.

During the construction period, there will be the additional activity associated with the development, generally associated with vehicle and construction machinery movement.

The proposed production pen area will be consistent with best practice design, construction and management of beef cattle feedlots. During the operation period, there will be the additional activity associated with the production pen area, generally associated with vehicle and operation machinery movement for feed delivery and solid waste management.

Visual effect

The production pen area has a large horizontal and low vertical scale. Consequently, whilst the visual effect of the production pen area is high, the low vertical scale ensures that all viewing locations are generally screened by some of the intervening topography and/or vegetation, limiting the visibility of the production pen area for receptors in adjacent areas.

The production pen area will create a high visual effect for those areas that have views towards this feature in the landscape. However, the rehabilitation and revegetation around the development, existing topography and surrounding vegetation will effectively limit views to these areas, reducing this high level of visual effect.

13.14.4.1.2. Effluent and solid waste management infrastructure

Physical character

Effluent and solid waste management infrastructure includes the construction and operation of effluent and solid waste management and reticulation infrastructure including solid waste storage area, pipelines, diversion drains, sedimentation basin and culverts, outlet weir, holding pond, pumping station and associated infrastructure. This infrastructure will be sized and located as required to capture runoff from the controlled drainage area.

The majority of the infrastructure elements are earthen construction and small in horizontal and vertical scale.

During the construction and operation period, there will be the additional activity associated vehicle and construction/operation machinery movement.

Visual effect

Elements of the effluent and solid waste management system include earthen drains located within the production pen area that will follow the design surface contours.

The development of solid waste storage area, sedimentation basin and holding pond will require vegetation clearance. The sedimentation basin and holding pond will initially have high visual effect during construction due to the colour contrast caused by exposed soils and loss of vegetation against the existing woodland backdrop of the ridgeline. This visual effect will reduce after ground cover is re-established over disturbed areas.

13.14.4.1.3. Feed storage and processing infrastructure

Physical character

The major infrastructure elements of the feed storage and processing facility include:

- Grain storage – silos;
- Grain processing facility – grain movement infrastructure;
- Commodity storage area – silage bunkers, hay laydown area;
- Commodity storage shed – processed grain, mixing rations; and
- Liquid storage facility – tanks.

All the major infrastructure elements of the feed storage and processing facility have a distinct industrial character. They are large in scale and coupled with the minor additional infrastructure elements, create a light industrial setting.

Visual effect

The feed storage and processing facility would create a high visual effect where they are visible to receptors due to strong contrasts with the surrounding rural landscapes. The rectilinear form, shape and line of the feed storage and processing, grain silos, commodity shed, grain movement conveyors, etc. will contrast strongly with the natural form, colour, shape and line of the topography and vegetation of the locality.

The visual effect of the construction process will add a visually dynamic element in terms of machinery and vehicle movement.

However, existing infrastructure shall be used and the local topography and vegetation will screen views to the feed storage and processing facility once constructed. Subsequently, any visual effects would be contained within the subject property and not perceivable to other local and more distant views.

Further, the form of the feed storage and processing infrastructure is of a form consistent with similar physical elements that are presently experienced within the landscape (typical grain production infrastructure e.g. grain silos, storage sheds etc.) albeit on a larger scale, however.

Consequently, visual effects of the proposed feed storage and processing infrastructure will be low.

13.14.4.2 Minor development elements

13.14.4.2.1. Water supply, storage and reticulation infrastructure

Physical character

Water infrastructure includes the operation of groundwater management and reticulation infrastructure including water tanks, pipelines, pumping stations and associated infrastructure. This infrastructure is existing.

Visual effect

Elements of the site water management system shall include underground pipelines, storage dam, pumping stations.

The establishment of additional water storage tank(s) will require soil disturbance. The water storage tank(s) shall be sited within the proposed development complex site and will initially have high visual effect during construction due to the colour contrast caused by exposed soils and loss of vegetation against the backdrop of the site. This visual effect will reduce after ground cover is re-established over disturbed areas.

Any water supply and reticulation pipelines generally will have a plain linear form and line and be underground.

Consequently, visual effects of the proposed water supply, storage and reticulation infrastructure infrastructure will be low.

13.14.4.2.2. Cattle handling infrastructure

Physical character

The proposed development shall include facilities for conducting livestock handling and management functions. This includes receival, dispatch and processing yards, hospital and associated facilities for example.

Visual effect

The cattle handling infrastructure will be of light industrial character including – sheds and handling equipment (crushes, drafting yards etc). The facilities are similar in character to the rural landscape but have larger scale and form than many cattle handling yards that currently occur in the valley.

Once constructed, the visual effect of this infrastructure will be low as they are screened by local topography and intervening vegetation and would have very little visual effect outside of the subject land.

Subsequently, visual effects of the cattle handling infrastructure will be low.

13.14.4.2.3. Administration/maintenance infrastructure

Physical character

The proposed development shall include facilities for conducting management, maintenance and administrative functions. This includes administration office, machinery workshop and associated facilities for example.

The administration office is existing and used primarily for conducting management and administrative functions at the existing development.

The machinery workshop is existing and caters for the repair and maintenance of machinery and for light engineering. Part of the building also serves as a store for spare parts and consumables. These elements relate to the operation of the proposed development.

Visual effect

The administration office is located in a rural setting with residential buildings that are similar in configuration and character.

Much of the maintenance infrastructure will be of light industrial character including - sheds, workshops, and service equipment. The facilities contrast in character to the rural landscape but have similar scale and form of many agricultural sheds and out-buildings that currently occur in the area. They are generally clustered in one location, thereby consolidating the extent of effect on the wider rural landscape.

The visual effect of this infrastructure will be low as they are screened by local topography and intervening vegetation and would have very little visual effect outside of the subject land.

Consequently, visual effects of the administration and maintenance infrastructure will be low.

13.14.4.2.4. Development entry and access road

Physical character

Access to the proposed development would generally be via a new dedicated entrance off Getta Getta Road.

An internal unsealed road will be constructed to access the proposed development complex from Getta Getta Road and allow the movement of livestock and commodities and solid waste on- and off-site.

Visual effect

The visual effect of the site entrance road will create a high visual effect during construction. However, once constructed, the visual effect of the entrance, will be reduced to low as they are generally set low in the landscape, screened by local topography and intervening vegetation and would represent the continuation of an existing visual element in the local and regional landscape settings.

There will be increases in traffic volumes introduced by the proposed development as described by the Traffic Impact Assessment Report (Appendix Q). The increased traffic volumes may result in a high visual effect however it is transient and would be restricted to receptors adjacent the key intersections and along the primary haulage routes and for travellers using Getta Getta Road.

13.14.4.2.5. Communications and electricity infrastructure

There is currently overhead electricity supplied to the subject land as shown in Photograph 5. Single-phase and three-phase power is provided by the overhead electricity supply to various infrastructure such as dwellings, grain storage and processing infrastructure, water supply and distribution. Solar powered pumps are also used for stock water supply.

Physical character

The proposed development will not involve the extension of overhead transmission.

Visual effect

The power transmission/distribution infrastructure represent similar physical elements that are presently experienced within the landscape. Visual effects of the proposed power transmission/distribution infrastructure will be low.

13.14.4.3 Visual effect

The built infrastructure has a large horizontal and low (fences) to medium (buildings, shade structures) vertical scale. The built infrastructure will create a high visual effect for those areas that have views towards this feature in the landscape. However, as previously outlined the proposed development shall use the built infrastructure of the existing development which has been established for over 3 years.

Areas that do not have views of the proposed development will not be visually impacted

13.14.4.4 Visual sensitivity

There is a limited range of potentially sensitive viewing locations within the PVC (Figure 15). These include the rural residences, roads, limited tourist facilities/recreation areas and agricultural areas.

13.14.4.4.1. Rural residences

There are a limited number of rural residences spread throughout the PVC (Figure 15). Residences are associated with the various grazing and cropping farms along Getta Getta Road.

There are few residences that would have views and moderate to high sensitivity. The majority of residences are unsighted due to intervening topographic and vegetation features. Any views of the proposed development from these locations would have a low visual sensitivity.

13.14.4.4.2. Roads

There is one local road within the PVC being Getta Getta Road which passes through agricultural and pastoral landscapes of the North Star region as illustrated in Figure 30.

Getta Getta Road is a local road which provides connection for local properties between Warialda Road and North Star.

Getta Getta Road will have low to moderate sensitivity to the proposed development complex along the frontage of the subject land for a distance of about 1 km. Some built infrastructure, like shade structures, silos, maybe viewable from Getta Getta Road however, the landscaping which has been established along the road frontage shall screen this infrastructure in time.

Beyond this, Getta Getta Road will have low sensitivity due to increased viewing distance, intervening topographic and vegetation features.

13.14.4.4.3. Public reserve area

There are no public reserves within 10 km of the proposed development complex.

13.14.4.4.4. Protected and conservation areas

The closest protected and conservation area (Planchonella Nature Reserve) is located over 16 km from the subject land and outside of the PVC. Views from protected and conservation area are unlikely due to intervening topography, dense woodland and distance. There are no public walking trails, lookouts, or camping facilities within Planchonella Nature Reserve.

There are no other NSW National Parks and Wildlife Service (NPWS) promoted bushwalks or camping areas closer to the proposed development.

Consequently, the protected and conservation areas would have low visual sensitivity.

13.14.4.4.5. Rural lands

The predominant land use within the PVC is agriculture comprising irrigated and dryland cropping and livestock grazing.

All of these pastoral/ agricultural areas in the PVC have a low visual sensitivity.

13.14.5 Potential impacts

13.14.5.1 Visual receivers

The surrounding area to the proposed development comprises agricultural land with the main activity being cropping. As shown in Figure 15, there are few residences located within 2 km of the proposed development complex site and it was considered appropriate that the residences identified in the Odour Impact Assessment (section 13.1.5.1) were used as visual receivers.

Each identified visual receiver was assessed with respect to:

- View type from the receiver (e.g. permanent or intermittent views);
- Distance from the receiver to the proposed development; and
- Sensitivity of the receiver (e.g. residences have a higher sensitivity than a road user).

No mitigation measures outside the proposed development (off-site) are proposed. Existing vegetation/tree lines shall remain.

Eighteen viewpoints were assessed separately, and all were considered to have low to negligible impact significance, as summarised in Table 79 and illustrated in Figure 15. As indicated in Table 79, it was established that all viewing opportunities do not have direct views to the proposed development and would not be visually impacted by the development other than travellers on Getta Getta Road. Photograph 21, Photograph 22 and Photograph 23 illustrate the existing conditions and expected views of the proposed development from Getta Getta Road at the site entrance and east and west of the site entrance respectively.

The undulating terrain of the area, the tree lines within the subject land and adjoining land and the relatively low profile of the proposed infrastructure would result in the proposed development being hidden from view from the rural dwellings to the west, south, north and east of the proposed development site.

The proposed development complex shall be visible from Getta Getta Road east of the site entrance and at the site entrance. However, views to the proposed development would generally be of short duration and seen from moving vehicles. The closest rural residence is some 1,275 m from the proposed development and views from that residence towards the proposed development are blocked by existing vegetation. Views towards the proposed development from other rural residences would be also obscured by the topography, existing vegetation and the distance of the viewer.

Generally, there are three main factors contributing to the lack of a direct view of the proposed development. The primary factor is the undulating topography and the amount of scattered vegetation in the area between each sensitive receiver and the proposed development and immediately surrounding rural dwellings. This vegetation obstructs the view of all surrounding viewpoints. Secondly, the considerable distance between the receiver and the proposed development minimises the probability of a sensitive view of the proposed development. Thirdly, the siting of the proposed development within proximity to Getta Getta Road and the undulating topography of the surrounding areas ensures that no sensitive views of the proposed development complex can be obtained other than from Getta Getta Road.

Table 79 – Proposed development – Viewpoint analysis

Identifier	Type of Viewer	Distance to development complex	Type of View	Sensitivity	Magnitude	Impact
R1	Rural Residence	~1,625	Not visible	High	Negligible	Low
R2	Rural Residence	~2,330	Not visible	High	Negligible	Low
R3	Rural Residence	~5,365	Not visible	High	Negligible	Low
R4	Rural Residence	~3,070	Not visible	High	Negligible	Negligible
R5	Rural Residence	~3,350	Not visible	High	Negligible	Negligible
R6	Rural Residence	~3,470	Not visible	High	Negligible	Negligible
R24	Rural Residence	~1,275	Not visible	High	Negligible	Negligible
Getta Getta Road	Road users	~150	Visible	High	Negligible	Medium
Protected/conservation areas	Public	~16,000	Not visible	Negligible	Negligible	Negligible

Photograph 21 – Proposed development - View from Getta Getta Road (site entrance)

Photograph 22 – Proposed development – View from Getta Getta Road (east)

Photograph 23 – Proposed development – View from Getta Getta Road (west)

13.14.6 Assessment of impacts

This section considers the visual impact of the proposed development based on visual sensitivity values of receptors and visual effects of development elements. The visual sensitivity levels of the proposed development were discussed in section 13.14.4.4. The visual effects of the various elements of the proposed development were discussed in section 13.14.4. The impact will vary according to the visual effect of the proposed development, its visibility, and the visual sensitivity of areas from which it is seen.

13.14.6.1 Visual absorption capacity

Visual absorption capacity is the level of visual contrast of the proposed development to the context in which it is placed. The existing landscape include undulating topography and patches of remnant vegetation between the sensitive receptors and the proposed development complex. These vegetation communities will impact on the ability of receptors in these directions to see the proposed development complex.

The subject land consists of open cultivated areas with remnant vegetation fringing drainage lines and roadways. These landscape features characterise the North Star region.

It is considered that the proposed development is consistent with the nature of the agribusiness undertaken in the local area. As such, the elements associated with the proposed development are generally consistent with infrastructure usually associated with these agricultural activities. However, the infrastructure required for the proposed development would be on a larger scale than currently exists in the North Star region.

The undulating topography, existing remnant vegetation and the distance between visual receivers and the proposed development complex minimises the potential visual impact due to the visual absorption capacity of the existing environment.

13.14.6.2 Viewpoint assessment

The potential visual impact of the proposed development would be a result of construction activities and the impact of the final built form on the environment.

As discussed in section 13.14.5.1, there are relatively few sensitive visual receivers to the proposed development. The location of these visual receivers to the proposed development are shown on Figure 15. The assessment took into account the nature of the landscape, topography, the distance between the receiver and the proposed development as well as the type of view experienced. The assessment concluded that due to the topography of the landscape and level and form of existing vegetation, no residential receivers would experience any level of visual impact as a result of the proposed development.

All of the selected viewpoints, as shown in Table 79, would experience no visual impact.

13.14.6.3 Impact of night lighting

Generally, the proposed development shall not operate at night. However, as outlined in section 8.7.12, the proposed development may requires illumination of a number of elements within the complex for activities that may be undertaken outside of daylight hours. However, these activities are likely to be ephemeral.

Lighting in the proposed development may be located on a range of infrastructure as well as on tall structures such as the feed processing facility, as well as the receival /dispatch facility (e.g. loading ramps, forcing yards etc).

With the exception of grain silos, top of elevators, most of this lighting will be lower than 5 m from ground level for building and site illumination of the ground plain. Lighting on grain silos/elevators shall only be used for emergency repairs of equipment if required.

Visual impacts emanating from light sources are low to negligible of sensitive receptors primarily treatments and normal light management through directional lighting and hooding will further reduce light spillage from active work areas.

13.14.7 Mitigation measures

As discussed in 13.14.6, the proposed development is not expected to impact on the visual amenity of sensitive receivers or the landscape character of the area in the immediate vicinity.

The numerous mitigation measures incorporated in the design and operation for the proposed development will reduce the visual effect and mitigate the visual impact of the proposed development on sensitive viewing locations.

The development design elements and planning are responsive to the potential visual effects and visual impacts.

The implementation of the following management and mitigation measures would further reduce the visual impact:

- The siting of the proposed development between existing topographic features to achieve screening from many sensitive external view locations, especially along Getta Getta Road Road;
- Timely construction and implementation of progressive rehabilitation post-construction to reduce visual effect levels;
- Provision of adequate separation distances between the proposed development and sensitive receivers as shown in Figure 15;
- Maintaining buffer strip of existing mature trees/vegetation around the extents of the proposed development;
- Maintenance of the vegetative buffer along Getta Getta Road; and
- Directional lighting on elevated infrastructure.

13.14.8 Conclusion

There are few receivers surrounding the proposed development as indicated in , with the closest residential receivers located some 1,275 m from the proposed development. Further, the development complex is proposed to be sited some 150 m from the property boundary adjoining the local access road – Getta Getta Road. This setback area contains stands of vegetation and partially screens the proposed development from road users.

The visual impact of the proposed development from these viewpoints were assessed by taking into account the visual absorption capacity of the proposed development and the types of views experienced from these viewpoints. The type of view took into account the type of viewer, the nature of the view and also the distance to the proposed development.

As a result, the viewpoint assessment indicated that there was expected to be negligible visual impact from the proposed development.

The assessment deemed that the nature of the proposed development would be consistent with the existing agricultural activities in the surrounding area although on a larger scale. It is considered that the proposed development would assimilate into the local landscape due to the nature of the development and the high visual absorption capacity of the surrounding landscape.

Overall, it is expected that the proposed development would not create any visual impacts to receivers in the surrounding area.

13.15 Pest animals and weeds

13.15.1 Introduction

Biosecurity relates to preventive measures designed to reduce the risk of transmission of infectious diseases, invasive pests or weeds or contaminants which may impact on the economy, environment, community or animal human health.

The *Biosecurity Act 2015* provides the statutory framework for managing biosecurity risks in NSW.

Pest plants and animals have the potential to become established as a result of the proposed development. Biosecurity risks shall be managed in accordance with the general biosecurity duty and the proposed development's relevant environmental management plans.

13.15.2 General Biosecurity Duty

The NSW Biosecurity Act 2015 is built around shared responsibility between government, industry and the people of NSW working together to protect NSW from biosecurity risks.

Consequently, any person who deals with biosecurity matter or a carrier and who knows, or ought reasonably to know, the biosecurity risk posed or likely to be posed by the biosecurity matter, carrier or dealing has a biosecurity duty to ensure that, so far as is reasonably practicable, the biosecurity risk is prevented, eliminated or minimised. This is known as the general biosecurity duty.

The general biosecurity duty can apply to more than one person in relation to the same biosecurity risk, for example an owner and a manager may both be responsible for managing a particular biosecurity risk on the subject land.

The subject land is part of the North West Local Land Services region and as such is subject to the strategic regional pest plant and animal initiatives of the North West Regional Strategic Pest Animal Management Plan 2023-2027 (North West Local Land Services, 2022). The overall goals of the plan are to:

- reduce the impacts of pest animals within the North West region on production, the environment and the community;
- improve community engagement and expertise in pest animal management; and
- improve monitoring and reporting of pest animal management activities.

The pest species prioritised for action within the North West Region are:
- European fox;
- Wild dog;
- Feral cat;
- Wild horse;
- Feral goat;

- Wild rabbit;
- Feral pig;
- Common carp; and
- Wild deer.

Pest animals can be defined as native or introduced, wild or feral, non-human species of animal that is currently troublesome locally, or over a wide area, to one or more persons, either by being a health hazard, a general nuisance, or by destroying food, fibre, or natural resources.

The problems caused by pest animals vary but include; competing with native wildlife for food and habitat; preying on livestock and wildlife; grazing pressure on pastures, crops and native plant communities. They may also spread weeds, contribute to erosion, waterway degradation and become nuisances to human activities which may, in turn, be responsible for stress in rural communities. Human and animal diseases may also be introduced and spread through these animals.

Weeds are non-native plant species that are in the early stages of establishment and have the potential to become a significant threat to biodiversity if they are not managed. Weeds are often grouped in categories depending on their characteristics and impacts with many occurring in more than one category. Categories include:

- Noxious weeds;
- Weeds of National Significance;
- National Environmental Alert List Weeds;
- Water weeds;
- Native plants considered weeds; and
- Non-saleable weeds.

13.15.3 Assessment of impacts

Whilst, the local area has been colonised by a range of pest animals such as foxes, feral pigs and feral goats and weeds, the potential for the proliferation and spread of these weeds and pest animals or introduction and invasion of other weeds or pest animal species is an important consideration for the proposed development.

The construction of the proposed development requires the movement and transport of machinery, equipment and people to the site. Subsequently, these activities are potential vectors for the introduction of weeds if not effectively managed. The key activities to be managed include:

- Movement of people, vehicles and machinery
- Clearing vegetation
- Movement of soil and vegetation.

A risk of increased pest species populations exists from food waste introduced during construction activities. Subsequently, mitigation measures will predominately focus on reducing the amount and access to food waste by pest species.

The operation of the proposed development requires the movement and transport of livestock, feed commodities, and people to the site. Subsequently, these activities are potential vectors for the introduction of weeds if not effectively managed. The key activities to be managed include:

- Movement of livestock, feed commodities and vehicles;
- Pen cleaning, drain and sedimentation basin cleaning;
- Solid waste (manure, carcasses, spoilt feed, human waste) handling, storage, processing and movement;
- Movement of solid wastes;
- Feed storage and processing; and
- Ration delivery, spoilage and spillage.

Incoming livestock and grains and roughages can carry weed seeds from other areas. Weeds can be easily imported from different regions or states because livestock and fodder can travel significant distances by road within a 24-hour period.

13.15.4 Mitigation measures

The implementation of the following management and mitigation measures shall minimise identified potential impacts from pest animals and weeds as a result of the operation of the development:

- A ‘mitigation hierarchy’ of first avoiding, then minimising and then mitigating the impact shall be adopted;
- Earthmoving machinery shall be cleaned down prior to entering the proposed development site;
- Earthmoving machinery shall be cleaned down on-site as soon as possible upon completion of works and leaving the proposed development site if advised by the Construction Manager or operators notice the presence of weeds in the construction area;
- Timely control of initial weed populations around the proposed development, such as, around sheds and buildings, along roadsides, cattle receival facilities/holding yards, along fence lines, drainage structures, in tree plantings etc. Weeds in these areas experience little competition and can produce large quantities of seed;
- Control of weeds around the proposed development also reduces any potential fire hazard. Control shall be achieved by regular mowing or herbicide application. Knockdown or residual herbicides (or a combination of the two) shall be used depending on whether the weeds have emerged, the time of year and the weeds present;

- Prior to importing livestock and /or feed commodities (grains, roughages) from known weed infestation areas (e.g. parthenium weed), the weed status of materials and vehicles shall be determined from the supplier;
- Aquatic weeds in water storages shall be controlled via mechanical and/or chemical means. Chemical control shall be undertaken with considerable care, considering the identity of the weed, the effect of herbicides on desirable plants, fish and other aquatic life and the eventual use of the water;
- A pest management program shall be implemented to control pest animal species already present, using acceptable methods as well as identifying potential pest species, their likely distribution and methods to prevent their spread;
- Wild dog, feral pig, fox and vermin pest species populations near the proposed development shall be monitored;
- Established pest animals shall be controlled, and their spread prevented;
- Pest animal control programs shall use the most humane, target specific, cost effective and efficacious techniques available;
- Mice and rat populations will be mitigated:
    - primarily through the solid waste management schedule outlined in Table 26 – Proposed development – Schedule for pen and drain cleaning and maintenance

Activity	Frequency and / or Action
	Class One (1)
Removal of spilt feed /feed residues	Weekly
Elimination of wet patches in pens	Weekly
Repairs to potholes in pens	Weekly
Clean water troughs	Weekly
Under fence cleaning	Monthly (or after manure obstructs pen drainage)
Pen cleaning	At intervals not exceeding 13 weeks
Pen surface inspections	After runoff events and repaired as required
Diversion banks and drains	After runoff events and repaired as required

    - (i.e. minimise feed wastage and spillage to minimise likelihood of attracting vermin)
    - implementing a baiting program if the vermin population reaches a nuisance level.
- Fly breeding sites shall be mitigated using measures such as:
    - Integration of design features, such as pen foundation and slope to facilitate pen drying, wide feed bunk and water trough aprons and wide fence panels, to make cleaning aprons, under fences and drains that are known potential breeding sites easier or more effective;
    - Several control methods such as biological, chemical and physical methods following integrated pest management (IPM) principles shall be used;
    - Best practice sanitation methods such as solid waste management practices (pen cleaning, under-fence cleaning) and schedules as outlined in Table 26 – Proposed development – Schedule for pen and drain cleaning and maintenance

Activity	Frequency and / or Action

	Class One (1)
Removal of spilt feed /feed residues	Weekly
Elimination of wet patches in pens	Weekly
Repairs to potholes in pens	Weekly
Clean water troughs	Weekly
Under fence cleaning	Monthly (or after manure obstructs pen drainage)
Pen cleaning	At intervals not exceeding 13 weeks
Pen surface inspections	After runoff events and repaired as required
Diversion banks and drains	After runoff events and repaired as required

  - to minimise fly breeding sites;
  - Controlling weeds and keeping grass and other vegetation short, particularly around pens, drains, sedimentation systems and holding ponds makes it more difficult for flies to find resting places and reduces the vegetation–manure interface, a preferred breeding substrate for stable flies.
- Composting carcasses shall be covered with manure; and
- Human waste shall be managed appropriately and in accordance with any relevant statutory requirements.

13.15.5 Conclusion

Doolin Farming Pty Ltd has a long-term view of weed and pest animal management across its rural properties and supports managing weeds and pest animals in collaboration and consultation with landholders, natural resource management bodies and the government.

An integrated approach to weed and pest animal management shall be implemented based around the important elements of weed hygiene, operational hygiene, prevention of infestations, arresting weed outbreaks using effective reporting and physical or chemical control procedures, documenting weed and pest animal infestations and auditing management programs.

In summary, the proposed development is not expected to impact the surrounding environment in particular the soils, waterways and loss of biodiversity from the introduction and/or spread of pest animals and/or weeds provided the mitigation measures outlined in section 13.15.4 are implemented.

13.16 Resource use

13.16.1 Introduction

Various resources would be required to construct the proposed development and associated infrastructure. Water and energy are the predominant resource requirements for both phases.

Water and energy are essential inputs for a beef cattle feedlot operation. However, there are increasing pressures to improve the efficiency of water and energy usage to reduce costs and meet regulatory requirements.

Energy is fundamental to a feedlot production system with a reliable energy supply required to operate and maintain feed and water supply to the cattle and for waste management. Furthermore, in recent years, there has been a substantial increase in the cost of energy.

Beef cattle feedlots use energy directly as fuel or electricity to operate machinery and equipment, to heat or cool buildings, for lighting and office equipment and indirectly through incoming and outgoing cattle and commodity delivery.

Water availability and cost of supply is changing rapidly, driven by increased demand for industry, urban water supply and the environment. With droughts adding to low river flows, water supplies are very tight in many regions of Australia.

Water is both the most important feed component fed to cattle and the most valuable natural resource after land in Australia. Water is required at the proposed development for cattle drinking water, cleaning of water troughs, evaporation and other losses from water troughs and pipes, staff amenities, dust control and dilution of effluent for irrigation.

13.16.2 Resource use impacts

Various resources would be required to construct the proposed development and associated infrastructure including the following:

- Construction materials, including metals, glass, plastics
- Masonry products, including concrete for feed bunks, water troughs, aprons, hardstand areas and building elements
- Steel products for fencing, cattle handling facilities and building elements
- Materials such as fuels and lubricants associated with operation of machinery and motor vehicles
- Water for construction activities and livestock operation
- Gravel, if required, for the main access track, pen surfacing, feed roads etc.

While increasing scarcity of resources and environmental impacts are emerging from the use of nonrenewable resources, the supply of the above materials is not currently limited or restricted. In the volumes required, the proposed development is unlikely to place significant pressure on the availability of local or regional resources.

13.16.2.1 Energy consumption

During construction, direct energy usage is primarily diesel fuels to operate vehicles and equipment used during the construction works on-site. A range of equipment may be used during construction such as elevating scraper, excavator, grader, roller, loader, semi-trailer and bulldozer as shown in Table 16.

During operation, direct energy usage is primarily diesel fuels to operate vehicles, trucks, tractors and other mobile machinery for feed delivery, waste management and administration. The range of equipment expected to be used includes excavator, box scraper, wheeled front-end loader, tractor, water cart, body trucks as shown in Table 30.

Vehicles utilised by employees travelling to and from the proposed development would also consume petrol or diesel fuel.

During operation, electricity shall be used to power grain processing equipment, water supply and cattle processing equipment. Electricity is used for lighting, heating, and cooling in the administration office.

The predominant energy sources shall be 3-phase electric power and diesel fuel. Single-phase power and petrol fuels shall also be used in lower quantities.

The subject land and existing development is well serviced by an overhead electricity supply line. No upgrades to the existing electrical services are required.

13.16.2.2 Water use

During construction, water usage is required for general construction activities including:

- dust suppression as needed;
- moisture control of bulk earthworks to achieve the required compaction level as needed;
- concrete batching;
- vehicle cleandown prior to demobilisation off-site; and
- Worker amenity (potable water).

During operation of the proposed development water is required or used for:

- cattle drinking water;
- cleaning of water troughs;
- evaporation and other losses from water troughs and pipes;
- cleaning of cattle handling yards for general hygiene purposes;
- dust suppression;
- staff amenities; and
- dilution (shandying) of effluent.

There will also be low level watering requirements for feature landscaping on the site.

The existing development is serviced by a rising mainline from the groundwater bore located some 2.5 km from the existing and proposed development complex.

13.16.3 Assessment of impacts

13.16.3.1 Energy

13.16.3.1.1. Construction

Diesel fuel shall be delivered to the proposed development site by B-double tanker. The diesel fuel shall be stored in bunded tanks in accordance with Australian standards. It is estimated that some 20-30 kL of diesel shall be consumed during the construction of the proposed development. However, the final quantity shall be dependent on the number and types of vehicles used, earthworks volume, material placed etc.

13.16.3.1.2. Operation

Davis et al (2010a; 2010b) measured actual energy usage within individual activities at a number of beef cattle feedlots representative of geographical, climatic and feed management systems within the Australian feedlot industry. The activities measured included water supply, feed management, waste management, cattle washing and administration and minor activities (cattle management and repairs and maintenance).

They found that total annual energy usage ranged from 444 MJ/head-on-feed to 1483MJ/head-non-feed with the total energy usage primarily dependent on the type of feed processing system in use. Dry processing of grain is the least intensive energy system. Electricity requirements are likely to be in the order of 444 MJ/head-on-feed. This equates to an annual usage in the order of 1,420,800 MJ or about 385 MWh per year for the size of the proposed development.

The subject land has an existing 3-phase electricity supply to operate existing feed processing equipment and existing irrigation infrastructure such as groundwater pumps and centre pivot irrigator. The existing supply does not require upgrading.

Any potential electricity network constraints have not been investigated. The impacts of the proposed development relating to the consumption of electrical energy are considered to be negligible and comparable to average yearly demand of about 10 MWh per capita in NSW (Haylen, 2014).

13.16.3.2 Water

13.16.3.2.1. Construction

It is difficult to estimate the volume of water required for dust suppression and moisture control as climatic factors (rainfall, wind etc) and in-situ moisture content of the soil at the time of construction are governing factors.

Water for dust suppression and earthworks moisture control shall be obtained from groundwater entitlements as required.

The subject land has existing entitlements for groundwater as outlined in section 13.3. A proportion of the existing allocation shall be used as a source of construction water for the proposed development. Hence, the proposed development shall have no impact on water availability

13.16.3.2.2. Operation

Davis et al (2010b) measured actual water usage within individual activities at a number of beef cattle feedlots representative of geographical, climatic and feed management systems within the Australian feedlot industry. The activities measured included water supply, feed management, waste management, cattle washing and administration and minor activities (cattle management and repairs and maintenance). They found that total water usage ranged from 13 to 20.5 ML/1000 head-on-feed depending on geographic location.

As outlined in section 8.7.3, the total annual water demand for the proposed development is estimated to be 41 ML when at a full capacity of 3,000 head.

The subject land has an existing entitlement for groundwater as outlined in section 13.3 of 1,558 shares under the Eastern Recharge Groundwater Source. A proportion of this existing allocation shall be used as a source of water for the proposed development.

Consequently, as there is a secure and adequate water supply available to meet the predicted operational needs, no adverse impact is predicted as a consequence of meeting the proposed development water needs.

If an extreme drought event were to occur which placed pressure on availability there is a fall-back capacity for the proponents to transport water to site or reduce livestock numbers during operation.

There is also an intent to capture stormwater from roof structures as may be available for incidental use, such as landscaping.

13.16.4 Mitigation measures

As discussed in 13.16.3, a number of resource use and waste generation impacts were identified. The implementation of the following management and mitigation measures would minimise identified impacts to resource use and waste generation as a result of the proposed development:

- Modern and well maintained equipment is to be used to encourage fuel efficiency;
- A Resource Use and Waste Management Plan would be developed to minimise waste and maximise the opportunity for reuse and recycling;
- Stormwater from roof structures captured for incidental uses; and
- Water recycling measures are implemented where practical, such as, through the cattle wash.

13.16.5 Conclusion

The construction and operation of the proposed development would result in resource consumption predominantly as energy in the form of electricity and fuel and water.

While increasing scarcity of resources and environmental impacts are emerging from the use of nonrenewable resources, the supply of the required resource materials are not currently limited or restricted. In the volumes required, the proposed development is unlikely to place significant pressure on the availability of local or regional resources.

13.17 Hazards and risks

13.17.1 Introduction

A review of State Environmental Planning Policy (Resilience and Hazards) 2021 was undertaken to assess whether the SEPP applies to the proposed development. The NSW Planning Portal Spatial Viewer indicates that the State Environmental Planning Policy (Resilience and Hazards) 2021 is a relevant planning control to the subject land. The applicable mapped triggers under SEPP (Resilience and Hazards) 2021 is Chapter 3 - Hazardous and offensive development.

SEPP Resilience and Hazards applies to proposed developments falling under the definition of “potentially hazardous” industry or “potentially offensive” industry. A beef cattle feedlot is a “potentially offensive” industry as when in operation if no measures to reduce or minimise its impact on the locality have been implemented, a polluting discharge (for example, odour, solid/liquid waste management) may be emitted in a manner which would have a significant adverse impact in the locality or on the existing or likely future development on other land in the locality.

The proposed development is defined as “Intensive livestock agriculture” and not within the definition of “hazardous industry” or “hazardous storage establishment” under the Gwydir LEP 2013.

A development considered potentially hazardous requires a Preliminary Hazard Analysis (PHA) if the storage or transport of dangerous goods exceeds screening thresholds specified in SEPP (Resilience and Hazards) 2021. A preliminary risk screening assessment for the proposed development in accordance with section 3.11 of SEPP (Resilience and Hazards) 2021 was undertaken and confirms that dangerous goods stored on site do not exceed screening thresholds specified in SEPP (Resilience and Hazards) 2021 The preliminary risk screening assessment report is provided in Appendix N. Therefore a preliminary hazard analysis is not required.

However, other hazards and risks involved with the proposed development include:

- Risks to human health and safety
- Risks to animal health
- Other risks to the biophysical environment.

13.17.2 Human health and safety

Disease which is naturally transmissible from animals to people is classified as a zoonosis. More than 200 zoonoses have been identified involving all types of agents, bacteria, parasites, viruses, prions, fungi and others. Zoonoses are common and the diseases they cause can be serious.

Zoonotic diseases can spread through a variety of means such as working closely with livestock or by coming in contact with soil or water contaminated by animals. In Australia, the two most common and important zoonoses diseases are Q Fever and Leptospirosis.

Q Fever is primarily a risk to workers in the livestock, agriculture, veterinary and meat industries, and therefore has been considered as part of this assessment for the proposed development.

Q Fever is an infection resulting from the organism *Coxiella burnetii* and was first identified in Australia in the 1930s and the infection became known as "Query" fever as the cause of the illness was then unknown. Q Fever is caused by a small bacterium-like organism that multiplies inside the cells of various organs of infected cattle.

Coxiella burnetti can also exist in a variety of domestic and wild animals without the animal displaying apparent signs of infection. In Australia, *Coxiella burnetti* is maintained in the wild by kangaroos, bandicoots and rodents. Domestic animals such as goats, cattle and sheep and their ticks also often carry the organism.

Humans are infected by breathing the organism in droplets or dust contaminated by the placenta, birth fluids, faeces or urine of infected diseases.

The *Coxiella burnetti* organism is very resilient and it has the ability to withstand harsh environmental conditions. It has been found to be resistant to heating, drying and sunlight and to survive for more than a year at 4°C in a dried state (O'Neill, 1997).

Leptospirosis is a contagious disease which infects both animals and humans. It is caused by bacteria called *Leptospira*. There are over 200 different strains of *Leptospira* found worldwide, with infections being most prominent in areas that have a hot and humid climate. Leptospirosis is considered an occupational hazard for many people who work outdoors or with cattle, for example farmers, veterinarians, abattoir workers, and therefore has been considered as part of this assessment for the proposed development.

In NSW, there are two strains of *Leptospira* that are frequently identified in dairy and beef cattle:

- *Leptospira hardjobovis; and*
- *Leptospira Pomona.*

Both the strains may also cause severe illness in humans.

Leptospira bacteria occurs most commonly in cattle (and pigs), rodents and wild animals. They colonise the kidneys of infected animals and, in females, they also colonise the reproductive tract.

Leptospirosis is also spread in contaminated water supplies, food, pastures and soil. Many infected animals do not display any illness. These apparently healthy carriers are the main source of infection for other cattle as well as for humans. The bacteria can live for a long time in surface fresh water, damp soil, vegetation and mud, but are very quickly killed on dry soil or by sunlight (Zelski, 2007).

The organism is present in the urine of infected animals and enters the human body through damaged (e.g. scratched and abraded) skin or through linings of the eyes, mouth or nose.

13.17.3 Animal welfare and disease management

13.17.3.1 Animal health

The welfare of cattle is an important consideration to maximise cattle growth and productivity and thus profitability. The main potential risk to cattle health in a feedlot environment is disease as animals reside in close contact. The main causes of feedlot disease are:

- nutrition – deficiencies or excess;
- infections; and
- injuries.

The illnesses and diseases which affect cattle, particularly in feedlots include:

1. Nutritionally-based diseases;

- Deficiency of energy – pregnancy toxaemia, ketosis, fatty liver, poor weight gain or weight loss;
- Excess of energy – acidosis, rumenitis, polioencephalomalacia, nutritional diarrhoea
- Deficiency of minerals (calcium) – transport tetany;
- Deficiency of dietary fibre – indigestion, acidosis, feedlot bloat, inanition, liver abscesses, dietary diarrhoea; and
- Excess of rough, unpalatable, indigestible fibre – impaction, poor weight gain and production.

2. Infectious diseases;

- Respiratory infections/ pneumonia – runny noses, fever, depression and rapid breathing;
- Bovine Ephemeral Fever (3-day Sickness);
- Foot rot and foot abscess;
- Pink Eye;
- Diarrhoea (infectious); and
- Ringworm.

3. Stress diseases;

- Heat stress; and
- Transport stress.

13.17.4 Biophysical environment

Risks to the biophysical environment would include the impacts of pests, odour, dust and solid and effluent and solid waste utilisation on the receiving environment.

13.17.5 Assessment of impacts

13.17.5.1 Human health

Q Fever and Leptospirosis are debilitating diseases. These infections are important and continuing public health problems in rural areas. Workers employed at the proposed development are at risk of contracting leptospirosis during normal cattle handling activities.

Q Fever and Leptospirosis illness may last for weeks or months, forcing the affected person to take considerable time off work. Relapses are common, with a ‘washed out’ feeling which may persist for months. Leptospirosis infection can cause serious problems for pregnant women and can prove fatal to a human foetus.

Leptospirosis in humans is a notifiable disease in Australia.

Subsequently, due to the mitigation and management measures proposed, the proposed development is not expected to impact on human health.

13.17.5.2 Animal health and disease management

The welfare of cattle is an important consideration to maximise cattle growth and productivity. Therefore, the proposed development has been designed to the highest of animal welfare and disease management standards and would be operated to ensure that the health and wellbeing of cattle is maintained and the potential for disease and spread of disease minimised.

Cattle for the proposed development may be sourced from multiple sources (markets or properties) and hence are high risk for introduction and spread of disease. The main causes of disease in lot-fed cattle are:

- nutrition – deficiencies or excess;
- infections; and
- injuries.

There are various health disorders routinely encountered in beef cattle feedlots. These can be broadly categorised as:

- Disease in special at-risk groups – new arrivals, fat cattle, late pregnancy/calving cows;
- Disease caused by faulty feeding or feedstuffs – acidosis, impaction, indigestion, bloat;
- Disease caused by faulty handling or faulty facilities – injuries, wounds, heat stress; and
- Disease caused by infectious agents – viruses, bacteria, internal or external parasites.

Heat stress is a significant animal welfare issue in beef cattle feedlots. Heat stress occurs when an animal cannot effectively control body heat and the body temperature rises to dangerous levels leading to reduced feed intake, poor production and, if not adequately controlled, death. There are several factors that can influence heat stress in feedlot cattle. These include:

- high humidity and air temperature over an extended period;
- an accumulation of manure within the pen;
- poor drainage and air circulation;
- lack of effective shelter;
- lack of options to reduce body temperature in the animal; and
- breed effect, with *Bos taurus* cattle recognised as more susceptible to heat stress.

Maintaining animal health and preventing disease in the proposed development is going to depend greatly on the experience of:

- stockmen – who have to be both skilled animal handlers and observers;
- consulting veterinarian; and
- animal nutritionist.

13.17.5.3 Biophysical environment

An assessment of odour and dust, and measures proposed to minimise these impacts have been considered and outlined in section 13.1.

An assessment of effluent and solid waste management and measures proposed to mitigate these impacts have been considered and outlined in sections 13.2 and 13.11.

An assessment of pest animals and weeds, and measures proposed to mitigate these impacts have been considered and are outlined section 13.15.

Assessments of the impacts to surface water and groundwater along with measures proposed to mitigate these impacts have been considered and outlined sections 13.3 and 13.4.

Assessment of the impacts to terrestrial ecology along with measures proposed to mitigate impacts has been considered and outlined section 13.8.

13.17.6 Mitigation measures

The implementation of the following management and mitigation measures shall minimise identified potential impacts from hazards and risks as a result of the construction and operation of the proposed development:

- Maintaining animal health through biosecurity and animal health programs, including the use of vaccines, plays an important role in reducing the risk of zoonotic diseases;
- Development and implementation of a Health and Safety Management Plan that covers the risks for employees associated with operational activities such as general safety for working with plant, equipment and livestock;
- All personnel working with or handling animals shall take precautions to minimise the risk of infection from animal-borne diseases. Because different zoonotic diseases behave differently, avoiding specific infections requires an individual approach. The following practices shall be implemented to provide a high level of general protection;
    - Good personal hygiene practices such as washing hands after handling animals and before preparing or eating food or smoking cigarettes shall be implemented;
    - Hygienic food preparation: Food-borne diseases can be largely avoided through correct processing and hygienic food preparation;
    - Personnel shall be vaccinated for those zoonoses for which vaccinations are available, for example Q Fever;

    - Personal protective equipment such as gloves, boots and aprons or overalls shall be worn when handling animals. Cuts and scratches shall be covered with waterproof plasters;
    - Pest animals such as rats or feral pigs can carry zoonotic diseases and control programs will reduce the likelihood of transmission to people;
    - Employees are trained to understand the mechanisms of disease introduction and spread, including via cattle, feedstuffs, people, vehicles, machinery and equipment, feral animals and wildlife, and solid and liquid waste;
    - Development of a preventive herd health plan to help prevent and treat animal health shall be developed in conjunction with a veterinarian;
    - Implementation of herd management systems that support rapid and accurate trace-back and trace-forward of livestock;
    - Livestock are vaccinated against major preventable diseases;
    - Early identification of animal health issues through daily monitoring, observation and assessment of livestock for a range of key behavioural indicators. Experienced stockmen are usually very good observers, and less experienced staff shall be trained in observation techniques;
    - Accurate diagnosis of animal health issues backed by the local veterinarian;
    - Separation of sick cattle into hospital/treatment pens for treatment and convalescing;
    - Prudent use of antibiotics to manage infectious disease, reduce livestock pain and suffering, and to minimise losses due to disease; and
    - Destruction and disposal of infected and exposed susceptible animals.
  - Seek accreditation under the National Feedlot Accreditation Scheme (NFAS). Subsequently, welfare issues will be adequately covered in the feedlots' Quality Assurance manuals, which are given both off-site and field audits.
  - Development and implementation of a heat stress management plan to mitigate excessive heat stress events. The plan should include procedures and equipment for dealing with an excessive heat load event including:
    - regular removal of manure;
    - diet changes to reduce metabolic heat produced during digestion;
    - more frequent water changes to ensure cool, good quality water is available at all times;
    - provision of additional shade and activation of additional cooling (irrigation) equipment;
    - trigger points for when to activate the plan; and
    - for example during periods of prolonged high temperature and humidity, or forecasted extreme weather conditions.
- Provision of shade structures over production pens;
- Sufficient capacity of water required to supply cattle; to clean vehicles, yards etc; and for general hygiene is available on-site;
- Sufficient capacity of feed required to supply cattle is available on-site;

- Implementation of best practice effluent and solid waste management techniques including regular cleaning of pens, drains and sedimentation basin of manure and composting of mortalities; and
- Preparation of a contingency plan to manage the disposal of large numbers of mortalities.

13.17.7 Conclusion

There are some potential hazards and risks associated with the construction and operation of the proposed development. The assessment has identified potential risks to human health and safety, potential risks to animal health and potential risks to the biophysical environment.

The main human risk is the potential for contracting a zoonootic disease (such as Q Fever and Leptospirosis) which may be acquired by personnel coming into contact with airborne particles created from tissue and waste from infected animals or dust.

The preparation and implementation of a Health and Safety Management Plan for the operational activities at the proposed development would manage the risks for employees such as general safety for working with machinery and cattle, including methods of managing the potential to acquire a zoonootic disease.

The proposed development also has the potential to impact upon the health of the animals through injury, infections and/or heat stress created from the climatic conditions. Mismanagement of the proposed development would also adversely impact upon the welfare of the animals and thus their productivity.

The proposed development would seek NFAS accreditation. NFAS accreditation incorporates third-party audits of management measures aimed at preserving the welfare of the animals.

The biophysical environment would also be potentially impacted by the proposal, in particular odour, effluent and solid wastes. Sections 13.1.4, 13.2, 13.3, 13.4, 13.8 and 13.11 assess the potential impacts to these biophysical elements and outline measures to be implemented in order to minimise potential adverse impacts.

In summary, the proposed development is not expected to create significant hazards or risks to humans, animals or the biophysical environment provided the mitigation measures outlined in section 13.17.6 are implemented.

13.18 Land use

The proposed development shall be located in a rural area on land comprising an area of about 1,713 ha which is approximately rectangular in shape. The subject land is bounded on the north by Getta Getta Road, and on the south, east and west by rural land comprising irrigated and dryland cropping and beef cattle grazing.

Road access to the proposed development is from Getta Getta Road, a council controlled road. Getta Getta Road intersects with North Star Road some 14 km west of the proposed development complex.

The subject land on which the development is proposed has been historically used for irrigated agriculture (cereals (wheat, barley, maize, oats), cotton) and dryland agriculture (cereals (wheat, barley, oats) and beef cattle grazing) and is located in a rural area which encourages agricultural uses.

13.18.1 Surrounding land use

The subject land is in the North Star region, a prime agricultural region of the north-western slopes of New South Wales approximately 25 km by road west of Yetman and 40 km south east of Boggabilla in northern New South Wales. The subject land and surrounding locality have historically been utilised for a variety of agricultural enterprises, including beef cattle grazing and dryland and irrigated broadacre cropping, and a small number of intensive animal industries such as beef cattle feedlots. Agricultural production continues to dominate the current land use practices in the locality. There are few other land uses such as mining and gas exploration, rural and residential developments and recreational and conservation areas. The Yetman State Forest is about 17 km to the east of the subject land.

The subject land on which the development is proposed is situated east of North Star. The surrounding land uses predominately include agricultural activities including dryland and irrigated cropping and beef cattle grazing and infrastructure to support these uses such as rural dwellings, cattle handling facilities, irrigation infrastructure.

13.18.1.1 Rural

Rural land uses dominate the surrounding area and include land used for beef cattle grazing and irrigated and dryland cropping. The area is also scattered with infrastructure that supports these activities such as sheds, livestock handling facilities , grain silos and rural residences.

The surrounding land holdings are of similar size in area to the subject land on which the development is proposed.

There are several beef cattle feedlots in the area being Myola Feedlot located some 18 km to the southwest and Gunyerwarildi Feedlot which is located some 32 km to the south of the subject land.

There are no solar or wind farms in the area.

13.18.1.2 Transport infrastructure

The subject land on which the development is proposed is well supported by a local, regional and state road network. The subject land is located on the southern side of Getta Getta Road. Getta Getta Road is two-lane, two-way undivided local road about 38.75 km long and is bitumen sealed from the Ottley's Creek Bridge to North Star. Getta Getta Road runs in a westerly direction and provides connection from Warialda Road to North Star Road at North Star.

North Star Road is a classified (Regional) road. North Star Road is two-lane, two-way undivided local road about 85 km long and is bitumen sealed for its entire the length. It provides connection from the Bruxner Way to Warialda Road and passes through the village of North Star.

The western alignment of the Bruxner Highway from Tenterfield to Boggabilla was named the Bruxner Way in 2011. The Bruxner Way is a classified (Regional) road. The Tenterfield Shire Council, Inverell Shire Council, Gwydir Shire Council and Moree Plains Shire Council are the roads authority for the Bruxner Way between Tenterfield and Boggabilla in accordance with Section 7 of the Roads Act 1993.

Warialda Road is a classified (Regional) road. The Gwydir Shire Council is the roads authority for Warialda Road in accordance with Section 7 of the Roads Act 1993.

Warialda Road is two-lane, two-way undivided local road about 82 km long and is bitumen sealed for its entire the length. It provides connection from the Bruxner Way near Yetman to the Gwydir Highway at Warialda and passes through the village of Coolatai.

13.18.1.3 Service infrastructure

The subject land on which the development is proposed is connected to the electricity network and serviced by overhead electricity infrastructure as shown in Photograph 5.

13.18.1.4 Recreation

The proposed development complex is separated from the closest protected or conservation area, being the Planchonella Nature Reserve, Parkhurst State Forest and Dthinna Dthinnawan National Park, by some 15 km, 21 km and 24 km respectively.

The Planchonella Nature Reserve was established in the mid 1990's to reserve the high conservation value of the endangered ecological community of Semi-evergreen Vine-thicket, this being considered the largest and most intact remnant of its type on the NSW North Western Slopes. Threatened species recorded on the reserve include glossy-black cockatoos and turquoise parrots.

The Dthinna Dthinnawan National Park can be explored via mountain bike, bushwalking or 4WD touring.

The Macintyre River is located some 22 km northeast of the subject land. The Macintyre River is used for picnicking, camping, fishing and other recreational activities.

13.18.1.5 Proposed land use

The proposed development would continue, but intensify, the existing rural land uses on the subject land.

13.18.2 Assessment of impacts

13.18.2.1 During construction

The construction of the proposed development complex and elements such as access roads, production pens, cattle handling infrastructure, sedimentation basin and holding pond and ancillary infrastructure is not expected to adverse impact surrounding land uses. There is the potential for dust and noise to be generated during construction. However, potential impacts to air quality and implementation of prescribed mitigation measures outlined in section 13.1 shall ensure that sensitive receivers would not be adversely impacted from construction activities.

13.18.2.2 During operation

The operation of the proposed development would substantially intensify the agricultural activities on the site, with some 3,000 head of cattle to be located within the proposed development at full capacity.

Operation of the proposed development would provide employment for some 3 full time equivalent personnel. Noise, odour and traffic have the potential to affect surrounding land users. Measures would be implemented to minimise noise and odour and increases in traffic are not expected to significantly affect receivers adjoining Getta Getta Road or the wider road network.

The proposed development would not require water in addition to that already permitted by entitlements held in accordance with the NSW Border Rivers Alluvium Groundwater Source and NSW Border Rivers Regulated River Water Source.

13.18.3 Conclusion

It is considered that the proposed development is consistent with the surrounding land uses of the area. The construction and operation of the proposed development is not expected to create significant impacts to the surrounding land uses. The implementation of management measures to mitigate air quality, noise, biodiversity, pest animals and weeds summarised in sections 13.1, 13.2, 13.3, 13.4, 13.4, 13.8, 13.11, 13.13 and 13.15 would minimise the potential for the proposed development to adversely affect the surrounding environment.

13.19 Bushfire and incident management

13.19.1 Bushfire

13.19.1.1 Introduction

The SEARs for the proposed development requires an assessment of hazards and risks associated with bushfires and incidents.

The bushfire assessment was undertaken in accordance with the following regulations, methods and guidance documents:

- *Rural Fire Act 1997*;
- Guide for Bush Fire Prone Land Mapping (NSW RFS 2015);
- NSW Rural Fire Service bush fire prone land mapping tool;
- Namoi-Gwydir Bushfire Risk Management Plan (NSW RFS 2018); and
- Planning for Bushfire Protection guidelines (NSW RFS 2019).

13.19.1.2 Existing environment

13.19.1.2.1. Bushfire prone land

In relation to bushfire prone land, the RFS's Guide for Bush Fire Prone Land Mapping (NSW RFS 2015) defines four classes of vegetation category. These include Category 1 vegetation, Category 2 vegetation, Category 3 vegetation and excluded vegetation as outlined below.

Category 1 vegetation is defined under the RFS's Guide for Bush Fire Prone Land Mapping (NSW RFS 2015) as:
- areas of forest, woodlands, heaths (tall and short), forested wetlands and timber plantations;

Category 2 vegetation is defined as:

- Rainforests;
- Lower risk vegetation parcels. These vegetation parcels represent a lower bush fire risk to surrounding development and consist of:
  - Remnant vegetation;
  - Land with ongoing land management practices that actively reduces bush fire risk. These areas must be subject to a plan of management or similar that demonstrates that the risk of bush fire is offset by strategies that reduce bush fire risk; and include:
    - Discrete urban reserve/s;

- Parcels that are isolated from larger uninterrupted tracts of vegetation and known fire paths;
- Shapes and topographies which do not permit significant upslope fire runs towards development;
- Suitable access and adequate infrastructure to support suppression by firefighters;
- Vegetation that represents a lower likelihood of ignitions because the vegetation is surrounded by development in such a way that an ignition in any part of the vegetation has a higher likelihood of detection.

Category 3 vegetation is defined as:

- Grasslands, freshwater wetlands, semi-arid woodlands, alpine complex and arid shrublands.

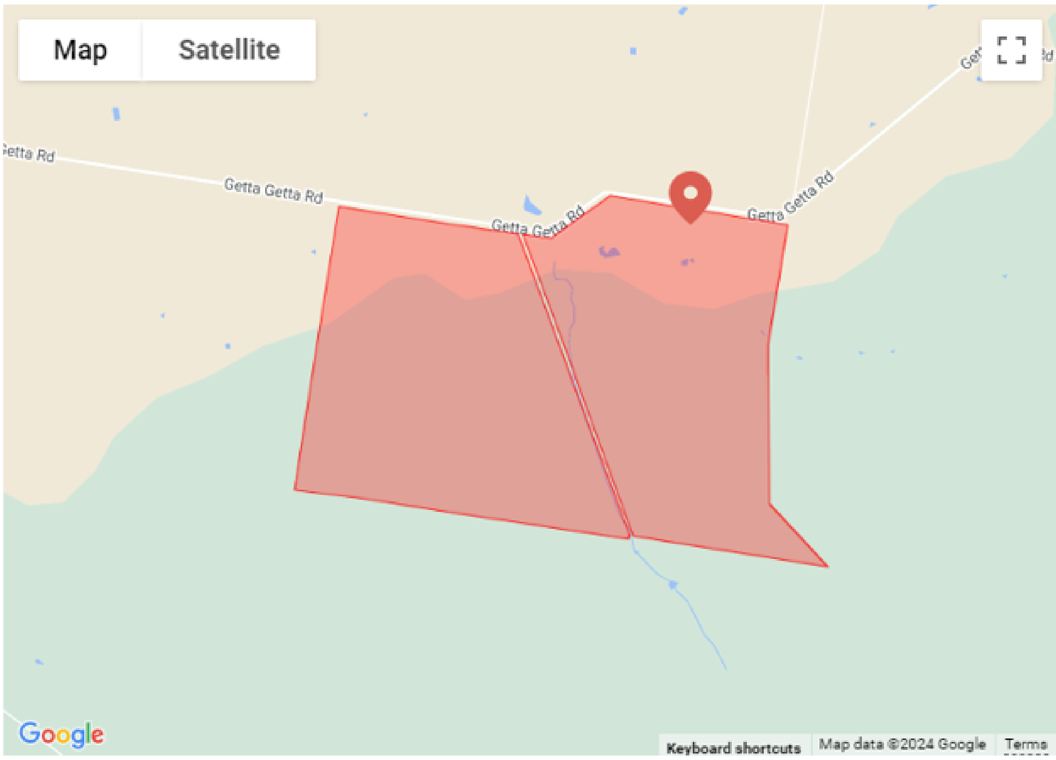
Vegetation excluded from being mapped as bush fire prone includes:

- Single areas of vegetation less than 1 hectare in area and greater than 100 metres separation from other areas of Category 1, 2 or 3 vegetation;
- Multiple areas of vegetation less than 0.25 hectares in area and not within 30 metres of each other;
- Strips of vegetation less than 20 metres in width, regardless of length and not within 20 metres of other areas of Category 1, 2 or 3 vegetation;
- Areas of “managed grassland” including grassland on, but not limited to, recreational areas, commercial/industrial land, residential land, airports/airstrips, maintained public reserves and parklands, commercial nurseries and the like;
- Areas of managed gardens and lawns within curtilage of buildings;
- Non-vegetated areas, including waterways, roads, footpaths, buildings and rocky outcrops.
- Managed botanical gardens;
- Agricultural lands used for annual and/or perennial cropping, orchard, market gardens, nurseries and the likes are excluded;
- Saline wetlands including mangroves; and
- Other areas that, due to their size, shape and overall risk are not considered Category 1, 2 or 3 vegetation.

Category 1 and Category 2 vegetation generally defines what land is considered to be bushfire prone.

The subject land comprises a mix of Category 2, Category 3 and excluded vegetation on the subject land. Consequently, NSW Rural Fire Service bush fire prone mapping tool indicates that the subject land is mapped as bushfire prone land as shown in Figure 49.

Your Property



Your search result

You have conducted a search of the online bush fire prone land tool for the land in the map above. This search result is valid for the date the search was conducted. If you have any questions about the Bush Fire Prone Land Tool please contact bushfireprone.mapping@rfs.nsw.gov.au

The parcel of land you have selected is within a designated bush fire prone area.

Make sure you have completed the four simple steps to prepare for bush fires

In a bush or grass fire, minutes can matter. You need to take action now. Getting ready for a bush fire is easier than you think. By taking 20 minutes with your family to discuss what you'll do during a fire, you could save their lives, as well as your home.

Figure 49 – Subject land – Bush fire prone land overlay

As shown in Figure 6, the proposed development complex site comprises Category 3 and excluded vegetation. Consequently, the proposed development site is not considered bush fire prone.

13.19.1.2.2. Namoi-Gwydir Bushfire Risk Management Plan

The NSW RFS's Namoi – Gwydir Bush Fire Management Committee has prepared a bushfire risk management plan which covers Gwydir Shire Council LGA (Namoi – Gwydir Bush Fire Management Committee, 2018). The plan identifies community assets at risk from bushfire and describes treatment measures for those assets. There are no community assets identified in the plan in or adjacent to the proposed development area. The assets identified are categorised as human settlements (towns or villages, residences/schools and hospitals), economic (silos, power lines), environmental (RAMSAR wetlands, plantations), and cultural (Aboriginal places of significance).

The nearest human settlement is the village of North Star. The nearest economic asset to the site is the Mt Mitchell Communications infrastructure located 50 km NW of Warialda. The nearest environmental asset is considered to be the Dthinna Dthinnawan National Park located approximately 25 km northeast of the subject land. The Gwydir Wetlands are located approximately 100 km south west of the subject land and not downstream of the proposed development. The nearest cultural asset listed in the risk management plan is the Yallaroi Community Hall located some 16 km south of the subject land.

13.19.1.2.3. Gwydir Shire Council

A bushfire prone land overlay of the subject land was obtained from the NSW Planning Portal Spatial Viewer and is shown in Figure 50.

The subject land on which the development is proposed contains Category 1, Category 2 and Category 3 vegetation. However, the proposed development complex site is not mapped as bushfire prone land by the Gwydir Shire Council as shown in Figure 50. Vegetation categories as defined by the RFS's Guide for Bush Fire Prone Land Mapping (NSW RFS 2015) are outlined in section 13.19.1.2.1.

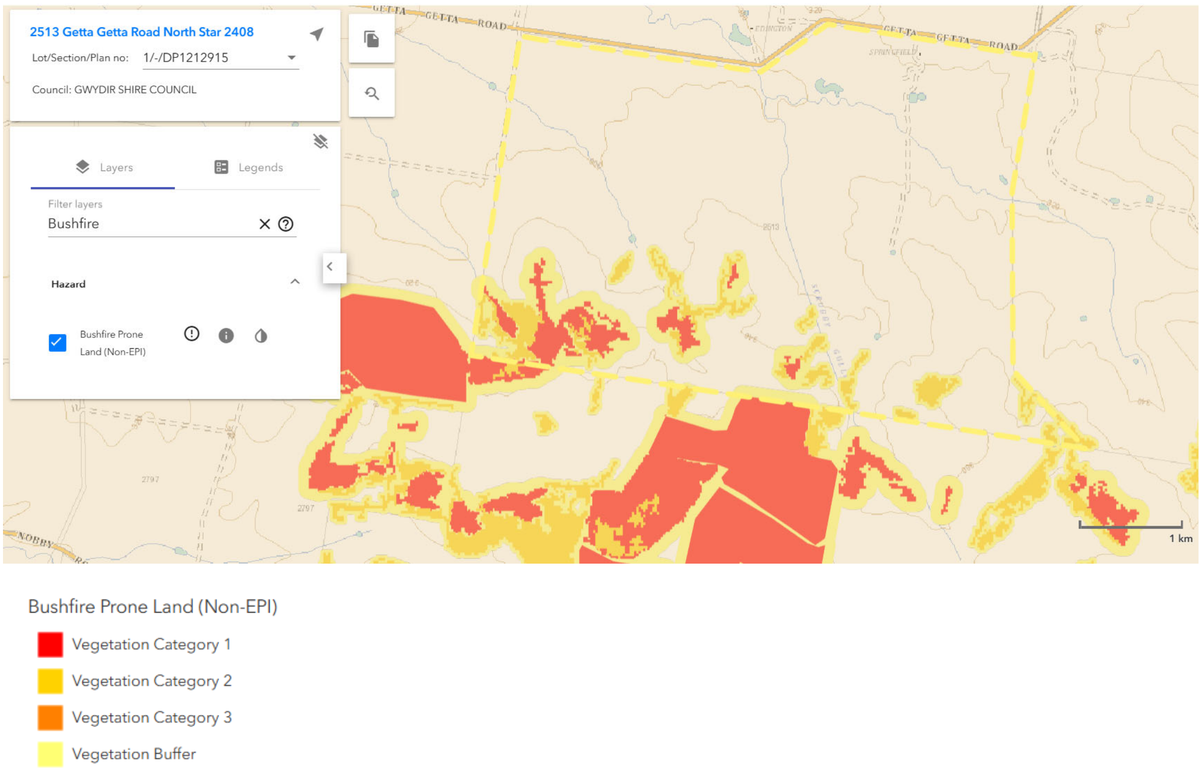


Figure 50 – Subject land – Bushfire prone land (NSW Planning Portal Spatial Viewer)

13.19.1.3 Impact assessment

13.19.1.3.1. Scope of assessment

The specifications and requirements of the NSW RFS's Planning for Bush Fire Protection (PBP) (NSW Rural Fire Service, 2019), have been considered in this bushfire assessment.

The PBP guidelines focus on protection of habitable buildings on bushfire prone land from bushfire. Habitable buildings are defined in accordance with the Building Code of Australia and include Class 1, 2, 3 and 4 buildings which are primarily used as residences, Class 5, 6, 7 and 8 buildings which are shops, warehouses, factories, offices and car parks and the like, and Class 9 buildings which include health care, community assembly buildings and aged care buildings.

The proposed development has one habitable building which is the administration office. Therefore, this bushfire hazard assessment focuses on this area.

The location of the habitable building within the proposed development complex is shown on Figure 6.

13.19.1.3.2. Assessment method

Bush fire risks have been assessed in accordance with the PBP guidelines and the requirements of the *NSW Rural Fire Act 1997*.

The objectives of the PBP guidelines (NSW RFS, 2019) are to:

- afford buildings and their occupants protection from exposure to a bush fire;
- provide for a defendable space to be located around buildings;
- provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent the likely fire spread to buildings;
- ensure that appropriate operational access and egress for emergency service personnel and occupants is available;
- provide for ongoing management and maintenance of BPMs; and
- ensure that utility services are adequate to meet the needs of firefighters.

In addition, the *NSW Rural Fire Act 1997* requires the owners of land to prevent the ignition and spread of bushfires on their land.

Whilst the subject land on which the development complex is proposed is classified as "bush fire prone land" (BPL), identified on NSW Planning Portal Spatial Viewer ERSC's BPL overlay, bushfire hazard at the development complex has been assessed, and management and mitigation measures described, in accordance with Appendix 4 of the PBP guidelines (NSW RFS, 2019), (submission requirements for DAs on bushfire prone land). The recommended management and mitigation measures in section 13.19.1.4 would aim to ensure that:

- human life, including fire fighters, is protected;

- impacts on property from the threat of bushfire are minimised; and
- the risk of bushfire ignition and spread would be as low as practically possible.

Recommended bushfire mitigation and management measures for other infrastructure in the proposed development complex are based on the PBP guidelines (NSW RFS, 2019).

Area Protection Zones (APZs), maintenance requirements and specifications for service and access provision were determined in accordance with the PBP guidelines (NSW RFS, 2019).

13.19.1.3.3. Type of development

Generally, the proposed development would be categorised in Chapter 8 of the PBP guidelines (NSW RFS, 2019) as ‘other development'.

Other development refers to any type of development that is not covered by Chapters 5 to 7 of this document. This includes commercial uses, industrial uses, infrastructure and development which involves large numbers of people. That is, development which is not a residential/rural residential subdivision, residential infill development (new houses or additions to new houses in existing subdivisions) or 'special fire protection purposes' (SFPP) development.

SFPP development is defined under section 100b of the *NSW Rural Fire Act 1997* as developments designed for occupants that are more vulnerable to bush fire attack, including seniors living accommodation, tourist facilities and schools.

13.19.1.3.4. Asset protection zones

As with all rural areas, there is a risk that bushfire could occur in or near the proposed development. Therefore, there is a risk that a bushfire could damage buildings and infrastructure and present a hazard to human life and livestock in the proposed development.

All vegetation in and around the development complex area is cleared to the disturbance boundary. The habitable buildings within the development complex area would have an Asset Protection Zone (APZ) of at least 30 m or greater. All infrastructure classed as special fire protection purpose in the development complex area would have an APZ greater than 100 m.

13.19.1.4 Management and mitigation

To ensure that human life, including fire fighters, is protected, impacts on property from the threat of bushfire are minimised, and the risk of bushfire ignition and spread will be as low as practically possible, a range of management and mitigation measures would be implemented by the proponent both during the construction and operational phases of the proposed development.

The potential for development related activities to ignite a bushfire would be considered in the detailed design, construction and operation. A bushfire management plan would be prepared that would describe measures to minimise the risk of bushfire related damage or ignition of a bushfire. The primary management measures are described below.

Protection measures for electricity infrastructure, provision of water for firefighting and access to and within the proposed development complex would be in accordance with the PBP guidelines (NSW RFS, 2019). Water and electricity services would be located and installed in a manner that minimises fire hazard.

13.19.1.4.1. Hazard reduction

The bushfire management plan would contain a strategy for hazard reduction, including hazard reduction in undeveloped areas where vegetation may regenerate.

13.19.1.4.2. Water

The availability of water is a critical element in the control of a bush fire, and would be provided as follows:

- The site water management system would provide water for firefighting; including from a dedicated fire-fighting outlet on t1 water storage tank as well as using other water sources (e.g. turkey nest storage) for supply; and
- dust suppression water carts may be fitted with water cannons to help with firefighting or other suitable mobile firefighting equipment will be provided on site;

If any fire cannot be controlled or attempts for control too dangerous, all staff would be evacuated to a safe area and the livestock let out of the pens into the surrounding paddocks.

13.19.1.4.3. Electricity

The risk of bushfire to electricity and gas supplies in the proposed development, and the risk these could ignite a bushfire or contribute to the consequences of a bushfire, would be minimised through the following:

- where operationally practical, electrical transmission lines would preferably be placed underground;
- where overhead electrical transmission lines are used, they would be installed and managed in accordance with electricity retailer's vegetation management near power lines;
- AS/NZS 1596 2021 The Storage and Handling of LP Gas would be followed for bottled gas installation and maintenance with metal piping to be used; AS/NZS 1596:2014 A2 Standards New Zealand
- There would be at least 10 m between fixed gas cylinders and flammable materials;
- shielding would be placed on the side of the cylinders which face potential fires; and
- release valves on gas cylinders that are close to buildings would be directed away from the building and at least 2m from combustible material; metal connections would be used.

13.19.1.4.4. Access

Internal roads would be designed in accordance with the following PBP guidelines (NSW RFS, 2019):

- There would be a minimum vertical clearance of 4m to any overhead obstructions including branches;
- there would be a minimum carriageway of 4 m with 1 m clearance on each side;
- there would be a maximum grade of 15º if sealed and less than 10º if unsealed;
- crossfall would not be more than 10; and
- dead end roads are not recommended by the PBP guidelines; however, when they are unavoidable, turning circles would be provided with a minimum 12 m outer radius at the end of these roads.

All access roads to and from the proposed development complex are to be designed so that unobstructed, two-way, heavy vehicle (including articulating vehicles) movements associated with the proposed development and firefighting trucks responding to an emergency within the site can be safely accommodated.

13.19.1.4.5. Firebreaks

There will be a graded road around the development complex (outside the controlled drainage area) that will act as a firebreak and also provide access for fire-fighting vehicles.

Fire breaks shall be maintained along fence lines and property boundaries.

13.19.1.4.6. Bushfire construction levels

All buildings would be designed in accordance with the general bushfire construction levels in Australian Standard 3959 2018 Construction of Buildings in Bushfire Prone Areas (AS 3959 2018).

13.19.1.4.7. Flammable material storage

All flammable chemicals stored on-site shall be kept in designated bunded areas or stored in transportable bunded vessels. This includes machinery chemical, fuel and water treatment products.

The chemical register shall include details of dangerous goods stored, or used in quantities, which could conceivably be a subject of concern in an emergency and which may have the potential to act as a pollutant causing environmental harm under certain circumstances.

The following list of Hazmats and/or Dangerous Goods materials are likely to be stored on the site during operations:

- Diesel fuel for trucks and machinery;
- Oils and lubricants for machinery maintenance;
- Fire extinguishers;
- Cleaning agents; and
- Degreasers

13.19.1.4.8. Reducing risk of fire or explosion

The following measures would reduce the risk of a fire or explosion in the proposed development from igniting a bushfire:

- refuelling would take place away from vegetation;
- fire extinguishers would be maintained in buildings, vehicles and refuelling areas;
- there would be no smoking in, or next to, vegetated areas;
- smoke or thermal detection in the administration office and grain processing facility;
- control panels in the administration office, grain processing control room and pumps;
- dust suppression water truck would be made available to help with firefighting when required; and
- spill response kits would be available should there be a spill of flammable substances.

The following measures would be taken to reduce the likelihood of a bushfire or the consequences of a bushfire should one occur:

- UHF/VHF communication system would enable rapid response to emergencies; and
- the NSW Rural Fire Service would be contacted in the event of a fire. Staff will fight the fire, if it is reasonably safe to do so.

13.19.1.4.9. Bushfire management procedures

Bushfire management procedures would be documented within an emergency response and incident management plan (Refer section 13.19.2) prepared prior to construction for the proposed development. Bushfire management procedures would include:

- contact person/details for emergency management;
- communication strategy for coordinated response to bushfires with the RFS;
- availability of suppression equipment;
- firefighting water supplies;
- storage of fuels and other flammable materials;
- evacuation procedures for staff in case of bushfire emergency in accordance with the RFS Guidelines for the Preparation of Emergency/Evacuation Plan; and
- evacuation procedures for livestock in case of bushfire emergency.

13.19.2 Incident management

An unplanned incident occurs without prior notice which can degrade safety, the environment or community.

Minor incidents defined as non-critical, regarding both safety and environment shall be managed through the development's Safety Management System, Construction Environmental Management Plan and Operation Environmental Management Plan and their related procedures as required.

An emergency situation is an event that could present significant risk to the environment, personnel or the community, as determined by the Environmental Representative (during construction) or the Feedlot Manager or Environmental Representative (during operation).

As outlined in section 15.2.1.1, a construction environmental management plan will be prepared prior to construction of the proposed development. The CEMP will include an emergency response and incident management sub-plan.

An emergency response and incident management plan (ERIMP) will be prepared for both the construction and operation phases of the proposed development. The plan will include, but not limited to, the following information:

- Induction protocol;
- Procedure approval – name and authority of the person approving the plan;
- 24 hour contact details of the site manager;
- Relevant authorities contact details – EPA, GSC, Work Cover NSW, NSW Rural Fire Service;
- Communications protocols;
- Handover responsibilities;
- Protocols for handing back responsibly once emergency services have left the site;
- Hazard response – full / partial evacuation;
- Pollution incident response;
- Assembly area;
- Site incident notification – to authorities, to employees/contractors;
- Notification to adjoining properties;
- Emergency equipment and inspection schedules – fire extinguisher, spill kit, first aid kit etc;
- Inventory of potential hazardous substances;
- Evacuation diagram; and
- Records management.

The objective of this ERIMP is to ensure incident planning and response procedures are managed effectively during construction and operation. It outlines the general procedures for initiating an emergency response that could occur as a result of development construction/operation works or natural causes.

13.19.2.1 Potential environmental incident identification

This section lists identified potential environmental incidents and assessment of potential impacts. Mitigation measures from the Construction Environmental Management Plan/ Operational Environmental Management Plan and associated sub-plans will be implemented to counter the occurrence of such events.

Table 80 – Proposed development – Potential environmental incident identification

Issue	Potential Impact	Impact Assessment
Air quality		
	Dust event due to weather conditions	section 13.1.5 and 13.1.6
	Dust event due to a particular construction/operation activity	section 13.1.5 and 13.1.6
	Community complaint relating to dust	section 13.1.5 and 13.1.6
	Odour event due to weather conditions	section 13.1.5 and 13.1.6
	Dust event due to a particular operation activity	section 13.1.5 and 13.1.6
	Community complaint relating to odour	section 13.1.5 and 13.1.6
	Weather monitoring equipment damaged or not operational	section 13.1.5 and 13.1.6
Groundwater		
	Intersection of groundwater during construction	section 13.3.2.2 and 13.3.3.2
	Leachate of effluent through the liner underlying the controlled drainage area as a result of integrity failure or exceedance of design criteria	section 13.3.2.3 and 13.3.3.3
	Spills or leaks of hazardous chemicals or substances stored or used on-site such as fuels, chemicals etc	section 13.3.2.2, 13.3.2.3, 13.3.3.3 and 13.3.3.2
	Impacts to groundwater due to effluent utilisation	section 8.7.5 and 13.11
Surface water		
	Flooding event	section 13.6.2.1 and 13.6.3.1
	Oil or fuel spill (e.g. hydraulic hose burst)	
	Erosion and sediment controls are damaged or ineffective	section 13.9.3.1
	Damage to sediment basin/holding pond	section 13.4.3
	Effluent discharge event due to weather conditions	section 13.4.3
	Runoff event due to effluent utilisation	section 13.11
Heritage		
	Aboriginal heritage item found during construction	section 13.7 and Appendix K
Biodiversity		
	Unapproved works undertaken outside of disturbance limit	section 13.8.2.7 and 13.8.5
	Impacts due to effluent and /or solid waste utilisation	section 13.8.2.7 and 13.8.5
Waste		
	Hazardous wastes generated	section 13.10.8 and 13.10.9

	Community complaint relating to litter or effluent and/or solid waste utilisation	section 13.10.8 and 13.10.9
Soils		
	Unanticipated contaminated soil requires offsite disposal	section 13.2.7.7 and 13.2.8.5
	Soil degradation due to effluent and /or solid waste utilisation	section 13.11.4, 13.11.5 and 13.11
Noise & vibration		
	Noise levels from construction or operation activities exceed criteria	section 13.13.6 and 13.13.7
	Community complaint relating to noise or vibration	section 13.13.6 and 13.13.7
Pest animals		
	Damage to property including damage to fences, buildings, etc	section 13.15.3 and 13.15.4
	Introduction of weeds from construction or operation activities	section 13.15.3 and 13.15.4
	Proliferation of pest animals from operation activities	section 13.15.3 and 13.15.4
Animal health		
	Mass sickness or death of livestock	section 13.17.3 and 13.17.6
Bushfire		
	Damage to property including damage to fences, buildings, machinery etc from bushfire	section 13.19.1.3 and 13.19.1.4
	Impacts to livestock and/or personnel from bushfire	section 13.19.1.3 and 13.19.1.4

13.19.3 Conclusion

Whilst, the proposed development complex is not mapped as bushfire prone land, the area contains habitable buildings adjacent to the proposed development complex.

Management measures such as separation distances, fire suppression systems etc are proposed to prevent a fire or explosion in the development complex igniting a bushfire. The impact of an existing bushfire shall be mitigated through the provision of appropriately sized protection zones for habitable assets, fire protection systems and emergency and incident management procedures.

Therefore, the risks associated with the proposed development being damaged by, igniting or contributing to the severity of a bushfire are expected to be appropriately managed.

At this preliminary design stage of the proposed development, potential incidents and adequate precautions have been identified to manage and resolve incidents and for emergency response. Ongoing design processes would further consider these issues and any conditions of approval would need to be achieved before construction could commence.

The recommended mitigation measures would reduce incidents, hazards and risk during construction and operation of the proposed development.

14. Summary of key planning issues

14.1 Introduction

The proposed development has been assessed under the relevant sections of the EP&A Act. A summary of these matters with regard to the proposed development is provided in the sections below.

14.1.1 Planning instruments

Section 9 addresses the relevant provisions of local, regional and State planning instruments as they relate to the proposed development. The proposed development is permissible with the approval of the Gwydir Shire Council.

There are no draft EPIs relating to the subject land on which the development is proposed.

There are no DCPs of relevance to the proposed development.

This EIS has been prepared in accordance with the matters required to be addressed in the EP&A Regulation 2000.

14.1.2 Site selection

Does the proposal fit in the locality?

The subject land on which the development is proposed is located within a rural area surrounded by large agricultural holdings. The proposed development is a beef cattle feedlot which would involve the construction of production/holding/hospital pens, drainage system (drains/sedimentation basin/holding pond) and associated infrastructure. Any buildings to be erected are of a nature and scale which would blend with the surrounding rural environment and given that the proposed development is for intensive agricultural use it is considered to be suited to the surrounding rural area. Further the proposed development is an expansion of an existing development.

Are the site attributes conducive to development?

A geotechnical and capability assessment of the proposed development complex and associated effluent and solid waste utilisation indicates that the subject land is suitable for the siting, design, and operation of a beef cattle feedlot and for on-site utilisation of effluent and solid wastes.

The subject land has been historically used for agricultural purposes including beef cattle grazing, intensive livestock agriculture (beef cattle feedlot) and irrigated and dryland cropping and is located in a rural area which encourages agricultural uses. Subsequently, the subject land is therefore considered to be suitable for siting of the proposed development.

Social and economic impacts in the locality

The proposed development would result in the employment of some 3 full time equivalent personnel after the construction phase, many of whom are likely to be local to the area. Further, the proposed development would intensify the use of the land, promoting agricultural activity in the area and boosting the local economy. The potential adverse social impacts of the proposed development are limited to factors such as noise and odour which may detract from the quality of life of surrounding residents. However, the proposed development complex is located a significant distance from the nearest residential areas and mitigation measures shall be put into place to ensure that impacts upon the amenity of the area is minimal.

Design and layout

The design of the proposed development takes account of the characteristics of the subject land including topography, soil types, drainage patterns, separation distances to sensitive receivers and existing vegetation. The proposed design is considered to be the most efficient and effective for the site and would minimise potential adverse impacts upon the surrounding natural environment.

14.1.3 Potential impacts on natural, built and social environment

Context and setting

The subject land on which the development is proposed is located within a rural area, characterised by large agricultural properties with grazing on native pastures and irrigated and dryland cropping. The proposed development is for the expansion of an existing beef cattle feedlot involving the construction of infrastructure in keeping with rural character e.g. cattle handling facilities (pens, crushes, yards), and associated structures including sedimentation basin, holding pond and clean water storage structures (tanks).

Any new buildings associated with the proposed development are not substantial in height and are rural in character and are therefore consistent with the surrounding rural environment without being obtrusive. Similarly, the use of the subject land for a beef cattle feedlot is an appropriate use within a rural area and would not detract from the existing character or setting of the surroundings.

Air quality

Odour generated from the proposed development complex are expected to be the primary impact to air quality as a result of the proposed development. These impacts are discussed in section 13.1.4 and Appendix G and are expected to be acceptable due to the separation distance between the proposed development complex and rural residences.

Other issues relating to air quality such as dust and greenhouse gases are not expected to create significant air quality impacts to the local area.

Access, transport and traffic

Transport and traffic issues are discussed in detail in section 13.12. The construction and operation of the proposed development would involve additional traffic movements. The subject land is situated on Getta Getta Road, which currently experiences little traffic movements but of a similar nature to the traffic associated with the proposed development.

All vehicles accessing the site during construction would travel from North Star Road onto Getta Getta Road. All heavy vehicles accessing the proposed development during operation shall also use the same route.

Access to the proposed development complex would be via a dedicated entrance off Getta Getta Road. The access road would connect the proposed development complex to Getta Getta Road. The various receival areas (livestock/feedstuffs), access road and entrance would be able to accommodate Type road train and B-double vehicles, as well as employee light vehicles. The proposed development provides sufficient car parking facilities for employees.

Overall, it is expected that with the proposed mitigation and management measures, the proposed development is unlikely to have a material impact on the existing local and state road network.

Cultural heritage

The Aboriginal Heritage Assessment identified no Aboriginal sites within the proposed development complex site area which require disturbance. The effluent and solid waste utilisation areas are existing cropping areas. The level of human impact, through land disturbance (land clearing, timber harvesting, grazing, cultivation etc.) has substantially affected the most culturally sensitive areas on the subject land. Consequently, it seems highly unlikely that evidence of previous occupation by Aboriginal people remains within these areas. Measures have been prepared to mitigate any impacts to possible Aboriginal heritage sites and objects.

Consequently, the proposed development would not impact on any Aboriginal heritage sites, objects or places, or areas of archaeological potential or Aboriginal sensitivity.

The non-Aboriginal Heritage Assessment and site assessment identified no non-Aboriginal sites on the land on which the development is proposed development. Therefore, it is considered that the proposed development would not impact on the non-aboriginal heritage fabric of the land on which the development is proposed.

An assessment of Aboriginal and Non-Aboriginal heritage is given in section 13.5 and Appendix K.

Land resources

The proposed development would not contaminate the land which is a valuable resource.

Water

The proposed development would utilise water in accordance with existing groundwater access licences issued under the Water Management Act 2000. An assessment of groundwater and surface water is given in sections 13.3 and 13.4 respectively.

Biodiversity (Flora and Fauna)

An biodiversity assessment has been prepared in accordance with the provisions of the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and the *Biodiversity Conservation Act 2016* (BC Act). It also takes into account other relevant Commonwealth and NSW legislation and environmental planning instruments.

The assessments of significance concluded no threatened species would be significantly affected by the proposal. A Species Impact Statement and/or Referral to the Federal Minister for the Environment and Energy (DoEE) is not required.

The proposed development has been designed to minimise impact to native vegetation by keeping impacts contained within the existing disturbed cleared and agricultural areas.

The proposed development will directly affect about 0.21 ha of native vegetation with the remaining area of the proposed development occurring on not native vegetation.

As there would be residual impacts on native vegetation as a result of the proposed development, the Biobanking Assessment Methodology (BAM) and Biobanking Assessment Methodology Credit Calculator (BAMCC) have been adopted to calculate the credits required for offsetting.

A detailed discussion on biodiversity issues in relation to the proposed development is provided in section 13.8 and Appendix J.

Waste materials

The construction and operation of the proposed development shall generate a small quantity of in-organic solid wastes such as product packaging, paper etc. Further, the operation of the proposed development shall significant levels of organic solid and liquid waste which can be wholly or partly sustainably utilised on the subject land as outlined in 13.11.

It is expected that, with the implementation of the outlined mitigation measures, the proposed development would not create significant impacts to the environment from waste generation.

14.1.4 The public interest

Section 4.15 (e) of the *Environmental Planning and Assessment Act 1979* require that the public interest be considered in the development assessment process.

The public interest is addressed by the orderly and economic use of land for purposes permissible under the relevant planning instruments and in accordance with the applicable planning controls relevant to the site.

Given the type of proposed development, its permissibility, general compliance with the planning controls, measures implemented to minimise adverse environmental impact, the lack of significant environmental impact, and the suitability of the site, the proposed development is in the public's interest. Further, the site is appropriately zoned for the development and the proposed use of the site aligns with the surrounding rural activities of the area.

There are no aspects of the proposed development that would be contrary to the public interest.

The proposed development has been designed to minimise potential adverse impacts upon the local community and the surrounding environment. Given the significant benefits of the proposed development to the local area such as providing employment for local people and promoting the efficient agricultural use of rural land, thus boosting the rural economy, the proposed development is considered to be in the public interest.

Part G – Commitments

15. Commitments

15.1 Introduction

This section outlines the environmental management strategy and provides a consolidated summary of the management measures that would be implemented during the construction and operation of the proposed development to manage, mitigate and/or monitor potential impacts identified within this EIS.

15.2 Environmental management strategy

Doolin Farming Pty Ltd are committed to conducting activities associated with the construction and operation of the proposed development in an environmentally responsible manner; and aim to implement best practice environmental management as part of a program of continuous improvement. This will be achieved by addressing issues systematically and consistent with internationally accepted standards.

Doolin Farming Pty Ltd vision is to minimise harm to the environment by designing, operating and closing all of our operations in an environmentally responsible manner. This is our commitment to environmental stewardship. Three fundamental environmental principles underpin our vision. These are;

- The mitigation hierarchy of avoiding, minimising, restoring and offsetting shall be applied as a best management approach to manage environmental impacts arising from our activities and services.
- Environmental incidents and non-conformances are reported, investigated and analysed to ensure corrective actions and preventative actions are taken and learnings shared to prevent their recurrence.
- Environmental management and performance standards and procedures shall be applied to both business and project operations.

Environmental management during the proposed development would be in accordance with an environmental management strategy (EMS). The EMS would contain a suite of environmental management plans which detail the site specific management measures and procedures to be implemented during construction and operation of the proposed development, as specified in this EIS, for mitigating and managing impacts including noise, air quality, biodiversity, heritage, water resources, land resources, traffic, social, hazards and risks, bushfire and visual.

The EMS would be consistent with the conditions of the proposed development's Development Consent and other planning approvals, should they be granted.

15.2.1 Environmental management plan

An Environmental Management Plan (EMP) is a procedural document which outlines the environmental goals of the proposed development, the safeguard measures to be implemented, the timing of the implementation in relation to the progress of the proposed development, responsibilities for implementation and management, and a review process.

An EMP would be prepared to address each stage of the proposed development namely, construction and operation.

The key objectives of the EMP include:

- Ensuring the works are carried out in accordance with appropriate environmental statutory requirements and relevant non-statutory policy as is detailed in this EIS;
- Operations and environmental protection measures shall be planned to minimise environmental risks and comply with specified environmental protection requirements;
- Ensuring that works are carried out in accordance with the objectives and requirements presented in this EIS;
- Ensuring that works are carried out in such a way as to minimise the likelihood of adverse environmental impact occurring;
- Ensuring that works are carried out in such a way as to manage the impact of the works on nearby sensitive receivers;
- Implement environmental management principles and practices to conserve and protect environmental resources through, amongst approaches, the efficient use of energy and water, reduction in greenhouse gas emissions intensity, vermin and pest control, minimising waste and preventing pollution;
- Communicate with our employees, local communities, contractors, suppliers, and other interested third parties to encourage an environmentally responsible culture;
- Monitor the effectiveness of the environmental protection measures;
- Response procedures which will initially contain, then remedy, any environmental incidents that may occur;
- Identifying management responsibilities and reporting requirements to demonstrate compliance with the EMP;
- Providing clear procedures for management of environmental incidents including corrective actions; and
- Improve environmental protection measures and revise the EMS and the EMP promptly when deficiencies are identified.

The scope and content of the EMP will be a function of the proposed development's potential environmental impacts as outlined in this EIS. The EMP, shall include, but not be limited to those elements identified and described in Table 81.

Table 81 – Typical EMP structure

Section	Description
Introduction	Background Purpose and Scope Objectives
Legislative and Other Requirements	Legal and Other Requirements Approvals, Permits and Licences
Environmental Management Framework	Environmental Policy EMS Obligations, Roles, Responsibilities and Authority Certification and Approval
Environmental Aspects and Impacts	Risk assessment to identify the actual and potential environmental impacts Risk analysis Objectives and Targets
Competence, Training and Awareness	Environmental Induction Training and Awareness
Consultation and Communication	Processes for external and internal communication in relation to the environmental aspects
Incident and Emergency Management	Incident Investigation, Reporting and Recording Environmental Emergency - Preparation and Response
Inspections, Monitoring and Auditing	Environmental Inspections Monitoring Auditing Reporting Non-conformances, Corrective, Preventative Actions
Review and Improvement	Review of environmental controls and procedures
Document Control and Records Management	Document Control Environmental Records

15.2.1.1 Construction environmental management plan

A Construction Environmental Management Plan (CEMP) would form an integral part of the EMS for the proposed development and would be consistent with the requirements of AS/NZS ISO14001:2015 and AS/NZS ISO 9001:2008.

A CEMP shall be developed, implemented and maintained for the duration of the construction phase of the proposed development. The CEMP would be submitted to GSC for approval prior to activities commencing on-site.

The CEMP may incorporate or reference various specialist sub-plans such as:

- Stormwater Management Plan
- Erosion and Sediment Control Plan
- Acid Sulfate Materials Management Plan
- Waste Management Plan
- Incident and Emergency Management Plan.

The Erosion and Sediment Control Plan would document erosion, sediment and leachate control measures to be implemented to minimise erosion, leachate and sediment mobilisation at the proposed development complex site during construction (and operation) phases of the proposed development. The ESCP shall show the type and location of each measure to be implemented, such as:

- Clean water diversion;
- Sediment traps;
- Diversion banks;
- Sediment fences;
- Bunds (earth, hay, mulch);
- Sediment ponds;
- Geofabric liners; and
- Other control measures as appropriate.

15.2.1.2 Operational environmental management plan

An Operational Environmental Management Plan (OEMP) would form an integral part of the EMS for the proposed development and would be consistent with the requirements of AS/NZS ISO14001:2014 and AS/NZS ISO 9001:2008.

An OEMP shall be developed, implemented and maintained during operation of the proposed development. The OEMP may incorporate or reference various specialist sub-plans or accreditation such as:

- Air Quality Management Plan;
- Soil and Water Quality Management Plan;
- Solid and Liquid Waste Management Plan;
- NFAS Standards; and
- Pollution Incident Management Response Plan (PIRMP).

A draft Operational Environmental Management Plan (OEMP) and relevant sub-plans has been prepared as part of the assessment process. The OEMP and associated sub-plans provides details and justification for the proposed monitoring program for soil characteristics, composted solid waste quality and quantity, effluent quality and quantity, surface and groundwater quality. The monitoring plan provides details of the locations of all monitoring sites and the parameters that will be monitored. The draft OEMP and associated sub-plans are provided in Appendix P.

15.3 Management and mitigation measures summary

In accordance with the EIS requirements issued under Schedule 2 of the EP&A Regulation, environmental management and mitigation measures described in section 13 are summarised in Table 82 as commitments.

Table 82 – Management and mitigation measures summary

Aspect	Phase	Commitment	EIS section
Air quality			
Odour	Design and siting	• Provision of adequate separation distances between the proposed development and sensitive receptors. • The pens shall be designed with adequate slope to maximise drainage and encourage rapid drying of the pen surface after rainfall. • Proposed grain treatment process maximises digestibility and minimises the amount of starch in faeces. • Sedimentation basin designed to maximise the removal of solids and drain free of water after a runoff event. • Design and siting of water troughs so that excess water released during trough cleaning or from a broken float valve does not enter the pen area, thus minimising wet areas in pens. • The catch and main drains designed with adequate and uniform slope to maximise drainage and encourage rapid drying after rainfall. • Design of shade structures that optimise pen drying by moving cattle (and their excretions) around the pen as the shade moves. • Provision of vegetative screen around proposed development as a wind break and vegetative filter.	section 13.1.6.2
	Operation	• Ensure the air quality and meteorological monitoring network is maintained and results are routinely analysed, assessed and reported. • Minimisation of wet areas in pens by fixing leaks from water troughs. • Utilising the best animal production genetics - Improved production traits such as growth rate and carcass weight will contribute significantly to reducing emissions intensity. • Maximise feed energy by eliminating parasites and nutrient deficiencies. • Generating and maintaining best practice management for solid and liquid waste storage, processing and utilisation. • Frequent removal of manure from the pens/drains and under-fences. • Elimination of wet areas within the pens.	section 13.1.6.3

		• Sedimentation basin control weir maintained in operational order to ensure that complete drainage occurs. • Remove solids from the sedimentation basin as soon as practical. • Dewatering of the holding pond by irrigation to crops or pastures as soon as possible after rainfall. • Receiving, reporting and responding to any complaints in relation to air quality through the 24-hour community response line. • Report the results of any air quality monitoring in accordance with the conditions of the Development Approval. • Ensure that all employees and contractors are given adequate training in environmental awareness, legal responsibilities, and air quality control methods.	
Dust	Design and siting	• Provision of adequate separation distances between the proposed development and sensitive receivers. • Provision of vegetative screen around the proposed development complex as a wind break and vegetative filter.	section 13.1.6.5
	Construction	• Construction environmental management plans (CEMPs) and sub-plans shall be developed and implemented for any construction works. • Vegetation clearing minimised to the extent necessary for construction of the development complex and access tracks. • Dust suppression measures, such as watering exposed soil and ceasing dust generating activities during periods of high wind, shall be implemented. • As soon as practical at the completion of construction works any disturbed areas required to be revegetated shall be.	section 13.1.6.6
	Operation	• Adapting the cattle stocking density in pens to maintain manure on pen surface at a moisture content that minimises dust generation. For example, stocking density may change from lighter rates in winter to heavy rates in summer. • Setting and enforcing speed limits on internal road network • Dust suppression measures, such as watering access and feed roads and solid waste stockpiles as required.	section 13.1.6.7

		• Any operations involving the movement of dusty materials such as hay processing, grain movement, solid waste turning and spreading shall be timed and managed where possible when materials are have adequate moisture content. • Minimising the accumulation of manure in pens and cattle lanes by cleaning more frequently that Class 1 requirements. • Application of solid wastes to land when wind conditions and dispersion conditions are favourable. • Ensure the air quality and meteorological monitoring network is maintained and results are routinely analysed, assessed and reported. • Receiving, reporting and responding to any complaints in relation to air quality through the 24-hour community response line. • Report the results of any air quality monitoring in accordance with the conditions of the Development Approval. • Ensure that all employees and contractors are given adequate training in environmental awareness, legal responsibilities, and air quality control methods.	
GHG	Design and siting	• The pens shall be designed with adequate slope to maximise drainage and encourage rapid drying of the pen surface after rainfall. • Proposed grain treatment process maximises digestibility and minimises the amount of starch in faeces. • Sedimentation basin designed to maximise the removal of solids and drain free of water after a runoff event. • Appropriately sized effluent and solid waste utilisation area for sustainable application of nutrients.	section 13.1.6.9
	Construction	• Use of appropriately sized plant and equipment for respective processes to ensure machines are operating at peak efficiency and activities completed in a timely manner. • Routine service and maintenance of mobile equipment used to ensure efficient operation. • Review and further evaluation of construction vehicles against current industry fuel efficiency benchmarks.	section 13.1.6.10
	Operation	• Sourcing livestock from as close to the development as practical as well as on-site production to minimise fugitive emissions during transport.	section 13.1.6.11

		• Utilising the best animal production genetics - Improved production traits such as growth rate and carcass weight will contribute significantly to reducing emissions intensity. • Maximise feed energy by eliminating parasites and nutrient deficiencies. • Use of appropriately sized plant and equipment for respective processes. • Generating and maintaining best practice management for solid and liquid waste storage, processing and utilisation. • Frequent removal of manure from the pens/drains and under-fences. • Sedimentation basin control weir maintained in operational order to ensure that complete drainage occurs. • Remove solids from the sedimentation basin as soon as practical. • Dewatering of the holding pond by irrigation to crops or pastures should occur as soon as possible after rainfall. • Matching fertiliser to plant nutrient requirements to maximise crop growth. • Sourcing feed commodities from as close to the development as practical as well as on-site production to minimise fugitive emissions during transport. • Routine service and maintenance of mobile equipment used on-site to ensure efficient operation. • Continuous improvement of GHG intensity of production by identifying and controlling energy intensive processes. • Regular reviews and monitoring of GHG emissions and energy usage.	
Geology, landform and soils			
Soils	Construction	• Controls and verification during construction to ensure the adopted construction specification and design is followed. • The disturbance area of the proposed development complex area shall be cleared and all trees, roots, stumps, small rocks, artificial obstructions, etc grubbed to a depth of 300 mm below the surface of the ground. • The topsoil shall be removed from all borrow areas and water retaining embankment foundation areas and from all other areas, which are to be filled or excavated as outlined in the Earthworks Specifications. • If any rock or beds of gravel, sand or other pervious materials are exposed during excavation, then an additional 600 mm shall be excavated and replaced by covering the exposed rock or	section 13.2.8

		pervious material with at least 600 mm of impervious material thoroughly compacted to prevent seepage along the rock plane or through the pervious material. • Suitable material won from the borrow area shall be used to form the design grades. This material, at the correct moisture content, shall be placed in progressive layers of uniform loose thickness of not more than 200 mm before compaction, preferably by rolling. • Filling shall be compacted to a field dry density of at least 98% maximum dry density as determined by AS 1289 5.1.1 (Standard Compaction). The material shall be compacted at a moisture content of within (+2% - 0%) of OMC as determined by AS 1289.5.1.1 (Standard Compaction). • Field dry density tests, according to AS 1289.5.1.1 (Standards Australia, 2003), shall be undertaken to ensure that adequate compaction is being achieved. • In the event that areas of the development site are known or are suspected to, or comprise ASM, a Construction Acid Sulfate Material Management Plan shall be prepared to describe how any Acid Sulfate Materials (i.e. Actual Acid Sulphate Soils (ASS), potential ASS (PASS), MBO) shall be assessed and managed.	
Groundwater			
	Design and siting	• Site selection considered the natural attributes and general suitability of the site with respect to soil characteristics (texture, depth, permeability), groundwater depth, and hydrogeological formation. • Geotechnical investigation conducted to determine those areas within the controlled drainage area where the permeability of underlying soil/rock strata exceeds the design permeability, thus requiring lining to prevent soil leachate movement. • The liner shall be capable of remaining effective when subject to the physical effects of livestock, machinery and water flow. • Runoff external to the controlled drainage area is diverted away from the controlled drainage area. • Effluent and solid waste utilisation areas are sited so that they do not pose an unacceptable risk to groundwater quality as a result of leaching. • Effluent and solid waste utilisation areas are designed to enable the sustainable use of effluent and any solid waste that is utilised on-site. • Facilities to store hazardous materials are designed to meet relevant guidelines and Australian Standards for the storage of hazardous and dangerous goods and spill management.	section 13.3.3.1

Construction	• A CEMP would be prepared for the construction of the proposed development and the following measures would be employed (where relevant) within that plan to minimise impacts to groundwater.
	• Erosion and sediment control measures implemented and maintained to minimise erosion and the release of sediment.
	• Construction of diversion banks to separate contaminated stormwater from clean water.
	• Where a liner is used in areas subject to traffic (including pen surfaces and parts of the drainage system subject to mechanical cleaning), or in drains exposed to flow velocities that would otherwise cause scouring, then:
	    • Sufficient depth of these materials is laid to prevent failure of the lining under the normal conditions;
	    • The liner is constructed to achieve the specified design permeability.
	• Fuels and lubricants are appropriately stored in bunded areas.
	• Maintenance of vehicles and equipment to minimise leaks of oil or fuel.
	• Provision and implementation of procedures to manage spills on site.
		section 13.3.3.2

Operation	• An Operational Environmental Management Plan (OEMP) and an Irrigation Management Plan (IMP) would be prepared for the operation of the proposed development. The IMP would detail the management and monitoring requirements for wastewater treatment and irrigation. • Development and implementation of emergency and contingency plans within the IMP detailing methods to manage spills or other emergencies on site, such as pipe breakages, pond overflows, pump failures etc. • Sustainable use of groundwater in accordance with allocation and entitlements under the Water Sharing Plan for the NSW Border Rivers Unregulated and Alluvial Water Sources 2012. • Solid waste stockpiles established within controlled drainage area to prevent contaminated leachate into groundwater resources. • The land application of effluent and solid waste is made at rates consistent with the ability of soils and crops grown in the on-site utilisation areas to sustainably utilise the applied nutrients, salts and organic matter, under the climatic conditions prevailing at the site. • Application rate of effluent is controlled to ensure that excessive ponding does not occur. • The liner of all elements of the controlled drainage area such as drains, sedimentation basin, flow control structures etc is maintained to ensure the integrity and ongoing compliance with specified design criteria.	section 13.3.3.3

		• Effluent shall be stored, treated and sustainably applied to land on-site by irrigation.	
Surface water			
	Design and siting	• The proposed development is sited above the height of a 100 year average recurrence interval (Q_{100}) flood level • Any soils proposed to be exposed during construction shall be assessed for the potential to be acid sulfate soils prior to disturbance. • Access roads sited on flood prone do not impact the hydrology of the area. • A controlled drainage area designed to an acceptable hydrological standard that prevents unauthorised discharges of runoff from areas such as pens, livestock handling, solid waste storage and processing area and silage storage area which have high organic matter and therefore a high pollution potential. • Runoff external to the controlled drainage area is diverted away from the controlled drainage area. • Solid and liquid waste utilisation areas are sited so that they do not pose an unacceptable risk to surface water quality as a result of flood events. • Solid and liquid waste utilisation areas are designed to enable the sustainable use of liquid waste and any solid waste that is utilised on-site. • Any facilities to store hazardous materials are designed to meet relevant guidelines and Australian Standards for the storage of hazardous and dangerous goods and spill management. • Elements within the controlled drainage area are designed to capture contaminated runoff and safely divert it to a sedimentation system and holding pond. • A holding pond is designed to store runoff from the controlled drainage area without spilling or overtopping at an unacceptable frequency. • Existing riparian areas to the Dumaresq River shall be retained and buffers to drainage lines implemented, thus minimising adverse impacts to preserving stream bank stability.	section 13.4.3.1
	Construction	• A CEMP would be prepared for the construction of the proposed development. • Erosion and sediment control measures implemented and maintained to minimise erosion and the release of sediment. • Appropriately designed culverts shall be installed at any points that the access road crosses existing drainage lines. • Construction of the sedimentation basin in the north of the site during early works on the site in order to retain stormwater runoff on-site and minimise release of sediment off-site.	section 13.4.3.2

	• Construction of diversion banks to separate contaminated stormwater from clean water and prevent contaminated runoff from entering surface water. • Fuels and lubricants are appropriately stored in bunded areas. • Maintenance of vehicles and equipment to minimise leaks of oil or fuel. • Provision and implementation of procedures to manage spills on site.	
Operation	• An Operational Environmental Management Plan (OEMP) and an Irrigation Management Plan (IMP) would be prepared for the operation of the proposed development. The IMP would detail the management and monitoring requirements for wastewater treatment and irrigation. • Development and implementation of emergency and contingency plans within the IMP detailing methods to manage spills or other emergencies on site, such as pipe breakages, pond overflows, pump failures etc. • Maintenance of buffer zones around drainage lines and riparian zones to prevent contamination of surface waters. • Solid waste stockpiles would be established within controlled drainage area to prevent contaminated runoff into clean water areas. • Sustainable use of surface water in accordance with WAL entitlements. • The land application of effluent and solid waste is made at rates consistent with the ability of soils and crops grown in the on-site utilisation areas to sustainably utilise the applied nutrients, salts and organic matter, under the climatic conditions prevailing at the site. • Soil condition is monitored periodically and soil tests are used where there is potential for deterioration of soil condition. • Application rates of liquid waste is controlled to ensure that excessive runoff does not occur. • All elements of the controlled drainage area such as drains, sedimentation basin, flow control structures etc are cleaned and maintained to ensure their integrity and ongoing compliance with specified design criteria. • Effluent shall be stored, treated and sustainably applied to land on-site by irrigation. • Design discharge events from the holding pond shall be directed to a natural grassed discharge area. This grassed area shall filter and disperse the effluent whilst allowing some infiltration. As the design discharge events are at a frequency of one in 10 years the concentration of nutrients shall be sustainably adsorbed and utilised by vegetation in between events.	section 13.4.3.3
Flooding, stormwater and coastal hazards		

Flooding	Design and siting, construction and operation	• The proposed development is sited above the height of a 100 year average recurrence interval (Q_{100}) flood level. • Site selection considered the natural attributes and general suitability of the land for draining and capturing runoff from the proposed development complex. • Effluent and solid waste utilisation areas are sited so that they do not pose an unacceptable risk to surface water quality as a result of flood events. • Effluent and solid waste utilisation areas are designed and managed to enable the sustainable use of effluent and any solid waste that is utilised on-site.	section 13.6.2.1
Stormwater	Construction and operation	• Preparation and implementation of a construction Erosion and Sediment Control plan prior to commencement of construction activities. • The ESCP shall outline all site drainage, stormwater quality devices and erosion / sedimentation control measures and the onsite treatment of stormwater . • Separation of 'clean water' and 'dirty water' during construction and operation with diversion banks and/or other relevant control structures diverting 'clean water' from undisturbed areas around disturbed areas. • Implementation of erosion control techniques based upon effective use of construction practices, structural controls and vegetative measures. Erosion control measures would be temporary for the construction phase of the proposed development. • Require regular maintenance of erosion control measures. • The installation of appropriate sediment control measures to ensure that any eroded material is trapped and retained prior to leaving the construction site. • Require regular maintenance and cleaning of sediment control measures. • A controlled drainage area designed to an acceptable hydrological standard that prevents unauthorised discharges of runoff from areas such as pens, livestock handling, solid waste storage and processing area and silage storage area which have high organic matter and therefore a high pollution potential. • Runoff external to the controlled drainage area is diverted away from the controlled drainage area to existing natural drainage lines. • Elements within the controlled drainage area are designed to capture contaminated stormwater runoff and safely divert it to the sedimentation system.	section 13.6.2.2

		• A holding pond is designed to store runoff from the controlled drainage area without spilling or overtopping at an unacceptable frequency. • Vehicles are maintained to minimise leaks of hydrocarbons, lubricating oil etc.	
Cultural Heritage			
Aboriginal Heritage	Design and siting and construction	• Known Aboriginal heritage sites shall be avoided during construction and operational activities. • A record of known Aboriginal heritage sites shall be marked on site plans and relevant development documentation. • The location of known Aboriginal heritage sites shall be considered during final detailed engineering designs of the access road alignments and ancillary infrastructure such feed processing facilities. • A protocol for surface works to reduce the risk of accidental damage to known sites shall be implemented. • Construction activities will be restricted to the areas approved and designated for the proposed development. No access tracks or other ground disturbing activities will be undertaken without the appropriate environmental assessment and, where relevant, approvals. • Should previously unidentified Aboriginal heritage sites be found during construction activities, work will immediately cease and the sites will be reported to the Construction Manager who will arrange for the appropriate assessment to be undertaken. • Erosion and sediment control works be undertaken in accordance with the requirements of the development approval and in consideration of other Aboriginal cultural heritage management measures. • Any new Aboriginal heritage sites identified during the development of the proposed development shall be registered with the NSW Office of Environment and Heritage (via Aboriginal site Impact Recording Form on AHIMS) in consultation with the Aboriginal community. • All construction employees and contractors will be provided with suitable training in how to identify Aboriginal heritage sites or items of significance and protocols for notification and reporting.	section 13.7

Non-Aboriginal Heritage	Operations	• During the proposed development will be sited and designed to avoid disturbance of heritage sites where possible, otherwise the appropriate consents will be obtained. • Construction activities will be restricted to the areas approved and designated for the proposed development. • Should previously unidentified heritage sites/objects be found during construction activities, work will immediately cease and the sites will be reported to the Construction Manager who will arrange for the appropriate assessment to be undertaken.	section 13.7.3.4
Biodiversity			
	Construction	• Protection of the remnant vegetation identified as a no-go area. • Clearing restricted to those areas required for the development complex and firebreaks. • Clearing of native vegetation would be performed in accordance with procedures developed specifically to minimise injury and death to wildlife during clearing. • Some overstorey timber would be retained and stockpiled for habitat enhancement purposes, the remainder may be mulched and stockpiled separately. • Communications protocols for employee and contractor education. • Provisions to limit heavy vehicle speeds and for signage along access roads. • Methods and communication tools to monitor road strike and mortality of wildlife. • Any areas to be rehabilitated with species of local providence.	section 13.8.5
Protected and conservation areas			
	Design and siting	• Provision of adequate separation distances between the proposed development and protected and conservation areas as shown in Figure 42. • A controlled drainage area designed to an acceptable hydrological standard that prevents unauthorised discharges of runoff from areas such as pens, livestock handling, solid waste storage and processing area and silage storage area which have high organic matter and therefore a high pollution potential. • Elements of the controlled drainage area are designed to capture contaminated stormwater runoff from within the development complex and safely divert it to a sedimentation system. • A holding pond is designed to store runoff from the controlled drainage area without spilling or overtopping at an unacceptable frequency.	section 13.9.4

		• Appropriately designed weirs and by-washes are used to discharge excess runoff downstream of OEH estate during overtopping or spill events in the sedimentation system and holding pond.	
	Construction	• Preparation and implementation of a construction Erosion and Sediment Control plan prior to commencement of construction activities. • Runoff external to the controlled drainage area is diverted away from the controlled drainage area to existing natural drainage lines downstream of protected and conservation areas. • Construction of a dedicated entrance for the proposed development based on GSC recommended standards. • Earthmoving machinery shall be cleaned down prior to entering the proposed development site.	section 13.9.4

	Operation	• Timely control of initial weed populations around the proposed development complex, such as, around sheds and buildings, along roadsides, cattle receival facilities/holding yards, along fence lines, drainage structures, in tree plantings etc. Weeds in these areas experience little competition and can produce large quantities of seed.
		• Control of weeds around the proposed development complex also reduces any potential fire hazard. Control shall be achieved by regular mowing or herbicide application. Knockdown or residual herbicides (or a combination of the two) shall be used depending on whether the weeds have emerged, the time of year and the weeds present.
		• Prior to importing livestock and /or feed commodities (grains, roughages) from known weed infestation areas (e.g. parthenium weed), the weed status of materials and vehicles shall be confirmed with the supplier.
		• A pest management program shall be implemented to control animal pest species already present, using acceptable methods as well as identify potential pest species, their likely distribution and methods to prevent their spread.
		• Wild dog, feral pig, fox and vermin pest species populations near the proposed development shall be monitored.
		• Established pest animals shall be controlled and their spread prevented.
		• Mice and rat populations will be managed and mitigated by:
		  ◦ minimising feed wastage and spillage to minimise likelihood of attracting vermin.
		  ◦ implementing a baiting program if the vermin population reaches a nuisance level.
		• Human waste shall be managed appropriately and in accordance with any relevant statutory requirements.
			section 13.9.4

Waste materials			
	Construction and Operation	• Ensure that all wastes (includes but not limited to liquid, air emissions, and solid material) generated by the proposed development, as far as reasonably practicable managed in a manner which reduces adverse impact to the environment. This approach is based on the hierarchy of waste materials management (elimination, reduction, reuse or recycling and treatment and disposal). • Ensure the correct quantities are ordered and delivered to the site. • Cut and fill works would be balanced where possible. • Clean excavated fill material would be used as construction fill and for road works where suitable. • Excavated material not suitable for re-use as fill would be re-used for mounding for visual amenity and landscaping where practicable. • All waste to be transported off-site shall be assessed to determine whether the waste requires tracking under the Protection of the Environment Operations (Waste) Regulation 2014. • All waste requiring tracking shall only be transported after all necessary documentation such as consignment authorisation and transport certificates have been obtained from the relevant authorities. • Ensure procedures are implemented to minimise any adverse environmental impacts associated with the storage, management and disposal of waste materials. • Inspections of the waste management areas would be constructed on a weekly basis to ensure that correct waste management practices are being followed, in that all waste materials are appropriately separated and stored. • No burying of waste relating to the construction and/or operation of the proposed development is to be conducted on the subject property with the exception of mass deaths of beef cattle. • No burning of waste relating to the construction and/or operation of the proposed development is to be conducted on the subject property. • Inductions to construction personnel outline measures on how to deal with suspected contaminated soil. • All waste that cannot be sustainable utilised on the subject property shall be removed from the subject property by an operator licensed to remove that waste removal and transported to a suitably licensed disposal site.	section 13.10.9

		• Putrescible domestic waste will be stored in a protected area away from vermin and inclement weather. • Wastes will be stored appropriately for its type. Different waste types will not be mixed to increase the potential for re-use or recycling of waste. Separate waste storage areas will be designated. • Quantities of waste stored onsite will be kept to a minimum. Maximum volume of each waste stored will be consistent with regulations and guidelines. • All sampling and classification results shall be retained for the life of the proposed development in accordance with EPA's Waste Classification Guidelines. • All waste shall be transported in accordance with Council and EPA regulations for the type and volume of waste transported. • All loads of waste removed from the proposed development site will be covered to prevent spillage. • Licensed waste contractors will be made responsible for collection and appropriate disposal of waste as required. • Solid waste storage and processing areas shall be contained in the controlled drainage area. • Records or a material register shall be retained detailing the quantity, classification method of transport of waste material removed from the site. The register will record the waste type, quantity, classification, contractor, licence details and details of the licensed receiving facility. • Any excavated material that is known or are suspected to comprise ASM, shall be managed in accordance with the ASM plan.
Land capability		
	Design and siting	• The solid and liquid utilisation areas have been sited and designed to minimise any adverse impacts to groundwater and surface waters. • Mitigation measures including riparian buffers, lagoons to capture first-flush stormwater runoff and sustainable utilisation of applied nutrients shall be implemented to minimise any adverse impacts to groundwater and surface waters . • The physical and chemical characteristics of the soils proposed for effluent and solid waste utilisation were assessed. • A sustainable effluent utilisation system was developed using MEDLI, a water and nutrient balance model.

	Operation	• An Irrigation Management Plan (IMP) for effluent utilisation shall be prepared and implemented for the operation of the proposed development. • Monitoring of the effluent irrigation system shall be undertaken to ensure that the system is meeting environmental requirements as well as satisfying licence conditions. • Annual reporting shall be undertaken in accordance with EPL requirements.	
Traffic and transport			
	Design, construction and operation	• Construction of a dedicated entrance for the proposed development complex based on GSC recommended standards. • Negotiation of a road maintenance contribution to GSC, based on tonnes of livestock transported. • Advance warning signs would be provided for the approaching traffic on Getta Getta Road to the entrance of the proposed development complex.	Appendix Q
Noise and vibration			
	Construction	• Carrying out all noisy construction works during the standard daytime construction hours • Scheduling construction to minimise multiple use of the noisiest equipment or plant items near noise sensitive receptors. • Strategic positioning of plant items to reduce the noise emission to noise sensitive receptors where possible. • Awareness training for staff and contractors in environmental noise issues. • Minimising the use of horn signals and consideration of alternative methods of communication. • Switching off any equipment not in use for extended periods during construction work. • Minimising heavy vehicles' entry to site and departure from site outside the nominated construction hours. • Consideration of the positioning of construction plant / processes. • All plant and equipment required shall be well maintained and regularly serviced. • All plant and equipment would be installed with the appropriate noise attenuation apparatus. • Retrofitting reversing alarms that are quieter and display less annoying characteristics. • Community consultation with local residents to assist in the alleviation of community concerns. • Maintaining a suitable complaint register. Should noise and/or vibration complaints be received, undertake noise and/or vibration monitoring at the locations concerned.	section 13.13.6.1

		• Heavy vehicles shall be routed via Bruxner Way/North Star Road/Warialda Road/Getta Getta Road for deliveries of materials, plant and equipment.	
	Operation	• Low-stress cattle handling techniques employed to manage cattle to ensure they are handled quietly and efficiently. • Carrying out all noisy activities such as feed processing during the standard daytime operational hours. • Awareness training for staff and contractors in environmental noise issues. • Minimising the use of horn signals and consideration of alternative methods of communication. • Switching off any equipment not in use for extended periods. • Minimising heavy vehicles' entry to site and departure from site outside the nominated operational hours. • All plant and equipment required shall be well maintained and regularly serviced. • All plant and equipment would be installed with the appropriate noise attenuation apparatus. • Retrofitting reversing alarms that are quieter and display less annoying characteristics. • Community consultation with local residents to assist in the alleviation of community concerns. • Maintaining a suitable complaint register. Should noise complaints be received, undertake noise monitoring at the locations concerned. Reasonable and feasible measures would need to be implemented to reduce noise impacts. • Selection of machines that are inherently free of or have low vibration. • Vibration-producing machinery shall be supported on stiff structural components, and be provided with efficient vibration isolation systems. • Maintenance of plant and equipment machinery – ensuring rotating parts are balanced, vibration isolators are functioning as intended etc.	section 13.13.6.2
Landscape and visual amenity			
	Design and Siting and Construction	• Provision of adequate separation distances between the proposed development complex and sensitive receivers as shown in Figure 15. • Provision of vegetative screen around proposed development complex as a wind break and vegetative filter.	section 13.14.7
Pest animals and weeds			

	Construction	• A 'mitigation hierarchy' of first avoiding, then minimising and then mitigating the impact shall be adopted. • A weed survey will be undertaken prior to construction to identify the overall abundance and diversity of weed species across the proposed development complex site and adjacent lands. • Earthmoving machinery shall be cleaned down prior to entering the proposed development site. • Earthmoving machinery shall be cleaned down as soon as possible, either on-site or at the closest clean-down facility, upon completion of works and leaving the proposed development site if advised by the Construction Manager or operators notice the presence of weeds in the construction area.	section 13.15.4
	Operation	• Timely control of initial weed populations around the proposed development, such as, around sheds and buildings, along roadsides, cattle receival facilities/holding yards, along fence lines, drainage structures, in tree plantings etc. Weeds in these areas experience little competition and can produce large quantities of seed.. • Control of weeds around the proposed development also reduces any potential fire hazard Control shall be achieved by regular mowing or herbicide application. Knockdown or residual herbicides (or a combination of the two) shall be used depending on whether the weeds have emerged, the time of year and the weeds present • Prior to importing livestock and /or feed commodities (grains, roughages) from known weed infestation areas (e.g. parthenium weed), the weed status of materials and vehicles shall be confirmed from the supplier. • Aquatic weeds in water storages shall be controlled via mechanical and/or chemical means. Chemical control shall be undertaken with considerable care, considering the identity of the weed, the effect of herbicides on desirable plants, fish and other aquatic life and the eventual use of the water. • A pest management program shall be implemented to control animal pest species already present, using acceptable methods as well as identify potential pest species, their likely distribution and methods to prevent their spread. • Established pest animals shall be controlled and their spread prevented. • Pest animal control programs shall use the most humane, target specific, cost effective and efficacious techniques available. • Mice and rat populations will be mitigated by:	section 13.15.4

	- minimising feed wastage and spillage to minimise likelihood of attracting vermin - implementing a baiting program if the vermin population reaches a nuisance level. • Fly breeding sites shall be mitigated using several control methods such as biological, chemical and physical methods following integrated pest management (IPM) principles shall be used. • Controlling weeds and keeping grass and other vegetation short, particularly around pens, drains, sedimentation basin and the holding pond makes it more difficult for flies to find resting places and reduces the vegetation–manure interface, a preferred breeding substrate for stable flies. • Moist silage provides a suitable substrate for fly breeding. Subsequently, silage spills particularly along the sides of silage pits shall be cleaned up, and the silage pits covered so that the edges are sealed to reduce fly breeding in this area. • Composting carcasses shall be covered with manure. • Human waste shall be managed appropriately and in accordance with any relevant statutory requirements.	
Other hazards and risks		
Operation	• Maintaining animal health through biosecurity and animal health programs, including the use of vaccines, plays an important role in reducing the risk of some zoonotic diseases. • Development and implementation of a Health and Safety Management Plan that covers the risks for employees associated with operational activities such as general safety for working with plant, equipment and livestock. • All personnel working with or handling animals shall take precautions to minimise the risk of infection from animal-borne diseases. Because different zoonotic diseases behave differently, avoiding specific infections requires an individual approach. • Good personal hygiene practices such as washing hands after handling animals and before preparing or eating food or smoking cigarettes shall be implemented. • Personnel shall be vaccinated for those zoonoses for which vaccinations are available, for example Q Fever. • Personal protective equipment such as gloves, boots and aprons or overalls shall be worn when handling animals. Cuts and scratches shall be covered with waterproof plasters. • Pest animals such as rats or feral pigs can carry zoonotic diseases and control programs will reduce the likelihood of transmission to people.	section 13.17.6

- Employees are trained to understand the mechanisms of disease introduction and spread, including via cattle, feedstuffs, people, vehicles, machinery and equipment, feral animals and wildlife, and manure and liquid waste.
- Development of a preventive herd health plan to help prevent and treat animal health shall be developed in conjunction with a veterinarian.
- Implementation of herd management systems that support rapid and accurate trace-back and trace-forward of livestock.
- Livestock are vaccinated against major preventable diseases.
- Early identification of animal health issues through daily monitoring, observation and assessment of livestock for a range of key behavioural indicators.
- Accurate diagnosis of animal health issues backed by the local veterinarian.
- Separation of sick cattle into hospital/treatment pens for treatment and convalescing.
- Prudent use of antibiotics to manage infectious disease, reduce livestock pain and suffering, and to minimise losses due to disease.
- Destruction and disposal of infected and exposed susceptible animals.
- Seek accreditation under the National Feedlot Accreditation Scheme (NFAS).
- Development and implementation of a heat stress management plans to mitigate excessive heat stress events.
- Provision of shade structures over production and hospital pens.
- Sufficient capacity of water required to supply cattle; to clean vehicles, yards etc; and for general hygiene is available on-site.
- Sufficient capacity of feed required to supply cattle is available on-site.
- Implementation of best practice solid and liquid waste management techniques including regular cleaning of pens, drains and sedimentation basin of manure and composting of mortalities.
- Preparation of a contingency plan to manage the disposal of large numbers of mortalities.

Part H – Justification

16. Development justification

16.1 Introduction

The proposed development requires justification on biophysical, economic and social grounds together with the principles of Ecologically Sustainable Development (ESD), taking into consideration whether it is consistent with the objects of the EP&A Act. Each aspect is dealt with in the following sections.

16.2 Biophysical

The potential biophysical impacts associated with the proposed development have been assessed in section 13 and include assessment of the following impacts:

- Air quality;
- Biodiversity and habitat;
- Landform and soils (primarily for suitability for waste utilisation and protection of groundwater); and
- Groundwater and surface water quantity and quality.

As discussed in this EIS, a suitable site has been selected for the proposed development. No adverse impacts to air quality, biodiversity, surface water and/or groundwater quantity or quality or soils are expected.

As outlined in section 13.1.7, the proposed development would have a minimal impact upon air quality due to the separation distances from sensitive receivers and mitigation measures proposed.

As outlined in section 13.8, the proposed development would have a minimal impact upon biodiversity.

Groundwater quality is not vulnerable as the groundwater is relatively deep and protected by overlying strata of medium-heavy clay and sedimentary rock. Further, design, construction and operation standards shall be implemented that will further protect groundwater resources.

Water for the proposed development shall be sourced from an existing groundwater access licence and no new allocation (or “new water”) is required.

Surface water quality shall be protected through design of a sustainable effluent and solid waste utilisation system, appropriate buffers, storages to capture first-flush runoff and best-practice application and management techniques. Further, the proposed development complex is not subject to flooding.

The proposed development could result in impacts to soils through siting, design and/or unsustainable utilisation of effluent and solid waste. However, as discussed in section 13.11, a sustainable effluent and solid waste utilisation system has been designed that incorporates various mitigation measures.

The assessment of the impact of the proposed development on each of the biophysical elements of the environment has concluded that providing management measures and monitoring systems are implemented to mitigate potential impacts, the proposed development would not have a significant impact.

The environmental mitigation, management and monitoring requirements have been compiled and summarised as commitments in section 15.

The proposed development is therefore justifiable in terms of the biophysical elements of the environment.

16.3 Economic

The capital investment and operational expenditure required for the proposed development would stimulate the local, regional and NSW economies. The proposed development will provide both direct and indirect economic benefits to the local, regional and state economies. The construction phase of the proposed development will generate local employment opportunities and income for contractors and local businesses in the local area.

Similarly, the operational phase of the proposed development would provide direct economic benefits in the form of local employment opportunities, both onsite for some 3 full-time equivalent personnel and associated activities such as transport of cattle and feedstuffs, and indirect benefits through activities such as maintenance of equipment and environmental monitoring. Further, economic benefits to the local region include the opportunity to supply inputs such as cattle and feedstuffs and purchase of solid waste.

The proposed development would also provide economic benefits to the GSC through royalties.

Subsequently, given these benefits, the proposed development is justifiable on economic grounds.

16.4 Social

The potential social impacts of the proposed development have been assessed in the EIS, and include consideration of an extensive range of issues, including the following key issues raised by the community during the community consultation program:

- Odour;
- Dust;
- Traffic and transportation;

- Noise;
- Amenity;
- Landscape character and visual impact;
- Cultural Heritage; and
- Hazard and risks.

A number of these issues interrelate with the biophysical and economic impacts of the proposed development, where, as described above, it has been concluded that the proposed development would not have a significant impact provided mitigation measures are implemented, and that the proposed development is justifiable on biophysical and economic grounds.

Through the consultation program, the community raised issues about the proposed development, based on its understanding and perception of the proposed development and its likely impacts.

Many of these issues raised, such as odour, dust, social amenity, visual impact and traffic have been demonstrated through the impact assessment to have an acceptable level of impact providing management measures are implemented.

The noise impact assessment predicted that no residential receivers would experience noise impacts during construction and/or operation.

The viewpoint assessment concluded that the visual impact of the proposed development is limited to road users on Getta Getta Road. Landscaping is proposed to along the subject land frontage to Getta Geta Road to soften this impact. The proposed development complex is not visible by sensitive receptors due to the topography of the land and screening provided by existing vegetation.

Further, the assessment concluded that the nature of the proposed development would be consistent with the existing agricultural activities in the surrounding area although on a larger scale and that the proposed development would assimilate into the local landscape due to the nature of the development and the high visual absorption capacity of the surrounding landscape.

The proposed development is not expected to create significant hazards or risks to humans, animals or the biophysical environment provided the mitigation measures outlined in section 13.17.6 are implemented.

The proposed development is not considered to have significant social impacts on the community, given its location with respect to sensitive receivers and design and management measures to be implemented. Subsequently, the proposed development is justifiable on social grounds.

16.5 Ecologically sustainable development

ESD is integrated into NSW environmental legislation and government policy. Schedule 2 of the Environmental Planning and Assessment Act 1979 lists four guiding principles to assist in achieving ESD. They are:

- *The precautionary principle*: if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.
- *Inter-generational equity*: the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations.
- *Conservation of biological diversity and ecological integrity*: conservation of biological diversity and ecological integrity should be a fundamental consideration.
- *Improved valuation and pricing of environmental resources*: environmental factors should be included in the valuation of assets and services, such as polluter pays, full life cycle costing, and utilising incentive structures / market mechanisms to meet environmental goals.

The four principles of ESD as they relate to this development are considered in the following sections.

In addition, the Commonwealth's National Strategy for Ecologically Sustainable Development defines ESD as 'using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future, can be increased'.

Conservation of ecological resources would be achieved through avoiding valuable areas (as far as practicable).

16.5.1 Precautionary principle

Doolin Farming Pty Ltd has adopted the 'precautionary principle' during the planning, design, construction and operation of the proposed development. This is demonstrated by investigation of alternative site locations and through the detailed investigations undertaken to determine the characteristics of the environment, and the likely impacts associated with the proposed development.

The identification and prioritisation of potential impacts to the environment has enabled the proposed development to be designed to avoid significant environmental impacts and allowed environmental management measures to be developed to manage potential impacts to ensure that significant adverse environmental impacts are prevented.

The subject land is ideally suited for the proposed development. In addition, high standards of design, construction and management are proposed for the proposed development. Providing the proposed development is sited, built and operated as described in this EIS there is no significant threat of serious or irreversible environmental harm.

In addition, environmental monitoring of the operations will be used to ensure that the environmental impacts are appropriately managed and adjustments made to ensure that the proposed development is operating in an environmentally sustainable way.

16.5.2 Inter-generational equity

Inter-generational equity is a part of social equity, as is intra-generational equity.

Inter-generational equity is the concept that decisions made by the present generation would not result in a degradation of the environment for future generations. While intra-generational equity is applied within the same generation.

The proposed development would have minimal long-term impacts on the environment as a result of the suitability of the subject property for such development and the proposed high standards of design, construction and management.

The potential impacts associated with the operational phase of the proposed development, such as from odour and traffic, would be managed through the implementation of environmental management measures, and are reversible in nature, and therefore would not result in significant environmental degradation for future generations.

The design and management of the proposed development would ensure that environmental impacts are managed during the operational phase and would not result in significant long-term environmental damage.

Much of the region suffers from limited opportunities because of a narrow economic base which is agriculture. The proposed development would contribute to social equity by providing additional employment opportunities both directly and indirectly.

Hence the proposed development would contribute to both inter-generational and intra-generational equity.

16.5.3 Biological diversity and ecological integrity

The principle of ‘biological diversity and ecological integrity’ requires a full and diverse range of plant and animal species to be maintained and conserved.

Consideration of the impacts of the proposed development on biodiversity and habitat has been undertaken as part of developing the preferred development complex design through environmental investigations.

Whilst, the proposed development complex shall result in the removal of small areas of native vegetation, the biodiversity assessment concluded that the proposed development is unlikely to have significant impacts on threatened flora and fauna species or habitat. Good design and management and the provision of buffers to watercourses and drainage lines will protect aquatic flora and fauna.

Monitoring of the environmental safeguards and environmental impacts would be carried out for the lifetime of the proposed development.

The proposed development maintains ecosystems, species and genetic diversity and therefore meets the principle of biological diversity and ecological integrity.

16.5.4 Valuation and pricing of environmental resources

One of the underlying goals of ESD is economic efficiency, including improved valuation and pricing of environmental resources.

Integration of environmental and economic goals can be measured by undertaking a cost-benefit analysis, that is, by measuring the costs of proceeding with the proposed development against the benefits arising from the proposed development.

In the past, it was assumed that some environmental resources were free or under-priced, leading to their wasteful use and consequent degradation. Consideration of economic efficiency, with improved valuation of environmental resources, aims to overcome the under-pricing of natural resources and has the effect of integrating economic and environment considerations in decision making, as required by ESD.

Given the different values placed on an environment, the various components of an environment and the varying methodologies used for valuation, it is difficult to assign a monetary value against the environmental costs and benefits associated with the proposed development. However, various studies have made comparison between grass-finished and grain-fed cattle using life-cycle analysis.

LCA studies concluded that in comparison to grass finished cattle, grain finished cattle had higher lifetime ADG and higher finished weights. In addition to efficiency improvements, feeding proportions of grain reduce daily methane emissions compared to grass feeding (Dong et al., 2006). Including all impacts associated with production across the supply chain, Peters et al. (2010), Pelletier et al. (2010) and Wiedemann et al. (2015) found that finishing cattle on grain compared to grass reduced emissions intensity.

Therefore, the approach adopted for the proposed development is the management of environmental impacts through appropriate safeguards, and to incorporate the value of environmental resources via direct valuation where practicable (e.g. the adoption and funding of mitigation measures to manage potential environmental impacts, such as dust suppression, odour, ground and surface water quality monitoring, soil monitoring etc.).

Relevant to the consideration of the valuation and pricing of environmental resources are the environmental assessment and siting and design criteria which have been considered during planning of the proposed development.

The value of the environment is also managed through the legislative process by imposing financial penalties or requirements to rehabilitate on persons responsible for polluting the environment.

Doolin Farming Pty Ltd would implement the mitigation and monitoring measures outlined in this EIS to minimise environmental impacts caused by the proposed development.

Having considered all aspects of ESD, the conclusion is that the proposed development is consistent with its specific components.

16.6 Conclusion

The proposed development described in this EIS is consistent with the principles of ESD and is justifiable taking into account potential health, biophysical, economic and social considerations.

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Appendix A

Environmental Planning Framework

Planning Policy (Housing) 2021, or a former site compatibility certificate, of which the council is aware, in relation to proposed development on the land and, if there is a certificate—

(a) the period for which the certificate is current, and

(b) that a copy may be obtained from the Department.

(2) If *State Environmental Planning Policy (Housing) 2021*, Chapter 2, Part 2, Division 1 or 5 applies to the land, any conditions of a development consent in relation to the land that are of a kind referred to in that Policy, section 21(1) or 40(1).

(3) Any conditions of a development consent in relation to land that are of a kind referred to in *State Environmental Planning Policy (Affordable Rental Housing) 2009*, clause 17(1) or 38(1).

(4) In this section—

former site compatibility certificate means a site compatibility certificate issued under *State Environmental Planning Policy (Affordable Rental Housing) 2009*.

23 Water or sewerage services

If water or sewerage services are, or are to be, provided to the land under the *Water Industry Competition Act 2006*, a statement to that effect.

Note—

A public water utility may not be the provider of some or all of the services to the land. If a water or sewerage service is provided to the land by a licensee under the *Water Industry Competition Act 2006*, a contract for the service will be deemed to have been entered into between the licensee and the owner of the land. A register relating to approvals and licences necessary for the provision of water or sewerage services under the *Water Industry Competition Act 2006* is maintained by the Independent Pricing and Regulatory Tribunal and provides information about the areas serviced, or to be serviced, under that Act. Purchasers should check the register to understand who will service the property. Outstanding charges for water or sewerage services provided under the *Water Industry Competition Act 2006* become the responsibility of the purchaser.

Schedule 3 Designated development

section 7

Part 1 Preliminary

1 Definitions

(1) In this Schedule—

acid sulfate soil means acid sulfate soil, potential acid sulfate soil, sulfidic clay or sulfidic sand with soil profiles or layers, within the material to be disturbed or impacted by the development, with more than 0.1% sulfide and a net acid generation potential of more than zero.

(7) The distance from a residential zone is measured as the shortest distance between—

(a) the boundary of the residential zone, and

(b) the facilities or works to which the development application applies, excluding access roads.

(8) The distance between turf farms is measured as the shortest distance between—

(a) the edge of an area that is growing or has previously grown turf sod within the last 5 years, and

(b) the edge of the area for growing turf sod to which the development application applies.

(9) The distance from a waterbody is measured as the shortest distance between—

(a) the boundary of the development site, and

(b) the top of the high bank, if present, or, if no high bank is present—

(i) the mean high water mark in tidal waters, or

(ii) the mean water level in non-tidal waters.

(10) The distance from a wetland is measured as the shortest distance between—

(a) the boundary of the development site, and

(b) the top of the high bank, if present, or, if no high bank is present, the edge of vegetation communities dominated by wetland species.

Part 2 Designated development

3 Agricultural produce processing facilities

(1) Development for the purposes of an agricultural processing facility is designated development if the facility—

(a) involves crushing, juicing, grinding, ginning, milling, separating, washing, sorting, coating, rolling, pressing, steaming, flaking, combing, homogenising and pasteurising more than 30,000 tonnes of agricultural produce per year, or

(b) releases effluent, sludge or other waste—

(i) in or within 100 metres of a natural waterbody or wetland, or

(ii) in an area of high watertable, highly permeable soils or acid sulfate, sodic or saline soils.

(2) In this section—

27 Feedlots

(1) Development for the purposes of a feedlot is designated development if the feedlot accommodates in a confinement area, and wholly or substantially rears or fattens on prepared or manufactured feed, more than—

(a) 1,000 head of cattle, or

(b) 4,000 sheep, or

(c) 5,000 animals of any kind, excluding poultry.

(2) This section does not apply to a facility for drought or similar emergency relief.

28 Geosequestration facilities

(1) Development for the purposes of a facility for the injection and geological storage of greenhouse gases is designated development.

(2) Development for the purposes of drilling or operating a greenhouse gas geological exploration well is designated development.

(3) Subsection (2) does not include apply to a stratigraphic borehole or monitoring well.

29 Horse facilities

(1) Development for the purposes of a facility or confined area operated on a commercial basis for the keeping or breeding of horses is designated development if the facility or area accommodates more than 400 horses.

(2) This section does not apply to a facility for drought or similar emergency relief.

30 Limestone mines and works

(1) Development for the purposes of limestone mines or works is designated development if the works disturb a total surface area of more than 2 hectares of land by—

(a) clearing or excavating, or

(b) constructing dams, ponds, drains, roads, railways or conveyors, or

(c) storing or depositing overburden, limestone, limestone products or tailings.

(2) Development for the purposes of a mine that mines or processes limestone is designated development if the mine is located—

(a) in or within 40 metres of—

(i) a natural waterbody, or

Appendix B

Consultation with Relevant Authorities

Appendix B.1

Consultation with DPIE (SEARs)

Department of Planning, Housing and Infrastructure

Mr Rod Davis
Director
RDC Engineers
PO Box 1223
TOOWOOMBA QLD 4350

EF22/7052
SEAR 1687

Dear Mr Davis,

Request for Updated Planning Secretary's Environmental Assessment Requirements
Feedlot (cattle feedlot expansion)
2513 Getta Getta Rd, North Star (Lot 8 DP 756018 & Lot 1 DP 1212915) (SEAR) 1687

I refer to your letter of 7 May 2024, seeking updated Planning Secretary's Environmental Assessment Requirements (SEARs) for the preparation of an Environmental Impact Statement (EIS) for the above development proposal.

The Department notes that SEAR 1687 issued on 2 June 2022 was for the expansion of an existing cattle feedlot, from 999 head to 3,500 head of cattle.

In its consideration of the request, the Department has re-consulted with all relevant State government authorities in relation to the proposal, including the Environment Protection Authority and the Environment and Heritage Group of the Department of Climate Change, Energy, the Environment and Water. Their additional comments/requirements for the EIS have been attached for your reference.

In consideration of your proposal and the responses received from the relevant State government authorities, the Department considers that the SEARs previously issued would continue to remain relevant to the revised proposal. Notwithstanding, you must ensure you address both the original SEARs and the authorities' additional comments/requirements as part of your EIS.

If you do not lodge an application under section 4.12(8) of the *Environmental Planning and Assessment Act 1979* within one year of the date of this letter, you must consult with the Planning Secretary in relation to any further requirements for lodgement.

Should you have any further enquiries, please contact Greg Michales, Planning and Assessment, at the Department on (02) 8217 2049 or at greg.michales@dpie.nsw.gov.au.

Yours sincerely

Chris Ritchie
Director
Industry Assessments
as delegate of the Planning Secretary

Department of Planning and Environment

2 June 2022

Mr Angus Doolin
Doolin Farming Pty Ltd
3202 Getta Getta Road
North Star NSW 2408

EF22/7052
SEAR 1687

Dear Mr Doolin

Feedlot (cattle feedlot expansion)
2513 Getta Getta Rd, North Star (Lot 8 DP 756018 & Lot 1 DP 1212915)
Planning Secretary's Environmental Assessment Requirements (SEAR) 1687

Thank you for your request for the Planning Secretary's Environmental Assessment Requirements (SEARs) for the preparation of an Environmental Impact Statement (EIS) for the above development proposal. I have attached a copy of these requirements.

In support of your application, you indicated that your proposal is both designated and integrated development under Part 4 of the *Environmental Planning and Assessment Act 1979* and requires a licence under the *Protection of the Environment Operations Act 1997.* In preparing the SEARs, the Department of Planning and Environment (the Department) has consulted with the Environment Protection Authority. A copy of its requirements is attached.

The Department has also consulted with the Biodiversity, Conservation and Science Directorate of the Environment and Heritage Group. A copy of their additional requirements for the EIS are attached.

If other integrated approvals are identified before the Development Application (DA) is lodged, you must undertake direct consultation with the relevant agencies, and address their requirements in the EIS.

If your proposal contains any actions that could have a significant impact on matters of National Environmental Significance, then it will require an additional approval under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). This approval is in addition to any approvals required under NSW legislation. If you have any questions about the application of the EPBC Act to your proposal, you should contact the Commonwealth Department of Agriculture, Water and the Environment on (02) 6274 1111.

Should you have any further enquiries, please contact Zoe Halpin, Planning and Assessment, at the Department on (02) 9995 6430 or via zoe.halpin@planning.nsw.gov.au.

Yours sincerely

C. Ritchie

Chris Ritchie
Director
Industry Assessments
as delegate of the Planning Secretary

Planning Secretary's Environmental Assessment Requirements

Section 4.12(8) of the *Environmental Planning and Assessment Act 1979*.
Schedule 3 of the Environmental Planning and Assessment Regulation 2021*.*

Designated Development

SEAR Number	1687
Proposal	The expansion of an existing cattle feedlot, from 999 head to 3,500 head of cattle.
Location	2513 Getta Getta Rd, North Star (Lot 8 DP 756018 & Lot 1 DP 1212915)
Applicant	Doolin Farming Pty Ltd
Date of Issue	2 June 2022
General Requirements	The Environmental Impact Statement (EIS) must comply with the assessment requirements and meet the minimum form and content requirements in sections 190 and 192 of the Environmental Planning and Assessment Regulation 2021.
Key Issues	The EIS must include an assessment of all potential impacts of the proposed development on the existing environment (including cumulative impacts if necessary) and develop appropriate measures to avoid, minimise, mitigate and/or manage these potential impacts. As part of the EIS assessment, the following matters must also be addressed: • **strategic and statutory context** – including: − a demonstration that the proposal is consistent with all relevant planning strategies, environmental planning instruments, development control plans (DCPs), or justification for any inconsistencies − a list of any approvals that must be obtained under any other Act or law before the development may lawfully be carried out. − a description of how the proposed expansion integrates with existing on-site operations − a description of any amendments to and/ or additional licence(s) or approval(s) required to carry out the proposed development. • **suitability of the site** – including: − a detailed justification that the site can accommodate the proposed processing capacity, having regard to the scope of the operations and its environmental impacts and relevant mitigation measures − plans depicting the proposed layout, including the location of pens, equipment, dams, effluent irrigation and/ or manure application areas and the like. • **air quality and odour** – including: − a quantitative assessment of the potential air quality, dust and odour impacts of the development, including cumulative impacts and impacts on adjacent residences, in accordance with relevant Environment Protection Authority guidelines − a description and appraisal of air quality and odour impact mitigation and monitoring measures. • **waste management** – including: − details of waste handling including, transport, identification, receipt, stockpiling and quality control including off-site reuse and disposal − detail of waste management including effluent and manure and disposal of dead cattle for the proposal

	- the measures that would be implemented to ensure that the proposed development is consistent with the aims, objectives and guidelines in the *NSW Waste Avoidance and Sustainable Materials Strategy 2041.* • **animal welfare, bio-security and disease management** – including: - details of how the proposed expansion would comply with relevant codes of practice and guidelines - a heat load assessment in accordance with Department of Primary Industries guidelines - details of all pest, weed and disease control measures - a detailed description of the contingency measures that would be implemented for the mass disposal of livestock in the event of disease outbreak. • **noise and vibration** – including: - a description of all potential noise and vibration sources during construction and operation, including road traffic noise - a noise and vibration assessment in accordance with the relevant Environment Protection Authority guidelines - a description and appraisal of noise and vibration mitigation and monitoring measures. • **soil and water** – including: - a description of local soils, topography, drainage and landscapes - details of water usage for the expansion including existing and proposed water licencing requirements in accordance with the *Water Act 1912* and/or the *Water Management Act 2000* - an assessment of potential impacts on floodplain and stormwater management and any impact to flooding in the catchment - details of sediment and erosion controls - a detailed site water balance - an assessment of potential impacts on the quality and quantity of surface and groundwater resources - details of the stormwater and wastewater management systems (including sewage), water monitoring program and other measures to mitigate surface and groundwater impacts from runoff from feedlot pens, effluent storage, evaporation and terminal ponds - details of sustainable effluent and manure utilisation to prevent land, groundwater or surface water pollution and potential offsite impacts - details of irrigation methods for effluent including consideration of pivot spray irrigation system to allow better control of irrigated effluent - characterisation of the nature and extent of any contamination on the site and surrounding area - a description and appraisal of impact mitigation and monitoring measures. • **hazards and risk** – including: - a preliminary risk screening completed in accordance with State Environmental Planning Policy (Resilience and Hazards) 2021, Chapter 3 and Applying SEPP 33 (DoP, 2011), with a clear indication of class, quantity and location of all dangerous goods and hazardous materials associated with the development. Should preliminary screening indicate that the project is "potentially hazardous" a Preliminary Hazard Analysis (PHA) must be prepared in accordance with Hazardous Industry Planning Advisory Paper No. 6 - Guidelines for Hazard Analysis (DoP, 2011) and Multi-Level Risk Assessment (DoP, 2011). - an assessment of bushfire risks and asset protection zones (APZ) in accordance with NSW Rural Fire Service guidelines • **traffic and transport** – including: - details of road transport routes and access to the site - road traffic predictions for the development, including cumulative impacts - an assessment of impacts to the safety and function of the road network and the details of any road upgrades required for the expansion.

	• **biodiversity** – including a description of any potential vegetation clearing needed to undertake the expansion and any impacts on flora and fauna. • **visual** – including an impact assessment at private receptors and public vantage points. • **heritage** – including Aboriginal and non-Aboriginal cultural heritage.
Environmental Planning Instruments and other policies	The EIS must assess the proposal against the relevant environmental planning instruments, including but not limited to: • State Environmental Planning Policy (Transport and Infrastructure) 2021 • (Chapter 2) • State Environmental Planning Policy (Biodiversity and Conservation) 2021 • (Chapters 2 and 3) • State Environmental Planning Policy (Primary Production) 2021 • State Environmental Planning Policy (Resilience and Hazards) 2021 (Chapters 3 and 4) • Gwydir Local Environmental Plan 2013 • relevant development control plans and section 7.11 plans.
Guidelines	During the preparation of the EIS you should consult the Department's Register of Development Assessment Guidelines which is available on the Department's website at https://www.planning.nsw.gov.au/Assess-and-Regulate/Development-Assessment/Industries. Whilst not exhaustive, this Register contains some of the guidelines, policies, and plans that must be taken into account in the environmental assessment of the proposed development.

Consultation	During the preparation of the EIS, you must consult the relevant local, State and Commonwealth government authorities, service providers and community groups, and address any issues they may raise in the EIS. In particular, you should consult with the:
	• Department of Planning and Environment, specifically the:
	  o Environment and Heritage Group (formerly Environment, Energy and Science Group)
	  o Water Group
	  o Environment Protection Authority
	• Department of Regional NSW, specifically:
	  o Department of Primary Industries – Agriculture
	• Transport for NSW
	• NSW Rural Fire Service
	• WaterNSW
	• Toomelah Local Aboriginal Land Council
	• Gwydir Shire Council
	• the surrounding landowners and occupiers that are likely to be impacted by the proposal.
	Details of the consultation carried out and issues raised must be included in the EIS.

Further consultation after 2 years	If you do not lodge an application under Section 4.12(8) of the *Environmental Planning and Assessment Act 1979* within 2 years of the issue date of these SEARs, you must consult with the Planning Secretary in relation to any further requirements for lodgement.

DOC22/388141

23 May 2022

Dept of Planning and Environment
Industry Assessments
4 Parramatta Square - 12 Darcy St
PARRAMATTA NSW 2150

Attention: Ms Zoe Halpin

BY EMAIL: Zoe.Halpin@planning.nsw.gov.au

Dear Ms Halpin,

Thankyou for your request, received on 18 May 2022, for the Environment Protection Authority's (EPA) requirements for an Environmental Impact Statement (EIS) for the proposed expansion of the existing feedlot at 2513 Getta Getta Road North Star (Lot 8 DP 756018 & Lot 1 DP 1212915) – your reference being SEAR 1687.

The EPA understands the proposal involves the expansion of an existing feedlot to increase capacity from 999 head to 3,500 head with the associated additional infrastructure to be constructed as part of the proposal.

The EPA has considered the details of the proposal as provided by the Department of Planning and Environment and has identified the information it requires to issue its general terms of approval in **Attachment A**.

In summary, the EPA's key information requirements for the proposal include an adequate assessment of:

1. **Air** - odour and dust generation and management of potential impacts on adjacent residences.
2. **Water** - water management systems and the protection of surface and groundwater from runoff from feedlot pens, effluent storage, evaporation and terminal ponds, and the application of effluent and/or manure to soils on the premises.
3. **Sustainable effluent and manure utilisation** - ensure that any proposed application to site soils are sustainable in relation to hydraulic, nutrient and salt loads to prevent land, groundwater or surface water pollution and potential offsite impacts.
4. **Irrigation Method** - provide details of irrigation methods for effluent including consideration of pivot spray irrigation system to allow better control of irrigated effluent. This may also effect the size needed for terminal ponds to capture run-off from the irrigation areas after rainfall.
5. **Noise** - proximity to sensitive receptors and the impact of any noise sources associated with the project.

6. **Disposal of mortalities** - management of mortalities under normal operating conditions and in the event of a mass death scenario, to prevent odour emissions, contain pathogens, control vermin and disease vectors, and protect surface water and groundwater from pollution.

In carrying out the assessment, the proponent should refer to the relevant guidelines as listed in **Attachment A** and any relevant industry codes of practice and best practice management guidelines. The application of principles provided in the *National Guidelines for Beef Cattle Feedlots in Australia, 3rd Edition,* Meat and Livestock Australia should also be considered by the proponent to assist in mitigating air, odour, water quality and waste (mortalities) impacts associated with the proposal.

Based on the information provided to the EPA, the proponent will require an Environment Protection Licence to construct and operate the proposed feedlot if approval is granted. The proposed expansion meets the threshold requirements specified in clause 22 – Livestock intensive industries, in Schedule 1 of the *Protection of the Environment Operations Act 1997*.

General information on licence requirements can be obtained from the EPA's Environment Line by calling 131 555 or on the EPA's website at www.epa.nsw.gov.au/licensing/licencePOEO.htm.

To assist the EPA in assessing the proposal we request that the EIS follows the format of the Department of Planning and Environment EIS guidelines and addresses the EPA's specific environmental assessment requirements outlined in the following attachments.

If the necessary information is not adequately provided in the EIS then delays in the development assessment process may occur. The Proponent should be made aware that any commitments made in the EIS may be formalised as approval conditions and may also be placed as formal licence conditions.

The Proponent should be made aware that, consistent with provisions under Part 9.4 of the *Protection of the Environment Operations Act 1997* ("the Act") the EPA may require the provision of a financial assurance and/or assurances. The amount and form of the assurance(s) would be determined by the EPA and required as a condition of an Environment Protection Licence.

In addition, and as a requirement of an Environment Protection Licence if approval is granted, the EPA will require the Proponent to prepare, test and implement a Pollution Incident Response Management Plan and/or plans in accordance with Section 153 of the Act.

If you have any questions or wish to discuss anything further, please contact me on 131 555 or via email to info@epa.nsw.gov.au, marked to my attention.

Yours sincerely

RScrivener

REBECCA SCRIVENER
Head, Regional Operations Unit
Regulatory Operations Regional – West

ATTACHMENT A: Environmental Assessment Requirements – SEARS 1687 – Doolin Farming Pty Ltd – Feedlot Expansion – Gretta Gretta Road, North Star

1. Environmental impacts of the project

1.1. The EIS must address the requirements of Section 45 of the Protection of the Environment Operations Act 1997 (POEO Act) by determining the extent of each impact and providing sufficient information to enable the EPA to determine appropriate conditions, limits and monitoring requirements for an Environment Protection Licence (EPL).

1.2. Impacts related to the following environmental issues need to be assessed, quantified and reported on:

- **Air Issues**: air quality including dust generation and odour from the operation on the surrounding landscape and/or community;
- **Noise impacts** associated with operational noise particularly machinery and plant movements;
- **Waste** including general waste and animal mortalities.
- **Water and Soils** including effluent/manure utilisation options, water quality, catchment description and premise water balance.

The Environmental Assessment (EA) should address the specific requirements outlined under each heading below and assess impacts in accordance with the relevant guidelines mentioned.

2. Licensing requirements

2.1. The development is a scheduled activity under the *Protection of the Environment Operations Act 1997* (POEO Act) and will therefore require an Environment Protection Licence (EPL) if approval is granted.

2.2. Should project approval be granted, the proponent will need to make an application to the EPA for its EPL for the proposed facility prior to undertaking any on site works. Additional information is available through the *EPA Guide to Licensing* document (www.epa.nsw.gov.au/licensing/licenceguide.htm).

SPECIFIC ISSUES

3 Air issues

3.7. The EA must demonstrate the proposal's ability to comply with the relevant regulatory framework, specifically the *Protection of the Environment Operations (POEO) Act (1997)* and the *POEO (Clean Air) Regulation (2002)*. Particular consideration should be given to section 129 of the POEO Act concerning control of "offensive odour".

3.8. The EA must include an air quality impact assessment (AQIA).

3.9. The AQIA must be carried out in accordance with the document, *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW* (2005) http://www.epa.nsw.gov.au/resources/air/ammodelling05361.pdf.

3.10. The EA must detail emission control techniques/practices that will be employed at the site and identify how the proposed control techniques/practices will meet the requirements of the POEO Act, *POEO (Clean Air) Regulation* and associated air quality limits or guideline criteria.

3.11. Odour emissions must be assessed in accordance with the *Technical Framework - Assessment and Management of Odour from Stationary Sources in NSW* and/or *Technical Notes - Assessment and Management of Odour from Stationary Sources in NSW* (DEC, 2006).

4. Noise and Vibration

The EA must assess the following noise and vibration aspects of the proposed development

4.1. Construction noise associated with the proposed development should be assessed using the *Interim Construction Noise Guideline (*DECC, 2009). These are available at:https://www.epa.nsw.gov.au/your-environment/noise/industrial-noise/interim-construction-noise-guideline

4.2. Vibration from all activities (including construction and operation) to be undertaken on the premises should be assessed using the guidelines contained in the *Assessing Vibration: a technical guideline* (DEC, 2006). These are available at: https://www.epa.nsw.gov.au/your-environment/noise/industrial-noise/assessing-vibration

4.3. If blasting is required for any reasons during the construction or operational stage of the proposed development, blast impacts should be demonstrated to be capable of complying with the guidelines contained in *Australian and New Zealand Environment Council – Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration* (ANZEC, 1990).These are available at: https://www.epa.nsw.gov.au/your-environment/noise/industrial-noise/interim-construction-noise-guideline

4.4. Operational noise from all industrial activities (including private haul roads and private railway lines) to be undertaken on the premises should be assessed using the guidelines contained in the *NSW Noise Policy for Industry* (EPA, 2017). https://www.epa.nsw.gov.au/your-environment/noise/industrial-noise/noise-policy-for-industry-(2017)

4.5. Noise on public roads from increased road traffic generated by land use developments should be assessed using the guidelines contained in the *NSW Road Noise Policy* and associated application notes (EPA, 2011).https://www.epa.nsw.gov.au/your-environment/noise/transport-noise

5 Waste, chemicals and hazardous materials and radiation

1. The EA must assess all aspects of waste generation, management and disposal associated with the proposed development.

2. The EA must demonstrate compliance with all regulatory requirements outlined in the POEO Act and associated waste regulations.

3. The EA must identify, characterise and classify the following in accordance with the EPA's *Waste Classification Guidelines (2014)* and associated addendums:
   (i) all waste that will be generated onsite through excavation, demolition or construction activities, including proposed quantities of the waste;
   (ii) all waste that is proposed to be disposed of to an offsite location, including proposed quantities of the waste and the disposal locations for the waste. This includes waste that is intended for re-use or recycling.

Note: The EPA's W*aste Classification Guidelines (2014)* and associated addendums are available at: https://www.epa.nsw.gov.au/your-environment/waste/classifying-waste

5.4. The EA must outline contingency plans for any event that may result in environmental harm, such as excessive stockpiling of material, or dirty water volumes exceeding the storage capacity available on-site.

5.5. The EA must demonstrate that appropriate spill containment will be provided for storage, filling and loading of all fuels and other chemicals to be used on site, in accordance with the relevant Australian Standard.

5.6. Provide details of how waste will be handled and managed onsite, including:

a) Stockpile location and management

- Labelling of stockpiles for identification, ensuring that all waste is clearly identified and stockpiled separately from other types of material (especially the separation of any contaminated and non-contaminated waste).
- Proposed height limits for all waste to reduce the potential for dust and odour.
- Procedures for minimising the movement of waste around the site and double handling.
- Measures to minimise leaching from stockpiles into the surrounding environment, such as sediment fencing, geofabric liners and hardstands.

b) Mortality disposal arrangements

- Define disposal methods and locations for normal operations and possible mass death scenarios.
- Procedures for preventing the spread of pathogens or disease.
- Measures for protecting surface and/or groundwaters from pollution.
- Measures to prevent offensive odour generated by mortality disposal.
- Measures to control or prevent vermin and disease vectors.

5.7. The proponent should provide details of:

- how leachate from stockpiled waste material will be kept separate from stormwater runoff;
- treatment of leachate through a wastewater treatment plant (if applicable); and
- any proposed transport and disposal of leachate off-site.

6 Water and Soils

6.1. The EA must demonstrate how the proposed development will meet the requirements of section 120 of the POEO Act.

6.2. The EA must include a water balance for the development including water requirements (quantity, quality and source(s)) and proposed storm and wastewater disposal, including type, volumes, proposed treatment and management methods and re-use options.

6.3. If the proposed development intends to discharge waters to the environment, the EA must demonstrate how the discharge(s) will be managed in terms of water quantity, quality and frequency of discharge and include an impact assessment of the discharge on the receiving environment. This should include:

- Description of the proposal including position of any intakes and discharges, volumes, water quality and frequency of all water discharges.

- Description of the receiving waters including upstream and downstream water quality as well as any other water users.

- Demonstration that all practical options to avoid discharge have been implemented and environmental impact minimised where discharge is necessary.

6.4. The EA must include an assessment of potential impacts on soil and land resources, being guided by *Soil and Landscape Issues in Environmental Impact Assessment* (DLWC 2000). The nature and extent of any significant impacts should be identified. Mitigation and management options to minimise identified soil and land resource impacts should be described.

6.5. The EA must refer to Water Quality Objectives for the receiving waters and indicators and associated trigger values or criteria for the identified environmental values of the receiving environment. This information should be sourced from the ANZECC (2000) Guidelines for Fresh and Marine Water Quality (http://www.environment.gov.au/water/policy-programs/nwqms/).

6.6. The EA must describe how stormwater will be managed in all phases of the project, including details of how stormwater and runoff will be managed to minimise pollution. Information should include measures to be implemented to minimise erosion, leachate and sediment mobilisation at the site. The EA should consider the guidelines *Managing urban stormwater: soils and construction,* vol. 1 (Landcom 2004) and vol. 2 (A. Installation of services; B. Waste landfills C. Unsealed roads; D. Main Roads; E. Mines and quarries) (DECC, 2008).

6.7. Erosion, sediment and leachate control measures to be implemented to minimise erosion, leachate and sediment mobilisation at the site during construction and operation phases of the project. The EA should show the location of each measure to be implemented. Include such control measures such as:

- Sediment traps
- Diversion banks
- Sediment fences
- Bunds (earth, hay, mulch)
- Geofabric liners
- Other control measures as appropriate.

6.8. Assessment undertaken of the design of terminal pond systems to manage stormwater runoff (and if applicable tailwater) from any proposed effluent utilisation area to minimise water quality impacts on the nearest watercourses.

6.9. Discharges from the site must be characterised with respect to their location, frequency, volume and likely water quality.

6.10. The controlled drainage area including feedlot pens, manure stockpile/composting areas, catch drains, sedimentation and effluent storage/evaporation ponds and terminal pond systems must be protected from inundation during floods with an average recurrence interval of up to 1 in 100 years.

6.11. Feedlot pen surfaces and manure stockpile/composting areas and the walls and bases of any catch drains, sedimentation, effluent holding/evaporation/terminal ponds must incorporate an impermeable liner. Acceptable impermeable liners include:

- a clay or modified soil liner of at least 900mm of recompacted clay with an in-situ permeability (K) of less than 1 x 10-9 m/s.
- A natural geological barrier that is established by geotechnical investigations to provide a secure barrier between the groundwater, soil and substrata equivalent to the 900 mm recompacted clay liner above.

6.12. If the proposal incorporates effluent or manure application/utilisation to cropping lands on the premises, an assessment of the sustainability of these utilisation practices must be provided. The assessment must be undertaken in accordance with the *Environmental Guidelines for the Use of Effluent by Irrigation* (DEC, 2004).

The assessment must identify soil constraints where applicable to the application of manures and/or effluent and include nutrient balance and salt management assessments. Maps of proposed manure and/or effluent application areas must be provided in the EA.

6.13. The EA must describe any water quality monitoring programs to be carried out at the project site. Water quality monitoring should be undertaken in accordance with the *Approved Methods for the Sampling and Analysis of Water Pollutant in NSW* (2004) which is available at:
http://www.epa.nsw.gov.au/resources/legislation/approvedmethods-water.pdf.

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Our ref: DOC22/397528
Your ref: SEAR1687

Zoe Halpin
Planning Officer
Industry Assessments
Department of Planning and Environment
Zoe.halpin@planning.nsw.gov.au

23 May 2022

Dear Ms Halpin

Feedlot (cattle feedlot expansion) – 2513 Getta Getta Rd, North Star (Lot 8 DP 756018 & Lot 1 DP 1212915)

I refer to your email dated 18 May 2022 seeking input into the Department of Planning and Environment's Environmental Assessment Requirements (EARs) for the preparation of an Environmental Impact Assessment (EIS) for Feedlot (cattle feedlot expansion), 2513 Getta Getta Road, North Star.

The Biodiversity, Conservation and Science Directorate (BCS) has considered your request and provides EARs for the proposed development in **Attachments A** and **B**.

BCS recommends the EIS needs to appropriately address the following:

1. Biodiversity and offsetting
2. Water and soils
3. Flooding

If you have any questions about this advice, please do not hesitate to contact Michelle Howarth, Senior Conservation Planning Officer, via michelle.howarth@environment.nsw.gov.au or (02) 6883 5339.

Yours sincerely,

Samantha Wynn

Samantha Wynn
Senior Team Leader Planning North West
Biodiversity, Conservation and Science Directorate

23 May 2022

Attachment A - Environmental Assessment Requirements

Attachment B - Guidance Material

ATTACHMENT A

BCS's Recommended Environmental Assessment Requirements (EARs) for Feedlot (expansion)

BCS	Biodiversity, Conservation and Science Directorate of the NSW Department of Planning and Environment
The Department	NSW Department of Planning and Environment
NPWS	National Parks and Wildlife Service

1. The Proposal

All components of the proposed development must be clearly described, including:

- the location of the proposed development and its context in the locality
- the rationale for the project
- the size, scale and type of the proposed development
- the pre-construction, construction, operational, and, where relevant, decommissioning and rehabilitation phases of the proposed development, and the methods proposed to implement these phases
- plans and maps of the proposed development showing the locations of relevant phases and infrastructure
- the staging and timing of the proposed development
- the proposed development's relationship to any other proposals and developments

2. Environmental Impacts of the Proposal

The proponent must consider, assess, quantify and report on the likely environmental impacts of the proposal if applicable, particularly:

- Biodiversity
- National Park estate: land reserved or acquired under the *National Parks and Wildlife Act 1974*
- Flooding and floodplain issues
- Cumulative impacts

The Secretary's Environmental Assessment Requirements should address the specific requirements outlined under each heading below and assess impacts in accordance with the relevant guidelines mentioned.

A full list of guidelines and reference material is presented in **Attachment B**. Appropriate justification should be provided in instances where the matters below are not addressed.

3. Biodiversity

Biodiversity Assessment Methodology for the Biodiversity Offsets Scheme (BOS)

The EIS should include an assessment of the following:

a. The EIS must assess the impact of the proposed development on biodiversity values to determine if the proposed development is "likely to significantly affect threatened species"

for the purposes of Section 7.2 of the Biodiversity Conservation Act 2016 (BC Act), as follows:

a. The EIS must demonstrate and document how the proposed development exceeds, or does not exceed, the biodiversity offsets scheme threshold as set out in Section 7.4 of the BC Act 2016 and Clause 7.1 of the Biodiversity Conservation Regulation 2017 (BC Regulation) by determining whether the proposed development involves:

   i. **The clearing of native vegetation exceeding the thresholds** listed under Clause 7.23 of the BC Regulation, **or**

   ii. The clearing of native vegetation, or other action, **on land included on the Biodiversity Values Map** published under Clause 7.23 of the BC Regulation (this map includes areas of outstanding biodiversity value, as declared under Section 3.1 of the BC Act).

b. If the proposal does not trigger any of the criteria in (a) above, then the EIS must determine whether the proposed development is likely to have a significant impact based on '*the test for determining whether proposed development likely to significant affect threatened species or ecological communities'* in Section 7.3 of the BC Act.

c. Where there is reasonable doubt regarding potential impacts, or where information is not available, then a significant impact upon biodiversity should be considered likely when applying the test in Section 7.3 of the BC Act. Where it is concluded that there is no significant impact, the EIS must justify how the conclusion has been reached.

d. If the development exceeds the thresholds in (a) or (b), then the EIS must be accompanied by a biodiversity development assessment report (BDAR) prepared in accordance with Part 6 of the BC Act. That is, the Biodiversity Assessment Methodology applies.

Required Information

Where development is considered "likely to significantly impact on threatened species" and a Biodiversity Development Assessment Report is required, the following requirements apply:

- Biodiversity impacts related to the proposal are to be assessed in accordance with the Biodiversity Assessment Method 2020 and documented in a Biodiversity Development Assessment Report (BDAR). The BDAR must include information in the form detailed in the *Biodiversity Conservation Act 2016* (s6.12), Biodiversity Conservation Regulation 2017 (s6.8) and Biodiversity Assessment Method.

- The BDAR must document the application of the avoid, minimise and offset hierarchy including assessing all direct, indirect, uncertain and prescribed impacts in accordance with the Biodiversity Assessment Method.

- The BDAR must include details of the measures proposed to address the offset obligation as follows:
    - The total number and classes of biodiversity credits required to be retired for the proposal.
    - The number and classes of like-for-like biodiversity credits proposed to be retired.
    - The number and classes of biodiversity credits proposed to be retired in accordance with the variation rules.
    - Any proposal to fund a biodiversity conservation action.
    - Any proposal to make a payment to the Biodiversity Conservation Fund.

- If seeking approval to use the variation rules, the BDAR must contain details of the reasonable steps that have been taken to obtain requisite like-for-like biodiversity credits.

The BDAR must be prepared by a person accredited to apply the Biodiversity Assessment Method under s6.10 of the *Biodiversity Conservation Act 2016*.

NOTE – A BDAR template and guidance document has been created to assist accredited assessors to prepare a BDAR. It has been developed in accordance with best practice, the minimum information requirements and to support BDAR reviewers. The BDAR Template can be found here and the Guidance for the BDAR Template can be found here.

Where a BDAR is not required and a threatened species assessment is prepared to support a conclusion of "no significant impact", the EIS must include a field survey of land identified as native vegetation and/or native species habitat inclusive of non-vegetative habitat, namely, karst, caves, crevices, cliffs, rocky outcrops and other features of geological significance and habitat associated with human made structures. This should be conducted and documented in accordance with the relevant guidelines including the Threatened Species Survey and Assessment Guidelines: Field Survey Methods for Fauna – Amphibians (DECCW, 2009), Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities - Working Draft (DEC, 2004) and Guidelines for Threatened Species Assessment (Dept Planning, July 2005). The approach should also reference the field survey methods and assessment information on the Department of Planning, Industry and Environment website including the BioNet Atlas, Threatened Species Profiles, taxon specific survey guidelines and BioNet Vegetation Classification (see Attachment 2).

Category 1 – exempt land
Clearing of native vegetation on land that meets the definition of Category 1 - exempt land (as defined under the Local Land Services Act 2013 (LLS Act)) does not require assessment or offsetting under the Biodiversity Conservation Act 2016. Prescribed impacts as outlined in chapter 6 of the Biodiversity Assessment Method (2020) must still be considered on Category 1 - exempt land. In addition, potential impacts to Matters of National Environmental Significance under the Environment Protection and Biodiversity Conservation Act 1999 on Category 1 – exempt land must be considered. Section 60F Local Land Services Act 2013 (LLS Act) Act provides the transitional arrangements that are in place until a comprehensive NVR Map with all the land categories is published. During the 'transitional period' assessors can make a reasonable approximation of land categorisation for unpublished layers, in consultation with the landholder. Where a reasonable approximation is required, it is recommended that: • assessors first identify whether land meets criteria for Category 2 - Regulated Land, prior to Category 1 - Exempt Land. o In some circumstances, land may meet multiple map criteria i.e. criteria for Category 2 - Regulated Land, AND Category 1 - Exempt Land o In most circumstances' Category 2 - Regulated Land criteria will determine the categorisation of the land, rather than Category 1 - Exempt Land criteria. Section 60I of the LLS Act defines the criteria in which land can be classified as Category 2 Regulated Land, this includes land which: • was not cleared of native vegetation as at 1 January 1990; • was unlawfully cleared of native vegetation between 1 January 1990 and 25 August 2017; • contains native vegetation that was grown or preserved with the assistance of public funds (other than funds for forestry purposes); • contains grasslands that are not low conservation grasslands; • is subject to a private land conservation agreement;

- is a 'set aside' under a Land Management (Native Vegetation) Code;
- is an offset under a property vegetation plan or a set aside under the former native vegetation laws;
- is subject to an approved conservation measure that was the basis for other land being biocertified;
- is identified as coastal wetlands or littoral rainforest;
- is identified as koala habitat;
- is a declared RAMSAR wetland; or
- is mapped as containing Critically Endangered species of plants or a Critically Endangered Ecological Community

The above criteria are inclusive of both Category 2 Vulnerable Regulated Land and Sensitive Regulated Land categories.

Where an assessor identifies land that does not meet the criteria for Category 2 Vulnerable or Sensitive Regulated land, the assessor should then assess whether or not the land meets the definition of Category 1 – exempt land.

Where the assessor identifies land as Category 1 – exempt land it must be adequately demonstrated that the identified land meets the criteria as set out in section 60H of the LLS Act. Multiple pieces of evidence should be used to demonstrate a Category 1 – exempt land designation. This might include:

- Publicly available data sets on the SEED data portal, such as:
  - Land use mapping – used to identify and map existing and historical agricultural land use in NSW – see the 2017 landuse map
  - Woody vegetation extent – used to identify and map native vegetation extent – see 2008 Woody extent 2011 woody extent
  - State-wide Landcover and Tree Survey (SLATS) woody clearing for NSW – used to identify detectable clearing events since January 1990 – available here
- Published information on the Native Vegetation Regulatory Map, including Category 2-sensitive regulated, Category 2-vulnerable regulated, and excluded land - available here
- Site-based information and records, including:
  - Current and historical high-resolution aerial photography
  - current and historical photographs of the subject land
  - historical land management records maintained by the landowner
  - vegetation survey data collected on the subject land
  - documentation demonstrating history of authorised clearing and/or development

The published *Native Vegetation regulatory map: method statement* should be reviewed to determine how the datasets can be best interrogated to support any identification of Category 1 – exempt land.

Where there is uncertainty or datasets/information are conflicting, a precautionary approach should be applied and the land should be categorised as Category 2 – regulated land.

Where Category 1 – exempt land is likely to be present on a development site, early engagement with BCS is encouraged. Prior to the Biodiversity Development Assessment Report being submitted to the consent authority, the accredited assessor should submit a proposed land categorisation method to the BCS North West Planning team at *rog.nw@environment.nsw.gov.au* for endorsement.

4. NPWS Managed Estate

Land reserved or acquired under the *National Parks and Wildlife Act 1974* (NPW Act)

If the proposed development is within, adjacent to, or in close proximity to, NPWS managed conservation estate (e.g. a national park, nature reserve, state conservation area, land which is declared wilderness under the *Wilderness Act 1987*), or is within, adjacent to, or in close proximity to, a watercourse that flows directly into NPWS managed conservation estate, then the EIS must address impacts upon such area/s.

Where NPWS managed estate is likely to be impacted, the EIS should include:

- The following (as appropriate):
  - Evidence that the proponent has consulted with BCS on the legal permissibility of the proposal under the NPW Act.
  - In the case of proposals on land declared as wilderness under the *Wilderness Act 1987*, evidence that the proponent has consulted with BCS on the appropriateness of the proposal. That is, whether it is consistent with the objects of the *Wilderness Act 1987* (section 3) and the management principles for wilderness areas (section 9).
  - Alternative options that have been explored to avoid impacts on the NPWS managed estate (on-park) and a clear justification of any on-park components of the proposal.
  - If on-park impacts are considered unavoidable, consideration of the issues, including details of any compensation proposal, consistent with the Department's *Revocation, Recategorisation and Road Adjustment Policy* (2012) for proposals that are located wholly or partly in a National Park or other land acquired or reserved under the *National Parks and Wildlife Act 1974*.
- Consideration of the matters identified in the *Guidelines for consent and planning authorities for Developments adjacent to National Parks and Wildlife Service Land* (NPWS, 2020) where a proposal adjoins or is immediate vicinity of NPWS managed estate, or is upstream of NPWS managed estate, which include:
  - The nature of the impacts, including direct and indirect impacts
  - The extent of the direct and indirect impacts
  - The duration of the direct and indirect impacts
  - The objectives of the reservation of the land
- A description of the mitigation and management options that will be used to prevent, control, abate or minimise identified direct and indirect impacts associated with the proposal. This should include an assessment of the effectiveness and reliability of the measures and any residual impacts after these measures are implemented.

5. Water

- The EIS must map features relevant to water, including:
  - Rivers, streams, estuaries (as described in s4.2 of the Biodiversity Assessment Method).
  - Wetlands (as described in s4.2 of the Biodiversity Assessment Method).
  - Groundwater.
  - Groundwater dependent ecosystems.
- The EIS must describe background conditions for any water resource likely to be affected by the proposal, including:
  - Existing surface and groundwater.
  - Hydrology

    - Water Quality Objectives (as endorsed by the NSW Government) including groundwater as appropriate that represent the community's uses and values for the receiving waters. Indicators and trigger values/criteria for the identified environmental values in accordance with the ANZECC (2000) *Guidelines for Fresh and Marine Water Quality* and / or local objectives, criteria or targets endorsed by the NSW Government
    - *Risk-based Framework for Considering Waterway Health Outcomes in Strategic Land-use Planning Decisions* (OEH/EPA, 2017).

- The EIS must assess the impacts of the proposal on water quality, including:
    - The nature and degree of impact on receiving waters for both surface and groundwater, demonstrating how the proposal protects the Water Quality Objectives where they are currently being achieved, and contributes towards achievement of the Water Quality Objectives over time where they are currently not being achieved. This should include an assessment of the mitigating effects of proposed stormwater and wastewater management during and after construction.
    - Identification of proposed monitoring of water quality.
    - Consistency with any relevant certified Coastal Management Program (or Coastal Zone Management Plan).

- The EIS must assess the impact of the proposal on hydrology, including:
    - Water balance including quantity, quality and source.
    - Effects upon rivers, wetlands, estuaries, marine waters and floodplain areas.
    - Effects upon water-dependent fauna and flora including groundwater dependent ecosystems.
    - Impacts to natural processes and functions within rivers, wetlands, estuaries and floodplains that affect river system and landscape health such as nutrient flow, aquatic connectivity and access to habitat for spawning and refuge (e.g. river benches).
    - Changes to environmental water availability, both regulated / licensed and unregulated / rules-based sources of such water.

6. Flooding

- The EIS must map the following features relevant to flooding as described in the Floodplain Development Manual 2005 (NSW Government 2005) including:
    - Flood prone land (ie land susceptible to the probable maximum flood event).
    - Flood planning area, the area below the flood planning level.
    - Hydraulic categorisation (floodway and flood storage areas).
    - Flood hazard.

- The EIS must describe flood assessment and modelling undertaken in determining the design flood levels for events, including a minimum of the 10% Annual Exceedance Probability (AEP), 1% AEP flood levels and the probable maximum flood, or an equivalent extreme event.

- The EIS must model the effect of the proposal (including fill) on the current flood behaviour for a range of design events as identified above, and the 0.5% AEP and 0.2% AEP year flood events as proxies for assessing sensitivity to an increase in rainfall intensity of flood producing rainfall events due to climate change.

- All site drainage, stormwater quality devices and erosion / sedimentation control measures should be identified in the EIS and the onsite treatment of stormwater and effluent runoff and predicted stormwater discharge quality from the proposal should be detailed.

- Modelling in the EIS must consider and document:
    - Existing council flood studies in the area and examine consistency to the flood behaviour documented in these studies.

- The impact on existing flood behaviour for a full range of flood events including up to the probable maximum flood (PMF), or an equivalent extreme flood.
- Impacts of the proposal on flood behaviour resulting in detrimental changes in potential flood affection of other developments or land. This may include redirection of flow, flow velocities, flood levels, hazard categories and hydraulic categories.
- Impacts of earthworks and stockpiles within the flood prone land up to the PMF level. The assessment should be based on understanding of cumulative flood impacts of construction and operational phases.
- Relevant provisions of the NSW Floodplain Development Manual 2005.

- The EIS must assess the impacts on the proposal on flood behaviour, including:
  - Whether there will be detrimental increases in the potential flood affectation of other properties, assets and infrastructure.
  - Consistency with Council floodplain risk management plans.
  - Consistency with any Rural Floodplain Management Plans.
  - Compatibility with the flood hazard of the land.
  - Compatibility with the hydraulic functions of flow conveyance in floodways and storage in flood storage areas of the land.
  - Whether there will be adverse effect to beneficial inundation of the floodplain environment, on, adjacent to or downstream of the site.
  - Whether there will be a direct or indirect increase in erosion, siltation, destruction of riparian vegetation or a reduction in the stability of river banks or watercourses.
  - Appropriate mitigation measures to offset potential flood risk arising from the proposal. Any proposed mitigation work should be modelled and assessed on the overall catchment basis in order to ensure it fits its purpose and meets the criteria of the Council where it is located, and to ensure it has no adverse impact to surrounding areas.
  - Any impacts the proposal may have upon existing community emergency management arrangements for flooding. These matters are to be discussed with the NSW SES and Council.
  - Whether the proposal incorporates specific measures to manage risk to life from flood. These matters are to be discussed with the NSW SES and Council.
  - Emergency management, evacuation and access, and contingency measures for the proposal during both construction and operational phases considering the full range of flood risk (based upon the probable maximum flood or an equivalent extreme flood event). These matters are to be discussed with and have the support of Council and the NSW SES.
  - Any impacts the proposal may have on the social and economic costs to the community as a consequence of flooding.

Guidance Material

Title	Web address
	Relevant Legislation
Biodiversity Conservation Act 2016	*https://www.legislation.nsw.gov.au/view/html/inforce/current/act-2016-063*
Commonwealth Environment Protection and Biodiversity Conservation Act 1999	*https://www.legislation.gov.au/Details/C2014C00140/Download*
Environmental Planning and Assessment Act 1979	*https://www.legislation.nsw.gov.au/view/html/inforce/current/act-1979-203*
Fisheries Management Act 1994	*https://www.legislation.nsw.gov.au/view/html/inforce/current/act-1994-038*
National Parks and Wildlife Act 1974	*https://www.legislation.nsw.gov.au/view/html/inforce/current/act-1974-080*
Protection of the Environment Operations Act 1997	*https://www.legislation.nsw.gov.au/view/html/inforce/current/act-1997-156*
Water Management Act 2000	*https://www.legislation.nsw.gov.au/view/html/inforce/current/act-2000-092*
Wilderness Act 1987	*https://www.legislation.nsw.gov.au/view/html/inforce/current/act-1987-196*
	Biodiversity
Biodiversity Values Map	*https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=BVMap*
Biodiversity Assessment Method (OEH, 2020)	*https://www.environment.nsw.gov.au/research-and-publications/publications-search/biodiversity-assessment-method-2020*
Biodiversity Development Assessment Report Template	*https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Biodiversity/biodiversity-development-assessment-report-template-220210.docx?la=en&hash=1A4829C7ACA5A51ECE414A767C27361893706CEC*
Guidance for the Biodiversity Development Assessment Report Template	*https://www.environment.nsw.gov.au/research-and-publications/publications-search/guidance-for-the-biodiversity-development-assessment-report-template*
Changes to the Biodiversity Assessment Method from 2017 to 2020	*https://www.environment.nsw.gov.au/research-and-publications/publications-search/changes-to-the-biodiversity-assessment-method-from-2017-to-2020*
BAM 2020 Operational Manual Stage 1	*https://www.environment.nsw.gov.au/research-and-publications/publications-search/biodiversity-assessment-manual-2020-operational-manual-stage-1*
BAM Operational Manual Stage 2	*https://www.environment.nsw.gov.au/research-and-publications/publications-search/biodiversity-assessment-method-operational-manual-stage-2*

Title	Web address
BAM 2020 Operational Manual Stage 3	*https://www.environment.nsw.gov.au/research-and-publications/publications-search/biodiversity-assessment-method-operational-manual-stage-3*
BAM Calculator User Guide	*https://www.environment.nsw.gov.au/research-and-publications/publications-search/biodiversity-assessment-method-user-guide*
Serious and irreversible impacts of development on biodiversity	*https://www.environment.nsw.gov.au/topics/animals-and-plants/biodiversity/biodiversity-offsets-scheme/serious-and-irreversible-impacts*
Practice Note - Guidance for assessors and decision makers in applying modified benchmarks to assessments of vegetation integrity: Biodiversity Assessment Method	*https://www.environment.nsw.gov.au/research-and-publications/publications-search/guidance-assessors-decision-makers-applying-modified-benchmarks-to-assessments-vegetation-integrity*
Guidance and Criteria to assist a decision maker to determine a serious and irreversible impact (OEH, 2017)	*https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Biodiversity/guidance-decision-makers-determine-serious-irreversible-impact-190511.pdf*
Accreditation Scheme for Application of the Biodiversity Assessment Method Order 2017	*https://www.legislation.nsw.gov.au/view/pdf/asmade/sl-2017-471*
Ancillary rules: Biodiversity conservation actions	*https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Biodiversity/ancillary-rules-biodiversity-conservation-actions-170496.pdf*
Ancillary rules: Reasonable steps to seek like-for-like biodiversity credits for the purpose of applying the variation rules	*https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Biodiversity/ancillary-rules-reasonable-steps-like-for-like-biodiversity-credits-170498.pdf*
Ancillary rules: Impacts on threatened species and ecological communities excluded from application of variation rules	*https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Biodiversity/ancillary-rules-impacts-on-threatened-entities-excluded-from-variation-170497.pdf?la=en&hash=C38840BFF49F012433532DF72E3D90C741E4DAC1*
The Department's Threatened Species Website	*https://www.environment.nsw.gov.au/topics/animals-and-plants/threatened-species*
NSW BioNet (Atlas of NSW Wildlife)	*www.bionet.nsw.gov.au/*
Surveying Threatened Plants and their Habitats - NSW Survey Guide For The Biodiversity Assessment Method (DPIE 2020).	*https://www.environment.nsw.gov.au/research-and-publications/publications-search/surveying-threatened-plants-and-their-habitats-survey-guide-for-the-biodiversity-assessment-method*
Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities - November 2004	*https://www.environment.nsw.gov.au/surveys/BiodiversitySurveyGuidelinesDraft.htm*
Threatened species survey and assessment guidelines: field survey methods for fauna – amphibians	*https://www.environment.nsw.gov.au/research-and-publications/publications-search/threatened-species-field-survey-methods-for-fauna-amphibians*

Title	Web address
NSW Survey Guide for Threatened Frogs	*https://www.environment.nsw.gov.au/research-and-publications/publications-search/nsw-survey-guide-for-threatened-frogs*
Surveying 'species credit' threatened bats and their habitats – NSW survey guide for the Biodiversity Assessment Method	*https://www.environment.nsw.gov.au/research-and-publications/publications-search/species-credit-threatened-bats-nsw-survey-guide-for-biodiversity-assessment-method*
Bat calls of NSW - region-based guide to the echolocation calls of Microchiropteran bats	*https://www.environment.nsw.gov.au/surveys/Batcalls.htm*
Community Biodiversity Survey Manual	*https://www.environment.nsw.gov.au/surveys/CommunityBiodiversitySurveyManual.htm*
BioNet Vegetation Classification - NSW Plant Community Type (PCT) database	*www.environment.nsw.gov.au/research/Vegetationinformationsystem.htm*
The Departments Data Portal (access to online spatial data)	*http://data.environment.nsw.gov.au/*
Fisheries NSW policies and guidelines	*https://www.dpi.nsw.gov.au/fishing/habitat/publications/pubs/fish-habitat-conservation*
National Park Estate	
Guidelines for consent and planning authorities for Developments adjacent to National Parks and Wildlife Service Land (NPWS, 2020)	*https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Parks-reserves-and-protected-areas/Development-guidelines/developments-adjacent-npws-lands-200362.pdf*
List of national parks	*https://www.nationalparks.nsw.gov.au/conservation-and-heritage/national-parks*
Revocation, recategorisation and road adjustment policy (OEH, 2012)	*http://www.environment.nsw.gov.au/policies/RevocationOfLandPolicy.htm*
List of aquatic reserves	*www.dpi.nsw.gov.au/fisheries/habitat/protecting-habitats/mpa*
Water	
Water Quality Objectives	*http://www.environment.nsw.gov.au/ieo/index.htm*
ANZECC & ARMCANZ (2000) Water Quality Guidelines	*https://www.waterquality.gov.au/anz-guidelines/resources/previous-guidelines/anzecc-armcanz-2000*
Risk-based Framework for Considering Waterway Health Outcomes in Strategic Land-use Planning Decisions	*http://www.environment.nsw.gov.au/research-and-publications/publications-search/risk-based-framework-for-considering-waterway-health-outcomes-in-strategic-land-use-planning*
Applying Goals for Ambient Water Quality Guidance for Operations Officers – Mixing Zones	*http://deccnet/water/resources/AWQGuidance7.pdf*
Approved Methods for the Sampling and Analysis of Water Pollutant in NSW (2004)	*http://www.environment.nsw.gov.au/resources/legislation/approvedmethods-water.pdf*
Flooding	
Floodplain development manual	*http://www.environment.nsw.gov.au/floodplains/manual.htm*

Title	Web address
Floodplain Risk Management Guidelines	*http://www.environment.nsw.gov.au/topics/water/coasts-and-floodplains/floodplains/floodplain-guidelines*
NSW Climate Impact Profile	*http://climatechange.environment.nsw.gov.au/*
Climate Change Impacts and Risk Management	*https://www.environment.gov.au/climate-change/adaptation/publications/climate-change-impact-risk-management*

Appendix B.2

Consultation with Gwydir Shire Council

Rod Davis

From: Patsy Cox <pcox@gwydir.nsw.gov.au>
Sent: Friday, 28 January 2022 3:56 PM
To: Rod Davis
Subject: RE: Proposed expansion of Springfield feedlot - North Star

Good Afternoon Rod

Generally, yes the DPIE would contact us. But just in case they don't
We will be looking particularly for Odour assessment, Traffic Impact Assessment, any Biodiversity Assessment (or Threatened Species Test of Significance, if needed), Adequate capture treatment of onsite waste/stormwater (Contained Drainage Area-Sediment pond/s-evaporation trenchs etc), Contamination of soil, surface water and ground water, Compliance with MLA guidelines for construction and operation of a feedlot, any proposed composting of manure onsite and subsequent use on crops and any irrigation of effluent, adequate primary and secondary water supplies for the feedlot, compliance with s94 Development Control Plan – Traffic Generating Development, Noise & Dust impacts on sensitive receivers, Pest & Vermon Management, any intention to background cattle prior to being placed into the feedlot. That's all I can think of at the moment hope this helps.

Will the Development be a true staged development under Division 4.4 of EP&A Act?

Cheers

Patsy Cox

Planning Officer
Email: pcox@gwydir.nsw.gov.au
Phone: 02 6724 2000
Mobile: 0418 579 538

Please note I work the following days from 8:00am-12:30pm & 1:00pm-5:15pm

Monday	Tuesday	Wednesday	Thursday	Friday
In	In	-	In	In

From: Rod Davis <rod.davis@rdcengineers.com.au>
Sent: Thursday, 27 January 2022 10:47 AM
To: Patsy Cox <pcox@gwydir.nsw.gov.au>
Cc: 'Angus Doolin' <angusdoolin8@bigpond.com>
Subject: Proposed expansion of Springfield feedlot - North Star

Good morning Patsy

I act on behalf of the applicant Doolin Farming Pty Ltd in relation to the above matter.

Doolin Farming Pty Ltd wish to expand their existing feedlot on the property "Springfield" from 999 head to 3500 head in two stages.

As I understand, an application for a >1000 head development would be designated development and require the preparation of an EIS. The proposed development if approved would also require a EPA licence and therefore be integrated development as well.

As the proposed development is designated development this would require preparation and submission to DPIE for a "Request for the Planning Secretary's Requirements for the preparation of an Environmental Impact Statement".

The proposed construction value of the proposed development would be less than $20M so Gwydir Shire would decide the application.

I shall prepare and submit to DPIE a Request for the Planning Secretary's Requirements for the preparation of an Environmental Impact Statement.

I assume DPIE shall contact Council to obtain Council's requirements for the EIS.

I attach a copy of the proposed development layout.

Regards,

Rod Davis
Director
—
0427629203
rod.davis@rdcengineers.com.au

RDC ENGINEERS | AGRICULTURAL ENVIRONMENTAL PROJECT MANAGEMENT

Rod Davis

From: Rod Davis <rod.davis@rdcengineers.com.au>
Sent: Tuesday, 16 April 2024 8:45 AM
To: 'Patsy Cox'; 'Alex Eddy'
Cc: 'Saul Standerwick'
Subject: RE: EIS Consultation - Proposed expansion of beef cattle Feedlot - Doolin Farming Pty Ltd - 2513 Getta Getta Rd, North Star - L8 DP756018 & L21 DP1212915

Thankyou Patsy,

Alex - I am also requesting the current classification of Getta Getta Road under council's road classification / hierarchy system and associated AADT capacity and existing seal width and pavement width.

I understand it has recently been sealed.

Regards,

Rod Davis
Director
—
0427629203
rod.davis@rdcengineers.com.au

RDC ENGINEERS | AGRICULTURAL ENVIRONMENTAL PROJECT MANAGEMENT

From: Patsy Cox <pcox@gwydir.nsw.gov.au>
Sent: Monday, April 15, 2024 12:53 PM
To: Rod Davis <rod.davis@rdcengineers.com.au>
Cc: Alex Eddy <aeddy@gwydir.nsw.gov.au>; Saul Standerwick <sstanderwick@gwydir.nsw.gov.au>
Subject: RE: EIS Consultation - Proposed expansion of beef cattle Feedlot - Doolin Farming Pty Ltd - 2513 Getta Getta Rd, North Star - L8 DP756018 & L21 DP1212915

Good Morning Rod

I have reviewed your summary of the proposed expansion of the Springfield Feedlot from 999 to 3500 Head.

You have requested that Council provide some information to you regarding the following:

1. any specific parts of the DCP that may relate to the proposed development – Gwydir does not have a Development Control Plan (DCP)
2. The minimum design standards for the proposed new entrance off Getta Getta Road – Minimum Design standards got the construction of the access and any road pavement within the Getta Getta Road reserve shall be designed with an appropriate site distances, width of pavement, surface and turning area for the access and egress of B-Doubles and Type A Road Trains as specified in the Austroad standards. The design of the proposed new access/egress point off Getta Getta Road will need to be submitted to and approved by Council prior to its construction under s138 of the Roads Act 1993. Please also provide details of roadside vegetation to be removed (if any).
3. Under the Private & Personal Information Protection Act 1998, Council is unable to provide a list of landowners and occupiers that would likely be impacted, but we are able to pass on any written form

of pre-development landholders consultation on the behalf of the development (at cost). Please note that there will be the mandatory 28 days Exhibition and notification period once the DA has been lodged that will also apply to the development. Generally, neighbouring landholders and those along the Council roads to be used as part of the haulage route would be notified in writing prior to the 28-day notification/exhibition period.

Base on the summary you have provided I would like further clarification in the EIS regarding the following:

1. Provide clarification of the location/flow of 1st and 2nd Order Stream as mentioned in the *Waterways* section on Page 5 of the summary.
2. There appears to be no increase in the size of the holding ponds or sediment terrace, please confirm that the existing ponds are of an existing capacity to ensure that failure does not occur due to the increase in cattle numbers.
3. Will any fodder or other feed supplies be stored and trucked in from other properties owned by the proponent (eg. Myall Downs) as part of the feedlot operations? And if so have these truck movements been accounted for in the Traffic Impact Assessment and which roads will be used for this haulage.

I am pretty happy with the rest. If you would like to undertake pre-DA lodgement consultation, please contact me and we can work out how to undertake it.
I look forward to the DA coming in so it can be assessed and determined.

Cheers

Patsy Cox
Planning Officer
Email: pcox@gwydir.nsw.gov.au
Phone: 02 6729 3022
Mobile: 0418 579 538

Please note I work the following days
from 8:00am-12:30pm & 1:00pm-5:15pm

Monday	Tuesday	Wednesday	Thursday	Friday
In	In	-	In	In

From: Rod Davis <rod.davis@rdcengineers.com.au>
Sent: Monday, April 15, 2024 9:08 AM
To: Patsy Cox <pcox@gwydir.nsw.gov.au>; Gwydir Mail <mail@gwydir.nsw.gov.au>
Subject: FW: EIS Consultation - Proposed expansion of beef cattle Feedlot - Doolin Farming Pty Ltd - 2513 Getta Getta Rd, North Star - L8 DP756018 & L21 DP1212915

[External Email] This email was sent from outside of Gwydir Shire Council – be cautious, particularly with links and attachments.

Good morning Patsy

I don't believe I have received a response to the request below.

Could you please advise the matters of interest to Council with respect to this proposed development.

Also I believe that Getta Getta Road has been upgraded recently.

Could you please provide the design/as-built geometry standard and largest design vehicle approved for Getta Road (west of Ottleys Creek Bridge) and design traffic volume in AADT.

Thankyou
Rod

Regards,

Rod Davis
Director
—
0427629203
rod.davis@rdcengineers.com.au

RDC ENGINEERS | AGRICULTURAL ENVIRONMENTAL PROJECT MANAGEMENT

From: Rod Davis <rod.davis@rdcengineers.com.au>
Sent: Monday, January 8, 2024 2:35 PM
To: 'pcox@gwydir.nsw.gov.au' <pcox@gwydir.nsw.gov.au>
Subject: EIS Consultation - Proposed expansion of beef cattle Feedlot - Doolin Farming Pty Ltd - 2513 Getta Getta Rd, North Star - L8 DP756018 & L21 DP1212915

Good afternoon Patsy,

We act for Doolin Farming Pty Ltd in relation to the above matter.

Doolin Farming Pty Ltd own and operate a 999 head beef cattle feedlot on the property "Springfield" located at 2513 Getta Getta Road, North Star within the Gwydir Shire.

Doolin Farming Pty Ltd proposes to expand the existing beef cattle feedlot from 999 head to 3,500 head.

A Request for the Planning Secretary's Requirements for the preparation of an Environmental Impact Statement was made on the **21st of January 2022**. The Planning Secretary's Environmental Assessment Requirements (SEAR) 1687 was received on the **2nd of June 2022**.

During the preparation of the EIS, direct consultation with relevant local, State and Commonwealth government authorities, service providers and community groups is required to identify and address any issues they may raise in the EIS.

In preparing the EIS, Doolin Farming Pty Ltd wish to consult with the Gwydir Shire Council in relation to any issues they may raise in respect of the proposed development and/or additional requirements for the EIS.

Please refer to the attached document for further information.

Regards,

Rod Davis
Director
—
0427629203
rod.davis@rdcengineers.com.au

RDC ENGINEERS | AGRICULTURAL ENVIRONMENTAL PROJECT MANAGEMENT

Appendix B.3

Consultation with Environmental Protection Agency

mlfurness@bigpond.com

From:	Lindsay Fulloon <Lindsay.Fulloon@epa.nsw.gov.au>
Sent:	Monday, 7 August 2023 12:03 PM
To:	mlfurness@bigpond.com
Cc:	Rebecca Scrivener
Subject:	FW: Planning Secretary's Environmental Assessment Requirements (SEAR) 1687 consultation [ref:_00D7F6iTix._5007F1OvBY6:ref]
Attachments:	SEAR 1687 - Applicant package.pdf; image001.png

Hello Mitch

From the EPA's perspective, you have been provided with our assessment requirements, and as such there is not any need for you to consult with us during the preparation of the EIS unless you have specific questions you wish to ask with respect to the assessment process. We will consider the application upon referral of the EIS as integrated development once it has been submitted.

Kind regards

Lindsay Fulloon
Manager Operations
NSW Environment Protection Authority
D: 02 6773 7016 M: 0419 418 577

www.epa.nsw.gov.au @NSW_EPA

The EPA acknowledges the traditional custodians of the land, waters and sky where we work. As part of the world's oldest surviving culture, we pay our respect to Aboriginal elders past, present and emerging.

I am based on Anaiwan Land.

Report pollution and environmental incidents 131 555 or +61 2 9995 5555

From: Environment Line <info@environment.nsw.gov.au>
Sent: Monday, 7 August 2023 9:27 AM
To: EPA Delivery Hub Mailbox <EPA.DeliveryHub@epa.nsw.gov.au>
Cc: EPA Environment Protection Planning Team Mailbox <environmentprotection.planning@epa.nsw.gov.au>
Subject: Planning Secretary's Environmental Assessment Requirements (SEAR) 1687 consultation [ref:_00D7F6iTix._5007F1OvBY6:ref]

--------------- Forwarded Message ---------------
From: [mlfurness@bigpond.com]
Sent: 04/08/2023 14:55
To: info@epa.nsw.gov.au
Subject: FW: Planning Secretary's Environmental Assessment Requirements (SEAR) 1687 consultation

Hello

I write on behalf of our client who has received SEARs number 1687 (attached) for preparation of an EIS as a result of an application for a cattle feedlot at 2513 Getta Getta Rd, North Star NSW.

During the preparation of the EIS we must consult the relevant local, State and Commonwealth government authorities, service providers and community groups, and address any issues they may raise in the EIS. In particular, we should consult with the Environmental Protection Agency, the Water Group and Environment and Heritage Group of the Department of Planning and Environment.

Please respond to this email confirming contact information for these three agencies within the Department of Planning and Environment. I will forward a letter to you on letterhead as formal consultation in the near future to address the requirements of the environmental impact statement as detailed in SEAR 1687.

Please contact me if you have any questions.

Regards

Mitchell Furness

0466 402 177

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ref:_00D7F6iTix._5007F1OvBY6:ref

This email is intended for the addressee(s) named and may contain confidential and/or privileged information.
If you are not the intended recipient, please notify the sender and then delete it immediately.

DOC22/388141

23 May 2022

Dept of Planning and Environment
Industry Assessments
4 Parramatta Square - 12 Darcy St
PARRAMATTA NSW 2150

Attention: Ms Zoe Halpin

BY EMAIL: Zoe.Halpin@planning.nsw.gov.au

Dear Ms Halpin,

Thankyou for your request, received on 18 May 2022, for the Environment Protection Authority's (EPA) requirements for an Environmental Impact Statement (EIS) for the proposed expansion of the existing feedlot at 2513 Getta Getta Road North Star (Lot 8 DP 756018 & Lot 1 DP 1212915) – your reference being SEAR 1687.

The EPA understands the proposal involves the expansion of an existing feedlot to increase capacity from 999 head to 3,500 head with the associated additional infrastructure to be constructed as part of the proposal.

The EPA has considered the details of the proposal as provided by the Department of Planning and Environment and has identified the information it requires to issue its general terms of approval in **Attachment A**.

In summary, the EPA's key information requirements for the proposal include an adequate assessment of:

1. **Air** - odour and dust generation and management of potential impacts on adjacent residences.
2. **Water** - water management systems and the protection of surface and groundwater from runoff from feedlot pens, effluent storage, evaporation and terminal ponds, and the application of effluent and/or manure to soils on the premises.
3. **Sustainable effluent and manure utilisation** - ensure that any proposed application to site soils are sustainable in relation to hydraulic, nutrient and salt loads to prevent land, groundwater or surface water pollution and potential offsite impacts.
4. **Irrigation Method** - provide details of irrigation methods for effluent including consideration of pivot spray irrigation system to allow better control of irrigated effluent. This may also effect the size needed for terminal ponds to capture run-off from the irrigation areas after rainfall.
5. **Noise** - proximity to sensitive receptors and the impact of any noise sources associated with the project.

Phone 131 555 **TTY** 133 677
Phone +61 2 9995 5555 (from outside NSW) **ABN** 43 692 285 758
PO Box 494 Armidale NSW 2350 Australia
85 Faulkner St Armidale NSW 2350 Australia
info@epa.nsw.gov.au
www.epa.nsw.gov.au

6. **Disposal of mortalities** - management of mortalities under normal operating conditions and in the event of a mass death scenario, to prevent odour emissions, contain pathogens, control vermin and disease vectors, and protect surface water and groundwater from pollution.

In carrying out the assessment, the proponent should refer to the relevant guidelines as listed in **Attachment A** and any relevant industry codes of practice and best practice management guidelines. The application of principles provided in the *National Guidelines for Beef Cattle Feedlots in Australia, 3rd Edition,* Meat and Livestock Australia should also be considered by the proponent to assist in mitigating air, odour, water quality and waste (mortalities) impacts associated with the proposal.

Based on the information provided to the EPA, the proponent will require an Environment Protection Licence to construct and operate the proposed feedlot if approval is granted. The proposed expansion meets the threshold requirements specified in clause 22 – Livestock intensive industries, in Schedule 1 of the *Protection of the Environment Operations Act 1997*.

General information on licence requirements can be obtained from the EPA's Environment Line by calling 131 555 or on the EPA's website at www.epa.nsw.gov.au/licensing/licencePOEO.htm.

To assist the EPA in assessing the proposal we request that the EIS follows the format of the Department of Planning and Environment EIS guidelines and addresses the EPA's specific environmental assessment requirements outlined in the following attachments.

If the necessary information is not adequately provided in the EIS then delays in the development assessment process may occur. The Proponent should be made aware that any commitments made in the EIS may be formalised as approval conditions and may also be placed as formal licence conditions.

The Proponent should be made aware that, consistent with provisions under Part 9.4 of the *Protection of the Environment Operations Act 1997* ("the Act") the EPA may require the provision of a financial assurance and/or assurances. The amount and form of the assurance(s) would be determined by the EPA and required as a condition of an Environment Protection Licence.

In addition, and as a requirement of an Environment Protection Licence if approval is granted, the EPA will require the Proponent to prepare, test and implement a Pollution Incident Response Management Plan and/or plans in accordance with Section 153 of the Act.

If you have any questions or wish to discuss anything further, please contact me on 131 555 or via email to info@epa.nsw.gov.au, marked to my attention.

Yours sincerely

REBECCA SCRIVENER
Head, Regional Operations Unit
Regulatory Operations Regional – West

ATTACHMENT A: Environmental Assessment Requirements – SEARS 1687 – Doolin Farming Pty Ltd – Feedlot Expansion – Gretta Gretta Road, North Star

1. Environmental impacts of the project

1.1. The EIS must address the requirements of Section 45 of the Protection of the Environment Operations Act 1997 (POEO Act) by determining the extent of each impact and providing sufficient information to enable the EPA to determine appropriate conditions, limits and monitoring requirements for an Environment Protection Licence (EPL).

1.2. Impacts related to the following environmental issues need to be assessed, quantified and reported on:

- **Air Issues**: air quality including dust generation and odour from the operation on the surrounding landscape and/or community;
- **Noise impacts** associated with operational noise particularly machinery and plant movements;
- **Waste** including general waste and animal mortalities.
- **Water and Soils** including effluent/manure utilisation options, water quality, catchment description and premise water balance.

The Environmental Assessment (EA) should address the specific requirements outlined under each heading below and assess impacts in accordance with the relevant guidelines mentioned.

2. Licensing requirements

2.1. The development is a scheduled activity under the *Protection of the Environment Operations Act 1997* (POEO Act) and will therefore require an Environment Protection Licence (EPL) if approval is granted.

2.2. Should project approval be granted, the proponent will need to make an application to the EPA for its EPL for the proposed facility prior to undertaking any on site works. Additional information is available through the *EPA Guide to Licensing* document (www.epa.nsw.gov.au/licensing/licenceguide.htm).

SPECIFIC ISSUES

3 Air issues

3.7. The EA must demonstrate the proposal's ability to comply with the relevant regulatory framework, specifically the *Protection of the Environment Operations (POEO) Act (1997)* and the *POEO (Clean Air) Regulation (2002)*. Particular consideration should be given to section 129 of the POEO Act concerning control of "offensive odour".

3.8. The EA must include an air quality impact assessment (AQIA).

3.9. The AQIA must be carried out in accordance with the document, *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW* (2005) http://www.epa.nsw.gov.au/resources/air/ammodelling05361.pdf.

3.10. The EA must detail emission control techniques/practices that will be employed at the site and identify how the proposed control techniques/practices will meet the requirements of the POEO Act, *POEO (Clean Air) Regulation* and associated air quality limits or guideline criteria.

3.11. Odour emissions must be assessed in accordance with the *Technical Framework - Assessment and Management of Odour from Stationary Sources in NSW* and/or *Technical Notes - Assessment and Management of Odour from Stationary Sources in NSW* (DEC, 2006).

4. Noise and Vibration

The EA must assess the following noise and vibration aspects of the proposed development

4.1. Construction noise associated with the proposed development should be assessed using the *Interim Construction Noise Guideline (*DECC, 2009). These are available at:https://www.epa.nsw.gov.au/your-environment/noise/industrial-noise/interim-construction-noise-guideline

4.2. Vibration from all activities (including construction and operation) to be undertaken on the premises should be assessed using the guidelines contained in the *Assessing Vibration: a technical guideline* (DEC, 2006). These are available at: https://www.epa.nsw.gov.au/your-environment/noise/industrial-noise/assessing-vibration

4.3. If blasting is required for any reasons during the construction or operational stage of the proposed development, blast impacts should be demonstrated to be capable of complying with the guidelines contained in *Australian and New Zealand Environment Council – Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration* (ANZEC, 1990).These are available at: https://www.epa.nsw.gov.au/your-environment/noise/industrial-noise/interim-construction-noise-guideline

4.4. Operational noise from all industrial activities (including private haul roads and private railway lines) to be undertaken on the premises should be assessed using the guidelines contained in the *NSW Noise Policy for Industry* (EPA, 2017). https://www.epa.nsw.gov.au/your-environment/noise/industrial-noise/noise-policy-for-industry-(2017)

4.5. Noise on public roads from increased road traffic generated by land use developments should be assessed using the guidelines contained in the *NSW Road Noise Policy* and associated application notes (EPA, 2011).https://www.epa.nsw.gov.au/your-environment/noise/transport-noise

5 Waste, chemicals and hazardous materials and radiation

1. The EA must assess all aspects of waste generation, management and disposal associated with the proposed development.

2. The EA must demonstrate compliance with all regulatory requirements outlined in the POEO Act and associated waste regulations.

3. The EA must identify, characterise and classify the following in accordance with the EPA's *Waste Classification Guidelines (2014)* and associated addendums:
   - (i) all waste that will be generated onsite through excavation, demolition or construction activities, including proposed quantities of the waste;
   - (ii) all waste that is proposed to be disposed of to an offsite location, including proposed quantities of the waste and the disposal locations for the waste. This includes waste that is intended for re-use or recycling.

Note: The EPA's W*aste Classification Guidelines (2014)* and associated addendums are available at: https://www.epa.nsw.gov.au/your-environment/waste/classifying-waste

5.4. The EA must outline contingency plans for any event that may result in environmental harm, such as excessive stockpiling of material, or dirty water volumes exceeding the storage capacity available on-site.

5.5. The EA must demonstrate that appropriate spill containment will be provided for storage, filling and loading of all fuels and other chemicals to be used on site, in accordance with the relevant Australian Standard.

5.6. Provide details of how waste will be handled and managed onsite, including:

a) Stockpile location and management

- Labelling of stockpiles for identification, ensuring that all waste is clearly identified and stockpiled separately from other types of material (especially the separation of any contaminated and non-contaminated waste).
- Proposed height limits for all waste to reduce the potential for dust and odour.
- Procedures for minimising the movement of waste around the site and double handling.
- Measures to minimise leaching from stockpiles into the surrounding environment, such as sediment fencing, geofabric liners and hardstands.

b) Mortality disposal arrangements

- Define disposal methods and locations for normal operations and possible mass death scenarios.
- Procedures for preventing the spread of pathogens or disease.
- Measures for protecting surface and/or groundwaters from pollution.
- Measures to prevent offensive odour generated by mortality disposal.
- Measures to control or prevent vermin and disease vectors.

5.7. The proponent should provide details of:

- how leachate from stockpiled waste material will be kept separate from stormwater runoff;
- treatment of leachate through a wastewater treatment plant (if applicable); and
- any proposed transport and disposal of leachate off-site.

6 Water and Soils

6.1. The EA must demonstrate how the proposed development will meet the requirements of section 120 of the POEO Act.

6.2. The EA must include a water balance for the development including water requirements (quantity, quality and source(s)) and proposed storm and wastewater disposal, including type, volumes, proposed treatment and management methods and re-use options.

6.3. If the proposed development intends to discharge waters to the environment, the EA must demonstrate how the discharge(s) will be managed in terms of water quantity, quality and frequency of discharge and include an impact assessment of the discharge on the receiving environment. This should include:

- Description of the proposal including position of any intakes and discharges, volumes, water quality and frequency of all water discharges.

- Description of the receiving waters including upstream and downstream water quality as well as any other water users.

- Demonstration that all practical options to avoid discharge have been implemented and environmental impact minimised where discharge is necessary.

6.4. The EA must include an assessment of potential impacts on soil and land resources, being guided by *Soil and Landscape Issues in Environmental Impact Assessment* (DLWC 2000). The nature and extent of any significant impacts should be identified. Mitigation and management options to minimise identified soil and land resource impacts should be described.

6.5. The EA must refer to Water Quality Objectives for the receiving waters and indicators and associated trigger values or criteria for the identified environmental values of the receiving environment. This information should be sourced from the ANZECC (2000) Guidelines for Fresh and Marine Water Quality (http://www.environment.gov.au/water/policy-programs/nwqms/).

6.6. The EA must describe how stormwater will be managed in all phases of the project, including details of how stormwater and runoff will be managed to minimise pollution. Information should include measures to be implemented to minimise erosion, leachate and sediment mobilisation at the site. The EA should consider the guidelines *Managing urban stormwater: soils and construction,* vol. 1 (Landcom 2004) and vol. 2 (A. Installation of services; B. Waste landfills C. Unsealed roads; D. Main Roads; E. Mines and quarries) (DECC, 2008).

6.7. Erosion, sediment and leachate control measures to be implemented to minimise erosion, leachate and sediment mobilisation at the site during construction and operation phases of the project. The EA should show the location of each measure to be implemented. Include such control measures such as:

- Sediment traps
- Diversion banks
- Sediment fences
- Bunds (earth, hay, mulch)
- Geofabric liners
- Other control measures as appropriate.

6.8. Assessment undertaken of the design of terminal pond systems to manage stormwater runoff (and if applicable tailwater) from any proposed effluent utilisation area to minimise water quality impacts on the nearest watercourses.

6.9. Discharges from the site must be characterised with respect to their location, frequency, volume and likely water quality.

6.10. The controlled drainage area including feedlot pens, manure stockpile/composting areas, catch drains, sedimentation and effluent storage/evaporation ponds and terminal pond systems must be protected from inundation during floods with an average recurrence interval of up to 1 in 100 years.

6.11. Feedlot pen surfaces and manure stockpile/composting areas and the walls and bases of any catch drains, sedimentation, effluent holding/evaporation/terminal ponds must incorporate an impermeable liner. Acceptable impermeable liners include:

- a clay or modified soil liner of at least 900mm of recompacted clay with an in-situ permeability (K) of less than 1 x 10-9 m/s.
- A natural geological barrier that is established by geotechnical investigations to provide a secure barrier between the groundwater, soil and substrata equivalent to the 900 mm recompacted clay liner above.

6.12. If the proposal incorporates effluent or manure application/utilisation to cropping lands on the premises, an assessment of the sustainability of these utilisation practices must be provided. The assessment must be undertaken in accordance with the *Environmental Guidelines for the Use of Effluent by Irrigation* (DEC, 2004).

The assessment must identify soil constraints where applicable to the application of manures and/or effluent and include nutrient balance and salt management assessments. Maps of proposed manure and/or effluent application areas must be provided in the EA.

6.13. The EA must describe any water quality monitoring programs to be carried out at the project site. Water quality monitoring should be undertaken in accordance with the *Approved Methods for the Sampling and Analysis of Water Pollutant in NSW* (2004) which is available at:
http://www.epa.nsw.gov.au/resources/legislation/approvedmethods-water.pdf.

----END----

DOC24/359193

20 May 2024

Gregory Michales
Student Planner
Industry Assessments
4PSQ Level 31, 12 Darcy Street
Parramatta NSW 2150

Email: greg.michales@dpie.nsw.gov.au

Dear Mr Michales,

I refer to the request for the NSW Environment Protection Authority (EPA) requirements for the Secretary's Environmental Assessment Requirements (SEARs) for the proposed expansion of the existing feedlot at 2513 Getta Getta Road North Star (Lot 8 DP 756018 & Lot 1 DP 1212915) your reference being SEAR 1687.

The EPA understands the proposal involves the expansion of an existing feedlot to increase capacity from 999 head to 3,500 head with the associated additional infrastructure to be constructed as part of the proposal.

The EPA has considered the details of the proposal as provided by the Department of Planning and Environment and has identified the information it requires to issue its general terms of approval in **Attachment A**.

In summary, the EPA's key information requirements for the proposal include an adequate assessment of:

6. **Air** – odour and dust generation and management of potential impacts on adjacent residences.

2. Water – water management systems and the protection of surface and groundwater from runoff from feedlot pens, effluent storage, evaporation and terminal ponds, and the application of effluent and/or manure to soils on the premises.

3. Sustainable effluent and manure utilisation – ensure that any proposed application to site soils are sustainable in relation to hydraulic, nutrient and salt loads to prevent land, groundwater or surface water pollution and potential offsite impacts.

4. Irrigation Method – provide details of irrigation methods for effluent including consideration of pivot spray irrigation system to allow better control of irrigated effluent. This may also affect the size needed for terminal ponds to capture run-off from the irrigation areas after rainfall.

5. Noise – proximity to sensitive receptors and the impact of any noise sources associated with the project

6. Disposal of mortalities - management of mortalities under normal operating conditions and in the event of a mass death scenario, to prevent odour emissions, contain pathogens, control vermin and disease vectors, and protect surface water and groundwater from pollution.

In carrying out the assessment, the proponent should refer to the relevant guidelines as listed in **Attachment A** and any relevant industry codes of practice and best practice management guidelines. The application of principles provided in the *National Guidelines for Beef Cattle Feedlots in Australia, 3rd Edition,* Meat and Livestock Australia should also be considered by the proponent to assist in mitigating air, odour, water quality and waste (mortalities) impacts associated with the proposal.

To assist the EPA in assessing the EIS it is requested that the EIS document follow the format of DPIE's EIS guidelines and addresses the EPA's specific requirements outlined in the following attachments. If the necessary information is not adequately addressed in the EIS, then delays in the development assessment process may occur.

The Proponent should be made aware that any commitments made in the Environmental Impact Statement (EIS) may be formalised as approval conditions and may also be placed as formal licence conditions.

Based on the information provided to the EPA, the proponent will require an Environment Protection Licence ("EPL") for Livestock Intensive activities clause 22 of Schedule 1 of the *Protection of the Environment Operations Act 1997* ("POEO Act"), to construct and operate the proposed feedlot if approval is granted.

The proponent will need to make a separate application to the EPA for an EPL at the completion of the assessment process should the proposal be issued with development consent. General information on licence requirements can be obtained from the EPA's Environment Line by calling 131 555 or on the EPA's website at www.epa.nsw.gov.au/licensing/licencePOEO.htm.

The Proponent should be made aware that, consistent with provisions under Part 9.4 of the POEO Act, the EPA may require the provision of a financial assurance and/or assurances. The amount and form of the assurance(s) would be determined by the EPA and required as a condition of an EPL.

In addition, as a requirement of an EPL, the EPA will require the Proponent to prepare, test and implement a Pollution Incident Response Management Plan and/or plans in accordance with Section 153A of the Act.

The EPA requests that the proponent provide one (1) electronic copy of the EIS when lodging it application with the EPA. These documents should be lodged via the NSW Planning Portal.

If you have any queries regarding this matter, please contact me on (02) 6773 7000.

Yours sincerely,

Lindsay Fulloon
Manager Regulatory Operations
Regulatory Operations Regional West

Encl: Attachment A: Environment Assessment Requirements – Feedlot (cattle feedlot expansion) 2513 Getta Getta Rd, North Star 2408 (SEAR 1687).

ATTACHMENT A: Environmental Assessment Requirements – Feedlot (cattle feedlot expansion) 2513 Getta Getta Rd, North Star (SEAR 1687) NSW, 2408.

1. Environmental impacts of the project

1.1. The EIS must address the requirements of Section 45 of the Protection of the Environment Operations Act 1997 (POEO Act) by determining the extent of each impact and providing sufficient information to enable the EPA to determine appropriate conditions, limits and monitoring requirements for an Environment Protection Licence (EPL).

1.2. Impacts related to the following environmental issues need to be assessed, quantified and reported on:

- **Air Issues, including odour**: air quality including dust and odour generation from the operation on the surrounding landscape and/or community;
- **Noise and vibration impacts** associated with blasting, and operational noise particularly machinery and plant movements;
- **Waste** including hazardous materials and radiation. Consideration needs to be given to disposal options for general waste, sanitary waste as well as hazardous materials and radiation, where relevant.
- **Water and Soils** including site water balance and sediment and erosion controls during construction and operation phases.

The Environmental Impact Statement (EIS) should address the specific requirements outlined under each heading below and assess impacts in accordance with the relevant guidelines mentioned.

2. Licensing requirements

2.1. The development is a scheduled activity under the *Protection of the Environment Operations Act 1997* (POEO Act) and will therefore require an Environment Protection Licence (EPL) if approval is granted.

2.2. Should project approval be granted, the proponent will need to make an application to the EPA for its EPL for the proposed facility prior to undertaking any on site works. Additional information is available through the *EPA Guide to Licensing* document (www.epa.nsw.gov.au/licensing/licenceguide.htm).

SPECIFIC ISSUES

3. Air issues

3.1. The EIS must demonstrate the proposal's ability to comply with the relevant regulatory framework, specifically the *Protection of the Environment Operations (POEO) Act (1997)* and the *POEO (Clean Air) Regulation (2002)*. Particular consideration should be given to section 129 of the POEO Act concerning control of "offensive odour".

3.2. The EIS must include an air quality impact assessment (AQIA). The AQIA must be carried out in accordance with the document, *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW* (2016), available at: https://www.epa.nsw.gov.au/your-environment/air/industrial-emissions/approved-methods-for-the-modelling-and-assessment-of-air-pollutants.

3.3. The EIS must detail emission control techniques/practices that will be employed at the site and identify how the proposed control techniques/practices will meet the requirements of the POEO Act, *POEO (Clean Air) Regulation* and associated air quality limits or guideline criteria.

4. Odour

4.1. An investigation and assessment of odour impacts likely to be associated with cold air drainage effects on all identified and potential receivers.

4.2. A requirement to install a meteorological station as soon as possible on or near the site to obtain site-specific meteorological data for a minimum of 3 months and ideally 6 to 12 months to aid in refining odour assessment and modelling.

4.3. Collection of wind speed data using an ultrasonic wind speed sensor to ensure accurate representation of low wind speed frequencies to allow more accurate prediction of likely katabatic impacts on receivers.

4.4. Include a consideration of 'worst case' emission scenarios, and sensitivity analysis around the timing of peak emissions.

4.5. Air dispersion modelling must be conducted in accordance with:
Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (2022) https://www.epa.nsw.gov.au/your-environment/air/industrial-emissions/approved-methods-for-the-modelling-and-assessment-of-air-pollutants; and Generic Guidance and Optimum Model Settings for the CALPUFF Modelling System for Inclusion into the 'Approved Methods for the Modelling and Assessments of Air Pollutants in NSW Australia' (TRC Environmental Corporation, 2011) https://www.epa.nsw.gov.au/-/media/epa/corporate-site/resources/air/calpuffmodelguidance.pdf

4.6. Demonstrate the proposal's ability to comply with the relevant regulatory framework, specifically the Protection of the Environment Operations (POEO) Act 1997 and the POEO (Clean Air) Regulation 2022. Particular consideration should be given to section 129 of the POEO Act concerning control of "offensive odour".

4.7. Odour emissions must be assessed in accordance with the Technical Framework – Assessment and Management of Odour from Stationary Sources in NSW and/or the Technical Notes – Assessment and Management of Odour from Stationary Sources in NSW (DEC, 2006) available at: https://www.epa.nsw.gov.au/your-environment/air/industrial-emissions/managing-odour/technical-framework-odour

4.8. Detail emission control techniques/practices that will be employed by the proposal.

5. Noise and Vibration

The EIS must assess the following noise and vibration aspects of the proposed development.

5.1. Construction noise associated with the proposed development should be assessed using the Interim Construction Noise Guideline (DECC, 2009). These are available at: https://www.epa.nsw.gov.au/your-environment/noise/industrial-noise/construction-noise.

5.2. Vibration from all activities (including construction and operation) to be undertaken on the premises should be assessed using the guidelines contained in the *Assessing Vibration: a technical guideline* (DEC, 2006). These are available at: https://www.epa.nsw.gov.au/your-environment/noise/industrial-noise/assessing-vibration.

5.3. If blasting is required for any reasons during the construction or operational stage of the proposed development, blast impacts should be demonstrated to be capable of complying with the guidelines contained in *Australian and New Zealand Environment Council – Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration* (ANZEC, 1990).These are available at: https://www.epa.nsw.gov.au/your-environment/noise/industrial-noise/interim-construction-noise-guideline.

5.4. Operational noise from all industrial activities (including private haul roads and private railway lines) to be undertaken on the premises should be assessed using the guidelines contained in the *NSW Noise Policy for Industry* (EPA, 2017). https://www.epa.nsw.gov.au/your-environment/noise/industrial-noise/noise-policy-for-industry-(2017).

5.5. Noise on public roads from increased road traffic generated by land use developments should be assessed using the guidelines contained in the *NSW Road Noise Policy* and associated application notes (EPA, 2011). https://www.epa.nsw.gov.au/your-environment/noise/transport-noise

5. Waste, chemicals and hazardous materials and radiation

6.1. The EIS must assess all aspects of waste generation, management and disposal associated with the proposed development.

6.2. The EIS must demonstrate compliance with all regulatory requirements outlined in the POEO Act and associated waste regulations.

6.3. The EIS must identify, characterise and classify the following in accordance with the EPA's *Waste Classification Guidelines (2014)* and associated addendums:
(i) all waste that will be generated onsite through excavation, demolition or construction activities, including proposed quantities of the waste;
(ii) all waste that is proposed to be disposed of to an offsite location, including proposed quantities of the waste and the disposal locations for the waste. This includes waste that is intended for re-use or recycling.

Note: The EPA's W*aste Classification Guidelines (2014)* and associated addendums are available at: https://www.epa.nsw.gov.au/your-environment/waste/classifying-waste.

6.4. The EIS must outline contingency plans for any event that may result in environmental harm, such as excessive stockpiling of material, or dirty water volumes exceeding the storage capacity available on-site.

6.5. The EIS must demonstrate that appropriate spill containment will be provided for storage, filling and loading of all fuels and other chemicals to be used on site, in accordance with the relevant Australian Standard.

6. Water

7.1. The EIS must demonstrate how the proposed development will meet the requirements of section 120 of the POEO Act.

7.2. The EIS must include a water balance for the development including water requirements (quantity, quality and source(s)) and proposed storm and wastewater disposal, including type, volumes, proposed treatment and management methods and re-use options.

7.3. If the proposed development intends to discharge waters to the environment, the EIS must demonstrate how the discharge(s) will be managed in terms of water quantity, quality and frequency of discharge and include an impact assessment of the discharge on the receiving environment. This should include:

- Description of the proposal including position of any intakes and discharges, volumes, water quality and frequency of all water discharges.
- Description of the receiving waters including upstream and downstream water quality as well as any other water users.
- Demonstration that all practical options to avoid discharge have been implemented and environmental impact minimised where discharge is necessary.

7.4. The EIS must refer to Water Quality Objectives for the receiving waters and indicators and associated trigger values or criteria for the identified environmental values of the receiving environment. This information should be sourced from the ANZECC (2018) Guidelines for Fresh and Marine Water Quality, available at: https://www.waterquality.gov.au/anz-guidelines

7.5. The EIS must describe how stormwater will be managed in all phases of the project, including details of how stormwater and runoff will be managed to minimise pollution. Information should include measures to be implemented to minimise erosion, leachate and sediment mobilisation at the site. The EIS should consider the guidelines *Managing urban stormwater: soils and construction,* vol. 1 (Landcom 2004) and vol. 2 (A. Installation of services; C. Unsealed roads; D. Main Roads; E. Mines and quarries) (DECC, 2008).

7.6. The EIS must describe any water quality monitoring programs to be carried out at the project site. Water quality monitoring should be undertaken in accordance with the *Approved Methods for the Sampling and Analysis of Water Pollutants in NSW* (2004) which is available at: https://www.epa.nsw.gov.au/licensing-and-regulation/licensing/environment-protection-licences/licensing-under-poeo-act-1997/licensing-to-regulate-water-pollution/approved-methods-for-sampling-and-analysing-water-pollutants

---------------END---------------

Appendix B.4

Consultation with Department of Regional NSW – Department of Primary Industries – Agriculture (DPI)

RDC ENGINEERS | AGRICULTURAL ENVIRONMENTAL PROJECT MANAGEMENT

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ABN 37 627 163 071

Our ref: E2-103-DF-SFFL-GSC-20240108

8th January 2024

Mr Paul Garnett
Agricultural Land Use Planning Officer
Department of Primary Industries – Agriculture
Grafton Primary Industries Institute
16 Experimental Farm
TRENAYR NSW 2460
Via email: landuse.ag@dpi.nsw.gov.au

Dear Paul,

RE: ENVIRONMENTAL IMPACT STATEMENT FOR PROPOSED EXPANSION OF BEEF CATTLE FEEDLOT ON THE PROPERTY "SPRINGFIELD" 2513 GETTA GETTA ROAD, NORTH STAR, LAND DESCRIBED AS LOT 8 ON DP756018 AND LOT 21 ON DP1212915

Doolin Farming Pty Ltd own and operate a 999 head beef cattle feedlot on the property "Springfield" located at 2513 Getta Getta Road, North Star within the Gwydir Shire. The property is currently used for beef cattle grazing, intensive livestock agriculture, dryland and irrigated cropping. Doolin Farming Pty Ltd proposes to expand the existing beef cattle feedlot from 999 head to 3,500 head. The location of the subject land on which the proposed development will be established is shown on Figure 1.

As the proposed development is considered Designated Development under the NSW Environment and Planning Assessment Act 1979, an Environmental Impact Statement (EIS) is required to be prepared to accompany the Development Application.

A Request for the Planning Secretary's Requirements for the preparation of an Environmental Impact Statement was made on the **21st of January 2022**. The Planning Secretary's Environmental Assessment Requirements (SEAR) 1687 was received **2nd of June 2022**. A copy of the SEAR 1687 - Applicant Package is provided in Annexure A.

The proposed development is both designated and integrated development under Part 4 of the Environmental Planning and Assessment Act 1979 and requires a licence under the Protection of the Environment Operations Act 1997. In preparing the SEAR, the Department of Planning and Environment (the Department) has consulted with several state agencies.

During the preparation of the EIS, direct consultation with relevant local, State and Commonwealth government authorities, service providers and community groups is required to identify and address any issues they may raise in the EIS.

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Consequently, Doolin Farming Pty Ltd wish to consult with The Department of Regional NSW – Department of Primary Industries – Agriculture in relation to any additional issues they may raise in respect of the proposed development and/or additional requirements for the EIS.
The following summary information is provided to allow the Department of Primary Industries – Agriculture to make an assessment of how their functions, interests or activities may be impacted by the proposed development and raise any relevant matters.

DESCRIPTION OF THE PROPOSED DEVELOPMENT

The proposed development is an expansion of the existing beef cattle feedlot from 999 head to 3,500 head. A layout plan of the proposed development is shown on Figure 2 and Figure 3.

The proposed development involves:

- Additional production pens and associated feed, water, shade and drainage infrastructure;
- A new cattle handling facility;
- A revised controlled drainage area;
- A revised manure stockpiling and carcass composting area;
- A revised sedimentation basin and holding pond capacity;
- A new entrance off Getta Getta Road and internal access road to the proposed development.

The proposed development shall utilise the existing approved manure and effluent utilisation areas on the subject land as shown on Figure 3. The proposed development does not seek to revise the existing waste utilisation areas.

The proposed development does not propose new or altered Class 1, 2, 3, 4, 5, 6, 8 or 9 buildings as shown on Figure 4.

The proposed development would incorporate Industry best practice during construction and operational activities to ensure that any environmental impacts are minimised. The environmental assessment process will identify these practices and incorporate them into the design of the development, ensuring that any environmental impacts are appropriately dealt with.

The existing development has been designed and constructed according to recommended methods outlined in the relevant state guidelines at the time of construction in the early 2020. These included the NSW Feedlot Manual (NSW Agriculture, 1997); National Guidelines for Beef Cattle Feedlots in Australia (MLA, 2012a); National Beef Cattle Feedlot Environmental Code of Practice (MLA, 2012b) and the Beef Cattle Feedlots: Design and Construction manual (MLA, 2015).

The proposed development will be designed, constructed and operated according to recommended methods outlined in State (NSW & QLD) and National Industry best practice guidelines. These include:

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- Beef Cattle Feedlots: Design and Construction manual - www.mla.com.au
- National Guidelines for Beef Cattle Feedlots in Australia - www.mla.com.au
- National Beef Cattle Feedlot Environmental Code of Practice - www.mla.com.au
- NSW Feedlot Manual - www.dpi.nsw.gov.au

Site details

Gwydir Local Environmental Plan 2013 (GLEP)

Clause 2.1 – Land Use and Permissibility

The Site is zoned RU1 Primary Production (RU1 Zone) under the Gwydir Local Environmental Plan 2013 (GLEP).

Access

The subject land has frontage to Getta Getta Road.

The proposed development seeks to construct a new subject land entrance from Getta Getta Road which provides a dedicated access to the expanded development. The new entrance is proposed to be sited some 180 m to the east of the existing subject land entrance.

The existing subject land entrance shall be retained for light vehicles to access the subject land homestead.

Traffic Generation

The existing development at a full capacity of 999 head generates on average in the order of 0.53 vehicle movements per day (light vehicles [0.15vpd] and heavy vehicles [0.38vpd].

At the full capacity of 3,500 head, the estimated traffic generation for the proposed development is about 3.5 vehicle movements per day (light vehicles [1.7vpd] and heavy vehicles [1.8vpd]. These data are based on 3 staff members residing on-site in the subject land homestead and cottage and B-double vehicles for haulage of livestock and commodities.

At additional traffic generated by the proposed development is about 3 vehicle movements per day (light vehicles [1.6vpd] and heavy vehicles [1.4vpd]. These data are based on 3 staff members residing on-site in the subject land homestead and cottage and B-double vehicles for haulage of livestock and commodities.

Bushfire hazard

Part of the southern area of the subject land is mapped as bushfire prone land by Gwydir Shire Council as shown on Figure 5.

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Flooding

The subject land is not mapped as flood prone. The proposed development is located some 6 km west from the closest known floodway which is along Ottleys Creek according to the MacIntyre Valley Flood Plain Atlas (Laurie, Montgomerie & Pettit Pty Ltd, 1982 commissioned by Water Resources Commission New South Wales).

Soils

The soils of the proposed development complex site and waste utilisation area comprise reddish brown to grey to black heavy clays.

Waterways

New infrastructure within the existing development complex site is setback 40 m from a stream order 1 and stream order 2 respectively.

Water supply

The applicant holds a groundwater allocation under the NSW Great Artesian Basin Eastern recharge groundwater source for irrigation use on the subject land under water access licence 41169 (Works Approval 90AL834721) for 1,558 shares.

Separation to neighbours

The closest sensitive receptor is located 1,300m to the northwest. The s-factor separation distance assessment outlined in the National Guidelines for Beef Cattle Feedlots in Australia demonstrates adequate separation from sensitive receptors.

Chemical residues

Testing of representative soils from the proposed development complex site show no presence of organochlorine pesticides.

Development complex details

Design and construction

The production pens will have a stocking density of about 15.75 m^2/head.

The development complex shall be constructed in accordance with

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- Beef Cattle Feedlots: Design and Construction manual - www.mla.com.au
- National Guidelines for Beef Cattle Feedlots in Australia - www.mla.com.au
- National Beef Cattle Feedlot Environmental Code of Practice - www.mla.com.au
- NSW Feedlot Manual - www.dpi.nsw.gov.au

Operation

The development complex shall be managed in accordance with the National Guidelines for Beef Cattle Feedlots in Australia and National Beef Cattle Feedlot Environmental Code of Practice.

Beef cattle will be supplied with an unrestricted, reliable supply of clean and fresh water, free from contamination.

Regular cleaning and maintenance of the production pens and drainage infrastructure shall be undertaken to minimise odour emissions and reduces the risk of any amenity impacts on neighbouring sensitive receptors.

Dead animal carcasses shall be composted within a dedicated area in the manure stockpile area.

Animal health and welfare will be managed in accordance with relevant state and federal legislation.

References

Laurie, Montgomerie & Pettit Pty Ltd, 1982, MacIntyre Valley Flood Plain Atlas (commissioned by Water Resources Commission New South Wales), Sydney NSW.

Meat and Livestock Australia, 2012a, National Guidelines for Beef Cattle Feedlots in Australia 3rd Edition, Meat & Livestock Australia, North Sydney, NSW.

Meat and Livestock Australia, 2012b, National Beef Cattle Feedlot Environmental Code of Practice 2nd Edition, Meat & Livestock Australia, North Sydney, NSW.

Meat and Livestock Australia, 2015a, Beef Cattle Feedlots: Design and Construction, Meat and Livestock Australia, North Sydney, NSW.

NSW Agriculture, 1997, The New South Wales Feedlot Manual, The Inter-Departmental Committee on Intensive Animal Industries (Feedlot Section), NSW Agriculture, Orange NSW.

In summary, Doolin Farming Pty Ltd hereby submit a consultation request to the Department of Primary Industries – Agriculture for advice in relation to any issues they may raise in respect of the proposed development and/or additional requirements for the EIS. Matters raised by the Department of Primary Industries – Agriculture shall be addressed during the preparation of the EIS.

RDC ENGINEERS

PO Box 1223
Toowoomba QLD 4350
info@rdcengineers.com.au

Could you please address all correspondence to:

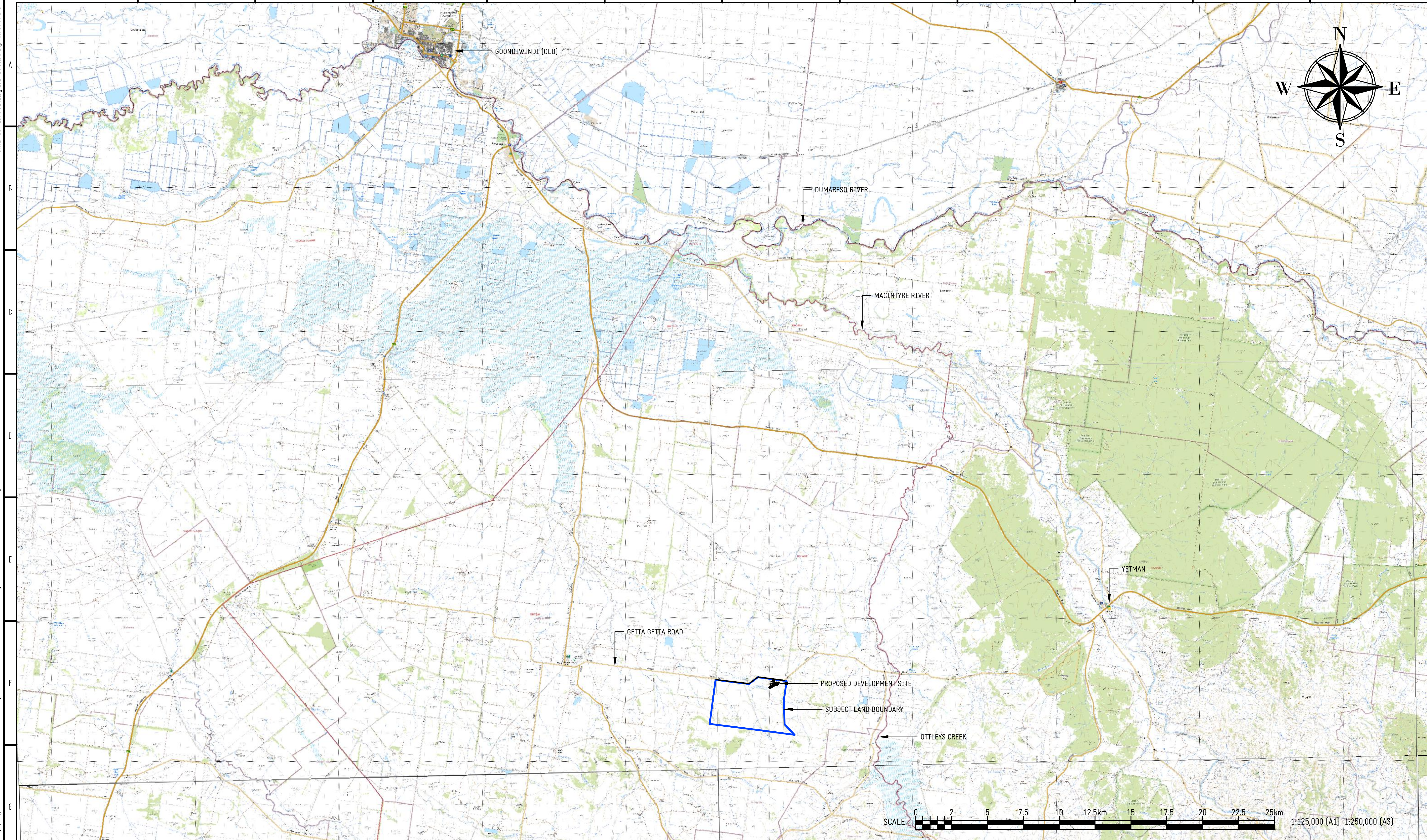
Rod Davis
Director
RDC Engineers Pty Ltd
PO Box 1223
TOOWOOMBA QLD 4350
rod.davis@rdcengineers.com.au

If you have any questions about this request, please contact Rod Davis via rod.davis@rdcengineers.com.au or 0427 629203.

Yours sincerely,

R.J. Davis

Rod Davis
Director
0427 629203
rod.davis@rdcengineers.com.au



LEGEND

- SUBJECT LAND BOUNDARY
- LAND PARCEL BOUNDARY

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DATE	04/01/2024
APPROVED	RJD
DATE	04/01/2024

CLIENT DOOLIN FARMING PTY LTD

PROJECT PROPOSED 3500 HEAD BEEF CATTLE FEEDLOT

TITLE DEVELOPMENT APPLICATION FOR INTENSIVE LIVESTOCK AGRICULTURE
ENVIRONMENTAL IMPACT STATEMENT - GOVERNMENT CONSULTATION
SUBJECT LAND - LOCALITY PLAN

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 1		A3	E2-103-2000-01	B

DATE PLOTTED: 3 January 2024 BY : RDC Engineers PTY LTD
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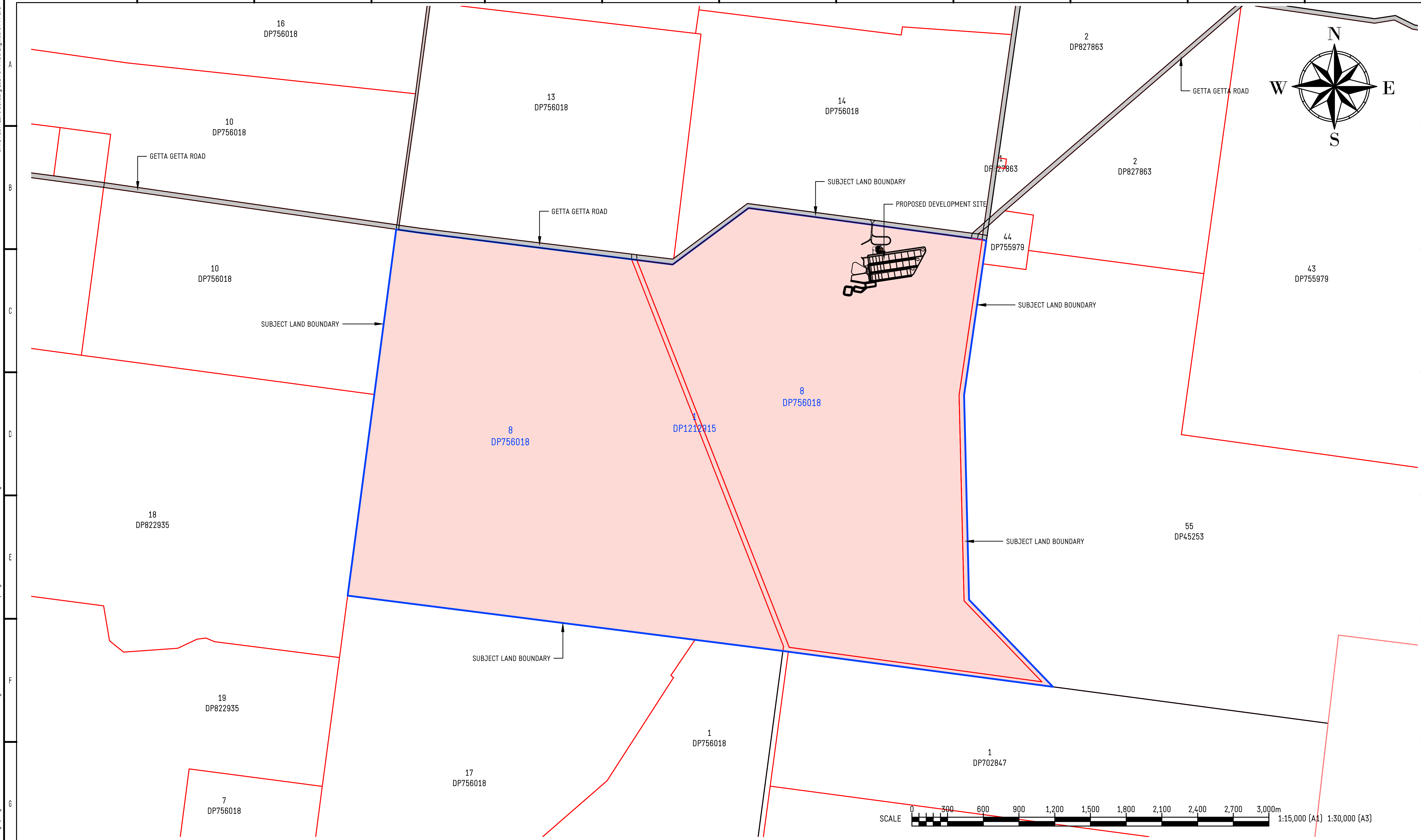

LEGEND

- SUBJECT LAND BOUNDARY
- LAND PARCEL BOUNDARY
- SUBJECT LAND AREA
- ROAD RESERVE
- EASEMENT

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DATE	04/01/2024

CLIENT: DOOLIN FARMING PTY LTD

PROJECT: PROPOSED 3500 HEAD BEEF CATTLE FEEDLOT

TITLE: DEVELOPMENT APPLICATION FOR INTENSIVE LIVESTOCK AGRICULTURE
ENVIRONMENTAL IMPACT STATEMENT - GOVERNMENT CONSULTATION
SUBJECT LAND - CADASTRAL PLAN

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 2		A3	E2-103-2000-02	B

DATE PLOTTED: 3 January 2024 BY : RDC Engineers PTY LTD
FILE PATH: C:\RDC Engineers\RDCE - Projects\E2-103 Doolin Farming Springfield EIS\05 - ACAD MasterPlan\05.1 Drawings - CURRENT FILE NAME: E2-103 DF Springfield MASTERPLAN-00-20220114vA.dwg

DATE PLOTTED: 3 January 2024 BY : RDC Engineers PTY LTD

LEGEND

- SUBJECT LAND BOUNDARY
- LAND PARCEL BOUNDARY
- EFFLUENT UTILISATION AREA
- SOLID WASTE UTILISATION AREA

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DATE	04/01/2024

CLIENT: DOOLIN FARMING PTY LTD

PROJECT: PROPOSED 3500 HEAD BEEF CATTLE FEEDLOT

TITLE: DEVELOPMENT APPLICATION FOR INTENSIVE LIVESTOCK AGRICULTURE
ENVIRONMENTAL IMPACT STATEMENT - GOVERNMENT CONSULTATION
PROPOSED DEVELOPMENT - LAYOUT PLAN

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 3		A3	E2-103-2000-03	B

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- LAND PARCEL BOUNDARY

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CLIENT: DOOLIN FARMING PTY LTD

PROJECT: PROPOSED 3500 HEAD BEEF CATTLE FEEDLOT

TITLE: DEVELOPMENT APPLICATION FOR INTENSIVE LIVESTOCK AGRICULTURE
ENVIRONMENTAL IMPACT STATEMENT - GOVERNMENT CONSULTATION
PROPOSED DEVELOPMENT - DEVELOPMENT COMPLEX LAYOUT

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 4		A3	E2-103-2000-04	B

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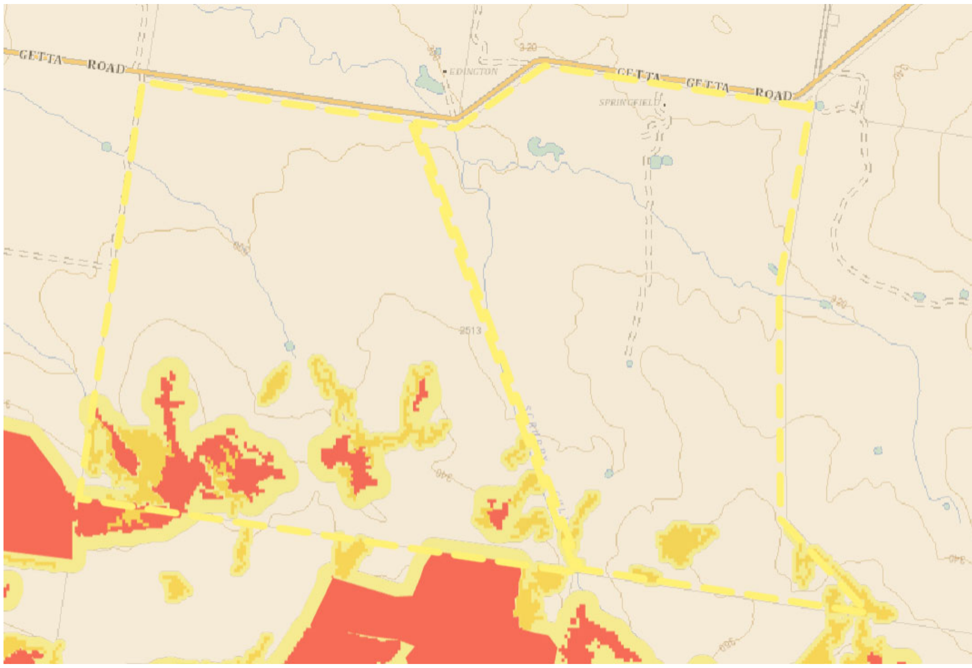

Figure 5 – Subject land - Bushfire prone land

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Annexure A

SEAR 1687 – Applicant Package

Department of Planning and Environment

2 June 2022

Mr Angus Doolin
Doolin Farming Pty Ltd
3202 Getta Getta Road
North Star NSW 2408

EF22/7052
SEAR 1687

Dear Mr Doolin

Feedlot (cattle feedlot expansion)
2513 Getta Getta Rd, North Star (Lot 8 DP 756018 & Lot 1 DP 1212915)
Planning Secretary's Environmental Assessment Requirements (SEAR) 1687

Thank you for your request for the Planning Secretary's Environmental Assessment Requirements (SEARs) for the preparation of an Environmental Impact Statement (EIS) for the above development proposal. I have attached a copy of these requirements.

In support of your application, you indicated that your proposal is both designated and integrated development under Part 4 of the *Environmental Planning and Assessment Act 1979* and requires a licence under the *Protection of the Environment Operations Act 1997.* In preparing the SEARs, the Department of Planning and Environment (the Department) has consulted with the Environment Protection Authority. A copy of its requirements is attached.

The Department has also consulted with the Biodiversity, Conservation and Science Directorate of the Environment and Heritage Group. A copy of their additional requirements for the EIS are attached.

If other integrated approvals are identified before the Development Application (DA) is lodged, you must undertake direct consultation with the relevant agencies, and address their requirements in the EIS.

If your proposal contains any actions that could have a significant impact on matters of National Environmental Significance, then it will require an additional approval under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). This approval is in addition to any approvals required under NSW legislation. If you have any questions about the application of the EPBC Act to your proposal, you should contact the Commonwealth Department of Agriculture, Water and the Environment on (02) 6274 1111.

Should you have any further enquiries, please contact Zoe Halpin, Planning and Assessment, at the Department on (02) 9995 6430 or via zoe.halpin@planning.nsw.gov.au.

Yours sincerely

C. Ritchie

Chris Ritchie
Director
Industry Assessments
as delegate of the Planning Secretary

Planning Secretary's Environmental Assessment Requirements

Section 4.12(8) of the *Environmental Planning and Assessment Act 1979*.
Schedule 3 of the Environmental Planning and Assessment Regulation 2021.

Designated Development

SEAR Number	1687
Proposal	The expansion of an existing cattle feedlot, from 999 head to 3,500 head of cattle.
Location	2513 Getta Getta Rd, North Star (Lot 8 DP 756018 & Lot 1 DP 1212915)
Applicant	Doolin Farming Pty Ltd
Date of Issue	2 June 2022
General Requirements	The Environmental Impact Statement (EIS) must comply with the assessment requirements and meet the minimum form and content requirements in sections 190 and 192 of the Environmental Planning and Assessment Regulation 2021.
Key Issues	The EIS must include an assessment of all potential impacts of the proposed development on the existing environment (including cumulative impacts if necessary) and develop appropriate measures to avoid, minimise, mitigate and/or manage these potential impacts. As part of the EIS assessment, the following matters must also be addressed: • **strategic and statutory context** – including: – a demonstration that the proposal is consistent with all relevant planning strategies, environmental planning instruments, development control plans (DCPs), or justification for any inconsistencies – a list of any approvals that must be obtained under any other Act or law before the development may lawfully be carried out. – a description of how the proposed expansion integrates with existing on-site operations – a description of any amendments to and/ or additional licence(s) or approval(s) required to carry out the proposed development. • **suitability of the site** – including: – a detailed justification that the site can accommodate the proposed processing capacity, having regard to the scope of the operations and its environmental impacts and relevant mitigation measures – plans depicting the proposed layout, including the location of pens, equipment, dams, effluent irrigation and/ or manure application areas and the like. • **air quality and odour** – including: – a quantitative assessment of the potential air quality, dust and odour impacts of the development, including cumulative impacts and impacts on adjacent residences, in accordance with relevant Environment Protection Authority guidelines – a description and appraisal of air quality and odour impact mitigation and monitoring measures. • **waste management** – including: – details of waste handling including, transport, identification, receipt, stockpiling and quality control including off-site reuse and disposal – detail of waste management including effluent and manure and disposal of dead cattle for the proposal

	- the measures that would be implemented to ensure that the proposed development is consistent with the aims, objectives and guidelines in the *NSW Waste Avoidance and Sustainable Materials Strategy 2041.* • **animal welfare, bio-security and disease management** – including: - details of how the proposed expansion would comply with relevant codes of practice and guidelines - a heat load assessment in accordance with Department of Primary Industries guidelines - details of all pest, weed and disease control measures - a detailed description of the contingency measures that would be implemented for the mass disposal of livestock in the event of disease outbreak. • **noise and vibration** – including: - a description of all potential noise and vibration sources during construction and operation, including road traffic noise - a noise and vibration assessment in accordance with the relevant Environment Protection Authority guidelines - a description and appraisal of noise and vibration mitigation and monitoring measures. • **soil and water** – including: - a description of local soils, topography, drainage and landscapes - details of water usage for the expansion including existing and proposed water licencing requirements in accordance with the *Water Act 1912* and/or the *Water Management Act 2000* - an assessment of potential impacts on floodplain and stormwater management and any impact to flooding in the catchment - details of sediment and erosion controls - a detailed site water balance - an assessment of potential impacts on the quality and quantity of surface and groundwater resources - details of the stormwater and wastewater management systems (including sewage), water monitoring program and other measures to mitigate surface and groundwater impacts from runoff from feedlot pens, effluent storage, evaporation and terminal ponds - details of sustainable effluent and manure utilisation to prevent land, groundwater or surface water pollution and potential offsite impacts - details of irrigation methods for effluent including consideration of pivot spray irrigation system to allow better control of irrigated effluent - characterisation of the nature and extent of any contamination on the site and surrounding area - a description and appraisal of impact mitigation and monitoring measures. • **hazards and risk** – including: - a preliminary risk screening completed in accordance with State Environmental Planning Policy (Resilience and Hazards) 2021, Chapter 3 and Applying SEPP 33 (DoP, 2011), with a clear indication of class, quantity and location of all dangerous goods and hazardous materials associated with the development. Should preliminary screening indicate that the project is "potentially hazardous" a Preliminary Hazard Analysis (PHA) must be prepared in accordance with Hazardous Industry Planning Advisory Paper No. 6 - Guidelines for Hazard Analysis (DoP, 2011) and Multi-Level Risk Assessment (DoP, 2011). - an assessment of bushfire risks and asset protection zones (APZ) in accordance with NSW Rural Fire Service guidelines • **traffic and transport** – including: - details of road transport routes and access to the site - road traffic predictions for the development, including cumulative impacts - an assessment of impacts to the safety and function of the road network and the details of any road upgrades required for the expansion.

	• **biodiversity** – including a description of any potential vegetation clearing needed to undertake the expansion and any impacts on flora and fauna. • **visual** – including an impact assessment at private receptors and public vantage points. • **heritage** – including Aboriginal and non-Aboriginal cultural heritage.
Environmental Planning Instruments and other policies	The EIS must assess the proposal against the relevant environmental planning instruments, including but not limited to: • State Environmental Planning Policy (Transport and Infrastructure) 2021 • (Chapter 2) • State Environmental Planning Policy (Biodiversity and Conservation) 2021 • (Chapters 2 and 3) • State Environmental Planning Policy (Primary Production) 2021 • State Environmental Planning Policy (Resilience and Hazards) 2021 (Chapters 3 and 4) • Gwydir Local Environmental Plan 2013 • relevant development control plans and section 7.11 plans.
Guidelines	During the preparation of the EIS you should consult the Department's Register of Development Assessment Guidelines which is available on the Department's website at https://www.planning.nsw.gov.au/Assess-and-Regulate/Development-Assessment/Industries. Whilst not exhaustive, this Register contains some of the guidelines, policies, and plans that must be taken into account in the environmental assessment of the proposed development.

Consultation	During the preparation of the EIS, you must consult the relevant local, State and Commonwealth government authorities, service providers and community groups, and address any issues they may raise in the EIS. In particular, you should consult with the:
	• Department of Planning and Environment, specifically the:
	  ○ Environment and Heritage Group (formerly Environment, Energy and Science Group)
	  ○ Water Group
	  ○ Environment Protection Authority
	• Department of Regional NSW, specifically:
	  ○ Department of Primary Industries – Agriculture
	• Transport for NSW
	• NSW Rural Fire Service
	• WaterNSW
	• Toomelah Local Aboriginal Land Council
	• Gwydir Shire Council
	• the surrounding landowners and occupiers that are likely to be impacted by the proposal.
	Details of the consultation carried out and issues raised must be included in the EIS.

Further consultation after 2 years	If you do not lodge an application under Section 4.12(8) of the *Environmental Planning and Assessment Act 1979* within 2 years of the issue date of these SEARs, you must consult with the Planning Secretary in relation to any further requirements for lodgement.

DOC22/388141

23 May 2022

Dept of Planning and Environment
Industry Assessments
4 Parramatta Square - 12 Darcy St
PARRAMATTA NSW 2150

Attention: Ms Zoe Halpin

BY EMAIL: Zoe.Halpin@planning.nsw.gov.au

Dear Ms Halpin,

Thankyou for your request, received on 18 May 2022, for the Environment Protection Authority's (EPA) requirements for an Environmental Impact Statement (EIS) for the proposed expansion of the existing feedlot at 2513 Getta Getta Road North Star (Lot 8 DP 756018 & Lot 1 DP 1212915) – your reference being SEAR 1687.

The EPA understands the proposal involves the expansion of an existing feedlot to increase capacity from 999 head to 3,500 head with the associated additional infrastructure to be constructed as part of the proposal.

The EPA has considered the details of the proposal as provided by the Department of Planning and Environment and has identified the information it requires to issue its general terms of approval in **Attachment A**.

In summary, the EPA's key information requirements for the proposal include an adequate assessment of:

1. **Air** - odour and dust generation and management of potential impacts on adjacent residences.

2. **Water** - water management systems and the protection of surface and groundwater from runoff from feedlot pens, effluent storage, evaporation and terminal ponds, and the application of effluent and/or manure to soils on the premises.

3. **Sustainable effluent and manure utilisation** - ensure that any proposed application to site soils are sustainable in relation to hydraulic, nutrient and salt loads to prevent land, groundwater or surface water pollution and potential offsite impacts.

4. **Irrigation Method** - provide details of irrigation methods for effluent including consideration of pivot spray irrigation system to allow better control of irrigated effluent. This may also effect the size needed for terminal ponds to capture run-off from the irrigation areas after rainfall.

5. **Noise** - proximity to sensitive receptors and the impact of any noise sources associated with the project.

6. **Disposal of mortalities** - management of mortalities under normal operating conditions and in the event of a mass death scenario, to prevent odour emissions, contain pathogens, control vermin and disease vectors, and protect surface water and groundwater from pollution.

In carrying out the assessment, the proponent should refer to the relevant guidelines as listed in **Attachment A** and any relevant industry codes of practice and best practice management guidelines. The application of principles provided in the *National Guidelines for Beef Cattle Feedlots in Australia, 3rd Edition,* Meat and Livestock Australia should also be considered by the proponent to assist in mitigating air, odour, water quality and waste (mortalities) impacts associated with the proposal.

Based on the information provided to the EPA, the proponent will require an Environment Protection Licence to construct and operate the proposed feedlot if approval is granted. The proposed expansion meets the threshold requirements specified in clause 22 – Livestock intensive industries, in Schedule 1 of the *Protection of the Environment Operations Act 1997*.

General information on licence requirements can be obtained from the EPA's Environment Line by calling 131 555 or on the EPA's website at www.epa.nsw.gov.au/licensing/licencePOEO.htm.

To assist the EPA in assessing the proposal we request that the EIS follows the format of the Department of Planning and Environment EIS guidelines and addresses the EPA's specific environmental assessment requirements outlined in the following attachments.

If the necessary information is not adequately provided in the EIS then delays in the development assessment process may occur. The Proponent should be made aware that any commitments made in the EIS may be formalised as approval conditions and may also be placed as formal licence conditions.

The Proponent should be made aware that, consistent with provisions under Part 9.4 of the *Protection of the Environment Operations Act 1997* ("the Act") the EPA may require the provision of a financial assurance and/or assurances. The amount and form of the assurance(s) would be determined by the EPA and required as a condition of an Environment Protection Licence.

In addition, and as a requirement of an Environment Protection Licence if approval is granted, the EPA will require the Proponent to prepare, test and implement a Pollution Incident Response Management Plan and/or plans in accordance with Section 153 of the Act.

If you have any questions or wish to discuss anything further, please contact me on 131 555 or via email to info@epa.nsw.gov.au, marked to my attention.

Yours sincerely

REBECCA SCRIVENER
Head, Regional Operations Unit
Regulatory Operations Regional – West

ATTACHMENT A: Environmental Assessment Requirements – SEARS 1687 – Doolin Farming Pty Ltd – Feedlot Expansion – Gretta Gretta Road, North Star

1. Environmental impacts of the project

1.1. The EIS must address the requirements of Section 45 of the Protection of the Environment Operations Act 1997 (POEO Act) by determining the extent of each impact and providing sufficient information to enable the EPA to determine appropriate conditions, limits and monitoring requirements for an Environment Protection Licence (EPL).

1.2. Impacts related to the following environmental issues need to be assessed, quantified and reported on:

- **Air Issues**: air quality including dust generation and odour from the operation on the surrounding landscape and/or community;
- **Noise impacts** associated with operational noise particularly machinery and plant movements;
- **Waste** including general waste and animal mortalities.
- **Water and Soils** including effluent/manure utilisation options, water quality, catchment description and premise water balance.

The Environmental Assessment (EA) should address the specific requirements outlined under each heading below and assess impacts in accordance with the relevant guidelines mentioned.

2. Licensing requirements

2.1. The development is a scheduled activity under the *Protection of the Environment Operations Act 1997* (POEO Act) and will therefore require an Environment Protection Licence (EPL) if approval is granted.

2.2. Should project approval be granted, the proponent will need to make an application to the EPA for its EPL for the proposed facility prior to undertaking any on site works. Additional information is available through the *EPA Guide to Licensing* document (www.epa.nsw.gov.au/licensing/licenceguide.htm).

SPECIFIC ISSUES

3 Air issues

3.7. The EA must demonstrate the proposal's ability to comply with the relevant regulatory framework, specifically the *Protection of the Environment Operations (POEO) Act (1997)* and the *POEO (Clean Air) Regulation (2002)*. Particular consideration should be given to section 129 of the POEO Act concerning control of "offensive odour".

3.8. The EA must include an air quality impact assessment (AQIA).

3.9. The AQIA must be carried out in accordance with the document, *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW* (2005) http://www.epa.nsw.gov.au/resources/air/ammodelling05361.pdf.

3.10. The EA must detail emission control techniques/practices that will be employed at the site and identify how the proposed control techniques/practices will meet the requirements of the POEO Act, *POEO (Clean Air) Regulation* and associated air quality limits or guideline criteria.

3.11. Odour emissions must be assessed in accordance with the *Technical Framework - Assessment and Management of Odour from Stationary Sources in NSW* and/or *Technical Notes - Assessment and Management of Odour from Stationary Sources in NSW* (DEC, 2006).

4. Noise and Vibration

The EA must assess the following noise and vibration aspects of the proposed development

4.1. Construction noise associated with the proposed development should be assessed using the *Interim Construction Noise Guideline (*DECC, 2009). These are available at:https://www.epa.nsw.gov.au/your-environment/noise/industrial-noise/interim-construction-noise-guideline

4.2. Vibration from all activities (including construction and operation) to be undertaken on the premises should be assessed using the guidelines contained in the *Assessing Vibration: a technical guideline* (DEC, 2006). These are available at: https://www.epa.nsw.gov.au/your-environment/noise/industrial-noise/assessing-vibration

4.3. If blasting is required for any reasons during the construction or operational stage of the proposed development, blast impacts should be demonstrated to be capable of complying with the guidelines contained in *Australian and New Zealand Environment Council – Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration* (ANZEC, 1990).These are available at: https://www.epa.nsw.gov.au/your-environment/noise/industrial-noise/interim-construction-noise-guideline

4.4. Operational noise from all industrial activities (including private haul roads and private railway lines) to be undertaken on the premises should be assessed using the guidelines contained in the *NSW Noise Policy for Industry* (EPA, 2017). https://www.epa.nsw.gov.au/your-environment/noise/industrial-noise/noise-policy-for-industry-(2017)

4.5. Noise on public roads from increased road traffic generated by land use developments should be assessed using the guidelines contained in the *NSW Road Noise Policy* and associated application notes (EPA, 2011).https://www.epa.nsw.gov.au/your-environment/noise/transport-noise

5 Waste, chemicals and hazardous materials and radiation

1. The EA must assess all aspects of waste generation, management and disposal associated with the proposed development.

2. The EA must demonstrate compliance with all regulatory requirements outlined in the POEO Act and associated waste regulations.

3. The EA must identify, characterise and classify the following in accordance with the EPA's *Waste Classification Guidelines (2014)* and associated addendums:
   (i) all waste that will be generated onsite through excavation, demolition or construction activities, including proposed quantities of the waste;
   (ii) all waste that is proposed to be disposed of to an offsite location, including proposed quantities of the waste and the disposal locations for the waste. This includes waste that is intended for re-use or recycling.

Note: The EPA's W*aste Classification Guidelines (2014)* and associated addendums are available at: https://www.epa.nsw.gov.au/your-environment/waste/classifying-waste

5.4. The EA must outline contingency plans for any event that may result in environmental harm, such as excessive stockpiling of material, or dirty water volumes exceeding the storage capacity available on-site.

5.5. The EA must demonstrate that appropriate spill containment will be provided for storage, filling and loading of all fuels and other chemicals to be used on site, in accordance with the relevant Australian Standard.

5.6. Provide details of how waste will be handled and managed onsite, including:

a) Stockpile location and management

- Labelling of stockpiles for identification, ensuring that all waste is clearly identified and stockpiled separately from other types of material (especially the separation of any contaminated and non-contaminated waste).
- Proposed height limits for all waste to reduce the potential for dust and odour.
- Procedures for minimising the movement of waste around the site and double handling.
- Measures to minimise leaching from stockpiles into the surrounding environment, such as sediment fencing, geofabric liners and hardstands.

b) Mortality disposal arrangements

- Define disposal methods and locations for normal operations and possible mass death scenarios.
- Procedures for preventing the spread of pathogens or disease.
- Measures for protecting surface and/or groundwaters from pollution.
- Measures to prevent offensive odour generated by mortality disposal.
- Measures to control or prevent vermin and disease vectors.

5.7. The proponent should provide details of:

- how leachate from stockpiled waste material will be kept separate from stormwater runoff;
- treatment of leachate through a wastewater treatment plant (if applicable); and
- any proposed transport and disposal of leachate off-site.

6 Water and Soils

6.1. The EA must demonstrate how the proposed development will meet the requirements of section 120 of the POEO Act.

6.2. The EA must include a water balance for the development including water requirements (quantity, quality and source(s)) and proposed storm and wastewater disposal, including type, volumes, proposed treatment and management methods and re-use options.

6.3. If the proposed development intends to discharge waters to the environment, the EA must demonstrate how the discharge(s) will be managed in terms of water quantity, quality and frequency of discharge and include an impact assessment of the discharge on the receiving environment. This should include:

- Description of the proposal including position of any intakes and discharges, volumes, water quality and frequency of all water discharges.

- Description of the receiving waters including upstream and downstream water quality as well as any other water users.

- Demonstration that all practical options to avoid discharge have been implemented and environmental impact minimised where discharge is necessary.

6.4. The EA must include an assessment of potential impacts on soil and land resources, being guided by *Soil and Landscape Issues in Environmental Impact Assessment* (DLWC 2000). The nature and extent of any significant impacts should be identified. Mitigation and management options to minimise identified soil and land resource impacts should be described.

6.5. The EA must refer to Water Quality Objectives for the receiving waters and indicators and associated trigger values or criteria for the identified environmental values of the receiving environment. This information should be sourced from the ANZECC (2000) Guidelines for Fresh and Marine Water Quality (http://www.environment.gov.au/water/policy-programs/nwqms/).

6.6. The EA must describe how stormwater will be managed in all phases of the project, including details of how stormwater and runoff will be managed to minimise pollution. Information should include measures to be implemented to minimise erosion, leachate and sediment mobilisation at the site. The EA should consider the guidelines *Managing urban stormwater: soils and construction,* vol. 1 (Landcom 2004) and vol. 2 (A. Installation of services; B. Waste landfills C. Unsealed roads; D. Main Roads; E. Mines and quarries) (DECC, 2008).

6.7. Erosion, sediment and leachate control measures to be implemented to minimise erosion, leachate and sediment mobilisation at the site during construction and operation phases of the project. The EA should show the location of each measure to be implemented. Include such control measures such as:

- Sediment traps
- Diversion banks
- Sediment fences
- Bunds (earth, hay, mulch)
- Geofabric liners
- Other control measures as appropriate.

6.8. Assessment undertaken of the design of terminal pond systems to manage stormwater runoff (and if applicable tailwater) from any proposed effluent utilisation area to minimise water quality impacts on the nearest watercourses.

6.9. Discharges from the site must be characterised with respect to their location, frequency, volume and likely water quality.

6.10. The controlled drainage area including feedlot pens, manure stockpile/composting areas, catch drains, sedimentation and effluent storage/evaporation ponds and terminal pond systems must be protected from inundation during floods with an average recurrence interval of up to 1 in 100 years.

6.11. Feedlot pen surfaces and manure stockpile/composting areas and the walls and bases of any catch drains, sedimentation, effluent holding/evaporation/terminal ponds must incorporate an impermeable liner. Acceptable impermeable liners include:

- a clay or modified soil liner of at least 900mm of recompacted clay with an in-situ permeability (K) of less than 1 x 10-9 m/s.
- A natural geological barrier that is established by geotechnical investigations to provide a secure barrier between the groundwater, soil and substrata equivalent to the 900 mm recompacted clay liner above.

6.12. If the proposal incorporates effluent or manure application/utilisation to cropping lands on the premises, an assessment of the sustainability of these utilisation practices must be provided. The assessment must be undertaken in accordance with the *Environmental Guidelines for the Use of Effluent by Irrigation* (DEC, 2004).

The assessment must identify soil constraints where applicable to the application of manures and/or effluent and include nutrient balance and salt management assessments. Maps of proposed manure and/or effluent application areas must be provided in the EA.

6.13. The EA must describe any water quality monitoring programs to be carried out at the project site. Water quality monitoring should be undertaken in accordance with the *Approved Methods for the Sampling and Analysis of Water Pollutant in NSW* (2004) which is available at:
http://www.epa.nsw.gov.au/resources/legislation/approvedmethods-water.pdf.

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Department of Planning and Environment

Our ref: DOC22/397528
Your ref: SEAR1687

Zoe Halpin
Planning Officer
Industry Assessments
Department of Planning and Environment
Zoe.halpin@planning.nsw.gov.au

23 May 2022

Dear Ms Halpin

Feedlot (cattle feedlot expansion) – 2513 Getta Getta Rd, North Star (Lot 8 DP 756018 & Lot 1 DP 1212915)

I refer to your email dated 18 May 2022 seeking input into the Department of Planning and Environment's Environmental Assessment Requirements (EARs) for the preparation of an Environmental Impact Assessment (EIS) for Feedlot (cattle feedlot expansion), 2513 Getta Getta Road, North Star.

The Biodiversity, Conservation and Science Directorate (BCS) has considered your request and provides EARs for the proposed development in **Attachments A** and **B**.

BCS recommends the EIS needs to appropriately address the following:

1. Biodiversity and offsetting
2. Water and soils
3. Flooding

If you have any questions about this advice, please do not hesitate to contact Michelle Howarth, Senior Conservation Planning Officer, via michelle.howarth@environment.nsw.gov.au or (02) 6883 5339.

Yours sincerely,

Samantha Wynn

Samantha Wynn
Senior Team Leader Planning North West
Biodiversity, Conservation and Science Directorate

23 May 2022

Attachment A - Environmental Assessment Requirements

Attachment B - Guidance Material

ATTACHMENT A

BCS's Recommended Environmental Assessment Requirements (EARs) for Feedlot (expansion)

BCS	Biodiversity, Conservation and Science Directorate of the NSW Department of Planning and Environment
The Department	NSW Department of Planning and Environment
NPWS	National Parks and Wildlife Service

1. The Proposal

All components of the proposed development must be clearly described, including:

- the location of the proposed development and its context in the locality
- the rationale for the project
- the size, scale and type of the proposed development
- the pre-construction, construction, operational, and, where relevant, decommissioning and rehabilitation phases of the proposed development, and the methods proposed to implement these phases
- plans and maps of the proposed development showing the locations of relevant phases and infrastructure
- the staging and timing of the proposed development
- the proposed development's relationship to any other proposals and developments

2. Environmental Impacts of the Proposal

The proponent must consider, assess, quantify and report on the likely environmental impacts of the proposal if applicable, particularly:

- Biodiversity
- National Park estate: land reserved or acquired under the *National Parks and Wildlife Act 1974*
- Flooding and floodplain issues
- Cumulative impacts

The Secretary's Environmental Assessment Requirements should address the specific requirements outlined under each heading below and assess impacts in accordance with the relevant guidelines mentioned.

A full list of guidelines and reference material is presented in **Attachment B**. Appropriate justification should be provided in instances where the matters below are not addressed.

3. Biodiversity

Biodiversity Assessment Methodology for the Biodiversity Offsets Scheme (BOS)

The EIS should include an assessment of the following:

a. The EIS must assess the impact of the proposed development on biodiversity values to determine if the proposed development is "likely to significantly affect threatened species"

for the purposes of Section 7.2 of the Biodiversity Conservation Act 2016 (BC Act), as follows:

a. The EIS must demonstrate and document how the proposed development exceeds, or does not exceed, the biodiversity offsets scheme threshold as set out in Section 7.4 of the BC Act 2016 and Clause 7.1 of the Biodiversity Conservation Regulation 2017 (BC Regulation) by determining whether the proposed development involves:

    i. **The clearing of native vegetation exceeding the thresholds** listed under Clause 7.23 of the BC Regulation, **or**

    ii. The clearing of native vegetation, or other action, **on land included on the Biodiversity Values Map** published under Clause 7.23 of the BC Regulation (this map includes areas of outstanding biodiversity value, as declared under Section 3.1 of the BC Act).

b. If the proposal does not trigger any of the criteria in (a) above, then the EIS must determine whether the proposed development is likely to have a significant impact based on '*the test for determining whether proposed development likely to significant affect threatened species or ecological communities'* in Section 7.3 of the BC Act.

c. Where there is reasonable doubt regarding potential impacts, or where information is not available, then a significant impact upon biodiversity should be considered likely when applying the test in Section 7.3 of the BC Act. Where it is concluded that there is no significant impact, the EIS must justify how the conclusion has been reached.

d. If the development exceeds the thresholds in (a) or (b), then the EIS must be accompanied by a biodiversity development assessment report (BDAR) prepared in accordance with Part 6 of the BC Act. That is, the Biodiversity Assessment Methodology applies.

Required Information

Where development is considered "likely to significantly impact on threatened species" and a Biodiversity Development Assessment Report is required, the following requirements apply:

- Biodiversity impacts related to the proposal are to be assessed in accordance with the Biodiversity Assessment Method 2020 and documented in a Biodiversity Development Assessment Report (BDAR). The BDAR must include information in the form detailed in the *Biodiversity Conservation Act 2016* (s6.12), Biodiversity Conservation Regulation 2017 (s6.8) and Biodiversity Assessment Method.
- The BDAR must document the application of the avoid, minimise and offset hierarchy including assessing all direct, indirect, uncertain and prescribed impacts in accordance with the Biodiversity Assessment Method.
- The BDAR must include details of the measures proposed to address the offset obligation as follows:
    - The total number and classes of biodiversity credits required to be retired for the proposal.
    - The number and classes of like-for-like biodiversity credits proposed to be retired.
    - The number and classes of biodiversity credits proposed to be retired in accordance with the variation rules.
    - Any proposal to fund a biodiversity conservation action.
    - Any proposal to make a payment to the Biodiversity Conservation Fund.
- If seeking approval to use the variation rules, the BDAR must contain details of the reasonable steps that have been taken to obtain requisite like-for-like biodiversity credits.

The BDAR must be prepared by a person accredited to apply the Biodiversity Assessment Method under s6.10 of the *Biodiversity Conservation Act 2016*.

NOTE – A BDAR template and guidance document has been created to assist accredited assessors to prepare a BDAR. It has been developed in accordance with best practice, the minimum information requirements and to support BDAR reviewers. The BDAR Template can be found here and the Guidance for the BDAR Template can be found here.

Where a BDAR is not required and a threatened species assessment is prepared to support a conclusion of "no significant impact", the EIS must include a field survey of land identified as native vegetation and/or native species habitat inclusive of non-vegetative habitat, namely, karst, caves, crevices, cliffs, rocky outcrops and other features of geological significance and habitat associated with human made structures. This should be conducted and documented in accordance with the relevant guidelines including the Threatened Species Survey and Assessment Guidelines: Field Survey Methods for Fauna – Amphibians (DECCW, 2009), Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities - Working Draft (DEC, 2004) and Guidelines for Threatened Species Assessment (Dept Planning, July 2005). The approach should also reference the field survey methods and assessment information on the Department of Planning, Industry and Environment website including the BioNet Atlas, Threatened Species Profiles, taxon specific survey guidelines and BioNet Vegetation Classification (see Attachment 2).

Category 1 – exempt land

Clearing of native vegetation on land that meets the definition of Category 1 - exempt land (as defined under the Local Land Services Act 2013 (LLS Act)) does not require assessment or offsetting under the Biodiversity Conservation Act 2016. Prescribed impacts as outlined in chapter 6 of the Biodiversity Assessment Method (2020) must still be considered on Category 1 - exempt land. In addition, potential impacts to Matters of National Environmental Significance under the Environment Protection and Biodiversity Conservation Act 1999 on Category 1 – exempt land must be considered.

Section 60F Local Land Services Act 2013 (LLS Act) Act provides the transitional arrangements that are in place until a comprehensive NVR Map with all the land categories is published. During the 'transitional period' assessors can make a reasonable approximation of land categorisation for unpublished layers, in consultation with the landholder.

Where a reasonable approximation is required, it is recommended that:

- assessors first identify whether land meets criteria for Category 2 - Regulated Land, prior to Category 1 - Exempt Land.
    - In some circumstances, land may meet multiple map criteria i.e. criteria for Category 2 - Regulated Land, AND Category 1 - Exempt Land
    - In most circumstances' Category 2 - Regulated Land criteria will determine the categorisation of the land, rather than Category 1 - Exempt Land criteria.

Section 60I of the LLS Act defines the criteria in which land can be classified as Category 2 Regulated Land, this includes land which:

- was not cleared of native vegetation as at 1 January 1990;
- was unlawfully cleared of native vegetation between 1 January 1990 and 25 August 2017;
- contains native vegetation that was grown or preserved with the assistance of public funds (other than funds for forestry purposes);
- contains grasslands that are not low conservation grasslands;
- is subject to a private land conservation agreement;

- is a 'set aside' under a Land Management (Native Vegetation) Code;
- is an offset under a property vegetation plan or a set aside under the former native vegetation laws;
- is subject to an approved conservation measure that was the basis for other land being biocertified;
- is identified as coastal wetlands or littoral rainforest;
- is identified as koala habitat;
- is a declared RAMSAR wetland; or
- is mapped as containing Critically Endangered species of plants or a Critically Endangered Ecological Community

The above criteria are inclusive of both Category 2 Vulnerable Regulated Land and Sensitive Regulated Land categories.

Where an assessor identifies land that does not meet the criteria for Category 2 Vulnerable or Sensitive Regulated land, the assessor should then assess whether or not the land meets the definition of Category 1 – exempt land.

Where the assessor identifies land as Category 1 – exempt land it must be adequately demonstrated that the identified land meets the criteria as set out in section 60H of the LLS Act. Multiple pieces of evidence should be used to demonstrate a Category 1 – exempt land designation. This might include:

- Publicly available data sets on the SEED data portal, such as:
  - Land use mapping – used to identify and map existing and historical agricultural land use in NSW – see the 2017 landuse map
  - Woody vegetation extent – used to identify and map native vegetation extent – see 2008 Woody extent 2011 woody extent
  - State-wide Landcover and Tree Survey (SLATS) woody clearing for NSW – used to identify detectable clearing events since January 1990 – available here
- Published information on the Native Vegetation Regulatory Map, including Category 2-sensitive regulated, Category 2-vulnerable regulated, and excluded land - available here
- Site-based information and records, including:
  - Current and historical high-resolution aerial photography
  - current and historical photographs of the subject land
  - historical land management records maintained by the landowner
  - vegetation survey data collected on the subject land
  - documentation demonstrating history of authorised clearing and/or development

The published *Native Vegetation regulatory map: method statement* should be reviewed to determine how the datasets can be best interrogated to support any identification of Category 1 – exempt land.

Where there is uncertainty or datasets/information are conflicting, a precautionary approach should be applied and the land should be categorised as Category 2 – regulated land.

Where Category 1 – exempt land is likely to be present on a development site, early engagement with BCS is encouraged. Prior to the Biodiversity Development Assessment Report being submitted to the consent authority, the accredited assessor should submit a proposed land categorisation method to the BCS North West Planning team at *rog.nw@environment.nsw.gov.au* for endorsement.

4. NPWS Managed Estate

Land reserved or acquired under the *National Parks and Wildlife Act 1974* (NPW Act)

If the proposed development is within, adjacent to, or in close proximity to, NPWS managed conservation estate (e.g. a national park, nature reserve, state conservation area, land which is declared wilderness under the *Wilderness Act 1987*), or is within, adjacent to, or in close proximity to, a watercourse that flows directly into NPWS managed conservation estate, then the EIS must address impacts upon such area/s.

Where NPWS managed estate is likely to be impacted, the EIS should include:

- The following (as appropriate):
  - Evidence that the proponent has consulted with BCS on the legal permissibility of the proposal under the NPW Act.
  - In the case of proposals on land declared as wilderness under the *Wilderness Act 1987*, evidence that the proponent has consulted with BCS on the appropriateness of the proposal. That is, whether it is consistent with the objects of the *Wilderness Act 1987* (section 3) and the management principles for wilderness areas (section 9).
  - Alternative options that have been explored to avoid impacts on the NPWS managed estate (on-park) and a clear justification of any on-park components of the proposal.
  - If on-park impacts are considered unavoidable, consideration of the issues, including details of any compensation proposal, consistent with the Department's *Revocation, Recategorisation and Road Adjustment Policy* (2012) for proposals that are located wholly or partly in a National Park or other land acquired or reserved under the *National Parks and Wildlife Act 1974*.
- Consideration of the matters identified in the *Guidelines for consent and planning authorities for Developments adjacent to National Parks and Wildlife Service Land* (NPWS, 2020) where a proposal adjoins or is immediate vicinity of NPWS managed estate, or is upstream of NPWS managed estate, which include:
  - The nature of the impacts, including direct and indirect impacts
  - The extent of the direct and indirect impacts
  - The duration of the direct and indirect impacts
  - The objectives of the reservation of the land
- A description of the mitigation and management options that will be used to prevent, control, abate or minimise identified direct and indirect impacts associated with the proposal. This should include an assessment of the effectiveness and reliability of the measures and any residual impacts after these measures are implemented.

5. Water

- The EIS must map features relevant to water, including:
  - Rivers, streams, estuaries (as described in s4.2 of the Biodiversity Assessment Method).
  - Wetlands (as described in s4.2 of the Biodiversity Assessment Method).
  - Groundwater.
  - Groundwater dependent ecosystems.
- The EIS must describe background conditions for any water resource likely to be affected by the proposal, including:
  - Existing surface and groundwater.
  - Hydrology

- Water Quality Objectives (as endorsed by the NSW Government) including groundwater as appropriate that represent the community's uses and values for the receiving waters. Indicators and trigger values/criteria for the identified environmental values in accordance with the ANZECC (2000) *Guidelines for Fresh and Marine Water Quality* and / or local objectives, criteria or targets endorsed by the NSW Government
- *Risk-based Framework for Considering Waterway Health Outcomes in Strategic Land-use Planning Decisions* (OEH/EPA, 2017).

- The EIS must assess the impacts of the proposal on water quality, including:
  - The nature and degree of impact on receiving waters for both surface and groundwater, demonstrating how the proposal protects the Water Quality Objectives where they are currently being achieved, and contributes towards achievement of the Water Quality Objectives over time where they are currently not being achieved. This should include an assessment of the mitigating effects of proposed stormwater and wastewater management during and after construction.
  - Identification of proposed monitoring of water quality.
  - Consistency with any relevant certified Coastal Management Program (or Coastal Zone Management Plan).

- The EIS must assess the impact of the proposal on hydrology, including:
  - Water balance including quantity, quality and source.
  - Effects upon rivers, wetlands, estuaries, marine waters and floodplain areas.
  - Effects upon water-dependent fauna and flora including groundwater dependent ecosystems.
  - Impacts to natural processes and functions within rivers, wetlands, estuaries and floodplains that affect river system and landscape health such as nutrient flow, aquatic connectivity and access to habitat for spawning and refuge (e.g. river benches).
  - Changes to environmental water availability, both regulated / licensed and unregulated / rules-based sources of such water.

6. Flooding

- The EIS must map the following features relevant to flooding as described in the Floodplain Development Manual 2005 (NSW Government 2005) including:
  - Flood prone land (ie land susceptible to the probable maximum flood event).
  - Flood planning area, the area below the flood planning level.
  - Hydraulic categorisation (floodway and flood storage areas).
  - Flood hazard.

- The EIS must describe flood assessment and modelling undertaken in determining the design flood levels for events, including a minimum of the 10% Annual Exceedance Probability (AEP), 1% AEP flood levels and the probable maximum flood, or an equivalent extreme event.

- The EIS must model the effect of the proposal (including fill) on the current flood behaviour for a range of design events as identified above, and the 0.5% AEP and 0.2% AEP year flood events as proxies for assessing sensitivity to an increase in rainfall intensity of flood producing rainfall events due to climate change.

- All site drainage, stormwater quality devices and erosion / sedimentation control measures should be identified in the EIS and the onsite treatment of stormwater and effluent runoff and predicted stormwater discharge quality from the proposal should be detailed.

- Modelling in the EIS must consider and document:
  - Existing council flood studies in the area and examine consistency to the flood behaviour documented in these studies.

- The impact on existing flood behaviour for a full range of flood events including up to the probable maximum flood (PMF), or an equivalent extreme flood.
- Impacts of the proposal on flood behaviour resulting in detrimental changes in potential flood affection of other developments or land. This may include redirection of flow, flow velocities, flood levels, hazard categories and hydraulic categories.
- Impacts of earthworks and stockpiles within the flood prone land up to the PMF level. The assessment should be based on understanding of cumulative flood impacts of construction and operational phases.
- Relevant provisions of the NSW Floodplain Development Manual 2005.

- The EIS must assess the impacts on the proposal on flood behaviour, including:
  - Whether there will be detrimental increases in the potential flood affectation of other properties, assets and infrastructure.
  - Consistency with Council floodplain risk management plans.
  - Consistency with any Rural Floodplain Management Plans.
  - Compatibility with the flood hazard of the land.
  - Compatibility with the hydraulic functions of flow conveyance in floodways and storage in flood storage areas of the land.
  - Whether there will be adverse effect to beneficial inundation of the floodplain environment, on, adjacent to or downstream of the site.
  - Whether there will be a direct or indirect increase in erosion, siltation, destruction of riparian vegetation or a reduction in the stability of river banks or watercourses.
  - Appropriate mitigation measures to offset potential flood risk arising from the proposal. Any proposed mitigation work should be modelled and assessed on the overall catchment basis in order to ensure it fits its purpose and meets the criteria of the Council where it is located, and to ensure it has no adverse impact to surrounding areas.
  - Any impacts the proposal may have upon existing community emergency management arrangements for flooding. These matters are to be discussed with the NSW SES and Council.
  - Whether the proposal incorporates specific measures to manage risk to life from flood. These matters are to be discussed with the NSW SES and Council.
  - Emergency management, evacuation and access, and contingency measures for the proposal during both construction and operational phases considering the full range of flood risk (based upon the probable maximum flood or an equivalent extreme flood event). These matters are to be discussed with and have the support of Council and the NSW SES.
  - Any impacts the proposal may have on the social and economic costs to the community as a consequence of flooding.

Guidance Material

Title	Web address
	Relevant Legislation
Biodiversity Conservation Act 2016	*https://www.legislation.nsw.gov.au/view/html/inforce/current/act-2016-063*
Commonwealth Environment Protection and Biodiversity Conservation Act 1999	*https://www.legislation.gov.au/Details/C2014C00140/Download*
Environmental Planning and Assessment Act 1979	*https://www.legislation.nsw.gov.au/view/html/inforce/current/act-1979-203*
Fisheries Management Act 1994	*https://www.legislation.nsw.gov.au/view/html/inforce/current/act-1994-038*
National Parks and Wildlife Act 1974	*https://www.legislation.nsw.gov.au/view/html/inforce/current/act-1974-080*
Protection of the Environment Operations Act 1997	*https://www.legislation.nsw.gov.au/view/html/inforce/current/act-1997-156*
Water Management Act 2000	*https://www.legislation.nsw.gov.au/view/html/inforce/current/act-2000-092*
Wilderness Act 1987	*https://www.legislation.nsw.gov.au/view/html/inforce/current/act-1987-196*
	Biodiversity
Biodiversity Values Map	*https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=BVMap*
Biodiversity Assessment Method (OEH, 2020)	*https://www.environment.nsw.gov.au/research-and-publications/publications-search/biodiversity-assessment-method-2020*
Biodiversity Development Assessment Report Template	*https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Biodiversity/biodiversity-development-assessment-report-template-220210.docx?la=en&hash=1A4829C7ACA5A51ECE414A767C27361893706CEC*
Guidance for the Biodiversity Development Assessment Report Template	*https://www.environment.nsw.gov.au/research-and-publications/publications-search/guidance-for-the-biodiversity-development-assessment-report-template*
Changes to the Biodiversity Assessment Method from 2017 to 2020	*https://www.environment.nsw.gov.au/research-and-publications/publications-search/changes-to-the-biodiversity-assessment-method-from-2017-to-2020*
BAM 2020 Operational Manual Stage 1	*https://www.environment.nsw.gov.au/research-and-publications/publications-search/biodiversity-assessment-manual-2020-operational-manual-stage-1*
BAM Operational Manual Stage 2	*https://www.environment.nsw.gov.au/research-and-publications/publications-search/biodiversity-assessment-method-operational-manual-stage-2*

Title	Web address
BAM 2020 Operational Manual Stage 3	*https://www.environment.nsw.gov.au/research-and-publications/publications-search/biodiversity-assessment-method-operational-manual-stage-3*
BAM Calculator User Guide	*https://www.environment.nsw.gov.au/research-and-publications/publications-search/biodiversity-assessment-method-user-guide*
Serious and irreversible impacts of development on biodiversity	*https://www.environment.nsw.gov.au/topics/animals-and-plants/biodiversity/biodiversity-offsets-scheme/serious-and-irreversible-impacts*
Practice Note - Guidance for assessors and decision makers in applying modified benchmarks to assessments of vegetation integrity: Biodiversity Assessment Method	*https://www.environment.nsw.gov.au/research-and-publications/publications-search/guidance-assessors-decision-makers-applying-modified-benchmarks-to-assessments-vegetation-integrity*
Guidance and Criteria to assist a decision maker to determine a serious and irreversible impact (OEH, 2017)	*https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Biodiversity/guidance-decision-makers-determine-serious-irreversible-impact-190511.pdf*
Accreditation Scheme for Application of the Biodiversity Assessment Method Order 2017	*https://www.legislation.nsw.gov.au/view/pdf/asmade/sl-2017-471*
Ancillary rules: Biodiversity conservation actions	*https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Biodiversity/ancillary-rules-biodiversity-conservation-actions-170496.pdf*
Ancillary rules: Reasonable steps to seek like-for-like biodiversity credits for the purpose of applying the variation rules	*https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Biodiversity/ancillary-rules-reasonable-steps-like-for-like-biodiversity-credits-170498.pdf*
Ancillary rules: Impacts on threatened species and ecological communities excluded from application of variation rules	*https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Biodiversity/ancillary-rules-impacts-on-threatened-entities-excluded-from-variation-170497.pdf?la=en&hash=C38840BFF49F012433532DF72E3D90C741E4DAC1*
The Department's Threatened Species Website	*https://www.environment.nsw.gov.au/topics/animals-and-plants/threatened-species*
NSW BioNet (Atlas of NSW Wildlife)	*www.bionet.nsw.gov.au/*
Surveying Threatened Plants and their Habitats - NSW Survey Guide For The Biodiversity Assessment Method (DPIE 2020).	*https://www.environment.nsw.gov.au/research-and-publications/publications-search/surveying-threatened-plants-and-their-habitats-survey-guide-for-the-biodiversity-assessment-method*
Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities - November 2004	*https://www.environment.nsw.gov.au/surveys/BiodiversitySurveyGuidelinesDraft.htm*
Threatened species survey and assessment guidelines: field survey methods for fauna – amphibians	*https://www.environment.nsw.gov.au/research-and-publications/publications-search/threatened-species-field-survey-methods-for-fauna-amphibians*

Title	Web address
NSW Survey Guide for Threatened Frogs	*https://www.environment.nsw.gov.au/research-and-publications/publications-search/nsw-survey-guide-for-threatened-frogs*
Surveying 'species credit' threatened bats and their habitats – NSW survey guide for the Biodiversity Assessment Method	*https://www.environment.nsw.gov.au/research-and-publications/publications-search/species-credit-threatened-bats-nsw-survey-guide-for-biodiversity-assessment-method*
Bat calls of NSW - region-based guide to the echolocation calls of Microchiropteran bats	*https://www.environment.nsw.gov.au/surveys/Batcalls.htm*
Community Biodiversity Survey Manual	*https://www.environment.nsw.gov.au/surveys/CommunityBiodiversitySurveyManual.htm*
BioNet Vegetation Classification - NSW Plant Community Type (PCT) database	*www.environment.nsw.gov.au/research/Vegetationinformationsystem.htm*
The Departments Data Portal (access to online spatial data)	*http://data.environment.nsw.gov.au/*
Fisheries NSW policies and guidelines	*https://www.dpi.nsw.gov.au/fishing/habitat/publications/pubs/fish-habitat-conservation*
National Park Estate	
Guidelines for consent and planning authorities for Developments adjacent to National Parks and Wildlife Service Land (NPWS, 2020)	*https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Parks-reserves-and-protected-areas/Development-guidelines/developments-adjacent-npws-lands-200362.pdf*
List of national parks	*https://www.nationalparks.nsw.gov.au/conservation-and-heritage/national-parks*
Revocation, recategorisation and road adjustment policy (OEH, 2012)	*http://www.environment.nsw.gov.au/policies/RevocationOfLandPolicy.htm*
List of aquatic reserves	*www.dpi.nsw.gov.au/fisheries/habitat/protecting-habitats/mpa*
Water	
Water Quality Objectives	*http://www.environment.nsw.gov.au/ieo/index.htm*
ANZECC & ARMCANZ (2000) Water Quality Guidelines	*https://www.waterquality.gov.au/anz-guidelines/resources/previous-guidelines/anzecc-armcanz-2000*
Risk-based Framework for Considering Waterway Health Outcomes in Strategic Land-use Planning Decisions	*http://www.environment.nsw.gov.au/research-and-publications/publications-search/risk-based-framework-for-considering-waterway-health-outcomes-in-strategic-land-use-planning*
Applying Goals for Ambient Water Quality Guidance for Operations Officers – Mixing Zones	*http://deccnet/water/resources/AWQGuidance7.pdf*
Approved Methods for the Sampling and Analysis of Water Pollutant in NSW (2004)	*http://www.environment.nsw.gov.au/resources/legislation/approvedmethods-water.pdf*
Flooding	
Floodplain development manual	*http://www.environment.nsw.gov.au/floodplains/manual.htm*

Title	Web address
Floodplain Risk Management Guidelines	*http://www.environment.nsw.gov.au/topics/water/coasts-and-floodplains/floodplains/floodplain-guidelines*
NSW Climate Impact Profile	*http://climatechange.environment.nsw.gov.au/*
Climate Change Impacts and Risk Management	*https://www.environment.gov.au/climate-change/adaptation/publications/climate-change-impact-risk-management*

Rod Davis

From: Paul Garnett <paul.garnett@dpi.nsw.gov.au>
Sent: Wednesday, 10 January 2024 11:06 AM
To: Rod Davis
Cc: Nita Scott
Subject: RE: EIS Consultation - Proposed expansion of beef cattle Feedlot - Doolin Farming Pty Ltd - 2513 Getta Getta Rd, North Star - L8 DP756018 & L21 DP1212915

Hello Rod,
Thank you for your email and the opportunity to provide input into the preparation of the environmental impact statement (EIS) for the expansion of the feedlot at 2513 Getta Getta Rd.

DPI's Agricultural Land Use Planning Officer for the New England North West Region, Nita Scott, has previously provided advice to Mitch Furness on the matters that DPI expects will be detailed in the EIS for this project. Nita is busy with other work at the moment and has asked me to respond.

NSW DPI Agriculture does not have a legislative role in the assessment and determination of development applications however it is common for consent authorities to refer proposals for feedlots to DPI Agriculture for advice.

DPI Agriculture's Land Use Planning team will typically consider planning issues such as site suitability, and potential impacts on or from adjoining land uses, including other agricultural land uses. DPI's Intensive Livestock team will review issues relating to the management of the facility such as animal welfare, and manure/effluent management while DPI's Biosecurity and Food Safety team will provide input into any potential biosecurity issues that may arise.

Therefore the matters that DPI Agriculture generally requests be included in an EIS for a feedlot include the following:

Site Selection including access to waters, soils, drainage, shelter, impacts on neighbours, vehicle access and chemical residues.

- An assessment of the soils on the site to indicate its appropriateness for the proposed feedlot pens and the re-use of effluent/manure.
- Detail the potential impacts from the proposed development on agricultural land and agricultural land uses, support services, processing and value adding industries on the site and in the locality.
- Demonstrate that all significant impacts on neighbouring properties from an odour, visual, noise and dust and any impacts on current and potential agricultural developments and resources can be reasonably avoided or adequately mitigated.
- A Land Use Conflict Risk Assessment is expected to be prepared to identify potential impacts on neighbouring properties, both residential and agricultural, and vice versa. DPI's latest factsheet is at https://www.dpi.nsw.gov.au/agriculture/lup/development-assessment/development-assessment2/lucra
- Demonstrate that a power supply which is reliable, adequate, and sufficient for farm requirements will be available or detail the necessary infrastructure required to achieve this. This includes access to 3 phase power, back up arrangements in the event of power failure and sufficient power for potential future farm expansion.
- Detail the estimated water demand and water availability and the source of water and any sanitisation methods proposed. Water must meet standards detailed in the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2000) and the National Guidelines for Beef Cattle Feedlots in Australia, 3rd Edition. NSW DPI recommends backup of at least 2 days total water requirement in case of breakdown or loss of supply with a stronger preference for seven days' supply.
- Outline any impacts to water use for agriculture on nearby land, particularly key water resources and measures to mitigate against these impacts.

Stock density and management of impacts

- Detail of stocking density and effluent disposal which are critical considerations in terms of land use and impacts on water resources.

Pen Construction

- The proposal should demonstrate that pens are located, designed, and managed to meet animal welfare standards and Best Practice Management as outlined in the industry guidelines.

Feed and Water Management

- Detail of where feed will be obtained, either on site or imported and if imported the traffic movements required and how the facility will satisfy industry nutrition standards.

Yard Management

- Detail how effluent and waste will be effectively stored, handled, and recycled or disposed of in a lawful manner to protect environmental values and biosecurity.
- Where the proposed development is located within 100m of an intermittently flowing creek the potential for deposition and movement of nutrients in the production area (including range area) is to be addressed.
- Provide details of any proposed reuse areas. Design of reuse areas is to include a reuse management plan based on a nutrient budget that considers proposed annual volumes and nutrient loads, soil types, current soil nutrient levels and pasture use rates. This is considered to be important given the more than 3 fold increase in the size of the facility.

Animal Health and Welfare

- Demonstrate how the proposed development will:
  - comply with the Animal Welfare Standards: Land transport, Cattle and Loading
  - provide all weather access or provisions on site to provide adequate food for the livestock for the duration of a flood event if applicable
  - manage sick livestock or disease
  - suitably manage and mitigate the heat loading risk after undertaking a heat loading risk assessment using ALFA Risk Assessment Program.

Dead Animal Management

- Details of dead animal management and disposal must be fully detailed. If onsite disposal is proposed the management facility and operations must be fully documented.

Biosecurity Matters Generally and Specifically as they relate to the Feedlot.

- Detail a biosecurity response plan to deal with identified risks as well as contingency plans for any failures as described in the National Biosecurity Manual for Beef Cattle Feedlots. Including monitoring and mitigation measures in disease (in particular Q Fever), weed and pest management plans.

It is expected that the EIS will demonstrate consistency with the *National guidelines for beef cattle feedlots in Australia, 3rd edition*.

The following table contains some links to resources prepared by DPI and the industry which may be of assistance.

Title	**Website link**
Land Use Conflict Risk Assessment Guide	https://www.dpi.nsw.gov.au/agriculture/lup/development-assessment2/lucra
Planning Guidelines, Intensive Livestock Agriculture Development	https://www.planning.nsw.gov.au/-/media/Files/DPE/Guidelines/Policy-and-legislation/Primary-Production/planning-guidelines-intensive-livestock-agricultural-development-2019-02-28.pdf?la=en

Title	**Website link**
Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2000)	https://www.waterquality.gov.au/guidelines/anz-fresh-marine
National Guidelines for Beef Cattle Feedlots in Australia, 3rd Edition	https://www.feedlots.com.au/_files/ugd/f25d7a_e63ccd7008c34ccc94e4d278713d5
National Biosecurity Manual for Beef Cattle Feedlots	http://www.farmbiosecurity.com.au/industry/lot-feeding/
ALFA Industry Resources	https://www.feedlots.com.au/resources
Australian Animal Welfare Standards and Guidelines	http://animalwelfarestandards.net.au/
National Beef Cattle Feedlot Environmental Code of Practice	https://www.feedlots.com.au/_files/ugd/f25d7a_9f5490f89b894f4cb3d8fdcadd5f37

Please don't hesitate to contact me on the phone number below should you wish to discuss any of the above .

Sincerely

Paul Garnett
Agricultural Landuse Planning Officer
Primary Industries
Department of Regional NSW

M 0429 864 501 **E** paul.garnett@dpi.nsw.gov.au

dpi.nsw.gov.au

16 Experiment Farm Road, TRENAYR, 2460
PMB 2 GRAFTON 2460

NSW GOVERNMENT
Department of Primary Industries
Department of Regional NSW

We stand on Country that always was and always will be Aboriginal land. We acknowledge the Traditional Custodians of the land and waters, and we show our respect for Elders past, present and emerging. We are committed to providing places in which Aboriginal people are included socially, culturally and economically through thoughtful and collaborative approaches to our work.

From: Rod Davis <rod.davis@rdcengineers.com.au>
Sent: Monday, 8 January 2024 3:30 PM
To: DPI Landuse Ag Mailbox <landuse.ag@dpi.nsw.gov.au>
Cc: Paul Garnett <paul.garnett@dpi.nsw.gov.au>

Subject: EIS Consultation - Proposed expansion of beef cattle Feedlot - Doolin Farming Pty Ltd - 2513 Getta Getta Rd, North Star - L8 DP756018 & L21 DP1212915

Good afternoon Paul,

We act for Doolin Farming Pty Ltd in relation to the above matter.

Doolin Farming Pty Ltd own and operate a 999 head beef cattle feedlot on the property "Springfield" located at 2513 Getta Getta Road, North Star within the Gwydir Shire.

Doolin Farming Pty Ltd proposes to expand the existing beef cattle feedlot from 999 head to 3,500 head.

A Request for the Planning Secretary's Requirements for the preparation of an Environmental Impact Statement was made on the **21st of January 2022**. The Planning Secretary's Environmental Assessment Requirements (SEAR) 1687 was received on the **2nd of June 2022**.

During the preparation of the EIS, direct consultation with relevant local, State and Commonwealth government authorities, service providers and community groups is required to identify and address any issues they may raise in the EIS.

In preparing the EIS, Doolin Farming Pty Ltd wish to consult with The Department of Regional NSW – Department of Primary Industries – Agriculture in relation to any issues they may raise in respect of the proposed development and/or additional requirements for the EIS.

Please refer to the attached document for further information.

Regards,

Rod Davis
Director
—
0427629203
rod.davis@rdcengineers.com.au

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Appendix B.5

Consultation with Transport for NSW (TfNSW)

Rod Davis

From:	Rod Davis <rod.davis@rdcengineers.com.au>
Sent:	Monday, 8 January 2024 2:21 PM
To:	'development.north@transport.nsw.gov.au'
Subject:	EIS Consultation - Proposed expansion of beef cattle Feedlot - Doolin Farming Pty Ltd - 2513 Getta Getta Rd, North Star - L8 DP756018 & L21 DP1212915
Attachments:	EIS Cattle Feedlot Doolin Farming 2513 Getta Getta Road North Star E2-103 DF-SFFL-TfNSW-20240108.pdf

Good afternoon,

We act for Doolin Farming Pty Ltd in relation to the above matter.

Doolin Farming Pty Ltd own and operate a 999 head beef cattle feedlot on the property "Springfield" located at 2513 Getta Getta Road, North Star within the Gwydir Shire.

Doolin Farming Pty Ltd proposes to expand the existing beef cattle feedlot from 999 head to 3,500 head.

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During the preparation of the EIS, direct consultation with relevant local, State and Commonwealth government authorities, service providers and community groups is required to identify and address any issues they may raise in the EIS.

In preparing the EIS, Doolin Farming Pty Ltd wish to consult with Transport for New South Wales (TfNSW) in relation to any issues they may raise in respect of the proposed development and/or additional requirements for the EIS.

Please refer to the attached document for further information.

Regards,

Rod Davis
Director
—
0427629203
rod.davis@rdcengineers.com.au

RDC ENGINEERS | AGRICULTURAL ENVIRONMENTAL PROJECT MANAGEMENT

Rod Davis

From: Shelby Wells <Shelby.Wells@transport.nsw.gov.au>
Sent: Monday, 22 January 2024 9:59 AM
To: 'Rod Davis'
Subject: TfNSW Response - Pre-EIS - Expansion of Feedlot - 2513 Getta Getta Road North Star
Attachments: NTH24_00018_001 - 20240122 - TfNSW Response - Pre-EIS - 2513 Getta Getta Road North Star.pdf

Hi Rod

Please see attached Transport for NSW (TfNSW) response for the proposed feedlot expansion at 2513 Getta Getta Road North Star.

If you have any questions, feel free to reach out.

Kind regards

Shelby Wells *she/her*
Development Services Case Officer
Development Services | Regional and Outer Metropolitan
Transport for NSW

T 1300 207 783 **M** 0429 155 086 **E** development.north@transport.nsw.gov.au

W transport.nsw.gov.au

6 Stewart Avenue, Newcastle NSW 2302
Locked Bag 2030, Newcastle NSW 2302

Working days Monday to Friday, 8:30am – 4:00pm

Transport for NSW

From: Rod Davis <rod.davis@rdcengineers.com.au>
Sent: Monday, 8 January 2024 3:21 PM
To: Development North <Development.North@transport.nsw.gov.au>

Subject: EIS Consultation - Proposed expansion of beef cattle Feedlot - Doolin Farming Pty Ltd - 2513 Getta Getta Rd, North Star - L8 DP756018 & L21 DP1212915

You don't often get email from rod.davis@rdcengineers.com.au. Learn why this is important

CAUTION: This email is sent from an external source. Do not click any links or open attachments unless you recognise the sender and know the content is safe.

Good afternoon,

We act for Doolin Farming Pty Ltd in relation to the above matter.

Doolin Farming Pty Ltd own and operate a 999 head beef cattle feedlot on the property "Springfield" located at 2513 Getta Getta Road, North Star within the Gwydir Shire.

Doolin Farming Pty Ltd proposes to expand the existing beef cattle feedlot from 999 head to 3,500 head.

A Request for the Planning Secretary's Requirements for the preparation of an Environmental Impact Statement was made on the **21st of January 2022**. The Planning Secretary's Environmental Assessment Requirements (SEAR) 1687 was received on the **2nd of June 2022**.

During the preparation of the EIS, direct consultation with relevant local, State and Commonwealth government authorities, service providers and community groups is required to identify and address any issues they may raise in the EIS.

In preparing the EIS, Doolin Farming Pty Ltd wish to consult with Transport for New South Wales (TfNSW) in relation to any issues they may raise in respect of the proposed development and/or additional requirements for the EIS.

Please refer to the attached document for further information.

Regards,

Rod Davis
Director
—
0427629203
rod.davis@rdcengineers.com.au

RDC ENGINEERS | AGRICULTURAL ENVIRONMENTAL PROJECT MANAGEMENT

Transport for NSW

22 January 2024

File No: NTH24/00018/001

The Director
RDC Engineers Pty Ltd
PO Box 1223
TOOWOOMBA QLD 4350

Attention: Rod Davis - rod.davis@rdcengineers.com.au

RE: Pre-EIS Advice - Expansion of Cattle Feedlot
Lot 8 DP756018; 2513 Getta Getta Road North Star

I refer to your email of 8 January 2024 requesting input from Transport for NSW for the abovementioned development proposal.

Roles and Responsibilities

Our key interests are the safety and efficiency of the transport network, the needs of our customers and the integration of land use and transport in accordance with the *Future Transport Strategy*.

Tamworth-Yetman Road (MR63) is a classified (Regional) road and Getta Getta Road is a local road. Council is the roads authority for both roads and all other public roads in the area, in accordance with Section 7 of the *Roads Act 1993*.

Transport for NSW Response

TfNSW requests that a Traffic Impact Assessment (TIA) be prepared by suitably qualified person/s in accordance with the Austroads Guide to Traffic Management Part 12, the complementary TfNSW Supplement and RTA Guide to Traffic Generating Developments. The TIA should include, but not necessarily be limited to, an assessment of the considerations outlined in **Attachment A**.

TfNSW highlights that in determining the application under the *Environmental Planning and Assessment Act 1979*, it is the Consent Authority's responsibility to consider the environmental impacts of any roadworks which are ancillary to the development. This includes any works which form part of the proposal and/or any works which are deemed necessary to include as requirements in the conditions of project approval.

If you have any further enquiries regarding the above comments, please do not hesitate to contact Shelby Wells, Development Services Case Officer or the undersigned on 1300 207 783 or via email at: development.north@transport.nsw.gov.au

Yours faithfully,

Christine B

Christine Bower
A/ Team Leader, Development Services
Community and Place | Region North
Regional & Outer Metropolitan - Transport for NSW
Enc. ATTACHMENT A - Requested TIA considerations

OFFICIAL

ATTACHMENT A - Traffic Impact Assessment – Requested considerations

For context, this attachment must be read with TfNSW letter of 22 January 2024 reference number NTH24/00018/001.

Traffic Impact Assessment (TIA) be prepared by suitably qualified person/s in accordance with the Austroads Guide to Traffic Management Part 12, the complementary TfNSW Supplement and RTA Guide to Traffic Generating Developments.

The TIA is to identify the impacts of the development and the proposed on-site and off-site measures proposed to mitigate the impacts of the development on any road or rail related infrastructure. The TIA must explain and justify all inputs informing the proposed mitigation measures and TIA conclusions.

The TIA should be tailored to the scope of the proposed development and include, but not necessarily be limited to, consideration of the following;

- A map of the proposed transport route/s identifying all public roads proposed to obtain access from the classified (State) road/s to the development site.
- The total impact of existing and proposed development on the road network with consideration for a 10 year horizon. This should include;
  - Identify Annual Average Daily Traffic (AADT) volumes with percentage heavy vehicles along the transport route/s and diagrammatically demonstrate AM and PM peak hour movements at key intersections.
  - Background traffic data from published sources and/or recent survey data. The source of data and any assumptions are to be clearly explained and justified, including the growth rate applied to the future horizon.
  - The volume and distribution of existing and proposed trips to be generated by the construction, operational and decommission phases of the development. This should identify the maximum daily and hourly demands generated by the development, particularly where they coincide with the network peak hour.
  - The type and frequency of design vehicles accessing the development site.
- Details of the road geometry and alignment along the identified transport route/s, including existing formations, crossings, intersection treatments and any identified hazards. This should include;
  - Available sight distances at intersections along the proposed transport routes and any constraint to achieving the required sight distance for the posted speed limit.
  - An assessment of turn treatment warrants in accordance with the Austroads Guide to Traffic Management Part 6 and Austroads Guide to Road Design Part 4A for intersections along the identified transport route/s, identifying the existence of the minimum basic turn treatments and addressing the need for any warranted higher order treatments.
  - Swept path analysis demonstrating the largest design vehicle entering and leaving the development, and moving in each direction through intersections along the proposed transport route/s.
- Capacity analysis using SIDRA or other relevant application, to identify an acceptable Level of Service (LOS) at intersections with the classified (State) road/s, and where relevant, analysis of any other intersections along the proposed transport route/s.
- A review of crash data along the identified transport route/s for the most recent 5 year reporting period and an assessment of road safety along the proposed transport route/s considering the safe systems principles adopted under Future Transport 2056.

- Strategic (2D) design drawings of all proposed road works and the site access demonstrating scope, estimated cost and constructability of works required to mitigate the impacts of the development on road safety, traffic efficiency and the integrity of transport infrastructure. Works must be appropriately designed for the existing posted speed limit.
- Site plan demonstrating site access, internal manoeuvring, servicing and parking areas consistent with the relevant parts of AS2890 and Council requirements.
- Details of measures to address impacts and/or provide connections for public transport services and active transport modes, such as, public and school bus services, walking and cycling.
- Details of measures to ameliorate the impacts of road traffic noise, dust, and/or glare generated along the proposed transport route/s.
- Details of any Traffic Management Plan (TMP) proposed to address the construction and operation phases of the proposed development. The TMP should be prepared and implemented in accordance with *Australian Standard 1742.3* and the *Work Health and Safety Regulation 2017.* It is recommended that any TMP include, but not necessarily limited to, the following;
  - A map of the primary transport route/s highlighting critical locations.
  - An induction process for vehicle operators and regular toolbox meetings.
  - Procedures for travel through residential areas, school zones and/or bus route/s.
  - any proposed temporary measures such a Traffic Guidance Scheme (TGS)
  - A Driver Code of Conduct for heavy vehicle operators.
  - A complaint resolution and disciplinary procedure.
- Community consultation measures proposed for peak periods.

Where road safety concerns are identified at a specific location along the proposed haulage routes, TfNSW suggests that the TIA be supported by a targeted Road Safety Audit undertaken by suitably qualified persons in accordance with the Austroads Guidelines.

Any roadwork on classified State or Regional road/s is to be designed and constructed in accordance with the current Austroads Guidelines, Australian Standards and TfNSW Supplements. Further information can be obtained from the TfNSW website.

Appendix B.6

Consultation with DPIE – Department of Planning and Environment – Biodiversity and Conservation Division

Department of Planning and Environment

Our ref: DOC22/397528
Your ref: SEAR1687

Zoe Halpin
Planning Officer
Industry Assessments
Department of Planning and Environment
Zoe.halpin@planning.nsw.gov.au

23 May 2022

Dear Ms Halpin

Feedlot (cattle feedlot expansion) – 2513 Getta Getta Rd, North Star (Lot 8 DP 756018 & Lot 1 DP 1212915)

I refer to your email dated 18 May 2022 seeking input into the Department of Planning and Environment's Environmental Assessment Requirements (EARs) for the preparation of an Environmental Impact Assessment (EIS) for Feedlot (cattle feedlot expansion), 2513 Getta Getta Road, North Star.

The Biodiversity, Conservation and Science Directorate (BCS) has considered your request and provides EARs for the proposed development in **Attachments A** and **B**.

BCS recommends the EIS needs to appropriately address the following:

1. Biodiversity and offsetting
2. Water and soils
3. Flooding

If you have any questions about this advice, please do not hesitate to contact Michelle Howarth, Senior Conservation Planning Officer, via michelle.howarth@environment.nsw.gov.au or (02) 6883 5339.

Yours sincerely,

Samantha Wynn

Samantha Wynn
Senior Team Leader Planning North West
Biodiversity, Conservation and Science Directorate

23 May 2022

Attachment A - Environmental Assessment Requirements

Attachment B - Guidance Material

ATTACHMENT A

BCS's Recommended Environmental Assessment Requirements (EARs) for Feedlot (expansion)

BCS	Biodiversity, Conservation and Science Directorate of the NSW Department of Planning and Environment
The Department	NSW Department of Planning and Environment
NPWS	National Parks and Wildlife Service

1. The Proposal

All components of the proposed development must be clearly described, including:

- the location of the proposed development and its context in the locality
- the rationale for the project
- the size, scale and type of the proposed development
- the pre-construction, construction, operational, and, where relevant, decommissioning and rehabilitation phases of the proposed development, and the methods proposed to implement these phases
- plans and maps of the proposed development showing the locations of relevant phases and infrastructure
- the staging and timing of the proposed development
- the proposed development's relationship to any other proposals and developments

2. Environmental Impacts of the Proposal

The proponent must consider, assess, quantify and report on the likely environmental impacts of the proposal if applicable, particularly:

- Biodiversity
- National Park estate: land reserved or acquired under the *National Parks and Wildlife Act 1974*
- Flooding and floodplain issues
- Cumulative impacts

The Secretary's Environmental Assessment Requirements should address the specific requirements outlined under each heading below and assess impacts in accordance with the relevant guidelines mentioned.

A full list of guidelines and reference material is presented in **Attachment B**. Appropriate justification should be provided in instances where the matters below are not addressed.

3. Biodiversity

Biodiversity Assessment Methodology for the Biodiversity Offsets Scheme (BOS)

The EIS should include an assessment of the following:

a. The EIS must assess the impact of the proposed development on biodiversity values to determine if the proposed development is "likely to significantly affect threatened species"

for the purposes of Section 7.2 of the Biodiversity Conservation Act 2016 (BC Act), as follows:

a. The EIS must demonstrate and document how the proposed development exceeds, or does not exceed, the biodiversity offsets scheme threshold as set out in Section 7.4 of the BC Act 2016 and Clause 7.1 of the Biodiversity Conservation Regulation 2017 (BC Regulation) by determining whether the proposed development involves:

   i. **The clearing of native vegetation exceeding the thresholds** listed under Clause 7.23 of the BC Regulation, **or**

   ii. The clearing of native vegetation, or other action, **on land included on the Biodiversity Values Map** published under Clause 7.23 of the BC Regulation (this map includes areas of outstanding biodiversity value, as declared under Section 3.1 of the BC Act).

b. If the proposal does not trigger any of the criteria in (a) above, then the EIS must determine whether the proposed development is likely to have a significant impact based on '*the test for determining whether proposed development likely to significant affect threatened species or ecological communities'* in Section 7.3 of the BC Act.

c. Where there is reasonable doubt regarding potential impacts, or where information is not available, then a significant impact upon biodiversity should be considered likely when applying the test in Section 7.3 of the BC Act. Where it is concluded that there is no significant impact, the EIS must justify how the conclusion has been reached.

d. If the development exceeds the thresholds in (a) or (b), then the EIS must be accompanied by a biodiversity development assessment report (BDAR) prepared in accordance with Part 6 of the BC Act. That is, the Biodiversity Assessment Methodology applies.

Required Information

Where development is considered "likely to significantly impact on threatened species" and a Biodiversity Development Assessment Report is required, the following requirements apply:

- Biodiversity impacts related to the proposal are to be assessed in accordance with the Biodiversity Assessment Method 2020 and documented in a Biodiversity Development Assessment Report (BDAR). The BDAR must include information in the form detailed in the *Biodiversity Conservation Act 2016* (s6.12), Biodiversity Conservation Regulation 2017 (s6.8) and Biodiversity Assessment Method.
- The BDAR must document the application of the avoid, minimise and offset hierarchy including assessing all direct, indirect, uncertain and prescribed impacts in accordance with the Biodiversity Assessment Method.
- The BDAR must include details of the measures proposed to address the offset obligation as follows:
  - The total number and classes of biodiversity credits required to be retired for the proposal.
  - The number and classes of like-for-like biodiversity credits proposed to be retired.
  - The number and classes of biodiversity credits proposed to be retired in accordance with the variation rules.
  - Any proposal to fund a biodiversity conservation action.
  - Any proposal to make a payment to the Biodiversity Conservation Fund.
- If seeking approval to use the variation rules, the BDAR must contain details of the reasonable steps that have been taken to obtain requisite like-for-like biodiversity credits.

The BDAR must be prepared by a person accredited to apply the Biodiversity Assessment Method under s6.10 of the *Biodiversity Conservation Act 2016*.

NOTE – A BDAR template and guidance document has been created to assist accredited assessors to prepare a BDAR. It has been developed in accordance with best practice, the minimum information requirements and to support BDAR reviewers. The BDAR Template can be found here and the Guidance for the BDAR Template can be found here.

Where a BDAR is not required and a threatened species assessment is prepared to support a conclusion of "no significant impact", the EIS must include a field survey of land identified as native vegetation and/or native species habitat inclusive of non-vegetative habitat, namely, karst, caves, crevices, cliffs, rocky outcrops and other features of geological significance and habitat associated with human made structures. This should be conducted and documented in accordance with the relevant guidelines including the Threatened Species Survey and Assessment Guidelines: Field Survey Methods for Fauna – Amphibians (DECCW, 2009), Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities - Working Draft (DEC, 2004) and Guidelines for Threatened Species Assessment (Dept Planning, July 2005). The approach should also reference the field survey methods and assessment information on the Department of Planning, Industry and Environment website including the BioNet Atlas, Threatened Species Profiles, taxon specific survey guidelines and BioNet Vegetation Classification (see Attachment 2).

Category 1 – exempt land

Clearing of native vegetation on land that meets the definition of Category 1 - exempt land (as defined under the Local Land Services Act 2013 (LLS Act)) does not require assessment or offsetting under the Biodiversity Conservation Act 2016. Prescribed impacts as outlined in chapter 6 of the Biodiversity Assessment Method (2020) must still be considered on Category 1 - exempt land. In addition, potential impacts to Matters of National Environmental Significance under the Environment Protection and Biodiversity Conservation Act 1999 on Category 1 – exempt land must be considered.

Section 60F Local Land Services Act 2013 (LLS Act) Act provides the transitional arrangements that are in place until a comprehensive NVR Map with all the land categories is published. During the 'transitional period' assessors can make a reasonable approximation of land categorisation for unpublished layers, in consultation with the landholder.

Where a reasonable approximation is required, it is recommended that:

- assessors first identify whether land meets criteria for Category 2 - Regulated Land, prior to Category 1 - Exempt Land.
    - In some circumstances, land may meet multiple map criteria i.e. criteria for Category 2 - Regulated Land, AND Category 1 - Exempt Land
    - In most circumstances' Category 2 - Regulated Land criteria will determine the categorisation of the land, rather than Category 1 - Exempt Land criteria.

Section 60I of the LLS Act defines the criteria in which land can be classified as Category 2 Regulated Land, this includes land which:

- was not cleared of native vegetation as at 1 January 1990;
- was unlawfully cleared of native vegetation between 1 January 1990 and 25 August 2017;
- contains native vegetation that was grown or preserved with the assistance of public funds (other than funds for forestry purposes);
- contains grasslands that are not low conservation grasslands;
- is subject to a private land conservation agreement;

- is a 'set aside' under a Land Management (Native Vegetation) Code;
- is an offset under a property vegetation plan or a set aside under the former native vegetation laws;
- is subject to an approved conservation measure that was the basis for other land being biocertified;
- is identified as coastal wetlands or littoral rainforest;
- is identified as koala habitat;
- is a declared RAMSAR wetland; or
- is mapped as containing Critically Endangered species of plants or a Critically Endangered Ecological Community

The above criteria are inclusive of both Category 2 Vulnerable Regulated Land and Sensitive Regulated Land categories.

Where an assessor identifies land that does not meet the criteria for Category 2 Vulnerable or Sensitive Regulated land, the assessor should then assess whether or not the land meets the definition of Category 1 – exempt land.

Where the assessor identifies land as Category 1 – exempt land it must be adequately demonstrated that the identified land meets the criteria as set out in section 60H of the LLS Act. Multiple pieces of evidence should be used to demonstrate a Category 1 – exempt land designation. This might include:

- Publicly available data sets on the SEED data portal, such as:
  - Land use mapping – used to identify and map existing and historical agricultural land use in NSW – see the 2017 landuse map
  - Woody vegetation extent – used to identify and map native vegetation extent – see 2008 Woody extent 2011 woody extent
  - State-wide Landcover and Tree Survey (SLATS) woody clearing for NSW – used to identify detectable clearing events since January 1990 – available here
- Published information on the Native Vegetation Regulatory Map, including Category 2-sensitive regulated, Category 2-vulnerable regulated, and excluded land - available here
- Site-based information and records, including:
  - Current and historical high-resolution aerial photography
  - current and historical photographs of the subject land
  - historical land management records maintained by the landowner
  - vegetation survey data collected on the subject land
  - documentation demonstrating history of authorised clearing and/or development

The published *Native Vegetation regulatory map: method statement* should be reviewed to determine how the datasets can be best interrogated to support any identification of Category 1 – exempt land.

Where there is uncertainty or datasets/information are conflicting, a precautionary approach should be applied and the land should be categorised as Category 2 – regulated land.

Where Category 1 – exempt land is likely to be present on a development site, early engagement with BCS is encouraged. Prior to the Biodiversity Development Assessment Report being submitted to the consent authority, the accredited assessor should submit a proposed land categorisation method to the BCS North West Planning team at *rog.nw@environment.nsw.gov.au* for endorsement.

4. NPWS Managed Estate

Land reserved or acquired under the *National Parks and Wildlife Act 1974* (NPW Act)

If the proposed development is within, adjacent to, or in close proximity to, NPWS managed conservation estate (e.g. a national park, nature reserve, state conservation area, land which is declared wilderness under the *Wilderness Act 1987*), or is within, adjacent to, or in close proximity to, a watercourse that flows directly into NPWS managed conservation estate, then the EIS must address impacts upon such area/s.

Where NPWS managed estate is likely to be impacted, the EIS should include:

- The following (as appropriate):
  - Evidence that the proponent has consulted with BCS on the legal permissibility of the proposal under the NPW Act.
  - In the case of proposals on land declared as wilderness under the *Wilderness Act 1987*, evidence that the proponent has consulted with BCS on the appropriateness of the proposal. That is, whether it is consistent with the objects of the *Wilderness Act 1987* (section 3) and the management principles for wilderness areas (section 9).
  - Alternative options that have been explored to avoid impacts on the NPWS managed estate (on-park) and a clear justification of any on-park components of the proposal.
  - If on-park impacts are considered unavoidable, consideration of the issues, including details of any compensation proposal, consistent with the Department's *Revocation, Recategorisation and Road Adjustment Policy* (2012) for proposals that are located wholly or partly in a National Park or other land acquired or reserved under the *National Parks and Wildlife Act 1974*.
- Consideration of the matters identified in the *Guidelines for consent and planning authorities for Developments adjacent to National Parks and Wildlife Service Land* (NPWS, 2020) where a proposal adjoins or is immediate vicinity of NPWS managed estate, or is upstream of NPWS managed estate, which include:
  - The nature of the impacts, including direct and indirect impacts
  - The extent of the direct and indirect impacts
  - The duration of the direct and indirect impacts
  - The objectives of the reservation of the land
- A description of the mitigation and management options that will be used to prevent, control, abate or minimise identified direct and indirect impacts associated with the proposal. This should include an assessment of the effectiveness and reliability of the measures and any residual impacts after these measures are implemented.

5. Water

- The EIS must map features relevant to water, including:
  - Rivers, streams, estuaries (as described in s4.2 of the Biodiversity Assessment Method).
  - Wetlands (as described in s4.2 of the Biodiversity Assessment Method).
  - Groundwater.
  - Groundwater dependent ecosystems.
- The EIS must describe background conditions for any water resource likely to be affected by the proposal, including:
  - Existing surface and groundwater.
  - Hydrology

- Water Quality Objectives (as endorsed by the NSW Government) including groundwater as appropriate that represent the community's uses and values for the receiving waters. Indicators and trigger values/criteria for the identified environmental values in accordance with the ANZECC (2000) *Guidelines for Fresh and Marine Water Quality* and / or local objectives, criteria or targets endorsed by the NSW Government
    - *Risk-based Framework for Considering Waterway Health Outcomes in Strategic Land-use Planning Decisions* (OEH/EPA, 2017).

- The EIS must assess the impacts of the proposal on water quality, including:
    - The nature and degree of impact on receiving waters for both surface and groundwater, demonstrating how the proposal protects the Water Quality Objectives where they are currently being achieved, and contributes towards achievement of the Water Quality Objectives over time where they are currently not being achieved. This should include an assessment of the mitigating effects of proposed stormwater and wastewater management during and after construction.
    - Identification of proposed monitoring of water quality.
    - Consistency with any relevant certified Coastal Management Program (or Coastal Zone Management Plan).

- The EIS must assess the impact of the proposal on hydrology, including:
    - Water balance including quantity, quality and source.
    - Effects upon rivers, wetlands, estuaries, marine waters and floodplain areas.
    - Effects upon water-dependent fauna and flora including groundwater dependent ecosystems.
    - Impacts to natural processes and functions within rivers, wetlands, estuaries and floodplains that affect river system and landscape health such as nutrient flow, aquatic connectivity and access to habitat for spawning and refuge (e.g. river benches).
    - Changes to environmental water availability, both regulated / licensed and unregulated / rules-based sources of such water.

6. Flooding

- The EIS must map the following features relevant to flooding as described in the Floodplain Development Manual 2005 (NSW Government 2005) including:
    - Flood prone land (ie land susceptible to the probable maximum flood event).
    - Flood planning area, the area below the flood planning level.
    - Hydraulic categorisation (floodway and flood storage areas).
    - Flood hazard.

- The EIS must describe flood assessment and modelling undertaken in determining the design flood levels for events, including a minimum of the 10% Annual Exceedance Probability (AEP), 1% AEP flood levels and the probable maximum flood, or an equivalent extreme event.

- The EIS must model the effect of the proposal (including fill) on the current flood behaviour for a range of design events as identified above, and the 0.5% AEP and 0.2% AEP year flood events as proxies for assessing sensitivity to an increase in rainfall intensity of flood producing rainfall events due to climate change.

- All site drainage, stormwater quality devices and erosion / sedimentation control measures should be identified in the EIS and the onsite treatment of stormwater and effluent runoff and predicted stormwater discharge quality from the proposal should be detailed.

- Modelling in the EIS must consider and document:
    - Existing council flood studies in the area and examine consistency to the flood behaviour documented in these studies.

- The impact on existing flood behaviour for a full range of flood events including up to the probable maximum flood (PMF), or an equivalent extreme flood.
    - Impacts of the proposal on flood behaviour resulting in detrimental changes in potential flood affection of other developments or land. This may include redirection of flow, flow velocities, flood levels, hazard categories and hydraulic categories.
    - Impacts of earthworks and stockpiles within the flood prone land up to the PMF level. The assessment should be based on understanding of cumulative flood impacts of construction and operational phases.
    - Relevant provisions of the NSW Floodplain Development Manual 2005.
- The EIS must assess the impacts on the proposal on flood behaviour, including:
    - Whether there will be detrimental increases in the potential flood affectation of other properties, assets and infrastructure.
    - Consistency with Council floodplain risk management plans.
    - Consistency with any Rural Floodplain Management Plans.
    - Compatibility with the flood hazard of the land.
    - Compatibility with the hydraulic functions of flow conveyance in floodways and storage in flood storage areas of the land.
    - Whether there will be adverse effect to beneficial inundation of the floodplain environment, on, adjacent to or downstream of the site.
    - Whether there will be a direct or indirect increase in erosion, siltation, destruction of riparian vegetation or a reduction in the stability of river banks or watercourses.
    - Appropriate mitigation measures to offset potential flood risk arising from the proposal. Any proposed mitigation work should be modelled and assessed on the overall catchment basis in order to ensure it fits its purpose and meets the criteria of the Council where it is located, and to ensure it has no adverse impact to surrounding areas.
    - Any impacts the proposal may have upon existing community emergency management arrangements for flooding. These matters are to be discussed with the NSW SES and Council.
    - Whether the proposal incorporates specific measures to manage risk to life from flood. These matters are to be discussed with the NSW SES and Council.
    - Emergency management, evacuation and access, and contingency measures for the proposal during both construction and operational phases considering the full range of flood risk (based upon the probable maximum flood or an equivalent extreme flood event). These matters are to be discussed with and have the support of Council and the NSW SES.
    - Any impacts the proposal may have on the social and economic costs to the community as a consequence of flooding.

Guidance Material

Title	Web address
	Relevant Legislation
Biodiversity Conservation Act 2016	*https://www.legislation.nsw.gov.au/view/html/inforce/current/act-2016-063*
Commonwealth Environment Protection and Biodiversity Conservation Act 1999	*https://www.legislation.gov.au/Details/C2014C00140/Download*
Environmental Planning and Assessment Act 1979	*https://www.legislation.nsw.gov.au/view/html/inforce/current/act-1979-203*
Fisheries Management Act 1994	*https://www.legislation.nsw.gov.au/view/html/inforce/current/act-1994-038*
National Parks and Wildlife Act 1974	*https://www.legislation.nsw.gov.au/view/html/inforce/current/act-1974-080*
Protection of the Environment Operations Act 1997	*https://www.legislation.nsw.gov.au/view/html/inforce/current/act-1997-156*
Water Management Act 2000	*https://www.legislation.nsw.gov.au/view/html/inforce/current/act-2000-092*
Wilderness Act 1987	*https://www.legislation.nsw.gov.au/view/html/inforce/current/act-1987-196*
	Biodiversity
Biodiversity Values Map	*https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=BVMap*
Biodiversity Assessment Method (OEH, 2020)	*https://www.environment.nsw.gov.au/research-and-publications/publications-search/biodiversity-assessment-method-2020*
Biodiversity Development Assessment Report Template	*https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Biodiversity/biodiversity-development-assessment-report-template-220210.docx?la=en&hash=1A4829C7ACA5A51ECE414A767C27361893706CEC*
Guidance for the Biodiversity Development Assessment Report Template	*https://www.environment.nsw.gov.au/research-and-publications/publications-search/guidance-for-the-biodiversity-development-assessment-report-template*
Changes to the Biodiversity Assessment Method from 2017 to 2020	*https://www.environment.nsw.gov.au/research-and-publications/publications-search/changes-to-the-biodiversity-assessment-method-from-2017-to-2020*
BAM 2020 Operational Manual Stage 1	*https://www.environment.nsw.gov.au/research-and-publications/publications-search/biodiversity-assessment-manual-2020-operational-manual-stage-1*
BAM Operational Manual Stage 2	*https://www.environment.nsw.gov.au/research-and-publications/publications-search/biodiversity-assessment-method-operational-manual-stage-2*

Title	Web address
BAM 2020 Operational Manual Stage 3	*https://www.environment.nsw.gov.au/research-and-publications/publications-search/biodiversity-assessment-method-operational-manual-stage-3*
BAM Calculator User Guide	*https://www.environment.nsw.gov.au/research-and-publications/publications-search/biodiversity-assessment-method-user-guide*
Serious and irreversible impacts of development on biodiversity	*https://www.environment.nsw.gov.au/topics/animals-and-plants/biodiversity/biodiversity-offsets-scheme/serious-and-irreversible-impacts*
Practice Note - Guidance for assessors and decision makers in applying modified benchmarks to assessments of vegetation integrity: Biodiversity Assessment Method	*https://www.environment.nsw.gov.au/research-and-publications/publications-search/guidance-assessors-decision-makers-applying-modified-benchmarks-to-assessments-vegetation-integrity*
Guidance and Criteria to assist a decision maker to determine a serious and irreversible impact (OEH, 2017)	*https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Biodiversity/guidance-decision-makers-determine-serious-irreversible-impact-190511.pdf*
Accreditation Scheme for Application of the Biodiversity Assessment Method Order 2017	*https://www.legislation.nsw.gov.au/view/pdf/asmade/sl-2017-471*
Ancillary rules: Biodiversity conservation actions	*https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Biodiversity/ancillary-rules-biodiversity-conservation-actions-170496.pdf*
Ancillary rules: Reasonable steps to seek like-for-like biodiversity credits for the purpose of applying the variation rules	*https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Biodiversity/ancillary-rules-reasonable-steps-like-for-like-biodiversity-credits-170498.pdf*
Ancillary rules: Impacts on threatened species and ecological communities excluded from application of variation rules	*https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Biodiversity/ancillary-rules-impacts-on-threatened-entities-excluded-from-variation-170497.pdf?la=en&hash=C38840BFF49F012433532DF72E3D90C741E4DAC1*
The Department's Threatened Species Website	*https://www.environment.nsw.gov.au/topics/animals-and-plants/threatened-species*
NSW BioNet (Atlas of NSW Wildlife)	*www.bionet.nsw.gov.au/*
Surveying Threatened Plants and their Habitats - NSW Survey Guide For The Biodiversity Assessment Method (DPIE 2020).	*https://www.environment.nsw.gov.au/research-and-publications/publications-search/surveying-threatened-plants-and-their-habitats-survey-guide-for-the-biodiversity-assessment-method*
Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities - November 2004	*https://www.environment.nsw.gov.au/surveys/BiodiversitySurveyGuidelinesDraft.htm*
Threatened species survey and assessment guidelines: field survey methods for fauna – amphibians	*https://www.environment.nsw.gov.au/research-and-publications/publications-search/threatened-species-field-survey-methods-for-fauna-amphibians*

Title	Web address
NSW Survey Guide for Threatened Frogs	*https://www.environment.nsw.gov.au/research-and-publications/publications-search/nsw-survey-guide-for-threatened-frogs*
Surveying 'species credit' threatened bats and their habitats – NSW survey guide for the Biodiversity Assessment Method	*https://www.environment.nsw.gov.au/research-and-publications/publications-search/species-credit-threatened-bats-nsw-survey-guide-for-biodiversity-assessment-method*
Bat calls of NSW - region-based guide to the echolocation calls of Microchiropteran bats	*https://www.environment.nsw.gov.au/surveys/Batcalls.htm*
Community Biodiversity Survey Manual	*https://www.environment.nsw.gov.au/surveys/CommunityBiodiversitySurveyManual.htm*
BioNet Vegetation Classification - NSW Plant Community Type (PCT) database	*www.environment.nsw.gov.au/research/Vegetationinformationsystem.htm*
The Departments Data Portal (access to online spatial data)	*http://data.environment.nsw.gov.au/*
Fisheries NSW policies and guidelines	*https://www.dpi.nsw.gov.au/fishing/habitat/publications/pubs/fish-habitat-conservation*
National Park Estate	
Guidelines for consent and planning authorities for Developments adjacent to National Parks and Wildlife Service Land (NPWS, 2020)	*https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Parks-reserves-and-protected-areas/Development-guidelines/developments-adjacent-npws-lands-200362.pdf*
List of national parks	*https://www.nationalparks.nsw.gov.au/conservation-and-heritage/national-parks*
Revocation, recategorisation and road adjustment policy (OEH, 2012)	*http://www.environment.nsw.gov.au/policies/RevocationOfLandPolicy.htm*
List of aquatic reserves	*www.dpi.nsw.gov.au/fisheries/habitat/protecting-habitats/mpa*
Water	
Water Quality Objectives	*http://www.environment.nsw.gov.au/ieo/index.htm*
ANZECC & ARMCANZ (2000) Water Quality Guidelines	*https://www.waterquality.gov.au/anz-guidelines/resources/previous-guidelines/anzecc-armcanz-2000*
Risk-based Framework for Considering Waterway Health Outcomes in Strategic Land-use Planning Decisions	*http://www.environment.nsw.gov.au/research-and-publications/publications-search/risk-based-framework-for-considering-waterway-health-outcomes-in-strategic-land-use-planning*
Applying Goals for Ambient Water Quality Guidance for Operations Officers – Mixing Zones	*http://deccnet/water/resources/AWQGuidance7.pdf*
Approved Methods for the Sampling and Analysis of Water Pollutant in NSW (2004)	*http://www.environment.nsw.gov.au/resources/legislation/approvedmethods-water.pdf*
Flooding	
Floodplain development manual	*http://www.environment.nsw.gov.au/floodplains/manual.htm*

Title	Web address
Floodplain Risk Management Guidelines	*http://www.environment.nsw.gov.au/topics/water/coasts-and-floodplains/floodplains/floodplain-guidelines*
NSW Climate Impact Profile	*http://climatechange.environment.nsw.gov.au/*
Climate Change Impacts and Risk Management	*https://www.environment.gov.au/climate-change/adaptation/publications/climate-change-impact-risk-management*

Your ref: SEARs 1687
Our ref: DOC24/ 396815-1

Greg Michales
Student Planning Officer
Department of Planning, Housing and Infrastructure

By email: greg.michales@dpie.nsw.gov.au.

Dear Greg

2513 Getta Getta Road, North Star – Cattle Feedlot Expansion – Request for Secretary's Environmental Assessment Requirements

I refer to your email dated 9 May 2024 to the Biodiversity, Conservation and Science Group (BCS) of the NSW Department of Climate Change, Energy, the Environment and Water (NSW DCCEEW) seeking input into the Department of Planning, Housing and Infrastructure Secretary's Environmental Assessment Requirements (SEARs) for the preparation of an Environmental Impact Assessment (EIS) for 2513 Getta Getta Road, North Star – Cattle Feedlot Expansion (SEARs 1687).

BCS has considered your request and provides SEARs for the proposed development in **Attachments A** and **B**. We recommend the EIS appropriately address the following:

1. Biodiversity and offsetting
2. Water and soils
3. Flooding

If you have any questions about this advice, please do not hesitate to contact Prakriti Mukherjee, Graduate Conservation Planning Officer, via prakriti.mukherjee@environment.nsw.gov.au.

Yours sincerely,

Samantha Wynn

Samantha Wynn
Senior Team Leader Planning North West
Biodiversity, Conservation and Science Group

23 May 2024

Attachment A - Environmental Assessment Requirements

Attachment B - Guidance Material

BCS Recommended Environmental Assessment Requirements (EARs) for 2513 Getta Getta Road, North Star – Cattle Feedlot Expansion

BCS	Biodiversity, Conservation and Science Group of the NSW Department of Climate Change, Energy, the Environment and Water
The Department	NSW Department of Planning, Housing and Infrastructure
NPWS	National Parks and Wildlife Service

1. The Proposal

All components of the proposed development must be clearly described, including:

- the location of the proposed development and its context in the locality
- the rationale for the project
- the size, scale and type of the proposed development
- the pre-construction, construction, operational, and, where relevant, decommissioning and rehabilitation phases of the proposed development, and the methods proposed to implement these phases
- plans and maps of the proposed development showing the locations of relevant phases and infrastructure
- the staging and timing of the proposed development
- the proposed development's relationship to any other proposals and developments

2. Environmental Impacts of the Proposal

The proponent must consider, assess, quantify and report on the likely environmental impacts of the proposal if applicable, particularly:

- Biodiversity
- National Park estate: land reserved or acquired under the *National Parks and Wildlife Act 1974*
- Flooding, floodplain issues and coastal erosion
- Cumulative impacts

The Secretary's Environmental Assessment Requirements should address the specific requirements outlined under each heading below and assess impacts in accordance with the relevant guidelines mentioned. A full list of guidelines and reference material is presented in **Attachment B**. Appropriate justification should be provided in instances where the matters below are not addressed.

3. Biodiversity

Biodiversity Assessment Methodology for the Biodiversity Offsets Scheme

The EIS must assess the impact of the proposed development on biodiversity values to determine if the proposed development is "likely to significantly affect threatened species" for the purposes of Section 7.2 of the Biodiversity Conservation Act 2016 (BC Act), as follows:

a. The EIS must demonstrate and document how the proposed development exceeds, or does not exceed, the biodiversity offsets scheme threshold as set out in Section 7.4 of the BC Act

2016 and Clause 7.1 of the Biodiversity Conservation Regulation 2017 (BC Regulation) by determining whether the proposed development involves:

i. **The clearing of native vegetation exceeding the thresholds** listed under Clause 7.23 of the BC Regulation, **or**

ii. The clearing of native vegetation, or other action, **on land included on the Biodiversity Values Map** published under Clause 7.23 of the BC Regulation (this map includes areas of outstanding biodiversity value, as declared under Section 3.1 of the BC Act).

b. If the proposal does not trigger any of the criteria in (a) above, then the EIS must determine whether the proposed development is likely to have a significant impact based on '*the test for determining whether proposed development likely to significant affect threatened species or ecological communities'* in Section 7.3 of the BC Act.

c. Where there is reasonable doubt regarding potential impacts, or where information is not available, then a significant impact upon biodiversity should be considered likely when applying the test in Section 7.3 of the BC Act. Where it is concluded that there is no significant impact, the EIS must justify how the conclusion has been reached.

d. If the development exceeds the thresholds in (a) or (b), then the EIS must be accompanied by a biodiversity development assessment report (BDAR) prepared in accordance with Part 6 of the BC Act. That is, the Biodiversity Assessment Methodology applies.

Required Information

Where development is considered "likely to significantly impact on threatened species" and a Biodiversity Development Assessment Report is required, the following requirements apply:

- Biodiversity impacts related to the proposal are to be assessed in accordance with the Biodiversity Assessment Method 2020 and documented in a Biodiversity Development Assessment Report (BDAR). The BDAR must include information in the form detailed in the *Biodiversity Conservation Act 2016* (s6.12), Biodiversity Conservation Regulation 2017 (s6.8) and Biodiversity Assessment Method.
- The BDAR must document the application of the avoid, minimise and offset hierarchy including assessing all direct, indirect, uncertain and prescribed impacts in accordance with the Biodiversity Assessment Method.
- The BDAR must include details of the measures proposed to address the offset obligation as follows:
  - The total number and classes of biodiversity credits required to be retired for the proposal.
  - The number and classes of like-for-like biodiversity credits proposed to be retired.
  - The number and classes of biodiversity credits proposed to be retired in accordance with the variation rules.
  - Any proposal to fund a biodiversity conservation action.
  - Any proposal to make a payment to the Biodiversity Conservation Fund.
- If seeking approval to use the variation rules, the BDAR must contain details of the reasonable steps that have been taken to obtain requisite like-for-like biodiversity credits.

The BDAR must be prepared by a person accredited to apply the Biodiversity Assessment Method under s6.10 of the *Biodiversity Conservation Act 2016*.

NOTE – A BDAR template and guidance document has been created to assist accredited assessors to prepare a BDAR. It has been developed in accordance with best practice, the minimum information requirements and to support BDAR reviewers. The BDAR Template can be found here and the Guidance for the BDAR Template can be found here.

Where a BDAR is not required and a threatened species assessment is prepared to support a conclusion of "no significant impact", the EIS must include a field survey of land identified as native vegetation and/or native species habitat inclusive of non-vegetative habitat, namely, karst, caves, crevices, cliffs, rocky outcrops and other features of geological significance and habitat associated with human made structures. This should be conducted and documented in accordance with the relevant guidelines including the Threatened Species Survey and Assessment Guidelines: Field Survey Methods for Fauna – Amphibians (DECCW, 2009), Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities - Working Draft (DEC, 2004) and Guidelines for Threatened Species Assessment (Dept Planning, July 2005). The approach should also reference the field survey methods and assessment information on the NSW DCCEEW website including the BioNet Atlas, Threatened Species Profiles, taxon specific survey guidelines and BioNet Vegetation Classification (see Attachment 2).

Category 1 – exempt land

The draft Native Regulatory Map (NVR Map) has been released for all of NSW. This identifies areas of Category 1 – exempt land. While the draft NVR Map is under review, land categories remain defined by the criteria in the legislation. The draft NVR Map can be utilised to inform decisions about native vegetation management.
 	
Clearing of native vegetation on land that meets the definition of Category 1 - exempt land (as defined under the Local Land Services Act 2013 (LLS Act)) does not require assessment or offsetting under the Biodiversity Conservation Act 2016. Prescribed impacts as outlined in chapter 6 of the Biodiversity Assessment Method (2020) must still be considered on Category 1 - exempt land. In addition, potential impacts to Matters of National Environmental Significance under the Environment Protection and Biodiversity Conservation Act 1999 on Category 1 – exempt land must be considered.
 	
Section 60F Local Land Services Act 2013 (LLS Act) Act provides the transitional arrangements that are in place until a finalised NVR Map with all the land categories is published. During the 'transitional period' assessors can make a reasonable approximation of land categorisation for unfinalised layers, in consultation with the landholder.
 	
Where a reasonable approximation is required, it is recommended that:
• assessors first identify whether land meets criteria for Category 2 - Regulated Land, prior to Category 1 - Exempt Land.
  o In some circumstances, land may meet multiple map criteria i.e. criteria for Category 2 - Regulated Land, AND Category 1 - Exempt Land
  o In most circumstances' Category 2 - Regulated Land criteria will determine the categorisation of the land, rather than Category 1 - Exempt Land criteria.
 	
Section 60I of the LLS Act defines the criteria in which land can be classified as Category 2 Regulated Land, this includes land which:
• was not cleared of native vegetation as at 1 January 1990
• was unlawfully cleared of native vegetation between 1 January 1990 and 25 August 2017
• contains native vegetation that was grown or preserved with the assistance of public funds (other than funds for forestry purposes)
• contains grasslands that are not low conservation grasslands
• is subject to a private land conservation agreement
• is a 'set aside' under a Land Management (Native Vegetation) Code

- is an offset under a property vegetation plan or a set aside under the former native vegetation laws
- is subject to an approved conservation measure that was the basis for other land being biocertified
- is identified as coastal wetlands or littoral rainforest
- is identified as koala habitat
- is a declared RAMSAR wetland; or
- is mapped as containing Critically Endangered species of plants or a Critically Endangered Ecological Community

The above criteria are inclusive of both Category 2 Vulnerable Regulated Land and Sensitive Regulated Land categories.

Where an assessor identifies land that does not meet the criteria for Category 2 Vulnerable or Sensitive Regulated land, the assessor should then assess whether or not the land meets the definition of Category 1 – exempt land.

Where the assessor identifies land as Category 1 – exempt land it must be adequately demonstrated that the identified land meets the criteria as set out in section 60H of the LLS Act. Multiple pieces of evidence should be used to demonstrate a Category 1 – exempt land designation. This might include:

- Publicly available data sets on the SEED data portal, such as:
  - Land use mapping – used to identify and map existing and historical agricultural land use in NSW – see the 2017 landuse map
  - Woody vegetation extent – used to identify and map native vegetation extent – see 2008 Woody extent 2011 woody extent
  - State-wide Landcover and Tree Survey (SLATS) woody clearing for NSW – used to identify detectable clearing events since January 1990 – available here
- Published information on the Native Vegetation Regulatory Map, including Category 2-sensitive regulated, Category 2-vulnerable regulated, and excluded land - available here
- Site-based information and records, including:
  - Current and historical high-resolution aerial photography
  - current and historical photographs of the subject land
  - historical land management records maintained by the landowner
  - vegetation survey data collected on the subject land
  - documentation demonstrating history of authorised clearing and/or development

The published *Native Vegetation regulatory map: method statement* should be reviewed to determine how the datasets can be best interrogated to support any identification of Category 1 – exempt land.

Where there is uncertainty or datasets/information are conflicting, a precautionary approach should be applied, and the land should be categorised as Category 2 – regulated land.

Where Category 1 – exempt land is likely to be present on a development site, early engagement with BCS is encouraged.

4. NPWS Managed Estate

Land reserved or acquired under the *National Parks and Wildlife Act 1974* (NPW Act)

If the proposed development is within, adjacent to, or in close proximity to, NPWS managed conservation estate (e.g. a national park, nature reserve, state conservation area, land which is declared wilderness under the *Wilderness Act 1987*), or is within, adjacent to, or in close proximity to, a watercourse that flows directly into NPWS managed conservation estate, then the EIS must address impacts upon such area/s.

Where NPWS managed estate is likely to be impacted, the EIS should include:

- The following (as appropriate):
  - Evidence that the proponent has consulted with BCS on the legal permissibility of the proposal under the NPW Act.
  - In the case of proposals on land declared as wilderness under the *Wilderness Act 1987*, evidence that the proponent has consulted with BCS on the appropriateness of the proposal. That is, whether it is consistent with the objects of the *Wilderness Act 1987* (section 3) and the management principles for wilderness areas (section 9).
  - Alternative options that have been explored to avoid impacts on the NPWS managed estate (on-park) and a clear justification of any on-park components of the proposal.
  - If on-park impacts are considered unavoidable, consideration of the issues, including details of any compensation proposal, consistent with the Department's *Revocation, Recategorisation and Road Adjustment Policy* (2012) for proposals that are located wholly or partly in a National Park or other land acquired or reserved under the *National Parks and Wildlife Act 1974*.
- Consideration of the matters identified in the *Guidelines for consent and planning authorities for Developments adjacent to National Parks and Wildlife Service Land* (NPWS, 2020) where a proposal adjoins or is immediate vicinity of NPWS managed estate, or is upstream of NPWS managed estate, which include:
  - The nature of the impacts, including direct and indirect impacts
  - The extent of the direct and indirect impacts
  - The duration of the direct and indirect impacts
  - The objectives of the reservation of the land
- A description of the mitigation and management options that will be used to prevent, control, abate or minimise identified direct and indirect impacts associated with the proposal. This should include an assessment of the effectiveness and reliability of the measures and any residual impacts after these measures are implemented.

5. Water

- The EIS must map features relevant to water, including:
  - Rivers, streams, estuaries (as described in s4.2 of the Biodiversity Assessment Method)
  - Wetlands (as described in s4.2 of the Biodiversity Assessment Method)
  - Groundwater
  - Groundwater dependent ecosystems.
- The EIS must describe background conditions for any water resource likely to be affected by the proposal, including:
  - Existing surface and groundwater
  - Hydrology
  - Water Quality Objectives (as endorsed by the NSW Government) including groundwater as appropriate that represent the community's uses and values for the receiving waters. Indicators and trigger values/criteria for the identified environmental values in accordance with the ANZECC (2000) *Guidelines for Fresh and Marine Water Quality* and / or local objectives, criteria or targets endorsed by the NSW Government
  - *Risk-based Framework for Considering Waterway Health Outcomes in Strategic Land-use Planning Decisions* (OEH/EPA, 2017).
- The EIS must assess the impacts of the proposal on water quality, including:

- The nature and degree of impact on receiving waters for both surface and groundwater, demonstrating how the proposal protects the Water Quality Objectives where they are currently being achieved, and contributes towards achievement of the Water Quality Objectives over time where they are currently not being achieved. This should include an assessment of the mitigating effects of proposed stormwater and wastewater management during and after construction.
- Identification of proposed monitoring of water quality.
- Consistency with any relevant certified Coastal Management Program (or Coastal Zone Management Plan).

- The EIS must assess the impact of the proposal on hydrology, including:
    - Water balance including quantity, quality and source.
    - Effects upon rivers, wetlands, estuaries, marine waters and floodplain areas.
    - Effects upon water-dependent fauna and flora including groundwater dependent ecosystems.
    - Impacts to natural processes and functions within rivers, wetlands, estuaries and floodplains that affect river system and landscape health such as nutrient flow, aquatic connectivity and access to habitat for spawning and refuge (e.g. river benches).
    - Changes to environmental water availability, both regulated / licensed and unregulated / rules-based sources of such water.

Where there is a heightened potential to impact on water quality and hydrology, the EIS should include the following:

- A description of existing water quality / hydrology based on suitable data (meaning data collection may be required) and must include:
    - Water chemistry.
    - A description of receiving water processes, circulation and mixing characteristics and hydrodynamic regimes.
    - Lake or estuary flushing characteristics.
    - Sensitive ecosystems or species conservation values.
    - Specific human uses and values (e.g. fishing, proximity to recreation areas).
    - A description of any impacts from existing industry or activities on water quality.
    - A description of the condition of the local catchment e.g. erosion, soils, vegetation cover.
    - An outline of baseline groundwater information, including, for example, depth to water table, flow direction and gradient, groundwater quality, reliance on groundwater by surrounding users and by the environment.
    - Historic river flow data.

- An assessment of the impacts of the proposal on water quality and hydrology including:
    - Water circulation, current patterns, water chemistry and other appropriate characteristics such as clarity, temperature, nutrient and toxicants, and potential for erosion.
    - Changes to hydrology
    - Stream bank stability and impacts on macro invertebrates.
    - Water quality and hydrology modelling and / or monitoring, where necessary.

- Proposed water quality monitoring in accordance with the *Approved Methods for the Sampling and Analysis of Water Pollutants in NSW* (DEC 2004). The water quality and aquatic ecosystem monitoring program must include:
    - Adequate data for evaluating maintenance, or progress towards achieving, the relevant Water Quality Objectives.
    - Measurement of pollutants identified or expected to be present.

6. Flooding

- The EIS must map the following features relevant to flooding as described in the Flood Risk Management Manual (NSW Government 2023) including:
    - Flood prone land (ie land susceptible to the probable maximum flood event).
    - Flood planning area, the area below the flood planning level.
    - Hydraulic categorisation (floodway and flood storage areas).
    - Flood hazard.
- The EIS must describe flood assessment and modelling undertaken in determining the design flood levels for events, including a minimum of the 10% Annual Exceedance Probability (AEP), 1% AEP flood levels and the probable maximum flood, or an equivalent extreme event.
- The EIS must model the effect of the proposal (including fill) on the current flood behaviour for a range of design events as identified above, and the 0.5% AEP and 0.2% AEP year flood events as proxies for assessing sensitivity to an increase in rainfall intensity of flood producing rainfall events due to climate change.
- All site drainage, stormwater quality devices and erosion / sedimentation control measures should be identified in the EIS and the onsite treatment of stormwater and effluent runoff and predicted stormwater discharge quality from the proposal should be detailed.
- Modelling in the EIS must consider and document:
    - Existing council flood studies in the area and examine consistency to the flood behaviour documented in these studies.
    - The impact on existing flood behaviour for a full range of flood events including up to the probable maximum flood (PMF), or an equivalent extreme flood.
    - Impacts of the proposal on flood behaviour resulting in detrimental changes in potential flood affection of other developments or land. This may include redirection of flow, flow velocities, flood levels, hazard categories and hydraulic categories.
    - Impacts of earthworks and stockpiles within the flood prone land up to the PMF level. The assessment should be based on understanding of cumulative flood impacts of construction and operational phases.
    - Relevant provisions of the Flood Risk Management Manual 2023.
- The EIS must assess the impacts on the proposal on flood behaviour, including:
    - Whether there will be detrimental increases in the potential flood affectation of other properties, assets and infrastructure.
    - Consistency with Council floodplain risk management plans.
    - Consistency with any Rural Floodplain Management Plans.
    - Compatibility with the flood hazard of the land.
    - Compatibility with the hydraulic functions of flow conveyance in floodways and storage in flood storage areas of the land.
    - Whether there will be adverse effect to beneficial inundation of the floodplain environment, on, adjacent to or downstream of the site.
    - Whether there will be a direct or indirect increase in erosion, siltation, destruction of riparian vegetation or a reduction in the stability of riverbanks or watercourses.
    - Appropriate mitigation measures to offset potential flood risk arising from the proposal. Any proposed mitigation work should be modelled and assessed on the overall catchment basis in order to ensure it fits its purpose and meets the criteria of the Council where it is located, and to ensure it has no adverse impact to surrounding areas.
    - Any impacts the proposal may have upon existing community emergency management arrangements for flooding. These matters are to be discussed with the NSW SES and Council.
    - Whether the proposal incorporates specific measures to manage risk to life from flood. These matters are to be discussed with the NSW SES and Council.

- Emergency management, evacuation and access, and contingency measures for the proposal during both construction and operational phases considering the full range of flood risk (based upon the probable maximum flood or an equivalent extreme flood event). These matters are to be discussed with and have the support of Council and the NSW SES.
- Any impacts the proposal may have on the social and economic costs to the community as a consequence of flooding.

Guidance Material

Title	Web address
	Relevant Legislation
Biodiversity Conservation Act 2016	*https://www.legislation.nsw.gov.au/view/html/inforce/current/act-2016-063*
Commonwealth Environment Protection and Biodiversity Conservation Act 1999	*https://www.legislation.gov.au/Details/C2014C00140/Download*
Environmental Planning and Assessment Act 1979	*https://www.legislation.nsw.gov.au/view/html/inforce/current/act-1979-203*
Fisheries Management Act 1994	*https://www.legislation.nsw.gov.au/view/html/inforce/current/act-1994-038*
National Parks and Wildlife Act 1974	*https://www.legislation.nsw.gov.au/view/html/inforce/current/act-1974-080*
Protection of the Environment Operations Act 1997	*https://www.legislation.nsw.gov.au/view/html/inforce/current/act-1997-156*
Water Management Act 2000	*https://www.legislation.nsw.gov.au/view/html/inforce/current/act-2000-092*
Wilderness Act 1987	*https://www.legislation.nsw.gov.au/view/html/inforce/current/act-1987-196*
	Biodiversity
Biodiversity Values Map	*https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=BVMap*
Biodiversity Assessment Method (OEH, 2020)	*https://www.environment.nsw.gov.au/research-and-publications/publications-search/biodiversity-assessment-method-2020*
Biodiversity Development Assessment Report Template	*https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Biodiversity/biodiversity-development-assessment-report-template-220210.docx?la=en&hash=1A4829C7ACA5A51ECE414A767C27361893706CEC*
Guidance for the Biodiversity Development Assessment Report Template	*https://www.environment.nsw.gov.au/research-and-publications/publications-search/guidance-for-the-biodiversity-development-assessment-report-template*
Changes to the Biodiversity Assessment Method from 2017 to 2020	*https://www.environment.nsw.gov.au/research-and-publications/publications-search/changes-to-the-biodiversity-assessment-method-from-2017-to-2020*
BAM 2020 Operational Manual Stage 1	*https://www.environment.nsw.gov.au/research-and-publications/publications-search/biodiversity-assessment-manual-2020-operational-manual-stage-1*
BAM Operational Manual Stage 2	*https://www.environment.nsw.gov.au/research-and-publications/publications-search/biodiversity-assessment-method-operational-manual-stage-2*
BAM 2020 Operational Manual Stage 3	*https://www.environment.nsw.gov.au/research-and-publications/publications-search/biodiversity-assessment-method-operational-manual-stage-3*

Title	Web address
BAM Calculator User Guide	*https://www.environment.nsw.gov.au/research-and-publications/publications-search/biodiversity-assessment-method-user-guide*
Serious and irreversible impacts of development on biodiversity	*https://www.environment.nsw.gov.au/topics/animals-and-plants/biodiversity/biodiversity-offsets-scheme/serious-and-irreversible-impacts*
Practice Note - Guidance for assessors and decision makers in applying modified benchmarks to assessments of vegetation integrity: Biodiversity Assessment Method	*https://www.environment.nsw.gov.au/research-and-publications/publications-search/guidance-assessors-decision-makers-applying-modified-benchmarks-to-assessments-vegetation-integrity*
Guidance and Criteria to assist a decision maker to determine a serious and irreversible impact (OEH, 2017)	*https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Biodiversity/guidance-decision-makers-determine-serious-irreversible-impact-190511.pdf*
Accreditation Scheme for Application of the Biodiversity Assessment Method Order 2017	*https://www.legislation.nsw.gov.au/view/pdf/asmade/sl-2017-471*
Ancillary rules: Biodiversity conservation actions	*https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Biodiversity/ancillary-rules-biodiversity-conservation-actions-170496.pdf*
Ancillary rules: Reasonable steps to seek like-for-like biodiversity credits for the purpose of applying the variation rules	*https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Biodiversity/ancillary-rules-reasonable-steps-like-for-like-biodiversity-credits-170498.pdf*
Ancillary rules: Impacts on threatened species and ecological communities excluded from application of variation rules	*https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Biodiversity/ancillary-rules-impacts-on-threatened-entities-excluded-from-variation-170497.pdf?la=en&hash=C38840BFF49F012433532DF72E3D90C741E4DAC1*
The Department's Threatened Species Website	*https://www.environment.nsw.gov.au/topics/animals-and-plants/threatened-species*
NSW BioNet (Atlas of NSW Wildlife)	*www.bionet.nsw.gov.au/*
Surveying Threatened Plants and their Habitats - NSW Survey Guide for The Biodiversity Assessment Method (DPIE 2020).	*https://www.environment.nsw.gov.au/research-and-publications/publications-search/surveying-threatened-plants-and-their-habitats-survey-guide-for-the-biodiversity-assessment-method*
Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities - November 2004	*https://www.environment.nsw.gov.au/surveys/BiodiversitySurveyGuidelinesDraft.htm*
Threatened species survey and assessment guidelines: field survey methods for fauna – amphibians	*https://www.environment.nsw.gov.au/research-and-publications/publications-search/threatened-species-field-survey-methods-for-fauna-amphibians*
NSW Survey Guide for Threatened Frogs	*https://www.environment.nsw.gov.au/research-and-publications/publications-search/nsw-survey-guide-for-threatened-frogs*

Title	Web address
Surveying 'species credit' threatened bats and their habitats – NSW survey guide for the Biodiversity Assessment Method	*https://www.environment.nsw.gov.au/research-and-publications/publications-search/species-credit-threatened-bats-nsw-survey-guide-for-biodiversity-assessment-method*
Bat calls of NSW - region-based guide to the echolocation calls of Microchiropteran bats	*https://www.environment.nsw.gov.au/surveys/Batcalls.htm*
Community Biodiversity Survey Manual	*https://www.environment.nsw.gov.au/surveys/CommunityBiodiversitySurveyManual.htm*
BioNet Vegetation Classification - NSW Plant Community Type (PCT) database	*www.environment.nsw.gov.au/research/Vegetationinformationsystem.htm*
The Departments Data Portal (access to online spatial data)	*http://data.environment.nsw.gov.au/*
Fisheries NSW policies and guidelines	*https://www.dpi.nsw.gov.au/fishing/habitat/publications/pubs/fish-habitat-conservation*
National Park Estate	
Guidelines for consent and planning authorities for Developments adjacent to National Parks and Wildlife Service Land (NPWS, 2020)	*https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Parks-reserves-and-protected-areas/Development-guidelines/developments-adjacent-npws-lands-200362.pdf*
List of national parks	*https://www.nationalparks.nsw.gov.au/conservation-and-heritage/national-parks*
Revocation, recategorisation and road adjustment policy (OEH, 2012)	*http://www.environment.nsw.gov.au/policies/RevocationOfLandPolicy.htm*
List of aquatic reserves	*www.dpi.nsw.gov.au/fisheries/habitat/protecting-habitats/mpa*
Water	
Water Quality Objectives	*http://www.environment.nsw.gov.au/ieo/index.htm*
ANZECC & ARMCANZ (2000) Water Quality Guidelines	*https://www.waterquality.gov.au/anz-guidelines/resources/previous-guidelines/anzecc-armcanz-2000*
Risk-based Framework for Considering Waterway Health Outcomes in Strategic Land-use Planning Decisions	*http://www.environment.nsw.gov.au/research-and-publications/publications-search/risk-based-framework-for-considering-waterway-health-outcomes-in-strategic-land-use-planning*
Applying Goals for Ambient Water Quality Guidance for Operations Officers – Mixing Zones	*http://deccnet/water/resources/AWQGuidance7.pdf*
Approved Methods for the Sampling and Analysis of Water Pollutant in NSW (2004)	*http://www.environment.nsw.gov.au/resources/legislation/approvedmethods-water.pdf*
Flooding	
Flood Risk Management Manual	https://www.environment.nsw.gov.au/topics/water/floodplains/floodplain-manual
Floodplain Risk Management Guidelines	*http://www.environment.nsw.gov.au/topics/water/coasts-and-floodplains/floodplains/floodplain-guidelines*
NSW Climate Impact Profile	*http://climatechange.environment.nsw.gov.au/*

Title	Web address
Climate Change Impacts and Risk Management	*https://www.environment.gov.au/climate-change/adaptation/publications/climate-change-impact-risk-management*

Appendix B.7

Consultation with NSW Rural Fire Service

RDC ENGINEERS | AGRICULTURAL ENVIRONMENTAL PROJECT MANAGEMENT

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Our ref: E2-103-DF-SFFL-RFS-20240108

8th January 2024

Manager Planning and Environment Services North
NSW Rural Fire Service
Customer Service Centre
Suite 1, 129 West High Street
COFFS HARBOUR NSW 2450
Via email: pes@rfs.nsw.gov.au

Dear Sir/Madam,

RE: ENVIRONMENTAL IMPACT STATEMENT FOR PROPOSED EXPANSION OF BEEF CATTLE FEEDLOT ON THE PROPERTY "SPRINGFIELD" 2513 GETTA GETTA ROAD, NORTH STAR, LAND DESCRIBED AS LOT 8 ON DP756018 AND LOT 21 ON DP1212915

Doolin Farming Pty Ltd own and operate a 999 head beef cattle feedlot on the property "Springfield" located at 2513 Getta Getta Road, North Star within the Gwydir Shire. The property is currently used for beef cattle grazing, intensive livestock agriculture, dryland and irrigated cropping. Doolin Farming Pty Ltd proposes to expand the existing beef cattle feedlot from 999 head to 3,500 head. The location of the subject land on which the proposed development will be established is shown on Figure 1.

As the proposed development is considered Designated Development under the NSW Environment and Planning Assessment Act 1979, an Environmental Impact Statement (EIS) is required to be prepared to accompany the Development Application.

A Request for the Planning Secretary's Requirements for the preparation of an Environmental Impact Statement was made on the **21st of January 2022**. The Planning Secretary's Environmental Assessment Requirements (SEAR) 1687 was received **2nd of June 2022**. A copy of the SEAR 1687 - Applicant Package is provided in Annexure A.

The proposed development is both designated and integrated development under Part 4 of the Environmental Planning and Assessment Act 1979 and requires a licence under the Protection of the Environment Operations Act 1997. In preparing the SEAR, the Department of Planning and Environment (the Department) has consulted with several state agencies.

During the preparation of the EIS, direct consultation with relevant local, State and Commonwealth government authorities, service providers and community groups is required to identify and address any issues they may raise in the EIS.

In preparing the EIS, Doolin Farming Pty Ltd wish to consult with the NSW Rural Fire Service in relation to any issues they may raise in respect of the proposed development and/or additional requirements for the EIS.

The following summary information is provided to allow the NSW Rural Fire Service to make an informed assessment of how their functions, interests or activities may be impacted by the proposed development and raise any relevant matters.

DESCRIPTION OF THE PROPOSED DEVELOPMENT

The proposed development is an expansion of the existing beef cattle feedlot from 999 head to 3,500 head A plan of proposed development is included in Figure 2.

The proposed development involves:

- Additional production pens and associated feed, water, shade and drainage infrastructure;
- A new cattle handling facility;
- A revised controlled drainage area;
- A revised manure stockpiling and carcass composting area;
- A revised sedimentation basin and holding pond capacity;
- A new entrance off Getta Getta Road and internal access road to the proposed development.

The proposed development shall utilise the existing approved manure and effluent utilisation areas on the subject land as shown on Figure 3. The proposal does not seek to revise the existing waste utilisation areas.

The proposed development does not propose new or reconfigured Class 1, 2, 3, 4, 5, 6, 8 or 9 buildings as shown on Figure 4.

The proposed development would incorporate Industry best practice during construction and operational activities to ensure that any environmental impacts are minimised. The environmental assessment process will identify these practices and incorporate them into the design of the development, ensuring that any environmental impacts are appropriately dealt with.

The existing development has been designed and constructed according to recommended methods outlined in the relevant state guidelines at the time of construction in the early 2020. These included the NSW Feedlot Manual (NSW Agriculture, 1997); National Guidelines for Beef Cattle Feedlots in Australia (MLA, 2012a); National Beef Cattle Feedlot Environmental Code of Practice (MLA, 2012b) and the Beef Cattle Feedlots: Design and Construction manual (MLA, 2015).

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The proposed development will be designed, constructed and operated according to recommended methods outlined in State (NSW & QLD) and National Industry best practice guidelines. These include:

Beef Cattle Feedlots: Design and Construction manual - www.mla.com.au
National Guidelines for Beef Cattle Feedlots in Australia - www.mla.com.au
National Beef Cattle Feedlot Environmental Code of Practice - www.mla.com.au
NSW Feedlot Manual - www.dpi.nsw.gov.au

Site details

Gwydir Local Environmental Plan 2013 (GLEP)

Clause 2.1 – Land Use and Permissibility

The Site is zoned RU1 Primary Production (RU1 Zone) under the Gwydir Local Environmental Plan 2013 (GLEP).
Access

The subject land has frontage to Getta Getta Road.

The proposal seeks to construct a new subject land entrance from Getta Getta Road which provides a dedicated access to the expanded development. The new entrance is proposed to be sited some 180 m to the east of the existing subject land entrance.

The existing subject land entrance shall be retained for light vehicles to access the subject land homestead.

Traffic Generation

The existing development at a full capacity of 999 head generates on average in the order of 0.53 vehicle movements per day (light vehicles [0.15vpd] and heavy vehicles [0.38vpd].

At the full capacity of 3,500 head, the estimated traffic generation for the proposed development is about 3.5 vehicle movements per day (light vehicles [1.7vpd] and heavy vehicles [1.8vpd]. These data are based on 3 staff members residing on-site in the subject land homestead and cottage and B-double vehicles for haulage of livestock and commodities.

At additional traffic generated by the proposed development is about 3 vehicle movements per day (light vehicles [1.6vpd] and heavy vehicles [1.4vpd]. These data are based on 3 staff members residing on-site in the subject land homestead and cottage and B-double vehicles for haulage of livestock and commodities.

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Bushfire hazard

Part of the southern area of the subject land is mapped as bushfire prone land by Gwydir Shire Council as shown on Figure 5.

Flooding

The subject land is not mapped as flood prone. The site is located some 6 km west from the closest known floodway which is along Ottleys Creek according to the MacIntyre Valley Flood Plain Atlas (Laurie, Montgomerie & Pettit Pty Ltd, 1982 commissioned by Water Resources Commission New South Wales).

Soils

The soils of the proposed development complex site and waste utilisation area comprise reddish brown to grey to black heavy clays.

Waterways

New infrastructure within the existing development complex site is setback 40 m from a stream order 1 and stream order 2 respectively.

Water supply

The applicant holds a groundwater allocation under the NSW Great Artesian Basin Eastern recharge groundwater source for irrigation use on the subject land under water access licence 41169 (Works Approval 90AL834721) for 1,558 shares.

Separation to neighbours

The closest sensitive receptor is located some 1,300m to the northwest. The s-factor separation distance assessment outlined in the National Guidelines for Beef Cattle Feedlots in Australia demonstrates adequate separation from sensitive receptors.

Chemical residues

Testing of representative soils from the proposed development complex site show no presence of organochlorines pesticides.

PO Box 1223
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info@rdcengineers.com.au

Development complex details

Infrastructure

No new buildings are proposed.

Design and construction

The production pens will have a stocking density of about 15.75 m^2/head.

The development complex shall be constructed in accordance with
Beef Cattle Feedlots: Design and Construction manual - www.mla.com.au
National Guidelines for Beef Cattle Feedlots in Australia - www.mla.com.au
National Beef Cattle Feedlot Environmental Code of Practice - www.mla.com.au
NSW Feedlot Manual - www.dpi.nsw.gov.au

Operation

The development complex shall be managed in accordance with the National Guidelines for Beef Cattle Feedlots in Australia and National Beef Cattle Feedlot Environmental Code of Practice.

Beef cattle will be supplied with an unrestricted, reliable supply of clean and fresh water, free from contamination.

Regular cleaning and maintenance of the production pens and drainage infrastructure shall be undertaken to minimise odour emissions and reduces the risk of any amenity impacts on neighbouring sensitive receptors.

Dead animal carcasses shall be composted within a dedicated area in the manure stockpile area.

Animal health and welfare will be managed in accordance with relevant state and federal legislation.

References

Laurie, Montgomerie & Pettit Pty Ltd, 1982, MacIntyre Valley Flood Plain Atlas (commissioned by Water Resources Commission New South Wales), Sydney NSW.

Meat and Livestock Australia, 2012a, National Guidelines for Beef Cattle Feedlots in Australia 3rd Edition, Meat & Livestock Australia, North Sydney, NSW.

Meat and Livestock Australia, 2012b, National Beef Cattle Feedlot Environmental Code of Practice 2nd Edition, Meat & Livestock Australia, North Sydney, NSW.

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Meat and Livestock Australia, 2015a, Beef Cattle Feedlots: Design and Construction, Meat and Livestock Australia, North Sydney, NSW.

NSW Agriculture, 1997, The New South Wales Feedlot Manual, The Inter-Departmental Committee on Intensive Animal Industries (Feedlot Section), NSW Agriculture, Orange NSW.

In summary, Doolin Farming Pty Ltd hereby submit a consultation request to the NSW Rural Fire Service for advice in relation to any issues they may raise in respect of the proposal and/or additional requirements for the EIS. Matters raised by the NSW Rural Fire Service shall be addressed during the preparation of the EIS to permit a detailed bush fire assessment of the proposal.

Could you please address all correspondence to:

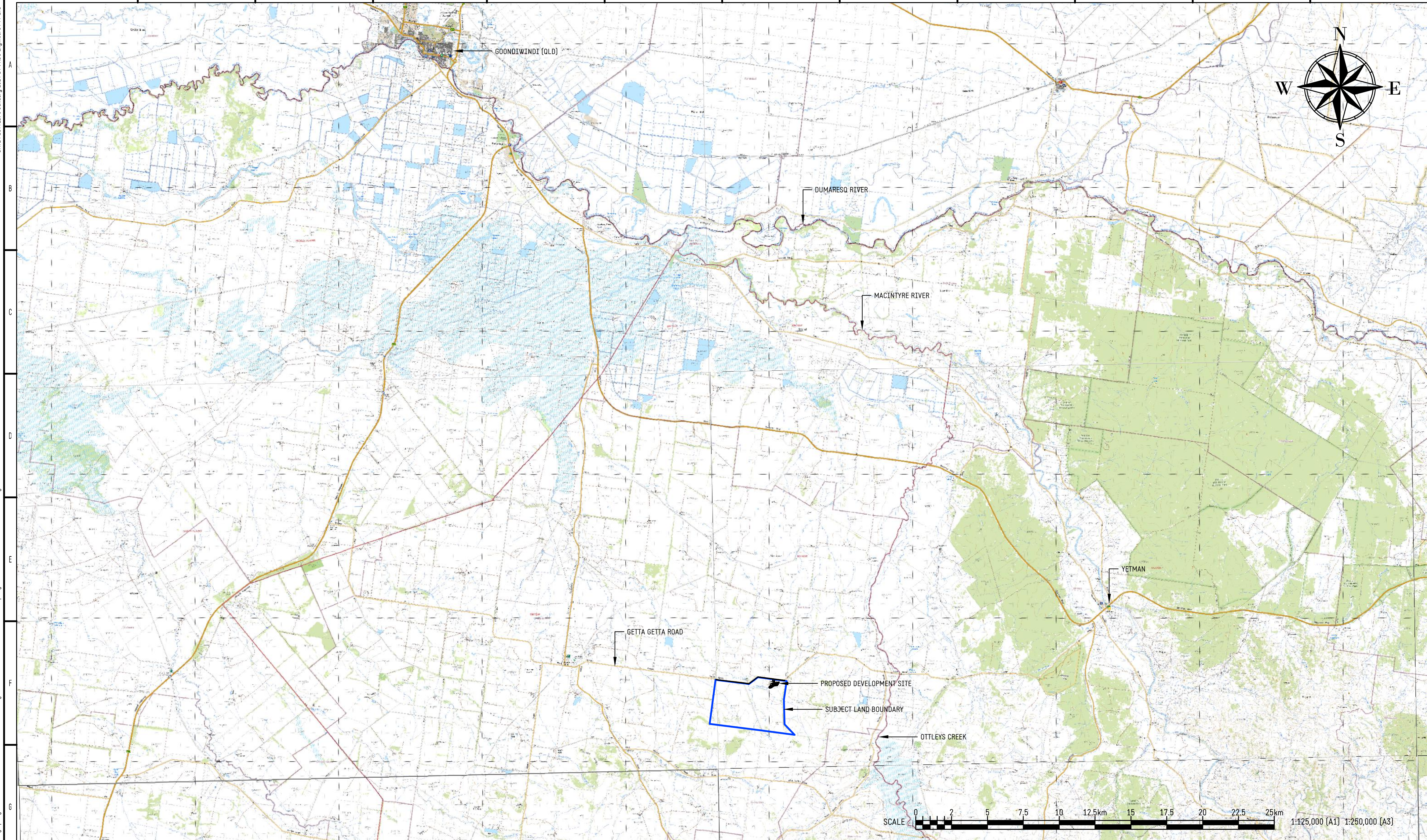
Rod Davis
Director
RDC Engineers Pty Ltd
PO Box 1223
TOOWOOMBA QLD 4350
rod.davis@rdcengineers.com.au

If you have any questions about this request, please contact Rod Davis via rod.davis@rdcengineers.com.au or 0427 629203.

Yours sincerely,

R.J. Davis

Rod Davis
Director
0427 629203
rod.davis@rdcengineers.com.au



LEGEND

- SUBJECT LAND BOUNDARY
- LAND PARCEL BOUNDARY

NOTES:

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A	06/12/23	DRAFT ISSUE TO CLIENT	RJD	RJD	RJD
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SCALE	1:250,000 (A3)
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DATE	04/01/2024
APPROVED	RJD
DATE	04/01/2024

CLIENT: DOOLIN FARMING PTY LTD

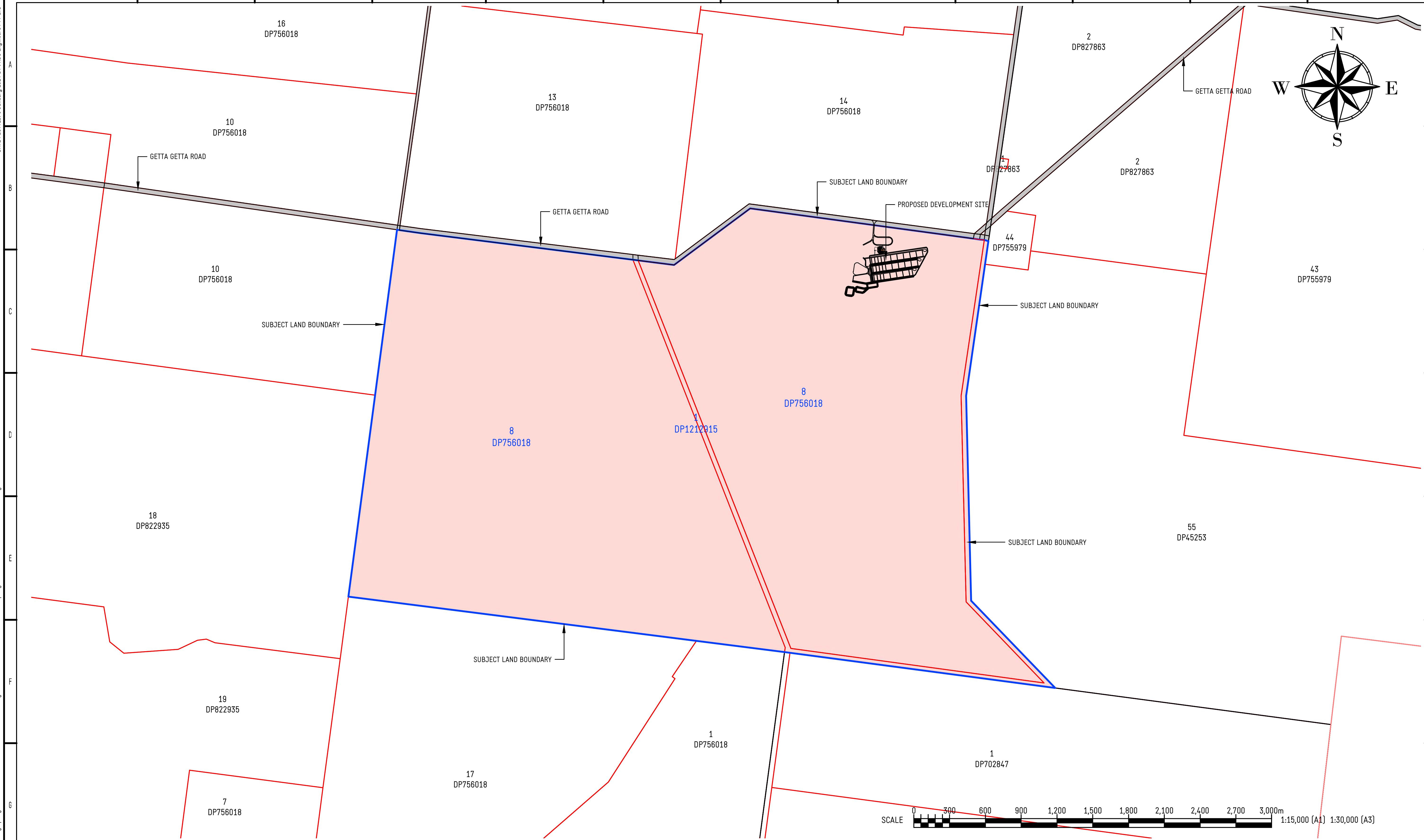
PROJECT: PROPOSED 3500 HEAD BEEF CATTLE FEEDLOT

TITLE: DEVELOPMENT APPLICATION FOR INTENSIVE LIVESTOCK AGRICULTURE
ENVIRONMENTAL IMPACT STATEMENT - GOVERNMENT CONSULTATION
SUBJECT LAND - LOCALITY PLAN

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 1		A3	E2-103-2000-01	B

DATE PLOTTED: 3 January 2024 BY: RDC Engineers PTY LTD

FILE PATH: C:\RDC Engineers\RDCE - Projects\E2-103 Doolin Farming Springfield EIS\05 - ACAD MasterPlan\05.1 Drawings - CURRENT FILE NAME: E2-103 DF Springfield MASTERPLAN-00-20220114vA.dwg



SCALE 0 300 600 900 1,200 1,500 1,800 2,100 2,400 2,700 3,000m 1:15,000 (A1) 1:30,000 (A3)

LEGEND

- SUBJECT LAND BOUNDARY
- LAND PARCEL BOUNDARY
- SUBJECT LAND AREA
- ROAD RESERVE
- EASEMENT

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DATE	04/01/2024
APPROVED	RJD
DATE	04/01/2024

CLIENT DOOLIN FARMING PTY LTD

PROJECT PROPOSED 3500 HEAD BEEF CATTLE FEEDLOT

TITLE DEVELOPMENT APPLICATION FOR INTENSIVE LIVESTOCK AGRICULTURE
ENVIRONMENTAL IMPACT STATEMENT - GOVERNMENT CONSULTATION
SUBJECT LAND - CADASTRAL PLAN

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 2		A3	E2-103-2000-02	B

DATE PLOTTED: 3 January 2024 BY : RDC Engineers PTY LTD

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LEGEND

- SUBJECT LAND BOUNDARY
- LAND PARCEL BOUNDARY
- EFFLUENT UTILISATION AREA
- SOLID WASTE UTILISATION AREA

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APPROVED	RJD
DATE	04/01/2024

CLIENT: DOOLIN FARMING PTY LTD

PROJECT: PROPOSED 3500 HEAD BEEF CATTLE FEEDLOT

TITLE: DEVELOPMENT APPLICATION FOR INTENSIVE LIVESTOCK AGRICULTURE
ENVIRONMENTAL IMPACT STATEMENT - GOVERNMENT CONSULTATION
PROPOSED DEVELOPMENT - LAYOUT PLAN

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 3		A3	E2-103-2000-03	B

DATE PLOTTED: 3 January 2024 BY: RDC Engineers PTY LTD

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LEGEND

- SUBJECT LAND BOUNDARY
- LAND PARCEL BOUNDARY

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DATE	04/01/2024
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DATE	04/01/2024
APPROVED	RJD
DATE	04/01/2024

CLIENT: DOOLIN FARMING PTY LTD

PROJECT: PROPOSED 3500 HEAD BEEF CATTLE FEEDLOT

TITLE: DEVELOPMENT APPLICATION FOR INTENSIVE LIVESTOCK AGRICULTURE
ENVIRONMENTAL IMPACT STATEMENT - GOVERNMENT CONSULTATION
PROPOSED DEVELOPMENT - DEVELOPMENT COMPLEX LAYOUT

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 4		A3	E2-103-2000-04	B

DATE PLOTTED: 3 January 2024 BY : RDC Engineers PTY LTD
FILE PATH: C:\RDC Engineers\RDCE - Projects\E2-103 Doolin Farming Springfield EIS\05 - ACAD MasterPlan\05.1 Drawings - CURRENT FILE NAME: E2-103 DF Springfield MASTERPLAN-00-20220114vA.dwg

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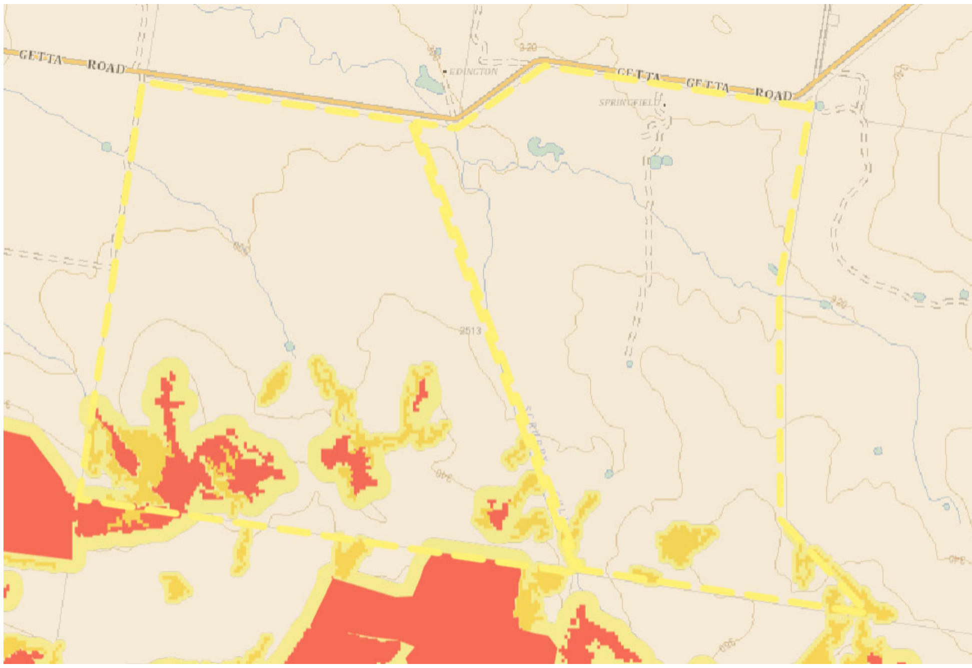

Figure 5 – Subject land - Bushfire prone land

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Annexure A

SEAR 1687 – Applicant Package

Department of Planning and Environment

2 June 2022

Mr Angus Doolin
Doolin Farming Pty Ltd
3202 Getta Getta Road
North Star NSW 2408

EF22/7052
SEAR 1687

Dear Mr Doolin

Feedlot (cattle feedlot expansion)
2513 Getta Getta Rd, North Star (Lot 8 DP 756018 & Lot 1 DP 1212915)
Planning Secretary's Environmental Assessment Requirements (SEAR) 1687

Thank you for your request for the Planning Secretary's Environmental Assessment Requirements (SEARs) for the preparation of an Environmental Impact Statement (EIS) for the above development proposal. I have attached a copy of these requirements.

In support of your application, you indicated that your proposal is both designated and integrated development under Part 4 of the *Environmental Planning and Assessment Act 1979* and requires a licence under the *Protection of the Environment Operations Act 1997.* In preparing the SEARs, the Department of Planning and Environment (the Department) has consulted with the Environment Protection Authority. A copy of its requirements is attached.

The Department has also consulted with the Biodiversity, Conservation and Science Directorate of the Environment and Heritage Group. A copy of their additional requirements for the EIS are attached.

If other integrated approvals are identified before the Development Application (DA) is lodged, you must undertake direct consultation with the relevant agencies, and address their requirements in the EIS.

If your proposal contains any actions that could have a significant impact on matters of National Environmental Significance, then it will require an additional approval under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). This approval is in addition to any approvals required under NSW legislation. If you have any questions about the application of the EPBC Act to your proposal, you should contact the Commonwealth Department of Agriculture, Water and the Environment on (02) 6274 1111.

Should you have any further enquiries, please contact Zoe Halpin, Planning and Assessment, at the Department on (02) 9995 6430 or via zoe.halpin@planning.nsw.gov.au.

Yours sincerely

C. Ritchie

Chris Ritchie
Director
Industry Assessments
as delegate of the Planning Secretary

Planning Secretary's Environmental Assessment Requirements

Section 4.12(8) of the *Environmental Planning and Assessment Act 1979*.
Schedule 3 of the Environmental Planning and Assessment Regulation 2021.

Designated Development

SEAR Number	1687
Proposal	The expansion of an existing cattle feedlot, from 999 head to 3,500 head of cattle.
Location	2513 Getta Getta Rd, North Star (Lot 8 DP 756018 & Lot 1 DP 1212915)
Applicant	Doolin Farming Pty Ltd
Date of Issue	2 June 2022
General Requirements	The Environmental Impact Statement (EIS) must comply with the assessment requirements and meet the minimum form and content requirements in sections 190 and 192 of the Environmental Planning and Assessment Regulation 2021.
Key Issues	The EIS must include an assessment of all potential impacts of the proposed development on the existing environment (including cumulative impacts if necessary) and develop appropriate measures to avoid, minimise, mitigate and/or manage these potential impacts. As part of the EIS assessment, the following matters must also be addressed: • **strategic and statutory context** – including: − a demonstration that the proposal is consistent with all relevant planning strategies, environmental planning instruments, development control plans (DCPs), or justification for any inconsistencies − a list of any approvals that must be obtained under any other Act or law before the development may lawfully be carried out. − a description of how the proposed expansion integrates with existing on-site operations − a description of any amendments to and/ or additional licence(s) or approval(s) required to carry out the proposed development. • **suitability of the site** – including: − a detailed justification that the site can accommodate the proposed processing capacity, having regard to the scope of the operations and its environmental impacts and relevant mitigation measures − plans depicting the proposed layout, including the location of pens, equipment, dams, effluent irrigation and/ or manure application areas and the like. • **air quality and odour** – including: − a quantitative assessment of the potential air quality, dust and odour impacts of the development, including cumulative impacts and impacts on adjacent residences, in accordance with relevant Environment Protection Authority guidelines − a description and appraisal of air quality and odour impact mitigation and monitoring measures. • **waste management** – including: − details of waste handling including, transport, identification, receipt, stockpiling and quality control including off-site reuse and disposal − detail of waste management including effluent and manure and disposal of dead cattle for the proposal

	– the measures that would be implemented to ensure that the proposed development is consistent with the aims, objectives and guidelines in the *NSW Waste Avoidance and Sustainable Materials Strategy 2041.* • **animal welfare, bio-security and disease management** – including: – details of how the proposed expansion would comply with relevant codes of practice and guidelines – a heat load assessment in accordance with Department of Primary Industries guidelines – details of all pest, weed and disease control measures – a detailed description of the contingency measures that would be implemented for the mass disposal of livestock in the event of disease outbreak. • **noise and vibration** – including: – a description of all potential noise and vibration sources during construction and operation, including road traffic noise – a noise and vibration assessment in accordance with the relevant Environment Protection Authority guidelines – a description and appraisal of noise and vibration mitigation and monitoring measures. • **soil and water** – including: – a description of local soils, topography, drainage and landscapes – details of water usage for the expansion including existing and proposed water licencing requirements in accordance with the *Water Act 1912* and/or the *Water Management Act 2000* – an assessment of potential impacts on floodplain and stormwater management and any impact to flooding in the catchment – details of sediment and erosion controls – a detailed site water balance – an assessment of potential impacts on the quality and quantity of surface and groundwater resources – details of the stormwater and wastewater management systems (including sewage), water monitoring program and other measures to mitigate surface and groundwater impacts from runoff from feedlot pens, effluent storage, evaporation and terminal ponds – details of sustainable effluent and manure utilisation to prevent land, groundwater or surface water pollution and potential offsite impacts – details of irrigation methods for effluent including consideration of pivot spray irrigation system to allow better control of irrigated effluent – characterisation of the nature and extent of any contamination on the site and surrounding area – a description and appraisal of impact mitigation and monitoring measures. • **hazards and risk** – including: – a preliminary risk screening completed in accordance with State Environmental Planning Policy (Resilience and Hazards) 2021, Chapter 3 and Applying SEPP 33 (DoP, 2011), with a clear indication of class, quantity and location of all dangerous goods and hazardous materials associated with the development. Should preliminary screening indicate that the project is "potentially hazardous" a Preliminary Hazard Analysis (PHA) must be prepared in accordance with Hazardous Industry Planning Advisory Paper No. 6 - Guidelines for Hazard Analysis (DoP, 2011) and Multi-Level Risk Assessment (DoP, 2011). – an assessment of bushfire risks and asset protection zones (APZ) in accordance with NSW Rural Fire Service guidelines • **traffic and transport** – including: – details of road transport routes and access to the site – road traffic predictions for the development, including cumulative impacts – an assessment of impacts to the safety and function of the road network and the details of any road upgrades required for the expansion.

	• **biodiversity** – including a description of any potential vegetation clearing needed to undertake the expansion and any impacts on flora and fauna. • **visual** – including an impact assessment at private receptors and public vantage points. • **heritage** – including Aboriginal and non-Aboriginal cultural heritage.
Environmental Planning Instruments and other policies	The EIS must assess the proposal against the relevant environmental planning instruments, including but not limited to: • State Environmental Planning Policy (Transport and Infrastructure) 2021 • (Chapter 2) • State Environmental Planning Policy (Biodiversity and Conservation) 2021 • (Chapters 2 and 3) • State Environmental Planning Policy (Primary Production) 2021 • State Environmental Planning Policy (Resilience and Hazards) 2021 (Chapters 3 and 4) • Gwydir Local Environmental Plan 2013 • relevant development control plans and section 7.11 plans.
Guidelines	During the preparation of the EIS you should consult the Department's Register of Development Assessment Guidelines which is available on the Department's website at https://www.planning.nsw.gov.au/Assess-and-Regulate/Development-Assessment/Industries. Whilst not exhaustive, this Register contains some of the guidelines, policies, and plans that must be taken into account in the environmental assessment of the proposed development.

Consultation	During the preparation of the EIS, you must consult the relevant local, State and Commonwealth government authorities, service providers and community groups, and address any issues they may raise in the EIS. In particular, you should consult with the:
	• Department of Planning and Environment, specifically the:
	  ○ Environment and Heritage Group (formerly Environment, Energy and Science Group)
	  ○ Water Group
	  ○ Environment Protection Authority
	• Department of Regional NSW, specifically:
	  ○ Department of Primary Industries – Agriculture
	• Transport for NSW
	• NSW Rural Fire Service
	• WaterNSW
	• Toomelah Local Aboriginal Land Council
	• Gwydir Shire Council
	• the surrounding landowners and occupiers that are likely to be impacted by the proposal.
	Details of the consultation carried out and issues raised must be included in the EIS.

Further consultation after 2 years	If you do not lodge an application under Section 4.12(8) of the *Environmental Planning and Assessment Act 1979* within 2 years of the issue date of these SEARs, you must consult with the Planning Secretary in relation to any further requirements for lodgement.

DOC22/388141

23 May 2022

Dept of Planning and Environment
Industry Assessments
4 Parramatta Square - 12 Darcy St
PARRAMATTA NSW 2150

Attention: Ms Zoe Halpin

BY EMAIL: Zoe.Halpin@planning.nsw.gov.au

Dear Ms Halpin,

Thankyou for your request, received on 18 May 2022, for the Environment Protection Authority's (EPA) requirements for an Environmental Impact Statement (EIS) for the proposed expansion of the existing feedlot at 2513 Getta Getta Road North Star (Lot 8 DP 756018 & Lot 1 DP 1212915) – your reference being SEAR 1687.

The EPA understands the proposal involves the expansion of an existing feedlot to increase capacity from 999 head to 3,500 head with the associated additional infrastructure to be constructed as part of the proposal.

The EPA has considered the details of the proposal as provided by the Department of Planning and Environment and has identified the information it requires to issue its general terms of approval in **Attachment A**.

In summary, the EPA's key information requirements for the proposal include an adequate assessment of:

1. **Air** - odour and dust generation and management of potential impacts on adjacent residences.

2. **Water** - water management systems and the protection of surface and groundwater from runoff from feedlot pens, effluent storage, evaporation and terminal ponds, and the application of effluent and/or manure to soils on the premises.

3. **Sustainable effluent and manure utilisation** - ensure that any proposed application to site soils are sustainable in relation to hydraulic, nutrient and salt loads to prevent land, groundwater or surface water pollution and potential offsite impacts.

4. **Irrigation Method** - provide details of irrigation methods for effluent including consideration of pivot spray irrigation system to allow better control of irrigated effluent. This may also effect the size needed for terminal ponds to capture run-off from the irrigation areas after rainfall.

5. **Noise** - proximity to sensitive receptors and the impact of any noise sources associated with the project.

Phone 131 555 **TTY** 133 677 PO Box 494 85 Faulkner St **info@epa.nsw.gov.au**
Phone +61 2 9995 5555 **ABN** 43 692 285 758 Armidale Armidale **www.epa.nsw.gov.au**
(from outside NSW) NSW 2350 Australia NSW 2350 Australia

6. **Disposal of mortalities** - management of mortalities under normal operating conditions and in the event of a mass death scenario, to prevent odour emissions, contain pathogens, control vermin and disease vectors, and protect surface water and groundwater from pollution.

In carrying out the assessment, the proponent should refer to the relevant guidelines as listed in **Attachment A** and any relevant industry codes of practice and best practice management guidelines. The application of principles provided in the *National Guidelines for Beef Cattle Feedlots in Australia, 3rd Edition,* Meat and Livestock Australia should also be considered by the proponent to assist in mitigating air, odour, water quality and waste (mortalities) impacts associated with the proposal.

Based on the information provided to the EPA, the proponent will require an Environment Protection Licence to construct and operate the proposed feedlot if approval is granted. The proposed expansion meets the threshold requirements specified in clause 22 – Livestock intensive industries, in Schedule 1 of the *Protection of the Environment Operations Act 1997*.

General information on licence requirements can be obtained from the EPA's Environment Line by calling 131 555 or on the EPA's website at www.epa.nsw.gov.au/licensing/licencePOEO.htm.

To assist the EPA in assessing the proposal we request that the EIS follows the format of the Department of Planning and Environment EIS guidelines and addresses the EPA's specific environmental assessment requirements outlined in the following attachments.

If the necessary information is not adequately provided in the EIS then delays in the development assessment process may occur. The Proponent should be made aware that any commitments made in the EIS may be formalised as approval conditions and may also be placed as formal licence conditions.

The Proponent should be made aware that, consistent with provisions under Part 9.4 of the *Protection of the Environment Operations Act 1997* ("the Act") the EPA may require the provision of a financial assurance and/or assurances. The amount and form of the assurance(s) would be determined by the EPA and required as a condition of an Environment Protection Licence.

In addition, and as a requirement of an Environment Protection Licence if approval is granted, the EPA will require the Proponent to prepare, test and implement a Pollution Incident Response Management Plan and/or plans in accordance with Section 153 of the Act.

If you have any questions or wish to discuss anything further, please contact me on 131 555 or via email to info@epa.nsw.gov.au, marked to my attention.

Yours sincerely

REBECCA SCRIVENER
Head, Regional Operations Unit
Regulatory Operations Regional – West

ATTACHMENT A: Environmental Assessment Requirements – SEARS 1687 – Doolin Farming Pty Ltd – Feedlot Expansion – Gretta Gretta Road, North Star

1. Environmental impacts of the project

1.1. The EIS must address the requirements of Section 45 of the Protection of the Environment Operations Act 1997 (POEO Act) by determining the extent of each impact and providing sufficient information to enable the EPA to determine appropriate conditions, limits and monitoring requirements for an Environment Protection Licence (EPL).

1.2. Impacts related to the following environmental issues need to be assessed, quantified and reported on:

- **Air Issues**: air quality including dust generation and odour from the operation on the surrounding landscape and/or community;
- **Noise impacts** associated with operational noise particularly machinery and plant movements;
- **Waste** including general waste and animal mortalities.
- **Water and Soils** including effluent/manure utilisation options, water quality, catchment description and premise water balance.

The Environmental Assessment (EA) should address the specific requirements outlined under each heading below and assess impacts in accordance with the relevant guidelines mentioned.

2. Licensing requirements

2.1. The development is a scheduled activity under the *Protection of the Environment Operations Act 1997* (POEO Act) and will therefore require an Environment Protection Licence (EPL) if approval is granted.

2.2. Should project approval be granted, the proponent will need to make an application to the EPA for its EPL for the proposed facility prior to undertaking any on site works. Additional information is available through the *EPA Guide to Licensing* document (www.epa.nsw.gov.au/licensing/licenceguide.htm).

SPECIFIC ISSUES

3 Air issues

3.7. The EA must demonstrate the proposal's ability to comply with the relevant regulatory framework, specifically the *Protection of the Environment Operations (POEO) Act (1997)* and the *POEO (Clean Air) Regulation (2002)*. Particular consideration should be given to section 129 of the POEO Act concerning control of "offensive odour".

3.8. The EA must include an air quality impact assessment (AQIA).

3.9. The AQIA must be carried out in accordance with the document, *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW* (2005) http://www.epa.nsw.gov.au/resources/air/ammodelling05361.pdf.

3.10. The EA must detail emission control techniques/practices that will be employed at the site and identify how the proposed control techniques/practices will meet the requirements of the POEO Act, *POEO (Clean Air) Regulation* and associated air quality limits or guideline criteria.

3.11. Odour emissions must be assessed in accordance with the *Technical Framework - Assessment and Management of Odour from Stationary Sources in NSW* and/or *Technical Notes - Assessment and Management of Odour from Stationary Sources in NSW* (DEC, 2006).

4. Noise and Vibration

The EA must assess the following noise and vibration aspects of the proposed development

4.1. Construction noise associated with the proposed development should be assessed using the *Interim Construction Noise Guideline (*DECC, 2009). These are available at:https://www.epa.nsw.gov.au/your-environment/noise/industrial-noise/interim-construction-noise-guideline

4.2. Vibration from all activities (including construction and operation) to be undertaken on the premises should be assessed using the guidelines contained in the *Assessing Vibration: a technical guideline* (DEC, 2006). These are available at: https://www.epa.nsw.gov.au/your-environment/noise/industrial-noise/assessing-vibration

4.3. If blasting is required for any reasons during the construction or operational stage of the proposed development, blast impacts should be demonstrated to be capable of complying with the guidelines contained in *Australian and New Zealand Environment Council – Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration* (ANZEC, 1990).These are available at: https://www.epa.nsw.gov.au/your-environment/noise/industrial-noise/interim-construction-noise-guideline

4.4. Operational noise from all industrial activities (including private haul roads and private railway lines) to be undertaken on the premises should be assessed using the guidelines contained in the *NSW Noise Policy for Industry* (EPA, 2017). https://www.epa.nsw.gov.au/your-environment/noise/industrial-noise/noise-policy-for-industry-(2017)

4.5. Noise on public roads from increased road traffic generated by land use developments should be assessed using the guidelines contained in the *NSW Road Noise Policy* and associated application notes (EPA, 2011).https://www.epa.nsw.gov.au/your-environment/noise/transport-noise

5 Waste, chemicals and hazardous materials and radiation

1. The EA must assess all aspects of waste generation, management and disposal associated with the proposed development.

2. The EA must demonstrate compliance with all regulatory requirements outlined in the POEO Act and associated waste regulations.

3. The EA must identify, characterise and classify the following in accordance with the EPA's *Waste Classification Guidelines (2014)* and associated addendums:
   (i) all waste that will be generated onsite through excavation, demolition or construction activities, including proposed quantities of the waste;
   (ii) all waste that is proposed to be disposed of to an offsite location, including proposed quantities of the waste and the disposal locations for the waste. This includes waste that is intended for re-use or recycling.

Note: The EPA's W*aste Classification Guidelines (2014)* and associated addendums are available at: https://www.epa.nsw.gov.au/your-environment/waste/classifying-waste

5.4. The EA must outline contingency plans for any event that may result in environmental harm, such as excessive stockpiling of material, or dirty water volumes exceeding the storage capacity available on-site.

5.5. The EA must demonstrate that appropriate spill containment will be provided for storage, filling and loading of all fuels and other chemicals to be used on site, in accordance with the relevant Australian Standard.

5.6. Provide details of how waste will be handled and managed onsite, including:

a) Stockpile location and management

- Labelling of stockpiles for identification, ensuring that all waste is clearly identified and stockpiled separately from other types of material (especially the separation of any contaminated and non-contaminated waste).
- Proposed height limits for all waste to reduce the potential for dust and odour.
- Procedures for minimising the movement of waste around the site and double handling.
- Measures to minimise leaching from stockpiles into the surrounding environment, such as sediment fencing, geofabric liners and hardstands.

b) Mortality disposal arrangements

- Define disposal methods and locations for normal operations and possible mass death scenarios.
- Procedures for preventing the spread of pathogens or disease.
- Measures for protecting surface and/or groundwaters from pollution.
- Measures to prevent offensive odour generated by mortality disposal.
- Measures to control or prevent vermin and disease vectors.

5.7. The proponent should provide details of:

- how leachate from stockpiled waste material will be kept separate from stormwater runoff;
- treatment of leachate through a wastewater treatment plant (if applicable); and
- any proposed transport and disposal of leachate off-site.

6 Water and Soils

6.1. The EA must demonstrate how the proposed development will meet the requirements of section 120 of the POEO Act.

6.2. The EA must include a water balance for the development including water requirements (quantity, quality and source(s)) and proposed storm and wastewater disposal, including type, volumes, proposed treatment and management methods and re-use options.

6.3. If the proposed development intends to discharge waters to the environment, the EA must demonstrate how the discharge(s) will be managed in terms of water quantity, quality and frequency of discharge and include an impact assessment of the discharge on the receiving environment. This should include:

- Description of the proposal including position of any intakes and discharges, volumes, water quality and frequency of all water discharges.

- Description of the receiving waters including upstream and downstream water quality as well as any other water users.

- Demonstration that all practical options to avoid discharge have been implemented and environmental impact minimised where discharge is necessary.

6.4. The EA must include an assessment of potential impacts on soil and land resources, being guided by *Soil and Landscape Issues in Environmental Impact Assessment* (DLWC 2000). The nature and extent of any significant impacts should be identified. Mitigation and management options to minimise identified soil and land resource impacts should be described.

6.5. The EA must refer to Water Quality Objectives for the receiving waters and indicators and associated trigger values or criteria for the identified environmental values of the receiving environment. This information should be sourced from the ANZECC (2000) Guidelines for Fresh and Marine Water Quality (http://www.environment.gov.au/water/policy-programs/nwqms/).

6.6. The EA must describe how stormwater will be managed in all phases of the project, including details of how stormwater and runoff will be managed to minimise pollution. Information should include measures to be implemented to minimise erosion, leachate and sediment mobilisation at the site. The EA should consider the guidelines *Managing urban stormwater: soils and construction,* vol. 1 (Landcom 2004) and vol. 2 (A. Installation of services; B. Waste landfills C. Unsealed roads; D. Main Roads; E. Mines and quarries) (DECC, 2008).

6.7. Erosion, sediment and leachate control measures to be implemented to minimise erosion, leachate and sediment mobilisation at the site during construction and operation phases of the project. The EA should show the location of each measure to be implemented. Include such control measures such as:

- Sediment traps
- Diversion banks
- Sediment fences
- Bunds (earth, hay, mulch)
- Geofabric liners
- Other control measures as appropriate.

6.8. Assessment undertaken of the design of terminal pond systems to manage stormwater runoff (and if applicable tailwater) from any proposed effluent utilisation area to minimise water quality impacts on the nearest watercourses.

6.9. Discharges from the site must be characterised with respect to their location, frequency, volume and likely water quality.

6.10. The controlled drainage area including feedlot pens, manure stockpile/composting areas, catch drains, sedimentation and effluent storage/evaporation ponds and terminal pond systems must be protected from inundation during floods with an average recurrence interval of up to 1 in 100 years.

6.11. Feedlot pen surfaces and manure stockpile/composting areas and the walls and bases of any catch drains, sedimentation, effluent holding/evaporation/terminal ponds must incorporate an impermeable liner. Acceptable impermeable liners include:

- a clay or modified soil liner of at least 900mm of recompacted clay with an in-situ permeability (K) of less than 1 x 10-9 m/s.
- A natural geological barrier that is established by geotechnical investigations to provide a secure barrier between the groundwater, soil and substrata equivalent to the 900 mm recompacted clay liner above.

6.12. If the proposal incorporates effluent or manure application/utilisation to cropping lands on the premises, an assessment of the sustainability of these utilisation practices must be provided. The assessment must be undertaken in accordance with the *Environmental Guidelines for the Use of Effluent by Irrigation* (DEC, 2004).

The assessment must identify soil constraints where applicable to the application of manures and/or effluent and include nutrient balance and salt management assessments. Maps of proposed manure and/or effluent application areas must be provided in the EA.

6.13. The EA must describe any water quality monitoring programs to be carried out at the project site. Water quality monitoring should be undertaken in accordance with the *Approved Methods for the Sampling and Analysis of Water Pollutant in NSW* (2004) which is available at:
http://www.epa.nsw.gov.au/resources/legislation/approvedmethods-water.pdf.

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Our ref: DOC22/397528
Your ref: SEAR1687

Zoe Halpin
Planning Officer
Industry Assessments
Department of Planning and Environment
Zoe.halpin@planning.nsw.gov.au

23 May 2022

Dear Ms Halpin

Feedlot (cattle feedlot expansion) – 2513 Getta Getta Rd, North Star (Lot 8 DP 756018 & Lot 1 DP 1212915)

I refer to your email dated 18 May 2022 seeking input into the Department of Planning and Environment's Environmental Assessment Requirements (EARs) for the preparation of an Environmental Impact Assessment (EIS) for Feedlot (cattle feedlot expansion), 2513 Getta Getta Road, North Star.

The Biodiversity, Conservation and Science Directorate (BCS) has considered your request and provides EARs for the proposed development in **Attachments A** and **B**.

BCS recommends the EIS needs to appropriately address the following:

1. Biodiversity and offsetting
2. Water and soils
3. Flooding

If you have any questions about this advice, please do not hesitate to contact Michelle Howarth, Senior Conservation Planning Officer, via michelle.howarth@environment.nsw.gov.au or (02) 6883 5339.

Yours sincerely,

Samantha Wynn

Samantha Wynn
Senior Team Leader Planning North West
Biodiversity, Conservation and Science Directorate

23 May 2022

Attachment A - Environmental Assessment Requirements

Attachment B - Guidance Material

ATTACHMENT A

BCS's Recommended Environmental Assessment Requirements (EARs) for Feedlot (expansion)

BCS	Biodiversity, Conservation and Science Directorate of the NSW Department of Planning and Environment
The Department	NSW Department of Planning and Environment
NPWS	National Parks and Wildlife Service

1. The Proposal

All components of the proposed development must be clearly described, including:

- the location of the proposed development and its context in the locality
- the rationale for the project
- the size, scale and type of the proposed development
- the pre-construction, construction, operational, and, where relevant, decommissioning and rehabilitation phases of the proposed development, and the methods proposed to implement these phases
- plans and maps of the proposed development showing the locations of relevant phases and infrastructure
- the staging and timing of the proposed development
- the proposed development's relationship to any other proposals and developments

2. Environmental Impacts of the Proposal

The proponent must consider, assess, quantify and report on the likely environmental impacts of the proposal if applicable, particularly:

- Biodiversity
- National Park estate: land reserved or acquired under the *National Parks and Wildlife Act 1974*
- Flooding and floodplain issues
- Cumulative impacts

The Secretary's Environmental Assessment Requirements should address the specific requirements outlined under each heading below and assess impacts in accordance with the relevant guidelines mentioned.

A full list of guidelines and reference material is presented in **Attachment B**. Appropriate justification should be provided in instances where the matters below are not addressed.

3. Biodiversity

Biodiversity Assessment Methodology for the Biodiversity Offsets Scheme (BOS)

The EIS should include an assessment of the following:

a. The EIS must assess the impact of the proposed development on biodiversity values to determine if the proposed development is "likely to significantly affect threatened species"

for the purposes of Section 7.2 of the Biodiversity Conservation Act 2016 (BC Act), as follows:

a. The EIS must demonstrate and document how the proposed development exceeds, or does not exceed, the biodiversity offsets scheme threshold as set out in Section 7.4 of the BC Act 2016 and Clause 7.1 of the Biodiversity Conservation Regulation 2017 (BC Regulation) by determining whether the proposed development involves:

   i. **The clearing of native vegetation exceeding the thresholds** listed under Clause 7.23 of the BC Regulation, **or**

   ii. The clearing of native vegetation, or other action, **on land included on the Biodiversity Values Map** published under Clause 7.23 of the BC Regulation (this map includes areas of outstanding biodiversity value, as declared under Section 3.1 of the BC Act).

b. If the proposal does not trigger any of the criteria in (a) above, then the EIS must determine whether the proposed development is likely to have a significant impact based on '*the test for determining whether proposed development likely to significant affect threatened species or ecological communities'* in Section 7.3 of the BC Act.

c. Where there is reasonable doubt regarding potential impacts, or where information is not available, then a significant impact upon biodiversity should be considered likely when applying the test in Section 7.3 of the BC Act. Where it is concluded that there is no significant impact, the EIS must justify how the conclusion has been reached.

d. If the development exceeds the thresholds in (a) or (b), then the EIS must be accompanied by a biodiversity development assessment report (BDAR) prepared in accordance with Part 6 of the BC Act. That is, the Biodiversity Assessment Methodology applies.

Required Information

Where development is considered "likely to significantly impact on threatened species" and a Biodiversity Development Assessment Report is required, the following requirements apply:

- Biodiversity impacts related to the proposal are to be assessed in accordance with the Biodiversity Assessment Method 2020 and documented in a Biodiversity Development Assessment Report (BDAR). The BDAR must include information in the form detailed in the *Biodiversity Conservation Act 2016* (s6.12), Biodiversity Conservation Regulation 2017 (s6.8) and Biodiversity Assessment Method.
- The BDAR must document the application of the avoid, minimise and offset hierarchy including assessing all direct, indirect, uncertain and prescribed impacts in accordance with the Biodiversity Assessment Method.
- The BDAR must include details of the measures proposed to address the offset obligation as follows:
    - The total number and classes of biodiversity credits required to be retired for the proposal.
    - The number and classes of like-for-like biodiversity credits proposed to be retired.
    - The number and classes of biodiversity credits proposed to be retired in accordance with the variation rules.
    - Any proposal to fund a biodiversity conservation action.
    - Any proposal to make a payment to the Biodiversity Conservation Fund.
- If seeking approval to use the variation rules, the BDAR must contain details of the reasonable steps that have been taken to obtain requisite like-for-like biodiversity credits.

The BDAR must be prepared by a person accredited to apply the Biodiversity Assessment Method under s6.10 of the *Biodiversity Conservation Act 2016*.

NOTE – A BDAR template and guidance document has been created to assist accredited assessors to prepare a BDAR. It has been developed in accordance with best practice, the minimum information requirements and to support BDAR reviewers. The BDAR Template can be found here and the Guidance for the BDAR Template can be found here.

Where a BDAR is not required and a threatened species assessment is prepared to support a conclusion of "no significant impact", the EIS must include a field survey of land identified as native vegetation and/or native species habitat inclusive of non-vegetative habitat, namely, karst, caves, crevices, cliffs, rocky outcrops and other features of geological significance and habitat associated with human made structures. This should be conducted and documented in accordance with the relevant guidelines including the Threatened Species Survey and Assessment Guidelines: Field Survey Methods for Fauna – Amphibians (DECCW, 2009), Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities - Working Draft (DEC, 2004) and Guidelines for Threatened Species Assessment (Dept Planning, July 2005). The approach should also reference the field survey methods and assessment information on the Department of Planning, Industry and Environment website including the BioNet Atlas, Threatened Species Profiles, taxon specific survey guidelines and BioNet Vegetation Classification (see Attachment 2).

Category 1 – exempt land

Clearing of native vegetation on land that meets the definition of Category 1 - exempt land (as defined under the Local Land Services Act 2013 (LLS Act)) does not require assessment or offsetting under the Biodiversity Conservation Act 2016. Prescribed impacts as outlined in chapter 6 of the Biodiversity Assessment Method (2020) must still be considered on Category 1 - exempt land. In addition, potential impacts to Matters of National Environmental Significance under the Environment Protection and Biodiversity Conservation Act 1999 on Category 1 – exempt land must be considered.
 	
Section 60F Local Land Services Act 2013 (LLS Act) Act provides the transitional arrangements that are in place until a comprehensive NVR Map with all the land categories is published. During the 'transitional period' assessors can make a reasonable approximation of land categorisation for unpublished layers, in consultation with the landholder.
 	
Where a reasonable approximation is required, it is recommended that:
• assessors first identify whether land meets criteria for Category 2 - Regulated Land, prior to Category 1 - Exempt Land.
    o In some circumstances, land may meet multiple map criteria i.e. criteria for Category 2 - Regulated Land, AND Category 1 - Exempt Land
    o In most circumstances' Category 2 - Regulated Land criteria will determine the categorisation of the land, rather than Category 1 - Exempt Land criteria.
 	
Section 60I of the LLS Act defines the criteria in which land can be classified as Category 2 Regulated Land, this includes land which:
• was not cleared of native vegetation as at 1 January 1990;
• was unlawfully cleared of native vegetation between 1 January 1990 and 25 August 2017;
• contains native vegetation that was grown or preserved with the assistance of public funds (other than funds for forestry purposes);
• contains grasslands that are not low conservation grasslands;
• is subject to a private land conservation agreement;

- is a ‘set aside’ under a Land Management (Native Vegetation) Code;
- is an offset under a property vegetation plan or a set aside under the former native vegetation laws;
- is subject to an approved conservation measure that was the basis for other land being biocertified;
- is identified as coastal wetlands or littoral rainforest;
- is identified as koala habitat;
- is a declared RAMSAR wetland; or
- is mapped as containing Critically Endangered species of plants or a Critically Endangered Ecological Community

The above criteria are inclusive of both Category 2 Vulnerable Regulated Land and Sensitive Regulated Land categories.

Where an assessor identifies land that does not meet the criteria for Category 2 Vulnerable or Sensitive Regulated land, the assessor should then assess whether or not the land meets the definition of Category 1 – exempt land.

Where the assessor identifies land as Category 1 – exempt land it must be adequately demonstrated that the identified land meets the criteria as set out in section 60H of the LLS Act. Multiple pieces of evidence should be used to demonstrate a Category 1 – exempt land designation. This might include:

- Publicly available data sets on the SEED data portal, such as:
    - Land use mapping – used to identify and map existing and historical agricultural land use in NSW – see the 2017 landuse map
    - Woody vegetation extent – used to identify and map native vegetation extent – see 2008 Woody extent 2011 woody extent
    - State-wide Landcover and Tree Survey (SLATS) woody clearing for NSW – used to identify detectable clearing events since January 1990 – available here
- Published information on the Native Vegetation Regulatory Map, including Category 2-sensitive regulated, Category 2-vulnerable regulated, and excluded land - available here
- Site-based information and records, including:
    - Current and historical high-resolution aerial photography
    - current and historical photographs of the subject land
    - historical land management records maintained by the landowner
    - vegetation survey data collected on the subject land
    - documentation demonstrating history of authorised clearing and/or development

The published *Native Vegetation regulatory map: method statement* should be reviewed to determine how the datasets can be best interrogated to support any identification of Category 1 – exempt land.

Where there is uncertainty or datasets/information are conflicting, a precautionary approach should be applied and the land should be categorised as Category 2 – regulated land.

Where Category 1 – exempt land is likely to be present on a development site, early engagement with BCS is encouraged. Prior to the Biodiversity Development Assessment Report being submitted to the consent authority, the accredited assessor should submit a proposed land categorisation method to the BCS North West Planning team at *rog.nw@environment.nsw.gov.au* for endorsement.

4. NPWS Managed Estate

Land reserved or acquired under the *National Parks and Wildlife Act 1974* (NPW Act)

If the proposed development is within, adjacent to, or in close proximity to, NPWS managed conservation estate (e.g. a national park, nature reserve, state conservation area, land which is declared wilderness under the *Wilderness Act 1987*), or is within, adjacent to, or in close proximity to, a watercourse that flows directly into NPWS managed conservation estate, then the EIS must address impacts upon such area/s.

Where NPWS managed estate is likely to be impacted, the EIS should include:

- The following (as appropriate):
  - Evidence that the proponent has consulted with BCS on the legal permissibility of the proposal under the NPW Act.
  - In the case of proposals on land declared as wilderness under the *Wilderness Act 1987*, evidence that the proponent has consulted with BCS on the appropriateness of the proposal. That is, whether it is consistent with the objects of the *Wilderness Act 1987* (section 3) and the management principles for wilderness areas (section 9).
  - Alternative options that have been explored to avoid impacts on the NPWS managed estate (on-park) and a clear justification of any on-park components of the proposal.
  - If on-park impacts are considered unavoidable, consideration of the issues, including details of any compensation proposal, consistent with the Department's *Revocation, Recategorisation and Road Adjustment Policy* (2012) for proposals that are located wholly or partly in a National Park or other land acquired or reserved under the *National Parks and Wildlife Act 1974*.
- Consideration of the matters identified in the *Guidelines for consent and planning authorities for Developments adjacent to National Parks and Wildlife Service Land* (NPWS, 2020) where a proposal adjoins or is immediate vicinity of NPWS managed estate, or is upstream of NPWS managed estate, which include:
  - The nature of the impacts, including direct and indirect impacts
  - The extent of the direct and indirect impacts
  - The duration of the direct and indirect impacts
  - The objectives of the reservation of the land
- A description of the mitigation and management options that will be used to prevent, control, abate or minimise identified direct and indirect impacts associated with the proposal. This should include an assessment of the effectiveness and reliability of the measures and any residual impacts after these measures are implemented.

5. Water

- The EIS must map features relevant to water, including:
  - Rivers, streams, estuaries (as described in s4.2 of the Biodiversity Assessment Method).
  - Wetlands (as described in s4.2 of the Biodiversity Assessment Method).
  - Groundwater.
  - Groundwater dependent ecosystems.
- The EIS must describe background conditions for any water resource likely to be affected by the proposal, including:
  - Existing surface and groundwater.
  - Hydrology

- Water Quality Objectives (as endorsed by the NSW Government) including groundwater as appropriate that represent the community's uses and values for the receiving waters. Indicators and trigger values/criteria for the identified environmental values in accordance with the ANZECC (2000) *Guidelines for Fresh and Marine Water Quality* and / or local objectives, criteria or targets endorsed by the NSW Government
  - *Risk-based Framework for Considering Waterway Health Outcomes in Strategic Land-use Planning Decisions* (OEH/EPA, 2017).

- The EIS must assess the impacts of the proposal on water quality, including:
  - The nature and degree of impact on receiving waters for both surface and groundwater, demonstrating how the proposal protects the Water Quality Objectives where they are currently being achieved, and contributes towards achievement of the Water Quality Objectives over time where they are currently not being achieved. This should include an assessment of the mitigating effects of proposed stormwater and wastewater management during and after construction.
  - Identification of proposed monitoring of water quality.
  - Consistency with any relevant certified Coastal Management Program (or Coastal Zone Management Plan).

- The EIS must assess the impact of the proposal on hydrology, including:
  - Water balance including quantity, quality and source.
  - Effects upon rivers, wetlands, estuaries, marine waters and floodplain areas.
  - Effects upon water-dependent fauna and flora including groundwater dependent ecosystems.
  - Impacts to natural processes and functions within rivers, wetlands, estuaries and floodplains that affect river system and landscape health such as nutrient flow, aquatic connectivity and access to habitat for spawning and refuge (e.g. river benches).
  - Changes to environmental water availability, both regulated / licensed and unregulated / rules-based sources of such water.

6. Flooding

- The EIS must map the following features relevant to flooding as described in the Floodplain Development Manual 2005 (NSW Government 2005) including:
  - Flood prone land (ie land susceptible to the probable maximum flood event).
  - Flood planning area, the area below the flood planning level.
  - Hydraulic categorisation (floodway and flood storage areas).
  - Flood hazard.

- The EIS must describe flood assessment and modelling undertaken in determining the design flood levels for events, including a minimum of the 10% Annual Exceedance Probability (AEP), 1% AEP flood levels and the probable maximum flood, or an equivalent extreme event.

- The EIS must model the effect of the proposal (including fill) on the current flood behaviour for a range of design events as identified above, and the 0.5% AEP and 0.2% AEP year flood events as proxies for assessing sensitivity to an increase in rainfall intensity of flood producing rainfall events due to climate change.

- All site drainage, stormwater quality devices and erosion / sedimentation control measures should be identified in the EIS and the onsite treatment of stormwater and effluent runoff and predicted stormwater discharge quality from the proposal should be detailed.

- Modelling in the EIS must consider and document:
  - Existing council flood studies in the area and examine consistency to the flood behaviour documented in these studies.

- The impact on existing flood behaviour for a full range of flood events including up to the probable maximum flood (PMF), or an equivalent extreme flood.
- Impacts of the proposal on flood behaviour resulting in detrimental changes in potential flood affection of other developments or land. This may include redirection of flow, flow velocities, flood levels, hazard categories and hydraulic categories.
- Impacts of earthworks and stockpiles within the flood prone land up to the PMF level. The assessment should be based on understanding of cumulative flood impacts of construction and operational phases.
- Relevant provisions of the NSW Floodplain Development Manual 2005.

- The EIS must assess the impacts on the proposal on flood behaviour, including:
  - Whether there will be detrimental increases in the potential flood affectation of other properties, assets and infrastructure.
  - Consistency with Council floodplain risk management plans.
  - Consistency with any Rural Floodplain Management Plans.
  - Compatibility with the flood hazard of the land.
  - Compatibility with the hydraulic functions of flow conveyance in floodways and storage in flood storage areas of the land.
  - Whether there will be adverse effect to beneficial inundation of the floodplain environment, on, adjacent to or downstream of the site.
  - Whether there will be a direct or indirect increase in erosion, siltation, destruction of riparian vegetation or a reduction in the stability of river banks or watercourses.
  - Appropriate mitigation measures to offset potential flood risk arising from the proposal. Any proposed mitigation work should be modelled and assessed on the overall catchment basis in order to ensure it fits its purpose and meets the criteria of the Council where it is located, and to ensure it has no adverse impact to surrounding areas.
  - Any impacts the proposal may have upon existing community emergency management arrangements for flooding. These matters are to be discussed with the NSW SES and Council.
  - Whether the proposal incorporates specific measures to manage risk to life from flood. These matters are to be discussed with the NSW SES and Council.
  - Emergency management, evacuation and access, and contingency measures for the proposal during both construction and operational phases considering the full range of flood risk (based upon the probable maximum flood or an equivalent extreme flood event). These matters are to be discussed with and have the support of Council and the NSW SES.
  - Any impacts the proposal may have on the social and economic costs to the community as a consequence of flooding.

ATTACHMENT B

Guidance Material

Title	Web address
	Relevant Legislation
Biodiversity Conservation Act 2016	*https://www.legislation.nsw.gov.au/view/html/inforce/current/act-2016-063*
Commonwealth Environment Protection and Biodiversity Conservation Act 1999	*https://www.legislation.gov.au/Details/C2014C00140/Download*
Environmental Planning and Assessment Act 1979	*https://www.legislation.nsw.gov.au/view/html/inforce/current/act-1979-203*
Fisheries Management Act 1994	*https://www.legislation.nsw.gov.au/view/html/inforce/current/act-1994-038*
National Parks and Wildlife Act 1974	*https://www.legislation.nsw.gov.au/view/html/inforce/current/act-1974-080*
Protection of the Environment Operations Act 1997	*https://www.legislation.nsw.gov.au/view/html/inforce/current/act-1997-156*
Water Management Act 2000	*https://www.legislation.nsw.gov.au/view/html/inforce/current/act-2000-092*
Wilderness Act 1987	*https://www.legislation.nsw.gov.au/view/html/inforce/current/act-1987-196*
	Biodiversity
Biodiversity Values Map	*https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=BVMap*
Biodiversity Assessment Method (OEH, 2020)	*https://www.environment.nsw.gov.au/research-and-publications/publications-search/biodiversity-assessment-method-2020*
Biodiversity Development Assessment Report Template	*https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Biodiversity/biodiversity-development-assessment-report-template-220210.docx?la=en&hash=1A4829C7ACA5A51ECE414A767C27361893706CEC*
Guidance for the Biodiversity Development Assessment Report Template	*https://www.environment.nsw.gov.au/research-and-publications/publications-search/guidance-for-the-biodiversity-development-assessment-report-template*
Changes to the Biodiversity Assessment Method from 2017 to 2020	*https://www.environment.nsw.gov.au/research-and-publications/publications-search/changes-to-the-biodiversity-assessment-method-from-2017-to-2020*
BAM 2020 Operational Manual Stage 1	*https://www.environment.nsw.gov.au/research-and-publications/publications-search/biodiversity-assessment-manual-2020-operational-manual-stage-1*
BAM Operational Manual Stage 2	*https://www.environment.nsw.gov.au/research-and-publications/publications-search/biodiversity-assessment-method-operational-manual-stage-2*

Title	Web address
BAM 2020 Operational Manual Stage 3	*https://www.environment.nsw.gov.au/research-and-publications/publications-search/biodiversity-assessment-method-operational-manual-stage-3*
BAM Calculator User Guide	*https://www.environment.nsw.gov.au/research-and-publications/publications-search/biodiversity-assessment-method-user-guide*
Serious and irreversible impacts of development on biodiversity	*https://www.environment.nsw.gov.au/topics/animals-and-plants/biodiversity/biodiversity-offsets-scheme/serious-and-irreversible-impacts*
Practice Note - Guidance for assessors and decision makers in applying modified benchmarks to assessments of vegetation integrity: Biodiversity Assessment Method	*https://www.environment.nsw.gov.au/research-and-publications/publications-search/guidance-assessors-decision-makers-applying-modified-benchmarks-to-assessments-vegetation-integrity*
Guidance and Criteria to assist a decision maker to determine a serious and irreversible impact (OEH, 2017)	*https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Biodiversity/guidance-decision-makers-determine-serious-irreversible-impact-190511.pdf*
Accreditation Scheme for Application of the Biodiversity Assessment Method Order 2017	*https://www.legislation.nsw.gov.au/view/pdf/asmade/sl-2017-471*
Ancillary rules: Biodiversity conservation actions	*https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Biodiversity/ancillary-rules-biodiversity-conservation-actions-170496.pdf*
Ancillary rules: Reasonable steps to seek like-for-like biodiversity credits for the purpose of applying the variation rules	*https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Biodiversity/ancillary-rules-reasonable-steps-like-for-like-biodiversity-credits-170498.pdf*
Ancillary rules: Impacts on threatened species and ecological communities excluded from application of variation rules	*https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Biodiversity/ancillary-rules-impacts-on-threatened-entities-excluded-from-variation-170497.pdf?la=en&hash=C38840BFF49F012433532DF72E3D90C741E4DAC1*
The Department's Threatened Species Website	*https://www.environment.nsw.gov.au/topics/animals-and-plants/threatened-species*
NSW BioNet (Atlas of NSW Wildlife)	*www.bionet.nsw.gov.au/*
Surveying Threatened Plants and their Habitats - NSW Survey Guide For The Biodiversity Assessment Method (DPIE 2020).	*https://www.environment.nsw.gov.au/research-and-publications/publications-search/surveying-threatened-plants-and-their-habitats-survey-guide-for-the-biodiversity-assessment-method*
Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities - November 2004	*https://www.environment.nsw.gov.au/surveys/BiodiversitySurveyGuidelinesDraft.htm*
Threatened species survey and assessment guidelines: field survey methods for fauna – amphibians	*https://www.environment.nsw.gov.au/research-and-publications/publications-search/threatened-species-field-survey-methods-for-fauna-amphibians*

Title	Web address
NSW Survey Guide for Threatened Frogs	*https://www.environment.nsw.gov.au/research-and-publications/publications-search/nsw-survey-guide-for-threatened-frogs*
Surveying 'species credit' threatened bats and their habitats – NSW survey guide for the Biodiversity Assessment Method	*https://www.environment.nsw.gov.au/research-and-publications/publications-search/species-credit-threatened-bats-nsw-survey-guide-for-biodiversity-assessment-method*
Bat calls of NSW - region-based guide to the echolocation calls of Microchiropteran bats	*https://www.environment.nsw.gov.au/surveys/Batcalls.htm*
Community Biodiversity Survey Manual	*https://www.environment.nsw.gov.au/surveys/CommunityBiodiversitySurveyManual.htm*
BioNet Vegetation Classification - NSW Plant Community Type (PCT) database	*www.environment.nsw.gov.au/research/Vegetationinformationsystem.htm*
The Departments Data Portal (access to online spatial data)	*http://data.environment.nsw.gov.au/*
Fisheries NSW policies and guidelines	*https://www.dpi.nsw.gov.au/fishing/habitat/publications/pubs/fish-habitat-conservation*
National Park Estate	
Guidelines for consent and planning authorities for Developments adjacent to National Parks and Wildlife Service Land (NPWS, 2020)	*https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Parks-reserves-and-protected-areas/Development-guidelines/developments-adjacent-npws-lands-200362.pdf*
List of national parks	*https://www.nationalparks.nsw.gov.au/conservation-and-heritage/national-parks*
Revocation, recategorisation and road adjustment policy (OEH, 2012)	*http://www.environment.nsw.gov.au/policies/RevocationOfLandPolicy.htm*
List of aquatic reserves	*www.dpi.nsw.gov.au/fisheries/habitat/protecting-habitats/mpa*
Water	
Water Quality Objectives	*http://www.environment.nsw.gov.au/ieo/index.htm*
ANZECC & ARMCANZ (2000) Water Quality Guidelines	*https://www.waterquality.gov.au/anz-guidelines/resources/previous-guidelines/anzecc-armcanz-2000*
Risk-based Framework for Considering Waterway Health Outcomes in Strategic Land-use Planning Decisions	*http://www.environment.nsw.gov.au/research-and-publications/publications-search/risk-based-framework-for-considering-waterway-health-outcomes-in-strategic-land-use-planning*
Applying Goals for Ambient Water Quality Guidance for Operations Officers – Mixing Zones	*http://deccnet/water/resources/AWQGuidance7.pdf*
Approved Methods for the Sampling and Analysis of Water Pollutant in NSW (2004)	*http://www.environment.nsw.gov.au/resources/legislation/approvedmethods-water.pdf*
Flooding	
Floodplain development manual	*http://www.environment.nsw.gov.au/floodplains/manual.htm*

Title	Web address
Floodplain Risk Management Guidelines	*http://www.environment.nsw.gov.au/topics/water/coasts-and-floodplains/floodplains/floodplain-guidelines*
NSW Climate Impact Profile	*http://climatechange.environment.nsw.gov.au/*
Climate Change Impacts and Risk Management	*https://www.environment.gov.au/climate-change/adaptation/publications/climate-change-impact-risk-management*

Rod Davis

From: Alan Bawden <Alan.Bawden@rfs.nsw.gov.au>
Sent: Wednesday, 10 January 2024 12:50 PM
To: rod.davis@rdcengineers.com.au
Cc: Meg Kitchner
Subject: FW: EIS Consultation - Proposed expansion of beef cattle Feedlot - Doolin Farming Pty Ltd - 2513 Getta Getta Rd, North Star - L8 DP756018 & L21 DP1212915
Attachments: EIS Cattle Feedlot Doolin Farming 2513 Getta Getta Rd North Star E2-103 DF-SFFL-RFS-20240108.pdf

Hello Rod

The NSW RFS has received and reviewed your request below.

As per our correspondence dated 22 August 2023 the EIS should identify fire risk (bush, grass, structural, etc) and identify mitigation measures to reduce risk and provide operational resources (water supply, access, etc) to minuses the impact of fire on the facility.

Regards

Alan Bawden
Acting Manager – Planning and Environment Services North

RFS

P 02 66910400 **E** alan.bawden@rfs.nsw.gov.au
51 Moonee Street Coffs Harbour NSW 2450
PO 652 Coffs Harbour NSW 2450
www.rfs.nsw.gov.au

From: Planning & Environment Services <CustomerService.Centre@rfs.nsw.gov.au>
Sent: Wednesday, January 10, 2024 11:35 AM
To: Alan Bawden <Alan.Bawden@rfs.nsw.gov.au>
Subject: FW: EIS Consultation - Proposed expansion of beef cattle Feedlot - Doolin Farming Pty Ltd - 2513 Getta Getta Rd, North Star - L8 DP756018 & L21 DP1212915

Margaret Kitchner
Administration Officer - Planning and Environment Services North
P 02 6691 0400
NSW RURAL FIRE SERVICE

From: Rod Davis <rod.davis@rdcengineers.com.au>
Sent: Monday, January 8, 2024 3:58 PM
To: Planning & Environment Services <CustomerService.Centre@rfs.nsw.gov.au>
Subject: EIS Consultation - Proposed expansion of beef cattle Feedlot - Doolin Farming Pty Ltd - 2513 Getta Getta Rd, North Star - L8 DP756018 & L21 DP1212915

Good afternoon,

We act for Doolin Farming Pty Ltd in relation to the above matter.

Doolin Farming Pty Ltd own and operate a 999 head beef cattle feedlot on the property "Springfield" located at 2513 Getta Getta Road, North Star within the Gwydir Shire.

Doolin Farming Pty Ltd proposes to expand the existing beef cattle feedlot from 999 head to 3,500 head.

A Request for the Planning Secretary's Requirements for the preparation of an Environmental Impact Statement was made on the **21st of January 2022**. The Planning Secretary's Environmental Assessment Requirements (SEAR) 1687 was received on the **2nd of June 2022**.

During the preparation of the EIS, direct consultation with relevant local, State and Commonwealth government authorities, service providers and community groups is required to identify and address any issues they may raise in the EIS.

In preparing the EIS, Doolin Farming Pty Ltd wish to consult with the NSW Rural Fire Service in relation to any issues they may raise in respect of the proposed development and/or additional requirements for the EIS.

Please refer to the attached document for further information.

Regards,

Rod Davis
Director
—
0427629203
rod.davis@rdcengineers.com.au

RDC ENGINEERS | AGRICULTURAL ENVIRONMENTAL PROJECT MANAGEMENT

NSW GOVERNMENT

NSW RURAL FIRE SERVICE

Mitchell Furness
mlfurness@bigpond.com

Our reference: DA20230807003466-Original-1

ATTENTION: Mitchell Furness

Date: Tuesday 22 August 2023

Dear Sir/Madam,

Development Application
Other – Other Assessment – Agriculture
SEAR 1687 2513 GETTA GETTA ROAD NORTH STAR NSW 2408, 8//DP756018, 1//DP1212915

I refer to your correspondence regarding the above proposal which was received by the NSW Rural Fire Service on 04/08/2023.

The subject site is not mapped bushfire prone land. NSW RFS is the primary response agency for structural fires within the facility.

The EIS shall provide details on access and water supply for fire fighting purposes.

For any queries regarding this correspondence, please contact Alan Bawden on 1300 NSW RFS.

Yours sincerely,

Allyn Purkiss
Manager Planning & Environment Services
Built & Natural Environment

Postal address

NSW Rural Fire Service
Locked Bag 17
GRANVILLE NSW 2142

Street address

NSW Rural Fire Service
4 Murray Rose Ave
SYDNEY OLYMPIC PARK NSW 2127

T (02) 8741 5555
F (02) 8741 5550
www.rfs.nsw.gov.au

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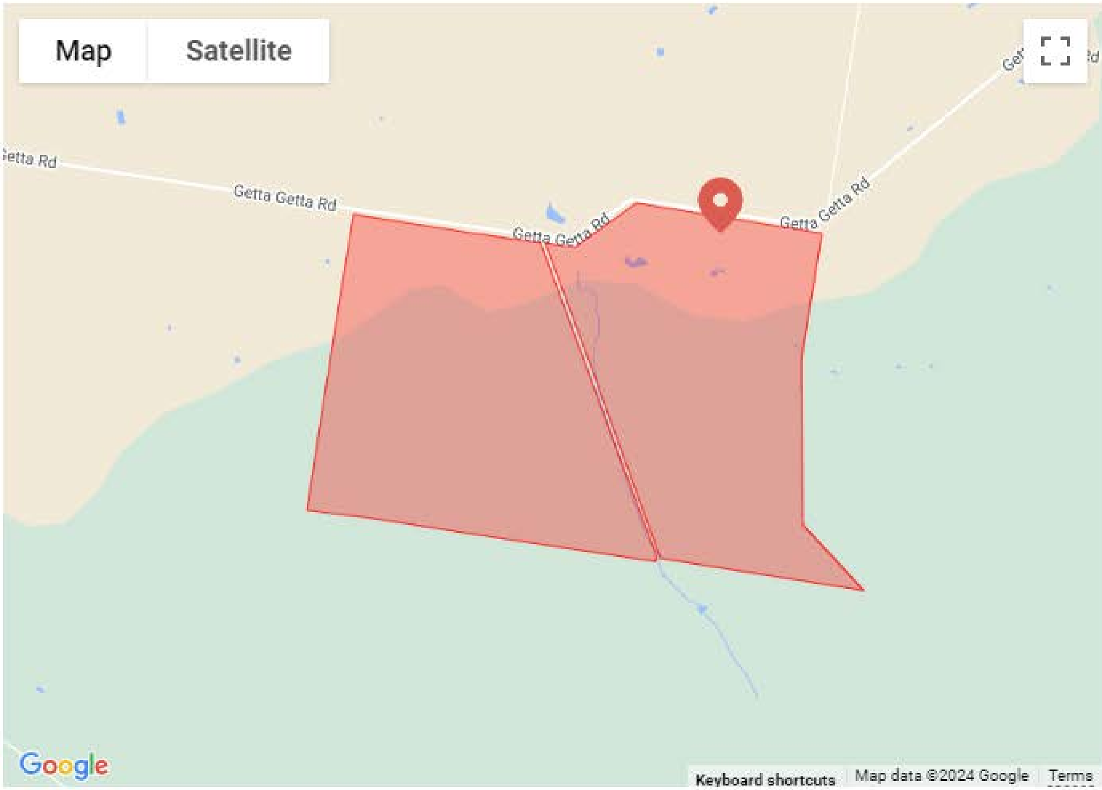
Check if you're in bush fire prone land

You can check here if your land is in a bush fire prone area.

- Enter your address including house number, street and suburb or town. Select your address from the drop down options provided.
- Check the map has correctly located your property. If not drag and drop the red marker on to your property.
- Click the 'Get Results' button to see if you're in a designated bush fire prone area.
- You should consider seeking expert advice before commencing any development.

Your Property



Your search result

You have conducted a search of the online bush fire prone land tool for the land in the map above. This search result is valid for the date the search was conducted. If you have any questions about the Bush Fire Prone Land Tool please contact bushfireprone.mapping@rfs.nsw.gov.au

The parcel of land you have selected is within a designated bush fire prone area.

Make sure you have completed the four simple steps to prepare for bush fires

In a bush or grass fire, minutes can matter. You need to take action now. Getting ready for a bush fire is easier than you think. By taking 20 minutes with your family to discuss what you'll do during a fire, you could save their lives, as well as your home.

Appendix C

Community Consultation Information

RDC ENGINEERS | AGRICULTURAL ENVIRONMENTAL PROJECT MANAGEMENT

PO Box 1223
Toowoomba QLD 4350
info@rdcengineers.com.au
ABN 37 627 163 071

Our ref: E2-103-DF-SFFL-ACD-20240910

10th September 2024

Mr & Mrs A Doolin
"Myall Downs"
2118 Getta Getta Road
NORTH STAR NSW 2408

Dear Angus & Camilla,

RE: ENVIRONMENTAL IMPACT STATEMENT FOR PROPOSED EXPANSION OF BEEF CATTLE FEEDLOT ON THE PROPERTY "SPRINGFIELD" 2513 GETTA GETTA ROAD, NORTH STAR, LAND DESCRIBED AS LOT 8 ON DP756018 AND LOT 21 ON DP1212915

Doolin Farming Pty Ltd own and operate a 999 head beef cattle feedlot on the property "Springfield" located at 2513 Getta Getta Road, North Star within the Gwydir Shire. The property is currently used for beef cattle grazing, intensive livestock agriculture, dryland and irrigated cropping. Doolin Farming Pty Ltd proposes to expand the existing beef cattle feedlot from 999 head to 3,000 head in two stages. The location of the subject land on which the proposed development will be established is shown on Figure 1.

As the proposed development is considered Designated Development under the NSW Environment and Planning Assessment Act 1979, an Environmental Impact Statement (EIS) is required to be prepared to accompany the Development Application.

The proposed development is both designated and integrated development under Part 4 of the Environmental Planning and Assessment Act 1979 and requires a licence under the Protection of the Environment Operations Act 1997.

During the preparation of the EIS, direct consultation with relevant local, State and Commonwealth government authorities, service providers and community groups is required to identify and address any issues they may raise in the EIS.

Consequently, Doolin Farming Pty Ltd wish to consult with the local community in relation to any issues they may raise in respect of the proposed development and/or additional requirements for the EIS. All comments will be considered and taken into account whilst preparing the EIS.

The following information is a brief summary of the proposed development.

RDC ENGINEERS

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Toowoomba QLD 4350
info@rdcengineers.com.au

DESCRIPTION OF THE PROPOSED DEVELOPMENT

The proposed development is an expansion of the existing beef cattle feedlot from 999 head to 3,000 head. A layout plan of the proposed development is shown on Figure 2 and Figure 3.

The proposed development involves:
- Additional production pens and associated feed, water, shade and drainage infrastructure;
- A new cattle handling facility;
- Reconfiguration of the controlled drainage area with increased area;
- Reconfiguration of the existing manure stockpiling and carcass composting area;
- Reconfiguration of the existing sedimentation basin and holding pond with increased capacity;
- A new dedicated development entrance off Getta Getta Road and internal access road to the proposed development complex.

The proposed development shall utilise the existing approved manure and effluent utilisation areas on the subject land as shown on Figure 3. The proposed development does not seek to revise the existing waste utilisation areas.

The proposed development does not propose new or altered Class 1, 2, 3, 4, 5, 6, 8 or 9 buildings as shown on Figure 4.

The proposed development would incorporate Industry best practice during construction and operational activities to ensure that any environmental impacts are minimised. The environmental assessment process will identify these practices and incorporate them into the design of the development, ensuring that any environmental impacts are appropriately dealt with.

The existing development has been designed and constructed according to recommended methods outlined in the relevant state guidelines at the time of construction in the early 2020. These included the NSW Feedlot Manual (NSW Agriculture, 1997); National Guidelines for Beef Cattle Feedlots in Australia (MLA, 2012a); National Beef Cattle Feedlot Environmental Code of Practice (MLA, 2012b) and the Beef Cattle Feedlots: Design and Construction manual (MLA, 2015).

The proposed development will be designed, constructed and operated according to recommended methods outlined in State (NSW & QLD) and National Industry best practice guidelines. These include:

- Beef Cattle Feedlots: Design and Construction manual - www.mla.com.au
- National Guidelines for Beef Cattle Feedlots in Australia - www.mla.com.au
- National Beef Cattle Feedlot Environmental Code of Practice - www.mla.com.au
- NSW Feedlot Manual - www.dpi.nsw.gov.au

PO Box 1223
Toowoomba QLD 4350
info@rdcengineers.com.au

Site details

Access

The subject land has frontage to Getta Getta Road.

The proposed development seeks to construct a new subject land entrance from Getta Getta Road which provides a dedicated access to the expanded development. The new entrance is proposed to be sited some 180 m to the east of the existing subject land entrance.

The existing subject land entrance shall be retained for light vehicles to access the subject land homestead.

Staging

There is no proposed commencement date as the proposed development is subject to approval. At this stage, it is proposed to develop all of the Stage 1 (bottom row) after development approval. The development of Stage 2 (top row) is a long term proposition and is not expected to be developed within the next 5 years.

Table 1 – Proposed development – Staging

Stage	Total Capacity	Description	Timeframe
1	2,000 head	Controlled Drainage Area 1. Production pen area for 1,001 head with associated drainage system, feed bunks, water troughs, fencing, feed roads, shade, solid waste and carcass composting area, sedimentation basin and holding pond for Controlled Drainage Area 1.	After development approvals
2	3,000 head	Controlled Drainage Area 1. Production pen area for 1,000 head with associated drainage system, feed bunks, water troughs, fencing, feed roads and shade.	5-10 years

Traffic Generation

The existing development at a full capacity of 999 head generates on average in the order of 0.53 vehicle movements per day (AADT light vehicles [0.15vpd] and heavy vehicles [0.38vpd].

At Stage 1 capacity of 2,000 head, the estimated traffic generation for the proposed development is about 3.5 vehicle movements per day (AADT light vehicles [2.3vpd] and heavy vehicles [1.1vpd].

At the full capacity (Stage 2) of 3,000 head, the estimated traffic generation for the proposed development is about 4.1 vehicle movements per day (AADT light vehicles [2.3vpd] and heavy vehicles [1.8vpd]. These data are based on 3 staff members residing on-site in the subject land

homestead and cottage and B-double and Type 1 road train vehicles for haulage of livestock and commodities.

The additional traffic generated by the proposed development when operating at 3,000 head capacity is about 3.5 vehicle movements per day (light vehicles [2.0vpd] and heavy vehicles [1.4vpd] when compared to the existing development.

Flooding

The subject land is not mapped as flood prone. The proposed development is located some 6 km west from the closest known floodway which is along Ottleys Creek according to the MacIntyre Valley Flood Plain Atlas (Laurie, Montgomerie & Pettit Pty Ltd, 1982 commissioned by Water Resources Commission New South Wales).

Water supply

The applicant holds a groundwater allocation under the NSW Great Artesian Basin Eastern recharge groundwater source for irrigation use on the subject land under water access licence 41169 (Works Approval 90AL834721) for 1,558 shares.

Separation to neighbours

The closest sensitive receptor is located about 1,385 m to the northwest. The s-factor separation distance assessment outlined in the National Guidelines for Beef Cattle Feedlots in Australia requires a separation distance of 675 m to a rural dwelling when developed to its full capacity of 3,000 head.

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info@rdcengineers.com.au

References

Laurie, Montgomerie & Pettit Pty Ltd, 1982, MacIntyre Valley Flood Plain Atlas (commissioned by Water Resources Commission New South Wales), Sydney NSW.

Meat and Livestock Australia, 2012a, National Guidelines for Beef Cattle Feedlots in Australia 3rd Edition, Meat & Livestock Australia, North Sydney, NSW.

Meat and Livestock Australia, 2012b, National Beef Cattle Feedlot Environmental Code of Practice 2nd Edition, Meat & Livestock Australia, North Sydney, NSW.

Meat and Livestock Australia, 2015a, Beef Cattle Feedlots: Design and Construction, Meat and Livestock Australia, North Sydney, NSW.

NSW Agriculture, 1997, The New South Wales Feedlot Manual, The Inter-Departmental Committee on Intensive Animal Industries (Feedlot Section), NSW Agriculture, Orange NSW.

As a neighbour to the proposed development if you would like to provide some comments and feedback on the proposed development before Friday 4th October 2024, we would like to hear from you. You can send your written comments to:

Rod Davis
Director
RDC Engineers Pty Ltd
PO Box 1223
TOOWOOMBA QLD 4350
rod.davis@rdcengineers.com.au

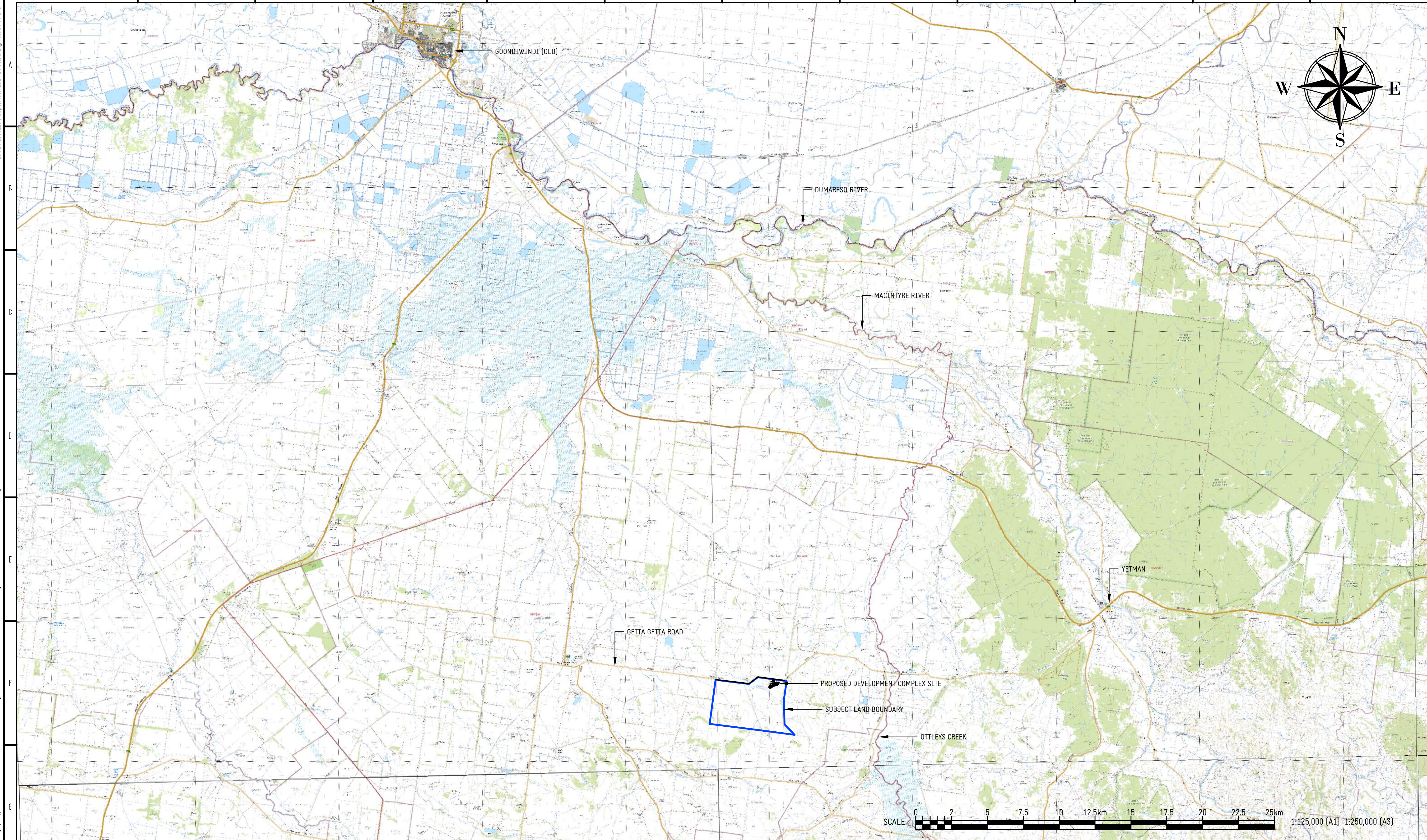
If you have any questions about this request, please contact Rod Davis via rod.davis@rdcengineers.com.au or 0427 629203.

Following completion and submission of the Development Application and EIS to Council, the application will be publicly exhibited at Gwydir Shire Council office's to enable the community to view the EIS and provide feedback and make further comments if they wish.

Yours sincerely,

R.J. Davis

Rod Davis
Director
0427 629203
rod.davis@rdcengineers.com.au



LEGEND

- SUBJECT LAND BOUNDARY
- LAND PARCEL BOUNDARY

NOTES:

1. CADASTRAL INFORMATION BASED ON THE NSW GOVERNMENT SPATIAL SERVICES DIGITAL CADASTRAL DATABASE (DCDB) 2022, PROVIDED BY THE NSW DEPARTMENT OF FINANCE, SERVICES AND INNOVATION (DFSI) SPATIAL INFORMATION eXCHANGE AND ACCURACY IS LIMITED.
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4. HORIZONTAL DATUM - UTM ZONE 56.

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RDC ENGINEERS
AGRICULTURAL
ENVIRONMENTAL
PROJECT MANAGEMENT

ABN 37 627 163 071
PO BOX 1223
TOOWOOMBA QLD 4350
M: 0427 629 203
E: info@rdcengineers.com.au

REV.	DATE	REVISION DESCRIPTION	DRAWN	CHECK	APPROVED
A	19/07/24	DRAFT ISSUE TO CLIENT	RJD	RJD	RJD
B	06/09/24	FINAL ISSUE FOR COMMUNITY CONSULTATION	RJD	RJD	RJD

SCALE	1:250,000 (A3)
DRAWN	RJD
DATE	06/09/2024
CHECKED	RJD
DATE	06/09/2024
APPROVED	RJD
DATE	06/09/2024

CLIENT: DOOLIN FARMING PTY LTD

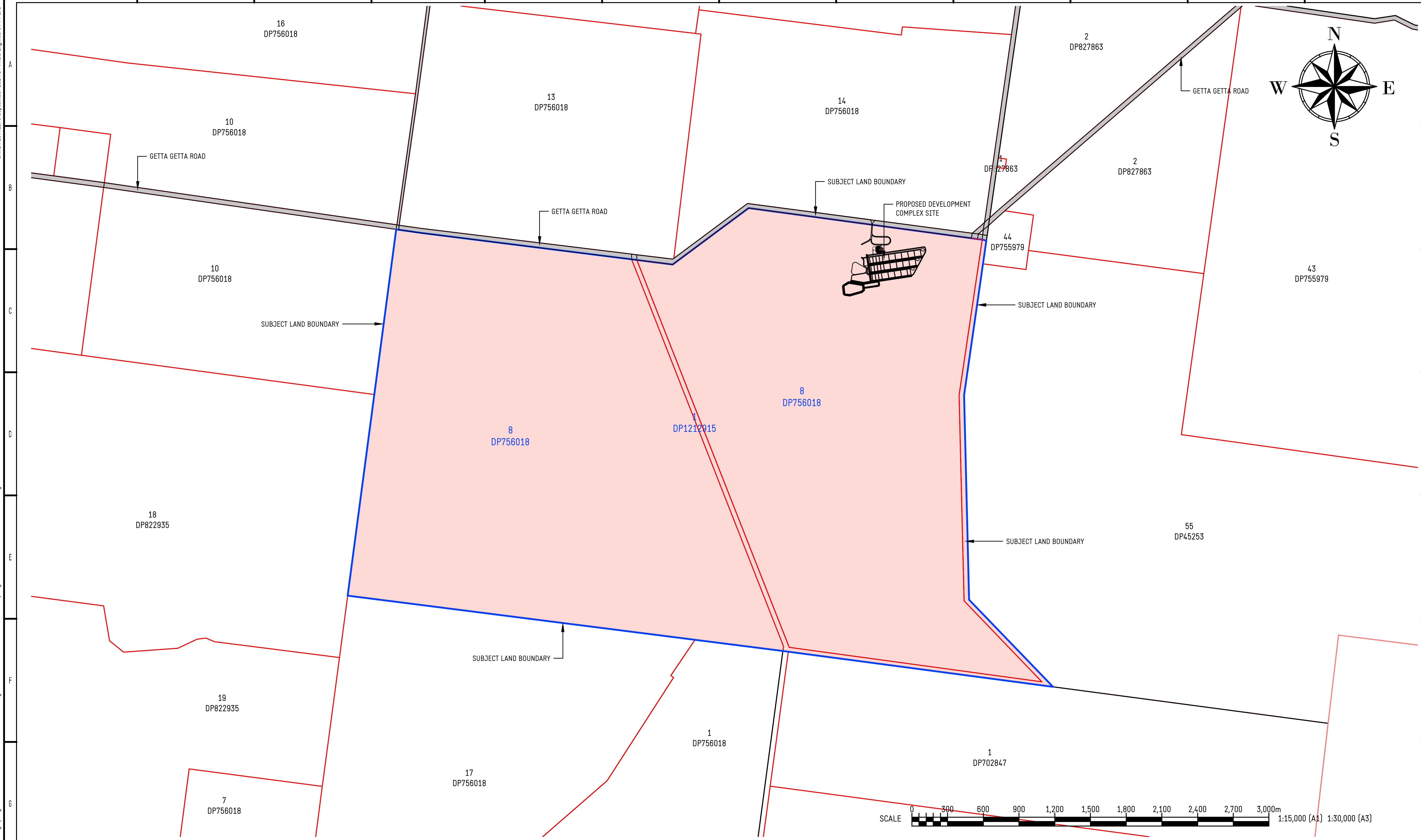
PROJECT: PROPOSED 3000 HEAD BEEF CATTLE FEEDLOT

TITLE: DEVELOPMENT APPLICATION FOR INTENSIVE LIVESTOCK AGRICULTURE
ENVIRONMENTAL IMPACT STATEMENT - COMMUNITY CONSULTATION
SUBJECT LAND - LOCALITY PLAN

REPORT REFERENCE	SUPPLIED DRAWING NUMBER	DRAWING NUMBER	REV.
FIGURE 1	A3	E2-103-3000-01	B

DATE PLOTTED: 6 September 2024 BY : RDC Engineers PTY LTD

FILE PATH: C:\RDC Engineers\RDCE - Projects\E2-103 Doolin Farming Springfield EIS\05 - ACAD MasterPlan\05.1 Drawings - CURRENT FILE NAME: E2-103 DF Springfield MASTERPLAN-00-20240726vA.dwg



LEGEND

- SUBJECT LAND BOUNDARY
- LAND PARCEL BOUNDARY
- SUBJECT LAND AREA
- ROAD RESERVE
- EASEMENT

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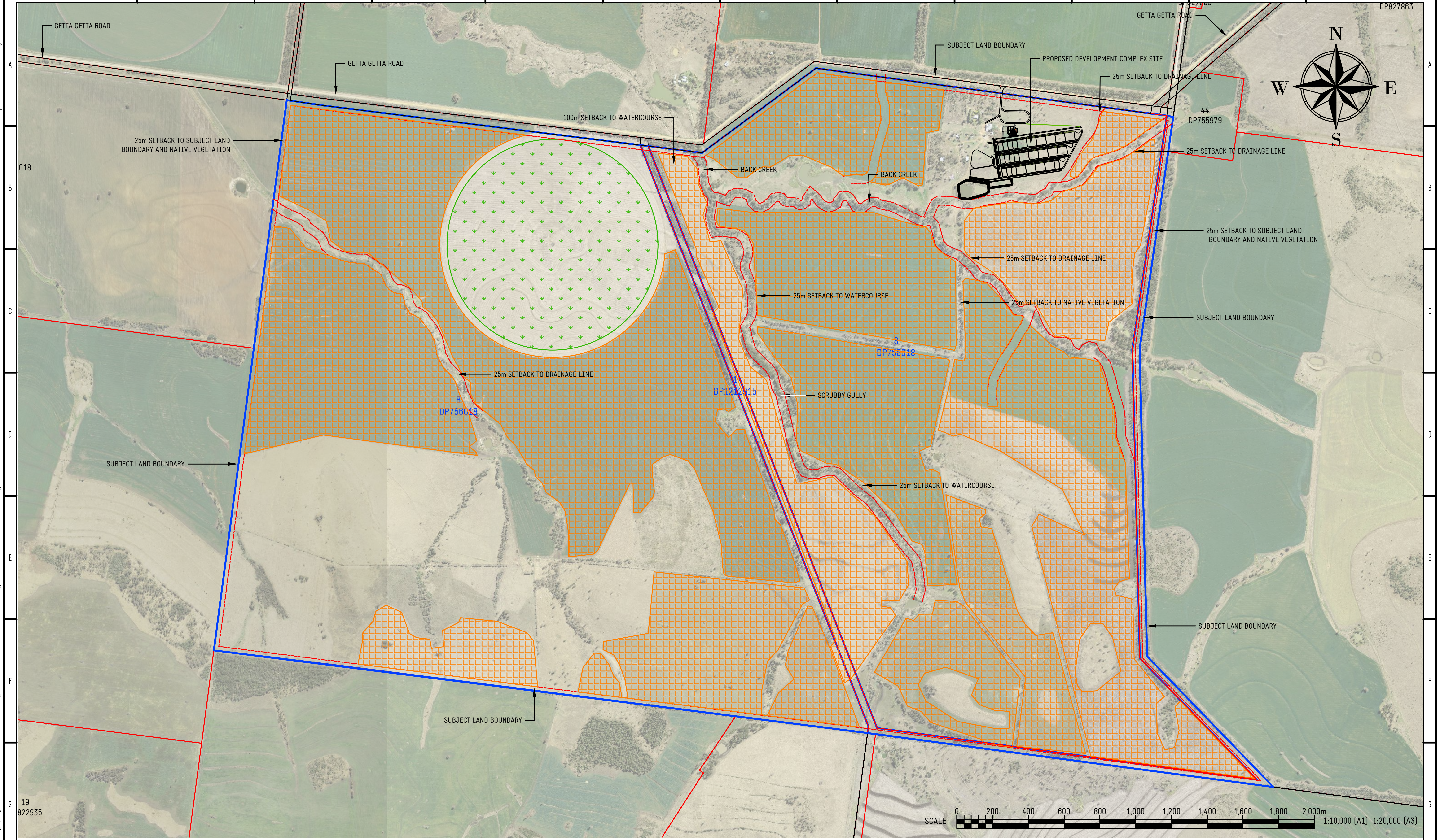
CLIENT DOOLIN FARMING PTY LTD

PROJECT PROPOSED 3000 HEAD BEEF CATTLE FEEDLOT

TITLE DEVELOPMENT APPLICATION FOR INTENSIVE LIVESTOCK AGRICULTURE
ENVIRONMENTAL IMPACT STATEMENT - COMMUNITY CONSULTATION
SUBJECT LAND - CADASTRAL PLAN

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 2		A3	E2-103-3000-02	B



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- SUBJECT LAND BOUNDARY
- LAND PARCEL BOUNDARY
- EFFLUENT UTILISATION AREA
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ENVIRONMENTAL IMPACT STATEMENT - COMMUNITY CONSULTATION
PROPOSED DEVELOPMENT - LAYOUT PLAN

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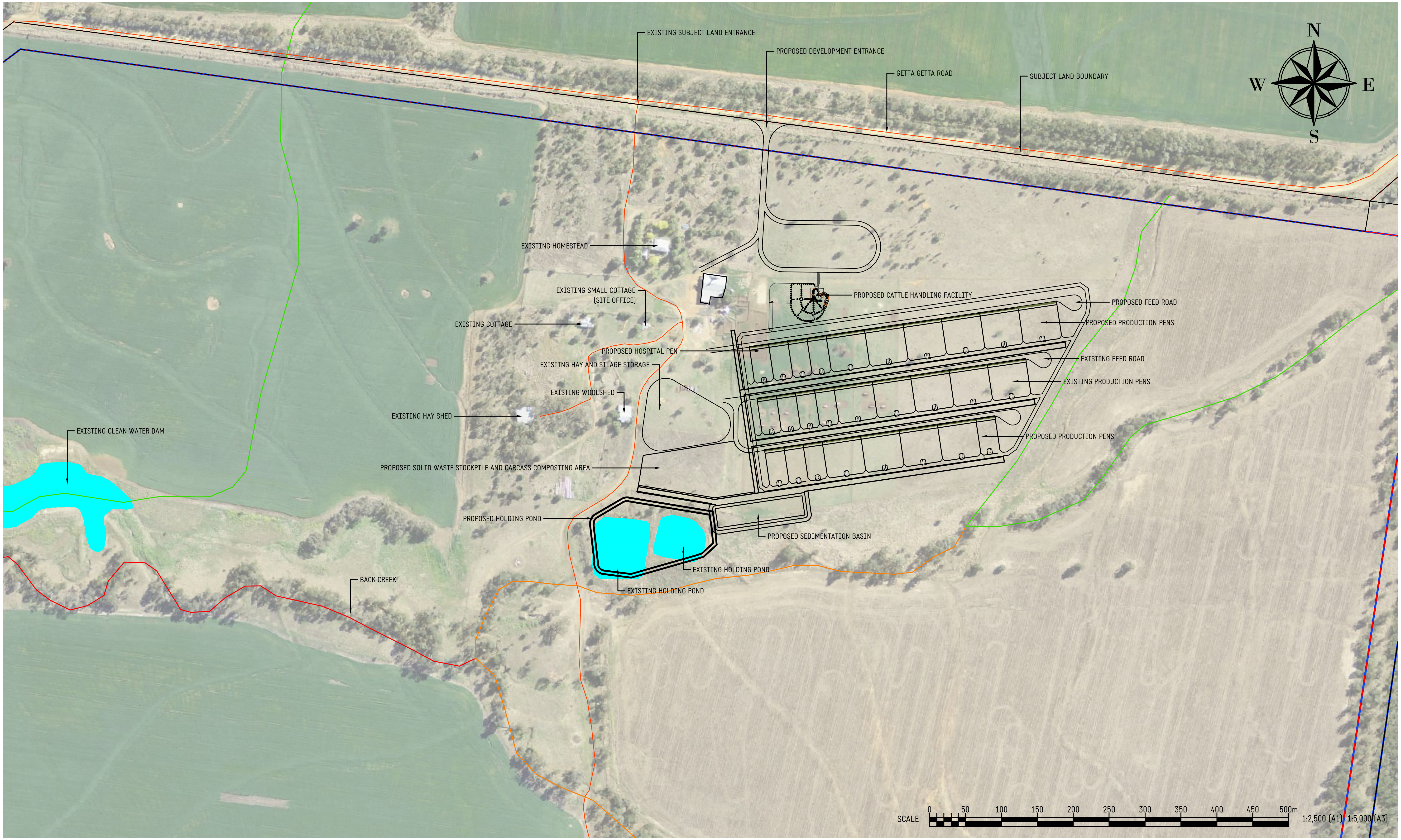
FIGURE 3		A3	E2-103-3000-03	B



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- LAND PARCEL BOUNDARY

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ENVIRONMENTAL IMPACT STATEMENT - COMMUNITY CONSULTATION
PROPOSED DEVELOPMENT - DEVELOPMENT COMPLEX LAYOUT

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FIGURE 4		A3	E2-103-3000-04	B

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Our ref: E2-103-DF-SFFL-BPC-20240910

10th September 2024

Mr & Mrs B Coulton
"Wallaroi"
2116 Getta Getta Road
NORTH STAR NSW 2408

Dear Ben & Pru,

RE: ENVIRONMENTAL IMPACT STATEMENT FOR PROPOSED EXPANSION OF BEEF CATTLE FEEDLOT ON THE PROPERTY "SPRINGFIELD" 2513 GETTA GETTA ROAD, NORTH STAR, LAND DESCRIBED AS LOT 8 ON DP756018 AND LOT 21 ON DP1212915

Doolin Farming Pty Ltd own and operate a 999 head beef cattle feedlot on the property "Springfield" located at 2513 Getta Getta Road, North Star within the Gwydir Shire. The property is currently used for beef cattle grazing, intensive livestock agriculture, dryland and irrigated cropping. Doolin Farming Pty Ltd proposes to expand the existing beef cattle feedlot from 999 head to 3,000 head in two stages. The location of the subject land on which the proposed development will be established is shown on Figure 1.

As the proposed development is considered Designated Development under the NSW Environment and Planning Assessment Act 1979, an Environmental Impact Statement (EIS) is required to be prepared to accompany the Development Application.

The proposed development is both designated and integrated development under Part 4 of the Environmental Planning and Assessment Act 1979 and requires a licence under the Protection of the Environment Operations Act 1997.

During the preparation of the EIS, direct consultation with relevant local, State and Commonwealth government authorities, service providers and community groups is required to identify and address any issues they may raise in the EIS.

Consequently, Doolin Farming Pty Ltd wish to consult with the local community in relation to any issues they may raise in respect of the proposed development and/or additional requirements for the EIS. All comments will be considered and taken into account whilst preparing the EIS.

The following information is a brief summary of the proposed development.

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DESCRIPTION OF THE PROPOSED DEVELOPMENT

The proposed development is an expansion of the existing beef cattle feedlot from 999 head to 3,000 head. A layout plan of the proposed development is shown on Figure 2 and Figure 3.

The proposed development involves:

- Additional production pens and associated feed, water, shade and drainage infrastructure;
- A new cattle handling facility;
- Reconfiguration of the controlled drainage area with increased area;
- Reconfiguration of the existing manure stockpiling and carcass composting area;
- Reconfiguration of the existing sedimentation basin and holding pond with increased capacity;
- A new dedicated development entrance off Getta Getta Road and internal access road to the proposed development complex.

The proposed development shall utilise the existing approved manure and effluent utilisation areas on the subject land as shown on Figure 3. The proposed development does not seek to revise the existing waste utilisation areas.

The proposed development does not propose new or altered Class 1, 2, 3, 4, 5, 6, 8 or 9 buildings as shown on Figure 4.

The proposed development would incorporate Industry best practice during construction and operational activities to ensure that any environmental impacts are minimised. The environmental assessment process will identify these practices and incorporate them into the design of the development, ensuring that any environmental impacts are appropriately dealt with.

The existing development has been designed and constructed according to recommended methods outlined in the relevant state guidelines at the time of construction in the early 2020. These included the NSW Feedlot Manual (NSW Agriculture, 1997); National Guidelines for Beef Cattle Feedlots in Australia (MLA, 2012a); National Beef Cattle Feedlot Environmental Code of Practice (MLA, 2012b) and the Beef Cattle Feedlots: Design and Construction manual (MLA, 2015).

The proposed development will be designed, constructed and operated according to recommended methods outlined in State (NSW & QLD) and National Industry best practice guidelines. These include:

- Beef Cattle Feedlots: Design and Construction manual - www.mla.com.au
- National Guidelines for Beef Cattle Feedlots in Australia - www.mla.com.au
- National Beef Cattle Feedlot Environmental Code of Practice - www.mla.com.au
- NSW Feedlot Manual - www.dpi.nsw.gov.au

Site details

Access

The subject land has frontage to Getta Getta Road.

The proposed development seeks to construct a new subject land entrance from Getta Getta Road which provides a dedicated access to the expanded development. The new entrance is proposed to be sited some 180 m to the east of the existing subject land entrance.

The existing subject land entrance shall be retained for light vehicles to access the subject land homestead.

Staging

There is no proposed commencement date as the proposed development is subject to approval. At this stage, it is proposed to develop all of the Stage 1 (bottom row) after development approval. The development of Stage 2 (top row) is a long term proposition and is not expected to be developed within the next 5 years.

Table 1 – Proposed development – Staging

Stage	Total Capacity	Description	Timeframe
1	2,000 head	Controlled Drainage Area 1. Production pen area for 1,001 head with associated drainage system, feed bunks, water troughs, fencing, feed roads, shade, solid waste and carcass composting area, sedimentation basin and holding pond for Controlled Drainage Area 1.	After development approvals
2	3,000 head	Controlled Drainage Area 1. Production pen area for 1,000 head with associated drainage system, feed bunks, water troughs, fencing, feed roads and shade.	5-10 years

Traffic Generation

The existing development at a full capacity of 999 head generates on average in the order of 0.53 vehicle movements per day (AADT light vehicles [0.15vpd] and heavy vehicles [0.38vpd].

At Stage 1 capacity of 2,000 head, the estimated traffic generation for the proposed development is about 3.5 vehicle movements per day (AADT light vehicles [2.3vpd] and heavy vehicles [1.1vpd].

At the full capacity (Stage 2) of 3,000 head, the estimated traffic generation for the proposed development is about 4.1 vehicle movements per day (AADT light vehicles [2.3vpd] and heavy vehicles [1.8vpd]. These data are based on 3 staff members residing on-site in the subject land

homestead and cottage and B-double and Type 1 road train vehicles for haulage of livestock and commodities.

The additional traffic generated by the proposed development when operating at 3,000 head capacity is about 3.5 vehicle movements per day (light vehicles [2.0vpd] and heavy vehicles [1.4vpd] when compared to the existing development.

Flooding

The subject land is not mapped as flood prone. The proposed development is located some 6 km west from the closest known floodway which is along Ottleys Creek according to the MacIntyre Valley Flood Plain Atlas (Laurie, Montgomerie & Pettit Pty Ltd, 1982 commissioned by Water Resources Commission New South Wales).

Water supply

The applicant holds a groundwater allocation under the NSW Great Artesian Basin Eastern recharge groundwater source for irrigation use on the subject land under water access licence 41169 (Works Approval 90AL834721) for 1,558 shares.

Separation to neighbours

The closest sensitive receptor is located about 1,385 m to the northwest. The s-factor separation distance assessment outlined in the National Guidelines for Beef Cattle Feedlots in Australia requires a separation distance of 675 m to a rural dwelling when developed to its full capacity of 3,000 head.

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References

Laurie, Montgomerie & Pettit Pty Ltd, 1982, MacIntyre Valley Flood Plain Atlas (commissioned by Water Resources Commission New South Wales), Sydney NSW.

Meat and Livestock Australia, 2012a, National Guidelines for Beef Cattle Feedlots in Australia 3rd Edition, Meat & Livestock Australia, North Sydney, NSW.

Meat and Livestock Australia, 2012b, National Beef Cattle Feedlot Environmental Code of Practice 2nd Edition, Meat & Livestock Australia, North Sydney, NSW.

Meat and Livestock Australia, 2015a, Beef Cattle Feedlots: Design and Construction, Meat and Livestock Australia, North Sydney, NSW.

NSW Agriculture, 1997, The New South Wales Feedlot Manual, The Inter-Departmental Committee on Intensive Animal Industries (Feedlot Section), NSW Agriculture, Orange NSW.

As a neighbour to the proposed development if you would like to provide some comments and feedback on the proposed development before Friday 4th October 2024, we would like to hear from you. You can send your written comments to:

Rod Davis
Director
RDC Engineers Pty Ltd
PO Box 1223
TOOWOOMBA QLD 4350
rod.davis@rdcengineers.com.au

If you have any questions about this request, please contact Rod Davis via rod.davis@rdcengineers.com.au or 0427 629203.

Following completion and submission of the Development Application and EIS to Council, the application will be publicly exhibited at Gwydir Shire Council office's to enable the community to view the EIS and provide feedback and make further comments if they wish.

Yours sincerely,

R.J. Davis

Rod Davis
Director
0427 629203
rod.davis@rdcengineers.com.au

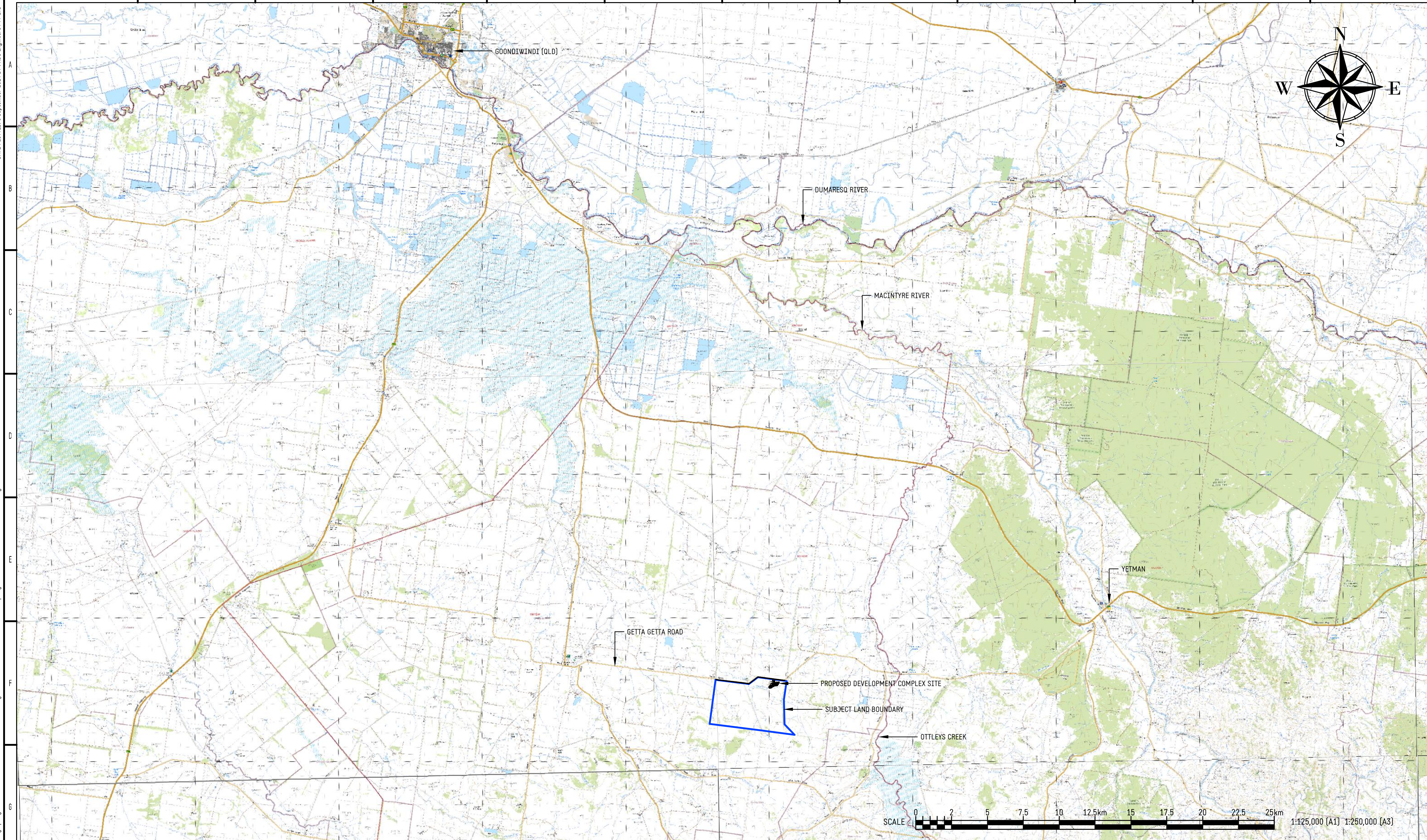

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FIGURE 1		A3	E2-103-3000-01	B

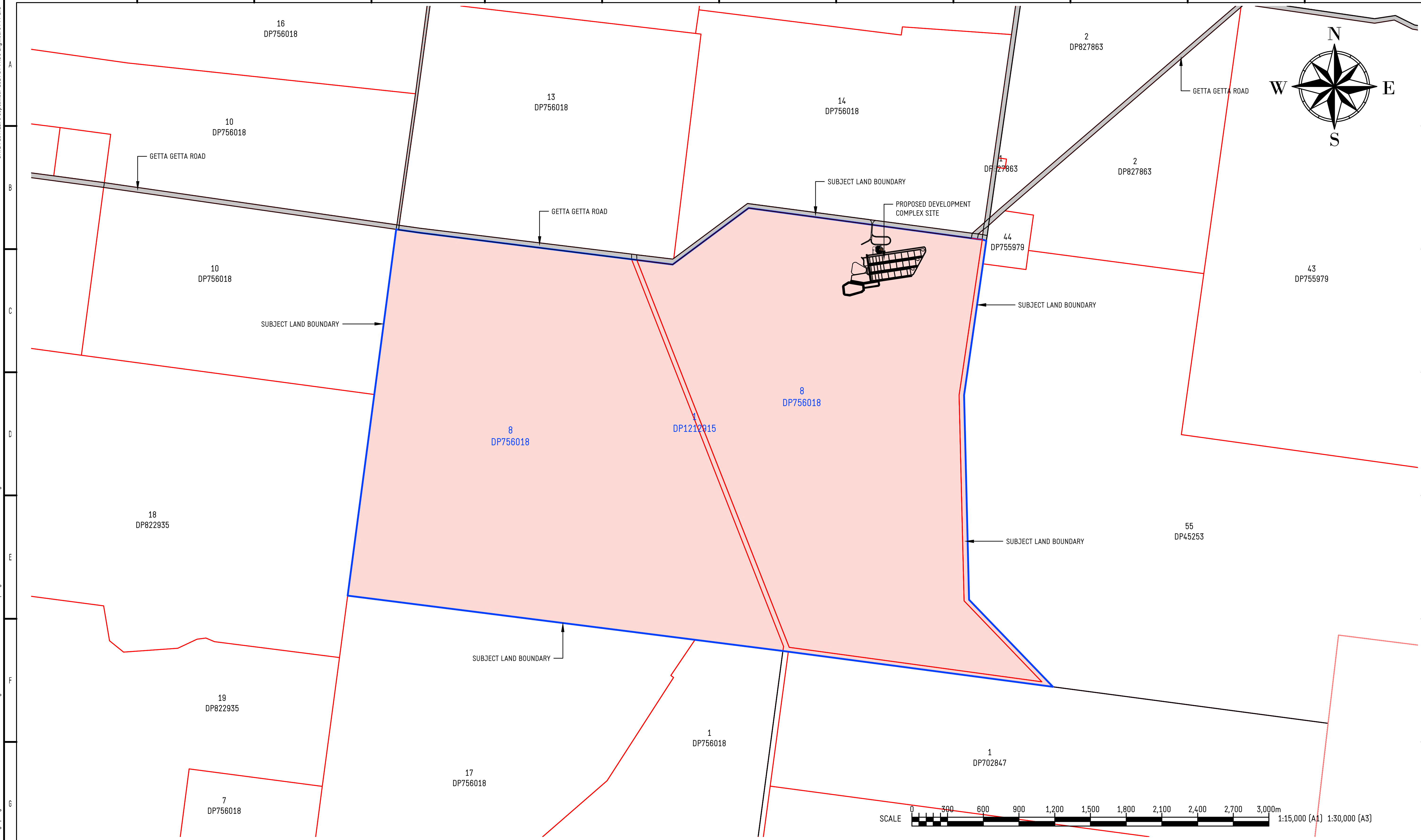

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FIGURE 2		A3	E2-103-3000-02	B

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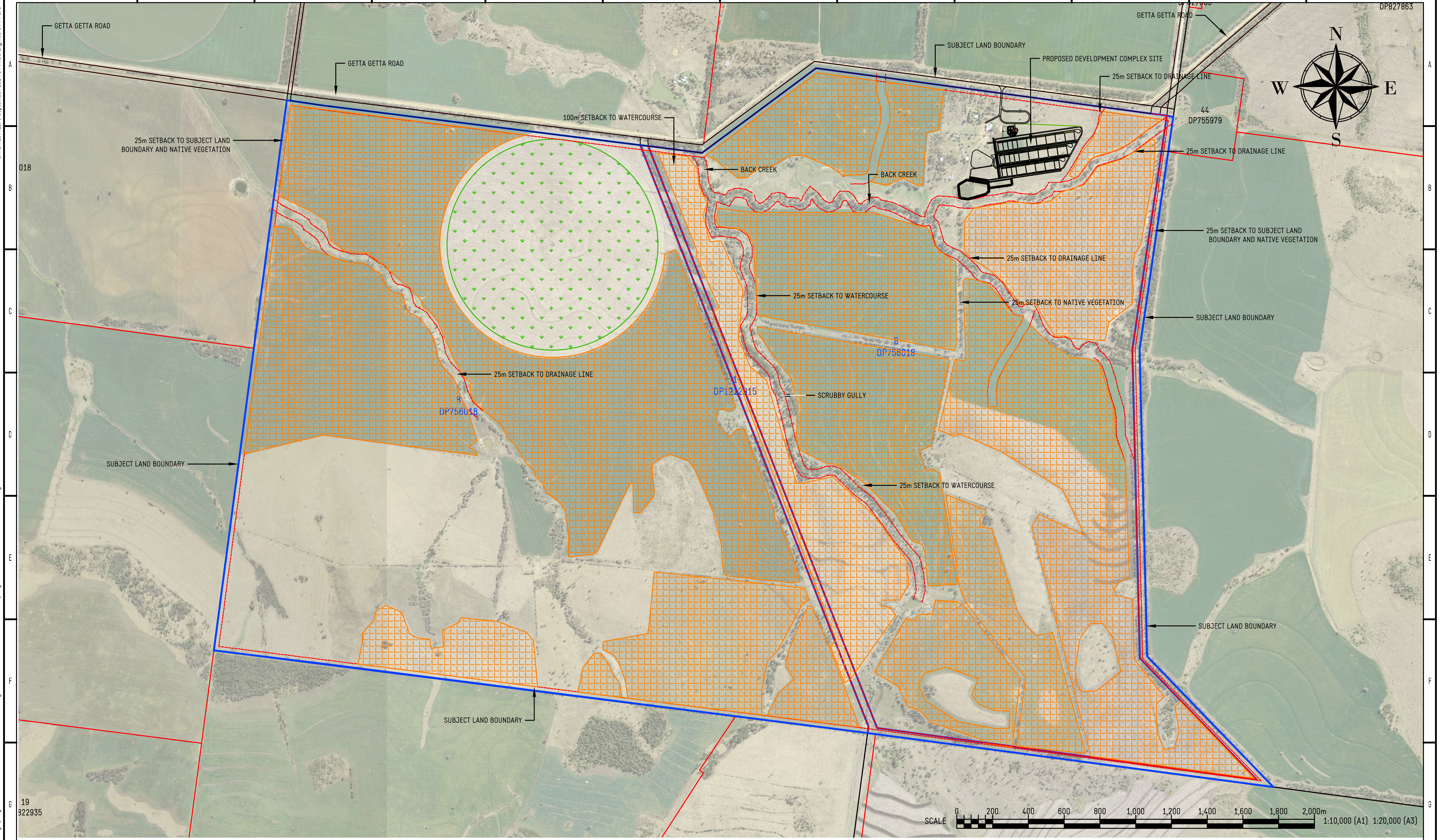

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FIGURE 3		A3	E2-103-3000-03	B

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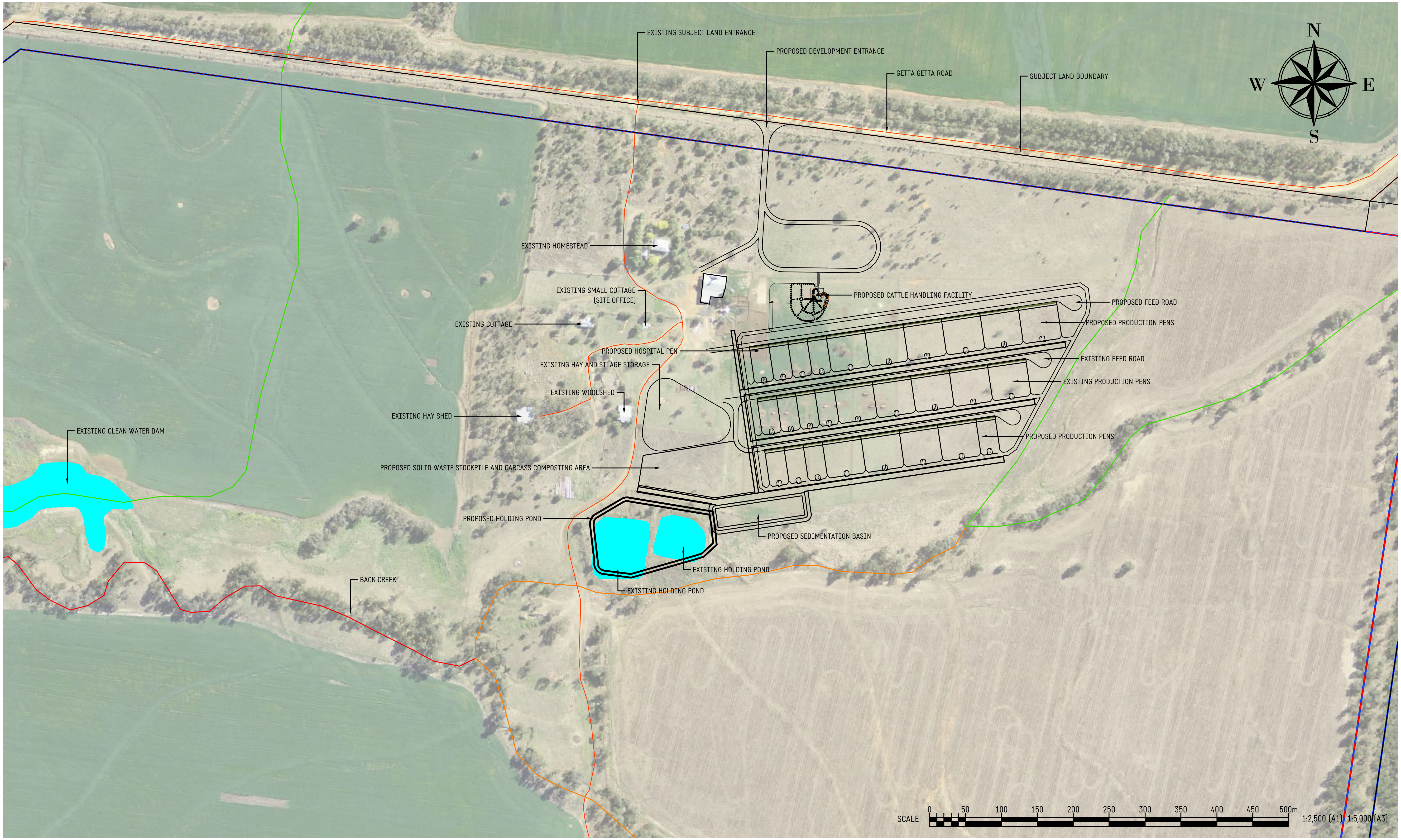

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M: 0427 629 203
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REV.	DATE	REVISION DESCRIPTION	DRAWN	CHECK	APPROVED
A	19/07/24	DRAFT ISSUE TO CLIENT	RJD	RJD	RJD
B	06/09/24	FINAL ISSUE FOR COMMUNITY CONSULTATION	RJD	RJD	RJD

SCALE	1:5,000 (A3)
DRAWN	RJD
DATE	06/09/2024
CHECKED	RJD
DATE	06/09/2024
APPROVED	RJD
DATE	06/09/2024

CLIENT: DOOLIN FARMING PTY LTD

PROJECT: PROPOSED 3000 HEAD BEEF CATTLE FEEDLOT

TITLE: DEVELOPMENT APPLICATION FOR INTENSIVE LIVESTOCK AGRICULTURE
ENVIRONMENTAL IMPACT STATEMENT - COMMUNITY CONSULTATION
PROPOSED DEVELOPMENT - DEVELOPMENT COMPLEX LAYOUT

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 4		A3	E2-103-3000-04	B

DATE PLOTTED: 6 September 2024 BY: RDC Engineers PTY LTD

FILE PATH: C:\RDC Engineers\RDCE - Projects\E2-103 Doolin Farming Springfield EIS\05 - ACAD MasterPlan\05.1 Drawings - CURRENT FILE NAME: E2-103 DF Springfield MASTERPLAN-00-20240726vA.dwg

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ABN 37 627 163 071

Our ref: E2-103-DF-SFFL-CU-20240910

10th September 2024

Mr C Ubergang
"Avoca"
1970 Blue Nobby Road
NORTH STAR NSW 2408

Dear Clinton,

RE: ENVIRONMENTAL IMPACT STATEMENT FOR PROPOSED EXPANSION OF BEEF CATTLE FEEDLOT ON THE PROPERTY "SPRINGFIELD" 2513 GETTA GETTA ROAD, NORTH STAR, LAND DESCRIBED AS LOT 8 ON DP756018 AND LOT 21 ON DP1212915

Doolin Farming Pty Ltd own and operate a 999 head beef cattle feedlot on the property "Springfield" located at 2513 Getta Getta Road, North Star within the Gwydir Shire. The property is currently used for beef cattle grazing, intensive livestock agriculture, dryland and irrigated cropping. Doolin Farming Pty Ltd proposes to expand the existing beef cattle feedlot from 999 head to 3,000 head in two stages. The location of the subject land on which the proposed development will be established is shown on Figure 1.

As the proposed development is considered Designated Development under the NSW Environment and Planning Assessment Act 1979, an Environmental Impact Statement (EIS) is required to be prepared to accompany the Development Application.

The proposed development is both designated and integrated development under Part 4 of the Environmental Planning and Assessment Act 1979 and requires a licence under the Protection of the Environment Operations Act 1997.

During the preparation of the EIS, direct consultation with relevant local, State and Commonwealth government authorities, service providers and community groups is required to identify and address any issues they may raise in the EIS.

Consequently, Doolin Farming Pty Ltd wish to consult with the local community in relation to any issues they may raise in respect of the proposed development and/or additional requirements for the EIS. All comments will be considered and taken into account whilst preparing the EIS.

The following information is a brief summary of the proposed development.

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DESCRIPTION OF THE PROPOSED DEVELOPMENT

The proposed development is an expansion of the existing beef cattle feedlot from 999 head to 3,000 head. A layout plan of the proposed development is shown on Figure 2 and Figure 3.

The proposed development involves:

- Additional production pens and associated feed, water, shade and drainage infrastructure;
- A new cattle handling facility;
- Reconfiguration of the controlled drainage area with increased area;
- Reconfiguration of the existing manure stockpiling and carcass composting area;
- Reconfiguration of the existing sedimentation basin and holding pond with increased capacity;
- A new dedicated development entrance off Getta Getta Road and internal access road to the proposed development complex.

The proposed development shall utilise the existing approved manure and effluent utilisation areas on the subject land as shown on Figure 3. The proposed development does not seek to revise the existing waste utilisation areas.

The proposed development does not propose new or altered Class 1, 2, 3, 4, 5, 6, 8 or 9 buildings as shown on Figure 4.

The proposed development would incorporate Industry best practice during construction and operational activities to ensure that any environmental impacts are minimised. The environmental assessment process will identify these practices and incorporate them into the design of the development, ensuring that any environmental impacts are appropriately dealt with.

The existing development has been designed and constructed according to recommended methods outlined in the relevant state guidelines at the time of construction in the early 2020. These included the NSW Feedlot Manual (NSW Agriculture, 1997); National Guidelines for Beef Cattle Feedlots in Australia (MLA, 2012a); National Beef Cattle Feedlot Environmental Code of Practice (MLA, 2012b) and the Beef Cattle Feedlots: Design and Construction manual (MLA, 2015).

The proposed development will be designed, constructed and operated according to recommended methods outlined in State (NSW & QLD) and National Industry best practice guidelines. These include:

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Site details

Access

The subject land has frontage to Getta Getta Road.

The proposed development seeks to construct a new subject land entrance from Getta Getta Road which provides a dedicated access to the expanded development. The new entrance is proposed to be sited some 180 m to the east of the existing subject land entrance.

The existing subject land entrance shall be retained for light vehicles to access the subject land homestead.

Staging

There is no proposed commencement date as the proposed development is subject to approval. At this stage, it is proposed to develop all of the Stage 1 (bottom row) after development approval. The development of Stage 2 (top row) is a long term proposition and is not expected to be developed within the next 5 years.

Table 1 – Proposed development – Staging

Stage	Total Capacity	Description	Timeframe
1	2,000 head	Controlled Drainage Area 1. Production pen area for 1,001 head with associated drainage system, feed bunks, water troughs, fencing, feed roads, shade, solid waste and carcass composting area, sedimentation basin and holding pond for Controlled Drainage Area 1.	After development approvals
2	3,000 head	Controlled Drainage Area 1. Production pen area for 1,000 head with associated drainage system, feed bunks, water troughs, fencing, feed roads and shade.	5-10 years

Traffic Generation

The existing development at a full capacity of 999 head generates on average in the order of 0.53 vehicle movements per day (AADT light vehicles [0.15vpd] and heavy vehicles [0.38vpd].

At Stage 1 capacity of 2,000 head, the estimated traffic generation for the proposed development is about 3.5 vehicle movements per day (AADT light vehicles [2.3vpd] and heavy vehicles [1.1vpd].

At the full capacity (Stage 2) of 3,000 head, the estimated traffic generation for the proposed development is about 4.1 vehicle movements per day (AADT light vehicles [2.3vpd] and heavy vehicles [1.8vpd]. These data are based on 3 staff members residing on-site in the subject land

homestead and cottage and B-double and Type 1 road train vehicles for haulage of livestock and commodities.

The additional traffic generated by the proposed development when operating at 3,000 head capacity is about 3.5 vehicle movements per day (light vehicles [2.0vpd] and heavy vehicles [1.4vpd] when compared to the existing development.

Flooding

The subject land is not mapped as flood prone. The proposed development is located some 6 km west from the closest known floodway which is along Ottleys Creek according to the MacIntyre Valley Flood Plain Atlas (Laurie, Montgomerie & Pettit Pty Ltd, 1982 commissioned by Water Resources Commission New South Wales).

Water supply

The applicant holds a groundwater allocation under the NSW Great Artesian Basin Eastern recharge groundwater source for irrigation use on the subject land under water access licence 41169 (Works Approval 90AL834721) for 1,558 shares.

Separation to neighbours

The closest sensitive receptor is located about 1,385 m to the northwest. The s-factor separation distance assessment outlined in the National Guidelines for Beef Cattle Feedlots in Australia requires a separation distance of 675 m to a rural dwelling when developed to its full capacity of 3,000 head.

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References

Laurie, Montgomerie & Pettit Pty Ltd, 1982, MacIntyre Valley Flood Plain Atlas (commissioned by Water Resources Commission New South Wales), Sydney NSW.

Meat and Livestock Australia, 2012a, National Guidelines for Beef Cattle Feedlots in Australia 3rd Edition, Meat & Livestock Australia, North Sydney, NSW.

Meat and Livestock Australia, 2012b, National Beef Cattle Feedlot Environmental Code of Practice 2nd Edition, Meat & Livestock Australia, North Sydney, NSW.

Meat and Livestock Australia, 2015a, Beef Cattle Feedlots: Design and Construction, Meat and Livestock Australia, North Sydney, NSW.

NSW Agriculture, 1997, The New South Wales Feedlot Manual, The Inter-Departmental Committee on Intensive Animal Industries (Feedlot Section), NSW Agriculture, Orange NSW.

As a neighbour to the proposed development if you would like to provide some comments and feedback on the proposed development before Friday 4th October 2024, we would like to hear from you. You can send your written comments to:

Rod Davis
Director
RDC Engineers Pty Ltd
PO Box 1223
TOOWOOMBA QLD 4350
rod.davis@rdcengineers.com.au

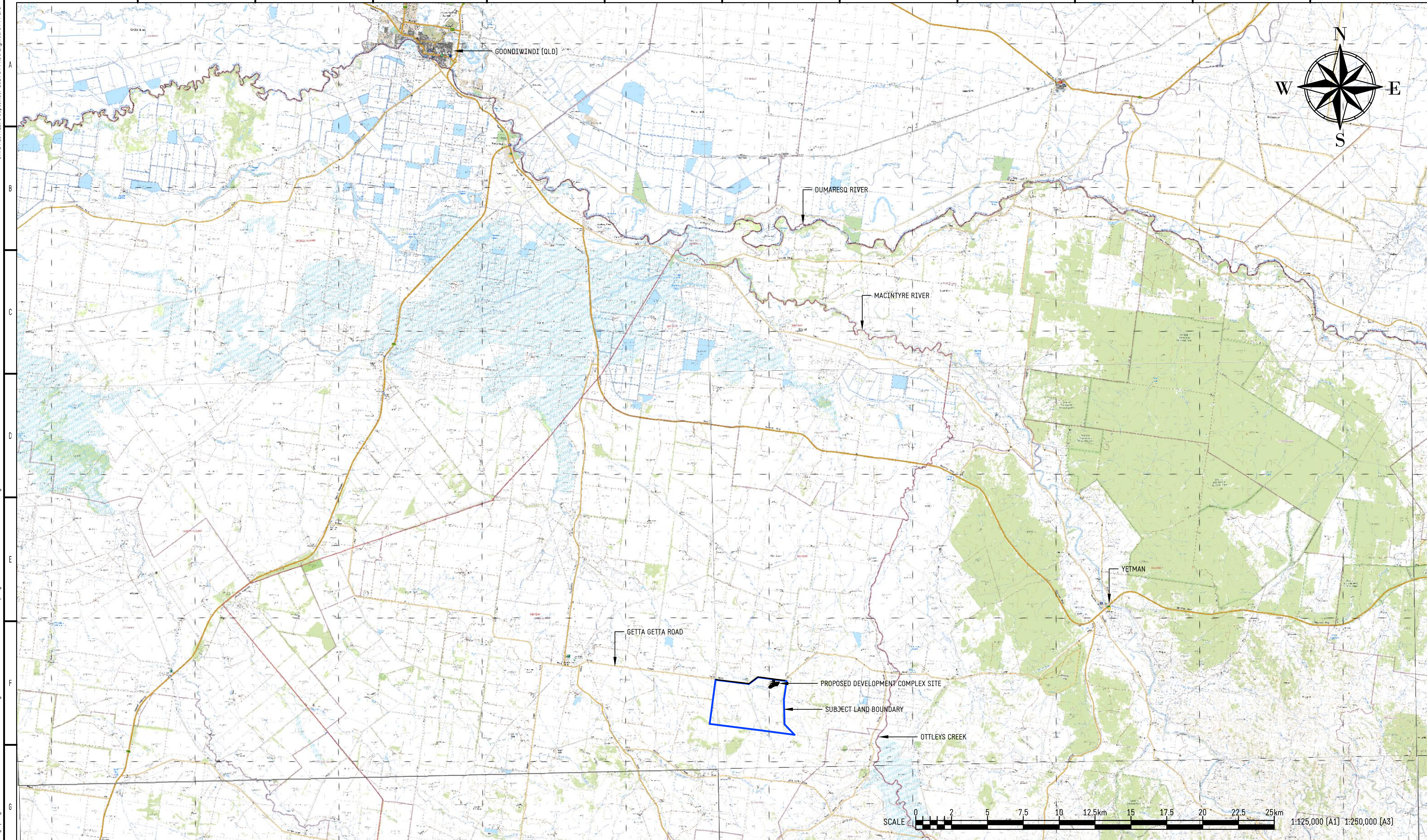
If you have any questions about this request, please contact Rod Davis via rod.davis@rdcengineers.com.au or 0427 629203.

Following completion and submission of the Development Application and EIS to Council, the application will be publicly exhibited at Gwydir Shire Council office's to enable the community to view the EIS and provide feedback and make further comments if they wish.

Yours sincerely,

R.J. Davis

Rod Davis
Director
0427 629203
rod.davis@rdcengineers.com.au



LEGEND

- SUBJECT LAND BOUNDARY
- LAND PARCEL BOUNDARY

NOTES:

1. CADASTRAL INFORMATION BASED ON THE NSW GOVERNMENT SPATIAL SERVICES DIGITAL CADASTRAL DATABASE (DCDB) 2022, PROVIDED BY THE NSW DEPARTMENT OF FINANCE, SERVICES AND INNOVATION (DFSI) SPATIAL INFORMATION eXCHANGE AND ACCURACY IS LIMITED.
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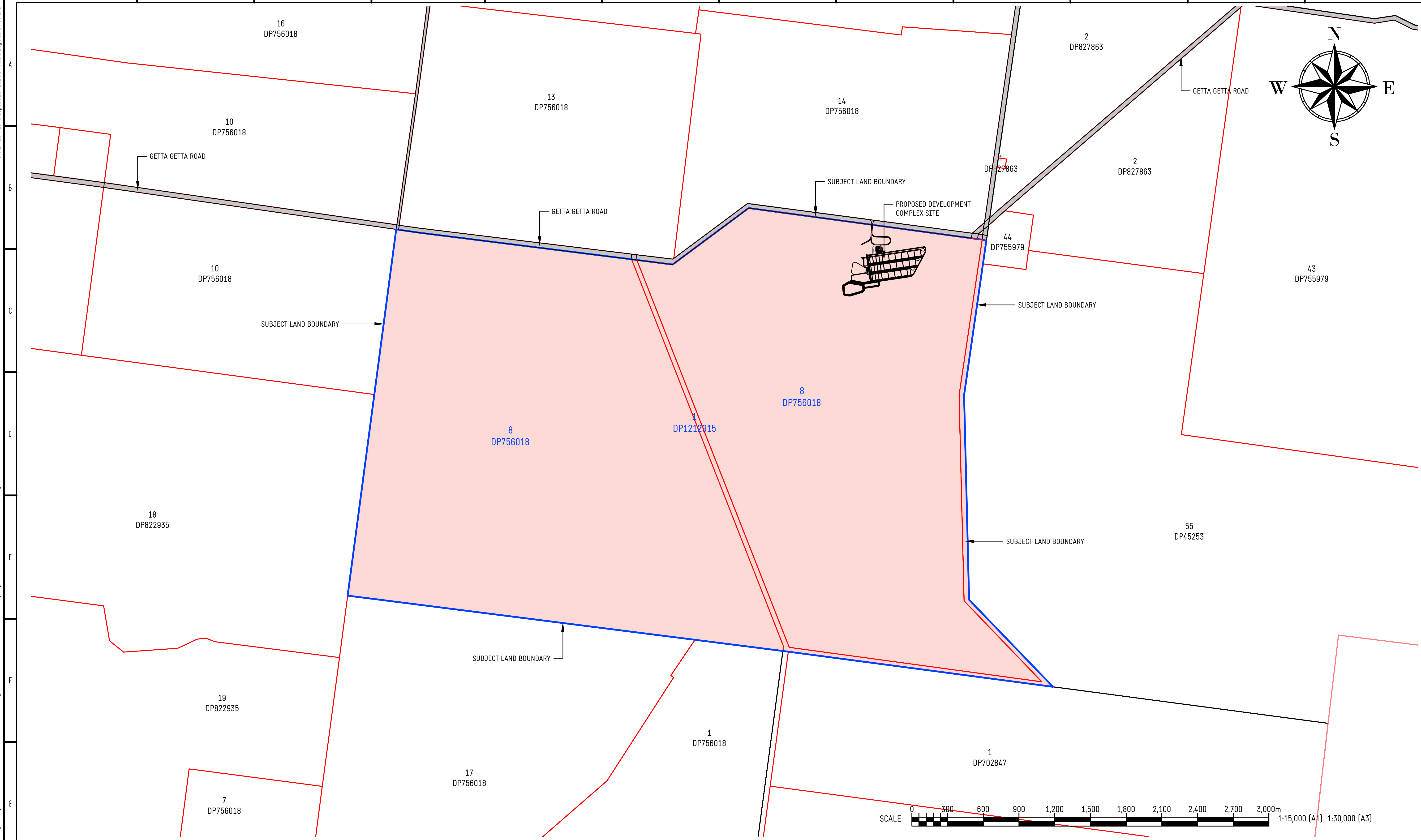
CLIENT: DOOLIN FARMING PTY LTD

PROJECT: PROPOSED 3000 HEAD BEEF CATTLE FEEDLOT

TITLE: DEVELOPMENT APPLICATION FOR INTENSIVE LIVESTOCK AGRICULTURE
ENVIRONMENTAL IMPACT STATEMENT - COMMUNITY CONSULTATION
SUBJECT LAND - LOCALITY PLAN

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 1		A3	E2-103-3000-01	B

DATE PLOTTED: 6 September 2024 BY : RDC Engineers PTY LTD
FILE PATH: C:\RDC Engineers\RDCE - Projects\E2-103 Doolin Farming Springfield EIS\05 - ACAD MasterPlan\05.1 Drawings - CURRENT FILE NAME: E2-103 DF Springfield MASTERPLAN-00-20240726rA.dwg



LEGEND

- SUBJECT LAND BOUNDARY
- LAND PARCEL BOUNDARY
- SUBJECT LAND AREA
- ROAD RESERVE
- EASEMENT

NOTES:

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SCALE	1:30,000 (A3)
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ENVIRONMENTAL IMPACT STATEMENT - COMMUNITY CONSULTATION
SUBJECT LAND - CADASTRAL PLAN

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 2		A3	E2-103-3000-02	B

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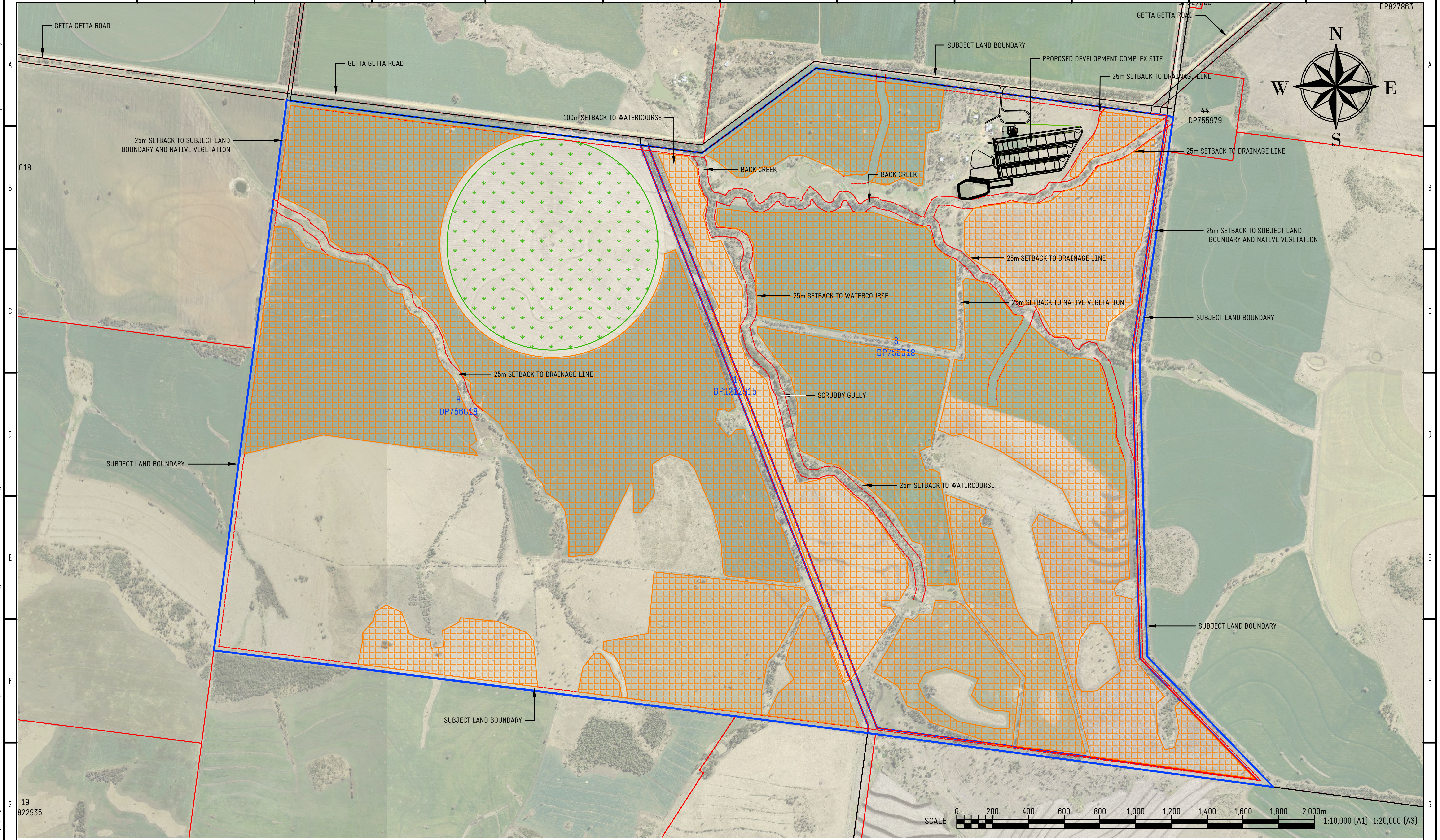

LEGEND

- SUBJECT LAND BOUNDARY
- LAND PARCEL BOUNDARY
- EFFLUENT UTILISATION AREA
- SOLID WASTE UTILISATION AREA

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ENVIRONMENTAL IMPACT STATEMENT - COMMUNITY CONSULTATION
PROPOSED DEVELOPMENT - LAYOUT PLAN

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 3		A3	E2-103-3000-03	B

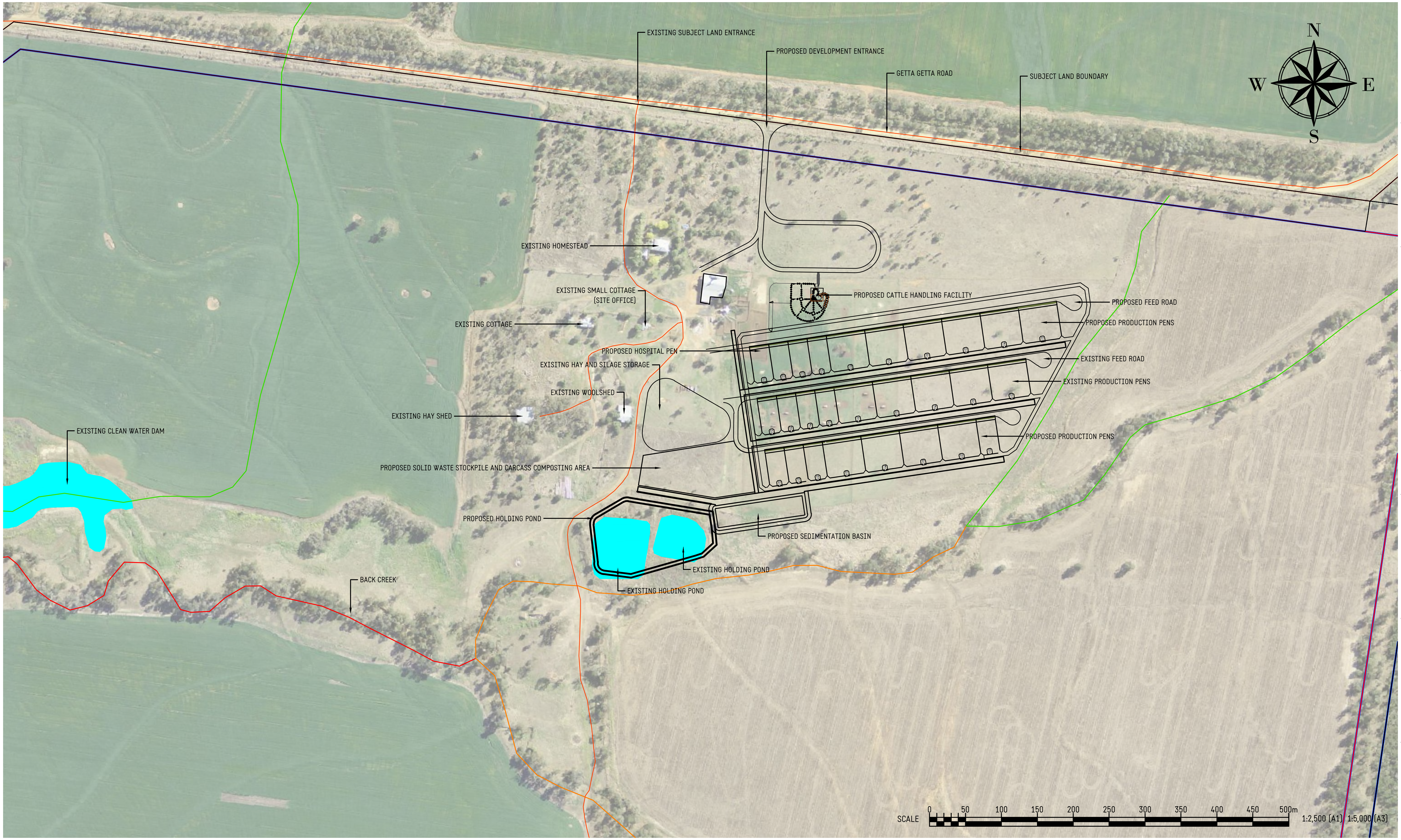

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FIGURE 4		A3	E2-103-3000-04	B

DATE PLOTTED: 6 September 2024 BY: RDC Engineers PTY LTD

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ABN 37 627 163 071

Our ref: E2-103-DF-SFFL-EJH-20240910

10th September 2024

Mr & Mrs E Hardcastle
"Edington"
2680 Getta Getta Road
NORTH STAR NSW 2408

Dear Sandy & Josie,

RE: ENVIRONMENTAL IMPACT STATEMENT FOR PROPOSED EXPANSION OF BEEF CATTLE FEEDLOT ON THE PROPERTY "SPRINGFIELD" 2513 GETTA GETTA ROAD, NORTH STAR, LAND DESCRIBED AS LOT 8 ON DP756018 AND LOT 21 ON DP1212915

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References

Laurie, Montgomerie & Pettit Pty Ltd, 1982, MacIntyre Valley Flood Plain Atlas (commissioned by Water Resources Commission New South Wales), Sydney NSW.

Meat and Livestock Australia, 2012a, National Guidelines for Beef Cattle Feedlots in Australia 3rd Edition, Meat & Livestock Australia, North Sydney, NSW.

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Yours sincerely,

R.J. Davis

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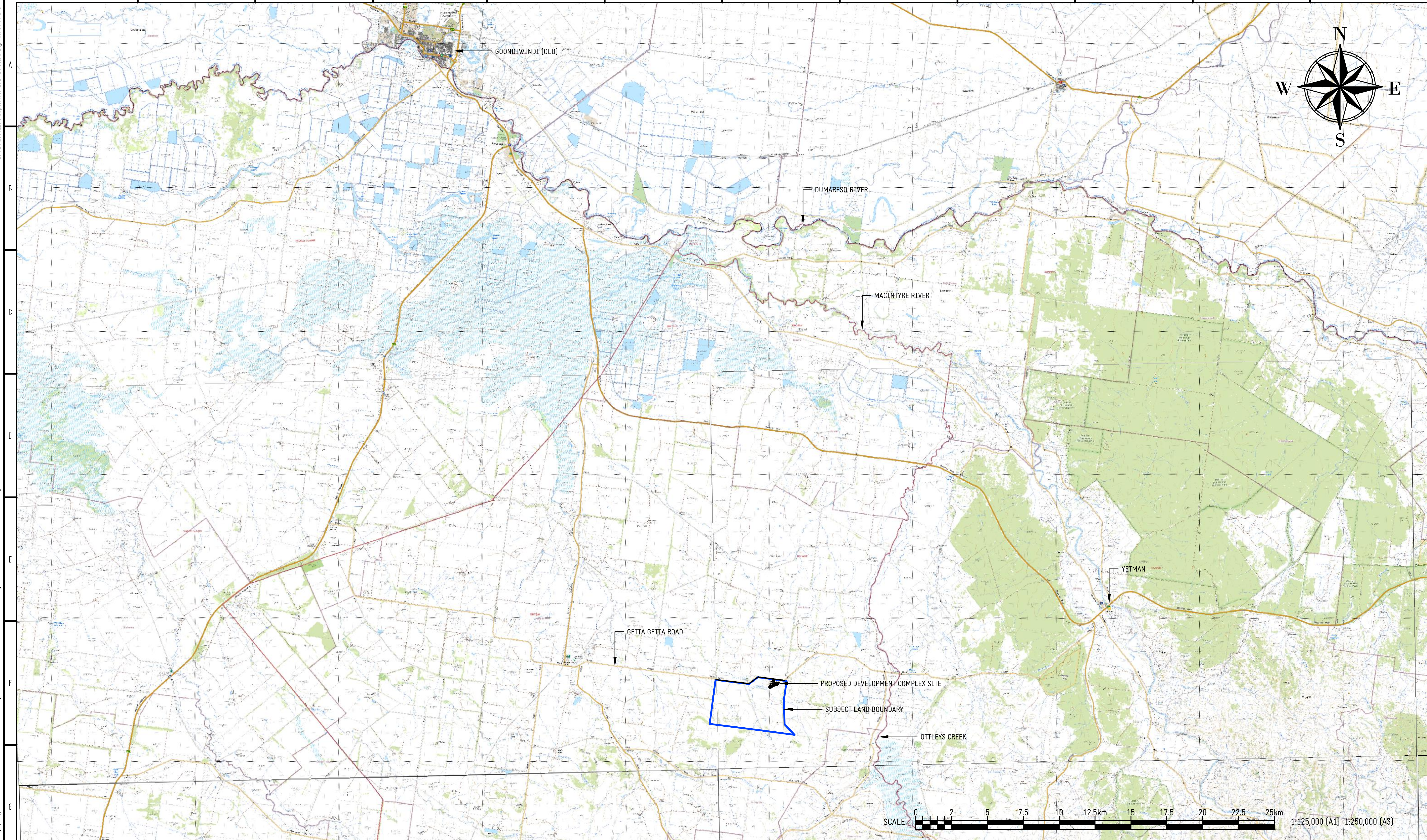

LEGEND

- SUBJECT LAND BOUNDARY
- LAND PARCEL BOUNDARY

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CLIENT: DOOLIN FARMING PTY LTD

PROJECT: PROPOSED 3000 HEAD BEEF CATTLE FEEDLOT

TITLE: DEVELOPMENT APPLICATION FOR INTENSIVE LIVESTOCK AGRICULTURE
ENVIRONMENTAL IMPACT STATEMENT - COMMUNITY CONSULTATION
SUBJECT LAND - LOCALITY PLAN

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 1		A3	E2-103-3000-01	B

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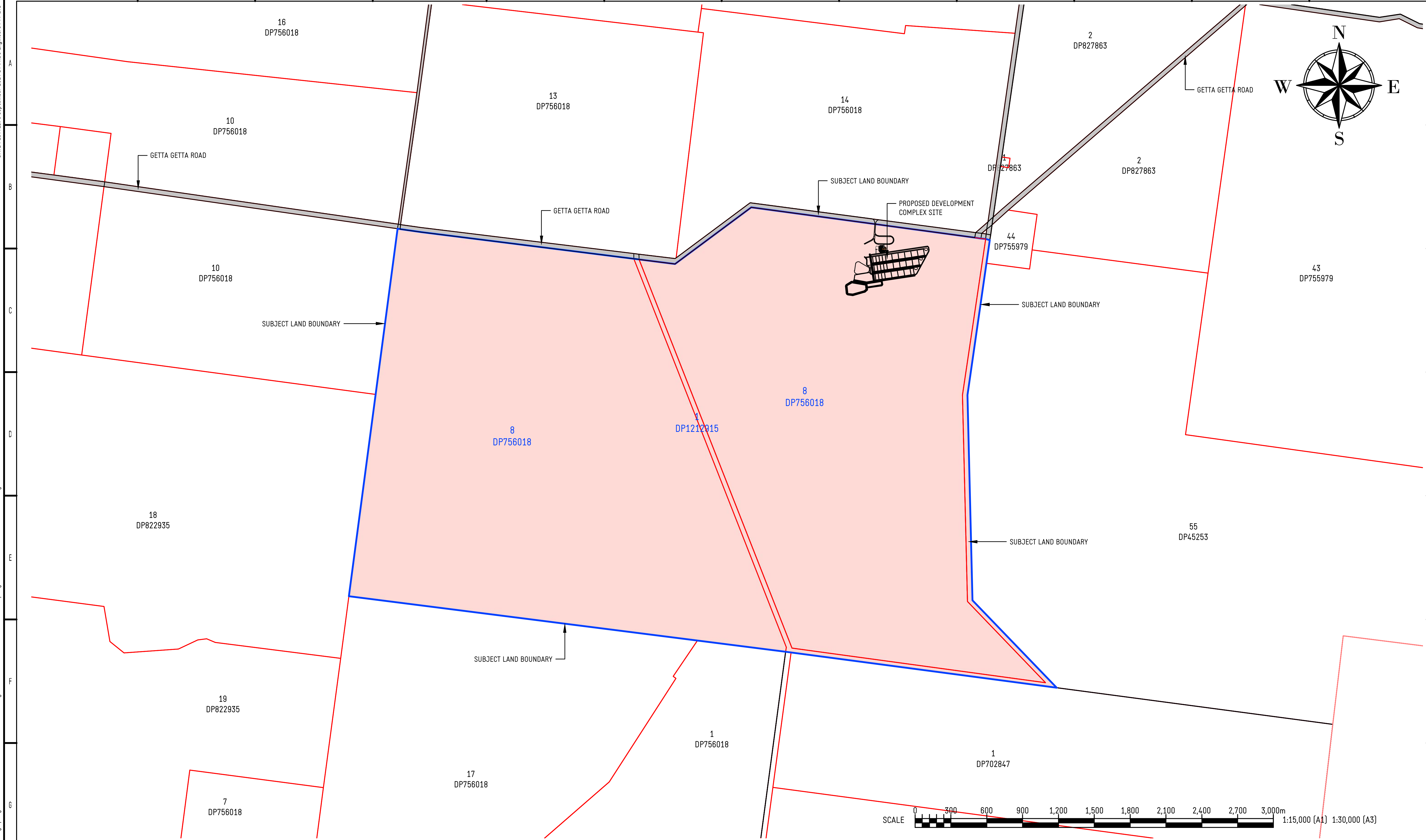

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CLIENT DOOLIN FARMING PTY LTD

PROJECT PROPOSED 3000 HEAD BEEF CATTLE FEEDLOT

TITLE DEVELOPMENT APPLICATION FOR INTENSIVE LIVESTOCK AGRICULTURE
ENVIRONMENTAL IMPACT STATEMENT - COMMUNITY CONSULTATION
SUBJECT LAND - CADASTRAL PLAN

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 2		A3	E2-103-3000-02	B

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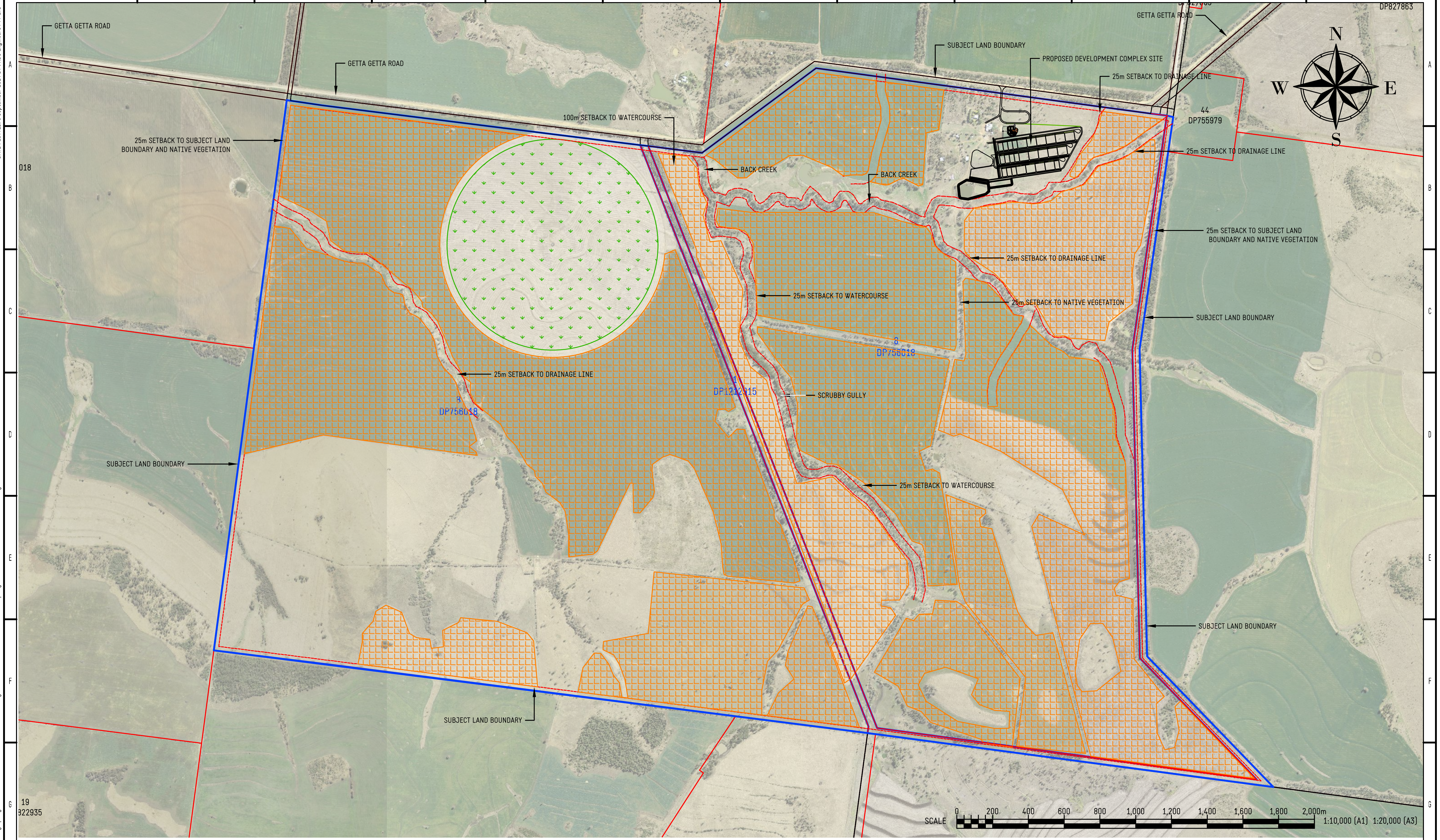

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ENVIRONMENTAL IMPACT STATEMENT - COMMUNITY CONSULTATION
PROPOSED DEVELOPMENT - LAYOUT PLAN

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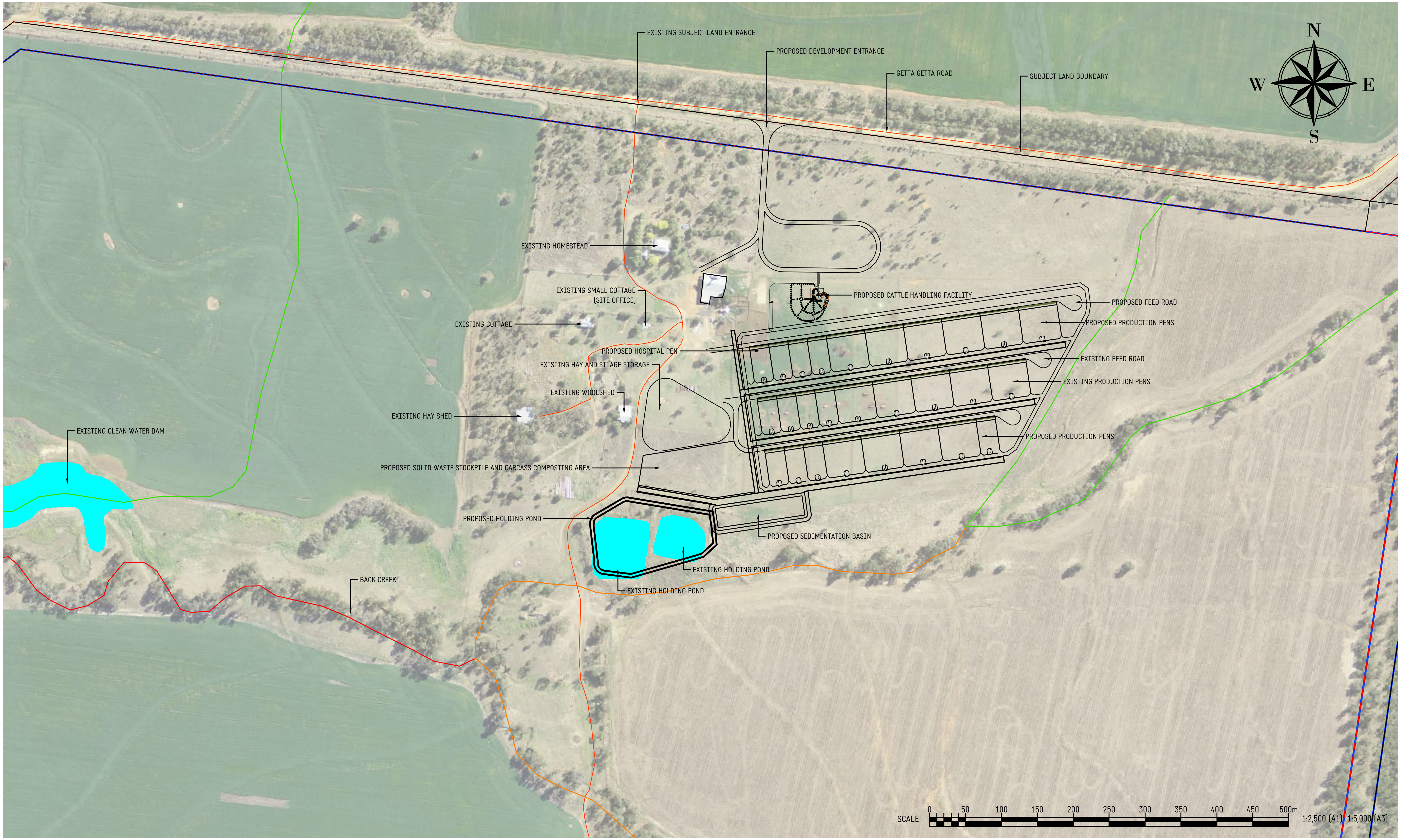
FIGURE 3		A3	E2-103-3000-03	B



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TITLE: DEVELOPMENT APPLICATION FOR INTENSIVE LIVESTOCK AGRICULTURE
ENVIRONMENTAL IMPACT STATEMENT - COMMUNITY CONSULTATION
PROPOSED DEVELOPMENT - DEVELOPMENT COMPLEX LAYOUT

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FIGURE 4		A3	E2-103-3000-04	B

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Our ref: E2-103-DF-SFFL-MJD-20240910

10th September 2024

Mr & Mrs M Doolin
"Glenhoma"/"Millroy"
3202 Getta Getta Road
NORTH STAR NSW 2408

Dear Malcolm & Jenny,

RE: ENVIRONMENTAL IMPACT STATEMENT FOR PROPOSED EXPANSION OF BEEF CATTLE FEEDLOT ON THE PROPERTY "SPRINGFIELD" 2513 GETTA GETTA ROAD, NORTH STAR, LAND DESCRIBED AS LOT 8 ON DP756018 AND LOT 21 ON DP1212915

Doolin Farming Pty Ltd own and operate a 999 head beef cattle feedlot on the property "Springfield" located at 2513 Getta Getta Road, North Star within the Gwydir Shire. The property is currently used for beef cattle grazing, intensive livestock agriculture, dryland and irrigated cropping. Doolin Farming Pty Ltd proposes to expand the existing beef cattle feedlot from 999 head to 3,000 head in two stages. The location of the subject land on which the proposed development will be established is shown on Figure 1.

As the proposed development is considered Designated Development under the NSW Environment and Planning Assessment Act 1979, an Environmental Impact Statement (EIS) is required to be prepared to accompany the Development Application.

The proposed development is both designated and integrated development under Part 4 of the Environmental Planning and Assessment Act 1979 and requires a licence under the Protection of the Environment Operations Act 1997.

During the preparation of the EIS, direct consultation with relevant local, State and Commonwealth government authorities, service providers and community groups is required to identify and address any issues they may raise in the EIS.

Consequently, Doolin Farming Pty Ltd wish to consult with the local community in relation to any issues they may raise in respect of the proposed development and/or additional requirements for the EIS. All comments will be considered and taken into account whilst preparing the EIS.

The following information is a brief summary of the proposed development.

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DESCRIPTION OF THE PROPOSED DEVELOPMENT

The proposed development is an expansion of the existing beef cattle feedlot from 999 head to 3,000 head. A layout plan of the proposed development is shown on Figure 2 and Figure 3.

The proposed development involves:

- Additional production pens and associated feed, water, shade and drainage infrastructure;
- A new cattle handling facility;
- Reconfiguration of the controlled drainage area with increased area;
- Reconfiguration of the existing manure stockpiling and carcass composting area;
- Reconfiguration of the existing sedimentation basin and holding pond with increased capacity;
- A new dedicated development entrance off Getta Getta Road and internal access road to the proposed development complex.

The proposed development shall utilise the existing approved manure and effluent utilisation areas on the subject land as shown on Figure 3. The proposed development does not seek to revise the existing waste utilisation areas.

The proposed development does not propose new or altered Class 1, 2, 3, 4, 5, 6, 8 or 9 buildings as shown on Figure 4.

The proposed development would incorporate Industry best practice during construction and operational activities to ensure that any environmental impacts are minimised. The environmental assessment process will identify these practices and incorporate them into the design of the development, ensuring that any environmental impacts are appropriately dealt with.

The existing development has been designed and constructed according to recommended methods outlined in the relevant state guidelines at the time of construction in the early 2020. These included the NSW Feedlot Manual (NSW Agriculture, 1997); National Guidelines for Beef Cattle Feedlots in Australia (MLA, 2012a); National Beef Cattle Feedlot Environmental Code of Practice (MLA, 2012b) and the Beef Cattle Feedlots: Design and Construction manual (MLA, 2015).

The proposed development will be designed, constructed and operated according to recommended methods outlined in State (NSW & QLD) and National Industry best practice guidelines. These include:

- Beef Cattle Feedlots: Design and Construction manual - www.mla.com.au
- National Guidelines for Beef Cattle Feedlots in Australia - www.mla.com.au
- National Beef Cattle Feedlot Environmental Code of Practice - www.mla.com.au
- NSW Feedlot Manual - www.dpi.nsw.gov.au

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Site details

Access

The subject land has frontage to Getta Getta Road.

The proposed development seeks to construct a new subject land entrance from Getta Getta Road which provides a dedicated access to the expanded development. The new entrance is proposed to be sited some 180 m to the east of the existing subject land entrance.

The existing subject land entrance shall be retained for light vehicles to access the subject land homestead.

Staging

There is no proposed commencement date as the proposed development is subject to approval. At this stage, it is proposed to develop all of the Stage 1 (bottom row) after development approval. The development of Stage 2 (top row) is a long term proposition and is not expected to be developed within the next 5 years.

Table 1 – Proposed development – Staging

Stage	Total Capacity	Description	Timeframe
1	2,000 head	Controlled Drainage Area 1. Production pen area for 1,001 head with associated drainage system, feed bunks, water troughs, fencing, feed roads, shade, solid waste and carcass composting area, sedimentation basin and holding pond for Controlled Drainage Area 1.	After development approvals
2	3,000 head	Controlled Drainage Area 1. Production pen area for 1,000 head with associated drainage system, feed bunks, water troughs, fencing, feed roads and shade.	5-10 years

Traffic Generation

The existing development at a full capacity of 999 head generates on average in the order of 0.53 vehicle movements per day (AADT light vehicles [0.15vpd] and heavy vehicles [0.38vpd].

At Stage 1 capacity of 2,000 head, the estimated traffic generation for the proposed development is about 3.5 vehicle movements per day (AADT light vehicles [2.3vpd] and heavy vehicles [1.1vpd].

At the full capacity (Stage 2) of 3,000 head, the estimated traffic generation for the proposed development is about 4.1 vehicle movements per day (AADT light vehicles [2.3vpd] and heavy vehicles [1.8vpd]. These data are based on 3 staff members residing on-site in the subject land

homestead and cottage and B-double and Type 1 road train vehicles for haulage of livestock and commodities.

The additional traffic generated by the proposed development when operating at 3,000 head capacity is about 3.5 vehicle movements per day (light vehicles [2.0vpd] and heavy vehicles [1.4vpd] when compared to the existing development.

Flooding

The subject land is not mapped as flood prone. The proposed development is located some 6 km west from the closest known floodway which is along Ottleys Creek according to the MacIntyre Valley Flood Plain Atlas (Laurie, Montgomerie & Pettit Pty Ltd, 1982 commissioned by Water Resources Commission New South Wales).

Water supply

The applicant holds a groundwater allocation under the NSW Great Artesian Basin Eastern recharge groundwater source for irrigation use on the subject land under water access licence 41169 (Works Approval 90AL834721) for 1,558 shares.

Separation to neighbours

The closest sensitive receptor is located about 1,385 m to the northwest. The s-factor separation distance assessment outlined in the National Guidelines for Beef Cattle Feedlots in Australia requires a separation distance of 675 m to a rural dwelling when developed to its full capacity of 3,000 head.

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Yours sincerely,

R.J. Davis

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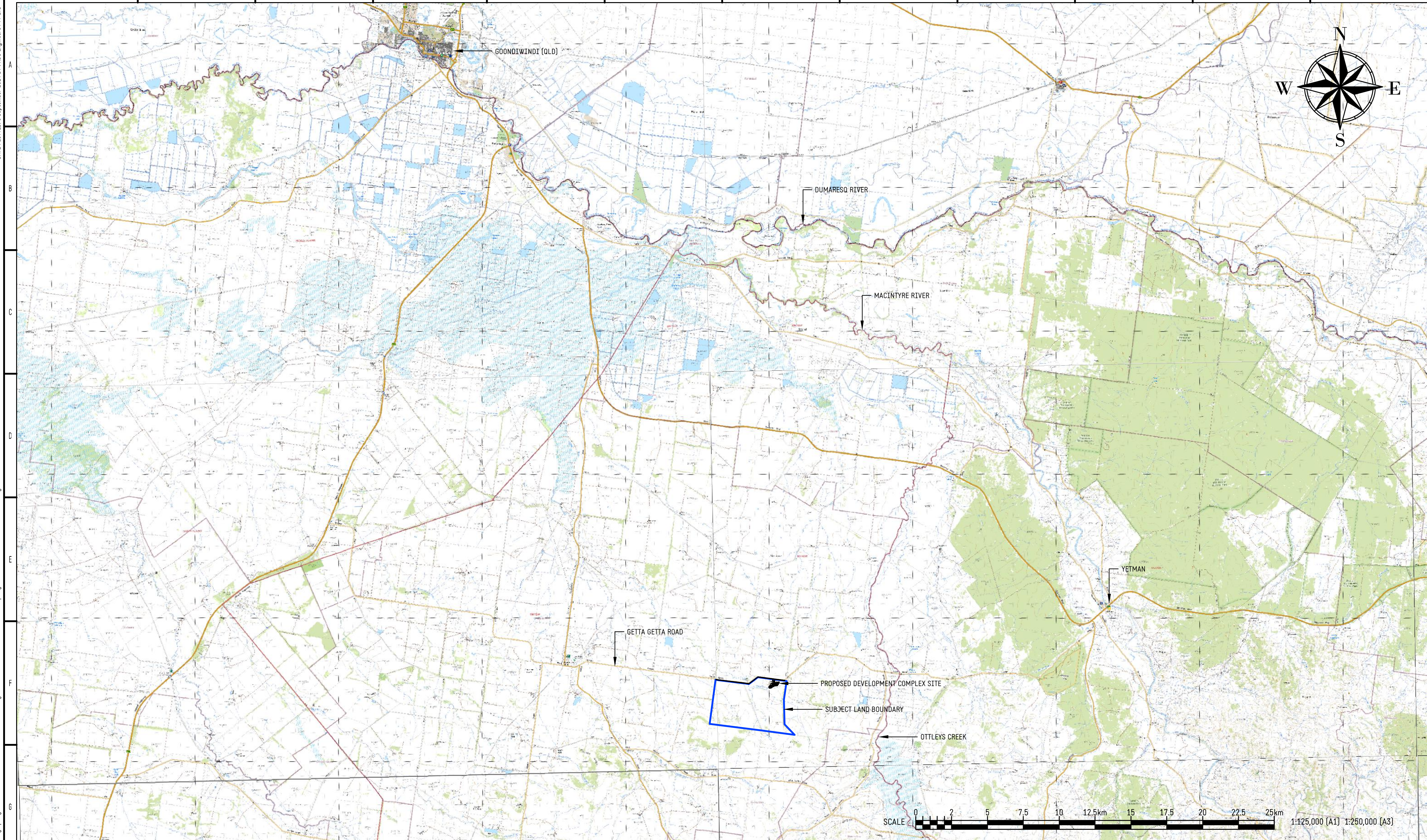

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FIGURE 1		A3	E2-103-3000-01	B

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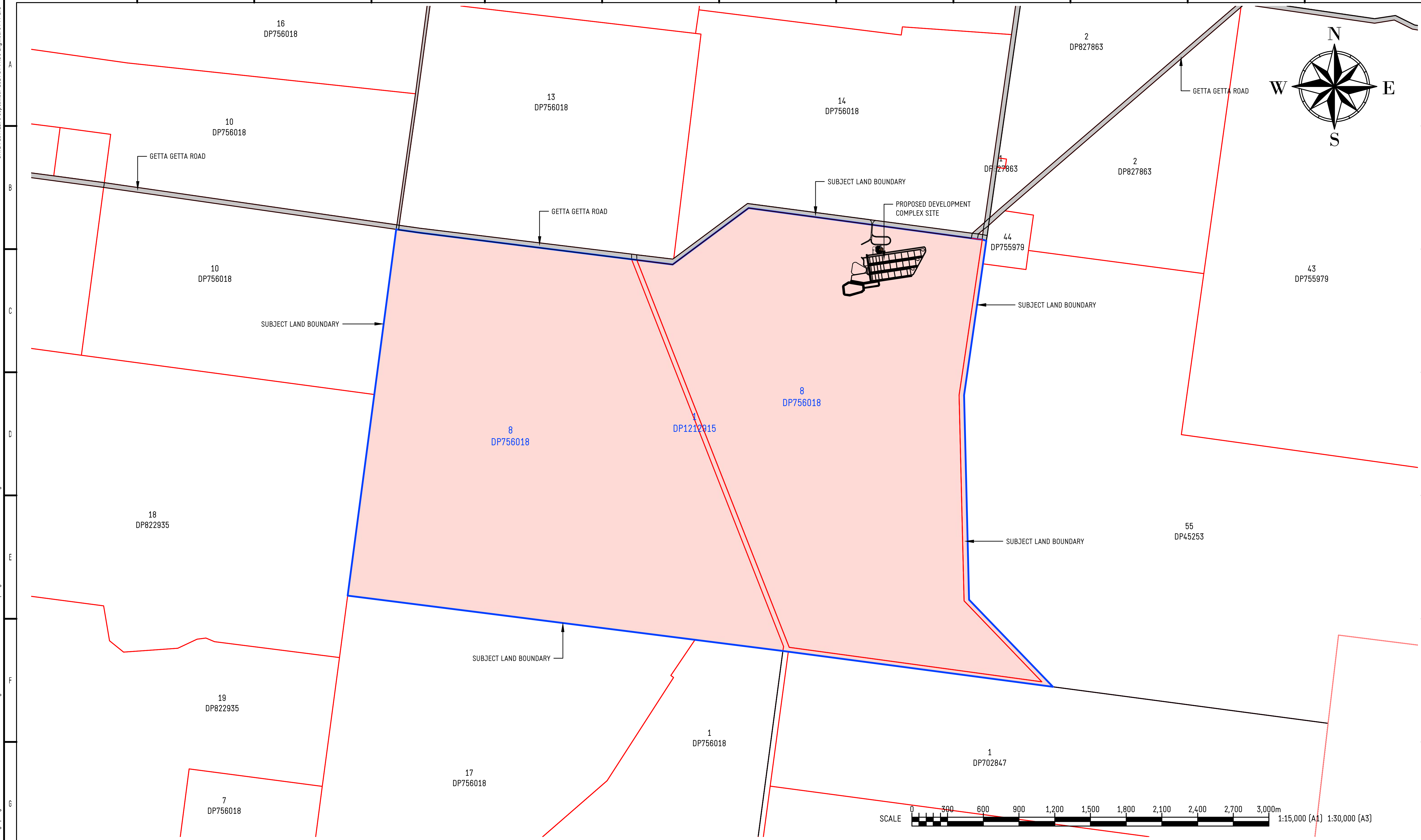

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- ROAD RESERVE
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CLIENT DOOLIN FARMING PTY LTD
PROJECT PROPOSED 3000 HEAD BEEF CATTLE FEEDLOT
TITLE DEVELOPMENT APPLICATION FOR INTENSIVE LIVESTOCK AGRICULTURE
ENVIRONMENTAL IMPACT STATEMENT - COMMUNITY CONSULTATION
SUBJECT LAND - CADASTRAL PLAN

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 2		A3	E2-103-3000-02	B

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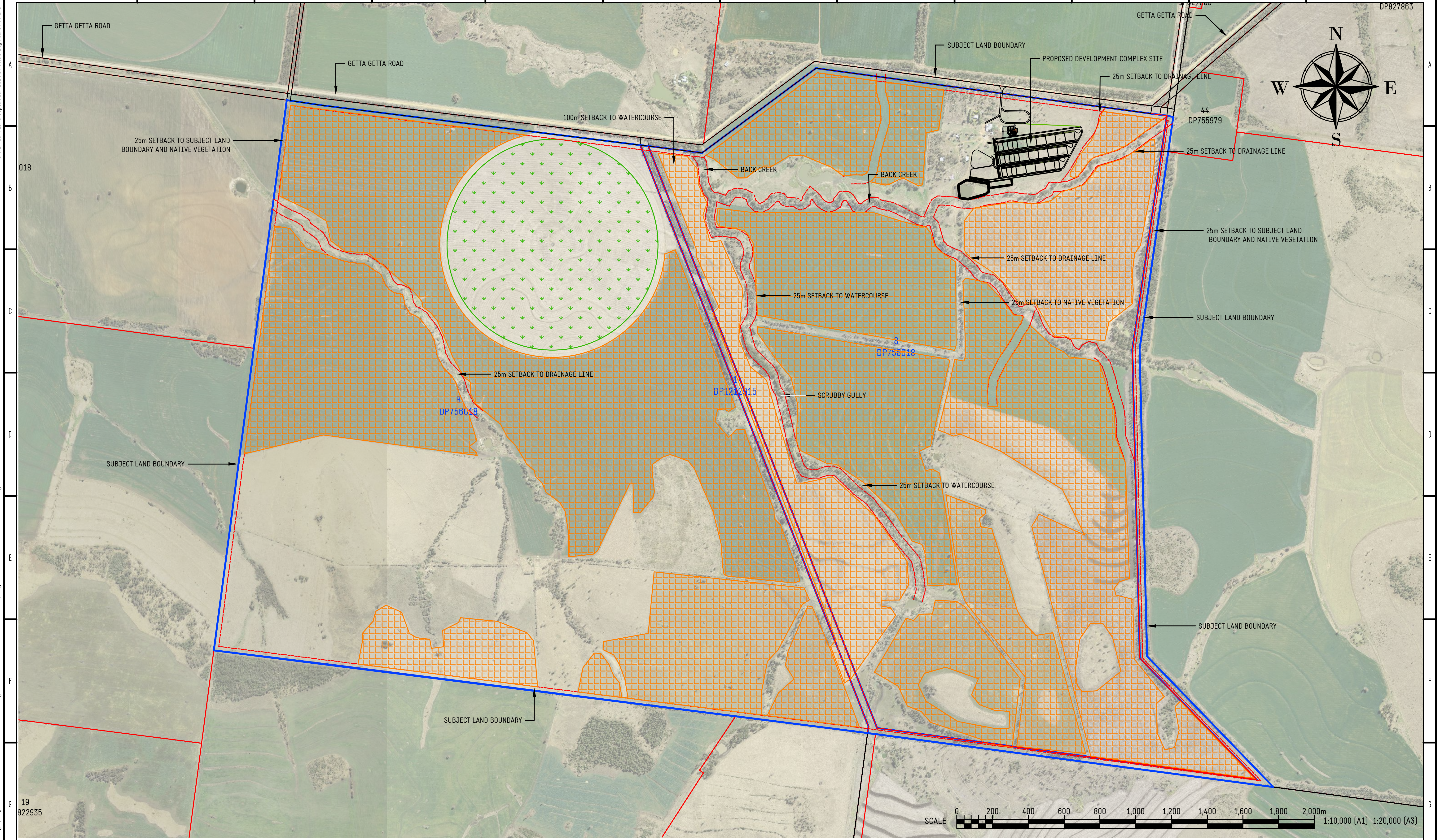

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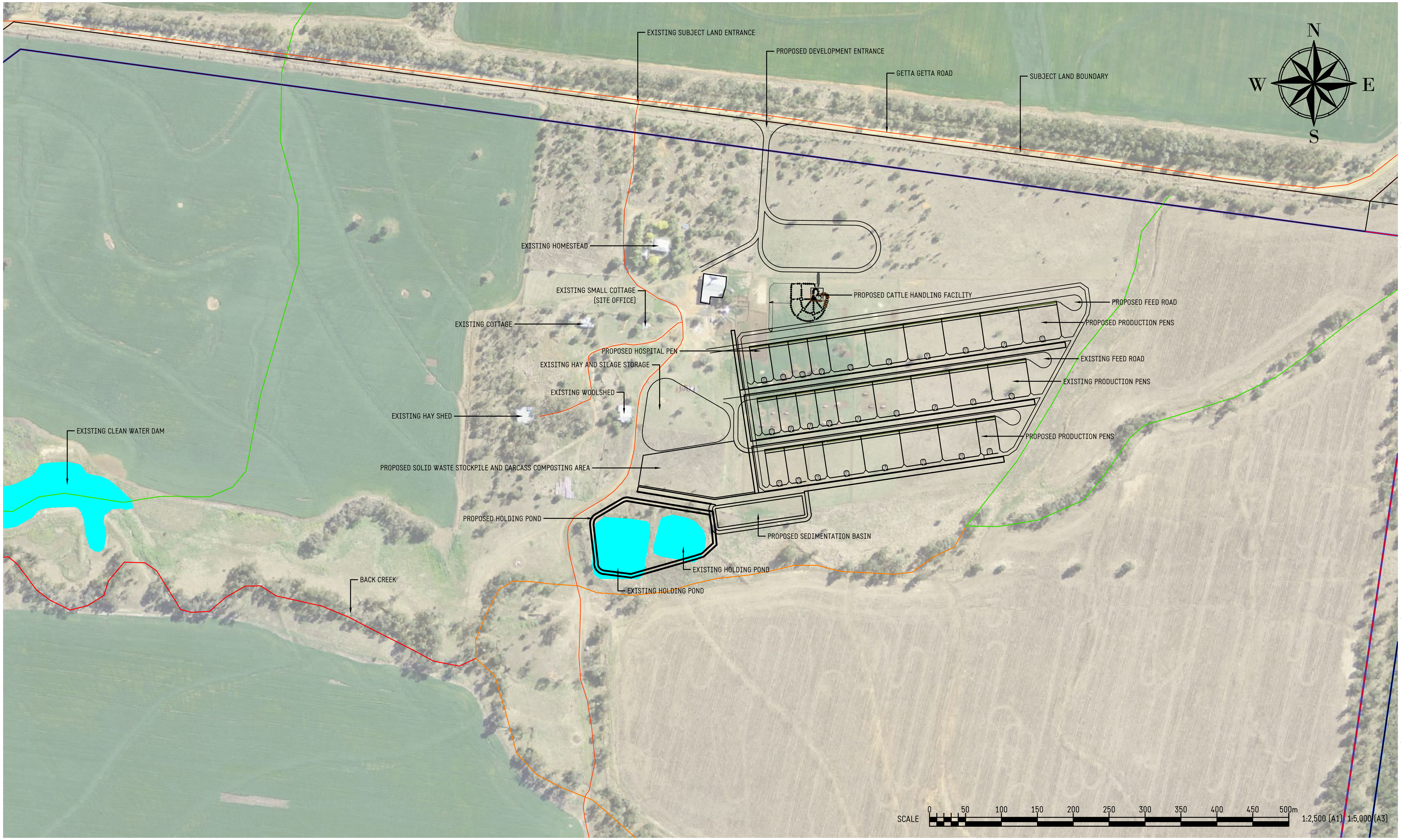
PROJECT: PROPOSED 3000 HEAD BEEF CATTLE FEEDLOT

TITLE: DEVELOPMENT APPLICATION FOR INTENSIVE LIVESTOCK AGRICULTURE
ENVIRONMENTAL IMPACT STATEMENT - COMMUNITY CONSULTATION
PROPOSED DEVELOPMENT - LAYOUT PLAN

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 3		A3	E2-103-3000-03	B

FILE PATH: C:\RDC Engineers\RDCE - Projects\E2-103 Doolin Farming Springfield EIS\05 - ACAD MasterPlan\05.1 Drawings - CURRENT FILE NAME: E2-103 OF Springfield MASTERPLAN-00-20240726A.dwg



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ENVIRONMENTAL IMPACT STATEMENT - COMMUNITY CONSULTATION
PROPOSED DEVELOPMENT - DEVELOPMENT COMPLEX LAYOUT

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 4		A3	E2-103-3000-04	B

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Our ref: E2-103-DF-SFFL-PS-20240910

10th September 2024

Mr P Schram
"Clearview"
1310 Goat Road
NORTH STAR NSW 2408

Dear Peter,

RE: ENVIRONMENTAL IMPACT STATEMENT FOR PROPOSED EXPANSION OF BEEF CATTLE FEEDLOT ON THE PROPERTY "SPRINGFIELD" 2513 GETTA GETTA ROAD, NORTH STAR, LAND DESCRIBED AS LOT 8 ON DP756018 AND LOT 21 ON DP1212915

Doolin Farming Pty Ltd own and operate a 999 head beef cattle feedlot on the property "Springfield" located at 2513 Getta Getta Road, North Star within the Gwydir Shire. The property is currently used for beef cattle grazing, intensive livestock agriculture, dryland and irrigated cropping. Doolin Farming Pty Ltd proposes to expand the existing beef cattle feedlot from 999 head to 3,000 head in two stages. The location of the subject land on which the proposed development will be established is shown on Figure 1.

As the proposed development is considered Designated Development under the NSW Environment and Planning Assessment Act 1979, an Environmental Impact Statement (EIS) is required to be prepared to accompany the Development Application.

The proposed development is both designated and integrated development under Part 4 of the Environmental Planning and Assessment Act 1979 and requires a licence under the Protection of the Environment Operations Act 1997.

During the preparation of the EIS, direct consultation with relevant local, State and Commonwealth government authorities, service providers and community groups is required to identify and address any issues they may raise in the EIS.

Consequently, Doolin Farming Pty Ltd wish to consult with the local community in relation to any issues they may raise in respect of the proposed development and/or additional requirements for the EIS. All comments will be considered and taken into account whilst preparing the EIS.

The following information is a brief summary of the proposed development.

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DESCRIPTION OF THE PROPOSED DEVELOPMENT

The proposed development is an expansion of the existing beef cattle feedlot from 999 head to 3,000 head. A layout plan of the proposed development is shown on Figure 2 and Figure 3.

The proposed development involves:

- Additional production pens and associated feed, water, shade and drainage infrastructure;
- A new cattle handling facility;
- Reconfiguration of the controlled drainage area with increased area;
- Reconfiguration of the existing manure stockpiling and carcass composting area;
- Reconfiguration of the existing sedimentation basin and holding pond with increased capacity;
- A new dedicated development entrance off Getta Getta Road and internal access road to the proposed development complex.

The proposed development shall utilise the existing approved manure and effluent utilisation areas on the subject land as shown on Figure 3. The proposed development does not seek to revise the existing waste utilisation areas.

The proposed development does not propose new or altered Class 1, 2, 3, 4, 5, 6, 8 or 9 buildings as shown on Figure 4.

The proposed development would incorporate Industry best practice during construction and operational activities to ensure that any environmental impacts are minimised. The environmental assessment process will identify these practices and incorporate them into the design of the development, ensuring that any environmental impacts are appropriately dealt with.

The existing development has been designed and constructed according to recommended methods outlined in the relevant state guidelines at the time of construction in the early 2020. These included the NSW Feedlot Manual (NSW Agriculture, 1997); National Guidelines for Beef Cattle Feedlots in Australia (MLA, 2012a); National Beef Cattle Feedlot Environmental Code of Practice (MLA, 2012b) and the Beef Cattle Feedlots: Design and Construction manual (MLA, 2015).

The proposed development will be designed, constructed and operated according to recommended methods outlined in State (NSW & QLD) and National Industry best practice guidelines. These include:

- Beef Cattle Feedlots: Design and Construction manual - www.mla.com.au
- National Guidelines for Beef Cattle Feedlots in Australia - www.mla.com.au
- National Beef Cattle Feedlot Environmental Code of Practice - www.mla.com.au
- NSW Feedlot Manual - www.dpi.nsw.gov.au

Site details

Access

The subject land has frontage to Getta Getta Road.

The proposed development seeks to construct a new subject land entrance from Getta Getta Road which provides a dedicated access to the expanded development. The new entrance is proposed to be sited some 180 m to the east of the existing subject land entrance.

The existing subject land entrance shall be retained for light vehicles to access the subject land homestead.

Staging

There is no proposed commencement date as the proposed development is subject to approval. At this stage, it is proposed to develop all of the Stage 1 (bottom row) after development approval. The development of Stage 2 (top row) is a long term proposition and is not expected to be developed within the next 5 years.

Table 1 – Proposed development – Staging

Stage	Total Capacity	Description	Timeframe
1	2,000 head	Controlled Drainage Area 1. Production pen area for 1,001 head with associated drainage system, feed bunks, water troughs, fencing, feed roads, shade, solid waste and carcass composting area, sedimentation basin and holding pond for Controlled Drainage Area 1.	After development approvals
2	3,000 head	Controlled Drainage Area 1. Production pen area for 1,000 head with associated drainage system, feed bunks, water troughs, fencing, feed roads and shade.	5-10 years

Traffic Generation

The existing development at a full capacity of 999 head generates on average in the order of 0.53 vehicle movements per day (AADT light vehicles [0.15vpd] and heavy vehicles [0.38vpd].

At Stage 1 capacity of 2,000 head, the estimated traffic generation for the proposed development is about 3.5 vehicle movements per day (AADT light vehicles [2.3vpd] and heavy vehicles [1.1vpd].

At the full capacity (Stage 2) of 3,000 head, the estimated traffic generation for the proposed development is about 4.1 vehicle movements per day (AADT light vehicles [2.3vpd] and heavy vehicles [1.8vpd]. These data are based on 3 staff members residing on-site in the subject land

homestead and cottage and B-double and Type 1 road train vehicles for haulage of livestock and commodities.

The additional traffic generated by the proposed development when operating at 3,000 head capacity is about 3.5 vehicle movements per day (light vehicles [2.0vpd] and heavy vehicles [1.4vpd] when compared to the existing development.

Flooding

The subject land is not mapped as flood prone. The proposed development is located some 6 km west from the closest known floodway which is along Ottleys Creek according to the MacIntyre Valley Flood Plain Atlas (Laurie, Montgomerie & Pettit Pty Ltd, 1982 commissioned by Water Resources Commission New South Wales).

Water supply

The applicant holds a groundwater allocation under the NSW Great Artesian Basin Eastern recharge groundwater source for irrigation use on the subject land under water access licence 41169 (Works Approval 90AL834721) for 1,558 shares.

Separation to neighbours

The closest sensitive receptor is located about 1,385 m to the northwest. The s-factor separation distance assessment outlined in the National Guidelines for Beef Cattle Feedlots in Australia requires a separation distance of 675 m to a rural dwelling when developed to its full capacity of 3,000 head.

References

Laurie, Montgomerie & Pettit Pty Ltd, 1982, MacIntyre Valley Flood Plain Atlas (commissioned by Water Resources Commission New South Wales), Sydney NSW.

Meat and Livestock Australia, 2012a, National Guidelines for Beef Cattle Feedlots in Australia 3rd Edition, Meat & Livestock Australia, North Sydney, NSW.

Meat and Livestock Australia, 2012b, National Beef Cattle Feedlot Environmental Code of Practice 2nd Edition, Meat & Livestock Australia, North Sydney, NSW.

Meat and Livestock Australia, 2015a, Beef Cattle Feedlots: Design and Construction, Meat and Livestock Australia, North Sydney, NSW.

NSW Agriculture, 1997, The New South Wales Feedlot Manual, The Inter-Departmental Committee on Intensive Animal Industries (Feedlot Section), NSW Agriculture, Orange NSW.

As a neighbour to the proposed development if you would like to provide some comments and feedback on the proposed development before Friday 4th October 2024, we would like to hear from you. You can send your written comments to:

Rod Davis
Director
RDC Engineers Pty Ltd
PO Box 1223
TOOWOOMBA QLD 4350
rod.davis@rdcengineers.com.au

If you have any questions about this request, please contact Rod Davis via rod.davis@rdcengineers.com.au or 0427 629203.

Following completion and submission of the Development Application and EIS to Council, the application will be publicly exhibited at Gwydir Shire Council office's to enable the community to view the EIS and provide feedback and make further comments if they wish.

Yours sincerely,

R.J. Davis

Rod Davis
Director
0427 629203
rod.davis@rdcengineers.com.au

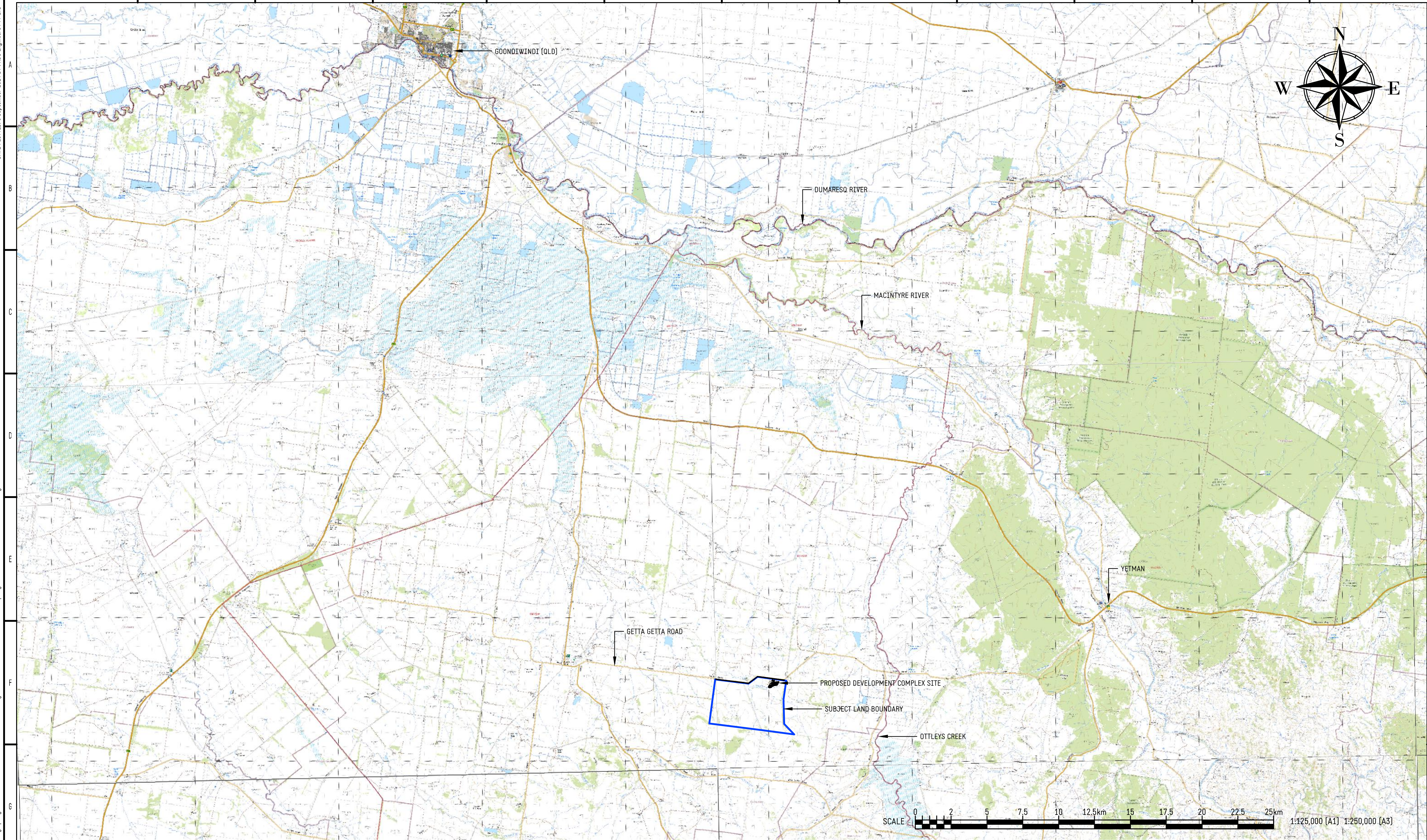

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FIGURE 1		A3	E2-103-3000-01	B

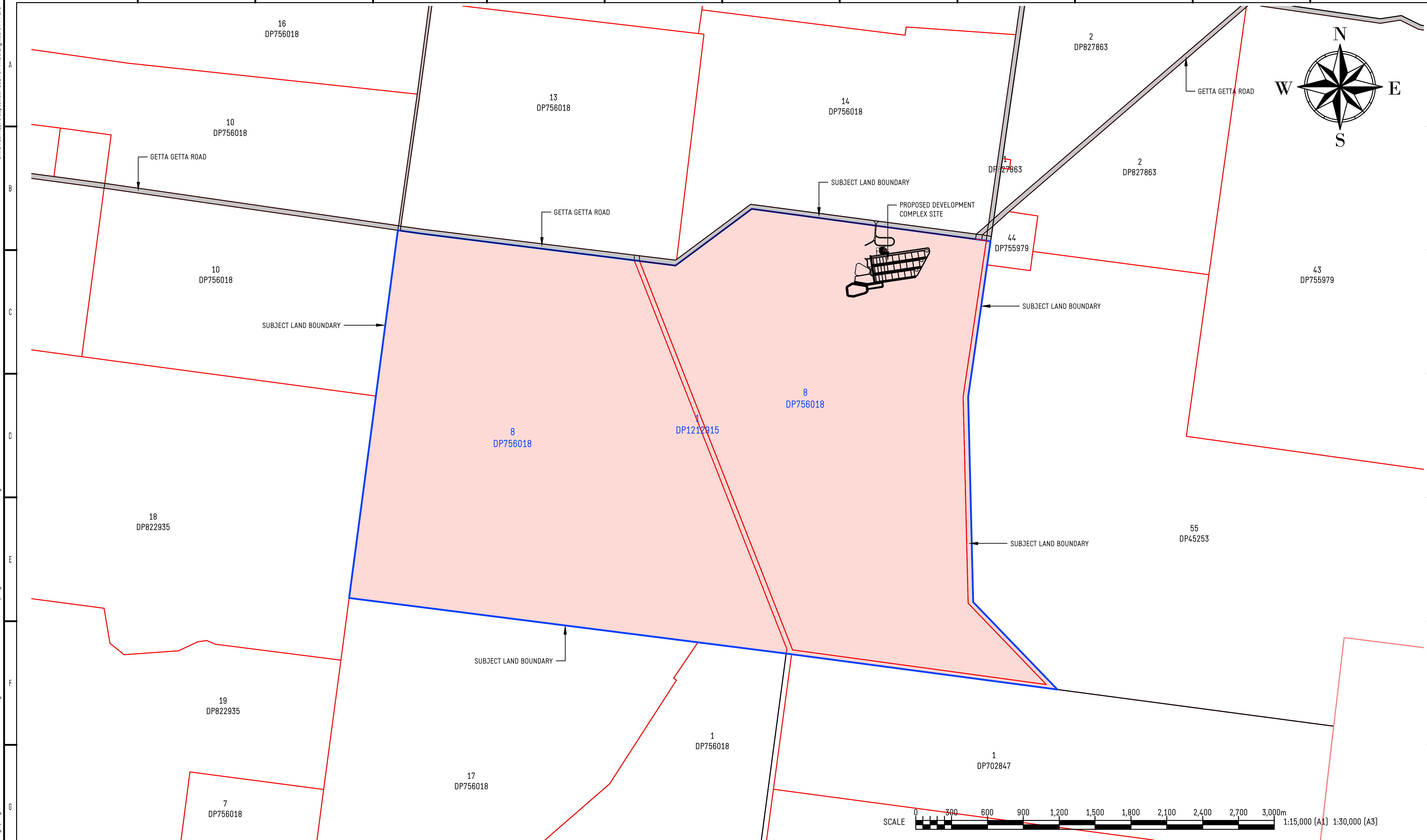

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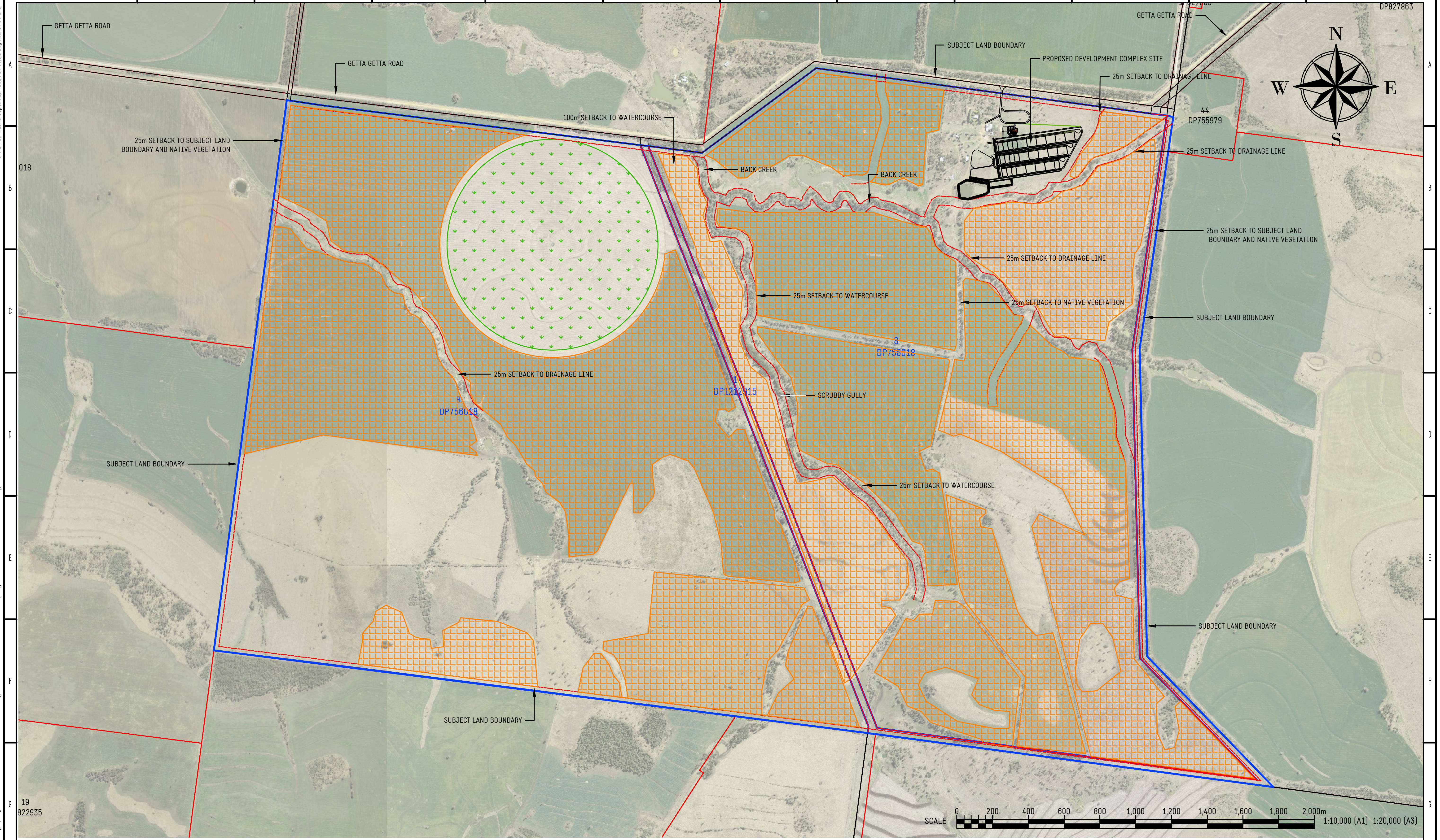
FIGURE 2		A3	E2-103-3000-02	B



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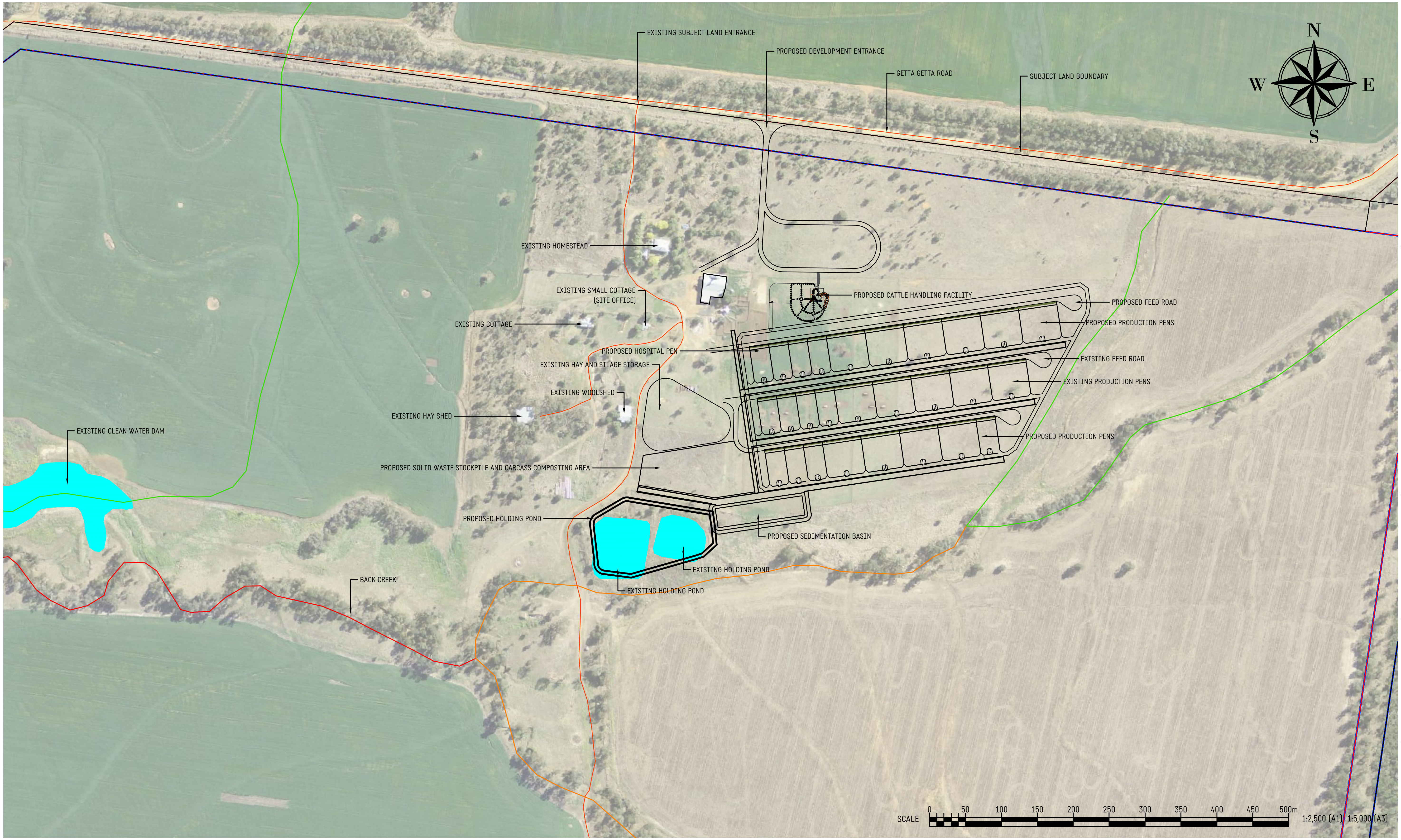

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AGRICULTURAL
ENVIRONMENTAL
PROJECT MANAGEMENT

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REV.	DATE	REVISION DESCRIPTION	DRAWN	CHECK	APPROVED
A	19/07/24	DRAFT ISSUE TO CLIENT	RJD	RJD	RJD
B	06/09/24	FINAL ISSUE FOR COMMUNITY CONSULTATION	RJD	RJD	RJD

SCALE	1:5,000 (A3)
DRAWN	RJD
DATE	06/09/2024
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APPROVED	RJD
DATE	06/09/2024

CLIENT DOOLIN FARMING PTY LTD

PROJECT PROPOSED 3000 HEAD BEEF CATTLE FEEDLOT

TITLE DEVELOPMENT APPLICATION FOR INTENSIVE LIVESTOCK AGRICULTURE
ENVIRONMENTAL IMPACT STATEMENT - COMMUNITY CONSULTATION
PROPOSED DEVELOPMENT - DEVELOPMENT COMPLEX LAYOUT

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 4		A3	E2-103-3000-04	B

DATE PLOTTED: 6 September 2024 BY : RDC Engineers PTY LTD

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Our ref: E2-103-DF-SFFL-WTC-20240910

10th September 2024

Mr & Mrs W Coulton
"Getta Getta"
1767 Getta Getta Road
NORTH STAR NSW 2408

Dear Will and Trudi,

RE: ENVIRONMENTAL IMPACT STATEMENT FOR PROPOSED EXPANSION OF BEEF CATTLE FEEDLOT ON THE PROPERTY "SPRINGFIELD" 2513 GETTA GETTA ROAD, NORTH STAR, LAND DESCRIBED AS LOT 8 ON DP756018 AND LOT 21 ON DP1212915

Doolin Farming Pty Ltd own and operate a 999 head beef cattle feedlot on the property "Springfield" located at 2513 Getta Getta Road, North Star within the Gwydir Shire. The property is currently used for beef cattle grazing, intensive livestock agriculture, dryland and irrigated cropping. Doolin Farming Pty Ltd proposes to expand the existing beef cattle feedlot from 999 head to 3,000 head in two stages. The location of the subject land on which the proposed development will be established is shown on Figure 1.

As the proposed development is considered Designated Development under the NSW Environment and Planning Assessment Act 1979, an Environmental Impact Statement (EIS) is required to be prepared to accompany the Development Application.

The proposed development is both designated and integrated development under Part 4 of the Environmental Planning and Assessment Act 1979 and requires a licence under the Protection of the Environment Operations Act 1997.

During the preparation of the EIS, direct consultation with relevant local, State and Commonwealth government authorities, service providers and community groups is required to identify and address any issues they may raise in the EIS.

Consequently, Doolin Farming Pty Ltd wish to consult with the local community in relation to any issues they may raise in respect of the proposed development and/or additional requirements for the EIS. All comments will be considered and taken into account whilst preparing the EIS.

The following information is a brief summary of the proposed development.

DESCRIPTION OF THE PROPOSED DEVELOPMENT

The proposed development is an expansion of the existing beef cattle feedlot from 999 head to 3,000 head. A layout plan of the proposed development is shown on Figure 2 and Figure 3.

The proposed development involves:

- Additional production pens and associated feed, water, shade and drainage infrastructure;
- A new cattle handling facility;
- Reconfiguration of the controlled drainage area with increased area;
- Reconfiguration of the existing manure stockpiling and carcass composting area;
- Reconfiguration of the existing sedimentation basin and holding pond with increased capacity;
- A new dedicated development entrance off Getta Getta Road and internal access road to the proposed development complex.

The proposed development shall utilise the existing approved manure and effluent utilisation areas on the subject land as shown on Figure 3. The proposed development does not seek to revise the existing waste utilisation areas.

The proposed development does not propose new or altered Class 1, 2, 3, 4, 5, 6, 8 or 9 buildings as shown on Figure 4.

The proposed development would incorporate Industry best practice during construction and operational activities to ensure that any environmental impacts are minimised. The environmental assessment process will identify these practices and incorporate them into the design of the development, ensuring that any environmental impacts are appropriately dealt with.

The existing development has been designed and constructed according to recommended methods outlined in the relevant state guidelines at the time of construction in the early 2020. These included the NSW Feedlot Manual (NSW Agriculture, 1997); National Guidelines for Beef Cattle Feedlots in Australia (MLA, 2012a); National Beef Cattle Feedlot Environmental Code of Practice (MLA, 2012b) and the Beef Cattle Feedlots: Design and Construction manual (MLA, 2015).

The proposed development will be designed, constructed and operated according to recommended methods outlined in State (NSW & QLD) and National Industry best practice guidelines. These include:

- Beef Cattle Feedlots: Design and Construction manual - www.mla.com.au
- National Guidelines for Beef Cattle Feedlots in Australia - www.mla.com.au
- National Beef Cattle Feedlot Environmental Code of Practice - www.mla.com.au
- NSW Feedlot Manual - www.dpi.nsw.gov.au

Site details

Access

The subject land has frontage to Getta Getta Road.

The proposed development seeks to construct a new subject land entrance from Getta Getta Road which provides a dedicated access to the expanded development. The new entrance is proposed to be sited some 180 m to the east of the existing subject land entrance.

The existing subject land entrance shall be retained for light vehicles to access the subject land homestead.

Staging

There is no proposed commencement date as the proposed development is subject to approval. At this stage, it is proposed to develop all of the Stage 1 (bottom row) after development approval. The development of Stage 2 (top row) is a long term proposition and is not expected to be developed within the next 5 years.

Table 1 – Proposed development – Staging

Stage	Total Capacity	Description	Timeframe
1	2,000 head	Controlled Drainage Area 1. Production pen area for 1,001 head with associated drainage system, feed bunks, water troughs, fencing, feed roads, shade, solid waste and carcass composting area, sedimentation basin and holding pond for Controlled Drainage Area 1.	After development approvals
2	3,000 head	Controlled Drainage Area 1. Production pen area for 1,000 head with associated drainage system, feed bunks, water troughs, fencing, feed roads and shade.	5-10 years

Traffic Generation

The existing development at a full capacity of 999 head generates on average in the order of 0.53 vehicle movements per day (AADT light vehicles [0.15vpd] and heavy vehicles [0.38vpd].

At Stage 1 capacity of 2,000 head, the estimated traffic generation for the proposed development is about 3.5 vehicle movements per day (AADT light vehicles [2.3vpd] and heavy vehicles [1.1vpd].

At the full capacity (Stage 2) of 3,000 head, the estimated traffic generation for the proposed development is about 4.1 vehicle movements per day (AADT light vehicles [2.3vpd] and heavy vehicles [1.8vpd]. These data are based on 3 staff members residing on-site in the subject land

homestead and cottage and B-double and Type 1 road train vehicles for haulage of livestock and commodities.

The additional traffic generated by the proposed development when operating at 3,000 head capacity is about 3.5 vehicle movements per day (light vehicles [2.0vpd] and heavy vehicles [1.4vpd] when compared to the existing development.

Flooding

The subject land is not mapped as flood prone. The proposed development is located some 6 km west from the closest known floodway which is along Ottleys Creek according to the MacIntyre Valley Flood Plain Atlas (Laurie, Montgomerie & Pettit Pty Ltd, 1982 commissioned by Water Resources Commission New South Wales).

Water supply

The applicant holds a groundwater allocation under the NSW Great Artesian Basin Eastern recharge groundwater source for irrigation use on the subject land under water access licence 41169 (Works Approval 90AL834721) for 1,558 shares.

Separation to neighbours

The closest sensitive receptor is located about 1,385 m to the northwest. The s-factor separation distance assessment outlined in the National Guidelines for Beef Cattle Feedlots in Australia requires a separation distance of 675 m to a rural dwelling when developed to its full capacity of 3,000 head.

References

Laurie, Montgomerie & Pettit Pty Ltd, 1982, MacIntyre Valley Flood Plain Atlas (commissioned by Water Resources Commission New South Wales), Sydney NSW.

Meat and Livestock Australia, 2012a, National Guidelines for Beef Cattle Feedlots in Australia 3rd Edition, Meat & Livestock Australia, North Sydney, NSW.

Meat and Livestock Australia, 2012b, National Beef Cattle Feedlot Environmental Code of Practice 2nd Edition, Meat & Livestock Australia, North Sydney, NSW.

Meat and Livestock Australia, 2015a, Beef Cattle Feedlots: Design and Construction, Meat and Livestock Australia, North Sydney, NSW.

NSW Agriculture, 1997, The New South Wales Feedlot Manual, The Inter-Departmental Committee on Intensive Animal Industries (Feedlot Section), NSW Agriculture, Orange NSW.

As a neighbour to the proposed development if you would like to provide some comments and feedback on the proposed development before Friday 4th October 2024, we would like to hear from you. You can send your written comments to:

Rod Davis
Director
RDC Engineers Pty Ltd
PO Box 1223
TOOWOOMBA QLD 4350
rod.davis@rdcengineers.com.au

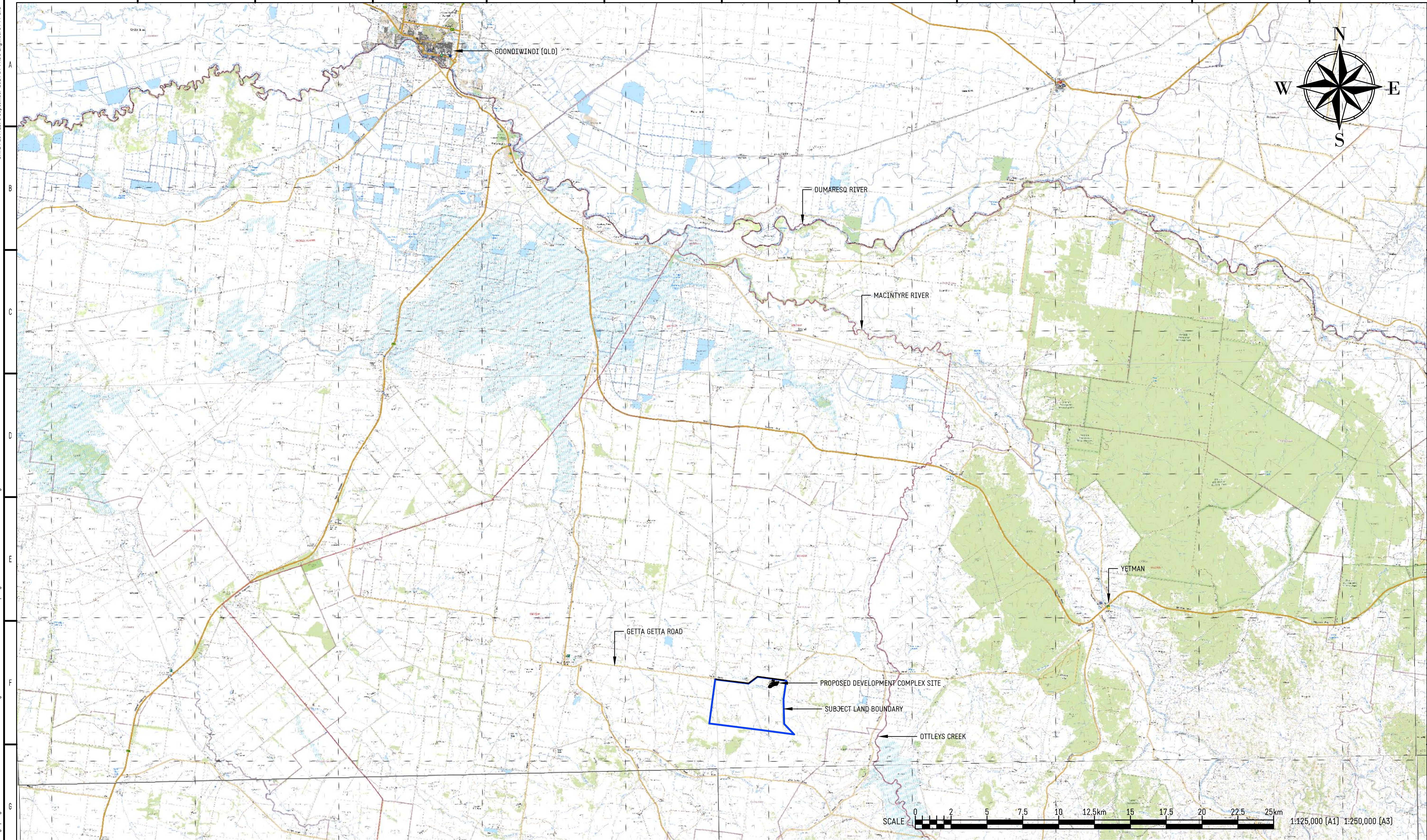
If you have any questions about this request, please contact Rod Davis via rod.davis@rdcengineers.com.au or 0427 629203.

Following completion and submission of the Development Application and EIS to Council, the application will be publicly exhibited at Gwydir Shire Council office's to enable the community to view the EIS and provide feedback and make further comments if they wish.

Yours sincerely,

R.J. Davis

Rod Davis
Director
0427 629203
rod.davis@rdcengineers.com.au



LEGEND

- SUBJECT LAND BOUNDARY
- LAND PARCEL BOUNDARY

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CLIENT: DOOLIN FARMING PTY LTD

PROJECT: PROPOSED 3000 HEAD BEEF CATTLE FEEDLOT

TITLE: DEVELOPMENT APPLICATION FOR INTENSIVE LIVESTOCK AGRICULTURE
ENVIRONMENTAL IMPACT STATEMENT - COMMUNITY CONSULTATION
SUBJECT LAND - LOCALITY PLAN

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 1		A3	E2-103-3000-01	B

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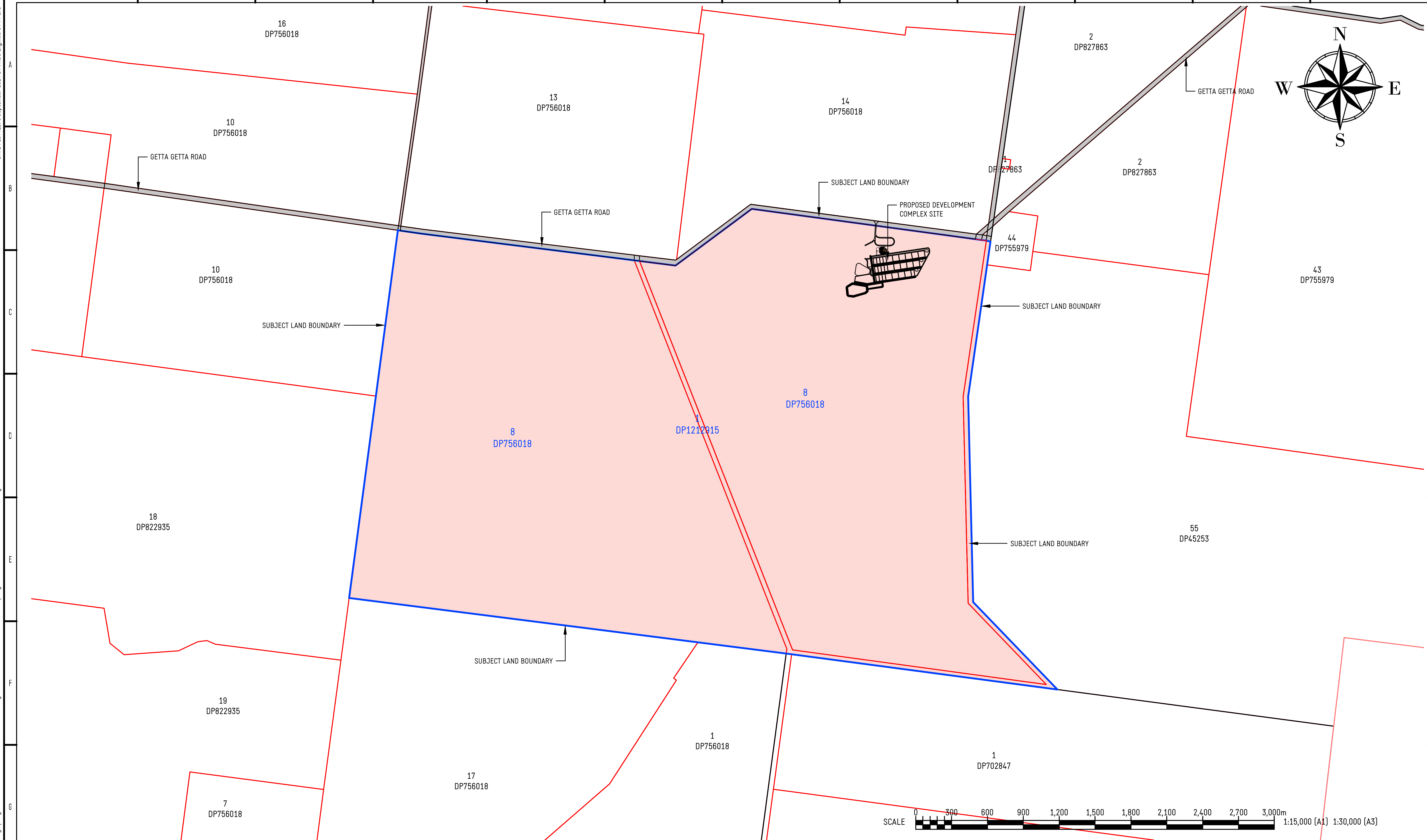

LEGEND

- SUBJECT LAND BOUNDARY
- LAND PARCEL BOUNDARY
- SUBJECT LAND AREA
- ROAD RESERVE
- EASEMENT

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CLIENT: DOOLIN FARMING PTY LTD

PROJECT: PROPOSED 3000 HEAD BEEF CATTLE FEEDLOT

TITLE: DEVELOPMENT APPLICATION FOR INTENSIVE LIVESTOCK AGRICULTURE
ENVIRONMENTAL IMPACT STATEMENT - COMMUNITY CONSULTATION
SUBJECT LAND - CADASTRAL PLAN

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 2		A3	E2-103-3000-02	B

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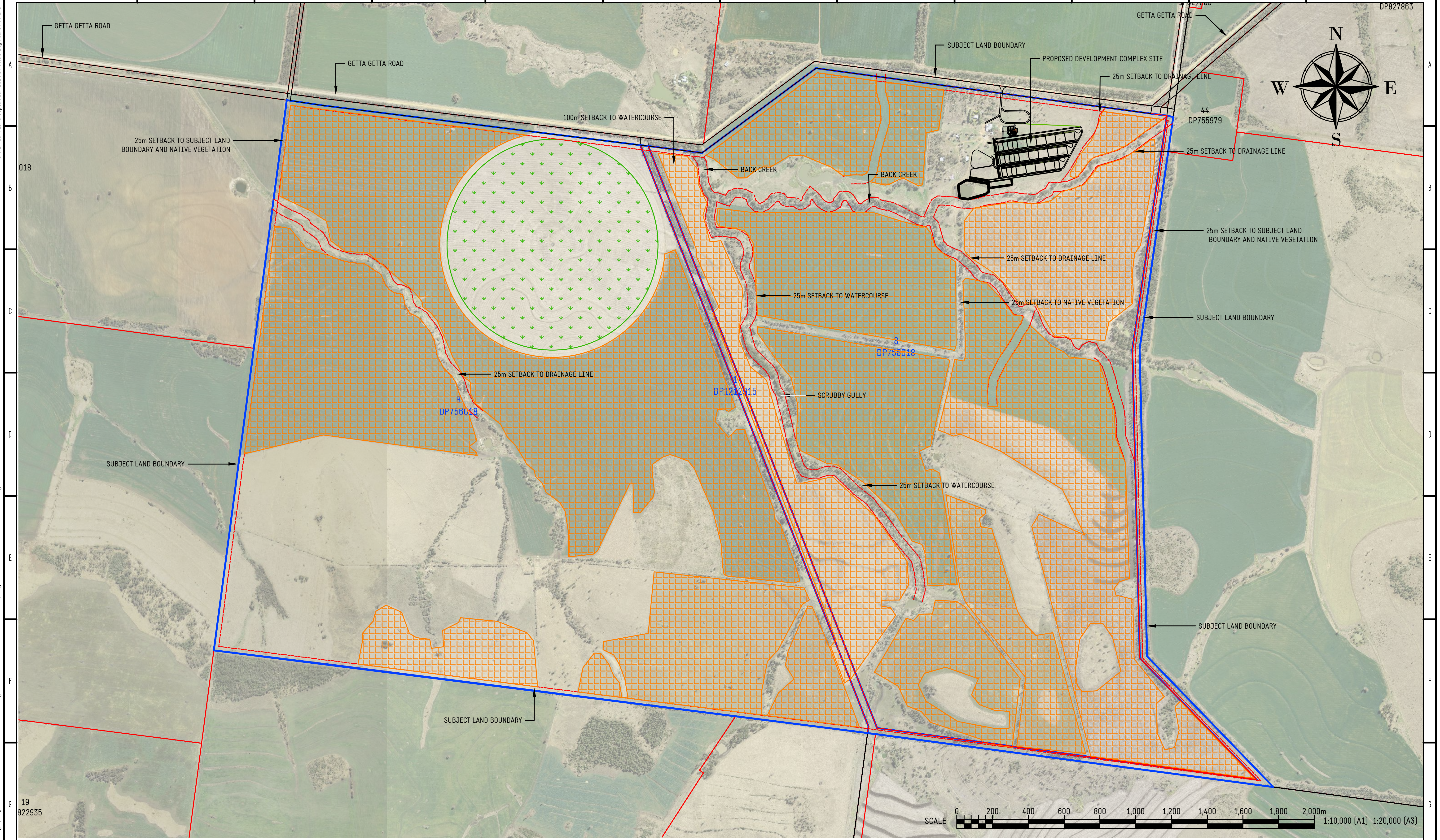

LEGEND

- SUBJECT LAND BOUNDARY
- LAND PARCEL BOUNDARY
- EFFLUENT UTILISATION AREA
- SOLID WASTE UTILISATION AREA

NOTES:

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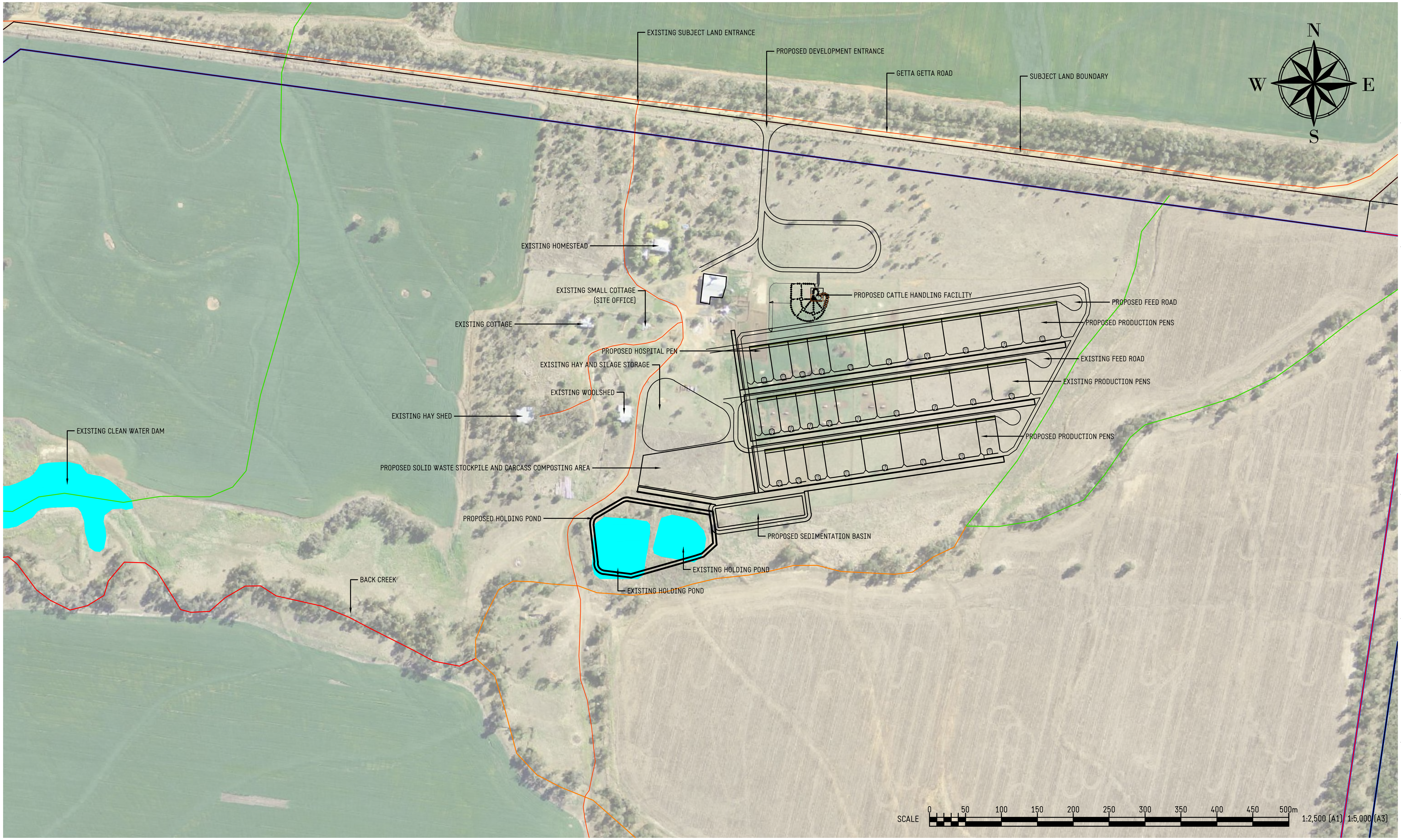
CLIENT: DOOLIN FARMING PTY LTD

PROJECT: PROPOSED 3000 HEAD BEEF CATTLE FEEDLOT

TITLE: DEVELOPMENT APPLICATION FOR INTENSIVE LIVESTOCK AGRICULTURE
ENVIRONMENTAL IMPACT STATEMENT - COMMUNITY CONSULTATION
PROPOSED DEVELOPMENT - LAYOUT PLAN

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 3		A3	E2-103-3000-03	B



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SUBJECT LAND BOUNDARY

LAND PARCEL BOUNDARY

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PROJECT: PROPOSED 3000 HEAD BEEF CATTLE FEEDLOT

TITLE: DEVELOPMENT APPLICATION FOR INTENSIVE LIVESTOCK AGRICULTURE
ENVIRONMENTAL IMPACT STATEMENT - COMMUNITY CONSULTATION
PROPOSED DEVELOPMENT - DEVELOPMENT COMPLEX LAYOUT

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 4		A3	E2-103-3000-04	B

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Appendix D

Study Team

PO Box 1223, TOOWOOMBA QLD 4350
Phone: +61 427 629 203, email: rod.davis@rdcengineers.com.au

CURRICULUM VITAE

ROD DAVIS

Director – RDC Engineers Pty Ltd

BEng (Ag), MEng, FIEAust, CPEng, RPEQ, CPESC, CDec

CAREER OVERVIEW AND KEY STRENGTHS

Extensive experience and depth of expertise in:

Project management – project initiation, contract and budget preparation, planning and design, client management, managing sub-consultants, project monitoring, resource coordination and scheduling, report preparation, quality control, financial management, project closure.

Water Resource Engineering - Earthen dam design, channel design, surface irrigation design, low pressure seepage assessments, environmental hydrology, surface water hydrology, hydrological modelling, amended RO water quality assessment for irrigation and livestock, water regulatory management (certification of works that take overland flow, CSG water beneficial reuse plans, consequence assessment of dam, CAR dams, Riverine Protection Permits, Permit to Take Water).

Intensive livestock production and environmental management – facility layout and design.

Environmental Risk and Impact Assessments - Regulatory applications and approvals, Site-Based Management Plans, Environmental Management Plans (Construction and Operation), Stormwater management plans, Erosion and Sediment Control plans, Closure and Rehabilitation Plans, Consulting with Environmental regulators and assisting in the negotiation of approvals and conditions.

Environmental Monitoring – soil assessment, identifying standards, monitoring design, equipment selection and installation and commissioning, data collection and analysis, data interpretation.

Staff management – leadership, staff selection, staff motivation, goal setting, communication, mentoring.

Sugarcane production, harvesting operations and harvester technologies – farming systems improvement and mechanisation, harvester verification and validation, gathering and forward feeding of cane, optimisation of feed-train setup, chopper system performance and billet quality, harvesting best practice.

Electronic data acquisition systems – monitoring design, sensor selection, signal conditioning, data collation, data interpretation.

PROFESSIONAL MEMBERSHIP / ACCREDITATION

Fellow of The Institution of Engineers Australia (FIEAust)

Chartered Professional Engineer of The Institution of Engineers Australia (CPEng)
Membership No 448892
Civil Engineering and Environmental Engineering

Registered Professional Engineer of Queensland (RPEQ)
RPEQ No 20256
Civil Engineering and Environmental Engineering

Certified Professional in Erosion and Sediment Control (CPESC)
CPESC No 8857

EDUCATION

Master of Engineering
University of Southern Queensland (Completed in 1995)

Bachelor of Engineering (Agricultural)
University of Southern Queensland (Completed in 1992)

CAREER SNAPSHOT

Director
RDC Engineers Pty Ltd

From
July 2018

Responsibilities include:

- To undertake water resource, irrigation and intensive livestock facility design, environmental risk and impact assessments and development approvals.
- Prepare project documentation and technical reports.
- Effective and high-level communication with clients and state and local agencies.
- Managing clients and project scope methods.

ROD DAVIS PO Box 1223, TOOWOOMBA QLD 4350
Phone: +61 427 629 203, email: rod.davis@rdcengineers.com.au

Senior Engineer September 2017
Stafford Adamson & Associates July 2018

Responsibilities include:

- To prepare water resource and intensive livestock development approvals and related supporting information.
- Effective and high-level communication with clients and state and local agencies.

Technical

- Earthen storage design and surface water hydrologic modelling.
- Design of irrigation infrastructure works including pipeline, supply and drainage channels, culverts and earthworks.
- Preparation of Site-Based Management Plans – Intensive Livestock Activities.
- Preparation of development applications – Intensive Livestock Activities.
- Preparation of Erosion and Sediment Control Plans – Intensive Livestock Activities.
- Layout design of feedlots including pens, water storages, effluent management systems.
- Undertaking geotechnical investigations for proposed development sites, assessment of material suitability.
- Checking and auditing report quality.

Group Manager - Environment July 2016 –
Ostwald Bros August 2017

- Monitor all environmental legislative requirements and standards and assist with implementation across the Ostwald Bros Group. Responsible for working with the HSEQ manager to gain ISO14001:2015 accreditation.
- Establish, develop and maintain positive relationships with key internal and external stakeholders to facilitate accurate dissemination of information relating to environmental issues.
- Assess and anticipate environmental issues relating to the Ostwald Bros Group by maintaining an awareness of projects and activities.
- Provide strategic advice and counsel to the executive management team regarding the identification and management of environmental issues and activities.
- Initiate and manage regulatory approvals, including environmental, water supply and wastewater beneficial use, intensive livestock, extractive materials etc. Negotiate approval conditions with agencies, and oversee approval compliance for current and future developments across the Ostwald Bros Group.
- Collaborate with the executive team to develop environmental systems and processes to support strategic directions and to identify risk exposures.
- Oversee development of planning, engineering, and/or environmental supporting information for relevant regulatory approvals, including coordination of consultants and contractors.
- Negotiate approval conditions with agencies, and ensure approval compliance for current and future developments across the Ostwald Bros Business Units.

Engineering and Environment Manager January2015 -
Ostwald Bros June 2016

Responsibilities included:

- Lead negotiations and communications with local, state and federal government agencies for environmental, construction materials, water supply and wastewater beneficial use approvals for future developments across the Ostwald Bros Business Units.
- Oversee development of planning, engineering, and/or environmental supporting information for relevant regulatory approvals, including coordination of consultants and contractors.
- Negotiate approval conditions with agencies, and ensure approval compliance for current and future developments across the Ostwald Bros Business Units.
- Provide timely and accurate advice on environmental hazards and compliance issues to internal stakeholders and pro-actively develop mitigation strategies.
- Overseeing audits, analysis and collation of environmental and engineering performance data and reporting information to internal staff, clients and regulatory bodies.
- Prepare reports and submissions to internal and external stakeholders from a planning, engineering and environmental perspective.
- Providing planning and environmental training to Ostwald Bros Group staff at all levels.
- Develop and manage environmental monitoring, testing and compliance programs and any appropriate corrective actions that may be required.

Senior Environmental Coordinator May 2014 -
Ostwald Facilities and Accommodation December 2014

Responsibilities included:

- Initiate, draft and manage regulatory approvals, including environmental, water supply and wastewater beneficial use, negotiate approval conditions with agencies, and oversee approval compliance for current and future developments across the Facilities and Accommodation Group.
- Provide input into the development/review of development plans from an environmental perspective.
- Ensure all aspects of development activities comply with relevant environmental regulations and standards.
- Develop and manage environmental monitoring, testing and compliance programs and any appropriate corrective actions that may be required.
- Ensure currency of regulatory approvals and fee payments for environmental compliance.
- Generate reports and submissions to internal and external stakeholders from an environmental perspective.
- Administration of current and new development environmental approvals in line with all relevant legal and environmental standards.
- Prepare and submit environmental authority annual returns as required.
- Oversee development of environmental assessments, regulatory audits and similar documentation including coordination of consultants and contractors.

- Coordinate field implementation of environmental systems and procedures to ensure compliance with regulatory requirements
- Coordinate preparation of, and manage, schedule and budget for environmental aspects of developments and oversee the design, development, procurement and implementation of the development's environmental requirements.
- Liaise with Government agencies and/or external stakeholders in relation to environmental audits and other environmental issues.

Principal Engineer November 2004 –
FSA Consulting April 2014

Responsibilities included:

- Providing leadership and management to a team of professionals in water resource engineering, intensive livestock design and environmental risk and impact assessment.
- To provide technical and professional development of the team.
- Prepare project documentation and technical reports.
- Project planning and leadership of multi-disciplinary project teams.
- Effective and high-level communication with clients and state and local agencies.
- Managing clients and project scope methods.

Key experience and achievements over this period include:

Staff Management

- Staff selection, conduct staff performance reviews and issue management.
- Directing and mentoring junior/mid-level professional staff as required on project management and technical tasks. Resolving local technical design issues with environmental risk and impact assessments, intensive livestock design, water resource engineering and regulatory applications.
- Ensuring compliance with FSA Consulting WHS and QA policies and procedures.

Project management

- Initiate project and establish terms of reference, clarify objectives, prepare budget, appoint project team and conduct mobilisation meeting.
- Project planning through development of a project plan, resource allocation, financial plan, identifying key deliverables and quality assurance.
- Execute project through construction of deliverables and client management.
- Manage sub-consultants.
- Monitor and control activities being undertaken. Manage time resources, costs against budget, quality management and scope management, preparation of deliverables ensuring completion against terms of reference and within budget.
- Manage issues between staff and clients.
- Project closure and review project completion.

Technical

- Preparation of Low Hazard Dam/Consequence Assessments.
- Preparation of Land and Water Management Plans (CSG beneficial reuse).
- Earthen storage design and surface water hydrologic modelling.
- Design of irrigation infrastructure works including pipeline, supply and drainage channels, culverts and earthworks.
- Undertaking soil suitability assessments for proposed surface and low pressure overhead irrigation developments.
- Amended RO water quality assessment for irrigation and intensive livestock.
- Preparation of Failure Impact Assessments for Regulatory dams.
- Identification of Technology for Improving Water Use Efficiency in Irrigation in the QLD MDB.
- Design of light and heavy vehicle washdown facilities and prepare functional design briefs.
- Preparation of Site-Based Management Plans – Extraction, Intensive Livestock Activities.
- Preparation of Closure and Rehabilitation Plans – Extraction, Waste Treatment.
- Preparation of Stormwater Management Plans – Extraction, Waste Treatment, Intensive Livestock Activities.
- Preparation of Erosion and Sediment Control Plans – Extraction, Waste Treatment, Intensive Livestock Activities.
- Preparation of Code of Environmental Compliance – Extraction Activities.
- Preparation of Operational Plans – Extraction Activities
- Preparation of Certification of Works that take overland flow.
- Preparation of Quality Assurance manuals and Environmental Impact Statements
- Layout design of feedlots including pens, water storages, effluent management systems.
- Design and development of electronic data logging systems. Resolving technical issues with water depth sensing equipment, power and water flow metering.
- Sugar Industry mechanisation and review projects.
- Undertaking geotechnical investigations for proposed development sites, assessment of material suitability.
- Management of automatic weather station design, procurement, installation and maintenance.
- Checking and auditing report quality.

Administrative

- Ensuring compliance with FSA Consulting WHS and QA policies and procedures.

Project Engineer
BSES Limited

December 1995 - November 2004

Key achievements over this period included responsibility for

Staff Management

- Staff selection, conduct staff performance reviews and issue management.
- Directing and mentoring technical staff as required on project management and technical tasks.
- Ensuring compliance with BSES Limited WPHS policies and procedures.

Project management

- Initiate project and establish terms of reference, clarify objectives, prepare budget, appoint project team and conduct mobilisation meeting.
- Project planning through development of a project plan, resource allocation, financial plan and identifying key deliverables.
- Execute project through construction of deliverables.
- Monitor and control activities being undertaken. Manage time resources, costs against budget, quality management and scope management, preparation of deliverables ensuring completion against terms of reference and within budget.

Technical

- Design and development of alternative forward feeding geometry for cane-harvesters. Accountable for managing a range of key design and construction tasks.
- Implementation of a high-speed cine film system.
- Design, implement and conduct in-field assessments of pre-prototype designs.
- Preparation of detailed design drawings and design evaluation of an improved gathering system and feedtrain-chopper modifications.
- Development of an instrumentation system incorporating load, pressure and speed sensing transducers, interfacing circuits, programming for high-speed data acquisition.
- The design and implementation of weight transfer systems for infield haulouts.
- Preparation of a reference manual for irrigation materials for use by BSES Limited extension staff.
- Representing BSES Limited at industry conferences and presentation of conference papers to industry stakeholders.

Design Engineer
Feedlot Services Australia Pty Ltd

March 1995 -
December 1995

Undertook a diverse range of design and assessment assignments including:

- Preparation of feedlot licence applications.
- Computer simulation of waste management systems including drainage, waste disposal and odour generation.
- Preparation of Quality Assurance manuals and Environmental Impact Statements.
- Cattle feedlots with an emphasis on conceptual design, preparation of technical specifications and earthworks.
- On-farm earth dams (up to 2000 ML capacity).
- Broadacre furrow irrigation layouts.
- Irrigation infrastructure works including pipeline, supply and drainage channels, culverts and earthworks.

Research Engineer
University of Southern Queensland

January 1993 -
February 2005

Worked as part of a multidisciplinary team on the Land and Water Resources Research and Development Corporation (LWRRDC) research project titled "Compaction Control and Repair practices for cropping lands in the sub-tropics". Undertook specific research on the behaviour of clay soils during compaction and compaction alleviating processes.

Undertook a diverse range of design, trials and assessment tasks including:

- Development of a simple shear apparatus.
- Field experiments to quantify the stresses applied to the soil with a soil stress transducer and soil deformation measurements using a novel pin displacement method.
- Laboratory experiments to establish the parameters of soil response utilising a simple shear box apparatus.

EDUCATION AND PROFESSIONAL DEVELOPMENT

Certified Professional in Erosion and Sediment Control (#8857)
International Erosion Control Association (Awarded 2017)

Master of Engineering (Research)
University of Southern Queensland (Awarded 1996)

Thesis - An Investigation of Soil Stresses and Mechanical Properties when Compacting Clay Soils

Bachelor of Engineering (Agricultural)
University of Southern Queensland (Awarded 1993)

Department of Justice and Attorney-General: Commissioner for Declarations 1996 (CDec)

International Erosion Control Association (Australasia): Fundamentals in Erosion and Sediment Control – Completed 2014

Generic Induction (Coal and Surface) – Completed in 2010

Queensland Construction White Card - Completed in 2010

Queensland Ambulance First Aid - Completed in 2010

Operate ATV (Quad bike) Training – Completed in 2008

Certificate in Hydraulic Training. HMI – Basic Hydraulic maintenance and HA2 Advanced Hydraulic systems and electronic controls. Mannesmann Rexroth. Completed in 1997.

SOFTWARE EXPERTISE

- Microsoft Office - Word 2010, Excel 2010, Powerpoint 2010 (Advanced)
- Computer Aided Drafting - AutoCAD LT 2017 (Advanced), AutoCAD Civil 3d (Intermediate)
- High Speed Data Acquisition - Various proprietary software Easiacces, DASYLab, Labtech Notebook

INTERNATIONAL EXPERIENCE

2003: 2 weeks in JuJuy province, North Argentina. Site inspections and technical advice on harvester design, setup and performance in order to increase cane quality at the mill and minimise field and harvester losses on 33,000 ha sugar plantation. This work involved a series of field experiments and presentations.

2009: 3 weeks in Sao Paulo State, Brazil. Study tour of Brazilian Sugar Industry. This included discussions with equipment manufacturers John Deere, Case IH, AGCO and sugarcane mills. Presentations on Australian developments and Australian Sugar Industry made and technical advice on harvester design, setup and performance given.

2012: 2 weeks in Sao Paulo State, Brazil. Technical specialist for AGCO on alternative cane harvester developments.

AWARDS

2004 Rod Rookwood Design Award. Awarded by the Australian Society of Sugar Cane Technologists for Agriculture/Engineering design. This was awarded for the paper "Enhancing harvester forward-feeding performance: an exercise in optimising machine-crop interactions". The best paper at the ASSCT Conference which focused on innovation and excellence in agricultural or factory design of sugar industry equipment.

The **Eric Anderson Award** recognises the best article in the Australasian Journal of Environmental Management (The Institute's journal) in 2015 -2016. It is sponsored by Taylor & Francis and honours the journal's first editor. It was presented to Chirag Mehta, Robyn Tucker, Glenn Poad, Rod Davis, Eugene

McGahan, Justin Galloway, Michael O'Keefe, Rachel Trigger and Damien Batstone for their article - 'Nutrients in Australian agro-industrial residues: production, characteristics and mapping' published in Vol 23(2).

PUBLICATIONS

Journal papers

Wiedemann SG, **Davis RJ**, McGahan EJ, Murphy, C, and Redding M, 2016, Resource use and greenhouse gas emissions from grain-finishing beef cattle in seven Australian feedlots: a life cycle assessment, Animal Production Science, CSIRO PUBLISHING, http://dx.doi.org/10.1071/AN15454.

Davis, RJ, Schembri, MG and Kingston, G, 2005, Optimising machine component layout for enhanced harvester feeding performance in lodged crops. *International Sugar Journal,* Vol.107, No. 1276.

Radford, BJ, Bridge, BJ, **Davis, RJ,** McGarry, D, Pillai, UP, Rickman, JF, Walsh, PA, and Yule, DF, 2000, Changes in Properties of a Clay Soil after Compaction with Header Tyres, *Soil and Tillage Research,* **54**: p 155-170.

Bakker, DM and **Davis, RJ,** 1995, Soil Deformation Observations in a Vertisol under Field Traffic, *Australian Journal of Soil Research,* **33**, p 817-32.

Conference and workshop papers

Schmidt, EJ, **Davis, RJ**, Giles, R, Baillie, CP, Jensen, TA, Sandell, GS and Norris CP, 2011, Sustainable Biomass Supply Chain for the Mallee Woody Crop Industry, BioEnergy Australia 2011 Conference, Novotel Twin Waters Resort, Twin Waters, Queensland

Davis, RJ, Water and Energy monitoring and efficiency in feedlots. Beefworks 2011, Toowoomba, Australia.

Schmidt, EJ, **Davis, RJ**, Baillie, CP, Jensen, TA, and Giles, R, 2010, Sustainable Biomass Supply Chain for the Mallee Woody Crop Industry, BioEnergy Australia 2010 Conference, Novotel Manly Pacific, Sydney, New South Wales

Jensen, TA, Baillie, CP, Bramley, R, Di Bella, L, Whiteing, C and **Davis, RJ**, Assessment of Sugarcane Yield Monitoring Technology for Precision Agriculture. Proc Aust Soc Sugar Cane Technol Vol 32 2010.

Davis RJ, Wiedemann, SG, Cornford GS and Watts, PJ, 2009, An Investigation Of Lot-Fed Cattle Drinking Water Consumption Under Australian Conditions, Biennial Conference of the Australian Society for Engineering in Agriculture (SEAg), published by SEAg, Editors: T.M. Banhazi and C. Saunders - 13-16 of September 2009, Brisbane, QLD.

Davis RJ, Wiedemann SG and Watts, PJ, 2009, Energy Usage of Individual Activities Within Australian Cattle Feedlots, Biennial Conference of the Australian Society for Engineering in Agriculture (SEAg). Published by SEAg, Editors: T.M. Banhazi and C. Saunders – 13-16 of September 2009, Brisbane, QLD.

Davis, RJ, Wiedemann, SG and Watts, PJ 2009, Water usage of individual activities within Australian cattle feedlots, Biennial Conference of the Australian Society for Engineering in

Agriculture (SEAg). Published by SEAg, Editors: T.M. Banhazi and C. Saunders – 13-16 of September 2009, Brisbane, QLD.

Ouellet-Plamondon, CM, **Davis, RJ**, Watts, PJ and Savoie, P, 2009, Audit, Need Analysis and Design of Vehicle Washdown Facilities for Biosecurity in Queensland, Australia, 2009 ASABE Annual International Meeting, Sponsored by ASABE, Grand Sierra Resort and Casino, Reno, Nevada, June 21 – June 24, 2009, Paper Number: 095775.

Davis, RJ, Norris, CP and Whiteing, C, 2009, Review of Sugarcane Harvester Performance. Biennial Conference of the Australian Society for Engineering in Agriculture (SEAg), published by SEAg, Editors: T.M. Banhazi and C. Saunders - 13-16 of September 2009, Brisbane, QLD.

Davis, RJ, Schembri, MG and Kingston, G, 2005, Optimising machine component layout for enhanced harvester feeding performance in lodged crops. *Proceedings of International Society of Sugar Cane Technologists,* **25**: p 326-330.

Davis, RJ and Norris, CP, 2005, An investigation of the feeding characteristics of the forward-feeding zone of chopper harvesters: Development of a research harvester. *Proceedings of International Society of Sugar Cane Technologists,* **25**: p 316-323.

Whiteing, C, **Davis, RJ** and Schmidt, EJ, 2004, Evaluation of cane loss monitoring systems. *Proceedings of Australian Society of Sugar Cane Technologists,* **26**: (CD-ROM, 12 pp).

Schembri, MG and **Davis, RJ,** 2004, Measuring the benefits of the SRI basecutter height control system and the floating basecutter system. *Proceedings of Australian Society of Sugar Cane Technologists,* **26**: (CD-ROM, 10 pp).

Davis, RJ and Schembri, MG, 2004, Enhancing harvester forward-feeding performance: an exercise in optimising machine-crop interactions. *Proceedings of Australian Society of Sugar Cane Technologists,* **26**: (CD-ROM, 14 pp).

Davis, RJ and Norris, CP, 2003, Optimising the forward feeding zone of harvesters. Development of a research platform. *Proceedings of Australian Society of Sugar Cane Technologists,* **25**: (CD-ROM, 12 pp).

Davis, RJ and Norris, CP, 2002, Improving the feeding ability of sugarcane harvesters. *Proceedings of Australian Society of Sugar Cane Technologists,* **24**: p 190–198.

Norris, CP and **Davis, RJ,** 2001, Developments in the feeding performance of sugarcane harvesters in large green crops. *Proceedings of International Society of Sugar Cane Technologists,* **24**: p 269–275.

Hockings, PR, Norris, CP and **Davis, RJ,** 2000, Chopper systems in cane harvesters: B: Results of a test program. *Proceedings of Australian Society of Sugar Cane Technologists,* **22**: p 250–255.

Norris, CP, Hockings, PR and **Davis, RJ,** 2000, Chopper systems in cane harvesters: A: Development of a test facility. *Proceedings of Australian Society of Sugar Cane Technologists,* **22**: p 244–249.

Norris, CP, **Davis, RJ** and Poulsen, LP, 1998, An Investigation into the Feeding of Lodged Green Cane by Harvesters. *Proceedings of Australian Society of Sugar Cane Technologists,* **20**: p 224–231.

Norris, CP, **Davis, RJ,** Quick, DJ and Mohammad, Y, 1998, An Alternative Approach to Cane Harvester Design: An Initial Review of the Massey Ferguson 405. *Proceedings of Australian Society of Sugar Cane Technologists,* **20**: p 10-16.

Davis, RJ and Harris, HD, 1995, Measuring the Variation of Soil Mechanical Properties with Treatment and Time in a Compaction Control and Repair experiment. *Proceedings of National Controlled Traffic Conference*, 13 - 14 September, 1995.

Books and Manuals

Watts, PJ, **Davis, RJ,** Keane, OB, Luttrell, MM, Tucker, RW, Stafford, RD and Janke, S, 2016, Beef Cattle Feedlots: Design and Construction Manual, *Meat and Livestock Australia*, Sydney.

Davis, RJ, Watts, PJ, Klepper, K and Hewitt, S, 2005, Managing Emissions from Intensive Livestock Wastes, in Chapter 5 – Greenhouse Best Practice Guide, *Australian Greenhouse Office*, Canberra.

Sandell, GR, Agnew, JR, Stainlay, GT, Whiteing, C, **Davis, RJ**, James, MP and Norris, CP, 2002, The Harvesting Best Practice Manual for Chopper-Extractor Harvesters. *Bureau of Sugar Experiment Stations*, Indooroopilly.

Reports and Thesis

Schmidt, EJ, Giles, R, **Davis, RJ**, Baillie, CP, Jensen, TA, Sandell, GS and Norris CP, 2011, Sustainable Biomass Supply Chain for the Mallee Woody Crop Industry, RIRDC Project No PRJ–005295, Rural Industries Research and Development Corporation, Canberra.

Watts, PJ, **Davis, RJ**, Fairfull, AR, Scobie, MJ, Muller, BD, Barker, SJ and Heinrich, NA, 2011, Estimating Land Surface Diversions: Stage 2. Murray-Darling Basin Authority project MD1015 Final Report.

Tucker RW, Gernjak W, **Davis RJ**, Scobie MJ, Watts PJ, Trigger RZ, Poad GD, O'Keefe MF and Bonner SL 2011, Treatment Technologies for Feedlot Effluent Reuse, B.FLT.0348 Final Report, June 2011, Meat & Livestock Australia, North Sydney

Davis, RJ, Watts, PJ and McGahan, EJ 2010, Quantification of feedlot manure output for BEEF-BAL model upgrade, RIRDC Project No. PRJ-004377, Rural Industries Research and Development Corporation, Canberra.

Tucker, RW, **Davis, RJ**, Scobie, MJ, Watts, PJ, Trigger, RZ, Poad, GD and O'Keefe, MF 2010, Determination of effluent volumes and reliability, effluent characterisation and feedlot water requirements, B.FLT.0348 Milestone Report, Meat & Livestock Australia Ltd, North Sydney.

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Davis, RJ, Wiedemann, SG and Watts, PJ 2008, Quantifying the Water and Energy Usage of Individual Activities within Australian Feedlots- Part B Energy Usage at Australian Feedlots, Meat and Livestock Australia Ltd, Project B.FLT.0339 Final Report, Sydney, NSW.

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Davis, RJ, Norris, CP and Whiteing, C, 2009, A Review of Opportunities to Improve the Performance of Sugarcane Harvesters. *Sugar Research and Development Corporation* project FSA001 Final Report.

Davis, RJ, Norris, CP and Whiteing C, 2009, A Review of Opportunities to Improve the Performance of Sugarcane Harvesters, FSA Consulting Report 6899/1, Toowoomba, Queensland.

Davis, RJ, 2007, Modified Rotary-Pinch Chopper System for Improved Harvesting Efficiency. *Sugar Research and Development Corporation* project HGP003 Final Report.

Davis, RJ, 2007, Stage 3 Report – Modified Rotary-Pinch Chopper System for Improved Harvesting Efficiency. *Sugar Research and Development Corporation* project HGP003 Milestone 4 Report.

Davis, RJ, Bartels, R and Schmidt, EJ, 2007, Precision agriculture technologies – Relevance and application to sugarcane production. *National Centre for Engineering in Agriculture* Publication 1002265/1, Toowoomba, Queensland.

Davis, RJ and Watts, PJ, 2006, Environmental Sustainability assessment of the Australian Feedlot Industry – Part A: Water usage at Australian Feedlots, *Meat and Livestock Australia*, project FLOT.328 Final Report, Sydney, NSW.

Davis, RJ and Watts, PJ, 2006, Environmental Sustainability assessment of the Australian Feedlot Industry – Part B: Energy Usage and Greenhouse Gas Emission Estimation at Australian Feedlots, *Meat and Livestock Australia*, project FLOT.328 Final Report, Sydney, NSW.

Tucker, RW, **Davis, RJ**, Klepper, K, Watts, PJ and McGahan, EJ, 2006, Environmental Sustainability assessment of the Australian Feedlot Industry – Part C: Nutrient Cycling at Australian Feedlots, *Meat and Livestock Australia*, project FLOT.328 Final Report, Sydney, NSW.

Davis, RJ and Watts, PJ, 2006, Environmental Sustainability assessment of the Australian Feedlot Industry – Part D: NPI Listed Substances Emission Estimation, *Meat and Livestock Australia*, project FLOT.328 Final Report, Sydney, NSW.

Davis, RJ, Watts, PJ and Tucker, RW, 2006, Environmental Sustainability assessment of the Australian Feedlot Industry – Part E: Review of Lot Fed Cattle Water Consumption – MRC Project No. DAQ.079, *Meat and Livestock Australia*, project FLOT.328 Final Report, Sydney, NSW.

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Davis, RJ and Heinrich, NA, 2006, Stage One Final Report – Part C. Audit and needs analysis Bungil Shire Council Washdown facility – Injune. *Queensland Murray-Darling Committee* Project WP05.

Davis, RJ and Heinrich, NA, 2006, Stage One Final Report – Part D. Audit and needs analysis Bauhinia Shire Council Washdown facility – Rolleston. *Queensland Murray-Darling Committee* Project WP05.

Davis, RJ and Heinrich, NA, 2006, Stage One Final Report – Part E. Audit and needs analysis Taroom Shire Council Washdown facility – Taroom. *Queensland Murray-Darling Committee* Project WP05.

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Davis, RJ, Robotham, BG, Whiteing, C and Sandell, GR, 2003, Review of Sugarcane Harvesting Practices - Minimising Cane and Juice Losses During Mechanical Cane Harvester Operations and EM in the Cane Supply. *Sugar Research and Development Corporation* project WS006. BSES consultancy report CO04003.

Kingston, G, **Davis, RJ**, Parsons, DP, Chapman, FL, Aitken, RL and Nielsen, PJ, 2002, Sustaining Un-Burnt Production Systems in Cool Wet Environments. *Sugar Research and Development Corporation* project BSS0168 Final Report SD02025.

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Davis, RJ and Norris, CP, 2001, Impact of Chopper Harvesting on the Translation of Field CCS to Factored Realised CCS. *Sugar Research and Development Corporation* project BSS0244 Final Report SD01007.

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Norris, CP, **Davis, RJ** and Hockings, PR, 1999, Improving the Performance of Chopper Systems in Cane Harvesters. *Sugar Research and Development Corporation* project BSS0188 Final Report SD99019.

Davis, RJ and Chapman, FL, 1999, Development of a Trash Rake. *SRDC project* BSS0144 Final report SD99003.

Davis, RJ, 1995, An Investigation of Soil Stresses and Changes in Mechanical Properties When Compacting Clay Soils. *Master of Engineering Thesis*, University of Southern Queensland, Toowoomba.

Davis, RJ, 1992, Development of Digging Machines. *Bachelor of Engineering Thesis*, University of Southern Queensland, Toowoomba.

Watts, PJ, **Davis, RJ** and Smith, RJ, 1992, Evaluation of an Electronic Odour Detection Meter. *Meat Research Council*, Report No DAQ 64/18.

Curriculum Vitae

Mitchell Furness

PERSONAL DETAILS

NAME: Mitchell Furness

ADDRESS: 112 Jonel Park Road
ALLORA QUEENSLAND 4362

MOBILE: 0466 402 177 or 0417 613 996

PRESENT POSITION

Consulting scientist - RDC Engineers Toowoomba QLD.

EDUCATIONAL DETAILS

Bachelor of Applied Science-Rural Technology Honours Class 1
University of Queensland-Gatton Campus
Graduated June 2000

Completed Enrolled Nurse training Stanthorpe Hospital 1988

Completed Year 12 Education Stanthorpe State High School 1986

CAREER SUMMARY

June 2023 – ongoing
RDC Engineers. Mr Rod Davis.

Ad hoc science services to RDC Engineers. Services include project research, project management, legislative interpretation and comment, experienced application of computer modelling of natural systems including excel based models used in intensive livestock, daily time hydraulic and nutrient models such as Medli, and air pollution models such as TAPM. Experience in natural resource assessments including flora and fauna, soils, and waters, agricultural production systems. Extensive experience in regulatory agency bringing and understanding of the opportunities and constraints in the contemporary Federal, State and Local Government regulatory environments.

April 2023 – June 2023
Project Management Officer
Southern Downs Regional Council

Responsible for introduction of project management practices and principals to the development and roll out of major projects within the Southern Downs Regional Council.

September 2013 – January 2023
Manager, Environmental Regulation
Agri-Business Policy and Industry Development
Department of Agriculture and Fisheries

The role of Manager, Environmental Regulation is responsible for the delivery of environmental regulatory services for the intensive livestock industries of feedlotting, pig keeping and poultry farming in Queensland. I lead a team of five environmental scientists who are responsible for the assessment of new and expanding activities and also the compliance of these activities, across the state of Queensland. The role is multidisciplinary and seeks to promote the growth of these industries whilst minimising their environmental impacts. The role is guided by relevant legislation and Departmental policies. The role is dynamic and is centred around delivery of regulatory services whilst managing the development of the regulated industries and the subsequent impacts to the community. The role is both administrative and technical with a thorough understanding of the science that underpins these industries and the impacts that they have on the community. The role is also the most senior in the group to hold legislative delegations and as such is responsible entity for all legislative decision making.
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April 2008 – September 2013
Senior Environmental Scientist and Acting Manager
Intensive Livestock Environmental Regulation Unit
Department of Agriculture, Fisheries and Forestry

<u>In my role as Senior Environmental Scientist with Animal Industries group, I am responsible for and deliver the following activities.</u>

Implementation and delivery of a regulatory reform agenda within the Animal Industries group within DAFF that has resulted in improved outcomes such as lower numbers of complaints about activities, reduced regulatory burden and improved environmental performance by industry generally through adoption of a co-regulatory model for feedlotting. This has seen the adoption of an outcomes based best practice approach to regulatory services provides by DAFF for the intensive animal industries.

Development and implementation of new or existing practices, protocols, standards, and procedures that result in appropriate regulation of intensive animal industries in Queensland.

Preparation of Ministerial correspondence, briefings and memos on matters related to intensive animal industries.

Implementation and delivery of legislative reforms to both the relevant environmental and planning legislation as it applies to these industries.

The administration of environmental authorities for intensive livestock activities within Queensland, through the issuing of new authorities or ensuring compliance with authority conditions.

Leading a team of environmental scientists responsible for Departmental responses to development applications for new or expanding intensive livestock activities in Queensland under relevant state legislation and policies.

Leading a team that is responsible for the resolution of non compliance by operators of intensive livestock developments through offsite monitoring, onsite auditing, encouragement of adoption of best practice through one on one meetings, forums etc, compliance with development approval or environmental authority conditions and or infrastructure on ground. This often involves encouraging producers to adopt new practices and technologies reducing impacts to the environment and community.

Working with the Animal Industries team within DAFF to achieve the State agenda of economic development whilst minimising impacts to the community and environment.

Working with producers to ensure the Queensland State Government's agenda of economic development occurs in a way that Queensland environment values are maintained. This includes supporting the adoption of innovative practices to improve the economic and environmental performance of livestock developments.

Working collaboratively with fellow DAFF officers, other state agencies both local and interstate and consultants to develop environmental assessment policies in relation to odour, hydraulic modelling and sustainable reuse of animal waste products.

Development of a range state and national best practice environmental assessment protocol, policies and guidelines for the regulation of intensive animal development

Consulting with officers from other state and federal agencies including New South Wales, South Australia, Victoria and the Western Australian Department of Agriculture and Food on the development and implementation of environmental policies relating to intensive livestock industries.

July 2001 – April 2008
Environmental Scientist
Intensive Livestock Environmental Regulation Unit
Department of Employment, Economic Development and Innovation

Responsibilities:

Provide expert advice on the impacts of intensive livestock developments in Queensland in terms of predicting environmental impacts to soils, air, waters and the community.

Development of protocol in the modelling of intensive livestock systems with various spreadsheets and computer models such as Medli and Ausplume

Working with the regulated intensive livestock farming community ensuring adoption of accepted regulatory protocol

Enforcing compliance with relevant legislation, policies, and development approval conditions

March 2000 to July 2001
Scientist
Department of Natural Resources and Mines

Establishment of environmental trials investigating soil carbon sequestration in grazing landscapes in south western Queensland.

Enrolled Nurse
March 1987 to December 1995
Various hospitals in Queensland

TRAINING

- Certificate IV in Government Fraud Control – completed November 2001
- Conflict resolution training (QCOSS) – October 2002
- Authorised Officer Training – completed March 2003
- Getting to know groundwater (CGS Groundwater short course) – April 2004
- 4th Australian Groundwater Modelling School (CGS) – November 2005
- Mental Health Awareness Training 2008
- Constructive Team leadership Course February 2009
- Fitzroy Ag Invest Summit 30 June 2010
- Climate Risk Management and Adaptation Project 12 October 2010
- Media Training - Corporate Communications 2010
- Ausplume odour modelling training December 2010

- Ombudsman and Crown Law training 2011 in good decision making
- ChemCert Training completed 2016
- Authorised Officer Training EP Act 1994 2017
- Good Decisions Training Queensland Ombudsman 2019
- Complaints management training Queensland Ombudsman 2020
- Authorised Officer Training Public Health Act 2005 2021
- CPR refresher training 2021
- Domestic and family violence training, Queensland Government 2021

REFEREES

1. **Mr Rod Davis**
   RDC Engineers
   Telephone: 0427 629 203

2. **Mr Luke Boucher**
   Department of Agriculture and Fisheries
   Telephone: 0407 582 369

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PO Box 525
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T 0401 751 796
tom@birdwingeco.com.au
www.birdwingeco.com.au
ABN 30 094 663 358

Dr Tom Pollard
Ecologist

Tom is a botanist and ecologist with 13 years of consulting experience working on projects relating to ecological assessment and management. His interests are in plant ecology, threatened species management and biogeography. Tom has had substantial working experience in ecological assessment and providing technical advice and reporting for a range of clients in the private and public sectors.

Since completing his PhD studies in rainforest ecology, Tom has worked as an ecologist for State government, not-for-profit and private organisations and for the last nine years Tom has operated his own small ecological consultancy.

Tom's work experience has included a mix of hands on vegetation management and restoration roles and ecological consulting, with a focus on botany and threatened plants, environmental impact assessment, and implementing the BioBanking and BAM methodologies for determining offset requirements.

Qualifications

PhD (Vegetation Ecology), University of Tasmania, 2006

Bachelor of Science (Hons 1 - Rainforest Ecology), University of Queensland, 2000

Bachelor of Science (Botany), University of Queensland, 1999

Professional memberships & associations

Member, Ecological Consultants Association of NSW Member, Ecological Society of Australia

Member, Ecological Society of Australia

Licenses and accreditations

Accredited Biodiversity Assessment Method (BAM) Assessor (accreditation number BAAS18071) (expiry 4th April 2022)

NSW driver's license

Apply first aid

Advanced 4WD Course (NSW)

Key areas of experience include:

- Ecological surveys
- Environmental impact assessment
- Offsetting (BAM implementation)
- Reporting (Ecological Assessments, BDARs, REFs, Management Plans)
- GIS mapping and analysis

Botanical survey experience

Tom has over 20 years' experience undertaking ecological surveys, with a particular focus on flora.

During his PhD studies on Tasmanian dry closed forest Tom surveyed extensively across the eastern half of Tasmania, collecting data on floristics and environmental relationships.

Following this, Tom worked for Greening Australia in Victoria and Queensland, where he undertook vegetation assessments (including using the Vegetation Quality Assessment (VQA) methodology) and developed revegetation plans for wind farm and road construction projects.

In his role as a consulting ecologist with GeoLINK and Birdwing Ecological Services, Tom has undertaken many impact assessment projects requiring a variety of different survey approaches including: vegetation mapping, random meander surveys and parallel transects for threatened flora, quadrat-based floristic surveys, fauna habitat assessment and targeted fauna surveys. Tom has extensive experience in undertaking botanical surveys using both the BioBanking methodology and the BAM. Assessments have been undertaken primarily in the North Coast, Northern Tablelands, North Western Slopes and North Western Plains regions of NSW.

Recent relevant projects

Date	Project	Client/ proponent	Role	Project description and outcome
2024	Biodiversity Development Assessment Report (BDAR) - "Ridge Views" subdivision, South West Rocks	Proficient Constructions (Aust) Pty Ltd	Ecologist/Project manager	BDAR prepared for proposed residential subdivision. BAM assessment was undertaken including targeted threatened flora and fauna surveys.
2024	Biodiversity Development Assessment Report (BDAR) – Jacks Creek Road, Narrabri	Hatton Group Properties Pty Ltd	Ecologist/Project manager	BDAR prepared for proposed rural subdivision. BAM assessment was undertaken including targeted threatened flora and fauna surveys.
2024	Private Native Forestry ecological assessment - Main Creek Road, Main Creek	Nick Cameron – Northeast NSW Forestry Hub	Ecologist/Project manager	Ecological assessment prepared for proposed Private Native Forestry (PNF) as part of DA submission to Dungog Shire Council. Fieldwork involved PCT mapping, targeted threatened species surveys, and BAM floristic plots. The ecological assessment report included tests of significance for potential impacts of the PNF on threatened species.
2024	Biodiversity Development Assessment Report (BDAR) – Uralla satellite tracking facility	Lockheed Martin Australia	Project manager, field assessments and reporting	BDAR prepared for proposed satellite tracking antenna. BAM assessment was undertaken including targeted threatened flora and fauna surveys.
2023	Tenterfield Youth Precinct - Review of Environmental Factors	Tenterfield Shire Council	Field assessments and reporting	Review of Environmental Factors (REF) prepared to inform the design and construction of Stage 1 of the Tenterfield Youth Precinct & Mountain Bike Trailhead project at Tenterfield.
2022	Biodiversity Stewardship Agreement business case 'Sly Property'	National Parks and Wildlife Service (subconsultant to Ascent Ecology)	Field Botanist	Ascent Ecology undertook a comprehensive preliminary site assessment, including preparation of a biodiversity assessment report and recommended management actions for the National Parks and Wildlife Service North Coast Branch. This assessment verified vegetation communities in the site using a method based on BAM survey plots to prepare a preliminary estimate of the biodiversity credits that may be able to be generated on proposed BSA site as well as prepare an estimate of the costs associated with implementation of the management action for the site.

Date	Project	Client/ proponent	Role	Project description and outcome
2021 to date	Preliminary site assessments for proposed Biodiversity Stewardship Agreements	Australian Rail Track Corporation (subconsultant to Ascent Ecology)	Field Botanist	Tom has undertaken a range of preliminary site assessments for BSA applications for the Inland Rail project, providing Field Botanist services to Ascent Ecology. The aim of these assessments is to verify vegetation communities using a method based on BAM survey plots and rapid data points and to prepare a preliminary estimate of the biodiversity credits that may be able to be generated on proposed BSA sites.

Work history and experience

Date	Project	Client	Project Position	Role
Private Consulting				
2015-2024	Ecological assessments	Various – local and state government, surveying and engineering firms, other ecological consultancies	Ecologist/Owner Birdwing Ecological Services, Tenterfield NSW	• BioBanking and BAM assessment • Flora and fauna surveys • Threatened species survey and monitoring • Reporting (Ecological Assessments, REFs, Threatened Species Management Plans, BioBanking reports, BDARs) • Vegetation mapping and GIS • Environmental impact assessment • Provide ecological assessment of DAs/planning proposals for Lismore City Council
2011-2015	Ecological assessments	Various – local government, state government departments, RMS, private companies, individuals.	Ecologist GeoLINK, Lennox Head NSW	• Conducting flora surveys and threatened species surveys • Vegetation mapping and GIS (ArcView and QGIS) • Preparing ecological reports • Providing specialist ecologist advice across a variety of projects, private and public sector, to identify environmental constraints and opportunities • Providing environmental input into large scale development and infrastructure projects • Managing and leading multi-disciplinary teams and projects including contract negotiation, financial budgeting, work and resource planning

Government				
2011	Vegetation consultant providing expert flora survey and vegetation management advice and services	Queensland Department of Transport and Main Roads	Greening Australia Queensland, Extension Officer	• Conducting flora surveys for road upgrade projects, with a focus on rare and threatened flora species • Preparation of native revegetation and landscaping plans to mitigate native vegetation clearing associated with road upgrade projects • Mapping vegetation types according to Qld Regional Ecosystem vegetation types • Production of high-quality flora survey reports, vegetation rehabilitation and revegetation/ landscaping plans • Preparation of maps using MapInfo GIS software
Natural Resources				
2006 - 2009	Environmental restoration work plans for Macquarie Forestry Investment properties, Vegetation offset planning for wind-farm developments, Monitoring of roadside revegetation plantings.	Macquarie Bank. Pacific Hydro. Private landholders.	Project Ecologist Greening Australia Victoria	• Conducting surveys of vegetation communities (EVCs) and plant species (including threatened species surveys) • Assessing the quality of native vegetation using the "Habitat Hectares" methodology • Producing high quality reports and vegetation management plans detailing protection, enhancement and restoration options • Produce maps in ArcGIS and MapInfo detailing vegetation communities and defining environmental management zones • Designing/implementing monitoring for vegetation restoration
2009 - 2010	National Reserve System prioritisation Increasing connectivity of Box Gum Woodland EEC (with Armidale Tree Group)	Northern Rivers Catchment Management Authority	Project Officer Southern New England Landcare	• Liaising with project partners such as State and Federal Government departments, Universities and various local stakeholders on the content and outcomes of the project • Speaking on the project and biodiversity issues at regional Natural Resource Management workshops • Preparing a strategy report detailing the project approach, outcomes and suggested improvements for future projects on the New England Tablelands • Prepare Landholder Management Agreements and undertake site audits

Tony Sonter – archaeologist and cultural heritage advisor.

I am an archaeologist of indigenous Australian Darkinyung heritage being a direct descendent, on my mothers side, of Elizabeth Smith (1799-1846) who was the daughter of 2nd Fleet convict Joseph Smith and his Aboriginal wife from the Macdonald / Hawkesbury river area.

I began working as a professional archaeologist in 2009 registering as such through the trading name of "Artefact and Aspect".

<u>Qualifications.</u>

Academic qualifications for the undertaking of archaeological investigations in Australia is outlined in the document "By Degrees – Benchmarking Archaeology Degrees in Australian Universities – April 2008", which focuses on the benchmarks that all Honors students should meet.

- Bachelor of Arts – (U.N.E. Armidale – 1984) Major in Physical Geography.
- Postgraduate Diploma in Social Science – (U.N.E. Armidale – 1986) Major in Prehistoric / Australian archaeology.
- Master of Letters (Honors equivalent U.N.E. Armidale – 1990) Coursework and dissertation "Aboriginal Art on the North West Slopes of New South Wales".
- Unspecified units of study - Australian Aboriginal History (155; 253 and 254 – U.N.E. Armidale 1991 / 1992)
- Graduate Certificate of Education (Edith Cowan University – Gwelup W.A. – 2003) Major in Vocational Education.
- Heritage Advisor Training (Heritage Council of New South Wales Heritage Branch, Department of Planning – 2010) Major in historical / industrial archaeology.

The above qualifications comply with the "Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales" (Part 6 *National Parks and Wildlife Act 1974*) where to undertake archaeological investigations "an appropriately skilled and experienced person has a minimum of a bachelor's degree with honors in archaeology" (September, 2010. p. 4)

<u>Areas of expertise and recent experience.</u>

In general I have undertaken archaeological investigations across a range of legislative requirements as outlined in the "Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW" (April 2011).

Recent investigations include but are not limited to:

- Due Diligence as an initial investigation procedure.
- Aboriginal Cultural Heritage Assessment Reports (ACHAR)/ Aboriginal Cultural Heritage Impact Permits (AHIP) as necessary following on from Due Diligence which indicated the likely or actual occurrence of items of Aboriginal cultural heritage.

- Negotiated with Registered Aboriginal Parties (RAP's) regarding care and repositioning of salvaged artefacts as outlined by NSW legislation.
- Historical Cultural Heritage Assessment and Management Plans.

Previous consultations have included projects with various Shire Councils including: Inverell, Walcha, Uralla, Gwydir, Bourke, Central West and with Local Inverell Aboriginal Land Councils (LALC) where I have variously held positions of preferred archaeological consultant. In addition I have undertaken numerous consultations for State Government agencies, private individuals, agricultural and mining companies.
A full list of past consultations can be made available on request on the understanding of "commercial in confidence".

Memorandum of Understanding – Aboriginal Land Councils.
Working across the New England / North-West area of NSW over the past 15 years has seen me enter into several Memorandums of Understanding (MOU) with local Aboriginal LALC's. There MOU's have resulted in a direct and ongoing link with local communities in regards to providing a service for Cultural Heritage assessment.

These MOU's have largely existed through the enthusiasm of specific CEO's who have negotiated them over specific projects and time periods

Educational workshops.
The development of workshops and presentations focusing on addressing client specific needs in regards to Cultural Heritage Awareness include a "sites and stone" tool making interpretation practical which have been presented to a range of audiences including:

Northern Tablelands Local Land Services (LLS) - Inverell
North West LLS – Moree
Central West LLS – Dubbo
ANAIWAN Local Aboriginal Land Council (LALC) – Tingha

Additionally I have contract taught sections of AHC32516 - Certificate III in Aboriginal Sites Work through the NSW Tafe system.

In the past I have also acted as a local resource person for both the University of New England Archaeology (UNE) faculty and the Australian Rock Art Research Association (AURA) providing insight into local archaeology.

Publications and Awards.
2009. Innovative Business Partnership Award – Border Rivers Gwydir Catchment Authority (BR-G CMA)
2011. Royal Australian Historical Society research award that resulted in the publication of "Dendroglyphs: Aboriginal Carved Trees of the New England Tableland and North-West Slopes of NSW"
2012. Co-author (contract) with Harry White: "Sticks and Stones" (A guide to stone artefacts, wooden tools, weapons and implements used and traded by the Aboriginal people within the Border Rivers and Gwydir Catchments)
2013-2014. Co-authored and edited education publications for Local Land Services (L.L.S. – previously Catchment Management Authority C.M.A.) "Looking After our Aboriginal Heritage".

Levels of Work Undertaken.
Within the cultural heritage legislative frameworks there are obvious degrees of investigation and reporting that are expected and necessary.
Some recent projects reflecting different levels of investigation being undertaken have been:

- Complete regional cultural heritage mapping projects
- Due Diligence reports – largely in support of Local Council Development Applications – Gwydir, Inverell, Mudgee, Uralla, Walcha have all recently had heritage work completed.
- Aboriginal Cultural Heritage Assessments following on from Due Diligence reports as necessary.
- Aboriginal Heritage Impact Permits (AHIP) for the disturbance of cultural heritage material and associated Aboriginal Site Impact Reporting (ASIR) – as necessary following Due Diligence and ACHAR investigations.
- Aboriginal Heritage Information Management System (AHIMS) recording of new sites as revealed during ACHAR investigations.
- Environmental Impact Statement (EIS) – submitted to Shire Councils as appropriate regarding development applications.
- Secretary's Environmental Assessment Requirements (SEAR) for State Significant Infrastructure project regarding infrastructure development.
- Third Party Review of previous ACH Assessment on behalf of several Shire Councils
- Mine Operations Plan (MOP) - NSW Resources and Energy (Division of Trade and Investment)
- Consultative advice to Road and Traffic Authority (NSW) regarding bridge replacement, road widening of major infrastructure projects.

Projects have been undertaken and reports completed from local property surveys to studies of State Significance.

Statement.

I have worked extensively in both the fields of Aboriginal Cultural Heritage (ACH) and European cultural heritage with a range of employers and on contract. I believe in following the procedures as defined by NSW legislation and respecting any evolving Community of Practice regarding these procedures.
I readily appreciate that Aboriginal Cultural Heritage practices exist in an evolving environment and have been an active participant in the 2023 Aboriginal Affairs (NSW) program developing a "Ladder of ACH Good Practice" which is designed to create a better outcome for ACH planning.

Tony Sonter
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Appendix E

Certificate of Title

Provided by CITEC Confirm

NEW SOUTH WALES LAND REGISTRY SERVICES - TITLE SEARCH

FOLIO: 1/1212915

SEARCH DATE	TIME	EDITION NO	DATE
4/10/2020	11:13 AM	3	6/1/2020

NO CERTIFICATE OF TITLE HAS ISSUED FOR THE CURRENT EDITION OF THIS FOLIO.
CONTROL OF THE RIGHT TO DEAL IS HELD BY COMMONWEALTH BANK OF AUSTRALIA.

LAND

LOT 1 IN DEPOSITED PLAN 1212915
AT NORTH STAR
LOCAL GOVERNMENT AREA GWYDIR
PARISH OF STAPYLTON   COUNTY OF STAPYLTON
TITLE DIAGRAM DP1212915

FIRST SCHEDULE

JENNIFER SUSAN DOOLIN (TX AK127950)

SECOND SCHEDULE (4 NOTIFICATIONS)

1 LAND EXCLUDES MINERALS (S.171 CROWN LANDS ACT 1989)
2 LIMITED TITLE. LIMITATION PURSUANT TO SECTION 28T(4) OF THE REAL PROPERTY ACT, 1900. THE BOUNDARIES OF THE LAND COMPRISED HEREIN HAVE NOT BEEN INVESTIGATED BY THE REGISTRAR GENERAL.
3 DP1237694 EASEMENT FOR OVERHEAD POWER LINE(S) 20 METRE(S) WIDE AFFECTING THE PART(S) SHOWN SO BURDENED IN DP1237694
4 AP811203 MORTGAGE TO COMMONWEALTH BANK OF AUSTRALIA

NOTATIONS

UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

Springfield PRINTED ON 4/10/2020

Provided on 04/10/2020 10:14 AM by CITEC Confirm

* Any entries preceded by an asterisk do not appear on the current edition of the Certificate of Title. Warning: the information appearing under notations has not been formally recorded in the Register.

CITEC Confirm hereby certifies that the information contained in this document has been provided electronically by the Registrar General in accordance with section 96B(2) of the Real Property Act, 1900.

Information contained in this document is provided by CITEC Confirm, ABN 52 566 829 700, confirm.com.au, an approved NSW Information Broker.

LAND REGISTRY SERVICES

Provided by CITEC Confirm

NEW SOUTH WALES LAND REGISTRY SERVICES - TITLE SEARCH

FOLIO: 8/756018

SEARCH DATE	TIME	EDITION NO	DATE
4/10/2020	11:10 AM	2	29/11/2017

NO CERTIFICATE OF TITLE HAS ISSUED FOR THE CURRENT EDITION OF THIS FOLIO.
CONTROL OF THE RIGHT TO DEAL IS HELD BY COMMONWEALTH BANK OF AUSTRALIA.

LAND

LOT 8 IN DEPOSITED PLAN 756018
LOCAL GOVERNMENT AREA GWYDIR
PARISH OF STAPYLTON COUNTY OF STAPYLTON
(FORMERLY KNOWN AS PORTION 8)
TITLE DIAGRAM CROWN PLAN 1456.1857

FIRST SCHEDULE

JENNIFER SUSAN DOOLIN (T R820294)

SECOND SCHEDULE (4 NOTIFICATIONS)

1 LAND EXCLUDES MINERALS AND IS SUBJECT TO RESERVATIONS AND CONDITIONS IN FAVOUR OF THE CROWN - SEE CROWN GRANT(S)
2 LAND EXCLUDES THE ROAD(S) SHOWN IN THE TITLE DIAGRAM 40.235 METRES WIDE
3 R820295 MORTGAGE TO COMMONWEALTH BANK OF AUSTRALIA
4 DP1237694 EASEMENT FOR OVERHEAD POWER LINE(S) 20 METRE(S) WIDE AFFECTING THE PART(S) SHOWN SO BURDENED IN DP1237694

NOTATIONS

UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

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Appendix F

Foundation and Clay lining of feedlot pens, pads and drainage system

Appendix C. – Clay lining of feedlot pens, pads and drainage system

Preamble

Runoff from the feedlot pad contains organic and mineralised manure constituents that could pose a significant ecological hazard if they were released, uncontrolled, into the environment.

If a groundwater assessment indicates a high potential for contamination of underground water resources because of leaching of nutrients through permeable, underlying soil or rock strata, an impermeable barrier will be needed between the contaminant and the groundwater. This is required if the permeability of underlying soil/rock strata exceeds 0.1mm/day (3.5 cm/year).

This impermeable barrier is generally created using a liner made of compacted clay or other suitable compactable soil materials. Where these materials are not available, a synthetic liner (polymembrane) may be used. Synthetic liners tend to be expensive, require specialist installation and are hard to protect from damage by cattle and cleaning equipment. Clay liners tend to be the most common form employed in feedlot construction, and the following section outlines the characteristics of suitable clay lining material.

Design standard

- Clay liners should have a maximum permeability of 1×10^{-9} m/s (0.1mm/day) for distilled water with 1 m of pressure head.
- Clay liners must be of sufficient depth so that the integrity of the structure is maintained throughout the general working of the feedlot.

Clay liners

Clay liners are commonly used in industry for a range of contaminants including liquid effluent.

For a given soil, permeability is related to soil particle composition, moisture content and level of compaction; and there are limits to the permeability that can be achieved at any level of compaction. *In-situ* and laboratory measurement of permeability is difficult, and relatively inaccurate. Also, some soil types, because of their physical and chemical properties, are impermeable *in-situ*, but fail to meet the design standard when measured in the laboratory.

For these reasons, rather than relying on permeability standards, this section provides guidance on specifications for materials and construction methods to be used for clay lining.

The specifications in Table C.1 provide guidance on the selection of the correct materials for use in the liner. Soils may need to be mixed or engineered to produce a material that meets the specifications.

Table C.1 Specifications for clay liner materials

Soil characteristic	Acceptability criterion	Test method
Percentage fines	More than 25% passing 75 μm sieve More than 15% passing 2 μm sieve	AS 1289 3.6
Liquid Limit	Less than 70	AS 1289 3.1.2
Plasticity Index	More than 15	AS 1289 3.3.1
Emerson class number	5 to 6	AS 1289 3.8.1

Areas to be clay lined within the controlled drainage area include:

- effluent catch drain
- sedimentation system
- holding ponds
- manure stockpile and composting pad
- any area where contaminants are stored or handled.

Because of the formation of a low permeability soil-manure interface layer, clay lining is not generally required on the feedlot pen and yard areas.

Trafficability of clay lined materials

The liner should be trafficable for cattle and equipment. To ensure that the integrity of the liner is maintained, the depth of the liner should be sufficient to ensure that equipment does not damage it during harvesting of manure. The minimum depth recommended for the clay liner is 300 mm after compaction. Periodic repair of the liner will be necessary due to the wear and tear associated with cattle traffic and normal cleaning operations.

The mechanical strength of liners can be tested using the Californian Bearing Ratio (CBR) test, which was developed for measuring the load-bearing capacity of soils used for building roads. The test is performed by measuring the pressure required to penetrate a soil sample with a plunger of standard area in both the saturated and dry conditions at a specified compaction. The minimum standard for CBR wet and dry is 20%.

Particular attention should be applied to the load-bearing capability of areas where cleaning or harvesting of dry waste is undertaken, including:

- feedlot pens
- effluent catch drain
- sedimentation system
- manure stockpile and composting pad.

Construction

All areas to be clay lined should be cleared and grubbed, stripped of top soil and prepared to the required levels and gradients by cutting and filling. The surface of the excavated area should also be tined before the clay material is placed to produce a satisfactory bonding surface.

The clay lining material should be placed in layers of 150 mm (±50 mm). Each layer should be tined, wetted to ±2% of optimum moisture content (AS 1289 5.1.1) and compacted to the required compaction (relative to the maximum dry density, AS 1289 5.4.2) that is needed to achieve the required permeability of 1mm/day.

APPENDIX E
STANDARD SPECIFICATION

CATTLE FEEDLOTS

QUEENSLAND GOVERNMENT

DPI QUEENSLAND DEPARTMENT OF PRIMARY INDUSTRIES

CLAY LINING OF DRAINS, SEDIMENTATION SYSTEMS, HOLDING PONDS AND MANURE STOCKPILE AREAS

Alan Skerman, Senior Environmental Engineer, Intensive Livestock Environmental Management Services

INTRODUCTION

This standard specification is intended to provide guidance and technical direction to licensees, contractors, consultants and project managers involved in the construction of cattle feedlots at sites where groundwater impact assessments have indicated a high potential for contamination of underground and/or surface water resources, because of leaching of nutrients through permeable, underlying soil or rock strata. It outlines this Department's recommended practices for the clay lining of drains, sedimentation systems, holding ponds and manure stockpile areas and provides a set of enforceable, quantitative standards to ensure that consistency is achieved throughout the industry.

This specification is based on established engineering principles and operational experience gained by the industry over several years. However, it may be revised from time to time as new methods are developed and/or as experience dictates. Proposals involving alternative materials and/or construction methods may be submitted to the administering authority for consideration.

1. PERMEABILITY STANDARD

If a groundwater impact assessment indicates a high potential for contamination of underground and/or surface water resources, because of the leaching of nutrients through permeable, underlying soil/rock strata, clay lining of the feedlot complex should be undertaken in accordance with this specification. For the purpose of this specification, it is considered that there is a significant risk of nutrient leaching if the permeability of underlying soil/rock strata exceeds 0.1 mm/day (37 mm/year).

Because in-situ and laboratory measurement of permeability is difficult and relatively inaccurate, rather than relying on permeability standards, this document provides proven standards for materials and methods used for clay lining. By applying these standards, the required permeability should be achieved consistently.

2. AREAS TO BE CLAY LINED

Unless the underlying soil type and geology changes significantly across the feedlot site, each of the following areas of the feedlot complex should be clay lined:

- internal catch drain(s),
- sedimentation system(s),
- holding pond(s) and
- manure stockpile area(s)

Because of the formation of a low permeability soil–manure interface layer, clay lining is not generally required on the pen and yard areas, unless directed by the administering authority.

3. CLAY LINING SURFACE PREPARATION

All surfaces to be clay lined shall be cleared and grubbed, stripped of topsoil and prepared to the required levels and gradients by cutting and filling, as required. This will involve over-excavation (excavation below the design level indicated on the plans) to accommodate the required thickness of clay lining while ensuring that the final design gradients, levels and dimensions are achieved, in accordance with the plans approved by the administering authority.

To produce a satisfactory bonding surface for the placement of subsequent layers, the following operations should be carried out on all areas to be clay lined:

(i) scarifying or ripping with a tined implement, to a minimum depth of 150 mm,
(ii) watering to produce the correct moisture content, as specified in Clause 6,
(iii) compaction in accordance with Clause 7.

4. CLAY LINING MATERIAL

Soils shall be considered suitable for use as clay lining materials, subject to compliance with the following requirements:

The material shall be classified as either CL, CI, CH, SC or GC in accordance with the soil classification system described in Appendix A of AS 1726. Furthermore, it shall conform with the following particle size distribution and plasticity limits:

(i) Particle Size Distribution:

AS Metric Sieve Size (mm)	**Percentage Passing** (by dry weight)
75	100
19	70 – 100
2.36	40 – 100
0.075	25 – 90

(ii) Plasticity Limits on fines fraction, passing 0.425 mm sieve:

Liquid Limit W_L	30 – 60 %
Plasticity Index I_p	> 10 %

Note for explanatory purposes: *The material classification symbols CL, CI, CH, SC* and *GC represent clays having low, intermediate and high plasticity, clayey sands and clayey gravels respectively.*

If materials complying with the above plasticity limits are not readily available, clays having liquid limits between 60% and 80% may be used as lining material, provided that the clay lining layer is covered with a layer of compacted gravel (or other approved material), having a minimum thickness of 100 mm, to prevent the clay lining from drying out and cracking.

Topsoil, soils incorporating tree roots or organic matter and any other material which does not compact properly, must not be placed in any of the areas to be clay lined. Wherever non-dispersive materials are available, they are to be used in preference to materials shown to be dispersive using the Emerson test, as described in Method 8.1 of AS 1289.

5. MATERIAL SUITABILITY AND IDENTIFICATION

The visual identification methods described in AS 1726 may be used by suitably qualified and experienced persons, for classifying soils in the field. However, if there is doubt about the suitability of the material, the administering authority may direct the licensee to arrange for laboratory testing, in accordance with the appropriate sections of AS 1289. All such laboratory testing must be carried out by a soils laboratory, accredited by the National Association of Testing Authorities (NATA).

6. CLAY LINING THICKNESS

The minimum required thickness of clay lining depends on the maximum head of effluent in contact with the clay lining and the duration of that contact. The following table outlines minimum lining thicknesses (after compaction), for the different areas of the feedlot, for two maximum head conditions.

Area of Feedlot	Maximum Head Over Clay Lining (m)	Minimum Clay Lining Thickness (mm)
Internal Catch Drains Sedimentation Systems Holding Ponds Manure Stockpile Areas	< 2 m	300
Sedimentation Systems Holding Ponds	> 2 m	450

7. PLACEMENT OF MATERIAL

Clay lining material complying with Clause 4, shall be placed at the correct moisture content as defined in Clause 8, on surfaces prepared in accordance with Clause 3, in progressive, uniform, horizontal layers, not exceeding 200 mm in thickness, prior to compaction.

8. CORRECT MOISTURE CONTENT

Prior to compaction, all material used for lining purposes shall be conditioned to have a moisture content within the range of two (2) percent wet to two (2) percent dry of the optimum moisture content required to produce the maximum dry density when compacted in accordance with Method 5.1.1 of AS 1289.

Note for explanatory purposes: *This moisture content is consistent with the requirements for compaction using a sheepsfoot roller to produce maximum impermeability. As a guide, the required moisture content is as wet as can be rolled without clogging a sheepsfoot roller. A preliminary assessment of the required moisture content can be made by rolling a sample of the material between the hands. If it can be rolled to pencil thickness without breaking, it should be satisfactory.*

9. COMPACTION

Each layer of material placed in accordance with Clause 7, shall be compacted to produce **either** a field dry density of at least 95% of the standard maximum laboratory dry density determined in accordance with Method 5.4.1 of AS 1289, **or alternatively**, a Hilf density ratio of at least 95% when tested in accordance with Method 5.7.1 of AS 1289.

Note for explanatory purposes: *This degree of compaction may generally be achieved by rolling each layer of material, placed at the correct moisture content, with at least eight (8) passes of a sheepsfoot roller of the configuration described in Clause 10 below. As a guide, compaction will generally be sufficient when there is a clearance of 100 mm between the drum of the roller and the compacted material.*

10. SHEEPSFOOT ROLLER

The following specifications describe a sheepsfoot roller which is suitable for fulfilling the compaction requirements described in Clause 9:

(i) The diameter of the drum(s) shall be not less than 1m.
(ii) The length of each drum(s) shall be approximately 1.2 times the drum diameter.
(iii) The feet shall extend approximately 175mm radially from the drum and be of the taper-foot type, with a cross-sectional area close to the outer end of not less than 3200mm^2 and not more than 4500mm^2.
(iv) The number of feet shall be such that their total area close to the outer ends shall be between 5% and approximately 8% of the area of the cylinder which would enclose all the feet, *i.e.* a cylinder having a diameter equal to the diameter of the drum plus twice the length of each foot.
(v) The weight of the roller ballasted, shall be such that the bearing pressure thus obtained shall be not less than 1750 kilopascals, in accordance with the following formula:

$$\text{Bearing Pressure (kPa)} = \frac{\text{Mass (kg)} \times 9.81 \times 1000}{\text{Area of contact of one row of feet (mm}^2\text{)}}$$

Rollers of other types and configurations may be used provided that the required compaction is achieved in accordance with Clause 9.

11. TEST FOR ADEQUATE COMPACTION

The administering authority may direct the licensee to arrange for compaction testing, in accordance with the methods referred to in Clause 9 of this specification, to be carried out on appropriate sections of the works area. Compaction testing is to be performed by suitably qualified and experienced personnel, employed by a soils laboratory accredited by the National Association of Testing Authorities (NATA) for the specified testing method.

Failure of the test results to comply with the compaction requirements described in Clause 9 will result in the licensee being prohibited from stocking the feedlot until appropriate remedial measures are implemented, as directed by the administering authority.

12. EXEMPTION FROM CLAY LINING REQUIREMENTS

The administering authority may exempt a licensee from the requirement to clay line cattle feedlot facilities if the licensee can submit certified test results confirming that the permeability of soils underlying nominated areas of the feedlot does not exceed 0.1 mm/day.

Permeability testing is to be carried in accordance with the methods specified in either Part 6 of BS 1377 (Triaxial Permeability) or Section F7.1 of AS 1289. The test results shall be submitted to the administering authority, following certification by a National Association of Testing Authorities (NATA) accredited soils laboratory.

13. FINAL TRIMMING

Following the completion of compaction, final trimming of all clay lined areas shall be carried out to produce a smooth, uniform surface, in accordance with the design gradients, levels and dimensions shown on the plans, as previously approved by the administering authority.

14. SYNTHETIC LINERS

A licensee may submit to the administering authority, alternate material and installation specifications relating to the use of synthetic lining materials, in lieu of clay lining. Approval of synthetic lining proposals will be subject to assessment by the administering authority.

15. INDEMNITY

The Department of Primary Industries and Officers of that Department shall not be responsible for any costs incurred by either the licensee or his/her contractor, in carrying out any works, as directed by the administering authority, for the purpose of rectifying design and/or construction faults or omissions.

Appendix G

Odour Impact Assessment

Proposed Intensive livestock agriculture development (Expansion of beef cattle feedlot from 999 head to 3,000 head) on the property "Springfield"

Separation distance assessment to sensitive receivers

"Springfield"
2513 Getta Getta Road
North Star NSW 2408

Doolin Farming Pty Ltd
"Glenhoma"
3202 Getta Getta Road
NORTH STAR NSW 2408

[February 2025]

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DOCUMENT INFORMATION RECORD

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Version	Issue date	Reason for issue	Author	Reviewed by	Approved by
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V1R2	21/02/2025	Final for lodgement to GSC	Rod Davis	Rod Davis	Rod Davis

Distribution

Version	Recipient	Lodgement	Copies
V1R1	Doolin Farming Pty Ltd	Electronic	-
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Disclaimer

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Executive Summary

Doolin Farming Pty Ltd own and operate a 10,000 ha mixed farming operation across several properties at North Star including “Glenhoma”, “Glenmodel”, “Springfield”, “Myall Downs” and “Yetman West” some 27 km east of Yetman and 45 km south-southeast of Goondiwindi (QLD) in NSW.

Doolin Farming Pty Ltd primarily engage in dryland and irrigated cropping and beef production. Doolin Farming Pty Ltd produces wheat, barley, oats and chickpeas in winter and cotton and maize in summer under pivot irrigation systems and dryland sorghum cropping.

Central to the beef production enterprise is the breeding, growing and lot feeding of cattle for the domestic market. Currently the beef supply chain includes breeding and growing of beef cattle and lot feeding of cattle within a feedlot on the property ‘Springfield”.

“Springfield” comprises some 1,713 ha (~4,231 acres) and currently, a dryland and irrigated cropping business is undertaken on a large proportion of the property with extensive cattle breeding and grazing and lot feeding of cattle.

Springfield Feedlot is approved as a 999 head feedlot and does not require an environmental licence from NSW EPA. Springfield Feedlot is accredited under the National Feedlot Accreditation Scheme (NFAS) with audits conducted annually.

Springfield Feedlot currently operates for 12 months of the year and employs approximately 2 full time staff. Casual staff and contractors are engaged as required during busy periods such as planting and harvesting of silage and fodder and to supply various associated services such as plant maintenance and veterinary requirements.

Doolin Farming Pty Ltd wish to expand Springfield Feedlot from the current approved capacity of 999 head by gaining development approval for intensive livestock agriculture to operate as a 3,000 head beef cattle feedlot on the site. The proposed development is to be developed in two stages with the first stage having a capacity of 1,251 head. The second stage will provide an additional 750 head, bringing the capacity of Springfield Feedlot to 3,000 head.

The proposed development will include additional pens within an expanded controlled drainage area, additional sedimentation basin and holding pond capacity. The proposed development will incorporate best practice design, construction and environmental management.

Existing infrastructure such as the grain storage and processing and cattle handling facilities have sufficient capacity to cater for the demands of the proposed development.

The property “Springfield” is within the Gwydir Shire Council local government area and relevant environmental planning instrument is the *Gwydir Local Environmental Plan 2013* (GLEP).

Beef cattle feedlots which exceed 1,000 head capacity are defined as designated development under Schedule 3 (Part 1 section 21a) of the Environmental Planning and Assessment

Regulation 2000 and therefore require a full Environmental Impact Statement (EIS) to accompany the development application.

This report forms part of the EIS prepared to support the Development Application to the Gwydir Shire Council for the proposed development and provides a separation distance assessment from sensitive receivers in accordance with methodology outlined in The National Guidelines for Beef Cattle Feedlots in Australia (3rd Edition) (MLA, 2012).

The separation distance assessment using the s-factor methodology demonstrates that sufficient separation exists between the proposed development with a capacity of 3,000 head and sensitive receptors.

1 Background

1.1 Introduction

Doolin Farming Pty Ltd own and operate a 10,000 ha mixed farming operation across several properties at North Star including “Glenhoma”, “Glenmodel”, “Springfield”, “Myall Downs” and “Yetman West” some 27 km east of Yetman and 45 km south-southeast of Goondiwindi (QLD) in NSW.

Doolin Farming Pty Ltd primarily engage in dryland and irrigated cropping and beef production. Doolin Farming Pty Ltd produces wheat, barley, oats and chickpeas in winter and cotton and maize in summer under pivot irrigation systems and dryland sorghum cropping. Doolin Farming Pty Ltd also have onsite storage to accommodate almost the entire grain produced and operate a fleet of trucks to transport their grain.

Central to the beef production enterprise is the breeding, growing and lot-feeding of cattle for the domestic market. Currently the beef supply chain includes breeding and growing of beef cattle on land less suitable for dryland and irrigated cropping and grazing of stubble and lot feeding of cattle within a feedlot on the property ‘Springfield”.

“Springfield” comprises some 1,713 ha (~4,231 acres) and currently, a dryland and irrigated cropping business is undertaken on a large proportion of the property with extensive cattle breeding and grazing of beef cattle on the remaining land which is unsuitable for cropping and lot feeding of cattle within a beef cattle feedlot in the north-east of the property. In the last few years, beef cattle bred on several adjoining properties have been walked into a feeding program on “Springfield” upon weaning. “Springfield” has built infrastructure such as a dwelling, machinery sheds, silos, cattle yards and feedlot etc to support the feeding program.

There has been a beef cattle feedlot on “Springfield” for over three years after approval was granted for a 999 head feedlot by the Gwydir Shire Council in 2021 (DA31/2020). Under Schedule 3, Item 21 of the Environmental Planning and Assessment Regulation 2000, as the capacity of the existing development does not exceed 1000 head it is not a designated development and an environmental licence from NSW EPA is not required.

The existing feedlot is known as Springfield Feedlot. Springfield Feedlot is used to finish Doolin Farming’s own cattle for the domestic export market.

Springfield Feedlot currently operates for 12 months of the year and employs approximately 2 full time staff. Casual staff and contractors are engaged as required during busy periods such as planting and harvesting of silage and fodder and to supply various associated services such as plant maintenance and veterinary requirements.

Springfield Feedlot includes one controlled drainage area with associated production pens and drainage system which includes catch drains, sedimentation basin and holding pond. Springfield Feedlot also has auxiliary infrastructure to support the use such as cattle handling and feed storage and processing facilities.

Springfield Feedlot is accredited under the National Feedlot Accreditation Scheme (NFAS) with audits conducted annually.

Doolin Farming Pty Ltd wish to expand Springfield Feedlot from the current approved capacity of 999 head by gaining development approval for intensive livestock agriculture to operate as a 3,000 head beef cattle feedlot on the site. The proposed development is to be developed in two stages with the first stage having a capacity of 1,251 head. The second stage will provide an additional 750 head, bringing the capacity of Springfield Feedlot to 3,000 head.

The proposed development will include additional pens within an expanded controlled drainage area, additional sedimentation basin and holding pond capacity. The proposed development will incorporate best practice design, construction and environmental management.

Existing infrastructure such as the grain storage and processing and cattle handling facilities have sufficient capacity to cater for the demands of the proposed development.

The property "Springfield" is within the Gwydir Shire Council local government area and relevant environmental planning instrument is the *Gwydir Local Environmental Plan 2013* (GLEP).

Doolin Farming Pty Ltd have access to a secure and appropriately licensed water supply provided by groundwater from the NSW Great Artesian Basin Eastern recharge groundwater source for irrigation and stock intensive use on the subject land under access licence 90AL834721.

Beef cattle feedlots which exceed 1,000 head capacity are defined as designated development under Schedule 3 (Part 1 section 21a) of the Environmental Planning and Assessment Regulation 2000 and therefore require a full Environmental Impact Statement (EIS) to accompany the development application.

This report forms part of the EIS prepared to support the Development Application to the Gwydir Shire Council for the proposed development and provides a separation distance assessment from sensitive receivers in accordance with methodology outlined in The National Guidelines for Beef Cattle Feedlots in Australia (3rd Edition) (MLA, 2012).

2 Site and locality

2.1 Subject land

The proposed development is to be located on two land parcels which form the property known as “Springfield”. The subject land is approximately 367 km south-west of Brisbane and 690 km north of Sydney in the North Star region. The subject land is located on Getta Getta Road approximately 15 km by road east of North Star and some 27 km west-southwest of Yetman.

The subject land has primary frontage to Getta Getta Road (unsealed) of approximately 5 km in length. Getta Getta Road intersects with North Star Road some 14 km west of and with Warialda Road which intersects with the Bruxner Way some 25 km east of the site access for the proposed development site respectively.

The proposed development site is bounded on the north by Getta Getta Road, to the west, east and south by other predominantly beef cattle and irrigated and dryland cropping mixed farming landholdings. Road access to the proposed development is from Getta Getta Road, a local controlled road.

Figure 1 is a locality plan highlighting the subject land to roads and the nearby townships of North Star and Yetman and the main watercourses and drainage lines in the region. The subject land falls within the catchment of the Murray-Darling Basin, more specifically the Barwon River catchment from the confluence of Macintyre River and Weir River (Qld) near Mungindi which is part of the NSW Border Rivers catchment.

The subject land has been historically used for irrigated agriculture (cereals (maize, barley, oats, cotton) and dryland agriculture (cereals (wheat, barley) and extensive beef cattle grazing and intensive beef cattle feedlot is located in a rural area which encourages agricultural uses.

2.1.1 Real property description

The real property description for “Springfield” is provided in Table 1. The subject land comprises of two (2) cadastral portions. The total area of the subject land is about 1,713.2 ha (~4,231 acres). The subject land is in the Gwydir Shire.

Figure 2 is a cadastral plan highlighting the cadastral parcels that comprise the subject land. Figure 3 is an aerial plan of the subject land.

Table 1 – Subject land – Real property description

Property name	Lot no.	Plan no.	Easements	Area Ha	Local government area
“Springfield”	8	DP756018	DP1237694	~883.3	Gwydir Shire
“Springfield”	8	DP756018	DP1237694	~792.7	Gwydir Shire
“Springfield”	1	DP1212915	DP1237694	~37.2	Gwydir Shire
Total area				~1,713.2	

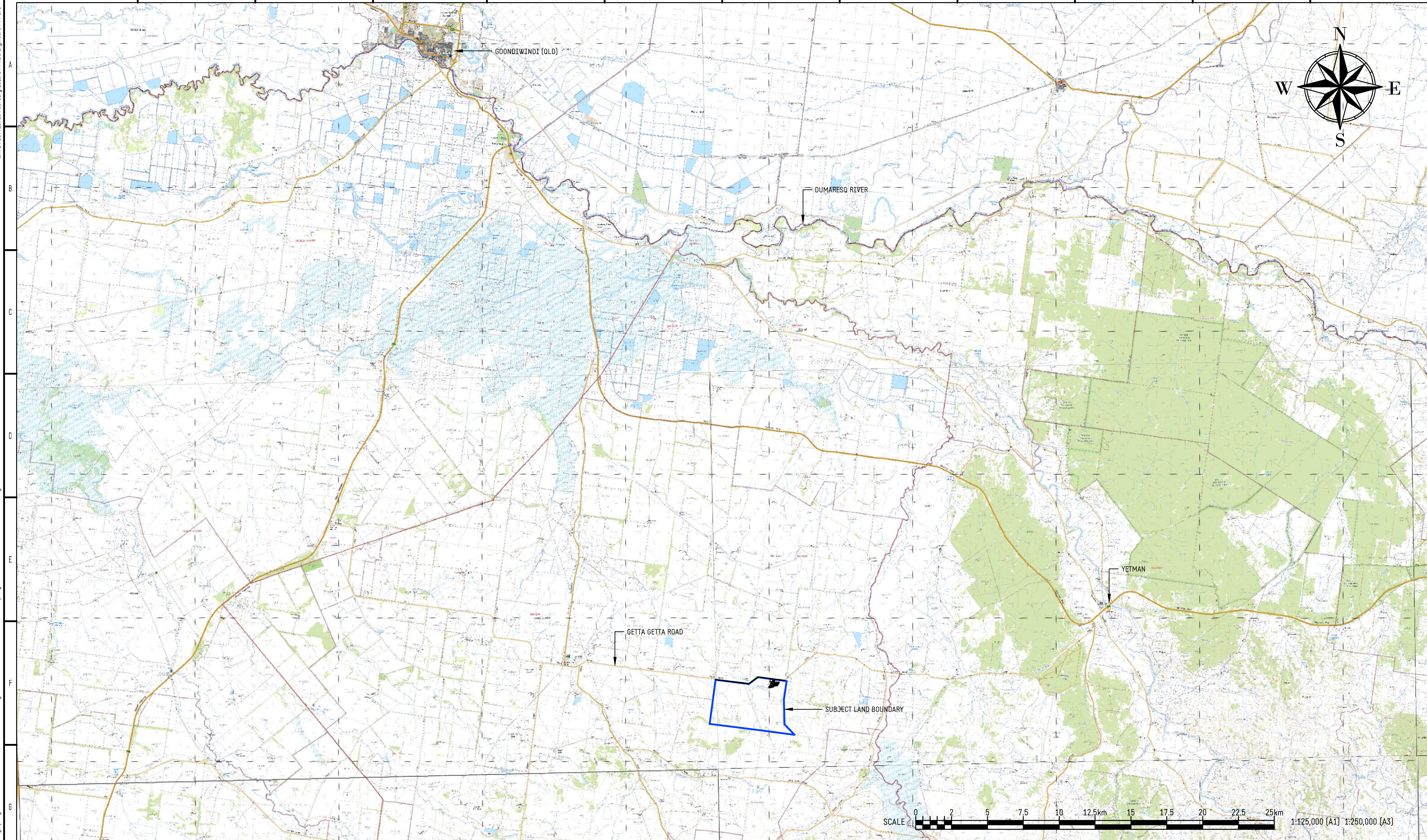
2.1.1.1 Limitations/Interests/Encumbrances

The subject land does contain an easement DP1237694 for overhead power lines(s) 20 metre(s) wide affecting the part(s) shown so burdened in DP1237694 as shown in Table 1 and Figure 2.

The subject land is not subject to reservations and interests in favour of the crown.

2.1.1.2 Road reserve

The subject land does not contain a road reserve under the *Roads Act 1993* as shown in Figure 2.



LEGEND

- SUBJECT LAND BOUNDARY
- LAND PARCEL BOUNDARY

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CLIENT: DOOLIN FARMING PTY LTD

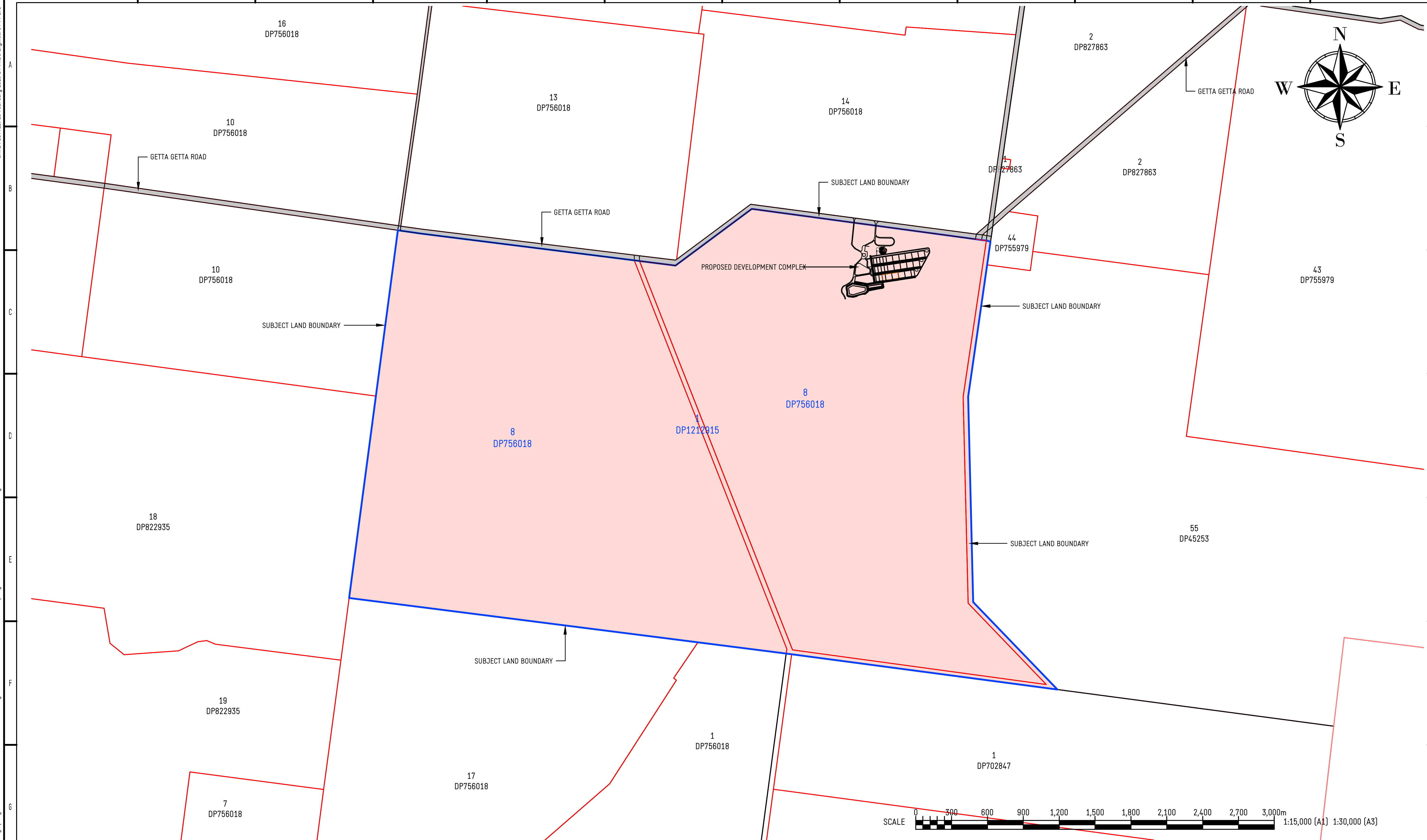
PROJECT: PROPOSED 3,000 HEAD BEEF CATTLE FEEDLOT

TITLE: DEVELOPMENT APPLICATION FOR INTENSIVE LIVESTOCK AGRICULTURE
EIS APPENDIX G - SEPARATION DISTANCE ASSESSMENT
SUBJECT LAND - LOCAL CONTEXT PLAN

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 1		A3	E2-103-200-01	B

DATE PLOTTED: 19 February 2025 BY : RDC Engineers PTY LTD

FILE PATH: C:\RDC Engineers\RDCE - Projects\E2-103 Doolin Farming Springfield EIS\05 - ACAD MasterPlan\05.1 Drawings - CURRENT FILE NAME: E2-103 DF Springfield MASTERPLAN-00-20250108rB.dwg



LEGEND

- SUBJECT LAND BOUNDARY
- LAND PARCEL BOUNDARY
- SUBJECT LAND AREA
- ROAD RESERVE
- EASEMENT

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DATE	21/02/2025

CLIENT: DOOLIN FARMING PTY LTD

PROJECT: PROPOSED 3,000 HEAD BEEF CATTLE FEEDLOT

TITLE: DEVELOPMENT APPLICATION FOR INTENSIVE LIVESTOCK AGRICULTURE
EIS APPENDIX G - SEPARATION DISTANCE ASSESSMENT
SUBJECT LAND - CADASTRAL PLAN

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 2		A3	E2-103-200-02	B

DATE PLOTTED: 19 February 2025 BY : RDC Engineers PTY LTD
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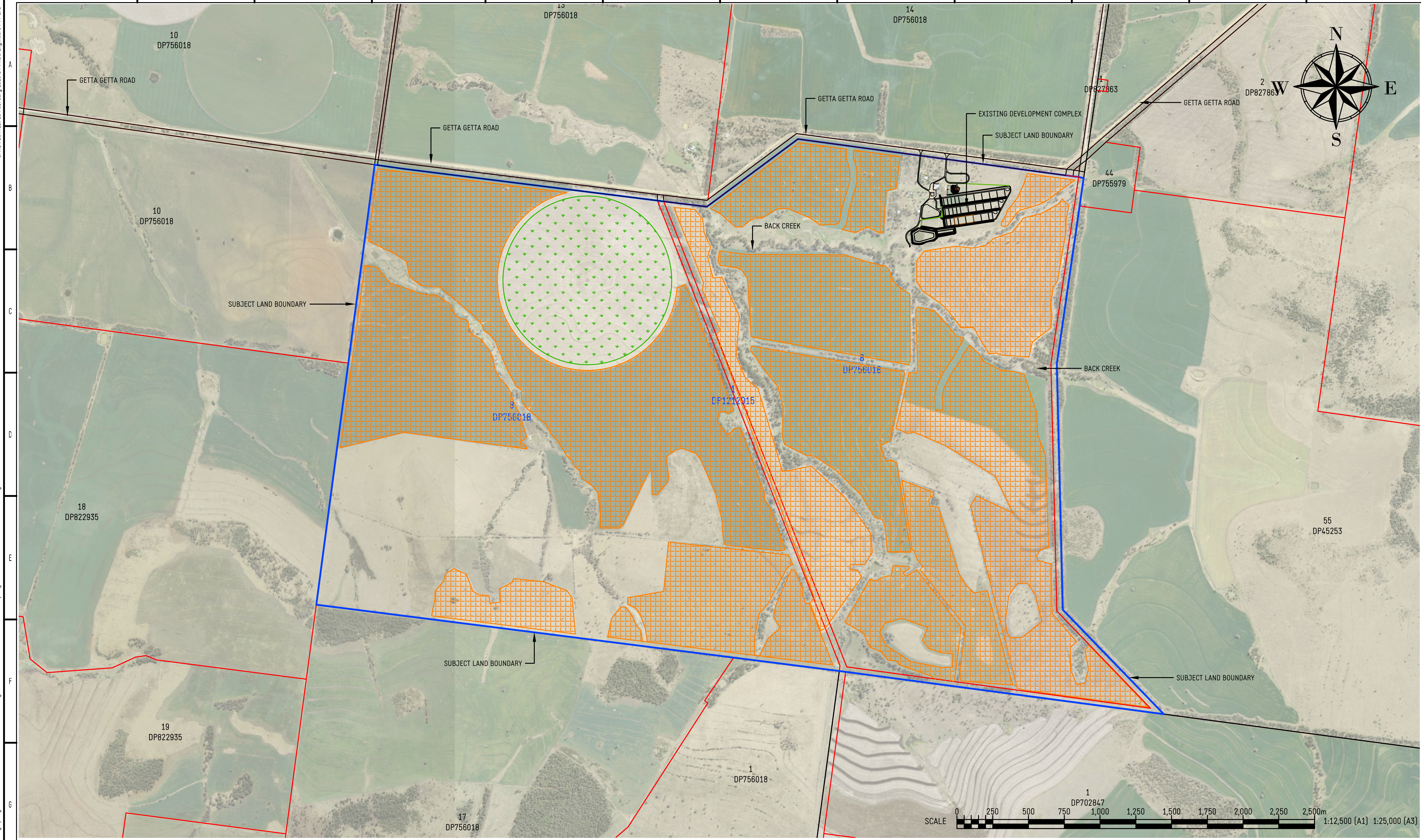

LEGEND

- SUBJECT LAND BOUNDARY
- LAND PARCEL BOUNDARY
- EXISTING EFFLUENT UTILISATION AREA
- EXISTING SOLID WASTE UTILISATION AREA

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DATE	21/02/2025

CLIENT: DOOLIN FARMING PTY LTD

PROJECT: PROPOSED 3,000 HEAD BEEF CATTLE FEEDLOT

TITLE: DEVELOPMENT APPLICATION FOR INTENSIVE LIVESTOCK AGRICULTURE
EIS APPENDIX G - SEPARATION DISTANCE ASSESSMENT
SUBJECT LAND - AERIAL PLAN

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 3		A3	E2-103-200-03	B

2.2 Proposed development

Doolin Farming Pty Ltd wish to expand the existing beef cattle feedlot on the subject land from the currently approved capacity of 999 head to 3,000 head when fully developed.

The proposed development comprises a permanent pen area with adjoining feed alley in which the beef cattle are housed in the open air and provided with their daily feed and water requirements. The pen area shall incorporate water, feeding and shade infrastructure.

There are two components of the proposed development being the infrastructure and waste utilisation area.

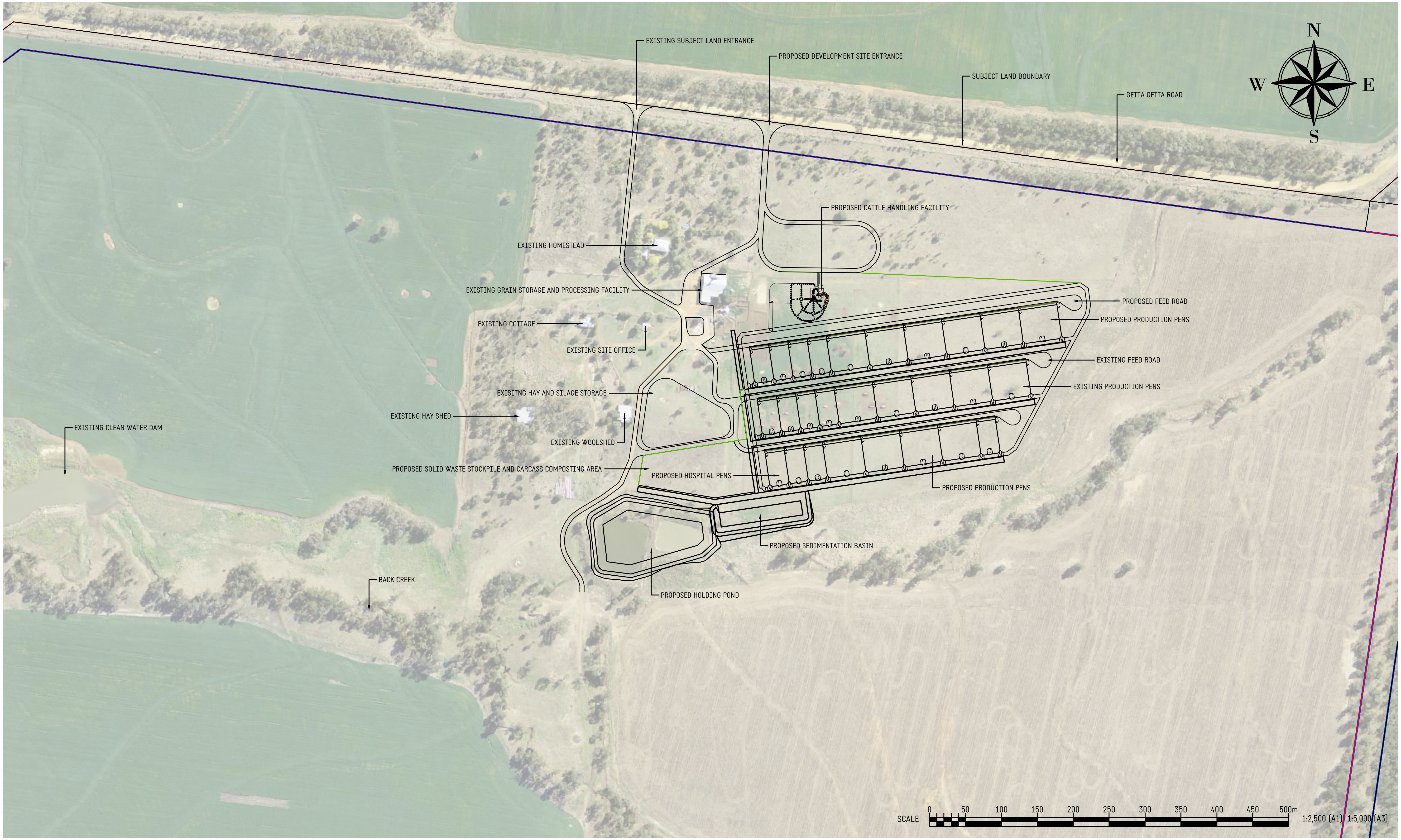
The infrastructure of the proposed development includes:

- Production pens for beef cattle;
- Drainage system incorporating catch drains, sedimentation basin and holding pond;
- A cattle handling facility with receival/dispatch infrastructure;
- Internal roadways connecting the subject land access to the cattle handling and commodity storage facilities;

The waste utilisation area includes:

- Effluent and solid waste (manure) utilisation areas. When available, effluent shall be applied to crops land via irrigation and solid waste applied to cropping land within the dedicated utilisation areas.

The layout of the proposed development is shown in Figure 4.



LEGEND

SUBJECT LAND BOUNDARY
LAND PARCEL BOUNDARY

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REV.	DATE	REVISION DESCRIPTION	DRAWN	CHECK	APPROVED
A	24/01/25	DRAFT ISSUE TO CLIENT	RJD	RJD	RJD
B	21/02/25	FINAL ISSUE FOR SUBMISSION TO GSC	RJD	RJD	RJD

SCALE	1:5,000 (A3)
DRAWN	RJD
DATE	21/02/2025
CHECKED	RJD
DATE	21/02/2025
APPROVED	RJD
DATE	21/02/2025

CLIENT: DOOLIN FARMING PTY LTD
PROJECT: PROPOSED 3,000 HEAD BEEF CATTLE FEEDLOT
TITLE: DEVELOPMENT APPLICATION FOR INTENSIVE LIVESTOCK AGRICULTURE
EIS APPENDIX G - SEPARATION DISTANCE ASSESSMENT
PROPOSED DEVELOPMENT - DEVELOPMENT COMPLEX LAYOUT

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 4		A3	E2-103-200-04	B

DATE PLOTTED: 19 February 2025 BY : RDC Engineers PTY LTD
FILE PATH: C:\RDC Engineers\RDCE - Projects\E2-103 Doolin Farming Springfield EIS\05 - ACAD MasterPlan\05.1 Drawings - CURRENT FILE NAME: E2-103 DF Springfield MASTERPLAN-00-20250108vB.dwg

2.3 Existing environment

2.3.1 Climate

The closest meteorological station to the subject land is the Bureau of Meteorology (BoM) station at North Star (Wolonga) located about 13 km south-west of the subject land. The North Star (Wolonga) (Site number: 053095) (BoM, 2024a) has been recording rainfall since 1972. The closest meteorological station to the subject land with climatic data is the Goondiwindi airport (Site number: 041521) located some 51 km to the north north-west. However, this station closed in 2015 (BoM, 2024b). However, these data may not be representative of the climate of the subject land.

A summary of the rainfall data from the North Star (Wolonga) (Site number: 053095) (BoM, 2024a) is provided in Table 2. Rainfall data is only available up to 2020.

Long-term daily climate data for the area (Latitude -28.95S, Longitude 150.55E) were derived from the Department of Science, Information Technology and Innovation (DSITIA) Silo Data Drill database (DSITIA, 2024). The Data Drill accesses data on a 5 km grid derived by interpolation from point observations by the Bureau of Meteorology station records. The data in the Data Drill are all synthetic; there are no original meteorological station data left in the calculated grid fields (Jeffrey et al. 2001). The data are supplied as an individual file of interpolated daily rainfall, maximum and minimum temperature, potential evapotranspiration and radiation at the nominated point location for the period 01/01/1924 to 31/12/2023 (DSITIA, 2024). A summary of the data used is included in Table 3.

The climate of the region is between the tropical and temperate climatic zones. Under the Köppen-Geiger climate classification system this climate is classified as humid subtropical climate (Cfa), and experiences typical cool to mild dry winters and very warm to hot dry summers.

Rainfall varies with time of year due to the latitude of the region (-28.9^0) and tends to be summer dominant. Rainfall patterns are linked to high pressure systems over northern parts of Australia and rainfall typically occurs as thunderstorms or short and intense storm events during summer with the occasional cold fronts that brings periods of prolonged light rainfall. Table 2 shows that the long-term average rainfall recorded at the North Star (Wolonga) for the period 1972 to 2024 was 636 mm with approximately 55% falling in the five months between November and March. Monthly rainfall over the autumn and winter months averages between 30 and 40 mm per month. The lowest rainfall totals are in June and August (Table 2).

Table 3 shows that the average annual rainfall interpolated by SILO for the period 1924 to 2023 is approximately 617 mm/year slightly less than that measured by BoM at the North Star (Wolonga) site. The annual evaporation is approximately 1,876 mm/year. The region has nett deficit rainfall with rainfall less than the evaporation and transpiration rates.

There is a large degree of variability in rainfall between years and there has been a drying climate with lower rainfall since about 1975.

The climatic influence on temperatures results in warm to hot summers and cool winters, regularly reaching single digit temperature. Table 3 shows that the mean maximum temperature interpolated by SILO for the period 1924 to 2023 is 33.2^{0}C in January and a mean minimum temperature of about 3.3^{0}C for July.

Relative humidity in the area is higher during the winter months when temperatures are lower. Average relative humidity 9 am readings range from 39% in October to 46% in February.

Table 2 – Regional rainfall data – North Star (Wolonga) (1972-2020) (BoM, 2024a)

	Units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Rainfall														
Mean	mm	78.7	73.4	65.0	35.0	39.0	31.9	39.3	30.7	33.0	55.4	72.4	73.1	636.0
Median	mm	55.4	61.8	55.0	17.4	28.5	25.4	33.0	23.7	22.5	46.4	59.7	71.8	612.8
Lowest	mm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	337.5
90% years at least	mm	10.4	11.8	8.6	0.0	2.3	8.6	3.2	2.1	1.8	20.8	19.8	14.0	475.1
10% years at least	mm	185.2	137.9	128.0	83.9	73.8	58.6	74.8	57.8	73.7	104.2	127.7	120.3	875.5
Highest	mm	337.0	369.4	197.4	282.0	168.2	162.0	177.0	183.2	103.0	133.3	219.0	212.0	1006.4

Table 3 – Proposed development site - Climatic data derived from SILO (1924-2023) (DES, 2024)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Rainfall													
Mean rainfall (mm)	80.0	73.5	59.6	31.8	38.3	37.0	39.1	32.8	34.7	55.3	65.5	69.7	617.2
Median rainfall (mm)	63.9	57.1	49.4	20.6	32.0	28.1	36.2	28.8	26.9	44.6	54.3	65.2	598.6
Lowest rainfall (mm)	2	0	0	0	0	0	0	0	0	1	0.2	1.1	139.4
90% years at least rainfall (mm)	18.5	14.1	5.4	0.7	3.3	8.3	3.5	2.4	3.0	12.3	12.0	13.1	441.6
10% years at least rainfall (mm)	166.2	147.3	142.2	69.6	81.0	76.6	78.7	64.7	72.5	109.2	129.5	127.3	801.0
Highest rainfall (mm)	330.1	329	198.4	263	194.9	175.9	169.4	172.2	132.2	187.1	230.3	255.8	1118.6
Temperature, Humidity and Pan evaporation													
Mean pan evaporation (mm)	247.8	201.3	186.0	130.6	87.8	62.9	69.0	97.7	139.6	187.7	217.9	246.8	1875.7
Mean maximum temperature (deg C)	33.2	32.6	30.4	26.5	22.0	18.5	17.9	19.7	23.4	27.0	30.0	32.2	26.1
Mean minimum temperature (deg C)	18.8	18.5	16.1	11.6	7.4	4.7	3.3	4.5	7.5	11.8	14.9	17.4	11.4
Relative Humidity (%)	43.5	46.3	46.2	46.0	48.0	48.7	45.5	42.1	40.1	40.0	39.8	41.4	44.0

2.3.2 Wind direction

The wind direction, frequency and intensity at the site are influenced by several factors including the local terrain and land use. On a relatively small scale, winds would be largely affected by the local topography. At larger scales, winds are affected by synoptic scale winds, which are modified by sea breezes near the coast in the daytime in summer (also to a certain extent in the winter) and by a complex pattern of regional drainage flows that develop overnight.

As no meteorological data exists for the proposed development site, data was obtained from the closest meteorological record station that holds wind direction statistics to the subject land. However, the closest station is the Goondiwindi Airport (1991-2015) (BoM, 2024a) which is located approximately 51 km north north-west of the subject land. Given the distance and terrain, these data can be used to provide a general indication of wind speed and direction at the proposed development site.

Consequently, the meteorological model – The Air Pollution Model (TAPM) (Version 4) was used to predict local wind speed and direction data.

TAPM, developed by the Commonwealth Scientific and Industrial Research Organisation (CSIRO) is a prognostic model which is used to predict three-dimensional meteorological data and air pollution concentrations. A detailed description of the TAPM model can be found in Hurley (2008).

TAPM software allows users to generate synthetic observations by referencing in-built databases (e.g. terrain information, synoptic scale meteorological observations, vegetation and soil type etc.) which are subsequently used in generating site-specific hourly meteorological observations.

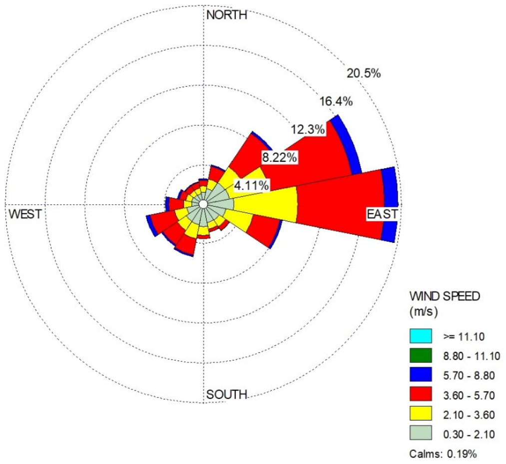
The modelling was centred on the closest grid point to the proposed development site being 27°57.0’S; 150°33.0’E and was configured with a 30 x 30 grid. In total, five domains were set up with grid spacings of 30km, 10 km, 3 km, 1 km and 0.3 km. Five (5) years data were modelled from 2016 to 2020. This setup is consistent with good practice and the guidance detailed in the Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales (NSW EPA, 2022).

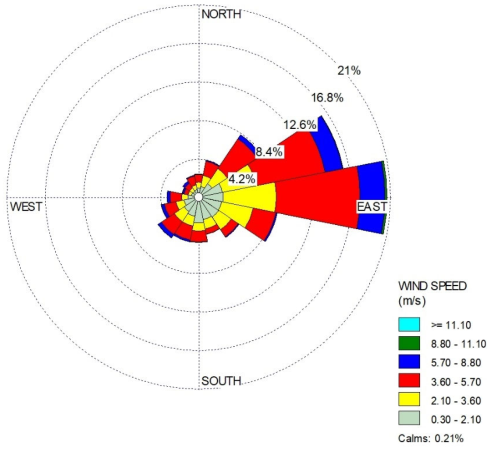
Wind speed and direction information obtained from TAPM modelling is presented in the form of wind roses. Wind roses are a way of presenting a summary of wind speed and directional data for a particular time and location and show the frequency of occurrence of winds by direction and strength.

The annual wind roses developed for the proposed development site from TAPM in years 2016 to 2020 inclusive are shown in Figure 5. All years modelled result in similar wind directions. Each bar shown on the wind rose represents winds blowing from that direction. The length of the bar represents the frequency of occurrence of winds from that direction, and the colour and width of the bar sections correspond to wind speed categories as outlined in the legend.

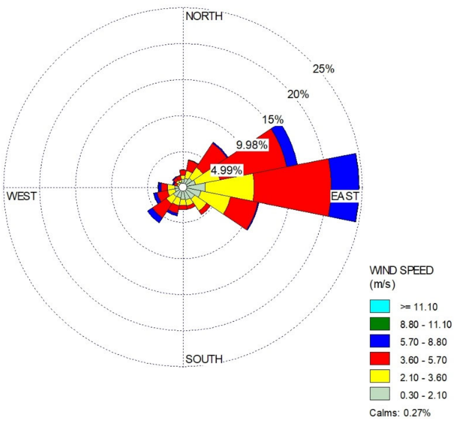
The composite wind rose developed for the proposed development site from TAPM in all five years (2016 to 2020) is shown in Figure 6. Figure 6 shows that wind direction is predominantly from the north-easterly to south-easterly sectors with light to moderate wind speeds (3.6 – 5.7 m/s) observed for most of the year.

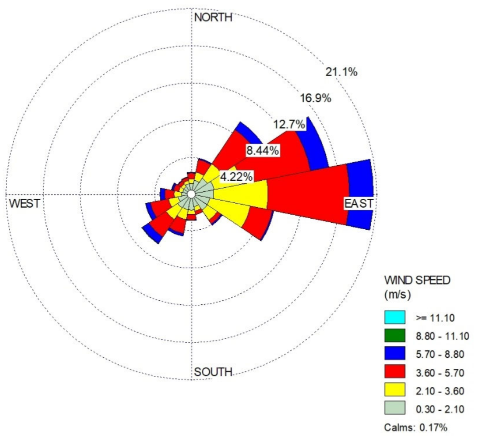
Analyses of the TAPM data shows that about 50% of the winds blow from ±40° from the general direction of east.



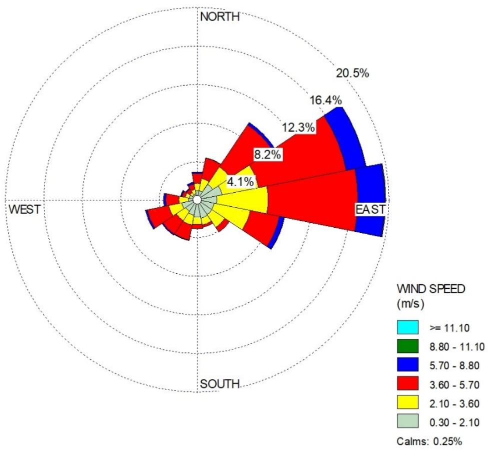


2016 **2017**





2018 **2019**



2020

Figure 5 – Proposed development site – Annual windroses (TAPM)

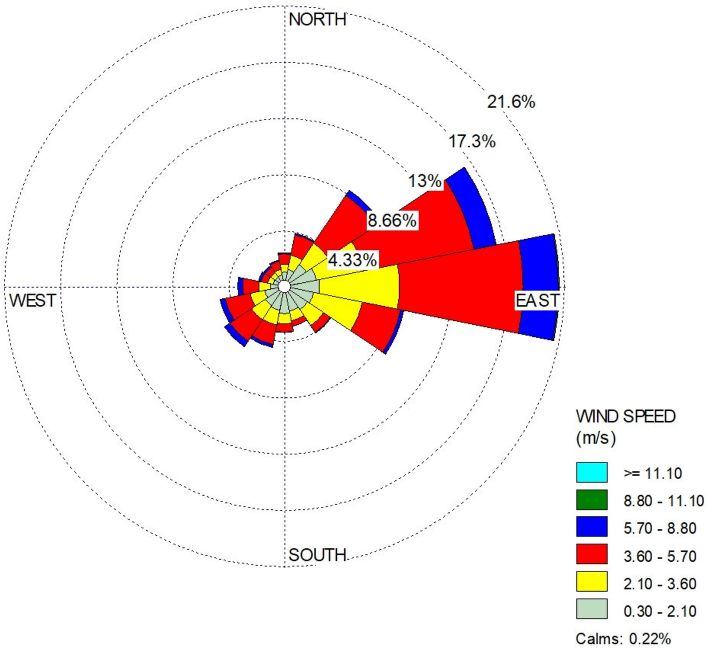


Figure 6 – Proposed development site – Composite annual windrose (TAPM 2016-2020)

2.4 Landform and topography

2.4.1 Landform

The geologic history and its climate contrasts are reflected in the landforms of the region. The subject land is located in the Gunnedah Basin a structural trough in central New South Wales. It is bounded by a regional unconformity surface over the Lachlan Fold Belt to the west and by the New England Fold Belt to the east and is continuous with the Bowen Basin to the north. The basin contains sediments of Permian and Triassic age. The Permian sediments have low resistance to weathering and consequently have deep weathering profiles. Consequently, outcrop is generally poor or absent over large areas with only the more resistant sandstone and conglomerate form isolated hills and ridges, particularly those with Tertiary volcanic capping.

The subsurface conditions of the Gunnedah Basin are dominated by Quaternary and Tertiary aged river plain sediments, including black and red clayey silt, and black and yellow brown clay soils (GHD, 2014).

These components have determined the landforms of the region and the overall pattern of drainage and relief. The region extends westward from the lower slopes of the New England Tablelands onto the low-lying riverine plains of the Barwon-Darling system. The region lies entirely within the Murray–Darling Basin and is made up of a group of waterways that straddle the NSW/QLD border. The main rivers in the region are the Gwydir, Macintyre and Barwon rivers which start at the Great Dividing Range and run westward, gradually merging to become the Barwon River.

The landform of the region is typically near level to gently undulating.

2.4.2 Topography

The subject land is located within the Yetman (9040) 1:100,000 and Goondiwindi (8940) 1:100,000 topographic map sheets within the north east of the North West slopes and Plains region of NSW. The topography at a regional scale is generally flat to gently undulating, with elevations from 310 m to 360 m AHD. The subject land is on the eastern margins of the plains with slopes in the order of 1-2%.

A topographic plan of the subject land was prepared from topographic data at a scale of 1:20,000 with a 5 m contour interval and is shown in Figure 7. This shows that the subject land has low relief landforms gently rising from the alluvial plains in the north west from approximately 300 m AHD towards the south – southeast to approximately 360 m AHD. There are few topographic highs.

Drainage is confined to a north-north westerly direction towards the alluvial plains and to Back Creek. The higher elevations occur to the south of the subject land resulting in a generally northerly aspect across the subject land. The proposed development site is located on a very gently sloping area with a southerly aspect and drains to a tributary of Back Creek.

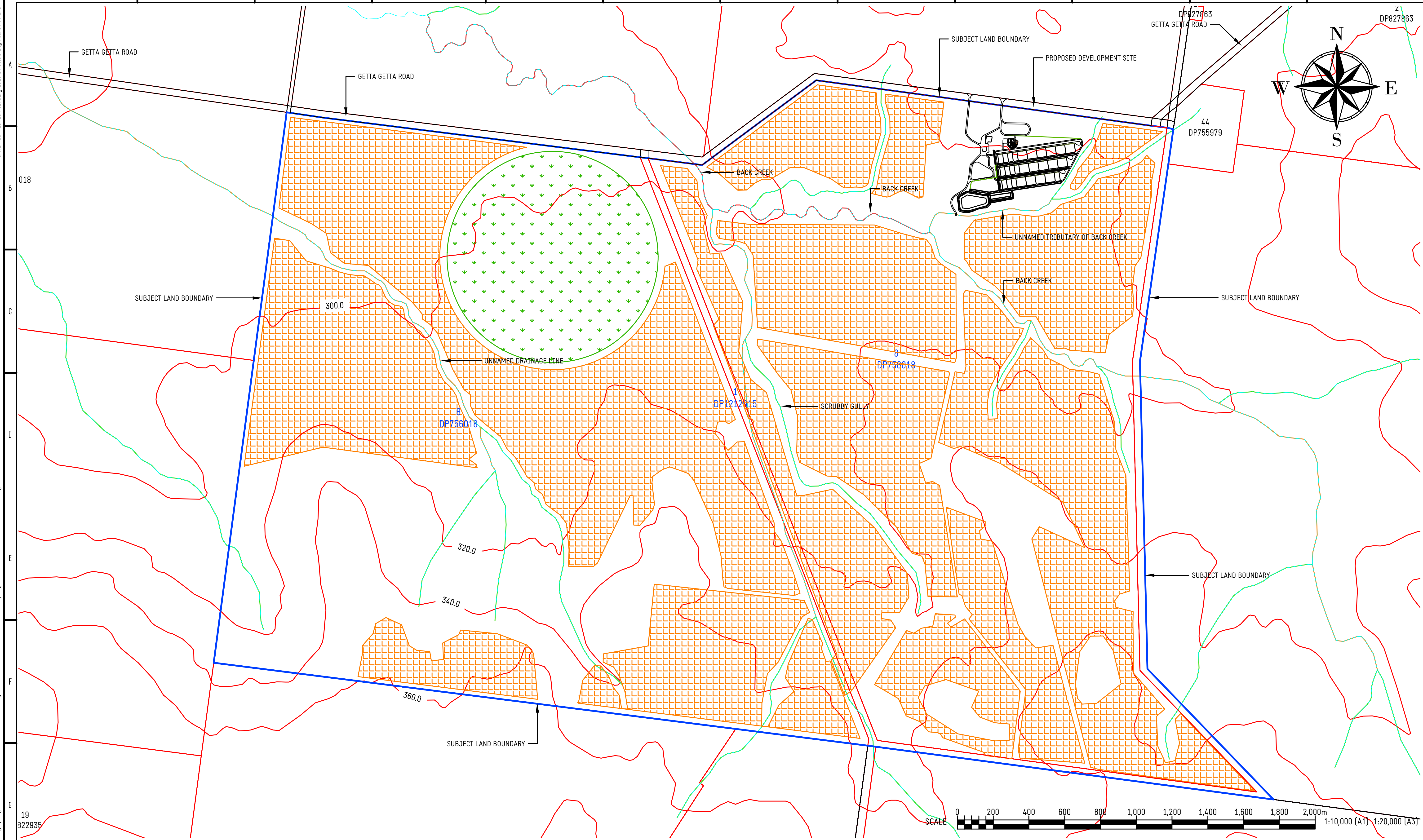
The proposed development infrastructure shall be located geographically to the north-east of the subject land where the land is gently sloping and falls southwards towards internal drainage lines. The site is inherently well drained due to the impermeable, predominantly clay soils and gradients of 2-3%.

The proposed effluent utilisation area is located in the west of the subject land on relatively flat land as shown on Figure 7. The solid waste utilisation areas are located across the subject land where the land is relatively flat to gently sloping as shown on Figure 7.

The subject land has retained its historical topography. There has been no modification to the natural landform from mining, quarrying or other groundworks which may have altered its topography through the removal of soil or other materials other than vegetation clearing.

Photograph 1 – Subject land – Existing development site – Looking south

Photograph 2 – Subject land – Waste utilisation areas – Looking west



LEGEND

- SUBJECT LAND BOUNDARY
- LAND PARCEL BOUNDARY
- HYDROAREA
- STREAM ORDER 1
- STREAM ORDER 2
- STREAM ORDER 3
- STREAM ORDER 4
- STREAM ORDER 5
- STREAM ORDER 6
- STREAM ORDER 7
- STREAM ORDER 8

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CLIENT DOOLIN FARMING PTY LTD

PROJECT PROPOSED 3,000 HEAD BEEF CATTLE FEEDLOT

TITLE DEVELOPMENT APPLICATION FOR INTENSIVE LIVESTOCK AGRICULTURE
EIS APPENDIX G - SEPARATION DISTANCE ASSESSMENT
SUBJECT LAND - TOPOGRAPHIC PLAN

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 7		A3	E2-103-200-07	B

3 Air quality assessment

The air quality assessment has been performed in line with the Technical Notes (DEC (NSW), 2006b) and the Technical Framework (DEC (NSW), 2006a).

The framework refers to Level 1, 2 and 3 assessments which range from screening level techniques (Level 1) to refined dispersion modelling techniques using site specific input data (Level 3).

For this assessment the Level 1 feedlot technique detailed in the Technical Notes was adopted as it is most appropriate for assessing feedlots with suitable separation distances and is consistent with The *National Guidelines for Beef Cattle Feedlots in Australia (3rd Edition)* (MLA, 2012) which is the most recently published Cattle feedlot guideline.

3.1 Separation distance assessment

The use of appropriate separation distances is a well-established and widely recognised means of mitigating the impacts on community amenity that arise from odour from beef cattle feedlots (MLA, 2012).

The Level 1 odour impact assessment for cattle feedlots is covered in Section 7 of the Technical Notes (DEC NSW, 2006b). The National Guidelines for Beef Cattle Feedlots in Australia (3rd Edition) (MLA, 2012) provide two methods for determining appropriate separation distances between cattle feedlots and sensitive receptors. These include the S-factor method and odour dispersion modelling.

The S-factor method uses a standard empirical formula that provides a conservative estimate of the separation distance required and therefore offers higher levels of protection for community amenity. Typically, the separation distance estimated using the S-factor method more than complies with the quantitative performance criteria set out in relevant environmental legislation, regulation and policy.

Typically, odour dispersion modelling is used for large feedlot developments or developments on complex sites. The modelling process utilises odour emission data (from similar developments) and site-specific climatic data to determine the probability of a particular odour level being exceeded at nearby receptors.

Given, the rural locality of the proposed development site, the size and scale of the proposed development and proximity to sensitive receptors the S-factor method has been adopted to assess the separation distance required to mitigate potential odour nuisance issues for nearby sensitive receptors.

The S-factor method relies on factors such as the number of cattle in the development, receptor type, topography, vegetation (surface roughness), wind frequency and feedlot design and operation. The required separation distance is measured from the closest odour source of the proposed development in the direction of the sensitive receptor, not the centre of the development.

The National Guidelines for Beef Cattle Feedlots in Australia (3rd Edition) (MLA, 2012) calculation of separation distances for each receptor type follows the form:

Separation distance (D) (m) = $N^{0.5} \times S_1 \times S_2 \times S_3 \times S_4 \times S_5$

Where:

- N = feedlot capacity in SCU;
- 0.5 = feedlot size exponent determined using the results of modelling;
- S_1 = feedlot design and management factor;
- S_2 = receptor type factor;
- S_3 = topography or terrain weighting factor;
- S_4 = vegetative cover factor; and
- S_5 = wind direction factor.

3.1.1 N – Feedlot capacity

The layout of the proposed development is shown in Figure 4. Generally, the expansion area shall be to the north and south of the existing production pen area.

The proposed development will include an expansion of the existing capacity from 999 head (873 SCUs) to 3,000 head (2,620 SCUs).

A standard cattle unit is equivalent to an animal of 600 kg liveweight (MLA, 2012).

The proposed development shall have an average stocking density of ~17.9 m^2/head for the proposed beef cattle production pens for the total capacity of 3,000 head. This equates to a stocking density in the order of about 20.5 m^2/SCU when the SCU scaling factor is applied.

Each animal can be converted to a SCU equivalent based on their metabolic liveweight and the following formula:

SCU scaling factor = $(\text{Animal liveweight}/600)^{0.75}$ ----------------------------Equation 1

The SCU scaling factor for various average liveweight for beef cattle is provided in Table 4.

Table 4 – Standard Cattle Unit conversion factor

Average liveweight (kg)	SCU Scaling factor
350	0.68
400	0.74
450	0.81
500	0.87
550	0.94
600	1.00
650	1.06
700	1.12

The average liveweight of the cattle on-feed in the existing development is about 500kg. The SCU scaling factor applied to lot fed cattle with an average liveweight of about 500 kg (Table 4) can be determined from Equation 1 as follows.

SCU scaling factor $= (500/600)^{0.75}$
$= 0.874$

Consequently, the proposed development shall have a total capacity equivalent to 2,620 standard cattle units (SCUs) once fully developed.

3.1.2 Siting, design and management factor (S_1)

Siting, design and management factors will influence odour emissions from the proposed development. These factors include the climatic conditions at the site, pen cleaning frequency, and stocking density which influence the depth of manure on the pen surface and its moisture content.

The proposed development will operate at the equivalent of a Class 1 standard (i.e. adopt best management practice).

The average stocking density of the proposed development is proposed to be ~20.5 m^2/SCU.

For comparable odour emission rates, pens must be stocked at a lower density (i.e. greater m^2/SCU) in a wetter climate than in a drier one (with all other factors equal). Thus, S_1 values for specific stocking densities are provided for an average annual rainfall of either <750 mm or >750 mm. As outlined in section 2.3.1, the average annual rainfall for the area is about 617 mm per year.

Consequently, based on a stocking density of ~20.5 m^2/SCU and a rainfall category of <750mm/year, a S_1 factor of **39** was interpolated from Table B-1 of the National Guidelines for Beef Cattle Feedlots in Australia (3rd Edition) (MLA, 2012).

3.1.3 Receptor factor (S_2)

S_2 is a receptor type factor which accounts for the variation in population density, odour sensitivity and risk of exposure for receptors located in the vicinity of a development. The greater the exposed population, the more likely it is that 'sensitive' individuals might be exposed to nuisance odour. Thus, the S_2 value for a large population centre (and the minimum separation distance) is greater than that for a single rural dwelling (Table B.2, MLA, 2012).

There are two types of receptors to be considered surrounding the proposed development. These include single rural dwellings on surrounding rural properties, and the village of North Star which is a population centre located some 15 km to the west.

The S_2 factors were selected for the closest receptors at each compass point. The location of each receptor is shown in Figure 8 and are summarised in Table 5.

Table 5 – Proposed development – Receptor factors – Adopted values of S_2

Identifier	Location	Direction from Development	Receptor type	S_2 value
R1	2680 Getta Getta Road, North Star	West by North	Single rural or farm dwelling	0.3
R2	2680 Getta Getta Road, North Star	North	Single rural or farm dwelling	0.3
R3	1310 Goat Road, North Star	North by East	Single rural or farm dwelling	0.3
R4	2118 Getta Getta Road, North Star	North northeast	Single rural or farm dwelling	0.3
R5	2116 Getta Getta Road, North Star	North east	Single rural or farm dwelling	0.3
R6	2116 Getta Getta Road, North Star	North east	Single rural or farm dwelling	0.3
R7	1767 Getta Getta Road, North Star	East southeast	Single rural or farm dwelling	0.3
R8	621 Myall Downs Road, Blue Nobby	South-east by east	Single rural or farm dwelling	0.3
R9	621 Myall Downs Road, Blue Nobby	South-east by east	Single rural or farm dwelling	0.3
R10	61 Ryelands Road, Yallaroi	South southeast	Single rural or farm dwelling	0.3
R11	61 Ryelands Road, Yallaroi	South southeast	Single rural or farm dwelling	0.3
R12	2271 Blue Nobby Road, North Star	South	Single rural or farm dwelling	0.3
R13	2463 Blue Nobby Road, North Star	South by West	Single rural or farm dwelling	0.3
R14	2463 Blue Nobby Road, North Star	South by West	Single rural or farm dwelling	0.3
R15	3241 Blue Nobby Road, North Star	Southwest	Single rural or farm dwelling	0.3
R16	5535 North Star Road, North Star	Southwest	Single rural or farm dwelling	0.3
R17	5788 North Star Road, North Star	South southwest	Single rural or farm dwelling	0.3
R18	5788 North Star Road, North Star	South southwest	Single rural or farm dwelling	0.3
R19	5981 North Star Road, North Star	West	Single rural or farm dwelling	0.3
R20	North Star	West by North	Small town (30-125 persons)	1.0
R21	3824 Getta Getta Road, North Star	West by North	Single rural or farm dwelling	0.3
R22	Peates Road, North Star	West by North	Single rural or farm dwelling	0.3
R23	1278 Forest Creek Road, North Star	North northwest	Single rural or farm dwelling	0.3
R24	2680 Getta Getta Road, North Star	Northwest	Single rural or farm dwelling	0.3

3.1.4 Terrain factor (S_3)

The terrain weighting factor (S_3) relates to the potential for the odour plume to be exaggerated in particular directions, and relatively small in others. This method provides an estimation of the potential changes to odour dispersion in situations where meteorological conditions may be influenced by local terrain.

The S_3 terrain factor is selected based on the topography at the site. Generally speaking, the terrain is undulating or flat between the proposed development site and the receptors downhill or uphill as shown in the topographic data in Figure 7 and from photographs of the area as shown in Photograph 1 and Photograph 2. The terrain factor selected for each receptor is summarised in Table 6. Consequently, for conservatism 'flat terrain' was selected.

Table 6 – Proposed development – Terrain factor – Adopted values of S_3

Identifier	Location	Elevation[1] m (AHD)	Distance from Development m	Grade %	S_3 value
R1	2680 Getta Getta Road, North Star	309	~1,645	-0.79	1.0
R2	2680 Getta Getta Road, North Star	309	~2,510	-0.28	1.0
R3	1310 Goat Road, North Star	301	~5,555	-0.25	1.0
R4	2118 Getta Getta Road, North Star	306	~3,135	0.19	1.0
R5	2116 Getta Getta Road, North Star	312	~3,410	0.09	1.0
R6	2116 Getta Getta Road, North Star	313	~3,530	0.11	1.0
R7	1767 Getta Getta Road, North Star	303	~6,540	-0.35	1.0
R8	621 Myall Downs Road, Blue Nobby	310	~7,635	-0.31	1.0
R9	621 Myall Downs Road, Blue Nobby	364	~7,745	-0.27	1.0
R10	61 Ryelands Road, Yallaroi	325	~6,100	1.00	1.0
R11	61 Ryelands Road, Yallaroi	338	~6,315	1.01	1.0
R12	2271 Blue Nobby Road, North Star	320	~7,030	0.43	1.0
R13	2463 Blue Nobby Road, North Star	311	~6,935	0.32	1.0
R14	2463 Blue Nobby Road, North Star	329	~6,885	0.29	1.0
R15	3241 Blue Nobby Road, North Star	302	~10,815	-0.23	1.0
R16	5535 North Star Road, North Star	295	~11,815	-0.05	1.0
R17	5788 North Star Road, North Star	336	~11,420	-0.28	1.0
R18	5788 North Star Road, North Star	376	~11,360	-0.28	1.0
R19	5981 North Star Road, North Star	322	~13,320	-0.33	1.0
R20	North Star	315	~14,125	-0.57	1.0
R21	3824 Getta Getta Road, North Star	313	~12,775	-0.38	1.0
R22	Peates Road, North Star	335	~6,570	-0.53	1.0
R23	1278 Forest Creek Road, North Star	271	~7,900	-0.59	1.0
R24	2680 Getta Getta Road, North Star	309	~1,300	0.22	1.0

[1] Terrain heights were taken from the Google Earth™ at each receptor location. The elevation of the proposed development site ranges from about 330 to 335 m.

3.1.5 Vegetative cover factor (S_4)

The vegetative cover factor (S_4) relates to the vegetative density or 'roughness elements' between the proposed development and the receptor. Generally, the rougher the surface, the more turbulent the air flow, and the more mixing and dilution of the air and more odour dispersion. Maximum turbulence occurs when the surface is a mixture of various sized obstacles of various heights.

Although the regional landscape is dominated by agricultural land uses, well-vegetated areas of closed and open forest are present throughout, particularly within state forest areas.

The vegetation factor for each sensitive receptor was selected based on both on-site observations and aerial imagery of the area and are shown in Figure 3. Receptors 1 through to 23 are separated by a combination of open grassland, cropping and remnant native vegetation woodland fringing drainage lines and roads. Consequently, for conservatism 'crops only (no effective tree cover)' was selected.

An indication of the vegetative cover can be seen on aerial imagery as shown in Figure 3.

Table 7 – Proposed development – Vegetative cover – Adopted values of S_4

Identifier	Location	Vegetation type	S_4 value
R1	2680 Getta Getta Road, North Star	Crops only (no effective tree cover)	1.0
R2	2680 Getta Getta Road, North Star	Crops only (no effective tree cover)	1.0
R3	1310 Goat Road, North Star	Crops only (no effective tree cover)	1.0
R4	2118 Getta Getta Road, North Star	Crops only (no effective tree cover)	1.0
R5	2116 Getta Getta Road, North Star	Crops only (no effective tree cover)	1.0
R6	2116 Getta Getta Road, North Star	Crops only (no effective tree cover)	1.0
R7	1767 Getta Getta Road, North Star	Crops only (no effective tree cover)	1.0
R8	621 Myall Downs Road, Blue Nobby	Crops only (no effective tree cover)	1.0
R9	621 Myall Downs Road, Blue Nobby	Crops only (no effective tree cover)	1.0
R10	61 Ryelands Road, Yallaroi	Crops only (no effective tree cover)	1.0
R11	61 Ryelands Road, Yallaroi	Crops only (no effective tree cover)	1.0
R12	2271 Blue Nobby Road, North Star	Crops only (no effective tree cover)	1.0
R13	2463 Blue Nobby Road, North Star	Crops only (no effective tree cover)	1.0
R14	2463 Blue Nobby Road, North Star	Crops only (no effective tree cover)	1.0
R15	3241 Blue Nobby Road, North Star	Crops only (no effective tree cover)	1.0
R16	5535 North Star Road, North Star	Crops only (no effective tree cover)	1.0
R17	5788 North Star Road, North Star	Crops only (no effective tree cover)	1.0
R18	5788 North Star Road, North Star	Crops only (no effective tree cover)	1.0
R19	5981 North Star Road, North Star	Crops only (no effective tree cover)	1.0
R20	North Star	Crops only (no effective tree cover)	1.0
R21	3824 Getta Getta Road, North Star	Crops only (no effective tree cover)	1.0
R22	3202 Getta Getta Road, North Star	Crops only (no effective tree cover)	1.0
R23	1278 Forest Creek Road, North Star	Crops only (no effective tree cover)	1.0
R24	2680 Getta Getta Road, North Star	Crops only (no effective tree cover)	1.0

Photograph 3 – Adjoining land – Existing vegetation (north)

Photograph 4 – Adjoining land – Existing vegetation (south)

Photograph 5 – Adjoining land – Existing vegetation (east)

Photograph 6 – Adjoining land – Existing vegetation (west)

3.1.6 Wind direction factor (S_5)

Wind direction has the potential to increase the exposure of a receptor located in the downwind path. While most Australian feedlot sites will have some form of prevailing wind, it is unlikely that it will blow from that general direction (±40° of the direct line) for most of the time (>60%) (MLA, 2012).

Site-specific wind direction data was used in the S-factor assessment to determine wind direction. Wind roses derived from TAPM (2016-2020) were used which totalled 43,844 hours of data. Figure 6 (TAPM 2016-2020) shows that the predominant wind direction is from the northeast through to southeast. Consequently, the receptors that would be most affected is receptor R1, R15-22. However, the wind does not blow from that general direction (±40° of the direct line) towards these receptors for most of the time (>60%) in as outlined in Table 8. Consequently, a normal wind factor was applied to all receptors.

Table 8 – Proposed development – Wind direction – Adopted values of S_5

Identifier	Location	Wind Direction (Bearing)	Hours wind blowing within ±40° of the bearing	Percentage wind blowing within ±40° of the bearing	S_5 value
R1	2680 Getta Getta Road, North Star	103.9	20,475	46.7	1.0
R2	2680 Getta Getta Road, North Star	182.75	6,342	14.5	1.0
R3	1310 Goat Road, North Star	186.1	6,459	14.7	1.0
R4	2118 Getta Getta Road, North Star	215.5	7,693	17.5	1.0
R5	2116 Getta Getta Road, North Star	230	7,962	18.2	1.0
R6	2116 Getta Getta Road, North Star	228.4	7,873	18.0	1.0
R7	1767 Getta Getta Road, North Star	285.75	4,663	10.6	1.0
R8	621 Myall Downs Road, Blue Nobby	301.35	3,763	8.6	1.0
R9	621 Myall Downs Road, Blue Nobby	302.95	3,725	8.5	1.0
R10	61 Ryelands Road, Yallaroi	340	3,857	8.8	1.0
R11	61 Ryelands Road, Yallaroi	340.65	3,814	8.7	1.0
R12	2271 Blue Nobby Road, North Star	7.9	5,974	13.6	1.0
R13	2463 Blue Nobby Road, North Star	24.2	9,448	21.5	1.0
R14	2463 Blue Nobby Road, North Star	24.85	9,448	21.5	1.0
R15	3241 Blue Nobby Road, North Star	65.7	22,289	50.8	1.0
R16	5535 North Star Road, North Star	70.4	22,958	52.4	1.0
R17	5788 North Star Road, North Star	82.7	23,403	53.4	1.0
R18	5788 North Star Road, North Star	83.65	23,387	53.3	1.0
R19	5981 North Star Road, North Star	92.10	22,582	51.5	1.0
R20	North Star	95.30	22,148	50.5	1.0
R21	3824 Getta Getta Road, North Star	99.55	21,402	48.8	1.0
R22	3202 Getta Getta Road, North Star	100.45	21,194	48.3	1.0
R23	1278 Forest Creek Road, North Star	149.00	7,235	16.5	1.0
R24	2680 Getta Getta Road, North Star	117.40	16,460	37.5	1.0

3.1.7 Cumulative effects

There are no intensive livestock facilities in the North Star/Yetman region. There are several intensive livestock facilities in the Croppa Creek region. The closest intensive livestock facility is Tullin Tulla Feedlot and Myola Feedlot located some 17 km and 24 km southwest of the existing and proposed development respectively. Tullin Tulla Feedlot is licensed for a capacity of 5,000 head and owned by the Owen family. Myola Feedlot is licensed for a capacity of 20,000 head and is owned and operated by the Bindaree Food Group.

The proposed development and Tullin Tulla Feedlot and Myola Feedlot are not separated by less than half the shortest separation distance (369 m). Consequently, the proposed development and Tullin Tulla Feedlot and Myola Feedlot do not need to be treated as a single entity (having a capacity equivalent to the combined capacities of the two facilities) as they are sufficiently separated.

There are no sensitive receptors unacceptably located within the 120% overlap zone of both the proposed development and Tullin Tulla Feedlot or Myola Feedlot as shown on Figure 8. Consequently, as there are no sensitive receptors unacceptably located within the 120% overlap zone a cumulative impact assessment is not warranted in accordance with the National Feedlot Guidelines (MLA, 2012) and normal separation distances apply.

3.1.8 Conclusion

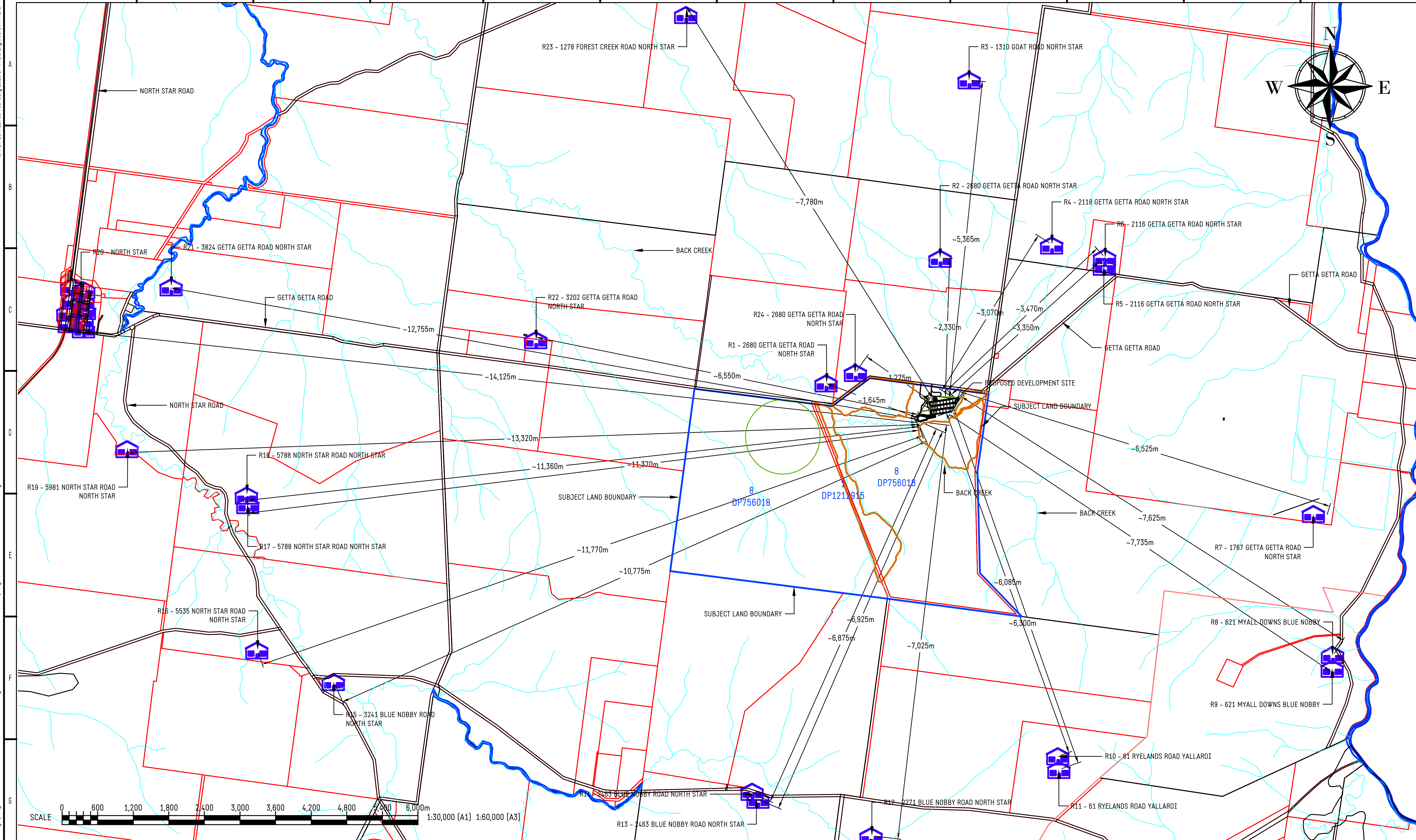
As outlined in Table 9, the S-factor assessment demonstrates that sufficient separation exists between the proposed development with a capacity of 3,000 head (2,620 SCUs) at 20.5 m^2/SCU and sensitive receptors respectively.

Table 9 – Proposed development – Separation distances from National Feedlot Guidelines (MLA, 2012)

Identifier	Type	Direction	S_1	S_2	S_3	S_4	S_5	Distance Required Normal S_5	Available Distance	Compliance
							Normal	m	m	
R1	2680 Getta Getta Road, North Star	West by North	45	0.3	1.0	1.0	1.0	592	~1,625	Yes
R2	2680 Getta Getta Road, North Star	North	45	0.3	1.0	1.0	1.0	592	~2,330	Yes
R3	1310 Goat Road, North Star	North by East	45	0.3	1.0	1.0	1.0	592	~5,365	Yes
R4	2118 Getta Getta Road, North Star	North northeast	45	0.3	1.0	1.0	1.0	592	~3,070	Yes
R5	2116 Getta Getta Road, North Star	North east	45	0.3	1.0	1.0	1.0	592	~3,350	Yes
R6	2116 Getta Getta Road, North Star	North east	45	0.3	1.0	1.0	1.0	592	~3,470	Yes
R7	1767 Getta Getta Road, North Star	East southeast	45	0.3	1.0	1.0	1.0	592	~6,525	Yes
R8	621 Myall Downs Road, Blue Nobby	South-east by east	45	0.3	1.0	1.0	1.0	592	~7,625	Yes
R9	621 Myall Downs Road, Blue Nobby	South-east by east	45	0.3	1.0	1.0	1.0	592	~7,735	Yes
R10	61 Ryelands Road, Yallaroi	South southeast	45	0.3	1.0	1.0	1.0	592	~6,085	Yes
R11	61 Ryelands Road, Yallaroi	South southeast	45	0.3	1.0	1.0	1.0	592	~6,300	Yes
R12	2271 Blue Nobby Road, North Star	South	45	0.3	1.0	1.0	1.0	592	~7,025	Yes
R13	2463 Blue Nobby Road, North Star	South by West	45	0.3	1.0	1.0	1.0	592	~6,925	Yes
R14	2463 Blue Nobby Road, North Star	South by West	45	0.3	1.0	1.0	1.0	592	~6,875	Yes
R15	3241 Blue Nobby Road, North Star	Southwest	45	0.3	1.0	1.0	1.0	592	~10,775	Yes
R16	5535 North Star Road, North Star	Southwest	45	0.3	1.0	1.0	1.0	592	~11,770	Yes

Table 43 – Proposed Development - Separation distances from National Feedlot Guidelines (MLA, 2012) cont'd

Identifier	Type	Direction	S1	S2	S3	S4	S5	Distance Required Normal S_5	Available Distance	Compliance
							Normal	m	m	
R17	5788 North Star Road North Star	South southwest	45	0.3	1.0	1.0	1.0	592	~11,370	Yes
R18	5788 North Star Road North Star	South southwest	45	0.3	1.0	1.0	1.0	592	~11,360	Yes
R19	5981 North Star Road North Star	West	45	0.3	1.0	1.0	1.0	592	~13,320	Yes
R20	North Star village	West by North	45	1.0	1.0	1.0	1.0	1,975	~14,125	Yes
R21	3824 Getta Getta Road North Star	West by North	45	0.3	1.0	1.0	1.0	592	~12,755	Yes
R22	3202 Getta Getta Road North Star	West by North	45	0.3	1.0	1.0	1.0	592	~6,550	Yes
R23	1278 Forest Creek Road North Star	North northwest	45	0.3	1.0	1.0	1.0	592	~7,780	Yes
R24	2680 Getta Getta Road, North Star	Northwest	45	0.3	1.0	1.0	1.0	592	~1,275	Yes



LEGEND

- SUBJECT LAND BOUNDARY
- LAND PARCEL BOUNDARY
- RURAL RESIDENTIAL RECEPTOR
- SMALL TOWN RECEPTOR
- HYDROLINE

NOTES:

1. CADASTRAL INFORMATION BASED ON THE NSW GOVERNMENT SPATIAL SERVICES DIGITAL CADASTRAL DATABASE (DCDB) 2022, PROVIDED BY THE NSW DEPARTMENT OF FINANCE, SERVICES AND INNOVATION (DFSI) SPATIAL INFORMATION eXCHANGE AND ACCURACY IS LIMITED.
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STATUS: **FOR APPROVAL**
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RPEQ

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REV.	DATE	REVISION DESCRIPTION	DRAWN	CHECK	APPROVED
A	24/01/25	DRAFT ISSUE TO CLIENT	RJD	RJD	RJD
B	21/02/25	FINAL ISSUE FOR SUBMISSION TO GSC	RJD	RJD	RJD

SCALE	1:60,000 (A3)
DRAWN	RJD
DATE	21/02/2025
CHECKED	RJD
DATE	21/02/2025
APPROVED	RJD
DATE	21/02/2025

CLIENT: DOOLIN FARMING PTY LTD
PROJECT: PROPOSED 3,000 HEAD BEEF CATTLE FEEDLOT
TITLE: DEVELOPMENT APPLICATION FOR INTENSIVE LIVESTOCK AGRICULTURE
EIS APPENDIX G - SEPARATION DISTANCE ASSESSMENT
PROPOSED DEVELOPMENT - SEPARATION TO SENSITIVE RECEPTORS PLAN

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 8		A3	E2-103-200-08	B

DATE PLOTTED: 19 February 2025 BY : RDC Engineers PTY LTD
FILE PATH: C:\RDC Engineers\RDCE - Projects\E2-103 Doolin Farming Springfield EIS\05 - ACAD MasterPlan\05.1 Drawings - CURRENT FILE NAME: E2-103 DF Springfield MASTERPLAN-00-20250108-B.dwg

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Appendix H

Water Licences

Information about a water licence or approval

Use this tool to search for information about water licences and approvals issued under the *Water Act 1912* or *Water Management Act 2000*.

Select the type of licence or approval and enter the licence or approval number:

- **Water access licence (WAL):** a WAL number starts with the letters 'WAL' followed by several numbers; a WAL also has a reference number that starts with a two digit number, followed by 'AL' and then several numbers.
- **1912 water licence:** a water licence number starts with a two digit number, followed by a two letter code and then several numbers. Note: a PT reference number cannot be entered.
- **Approval:** an approval number starts with a two digit number, followed by a two letter code (WA, UA, CA or FW) and then several numbers.

Search for information about either a:

◉ **Water access licence (WAL) issued under the *Water Management Act 2000***

Water Access Licence (WAL) Number WAL 41169

A WAL number starts with the letters 'WAL' followed by several numbers

Can't find your WAL number? Do you have a reference number? A reference number starts with a two digit number, followed by 'AL' and then several numbers. Use the following tool to find your WAL by entering your reference number. Enter the reference number to find the WAL number.

Cancelled WALs are not searchable on the NSW Water Register.

Notes:

The search results will list the conditions imposed on the water access licence. Any approved water supply work/s nominated on the water access licence are identified by the approval number/s for the work/s.

The information about a water access licence provided in the search results is a summary and may not always be up to date. If you require full and up to date details about a particular water access licence (including current holders, share and extraction component details, encumbrances and notations) you should search the Water Access Licence Register administered by NSW Land Registry Services.

○ *Water Act 1912* Licences and Authorities

○ Approval issued under the *Water Management Act 2000*

Find out if a *Water Act 1912* licence has been converted

○ Water licence conversion status

« Previous Search Print Export

Search Results

Category [Subcategory]	Status	Water Source	Tenure Type	Management Zone	Share Components (units or ML)	IDEC (Daily flow shares)
Aquifer	Current	Eastern Recharge Groundwater Source	Continuing		1,558.00	N/A

Extraction Times or Rates

Subject to conditions water may be taken at any time or rate

Nominated Work Approval(s)

90CA811247

- Conditions

Plan Conditions

Water sharing plan	NSW Great Artesian Basin Groundwater Sources 2020
	Take of water
MW7035-00005	The maximum water allocation that may be carried over in the water allocation account from one water year to the next water year is 0.6 ML/unit share of the access licence share component.
MW7032-00007	The maximum water account debit in a water year must not exceed the following: A. 1.3 ML/unit share of the access licence share component or, if applicable, a lower amount determined by the Minister, plus B. the net amount of water allocations assigned to or from the water allocation account under a water allocation assignment in the that water year, plus C. any water allocations re-credited by the Minister to the water allocation account in that water year.
	Monitoring and recording
MW6612-00001	A logbook used to record water take information must be retained for five (5) years from the last date recorded in the logbook.
	Reporting
MW6983-00003	A. Once the water access licence holder becomes aware of a breach of any condition on this water access licence, the water access licence holder must notify the Minister as soon as practicable. B. If the initial notification was not in writing, written notice must be provided within seven days of becoming aware of the breach by emailing: nrar.enquiries@nrar.nsw.gov.au

Other Conditions

NIL

More information: Should you require further information or technical assistance, please submit your request to customer.helpdesk@waternsw.com.au or contact 1300 662 077

Appendix I

Groundwater Bore Report

WaterNSW
Work Summary

GW005873

Licence: 90BL007117 **Licence Status:** CONVERTED

Authorised Purpose(s): STOCK
Intended Purpose(s): STOCK

Work Type: Bore open thru rock
Work Status:
Construct.Method: Cable Tool
Owner Type: Private

Commenced Date: **Final Depth:** 207.30 m
Completion Date: 01/12/1957 **Drilled Depth:** 207.30 m

Contractor Name: (None)
Driller:
Assistant Driller:

Property: SPRINGFIELD NSW **Standing Water Level (m):**
GWMA: 601 **Salinity Description:** Good
GW Zone: **Yield (L/s):**

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	STAPYLTON	STAPYLTON	8
Licensed:	STAPYLTO	STAPYLTO	Whole Lot

Region: 90 - Barwon **CMA Map:** 9040-S

River Basin: 416 - BORDER RIVERS **Grid Zone:** **Scale:**
Area/District:

Elevation: 0.00 m (A.H.D.) **Northing:** 6793879.000 **Latitude:** 28°57'37.3"S
Elevation Source: (Unknown) **Easting:** 258695.000 **Longitude:** 150°31'26.0"E

GS Map: - **MGA Zone:** 56 **Coordinate Source:** GD.,ACC.MAP

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1	1	Casing	Threaded Steel	-0.50	158.80	127			
1	1	Casing	Threaded Steel	0.00	144.20	152			

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
39.00	39.00	0.00	(Unknown)			0.01			
125.00	125.00	0.00	Unconsolidated			0.04			
144.80	144.80	0.00	(Unknown)	39.60		0.38			
151.20	154.80	3.60	Consolidated						
167.60	195.00	27.40	Consolidated						

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	1.21	1.21	Soil Black Basalt Pebbles/pebbly	Soil	
1.21	2.13	0.92	Pipe Clay	Clay	
2.13	21.33	19.20	Sandstone Yellow	Sandstone	
21.33	39.01	17.68	Shale	Shale	
39.01	54.86	15.85	Sandstone	Sandstone	
54.86	124.96	70.10	Shale Free Small Sand Bands	Shale	
124.96	144.78	19.82	Shale	Shale	
144.78	149.35	4.57	Sandstone Coarse	Sandstone	
149.35	151.18	1.83	Shale	Shale	
151.18	154.83	3.65	Sandstone Water Supply	Sandstone	
154.83	167.64	12.81	Sandstone	Sandstone	
167.64	195.07	27.43	Sandstone Water Supply	Sandstone	
195.07	201.16	6.09	Sandstone	Sandstone	
201.16	207.26	6.10	Shale	Shale	

***** End of GW005873 *****

WaterNSW
Work Summary

GW006427

Licence: 90BL001039 **Licence Status:** CONVERTED

Authorised Purpose(s): DOMESTIC,STOCK
Intended Purpose(s): STOCK, DOMESTIC

Work Type: Bore open thru rock
Work Status:
Construct.Method: Cable Tool
Owner Type: Private

Commenced Date: **Final Depth:** 227.40 m
Completion Date: 01/10/1938 **Drilled Depth:** 227.40 m

Contractor Name: (None)
Driller:
Assistant Driller:

Property: CROOBLE NSW **Standing Water Level (m):**
GWMA: 601 **Salinity Description:** Fresh
GW Zone: **Yield (L/s):**

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	STAPYLTON	STAPYLTON	8
Licensed:	STAPYLTO	STAPYLTO	Whole Lot

Region: 90 - Barwon **CMA Map:** 9040-S
River Basin: 416 - BORDER RIVERS **Grid Zone:** **Scale:**
Area/District:

Elevation: 0.00 m (A.H.D.) **Northing:** 6793719.000 **Latitude:** 28°57'43.3"S
Elevation Source: (Unknown) **Easting:** 259864.000 **Longitude:** 150°32'09.0"E

GS Map: - **MGA Zone:** 56 **Coordinate Source:** GD.,ACC.MAP

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1	1	Casing	Threaded Steel	0.00	223.60	152			

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
76.20	76.80	0.60	Consolidated	61.00		0.04			
141.10	159.90	18.80	Consolidated	141.10		0.23			
222.50	227.30	4.80	Consolidated	70.10		0.38			

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	1.52	1.52	Earth	Invalid Code	
1.52	3.04	1.52	Pipe Clay	Clay	
3.04	20.11	17.07	Clay Yellow	Clay	
20.11	23.46	3.35	Shale	Shale	
23.46	28.04	4.58	Shale Grey Sandy	Shale	
28.04	28.34	0.30	Sandstone Hard	Sandstone	
28.34	31.08	2.74	Sandstone Grey	Sandstone	
31.08	32.61	1.53	Sandstone White Fine	Sandstone	
32.61	34.74	2.13	Shale Sandy	Shale	
34.74	44.19	9.45	Shale Grey Sandy	Shale	
44.19	48.76	4.57	Shale Black Heavy	Shale	
48.76	61.56	12.80	Shale Grey Sandy	Shale	
61.56	76.20	14.64	Shale Grey	Shale	
76.20	76.80	0.60	Sandstone Grey Fine Water Supply	Sandstone	
76.80	77.11	0.31	Shale Grey	Shale	
77.11	94.79	17.68	Shale Grey Sandy	Shale	
94.79	95.40	0.61	Sandstone Grey Fine	Sandstone	
95.40	97.84	2.44	Shale Sandy Fine	Shale	
97.84	112.77	14.93	Shale Grey	Shale	
112.77	120.39	7.62	Shale Grey Sandy	Shale	
120.39	123.74	3.35	Sandstone Grey	Sandstone	
123.74	124.96	1.22	Shale Grey Sandy	Shale	
124.96	138.68	13.72	Sandstone	Sandstone	
138.68	141.12	2.44	Shale Grey	Shale	
141.12	160.02	18.90	Sandstone Water Supply	Sandstone	
160.02	164.59	4.57	Shale Micaceous	Shale	
164.59	185.92	21.33	Shale Grey Sandy	Shale	
185.92	188.36	2.44	Shale Sandy	Shale	
188.36	213.05	24.69	Sandstone White Coarse	Sandstone	
213.05	216.40	3.35	Shale Grey	Shale	
216.40	222.50	6.10	Sandstone Coarse	Sandstone	
222.50	227.38	4.88	Sandstone Hard Water Supply	Sandstone	

***** End of GW006427 *****

WaterNSW
Work Summary

GW016679

Licence: 90BL007118

Licence Status: CONVERTED

Authorised Purpose(s): STOCK
Intended Purpose(s): STOCK

Work Type: Bore open thru rock
Work Status:
Construct.Method: Cable Tool
Owner Type: Private

Commenced Date:
Completion Date: 01/01/1957

Final Depth: 192.90 m
Drilled Depth: 192.90 m

Contractor Name: (None)
Driller:
Assistant Driller:

Property: SPRINGFIELD NSW
GWMA: 601
GW Zone:

Standing Water Level (m):
Salinity Description: Good
Yield (L/s):

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	STAPYLTON	STAPYLTON	8
Licensed:	STAPYLTO	STAPYLTO	Whole Lot

Region: 90 - Barwon

CMA Map: 9040-S

River Basin: 416 - BORDER RIVERS
Area/District:

Grid Zone:

Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: (Unknown)

Northing: 6793148.000
Easting: 257627.000

Latitude: 28°58'00.3"S
Longitude: 150°30'46.0"E

GS Map: -

MGA Zone: 56

Coordinate Source: GD.,ACC.MAP

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1	1	Casing	Threaded Steel	-0.50	152.60	152			Suspended in Clamps

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
57.00	58.50	1.50	Consolidated	51.80		0.13			
175.90	189.00	13.10	Consolidated	51.80					

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	0.60	0.60	Topsoil Black	Topsoil	
0.60	1.21	0.61	Basalt	Basalt	
1.21	18.89	17.68	Clay Yellow	Clay	
18.89	41.14	22.25	Sandstone	Sandstone	
41.14	51.20	10.06	Shale	Shale	
51.20	56.99	5.79	Sandstone	Sandstone	
56.99	58.52	1.53	Sandstone Water Supply	Sandstone	
58.52	67.66	9.14	Sandstone	Sandstone	
67.66	69.49	1.83	Shale	Shale	
69.49	70.71	1.22	Sandstone	Sandstone	
70.71	74.98	4.27	Shale	Shale	
74.98	78.94	3.96	Sandstone	Sandstone	
78.94	79.24	0.30	Shale	Shale	
79.24	81.07	1.83	Sandstone	Sandstone	
81.07	145.38	64.31	Shale Water Supply	Shale	
145.38	175.86	30.48	Sandstone	Sandstone	
175.86	188.97	13.11	Sandstone Water Supply	Sandstone	
188.97	192.93	3.96	Sandstone	Sandstone	

***** End of GW016679 *****

WaterNSW
Work Summary

GW093553

Licence:

Licence Status:

Authorised Purpose(s):
Intended Purpose(s): MONITORING BORE

Work Type: Bore - GAB
Work Status: Instrumented
Construct.Method: Rotary Mud
Owner Type: NSW Office of Water

Commenced Date:
Completion Date: 09/12/2007

Final Depth: 293.00 m
Drilled Depth: 293.00 m

Contractor Name: DWE GROUNDWATER DRILLING
Driller: Phillip Francis Gaffney
Assistant Driller: John Brien

Property:
GWMA:
GW Zone:

Standing Water Level (m): 57.800
Salinity Description:
Yield (L/s): 5.000

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	STAPYLTON	TUBBLE GAH	24//756022
Licensed:			

Region: 90 - Barwon
CMA Map: 9040-S
River Basin: 416 - BORDER RIVERS
Area/District:
Grid Zone:
Scale:

Elevation: 289.79 m (A.H.D.)
Elevation Source: Unknown
Northing: 6797488.000
Easting: 264621.000
Latitude: 28°55'43.8"S
Longitude: 150°35'07.5"E

GS Map: -
MGA Zone: 56
Coordinate Source: GD.,PR. MAP

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1		Hole	Hole	0.00	115.00	222			Rotary Mud
1		Hole	Hole	115.00	293.00	172			Rotary Mud
1	1	Casing	Pressure Cemented	-0.85	115.00	168	158		Cemented, Welded - Butt
1	1	Casing	Steel - Erw	103.00	293.00	114	104		Cemented, Welded - Butt, S: 284.00-293.00m
1	1	Opening	Slots - Vertical	149.00	158.00	114		0	Casing - Plasma-cut Slot, Steel - ERW, Welded - Butt, SL: 500.0mm, A: 4.00mm
1	1	Opening	Slots - Vertical	239.00	248.00	114		0	Casing - Plasma-cut Slot, Steel - ERW, Welded - Butt, SL: 500.0mm, A: 4.00mm
1	1	Opening	Slots - Vertical	275.00	284.00	114		0	Casing - Plasma-cut Slot, Steel - ERW, Welded - Butt, SL: 500.0mm, A: 4.00mm

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
114.00	256.00	142.00	Unknown	57.80		5.00		06:00:00	

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	1.50	1.50	Soil, black	Soil	
1.50	4.50	3.00	Clay, yellow	Clay	
4.50	6.00	1.50	Sandstone, hard, red	Sandstone	
6.00	8.00	2.00	Clay, yellow	Clay	
8.00	19.00	11.00	Clay, brown	Clay	
19.00	27.00	8.00	Shale	Shale	
27.00	42.00	15.00	Sandstone, grey	Sandstone	
42.00	43.00	1.00	Coal	Coal	
43.00	46.00	3.00	Sandstone, grey	Sandstone	
46.00	51.00	5.00	Shale	Shale	
51.00	55.00	4.00	Sandstone, grey	Sandstone	
55.00	66.00	11.00	Shale	Shale	
66.00	67.00	1.00	Sandstone, grey	Sandstone	
67.00	68.00	1.00	Shale/Clay	Shale	
68.00	72.00	4.00	Sandstone, grey	Sandstone	
72.00	114.00	42.00	Shale	Shale	
114.00	256.00	142.00	Sandstone, grey	Sandstone	
256.00	270.00	14.00	Shale	Shale	
270.00	289.00	19.00	Sandstone	Sandstone	
289.00	293.00	4.00	Shale	Shale	

Remarks

09/12/2007: Form A Remarks:
Nat Carling, 19-June-2008: GPS provided by hydrogeologist, Steel ERW casing was pressure cemented from 0-115m.
WMMIS Drilling at GAB Eastern Recharge Zone.
14/07/2010: Nat Carling, 14-July-2010: Entered geology log.
09/06/2020: HDT Intermedaite viisit TS/BK.SWL:53.710 Raw:28.584 Battery:13.7 Solar:14.1 RSSI:-73 WLM Solinst 100m:51034 Cal.Due: 05/11/2021 Sensor exchanged for calibration
24/05/2021: HDT Visit TS.SWL:49.580 Raw:27.729 Battery:13.7 Solar:14.1 RSSI:-73 WLM Solinst 100m:51034 Cal.Due: 05/11/2021
HDT Visit TS.SWL:49.580 Raw:27.729 Battery:13.7 Solar:14.1 RSSI:-73 WLM Solinst 100m:51034 Cal.Due: 05/11/2021
15/11/2021: HDT Visit by BK/TS SWL:44.970 Log:NAN/44.974 after reset. Raw:29.536 RSSI:-71 Solar:19.63 Batt:14.3
24/05/2022: New site book needed

31/05/2023: Logger=60.67/ Actual60.73/rssi=-71/ Batt=13.7/sol=14.2/ Sensor exchanged for Cal Height reset 60.73
31/05/2023: Sensor exchanged for calibration

***** End of GW093553 *****

WaterNSW
Work Summary

GW093558

Licence:

Licence Status:

Authorised Purpose(s):
Intended Purpose(s): MONITORING BORE

Work Type: Bore - GAB
Work Status: Instrumented
Construct.Method: Rotary Mud
Owner Type: NSW Office of Water

Commenced Date:
Completion Date: 27/05/2008

Final Depth: 357.00 m
Drilled Depth: 357.00 m

Contractor Name: DWE GROUNDWATER DRILLING
Driller: Edward Noel Williams
Assistant Driller: Joel Ray

Property:
GWMA:
GW Zone:

Standing Water Level (m):
Salinity Description:
Yield (L/s): 8.000

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	STAPYLTON	STAPYLTON	2//609384
Licensed:			

Region: 90 - Barwon
River Basin: 416 - BORDER RIVERS
Area/District:

CMA Map: 8940-S
Grid Zone:
Scale:

Elevation: 276.59 m (A.H.D.)
Elevation Source: Unknown

Northing: 6796235.000
Easting: 251947.000

Latitude: 28°56'15.9"S
Longitude: 150°27'18.8"E

GS Map: -
MGA Zone: 56
Coordinate Source: GD.,PR. MAP

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1		Hole	Hole	0.00	200.00	222			Rotary Mud
1		Hole	Hole	200.00	357.00	152			Rotary Mud
1	1	Casing	Pressure Cemented	-1.06	200.00	168	158		Cemented, Welded - Butt
1	1	Casing	Steel - Erw	116.00	287.00	141	131		Cemented, Kwik-lock
1	1	Casing	Steel - Erw	231.00	357.00	114	104		Cemented, Kwik-lock, S: 348.00-357.00m
1	1	Opening	Slots - Vertical	302.00	347.00	114		0	Casing - Plasma-cut Slot, Stainless Steel 316, Welded - Butt, SL: 300.0mm, A: 1.00mm

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
218.00	268.00	50.00	Unknown			8.00		08:00:00	
285.00	357.00	72.00	Unknown						

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	1.00	1.00	Topsoil	Topsoil	
1.00	9.00	8.00	Sandy Clay, yellow	Invalid Code	
9.00	13.00	4.00	Sandy Clay, grey	Invalid Code	
13.00	110.00	97.00	Shale	Shale	
110.00	118.00	8.00	Sandstone	Sandstone	
118.00	119.00	1.00	Shale, sandy	Shale	
119.00	219.00	100.00	Shale	Shale	
219.00	268.00	49.00	Sandstone	Sandstone	
268.00	285.00	17.00	Shale, sandy	Shale	
285.00	357.00	72.00	Sandstone	Sandstone	

Remarks

27/05/2008: Form A Remarks:
Nat Carling, 19-June-2008: GPS provided by hydrogeologist, Steel ERW casing was pressure cemented from 0-200m. Geologist log entered. Comments provided on log: 1; Slots were selected from drill samples. 2; 141mm diameter liner with slots was lowered in the hole first, but it could not reach the bottom and struck at depth 284m. As this liner could not be retrieved from the hole, another smaller diameter (114mm) liner was lowered through the above liner. 3; Driller informed that the bore was drilled to 361m and later it is confirmed that the hole is only 354m deep. 4; This hole is drilled using two shifts with two different drillers. Samples: Logged from the rotary mud drilling samples collected from each length of drilling stem.
01/10/2008: Nat Carling, 1-Oct-2008: Adjusted coordinates, based on GPS provided by State Water survey (Jim Salmon).
31/05/2017: BDK L39.51swl H 39.50swl
06/07/2017: BDK L 39.13swl H 39.11swl
22/05/2018: SJM BDK L 48.24swl H 48.31swl / replace sim out 60575602 2n /in 800022577454 8n
31/05/2018: SJM replace battery 12amh
09/06/2020: HDT Intermediate Visit TS/BK.SWL:43.000 Raw:16.008 Battery:13.7 Solar:14.1 RSSI:-85 WLM Solinst 100m:51034 Cal.Due: 05/11/2021
Sensor exchanged for calibration
24/05/2021: HDT Visit TS.SWL:37.580 Raw:21.630 Battery:13.6 Solar:14.1 RSSI:-81 WLM Solinst 100m:51034 Cal.Due: 05/11/2021
15/11/2021: HDT Visit TS/BK.SWL:33.760 Raw:25.734 Solar:18.4 Battery:14.2 RSSI:-83 WLM Solinst 100m:51034 Cal.Due:05/11/2021
31/05/2023: Logger=42.41/Actual=42.41/Raw=16.384/Rssi=-71/Batt14.85/Sol=19.0/Height reset

*** End of GW093558 ***

WaterNSW
Work Summary

GW900932

Licence: 90CA811247 | **Licence Status:** CURRENT

Authorised Purpose(s): DOMESTIC,INDUSTRIAL (LOW SECURITY),IRRIGATION,STOCK
Intended Purpose(s): IRRIGATION

Work Type: Bore - GAB
Work Status:
Construct.Method: Rot. Rev. Circ
Owner Type:

Commenced Date: | **Final Depth:** 371.00 m
Completion Date: 15/03/1996 | **Drilled Depth:** 378.00 m

Contractor Name: ARFRAC DRILLING PTY LTD
Driller: Alan Francis Ryan
Assistant Driller:

Property: MINILYA Oaklea MOREE 2400 NSW,PT WARIVAN NORTH STAR 2408 NSW,DYERS/GLENHOMA GLENHOMA NORTH STAR 2408 NSW | **Standing Water Level (m):**
GWMA: 601 | **Salinity Description:**
GW Zone: | **Yield (L/s):**

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	STAPYLTON	STAPYLTON	8
Licensed:	STAPYLTO	STAPYLTO	Whole Lot 10//756018

Region: 90 - Barwon | **CMA Map:**
River Basin: - Unknown | **Grid Zone:** | **Scale:**
Area/District:

Elevation: 0.00 m (A.H.D.) | **Northing:** 6794939.000 | **Latitude:** 28°57'02.3"S
Elevation Source: Unknown | **Easting:** 257806.000 | **Longitude:** 150°30'54.0"E

GS Map: - | **MGA Zone:** 56 | **Coordinate Source:** Unknown

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1		Hole	Hole	0.00	3.00	375			Rotary
1		Hole	Hole	3.00	247.20	311			Rotary Air
1		Hole	Hole	247.20	371.00	200			Rotary Air
1		Hole	Hole	371.00	378.00	150			Rotary Air
1	1	Casing	Steel	0.00	3.00	356	336		
1	1	Casing	Steel	0.50	247.20	219	206		

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	1.00	1.00	black - brown top soil	Unknown	
1.00	13.00	12.00	light brown weathered sandstone and siltstone	Unknown	
13.00	20.00	7.00	grey mudstone sandy	Unknown	
20.00	22.00	2.00	grey sandstone, silty	Unknown	
22.00	33.00	11.00	grey mudstone	Unknown	
33.00	35.00	2.00	grey blue mudstone, soapstone	Unknown	
35.00	36.00	1.00	grey sandy mudstone	Unknown	
36.00	37.00	1.00	grey mudstone	Unknown	
37.00	38.00	1.00	blueish soapstone	Unknown	
38.00	49.00	11.00	grey sandy mudstone	Unknown	
49.00	54.00	5.00	grey mudstone	Unknown	
54.00	64.00	10.00	light grey sandstone, silty	Unknown	
64.00	75.00	11.00	grey mudstone	Unknown	
75.00	77.00	2.00	grey sandstone, silty	Unknown	
77.00	86.00	9.00	grey mudstone slightly sandy	Unknown	
86.00	95.00	9.00	grey mudstone	Unknown	
95.00	100.00	5.00	grey sandstone, silty	Unknown	
100.00	139.00	39.00	grey mudstone , sand at 114m and 136m	Unknown	
139.00	162.00	23.00	grey sandstone, silty, coal lenses at 159m	Unknown	
162.00	165.00	3.00	grey mudstone minor carb	Unknown	
165.00	180.00	15.00	grey silty sandstone	Unknown	
180.00	181.00	1.00	grey mudstone	Unknown	
181.00	184.00	3.00	grey sandstone, silty	Unknown	
184.00	192.00	8.00	grey sandy mudstone	Unknown	
192.00	203.00	11.00	grey mudstone	Unknown	
203.00	224.00	21.00	grey sandstone, silty	Unknown	
224.00	226.00	2.00	grey mudstone with basalt lenses	Unknown	
226.00	230.00	4.00	grey silty sandstone	Unknown	
230.00	232.00	2.00	grey coarse silty sandstone	Unknown	
232.00	247.00	15.00	grey sandstone, silty	Unknown	
247.00	248.00	1.00	grey coarse silty sandstone	Unknown	
248.00	251.00	3.00	grey coarse sandstone, clean	Unknown	
251.00	263.00	12.00	grey fine sandstone, silty	Unknown	
263.00	265.00	2.00	carb lenses	Unknown	
265.00	266.00	1.00	grey coarse sandstone and minor carb with quartz lenses	Unknown	
266.00	273.00	7.00	grey fine silty sandstone	Unknown	
273.00	277.00	4.00	grey coarse silty sandstone	Unknown	
277.00	296.00	19.00	off white fine silty sandstone	Unknown	

296.00	298.00	2.00	off white coarse sandstone	Unknown	
298.00	302.00	4.00	off white fine sandstone	Unknown	
302.00	330.00	28.00	off white fine silty sandstone	Unknown	
330.00	331.00	1.00	off white fine sandstone with minor carb	Unknown	
331.00	334.00	3.00	grey/white coarse sandstone	Unknown	
334.00	336.00	2.00	grey coarse sandstone silty with minor carb	Unknown	
336.00	356.00	20.00	off white fine sandstone	Unknown	
356.00	367.00	11.00	grey off white coarse sandstone	Unknown	
367.00	371.00	4.00	off white fine sandstone	Unknown	
371.00	373.00	2.00	grey coarse sandstone, silty	Unknown	
373.00	378.00	5.00	grey/off white coarse sandstone	Unknown	

Remarks

15/03/1996: Form A Remarks:
see composite log for aquifers

***** End of GW900932 *****

Appendix J

Biodiversity Assessment

Australian Government

Department of Climate Change, Energy, the Environment and Water

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 07-Oct-2024

- Summary
- Details
  - Matters of NES
  - Other Matters Protected by the EPBC Act
  - Extra Information
- Caveat
- Acknowledgements

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	3
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	6
Listed Threatened Species:	33
Listed Migratory Species:	8

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	17
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	None
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	1
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	1
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar Wetlands) [Resource Information]

Ramsar Site Name	Proximity	Buffer Status
Banrock station wetland complex	1100 - 1200km upstream from Ramsar site	In feature area
Riverland	1000 - 1100km upstream from Ramsar site	In feature area
The coorong, and lakes alexandrina and albert wetland	1200 - 1300km upstream from Ramsar site	In feature area

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Brigalow (Acacia harpophylla dominant and co-dominant)	Endangered	Community known to occur within area	In buffer area only
Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions	Endangered	Community may occur within area	In feature area
Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland	Critically Endangered	Community likely to occur within area	In feature area
Poplar Box Grassy Woodland on Alluvial Plains	Endangered	Community likely to occur within area	In feature area
Weeping Myall Woodlands	Endangered	Community may occur within area	In feature area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community may occur within area	In feature area

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Foraging, feeding or related behaviour may occur within area	In feature area
Aphelocephala leucopsis Southern Whiteface [529]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Calyptorhynchus lathami lathami South-eastern Glossy Black-Cockatoo [67036]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Climacteris picumnus victoriae Brown Treecreeper (south-eastern) [67062]	Vulnerable	Species or species habitat may occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat may occur within area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat may occur within area	In feature area
Geophaps scripta scripta Squatter Pigeon (southern) [64440]	Vulnerable	Species or species habitat may occur within area	In feature area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Lathamus discolor			
Swift Parrot [744]	Critically Endangered	Species or species habitat may occur within area	In feature area
Melanodryas cucullata cucullata			
South-eastern Hooded Robin, Hooded Robin (south-eastern) [67093]	Endangered	Species or species habitat may occur within area	In feature area
Neophema chrysostoma			
Blue-winged Parrot [726]	Vulnerable	Species or species habitat may occur within area	In feature area
Polytelis swainsonii			
Superb Parrot [738]	Vulnerable	Species or species habitat may occur within area	In feature area
Rostratula australis			
Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area	In feature area
Stagonopleura guttata			
Diamond Firetail [59398]	Vulnerable	Species or species habitat likely to occur within area	In feature area
MAMMAL			
Chalinolobus dwyeri			
Large-eared Pied Bat, Large Pied Bat [183]	Endangered	Species or species habitat likely to occur within area	In feature area
Dasyurus maculatus maculatus (SE mainland population)			
Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat may occur within area	In feature area
Nyctophilus corbeni			
Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)			
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Endangered	Species or species habitat likely to occur within area	In feature area
Pteropus poliocephalus			
Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
PLANT			
Cadellia pentastylis Ooline [9828]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Dichanthium setosum bluegrass [14159]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Homopholis belsonii Belson's Panic [2406]	Vulnerable	Species or species habitat may occur within area	In feature area
Lepidium aschersonii Spiny Peppercress [10976]	Vulnerable	Species or species habitat may occur within area	In feature area
Lepidium monoplocoides Winged Pepper-cress [9190]	Endangered	Species or species habitat may occur within area	In feature area
Swainsona murrayana Slender Darling-pea, Slender Swainson, Murray Swainson-pea [6765]	Vulnerable	Species or species habitat may occur within area	In feature area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat may occur within area	In feature area
Vincetoxicum forsteri listed as Tylophora linearis [92384]	Endangered	Species or species habitat may occur within area	In feature area
REPTILE			
Anomalopus mackayi Five-clawed Worm-skink, Long-legged Worm-skink [25934]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Hemiaspis damelii Grey Snake [1179]	Endangered	Species or species habitat likely to occur within area	In feature area
Uvidicolus sphyrurus Border Thick-tailed Gecko, Granite Belt Thick-tailed Gecko [84578]	Vulnerable	Species or species habitat may occur within area	In buffer area only

Listed Migratory Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Migratory Terrestrial Species			
Hirundapus caudacutus			
White-throated Needletail [682]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Motacilla flava			
Yellow Wagtail [644]		Species or species habitat may occur within area	In feature area
Migratory Wetlands Species			
Actitis hypoleucos			
Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Calidris acuminata			
Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris ferruginea			
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Calidris melanotos			
Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
Gallinago hardwickii			
Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat may occur within area	In feature area

Other Matters Protected by the EPBC Act

Listed Marine Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat likely to occur within area overfly marine area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat may occur within area overfly marine area	In feature area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat may occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat likely to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat may occur within area overfly marine area	In feature area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat may occur within area overfly marine area	In feature area
Pterodroma cervicalis White-necked Petrel [59642]		Species or species habitat may occur within area	In feature area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area

Extra Information

EPBC Act Referrals				[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area

Bioregional Assessments [Resource Information]

SubRegion	BioRegion	Website	Buffer Status
Gwydir	Northern Inland Catchments	BA website	In feature area

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.

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Department of Planning and Environment

Biodiversity Development Assessment Report, 2513 Getta Getta Road, North Star feedlot expansion

Prepared by Tom Pollard, BAAS18071

Final Report February 2025

Document control

Version	Date	Author	Details
1	12/04/2024	T. Pollard	RDC Engineers
2	20/02/2025	T. Pollard	Final issued with development application

Summary

- The proposed development is for the expansion of an existing cattle feedlot, from 999 head to 3,500 head of cattle.
- The BOS applies to the proposed development as native vegetation removal for the proposal exceeds the clearing threshold for the minimum lot size shown in the Gwydir LEP 2012 applicable to the subject land.
- The subject land supports 9.41 ha of PCT 429 White Cypress Pine - Poplar Box - Silver-leaved Ironbark viney shrub woodland of the Brigalow Belt South Bioregion.
- PCT 429 vegetation on the subject land is not consistent with the characteristics of a state-listed threatened ecological community (TEC) or commonwealth-listed endangered community (EC).
- Direct impacts of the proposal consist of removal of 9.41 ha of PCT 429.
- No direct impacts on species credit species would occur.
- Possible indirect impacts of the proposed development would include:
    - Inadvertent impacts on adjacent habitat or vegetation
- Avoiding and minimising biodiversity impacts:
    - The project has been located to occupy an already substantially disturbed site. The majority of the subject land (98%) is vegetated with derived native grassland (vegetation 429_low_DNG). All of the vegetation being removed within vegetation zone 429_low_DNG is in low condition and below the threshold requiring a biodiversity offset.
    - The project location does not coincide with any vegetation that is consistent with the characteristics of a state-listed threatened ecological community (TEC) or commonwealth-listed endangered community (EC).
    - Furthermore, the results of the BAM targeted surveys indicate that removal of native vegetation for the proposal would be unlikely to impact on threatened species and their habitat.
    - If ancillary facilities are required for the proposed development these would be located within the low condition derived native grassland area (vegetation zone 429_low_DNG). This would therefore result in ancillary facilities being located within areas with a low biodiversity value and with the lowest vegetation integrity score.
- Recommended mitigation measures consist of protection of adjacent areas of retained woodland (PCT 429) vegetation.

Table E1 identifies impacts (ecosystem credits) that require an offset (as per BAM Subsection 9.2.2(2.)). No impacts to species credit species require an offset.

Table E1 Impacts that require an offset – ecosystem credits

Vegetation zone	PCT	TEC/EC	Impact area (ha)	Number of ecosystem credits required
429_low_woodland	PCT 429 White Cypress Pine - Poplar Box - Silver-leaved Ironbark viney shrub woodland of the Brigalow Belt South Bioregion	none	0.21	3

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Shortened forms

BAM	Biodiversity Assessment Method
BAM-C	Biodiversity Assessment Method Calculator
BC Act	*Biodiversity Conservation Act 2016* (NSW)
BC Regulation	Biodiversity Conservation Regulation 2017 (NSW)
BDAR	Biodiversity Development Assessment Report
BOAMS	Biodiversity Offsets and Agreement Management System
BOS	Biodiversity Offsets Scheme
DBH	diameter at breast height over bark
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cwlth)
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW)
HTW	high threat weed
IBRA	Interim Biogeographic Regionalisation for Australia
LLS Act	*Local Land Services Act 2013* (NSW)
MNES	matters of national environmental significance
NSW	New South Wales
PCT	plant community type
SAII	serious and irreversible impact
TBDC	Threatened Biodiversity Data Collection
TEC	threatened ecological community

Declarations

i. Certification under clause 6.15 *Biodiversity Conservation Act 2016*

I certify that this report has been prepared based on the requirements of, and information provided under, the Biodiversity Assessment Method and clause 6.15 of the *Biodiversity Conservation Act 2016* (BC Act).

Signature: 

Date: 20/02/2025

BAM Assessor Accreditation no: BAAS18071

This BDAR has been prepared to meet the requirements of BAM 2020. Appendix A provides an assessment of compliance with the minimum information requirements outlined in BAM Appendix K.

The lead or responsible assessor for the project must certify in the BDAR that the report has been prepared on the basis of the requirements of, and information provided under the BAM as at a specified date, and that date is within 14 days of the date the report is submitted to the decision-maker.

The BAM Calculator (BAM-C) must also be finalised and submitted within the Biodiversity Offsets and Agreement Management System (BOAMS). The date the assessor certifies (signs) the BDAR does not need to match the date on the finalised credit report; however, to be considered valid, the BDAR must be submitted to the decision-maker within 14 days of the finalisation of the BAM-C.

ii. Details and experience of author/s and contributors

Authors and contributors

Name	BAM Assessor Accreditation no. (if relevant)	Position/Role	Tasks performed	Relevant qualifications
Tom Pollard	BAAS18071	Ecologist	• targeted threatened flora surveys • targeted threatened fauna surveys • BAM plot surveys • BAM-C data entry and analysis • figure preparation • report preparation	BSc (1st Class Honours University of Queensland PhD (Vegetation ecology) University of Tasmania

iii. Conflict of interest

I declare that I have considered the circumstances and there is no actual, perceived or potential conflict of interest

This declaration has been made in the interests of full disclosure to the decision-maker. Full disclosure has also been provided to the client.

Signature:

Date: 20/02/2025

BAM Assessor Accreditation no: BAAS18071

Stage 1: Biodiversity assessment

1. Introduction

1.1 Proposed development

1.1.1 Development overview

The proposed development is for the expansion of an existing cattle feedlot, from 999 head to 3,500 head of cattle.

The proposal land is zoned RU1 (Primary Production) under the Gwydir Local Environmental Plan 2012, with a minimum lot size of 200 ha.

The legislative pathway is for a designated development that requires consent under Part 4 of the EP&A Act.

1.1.2 Location

The proposed development is located at 2513 Getta Getta Road, North Star (Lot 8 DP 756018 & Lot 1 DP 1212915) (refer to Figure 1 and Figure 2).

1.1.3 Proposed development and the subject land

The layout of the proposed development is shown in Figure 3.

The development includes:

- Water supply/storage and reticulation infrastructure – Water storage tanks and pipelines to supply clear water for livestock drinking water;
- Pens – Fenced areas are required for accommodating beef cattle (production pens);
- Commodity storage – Commodities such as hay and grain are stored onsite;
- Access and internal roads – All weather road access to the site is provided;
- Construction of stock yards accessed by loop rood from Getta Getta Road;
- Controlled drainage area – Rainfall runoff from areas such as the production pens and livestock handling areas that has a high organic matter and therefore a high pollution potential is controlled within a system that collects and conveys this runoff to a sedimentation system and holding pond prior to environmentally sustainable utilisation;
- Drainage system – The controlled drainage area contains a systems including=, catch drains, sedimentation system and holding pond(s) for conveying stormwater, allow entrained sediment to ‘settle out’ and capture and storage of the stormwater from the controlled drainage areas until it can be sustainably utilised; and
- Solid waste and effluent management areas – Solid wastes such as manure and mortalities are temporarily stockpiled and processed within the solid waste stockpile and carcass composting area prior to removal off-site onto adjoining land for utilisation. Effluent is store in a holding pond pending application to the effluent utilisation area.
- The proposed development also includes associated cropping land for effluent and solid waste utilisation. When available, effluent shall be applied to land via irrigation within a dedicated effluent utilisation area.

The subject land boundary is shown in Figure 1 and occupies an area of approximately 11.23 ha.

The construction footprint and operation footprint occupies all of the subject land (refer to Figure 3).

The subject land is located within the Brigalow Belt South bioregion and Northern Basalts subregion (Interim Biogeographic Regionalisation of Australia (IBRA) version 7, Department of the Environment [2012]) in an area with low relief. Site elevation ranges from approximately 315-335 m above mean sea level. The area is an ancient depositional landscape that has formed an extensive alluvial plain. Underlying geology consists of sedimentary rock (sandstone). Soils on the subject land are Ferrosols and are described as a reddish brown sandy clay loam.

Two small 1st and 2nd order waterways occur on the subject land. These waterways are minor tributaries of Back Creek and are ephemeral (the waterways were not flowing at the time the survey was conducted). Two dams/holding ponds of approximately 1800 m^2 and 4000 m^2 occurs on the subject land.

Previous land use is likely to have included timber and firewood removal, stock grazing and some cropping. Current land use consists of a cattle feedlot and stock grazing.

1.2 Biodiversity Offsets Scheme entry

The BOS applies to the proposed development as native vegetation removal exceeds the area clearing threshold of 1 ha for the defined minimum lot size of 200 ha (Gwydir Local Environmental Plan 2012) (refer to Appendix B Biodiversity Values Map and Threshold tool report).

The site-based development assessment methodology has been used in this BAM assessment.

1.3 Excluded impacts

Clause 6.8(3) of the BC Act specifies that the BAM is to exclude the assessment of the impacts of any clearing of native vegetation and loss of habitat on category 1-exempt land (as defined in Part 5A of the LLS Act). The subject land is not mapped on the draft Native Vegetation Regulatory Map as of March 2024.

Category 1-exempt land includes land containing low conservation value' grasslands for the purposes of Division 2 of Part 5A of the Act if the land is determined to contain low conservation value grasslands under the "Interim Grasslands and other Groundcover Assessment Method" published by the Minister for the Environment in the Gazette on 25 August 2017. BAM assessment of the derived native grassland on the subject land indicated that this does not consists of low conservation value grasslands as defined as having a VI score of <15 in the "Interim Grasslands and other Groundcover Assessment Method".

Therefore, there is no category 1-exempt land mapped on the subject land, and no excluded impacts to consider.

1.4 Matters of national environmental significance

The proposed development would be unlikely to significantly impact any Matters of National Environmental Significance (MNES) and therefore does not need referral under the EPBC Act and is not deemed a controlled action.

1.5 Information sources

The following key information sources were used in this BDAR:

- *Interim Biogeographic Regionalisation for Australia (IBRA) (Subregions - States and Territories) version 7* [ESRI shapefile]. Department of the Environment (2012)
- *Mitchell Landscapes version 3.1* [ESRI shapefile]. NSW Office of Environment and Heritage (2010)
- *BioNet Vegetation Classification Database.* NSW Department of Planning, Industry and Environment (2024). Accessed online via login at https://www.environment.nsw.gov.au/NSWVCA20PRapp/LoginPR.aspx
- *NSW Biodiversity Values Map* https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=BOSETMap
- NSW Office of Environment and Heritage (2020). *Biodiversity Assessment Method.* Office of Environment and Heritage for the NSW Government, Sydney, NSW.
- Department of Planning, Industry and Environment (2020). *Biodiversity Assessment Method 2020 Operational Manual - Stage 1.* State of NSW and Department of Planning, Industry and Environment.
- Department of Planning, Industry and Environment (2023). *Biodiversity Assessment Method 2020 Operational Manual - Stage 2.* State of NSW and Department of Planning, Industry and Environment.
- *NSW BAM Credit Calculator*. Accessed online via login at https://customer.lmbc.nsw.gov.au/assessment/s/userlogin
- *NSW Atlas of NSW Wildlife (BioNet)* (including BioNet 'threatened biodiversity data collection' [TBDC]). Accessed online via login at https://www.environment.nsw.gov.au/asmslightprofileapp/Account/MyApps
- *NSW Threatened Species Profiles* https://www.environment.nsw.gov.au/threatenedspeciesapp/
- *Commonwealth Department of the Environment and Energy Protected Matters Search Tool (PMST).* Accessed online at http://environment.gov.au/epbc/protected-matters-search-tool
- *Australian Government's Species Profiles and Threats (SPRAT) database* http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl
- *NSW Wetlands layer* [ESRI Shapefile]. Office of Environment and Heritage (2013).
- *NSW Flora Online.* National Herbarium of NSW, Royal Botanic Garden, Sydney Australia. Available from: http://plantnet.rbgsyd.nsw.gov.au/floraonline.htm
- *NSW State Vegetation Type Map – Extant PCT (Release C1.1.M1.1).* [Quickview (Vector Data - Geodatabase Format) and SVTM NSW Extant PCT 5m (Raster Data - TIFF format)]. State Government of NSW and Department of Planning and Environment (2022).

2. Methods

2.1 Site context methods

2.1.1 Landscape features

A full site walk over of the subject land was conducted to determine the occurrence of rivers, streams, estuaries or wetlands, karsts, caves, crevices or cliffs, rocks or other areas of geological significance.

2.1.2 Native vegetation cover

Desktop assessment to determine the extent and condition of native vegetation cover on the subject land and assessment area consisted of investigation of available vegetation mapping (State Government of NSW and Department of Planning and Environment 2022), aerial photograph interpretation and knowledge of the vegetation within the assessment area.

It was not possible to estimate the extent of derived grassland communities with native vegetation occurring within the assessment area outside of the subject land due to project time and cost constraints and inability to gain access to the required properties for assessment. Consequently, only mapped PCTs as shown in the NSW SVTM were included to estimate the native vegetation cover in the assessment area.

2.2 Native vegetation, threatened ecological communities and vegetation integrity methods

2.2.1 Existing information

Potential PCTs and TECs occurring at the subject land and in adjoining parts of the assessment area were determined using photograph interpretation and available vegetation mapping (State Government of NSW and Department of Planning and Environment 2022).

Several potentially occurring vegetation types were identified, consisting of:

- PCT 589 - White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion
- PCT 429 - White Cypress Pine - Poplar Box - Silver-leaved Ironbark viney shrub woodland of the Brigalow Belt South Bioregion
- PCT 441 - Carbeen - White Box +/- Silver-leaved Ironbark grassy tall woodland on basalt hills, Brigalow Belt South Bioregion
- PCT 56 - Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
- PCT 36 - River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion

Relevant BioNet Flora Survey data was also reviewed within a 5 km radius of the subject land.

2.2.2 Mapping native vegetation extent

The extent of native vegetation on the subject land was determined by way of a full site walk over. All vegetation that met the definition of native vegetation under section 60B of the *Local Land Services Act 2013* was mapped as native vegetation.

2.2.3 Plot-based vegetation survey

A plot-based vegetation survey was undertaken on 18th December 2023 in accordance with the BAM (State of NSW and Department of Planning, Industry and Environment 2020). Floristic data was collected from the minimum number of plots established within each vegetation zone to provide information on determining the PCTs present (refer to Appendix F and Figure 5).

2.2.4 Vegetation integrity survey

A vegetation integrity survey was undertaken on 18th December 2023 in accordance with the BAM (State of NSW and Department of Planning, Industry and Environment 2020). The aim of the survey was to use the BAM to assess PCT structure, function and composition. The number of plots was determined by vegetation zone area (refer to Figure 5).

Plot locations were initially selected using aerial photography (September 2023 imagery) with the aim to sample representative areas within each vegetation zone. Where the vegetation zone was of an adequate size, the final location of the plot was randomised in the field by walking a random distance into the vegetation zone and establishing the plot on a random bearing.

The survey predominantly consisted of data collection within a 400 m^2 survey plot (for measuring composition and structure attributes) nested within a 1000 m^2 survey plot (for measuring function attributes).

These attributes were measured against the relevant benchmark data from the BioNet Vegetation Classification. The use of more appropriate local benchmark data was not proposed to conduct the integrity assessment.

2.3 Threatened flora survey methods

2.3.1 Review of existing information

Habitat constraints and microhabitats were reviewed or each candidate threatened flora species identified by the BAM-C using descriptions in the TBDC.

2.3.2 Habitat constraints assessment

An assessment of the subject land was undertaken on 18th December 2023 to identify the presence of habitat constraints and microhabitats occurring on the subject land relevant to each candidate threatened flora species. This involved a random meander of the subject land.

2.3.3 Field surveys

Threatened flora surveys were required for the potentially occurring species *Dichanthium setosum* (Bluegrass), *Polygala lineariifolia* (Native Milkwort), *Pomaderris queenslandica* (Scant Pomaderris), *Swainsona sericea* (Silky Swainson-pea) and *Tylophora linearis*.

Targeted surveys for these threatened flora were undertaken in accordance with the NSW Threatened Guideline to Surveying Threatened Plants (OEH 2016). With consideration of the open vegetation present at the site a separation between parallel field-traverses of 10 m was selected which was adequate for detection of the groundcover species.

Figure 5 shows the location of field surveys undertaken on the subject land.

2.4 Threatened fauna survey methods

2.4.1 Review of existing information

Habitat constraints and microhabitats were reviewed or each candidate threatened fauna species identified by the BAM-C using descriptions in the TBDC.

2.4.2 Habitat constraints assessment

A preliminary assessment of the subject land was undertaken on 18th December 2023 to identify the presence of habitat constraints and microhabitats occurring on the subject land relevant to each candidate threatened fauna species. This involved a random meander of the subject land. In particular, focus was given to identifying:

- the presence of hollow-bearing trees with suitably sized hollow dimensions (and height above ground where relevant)
- the presence of raptor nest trees
- presence of koala food trees (parallel field traverses in accordance with DPE 2022).

2.4.3 Field surveys

Following the habitat constraints assessment, none of the identified candidate threatened fauna species (auto-populated in the BAM-C) were identified as requiring survey.

2.5 Weather conditions

Table 1 documents the weather conditions at the time that surveys were conducted. There had been a small amount of 0.2mm rain in the previous 3 days prior to the surveys and temperatures were above average.

Table 1 Environmental conditions during threatened species surveys

Survey undertaken (e.g. method / targeted species)	**Date**	**Time**	**Temperature** (min. & max.)	**Wind** (light, mod…)	**Rainfall** (mm)	**Other conditions relevant to the species**
Threatened flora (refer to list in section 2.3.3.)	18th December 2023	10:00am-3:00pm	min 23.7 max 40.7	light	0.0 mm	
Habitat constraints assessment (hollow-bearing tree survey, Koala potential habitat, raptor nest trees)		10:00am-11:00am				

2.6 Limitations

There were no particular limitations in undertaking the required surveys.

Appropriate licences to undertake the surveys are listed below:

- Scientific Licence (SL101582).
- Animal Research Authority (15/1405)

3. Site context

3.1 Assessment area

The proposal is for a site-based development. The assessment area covers approximately 1027 ha and consists of the subject land and the area of land within the 1500 metre buffer zone surrounding the subject land (refer to Figure 2).

3.2 Landscape features

Landscape features identified within the subject land and assessment area are shown on Figure 1 and Figure 2, respectively. A discussion of relevant landscape features is provided below.

3.2.1 IBRA bioregions and IBRA subregions

The subject land and assessment area are located within the Brigalow Belt South bioregion and Northern Basalts subregion (Interim Biogeographic Regionalisation of Australia (IBRA) version 7, Department of the Environment [2012]).

3.2.2 Rivers, streams, estuaries and wetlands

A full site walk over was conducted to determine the presence of rivers, streams, estuaries and wetlands on the subject land. A desktop analysis was undertaken of the NSW hydrography GIS layer (NSW Department of Customer Service - Spatial Services 2022) and the NSW Wetlands GIS layer (Office of Environment and Heritage 2013) downstream from the site within the assessment area.

Two small 1st and 2nd order waterways occur on the subject land. These waterways are minor tributaries of Back Creek and are ephemeral (the waterways were not flowing at the time the survey was conducted). Two dams/holding ponds of approximately 1800 m^2 and 4000 m^2 occurs on the subject land. No other rivers, estuaries or wetlands occur on the subject land. Back Creek and tributaries of Forest Creek occur in the assessment area. No estuaries or wetlands occur in the assessment area.

3.2.3 Habitat connectivity

Connectivity between small patches of woodland vegetation (mostly occurring as scattered trees) occurring at the subject land and in surrounding areas is poor. The locality has been heavily cleared of vegetation, with only tenuous connectivity remaining between onsite vegetation in the north of the subject land and vegetation within the road corridor of Getta Getta Road. There is therefore very limited potential for movement of less mobile threatened fauna species between the subject land and surrounding vegetation (e.g. Koala).

3.2.4 Karst, caves, crevices, cliffs, rocks or other geological features of significance

No karsts, caves, crevices or cliffs, rocks or other areas of geological significance occur within or adjacent to the subject land (a full site walk over was conducted).

A desktop analysis was undertaken of NSW imagery and NSW topography GIS layers (NSW Department of Customer Service - Spatial Services 2022) across the assessment area, indicating that none of the above-listed features are present to the best of the knowledge of the assessor.

3.2.5 Areas of outstanding biodiversity value

No areas of Outstanding Biodiversity Value have been declared under the *Biodiversity Conservation Act 2016* that occur within the subject land or assessment area.

3.2.6 NSW (Mitchell) landscape

The subject land and part of the assessment area is located within the Mitchell Landscape 'Strathmore Sandstones'. The assessment area also includes small areas of the 'Croppa Clay Plains' and 'Croppa Creek Channels and Floodplains' Mitchell Landscapes. (Mitchell Landscape, version 3.1, NSW Office of Environment and Heritage [2010]).

3.3 Native vegetation cover

Native vegetation (woody and non-woody) in the assessment area (subject land and 1500 m buffer) was estimated to occupy an area of approximately 125 ha out of a total area of 1027 ha. The corresponding native vegetation cover within the assessment area is therefore estimated to be approximately 12%, and within the >10-30% vegetation cover class. This figure was arrived at by way of investigation of available vegetation mapping (State Government of NSW and Department of Planning and Environment 2022), aerial photograph interpretation and knowledge of the vegetation within the assessment area.

Table 2 summarises the extent of native vegetation cover within the assessment area.

Table 2 Native vegetation cover in the assessment area

Assessment area (ha)	1027
Total area of native vegetation cover (ha)	125
Percentage of native vegetation cover (%)	12
Class (0-10, >10-30, >30-70 or >70%)	>10-30

4. Native vegetation, threatened ecological communities and vegetation integrity

4.1 Native vegetation extent

A total area of 11.23 ha of native vegetation was determined to occur on the subject land (refer to Figure 6).

4.1.1 Areas that are not native vegetation

No areas of native vegetation on the subject land are considered to be non-native, in accordance with the definition of native vegetation in section 60B of the *Local Land Services Act 2013*.

4.2 Plant community types

4.2.1 Overview

Vegetation within the subject land has been assessed as aligning with one BioNet Vegetation Classification PCTs identified within Table 3. The extent of this PCT on the subject land is shown in Figure 7. Detailed descriptions of the PCT is provided in the following subsections.

Table 3 PCTs identified within the subject land

PCT ID	PCT name	Subject land area (ha)
429	White Cypress Pine - Poplar Box - Silver-leaved Ironbark viney shrub woodland of the Brigalow Belt South Bioregion	9.41
	Total area	**9.41**

4.2.2 PCT 429 White Cypress Pine - Poplar Box - Silver-leaved Ironbark viney shrub woodland of the Brigalow Belt South Bioregion

4.2.2.1 PCT overview

Table 4 PCT 429 White Cypress Pine - Poplar Box - Silver-leaved Ironbark viney shrub woodland of the Brigalow Belt South Bioregion

PCT ID	429
PCT name	White Cypress Pine - Poplar Box - Silver-leaved Ironbark viney shrub woodland of the Brigalow Belt South Bioregion
Vegetation formation	Dry Sclerophyll Forest (shrub-grass sub-formation)
Vegetation class	North-west Slopes Dry Sclerophyll Forests
Per cent cleared value (%)	50
Extent within subject land (ha)	0.21

This community on the subject land occurs mostly as a derived native grassland and a small are of open woodland.

Within the subject land the overstorey is mostly absent. Where present in the open woodland area, the overstorey is limited to widely scattered Cooba (*Acacia salicina*) or regrowth of saplings and seedlings of Quinine Tree (*Alstonia constricta*).

Midstorey shrubs are absent.

The understorey is grassy and dominated by Couch (*Cynodon dactylon*). Other common species present are Goose Grass (*Dactyloctenium radulans*, Early Spring Grass (*Eriochloa pseudoatrotrich*a, Slender Rat's-tail Grass (*Sporobolus creber*), and the exotic species Buffel Grass (*Cenchrus ciliaris*)* and *Eragrostis trichophora**. Common herbs include Tarvine (*Boerhavia dominii)* and Goosefoot (*Chenopodium* sp.)* in the derived native grassland and Yellow Burr-daisy (*Calotis lappulacea*), Golden Rod (*Sida hackettiana*) and Mayne's Pest (*Glandularia aristigera*)* in the sparse woodland.

4.2.2.2 Condition states

PCT 429 on the subject land occurs as a low condition derived native grassland and woodland (refer to Photo 1 and Photo 2).

This vegetation has been subject to past and ongoing disturbances including vegetation clearing and grazing by stock. Overstorey trees, where present predominantly occur as regenerating saplings and seedlings. Hollow-bearing trees are not present.

Photo 1 PCT 429 – low condition derived native grassland

Photo 2 PCT 429 – low condition open woodland

4.2.2.3 Justification of PCT selection

Based on NSW SVTM (State Government of NSW and Department of Planning and Environment 2022), PCT 429 is mapped as occurring on the subject land.

As indicated in the PCT description in the BioNet Vegetation Classification, PCT 429 is known to occur in the Brigalow Belt South bioregion and Northern Basalts subregion. Occurs on moist light brown to red-brown clay loam to sandy loam soils derived from sedimentary rocks with some clay content such as conglomerate, lithic sandstone or siltstone on flats or hillslopes in low rise and plains landscape patterns in the Brigalow Belt South Bioregion north of Narrabri. Soils on the subject land are Ferrosols and are described as a reddish brown sandy clay loam.

With reference to the species by growth form for this PCT in the BioNet Vegetation Classification, species relied upon for identification as PCT 429 include:

- presence of Quinnine Tree (*Alstonia constricta*) and Gargaloo (*Parsonsia eucalyptophylla)* in the midstorey;
- presence of Lovegrasses (*Eragrostis* spp.) and Yellow Burr-daisy (*Calotis lappulacea*) in the understorey; and
- (although no overstorey is present within the subject land) presence of White Cypress Pine (*Callitris glaucophylla*) in the adjacent regrowth woodland area.

4.2.2.4 Alignment with TECs

PCT 429 is not associated with a TEC within the BioNet Vegetation Classification.

4.2.2.5 Alignment with EPBC Act listed ECs

PCT 429 is not associated with an EC listed under the EPBC Act within the BioNet Vegetation Classification.

4.3 Vegetation zones

Within the subject land each PCT was stratified into a single vegetation zone, as listed below (refer to Table 5 and Figure 8).

- 441_zone 1 – PCT 441 occurring as a low condition derived native grassland
- 429_zone 1 – PCT 429 occurring as a low condition woodland

Patch size was calculated using available vegetation mapping and the results of the field survey for all patches of intact native vegetation on and adjoining the subject land. The patch size for all vegetation zones was determined to be within the 25-100 ha patch size class (refer to Table 5).

Table 5 Vegetation zones and patch sizes

Vegetation zone ID	PCT ID number and name	Condition / other defining feature	Area (ha)	Patch size class (select multiple if areas of native vegetation are discontinuous)	No. vegetation integrity plots required	No. vegetation integrity plots completed	No. vegetation integrity plots used in assessment	Plot IDs of vegetation integrity plots used in assessment
429_low_DNG	PCT 429 - White Cypress Pine - Poplar Box - Silver-leaved Ironbark viney shrub woodland of the Brigalow Belt South Bioregion	Low condition derived native grassland	9.20	☐ <5 ha ☐ 5–24 ha ☒ 25–100 ha ☐ >100 ha	3	3	3	Plot 1 Plot 2 Plot 3
429_low_woodland	PCT 429 - White Cypress Pine - Poplar Box - Silver-leaved Ironbark viney shrub woodland of the Brigalow Belt South Bioregion	Low condition woodland	0.21	☐ <5 ha ☐ 5–24 ha ☒ 25–100 ha ☐ >100 ha	1	1	1	Plot 4

4.4 Vegetation integrity (vegetation condition)

4.4.1 Vegetation integrity survey plots

Data was collected from the required number of vegetation integrity plots in each vegetation zone, as detailed in BAM Table 3. The number of plots completed in each zone is listed below.

- 441_zone 1 (9.20 ha) – 3 VI plot completed; 3 used in BAM-C
- 429_zone 1 (1.21 ha) – 1 VI plots completed; 1 used in BAM-C

4.4.2 Scores

Vegetation integrity scores from sampled vegetation integrity survey plots are shown in Table 6.

Table 6 Vegetation integrity scores

Vegetation zone ID	Composition condition score	Structure condition score	Function condition score (where relevant)	Vegetation integrity score	Hollow bearing trees present?
441_zone 1	13.8	65	19.1	25.8	No
429_zone 1	55.3	28	16	29.1	No

4.4.3 Use of benchmark data

These attributes were measured against the relevant benchmark data from the BioNet Vegetation Classification. The use of more appropriate local benchmark data was not proposed to conduct the integrity assessment.

5. Habitat suitability for threatened species

5.1 Identification of threatened species for assessment

5.1.1 Ecosystem credit species

Ecosystem credit species likely to occur on or use the subject land as automatically populated in BAM-C is provided in Table 7.

Table 7 Predicted ecosystem credit species

Common name	Scientific name	Listing status		Dual credit species	Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID	Sensitivity to gain class
		BC Act	EPBC Act						
Artamus cyanopterus cyanopterus	Dusky Woodswallow	Vulnerable	Not Listed	No	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes		429_low_woodland 429_low_DNG	Moderate
Calyptorhynchus lathami	Glossy Black-Cockatoo (Foraging)	Vulnerable	Vulnerable	Yes	☒ BAM-C ☒ TBDC ☐ Previous survey ☐ Current survey	No	Habitat constraints		High

Common name	Scientific name	Listing status		Dual credit species	Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID	Sensitivity to gain class
		BC Act	EPBC Act						
Chalinolobus picatus	Little Pied Bat	Vulnerable	Not Listed	No	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Partial (when a species is retained within one vegetation zone but not another)	Habitat constraints	429_low_woodland	Moderate
Chthonicola sagittata	Speckled Warbler	Vulnerable	Not Listed	No	☒ BAM-C ☒ TBDC ☐ Previous survey ☐ Current survey	Partial (when a species is retained within one vegetation zone but not another)	Habitat constraints	429_low_woodland	High
Circus assimilis	Spotted Harrier	Vulnerable	Not Listed	No	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes		429_low_woodland 429_low_DNG	Moderate

Common name	Scientific name	Listing status		Dual credit species	Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID	Sensitivity to gain class
		BC Act	EPBC Act						
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	Vulnerable	Not Listed	No	☒ BAM-C ☒ TBDC ☐ Previous survey ☐ Current survey	No	Habitat constraints		High
Daphoenositta chrysoptera	Varied Sittella	Vulnerable	Not Listed	No	☒ BAM-C ☒ TBDC ☐ Previous survey ☐ Current survey	Partial (when a species is retained within one vegetation zone but not another)	Habitat constraints	429_low_woodland	Moderate
Dasyurus maculatus	Spotted-tailed Quoll	Vulnerable	Endangered	No	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes		429_low_woodland 429_low_DNG	High

Common name	**Scientific name**	**Listing status**		**Dual credit species**	**Sources**	**Species retained for further assessment?**	**Reason for exclusion from further assessment**	**Vegetation zone ID species retained within, including PCT ID**	**Sensitivity to gain class**
		BC Act	**EPBC Act**						
Glossopsitta pusilla	Little Lorikeet	Vulnerable	Not Listed	No	☒ BAM-C ☒ TBDC ☐ Previous survey ☐ Current survey	No	Habitat constraints		High
Grantiella picta	Painted Honeyeater	Vulnerable	Vulnerable	No	☒ BAM-C ☒ TBDC ☐ Previous survey ☐ Current survey	No	Habitat constraints		Moderate
Hieraaetus morphnoides	Little Eagle (Foraging)	Vulnerable	Not Listed	No	☒ BAM-C ☒ TBDC ☐ Previous survey ☐ Current survey	Partial (when a species is retained within one vegetation zone but not another)	Habitat constraints	429_low_woodland	Moderate

Common name	Scientific name	Listing status		Dual credit species	Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID	Sensitivity to gain class
		BC Act	EPBC Act						
Hirundapus caudacutus	White-throated Needletail	Not Listed	Vulnerable	No	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes			High
Lathamus discolor	Swift Parrot (Foraging)	Endangered	Critically Endangered	Yes	☒ BAM-C ☒ TBDC ☐ Previous survey ☐ Current survey	No	Habitat constraints		Moderate
Lophoictinia isura	Square-tailed Kite (Foraging)	Vulnerable	Not Listed	No	☒ BAM-C ☒ TBDC ☐ Previous survey ☐ Current survey	Partial (when a species is retained within one vegetation zone but not another)	Habitat constraints	429_low_woodland	Moderate

Common name	Scientific name	Listing status		Dual credit species	Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID	Sensitivity to gain class
		BC Act	EPBC Act						
Macropus dorsalis	Black-striped Wallaby	Endangered	Not Listed	No	☒ BAM-C ☒ TBDC ☐ Previous survey ☐ Current survey	No	Habitat constraints		High
Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	Vulnerable	Not Listed	No	☒ BAM-C ☒ TBDC ☐ Previous survey ☐ Current survey	Partial (when a species is retained within one vegetation zone but not another)	Habitat constraints	429_low_woodland	Moderate
Miniopterus orianae oceanensis	Large Bent-winged Bat	Vulnerable	Not Listed	Yes	☒ BAM-C ☒ TBDC ☐ Previous survey ☐ Current survey	Partial (when a species is retained within one vegetation zone but not another)	Habitat constraints	429_low_woodland	High

Common name	Scientific name	Listing status		Dual credit species	Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID	Sensitivity to gain class
		BC Act	EPBC Act						
Neophema pulchella	Turquoise Parrot	Vulnerable	Not Listed	No	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes		429_low_woodland 429_low_DNG	High
Nyctophilus corbeni	Corben's Long-eared Bat	Vulnerable	Vulnerable	No	☒ BAM-C ☒ TBDC ☐ Previous survey ☐ Current survey	Partial (when a species is retained within one vegetation zone but not another)	Habitat constraints	429_low_woodland	High
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	Vulnerable	Not Listed	No	☒ BAM-C ☒ TBDC ☐ Previous survey ☐ Current survey	Partial (when a species is retained within one vegetation zone but not another)	Habitat constraints	429_low_woodland	Moderate

Common name	Scientific name	Listing status		Dual credit species	Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID	Sensitivity to gain class
		BC Act	EPBC Act						
Pteropus poliocephalus	Grey-headed Flying-fox (Foraging)	Vulnerable	Vulnerable	Yes	☒ BAM-C ☒ TBDC ☐ Previous survey ☐ Current survey	Partial (when a species is retained within one vegetation zone but not another)	Habitat constraints	429_low_woodland	High
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	Vulnerable	Not Listed	No	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes		429_low_woodland 429_low_DNG	High
Stagonopleura guttata	Diamond Firetail	Vulnerable	Not Listed	No	☒ BAM-C ☒ TBDC ☐ Previous survey ☐ Current survey	Yes		429_low_woodland 429_low_DNG	Moderate

The following species were excluded or partially excluded from further assessment (refer to Table 7) in identified vegetation zones:

- *Calyptorhynchus lathami* (Glossy Black-Cockatoo (Foraging)) - excluded due to habitat constraints as no *Allocasuarina/Casuarina* species present.
- *Climacteris picumnus victoriae* (Brown Treecreeper (eastern subspecies)) - excluded as subject land vegetation is not within 100 m of moderate to good condition vegetation of suitable type.
- *Glossopsitta pusilla* (Little Lorikeet) and *Lathamus discolor* (Swift Parrot (Foraging)), – excluded as vegetation zones do not contain suitable eucalypts for foraging.
- *Grantiella picta* (Painted Honeyeater) - excluded due to habitat constraints as Mistletoes are not present at a density of greater than five mistletoes per hectare.
- *Macropus dorsalis* (Black-striped Wallaby) - excluded due to habitat constraints as no suitable habitat is present (dense vegetation within 3 m of the ground – TBDC).
- *Chalinolobus picatus* (Little Pied Bat), *Chthonicola sagittata* (Speckled Warbler), *Daphoenositta chrysoptera* (Varied Sittella), *Hieraaetus morphnoides* (Little Eagle (Foraging)), *Lophoictinia isura* (Square-tailed Kite (foraging)), *Melanodryas cucullata cucullata* (Hooded Robin (south-eastern form)),)), *Miniopterus orianae oceanensis* (Large Bent-winged Bat), *Nyctophilus corbeni* (Corben's Long-eared Bat), *Pomatostomus temporalis temporalis* (Grey-crowned Babbler (foraging)), *Pteropus poliocephalus* (Grey-headed Flying-fox (Foraging)) - partially excluded from 429_low_DNG as not associated with grassland habitats.

All other predicted ecosystem credit species were retained.

5.1.2 Species credit species

Predicted flora species credit species as automatically populated in BAM-C is provided in Table 8. Predicted fauna species credit species as automatically populated in BAM-C is provided in Table 9.

Table 8 Predicted flora species credit species

Common name	Scientific name	Listing status		Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID
		BC Act	EPBC Act				
Bluegrass	*Dichanthium setosum*	Vulnerable	Vulnerable	☒ BAM-C ☒ TBDC ☐ Previous survey	Yes		429_low_woodland 429_low_DNG

Common name	Scientific name	Listing status		Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID
		BC Act	EPBC Act				
				☐ Current survey			
Native Milkwort	*Polygala linariifolia*	Endangered	Not listed	☒ BAM-C ☒ TBDC ☐ Previous survey ☐ Current survey	Partial (when a species is retained within one vegetation zone but not another)	Habitat constraints	429_low_woodland
Scant Pomaderris	*Pomaderris queenslandica*	Endangered	Not listed	☒ BAM-C ☒ TBDC ☐ Previous survey ☐ Current survey	Partial (when a species is retained within one vegetation zone but not another)	Habitat constraints	429_low_woodland
Silky Swainson-pea	*Swainsona sericea*	Vulnerable	Not listed	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Partial (when a species is retained within one vegetation zone but not another)	Habitat constraints	429_low_woodland 429_low_DNG
Tylophora linearis	*Tylophora linearis*	Vulnerable	Endangered	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Partial (when a species is retained within one vegetation zone but not another)	Habitat constraints	429_low_woodland

The following species were excluded or partially excluded from further assessment in identified vegetation zones (refer to Table 7):

- Native Milkwort (*Polygala linariifolia*), Scant Pomaderris (Pomaderris *queenslandica*), Tylophora linearis (*Tylophora linearis*) - partially excluded from 429_low_DNG as not associated with grassland habitats.

All remaining predicted flora species credit species were retained for further assessment.

Table 9 Predicted fauna species credit species

Common name	Scientific name	Listing status		Dual credit species	Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID
		BC Act	EPBC Act					
Zigzag Velvet Gecko	*Amalosia rhombifer*	Endangered	Not listed	No	☒ BAM-C ☒ TBDC ☐ Previous survey ☐ Current survey	No	Habitat degraded	
Glossy Black-Cockatoo (Breeding)	*Calyptorhynchus lathami*	Vulnerable	Vulnerable	Yes	☒ BAM-C ☒ TBDC ☐ Previous survey ☐ Current survey	No	Habitat constraints	
Eastern Pygmy-possum	*Cercartetus nanus*	Vulnerable	Not listed	No	☒ BAM-C ☒ TBDC ☐ Previous survey ☐ Current survey	No	Habitat degraded	
Large-eared Pied Bat	*Chalinolobus dwyeri*	Vulnerable	Endangered	No	☒ BAM-C ☒ TBDC ☐ Previous survey	No	Habitat constraints	

Common name	Scientific name	Listing status		Dual credit species	Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID
		BC Act	EPBC Act					
					☐ Current survey			
Squatter Pigeon (southern subspecies)	*Geophaps scripta scripta*	Critically Endangered	Vulnerable	No	☒ BAM-C ☒ TBDC ☐ Previous survey ☐ Current survey	No	Habitat degraded	
Little Eagle (Breeding)	*Hieraaetus morphnoides*	Vulnerable	Not listed	Yes	☒ BAM-C ☒ TBDC ☐ Previous survey ☐ Current survey	No	Habitat constraints	
Pale-headed Snake	*Hoplocephalus bitorquatus*	Vulnerable	Not listed	No	☒ BAM-C ☒ TBDC ☐ Previous survey ☐ Current survey	No	Habitat degraded	
Swift Parrot (Breeding)	*Lathamus discolor*	Endangered	Critically Endangered	Yes	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	No	Habitat constraints	

Common name	Scientific name	Listing status		Dual credit species	Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID
		BC Act	EPBC Act					
Square-tailed Kite (Breeding)	*Lophoictinia isura*	Vulnerable	Not listed	Yes	☒ BAM-C ☒ TBDC ☐ Previous survey ☐ Current survey	No	Habitat constraints	
Large Bent-winged Bat (Breeding)	*Miniopterus orianae oceanensis*	Vulnerable	Not listed	Yes	☒ BAM-C ☒ TBDC ☐ Previous survey ☐ Current survey	No	Habitat constraints	
Barking Owl	*Ninox connivens*	Vulnerable	Not listed	Yes	☒ BAM-C ☒ TBDC ☐ Previous survey ☐ Current survey	No	Habitat constraints	
Squirrel Glider	*Petaurus norfolcensis*	Vulnerable	Not listed	No	☒ BAM-C ☒ TBDC ☐ Previous survey ☐ Current survey	No	Habitat degraded	
Koala	*Phascolarctos cinereus*	Endangered	Endangered	Yes	☒ BAM-C ☒ TBDC ☐ Previous survey	No	Habitat constraints	

Common name	Scientific name	Listing status		Dual credit species	Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID
		BC Act	EPBC Act					
					☐ Current survey			
Grey-headed Flying-fox (Breeding)	*Pteropus poliocephalus*	Vulnerable	Vulnerable	Yes	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	No	Habitat constraints	
Masked Owl	*Tyto novaehollandiae*	Vulnerable	Not listed	Yes	☒ BAM-C ☒ TBDC ☐ Previous survey ☐ Current survey	No	Habitat constraints	
Border Thick-tailed Gecko	*Uvidicolus sphyrurus*	Vulnerable	Vulnerable	No	☒ BAM-C ☒ TBDC ☐ Previous survey ☐ Current survey	No	Microhabitats	
Eastern Cave Bat	*Vespadelus troughtoni*	Vulnerable	Not listed	No	☒ BAM-C ☒ TBDC ☐ Previous survey ☐ Current survey		Habitat constraints	

The following predicted fauna species credit species were fully or partially excluded in identified vegetation zones (refer to Table 9):

- Zigzag Velvet Gecko (*Amalosia rhombifer*) – Habitat degraded. Woodland habitat is absent in 429_low_DNG and occurs in low condition (VI score <30) in 429_low_woodland.
- Eastern Pygmy-possum (*Cercartetus nanus*) and Squirrel Glider (*Petaurus norfolcensis*) - Habitat degraded. Vegetation on the subject land is highly fragmented and has been substantially degraded by clearing and stock grazing. Woodland habitat is absent in 429_low_DNG and occurs in low condition (VI score <30) in 429_low_woodland. This vegetation does not contain a dense midstorey/understorey of flowering shrubs preferred by this species and no hollows are present.
- Squatter Pigeon (southern subspecies) (*Geophaps scripta scripta*) – Habitat degraded. Inhabits woodland vegetation. Woodland habitat is absent in 429_low_DNG and occurs in low condition (VI score <30) in 429_low_woodland with no eucalypt overstorey present.
- Glossy Black-Cockatoo (Breeding) (*Calyptorhynchus lathami*) – Habitat constraints. The subject land does not contain living or dead tree with hollows greater than 15cm diameter and greater than 8m above ground.
- Large-eared Pied Bat (*Chalinolobus dwyeri*) – Habitat constraints. The subject land does not contain cliffs/and is not within two kilometres of rocky areas containing caves, overhangs, escarpments, outcrops, or crevices, or within two kilometres of old mines or tunnels.
- Little Eagle (Breeding) (*Hieraaetus morphnoides*) - Habitat constraints. No nest trees are present.
- Swift Parrot (Breeding) (*Lathamus discolor*) – Habitat constraints. The subject land is not located within the important habitat map for this species.
- Square-tailed Kite (Breeding) (*Lophoictinia isura*) – Habitat constraints. No nest trees are present.
- Large Bent-winged Bat (*Miniopterus orianae oceanensis*) (Breeding) – Habitat constraints. Subject land does not contain cave, tunnel, mine, culvert or other structure known or suspected to be used for breeding including species records with microhabitat code "IC - in cave" observation type code "E nest-roost" with numbers of individuals >500.
- Barking Owl (*Ninox connivens*) and Masked Owl (*Tyto novaehollandiae*) – Habitat constraints. Subject land does not contain living or dead trees with hollows greater than 20 cm diameter and greater than 4m above the ground.
- Koala (*Phascolarctos cinereus*) – Habitat constraints. Subject land does not contain koala food trees.
- *Pteropus poliocephalus* (Grey-headed Flying-fox (Breeding)) – the subject land does not support any breeding camps.
- Eastern Cave Bat (*Vespadelus troughtoni*) - Habitat constraints. Subject land is not within two kilometres of rocky areas containing caves, overhangs, escarpments, outcrops, crevices or boulder piles, or within two kilometres of old mines, tunnels, old buildings or sheds.
- Border Thick-tailed Gecko (*Uvidicolus sphyrurus*) – Microhabitats. The subject land does not contain rocky outcrops.

All other predicted fauna species credit species were retained for further assessment.

5.2 Presence of candidate species credit species

The presence of candidate species credit species on the subject land is shown in Table 10 (flora).

Table 10 Determining the presence of candidate flora species credit species on the subject land

Common name	Scientific name	Listing status		Method used to determine presence	Present?	Further assessment required? (BAM Subsections 5.2.5 and 5.2.6)
		BC Act	EPBC Act			
Bluegrass	*Dichanthium setosum*	Vulnerable	Vulnerable	Targeted threatened species survey	No	No
Native Milkwort	*Polygala linariifolia*	Endangered	Not listed	Targeted threatened species survey	No	No
Scant Pomaderris	*Pomaderris queenslandica*	Endangered	Not listed	Targeted threatened species survey	No	No
Silky Swainson-pea	*Swainsona sericea*	Vulnerable	Not listed	Targeted threatened species survey	No	No
Tylophora linearis	*Tylophora linearis*	Vulnerable	Endangered	Targeted threatened species survey	No	No

5.3 Threatened species surveys

Details of targeted threatened species surveys used to determine presence of the species are shown in Table 11 (flora) and Table 12 (fauna).

Table 11 Threatened species surveys for candidate flora species credit species on the subject land

Common name	Scientific name	Threatened flora species surveys				Present	Further assessment required (BAM Subsections 5.2.5 and 5.2.6)
		Survey method (transects or grids)	**Timing of survey – within recommended period?** (BAM-C / TBDC)		**Effort** (hours & no. people)		
Bluegrass	*Dichanthium setosum*	Transects	☒ Yes December 18th 10:00am-3:00pm	☐ No	5 hrs one person	No	No
Native Milkwort	*Polygala linariifolia*	Transects	☒ Yes December 18th 10:00am-3:00pm	☐ No	5 hrs one person	No	No
Scant Pomaderris	*Pomaderris queenslandica*	Transects	☒ Yes December 18th 10:00am-3:00pm	☐ No	5 hrs one person	No	No
Silky Swainson-pea	*Swainsona sericea*	Transects	☐ Yes	☒ No December 18th 10:00am-3:00pm	5 hrs one person	No	No
Tylophora linearis	*Tylophora linearis*	Transects	☒ Yes December 18th 10:00am-3:00pm	☐ No	5 hrs one person	No	No

The surveys were undertaken in accordance with the methods of NSW Threatened Guideline to Surveying Threatened Plants (OEH 2016) and survey guidelines for individuals species within the TBDC. No variations from these methods were required.

Table 12 Threatened species surveys for candidate fauna species credit species on the subject land

Common name	Scientific name	Threatened fauna species surveys				Present	Further assessment required (BAM Subsections 5.2.5 and 5.2.6)
		Survey method (e.g. harp trap, Elliott trap, bioacoustics, etc.)	**Timing of survey – within recommended period?** (BAM-C / TBDC)		**Effort** (hours & no. people)		
Koala	*Phascolarctos cinereus*	Survey for suitable koala habitat (in conjunction with threatened flora survey)	☒ Yes 18th December	☐ No	5 hours One person	No	No

<u>Koala (*Phascolarctos cinereus*)</u>

Suitable koala habitat was not determined to be present on the subject land due to a lack of koala food tree species in any of the vegetation zones. No further surveys for the koala were deemed to be necessary.

The surveys were undertaken in accordance with the methods contained within the Koala (*Phascolarctos cinereus*): Biodiversity Assessment Method Survey Guide (DPE 2022).

5.4 Expert reports

No expert reports were used to inform the presence of any candidate species credit species for this BDAR.

5.5 More appropriate local data (where relevant)

Use of more appropriate local data to assess habitat suitability was not requested for this this BDAR.

5.6 Area or count, and location of suitable habitat for a species credit species (a species polygon)

No species credit species were assumed or determined to be present on the subject land (by survey, expert report or important habitat map). Nor were any EPBC Act listed species present (recorded within the subject land).

6. Identifying prescribed impacts

Table 13 details prescribed impacts that are present on the subject land. Prescribed impacts that are relevant to the proposed development consist of waterbodies, water quality and hydrological processes.

Of these identified prescribed impacts, no threatened entities were identified that use, are likely to use, or are part of the habitat feature (as per auto-populated BAM-C list).

The absence of other prescribed impacts was confirmed by way of a full site walk over of the subject land.

Table 13 Prescribed impacts identified

Feature	Present	Description of feature characteristics and location	Threatened entities that use, are likely to use, or are part of the habitat feature. Where relevant, threatened species or fauna that are part of a TEC or EC, that are at risk of vehicle strike
Karst, caves, crevices, cliffs, rocks or other geological features of significance	☐Yes / ☒No	n/a	n/a
Human-made structures	☐Yes / ☒No	n/a	n/a
Non-native vegetation	☐Yes / ☒No	n/a	n/a
Habitat connectivity	☐Yes / ☒No	n/a	n/a
Waterbodies, water quality and hydrological processes	☒Yes / ☐No	Two small 1st and 2nd order waterways occur on the subject land. These waterways are minor tributaries of Back Creek and are ephemeral (the waterways were not flowing at the time the survey was conducted). Two dams/holding ponds of approximately 1800 m^2 and 4000 m^2 occurs on the subject land.	None of the predicted fauna species credit species (as per auto-populated BAM-C list) would potentially use these features
Wind turbine strikes (wind farm development only)	☐Yes / ☒No		
Vehicle strikes	☐Yes / ☒No	n/a	n/a

Stage 2: Impact assessment (biodiversity values and prescribed impacts)

7. Avoid and minimise impacts

7.1 Avoid and minimise direct and indirect impacts

7.1.1 Project location

The project has been located to occupy an already substantially disturbed site. The majority of the subject land (98%) is vegetated with derived native grassland (vegetation 429_low_DNG). All of the vegetation being removed within vegetation zone 429_low_DNG is in low condition and below the threshold requiring a biodiversity offset.

The project location does not coincide with any vegetation that is consistent with the characteristics of a state-listed threatened ecological community (TEC) or commonwealth-listed endangered community (EC).

Furthermore, the results of the BAM targeted surveys indicate that removal of native vegetation for the proposal would be unlikely to impact on threatened species and their habitat.

7.1.2 Project design

If ancillary facilities are required for the proposed development these would be located within the low condition derived native grassland area (vegetation zone 429_low_DNG). This would therefore result in ancillary facilities being located within areas with a low biodiversity value and with the lowest vegetation integrity score.

7.2 Summary of measures to avoid and minimise impacts

Table 14 summarises measures to be taken to avoid and minimise direct, indirect and prescribed impacts in relation to the development proposal.

Table 14 Avoidance and minimisation measures for direct, indirect and prescribed impacts

Action	Outcome (Describe the outcome of implementing the measure, with reference to specific entities identified in Sections 4 and 5)	Timing	Responsibility
Locating the proposal in areas lacking biodiversity values	Areas of highest biodiversity value are avoided. The project has been located to occupy an already substantially disturbed site. The majority of the subject land (98%) is vegetated with low condition derived native grassland (vegetation 429_low_DNG) of low biodiversity value.	During project planning	Project planning team

Action	Outcome (Describe the outcome of implementing the measure, with reference to specific entities identified in Sections 4 and 5)	Timing	Responsibility
Locating the proposal where the native vegetation or threatened species habitat is in the poorest condition (i.e. areas that have a low vegetation integrity score)	Areas of better quality native vegetation and threatened species habitat are avoided. Vegetation being removed within vegetation zone 429_low_DNG is in low condition (VI score 16.8) and below the threshold requiring a biodiversity offset.	During project planning	Project planning team
Locating the proposal in areas that avoid habitat for species with a high biodiversity risk weighting or land mapped on the important habitat map, or native vegetation that is a TEC or a highly cleared PCT.	The proposal is located in an area that avoids habitat for species with a high biodiversity risk weighting or land mapped on the important habitat map, or native vegetation that is a TEC or a highly cleared PCT. Considering that the proposal is predominantly located to occupy an already substantially disturbed site (98% of the subject land is vegetated with low condition derived native grassland), the proposal would have limited impacts on any habitat for ecosystem credit species with a high biodiversity risk weighting (auto-populated from BAM-C). The results of the targeted surveys indicate that removal of native vegetation for the proposal would not impact on the habitat of any confirmed species credit species. The subject land is also not located on any land mapped on the important habitat map for any threatened species. The project location does not coincide with any vegetation that is consistent with the characteristics of a state-listed threatened ecological community (TEC) or commonwealth-listed endangered community (EC).	During project planning	Project planning team
Locating the proposal outside of the buffer area around breeding habitat features such as nest trees or caves.	No breeding habitat features and associated buffer areas are located within the subject land.	n/a	n/a
Reducing the proposal's clearing footprint by	As 98% of the proposal is located within an area containing very limited biodiversity value, the	During project planning	Project planning team

Action	Outcome (Describe the outcome of implementing the measure, with reference to specific entities identified in Sections 4 and 5)	Timing	Responsibility
minimising the number and type of facilities	proposal does not seek to reduce the proposal clearing footprint by minimising the number and type of facilities.		
Locating ancillary facilities in areas that have no biodiversity values	Areas of highest biodiversity value are avoided. If ancillary facilities are required for the proposed development these would be located within the low condition derived native grassland area (vegetation zone 429_low_DNG). This would therefore result in ancillary facilities being located within areas with low biodiversity value.	During construction phase of project	Proponent
Locating ancillary facilities in areas where the native vegetation or threatened species habitat is in the poorest condition (i.e. areas with the lowest vegetation integrity scores)	Areas of better condition native vegetation are avoided. If ancillary facilities are required for the proposed development these would be located within the low condition derived native grassland area (vegetation zone 429_low_DNG). This would therefore result in ancillary facilities being located within areas with a lowest vegetation integrity score.	During construction phase of project	Proponent
Locating ancillary facilities in areas that avoid habitat for species and vegetation that has a high threat status (e.g. an endangered ecological community (EEC) or critically endangered ecological community (CEEC) or is an entity at risk of a serious and irreversible impact (SAII)	Habitat for species and vegetation with a high threat status is avoided None of the vegetation on the subject land is habitat for species and vegetation that has a high threat status (e.g. an endangered ecological community (EEC) or critically endangered ecological community (CEEC) or is an entity at risk of a serious and irreversible impact (SAII).	During construction phase of project	Proponent

8. Impact assessment

8.1 Direct impacts

8.1.1 Residual direct impacts

Table 15 lists impacts likely to occur on the subject land after steps taken to avoid and minimise impacts (refer to Figure 10).

Table 15 Summary of residual direct impacts

Direct impact (Describe the impact on PCT/TEC/EC or threatened species and their habitat)	**BC Act status**	**EPBC Act status**	**SAII entity**	**Project phase/timing of impact** (e.g. construction, operation, rehabilitation)	**Extent** (ha, number of individuals)
Removal of PCT 429 White Cypress Pine - Poplar Box - Silver-leaved Ironbark viney shrub woodland of the Brigalow Belt South Bioregion	n/a	n/a	No	Construction and operation	9.41 ha

8.1.2 Change in vegetation integrity score

Table 16 documents the change in vegetation integrity for residual direct impacts on native vegetation, TECs, threatened species and their habitat that were identified on the subject land.

Table 16 Impacts to vegetation integrity

Vegetation zone	**PCT ID**	**Management zone**	**Area** (ha)	**Before development**				**After development**				**Change**
				Composition	**Structure**	**Function**	**VI score**	**Composition**	**Structure**	**Function**	**VI score**	**Change in VI score**
429_low_DNG	429	remove	9.2	12.1	27.4	16	16.8	0	0	0	0	-16.8
429_low_woodland	429	remove	0.21	55.3	28	16	29.1	0	0	0	0	-29.1

8.2 Indirect impacts

Table 17 documents residual indirect impacts (likely to occur on native vegetation, threatened entities and their habitat beyond the development footprint).

Table 17 Summary of residual indirect impacts

Indirect impact (Describe impact, e.g. transport of weeds and pathogens form the site to adjacent vegetation)	**Impacted entities** (PCT/threatened entity and their habitats and where relevant, EPBC Act listing)	**Extent** (ha or zone reference)	**Frequency**	**Duration** (long-term/ short-term/ medium-term)	**Project phase/ timing of impact** (e.g. construction, operation, rehabilitation)	**Likelihood and consequences**
Inadvertent impacts on adjacent habitat or vegetation	PCT 429 (woodland)	woodland adjacent to the development footprint (off-site) (vegetation zone 429_low_woodland)	once	short-term	during construction phase	Moderate Potential damage to adjacent habitat or vegetation Mitigation measures required to minimise risk

8.3 Prescribed impacts

8.3.1 Waterbodies, water quality and hydrological processes

8.3.1.1 Nature

The proposal could potentially impact on these features and result in degradation of water quality and hydrological processes.

8.3.1.2 Extent

Two small 1st and 2nd order waterways occur on the subject land. These waterways are minor tributaries of Back Creek and are ephemeral (the waterways were not flowing at the time the survey was conducted). Two dams/holding ponds of approximately 1800 m^2 and 4000 m^2 occurs on the subject land.

8.3.1.3 Duration

This prescribed impact would occur during construction and operation.

8.3.1.4 Consequences

These features are substantially degraded as a result of historic and ongoing farming disturbances on the subject land. The results of the BAM targeted surveys indicated that none of these features provide any potential habitat for candidate species credit species.

8.4 Mitigating residual impacts – management measures and implementation

Table 18 detail proposed mitigation and management measures.

Table 18 Summary of proposed mitigation and management measures for residual impacts (direct, indirect and prescribed)

Mitigation measure (specify if none proposed and ensure an adaptive management strategy is developed and addressed in Section 1.1)	**Method/technique**	**Timing**	**Frequency**	**Responsibility**	**Likely efficacy** (including risk of failure)	**MNES** (when relevant)
Adoption of clearing protocols that identify vegetation to be retained, prevent inadvertent damage and reduce soil disturbance	The extent of the clearing footprint would be delineated (e.g. pegging, temporary fencing/ high-visibility flagging) where clearing will occur in vegetation zone 429_low_woodland (refer to Figure 9).	prior to vegetation clearing commencing	once	project manager/contractors	high	n/a

8.5 Consistency with other legislation - State Environmental Planning Policy (Biodiversity and Conservation) 2021, Chapter 3 – Koala Habitat Protection 2020

This Policy aims to encourage the proper conservation and management of areas of natural vegetation that provide habitat for koalas to ensure a permanent free-living population over their present range and reverse the current trend of koala population decline:

(a) by requiring the preparation of plans of management before development consent can be granted in relation to areas of core koala habitat, and

(b) by encouraging the identification of areas of core koala habitat, and

(c) by encouraging the inclusion of areas of core koala habitat in environment protection zones.

Schedule 2 lists LGAs for which Koala Habitat Protection 2020 applies, which includes Gwydir LGA.

Part 3.2 Development control of koala habitats

This Part applies to land—

(a) that is land to which this Chapter applies, and

(b) that is land in relation to which a development application has been made, and

(c) that, whether or not the development application applies to the whole, or only part, of the land—

(i) has an area of more than 1 hectare, or

(ii) has, together with adjoining land in the same ownership, an area of more than 1 hectare.

The site meets the above requirements and is therefore land to which Part 3.2 applies.

Part 3.2 assesses the presence of potential koala habitat and core koala habitat on the land and whether development consent can be granted in relation to core koala habitat.

Schedule 1 lists ten eucalypt species which are primary koala feed trees:

Potential koala habitat is defined in Chapter 3 as areas of native vegetation where the trees of the types listed in Schedule 2 constitute at least 15% of the total number of trees in the upper or lower strata of the tree component.

No Schedule 2 listed koala food tree species are present on the subject land and therefore no part of the site is consistent with this definition of potential koala habitat.

Based on the above finding, there is no supporting evidence for the land to be mapped as core koala habitat as defined in Chapter 3. No further provisions of the policy apply to the DA, and no individual plan of management is required.

9. Impact summary

9.1 Determine an offset requirement for impacts

9.1.1 Impacts on native vegetation and TECs or ECs (ecosystem credits)

Table 19 details impacts on native vegetation and TECs or ECs that do not require an offset (as per BAM Subsection 9.2.1(3.)) (refer to Figure 10). The vegetation integrity score of vegetation zone 429_low_DNG was <17 and this PCT is not a TEC. Therefore, no offset (ecosystem credits) are required.

Table 20 details impacts (ecosystem credits) that require an offset (as per BAM Subsection 9.2.1(1.)) (refer to Figure 10).

Table 19 Impacts that do not require offset – ecosystem credits

Vegetation zone	PCT name	TEC	Impact area (ha)	TEC association	Entity at risk of an SAII?	Current VI score
429_low_DNG	PCT 429 White Cypress Pine - Poplar Box - Silver-leaved Ironbark viney shrub woodland of the Brigalow Belt South Bioregion	no	9.2	Not associated	No	16.8

Table 20 Impacts that require an offset – ecosystem credits

Vegetation zone	PCT name	TEC	Impact area (ha)	Current VI score	Future VI score	Change in VI score	Biodiversity risk weighting	Number of ecosystem credits required
429_low_woodland	PCT 429 White Cypress Pine - Poplar Box - Silver-leaved Ironbark viney shrub woodland of the Brigalow Belt South Bioregion	no	0.21	29.1	0	-29.1	1.75	3
							Total credits	3

9.1.2 Impacts on threatened species and their habitat (species credits)

There are no impacts on threatened species (species credits) that require an offset (as per BAM Subsection 9.2.2(2.)).

9.2 Impacts that do not need further assessment

Areas within the subject land that do not contain native vegetation do not need to be assessed for ecosystem credits.

All vegetation that met the definition of native vegetation under section 60B of the *Local Land Services Act 2013* was mapped as native vegetation on the subject land. No non-native vegetation was mapped. Therefore, there were no impacts that do not need further assessment for ecosystem credits on the subject land.

10. Biodiversity credit report

Ecosystem credits and matching credit profiles are detailed in Table 21 (also refer to Appendix C). No species credits are required.

10.1 Ecosystem credits

Table 21 Ecosystem credit class and matching credit profile

Ecosystem credit	Attributes shared with matching credits						
	PCT name	**PCT vegetation class**	**PCT vegetation formation**	**Associated TEC or EC**	**Offset trading group** (BAM Section 10.2, Tables 4 & 5)	**Hollow bearing trees present?**	**IBRA subregion** (in which proposal is located)
3	PCT 429 White Cypress Pine - Poplar Box - Silver-leaved Ironbark viney shrub woodland of the Brigalow Belt South Bioregion	North-west Slopes Dry Sclerophyll Forests	Dry Sclerophyll Forest (shrub/grass sub-formation)	none	North-west Slopes Dry Sclerophyll Woodlands - ≥ 50% - < 70% cleared group (including Tier 3 or higher threat status).	No	Northern Basalts

11. References

DEC (2004). Threatened Species Survey and Assessment: Guidelines for developments and activities (working draft), New South Wales Department of Environment and Conservation, Hurstville, NSW.

Department of Planning & Environment (DPE) (2022). *Koala (Phascolarctos cinereus): Biodiversity Assessment Method Survey Guide.* Department of Planning & Environment, Sydney.

Department of Planning, Industry and Environment (DPIE 2020*). Surveying threatened plants and their habitats. NSW survey guide for the Biodiversity Assessment Method 2020.* State of NSW and Department of Planning, Industry and Environment, Sydney.

NSW Office of Environment and Heritage (2020). *Biodiversity Assessment Method.* Office of Environment and Heritage, Sydney.

State Government of NSW and Department of Planning and Environment (2022). *NSW State Vegetation Type Map – Extant PCT (Release C1.1.M1.1). [Quickview (Vector Data - Geodatabase Format) and SVTM NSW Extant PCT 5m (Raster Data - TIFF format)]*

12. Figures

Figure 1 Site Map

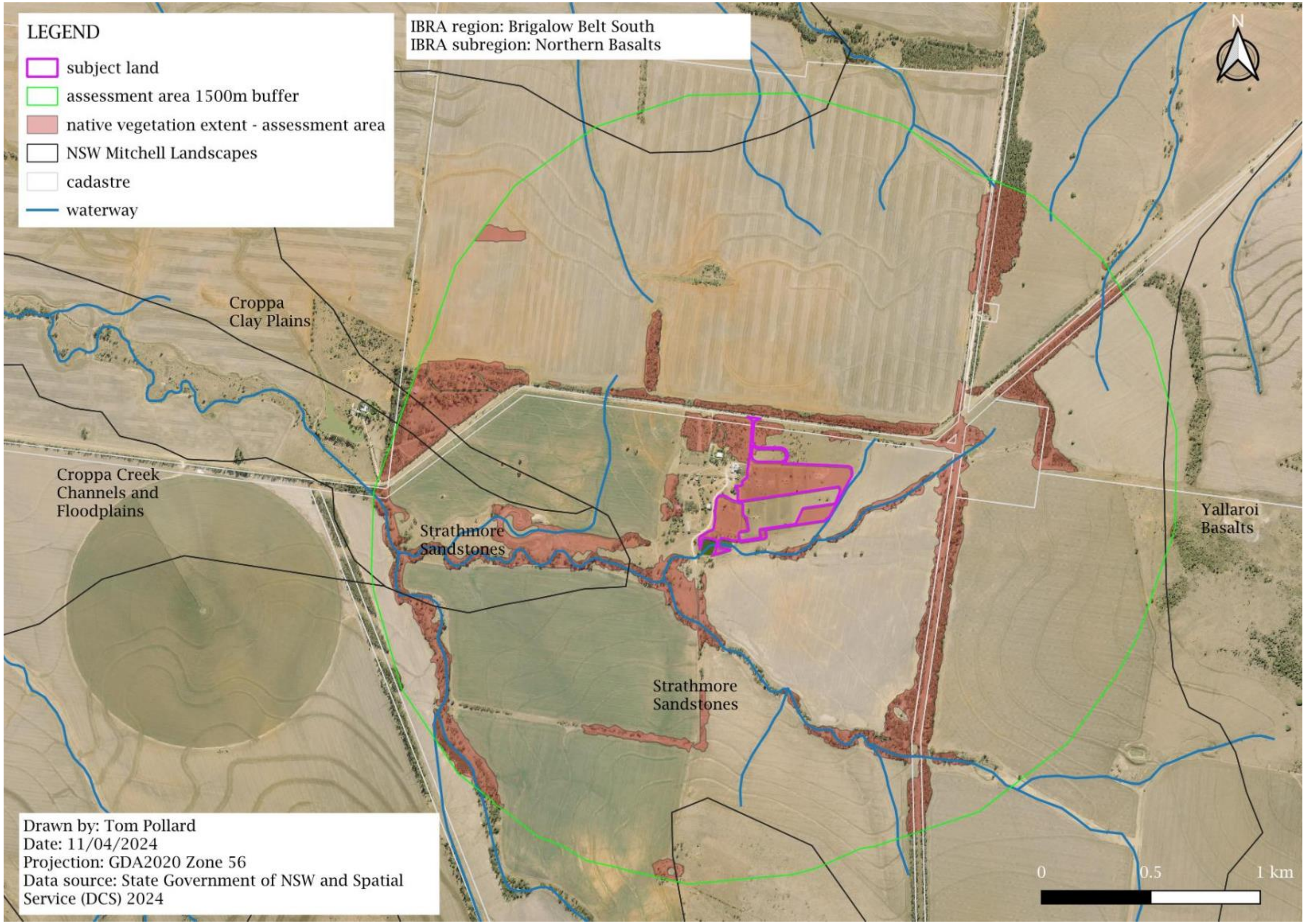

Figure 2 **Location Map**

Figure 3 **Development layout (as per RDC Engineers drawing: proposed development - infrastructure layout (E2-103-5000-01))**

Biodiversity Values Map

673.5 0 336.76 673.5 Metres

WGS_1984_Web_Mercator_Auxiliary_Sphere

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

Legend

- Biodiversity Values that have been mapped for more than 90 days
- Biodiversity Values added within last 90 days
- Native Vegetation Area Clearing Estimate (NVACE)
- Development area selected by proponent

22/03/2024 10:17 AM

Imagery © Airbus DS/Spot Image 2016

The results provided in this tool are generated using the best available mapping and knowledge of species habitat requirements.

This map is valid as at the date the report was generated. Checking the Biodiversity Values Map viewer for mapping updates is recommended.

Figure 4 Biodiversity Values Map

Figure 5 **Field survey locations**

Figure 6 Native vegetation extent

Figure 7 Plant community types

Figure 8 Vegetation zones

Figure 9 **Final impacts likely to occur on the subject land**

Figure 10 Thresholds for assessing and offsetting impacts

Appendix A: BDAR requirements compliance

Table 22 Assessment of compliance with BDAR minimum information requirements

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
Introduction	Chapters 2 and 3	Information	
		Introduction to the biodiversity assessment including:	–
		☒ brief description of the proposal	<1.1.1>
		☒ identification of subject land boundary, including:	<1.1.3>
		☒ operational footprint	
		☒ construction footprint indicating clearing associated with temporary/ancillary construction facilities and infrastructure	
		☒ general description of the subject land	<1.1.3>
		☒ sources of information used in the assessment, including reports and spatial data	<1.5>
		☒ identification and justification for entering the BOS	<1.2>
		Maps and tables	
		☒ Map of the subject land boundary showing the final proposal footprint, including the construction footprint for any clearing associated with temporary/ancillary construction facilities and infrastructure	<Figure 1>
Landscape	Sections 3.1 and 3.2, Appendix E	Information	
		Identification of site context components and landscape features, including:	–
		☒ general description of subject land topographic and hydrological setting, geology and soils	<1.1.3>
		☒ per cent native vegetation cover in the assessment area (as described in BAM Section 3.2)	<3.3>
		☒ IBRA bioregions and subregions (as described in BAM Subsection 3.1.3(2.))	<3.2.1>

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		☒ rivers and streams classified according to stream order (as described in BAM Subsection 3.1.3(3.) and Appendix E)	<3.2.2>
		☒ wetlands within, adjacent to and downstream of the site (as described in BAM Subsection 3.1.3(3.))	<3.2.2>
		☒ connectivity of different areas of habitat (as described in BAM Subsection 3.1.3(5–6.))	<3.2.3>
		☒ karst, caves, crevices, cliffs, rocks and other geological features of significance and for vegetation clearing proposals, soil hazard features (as described in BAM Subsections 3.1.3(7.) and 3.1.3(12.))	<3.2.4>
		☒ areas of outstanding biodiversity value occurring on the subject land and assessment area (as described in BAM Subsection 3.1.3(8–9.))	<3.2.5>
		☐ any additional landscape features identified in any SEARs for the proposal	n/a
		☒ NSW (Mitchell) landscape on which the subject land occurs	<3.2.6>
		☒ details of field reconnaissance undertaken to confirm the extent and condition of landscape features and native vegetation cover (as described in Operational Manual Stage 1 Section 2.4)	<2.1>
		Maps and tables	
		☒ Site Map ☒ Boundary of subject land ☒ Cadastre of subject land (including labelling of Lot and DP or section plan if relevant) ☒ Landscape features identified in BAM Subsection 3.1.3	<Figure 1>
		☒ Location Map ☒ Digital aerial photography at 1:10,000 scale or finer ☒ Boundary of subject land ☒ Assessment area (i.e. the subject land and either 1500 m buffer area or 500 m buffer for linear development)	<Figure 2>

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		☒ Landscape features identified in BAM Subsection 3.1.3 ☐ Additional detail (e.g. local government area boundaries) relevant at this scale	
		Landscape features identified in BAM Subsection 3.1.3 and to be shown on the Site Map and/or Location Map include:	–
		☒ IBRA bioregions and subregions	<Figure 1 & Figure 2>
		☒ rivers, streams and estuaries	
		☐ wetlands and important wetlands	
		☐ connectivity of different areas of habitat	
		☐ karst, caves, crevices, cliffs, rocks and other geological features of significance and if required, soil hazard features	
		☐ areas of outstanding biodiversity value occurring on the subject land and assessment area	
		☐ any additional landscape features identified in any SEARs for the proposal	
		☒ NSW (Mitchell) landscape on which the subject land occurs	
		Data	
		☒ All report maps as separate jpeg files	–
		Individual digital shape files of:	–
		☒ subject land boundary	–
		☒ assessment area (i.e. subject land and 1500 m buffer area) boundary	–
		☐ cadastral boundary of subject land	–
		☒ areas of native vegetation cover	–
		☒ landscape features	–
Native vegetation	Chapter 4, Appendix A and Appendix H	Information	

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		☒ Identify native vegetation extent within the subject land, including cleared areas and evidence to support differences between mapped vegetation extent and aerial imagery (as described in BAM Section 4.1(1–3.) and Subsection 4.1.1)	<4.1 & Figure 6>
		☒ Provide justification for all parts of the subject land that do not contain native vegetation (as described in BAM Subsection 4.1.2)	<4.1.1>
		☒ Review of existing information on native vegetation including references to previous vegetation maps of the subject land and assessment area (described in BAM Section 4.1(3.) and Subsection 4.1.1)	<2.2.2>
		☒ Describe the systematic field-based floristic vegetation survey undertaken in accordance with BAM Section 4.2	<2.2.3>
		☐ Where relevant, describe the use of more appropriate local data, provide reasons that support the use of more appropriate local data and include the written confirmation from the decision-maker that they support the use of more appropriate local data (as described in BAM Subsection 1.4.2 and Appendix A)	n/a
		For each PCT within the subject land, describe:	–
		☒ PCT name and ID	<4.1 & Figure 7>
		☒ vegetation class	<4.1.1>
		☒ extent (ha) within subject land	<2.2.2>
		☒ evidence used to identify a PCT including any analyses undertaken, references/sources, existing vegetation maps (BAM Section 4.2(1–3.))	<2.2.3>
		☒ plant species relied upon for identification of the PCT and relative abundance of each species	<4.2.2.3 and Appendix B>
		☐ if relevant, TEC status including evidence used to determine vegetation is the TEC (BAM Subsection 4.2.2(1–2.))	n/a
		☒ estimate of per cent cleared value of PCT (BAM Subsection 4.2.1(5.))	<4.1.1>
		Describe the vegetation integrity assessment of the subject land, including:	–
		☒ identification and mapping of vegetation zones (as described in BAM Subsection 4.3.1)	<4.3 & Figure 8>

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		☒ description of vegetation zones within the subject land (as described in Operational Manual Stage 1 Table 2 and Subsection 3.3.2)	<4.3 & Figure 8>
		☐ area (ha) of each vegetation zone	<4.3>
		☒ assessment of patch size (as described in BAM Subsection 4.3.2)	<4.3>
		☒ survey effort (i.e. number of vegetation integrity survey plots) as described in BAM Subsection 4.3.4(1–2.)	<4.4.1>
		☐ use of relevant benchmark data from BioNet Vegetation Classification (as described in BAM Subsection 4.3.3(5.))	n/a
		Where use of more appropriate local benchmark data is proposed (as described in BAM Subsection 1.4.2, BAM Subsection 4.3.3(5.) and BAM Appendix A):	–
		☐ identify the PCT or vegetation class for which local benchmark data will be applied	n/a
		☐ identify published sources of local benchmark data (if benchmarks obtained from published sources)	
		☐ describe methods of local benchmark data collection (if reference plots used to determine local benchmark data)	
		☐ provide justification for use of local data rather than BioNet Vegetation Classification benchmark values	n/a
		☐ provide written confirmation from the decision-maker that they support the use of local benchmark data	n/a
		Maps and tables	
		☒ Map of native vegetation extent within the subject land at scale not greater than 1:10,000 including identification of all areas of native vegetation including areas that are ground cover only, cleared areas (as described in BAM Section 4.1(1–3.)) and all parts of the subject land that do not contain native vegetation (BAM Subsection 4.1.2)	<Figure 6>
		☒ Map of PCTs within the subject land (as described in BAM Section 4.2(1.))	<Figure 7>
		☒ Map of vegetation zones within the subject land (as described in BAM Subsection 4.3.1)	<Figure 8>

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		☒ Map the location of floristic vegetation survey plots and vegetation integrity survey plots relative to PCT boundaries	<Figure 5>
		☐ Map of TEC distribution on the subject land and table of TEC listing, status and area (ha)	n/a
		☒ Map of patch size locations for each native vegetation zone and table of patch size areas (as described in BAM Subsection 4.3.2)	<Figure 8 & Table 5>
		Table of current vegetation integrity scores for each vegetation zone within the site and including:	–
		☒ composition condition score	<Table 6 >
		☒ structure condition score	
		☒ function condition score	
		☒ presence of hollow bearing trees	
		Data	
		☐ All report maps as separate jpeg files	–
		☒ Plot field data (MS Excel format)	
		☒ Plot field datasheets	<Appendix B>
		Digital shape files of:	–
		☒ PCT boundaries within subject land	–
		☐ TEC boundaries within subject land	n/a
		☒ vegetation zone boundaries within subject land	–
		☒ floristic vegetation survey and vegetation integrity plot locations	–
Threatened species	Chapter 5	Information	
		Identify ecosystem credit species likely to occur on the subject land, including:	–

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		☒ list of ecosystem credit species derived from the BAM-C (as described in BAM Subsection 5.1.1 and Section 5.2(1.))	<Table 7>
		☒ justification and supporting evidence for exclusion of any ecosystem credit species based on geographic limitations, habitat constraints or vagrancy (as described in BAM Subsections 5.2.1 and 5.2.2)	<5.1.1>
		☐ justification for addition of any ecosystem credit species to the list	n/a
		Identify species credit species likely to occur on the subject land, including:	–
		☒ list of species credit species derived from the BAM-C (as described in BAM Subsection 5.1.1)	<Table 8 & Table 9>
		☒ justification and supporting evidence for exclusions based on geographic limitations, habitat constraints or vagrancy (as described in BAM Subsections 5.2.1 and 5.2.2)	<5.1.2>
		☐ justification and supporting evidence for exclusions based on degraded habitat constraints and/or microhabitats on which the species depends (as described in BAM Subsection 5.2.2)	<5.1.2>
		☐ justification for addition of any species credit species to the list	n/a
		From the list of candidate species credit species, identify:	–
		☐ species assumed present within the subject land (if relevant) (as described in BAM Subsection 5.2.4(2.a.))	<Table 10 & 11>
		☐ species present within the subject land on the basis of being identified on an important habitat map for a species (as described in BAM Subsection 5.2.4(2.d.))	
		☒ species for which targeted surveys are to be completed to determine species presence (BAM Subsection 5.2.4(2.b.))	
		☐ species for which an expert report is to be used to determine species presence (BAM Subsection 5.2.4(2.c.))	
		Present the outcomes of species credit species assessments from:	–
		☒ threatened species survey (as described in BAM Section 5.2.4)	<Table 12 & 13>
		☒ expert reports (if relevant) including justification for presence of the species and information used to make this determination (as described in BAM Subsection 5.2.4, Section 5.3, Box 3)	n/a

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		Where survey has been undertaken include detailed information on:	–
		☒ survey method and effort (as described in BAM Section 5.3)	<Table 12 & Table 13>
		☐ justification of survey method and effort (e.g. citation of peer-reviewed literature) if approach differs from the department's taxa-specific survey guides or where no relevant guideline has been published	n/a
		☒ timing of survey in relation to requirements in the TBDC or the department's taxa-specific survey guides. Where survey was undertaken outside these guides include justification for the timing of surveys	<Table 12 & Table 13 & 5.3>
		☒ survey personnel and relevant experience	<Declarations ii>
		☐ describe any limitations to surveys and how these were addressed/overcome	n/a
		Where an expert report has been used in place of survey (as described in BAM Section 5.3, Box 3), include:	–
		☐ justification of the use of an expert report ☐ identify the expert, provide evidence of their expert credentials and departmental approval of expert status ☐ all requirements of Box 3 have been addressed in the expert report	n/a
		Where use of local data is proposed (BAM Subsection 1.4.2):	–
		☐ identify relevant species ☐ identify data to be amended ☐ identify source of information for local data, e.g. published literature, additional survey data, etc. ☐ justify use of local data in preference to VIS Classification or TBDC data	n/a
		☐ provide written confirmation from the decision-maker that they support the use of local data	n/a
		Species polygon completed for species credit species present within the subject land (assumed present or determined on the basis of survey, expert report or important habitat map) ensuring that:	–
		☐ the unit of measure for each species is documented	n/a
		for species assessed by area:	–

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		☐ the polygon includes the extent of suitable habitat for the target species within the subject land (as described in BAM Subsection 5.2.5)	n/a
		☐ a description of, and evidence-based justification for, the habitat constraints, features or microhabitats used to map the species polygon including reference to information in the TBDC for that species and any buffers applied	n/a
		for species assessed by counts of individuals:	–
		☐ the number of individual plants present on the subject land (as described in BAM Subsection 5.2.5(3.))	n/a
		☐ the method used to derive this number (i.e. threatened species survey or expert report) and evidence-based justification for the approach taken	n/a
		☐ the polygon includes all individuals located on the subject land with a buffer of 30 m around the individuals or groups of individuals on the subject land	n/a
		☐ Identify the biodiversity risk weighting for each species credit species identified as present within the subject land (as described in BAM Section 5.4)	n/a
		Maps and tables	
		☒ Table showing ecosystem credit species in accordance with BAM Subsection 5.1.1, and identifying:	
		☒ the ecosystem credit species removed from the list	<Table 7>
		☒ the sensitivity to gain class of each species	<Table 7>
		☒ Table detailing species credit species in accordance with BAM Section 5.2 and identifying:	
		☒ the species credit species removed from the list of species because the species is considered vagrant, out of geographic range or the habitat or microhabitat features are not present	<Table 8 & Table 9>
		☒ the candidate species credit species not recorded on the subject land as determined by targeted survey, expert report or important habitat map	<Table 10 & Table 11>
		☐ Table detailing species credit species recorded or assumed as present within the subject land, habitat constraints or microhabitats associated with the species, counts of individuals (flora)/extent of	n/a

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		suitable habitat (flora and fauna) (as described in BAM Subsection 5.2.6) and biodiversity risk weighting (BAM Section 5.4)	
		☐ Map indicating the GPS coordinates of all individuals of each species recorded within the subject land and the species polygon for each species (as described in BAM Subsection 5.2.5)	n/a
		Data	
		☒ Digital shape files of suitable habitat identified for survey for each candidate species credit species	–
		☒ Survey locations including GPS coordinates of any plots, transects, grids	
		☐ Digital shape files of each species polygon including GPS coordinates of located individuals	n/a
		☐ Species polygon map in jpeg format	n/a
		☐ Expert reports and any supporting data used to support conclusions of the expert report	n/a
		☐ Field datasheets detailing survey information including prevailing conditions, date, time, equipment used, etc.	n/a <see 2.5 & 5.3>
Prescribed impacts	Chapter 6	Information	
		Identify potential prescribed biodiversity impacts on threatened entities, including:	–
		☒ karst, caves, crevices, cliffs, rocks and other geological features of significance (as described in BAM Subsection 6.1.1) ☒ occurrences of human-made structures and non-native vegetation (as described in BAM Subsection 6.1.2) ☒ corridors or other areas of connectivity linking habitat for threatened entities (as described in BAM Subsection 6.1.3) ☒ waterbodies or any hydrological processes that sustain threatened entities (as described in BAM Subsection 6.1.4)	<Table 13>
		☐ protected animals that may use the proposed wind farm development site as a flyway or migration route (as described in BAM Subsection 6.1.5)	n/a

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		☐ where the proposed development may result in vehicle strike on threatened fauna or on animals that are part of a threatened ecological community (as described in BAM Subsection 6.1.6)	n/a
		☐ Identify a list of threatened entities that may be dependent upon or may use habitat features associated with any of the prescribed impacts	n/a
		☐ Describe the importance of habitat features to the species including, where relevant, impacts on life cycle or movement patterns (e.g. Subsection 6.1.3)	n/a
		Where the proposed development is for a wind farm:	–
		☐ identify a candidate list of protected animals that may use the development site as a flyway or migration route, including: resident threatened aerial species, resident raptor species and nomadic and migratory species that are likely to fly over the proposal area (as described in BAM Subsection 6.1.5)	n/a
		☐ provide details of targeted survey for candidate species of wind farm developments undertaken in accordance with BAM Subsection 6.1.5(2–3.)	n/a
		☐ predict the habitual flight paths for nomadic and migratory species likely to fly over the subject land and map the likely habitat for resident threatened aerial and raptor species (BAM Subsection 6.1.5(4.))	n/a
		Where the proposal may result in vehicle strike:	–
		☐ identify a list of threatened fauna or protected fauna species that are part of a TEC and at risk of vehicle strike due to the proposal	n/a
		Maps and tables	
		☐ Map showing location of any prescribed impact features (i.e. karst, caves, crevices, cliffs, rocks, human-made structures, etc.)	n/a
		☐ Map showing location of potential vehicle strike locations	n/a
		☐ Maps of habitual flight paths for nomadic and migratory species likely to fly over the site and maps of likely habitat for threatened aerial species resident on the site (for wind farm developments only)	n/a
		Data	
		☐ Digital shape files of prescribed impact feature locations	n/a

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		☐ Prescribed impact features map in jpeg format	n/a
Avoid and minimise impacts	Chapter 7	Information	
		Demonstration of efforts to avoid and minimise impacts on biodiversity values (including prescribed impacts) associated with the proposal location in accordance with Chapter 7, including an analysis of alternative:	–
		☐ modes or technologies that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed mode or technology	n/a
		☐ routes that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed route	n/a
		☐ alternative locations that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed location	n/a
		☐ alternative sites within a property on which the proposal is located that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed site	n/a
		☒ Describe efforts to avoid and minimise impacts (including prescribed impacts) to biodiversity values through proposal design (as described in BAM Sections 7.1 and 7.2)	<7.1.2>
		☒ Identification of any other site constraints that the proponent has considered in determining the location and design of the proposal (as described in BAM Subsection 7.2.1(3.))	<7>
		☐ Detail measures or options considered but not implemented because they are not feasible and/or practical (e.g. due to site constraints)	n/a
		Maps and tables	
		☒ Table of measures to be implemented to avoid and minimise the impacts of the proposal, including action, outcome, timing and responsibility	<Table 14>
		☐ Map of alternative footprints considered to avoid or minimise impacts on biodiversity values; and of the final proposal footprint, including construction and operation	n/a
		☐ Maps demonstrating indirect impact zones where applicable	n/a

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		Data	
		Digital shape files of:	–
		☒ alternative and final proposal footprint	–
		☒ direct and indirect impact zones	–
		☒ Maps in jpeg format	–
Assessment of impacts	Chapter 8, Sections 8.1 and 8.2	Information	
		☒ Determine the impacts on native vegetation and threatened species habitat, including a description of direct impacts of clearing of native vegetation, threatened ecological communities and threatened species habitat (as described in BAM Section 8.1)	<Table 15>
		Assessment of indirect impacts on vegetation and threatened species and their habitat including (as described in BAM Section 8.2):	–
		☒ description of the nature, extent, frequency, duration and timing of indirect impacts of the proposal	<Table 17>
		☒ documenting the consequences to vegetation and threatened species and their habitat including evidence-based justifications	<Table 17>
		☐ reporting any limitations or assumptions, etc. made during the assessment	n/a
		☒ identification of the threatened entities and their habitat likely to be affected	<Table 17>
		Assessment of prescribed biodiversity impacts (as described in BAM Section 8.3) including:	–
		assessment of the nature, extent frequency, duration and timing of impacts on the habitat of threatened species or ecological communities associated with:	–
		☐ karst, caves, crevices, cliffs, rocks and other features of geological significance	n/a
		☐ human-made structures	n/a
		☐ non-native vegetation	n/a

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		☐ connectivity of different areas of habitat of threatened species that facilitates the movement of those species across their range	n/a
		☐ movement of threatened species that maintains their life cycle	n/a
		☒ water quality, waterbodies and hydrological processes that sustain threatened species and threatened ecological communities	<8.3>
		☐ assessment of the impacts of wind turbine strikes on protected animals	n/a
		☐ assessment of the impacts of vehicle strikes on threatened species of animals or on animals that are part of a TEC	n/a
		☐ evaluate the consequences of prescribed impacts	n/a
		☐ describe impacts that are uncertain	n/a
		☐ document limitations to data, assumptions and predictions	n/a
		Maps and tables	
		☐ Table showing change in vegetation integrity score for each vegetation zone as a result of identified impacts	<Table 16>
		Data	
		N/A	–
Mitigation and management of impacts	Chapter 8, Sections 8.4 and 8.5	Information	
		Identification of measures to mitigate or manage impacts in accordance with the recommendations in BAM Sections 8.4 and 8.5 including:	–
		☒ techniques, timing, frequency and responsibility	<Table 18>
		☒ identify measures for which there is risk of failure	
		☒ evaluate the risk and consequence of any residual impacts	

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		☐ document any adaptive management strategy proposed	n/a
		Identification of measures for mitigating impacts related to:	–
		☒ displacement of resident fauna (as described in BAM Subsection 8.4.1(2.))	<8.4>
		☒ indirect impacts on native vegetation and habitat (as described in BAM Subsection 8.4.1(3.))	
		☐ mitigating prescribed biodiversity impacts (as described in BAM Subsection 8.4.2)	
		☐ Details of the adaptive management strategy proposed to monitor and respond to impacts on biodiversity values that are uncertain (BAM Section 8.5)	n/a
		Maps and tables	
		☐ Table of measures to be implemented before, during and after construction to mitigate and manage impacts of the proposal, including action, outcome, timing and responsibility	<Table 16>
		Data	
		N/A	–
Impact summary	Chapter 9	Information	
		Identification and assessment of impacts on TECs and threatened species that are at risk of a serious and irreversible impacts (SAII, in accordance with BAM Section 9.1) including:	–
		☐ addressing all criteria in Subsection 9.1.1 for each TEC listed as at risk of an SAII present on the subject land	n/a
		☐ for each TEC, report the extent of the TEC in NSW	n/a
		☐ addressing all criteria in Subsection 9.1.2 for each threatened species at risk of an SAII present on the subject land	n/a
		☐ for each threatened species, report the population size in NSW	n/a
		☐ documenting assumptions made and/or limitations to information	n/a

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		☐ documenting all sources of data, information, references used or consulted ☐ clearly justifying why any criteria could not be addressed	
		☒ Identification of impacts requiring offset in accordance with BAM Section 9.2	<Table 20>
		☒ Identification of impacts not requiring offset in accordance with BAM Subsection 9.2.1(3.)	<Table 19>
		☒ Identification of areas not requiring assessment in accordance with BAM Section 9.3	<9.2>
		Maps and tables	
		☐ Map showing the extent of TECs at risk of an SAII within the subject land	n/a
		☐ Map showing location of threatened species at risk of an SAII within the subject land	n/a
		Map showing location of:	–
		☒ impacts requiring offset	<Figure 10>
		☒ impacts not requiring offset	<Figure 10>
		☒ areas not requiring assessment	<Figure 10>
		Data	
		Digital shape files of:	–
		☐ extent of TECs at risk of an SAII within the subject land	n/a
		☐ location of threatened species at risk of an SAII within the subject land	n/a
		☒ boundary of impacts requiring offset	–
		☒ boundary of impacts not requiring offset	-
		☒ boundary of areas not requiring assessment	–
		☒ Maps in jpeg format	–
Impact summary	Chapter 10	Information	

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		Ecosystem credits and species credits that measure the impact of the development on biodiversity values, including:	–
		☒ future vegetation integrity score for each vegetation zone within the subject land (Equation 25 and Equation 26 in BAM Appendix H) ☒ change in vegetation integrity score (BAM Subsection 8.1.1) ☒ number of required ecosystem credits for the direct impacts of the proposal on each vegetation zone within the subject land (BAM Subsection 10.1.2)	<Table 16>
		☒ biodiversity risk weighting for each	<Table 16>
		☐ number of required species credits for each candidate threatened species that is directly impacted on by the proposal (BAM Subsection 10.1.3)	n/a
		Maps and tables	
		☒ Table of PCTs requiring offset and the number of ecosystem credits required	<Table 20>
		☐ Table of threatened species requiring offset and the number of species credits required	n/a
		Data	
		☒ Submitted proposal in the BAM Calculator	–
Biodiversity credit report	Chapter 10	Information	
		☒ Description of credit classes for ecosystem credits and species credits at the development or clearing site or land to be biodiversity certified (BAM Section 10.2)	<Table 28>
		☒ BAM credit report in pdf format	<Appendix C>
		Maps and tables	
		☐ Table of credit class and matching credit profile	<Table 21>
		Data	
		☒ BAM credit report in pdf format	<Appendix C>

Appendix B: Vegetation survey data

Table 23 Vegetation survey data and locations

Plot 1

Overview	
Location	**2513 Getta Getta Road, North Star**
Plot ID	*Plot 1*
PCT	*PCT 429*
Vegetation zone	*429_low_DNG*
TEC	No
IBRA region	Brigalow Belt South
Recorder	Tom Pollard
Date	18/12/2023
GPS start of transect	260366, 6795311
Midline bearing	150°

Composition and structure (400m² plot)									
Scientific name	***Common name***	***Family***	***Cover (%)***	***Abundance***	***Growth form***	***Exotic***	***High threat weed? (yes/no)***	***NSW BC Act listing status***	***Commonwealth EPBC Act listing status***
Tribulus micrococcus	Yellow Vine	Zygophyllaceae	0.1	1	FG (forb)	No	No	-	-
Chenopodium sp.	a Goosefoot	Chenopodiaceae	0.1	2	FG (forb)	No	No	-	-
Einadia trigonos	Fishweed	Chenopodiaceae	0.1	2	FG (forb)	No	No	-	-
Dactyloctenium radulans	Button Grass	Poaceae	30	-	GG (grass and grass-like)	No	No	-	-
Cynodon dactylon	Couch Grass	Poaceae	50	-	GG (grass and grass-like)	No	No	-	-
Eragrostis sp.	a Lovegrass	Poaceae	0.1	10	GG (grass and grass-like)	No	No	-	-
Cenchrus ciliaris	Buffel Grass	Poaceae	4	80		Yes	Yes	-	-
Eragrostis trichophora	-	Poaceae	1	20		Yes	No	-	-
Malva parviflora	Small-flowered Mallow	Malvaceae	0.1	5		Yes	No	-	-
Lepidium sp.	a Peppercress	Brassicaceae	0.1	1		Yes	No	-	-
Sonchus oleraceus	Milk Thistle	Asteraceae	0.1	1		Yes	No	-	-

Structure (400 m2 plot)		
BAM attribute		***Sum values***
Count of native richness	*Trees*	0
	Shrubs	0
	Grasses and grass-like	3
	Forbs	3
	Ferns	0
	Other	0
	Trees	0

Sum of cover of native vascular plans by growth form group	*Shrubs*	0
	Grasses and grass-like	80.1
	Forbs	0.3
	Ferns	0
	Other	0
High Threat Weed cover		4

Function (1000m² plot)					
Tree stem size classes (DBH cm)	**presence/absence (and large tree count)**				
large trees (>50cm)	absent				
30-49	absent				
20-29	absent				
10-19	absent				
5-9	absent				
<5 (regeneration)	absent				
Hollow tree count	0				
Length of logs (m) ≥10cm and >50cm	0				
Litter cover (%)	*subplot 1*	*subplot 2*	*subplot 3*	*subplot 4*	*subplot 5*
Subplot score (% in each of 5 plots)	30	40	30	40	50
Average of the 5 subplots	38				

Plot 2

Overview	
Location	**2513 Getta Getta Road, North Star**
Plot ID	*Plot 2*
PCT	*PCT 429*
Vegetation zone	*429_low_DNG*
TEC	No
IBRA region	Brigalow Belt South
Recorder	Tom Pollard
Date	18/12/2023
GPS start of transect	260300, 6795284
Midline bearing	233°

Composition and structure (400m² plot)									
Scientific name	**Common name**	**Family**	**Cover (%)**	**Abundance**	**Growth form**	**Exotic**	**High threat weed? (yes/no)**	**NSW BC Act listing status**	**Commonwealth EPBC Act listing status**
Chenopodium sp.	a Goosefoot	Chenopodiaceae	0.3	30	FG (forb)	No	No	-	-
Calotis lappulacea	Yellow Burr-daisy	Asteraceae	0.1	1	FG (forb)	No	No	-	-
Dactyloctenium radulans	Button Grass	Poaceae	40	-	GG (grass and grass-like)	No	No	-	-
Cynodon dactylon	Couch Grass	Poaceae	45	-	GG (grass and grass-like)	No	No	-	-

Eragrostis sp.	a Lovegrass	Poaceae	0.5	10	GG (grass and grass-like)	No	No	-	-
Lachnagrostis sp.	Blown Grass	Poaceae	0.1	1	GG (grass and grass-like)	No	No	-	-
Cenchrus ciliaris	Buffel Grass	Poaceae	5	50		Yes	Yes	-	-
Digitaria eriantha	Digit Grass	Poaceae	0.1	1		Yes	No	-	-
Lepidium sp.	a Peppercress	Brassicaceae	0.1	5		Yes	No	-	-
Sonchus oleraceus	Milk Thistle	Asteraceae	0.1	1		Yes	No	-	-
Eragrostis trichophora	-	Poaceae	0.5	10		Yes	No	-	-

Structure (400 m2 plot)		
BAM attribute		***Sum values***
Count of native richness	*Trees*	0
	Shrubs	0
	Grasses and grass-like	2
	Forbs	4
	Ferns	0
	Other	0
Sum of cover of native vascular plans by growth form group	*Trees*	0
	Shrubs	0
	Grasses and grass-like	85.6
	Forbs	0.4
	Ferns	0
	Other	0
High Threat Weed cover		5

Function (1000m² plot)					
Tree stem size classes (DBH cm)	***presence/absence (and large tree count)***				
large trees (>50cm)	absent				
30-49	absent				
20-29	absent				
10-19	absent				
5-9	absent				
<5 (regeneration)	absent				
Hollow tree count	0				
Length of logs (m) ≥10cm and >50cm	0				
Litter cover (%)	*subplot 1*	*subplot 2*	*subplot 3*	*subplot 4*	*subplot 5*
Subplot score (% in each of 5 plots)	80	50	50	50	20
Average of the 5 subplots	50				

Plot 3

Overview

Location	**2513 Getta Getta Road, North Star**
Plot ID	*Plot 3*
PCT	*PCT 429*
Vegetation zone	*429_low_DNG*
TEC	No
IBRA region	Brigalow Belt South
Recorder	Tom Pollard
Date	18/12/2023
GPS start of transect	260229, 6795411
Midline bearing	110°

Composition and structure (400m² plot)									
Scientific name	***Common name***	***Family***	***Cover (%)***	***Abundance***	***Growth form***	***Exotic***	***High threat weed? (yes/no)***	***NSW BC Act listing status***	***Commonwealth EPBC Act listing status***
Boerhavia dominii	Tarvine	Nyctaginaceae	3	20	FG (forb)	No	No	-	-
Tribulus micrococcus	Yellow Vine	Zygophyllaceae	0.1	2	FG (forb)	No	No	-	-
Solanum euriale	Quena	Solanaceae	0.1	5	FG (forb)	No	No	-	-
Dactyloctenium radulans	Button Grass	Poaceae	0.1	20	GG (grass and grass-like)	No	No	-	-
Cynodon dactylon	Couch Grass	Poaceae	90	-	GG (grass and grass-like)	No	No	-	-
Malva parviflora	Small-flowered Mallow	Malvaceae	0.1	2		Yes	No	-	-
Sonchus oleraceus	Milk Thistle	Asteraceae	0.1	10		Yes	No	-	-
Eragrostis trichophora	-	Poaceae	0.1	1		Yes	No	-	-

Structure (400 m2 plot)		
BAM attribute		***Sum values***
Count of native richness	*Trees*	0
	Shrubs	0
	Grasses and grass-like	2
	Forbs	3
	Ferns	0
	Other	0
Sum of cover of native vascular plans by growth form group	*Trees*	0
	Shrubs	0
	Grasses and grass-like	90.1
	Forbs	3.2
	Ferns	0
	Other	0
High Threat Weed cover		0

Function (1000m² plot)	

Tree stem size classes (DBH cm)	presence/absence (and large tree count)				
large trees (>50cm)	absent				
30-49	absent				
20-29	absent				
10-19	absent				
5-9	absent				
<5 (regeneration)	absent				
Hollow tree count	0				
Length of logs (m) ≥10cm and >50cm	0				
Litter cover (%)	subplot 1	subplot 2	subplot 3	subplot 4	subplot 5
Subplot score (% in each of 5 plots)	50	60	40	40	25
Average of the 5 subplots	43				

Plot 4

Overview	
Location	2513 Getta Getta Road, North Star
Plot ID	Plot 4
PCT	PCT 429
Vegetation zone	429_low_woodland
TEC	No
IBRA region	Brigalow Belt South
Recorder	Tom Pollard
Date	18/12/2023
GPS start of transect	260235, 6795711
Midline bearing	177°

Composition and structure (400m² plot)									
Scientific name	Common name	Family	Cover (%)	Abundance	Growth form	Exotic	High threat weed? (yes/no)	NSW BC Act listing status	Commonwealth EPBC Act listing status
Enchylaena tomentosa	Ruby Saltbush	Chenopodiaceae	0.5	50	FG (forb)	No	No	-	-
Sida hackettiana	Golden Rod	Malvaceae	3	50	FG (forb)	No	No	-	-
Calotis lappulaceae	Yellow Burr-daisy	Asteraceae	15	200	FG (forb)	No	No	-	-
Einadia trigonos	Fishweed	Chenopodiaceae	0.2	1	FG (forb)	No	No	-	-
Cullen tenax	Tough Scurf-pea	Fabaceae	0.1	10	FG (forb)	No	No	-	-
Wahlenbergia sp.	a Bluebell	Campanulaceae	0.1	20	FG (forb)	No	No	-	-
Tribulus micrococcus	Yellow Vine	Zygophyllaceae	0.1	1	FG (forb)	No	No	-	-
Eriochloa pseudoatrotriche	Early Spring Grass	Poaceae	2	100	GG (grass and grass-like)	No	No	-	-
Tragus australianus	Small Burr-grass	Poaceae	0.1	50	GG (grass and grass-like)	No	No	-	-
Dactyloctenium radulans	Button Grass	Poaceae	1	100	GG (grass and grass-like)	No	No	-	-
Cynodon dactylon	Couch Grass	Poaceae	15	-	GG (grass and grass-like)	No	No	-	-
Eragrostis sp.	a Lovegrass	Poaceae	0.5	50	GG (grass and grass-like)	No	No	-	-

Lachnagrostis sp.	Blown Grass	Poaceae	0.5	50	GG (grass and grass-like)	No	No	-	-
Sporobolus creber	Slender Rat's-tail Grass	Poaceae	1	50	GG (grass and grass-like)	No	No	-	-
Eragrostis brownii	Brown's Lovegrass	Poaceae	0.1	1	GG (grass and grass-like)	No	No	-	-
Parsonsia eucalyptophylla	Gargaloo	Apocynaceae	0.1	2	OG (other)	No	No	-	-
Glycine sp.	a Glycine	Fabaceae	0.1	5	OG (other)	No	No	-	-
Sclerolaena muricata	Black Rolypoly	Chenopodiaceae	0.1	1	SG (shrub)	No	No	-	-
Sclerolaena birchii	Galvanised Burr	Chenopodiaceae	0.2	5	SG (shrub)	No	No	-	-
Alstonia constricta	Quinine Tree	Apocynaceae	7	-	TG (tree)	No	No	-	-
Cenchrus ciliaris	Buffel Grass	Poaceae	0.5	20		Yes	Yes	-	-
Glandularia aristigera	Mayne's Pest	Verbenaceae	5	100		Yes	No	-	-
Digitaria eriantha	Digit Grass	Poaceae	0.2	2		Yes	No	-	-
Sonchus oleraceus	Milk Thistle	Asteraceae	0.1	2		Yes	No	-	-

Structure (400 m2 plot)		
BAM attribute		***Sum values***
Count of native richness	*Trees*	1
	Shrubs	2
	Grasses and grass-like	8
	Forbs	7
	Ferns	0
	Other	2
Sum of cover of native vascular plans by growth form group	*Trees*	7
	Shrubs	0.3
	Grasses and grass-like	20.2
	Forbs	19
	Ferns	0
	Other	0.2
High Threat Weed cover		0.5

Function (1000m² plot)					
Tree stem size classes (DBH cm)	***presence/absence (and large tree count)***				
large trees (>50cm)	absent				
30-49	absent				
20-29	absent				
10-19	absent				
5-9	absent				
<5 (regeneration)	present				
Hollow tree count	0				
Length of logs (m) ≥10cm and >50cm	0				
Litter cover (%)	*subplot 1*	*subplot 2*	*subplot 3*	*subplot 4*	*subplot 5*

Subplot score (% in each of 5 plots)	5	3	10	25	10
Average of the 5 subplots	10.6				

Appendix C: Credit reports

BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00045202/BAAS18071/23/00045203	North Star Springfield Feedlot expansion BDAR	28/10/2024
Assessor Name	Assessor Number	BAM Data version *
Tom Pollard	BAAS18071	Current classification (live - default) (80)
Proponent Names	Report Created	BAM Case Status
	20/02/2025	Finalised
Assessment Revision	BOS entry trigger	Assessment Type
0	BOS Threshold: Area clearing threshold	Part 4 Developments (General)
Date Finalised		
20/02/2025		

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
Nil		

Species
Nil

Additional Information for Approval

PCT Outside Ibra Added

None added

PCTs With Customized Benchmarks

PCT
No Changes

Predicted Threatened Species Not On Site

Name
Calyptorhynchus lathami lathami / South-eastern Glossy Black-Cockatoo
Climacteris picumnus victoriae / Brown Treecreeper (eastern subspecies)
Lathamus discolor / Swift Parrot
Glossopsitta pusilla / Little Lorikeet
Grantiella picta / Painted Honeyeater
Macropus dorsalis / Black-striped Wallaby

Ecosystem Credit Summary (Number and class of biodiversity credits to be retired)

BAM Biodiversity Credit Report (Like for like)

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
429-White Cypress Pine - Poplar Box - Silver-leaved Ironbark viney shrub woodland of the Brigalow Belt South Bioregion	Not a TEC	9.4	0	3	3

	Like-for-like credit retirement options					
429-White Cypress Pine - Poplar Box - Silver-leaved Ironbark viney shrub woodland of the Brigalow Belt South Bioregion	Class	Trading group	Zone	HBT	Credits	IBRA region
	North-west Slopes Dry Sclerophyll Woodlands This includes PCT's: 228, 429, 435, 517, 527, 529, 564, 588, 594, 595, 597, 598, 856, 1165, 1306, 1308, 1317, 1387, 1586, 1607, 3511, 3512, 3514, 3515, 3517, 3518, 3521, 3522, 3523, 3525, 3528, 3530, 3532, 4148, 4149, 4150	North-west Slopes Dry Sclerophyll Woodlands >=50% and <70%	429_low_woodland	No	3	Northern Basalts, Castlereagh-Barwon, Inverell Basalts, Kaputar, Liverpool Plains, Nandewar Northern Complex, Northern Outwash and Peel. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	North-west Slopes Dry Sclerophyll Woodlands This includes PCT's: 228, 429, 435, 517, 527, 529, 564, 588, 594, 595, 597, 598, 856, 1165, 1306, 1308, 1317, 1387, 1586, 1607, 3511, 3512, 3514, 3515, 3517, 3518, 3521, 3522, 3523, 3525, 3528, 3530, 3532, 4148, 4149, 4150	North-west Slopes Dry Sclerophyll Woodlands >=50% and <70%	429_low_DNG	No	0	Northern Basalts, Castlereagh-Barwon, Inverell Basalts, Kaputar, Liverpool Plains, Nandewar Northern Complex, Northern Outwash and Peel. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Species Credit Summary

No Species Credit Data

Credit Retirement Options

Like-for-like credit retirement options

BAM Biodiversity Credit Report (Variations)

Proposal Details

Assessment Id
00045202/BAAS18071/23/00045203

Proposal Name
North Star Springfield Feedlot expansion BDAR

BAM data last updated *
28/10/2024

Assessor Name
Tom Pollard

Assessor Number
BAAS18071

BAM Data version *
Current classification (live - default) (80)

Proponent Name(s)

Report Created
20/02/2025

BAM Case Status
Finalised

Assessment Revision
0

BOS entry trigger
BOS Threshold: Area clearing threshold

Assessment Type
Part 4 Developments (General)

Date Finalised
20/02/2025

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
Nil		

Species
Nil

Additional Information for Approval

PCT Outside Ibra Added

None added

PCTs With Customized Benchmarks

PCT
No Changes

Predicted Threatened Species Not On Site

Name
Calyptorhynchus lathami lathami / South-eastern Glossy Black-Cockatoo
Climacteris picumnus victoriae / Brown Treecreeper (eastern subspecies)
Lathamus discolor / Swift Parrot
Glossopsitta pusilla / Little Lorikeet
Grantiella picta / Painted Honeyeater
Macropus dorsalis / Black-striped Wallaby

Ecosystem Credit Summary (Number and class of biodiversity credits to be retired)

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
429-White Cypress Pine - Poplar Box - Silver-leaved Ironbark viney shrub woodland of the Brigalow Belt South Bioregion	Not a TEC	9.4	0	3	3.00

	Like-for-like credit retirement options					
429-White Cypress Pine - Poplar Box - Silver-leaved Ironbark viney shrub woodland of the Brigalow Belt South Bioregion	Class	Trading group	Zone	HBT	Credits	IBRA region

	North-west Slopes Dry Sclerophyll Woodlands This includes PCT's: 228, 429, 435, 517, 527, 529, 564, 588, 594, 595, 597, 598, 856, 1165, 1306, 1308, 1317, 1387, 1586, 1607, 3511, 3512, 3514, 3515, 3517, 3518, 3521, 3522, 3523, 3525, 3528, 3530, 3532, 4148, 4149, 4150	North-west Slopes Dry Sclerophyll Woodlands >=50% and <70%	429_low_woodland	No	3	Northern Basalts,Castlereagh-Barwon, Inverell Basalts, Kaputar, Liverpool Plains, Nandewar Northern Complex, Northern Outwash and Peel. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	North-west Slopes Dry Sclerophyll Woodlands This includes PCT's: 228, 429, 435, 517, 527, 529, 564, 588, 594, 595, 597, 598, 856, 1165, 1306, 1308, 1317, 1387, 1586, 1607, 3511, 3512, 3514, 3515, 3517, 3518, 3521, 3522, 3523, 3525, 3528, 3530, 3532, 4148, 4149, 4150	North-west Slopes Dry Sclerophyll Woodlands >=50% and <70%	429_low_DNG	No	0	Northern Basalts,Castlereagh-Barwon, Inverell Basalts, Kaputar, Liverpool Plains, Nandewar Northern Complex, Northern Outwash and Peel. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					
	Formation	Trading group	Zone	HBT	Credits	IBRA region

	Dry Sclerophyll Forests (Shrub/grass sub-formation)	Tier 3 or higher threat status	429_low_woodland	No	3	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Dry Sclerophyll Forests (Shrub/grass sub-formation)	Tier 3 or higher threat status	429_low_DNG	No	0	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Species Credit Summary

No Species Credit Data

Credit Retirement Options

Like-for-like options

Appendix K

Heritage Assessment and AIHMS Search Results

Due Diligence Assessment.

Aboriginal and non-Aboriginal cultural heritage –

part of "Springfield" 2513 Getta Getta Rd. North Star.

Report compiled by Tony Sonter
December, 2023.

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Scales

- Ranging pole is in red and white sections each 20cm.
- Coloured IFRAO scale has black and white 1cm² cubes

Abbreviations:

AHIMS – Aboriginal Heritage Information Management System
ASL – Above Sea Level (elevation)
EIS – Environmental Impact Statement
GDA94 – Geocentric Datum of Australia 1994
LALC – Local Aboriginal Land Council
LEP – Gwydir Shire Local Environment Plan.
SEARs – Secretary’s Environmental Assessment Requirements

Author statement.

I am an archaeologist of indigenous Australian Darkinyung heritage, being a direct descendent, on my mother’s side, of Elizabeth Smith (1799-1846) who was the daughter of 2nd Fleet convict Joseph Smith and his Darkinyung Aboriginal wife from the Macdonald / Hawkesbury river area.

I began working as a professional archaeologist in 2009 registering as such through the trading name of “Artefact and Aspect”.

Academic qualifications for the undertaking of archaeological investigations in Australia is outlined in the document “By Degrees – Benchmarking Archaeology Degrees in Australian Universities – April 2008”, which focuses on the benchmarks that all Honors students should meet.

- Bachelor of Arts – (U.N.E. Armidale – 1984) Major in Physical Geography.
- Postgraduate Diploma in Social Science – (U.N.E. Armidale – 1986) Major in Prehistoric / Australian archaeology.
- Master of Letters (Honors equivalent U.N.E. Armidale – 1990) Coursework and dissertation “Aboriginal Art on the North West Slopes of New South Wales”.
- Unspecified units of study - Australian Aboriginal History (155; 253 and 254 – U.N.E. Armidale 1991 / 1992)
- Graduate Certificate of Education (Edith Cowan University – Gwelup W.A. – 2003) Major in Vocational Education.
- Heritage Advisor Training (Heritage Council of New South Wales Heritage Branch, Department of Planning – 2010) Major in historical / industrial archaeology.

The above qualifications comply with the “Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales” (Part 6 *National Parks and Wildlife Act 1974*) where to undertake archaeological investigations “an appropriately skilled and experienced person has a minimum of a bachelor’s degree with honors in archaeology” (September, 2010. p. 4)

1. Executive Summary

Doolin Farming Pty. Ltd. (Angus Doolin) currently operate an existing cattle feedlot of 999 head on the property “Springfield” at 2513 Getta Getta Rd. North Star. The company wish to expand their feedlot operation to accommodate 3,500 head of cattle.
To facilitate this expansion the NSW Department of Planning and Environment have deemed the proposed expansion a Designated Development and issued SEAR Number 1687 for the company to respond to.

Regarding the matter of Aboriginal and non-Aboriginal cultural heritage as listed in the SEAR request, an investigation was undertaken based on the Due Diligence Code of Practice, between 12th July and 17th October, 2023.

The following is a summary of the Due Diligence investigation.

- No items of Aboriginal and or non-Aboriginal cultural heritage are recorded on any available data base.
- No items of Aboriginal and or non-Aboriginal cultural heritage were observed on the site.
- All proposed developments associated with the feedlot expansion are sited on disturbed land. (Due Diligence (4) pp. 7/8)
- Several of the activities necessary for the proposed development to proceed are deemed low impact activities. (Due Diligence (1 a;b;c) p.6)

Under the Due Diligence practice it would be prudent before any development is undertaken that all employees and contractors are aware of potential and familiar in identifying objects of Aboriginal cultural heritage.

All development activities should proceed with caution.

Should any objects of Aboriginal and non-Aboriginal cultural heritage be observed or uncovered then work should stop and appropriate organisations contacted for advice vis-à-vis this report author and Toomelah Local Aboriginal Land Council (LALC) or in the case of skeletal material the nearest police station Boggabilla vis-à-vis Yetman.

2. Background

Doolin Farming Pty. Ltd. (Angus Doolin) currently operate an existing cattle feedlot of 999 head on the property “Springfield” at 2513 Getta Getta Rd. North Star. The company wish to expand their feedlot operation to accommodate 3,500 head of cattle.
To help facilitate this expansion development Doolin Farming Pty. Ltd. have engaged the services of agricultural environmental project management company RDC Engineers Pty. Ltd., Toowoomba (Rod Davis).

The proposed feedlot expansion development is defined as a Designated Development by the NSW Department of Planning and Environment and under Section 4. 12(8) of the *Environmental Planning and Assessment Act 1979* and requires a specific Environmental Impact Statement (EIS) as specified by the Planning Secretary’s Environmental Assessment Requirements. (SEARs). This Due Diligence report addresses two areas specified within the proposed feedlot expansion as noted in SEAR 1687.

These two areas are:

1) An assessment of any potential impact on heritage of both Aboriginal and non-Aboriginal cultural heritage.
   and
2) Consultation with Toomelah Local Aboriginal Land Council (LALC)

The proposed development essentially comprises the construction of:

- two new rows of feedlot pens (one north and one south of existing feedlot pens) and associated service road for each
  and
- associated farm infrastructure e.g solid waste stockpile and sediment capture.

All proposed infrastructure associated with the feedlot expansion are sited on “disturbed land” i.e. land that has been subject of farming / grazing activity with associated infrastructure that has significantly “changed the land’s surface”. (Due Diligence, 2010. p.18)

3. Proposed Development Location

The property "Springfield" is located on the Getta Getta Rd., 14.6km. east of North Star and 23.6km south west of Yetman (Figure 1) with a central GDA94 reference for the feedlot development being -

28.946806102 S Lat.
150.539813623 E Long.

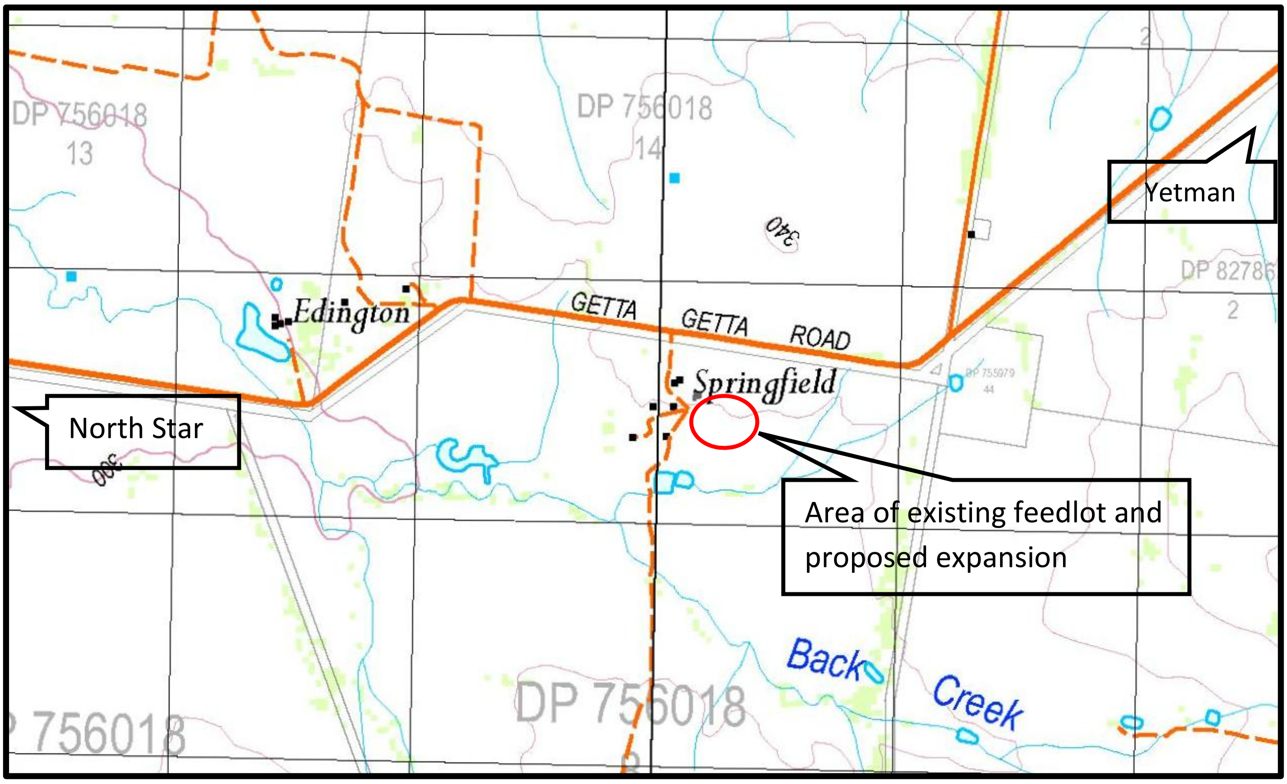

Figure 1. Location of existing feedlot and proposed expansion on "Springfield".
(Indicative only not to scale.)
(Source: Central Mapping Authority of NSW. Topographic Map Sheet YETMAN 9040-II & III)

4. The Site

The site of the proposed feedlot expansion consists largely of two distinct units; one being the actual feedlot pens while the other is the associated surrounding area that is best described as the potential "field of works". (Figure 2)

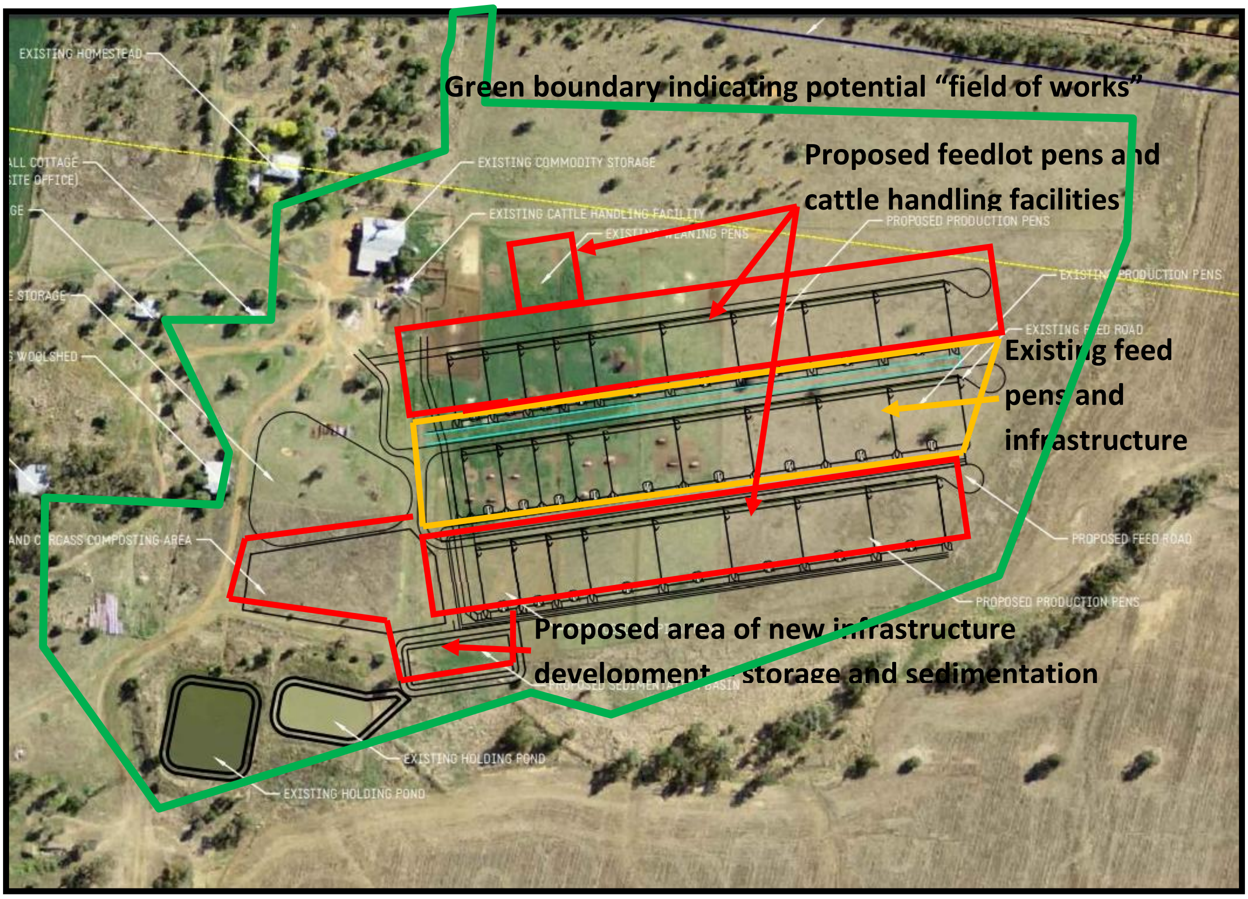

Figure 2 – Proposed extension of existing "Springfield" feedlot to increase capacity to 3,500 head – generalised schematic indicating "field of works" and planned developments. (Source – adapted from Draft schematic Figure 1 by RDC Engineers 27/1/2022)

Generally the site is a south facing gentle slope ranging from 327m. asl on the northern edge to 316m. asl on the southern edge. Given that the area within the "field of works" has a long history of intensive agricultural use there are very few remnant trees remaining with the area being extensively cleared. (Figure 3). There is a ribbon of riverine vegetation that exists outside the southern boundary of the field of works that is associated with an ephemeral drainage line tributary of Back Creek.

Soils progress in a catena down slope from lighter reds to a heavier grey loam on the southern down slope edge. Some scalding occurs with exposed areas of sedimentary bedrock and a number of quite large sedimentary "slabs" were evident on the eastern edge of the field of works, none showed evidence of being utilised for Aboriginal "grinding" purposes.

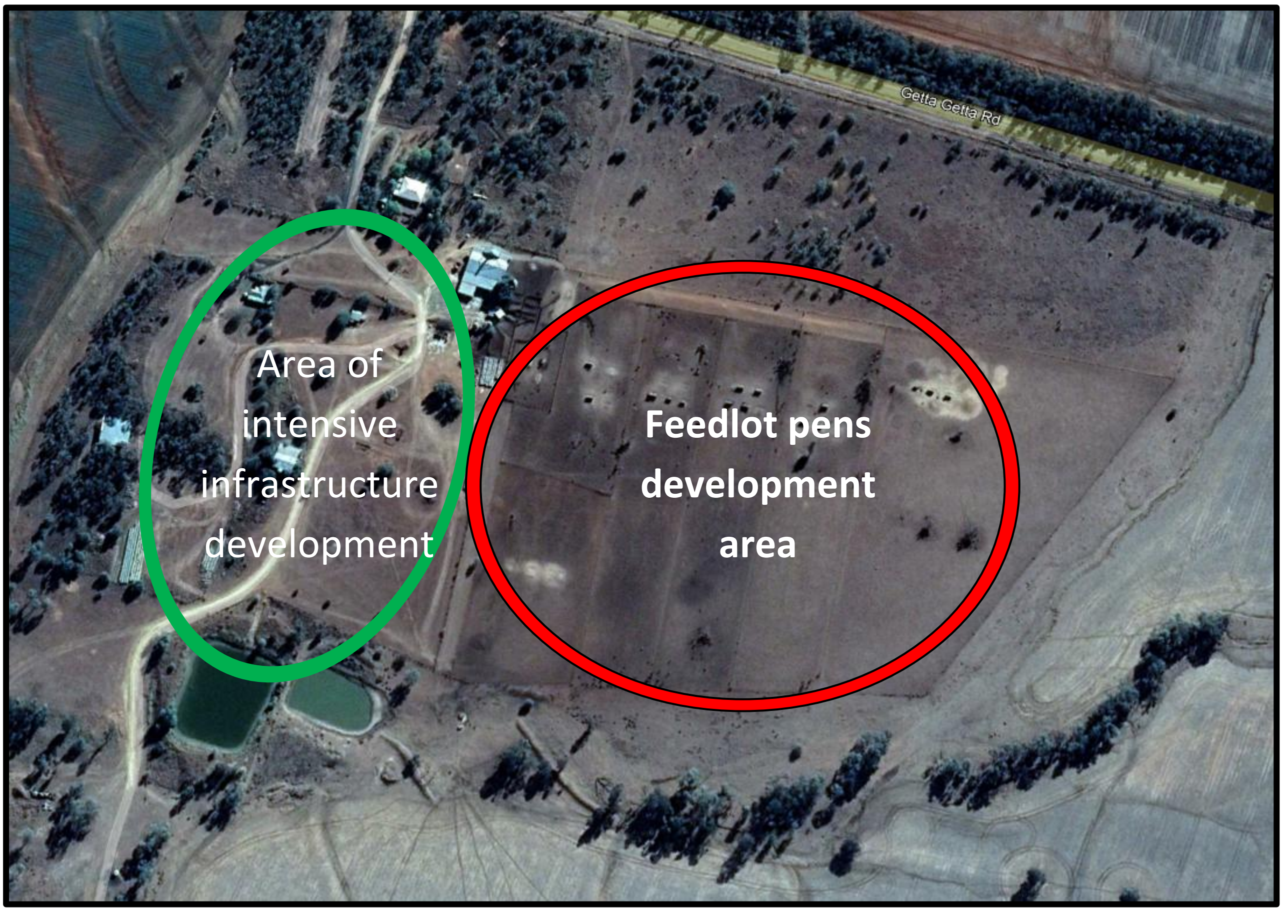

Figure 3 – Historical aerial photo of site pre current feedlot illustrating historical intensive agricultural use of site.
(Source: Google maps 16th June, 2018 – accessed 16th October, 2023)

The external field of works was included as a precautionary matter and to all intent and purpose with the exception of the area noted in Figure 3 “Area of intensive infrastructure development” (Area 1 – Figure 4) it is unlikely to be impacted on during the proposed feedlot expansion works.

5. The Generic Due Diligence Process.

This process outlines the reasonable and practical procedural steps to be undertaken by individuals and organisations to "identify whether or not Aboriginal objects are, or are likely to be present in an area". (Due Diligence. 2010 p. 2).

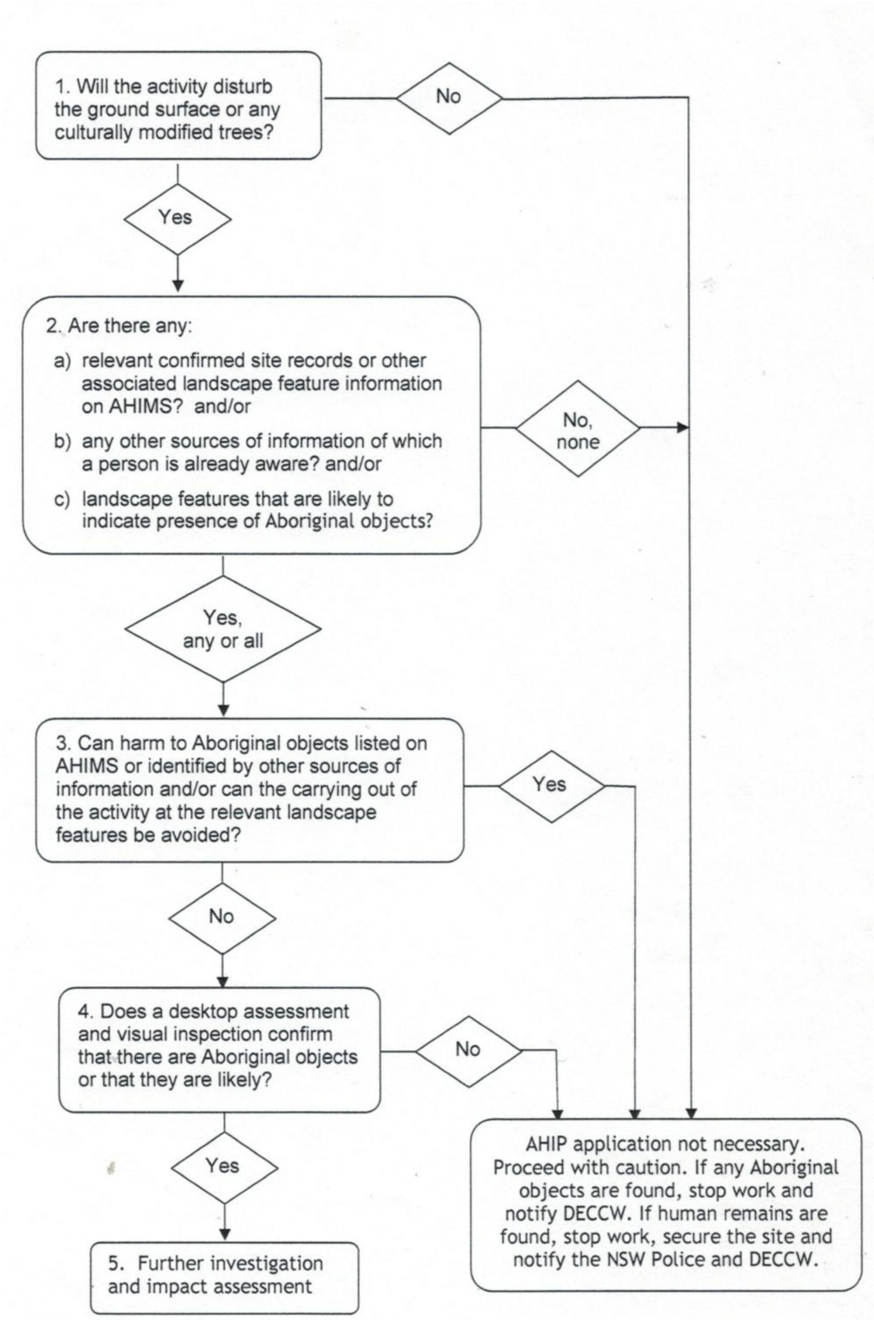

Figure 4. The generic Due Diligence process flow chart
(Source: Due Diligence Code of Practice. 2010. p.10)

Much of the development area in this proposed feedlot expansion project can be defined as disturbed land under Part (4) of the due diligence process (Due Diligence. 2010. pp 7-8) Examples of activities that have occurred onsite previously that fall within the definition of “disturbed land” include but are not limited to:

- Construction of rural infrastructure – e.g. dams, fences etc.
- Construction of roads and tracks
- Clearing of vegetation
- Construction of buildings and other structure
- Installation of utilities such as electricity, water supply and storm water drainage
- Substantial grazing
- Construction of earthworks in association with any of the items above or erosion control contours
- Maintenance of any of the above items once installed and existing

The due diligence process lists several intrinsic landscape features that Aboriginal objects are more likely to occur in, due to a preference for traditional cultural use of those areas. (Due Diligence. 2010. p. 12) Relative to this proposed development is the southern section being “within 200m of waters”. An un-named ephemeral tributary of Back Creek occurs outside the field of works but runs basically parallel to the southern boundary of the proposed development and falls within this 200m “limit” and therefore becomes an area of greater interest. (See Section – 8)

6. AHIMS (Aboriginal Heritage Information Management System)

An essential component of the Due Diligence process is consulting the AHIMS data base to see if any Aboriginal sites have previously been recorded in the area where the proposed activity is planned. Such an enquiry was made on 12th July, 2023 using the proposed development location “central” to the searched area. This enquiry returned nil Aboriginal sites recorded in or near the location. (Appendix A).

While the proposed development is specific to 2 Lots (Lot 8 DP 756018 and Lot 1 DP 1212915) the AHIMS search was conducted over a much larger area of approximately 400 km^2 (24km x 16km) in accordance with Requirement 1b of the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (2010. p.7) that requires an AHIMS search to:

- Include an area larger than , and wholly containing, the subject area
  and
- Include an area large enough to allow adequate landscape interpretation, and if available - sites in large enough numbers to allow adequate understanding of the distribution of the sites within the landscape.

7. Due Diligence Visual Inspection

On Tuesday 17th October, 2023 a field inspection was carried out to examine the area under the due diligence process to confirm the actual presence or likely existence of Aboriginal objects on site. The inspection was carried out by the report author and a field assistant, Sally Kelso who has approximately 15 years field experience in assessing Aboriginal cultural heritage, largely stone artefacts, modified trees and art work. Where circumstances permitted the field inspection was undertaken in a boustrophedon method to allow accurate surface coverage. (Code of Practice 2010, pp.12-13). The weather was warm 24° and sunny with clear visibility. As the preceding weather conditions had been dry coming out of winter, it was predicted that there would be opportune surface exposure. To facilitate field inspection the area was divided into 5 sections. (Figure 5).

In accordance with Due Diligence procedure it was intended to assess all mature trees for evidence of cultural modification against criteria as outlined in the Aboriginal Scarred Tree Manual (Long, 2005). However, once onsite, field inspection revealed no mature trees present capable of bearing Aboriginal scars.

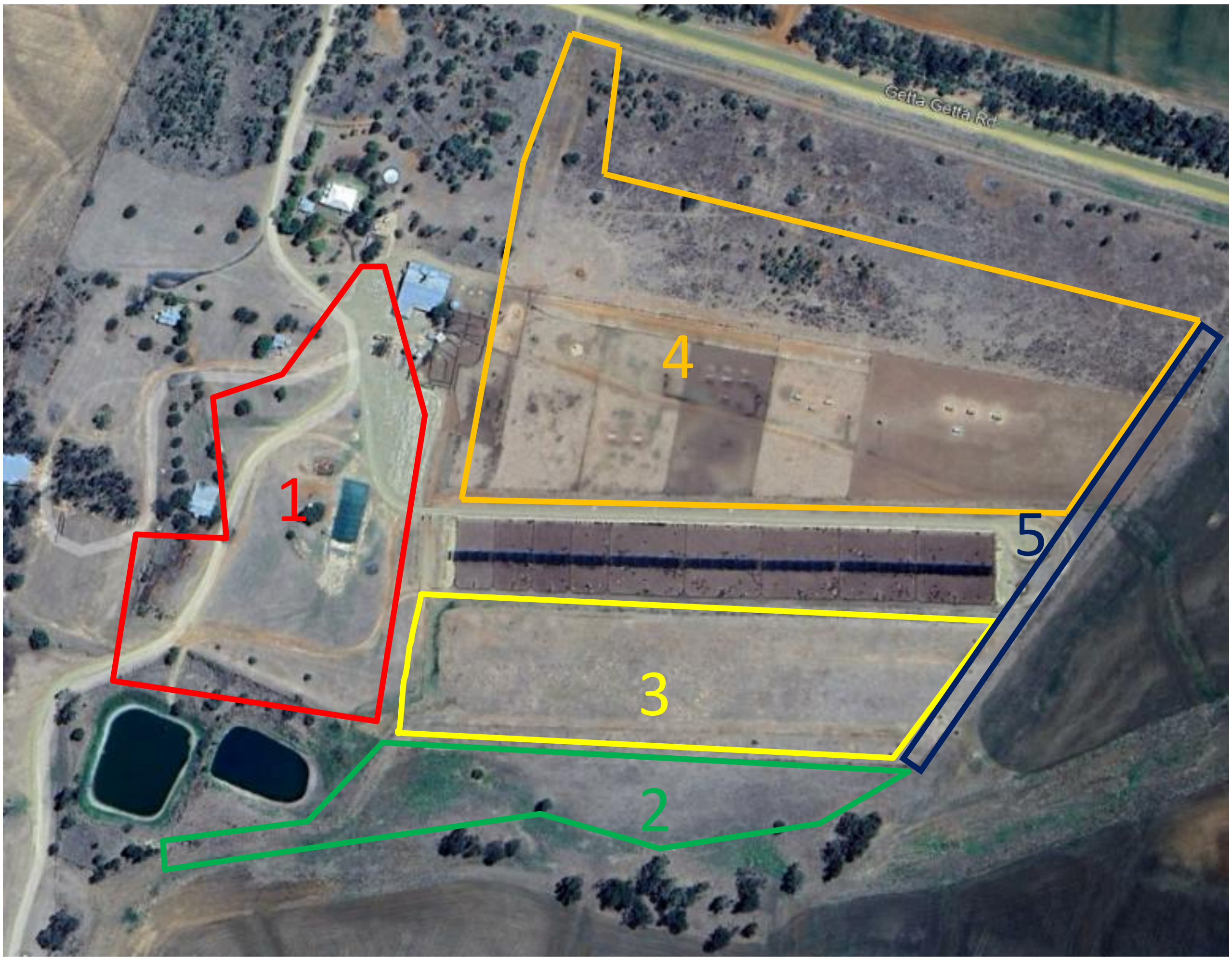

Figure 5. Areas of due diligence field inspection. (Indicative boundaries)

1. Western infrastructure area – nominally 5 hectares.
2. Southern boundary – nominally 2 hectares.
3. Southern pen row – nominally 3.5 hectares.
4. Northern pen row – nominally 10 hectares.
5. Eastern boundary buffer – nominally 1.5 hectares.

(Source: Adapted from Google Earth Pro – photo 23rd September 2023 accessed 16th October, 2023)

8. Field Inspection Results

8.1 Western infrastructure area.

Current use: General storage – various stockpiles, machinery parking, fuel storage, criss-crossed by tracks. (Plate 1) Some “imported” gravel used for road construction.
Proposed use – continuing as same
Topography – north to south gentle slope.
Vegetation – short grass cover, maintained as part of farm management. (Plate 2)
Ground surface visibility – clear on tracks, basically nil on grass covered area, some areas of scalding. (Plate 3)
Estimated surface exposure – 30 to 40%
Rock exposure – some noted on scalds including numerous quartz “marble” size pebbles.
Extensive use of “imported” gravel for road base. (Plate 4)
Field survey process – random survey of road and scald exposures
Field survey result – no items of Aboriginal or non-Aboriginal cultural heritage were observed.

Plate 1. General view of Area 1. Looking north from southern boundary.

Plate 2. 100% short grass ground cover on selected areas of Area 1.
Note the dry and "crisp" nature of the grass cover with the ongoing dry season.

Plate 3. Example of hard baked surface scald road surface within Area 1.

Plate 4. Stockpile of “imported” road base gravel – part of the storage use of Area 1.

8.2 Southern boundary area.

Current use: Buffer zone, casual grazing.

Proposed use - continuing as same but included in field of works.

Topography – west to east lower hill slope. (Plate 5)

Vegetation – longer grass cover as tufted rank clumps, casual grazing shorter of more palatable species, as part of farm management (Plates 6/7)

Ground surface visibility – limited - some clear on cattle tracks, basically nil on grassed areas (Plate 7)

Estimated surface exposure – 10%

Rock exposure – none noted

Field survey process – single boustrophedon sweep west to east concentrating on exposures i.e. cattle pads

Field survey result – no items of Aboriginal or non-Aboriginal cultural heritage were observed. Given the Due Diligence emphasis on landscape units "within 200m of water" it was this survey unit that held the greatest potential for the existence of Aboriginal objects. Two factors probably largely contributed to this nil result.

i) Vegetation cover was more extensive in this area with only an estimated 10% surface exposure on cattle tracks that "wandered" through the area.

ii) The un-named tributary of Back Creek that abuts the area to the south is an ephemeral stream and as such would have provided only limited opportunity for traditional Aboriginal cultural use. Any such use would probably have been transient given the need for a more permanent water source, such as Ottley Creek 8kms. to the east or Back Creek itself which becomes a more substantial creek itself as it flows westward.

Plate 5. General view of Area 2 along lower hill slope looking from eastern edge to west. Note trees on left of photo are riverine along un-named creek and are outside proposed field of works.

Plate 6. Field assistant Sally Kelso recording vegetation details mid Area 2. Note cattle track to foreground, tufted vegetation remains and shorter grazed grass areas. Photo looking south towards un-named creek and riverine vegetation outside the field of works.

Plate 7. Cattle track exposure in foreground, tufted vegetation remains and shorter grazed grass areas. Photo looking south towards east from mid transect Area 2.

8.3 Southern pen run.

Current use: Buffer zone, very heavily grazed .
Proposed use – establishment of feedlot pens and servicing infrastructure.
Topography – west to east lower hill slope, some surface scalding. (Plate 8)
Vegetation – very short grass cover. (Plate 9)
Ground surface visibility – extensive but some “leaf litter” (Plate9)
Estimated surface exposure – 60-70%
Rock exposure – isolated examples - perhaps moved downslope? None modified.
Field survey process – 2 x boustrophedon sweeps west to east.
Field survey result – no items of Aboriginal or non-Aboriginal cultural heritage were observed.

Plate 8. General view of Area 3. Current feedlot pens to right and contact boundary with Area 2 to left. Photo across lower hill slope from east to west.

Plate 9. Specific view of Area 3 illustrating extensive “leaf litter” scalds and short vegetation. Current feedlot pens to right and contact boundary with Area 2 to left. Photo across lower hill slope from east to west.

8.4 Northern pen run.

Current use: Cattle auxiliary feeding, weaning paddocks very heavily grazed. Horse paddock across northern section. (Plate 10)
Proposed use – establishment of feedlot pens and servicing infrastructure, cattle handling and road infrastructure improvements.
Topography – west to east upper hill slope, some surface scalding.
Vegetation – nil grass cover in auxiliary feeding area, very heavily grazed in “horse paddock” (Plates 10/ 11 / 12)
Ground surface visibility – extensive (Plates 10 / 11)
Estimated surface exposure – 90+%
Rock exposure – some noted - perhaps localised bedrock or floater exposure? None modified (Plate 12)
Field survey process – 3 x boustrophedon sweeps west to east.
Field survey result – no items of Aboriginal or non-Aboriginal cultural heritage were observed

Plate 10. General view across Area 4 looking slightly north-west, from eastern edge, to include auxiliary feed bins.

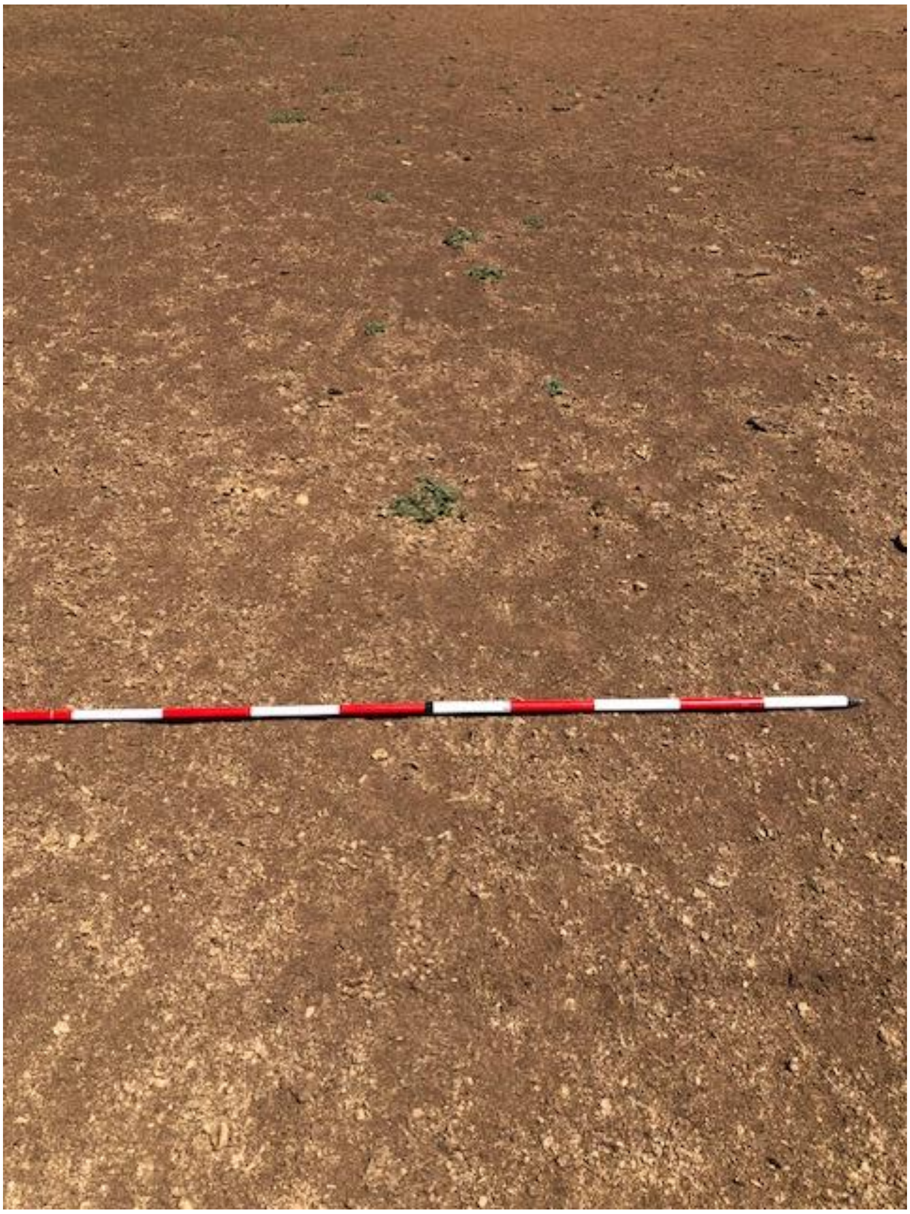

Plate 11. Specific view a) of Area 4 showing basically nil vegetation ground cover

Plate 12. Specific view b) of Area 4 showing basically nil vegetation ground cover, however, some rock exposure was noted – none displayed any evidence by Aboriginal modification. Isolated examples may have been introduced examples from developing feed pads; road works etc.

8.5 Eastern boundary buffer.

Current use: Buffer zone between proposed feedlot infrastructure and cropping paddock. (Plate 13). Vehicle access track noted.
Proposed use – continuing as same but included in field of works
Topography – north to south basically full hill slope. (Plate 13)
Vegetation – grass cover strip (Plates 13 / 14)
Ground surface visibility – Grass very short, a few larger weed species on fence line (Plates 13 / 14)
Estimated surface exposure – 70-80%
Rock exposure – some noted as a stockpile on upper edge of contour bank - perhaps localised bedrock or floater exposure – appears unnatural accumulation and some probably have been “cleared” from cultivation paddock on eastern side and deposited here or exposed and deposited? None modified (Plate 15)
Field survey process – single boustrophedon sweep from south west to north-east
Field survey result – no items of Aboriginal or non-Aboriginal cultural heritage were observed. The large slabs of sedimentary material offered potential for grinding activity, however given they appeared to be accumulated from paddock clearing and deposited in this position, with no modification being noted, they did not reflect Aboriginal cultural heritage.

Plate 13. General view from southern end of Area 5 looking uphill to north. Crop cultivation on right hand side and feedlot development to left hand side inside existing fence line.

Plate 14 – Mid way uphill of area 5 showing short grass cover strip with past cultivation cropping to right. Rock exposure (Plate 15) is to the north side of contour bank upper centre.

Plate 15. Part of the bedrock exposure and accumulation in Area 5. Photo looking north west from eastern side. Rocks appear to have been accumulated – perhaps as clearing from cultivation paddock? A similar accumulation was noted in the cultivation paddock outside the field of works south of Area 2 which probably indicates past or present farming practice.

9. Field Survey coverage.

Area	Nominal area - hectares	Estimated surface exposure %	Survey actual area exposed
1. Western infrastructure	5	30%	1.5 hectares
2. Southern boundary	2	10%	$200m^2$
3. Southern pen run	3.5	60%	2.1 hectares
4. Northern pen run	10	90%	9 hectares
5. Eastern boundary buffer	1.5	70%	1.05 hectares
	22		13.85 hectares

Table 1. Summary of field survey coverage by unit area and exposure estimate.

No items of Aboriginal cultural history were observed during the field survey. The 2 areas destined for the actual pen construction had good exposure. Ostensibly the survey was largely examining exposures for Aboriginal stone artefact material.

Given the nature of surface erosion there always remains the possibility that artefacts may be present and exposed, especially after a heavy rain event and employees and contractors should be aware of this possibility.

10. Consultation process

Extensive communication was undertaken with Toomelah LALC informing them of the proposed development and extending an invitation on numerous occasions to visit the site and potentially take part in the Due Diligence field survey process. (See Appendix B).

Various factors prevented Toomelah LALC from being involved in the field assessment of 17th October, 2023. The invitation however, to visit the site remained open as did the opportunity to comment on a supplied DRAFT of the Due Diligence by Tuesday 12th. December, 2023.

11. Non Aboriginal cultural heritage

No items of potential non-Aboriginal cultural heritage were noted during field work. Similarly a search of relative data bases – Gwydir LEP and NSW State Heritage Register, indicated no items of non-Aboriginal cultural heritage were registered within or near the proposed development site.

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Appendix A. AHIMS report 12th July 2023

AHIMS Web Services (AWS)
Search Result

Your Ref/PO N
Client S

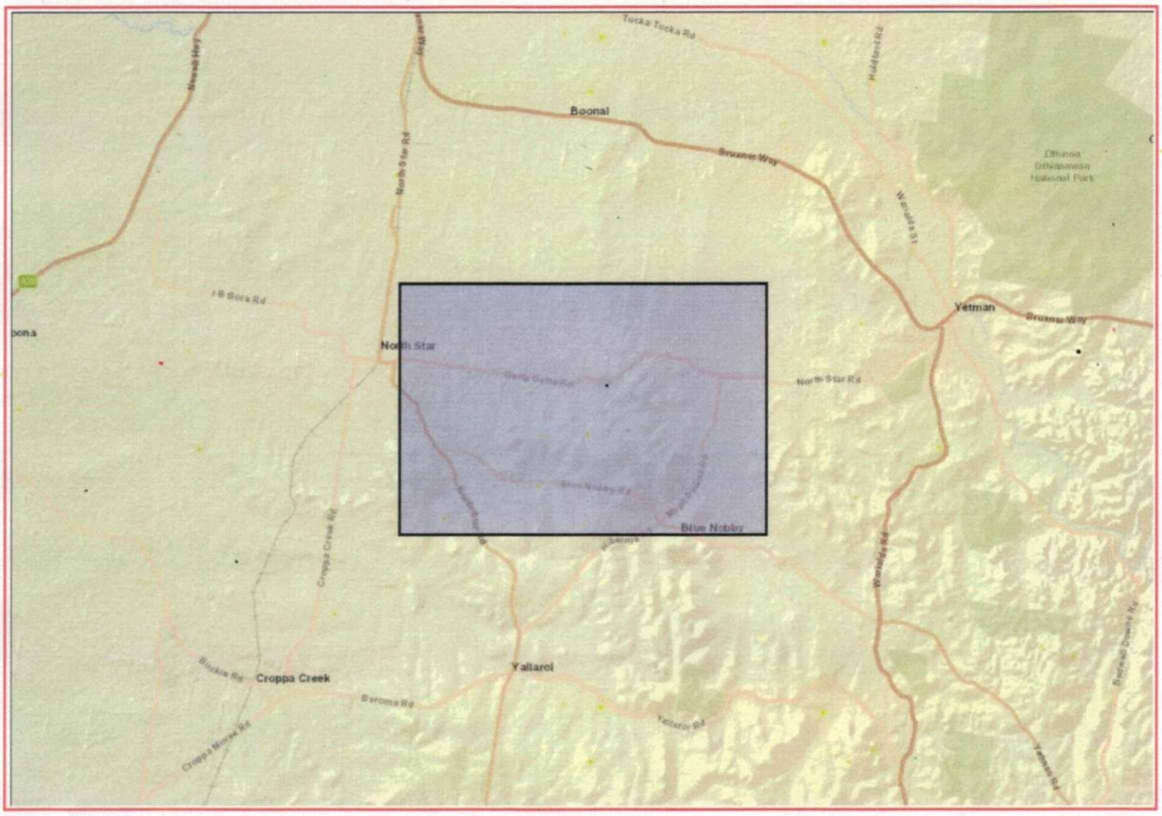
D

Artefact and Aspect
39 Brae Street
INVERELL New South Wales 2360
Attention: Tony Sonter
Email: tsonter@bigpond.net.au

Dear Sir or Madam:

<u>AHIMS Web Service search for the following area at Lat, Long From : -29.0357, 150.4051 - Lat, Long To : -28.8855, 150.6523, conducted by Tony Sonter on 12 July 2023.</u>

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of Heritage NSW AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

0	**Aboriginal sites are recorded in or near the above location.**
0	**Aboriginal places have been declared in or near the above location. ***

Appendix B.

Consultation Record – Summary Table

Date - 2023	Contact	Content / Outcome
12th July 8.30am.	Toomelah LALC Email via NSW ALC website enquiry form. alc.org.au/land_council/toomelah/ **Copy A.**	General enquiry – • Availability Aboriginal sites officers? • Cost of above? • Provision of report response? Nil response
12th July 12.00 mid day	Phone Toomelah LALC 0746762348	Spoke with Shantia? At LALC Need to ring Rex (Weribone) “the boss” and provided his mobile phone number 0422095516
12th July 2.23pm.	Phone Rex Weribone (Acting CEO Toomelah LALC. 0422095516	Left message re general enquiry and details on email. **Copy A.**
13th July 3.52pm.	ditto	ditto
14th July 2.45pm.	Email to LALC– similar to **Copy A** but with minor variations – **Copy B**	Response from LALC 17th July received asking for more details. **Copy C**
24th July 11.11am	Email to LALC – response to request **Copy C**	Email to LALC – • Supplied maps • Detailed need to supply quote to project manager RDC Engineers, Toowoomba **Copy D**
24th July 11.59am	Email from LALC **Copy E** – response to **Copy D**	Will review rates etc. and get back.
4th August 12.19pm	Email to LALC **Copy F**	Enquiry as to update on rate review.
4th August	Email from LALC **Copy G**	Updated cost sheet from Toomelah LALC
7th September 10.59am	Email to LALC **Copy H**	Further reinforced: • Project details • Need to supply quote to

		RDC Engineers, Toowoomba. Previously mentioned in email **Copy D**
30th Sept for 2nd Oct. 11.59am	Email to LALC **Copy I**	• Suggested dates • Need to supply quote to RDC Engineers, Toowoomba and have it accepted. Previously mentioned in emails **Copy D / H**
3rd Oct. 11.45	Email from LALC **Copy J**	Will look into details of email **Copy I**
9th Oct. 11.18am	Email to LALC **Copy K**	Follow up: • Proposed dates • Need to submit quote to RDC Engineers, Toowoomba and have it accepted. Previously mentioned in emails **Copy D / H / I**
13th Oct. 4.03pm	Email to LALC **Copy L**	Moving forward with project
13th Oct. 5.12pm	Email from LALC **Copy M** – response to **Copy L**	• Apologies due to work load • Enquiring what day survey was completed
16th Oct. 2.23pm	Email to LALC **Copy N**	• Reiterated no quote received by project manager • Informing LALC field survey would be undertaken tomorrow 17th Oct • Informing LALC desktop assessment appears to indicate "disturbed farmland"
16th Oct.	Email from LALC **Copy O**	Some confusion as LALC

3.03pm		thought project was a DA lodged with Moree Plains Shire Council who would insist on cultural heritage assessment by Toomelah
17th Oct. 8.21pm	Email to LALC **Copy P –** Response to **Copy O**	• Clarification of DA and Moree Plains S.C. confusion. • Informing Due Diligence field survey undertaken and DRAFT report will be forwarded • Reiterating opportunity to visit site through Rod Davis.
17th Oct. 8.27pm	Email to Rod Davis **Copy Q**	Update regarding Due Diligence undertaken and informing Toomelah LALC may still wish to visit site
18th Oct. 6.42am	Email from Rod Davis **Copy R –** Response to **Copy Q**	No problem regarding Toomelah LALC welcome to visit the site
18th Oct. 7.58am	Email from LALC **Copy S –** Response to **Copy P**	Acknowledging update of update information
5th Dec. 10.16am	Email to LALC – **Copy T**	Draft Due Diligence Report forwarded for comment. Response asked for by 12th Dec.
5th Dec. 12.14pm.	Email from LALC – **Copy U**	Asking if Cultural Heritage Officers (from LALC) would be funded
5th Dec. 1.32pm	Email to LALC – **Copy V** Response to **Copy U**	Advising LALC that Rod Davis of RDC Engineers was contact for project management / site visit. N.B. This information re site inspection was similar to earlier notifications:

		24th July 4th August 7th and 30th September 2nd, 9th and 17th October
13th Dec. 11.35am.	Email to Rod Davis (Project Manager) – **Copy W**	Asking if Toomelah LALC had been in contact re site visit / inspection
13th Dec. 12.37pm.	Email from Rod Davis – **Copy X** Response to **Copy W.**	No request from Toomelah LALC received
15th Dec. 3.56pm	Email to Toomelah LALC – **Copy Y**	Advising report now finalised

Email copies

Copy A – 12th July

I'm making initial contact regarding a proposed development near North Star and engaging some representatives of the Toomelah LALC to assist in Aboriginal cultural heritage field work.

Would you be able to indicate if you have Aboriginal sites officers to undertake this work? Are they trained and perhaps hold a Cert III from TAFE in Aboriginal sites work?

Assuming there would be a "days work" surveying the site could you please give me a cost for engaging your sites officers? Additionally there would be travel compensation. The potential work site is approximately 20kms east of North Star making it a 120km round trip from Boggabilla.

As a finalisation to the survey a statement on behalf of Toomelah would also be necessary - would there be an additional cost for such a letter / report?

Looking forward to your response and working with you in the future,

Regards,

Tony Sonter - I did work in your locality previously with Harry White (now retired) from Local Land Services. 12/7/2023

Copy B – 14th July

On Fri, Jul 14, 2023 at 2:47 PM NSW Aboriginal Land Council <notifications@mg.ngny.com.au> wrote:

Hi Rex, I'm making enquiries about possible involvement by some members of Toomelah LALC in a planned development application near North Star regarding onsite ACH.
If you could let me know if you have members who could assist in an ACH assessment it would be appreciated.
A couple of other questions I have include.
1. Are the sites officers trained? e.g maybe hold a Cert III in Aboriginal sites work? If not trained than experienced?
2. What pay rate would they require?
3. Travel is about 120km from Boggabilla (a bit shorter from Toomelah) - what rate for travel compensation is expected?
4. After field work could a formal letter / summary be supplied and cost of this?
Thanks for your time Rex - must be a busy job you have!
I actually met you a few years ago working with Harry White (now retired from LLS)
Appreciate your response,

Copy C - 17th July

Hi Tony,

Can you provide more details on the project scope of work for the onsite CH work including maps, proposed dates, and approximate location?

regards

Rex

Copy D – 24th July

Hi Rex,

Attached are 2 x maps. One shows the original feedlot development when they constructed a 999 head feedlot in October 2020 which they now propose to increase to a 3,500 enterprise. The total area to be developed for the new pens and associated infrastructure is less than 10hectares of what is described as “Cleared, grassed cattle paddocks”.

The project is being supervised by RDC Engineers of Toowoomba who would require your quotation for ACH survey of the proposed area.

RDC Engineers Pty Ltd.

PO Box 1223

Toowoomba Qld.

4352

My involvement would be to compile a Due Diligence Report based on the “Code of Practice” (September 2010) of which your input from the site survey would be an integral part – hence my enquiry about the provision and cost of such a letter / report document following ACH survey. Obviously should any ACH material be present the Due Diligence report may have to be promoted to a more in depth ACH report.

At this stage there is no set survey date – obviously this would be dependent on quote acceptance (both from the LALC and myself) and then co-ordination of both our work schedules to facilitate a site visit and inspection.

To allow you to calculate travel expenses the proposed feedlot development is approximately 15kms east of North Star.

Gwydir Shire Council may also have some further “unique” requests re the development given any outcomes from this Friday’s Aboriginal Affairs NSW Community of Practice for Local Council webinar – we will just have to wait and act as necessary given any developments in this regard.

Hope this helps and answers you earlier queries – happy to further clarify any concerns

Copy E – 24th July

Hi Tony,

Thanks for the information, we can engage a couple of our CH Officers to assist with a site visit and inspection of the proposed feedlot near North Star. We are currently in the process of reviewing and upgrading our Daily Rates for CH site inspections and field works.

We will provide the new rates and send a quote/budget for the work in due course. We just need an approve the costs before we take part in the site inspections.

regards

Rex

Copy F – 4th August

Hi Rex,

Have you reviewed your field work rates yet to provide a quote for Rod Davis Toowoomba so we can continue to work towards a survey of the North Star feedlot expansion?

Regards,

Tony Sonter

Copy G – 4th August

Hi Tony,

Due to the increased insurance expenses and additional costs to our business, we have increased our Day Rates to be more reflective and aligned with current market rates for all of our future Cultural Heritage Assessments and Site works.

Please see below Day Rates for All Cultural Heritage Assessments and Site Works as of 01 July 2023:

1 x CH Officer @ $120 hr for half day - 4 - 5 hrs (minimum of 2 CHO's) including travel

1 x CH Officer @ $120 hr for full day - 8 - 10 hrs (minimum of 2 CHO's) including travel

New 23/24 ATO Kilometre rate @0.85 cents a klm

Admin Fee @ 22.5%

GST @10%

If you have any questions please let me know.

regards

Rex

Copy H – 7th September

Hi Rex,

Sorry it’s been a while since I last contacted you – been busy but got my head above water now.

Many thanks for supplying work rates for Cultural Heritage work etc.

The feedlot as I said previously is about 20kms east of North Star – that should allow you to calculate travel costs.

The feedlot owner wants to expand from 999 head to 3,500 head in adjoining paddock area so site inspection would be in an ex grazing paddock.

I would assume 4-5 hours would be enough time to “walk the area”

My initial intention would be to undertake a Due Diligence Report which would satisfy development application requirements, however, should ACH material be observed that would necessitate a report upgrade to a full Aboriginal Cultural Heritage Assessment.

Can you provide a quote please to:

Rod Davis

RDC Engineers Pty Ltd.

PO Box 1223

Toowoomba 4350

Quote should include provision of Cultural Heritage Officer(s) for field inspection, travel to site and short report / letter on field work outcome.

I predict that field work would occur mid to late Oct / early November and will co-ordinate with you should applicant wish to proceed.

Many thanks for your input,

Regards,

Tony Sonter

Copy I – 30th September

Hi Rex,

Writing this on long weekend Saturday realising you won’t get it until Tuesday but all good – just catching up on a few things.

1. I’ve got the “go ahead” from RDC Engineers Pty Ltd (Rod Davis - PO Box 1223, Toowoomba 4350) to undertake a due diligence study of the feedlot we discussed earlier at North Star.

2. Have you been able to supply a quote to Rod Davis for Cultural Heritage Officers for field inspection of the site and if so has he accepted / declined?
3. I’m looking at undertaking the field inspection on a day either Tues – Thursday 10th – 12th or 17-19th Oct.
4. Obviously it will require a bit of co-ordination but do any of these days / dates suit?
5. I’d need to co-ordinate with Rod and / or property owner as well but if we start looking at things we can find a suitable day / date.
6. The ongoing dry makes field survey opportunity quite good – not good for farmers though!

If you can give these points some thought & get back to me asap it would be appreciated.

Regards,

Tony Sonter

Copy J – 3rd October

Tony

I will look into this and get back to you.

regards

Rex

Copy K – 9th October

Hi Rex,

Any updates to planning? Looking at day next week – preferably Tues 17th or Wednesday 18th?

Need to co-ordinate with property owner etc. and have your quote accepted by RDC Engineers.

Regards,

Tony

Copy L – 13th October

Hi Rex,

Just letting you know I need to continue forward with the work at North Star.

It appears you’re unable to link up for a survey with the dates previously provided as project manager Rod Davis has not received a quote as required.

The area appears to be “disturbed farmland” under the definitions provided in the 2010 Due Diligence Code. However, if we need to proceed to a cultural heritage assessment I’ll be back in touch.

Due Diligence Assessment Aboriginal and non-Aboriginal cultural heritage “Springfield” North Star.

Regards,

Tony Sonter

Copy M – 13th October

Hi Toni,

My apologies was a bit snowed under with my hectic work load.

What date did you do the surveys?

regards

Rex

Copy N – 16th October

Hi Rex,

Snowed under! Sure am – you and me both!

I spoke with the project manager, Rod Davis and when he said he hadn’t heard from you I’ve taken the opportunity tomorrow to have a look at the site.

As time has moved on from the dates I proposed earlier, tomorrow is my best opportunity until mid November! Busy!

So far its all been desktop work and as I said it looks pretty much like disturbed farmland. I’ll be back in touch if we need to proceed to a full cultural heritage assessment.

Regards,

Tony Sonter

Copy O – 16th October

Hi Tony,

Unfortunately for the DA, MPSC will insist on having a cultural heritage assessment completed with the involvement of CH reps on site from Toomelah LALC. Let me know if they make exceptions to the rule for this particular project site.

regards

Rex

Copy P – 17th October

Hi Rex,

Just a couple of points that might clear up a bit of confusion.

The feed lot area is in not in Moree Plains S.C. but in Gwydir.

At this stage it is not being considered through a Development Application (D.A.) but a SEARs through the Department of Planning.

We undertook a survey today based on the Due Diligence Code of Practice and will work on a draft report for 2-3 weeks time. I'll forward the DRAFT report to you for information / comment when completed. In the mean time if you wish to visit the site please contact Rod Davis – Project Manager as suggested in previous contacts – take a fly veil with you!

Regards,

Tony

Copy Q – 17th October

Hi Rod,

Just sent Rex an email as follow up to yesterdays query – included you in BCC

Due Diligence today was all good – I'll do a draft & process over next 2-3 weeks.

Can you resend me the SEARs request outline please? My I.T. consultant (me) didn't save it and automatic email clearance has wiped it after 3 months!

Toomelah LALC may still want to visit site but I'll let that evolve through you if / when it happens – keep me updated – if I have to revisit so be it to get the SEARs across the line!

All good,

Regards,

Tony

Copy R – 18th October

Tony,

That will be no problems if Toomelah LAC wish to visit the site.

I attach a copy of the SEARs Applicant Package.

Regards,

Rod Davis

Copy S – 18th October

No worries, thanks for the update.

Rex

Copy T – 5th December

Hi Rex,

Welcome to summer!

Attached is a copy of a Draft Due Diligence Report for the expansion of “Springfield” feedlot North Star.   If you would like to have a look at it and make any comments it would be appreciated if they could be provided by 5pm Tuesday next week 12th December 2023.

Rod Davis of RDC Engineers Pty Ltd. (Toowoomba) still extends the invitation for members of the LALC to visit the site.

Regards,

Tony

Copy U – 5th December

Hi Tony,

The site visit from our CH Officers, will this inspection be funded?

regards

Rex

Copy V – 5th December

Hi Rex,

Any enquiries regarding the opportunity for a site visit and funding of such should be raised directly with Rod Davis who is the project manager rod.davis@rdcengineers.com.au

I’m trying to complete the Due Diligence this fortnight as after 18th December I’m basically out of action until first week of March next year hence my request for comments by Tuesday next week.

Regards,

Tony

Copy W – 13th December

Morning Rod,

Just wondering if Toomelah have had any contact with you?

I gave them until yesterday evening to comment on the report and before I let them know I’m finalizing it I just want to see if they had arranged anything.

Regards,

Tony

Copy X – 13th December

Tony,

No – they have not been in contact.

Regards,

Rod Davis

Director

Copy Y – 15th December

Hi Rex,

Hope you’re managing to keep cool with the present heat passing through.

As I have received no comment from Toomelah LALC on the Draft Due Diligence report re “Springfield” proposed feedlot, that I forwarded Tues 5th December, I have therefore finalized the report for RDC Engineers.

I did ask for any comment by Tuesday 12th and allowed a couple of extra days until today (Friday 15th) understanding how busy work can be.

Hope the Christmas period and New Year is good to you,

Regards,

Tony Sonter

Appendix L

Soil Test Pit Analysis Results

Material Test Report

Report Number: **MS03324-1**
Issue Number: 1
Date Issued: 21/08/2024
Client: RDC Engineers Pty Ltd
PO Box 1223, Toowoomba QLD 4350
Contact: Rod Davis
Project Number: MS03324
Project Name: Geotechnical Investigation
Project Location: Springfield Feedlot, North Star
Work Request: 5352
Sample Number: S-245352A
Date Sampled: 25/06/2024
Dates Tested: 12/08/2024 - 19/08/2024
Sampling Method: Sampled by Client
The results apply to the sample as received
Preparation Method: AS 1289.1.1 - Sampling and Preparation of Soils
Sample Location: **TP1**
Material: Brown Silty CLAY trace Sand

Soiltech Testing Services Pty Ltd
1300 736 724
www.soiltech.com.au
Soiltech Testing Services Pty Ltd
Site No. 2110
Soiltech Toowoomba Laboratory
194 Stephen Street Toowoomba QLD 4350
Phone: (07) 4633 1622
Email: makayla@soiltech.com

NATA
WORLD RECOGNISED ACCREDITATION

Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Makayla Mudge
Geotechnical Laboratory Supervisor

NATA Accredited Laboratory Number: 2117

Atterberg Limit (AS1289 3.9.2 & 3.2.1 & 3.3.2)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Retained 0.425 (%)			
Liquid Limit (%)	33		
Plastic Limit (%)	17		
Plasticity Index (%)	**16**		

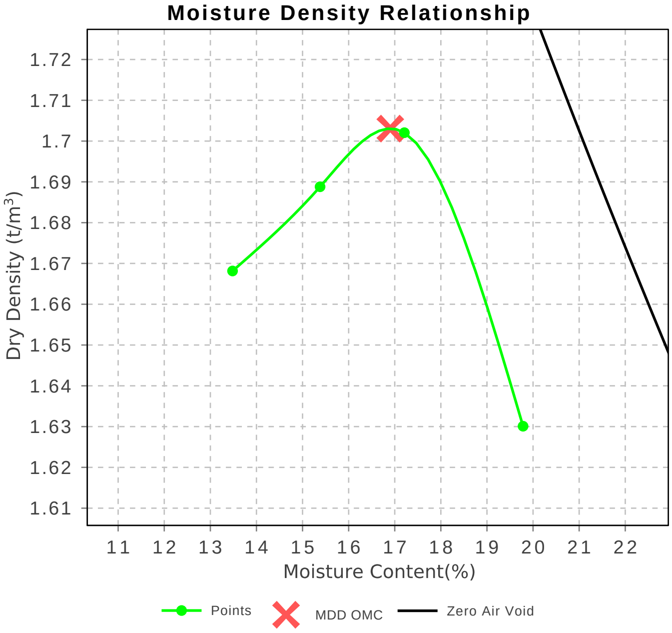
Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.9.2		
Linear Shrinkage (%)	**11.0**		
Cracking Crumbling Curling	Curling		

Emerson Class Number of a Soil (AS 1289 3.8.1)		Min	Max
Emerson Class	**5**		
Soil Description	Brown Silty CLAY trace Sand		
Nature of Water	Distilled		
Temperature of Water (^{o}C)	20		

Dry Density - Moisture Relationship (AS 1289 5.1.1 & 2.1.1)		Min	Max
Mould Type	1 LITRE MOULD A		
Compaction	Standard		
Maximum Dry Density (t/m^3)	1.70		
Optimum Moisture Content (%)	17.0		
Oversize Sieve (mm)	19.0		
Oversize Material Wet (%)			
Method used to Determine Plasticity	Visual/Tactile		
Curing Hours (h)	50.5		

Moisture Content (AS 1289 2.1.1)	
Moisture Content (%)	

Moisture Density Relationship



Material Test Report

Report Number: **MS03324-1**
Issue Number: 1
Date Issued: 21/08/2024
Client: RDC Engineers Pty Ltd
PO Box 1223, Toowoomba QLD 4350
Contact: Rod Davis
Project Number: MS03324
Project Name: Geotechnical Investigation
Project Location: Springfield Feedlot, North Star
Work Request: 5352
Sample Number: S-245352B
Date Sampled: 25/06/2024
Dates Tested: 12/08/2024 - 19/08/2024
Sampling Method: Sampled by Client
The results apply to the sample as received
Preparation Method: AS 1289.1.1 - Sampling and Preparation of Soils
Sample Location: **TP2**
Material: Brown Silty CLAY trace Sand

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194 Stephen Street Toowoomba QLD 4350
Phone: (07) 4633 1622
Email: makayla@soiltech.com

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M.S Mudge

Approved Signatory: Makayla Mudge
Geotechnical Laboratory Supervisor

NATA Accredited Laboratory Number: 2117

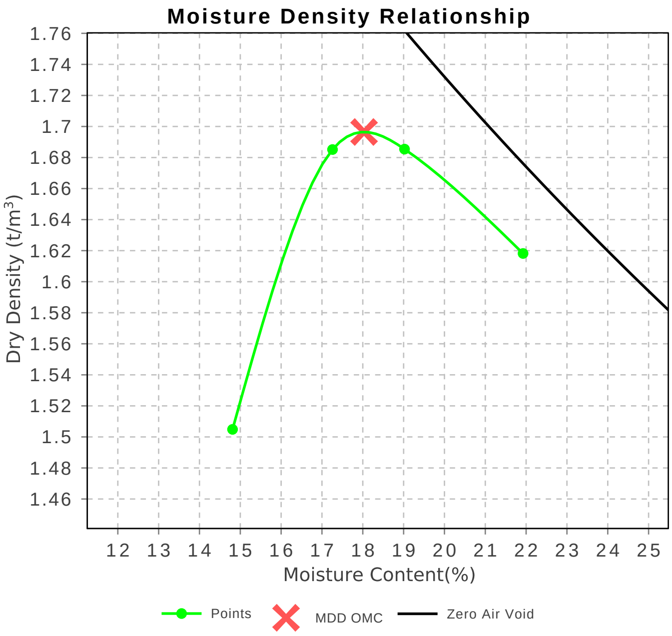
Atterberg Limit (AS1289 3.9.2 & 3.2.1 & 3.3.2)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Retained 0.425 (%)			
Liquid Limit (%)	43		
Plastic Limit (%)	21		
Plasticity Index (%)	**22**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.9.2		
Linear Shrinkage (%)	**13.0**		
Cracking Crumbling Curling	Crumbling & Curling		

Emerson Class Number of a Soil (AS 1289 3.8.1)		Min	Max
Emerson Class	**4 ***		
Soil Description	Brown Silty CLAY trace Sand		
Nature of Water	Distilled		
Temperature of Water (^{o}C)	20		
* Mineral Present	Carbonate		

Dry Density - Moisture Relationship (AS 1289 5.1.1 & 2.1.1)		Min	Max
Mould Type	1 LITRE MOULD A		
Compaction	Standard		
Maximum Dry Density (t/m^3)	1.70		
Optimum Moisture Content (%)	18.0		
Oversize Sieve (mm)	19.0		
Oversize Material Wet (%)			
Method used to Determine Plasticity	Visual/Tactile		
Curing Hours (h)	46.2		

Moisture Content (AS 1289 2.1.1)	
Moisture Content (%)	



Material Test Report

Report Number: **MS03324-1**
Issue Number: 1
Date Issued: 21/08/2024
Client: RDC Engineers Pty Ltd
PO Box 1223, Toowoomba QLD 4350
Contact: Rod Davis
Project Number: MS03324
Project Name: Geotechnical Investigation
Project Location: Springfield Feedlot, North Star
Work Request: 5352
Sample Number: S-245352C
Date Sampled: 25/06/2024
Dates Tested: 12/08/2024 - 19/08/2024
Sampling Method: Sampled by Client
The results apply to the sample as received
Preparation Method: AS 1289.1.1 - Sampling and Preparation of Soils
Sample Location: **TP3**
Material: Brown Silty CLAY trace Sand

SOILTECH Testing Services Pty Ltd
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Email: makayla@soiltech.com

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M.J. Mudge

Approved Signatory: Makayla Mudge
Geotechnical Laboratory Supervisor

NATA Accredited Laboratory Number: 2117

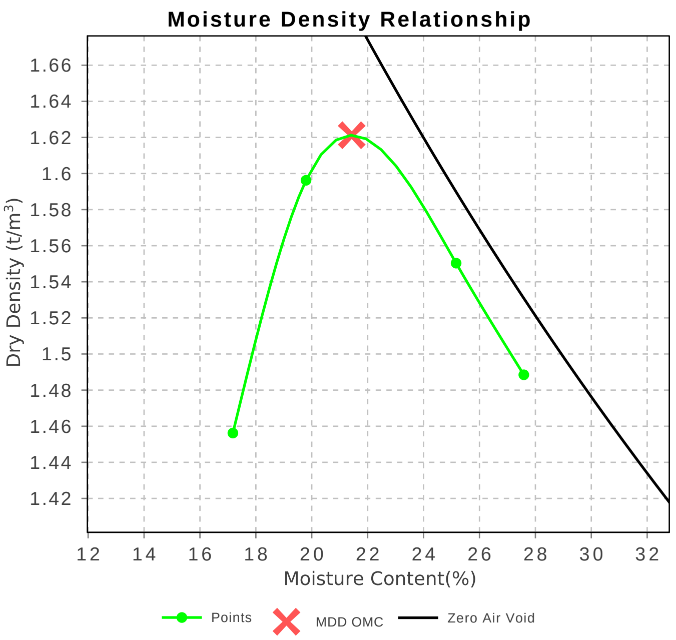
Atterberg Limit (AS1289 3.9.2 & 3.2.1 & 3.3.2)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Retained 0.425 (%)			
Liquid Limit (%)	51		
Plastic Limit (%)	23		
Plasticity Index (%)	**28**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.9.2		
Linear Shrinkage (%)	**13.0**		
Cracking Crumbling Curling	Cracking		

Emerson Class Number of a Soil (AS 1289 3.8.1)		Min	Max
Emerson Class	**6**		
Soil Description	Brown Silty CLAY trace Sand		
Nature of Water	Distilled		
Temperature of Water (°C)	20		

Dry Density - Moisture Relationship (AS 1289 5.1.1 & 2.1.1)		Min	Max
Mould Type	1 LITRE MOULD A		
Compaction	Standard		
Maximum Dry Density (t/m^3)	1.62		
Optimum Moisture Content (%)	21.5		
Oversize Sieve (mm)	19.0		
Oversize Material Wet (%)			
Method used to Determine Plasticity	Visual/Tactile		
Curing Hours (h)	52.0		

Moisture Content (AS 1289 2.1.1)	
Moisture Content (%)	



Material Test Report

SOILTECH
Testing Services Pty Ltd
1300 736 724
www.soiltech.com.au
Soiltech Testing Services Pty Ltd
Civil and Geotechnical Testing Laboratory
194 Stephen Street Toowoomba QLD 4350
Phone: (07) 4633 1622
Email: stephen@soiltech.com.au

Report Number:	**ST50820-1**
Issue Number:	1
Date Issued:	14/10/2020
Client:	RDC Engineers PO Box 1223, Toowoomba QLD 4350
Contact:	Rod Davis
Project Number:	ST50820
Project Name:	Material Testing
Project Location:	B9-111DF-SPRINGFIELD
Work Request:	758
Sample Number:	S-20758A
Date Sampled:	07/10/2020
Dates Tested:	07/10/2020 - 13/10/2020
Sampling Method:	Sampled by Client *The results apply to the sample as received*
Preparation Method:	AS 1289.1.1 - Sampling and preparation of soils
Site Selection:	Selected by Client
Sample Location:	**Pen Material**
Material:	Brown Silty CLAY with a trace of Gravel

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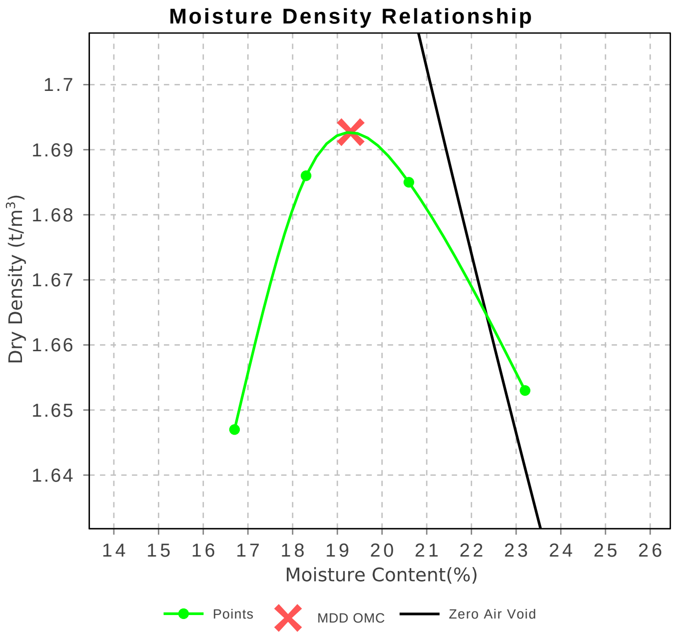
Approved Signatory: Stephen Ott
Geotechnical Laboratory Coordinator

NATA Accredited Laboratory Number: 2117

Dry Density - Moisture Relationship (AS 1289 5.1.1 & 2.1.1)	
Mould Type	1 LITRE MOULD A
Compaction	Standard
Maximum Dry Density (t/m^3)	1.69
Optimum Moisture Content (%)	19.5
Oversize Sieve (mm)	19
Oversize Material Wet (%)	0
Method used to Determine Plasticity	Visual/Tactile
Curing Hours	168

Moisture Content (AS 1289 2.1.1)	
Moisture Content (%)	-



Material Test Report

Report Number:	**B-24-529-3**
Issue Number:	1
Date Issued:	29/08/2024
Client:	Soiltech Testing Services PO Box 6055, Toowoomba West QLD 4350
Contact:	Tim Miller
Project Number:	B-24-529
Project Name:	Quality Assurance 2024
Client Reference:	MS0334
Work Request:	16105
Sample Number:	B-16105A
Date Sampled:	22/08/2024
Dates Tested:	23/08/2024 - 29/08/2024
Sampling Method:	Sampled by Client - Tested as Received *The results apply to the sample as received*
Preparation Method:	AS 1289.1.1 - Sampling and Preparation of Soils
Site Selection:	Selected by Client
Sample Location:	**MS0334 TP1**
Material:	Sandy Clay

SQS www.sqs.net.au
SOIL QUALITY SERVICES
AMB Geotech SQS Pty Ltd
ABN 36 631 788 620

SQS
Brisbane Laboratory
105 Granite Street Geebung QLD 4034
Phone: (07) 3284 8766
Email: brisbane@sqs.net.au

NATA WORLD RECOGNISED ACCREDITATION

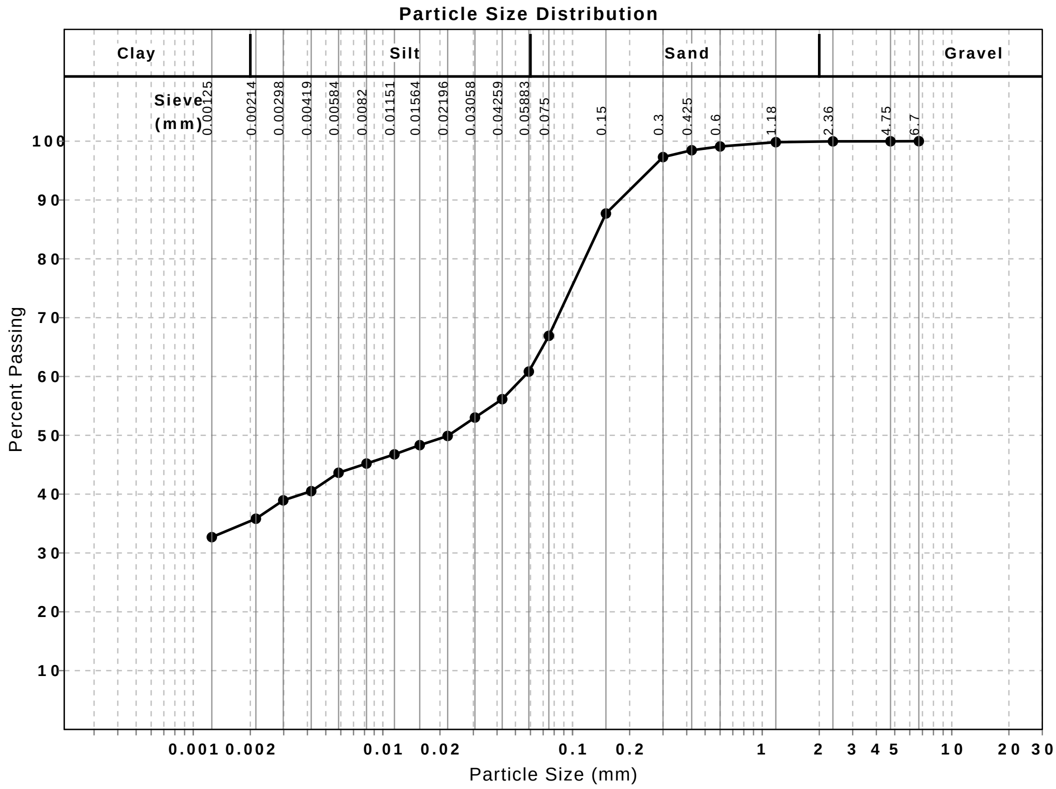
Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Torin Pegler
Senior Soil Technician

NATA Accredited Laboratory Number: 2911

Particle Size Distribution (AS 1289 3.6.1)			
Sieve	Passed %	Passing Limits	
6.7 mm	**100**		
4.75 mm	**100**		
2.36 mm	**100**		
1.18 mm	**100**		
0.6 mm	**99**		
0.425 mm	**98**		
0.3 mm	**97**		
0.15 mm	**88**		
0.075 mm	**67**		

Fine Analysis Using a Hydrometer (AS 1289 3.6.3)	
Particle Size (mm)	Passed %
0.0588	**60.8**
0.0426	**56.1**
0.0306	**53.0**
0.0220	**49.9**
0.0156	**48.3**
0.0115	**46.8**
0.0082	**45.2**
0.0058	**43.6**
0.0042	**40.5**
0.0030	**38.9**
0.0021	**35.8**
0.0013	**32.7**



Fine Analysis Using a Hydrometer (AS 1289 3.6.3)	
Type of Hydrometer	Bouyoucos Scale
Method of Preparation	Oven Dried
Method of Dispersion	Mechanical Device
Loss in Pretreatment	0
Soil Particle Density (t/m^3)	2.56

Material Test Report

Report Number:	**B-24-529-3**
Issue Number:	1
Date Issued:	29/08/2024
Client:	Soiltech Testing Services PO Box 6055, Toowoomba West QLD 4350
Contact:	Tim Miller
Project Number:	B-24-529
Project Name:	Quality Assurance 2024
Client Reference:	MS0334
Work Request:	16105
Sample Number:	B-16105B
Date Sampled:	22/08/2024
Dates Tested:	23/08/2024 - 29/08/2024
Sampling Method:	Sampled by Client - Tested as Received *The results apply to the sample as received*
Preparation Method:	AS 1289.1.1 - Sampling and Preparation of Soils
Site Selection:	Selected by Client
Sample Location:	**MS0334 TP2**
Material:	Sandy Clay

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AMB Geotech SQS Pty Ltd
ABN 36 631 788 620

SQS
Brisbane Laboratory
105 Granite Street Geebung QLD 4034
Phone: (07) 3284 8766
Email: brisbane@sqs.net.au

NATA WORLD RECOGNISED ACCREDITATION

Accredited for compliance with ISO/IEC 17025 - Testing

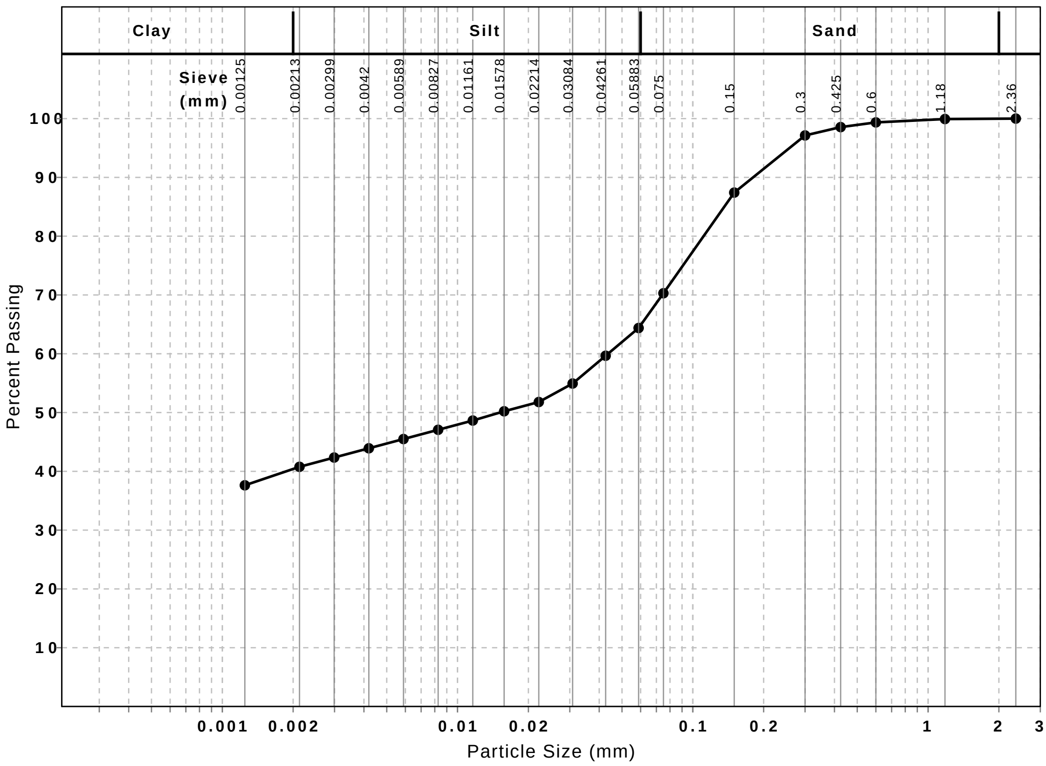
Approved Signatory: Torin Pegler
Senior Soil Technician

NATA Accredited Laboratory Number: 2911

Particle Size Distribution (AS 1289 3.6.1)			
Sieve	Passed %	Passing Limits	
2.36 mm	**100**		
1.18 mm	**100**		
0.6 mm	**99**		
0.425 mm	**99**		
0.3 mm	**97**		
0.15 mm	**87**		
0.075 mm	**70**		

Fine Analysis Using a Hydrometer (AS 1289 3.6.3)	
Particle Size (mm)	Passed %
0.0588	**64.4**
0.0426	**59.7**
0.0308	**54.9**
0.0221	**51.8**
0.0158	**50.2**
0.0116	**48.6**
0.0083	**47.1**
0.0059	**45.5**
0.0042	**43.9**
0.0030	**42.3**
0.0021	**40.8**
0.0012	**37.6**

Particle Size Distribution



Fine Analysis Using a Hydrometer (AS 1289 3.6.3)	
Type of Hydrometer	Bouyoucos Scale
Method of Preparation	Oven Dried
Method of Dispersion	Mechanical Device
Loss in Pretreatment	0
Soil Particle Density (t/m^3)	2.49

Material Test Report

Report Number:	**B-24-529-3**
Issue Number:	1
Date Issued:	29/08/2024
Client:	Soiltech Testing Services
	PO Box 6055, Toowoomba West QLD 4350
Contact:	Tim Miller
Project Number:	B-24-529
Project Name:	Quality Assurance 2024
Client Reference:	MS0334
Work Request:	16105
Sample Number:	B-16105C
Date Sampled:	22/08/2024
Dates Tested:	23/08/2024 - 29/08/2024
Sampling Method:	Sampled by Client - Tested as Received
	The results apply to the sample as received
Preparation Method:	AS 1289.1.1 - Sampling and Preparation of Soils
Site Selection:	Selected by Client
Sample Location:	**MS0334 TP3**
Material:	Sandy Clay

SQS www.sqs.net.au
SOIL QUALITY SERVICES
AMB Geotech SQS Pty Ltd
ABN 36 631 788 620

SQS
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Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Torin Pegler
Senior Soil Technician

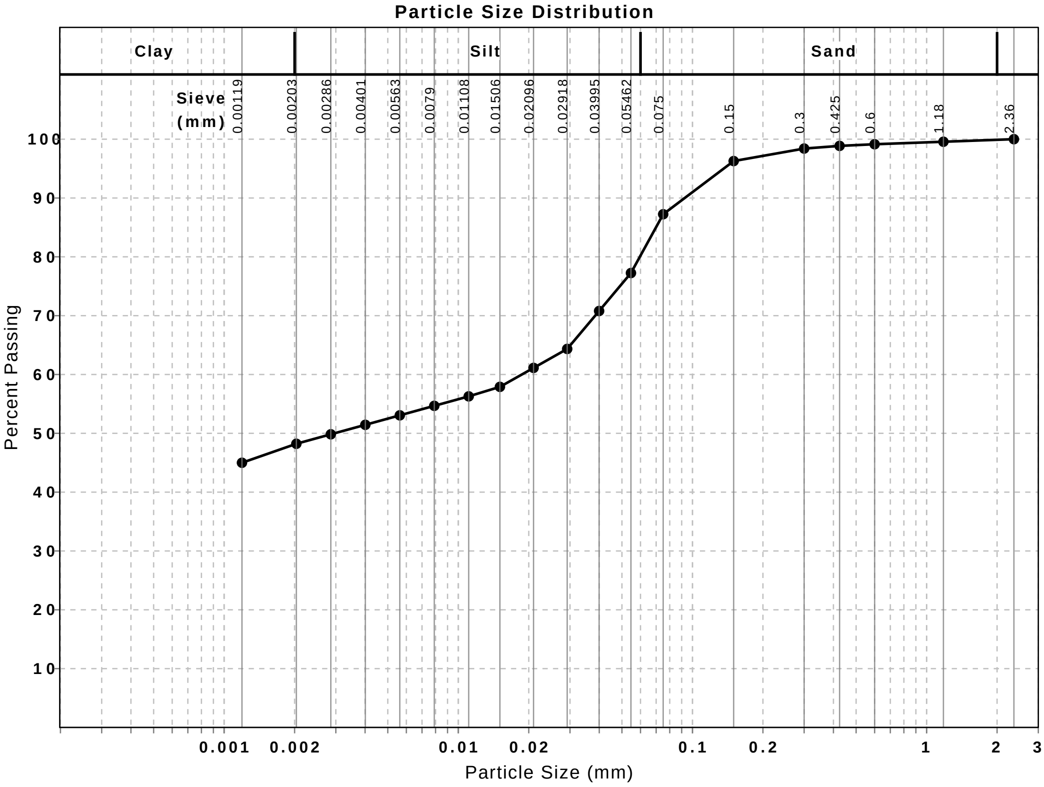
NATA Accredited Laboratory Number: 2911

Particle Size Distribution (AS 1289 3.6.1)

Sieve	Passed %	Passing Limits	
2.36 mm	**100**		
1.18 mm	**100**		
0.6 mm	**99**		
0.425 mm	**99**		
0.3 mm	**98**		
0.15 mm	**96**		
0.075 mm	**87**		

Fine Analysis Using a Hydrometer (AS 1289 3.6.3)

Particle Size (mm)	Passed %
0.0546	**77.2**
0.0399	**70.8**
0.0292	**64.3**
0.0210	**61.1**
0.0151	**57.9**
0.0111	**56.3**
0.0079	**54.7**
0.0056	**53.1**
0.0040	**51.4**
0.0029	**49.8**
0.0020	**48.2**
0.0012	**45.0**



Fine Analysis Using a Hydrometer (AS 1289 3.6.3)

Type of Hydrometer	Bouyoucos Scale
Method of Preparation	Oven Dried
Method of Dispersion	Mechanical Device
Loss in Pretreatment	0
Soil Particle Density (t/m^3)	2.53

Material Test Report

Report Number:	**ST50820-1**
Issue Number:	1
Date Issued:	14/10/2020
Client:	RDC Engineers
	PO Box 1223, Toowoomba QLD 4350
Contact:	Rod Davis
Project Number:	ST50820
Project Name:	Material Testing
Project Location:	B9-111DF-SPRINGFIELD
Work Request:	758
Sample Number:	S-20758A
Date Sampled:	07/10/2020
Dates Tested:	07/10/2020 - 13/10/2020
Sampling Method:	Sampled by Client
	The results apply to the sample as received
Preparation Method:	AS 1289.1.1 - Sampling and preparation of soils
Site Selection:	Selected by Client
Sample Location:	**Pen Material**
Material:	Brown Silty CLAY with a trace of Gravel

SOILTECH Testing Services Pty Ltd
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NATA WORLD RECOGNISED ACCREDITATION

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Approved Signatory: Stephen Ott
Geotechnical Laboratory Coordinator

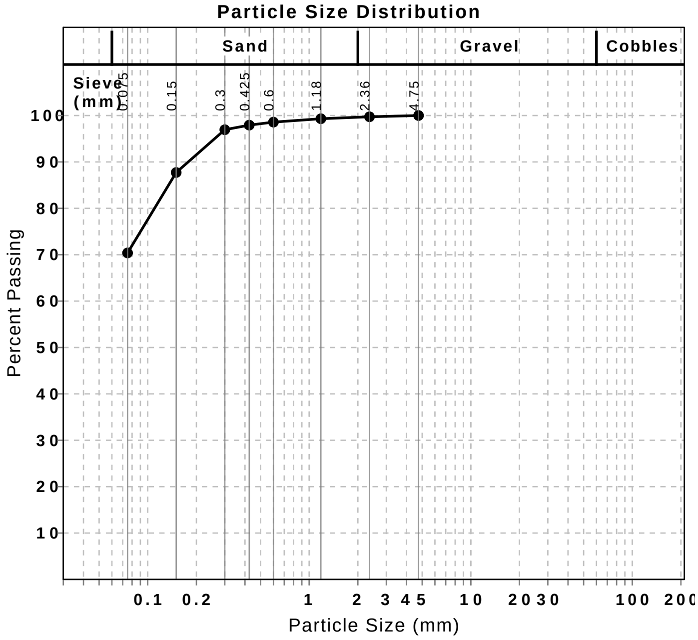
NATA Accredited Laboratory Number: 2117

Particle Size Distribution (AS1289 3.6.1)			
Sieve	Passed %	Passing Limits	
4.75 mm	**100**		
2.36 mm	**100**		
1.18 mm	**99**		
0.6 mm	**99**		
0.425 mm	**98**		
0.3 mm	**97**		
0.15 mm	**88**		
0.075 mm	**70**		

Atterberg Limit (AS1289 3.9.2 & 3.2.1 & 3.3.2)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Passing 0.425 (%)	98		
Liquid Limit (%)	52		
Plastic Limit (%)	16		
Plasticity Index (%)	**36**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.9.2		
Linear Shrinkage (%)	17.5		
Cracking Crumbling Curling	Curling		

Emerson Class Number of a Soil (AS 1289 3.8.1)		Min	Max
Emerson Class	**4 ***		
Soil Description	Brown Silty CLAY with a trace of Gravel		
Nature of Water	Distilled		
Temperature of Water (^{o}C)	21		
* Mineral Present	Carbonate		



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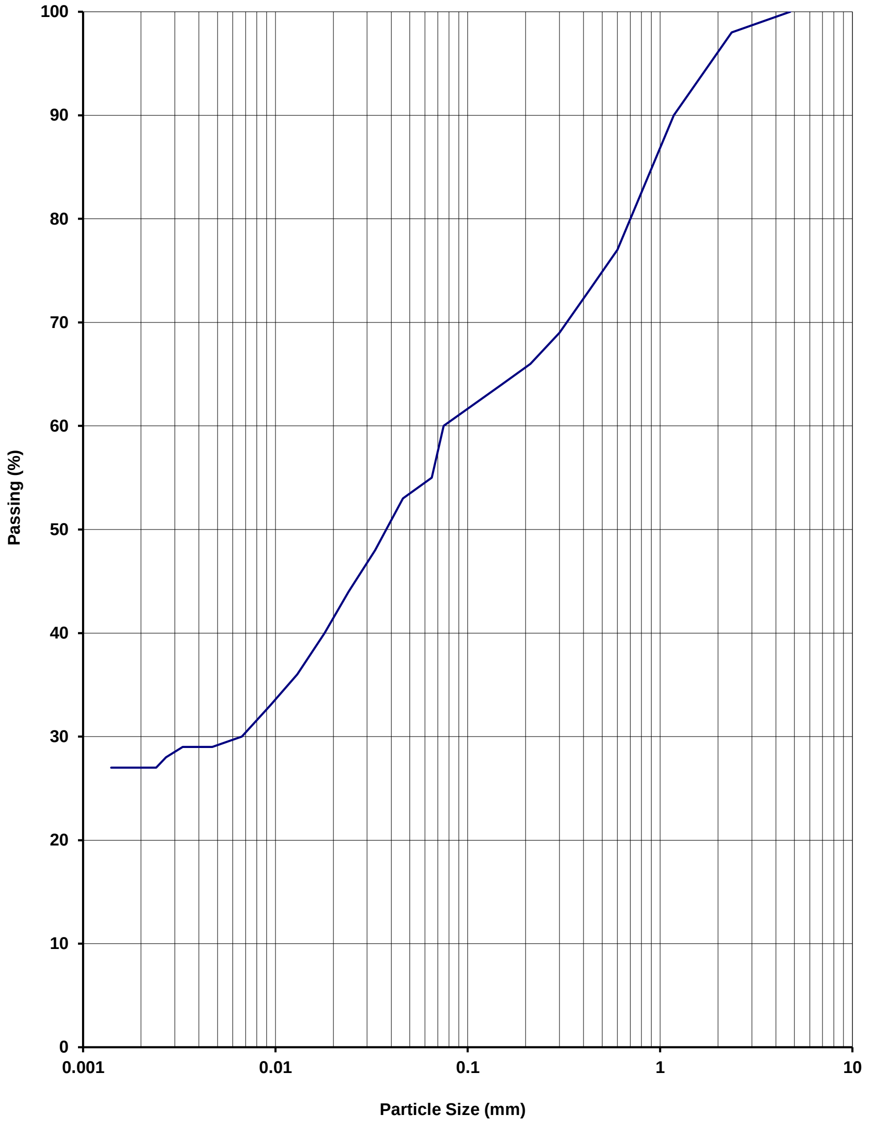
PARTICLE SIZE DISTRIBUTION TEST REPORT

Test Method: AS 1289 3.6.1, 3.6.3, 3.5.1 & 2.1.1

Client	Soiltech Testing Services Pty Ltd	**Report No.**	24090011-PSDH
		Workorder No.	9919/T/633
Address	194 Stephen Street Toowoomba QLD 4350	**Test Date**	16/9/2024
		Report Date	10/10/2024
Project	MS03324		

Client ID	MS03324	**Location**	TP1	**Depth (m)**	Not Supplied
Description	Disturbed				

Sieve Size (mm)	Passing %
150.0	
75.0	
63.0	
53.0	
37.5	
26.5	
19.0	
13.2	
9.5	
6.7	
4.75	100
2.36	98
1.18	90
0.600	77
0.425	73
0.300	69
0.212	66
0.150	64
0.075	60
0.065	55
0.046	53
0.033	48
0.024	44
0.018	40
0.013	36
0.0094	33
0.0067	30
0.0047	29
0.0039	29
0.0033	29
0.0027	28
0.0024	27
0.0014	27



NOTES/REMARKS: -

Moisture Content 14.9%   -2.36mm Soil Particle Density(t/m^3) 2.64

Sample/s supplied by the client

 REP03905

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Approved Signatory

Wade Els

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Tested at Trilab Brisbane Laboratory

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PARTICLE SIZE DISTRIBUTION TEST REPORT

Test Method: AS 1289 3.6.1, 3.6.3, 3.5.1 & 2.1.1

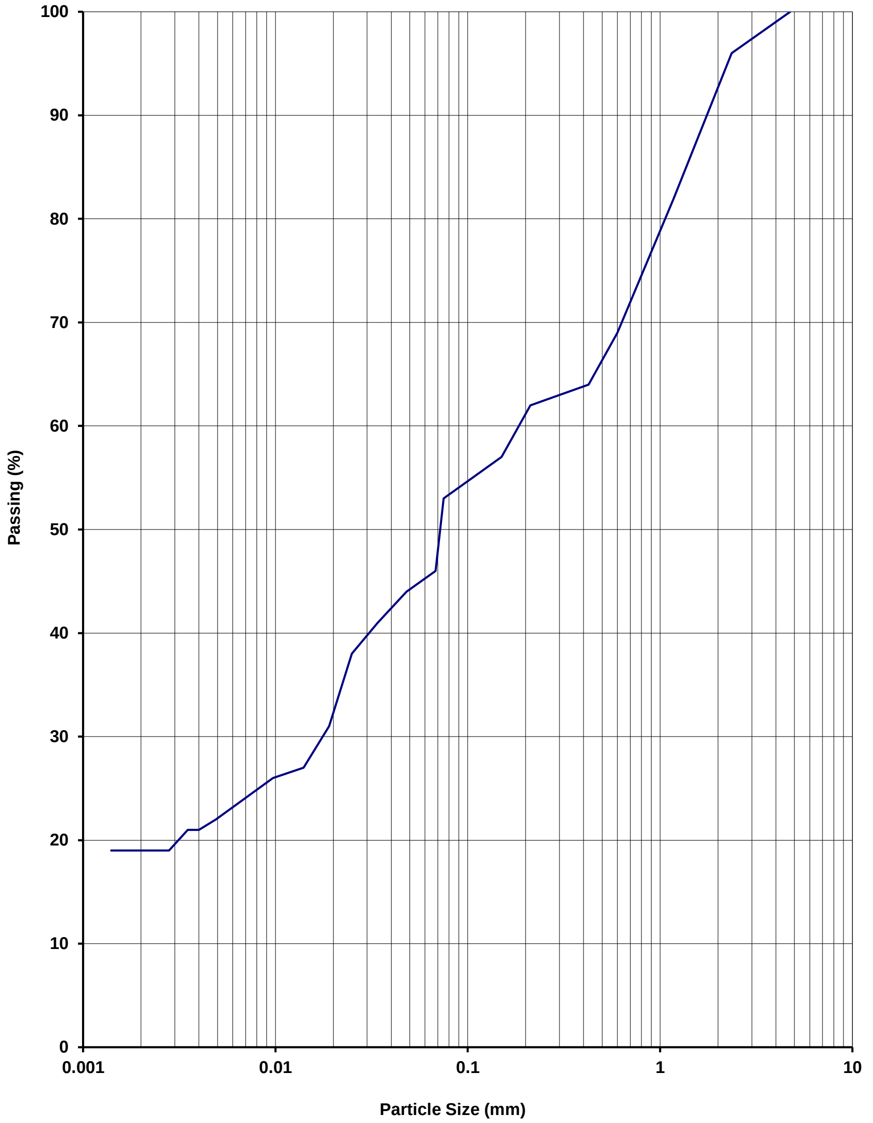
Client	Soiltech Testing Services Pty Ltd	**Report No.**	24090012-PSDH
		Workorder No.	9919/T/633
Address	194 Stephen Street Toowoomba QLD 4350	**Test Date**	16/9/2024
		Report Date	10/10/2024

Project MS03324

Client ID MS03324 | **Location** TP2 | **Depth (m)** Not Supplied

Description Disturbed

Sieve Size (mm)	Passing %
150.0	
75.0	
63.0	
53.0	
37.5	
26.5	
19.0	
13.2	
9.5	
6.7	
4.75	100
2.36	96
1.18	82
0.600	69
0.425	64
0.300	63
0.212	62
0.150	57
0.075	53
0.068	46
0.048	44
0.034	41
0.025	38
0.019	31
0.014	27
0.0097	26
0.0069	24
0.0049	22
0.004	21
0.0035	21
0.0028	19
0.0025	19
0.0014	19



NOTES/REMARKS: -

Moisture Content 14.1%
-2.36mm Soil Particle Density(t/m^3) 2.59

Sample/s supplied by the client

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PERMEABILITY BY CONSTANT HEAD TEST REPORT

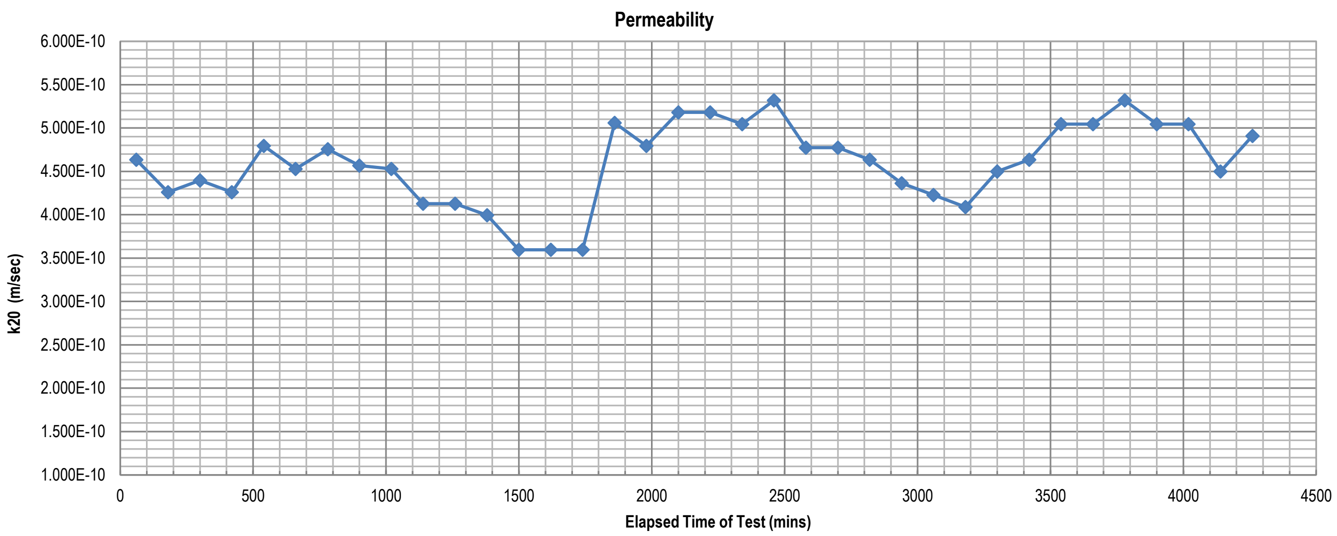
Test Method AS 1289 6.7.3, 5.1.1

Client	Soiltech Testing Services Pty Ltd	**Report No.**	24090012-TPER
		Workorder No.	9919/T/633
Address	194 Stephen Street Toowoomba QLD 4350	**Test Date**	9/09/2024
		Report Date	20/09/2024
Project	MS03324		
Client ID	MS03324 TP2	**Depth (m)**	Not Supplied
Description	Sandy CLAY - brown	**Sample Type**	Remoulded Soil Specimen.

RESULTS OF TESTING

Compaction Method	**AS1289.5.1.1 - Standard Compaction**		
Maximum Dry Density (t/m^3)	**1.86**	Confining Pressure (kPa)	**360**
Optimum Moisture Content (%)	**14.0**	Inlet Pressure/Outlet Pressure (kPa)	**320 / 300**
Placement Moisture Content (%)	**14.1**	Mean Effective Stress (kPa)	**50**
Moisture Ratio (%)	**100.9**	Water Type	**De-Ionized**
Placement Wet Density (t/m^3)	**2.08**	Percentage Material Retained/Sieve Size (mm)	**0 % / 6.7 mm**
Density Ratio (%)	**98.1**	Sample Height and Diameter (mm)	**63.8 / 62.9 mm**

PERMEABILITY $k_{(20)} = 4.9 \times 10^{-10}$ **(m/sec)**



Remarks: The above specimen was remoulded to a target of 98% of Standard Maximum Dry Density and at Optimum Moisture Content.

Sample/s supplied by client The compaction data was supplied by the client. **Page: 1 of 1** REP06502

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Approved Signatory

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PERMEABILITY BY CONSTANT HEAD TEST REPORT

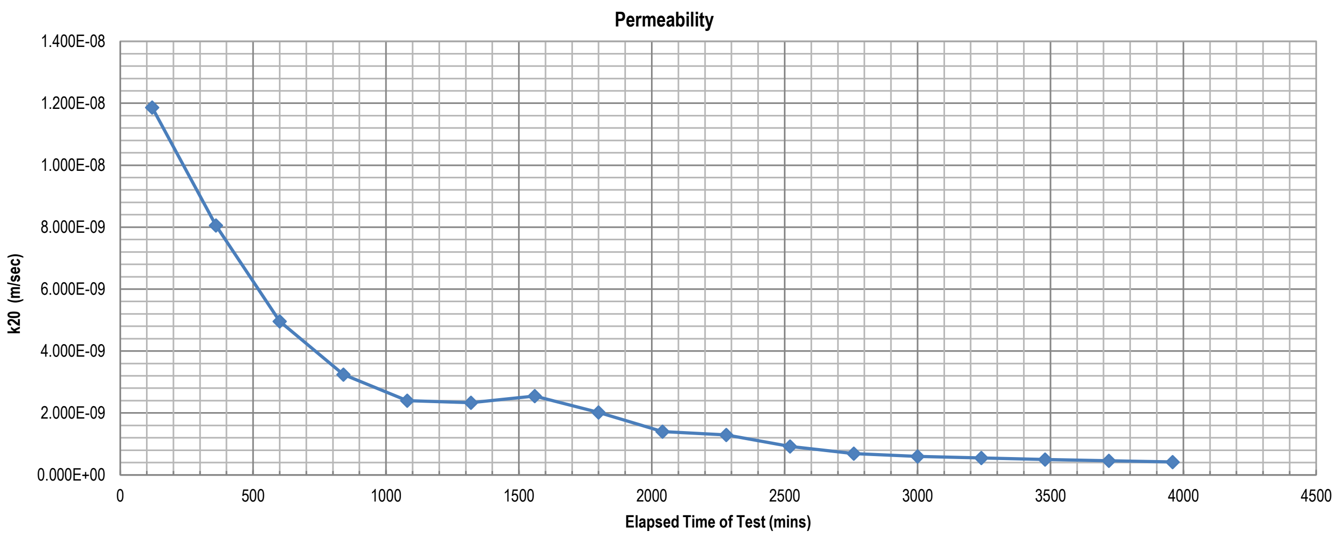
Test Method AS 1289 6.7.3, 5.1.1

Client	Soiltech Testing Services Pty Ltd	**Report No.**	24090014-TPER
		Workorder No.	9919/T/633
Address	194 Stephen Street Toowoomba QLD 4350	**Test Date**	12/09/2024
		Report Date	20/09/2024
Project	MS03324		
Client ID	MS03324 TP3	**Depth (m)**	Not Supplied
Description	CLAY with a trace of sand - brown	**Sample Type**	Remoulded Soil Specimen.

RESULTS OF TESTING

Compaction Method	**AS1289.5.1.1 - Standard Compaction**		
Maximum Dry Density (t/m^3)	**1.62**	Confining Pressure (kPa)	**360**
Optimum Moisture Content (%)	**21.5**	Inlet Pressure/Outlet Pressure (kPa)	**320 / 300**
Placement Moisture Content (%)	**21.5**	Mean Effective Stress (kPa)	**50**
Moisture Ratio (%)	**100.1**	Water Type	**De-Ionized**
Placement Wet Density (t/m^3)	**1.93**	Percentage Material Retained/Sieve Size (mm)	**0 % / 6.7 mm**
Density Ratio (%)	**98.0**	Sample Height and Diameter (mm)	**63.9 / 62.6 mm**

PERMEABILITY $k_{(20)} = 4.4 \times 10^{-10}$ **(m/sec)**



Remarks: The above specimen was remoulded to a target of 98% of Standard Maximum Dry Density and at Optimum Moisture Content.

Sample/s supplied by client The compaction data was supplied by the client. **Page: 1 of 1** REP06502

Tested at Trilab Brisbane Laboratory

Approved Signatory

Wade Els

Wade Els

Laboratory No. 9926

Appendix M

Effluent Utilisation Assessment

Soil Investigation, soil sampling, runoff determination and pond/land sizing using MEDLI for the proposed Springfield Feedlot expansion

Prepared for: RDC Engineers Pty Ltd
Attention: Rod Davis

February 2025

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1 Introduction

Doolin Farming Pty Ltd own and operate a 10,000 ha mixed farming operation across several properties at North Star including "Glenhoma", "Glenmodel", "Springfield", "Myall Downs" and "Yetman West" some 27 km east of Yetman and 45 km south-southeast of Goondiwindi (QLD) in NSW.

"Springfield" comprises some 1,713 ha (~4,231 acres) and there has been a beef cattle feedlot on "Springfield" for over three years after approval was granted for a 999 head feedlot by the Gwydir Shire Council in 2021 (DA31/2020). In addition to the feedlot, a dryland and irrigated cropping business is undertaken on a large proportion of the property with grazing of beef cattle on the remaining land which is unsuitable for cropping.

Doolin Farming Pty Ltd wish to expand Springfield Feedlot from the current approved capacity of 999 head by gaining development approval for intensive livestock agriculture to operate as a 3,000 head beef cattle feedlot on the site. The proposed development is to be developed in two stages with the first stage having a capacity of 1,251 head. The second stage will provide an additional 750 head, bringing the capacity of Springfield Feedlot to 3,000 head.

JG Environmental was engaged to undertake an assessment of the soils in the current/proposed effluent and manure utilisation areas through on-site assessment including taking soil cores and samples for analyses.

Furthermore, JG Environmental was engaged to undertake an assessment of the runoff generated, pond sizing and sustainability of the proposed feedlot effluent utilisation system.

2 Description of the Existing Environment

2.1 Location of Subject Land

The subject land is located approximately 15 km by road east of the small village of North Star in the Gwydir Shire of northern New South Wales. The subject land has primary frontage to Getta Getta Road (sealed to property entrance) of approximately 5.1 km in length.

Figure 1 is a locality plan showing the proximity of the subject land to nearby towns and roads.

2.2 Climate

Climate data for the locality was obtained from the SILO database with data provided by the Bureau of Meteorology (BOM). Daily climate data for the site for 100 years is summarised in Table 1. The mean annual rainfall is ~617 mm/year, whilst the mean annual pan evaporation is 1,889 mm/year.

Table 1: Climatic Data for Springfield Feedlot (-28.95 deg S 150.55 deg E)

Month	Mean Rainfall (mm)	Pan Evaporation (mm)	Net Evaporation (mm)	Max Temp (°C)	Min Temp (°C)	Rad (MJ/m²/d)
Jan	79.8	252.1	172.3	33.2	18.8	25.2
Feb	73.4	204.2	130.8	32.3	18.4	23
Mar	59.6	186.5	126.9	30.4	16.1	20.4
Apr	31.7	131.2	99.5	26.5	11.6	17.2
May	38.5	87.9	49.4	22	7.4	13.5
Jun	36.8	62.9	26.1	18.5	4.7	11.6
Jul	39.1	68.6	29.5	17.8	3.3	12.7
Aug	32.8	98.7	65.9	19.7	4.5	16.2
Sep	34.7	139.6	104.9	23.4	7.5	20.1
Oct	55.4	187.4	132	27	11.8	22.8
Nov	65.6	220.7	155.1	30	14.9	25.1
Dec	69.7	249.2	179.4	32.2	17.4	25.9
Year	617.3	1889.1	1271.8	26.1	11.3	19.4

Figure 1: Locality Plan

2.3 Land Resource Information

The subject land has previously been mapped to a landscape level as part of the natural resource mapping for the Moree Plains (OEH 2015). This digital only soil landscape product covers the alluvial plains and fans of the Namoi, Gwydir, Barwon and Macintyre Rivers in the north and Pilliga Outwash fans in the South. The scale of the information and mapping in this publication is not provided.

Forty-four soil landscape map units have been described for the Moree Plains. Each unit is an inventory of soil and landscape information with relatively uniform land management requirements, allowing major soil and landscape qualities and constraints to be identified. The report and online map identify two soil landscape mapping units within the existing effluent reuse and manure spreading areas on the property.

These soil landscapes are summarised in Table 2, which describes the landform, vegetation, major soils and encountered in the three identified landscape mapping units.

Table 2: Landscape Units Occurring in the Liquid/Solid Reuse Areas (OEH 2015)

Landscape Unit	Landform	Major Soils
mgh Mungle	Gently undulating rises to hills mainly on sandstones. Slopes 3 - 10%, local relief 10 - 50 m, elevation 200 - 320 m. Extensively cleared grasslands to woodlands.	Deep to very deep (>150 cm), moderately well-drained Red Ferrosols, Red and Brown Dermosols (Red-brown Earths), Red Chromosols (Red Podzolic Soils), and Brown Chromosols (Yellow Podzolic Soils) on hillcrests to upper slopes. Deep to very deep (>150 cm), moderately well-drained Red Ferrosols, Red and Brown Dermosols (Red-brown Earths), Red Chromosols (Red Podzolic Soils), and Brown Chromosols (Yellow Podzolic Soils) on slopes.
mkt Mobbindry Creek	Narrow drainage lines and alluvial flats usually draining basalt-influenced catchments. Slopes 0 - 2%, local relief 0 - 5 m, elevation 160 - 340 m. Extensively cleared tall open-forest, woodland and grassland.	Very deep (>150 cm), imperfectly drained to poorly-drained Black Vertosols (Black Earths), Grey Vertosols (Grey Clays) and Brown Dermosols (Alluvial Soils) on alluvial flats.

2.4 Site Specific Soil Information

The available land resource mapping should provide sufficient information to be used for property scale planning and management. However, a site-specific soil assessment was undertaken by Mr Justin Galloway (Certified professional soil scientist) in the current effluent and manure utilisation areas to validate the soil mapping information and provided physical and chemical data for input to the hydraulic and nutrient balance modelling.

A total of 18 sites were described to a depth of up to 120 cm using a 5 cm diameter soil push tube that removed intact soil cores. The soil assessment confirmed the alluvial and flat plains are dominated by deep dark clay soils (Dermosols or Vertosols). These soils have been utilised for successfully growing irrigated/dryland cotton and various fodder and grain crops.

The dominant soils observed in the mid and lower slope positions were deep brown Dermosols (some Chromosols). Once again, these soils are currently being utilised for growing irrigated/dryland cotton and various fodder and grain crops. The mid to upper slope positions also contain deep reddish soils similar to the red and brown Ferrosols and Dermosols described in OEH (2015).

In the high crests and upper landscape positions, also observed were shallow to moderately deep soils (Tenosols and Rudosols). These soils are used for grazing only and have not been developed. These unsuitable soils have been excluded from the current manure spreading areas.

Photographs of the various typical soil profiles observed within the current effluent and manure utilisation areas are shown below in Figure 2. Typical profile descriptions of the dominant soil types are provided in Tables 3, 4 and 5.

The existing landscape around soil observation and sampling sites are shown in Figures 3 to 7.

Figure 2: Typical Soil Profiles Observed

Table 3: Dominant soil in alluvial areas - Typical Description

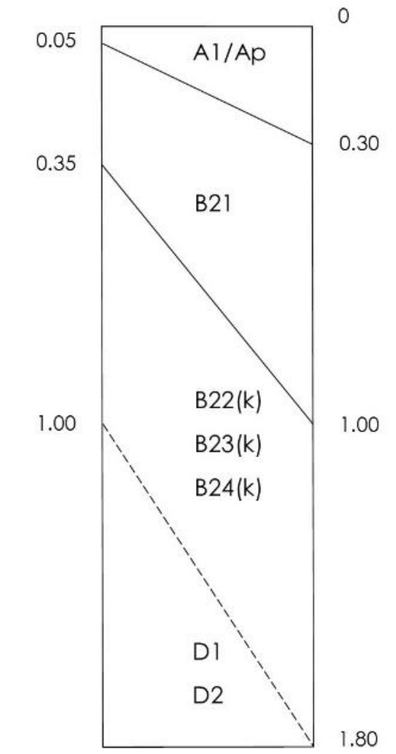
Profile Diagram	Description
	**A1/Ap:** Black (10YR 2-3/1-2) light to medium clay; moderate to strong angular/subangular blocky structure; field pH 8.0-5.5; clear change to
	B21: Black (7.5-10YR 2-3/1-2) light to heavy clay; weak lenticular structure parting to moderate to strong angular/subangular blocky, frequent slickensides; rarely few gravels; few medium calcareous segregations; field pH 8.0-9.0; gradual/diffuse change to
	B22(k)/23(k): black or brown (7.5-10YR 2-4/1-4, 2.5Y 4/3) light medium to medium heavy clay; moderate to strong prismatic and lenticular structure with slickensides; few to common fine to coarse calcareous segregations; occasional manganiferous nodules; field pH 8.5-9.0.
	D1/D2: Where present, black or brown (10YR 2/1, 2-3/2-3) medium clay; weak to moderate prismatic structure, frequently few medium calcareous nodules; field pH 9.0.

Table 4: Dominant soil (Dermosol) in mid and lower slopes - Typical Description

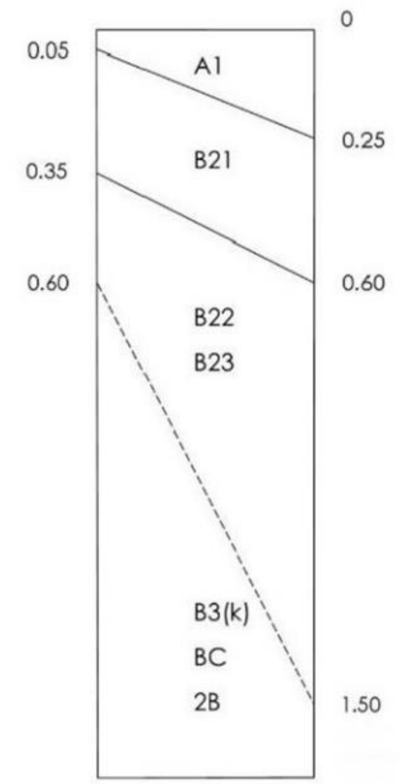
Profile Diagram	Description
	**A1:** Black to dark brown (10YR 2-3/1-2; light to medium clay; moderate polyhedral, granular or angular/subangular blocky structure; rarely few gravels; field pH 7.5-8.0; gradual to -
	B21: Grey or brown (10YR 3-4/2-4, 7.5YR 3-4/3); medium to medium heavy clay; moderate to strong subangular blocky structure; very few calcareous or manganiferous segregations; field pH 8.5-9.0; clear to gradual change to -
	B22/23: Black, brown or grey (7.5-2.5Y 3-5/1-4) medium to heavy clay; weak to moderate lenticular structure, parting to subangular blocky structure; few to common calcareous or manganiferous nodules; field pH 8.5-9.0; gradual to diffuse to –
	B3/BC: Where present, grey (10YR 5-7/1-2) silty/sandy light to medium heavy clay; strong subangular blocky structure, or weak to moderate lenticular structure with slickensides; few distinct mottles; few calcareous and manganiferous segregations; field pH 8.5-9.0.

Table 5: Dominant soil (Tenosol) in upper slopes - Typical Description

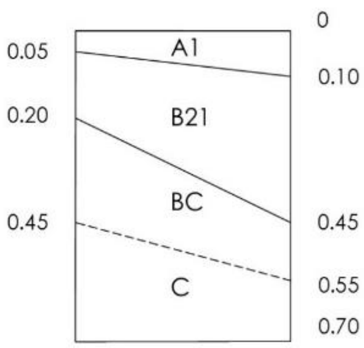
Profile Diagram	Description
	**A1:** Brown to dull reddish brown (5-10YR 3-4/4-6; clay loam to light clay; moderate subangular blocky structure; few to common fine gravels; field pH 7.5-8.0; clear change to
	B21: Dull yellowish brown (5-7.5YR 5/3-4) light to medium clay; week to moderate subangular blocky structure; common fine and medium gravels; field pH 7.5-8.5; gradual change to
	BC: Where present, dull yellowish brown (10YR 5/3-4) light to medium clay; weak angular/subangular blocky structure; many fine and medium gravels; field pH 7.5-8.5.
	C/R: Weak to moderate, massive saprolite.

Figure 3: Typical landscape (mid/lower slopes) showing contour banks (near TP6)

Figure 4: Typical landscape on alluvial flats (near TP1)

Figure 5: Typical landscape on lower slopes and flats (near TP9)

Figure 6: Typical landscape (red soils) in mid/upper slopes (near TP11)

Figure 7: Typical landscape in Effluent Reuse Area (near TP13)

2.5 Soil Sampling and Analysis

Representative soil profiles (refer Figure 8) were sampled at 0-20, 20-40, 40-70 and 70-100cm depths. The samples were submitted to the Environmental Analysis Laboratory (EAL), a NATA and ASPAC accredited laboratory located at the Southern Cross University in Lismore (NSW), for analysis.

The analysis results are given in the following series of tables (Table 6 through Table 12). The full laboratory results are also presented in Appendix A.

Table 6: Soil Analysis Results (TP1)

Parameter	Unit	0-20cm	20-40cm	40-70cm	70-100cm
pH		8.58	8.70	9.03	9.37
Electrical Conductivity	dS/m	0.169	0.283	0.295	0.573
Organic Matter	%	2.7	2.4	1.7	1.6
Nitrogen (Total)	%	0.11	0.10	0.07	0.06
Nitrogen (Nitrate)	mg/kg	15	49	30	18
Nitrogen (Ammonium)	mg/kg	2.9	2.2	2.0	1.8
Phosphorus (Colwell)	mg/kg	29	9.8	2.6	2.0
Phosphorus (Bray)	mg/kg	20	2.2	1.5	1.5
Phosphorus Sorption	mg P/kg	164	194	128	189
Exch. Calcium	cmol+/kg	30	28	22	25
Exch. Magnesium	cmol+/kg	13	15	20	22
Exch. Potassium	cmol+/kg	0.70	0.37	0.31	0.37
Exch. Sodium	cmol+/kg	1.4	2.5	5.6	8.7
Exch. Aluminium	cmol+/kg	0.02	0.02	<0.01	<0.01
Cation Exch. Capacity	cmol+/kg	45	45	48	56
Exchangeable Sodium	%	3.1	5.5	12	15

Figure 8: Soil Observation and Sampling Locations (sites in yellow)

Table 7: Soil Analysis Results (TP6)

Parameter	Unit	0-20cm	20-40cm	40-70cm	70-100cm
pH		8.10	8.49	8.69	8.87
Electrical Conductivity	dS/m	0.207	0.145	0.184	0.212
Organic Matter	%	4.2	3.1	2.8	2.5
Nitrogen (Total)	%	0.17	0.10	0.09	0.07
Nitrogen (Nitrate)	mg/kg	53	7.6	12	5.6
Nitrogen (Ammonium)	mg/kg	16	2.6	2.3	2.7
Phosphorus (Colwell)	mg/kg	13	3.0	2.3	1.3
Phosphorus (Bray)	mg/kg	3.6	2.5	1.1	<1
Phosphorus Sorption	mg P/kg	381	521	506	487
Exch. Calcium	cmol+/kg	36	39	39	31
Exch. Magnesium	cmol+/kg	7.9	14	19	19
Exch. Potassium	cmol+/kg	1.1	0.57	0.62	0.61
Exch. Sodium	cmol+/kg	0.38	0.48	1.4	2.4
Exch. Aluminium	cmol+/kg	0.02	0.02	0.01	0.02
Cation Exch. Capacity	cmol+/kg	46	54	59	53
Exchangeable Sodium	%	0.82	0.89	2.4	4.6

Table 8: Soil Analysis Results (TP9)

Parameter	Unit	0-20cm	20-40cm	40-70cm	70-100cm
pH		7.83	8.46	8.79	9.14
Electrical Conductivity	dS/m	0.083	0.111	0.119	0.206
Organic Matter	%	2.2	2.3	1.8	1.7
Nitrogen (Total)	%	0.09	0.07	0.06	0.04
Nitrogen (Nitrate)	mg/kg	5.5	1.4	0.66	0.62
Nitrogen (Ammonium)	mg/kg	4.0	2.1	1.6	2.3
Phosphorus (Colwell)	mg/kg	7.9	4.3	2.3	3.0
Phosphorus (Bray)	mg/kg	5.0	1.6	1.7	2.7
Phosphorus Sorption	mg P/kg	131	208	220	214
Exch. Calcium	cmol+/kg	30	35	30	37
Exch. Magnesium	cmol+/kg	7.8	9.9	12	16
Exch. Potassium	cmol+/kg	0.43	0.35	0.31	0.37
Exch. Sodium	cmol+/kg	0.48	0.89	1.7	3.5
Exch. Aluminium	cmol+/kg	0.01	0.02	0.02	0.01
Cation Exch. Capacity	cmol+/kg	39	46	45	58
Exchangeable Sodium	%	1.2	1.9	3.7	6.1

Table 9: Soil Analysis Results (TP11)

Parameter	Unit	0-20cm	20-40cm	40-70cm	70-100cm
pH		8.20	8.30	8.53	8.83
Electrical Conductivity	dS/m	0.108	0.096	0.136	0.119
Organic Matter	%	2.3	1.2	2.2	1.8
Nitrogen (Total)	%	0.08	0.17	0.05	0.03
Nitrogen (Nitrate)	mg/kg	12	10	14	8.2
Nitrogen (Ammonium)	mg/kg	1.7	1.3	1.3	1.5
Phosphorus (Colwell)	mg/kg	33	4.9	5.9	3.3
Phosphorus (Bray)	mg/kg	22	3.7	<1	<1
Phosphorus Sorption	mg P/kg	146	274	236	90
Exch. Calcium	cmol+/kg	19	20	28	27
Exch. Magnesium	cmol+/kg	2.1	2.9	3.0	4.3
Exch. Potassium	cmol+/kg	0.91	0.47	0.38	0.30
Exch. Sodium	cmol+/kg	0.18	0.14	0.13	0.14
Exch. Aluminium	cmol+/kg	0.01	0.01	<0.01	0.01
Cation Exch. Capacity	cmol+/kg	22	24	31	31
Exchangeable Sodium	%	0.83	0.58	0.42	0.43

Table 10: Soil Analysis Results (TP13)

Parameter	Unit	0-20cm	20-40cm	40-70cm	70-100cm
pH		8.58	9.03	9.13	9.28
Electrical Conductivity	dS/m	0.265	0.268	0.398	0.518
Organic Matter	%	2.4	1.7	1.7	0.96
Nitrogen (Total)	%	0.10	0.07	0.06	<0.02
Nitrogen (Nitrate)	mg/kg	18	8.1	13	1.8
Nitrogen (Ammonium)	mg/kg	2.1	1.8	3.1	2.5
Phosphorus (Colwell)	mg/kg	24	3.0	2.0	1.3
Phosphorus (Bray)	mg/kg	13	1.5	1.3	1.6
Phosphorus Sorption	mg P/kg	262	280	288	210
Exch. Calcium	cmol+/kg	31	32	28	27
Exch. Magnesium	cmol+/kg	10	12	13	15
Exch. Potassium	cmol+/kg	1.0	0.39	0.30	0.31
Exch. Sodium	cmol+/kg	1.6	3.3	5.2	8.5
Exch. Aluminium	cmol+/kg	0.02	0.01	0.01	0.02
Cation Exch. Capacity	cmol+/kg	44	48	47	50
Exchangeable Sodium	%	3.6	7.0	11	17

Table 11: Soil Analysis Results (TP15)

Parameter	Unit	0-20cm	20-40cm	40-70cm	70-100cm
pH		8.71	8.97	9.20	9.34
Electrical Conductivity	dS/m	0.196	0.277	0.432	0.540
Organic Matter	%	2.6	2.3	1.7	1.6
Nitrogen (Total)	%	0.11	0.07	0.05	0.03
Nitrogen (Nitrate)	mg/kg	7.2	7.5	11	5.8
Nitrogen (Ammonium)	mg/kg	2.6	1.6	1.7	2.4
Phosphorus (Colwell)	mg/kg	8.9	2.0	<1	2.3
Phosphorus (Bray)	mg/kg	3.9	1.3	1.8	1.1
Phosphorus Sorption	mg P/kg	290	349	324	272
Exch. Calcium	cmol+/kg	31	29	25	25
Exch. Magnesium	cmol+/kg	13	15	17	18
Exch. Potassium	cmol+/kg	0.89	0.53	0.49	0.51
Exch. Sodium	cmol+/kg	2.1	3.5	5.9	8.0
Exch. Aluminium	cmol+/kg	<0.01	0.01	<0.01	<0.01
Cation Exch. Capacity	cmol+/kg	47	48	49	52
Exchangeable Sodium	%	4.5	7.4	12	16

Table 12: Soil Analysis Results (TP17)

Parameter	Unit	0-20cm	20-40cm	40-70cm	70-100cm
pH		6.87	8.78	9.14	9.32
Electrical Conductivity	dS/m	0.046	0.175	0.274	0.336
Organic Matter	%	2.7	2.0	1.9	2.3
Nitrogen (Total)	%	0.13	0.07	0.04	0.06
Nitrogen (Nitrate)	mg/kg	5.7	2.8	3.2	3.2
Nitrogen (Ammonium)	mg/kg	3.1	1.4	1.3	1.6
Phosphorus (Colwell)	mg/kg	35	2.0	2.3	3.0
Phosphorus (Bray)	mg/kg	19	5.4	2.8	1.1
Phosphorus Sorption	mg P/kg	216	433	475	446
Exch. Calcium	cmol+/kg	17	32	28	26
Exch. Magnesium	cmol+/kg	8.0	13	18	19
Exch. Potassium	cmol+/kg	0.74	0.49	0.48	0.45
Exch. Sodium	cmol+/kg	0.49	1.5	3.6	4.9
Exch. Aluminium	cmol+/kg	0.01	0.02	0.02	0.01
Cation Exch. Capacity	cmol+/kg	26	48	49	51
Exchangeable Sodium	%	1.9	3.2	7.3	9.7

2.6 Brief Soil Analyses Interpretation and Discussion

The following provides a brief interpretation and discussion of the soil analysis results.

2.6.1 pH

The surface (0-20 cm) pH for samples collected and analysed range from 6.9 (neutral) at TP17 to 8.7 (strongly alkaline) at TP15. The subsoil (70-100 cm) pH ranges from 8.8 (strongly alkaline) at TP11 to 9.4 (very strongly alkaline) at site TP1. Surface soil pH measured at the representative sites is considered acceptable for pasture and crop growth and is typical for these soil types under natural conditions.

2.6.2 Nitrogen

Results for soil samples collected and analysed in July 2024 show that total nitrogen in the surface (0-20 cm) ranges from 826 mg/kg to 1,690 mg/kg. The total nitrogen concentrations are considered low to moderate (Hazelton and Murphy 2016). Whilst the majority of the total nitrogen is not immediately available to plants, adequate concentrations will ensure soil microbes can mineralise the reserves to plant-available forms such as ammonium and nitrate.

Nitrate nitrogen in the surface (0-20 cm) ranges from 6 mg/kg to 53 mg/kg. Results from the recent sampling shows that all but one of the surface nitrate concentrations are considered deficient to marginal and a plant response to nitrogen additions is highly likely (Hazelton and Murphy 2016). Adequate available nitrogen will maximise crop growth and maximise nutrient uptake, especially of phosphorus. The subsoil (70-100 cm) nitrate nitrogen concentrations measured in samples collected in 2024 range from <1 mg/kg to 18 mg/kg at site TP1 (mean of 6 mg/kg).

2.6.3 Phosphorus

The available (Colwell) phosphorus concentrations measured for the surface soil (0-20 cm) ranges from 8 mg/kg at site TP9 to 35 mg/kg at monitoring site TP17. These are considered low concentrations. The subsoil (70-100 cm) available (Colwell) phosphorus concentrations measured in samples collected in 2024 are considered very low and range from 1 mg/kg to 3 mg/kg.

2.6.4 Phosphorus Sorption Capacity

The behaviour of labile inorganic phosphorus in soils is dominated by sorption and desorption processes (Hazelton and Murphy 2016). The amount of phosphorus (P) that a soil will remove from solution (be absorbed) is critical for effluent disposal, to ensure long term sustainability. The phosphorus adsorption capacity is the ability of a soil material to sorb P compounds onto soil particles thereby rendering the P unavailable to plants and immobilising it within the soil itself.

The surface soil (0-20 cm) phosphorus sorption results range from 131 up to 381 mg/kg. As for the subsoil (70-100 cm), phosphorus sorption results range from 90 up to 487 mg/kg. The phosphorus sorption levels are good to excellent and suggest a good capacity to safely store excess phosphorus.

2.6.5 Salinity

Salinity refers to the dissolved salts in a liquid or in soil solution and is usually measured by electrical conductivity. Salt is mostly added to the soil through soil formation, hydrologic processes and rainfall (Shaw et al. 1994). However, effluent irrigation can add significant quantities of salt to the soil.

The electrical conductivity measured in the surface soil ranges from 0.05 dS/m (very low) at site TP17 to 0.27 dS/m (medium) at site TP13. The subsoil electrical conductivity results range from 0.12 dS/m (low) to 0.57 dS/m (medium to high).

If soil conductivity for these soil types becomes very high (>0.96 dS/m in surface or >1.18 dS/m in subsoil), it may restrict potential rooting depth, decrease plant available water and reduce crop performance in species, which are not classed as 'very tolerant' (DNR 1997).

2.6.6 Sodicity

Soil sodicity occurs when the ratio of exchangeable sodium ions to other exchangeable cations is sufficient to influence the swelling and dispersion behaviour of soils (Rengasamy and Churchman 1999). Sodicity can cause a range of land management issues and the soils exchangeable sodium percentage (ESP) is the easiest and best indicator of soil sodicity. A soil is considered non-sodic if ESP is less than 6 %, marginally sodic to sodic if ESP is between 6 and 14 % and strongly sodic if ESP is greater than 14 % (Northcote and Skene 1972).

The surface soil (0-20 cm) ESP results range from <1 % at site TP11 to 4.5 % at sites TP15. The subsoil ESP results range from <1 % at site TP11 to 17 % at site TP13. All surface sites are considered non-sodic. The majority of the deep subsoil (70-100cm) sites are considered sodic or strongly sodic.

3 Land/Soil Capability and Suitability

3.1 Land Capability Assessment

Land capability is the inherent physical capacity of the land to sustain a range of land uses and management practices in the long term without degradation to soil, land, air and water resources.

An updated land and soil capability (LSC) assessment scheme titled "The Land and Soil Capability Scheme—a general rural land evaluation scheme for NSW" (OEH 2012) was implemented after building on previous assessment methodologies.

The following summarises the concepts and methodology of the LSC scheme.

> *The LSC assessment scheme uses the biophysical features of the land and soil including landform position, slope gradient, drainage, climate, soil type and soil characteristics to derive detailed rating tables for a range of land and soil hazards. These hazards include water erosion, wind erosion, soil structure decline, soil acidification, salinity, waterlogging, shallow soils and mass movement. Each hazard is given a rating between 1 (best, highest capability land) and 8 (worst, lowest capability land). The final LSC class of the land is based on the most limiting hazard.*
>
> *The LSC class gives an indication of the land management practices that can be applied to a parcel of land without causing degradation to the land and soil at the site and to the off-site environment. High impact practices require good quality, high capability land, such as LSC classes 1 to 3, while low impact practices can be sustainable on poorer quality, lower capability land, such as LSC classes 5 to 8. As land capability decreases, the management of hazards requires an increase in knowledge, expertise and investment. In lands with lower capability, the hazards cannot be managed effectively for some land uses.*

The definitions and descriptions for each LSC class are outlined in Table 13.

Table 13: Land and soil capability classes – general definitions (OEH 2012)

LSC Class	General Definition
	Land capable of a wide variety of land uses (cropping, grazing, horticulture, forestry, nature conservation)
1	Extremely high capability land: Land has no limitations. No special land management practices required. Land capable of all rural land uses and land management practices.
2	Very high capability land: Land has slight limitations. These can be managed by readily available, easily implemented management practices. Land is capable of most land uses and land management practices, including intensive cropping with cultivation.
3	High capability land: Land has moderate limitations and is capable of sustaining high-impact land uses, such as cropping with cultivation, using more intensive, readily available and widely accepted management practices. However, careful management of limitations is required for cropping and intensive grazing to avoid land and environmental degradation.
	Land capable of a variety of land uses (cropping with restricted cultivation, pasture cropping, grazing, some horticulture, forestry, nature conservation)
4	Moderate capability land: Land has moderate to high limitations for high-impact land uses. Will restrict land management options for regular high-impact land uses such as cropping, high-intensity grazing and horticulture. These limitations can only be managed by specialised management practices with a high level of knowledge, expertise, inputs, investment and technology.
5	Moderate–low capability land: Land has high limitations for high-impact land uses. Will largely restrict land use to grazing, some horticulture (orchards), forestry and nature conservation. The limitations need to be carefully managed to prevent long-term degradation.
	Land capable for a limited set of land uses (grazing, forestry and nature conservation, some horticulture)
6	Low capability land: Land has very high limitations for high-impact land uses. Land use restricted to low-impact land uses such as grazing, forestry and nature conservation. Careful management of limitations is required to prevent severe land and environmental degradation
	Land generally incapable of agricultural land use (selective forestry and nature conservation)
7	Very low capability land: Land has severe limitations that restrict most land uses and generally cannot be overcome. On-site and off-site impacts of land management practices can be extremely severe if limitations not managed. There should be minimal disturbance of native vegetation.
8	Extremely low capability land: Limitations are so severe that the land is incapable of sustaining any land use apart from nature conservation. There should be no disturbance of native vegetation.

3.1.1 Summary of Land Capability

A summary of the assessment of hazards and land capability classes are shown below in Table 14. The results show that the alluvial and mid/lower slope soils are considered high capable land capable of a wide variety of land uses. The land has slight to moderate limitations and is capable of sustaining high-impact land uses, such as cropping with cultivation, using readily available and widely accepted management practices. However, careful management of limitations is required for cropping and intensive grazing to avoid land and environmental degradation.

The upper slope soils are considered moderate capability land, which has moderate to high limitations for high-impact land uses. This will generally restrict land management options for high-impact land uses such as cropping, high-intensity grazing and horticulture. These limitations can only be managed by specialised management practices with a high level of knowledge, expertise, inputs, investment and technology.

Table 14: Summary of hazards and LSC classes

Main Hazard	Alluvial soils	Mid and lower slope soils	Upper slope soils
water erosion, including sheet, rill and gully erosion	1-2	2-3	3-4
wind erosion	1-2	1-2	1-2
soil structure decline	1-3	1-3	2-3
soil acidification	1-2	2-3	3-4
salinity	1	2	1-3
waterlogging	2-3	2-3	1
shallow soils and rockiness	1	1	2-4
mass movement	1	1	1
Overall LSC Capability	**2-3**	**2-3**	**3-4**

3.2 Effluent Reuse Suitability

Selecting a suitable site is important for successfully establishing an effluent irrigation system that complies with the principles and guidelines set out in the Environmental Guidelines – Use of effluent by irrigation (DEC 2004). The suitability of a particular site depends on both landform and soil factors.

Detailed soil investigations were undertaken and confined to potentially suitable sites identified from the preliminary investigations. The aim of the detailed survey is to (a) confirm the suitability of the proposed irrigation site and (b) identify 'moderate' and/or 'severe' soil limitations.

Landform and soil properties that describe sites likely to be suitable for effluent irrigation are shown below in Table 15 and Table 16. Surface and subsoil properties both need to be considered. Where a soil property limitation is considered 'slight', no soil amelioration is generally required. If the property limitation is considered 'moderate', some soil amelioration or a management response is required, for example, application of gypsum to a sodic (dispersive) soil, lime to an acidic soil, or careful irrigation of poorly drained or excessively well drained soil. Where a limitation is considered 'severe', the site may be unsuited to irrigation of some or all potential effluent products (DEC 2004).

Table 15: Landform requirements for effluent irrigation systems (DEC 2004)

Property	Nil or Slight	Moderate	Severe	Restrictive Feature
Slope (%) (for following irrigation methods)				
– flood/surface	< 1	1–3	> 3	excess runoff and erosion risk
– sprinkler/spray	< 6	6–12	> 12	
– trickle/microspray	< 10	10–20	> 20	
Flooding	none or rare	Occasional	frequent	limited irrigation opportunities
Landform	crests, convex slopes and plains	concave slopes and foot-slopes	drainage lines and incised channels	erosion and seasonal water-logging risk
Surface rock outcrop (%)	Nil	0–5	> 5	interferes with irrigation and/or cultivation

Table 16: Typical soil characteristics for effluent irrigation systems (DEC 2004)

Property	Nil or Slight	Moderate	Severe	
Exchangeable sodium percentage (0–40 cm)	0–5	5–10	> 10	structural degradation and waterlogging
Exchangeable sodium percentage (40–100 cm)	< 10	>10	-	structural degradation and waterlogging
Salinity as electrical conductivity (ECe) (dS/m at 0–70 cm)	< 2	2–4	> 4	excess salt may restrict plant growth
Salinity measured as electrical conductivity (ECe) (dS/m at 70–100 cm)	< 4	4–8	> 8	excess salt may restrict plant growth; potential seasonal groundwater rise
Depth to top of seasonal high water table (metres)	> 3	0.5–3	< 0.5	poor aeration, restricts plant growth, risk to groundwater
Depth to bedrock or hardpan	> 1	0.5–1	< 0.5	restricts plant growth, excess runoff, waterlogging
Available water capacity (AWC, mm/m)	> 100	< 100	-	little plant-available water in reserve, risk to groundwater
Soil pHCaCl2 (surface layer)	> 6–7.5	3.5–6.0 > 7.5	< 3.5	reduces optimum plant growth
Cation capacity (CEC, cmol (+)/kg, exchange average 0–40 cm)	> 15	3–15	< 3	unable to hold plant nutrients
Emerson aggregate test (0–100cm)	4, 5, 6, 7, 8	2, 3	1	Poor structure
Phosphorus (P) sorption (kg/ha at total 0–100 cm	high	moderate	Low	unable to immobilise any excess phosphorus

3.2.1 Summary of Suitability

Table 17 below summarises the assessment of landform hazards for effluent utilisation. The results show that for a sprinkler/spray irrigation system the mid and lower slope soils have nil to slight ratings and are suitable. The alluvial soils are also suitable with the only moderate hazard identified as occasional flooding risk. Management needs to acknowledge the risk and plan infrastructure accordingly. The timing and frequency of irrigation also needs to factor the risk of flooding in low lying areas. The soils occurring in the upper slopes have moderate hazard ratings for irrigation method and rock outcrop. However, they are also suitable with appropriate management actions.

Table 17: Assessment of landform requirements outlined in DEC (2004)

Property	Alluvial soils	Mid and lower slope soils	Upper slope soils
Slope (%) (for following irrigation methods)			
– flood/surface	Nil/slight	Severe	Severe
– sprinkler/spray	Nil/slight	Nil/slight	Moderate
– trickle/microspray	Nil/slight	Nil/slight	Nil/slight
Flooding	Nil/slight to Moderate	Nil/slight	Nil/slight
Landform	Nil/slight	Nil/slight	Nil/slight
Surface rock outcrop (%)	Nil/slight	Nil/slight	Moderate

In addition to the landform hazards, Table 18 below summarises the assessment of soil characteristic hazards for effluent reuse.

The alluvial soils are assessed as being suitable, having nil/slight limitations for all identified soil hazards except for subsoil sodicity. Likewise, the mid and lower slope soils have nil/slight limitations for all hazards except a nil/slight to moderate hazard for sodicity. It must be noted that the topsoil (0-20cm) is non sodic at all sites.

The upper slope soils are also mostly nil/slight limitations for all hazards except a nil/slight to moderate hazard for soil depth and possibly water availability. Some minor occurrences of soils within the crests and upper slope position were identified as having weathered bedrock at <100cm depth. These minor occurrences should not cause any issues for manure reuse considering the majority of these areas have already been excluded from the dryland cropping area. However, management should prioritise the use of the deeper soils where possible.

Table 18: Assessment of soil characteristic requirements outlined in DEC (2004)

Property	Alluvial soils	Mid and lower slope soils	Upper slope soils
Exchangeable sodium percentage (0–40 cm)	Nil/slight	Nil/slight to Moderate	Nil/slight
Exchangeable sodium percentage (40–100 cm)	Nil/slight to Moderate	Nil/slight to Moderate	Nil/slight
Salinity as electrical conductivity (ECe) (dS/m at 0–70 cm)	Nil/slight	Nil/slight	Nil/slight
Salinity measured as electrical conductivity (ECe) (dS/m at 70–100 cm)	Nil/slight	Nil/slight	Nil/slight
Depth to top of seasonal high water table (metres)	Nil/slight	Nil/slight	Nil/slight
Depth to bedrock or hardpan	Nil/slight	Nil/slight	Nil/slight to Moderate
Available water capacity (AWC, mm/m)	Nil/slight	Nil/slight	Nil/slight to Moderate
Soil pHCaCl2 (surface layer)	Nil/slight	Nil/slight	Nil/slight
Cation capacity (CEC, cmol (+)/kg, exchange average 0–40 cm)	Nil/slight	Nil/slight	Nil/slight
Emerson aggregate test (0–100cm)	Nil/slight	Nil/slight	Nil/slight
Phosphorus (P) sorption (kg/ha at total 0–100 cm	Nil/slight	Nil/slight	Nil/slight

4 Runoff Estimation

4.1 Introduction

Runoff generated from the proposed development complex controlled drainage area has the potential to pollute surface and ground water if it is not effectively controlled and managed. The correct sizing of ponds to accommodate runoff and the responsible application of the organic and nutrient rich runoff to land are both important considerations.

4.2 MEDLI Feedlot Hydrological Model

MEDLI® is a Windows® based computer model for designing and analysing effluent reuse systems for intensive rural industries, agri-industrial processors (e.g. abattoirs) and sewage treatment plants.

Confined intensive cattle feeding systems are described in MEDLI V2.5 using the waste estimation/feedlot module. The feedlot module contained in MEDLI, models the daily water and nutrient balance of the pen/feeding area and its surrounding catchment (hard and soft) and then predicts the quantity and quality of the runoff entering the holding pond following rainfall.

The description of a feedlot enterprise in MEDLI is very flexible with provision for modifying the market composition of the herd, manure excretion rates, stocking density, catchment configurations, manure pad maintenance rules and harvesting rates. To obtain accurate manure production values (total solids, volatile solids, nitrogen, phosphorus, potassium and salt) for beef cattle to be entered in MEDLI, we used BeefBal v10.01 (DAF 2019). In BeefBal, the percentages of individual feed ingredients and the amount fed were input. Annual manure production in kilograms per head per year were then entered into the MEDLI model.

The model assumes all runoff from the catchment area is directed into a holding pond via a sedimentation basin. The sedimentation basin surface area was included in the "hard area". Runoff from the hard and soft areas, and from any other non-production areas defined by the user i.e. "other areas", is assumed to be free of solids, nutrients and salts. The assumption is reasonable unless these "other areas" involve manure stockpiling/composting areas.

The feedlot summary report includes information on annual runoff, nutrients contained in the runoff, manure harvesting rates and average pad nutrient and dry matter composition.

In summary, the feedlot waste estimation module predicts the quantity and quality of runoff entering the holding pond. The module is a deterministic, daily time-step program which generates the runoff details (date, volume, concentrations) for the run period.

4.3 Catchment Runoff Modelling (Expanded CDA)

The expanded controlled drainage area (CDA) of the proposed development consists of the following component areas for MEDLI modelling purposes:

Pen Area - area occupied by production pens, irrespective of their occupancy rate. The total pen area is a derived value based on the inputted stocking density (m^2/SCU), licensed capacity (SCU) and number of pens.

Hard Area - area occupied by concrete, roads, drains, cattle lanes, surface area of sedimentation basin(s), building roofs etc.

Soft Area - permanently grassed and vegetated areas within the catchment.

Other area(s) - any non-production area which possess different hydraulic properties to those of the soft and hard areas.

The various catchment area components for the expanded catchment (CDA) are summarised below in Table 19.

Table 19: Expanded Catchment Area Details

Catchment component	Area (ha)
Pens – production, holding, hospital	5.64
Hard – feed roads, cattle lanes / drains, cattle handling facility, manure stockpile	4.96
Hard – Sedimentation Basin	0.56
Soft - grassed areas	2.61
Other –	-
Total	13.77

The predicted runoff from the expanded controlled drainage area (CDA) is summarised on a monthly basis for the 100 modelling years in Table 20 and presented graphically in Figure 9.

There is high variability in the annual runoff (range 2.69 ML/yr to 53.57 ML/yr). The mean and median annual runoff for the 100-year modelling period is 21.16 and 19.70 ML/yr respectively.

Table 20: Monthly Runoff (ML) Predicted for Expanded CDA

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1924	1.8	5.0	0.3	2.8	0.0	0.9	1.8	2.0	0.4	0.5	8.1	0.2	23.79
1925	1.9	0.6	0.2	0.0	1.1	0.0	0.9	1.1	0.0	0.1	5.2	2.4	13.61
1926	0.2	1.5	0.1	0.6	2.3	1.0	2.0	0.0	1.4	0.1	0.0	6.0	15.19
1927	1.9	0.1	1.1	1.1	0.0	0.5	0.0	0.6	0.0	2.7	2.7	0.7	11.49
1928	4.0	5.6	3.7	1.0	0.1	2.5	0.4	0.0	0.0	0.4	0.1	0.0	17.80
1929	0.2	5.3	0.8	6.2	0.0	0.4	0.2	1.1	0.1	2.5	0.2	1.8	18.89
1930	6.6	0.1	1.9	0.3	1.2	3.2	5.3	3.7	0.3	3.4	0.6	1.2	27.86
1931	1.0	0.4	1.4	0.2	0.7	3.2	2.3	0.3	0.8	1.3	2.0	4.6	18.13
1932	0.3	0.6	1.0	1.4	0.5	1.0	1.0	0.1	2.3	0.8	2.0	1.1	12.10
1933	2.6	0.2	0.0	0.2	1.4	3.5	2.5	2.1	0.3	6.3	2.8	0.2	21.98
1934	0.8	5.4	0.2	0.6	1.3	1.1	1.0	0.6	0.7	3.3	0.2	11.7	27.08
1935	9.8	0.7	0.0	0.0	0.0	0.8	0.7	0.1	1.8	1.2	0.1	1.2	16.31
1936	1.0	3.4	2.0	0.1	1.9	0.2	1.7	1.8	1.0	0.0	0.0	2.4	15.54
1937	9.1	0.3	15.1	0.2	0.0	0.7	1.2	0.0	0.0	0.1	4.3	0.7	31.62
1938	1.5	0.6	0.0	0.0	11.4	0.5	0.0	1.7	0.9	1.9	4.0	0.1	22.58
1939	0.5	0.0	2.6	0.8	0.0	1.3	0.3	2.8	0.0	0.1	0.2	0.3	8.85
1940	0.5	4.6	7.2	0.2	0.0	0.0	0.0	0.0	0.3	0.2	0.6	1.4	14.93
1941	7.3	5.1	1.5	0.0	0.0	0.4	0.1	0.0	0.0	0.5	0.7	0.0	15.48
1942	0.4	4.2	0.0	0.0	1.1	0.5	5.1	0.0	0.0	2.2	1.0	6.1	20.64
1943	1.8	0.0	0.5	3.9	0.1	1.4	0.4	0.4	0.2	0.8	4.9	2.2	16.75
1944	1.2	0.3	0.0	0.0	0.2	0.1	0.4	4.4	0.3	0.4	0.3	0.1	7.57
1945	0.9	9.6	0.0	0.2	0.4	6.0	1.4	0.7	0.0	0.0	1.1	2.4	22.79
1946	6.5	1.9	0.4	3.2	0.1	0.0	0.0	0.0	7.5	0.0	1.0	2.1	22.59
1947	0.4	2.7	8.2	0.3	0.6	0.5	0.1	0.6	1.6	2.1	2.3	2.6	21.98
1948	4.0	0.3	0.9	0.5	1.5	5.6	1.0	0.0	1.3	0.3	0.0	0.9	16.37
1949	11.1	3.4	0.0	0.1	0.0	0.4	0.1	0.0	1.0	3.1	1.0	0.0	20.31

1950	0.8	8.8	1.5	0.6	1.9	10.2	11.0	0.0	0.0	2.3	15.1	1.4	53.57
1951	7.9	0.0	0.3	0.0	0.3	4.2	0.0	0.5	1.2	0.3	0.3	0.0	14.87
1952	0.0	2.6	2.5	0.7	1.8	0.5	0.5	2.8	0.3	7.6	0.0	0.1	19.47
1953	0.1	23.2	0.7	0.2	2.0	0.0	0.1	2.6	0.0	0.7	0.7	0.0	30.37
1954	0.2	9.7	0.0	0.0	0.1	0.3	0.4	0.7	0.0	12.2	3.1	0.6	27.39
1955	0.4	11.0	0.0	2.3	1.1	0.0	0.6	0.3	0.3	1.4	0.1	2.4	19.93
1956	12.3	7.7	1.5	1.2	3.7	4.6	1.2	0.0	0.4	0.3	0.2	0.4	33.40
1957	1.6	2.6	2.4	0.1	0.0	1.2	0.0	0.1	0.0	1.0	0.0	0.1	9.30
1958	0.5	0.9	9.7	1.6	0.1	2.7	0.0	0.1	1.0	0.7	0.6	1.6	19.46
1959	4.1	6.6	0.4	0.0	1.3	0.0	1.6	0.0	0.0	1.0	7.5	1.3	23.94
1960	1.0	0.9	0.4	0.3	1.8	0.3	0.5	2.1	0.6	0.1	0.5	1.6	10.03
1961	1.0	3.7	1.5	0.1	3.2	3.4	1.1	1.1	0.0	0.5	9.0	1.1	25.65
1962	11.6	0.4	5.0	0.6	0.4	0.0	0.2	0.6	0.3	0.8	0.0	3.9	23.97
1963	0.7	0.8	1.9	0.0	1.4	0.2	0.0	0.5	0.0	0.0	6.7	4.9	17.16
1964	2.7	0.5	1.1	7.6	0.9	0.0	0.8	1.1	2.4	2.8	0.4	0.7	21.05
1965	0.2	0.0	0.1	0.0	0.0	0.0	0.5	0.1	0.8	0.4	0.0	1.7	3.74
1966	0.0	0.0	0.2	1.0	0.1	1.3	0.0	7.7	0.7	0.3	4.3	0.2	15.70
1967	0.6	0.0	6.1	0.0	0.6	1.1	0.2	0.2	0.0	2.7	0.0	1.3	12.80
1968	2.7	2.8	0.3	0.4	2.3	0.1	0.4	0.4	0.3	0.3	0.0	1.4	11.21
1969	1.7	0.3	0.7	1.2	3.7	1.8	0.4	0.4	1.6	5.8	5.6	0.1	23.35
1970	1.4	4.6	0.0	1.8	0.1	0.0	0.0	0.3	6.2	0.9	1.2	15.6	32.13
1971	8.4	5.8	0.0	0.4	0.0	0.0	5.5	2.4	0.2	0.3	1.3	3.5	27.86
1972	0.7	0.2	0.1	2.5	0.1	0.0	0.0	1.2	4.2	3.9	2.9	1.0	16.90
1973	1.1	5.0	0.7	0.0	0.2	0.2	1.6	0.3	0.5	4.1	2.0	4.4	20.04
1974	3.9	0.7	0.3	0.5	0.2	0.4	0.0	0.6	0.2	0.5	8.4	0.1	15.87
1975	0.6	9.2	6.6	0.3	0.0	0.5	2.1	0.7	0.4	2.8	1.3	4.7	29.27
1976	1.7	31.4	1.1	0.0	0.4	0.7	0.7	0.4	3.2	0.3	2.4	1.4	43.67
1977	5.7	5.7	6.8	1.2	4.5	0.6	0.0	0.2	0.1	0.5	0.8	0.5	26.58
1978	6.4	0.1	0.6	0.8	6.9	0.6	1.8	0.7	3.6	2.2	3.3	1.0	28.03

1979	0.0	0.0	2.9	0.3	3.0	0.5	0.1	0.1	1.0	8.1	1.6	0.0	17.69
1980	0.0	0.4	0.5	0.0	3.8	0.1	0.2	0.0	0.0	3.2	0.3	6.4	14.91
1981	0.0	2.4	0.3	0.7	3.5	6.0	5.3	0.1	0.1	0.7	2.3	1.2	22.65
1982	1.6	0.8	14.3	0.4	0.7	0.0	0.1	0.0	0.4	2.3	0.0	2.2	22.79
1983	4.8	0.0	2.8	8.0	14.7	1.9	0.9	1.0	2.2	1.5	2.5	0.9	41.23
1984	6.7	3.3	0.3	5.2	0.1	0.9	9.0	0.1	0.4	0.7	2.7	2.8	32.21
1985	0.0	1.5	1.2	1.0	0.2	0.1	4.1	2.3	0.2	0.8	2.6	1.5	15.63
1986	1.2	0.2	0.0	0.0	2.4	0.0	2.7	2.3	3.5	2.9	4.9	0.8	20.94
1987	5.9	0.3	1.6	0.0	2.7	1.2	2.2	1.0	0.1	1.5	0.2	1.7	18.38
1988	8.7	5.8	0.0	16.5	0.6	0.1	5.5	1.6	0.9	0.4	2.2	0.2	42.39
1989	1.0	0.0	8.1	3.1	1.2	1.4	0.6	0.0	0.0	0.4	2.2	1.3	19.37
1990	3.5	6.2	0.2	4.5	2.5	0.8	0.2	0.0	0.1	0.5	0.2	0.1	18.84
1991	7.8	7.7	1.0	0.0	1.2	0.1	2.7	0.0	0.0	0.4	0.5	5.2	26.52
1992	0.2	7.2	0.2	1.6	0.5	0.1	0.2	2.0	0.0	0.2	0.7	2.5	15.30
1993	0.5	1.1	0.2	0.0	0.2	1.1	3.1	0.8	2.4	1.0	0.0	2.6	12.98
1994	0.4	9.0	3.2	0.0	0.0	0.3	0.0	0.6	0.0	0.3	1.1	2.2	17.15
1995	7.9	1.1	1.8	0.0	0.4	1.8	0.0	0.0	1.1	0.8	11.1	1.2	27.27
1996	25.2	0.5	0.3	0.3	5.4	0.3	1.9	0.4	2.3	1.6	0.7	8.2	47.19
1997	5.5	6.6	0.0	0.0	6.7	0.1	0.1	0.0	0.1	2.0	0.9	2.0	23.92
1998	0.3	2.7	0.3	1.6	3.5	1.5	8.8	11.9	0.5	1.8	1.0	0.1	33.98
1999	0.8	5.3	8.8	0.0	0.4	0.9	1.4	1.8	0.1	2.5	3.1	3.1	28.23
2000	0.5	1.7	7.8	0.3	1.1	0.0	1.6	0.3	0.0	3.1	6.5	1.9	24.92
2001	3.3	12.4	1.0	0.0	0.6	1.2	4.1	0.2	0.1	1.4	2.0	0.3	26.50
2002	0.3	0.8	8.9	0.0	0.0	0.1	0.0	2.3	0.1	0.5	1.2	0.9	15.26
2003	0.1	4.9	2.5	1.6	0.0	0.5	0.6	0.2	0.0	4.0	0.9	4.9	20.20
2004	5.9	0.6	6.2	1.1	0.7	0.0	0.5	0.3	5.3	0.3	2.9	3.7	27.64
2005	0.5	0.0	0.4	0.0	0.7	8.0	0.0	0.2	0.3	1.0	3.3	1.9	16.40
2006	4.2	2.9	0.4	0.2	0.0	1.1	1.6	0.0	0.6	0.0	1.0	0.2	12.05
2007	0.1	1.5	0.3	1.7	0.4	1.7	0.0	1.9	0.0	1.0	0.9	3.4	12.93

2008	0.8	2.2	0.0	0.0	0.0	0.9	0.6	0.0	2.9	0.1	3.8	1.0	12.27
2009	1.7	8.2	0.0	0.1	1.4	0.3	0.1	0.0	1.9	0.1	0.3	4.7	18.91
2010	0.6	1.4	4.1	0.0	0.7	0.1	3.4	1.4	4.1	4.5	3.9	0.9	25.06
2011	2.1	1.5	4.9	0.7	0.4	0.4	0.1	1.2	3.8	1.2	5.0	8.4	29.68
2012	11.1	0.9	0.2	0.5	1.8	0.3	0.7	0.0	0.1	0.3	0.4	2.9	19.21
2013	14.3	0.5	6.8	0.4	0.1	1.3	0.3	0.1	0.5	0.3	1.2	0.0	25.93
2014	1.3	1.0	8.4	0.1	0.3	0.5	0.1	1.3	0.2	0.0	0.3	3.0	16.51
2015	5.5	0.8	1.9	4.4	2.5	2.2	2.5	0.1	0.0	0.6	0.2	3.0	23.67
2016	5.2	0.2	0.1	0.2	0.8	3.0	2.1	2.3	2.9	0.9	0.1	0.7	18.43
2017	1.1	0.6	6.5	1.0	0.5	0.8	0.0	0.3	0.0	7.1	0.5	1.3	19.45
2018	0.2	0.7	2.8	0.5	0.0	0.0	0.2	0.5	0.1	1.5	2.5	0.0	9.20
2019	0.0	0.0	1.9	0.0	0.2	0.2	0.0	0.0	0.0	0.4	0.0	0.1	2.69
2020	1.3	1.7	2.3	0.2	1.5	1.0	0.2	0.6	0.0	1.5	0.0	2.7	13.06
2021	1.2	1.0	9.7	0.2	0.1	1.9	0.6	0.7	2.6	0.5	5.1	3.1	26.58
2022	2.4	2.3	3.5	0.3	2.3	1.2	0.1	0.3	3.7	8.8	1.5	0.9	27.32
2023	0.4	0.2	6.3	0.4	2.5	0.3	0.1	0.0	0.0	0.1	2.5	1.1	13.88
Mean	**3.03**	**3.17**	**2.36**	**1.07**	**1.37**	**1.17**	**1.30**	**0.93**	**0.96**	**1.64**	**2.10**	**2.06**	**21.16**
Median	**1.21**	**1.42**	**0.96**	**0.30**	**0.57**	**0.53**	**0.48**	**0.38**	**0.29**	**0.81**	**1.07**	**1.31**	**19.70**
Min	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**2.69**
10^{th} %ile	**0.15**	**0.03**	**0.00**	**0.00**	**0.00**	**0.02**	**0.00**	**0.00**	**0.00**	**0.10**	**0.04**	**0.07**	**12.09**
90^{th} %ile	**7.97**	**7.74**	**7.22**	**2.85**	**3.47**	**3.17**	**3.45**	**2.27**	**2.97**	**3.95**	**5.15**	**4.76**	**30.49**
Max	**25.23**	**31.36**	**15.10**	**16.52**	**14.73**	**10.18**	**10.96**	**11.93**	**7.49**	**12.24**	**15.11**	**15.60**	**53.57**
Std Dev.	**4.01**	**4.61**	**3.23**	**2.20**	**2.21**	**1.73**	**2.01**	**1.59**	**1.45**	**2.13**	**2.63**	**2.47**	**8.66**

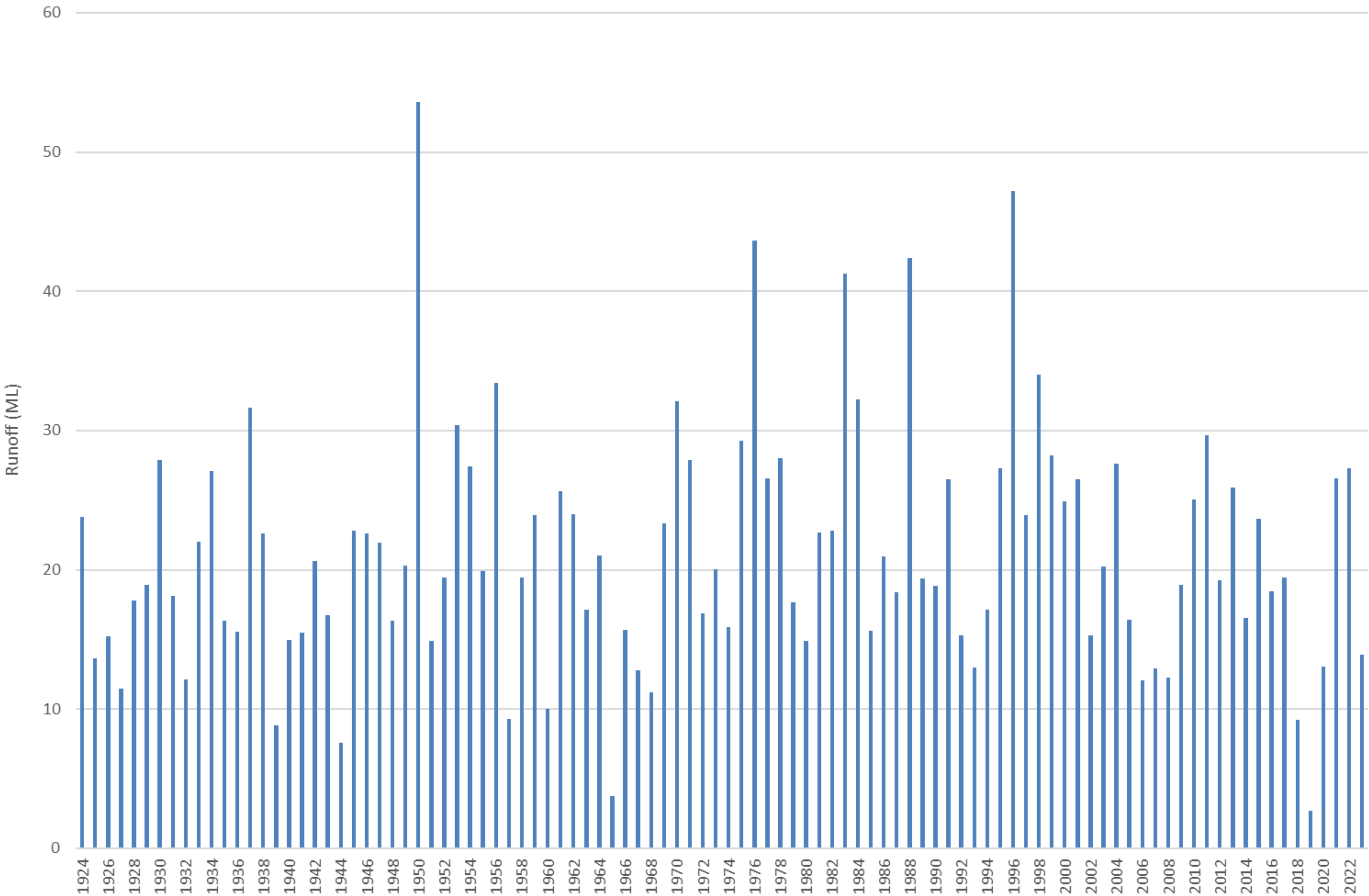


Figure 9: Summary of Annual Runoff Volume (ML) for Expanded CDA

5 Sizing of Holding Pond and Effluent Utilisation Area

Land application of feedlot effluent onto areas growing crops or pastures is regarded as the most efficient and beneficial means of utilising the valuable water, nutrient and organic components of this feedlot by-product. This practice is consistent with the principles of the internationally accepted waste management hierarchy (i.e. avoidance, recycling, waste to energy, treatment and disposal) that lists recycling as the second most desirable management option.

The reuse of effluent through irrigation is aimed at:

- Using crops, pastures and soils to efficiently utilise or sustainably assimilate the nutrients, salts, organic matter and water contained in the effluent (ARMCANZ, 1997).
- Maximise the utilisation of the fertiliser, water and soil amendment values of feedlot effluent while avoiding adverse environmental impacts.

Effluent irrigation must be managed carefully to ensure that:

- Nutrients are not excessively leached below the active root zone.
- Dissolved and suspended contaminants are not exported from utilisation areas to watercourses.
- Excessive application of effluent does not adversely affect the chemical and physical properties of the soils in the reuse areas.
- The productivity of pasture or cropping land is maintained or enhanced.
- Nearby neighbours do not experience odour or dust nuisance due to poorly timed and managed applications of effluent.

To maximise the benefits of the valuable water, nutrient and soil amendment values of the effluent, while minimising any adverse impacts upon the environment, land areas used for effluent irrigation must be carefully selected and managed.

JG Environmental used MEDLI modelling to determine the hydraulic and nutrient loading rate of the proposed expanded effluent utilisation system to assess its sustainability under proposed operating conditions.

5.1 MEDLI Model

MEDLI stands for “Model for Effluent Disposal using Land Irrigation”. MEDLI is a Windows™ based daily time step computer model for designing and assessing effluent reuse systems. MEDLI V2.5 is a mathematical model developed to simulate the operation of an effluent irrigation scheme over a ‘long’ period, typically many decades. The model’s basis is a ‘physical system’ comprising a field of crop or pasture which has been irrigated with effluent supplied from a tank or pond. This in turn provides a buffer storage to hold incoming effluent at times when water is not being applied to the soil.

Although MEDLI is based on a group of previously available models covering soil-water balance and crop growth, its primary focus is on liquid waste management. It simulates day to day natural processes which take place, by performing material balance calculations to account for the incoming water and constituents such as nitrogen, phosphorus and dissolved salts, to estimate irrigation demand. It also uses data about the physical system itself plus historical climatic data for the particular site.

MEDLI uses a material balance between storage systems, soil systems and crop growth. This provides information on the fate of the irrigated wastewater, nutrients, salts and pathogens and their potential impact in the receiving environment. The model can be used to design the effluent irrigation scheme and provides details of the required land area and wet weather storage, in addition to guide strategies for irrigation.

5.2 Analysis of Nutrient Application Sustainability

The objective of the MEDLI modelling is to develop a system, which will provide the sustainable utilisation of effluent generated from the proposed expansion at the Springfield Feedlot. The performance criteria for such as system include:

- Holding pond overflows are less frequent than 1 in 10 years.
- Nitrogen loading rate (after losses) from effluent less than crop removal.
- Nitrate leaching below the root zone such that NO_{3-} concentration in leachate is < 10 mg/L.
- Phosphorus loading rate from effluent is lower than crop removal and safe soil sorption.
- Salinity levels in soil do not reduce crop yields.

Given that the runoff volume is fixed (for a particular feedlot configuration), the options available include:

- Adjust holding pond volume to limit overflows.
- Adjust irrigation area to limit loading rate.
- Adjust crop type to change nutrient removal.
- Adjust irrigation scheduling to maximise water usage.

5.3 Input Data for MEDLI Modelling

The following scenarios were modelled:

Scenario 1 – Expanded CDA

- Catchment details = See Section 4
- Effluent Inflow = See Section 4
- Irrigation Area = 120 ha (existing pivot)
- Demand-Based Irrigation Scheduling = 30mm SWD
- Feedlot Holding Pond = 20 ML (expanded pond)
- Vegetation = Summer/winter cropping (current practice)
- Shandy Water = Yes

The average annual effluent inflow to the ponds was estimated by the MEDLI feedlot module (Refer Section 4) to be 21.16 ML/yr for the expanded CDA. This equates to 154mm/yr of runoff from the 13.77 ha catchment. This represents ~25% of the annual rainfall for the site.

A 100-year (1924-2023) climate file for the North Star area was obtained from the SILO database operated by the Bureau of Meteorology (BOM) that gives daily meteorological data (refer Table 1). The mean annual rainfall is just 617 mm/year, whilst pan evaporation is 1889 mm/yr. This provides a large net evaporation and large scope for irrigation.

The soil parameters were calculated from data collected during the site inspection and physical/chemical tests undertaken. The results were compared with published data for similar soil types. The dominant soil type is best correlated with the default "dermosol" contained within MEDLI. This default soil type was modified to include site specific soil depths, nitrogen, phosphorus and absorption isotherms (all recently analysed).

The irrigation input data includes the irrigator type, irrigation area size and irrigation scheduling rules. The irrigator modelled was a centre pivot (spray) with scheduling based on a soil water deficit i.e irrigation does not occur when soil conditions do not allow for the volume to be applied without runoff or reaching the soil's field capacity.

5.4 Modelling Results

Table 21 summarises the pond water balance and diagnostics, whilst Table 22 summarises the predicted hydraulic and nutrient balances for the effluent irrigation system. The full MEDLI output files are presented in Appendix B.

Table 21: Pond Water Balance and Diagnostics

Parameter	Springfield Feedlot (Expanded CDA)
Water Balance (ML/yr)	
Effluent Inflow (runoff)	21.16
Rainfall added	4.86
Evaporation	7.16
Irrigation	18.02
Overflow	0.48
Sludge	0.17
Pond Diagnostics	
Effluent Reuse Efficiency (%)	97
Overflow events (per 10 yrs)	0.8
Overflow days (per 10 yrs)	3.3

The modelling results for the Springfield Feedlot expanded catchment (CDA) show that under the proposed effluent reuse system, overtopping of the holding pond only occurs during extreme storm and prolonged wet events. Pond overflows occur less than once every 10 years (design criteria).

The predicted overflows are shown in Figure 10. The effluent reuse efficiency is 97%, which exceeds the 90% suggested in the NSW Environmental Guidelines: Use of Effluent by Irrigation (DEC 2004).

Table 22: Effluent Irrigation Area Water and Nutrient Balance

Parameter	Springfield Feedlot (Expanded CDA)
Water Balance (mm/yr)	
Rainfall	617
Irrigation (effluent)	15
Irrigation (clean water)	640
Runoff (rain)	71
Runoff (irrigation)	0
Drainage	16
Nutrient Application and Losses (kg/ha/yr)	
N applied via effluent	103
N removed by crop harvest	108
N Denitrified	<1
N Leached	<0.1
P applied via effluent	10
P removed by crop harvest	10
P Sorbed (safely stored)	0
P Leached	0

NB: All data are means over 100-year simulation period.

The annual effluent irrigation volume applied is just 15 mm/yr, which is very low. This is because of the large pivot that is currently utilised for irrigated cropping. The predicted deep drainage rate is 16 mm and predicted runoff is estimated to be 71 mm/yr. There is no runoff due to effluent application. The predicted runoff and deep drainage are low due to deficit irrigation and are similar to background values (no irrigation).

The annual average nitrogen loading rate is estimated at just 103 kg/ha/yr and leached nitrogen is predicted to be <0.1 kg/ha/yr. The nitrogen predicted to be removed through crop production is higher than that applied. Almost certainly, the crop will be nitrogen stressed and additional applications of inorganic nitrogen will be required (as is typically agronomic practice).

The average annual phosphorus loading rate is just 10 kg/ha/yr, with approximately 10 kg/ha/yr utilised by the crop. It is predicted that no phosphorus leaching should occur. This is due to good phosphorus adsorption capacities measured at the site, and the low applications through effluent.

The modelling predicts that a minimum 20 ML holding pond is required for acceptable holding pond overflows. The full MEDLI output files are located in Appendix B.

In summary, the hydraulic and nutrient balance modelling of the proposed feedlot effluent reuse system at the Springfield Feedlot site is considered sustainable, because predicted overtopping of the holding pond occurs very infrequently, the reuse efficiency target is exceeded, the nutrient applications through effluent are exceeded by the predicted removal rates; there is no runoff caused by irrigation applications and the predicted deep drainage does not result in excessive leaching losses of nutrients.

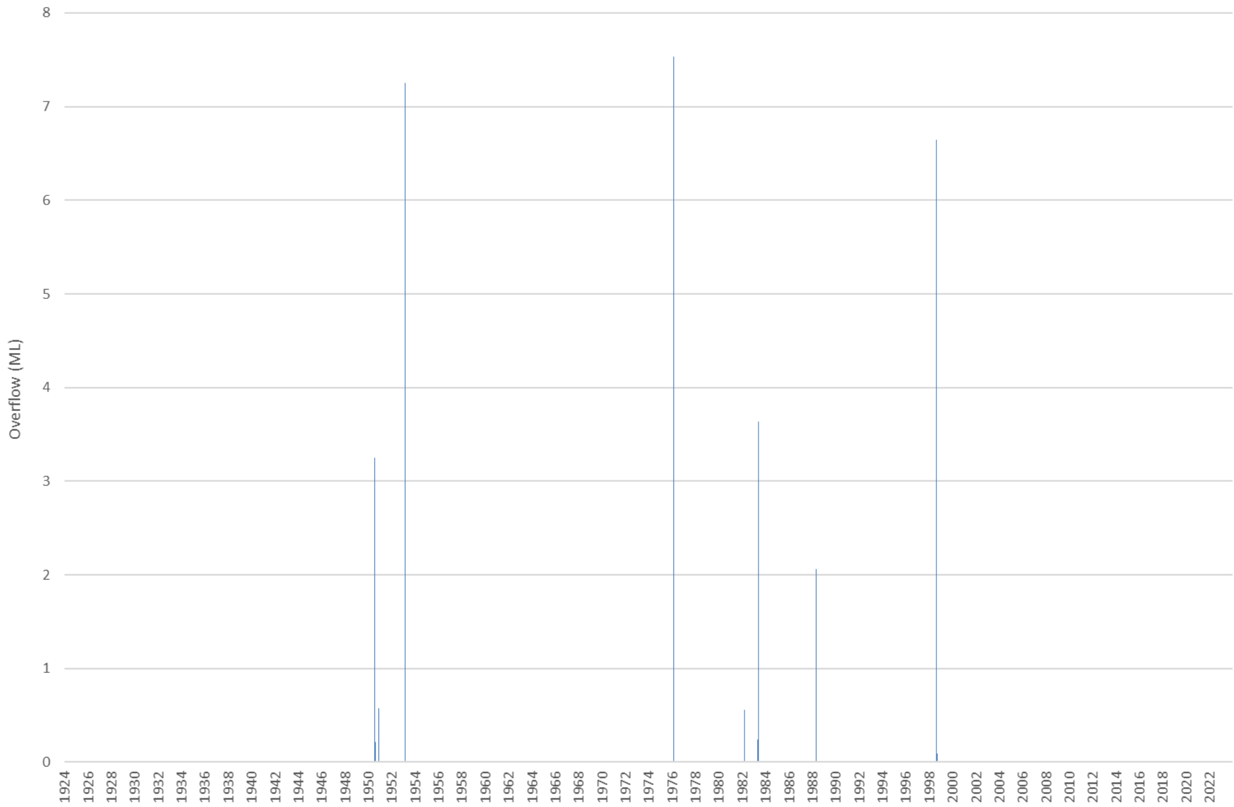


Figure 10: Expanded Catchment (CDA) Pond Overflows

6 Summary

The sustainable utilisation of effluent can be accommodated on the existing effluent utilisation area on the subject land with allowance for additional holding pond capacity and utilisation of the current irrigation infrastructure. Our main conclusions are listed below.

1. The subject land is appropriate and soil types along with historic cropping regime is suitable for the reuse of effluent and manure generated at the site.

2. MEDLI modelling of the effluent reuse system shows overtopping of the proposed 20 ML holding pond only occurs during extreme events. The target effluent reuse efficiency of 90% is far exceeded and the overflow frequency (<1 in 10 years) is achieved.

3. The hydraulic and nutrient balance modelling of the proposed feedlot effluent utilisation system is considered sustainable, because the nutrient applications through effluent are exceeded by the predicted removal rates (including safe storage); there is no runoff cause by irrigation and the predicted deep drainage does not result in excessive leaching losses of nutrients. The hydraulic and nutrient loads are considered very low.

4. The environmental impacts from the reuse of effluent and manure applied to land on the subject land is considered entirely manageable with good management practices and ongoing monitoring.

7 References

DEC 2004, *Use of Effluent by Irrigation; Environmental Guidelines*, Department of Environment and Conservation (DEC), New South Wales Government, Sydney.

Hazelton PA and Murphy BW 2016, *Interpreting Soil Test Results - What Do All The Numbers Mean? f.* CSIRO Publishing, Collingwood VIC. ISBN: 9781486303984

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OEH 2012 The Land and Soil Capability Scheme—a general rural land evaluation scheme for NSW. Technical Report. Office of Environment and Heritage NSW, Sydney.

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Appendix A: Soil Analysis Results

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AGRICULTURAL SOIL ANALYSIS REPORT

32 samples supplied by JG Environmental Pty Ltd on 26/07/2024. Lab Job No.R6974

Analysis requested by Justin Galloway. Your Job: 20229

PO Box 237 NAMBOUR QLD 4560

Parameter	Unit	Method reference	Sample 1	Sample 2	Sample 3	Sample 4
		Sample ID:	20229/ TP1/ 0-20cm	20229/ TP1/ 20-40cm	20229/ TP1/ 40-70cm	20229/ TP1/ 70-100cm
		Crop:	Soil	Soil	Soil	Soil
		Client:	20229	20229	20229	20229
Parameter		**Method reference**	**R6974/1**	**R6974/2**	**R6974/3**	**R6974/4**
Soluble Calcium (mg/kg)		**Inhouse S10 - Morgan 1	2,921	4,090	1,859	5,969
Soluble Magnesium (mg/kg)		**Inhouse S10 - Morgan 1	640	762	742	1,037
Soluble Potassium (mg/kg)		**Inhouse S10 - Morgan 1	56	38	<25	<25
Soluble Phosphorus (mg/kg)		**Inhouse S10 - Morgan 1	3.5	2.3	2.2	2.1
Phosphorus (mg/kg P)		**Rayment & Lyons 2011 - 9E2 (Bray 1)	20	2.2	1.5	1.5
Phosphorus (mg/kg P)		**Rayment & Lyons 2011 - 9B2 (Colwell)	29	9.8	2.6	2.0
Phosphorus (mg/kg P)		**Inhouse S3A (Bray 2)	36	8.4	6.8	8.8
Nitrate Nitrogen (mg/kg N)		**Inhouse S37 (KCl)	15	49	30	18
Ammonium Nitrogen (mg/kg N)		**Inhouse S37 (KCl)	2.9	2.2	2.0	1.8
Sulfur (mg/kg S)		**Inhouse S37 (KCl)	10	12	12	51
pH		Rayment & Lyons 2011 - 4A1 (1:5 Water)	8.58	8.70	9.03	9.37
Electrical Conductivity (dS/m)		Rayment & Lyons 2011 - 3A1 (1:5 Water)	0.169	0.283	0.295	0.573
Estimated Organic Matter (% OM)		**Calculation: Total Carbon x 1.75	2.7	2.4	1.7	1.6
Exchangeable Calcium	(cmol+/kg)	Rayment & Lyons 2011 - 15D3 (Ammonium Acetate)	30	28	22	25
Exchangeable Calcium	(kg/ha)	Rayment & Lyons 2011 - 15D3 (Ammonium Acetate)	13,282	12,396	9,970	11,186
Exchangeable Calcium	(mg/kg)	Rayment & Lyons 2011 - 15D3 (Ammonium Acetate)	5,930	5,534	4,451	4,994
Exchangeable Magnesium	(cmol+/kg)	Rayment & Lyons 2011 - 15D3 (Ammonium Acetate)	13	15	20	22
Exchangeable Magnesium	(kg/ha)	Rayment & Lyons 2011 - 15D3 (Ammonium Acetate)	3,670	4,044	5,311	6,111
Exchangeable Magnesium	(mg/kg)	Rayment & Lyons 2011 - 15D3 (Ammonium Acetate)	1,638	1,805	2,371	2,728
Exchangeable Potassium	(cmol+/kg)	Rayment & Lyons 2011 - 15D3 (Ammonium Acetate)	0.70	0.37	0.31	0.37
Exchangeable Potassium	(kg/ha)	Rayment & Lyons 2011 - 15D3 (Ammonium Acetate)	615	321	272	325
Exchangeable Potassium	(mg/kg)	Rayment & Lyons 2011 - 15D3 (Ammonium Acetate)	275	143	121	145
Exchangeable Sodium	(cmol+/kg)	Rayment & Lyons 2011 - 15D3 (Ammonium Acetate)	1.4	2.5	5.6	8.7
Exchangeable Sodium	(kg/ha)	Rayment & Lyons 2011 - 15D3 (Ammonium Acetate)	726	1,289	2,885	4,493
Exchangeable Sodium	(mg/kg)	Rayment & Lyons 2011 - 15D3 (Ammonium Acetate)	324	576	1,288	2,006
Exchangeable Aluminium	(cmol+/kg)	**Inhouse S37 (KCl)	0.02	0.02	<0.01	<0.01
Exchangeable Aluminium	(kg/ha)	**Inhouse S37 (KCl)	5.0	4.8	1.5	1.8
Exchangeable Aluminium	(mg/kg)	**Inhouse S37 (KCl)	2.2	2.1	<1	<1
Exchangeable Hydrogen	(cmol+/kg)	**Rayment & Lyons 2011 - 15G1 (Acidity Titration)	<0.01	<0.01	<0.01	<0.01
Exchangeable Hydrogen	(kg/ha)	**Rayment & Lyons 2011 - 15G1 (Acidity Titration)	<1	<1	<1	<1
Exchangeable Hydrogen	(mg/kg)	**Rayment & Lyons 2011 - 15G1 (Acidity Titration)	<1	<1	<1	<1
Effective Cation Exchange Capacity (ECEC) (cmol+/kg)		**Calculation: Sum of Ca,Mg,K,Na,Al,H (cmol+/kg)	45	45	48	56
Calcium (%)		**Base Saturation Calculations - Cation cmol+/kg / ECEC x 100	65	61	47	44
Magnesium (%)		**Base Saturation Calculations - Cation cmol+/kg / ECEC x 100	30	33	41	40
Potassium (%)		**Base Saturation Calculations - Cation cmol+/kg / ECEC x 100	1.6	0.81	0.65	0.66
Sodium - ESP (%)		**Base Saturation Calculations - Cation cmol+/kg / ECEC x 100	3.1	5.5	12	15
Aluminium (%)		**Base Saturation Calculations - Cation cmol+/kg / ECEC x 100	0.05	0.05	0.02	0.02
Hydrogen (%)		**Base Saturation Calculations - Cation cmol+/kg / ECEC x 100	0.00	0.00	0.00	0.00
Calcium/Magnesium Ratio		**Calculation: Calcium / Magnesium (cmol+/kg)	2.2	1.9	1.1	1.1

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AGRICULTURAL SOIL ANALYSIS REPORT

32 samples supplied by JG Environmental Pty Ltd on 26/07/2024. Lab Job No.R6974

Analysis requested by Justin Galloway. Your Job: 20229

PO Box 237 NAMBOUR QLD 4560

Parameter	Method reference	Sample 1	Sample 2	Sample 3	Sample 4
Sample ID:		20229/ TP1/ 0-20cm	20229/ TP1/ 20-40cm	20229/ TP1/ 40-70cm	20229/ TP1/ 70-100cm
Crop:		Soil	Soil	Soil	Soil
Client:		20229	20229	20229	20229
		R6974/1	R6974/2	R6974/3	R6974/4
Zinc (mg/kg)	Rayment & Lyons 2011 - 12A1 (DTPA)	0.60	<0.5	<0.5	<0.5
Manganese (mg/kg)	Rayment & Lyons 2011 - 12A1 (DTPA)	3.4	3.2	1.5	1.7
Iron (mg/kg)	Rayment & Lyons 2011 - 12A1 (DTPA)	14	10	11	12
Copper (mg/kg)	Rayment & Lyons 2011 - 12A1 (DTPA)	0.79	0.48	0.67	0.60
Boron (mg/kg)	**Rayment & Lyons 2011 - 12C2 (Hot $CaCl_2$)	0.43	0.27	0.35	0.79
Silicon (mg/kg Si)	**Inhouse S11 (Hot CaCl2)	37	22	22	5.2
Total Carbon (%)	Inhouse S4a (LECO Trumac Analyser)	1.5	1.4	0.99	0.90
Total Nitrogen (%)	Inhouse S4a (LECO Trumac Analyser)	0.11	0.10	0.07	0.06
Carbon/Nitrogen Ratio	**Calculation: Total Carbon/Total Nitrogen	13	14	14	16
Basic Texture	**Inhouse S65	Clay	Clay	Clay	Clay
Basic Colour	**Inhouse S65	Black	Black	Black	Black
Chloride Estimate (equiv. mg/kg)	**Calculation: Electrical Conductivity x 640	108	181	189	367
Phosphorus Sorption (mg P/kg)	**Inhouse S18b (Based on Abbott 1985)	164	194	128	189

Notes:

1. All results presented as a 40°C oven dried weight. Soil sieved and lightly crushed to < 2 mm.
2. Methods from Rayment and Lyons, 2011. *Soil Chemical Methods - Australasia.* CSIRO Publishing: Collingwood.
3. Soluble Salts included in Exchangeable Cations - NO PRE-WASH (unless requested).
4. 'Morgan 1 Extract' adapted from 'Science in Agriculture', 'Non-Toxic Farming' and LaMotte Soil Handbook.
5. Guidelines for phosphorus have been reduced for Australian soils.
6. Indicative guidelines are based on 'Albrecht' and 'Reams' concepts.
7. Total Acid Extractable Nutrients indicate a store of nutrients.
8. National Environmental Protection (Assessment of Site Contamination) Measure 2013,
   Schedule B(1) - Guideline on Investigation Levels for Soil and Groundwater. Table 5-A Background Ranges.
9. Information relating to testing colour codes is available on sheet 2 - 'Understanding your agricultural soil results'.
10. Conversions for 1 $cmol_+/kg$ = 230 mg/kg Sodium, 390 mg/kg Potassium,
    122 mg/kg Magnesium, 200 mg/kg Calcium
11. Conversions to kg/ha = mg/kg x 2.24
12. The chloride calculation of Cl mg/L = EC x 640 is considered an estimate, and most likely an over-estimate
13. ** NATA accreditation does not cover the performance of this service.
14. Analysis conducted between sample arrival date and reporting date.
15. This report is not to be reproduced except in full. Results only relate to the item tested.
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17. This report was issued on 5/08/2024.

Quality Checked: Kris Saville
Agricultural Co-Ordinator

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Analysis requested by Justin Galloway. Your Job: 20229

PO Box 237 NAMBOUR QLD 4560

		Method reference	Sample 5	Sample 6	Sample 7	Sample 8
Sample ID:			20229/ TP6/ 0-20cm	20229/ TP6/ 20-40cm	20229/ TP6/ 40-70cm	20229/ TP6/ 70-100cm
Crop:			Soil	Soil	Soil	Soil
Client:			20229	20229	20229	20229
Parameter		**Method reference**	**R6974/5**	**R6974/6**	**R6974/7**	**R6974/8**
Soluble Calcium (mg/kg)		**Inhouse S10 - Morgan 1	5,464	6,519	8,844	6,289
Soluble Magnesium (mg/kg)			446	674	1,219	1,180
Soluble Potassium (mg/kg)			84	25	30	37
Soluble Phosphorus (mg/kg)			1.9	1.8	<1	<1
Phosphorus (mg/kg P)		**Rayment & Lyons 2011 - 9E2 (Bray 1)	3.6	2.5	1.1	<1
		**Rayment & Lyons 2011 - 9B2 (Colwell)	13	3.0	2.3	1.3
		**Inhouse S3A (Bray 2)	19	9.1	5.8	8.0
Nitrate Nitrogen (mg/kg N)		**Inhouse S37 (KCl)	53	7.6	12	5.6
Ammonium Nitrogen (mg/kg N)			16	2.6	2.3	2.7
Sulfur (mg/kg S)			4.2	8.1	4.7	3.5
pH		Rayment & Lyons 2011 - 4A1 (1:5 Water)	8.10	8.49	8.69	8.87
Electrical Conductivity (dS/m)		Rayment & Lyons 2011 - 3A1 (1:5 Water)	0.207	0.145	0.184	0.212
Estimated Organic Matter (% OM)		**Calculation: Total Carbon x 1.75	4.2	3.1	2.8	2.5
Exchangeable Calcium	(cmol+/kg)	Rayment & Lyons 2011 - 15D3 (Ammonium Acetate)	36	39	39	31
	(kg/ha)		16,338	17,707	17,360	13,856
	(mg/kg)		7,294	7,905	7,750	6,186
Exchangeable Magnesium	(cmol+/kg)		7.9	14	19	19
	(kg/ha)		2,159	3,690	5,074	5,148
	(mg/kg)		964	1,647	2,265	2,298
Exchangeable Potassium	(cmol+/kg)		1.1	0.57	0.62	0.61
	(kg/ha)		980	501	542	533
	(mg/kg)		438	224	242	238
Exchangeable Sodium	(cmol+/kg)		0.38	0.48	1.4	2.4
	(kg/ha)		194	248	739	1,256
	(mg/kg)		87	111	330	561
Exchangeable Aluminium	(cmol+/kg)	**Inhouse S37 (KCl)	0.02	0.02	0.01	0.02
	(kg/ha)		3.9	3.8	2.6	3.4
	(mg/kg)		1.7	1.7	1.2	1.5
Exchangeable Hydrogen	(cmol+/kg)	**Rayment & Lyons 2011 - 15G1 (Acidity Titration)	<0.01	<0.01	<0.01	<0.01
	(kg/ha)		<1	<1	<1	<1
	(mg/kg)		<1	<1	<1	<1
Effective Cation Exchange Capacity (ECEC) (cmol+/kg)		**Calculation: Sum of Ca,Mg,K,Na,Al,H (cmol+/kg)	46	54	59	53
Calcium (%)		**Base Saturation Calculations - Cation cmol+/kg / ECEC x 100	79	73	65	58
Magnesium (%)			17	25	31	36
Potassium (%)			2.4	1.1	1.0	1.2
Sodium - ESP (%)			0.82	0.89	2.4	4.6
Aluminium (%)			0.04	0.03	0.02	0.03
Hydrogen (%)			0.00	0.00	0.00	0.00
Calcium/Magnesium Ratio		**Calculation: Calcium / Magnesium (cmol+/kg)	4.6	2.9	2.1	1.6

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		Sample 5	Sample 6	Sample 7	Sample 8
	Sample ID:	20229/ TP6/ 0-20cm	20229/ TP6/ 20-40cm	20229/ TP6/ 40-70cm	20229/ TP6/ 70-100cm
	Crop:	Soil	Soil	Soil	Soil
	Client:	20229	20229	20229	20229
Parameter	**Method reference**	**R6974/5**	**R6974/6**	**R6974/7**	**R6974/8**
Zinc (mg/kg)	Rayment & Lyons 2011 - 12A1 (DTPA)	<0.5	<0.5	<0.5	<0.5
Manganese (mg/kg)	Rayment & Lyons 2011 - 12A1 (DTPA)	7.5	4.1	3.4	3.3
Iron (mg/kg)	Rayment & Lyons 2011 - 12A1 (DTPA)	10	14	16	18
Copper (mg/kg)	Rayment & Lyons 2011 - 12A1 (DTPA)	0.80	0.99	0.91	0.95
Boron (mg/kg)	**Rayment & Lyons 2011 - 12C2 (Hot $CaCl_2$)	0.26	0.11	0.22	0.47
Silicon (mg/kg Si)	**Inhouse S11 (Hot CaCl2)	21	1.5	1.5	2.4
Total Carbon (%)	Inhouse S4a (LECO Trumac Analyser)	2.4	1.8	1.6	1.4
Total Nitrogen (%)	Inhouse S4a (LECO Trumac Analyser)	0.17	0.10	0.09	0.07
Carbon/Nitrogen Ratio	**Calculation: Total Carbon/Total Nitrogen	14	17	18	19
Basic Texture	**Inhouse S65	Clay	Clay	Clay	Clay
Basic Colour	**Inhouse S65	Brownish	Brownish	Brownish	Brownish
Chloride Estimate (equiv. mg/kg)	**Calculation: Electrical Conductivity x 640	132	93	118	136
Phosphorus Sorption (mg P/kg)	**Inhouse S18b (Based on Abbott 1985)	381	521	506	487

Notes:

1. All results presented as a 40°C oven dried weight. Soil sieved and lightly crushed to < 2 mm.
2. Methods from Rayment and Lyons, 2011. *Soil Chemical Methods - Australasia.* CSIRO Publishing: Collingwood.
3. Soluble Salts included in Exchangeable Cations - NO PRE-WASH (unless requested).
4. 'Morgan 1 Extract' adapted from 'Science in Agriculture', 'Non-Toxic Farming' and LaMotte Soil Handbook.
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Quality Checked: Kris Saville
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Analysis requested by Justin Galloway. Your Job: 20229
PO Box 237 NAMBOUR QLD 4560

			Sample 9	Sample 10	Sample 11	Sample 12
		Sample ID:	20229/ TP9/ 0-20cm	20229/ TP9/ 20-40cm	20229/ TP9/ 40-70cm	20229/ TP9/ 70-100cm
		Crop:	Soil	Soil	Soil	Soil
		Client:	20229	20229	20229	20229
Parameter		Method reference	R6974/9	R6974/10	R6974/11	R6974/12
Soluble Calcium (mg/kg)		**Inhouse S10 - Morgan 1	1,843	2,931	2,553	7,019
Soluble Magnesium (mg/kg)			365	464	591	825
Soluble Potassium (mg/kg)			<25	<25	<25	40
Soluble Phosphorus (mg/kg)			1.4	<1	<1	1.6
Phosphorus (mg/kg P)		**Rayment & Lyons 2011 - 9E2 (Bray 1)	5.0	1.6	1.7	2.7
		**Rayment & Lyons 2011 - 9B2 (Colwell)	7.9	4.3	2.3	3.0
		**Inhouse S3A (Bray 2)	21	3.7	3.3	7.8
Nitrate Nitrogen (mg/kg N)		**Inhouse S37 (KCl)	5.5	1.4	0.66	0.62
Ammonium Nitrogen (mg/kg N)			4.0	2.1	1.6	2.3
Sulfur (mg/kg S)			1.5	<1	4.2	6.2
pH		Rayment & Lyons 2011 - 4A1 (1:5 Water)	7.83	8.46	8.79	9.14
Electrical Conductivity (dS/m)		Rayment & Lyons 2011 - 3A1 (1:5 Water)	0.083	0.111	0.119	0.206
Estimated Organic Matter (% OM)		**Calculation: Total Carbon x 1.75	2.2	2.3	1.8	1.7
Exchangeable Calcium	(cmol+/kg)	Rayment & Lyons 2011 - 15D3 (Ammonium Acetate)	30	35	30	37
	(kg/ha)		13,558	15,734	13,641	16,795
	(mg/kg)		6,053	7,024	6,090	7,498
Exchangeable Magnesium	(cmol+/kg)		7.8	9.9	12	16
	(kg/ha)		2,111	2,684	3,358	4,436
	(mg/kg)		942	1,198	1,499	1,980
Exchangeable Potassium	(cmol+/kg)		0.43	0.35	0.31	0.37
	(kg/ha)		374	303	270	324
	(mg/kg)		167	135	121	145
Exchangeable Sodium	(cmol+/kg)		0.48	0.89	1.7	3.5
	(kg/ha)		246	457	856	1,796
	(mg/kg)		110	204	382	802
Exchangeable Aluminium	(cmol+/kg)	**Inhouse S37 (KCl)	0.01	0.02	0.02	0.01
	(kg/ha)		2.2	4.3	4.4	2.5
	(mg/kg)		<1	1.9	2.0	1.1
Exchangeable Hydrogen	(cmol+/kg)	**Rayment & Lyons 2011 - 15G1 (Acidity Titration)	<0.01	<0.01	<0.01	<0.01
	(kg/ha)		<1	<1	<1	<1
	(mg/kg)		<1	<1	<1	<1
Effective Cation Exchange Capacity (ECEC) (cmol+/kg)		**Calculation: Sum of Ca,Mg,K,Na,Al,H (cmol+/kg)	39	46	45	58
Calcium (%)		**Base Saturation Calculations - Cation cmol+/kg / ECEC x 100	78	76	68	65
Magnesium (%)			20	21	28	28
Potassium (%)			1.1	0.75	0.69	0.64
Sodium - ESP (%)			1.2	1.9	3.7	6.1
Aluminium (%)			0.03	0.05	0.05	0.02
Hydrogen (%)			0.00	0.00	0.00	0.00
Calcium/Magnesium Ratio		**Calculation: Calcium / Magnesium (cmol+/kg)	3.9	3.6	2.5	2.3

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AGRICULTURAL SOIL ANALYSIS REPORT

32 samples supplied by JG Environmental Pty Ltd on 26/07/2024. Lab Job No.R6974

Analysis requested by Justin Galloway. Your Job: 20229

PO Box 237 NAMBOUR QLD 4560

		Sample 9	Sample 10	Sample 11	Sample 12
	Sample ID:	20229/ TP9/ 0-20cm	20229/ TP9/ 20-40cm	20229/ TP9/ 40-70cm	20229/ TP9/ 70-100cm
	Crop:	Soil	Soil	Soil	Soil
	Client:	20229	20229	20229	20229
Parameter	**Method reference**	**R6974/9**	**R6974/10**	**R6974/11**	**R6974/12**
Zinc (mg/kg)	Rayment & Lyons 2011 - 12A1 (DTPA)	<0.5	<0.5	<0.5	<0.5
Manganese (mg/kg)		7.5	2.2	2.3	2.4
Iron (mg/kg)		8.5	6.4	9.8	14
Copper (mg/kg)		0.40	0.35	0.43	0.49
Boron (mg/kg)	**Rayment & Lyons 2011 - 12C2 (Hot $CaCl_2$)	0.30	0.14	0.13	<0.1
Silicon (mg/kg Si)	**Inhouse S11 (Hot CaCl2)	57	54	21	5.3
Total Carbon (%)	Inhouse S4a (LECO Trumac Analyser)	1.3	1.3	1.1	0.98
Total Nitrogen (%)		0.09	0.07	0.06	0.04
Carbon/Nitrogen Ratio	**Calculation: Total Carbon/Total Nitrogen	13	18	17	26
Basic Texture	**Inhouse S65	Clay	Clay	Clay	Clay
Basic Colour		Black	Black	Black	Black
Chloride Estimate (equiv. mg/kg)	**Calculation: Electrical Conductivity x 640	53	71	76	132
Phosphorus Sorption (mg P/kg)	**Inhouse S18b (Based on Abbott 1985)	131	208	220	214

Notes:

1. All results presented as a 40°C oven dried weight. Soil sieved and lightly crushed to < 2 mm.
2. Methods from Rayment and Lyons, 2011. *Soil Chemical Methods - Australasia.* CSIRO Publishing: Collingwood.
3. Soluble Salts included in Exchangeable Cations - NO PRE-WASH (unless requested).
4. 'Morgan 1 Extract' adapted from 'Science in Agriculture', 'Non-Toxic Farming' and LaMotte Soil Handbook.
5. Guidelines for phosphorus have been reduced for Australian soils.
6. Indicative guidelines are based on 'Albrecht' and 'Reams' concepts.
7. Total Acid Extractable Nutrients indicate a store of nutrients.
8. National Environmental Protection (Assessment of Site Contamination) Measure 2013,
   Schedule B(1) - Guideline on Investigation Levels for Soil and Groundwater. Table 5-A Background Ranges.
9. Information relating to testing colour codes is available on sheet 2 - 'Understanding your agricultural soil results'.
10. Conversions for 1 $cmol_c/kg$ = 230 mg/kg Sodium, 390 mg/kg Potassium,
    122 mg/kg Magnesium, 200 mg/kg Calcium
11. Conversions to kg/ha = mg/kg x 2.24
12. The chloride calculation of Cl mg/L = EC x 640 is considered an estimate, and most likely an over-estimate
13. ** NATA accreditation does not cover the performance of this service.
14. Analysis conducted between sample arrival date and reporting date.
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Analysis requested by Justin Galloway. Your Job: 20229

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				Sample 13	Sample 14	Sample 15	Sample 16
			Sample ID:	20229/ TP11/ 0-20cm	20229/ TP11/ 20-40cm	20229/ TP11/ 40-70cm	20229/ TP11/ 70-100cm
			Crop:	Soil	Soil	Soil	Soil
			Client:	20229	20229	20229	20229
Parameter			Method reference	R6974/13	R6974/14	R6974/15	R6974/16
Soluble Calcium (mg/kg)			**Inhouse S10 - Morgan 1	2,756	2,217	11,594	9,344
Soluble Magnesium (mg/kg)				142	197	364	449
Soluble Potassium (mg/kg)				94	28	41	32
Soluble Phosphorus (mg/kg)				11	<1	<1	<1
Phosphorus (mg/kg P)			**Rayment & Lyons 2011 - 9E2 (Bray 1)	22	3.7	<1	<1
			**Rayment & Lyons 2011 - 9B2 (Colwell)	33	4.9	5.9	3.3
			**Inhouse S3A (Bray 2)	74	4.7	9.8	4.1
Nitrate Nitrogen (mg/kg N)			**Inhouse S37 (KCl)	12	10	14	8.2
Ammonium Nitrogen (mg/kg N)				1.7	1.3	1.3	1.5
Sulfur (mg/kg S)				7.7	5.3	<1	7.4
pH			Rayment & Lyons 2011 - 4A1 (1:5 Water)	8.20	8.30	8.53	8.83
Electrical Conductivity (dS/m)			Rayment & Lyons 2011 - 3A1 (1:5 Water)	0.108	0.096	0.136	0.119
Estimated Organic Matter (% OM)			**Calculation: Total Carbon x 1.75	2.3	1.2	2.2	1.8
Exchangeable Calcium		(cmol+/kg)	Rayment & Lyons 2011 - 15D3 (Ammonium Acetate)	19	20	28	27
		(kg/ha)		8,458	9,184	12,389	11,917
		(mg/kg)		3,776	4,100	5,531	5,320
Exchangeable Magnesium		(cmol+/kg)		2.1	2.9	3.0	4.3
		(kg/ha)		582	788	828	1,178
		(mg/kg)		260	352	369	526
Exchangeable Potassium		(cmol+/kg)		0.91	0.47	0.38	0.30
		(kg/ha)		796	413	334	263
		(mg/kg)		356	184	149	117
Exchangeable Sodium		(cmol+/kg)		0.18	0.14	0.13	0.14
		(kg/ha)		95	71	67	70
		(mg/kg)		42	32	30	31
Exchangeable Aluminium		(cmol+/kg)	**Inhouse S37 (KCl)	0.01	0.01	<0.01	0.01
		(kg/ha)		2.7	2.1	1.1	2.3
		(mg/kg)		1.2	<1	<1	1.0
Exchangeable Hydrogen		(cmol+/kg)	**Rayment & Lyons 2011 - 15G1 (Acidity Titration)	<0.01	<0.01	<0.01	<0.01
		(kg/ha)		<1	<1	<1	<1
		(mg/kg)		<1	<1	<1	<1
Effective Cation Exchange Capacity (ECEC) (cmol+/kg)			**Calculation: Sum of Ca,Mg,K,Na,Al,H (cmol+/kg)	22	24	31	31
Calcium (%)			**Base Saturation Calculations - Cation cmol+/kg / ECEC x 100	85	85	89	85
Magnesium (%)				9.7	12	9.8	14
Potassium (%)				4.1	2.0	1.2	0.96
Sodium - ESP (%)				0.83	0.58	0.42	0.43
Aluminium (%)				0.06	0.04	0.02	0.04
Hydrogen (%)				0.00	0.00	0.00	0.00
Calcium/Magnesium Ratio			**Calculation: Calcium / Magnesium (cmol+/kg)	8.8	7.1	9.1	6.1

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AGRICULTURAL SOIL ANALYSIS REPORT

32 samples supplied by JG Environmental Pty Ltd on 26/07/2024. Lab Job No.R6974

Analysis requested by Justin Galloway. Your Job: 20229

PO Box 237 NAMBOUR QLD 4560

Parameter	Method reference	Sample 13	Sample 14	Sample 15	Sample 16
	Sample ID:	20229/ TP11/ 0-20cm	20229/ TP11/ 20-40cm	20229/ TP11/ 40-70cm	20229/ TP11/ 70-100cm
	Crop:	Soil	Soil	Soil	Soil
	Client:	20229	20229	20229	20229
		R6974/13	R6974/14	R6974/15	R6974/16
Zinc (mg/kg)	Rayment & Lyons 2011 - 12A1 (DTPA)	1.1	<0.5	<0.5	<0.5
Manganese (mg/kg)	Rayment & Lyons 2011 - 12A1 (DTPA)	7.7	2.9	2.9	0.94
Iron (mg/kg)	Rayment & Lyons 2011 - 12A1 (DTPA)	6.1	6.3	4.9	3.5
Copper (mg/kg)	Rayment & Lyons 2011 - 12A1 (DTPA)	0.52	0.31	0.27	<0.1
Boron (mg/kg)	**Rayment & Lyons 2011 - 12C2 (Hot $CaCl_2$)	0.43	0.55	0.26	0.37
Silicon (mg/kg Si)	**Inhouse S11 (Hot CaCl2)	56	33	19	60
Total Carbon (%)	Inhouse S4a (LECO Trumac Analyser)	1.3	0.71	1.3	1.0
Total Nitrogen (%)	Inhouse S4a (LECO Trumac Analyser)	0.08	0.17	0.05	0.03
Carbon/Nitrogen Ratio	**Calculation: Total Carbon/Total Nitrogen	16	4.2	24	35
Basic Texture	**Inhouse S65	Clay Loam	Clay	Clay	Clay
Basic Colour	**Inhouse S65	Brownish	Red	Brownish	Brownish
Chloride Estimate (equiv. mg/kg)	**Calculation: Electrical Conductivity x 640	69	61	87	76
Phosphorus Sorption (mg P/kg)	**Inhouse S18b (Based on Abbott 1985)	146	274	236	90

Notes:

1. All results presented as a 40°C oven dried weight. Soil sieved and lightly crushed to < 2 mm.
2. Methods from Rayment and Lyons, 2011. *Soil Chemical Methods - Australasia.* CSIRO Publishing: Collingwood.
3. Soluble Salts included in Exchangeable Cations - NO PRE-WASH (unless requested).
4. 'Morgan 1 Extract' adapted from 'Science in Agriculture', 'Non-Toxic Farming' and LaMotte Soil Handbook.
5. Guidelines for phosphorus have been reduced for Australian soils.
6. Indicative guidelines are based on 'Albrecht' and 'Reams' concepts.
7. Total Acid Extractable Nutrients indicate a store of nutrients.
8. National Environmental Protection (Assessment of Site Contamination) Measure 2013, Schedule B(1) - Guideline on Investigation Levels for Soil and Groundwater. Table 5-A Background Ranges.
9. Information relating to testing colour codes is available on sheet 2 - 'Understanding your agricultural soil results'.
10. Conversions for 1 $cmol_+/kg$ = 230 mg/kg Sodium, 390 mg/kg Potassium, 122 mg/kg Magnesium, 200 mg/kg Calcium
11. Conversions to kg/ha = mg/kg x 2.24
12. The chloride calculation of Cl mg/L = EC x 640 is considered an estimate, and most likely an over-estimate
13. ** NATA accreditation does not cover the performance of this service.
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			Sample 17	Sample 18	Sample 19	Sample 20
		Sample ID:	20229/ TP13/ 0-20cm	20229/ TP13/ 20-40cm	20229/ TP13/ 40-70cm	20229/ TP13/ 70-100cm
		Crop:	Soil	Soil	Soil	Soil
		Client:	20229	20229	20229	20229
Parameter		**Method reference**	**R6974/17**	**R6974/18**	**R6974/19**	**R6974/20**
Soluble Calcium (mg/kg)		**Inhouse S10 - Morgan 1	5,214	7,879	8,784	6,304
Soluble Magnesium (mg/kg)			651	850	1,106	990
Soluble Potassium (mg/kg)			126	<25	<25	<25
Soluble Phosphorus (mg/kg)			3.4	<1	<1	<1
Phosphorus (mg/kg P)		**Rayment & Lyons 2011 - 9E2 (Bray 1)	13	1.5	1.3	1.6
		**Rayment & Lyons 2011 - 9B2 (Colwell)	24	3.0	2.0	1.3
		**Inhouse S3A (Bray 2)	90	7.0	5.0	9.3
Nitrate Nitrogen (mg/kg N)		**Inhouse S37 (KCl)	18	8.1	13	1.8
Ammonium Nitrogen (mg/kg N)			2.1	1.8	3.1	2.5
Sulfur (mg/kg S)			31	16	25	43
pH		Rayment & Lyons 2011 - 4A1 (1:5 Water)	8.58	9.03	9.13	9.28
Electrical Conductivity (dS/m)		Rayment & Lyons 2011 - 3A1 (1:5 Water)	0.265	0.268	0.398	0.518
Estimated Organic Matter (% OM)		**Calculation: Total Carbon x 1.75	2.4	1.7	1.7	0.96
Exchangeable Calcium	(cmol+/kg)	Rayment & Lyons 2011 - 15D3 (Ammonium Acetate)	31	32	28	27
	(kg/ha)		13,968	14,381	12,629	12,038
	(mg/kg)		6,236	6,420	5,638	5,374
Exchangeable Magnesium	(cmol+/kg)		10	12	13	15
	(kg/ha)		2,782	3,298	3,560	4,005
	(mg/kg)		1,242	1,472	1,589	1,788
Exchangeable Potassium	(cmol+/kg)		1.0	0.39	0.30	0.31
	(kg/ha)		914	338	265	270
	(mg/kg)		408	151	118	120
Exchangeable Sodium	(cmol+/kg)		1.6	3.3	5.2	8.5
	(kg/ha)		804	1,719	2,670	4,352
	(mg/kg)		359	767	1,192	1,943
Exchangeable Aluminium	(cmol+/kg)	**Inhouse S37 (KCl)	0.02	0.01	0.01	0.02
	(kg/ha)		3.1	2.5	3.0	4.0
	(mg/kg)		1.4	1.1	1.3	1.8
Exchangeable Hydrogen	(cmol+/kg)	**Rayment & Lyons 2011 - 15G1 (Acidity Titration)	<0.01	<0.01	<0.01	<0.01
	(kg/ha)		<1	<1	<1	<1
	(mg/kg)		<1	<1	<1	<1
Effective Cation Exchange Capacity (ECEC) (cmol+/kg)		**Calculation: Sum of Ca,Mg,K,Na,Al,H (cmol+/kg)	44	48	47	50
Calcium (%)		**Base Saturation Calculations - Cation cmol+/kg / ECEC x 100	71	67	60	53
Magnesium (%)			23	25	28	29
Potassium (%)			2.4	0.81	0.65	0.61
Sodium - ESP (%)			3.6	7.0	11	17
Aluminium (%)			0.04	0.03	0.03	0.04
Hydrogen (%)			0.00	0.00	0.00	0.00
Calcium/Magnesium Ratio		**Calculation: Calcium / Magnesium (cmol+/kg)	3.0	2.6	2.2	1.8

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		Sample 17	Sample 18	Sample 19	Sample 20
	Sample ID:	20229/ TP13/ 0-20cm	20229/ TP13/ 20-40cm	20229/ TP13/ 40-70cm	20229/ TP13/ 70-100cm
	Crop:	Soil	Soil	Soil	Soil
	Client:	20229	20229	20229	20229
Parameter	**Method reference**	**R6974/17**	**R6974/18**	**R6974/19**	**R6974/20**
Zinc (mg/kg)	Rayment & Lyons 2011 - 12A1 (DTPA)	3.1	<0.5	<0.5	<0.5
Manganese (mg/kg)	Rayment & Lyons 2011 - 12A1 (DTPA)	6.2	2.9	3.2	3.8
Iron (mg/kg)	Rayment & Lyons 2011 - 12A1 (DTPA)	11	15	15	11
Copper (mg/kg)	Rayment & Lyons 2011 - 12A1 (DTPA)	0.58	0.47	0.62	0.55
Boron (mg/kg)	**Rayment & Lyons 2011 - 12C2 (Hot $CaCl_2$)	0.53	0.30	0.81	1.7
Silicon (mg/kg Si)	**Inhouse S11 (Hot CaCl2)	25	4.2	3.5	8.1
Total Carbon (%)	Inhouse S4a (LECO Trumac Analyser)	1.4	0.97	0.97	0.55
Total Nitrogen (%)	Inhouse S4a (LECO Trumac Analyser)	0.10	0.07	0.06	<0.02
Carbon/Nitrogen Ratio	**Calculation: Total Carbon/Total Nitrogen	14	14	15	37
Basic Texture	**Inhouse S65	Clay	Clay	Clay	Clay
Basic Colour	**Inhouse S65	Brownish	Brownish	Brownish	Brownish
Chloride Estimate (equiv. mg/kg)	**Calculation: Electrical Conductivity x 640	170	172	255	332
Phosphorus Sorption (mg P/kg)	**Inhouse S18b (Based on Abbott 1985)	262	280	288	210

Notes:

1. All results presented as a 40°C oven dried weight. Soil sieved and lightly crushed to < 2 mm.
2. Methods from Rayment and Lyons, 2011. *Soil Chemical Methods - Australasia.* CSIRO Publishing: Collingwood.
3. Soluble Salts included in Exchangeable Cations - NO PRE-WASH (unless requested).
4. 'Morgan 1 Extract' adapted from 'Science in Agriculture', 'Non-Toxic Farming' and LaMotte Soil Handbook.
5. Guidelines for phosphorus have been reduced for Australian soils.
6. Indicative guidelines are based on 'Albrecht' and 'Reams' concepts.
7. Total Acid Extractable Nutrients indicate a store of nutrients.
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			Sample 21	Sample 22	Sample 23	Sample 24
		Sample ID:	20229/ TP15/ 0-20cm	20229/ TP15/ 20-40cm	20229/ TP15/ 40-70cm	20229/ TP15/ 70-100cm
		Crop:	Soil	Soil	Soil	Soil
		Client:	20229	20229	20229	20229
Parameter		**Method reference**	**R6974/21**	**R6974/22**	**R6974/23**	**R6974/24**
Soluble Calcium (mg/kg)		**Inhouse S10 - Morgan 1	3,249	7,919	7,939	7,814
Soluble Magnesium (mg/kg)			803	1,093	1,266	1,337
Soluble Potassium (mg/kg)			58	28	<25	26
Soluble Phosphorus (mg/kg)			<1	<1	<1	<1
Phosphorus (mg/kg P)		**Rayment & Lyons 2011 - 9E2 (Bray 1)	3.9	1.3	1.8	1.1
		**Rayment & Lyons 2011 - 9B2 (Colwell)	8.9	2.0	<1	2.3
		**Inhouse S3A (Bray 2)	16	11	7.9	9.3
Nitrate Nitrogen (mg/kg N)		**Inhouse S37 (KCl)	7.2	7.5	11	5.8
Ammonium Nitrogen (mg/kg N)			2.6	1.6	1.7	2.4
Sulfur (mg/kg S)			10	21	47	49
pH		Rayment & Lyons 2011 - 4A1 (1:5 Water)	8.71	8.97	9.20	9.34
Electrical Conductivity (dS/m)		Rayment & Lyons 2011 - 3A1 (1:5 Water)	0.196	0.277	0.432	0.540
Estimated Organic Matter (% OM)		**Calculation: Total Carbon x 1.75	2.6	2.3	1.7	1.6
Exchangeable Calcium	(cmol+/kg)	Rayment & Lyons 2011 - 15D3 (Ammonium Acetate)	31	29	25	25
	(kg/ha)		13,724	12,960	11,200	11,097
	(mg/kg)		6,127	5,786	5,000	4,954
Exchangeable Magnesium	(cmol+/kg)		13	15	17	18
	(kg/ha)		3,560	4,147	4,727	4,989
	(mg/kg)		1,589	1,851	2,110	2,227
Exchangeable Potassium	(cmol+/kg)		0.89	0.53	0.49	0.51
	(kg/ha)		783	464	428	445
	(mg/kg)		349	207	191	198
Exchangeable Sodium	(cmol+/kg)		2.1	3.5	5.9	8.0
	(kg/ha)		1,079	1,826	3,053	4,119
	(mg/kg)		482	815	1,363	1,839
Exchangeable Aluminium	(cmol+/kg)	**Inhouse S37 (KCl)	<0.01	0.01	<0.01	<0.01
	(kg/ha)		1.8	2.3	<1	1.8
	(mg/kg)		<1	1.0	<1	<1
Exchangeable Hydrogen	(cmol+/kg)	**Rayment & Lyons 2011 - 15G1 (Acidity Titration)	<0.01	<0.01	<0.01	<0.01
	(kg/ha)		<1	<1	<1	<1
	(mg/kg)		<1	<1	<1	<1
Effective Cation Exchange Capacity (ECEC) (cmol+/kg)		**Calculation: Sum of Ca,Mg,K,Na,Al,H (cmol+/kg)	47	48	49	52
Calcium (%)		**Base Saturation Calculations - Cation cmol+/kg / ECEC x 100	66	60	51	48
Magnesium (%)			28	32	36	36
Potassium (%)			1.9	1.1	1.0	0.98
Sodium - ESP (%)			4.5	7.4	12	16
Aluminium (%)			0.02	0.02	0.00	0.02
Hydrogen (%)			0.00	0.00	0.00	0.00
Calcium/Magnesium Ratio		**Calculation: Calcium / Magnesium (cmol+/kg)	2.3	1.9	1.4	1.3

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AGRICULTURAL SOIL ANALYSIS REPORT

32 samples supplied by JG Environmental Pty Ltd on 26/07/2024. Lab Job No.R6974

Analysis requested by Justin Galloway. Your Job: 20229

PO Box 237 NAMBOUR QLD 4560

Parameter	Method reference	Sample 21	Sample 22	Sample 23	Sample 24
	Sample ID:	20229/ TP15/ 0-20cm	20229/ TP15/ 20-40cm	20229/ TP15/ 40-70cm	20229/ TP15/ 70-100cm
	Crop:	Soil	Soil	Soil	Soil
	Client:	20229	20229	20229	20229
		R6974/21	R6974/22	R6974/23	R6974/24
Zinc (mg/kg)	Rayment & Lyons 2011 - 12A1 (DTPA)	<0.5	<0.5	<0.5	<0.5
Manganese (mg/kg)		5.4	3.4	3.1	3.8
Iron (mg/kg)		19	20	18	15
Copper (mg/kg)		0.80	0.68	0.72	0.65
Boron (mg/kg)	**Rayment & Lyons 2011 - 12C2 (Hot $CaCl_2$)	0.36	0.63	1.4	1.3
Silicon (mg/kg Si)	**Inhouse S11 (Hot CaCl2)	18	6.6	6.8	5.2
Total Carbon (%)	Inhouse S4a (LECO Trumac Analyser)	1.5	1.3	0.98	0.91
Total Nitrogen (%)		0.11	0.07	0.05	0.03
Carbon/Nitrogen Ratio	**Calculation: Total Carbon/Total Nitrogen	14	19	18	26
Basic Texture	**Inhouse S65	Clay	Clay	Clay	Clay
Basic Colour		Brownish	Brownish	Brownish	Brownish
Chloride Estimate (equiv. mg/kg)	**Calculation: Electrical Conductivity x 640	125	177	276	346
Phosphorus Sorption (mg P/kg)	**Inhouse S18b (Based on Abbott 1985)	290	349	324	272

Notes:

1. All results presented as a 40°C oven dried weight. Soil sieved and lightly crushed to < 2 mm.
2. Methods from Rayment and Lyons, 2011. *Soil Chemical Methods - Australasia.* CSIRO Publishing: Collingwood.
3. Soluble Salts included in Exchangeable Cations - NO PRE-WASH (unless requested).
4. 'Morgan 1 Extract' adapted from 'Science in Agriculture', 'Non-Toxic Farming' and LaMotte Soil Handbook.
5. Guidelines for phosphorus have been reduced for Australian soils.
6. Indicative guidelines are based on 'Albrecht' and 'Reams' concepts.
7. Total Acid Extractable Nutrients indicate a store of nutrients.
8. National Environmental Protection (Assessment of Site Contamination) Measure 2013,
   Schedule B(1) - Guideline on Investigation Levels for Soil and Groundwater. Table 5-A Background Ranges.
9. Information relating to testing colour codes is available on sheet 2 - 'Understanding your agricultural soil results'.
10. Conversions for 1 $cmol_+/kg$ = 230 mg/kg Sodium, 390 mg/kg Potassium,
    122 mg/kg Magnesium, 200 mg/kg Calcium
11. Conversions to kg/ha = mg/kg x 2.24
12. The chloride calculation of Cl mg/L = EC x 640 is considered an estimate, and most likely an over-estimate
13. ** NATA accreditation does not cover the performance of this service.
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AGRICULTURAL SOIL ANALYSIS REPORT

32 samples supplied by JG Environmental Pty Ltd on 26/07/2024. Lab Job No.R6974

Analysis requested by Justin Galloway. Your Job: 20229

PO Box 237 NAMBOUR QLD 4560

Parameter		Method reference	Sample 25	Sample 26	Sample 27	Sample 28
		Sample ID:	20229/ TP17/ 0-20cm	20229/ TP17/ 20-40cm	20229/ TP17/ 40-70cm	20229/ TP17/ 70-100cm
		Crop:	Soil	Soil	Soil	Soil
		Client:	20229	20229	20229	20229
			R6974/25	R6974/26	R6974/27	R6974/28
Soluble Calcium (mg/kg)		**Inhouse S10 - Morgan 1	1,359	7,389	8,954	8,264
Soluble Magnesium (mg/kg)			415	999	1,318	1,372
Soluble Potassium (mg/kg)			50	<25	<25	<25
Soluble Phosphorus (mg/kg)			<1	<1	<1	<1
Phosphorus (mg/kg P)		**Rayment & Lyons 2011 - 9E2 (Bray 1)	19	5.4	2.8	1.1
		**Rayment & Lyons 2011 - 9B2 (Colwell)	35	2.0	2.3	3.0
		**Inhouse S3A (Bray 2)	26	4.3	6.6	5.4
Nitrate Nitrogen (mg/kg N)		**Inhouse S37 (KCl)	5.7	2.8	3.2	3.2
Ammonium Nitrogen (mg/kg N)			3.1	1.4	1.3	1.6
Sulfur (mg/kg S)			3.8	8.0	4.4	7.8
pH		Rayment & Lyons 2011 - 4A1 (1:5 Water)	6.87	8.78	9.14	9.32
Electrical Conductivity (dS/m)		Rayment & Lyons 2011 - 3A1 (1:5 Water)	0.046	0.175	0.274	0.336
Estimated Organic Matter (% OM)		**Calculation: Total Carbon x 1.75	2.7	2.0	1.9	2.3
Exchangeable Calcium	(cmol$_+$/kg)	Rayment & Lyons 2011 - 15D3 (Ammonium Acetate)	17	32	28	26
	(kg/ha)		7,721	14,459	12,380	11,825
	(mg/kg)		3,447	6,455	5,527	5,279
Exchangeable Magnesium	(cmol$_+$/kg)		8.0	13	18	19
	(kg/ha)		2,166	3,643	4,825	5,148
	(mg/kg)		967	1,626	2,154	2,298
Exchangeable Potassium	(cmol$_+$/kg)		0.74	0.49	0.48	0.45
	(kg/ha)		648	430	421	397
	(mg/kg)		289	192	188	177
Exchangeable Sodium	(cmol$_+$/kg)		0.49	1.5	3.6	4.9
	(kg/ha)		252	778	1,847	2,522
	(mg/kg)		112	347	825	1,126
Exchangeable Aluminium	(cmol$_+$/kg)	**Inhouse S37 (KCl)	0.01	0.02	0.02	0.01
	(kg/ha)		2.3	4.4	3.2	2.5
	(mg/kg)		1.0	2.0	1.4	1.1
Exchangeable Hydrogen	(cmol$_+$/kg)	**Rayment & Lyons 2011 - 15G1 (Acidity Titration)	<0.01	<0.01	<0.01	<0.01
	(kg/ha)		<1	<1	<1	<1
	(mg/kg)		<1	<1	<1	<1
Effective Cation Exchange Capacity (ECEC) (cmol$_+$/kg)		**Calculation: Sum of Ca,Mg,K,Na,Al,H (cmol$_+$/kg)	26	48	49	51
Calcium (%)		**Base Saturation Calculations - Cation cmol$_+$/kg / ECEC x 100	65	68	56	52
Magnesium (%)			30	28	36	37
Potassium (%)			2.8	1.0	0.97	0.89
Sodium - ESP (%)			1.9	3.2	7.3	9.7
Aluminium (%)			0.04	0.05	0.03	0.02
Hydrogen (%)			0.00	0.00	0.00	0.00
Calcium/Magnesium Ratio		**Calculation: Calcium / Magnesium (cmol$_+$/kg)	2.2	2.4	1.6	1.4

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AGRICULTURAL SOIL ANALYSIS REPORT

32 samples supplied by JG Environmental Pty Ltd on 26/07/2024. Lab Job No.R6974

Analysis requested by Justin Galloway. Your Job: 20229

PO Box 237 NAMBOUR QLD 4560

	Method reference	Sample 25	Sample 26	Sample 27	Sample 28
Sample ID:		20229/ TP17/ 0-20cm	20229/ TP17/ 20-40cm	20229/ TP17/ 40-70cm	20229/ TP17/ 70-100cm
Crop:		Soil	Soil	Soil	Soil
Client:		20229	20229	20229	20229
Parameter	**Method reference**	**R6974/25**	**R6974/26**	**R6974/27**	**R6974/28**
Zinc (mg/kg)	Rayment & Lyons 2011 - 12A1 (DTPA)	0.83	<0.5	<0.5	<0.5
Manganese (mg/kg)	Rayment & Lyons 2011 - 12A1 (DTPA)	35	4.1	2.5	1.6
Iron (mg/kg)	Rayment & Lyons 2011 - 12A1 (DTPA)	30	16	17	13
Copper (mg/kg)	Rayment & Lyons 2011 - 12A1 (DTPA)	1.0	0.62	0.83	0.73
Boron (mg/kg)	**Rayment & Lyons 2011 - 12C2 (Hot $CaCl_2$)	0.62	0.46	0.84	1.9
Silicon (mg/kg Si)	**Inhouse S11 (Hot CaCl2)	102	5.8	<1	2.3
Total Carbon (%)	Inhouse S4a (LECO Trumac Analyser)	1.5	1.1	1.1	1.3
Total Nitrogen (%)	Inhouse S4a (LECO Trumac Analyser)	0.13	0.07	0.04	0.06
Carbon/Nitrogen Ratio	**Calculation: Total Carbon/Total Nitrogen	12	16	31	21
Basic Texture	**Inhouse S65	Clay	Clay	Clay	Clay
Basic Colour	**Inhouse S65	Brownish	Brownish	Brownish	Brownish
Chloride Estimate (equiv. mg/kg)	**Calculation: Electrical Conductivity x 640	29	112	175	215
Phosphorus Sorption (mg P/kg)	**Inhouse S18b (Based on Abbott 1985)	216	433	475	446

Notes:

1. All results presented as a 40°C oven dried weight. Soil sieved and lightly crushed to < 2 mm.
2. Methods from Rayment and Lyons, 2011. *Soil Chemical Methods - Australasia.* CSIRO Publishing: Collingwood.
3. Soluble Salts included in Exchangeable Cations - NO PRE-WASH (unless requested).
4. 'Morgan 1 Extract' adapted from 'Science in Agriculture', 'Non-Toxic Farming' and LaMotte Soil Handbook.
5. Guidelines for phosphorus have been reduced for Australian soils.
6. Indicative guidelines are based on 'Albrecht' and 'Reams' concepts.
7. Total Acid Extractable Nutrients indicate a store of nutrients.
8. National Environmental Protection (Assessment of Site Contamination) Measure 2013,
   Schedule B(1) - Guideline on Investigation Levels for Soil and Groundwater. Table 5-A Background Ranges.
9. Information relating to testing colour codes is available on sheet 2 - 'Understanding your agricultural soil results'.
10. Conversions for 1 $cmol_c/kg$ = 230 mg/kg Sodium, 390 mg/kg Potassium,
    122 mg/kg Magnesium, 200 mg/kg Calcium
11. Conversions to kg/ha = mg/kg x 2.24
12. The chloride calculation of Cl mg/L = EC x 640 is considered an estimate, and most likely an over-estimate
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AGRICULTURAL SOIL ANALYSIS REPORT

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Analysis requested by Justin Galloway. Your Job: 20229
PO Box 237 NAMBOUR QLD 4560

Sample ID:
Crop:
Client:

Parameter		Method reference
Soluble Calcium (mg/kg)		**Inhouse S10 - Morgan 1
Soluble Magnesium (mg/kg)		
Soluble Potassium (mg/kg)		
Soluble Phosphorus (mg/kg)		
Phosphorus (mg/kg P)		**Rayment & Lyons 2011 - 9E2 (Bray 1) **Rayment & Lyons 2011 - 9B2 (Colwell) **Inhouse S3A (Bray 2)
Nitrate Nitrogen (mg/kg N)		**Inhouse S37 (KCl)
Ammonium Nitrogen (mg/kg N)		
Sulfur (mg/kg S)		
pH		Rayment & Lyons 2011 - 4A1 (1:5 Water)
Electrical Conductivity (dS/m)		Rayment & Lyons 2011 - 3A1 (1:5 Water)
Estimated Organic Matter (% OM)		**Calculation: Total Carbon x 1.75
Exchangeable Calcium	**(cmol$_+$/kg)**	Rayment & Lyons 2011 - 15D3 (Ammonium Acetate)
	(kg/ha)	
	(mg/kg)	
Exchangeable Magnesium	**(cmol$_+$/kg)**	
	(kg/ha)	
	(mg/kg)	
Exchangeable Potassium	**(cmol$_+$/kg)**	
	(kg/ha)	
	(mg/kg)	
Exchangeable Sodium	**(cmol$_+$/kg)**	
	(kg/ha)	
	(mg/kg)	
Exchangeable Aluminium	**(cmol$_+$/kg)**	**Inhouse S37 (KCl)
	(kg/ha)	
	(mg/kg)	
Exchangeable Hydrogen	**(cmol$_+$/kg)**	**Rayment & Lyons 2011 - 15G1 (Acidity Titration)
	(kg/ha)	
	(mg/kg)	
Effective Cation Exchange Capacity (ECEC) (cmol$_+$/kg)		**Calculation: Sum of Ca,Mg,K,Na,Al,H (cmol$_+$/kg)
Calcium (%)		**Base Saturation Calculations - Cation cmol$_+$/kg / ECEC x 100
Magnesium (%)		
Potassium (%)		
Sodium - ESP (%)		
Aluminium (%)		
Hydrogen (%)		
Calcium/Magnesium Ratio		**Calculation: Calcium / Magnesium (cmol$_+$/kg)

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Analysis requested by Justin Galloway. Your Job: 20229
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Sample ID:

Crop:

Client:

Parameter	Method reference
Zinc (mg/kg)	Rayment & Lyons 2011 - 12A1 (DTPA)
Manganese (mg/kg)	
Iron (mg/kg)	
Copper (mg/kg)	
Boron (mg/kg)	**Rayment & Lyons 2011 - 12C2 (Hot $CaCl_2$)
Silicon (mg/kg Si)	**Inhouse S11 (Hot CaCl2)
Total Carbon (%)	Inhouse S4a (LECO Trumac Analyser)
Total Nitrogen (%)	
Carbon/Nitrogen Ratio	**Calculation: Total Carbon/Total Nitrogen
Basic Texture	**Inhouse S65
Basic Colour	
Chloride Estimate (equiv. mg/kg)	**Calculation: Electrical Conductivity x 640
Phosphorus Sorption (mg P/kg)	**Inhouse S18b (Based on Abbott 1985)

Notes:

1. All results presented as a 40°C oven dried weight. Soil sieved and lightly crushed to < 2 mm.
2. Methods from Rayment and Lyons, 2011. *Soil Chemical Methods - Australasia.* CSIRO Publishing: Collingwood.
3. Soluble Salts included in Exchangeable Cations - NO PRE-WASH (unless requested).
4. 'Morgan 1 Extract' adapted from 'Science in Agriculture', 'Non-Toxic Farming' and LaMotte Soil Handbook.
5. Guidelines for phosphorus have been reduced for Australian soils.
6. Indicative guidelines are based on 'Albrecht' and 'Reams' concepts.
7. Total Acid Extractable Nutrients indicate a store of nutrients.
8. National Environmental Protection (Assessment of Site Contamination) Measure 2013, Schedule B(1) - Guideline on Investigation Levels for Soil and Groundwater. Table 5-A Background Ranges.
9. Information relating to testing colour codes is available on sheet 2 - 'Understanding your agricultural soil results'.
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			Heavy Soil	Medium Soil	Light Soil	Sandy Soil
		Sample ID:				
		Crop:				
		Client:	*Clay*	*Clay Loam*	*Loam*	*Loamy Sand*
Parameter		**Method reference**	**Indicative guidelines - refer to Notes 6 and 8**			
Soluble Calcium (mg/kg)		**Inhouse S10 - Morgan 1	1150	750	375	175
Soluble Magnesium (mg/kg)			160	105	60	25
Soluble Potassium (mg/kg)			113	75	60	50
Soluble Phosphorus (mg/kg)			15	12	10	5.0
Phosphorus (mg/kg P)		**Rayment & Lyons 2011 - 9E2 (Bray 1)	45 [note 5]	30 [note 5]	24 [note 5]	20 [note 5]
		**Rayment & Lyons 2011 - 9B2 (Colwell)	80	50	45	35
		**Inhouse S3A (Bray 2)	90 [note 5]	60 [note 5]	48 [note 5]	40 [note 5]
Nitrate Nitrogen (mg/kg N)		**Inhouse S37 (KCl)	15	13	10	10
Ammonium Nitrogen (mg/kg N)			20	18	15	12
Sulfur (mg/kg S)			10.0	8.0	8.0	7.0
pH		Rayment & Lyons 2011 - 4A1 (1:5 Water)	6.5	6.5	6.3	6.3
Electrical Conductivity (dS/m)		Rayment & Lyons 2011 - 3A1 (1:5 Water)	0.200	0.150	0.120	0.100
Estimated Organic Matter (% OM)		**Calculation: Total Carbon x 1.75	> 5.5	>4 .5	> 3.5	> 2.5
Exchangeable Calcium	**(cmol$_+$/kg)**	Rayment & Lyons 2011 - 15D3 (Ammonium Acetate)	15.6	10.8	5.0	1.9
	(kg/ha)		7000	4816	2240	840
	(mg/kg)		3125	2150	1000	375
Exchangeable Magnesium	**(cmol$_+$/kg)**		2.4	1.7	1.2	0.60
	(kg/ha)		650	448	325	168
	(mg/kg)		290	200	145	75
Exchangeable Potassium	**(cmol$_+$/kg)**		0.60	0.50	0.40	0.30
	(kg/ha)		526	426	336	224
	(mg/kg)		235	190	150	100
Exchangeable Sodium	**(cmol$_+$/kg)**		0.3	0.26	0.22	0.11
	(kg/ha)		155	134	113	57
	(mg/kg)		69	60	51	25
Exchangeable Aluminium	**(cmol$_+$/kg)**	**Inhouse S37 (KCl)	0.6	0.5	0.4	0.2
	(kg/ha)		121	101	73	30
	(mg/kg)		54	45	32	14
Exchangeable Hydrogen	**(cmol$_+$/kg)**	**Rayment & Lyons 2011 - 15G1 (Acidity Titration)	0.6	0.5	0.4	0.2
	(kg/ha)		13	11	8	3
	(mg/kg)		6	5	4	2
Effective Cation Exchange Capacity (ECEC) (cmol$_+$/kg)		**Calculation: Sum of Ca,Mg,K,Na,Al,H (cmol$_+$/kg)	20.1	14.3	7.8	3.3
Calcium (%)		**Base Saturation Calculations - Cation cmol$_+$/kg / ECEC x 100	77.6	75.7	65.6	57.4
Magnesium (%)			11.9	11.9	15.7	18.1
Potassium (%)			3.0	3.5	5.2	9.1
Sodium - ESP (%)			1.5	1.8	2.9	3.3
Aluminium (%)			6.0	7.1	10.5	12.1
Hydrogen (%)						
Calcium/Magnesium Ratio		**Calculation: Calcium / Magnesium (cmol$_+$/kg)	6.5	6.4	4.2	3.2

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AGRICULTURAL SOIL ANALYSIS REPORT

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Analysis requested by Justin Galloway. Your Job: 20229

PO Box 237 NAMBOUR QLD 4560

		Heavy Soil	Medium Soil	Light Soil	Sandy Soil
	Sample ID:				
	Crop:				
	Client:	*Clay*	*Clay Loam*	*Loam*	*Loamy Sand*
Parameter	**Method reference**	**Indicative guidelines - refer to Notes 6 and 8**			
Zinc (mg/kg)	Rayment & Lyons 2011 - 12A1 (DTPA)	*6.0*	*5.0*	*4.0*	*3.0*
Manganese (mg/kg)	Rayment & Lyons 2011 - 12A1 (DTPA)	*25*	*22*	*18*	*15*
Iron (mg/kg)	Rayment & Lyons 2011 - 12A1 (DTPA)	*25*	*22*	*18*	*15*
Copper (mg/kg)	Rayment & Lyons 2011 - 12A1 (DTPA)	*2.4*	*2.0*	*1.6*	*1.2*
Boron (mg/kg)	**Rayment & Lyons 2011 - 12C2 (Hot $CaCl_2$)	*2.0*	*1.7*	*1.4*	*1.0*
Silicon (mg/kg Si)	**Inhouse S11 (Hot CaCl2)	*50*	*45*	*40*	*35*
Total Carbon (%)	Inhouse S4a (LECO Trumac Analyser)	*> 3.1*	*> 2.6*	*> 2.0*	*> 1.4*
Total Nitrogen (%)	Inhouse S4a (LECO Trumac Analyser)	*> 0.30*	*> 0.25*	*> 0.20*	*> 0.15*
Carbon/Nitrogen Ratio	**Calculation: Total Carbon/Total Nitrogen	*10–12*	*10–12*	*10–12*	*10–12*
Basic Texture	**Inhouse S65	..	..	..	..
Basic Colour	**Inhouse S65	..	..	..	..
Chloride Estimate (equiv. mg/kg)	**Calculation: Electrical Conductivity x 640	..	..	..	..
Phosphorus Sorption (mg P/kg)	**Inhouse S18b (Based on Abbott 1985)				

Notes:

1. All results presented as a 40°C oven dried weight. Soil sieved and lightly crushed to < 2 mm.
2. Methods from Rayment and Lyons, 2011. *Soil Chemical Methods - Australasia.* CSIRO Publishing: Collingwood.
3. Soluble Salts included in Exchangeable Cations - NO PRE-WASH (unless requested).
4. 'Morgan 1 Extract' adapted from 'Science in Agriculture', 'Non-Toxic Farming' and LaMotte Soil Handbook.
5. Guidelines for phosphorus have been reduced for Australian soils.
6. Indicative guidelines are based on 'Albrecht' and 'Reams' concepts.
7. Total Acid Extractable Nutrients indicate a store of nutrients.
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   Schedule B(1) - Guideline on Investigation Levels for Soil and Groundwater. Table 5-A Background Ranges.
9. Information relating to testing colour codes is available on sheet 2 - 'Understanding your agricultural soil results'.
10. Conversions for 1 $cmol_+/kg$ = 230 mg/kg Sodium, 390 mg/kg Potassium,
    122 mg/kg Magnesium, 200 mg/kg Calcium
11. Conversions to kg/ha = mg/kg x 2.24
12. The chloride calculation of Cl mg/L = EC x 640 is considered an estimate, and most likely an over-estimate
13. ** NATA accreditation does not cover the performance of this service.
14. Analysis conducted between sample arrival date and reporting date.
15. This report is not to be reproduced except in full. Results only relate to the item tested.
16. All services undertaken by EAL are covered by the EAL Laboratory Services Terms and Conditions
17. This report was issued on 5/08/2024.

Quality Checked: Kris Saville
Agricultural Co-Ordinator
KS

MEDLI P ADSORPTION ISOTHERM PARAMETER CALCULATOR

Algorithms from HSPF (Johnson et al., 1984) and described fully in the MEDLI Version 2.0 Manual

Excel version by Alison Vieritz, NRS, NR&M [09/2002]

1 Colwell P

Analyse the sample for sodium bicarbonate extractable P (Colwell-P) in a solution to soil mixture. Enter the Colwell P in mg/kg solution and the solution to soil ratio used.

2 Isotherm Data

P sorption curve is performed on dried (40oC) soil samples ground to <2mm. The soil is then equilibrated with a solution containing 0.01 M CaCl2 and phosphorus (added as KH2PO4) ranging in concentration from 20 to 1600 mgP/kg (six data points on the curve). A soil to solution ratio of 1:10 is used and each sample is shaken end-over-end at 30 rpm for 18 hr at 25oC, before centrifuging at 2000 g for 30 minutes. The supernatant solution P concentration is then read by Auto Analyser using the procedure of Warrell and Moody (1984). This measure is then used to calculate the amount of extra phosphorus (mg/kg) that can be adsorbed by the soil at each equilibrium solution P concentration (Padded ads). For each equilibrium solution P concentration (mg/L):

Total sorbed P (mg/kg) = $P_{added\ ads}$ + Colwell-P

3 Linear regression of Ln(X) and Ln(Y)

The X (P Equilibrium concentration in mg/L) and Y (P sorbed in mg/kg) data is then fitted to the equation:

$Y = AX^B$ by linear regression of Ln(Y) = aLn(X) + b

where b = Ln(A) and a=B.

A = MEDLI adsorption coefficient

B = MEDLI adsorption exponent

Check the fit shown by the graph.

4 MEDLI Parameters

The MEDLI adsorption coefficient, adsorption exponent, desorption exponent are then estimated. In the absence of a desorption isotherm the desorption exponent is assumed to be 95% of the adsorption exponent to allow conservatively a very minor hysteresis effect.

MEDLI P ADSORPTION ISOTHERM PARAMETER CALCULATOR

Input data in white cells only

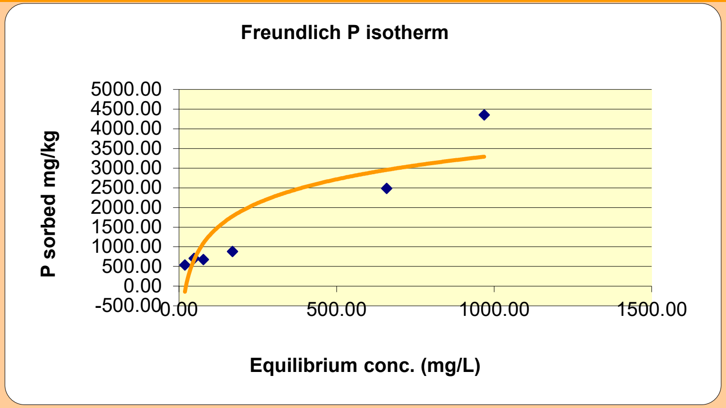
1 Colwell P

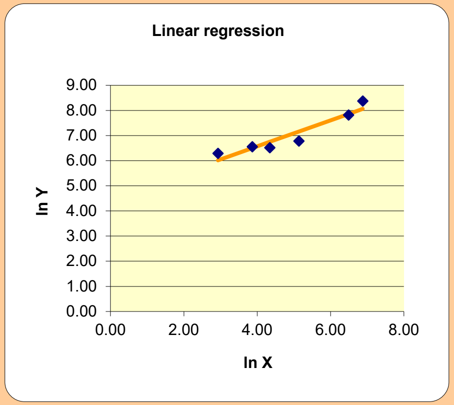
Colwell P mg/kg solution	Solution:soil ratio
20.99	10

R6974/29
20229/ MEDLI/ 0-20cm

2 Isotherm Data

Std Conc mg/L	Equil Conc mg/L X	P Sorbed mg/kg Y
51.68	18.74	539.32
97.49	47.84	706.42
123.70	77.20	674.92
237.20	169.90	882.92
886.60	659.20	2483.92
1383.00	968.40	4355.92





3 Linear regression of Ln(X) and Ln(Y)

The linear regression equation uses the form y=ax+b

a	b		r^2
0.5184	4.4960	Equation is y = 0.5184x + 4.4960	0.8929

4 MEDLI Parameters

MEDLI's isotherm equation $Y=AX^B$ is shown on the graph above.

Adsorption Coefficient (A)	**89.66**
Adsorption Exponent (B)	**0.5184**
Desorption Exponent	**0.4925**

Example 1 Orig soln	Soln dilution	soln:soil ratio ?
50	51.68	0.96749226
100	97.49	1.02574623
250	123.70	2.021018593
500	237.20	2.107925801
1000	886.60	1.127904354
1500	1383.00	1.084598698
	avg	1.389114323

MEDLI P ADSORPTION ISOTHERM PARAMETER CALCULATOR

Input data in white cells only

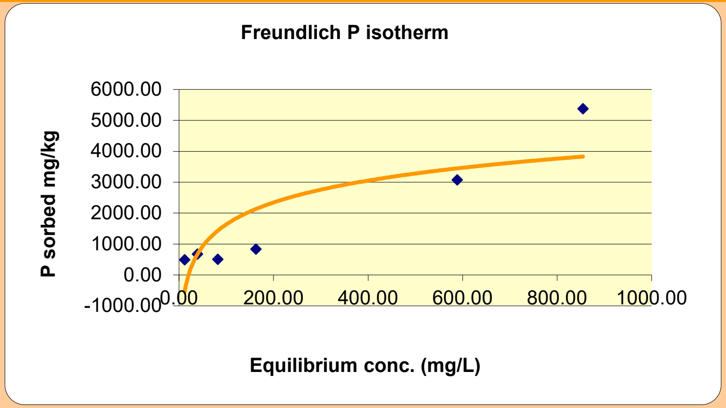
1 Colwell P

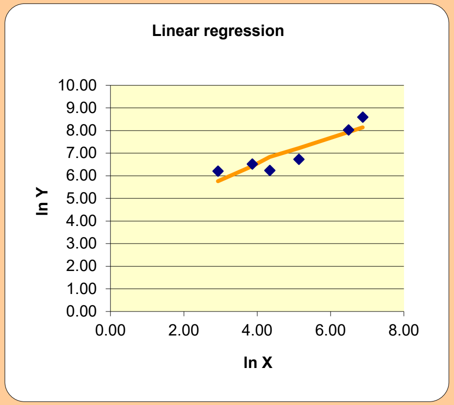
Colwell P mg/kg solution	Solution:soil ratio
9.51	10

R6974/30
20229/ MEDLI/ 20-40cm

2 Isotherm Data

Std Conc mg/L	Equil Conc mg/L X	P Sorbed mg/kg Y
51.68	11.88	493.12
97.49	39.17	678.32
123.70	82.20	510.12
237.20	162.95	837.62
886.60	588.60	3075.12
1383.00	854.70	5378.12





3 Linear regression of Ln(X) and Ln(Y)

The linear regression equation uses the form y=ax+b

a	b		r^2
0.5561	4.3843	Equation is y = 0.5561x + 4.3843	0.8011

4 MEDLI Parameters

MEDLI's isotherm equation $Y=AX^B$ is shown on the graph above.

Adsorption Coefficient (A)	**80.18**
Adsorption Exponent (B)	**0.5561**
Desorption Exponent	**0.5283**

Example 1 Orig soln	Soln dilution	soln:soil ratio ?
50	51.68	0.96749226
100	97.49	1.02574623
250	123.70	2.021018593
500	237.20	2.107925801
1000	886.60	1.127904354
1500	1383.00	1.084598698
	avg	1.389114323

MEDLI P ADSORPTION ISOTHERM PARAMETER CALCULATOR

Input data in white cells only

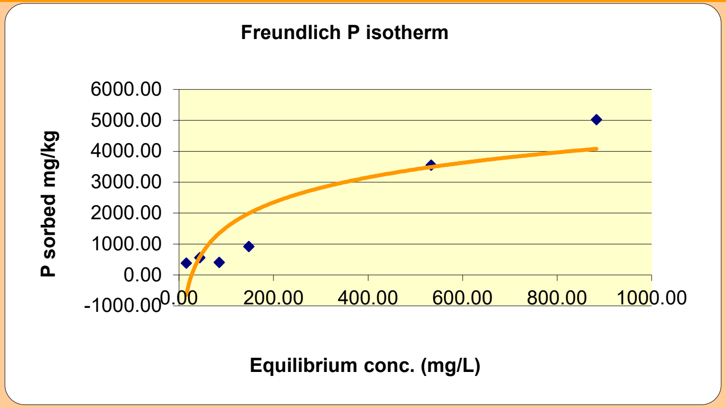
1 Colwell P

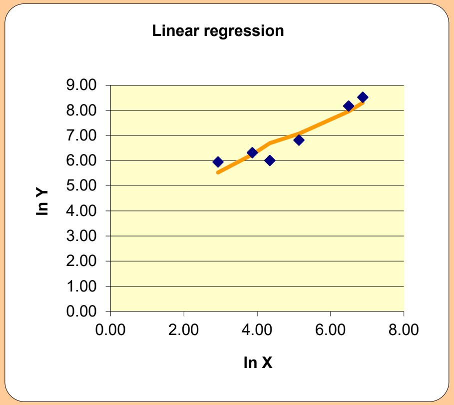
Colwell P mg/kg solution	Solution:soil ratio
2.30	10

R6974/31
20229/ MEDLI/ 40-70cm

2 Isotherm Data

Std Conc mg/L	Equil Conc mg/L X	P Sorbed mg/kg Y
51.68	15.50	384.76
97.49	43.99	557.96
123.70	85.10	408.96
237.20	147.50	919.96
886.60	533.70	3551.96
1383.00	883.10	5021.96





3 Linear regression of Ln(X) and Ln(Y)

The linear regression equation uses the form y=ax+b

a	b		r^2
0.6860	3.6501	Equation is y = 0.6860x + 3.6501	0.8701

4 MEDLI Parameters

MEDLI's isotherm equation $Y=AX^B$ is shown on the graph above.

Adsorption Coefficient (A)	**38.48**
Adsorption Exponent (B)	**0.6860**
Desorption Exponent	**0.6517**

Example 1 Orig soln	Soln dilution	soln:soil ratio ?
50	51.68	0.96749226
100	97.49	1.02574623
250	123.70	2.021018593
500	237.20	2.107925801
1000	886.60	1.127904354
1500	1383.00	1.084598698
	avg	1.389114323

MEDLI P ADSORPTION ISOTHERM PARAMETER CALCULATOR

Input data in white cells only

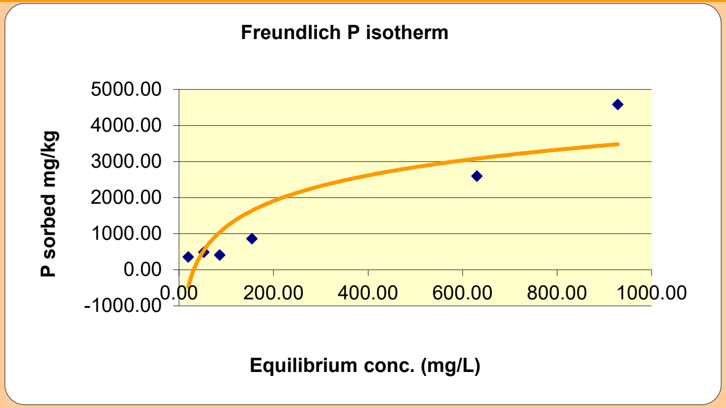
1 Colwell P

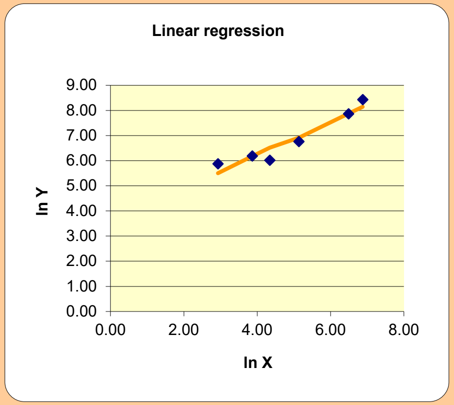
Colwell P mg/kg solution	Solution:soil ratio
3.61	10

R6974/32
20229/ MEDLI/ 70-100cm

2 Isotherm Data

Std Conc mg/L	Equil Conc mg/L X	P Sorbed mg/kg Y
51.68	19.58	357.08
97.49	52.56	485.38
123.70	86.25	410.58
237.20	154.35	864.58
886.60	630.00	2602.08
1383.00	928.40	4582.08





3 Linear regression of Ln(X) and Ln(Y)

The linear regression equation uses the form y=ax+b

a	b		r^2
0.6846	3.4658	Equation is y = 0.6846x + 3.4658	0.9115

4 MEDLI Parameters

MEDLI's isotherm equation $Y=AX^B$ is shown on the graph above.

Adsorption Coefficient (A)	32.00
Adsorption Exponent (B)	0.6846
Desorption Exponent	0.6504

Example 1 Orig soln	Soln dilution	soln:soil ratio ?
50	51.68	0.96749226
100	97.49	1.02574623
250	123.70	2.021018593
500	237.20	2.107925801
1000	886.60	1.127904354
1500	1383.00	1.084598698
	avg	1.389114323

REFERENCES

Johnson, R.C., J.C. Imhoff, J.L. Kittle and A.S. Donigan (1984). Hydrological Simulation Program - Fortran (HSPF):

Warrell, LA, and Moody, PW (1984). Automated determination of micro amounts of phosphate in dilute calcium chloride extracts of soils. Commun. Soil Sci. Plant Anal. **v** 15, *pp* 779-85.

Appendix B: MEDLI Output File

SCENARIO REPORT: Full run

General information

Enterprise: Springfield Feedlot
Client: RDC Engineers
MEDLI user: JG

Description:

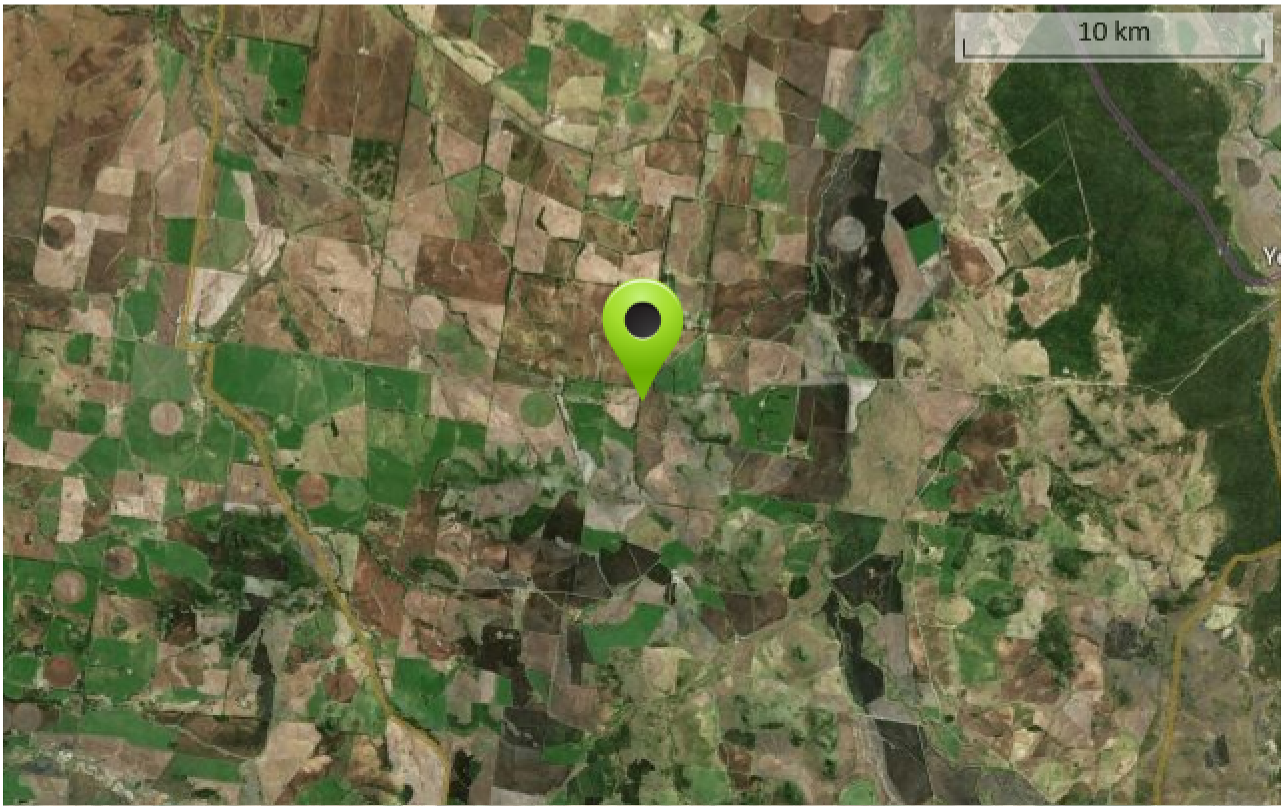
Stage 3

Scenario details:

3000 Head

Map of location:

Note: If the map above appears as a dark box, check that the network is accessible and that the coordinates are not for a location in the ocean.



Description

Climate information

Climate Data Location: Springfield -28.95 150.55, -28.95°, 150.55°

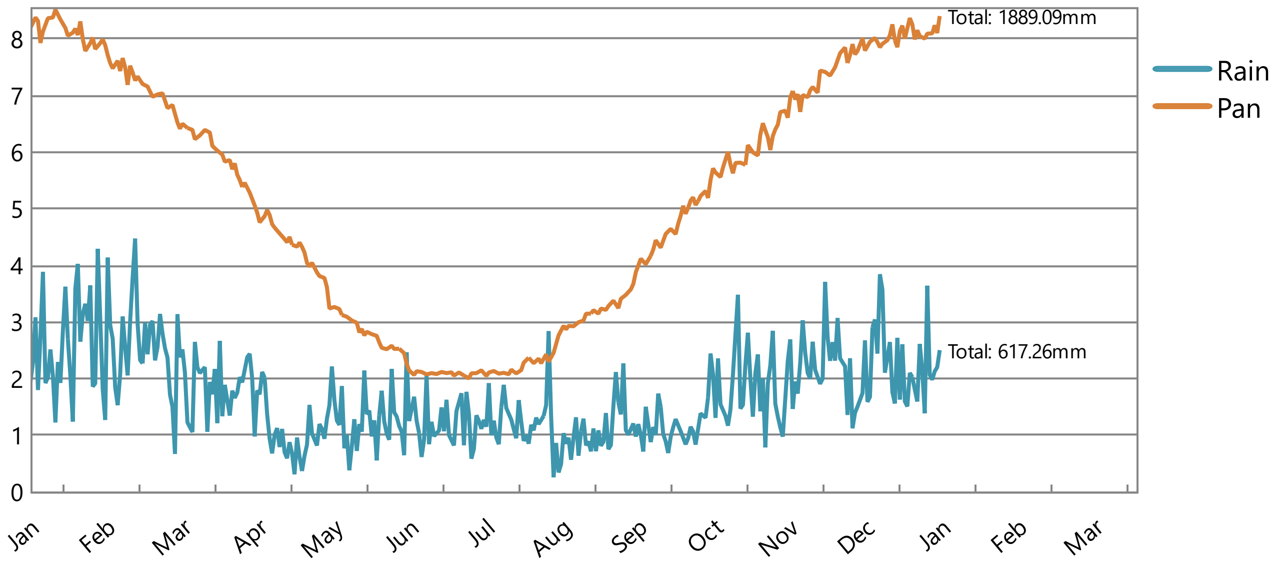
Run Period: 01/01/1924 to 31/12/2023 (100 years)

Climate statistics

	5th Percentile		50th Percentile		95th Percentile	
Rainfall (mm/year)	(Year 1957)	411.4	(Year 2020)	598.6	(Year 1956)	869.4
Pan evaporation (mm/year)	(Year 1978)	1618.5	(Year 1972)	1872.4	(Year 2009)	2129.2

Climate data

Daily average across run period:



Description

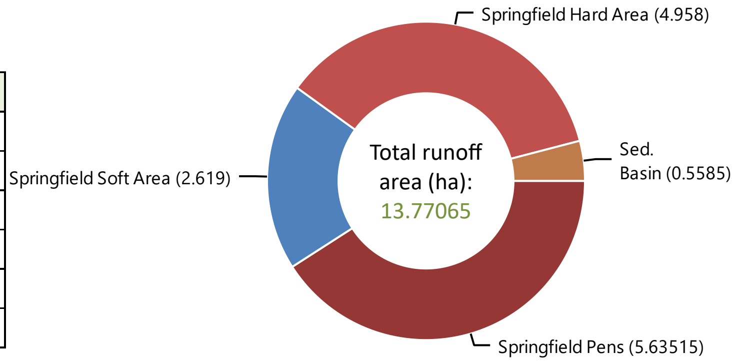
Livestock yard information

Enterprise Name: Springfield Feedlot

Design of cattle feedlot

Name	Value
Maximum capacity (SCU)*	2621
Number of pens (pens)	27
Pen area (m2/pen)	2087.09
Stocking density (m2/SCU)	21.5
Working head (head)	3000
Calculated mortality rate (%)	0.25

*SCU - Standard Cattle Unit (kg/head) is 600



Herd details for each market type (before any mortalities)

	DF Ex 150d
Proportion of total SCUs (fraction)	1
SCU factor (factor)	0.87
Proportion of pens occupied (fraction)	0.95
Av. no. per occupied pen (head)	92.08
No. occupied pens (pens)	26
Working head (head)	2394
Entry weight (kg/head)	370
Exit weight (kg/head)	633
Daily weight gain (kg/head)	1.75

Raw manure production (kg/head/year)

	DF Ex 150d
Excreted nitrogen	100.7
Excreted phosphorus	12.6
Excreted salt	9
Excreted volatile solids	541.4
Excreted total solids	761.7
Excreted water	4316.2

Drinking Water Salinity (dS/m): 1

Drinking Water Used: 41.68 ML/year or 0.02 ML/SCU/year

Manure management

Name	Value
Minimum number of days between cleaning events for a pen (days)	91
Pad depth above base after cleaning (mm)	20
Pad moisture content range suitable for pen cleaning (%g/g dry basis) (min - max)	20.00 - 120.00
Pad moisture content range suitable for pen cleaning (%g/g wet basis) (min - max)	16.67 - 54.55
Maximum number of pens cleaned in one day (pens)	5

Pad details (applies to both surface and subsurface layer)

Name	Value
Moisture content range (air dry to maximum) (%g/g dry basis)	7.00 - 190.00
Moisture content range (air dry to maximum) (%g/g wet basis)	6.54 - 65.52
Maximum percolation rate (mm/hour)	0.417

Description

Wastestream information

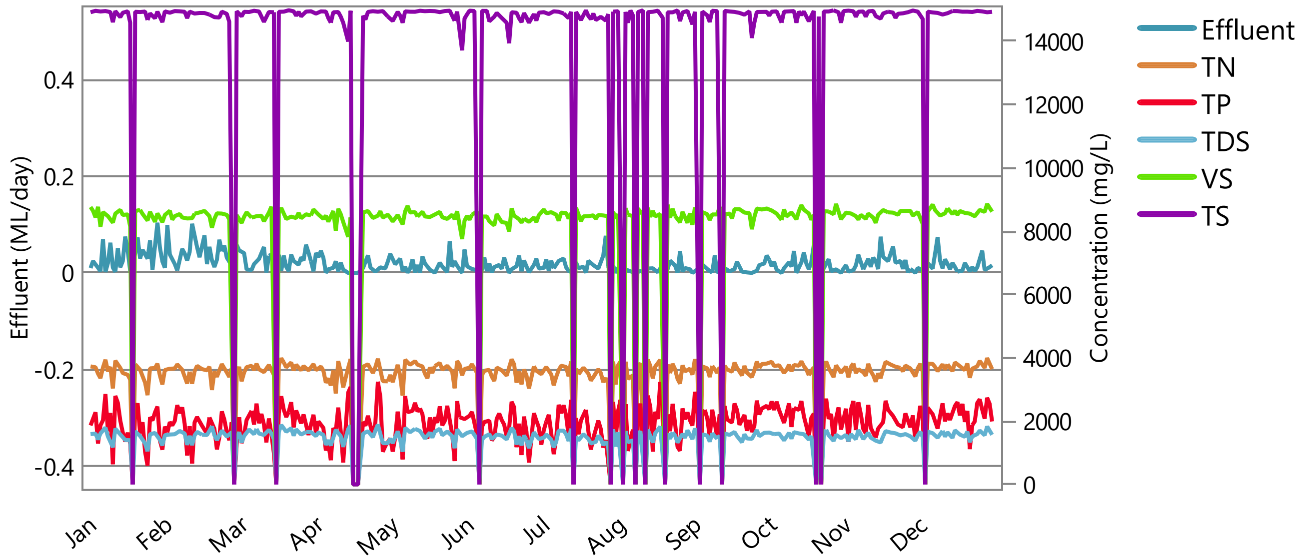
Wastestream Name: Waste estimation system - Springfield Pens

Wastestream production description

Runoff from Springfield Pens, a manure pad (impermeable) surface, with area 5.6352 ha with maximum capacity of 2621 SCU, 0.2500 % mortality, drinking water at 1.0000 dS/m salinity, and with 0.4000 (fraction) of total nitrogen in urine, and 0.6000 (fraction) of urine total nitrogen volatilised. Runoff quality assumes a nutrient enrichment ratio of 3.50 for total nitrogen, 15.00 for total phosphorus and 5.00 for salt. This wastestream is not separately pretreated. The sedimentation basin was used to treat the runoff.

Wastestream

Average Daily Quantity and Flow-Weighted Average Quality:



Wastestream (before sedimentation basin)

Effluent Quantity: 6.89 ML/year or 0.02 ML/day (Min-Max 0.00 - 8.68)

Flow-Weighted Average (Min - Max) Daily Effluent Quality:

	Concentration (mg/L)	Load (kg/year)
Total nitrogen	3608.97 (0.00 - 4173.28)	24856.41 (245.35 - 78958.64)
Total phosphorus	1938.80 (0.00 - 3478.84)	13353.30 (196.21 - 30037.66)
Total dissolved salts	1548.33 (0.00 - 2200.63)	10663.96 (112.87 - 30926.81)
Volatile solids	8526.77 (0.00 - 8999.76)	58727.32 (533.68 - 204968.60)
Total solids	14877.27 (0.00 - 14986.16)	102465.78 (909.01 - 358626.68)

Description

Wastestream information

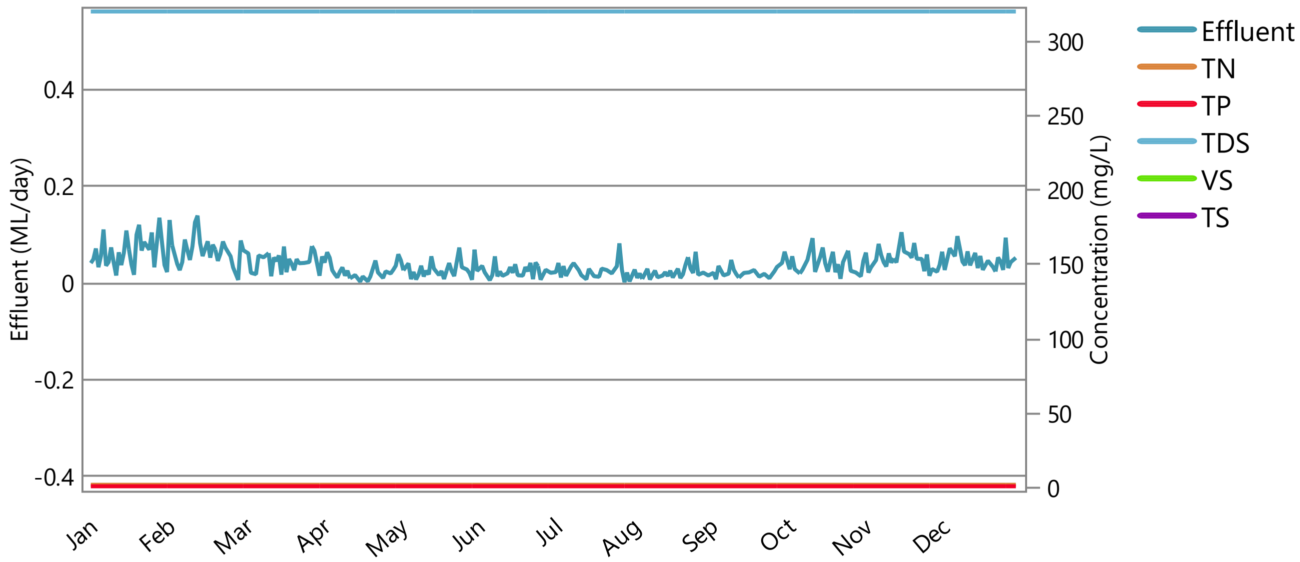
Wastestream Name: Waste estimation system - Springfield Hard Area

Wastestream production description

Runoff from Springfield Hard Area, a hard surface, with area 4.96 ha and assuming concentrations of 2.00 mg/L for total nitrogen, 1.00 mg/L for total phosphorus and 320.00 mg/L for total dissolved salt. This wastestream is not separately pretreated. The sedimentation basin was used to treat the runoff.

Wastestream

Average Daily Quantity and Flow-Weighted Average Quality:



Wastestream (before sedimentation basin)

Effluent Quantity: 13.72 ML/year or 0.04 ML/day (Min-Max 0.00 - 7.66)

Flow-Weighted Average (Min - Max) Daily Effluent Quality:

	Concentration (mg/L)	Load (kg/year)
Total nitrogen	2.00 (2.00 - 2.00)	27.44 (4.73 - 54.26)
Total phosphorus	1.00 (1.00 - 1.00)	13.72 (2.37 - 27.13)
Total dissolved salts	320.00 (320.00 - 320.00)	4389.81 (757.34 - 8681.38)
Volatile solids	0.00 (0.00 - 0.00)	0.00 (0.00 - 0.00)
Total solids	0.00 (0.00 - 0.00)	0.00 (0.00 - 0.00)

Description

Wastestream information

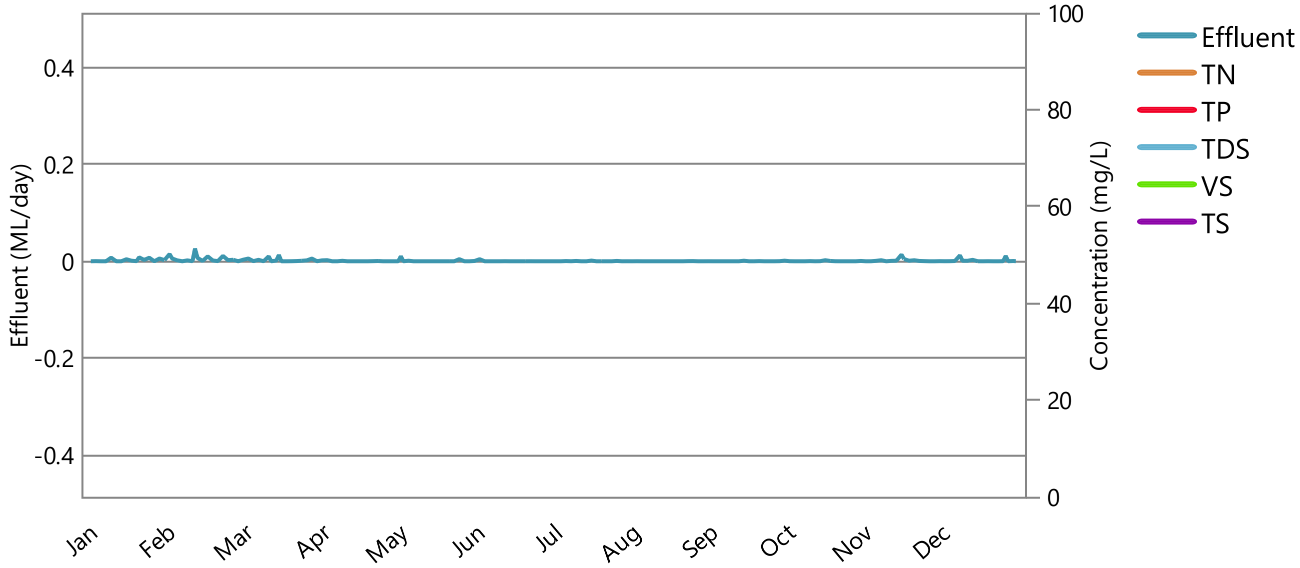
Wastestream Name: Waste estimation system - Springfield Soft Area

Wastestream production description

Runoff from Springfield Soft Area, a soft surface, with area 2.62 ha and assuming concentrations of 0.00 mg/L for total nitrogen, 0.00 mg/L for total phosphorus and 0.00 mg/L for total dissolved salt. This wastestream is not separately pretreated. A sedimentation basin was defined but not used to treat this runoff.

Wastestream

Average Daily Quantity and Flow-Weighted Average Quality:



Wastestream

Effluent Quantity: 0.41 ML/year or 0.00 ML/day (Min-Max 0.00 - 2.50)

Flow-Weighted Average (Min - Max) Daily Effluent Quality:

	Concentration (mg/L)	Load (kg/year)
Total nitrogen	0.00 (0.00 - 0.00)	0.00 (0.00 - 0.00)
Total phosphorus	0.00 (0.00 - 0.00)	0.00 (0.00 - 0.00)
Total dissolved salts	0.00 (0.00 - 0.00)	0.00 (0.00 - 0.00)
Volatile solids	0.00 (0.00 - 0.00)	0.00 (0.00 - 0.00)
Total solids	0.00 (0.00 - 0.00)	0.00 (0.00 - 0.00)

Description

Wastestream information

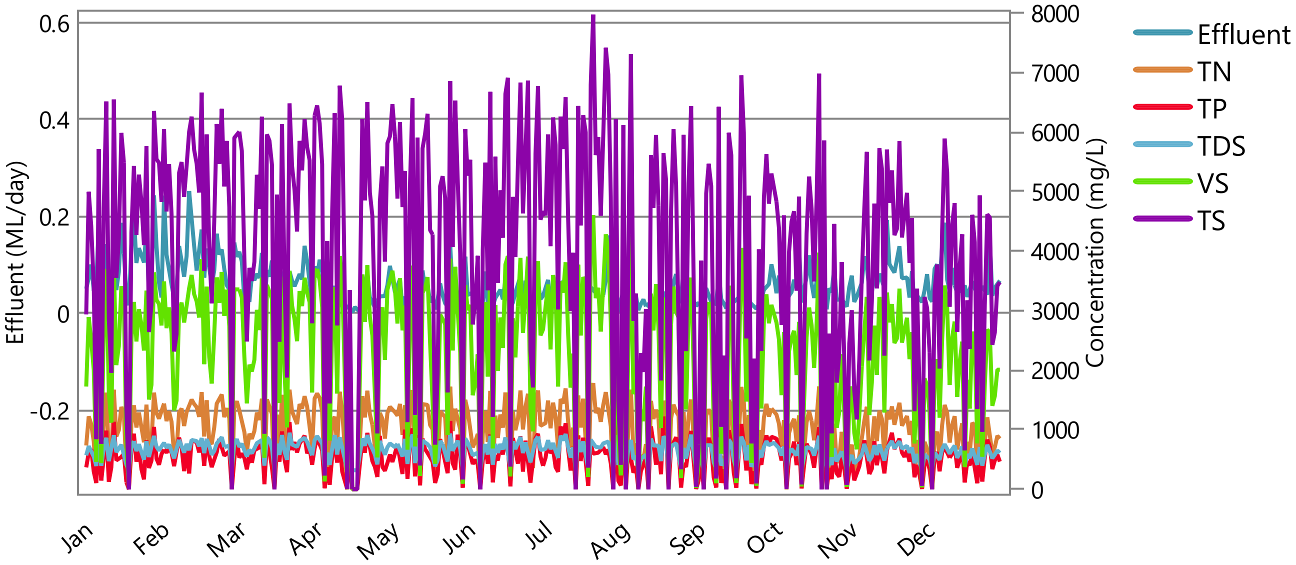
Combined Wastestream Name: Springfield Feedlot - Waste estimation system

Wastestream production description

The enterprise Waste estimation system has a combined wastestream primarily consisting of flows from Springfield Pens and with additional flows from Springfield Hard Area, and Springfield Soft Area. This includes runoff from a total of 13.77 ha of land when including the sedimentation basin area.

Wastestream before sedimentation basin

Average Daily Quantity and Flow-Weighted Average Quality:



Sedimentation basin

The sedimentation basin was assumed to remove 0.25 (fraction) of total nitrogen, 0.10 (fraction) of total phosphorus, 0.32 (fraction) of volatile solids, and 0.64 (fraction) of total solids from the effluent. Rainfall runoff from the 0.56 ha basin also contributed on average an additional 0.15 ML to the annual flow into the pond system.

Combined wastestream (after sedimentation basin)

Effluent Quantity: 21.16 ML/year or 0.06 ML/day (Min-Max 0.00 - 19.38)

Flow-Weighted Average (Min - Max) Daily Effluent Quality Entering the Pond System:

	Concentration (mg/L)	Load (kg/year)
Total nitrogen	881.89 (0.00 - 2667.13)	18662.88 (189.53 - 59259.67)
Total phosphorus	568.48 (0.00 - 2120.78)	12030.31 (179.90 - 27058.31)
Total dissolved salts	711.35 (0.00 - 1519.95)	15053.78 (1290.13 - 39608.19)
Volatile solids	1887.06 (0.00 - 5634.53)	39934.57 (362.90 - 139378.65)
Total solids	1743.08 (0.00 - 5250.36)	36887.68 (327.24 - 129105.60)

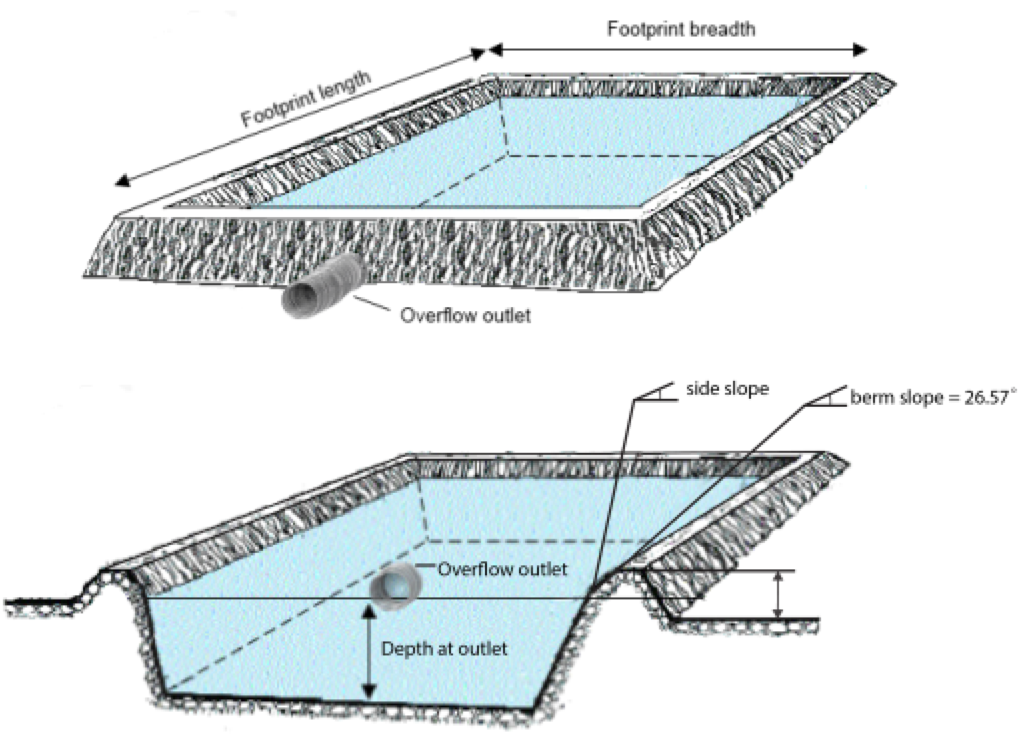
Description

Pond system information

Pond System Configuration: 1 anaerobic pond

Pond system details

	Pond 1
Maximum pond volume (ML)	20.00
Minimum allowable pond volume (ML)	1.60
Pond depth at overflow outlet (m)	3.50
Maximum water surface area (m2)	7499.53
Pond footprint length (m)	124.47
Pond footprint width (m)	63.24
Pond catchment area (m2)	7870.94
Average active volume (ML)	1.85



Irrigation pump limits

Minimum pump rate per area limit (ML/day/ha)	0.00
Maximum pump rate per area limit (ML/day/ha)	1.00

Shandying water

Annual allocation of fresh water available for shandying (ML/year)	1500.00
Maximum rate of application of fresh water (ML/day)	3.00
Nitrogen concentration (mg/L)	5.00
Salinity (dS/m)	0.70
Minimum shandy water is used	No

Description

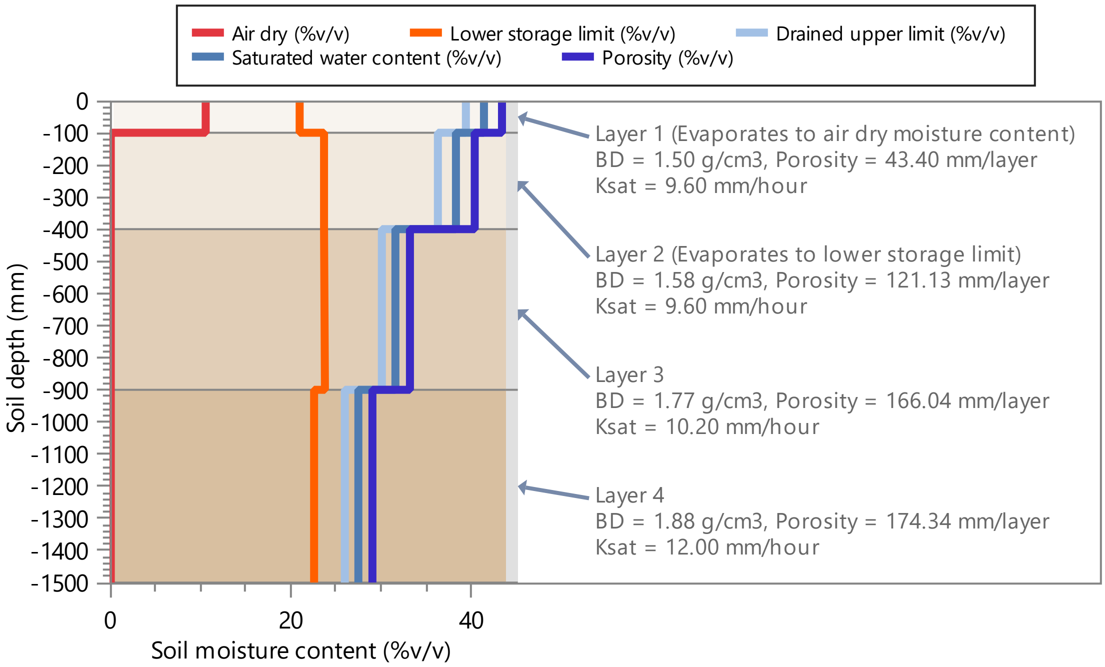
Paddock information

Paddock: Pivot, 120 ha

Soil type: Springfield Brown/Grey Dermosol, 1500.00 mm defined profile depth

Profile porosity (mm)	504.91
Profile saturation water content (mm)	479.30
Profile drained upper limit (or field capacity) (mm)	454.80
Profile lower storage limit (or permanent wilting point) (mm)	346.70
Profile available water capacity (mm)	108.10
Profile limiting saturated hydraulic conductivity (mm/hour)	9.60
Surface saturated hydraulic conductivity (mm/hour)	9.60
Runoff curve number II (coefficient)	85.00
Soil evaporation U (mm)	9.00
Soil evaporation Cona (mm/sqrt day)	4.00

Profile



Planting regime: Rotated Forage maize crop | Barley crop

Maximum crop factor at 100% cover (mm/mm) (Maximum crop coefficient 0.8 | 0.9 x Pan coefficient 1 | 1)	0.80 | 0.90
Dead cover (if Mthly Covers) or Tot. cover left after harvest (fraction)	0.00 | 0.00
Potential rooting depth in defined soil profile (mm)	1500.00 | 1500.00
Salt tolerance	Moderately sensitive | Moderately tolerant
Salinity threshold (dS/m soil saturation extract)	1.80 | 6.00
Proportion of yield decrease per dS/m increase (fraction/dS/m)	0.07 | 0.07

Irrigation rules: Centre pivot

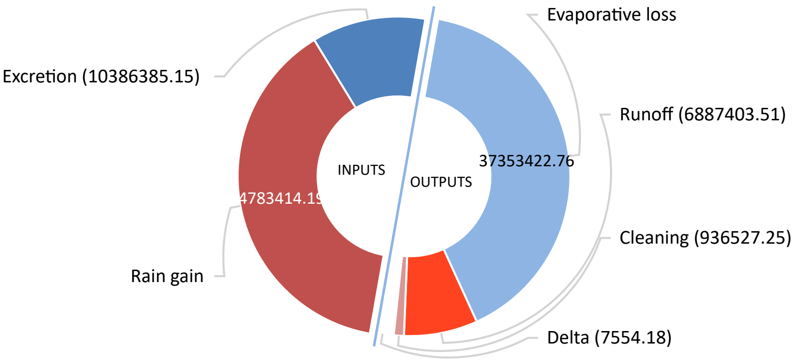
Rule 1. Irrigation triggered when soil water deficit reaches 30.00 mm and rainfall is less than or equal to 30.00 mm
Rule 2. Irrigate up to a soil water content of drained upper limit plus 0.00 mm
Rule 3. Irrigation window from 1/1 to 31/12 including the days specified
Rule 4. A minimum of 0 days must be skipped between irrigation events

Performance

Livestock yard information

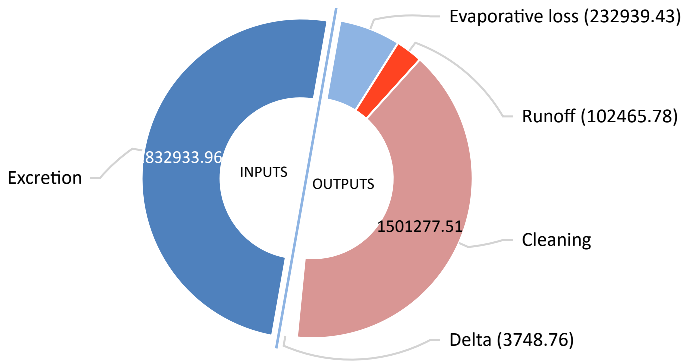
Enterprise Name: Springfield Feedlot - Springfield Pens

Yard water balance (kg/year)



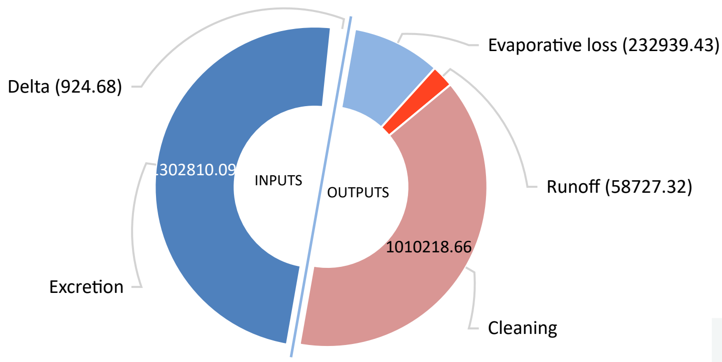
Name	Value
Rain gain	34783414.19
Excretion	10386385.15
Evaporative loss	37353422.76
Runoff	6887403.51
Cleaning	936527.25
Delta	7554.18

Yard total solids balance (kg/year)



Name	Value
Excretion	1832933.96
Evaporative loss	232939.43
Runoff	102465.78
Cleaning	1501277.51
Delta	3748.76

Yard volatile solids balance (kg/year)



Name	Value
Excretion	1302810.09
Evaporative loss	232939.43
Runoff	58727.32
Cleaning	1010218.66
Delta	-924.68

Pen cleaning: across the 27 -pen yard

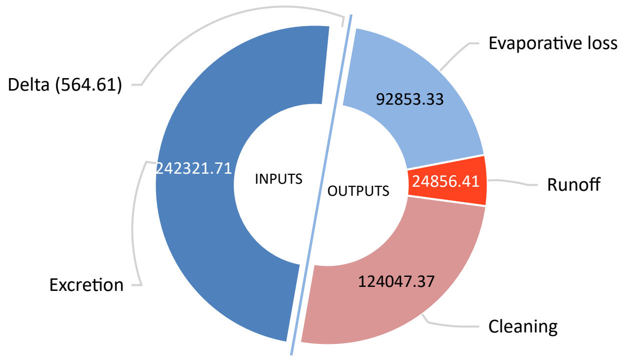
No. Days When At Least One Pen Was Cleaned: Over the simulation, at least one pen was cleaned on 2093 days over 100 years or 20.93 days/year.

Performance

Livestock yard information

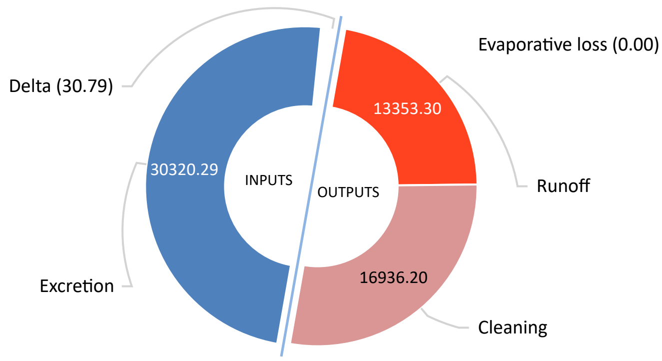
Enterprise Name: Springfield Feedlot - Springfield Pens

Yard total nitrogen balance (kg/year)



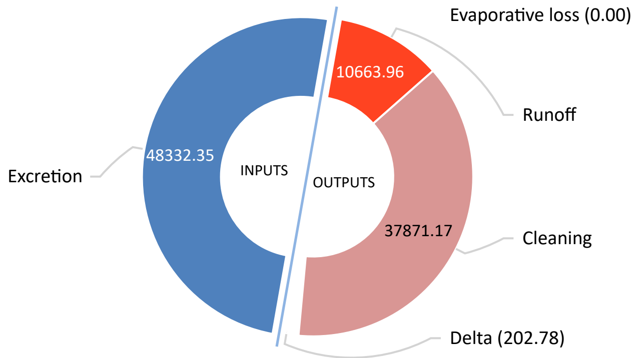
Name	Value
Excretion	242321.71
Evaporative loss	92853.33
Runoff	24856.41
Cleaning	124047.37
Delta	-564.61

Yard total phosphorus balance (kg/year)



Name	Value
Excretion	30320.29
Evaporative loss	0.00
Runoff	13353.30
Cleaning	16936.20
Delta	-30.79

Yard salts balance (kg/year)



Name	Value
Excretion	48332.35
Evaporative loss	0.00
Runoff	10663.96
Cleaning	37871.17
Delta	202.78

Enrichment ratios used

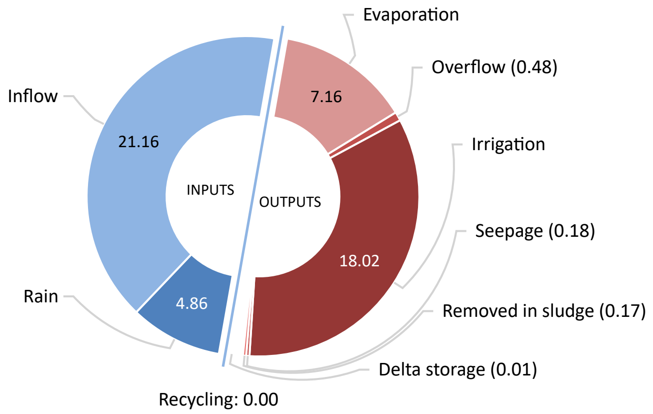
	Enrichment ratio
Total nitrogen	3.50
Total phosphorus	15.00
Salt	5.00

Performance

Pond system information

Pond System Configuration: 1 anaerobic pond (wet weather storage pond: 20 ML)

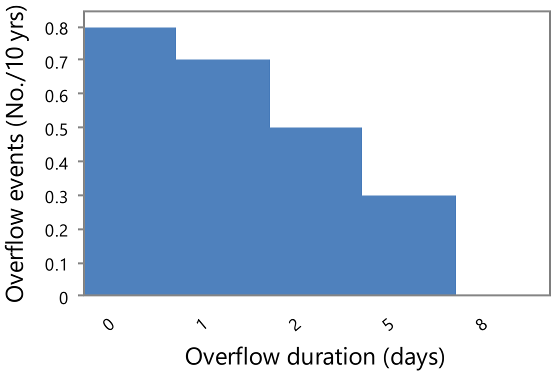
Pond system water balance (ML/year)

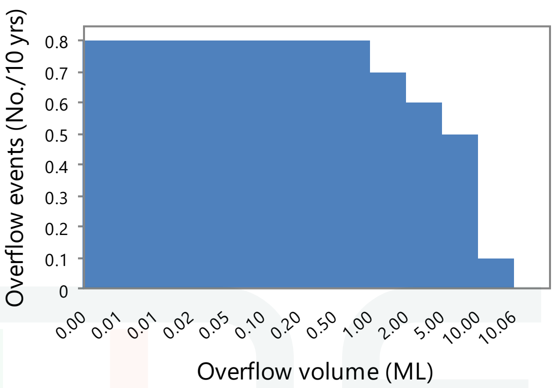


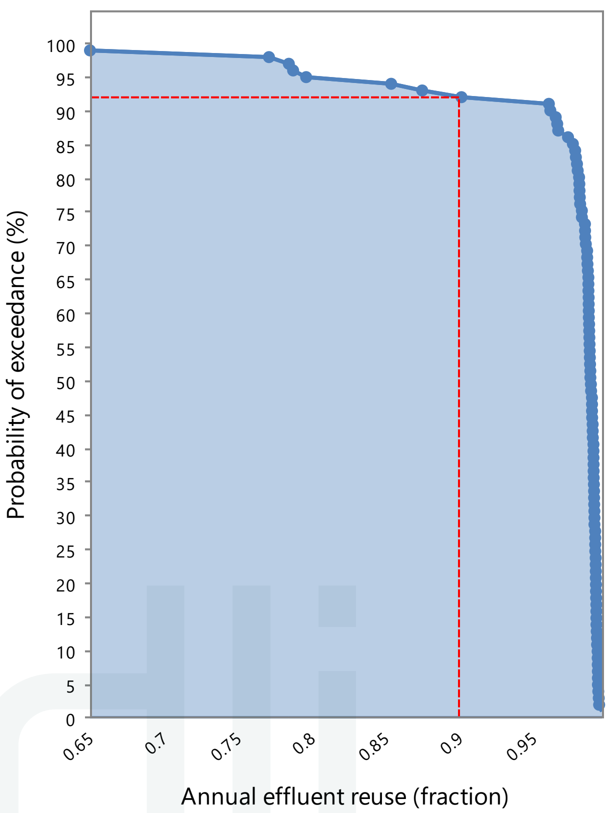
Name	Value
Rain	4.86
Inflow	21.16
Recycling	0.00
Evaporation	7.16
Overflow	0.48
Irrigation	18.02
Seepage	0.18
Removed in sludge	0.17
Delta storage	0.01

Overflow and reuse diagnostics

Metric	Value
Total volume of overflow (ML/10 years)	4.76
Total number of overflow events (events/10 years)	0.80
Total number of pond overflow days (days/10 years)	3.30
Probability of at least 90% effluent reuse (%)	92.13
Effluent reuse (Proportion of inflow + net gain in rain that is irrigated) (fraction)	0.97





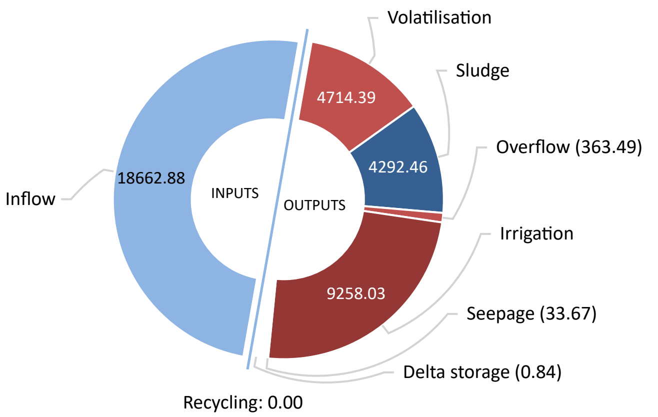


Performance

Pond system information

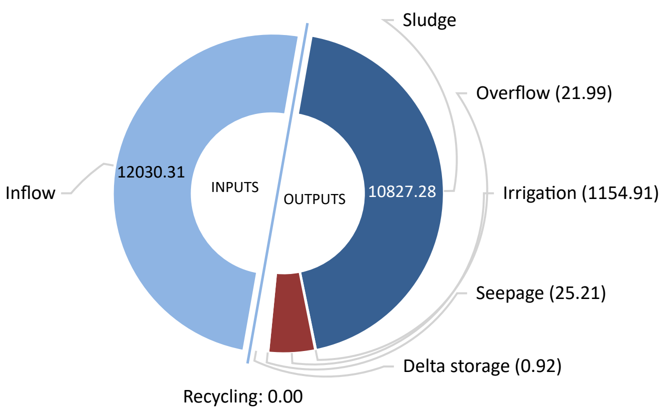
Pond System Configuration: 1 anaerobic pond

Pond system nitrogen balance (kg/year)



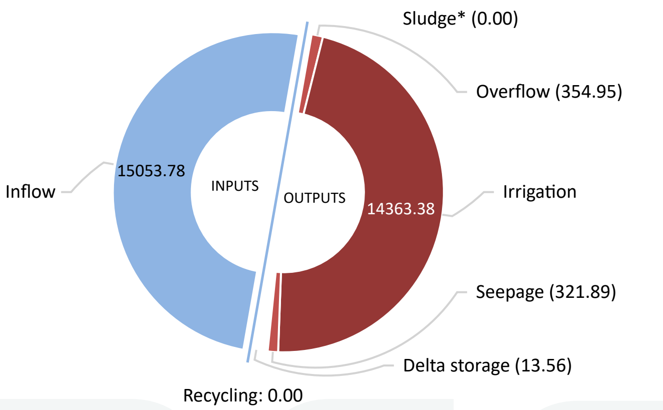
Name	Value
Inflow	18662.88
Recycling	0.00
Volatilisation	4714.39
Sludge	4292.46
Overflow	363.49
Irrigation	9258.03
Seepage	33.67
Delta storage	0.84

Pond system phosphorus balance (kg/year)



Name	Value
Inflow	12030.31
Recycling	0.00
Sludge	10827.28
Overflow	21.99
Irrigation	1154.91
Seepage	25.21
Delta storage	0.92

Pond system salt balance (kg/year)



Name	Value
Inflow	15053.78
Recycling	0.00
Sludge*	0.00
Overflow	354.95
Irrigation	14363.38
Seepage	321.89
Delta storage	13.56

* Salt removal in sludge is not calculated from the pond salt balance. However if salt could be assumed to be present in the sludge at the same concentration as in the pond supernatant (up to a maximum of salt added in inflow) - then salt accumulation in the sludge could be 38.73 kg/year

Pond system sludge accumulation: 102381.76 kg dwt/year

Performance

Pond system information

Pond System Configuration: 1 anaerobic pond

Pond nutrient concentrations and salinity

Average across simulation period	Pond 1
Average nitrogen concentration of pond liquid (mg/L)	330.82
Average phosphorus concentration of pond liquid (mg/L)	69.02
Average salinity of pond liquid (dS/m)	1.47

Value on final day of simulation period	Pond 1
Final nitrogen concentration of pond liquid (mg/L)	58.34
Final phosphorus concentration of pond liquid (mg/L)	64.30
Final salinity of pond liquid (dS/m)	1.47

Performance

Water use (assumes 100% irrigation efficiency)

Metric	Value
Pond water irrigated (ML/year)	18.02
Average shandy water irrigation (ML/year) (minimum - maximum)	767.58 (446.21 - 1080.58)
Total water irrigated (ML/year)	785.60
Proportion of irrigation events requiring shandying (fraction of events)	1.00
Proportion of years shandying water allocation of 1500 ML/year is exceeded (fraction of years)	0.00
Average exceedance as a proportion of annual shandy water allocation (fraction of allocation) (minimum - maximum)	0.00 (0.00 - 0.00)

Irrigation quality

Metric	Value
Average nitrogen concentration of irrigation water - before ammonia loss during irrigation (mg/L)	16.67
Average nitrogen concentration of irrigation water - after ammonia loss during irrigation (mg/L)	15.80
Average phosphorus concentration of irrigation water (mg/L)	1.47
Average salinity of irrigation water (dS/m)	0.71

Irrigation diagnostics

Metric	Value
No. periods/year without any irrigable effluent in the wet weather storage pond (periods/year)	10.89
Average length of such periods (days)	25.36

Irrigation triggering and application

No. Days without Irrigation Applied per Year: 109.39 (with water demand too small to trigger irrigation [106.17] and rain exceeding specified rainfall threshold [3.22])
No. Days without Irrigation Applied per Year: 109.39 (with not triggered)
No. Days with Irrigation Applied per Year: 255.86 (with supply limited - partial application)
No. Days with Irrigation Triggered per Year: 255.86

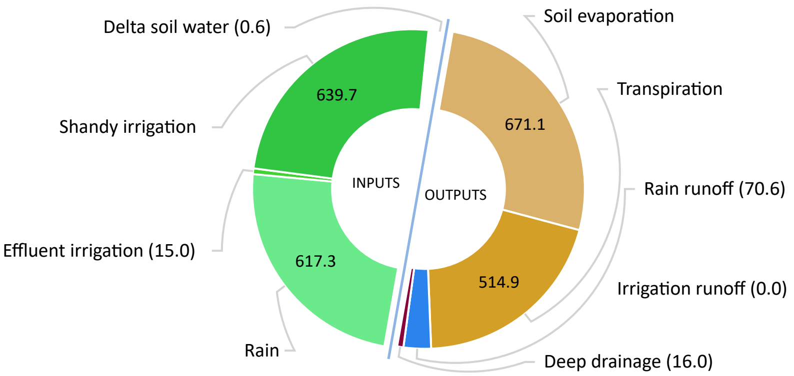
Performance

Paddock information

Paddock: Pivot, 120 ha

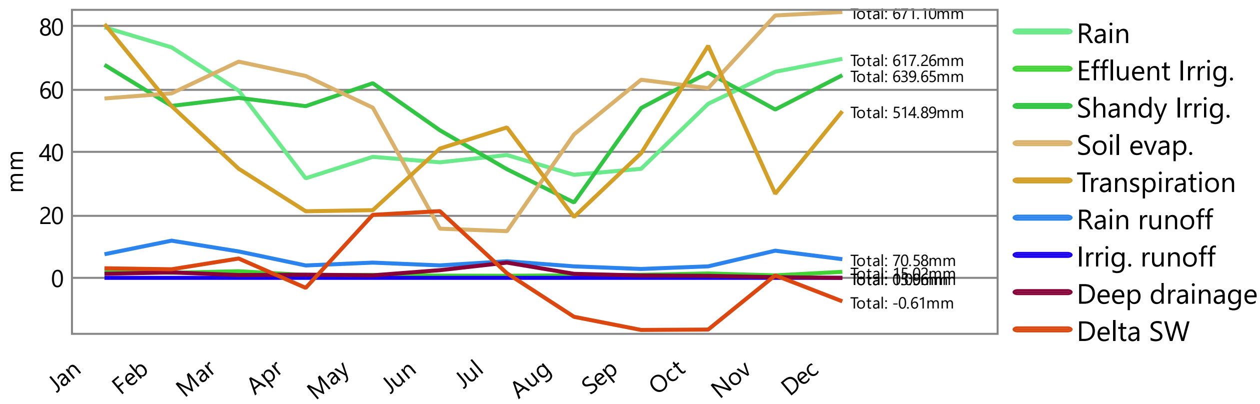
Soil Type: Springfield Brown/Grey Dermosol, 108.10 mm PAWC at maximum root depth

Soil water balance (mm/year)

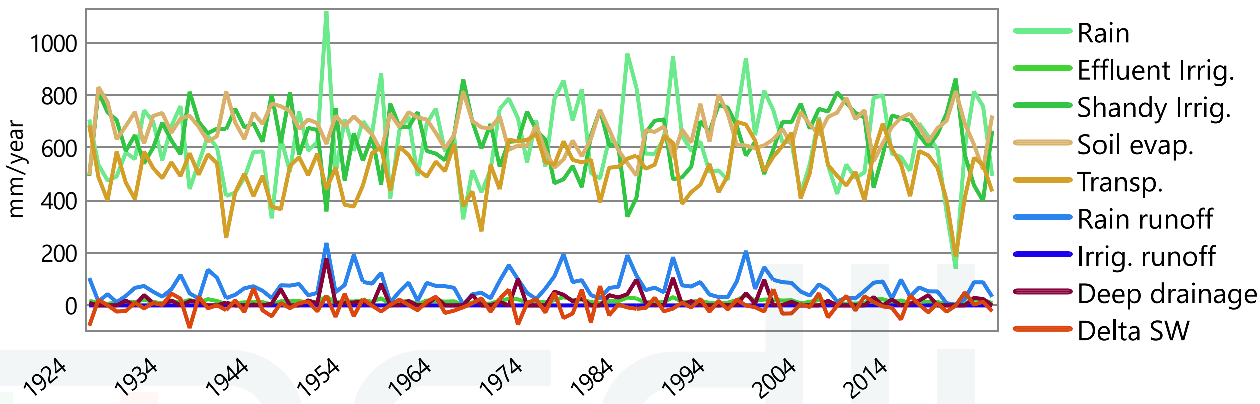


Name	Value
Rain	617.3
Effluent irrigation	15.0
Shandy irrigation	639.7
Soil evaporation	671.1
Transpiration	514.9
Rain runoff	70.6
Irrigation runoff	0.0
Deep drainage	16.0
Delta soil water	-0.6

Average monthly totals (mm)



Average annual totals (mm/year)

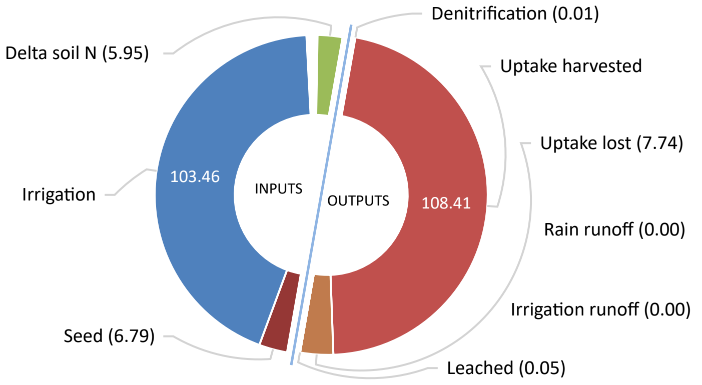


Performance

Paddock information

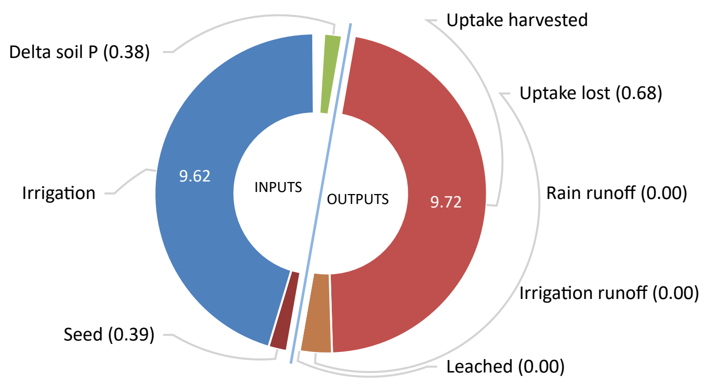
Paddock: Pivot, 120 ha
Soil Type: Springfield Brown/Grey Dermosol
Irrigation Ammonia-N Volatilisation Losses (kg/ha/year): 5.67
Proportion of Total Nitrogen in Irrigated Effluent as Ammonium (fraction): 0.20

Soil nitrogen balance (kg/ha/year)



Name	Value
Seed	6.79
Irrigation	103.46
Denitrification	0.01
Uptake harvested	108.41
Uptake lost	7.74
Rain runoff	0.00
Irrigation runoff	0.00
Leached	0.05
Delta soil N	-5.95

Soil phosphorus balance (kg/ha/year)



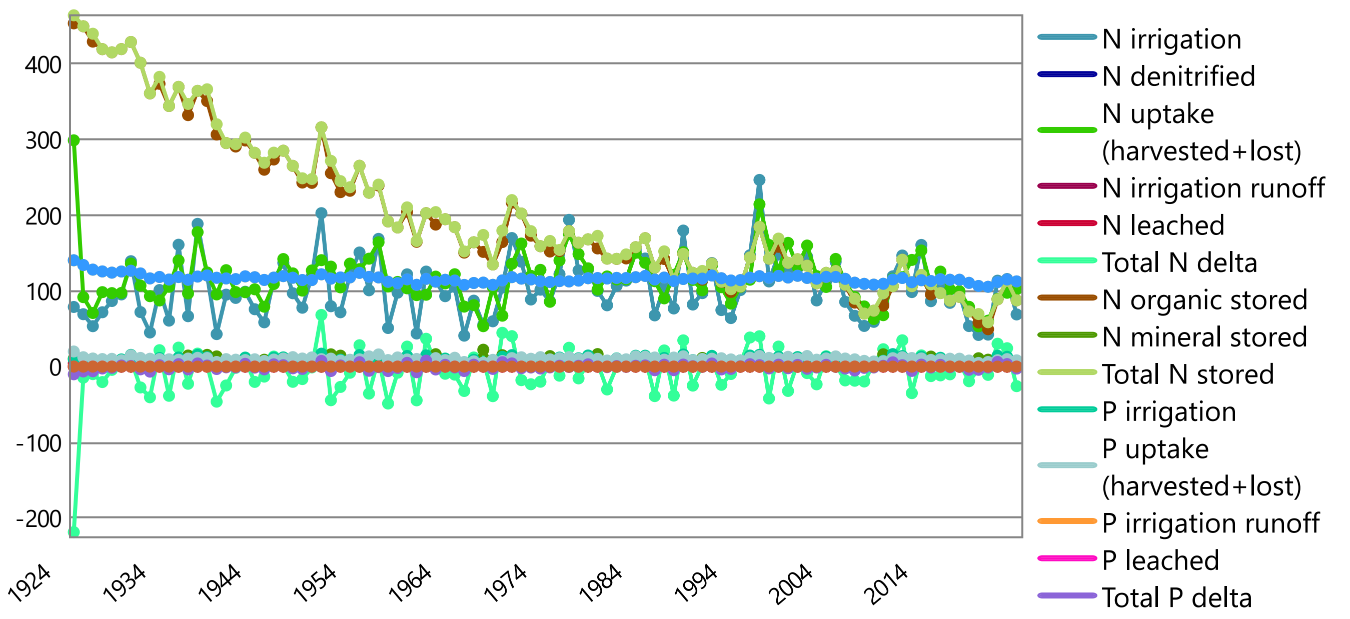
Name	Value
Seed	0.39
Irrigation	9.62
Uptake harvested	9.72
Uptake lost	0.68
Rain runoff	0.00
Irrigation runoff	0.00
Leached	1.62E-03
Delta soil P	-0.38

Performance

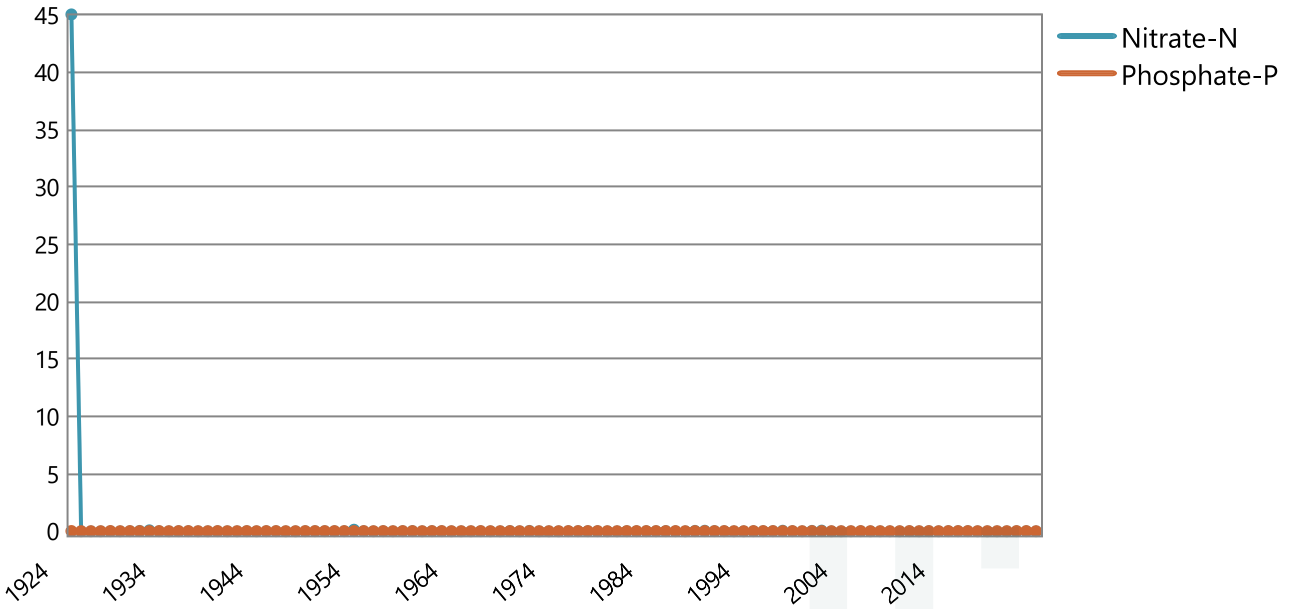
Paddock information

Paddock: Pivot, 120 ha
Soil Type: Springfield Brown/Grey Dermosol

Annual nutrient totals (kg/ha)



Annual nutrient leaching concentration (mg/L)



Performance

Paddock information

Paddock: Pivot, 120 ha
Soil Type: Springfield Brown/Grey Dermosol
Planting Regime: Rotated Forage maize crop & Barley crop

Plant growth (minimum - maximum)

Season one plant metrics	Value
Average annual shoot dry matter harvestable yield* (kg/ha/year)	6684.68 (958.25 - 13183.73)
Average annual shoot dry matter lost (kg/ha/year)	470.95 (105.78 - 880.92)
Average monthly plant (green) cover (fraction)	0.26 (0.00 - 0.67)
Average monthly root depth (mm)	660.92 (101.70 - 1345.89)

Season two plant metrics	Value
Average annual shoot dry matter harvestable yield* (kg/ha/year)	5795.86 (1728.73 - 10847.21)
Average annual shoot dry matter lost (kg/ha/year)	320.42 (0.00 - 1027.11)
Average monthly plant (green) cover (fraction)	0.44 (0.00 - 0.78)
Average monthly root depth (mm)	1120.18 (114.56 - 1500.00)

Plant nutrient uptake (minimum - maximum)

Season one plant metrics	Value
Average annual shoot nitrogen in harvestable yield* (kg/ha/year)	56.91 (13.00 - 171.60)
Average annual shoot nitrogen lost (kg/ha/year)	3.93 (0.84 - 8.06)
Average annual shoot phosphorus in harvestable yield* (kg/ha/year)	3.93 (0.89 - 8.05)
Average annual shoot phosphorus lost (kg/ha/year)	0.32 (0.05 - 0.54)
Average annual shoot nitrogen concentration (fraction dwt)	0.01 (0.01 - 0.03)
Average annual shoot phosphorus concentration (fraction dwt)	0.001 (0.000 - 0.001)

Season two plant metrics	Value
Average annual shoot nitrogen in harvestable yield* (kg/ha/year)	51.50 (20.27 - 111.71)
Average annual shoot nitrogen lost (kg/ha/year)	3.80 (0.00 - 13.54)
Average annual shoot phosphorus in harvestable yield* (kg/ha/year)	5.79 (2.59 - 10.97)
Average annual shoot phosphorus lost (kg/ha/year)	0.36 (0.00 - 0.80)
Average annual shoot nitrogen concentration (fraction dwt)	0.01 (0.01 - 0.02)
Average annual shoot phosphorus concentration (fraction dwt)	0.001 (0.001 - 0.002)

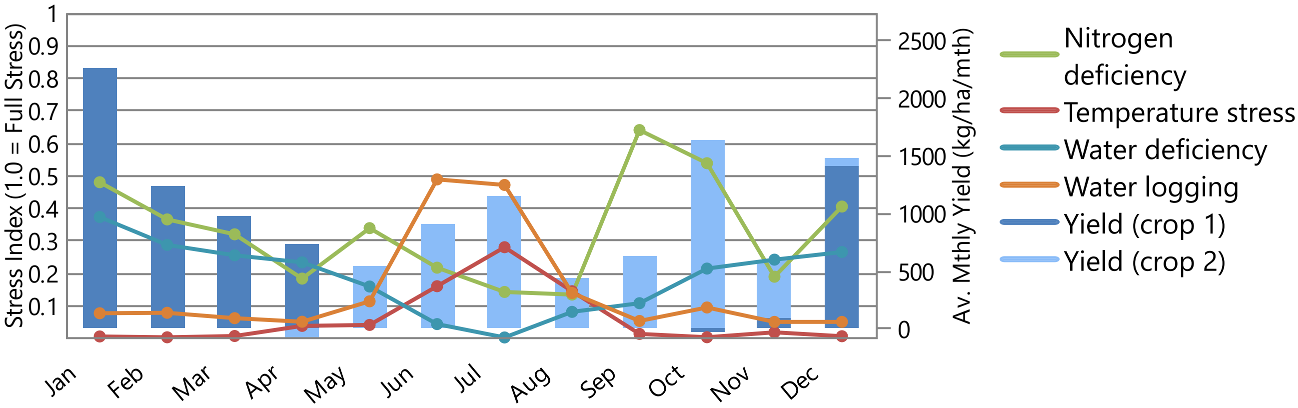
*Harvestable yield is a measure of *net* gain over a nominated period - say monthly. It is the total shoot-dry-matter gain minus any shot-dry-matter loss within a given period. Hence, just like financial investments, negative harvestable yields may occur when the (episodic) losses exceed the gains made within a particular accounting period.

Performance

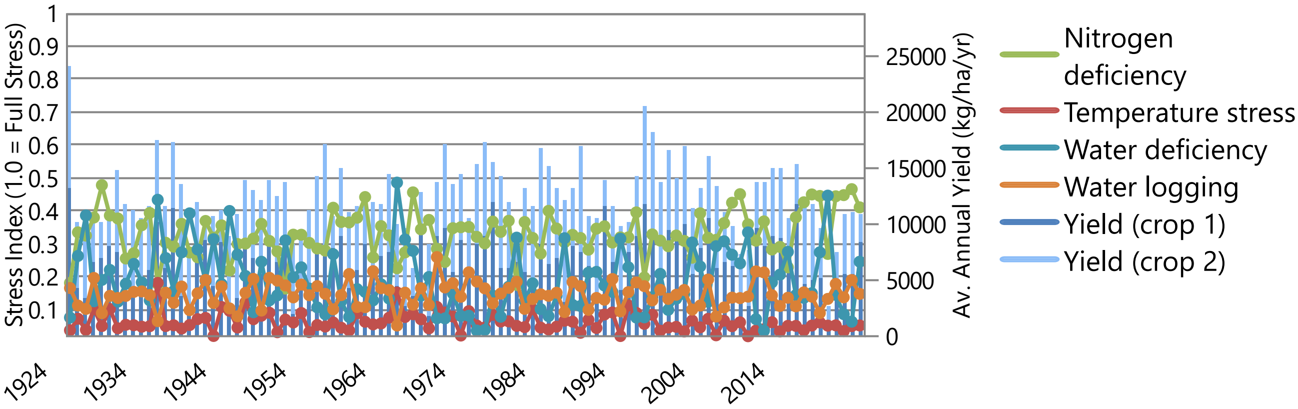
Paddock information

Paddock: Pivot, 120 ha
Soil Type: Springfield Brown/Grey Dermosol
Planting Regime: Rotated Forage maize crop & Barley crop

Av. monthly stresses & harvestable yield* (kg/ha/month)



Av. annual stresses & harvestable yield* (kg/ha/year)



*Harvestable yield is a measure of *net* gain over a nominated period - say monthly. It is the total shoot-dry-matter gain minus any shot-dry-matter loss within a given period. Hence, just like financial investments, negative harvestable yields may occur when the (episodic) losses exceed the gains made within a particular accounting period.

Normal and forced harvest information

No. of Harvests per Year: 3.64 (normal), 0.73 (forced by crop death due to water stress [0.46] and nitrogen stress [0.27]).
No. Days without Crop per Year (no./year): 16.42 (due to water stress [16.26] and frosting [0.16])

Performance

Paddock information

Paddock: Pivot, 120 ha
Soil Type: Springfield Brown/Grey Dermosol
Planting Regime: Rotated Forage maize crop & Barley crop

Plant salinity tolerance

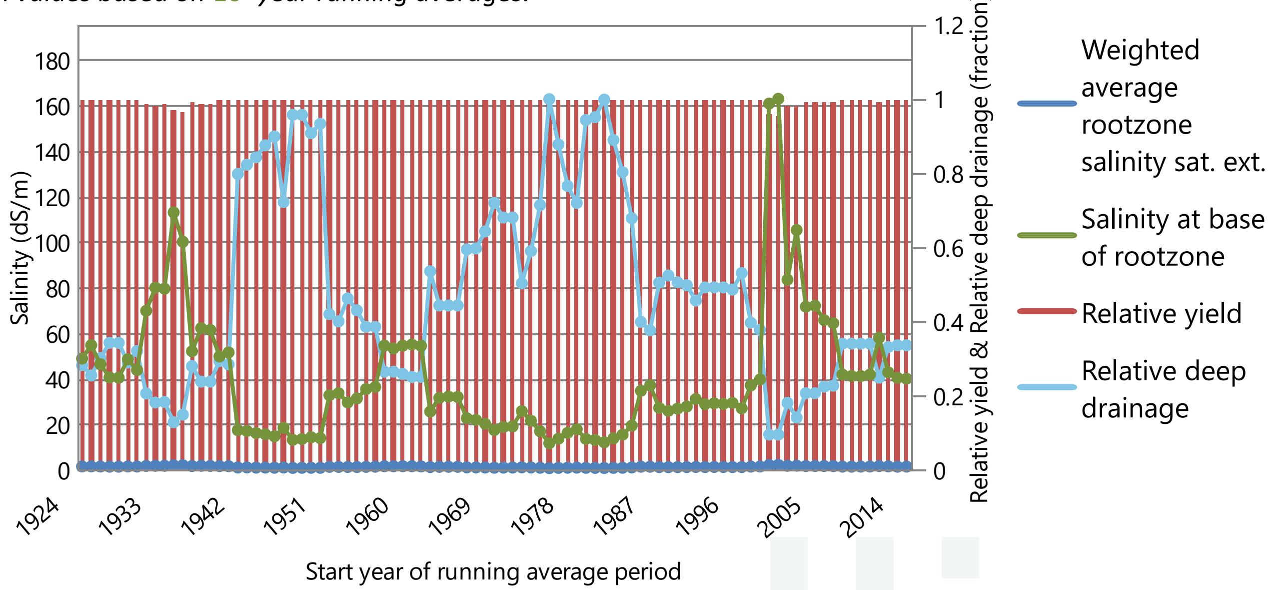
Metric	Value
Salt tolerance	Moderately sensitive | Moderately tolerant
Salinity threshold (dS/m soil saturation extract)	1.80 | 6.00
Proportion of yield decrease per dS/m increase (fraction/dS/m)	0.07 | 0.07
No. years assumed for leaching to reach steady-state (years)	10.00

Soil salinity

Metric	Value
Salinity of infiltrated water (Average salinity of rainwater = 0.03 dS/m) (dS/m)	0.40
Salt added by rainfall (kg/ha/year)	104.96
Average annual salt added & leached at steady state (kg/ha/year)	3090.29
Average leaching fraction based on 10 -year running averages (fraction)	0.12
Average water-uptake-weighted rootzone salinity sat. ext. (dS/m)	1.56
Salinity of the soil solution (at drained upper limit) at base of rootzone (dS/m)	40.73
Relative crop yield expected due to salinity (fraction)	1.00
Proportion of years that crop yields would be expected to fall below 90% of potential due to salinity (fraction)	0.00

Average annual rootzone salinity and relative yield

All values based on 10 -year running averages.

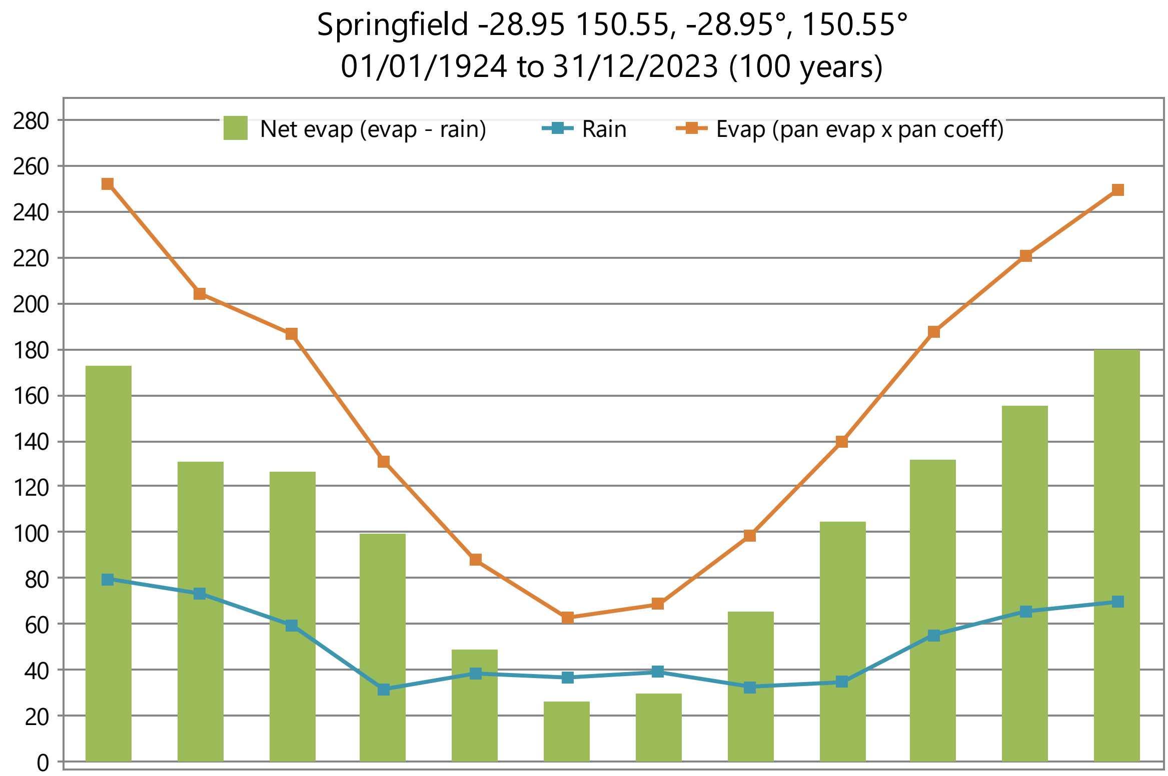


Diagnostics

Scenario information

Enterprise: Springfield Feedlot

Climate long-term monthly averages (mm)



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Rain	79.8	73.4	59.6	31.7	38.5	36.8	39.1	32.8	34.7	55.4	65.6	69.7	617.3
Evap	252.1	204.2	186.5	131.2	87.9	62.9	68.6	98.7	139.6	187.4	220.7	249.2	1889.1
Net evap	172.3	130.8	126.9	99.5	49.4	26.1	29.5	65.9	104.9	132.0	155.1	179.4	1271.8
Net evap/day	5.6	4.6	4.1	3.3	1.6	0.9	1.0	2.1	3.5	4.3	5.2	5.8	3.5

Diagnostics

Enterprise name:

Enterprise Name: Springfield Feedlot - Springfield Pens - 2490 SCU stocked - 0.250 % mortality

Key pad details

Name	Value
Pen pan factor for evaporation (at air dry MC - at max pugging MC)	0 - 1.2
Pad moisture content (at air dry MC - at max pad MC) (%g/g wet basis)	6.54 - 65.52
Bulk density (surface layer - subsurface layer) (g/cm3)	750 - 1000
Maximum percolation rate (mm/hour)	0.42
Baseline pad volatile solids decay rate (%pad VS/day)	0.15

Average pad manure composition

Component	Value	Powell (1994)	Sinclair (1994)
Dry matter content using wet basis (%g/g)	77.15	66	60
Water content using wet basis (%g/g)	22.85	34	40
Water content using dry basis (%g/g)	29.61	52	67
Total nitrogen content using dry basis (%g/g)	7.01	2.37	2.78
Total phosphorus content using dry basis (%g/g)	0.92	0.75	0.67
Salt content using dry basis (%g/g)	2.11	> 2.3	4.3

Note: The cattle used 41.68 ML/year of drinking water, at a salinity of 1.00 dS/m. The output assumes 0.40 (fraction) of total nitrogen excreted is in the urine, of which 0.60 (fraction) volatilises.

Pen cleaning (tonnes/head/year)

Name	Value	Expected
Excreted manure (dry matter basis)	0.76	0.6 - 1.6
Manure removed in cleaning (dry matter basis)	0.62	0.41 - 1.05
Water removed in cleaning	0.39	0.02 - 0.3
Wet manure removed in cleaning	1.01	0.7 - 1.07

Pen cleaning operation - Average cleaning interval (min. - max.): 107.0 (92.0 - 283.0) days

Reasons for not cleaning pens	Fraction of non-cleaning days for Pen 1	Fraction of non-cleaning days for Yard
Insufficient buildup / too soon to clean	0.00 / 0.88	0.00 / 0.86
Pad too dry / too wet	0.12 / 0.00	0.13 / 0.00
Skipped as too many pens to clean	0.00	0.01

Average runoff quantity (ML/year) and quality (mg/L) from each surface defined.

Livestock Yard Enrichment Ratios Used: Total nitrogen 3.5 , Total phosphorus 15 , Salt 5

Area Names	Runoff	TS	VS	TN	TP	Salt
Springfield Pens	6.9	14877.3	8526.8	3609.0	1938.8	1548.3
Springfield Hard Area	13.7	0.0	0.0	2.0	1.0	320.0
Springfield Soft Area	0.4	0.0	0.0	0.0	0.0	0.0

Mass lost in runoff as fraction of mass excreted

Runoff Expressed as a fraction of Rainfall, Yard: 0.20 , All Areas: 0.26

Area Names	TS	VS	TN	TP	Salt
Livestock yard	0.1	0.0	0.1	0.4	0.2
All defined areas	0.1	0.0	0.1	0.4	0.3

Diagnostics

Pond system information

Pond System Configuration: 1 anaerobic pond, desludging 2 times during the run according to the rule: "Maintain required active volume and desludge when sludge reaches 30% of pond volume"
Effluent Type: Waste estimation system - 21.16 ML/year or 0.06 ML/day generated on average

Effluent entering pond system after any pretreatment and recycling

Average (Minimum-Maximum) influent quality calculated for 52.57 non-zero flow days/year.

Constituent	Concentration (mg/L)	Load (kg/year)
Total nitrogen	881.89 (0.00 - 2667.13)	18662.88 (189.53 - 59259.67)
Total phosphorus	568.48 (0.00 - 2120.78)	12030.31 (179.90 - 27058.31)
Total dissolved salts	711.35 (0.00 - 1519.95)	15053.78 (1290.13 - 39608.19)
Volatile solids	1887.06 (0.00 - 5634.53)	39934.57 (362.90 - 139378.65)
Total solids	1743.08 (0.00 - 5250.36)	36887.68 (327.24 - 129105.60)

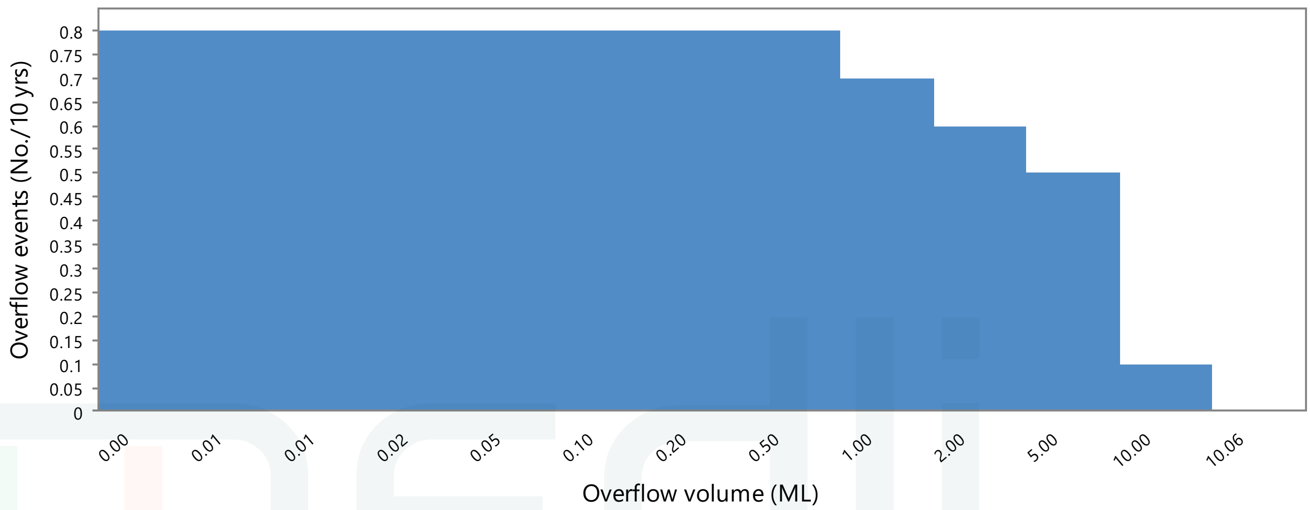
Ammonia-N loss from pond system water surface area: 94.73 kg/m2/year

Last pond (wet weather store): 20.00 ML

Metric	Value
Theoretical hydraulic retention time (days)	345.19
Volume of overflow (ML/year) Average (minimum-maximum)	0.48 (0.00 - 11.74)
Volume of overflow per day (m3/day) Average (minimum-maximum)	1.30 (0.00 - 7537.05)
No overflow days - Average per year (Total in run period)	0.33 (33)
No. overflow events per 10 years exceeding threshold of 0.010 ML* (events/10 years)	0.80
Average overflow event recurrence interval (years)	12.50
Average duration of overflow (days)	4.13
Probability of at least 90% effluent reuse (%)	92.13
Effluent reuse (proportion of inflow + net rain gain that is irrigated) (fraction)	0.97
Average salinity (dS/m)	1.47
Salinity on final day of simulation (dS/m)	1.47

* The overflow event is calculated as defined in WATBAL and based on the National Guidelines for Beef Cattle Feedlots in Australia

Volume distribution of the overflow events



Diagnostics

Scenario information

Area irrigated: 120 ha total area

Loading to whole irrigation area: (assuming 100% irrigation efficiency)

	Quantity/year	Quantity/ha/year
Total irrigation applied (ML)	785.60	6.55
Total nitrogen applied (kg)	12414.94	103.46
Total phosphorus applied (kg)	1154.91	9.62
Total salts applied (kg)	358239.22	2985.33

Shandying

Metric	Value
Annual allocation of fresh water for shandying (ML/year)	1500.00
Average shandy water irrigation (ML/year) (minimum - maximum)	767.58 (446.21 - 1080.58)
Average exceedance as a proportion of annual shandy water allocation (% of allocation) (minimum - maximum)	0.00 (0.00 - 0.00)
Minimum shandy water is used	No

Irrigation issues

Metric	Value
Number of days without irrigation (days/year)	109.39
Number of periods without irrigatable water (periods/year)	10.89
Average length of such periods (days)	25.36

Paddock information

Paddock: - Pivot, 120 ha

Irrigation: Centre pivot with 0.26% ammonium loss during irrigation

Irrigation Rules
Irrigation triggered when soil water deficit reaches 30.00 mm and rainfall is less than or equal to 30.00 mm
Irrigate up to a soil water content of drained upper limit plus 0.00 mm
Irrigation window from 1/1 to 31/12 including the days specified
A minimum of 0 days must be skipped between irrigation events

Soil water balance (mm): Springfield Brown/Grey Dermosol, 108.10 mm PAWC at maximum root depth

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Rain	79.8	73.4	59.6	31.7	38.5	36.8	39.1	32.8	34.7	55.4	65.6	69.7	617.3
Efflt. irrg.	2.2	1.6	2.1	0.9	0.9	0.7	0.7	0.8	1.0	1.4	0.8	1.9	15.0
Shdy. irrg.	67.8	54.8	57.3	54.7	62.0	47.0	34.6	24.0	54.1	65.3	53.6	64.5	639.7
Soil evap	57.1	58.7	68.8	64.3	54.2	15.7	14.9	45.7	63.1	60.4	83.6	84.7	671.1
Transpn.	80.8	54.7	34.7	21.2	21.5	41.2	47.9	19.4	39.7	73.9	26.8	53.1	514.9
Rain runoff	7.5	11.8	8.4	3.9	4.8	4.0	5.3	3.7	2.8	3.7	8.7	5.9	70.6
Irr. runoff	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Drainage	1.3	1.7	0.9	1.0	0.8	2.4	4.9	1.3	0.8	0.7	0.2	0.0	16.0
Delta SW	3.0	2.7	6.2	-3.2	20.1	21.2	1.5	-12.4	-16.6	-16.5	0.8	-7.5	-0.6

Soil nitrogen balance: (Concentrations are flow-weighted)

Metric	Value
Average annual nitrogen added in seed (kg/ha/year)	6.79
Average annual nitrogen added from irrigation (kg/ha/year)	103.46
Av. annual soil N removed by uptake (harvest + lost) (kg/ha/year)	116.15 (108.41, 7.74)
Av. annual soil nitrogen removed by denitrification (kg/ha/year)	0.01
Average annual soil nitrogen leached (kg/ha/year)	0.05
Average annual nitrate-N loading to groundwater (kg/ha/year)	0.05
Soil organic-N kg/ha (Initial - Final)	419.40 - 87.66
Soil inorganic-N kg/ha (Initial - Final)	263.70 - 0.04
Average nitrate-N concentration of deep drainage (Max annual concentration)	
Across all years (mg/L)	0.29 (45.02)
Excluding first year of data (mg/L)	0.01 (0.13)

Soil phosphorus balance: (Concentrations are flow-weighted)

Metric	Value
Average annual phosphorus added in seed (kg/ha/year)	0.39
Average annual phosphorus added from irrigation (kg/ha/year)	9.62
Av. annual soil P removed by uptake (harvest + lost) (kg/ha/yr)	10.40 (9.72, 0.68)
Average annual soil phosphorus leached (kg/ha/year)	1.62E-03
Dissolved phosphorus (kg/ha) (Initial - Final)	0.16 - 0.04
Adsorbed phosphorus (kg/ha) (Initial - Final)	150.57 - 112.68
Average phosphate-P concentration in rootzone (mg/L)	0.02
Average phosphate-P concentration of deep drainage (Max annual concentration)	
Across all years (mg/L)	0.00 (0.02)
Last year only (mg/L)	0.00 (N.D.*)
Design soil profile storage life based on average infiltrated water phosphorus concn. of 0.80 mg/L (years)	999.00

* Not determined

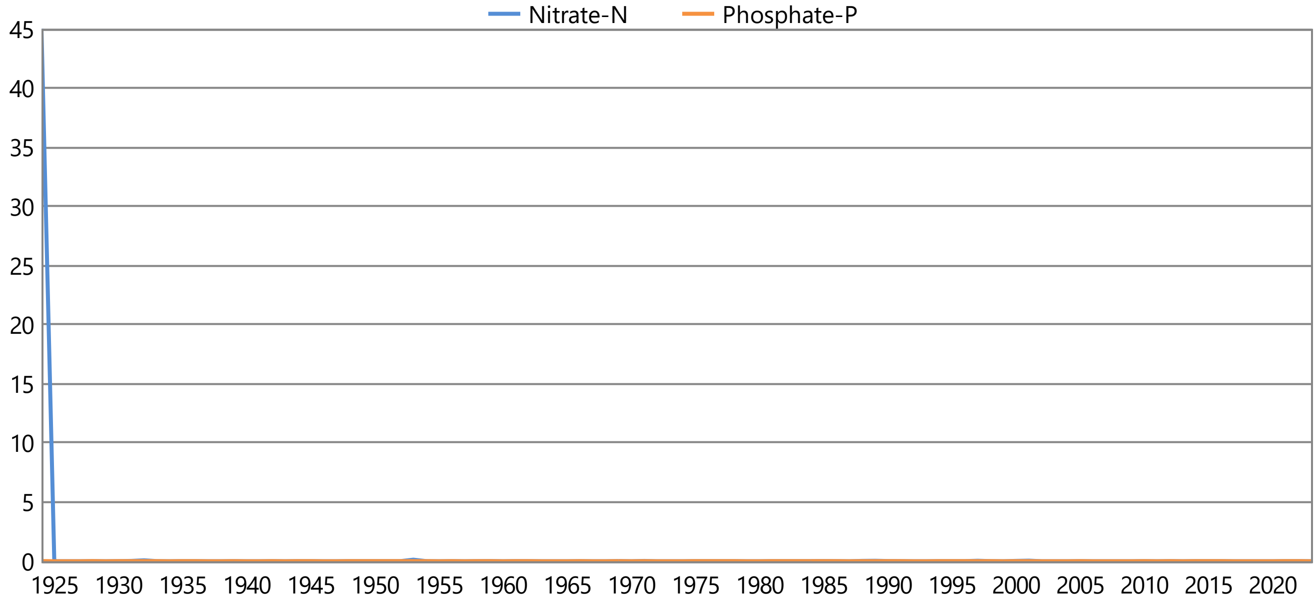
Diagnostics

Paddock information

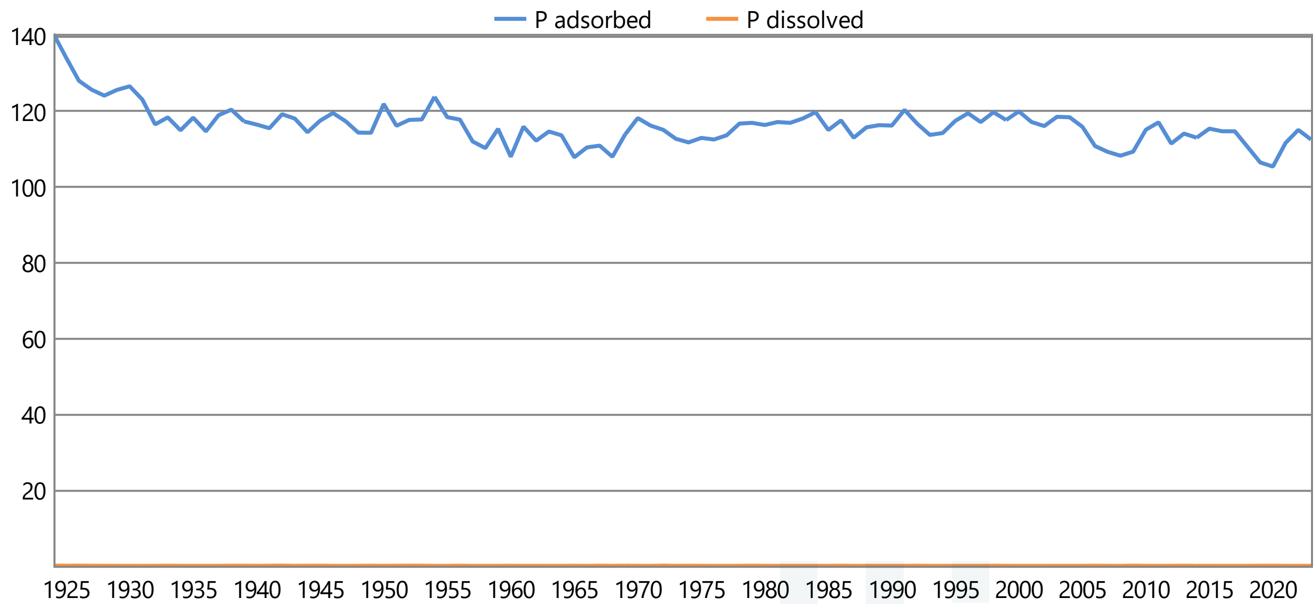
Paddock: Pivot, 120 ha

Irrigation: Centre pivot with 0.26% ammonium loss during irrigation

Annual nutrient leachate concentration (mg/L)



Annual phosphate-P in soil (kg/ha)



Diagnostics

Paddock information

Paddock: Pivot, 120 ha

Planting Regime: Rotated Forage maize crop & Barley crop

Average plant performance (minimum - maximum)

Metric	Value
Average annual shoot dry matter harvestable yield (kg/ha/year)	12480.54 (2686.97 - 24030.94)
Average annual shoot dry matter lost (kg/ha/year)	791.37 (411.77 - 1345.85)
Average monthly plant (green) cover (fraction)	0.44 (0.19 - 0.78)
Average monthly crop factor (fraction)	0.38 (0.17 - 0.70)
Dead cover (if Mthly Covers) or Tot. cover left after harvest (fraction)	0.00 | 0.00
Average monthly root depth (mm)	962.74 (465.91 - 1417.38)
Average number of normal harvests per year (no./year)	3.64 (2.00 - 4.00)
Average number of normal harvests for last five years only (no./year)	3.40
Average number of forced harvests per year (no./year)	0.73 (0.00 - 3.00)
Average number of forced harvests for last five years only (no./year)	1.20
Average annual nitrogen deficiency index (0 = no stress, 1 = full stress) (coefficient)	0.33 (0.16 - 0.48)
Average January temperature stress index (0 = no stress, 1 = full stress) (coefficient)	0.01 (0.00 - 0.09)
Average July temperature stress index (0 = no stress, 1 = full stress) (coefficient)	0.28 (0.00 - 0.63)
Average monthly water stress index (0 = no stress, 1 = full stress) (coefficient)	0.19 (0.00 - 0.37)
Average monthly waterlogging index (0 = no stress, 1 = full stress) (coefficient)	0.15 (0.05 - 0.49)
No. days without crop per year. Excludes bare fallow days (days)	16.42

Soil salinity - plant salinity tolerance: Moderately sensitive | Moderately tolerant

Assumes 1.0 dS/m Electrical Conductivity = 640 mg/L Total Dissolved Salts

All values based on 10 -year running averages.

Metric	Value
Salinity of infiltrated water (Average salinity of rainwater = 0.03 dS/m) (dS/m)	0.40
Salt added by rainfall (kg/ha/year)	104.96
Average annual salt added & leached at steady state (kg/ha/year)	3090.29
Average leaching fraction based on 10 -year running averages (fraction)	0.12
Average water-uptake-weighted rootzone salinity sat. ext. (dS/m)	1.56
Salinity of the soil solution (at drained upper limit) at base of rootzone (dS/m)	40.73
Relative crop yield expected due to salinity (fraction)	1.00
Proportion of years that crop yields would be expected to fall below 90% of potential due to salinity (fraction)	0.00

Diagnostics

Run information

Messages generated when the scenario was run
************************************** WASTESTREAM RESULTS **************************************
TABLE OF QUANTITY AND QUALITY OF EACH RUNOFF-BASED WASTESTREAM (AFTER PRETREATMENT AND BEFORE ENTERING ANY SEDIMENTATION BASIN)
____
Surface defined Runoff_ML/yr N conc_mg/L P conc_mg/L TDS conc_mg/L Area_ha Runoff_mm/yr Runoff as_%rainfall
Springfield Pens* 6.9 3609.0 1938.8 1548.3 5.6 122.2 19.8
Springfield Hard Area* 13.7 2.0 1.0 320.0 5.0 276.7 44.8
Springfield Soft Area 0.4 0.0 0.0 0.0 2.6 15.6 2.5
Combined runoff 21.0 1184.2 636.1 716.4 13.2 159.0 25.8
____
* Wastestreams flowing into sedimentation basin
TABLE OF QUANTITY AND QUALITY OF MANURE AND ALSO EACH RAINFALL-INDEPENDENT WASTESTREAM (AFTER PRETREATMENT AND BEFORE ENTERING ANY SEDIMENTATION BASIN)
____
Source Volume_m3/yr N conc_mg/L P conc_mg/L TDS conc_mg/L N load_kg/yr P load_kg/yr TDS load_kg/yr
Manure removed from Springfield Pens 2437.8 50884.9 6947.3 15534.9 124047.4 16936.2 37871.2
____
(Dead carcasses removed from yard: 7321.9 kg/yr) (Average moisture content of manure removed: 38.4 %g/g wet basis) * Wastestreams flowing into sedimentation basin
TABLE OF WASTESTREAM FLOWS TREATED BY 0.6 HA SEDIMENTATION BASIN:
____
Value defined Volume_ML/yr N load_kg/yr P load_kg/yr TDS load_kg/yr
Additions and Removals +0.1 -6221.0 -1336.7 -0.0
Post-Sedimentation Basin flow 20.6 24883.8 13367.0 15053.8
____
TABLE OF FINAL COMBINED WASTESTREAM COMPOSITION (EXCLUDING IMPACT OF RECYCLING)
____
Total flow Volume_ML/yr N conc_mg/L P conc_mg/L TDS conc_mg/L N load_kg/yr P load_kg/yr TDS load_kg/yr
Inflow to pond system 21.2 881.9 568.5 711.3 18662.9 12030.3 15053.8
____
************************************** END WASTESTREAM RESULTS **************************************
No. Days without Irrigation Applied per Year: 109.39 (with water demand too small to trigger irrigation [106.17] and rain exceeding specified rainfall threshold [3.22])
WARNING: Plant phosphorus deficiency. At shoot P concentrations below 0.2% dry weight, many plant species will show reduced yields due to phosphorus deficiency. Please check if this is true for the simulated species, as if so, the predicted plant yield and soil nutrient balances will be INVALID!
WARNING: CONDITIONAL FINISH!

Appendix N

Preliminary Risk Screening

Proposed Intensive livestock agriculture development (Expansion of beef cattle feedlot from 999 head to 3,000 head) on the property "Springfield"

SEPP (Resilience and Hazards) 2021 Preliminary Risk Screening Assessment

"Springfield"
2513 Getta Getta Road
North Star NSW 2408

Doolin Farming Pty Ltd
"Glenhoma"
3202 Getta Getta Road
NORTH STAR NSW 2408

[February 2025]

RDC ENGINEERS | AGRICULTURAL ENVIRONMENTAL PROJECT MANAGEMENT

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DOCUMENT INFORMATION RECORD

Project details

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Project:	Proposed expansion of Springfield Feedlot
Project No:	E2-103

Document control

Document title:	Proposed Intensive livestock agriculture development (Expansion of beef cattle feedlot from 999 head to 3,000 head) on the property "Springfield" - SEPP (Resilience and Hazards) 2021 Preliminary Risk Screening Assessment		
File name:	E2-103 DF Springfield FL PRS V1R2.docx		
Revision:	V1R2		
Author:	Rod Davis	**Position:**	Director
Signature:	R.J. Davis	**Date:**	21/02/2025
Reviewed by:	Rod Davis	**Position:**	Director
Signature:	R.J. Davis	**Date:**	21/02/2025
Approved by:	Rod Davis	**Position:**	Director
Signature:	R.J. Davis	**Date:**	21/02/2025

Revision history

Version	Issue date	Reason for issue	Author	Reviewed by	Approved by
V1R1	24/01/2025	Draft for client review	Rod Davis	Rod Davis	Rod Davis
V1R2	21/02/2025	Final for lodgement to GSC	Rod Davis	Rod Davis	Rod Davis

Distribution

Version	Recipient	Lodgement	Copies
V1R1	Doolin Farming Pty Ltd	Electronic	-
V1R2	Doolin Farming Pty Ltd / Gwydir Shire Council (GSC)	Electronic	-

Disclaimer

Citation

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Executive Summary

Doolin Farming Pty Ltd own and operate a 10,000 ha mixed farming operation across several properties at North Star including “Glenhoma”, “Glenmodel”, “Springfield”, “Myall Downs” and “Yetman West” some 27 km east of Yetman and 45 km south-southeast of Goondiwindi (QLD) in NSW.

Doolin Farming Pty Ltd primarily engage in dryland and irrigated cropping and beef production. Doolin Farming Pty Ltd produces wheat, barley, oats and chickpeas in winter and cotton and maize in summer under pivot irrigation systems and dryland sorghum cropping.

Currently the beef supply chain includes breeding and growing of beef cattle on land less suitable for dryland and irrigated cropping and grazing of stubble and lot feeding of cattle within a feedlot on the property ‘Springfield”.

“Springfield” comprises some 1,713 ha (~4,231 acres) and currently, a dryland and irrigated cropping business is undertaken on a large proportion of the property with extensive cattle breeding and grazing and lot feeding of cattle.

Springfield Feedlot is approved as a 999 head feedlot and does not require an environmental licence from NSW EPA. Springfield Feedlot is accredited under the National Feedlot Accreditation Scheme (NFAS) with audits conducted annually.

Springfield Feedlot currently operates for 12 months of the year and employs approximately 2 full time staff. Casual staff and contractors are engaged as required during busy periods such as planting and harvesting of silage and fodder and to supply various associated services such as plant maintenance and veterinary requirements.

Doolin Farming Pty Ltd wish to expand Springfield Feedlot from the current approved capacity of 999 head by gaining development approval for intensive livestock agriculture to operate as a 3,000 head beef cattle feedlot on the site. The proposed development is to be developed in two stages with the first stage having a capacity of 1,251 head. The second stage will provide an additional 750 head, bringing the capacity of Springfield Feedlot to 3,000 head.

The proposed development will include additional pens within an expanded controlled drainage area, additional sedimentation basin and holding pond capacity. The proposed development will incorporate best practice design, construction and environmental management.

Existing infrastructure such as the grain storage and processing and cattle handling facilities have sufficient capacity to cater for the demands of the proposed development.

The property “Springfield” is within the Gwydir Shire Council local government area and relevant environmental planning instrument is the *Gwydir Local Environmental Plan 2013* (GLEP).

Beef cattle feedlots which exceed 1,000 head capacity are defined as designated development under Schedule 3 (Part 1 section 21a) of the Environmental Planning and Assessment

Regulation 2000 and therefore require a full Environmental Impact Statement (EIS) to accompany the development application.

Pursuant to State Environmental Planning Policy (Resilience and Hazards) 2021 it has been identified that consideration should be made as to whether the proposed development is considered a 'hazardous or potentially hazardous industry'.

A development is considered potentially hazardous and requires a Preliminary Hazard Analysis (PHA) if the storage or transport of dangerous goods exceeds screening thresholds specified in SEPP (Resilience and Hazards) 2021.

This report forms part of the EIS prepared to support the Development Application to the Gwydir Shire Council for the proposed development. A preliminary risk screening method set out in *Hazardous and Offensive Development Application Guidelines, Applying SEPP 3*3 (Department of Planning, 2011) has been undertaken to assess the possible off-site effects or consequences from hazardous materials present on site, taking into account locational characteristics.

Various hazardous materials, such as diesel fuel shall be stored on the proposed development site during construction and/or operation. The preliminary risk screening assessment demonstrates that the quantity and distance from site boundaries is less than the screening threshold, and no further analysis is necessary. Hence, the proposed development is not a 'hazardous or potentially hazardous industry'.

1 Introduction

Doolin Farming Pty Ltd own and operate a 10,000 ha mixed farming operation across several properties at North Star including “Glenhoma”, “Glenmodel”, “Springfield”, “Myall Downs” and “Yetman West” some 27 km east of Yetman and 45 km south-southeast of Goondiwindi (QLD) in NSW.

Doolin Farming Pty Ltd primarily engage in dryland and irrigated cropping and beef production. Doolin Farming Pty Ltd produces wheat, barley, oats and chickpeas in winter and cotton and maize in summer under pivot irrigation systems and dryland sorghum cropping. Doolin Farming Pty Ltd also have onsite storage to accommodate almost the entire grain produced and operate a fleet of trucks to transport their grain.

Central to the beef production enterprise is the breeding, growing and lot-feeding of cattle for the domestic market. Currently the beef supply chain includes breeding and growing of beef cattle on land less suitable for dryland and irrigated cropping and grazing of stubble and lot feeding of cattle within a feedlot on the property ‘Springfield”.

“Springfield” comprises some 1,713 ha (~4,231 acres) and currently, a dryland and irrigated cropping business is undertaken on a large proportion of the property with extensive cattle breeding and grazing of beef cattle on the remaining land which is unsuitable for cropping and lot feeding of cattle within a beef cattle feedlot in the north-east of the property. In the last few years, beef cattle bred on several adjoining properties have been walked into a feeding program on “Springfield” upon weaning. “Springfield” has built infrastructure such as a dwelling, machinery sheds, silos, cattle yards and feedlot etc to support the feeding program.

There has been a beef cattle feedlot on “Springfield” for over three years after approval was granted for a 999 head feedlot by the Gwydir Shire Council in 2021 (DA31/2020). Under Schedule 3, Item 21 of the Environmental Planning and Assessment Regulation 2000, as the capacity of the existing development does not exceed 1000 head it is not a designated development and an environmental licence from NSW EPA is not required.

The existing feedlot is known as Springfield Feedlot. Springfield Feedlot is used to finish the Doolin Farming’s own cattle for the domestic export market.

Springfield Feedlot currently operates for 12 months of the year and employs approximately 2 full time staff. Casual staff and contractors are engaged as required during busy periods such as planting and harvesting of silage and fodder and to supply various associated services such as plant maintenance and veterinary requirements.

Springfield Feedlot includes one controlled drainage area with associated production pens and drainage system which includes catch drains, sedimentation basin and holding pond. Springfield Feedlot also has auxiliary infrastructure to support the use such as cattle handling and feed storage and processing facilities.

Springfield Feedlot is accredited under the National Feedlot Accreditation Scheme (NFAS) with audits conducted annually.

Doolin Farming Pty Ltd wish to expand Springfield Feedlot from the current approved capacity of 999 head by gaining development approval for intensive livestock agriculture to operate as a 3,000 head beef cattle feedlot on the site. The proposed development is to be developed in two stages with the first stage having a capacity of 1,251 head. The second stage will provide an additional 750 head, bringing the capacity of Springfield Feedlot to 3,000 head.

The proposed development will include additional pens within an expanded controlled drainage area, additional sedimentation basin and holding pond capacity. The proposed development will incorporate best practice design, construction and environmental management.

Existing infrastructure such as the grain storage and processing and cattle handling facilities have sufficient capacity to cater for the demands of the proposed development.

The property "Springfield" is within the Gwydir Shire Council local government area and relevant environmental planning instrument is the *Gwydir Local Environmental Plan 2013* (GLEP).

Doolin Farming Pty Ltd have access to a secure and appropriately licensed water supply provided by groundwater from the NSW Great Artesian Basin Eastern recharge groundwater source for irrigation and stock intensive use on the subject land under access licence 90AL834721.

Beef cattle feedlots which exceed 1,000 head capacity are defined as designated development under Schedule 3 (Part 1 section 21a) of the Environmental Planning and Assessment Regulation 2000 and therefore require a full Environmental Impact Statement (EIS) to accompany the development application.

This report forms part of the EIS prepared to support the Development Application to the Gwydir Shire Council for the proposed development. It provides a preliminary risk screening assessment to ensure that Council has sufficient information to assess whether the development is hazardous or offensive and to ensure that any measures proposed to be employed to reduce the impact of the development are taken into account.

2 Objectives

Doolin Farming Pty Ltd wish to expand Springfield Feedlot from the current approved capacity of 999 head by gaining development approval for intensive livestock agriculture to operate as a 3,000 head beef cattle feedlot on the site.

The proposed development is categorised as Intensive livestock agriculture under the Gwydir Local Environment Plan 2013.

Beef cattle feedlots which exceed 1,000 head capacity are defined as designated development under Schedule 3 (Part 1 section 21a) of the Environmental Planning and Assessment Regulation 2000 and therefore require a full Environmental Impact Statement (EIS) to accompany the development application. Consequently, the development application is required to be accompanied by an EIS.

Assessment of the impacts of the proposed development include consideration of State Environmental Planning Policies (SEPPs) which deal with matters of state or regional environmental planning significance. Various SEPPs are of relevance to the proposed development and are outlined in the EIS.

State Environmental Planning Policy (Resilience and Hazards) 2021 aims to amend the definitions of hazardous and offensive industries where used in environmental planning instruments and to ensure that the consent authority has sufficient information to assess whether the development is hazardous or offensive and to ensure that any measures proposed to be employed to reduce the impact of the development are taken into account.

It has been identified that consideration should be made as to whether the proposed development is considered a hazardous or potentially hazardous industry under State Environmental Planning Policy (Resilience and Hazards) 2021.

In accordance with the risk screening method provided by the Department of Planning (DoP) document "*Applying SEPP 33 Hazardous and Offensive Development Application Guidelines*" (Department of Planning, 2011), this report presents the details of the determination as to the classification of the proposed development under State Environmental Planning Policy (Resilience and Hazards) 2021.

Industries or projects determined to be hazardous or potentially hazardous would require the preparation of a Preliminary Hazard Analysis (PHA) in accordance with Clause 12 of SEPP 33. No further assessment under State Environmental Planning Policy (Resilience and Hazards) 2021 is required for projects not considered potentially hazardous following a State Environmental Planning Policy (Resilience and Hazards) 2021 Risk Assessment.

3 Proposed development

Doolin Farming Pty Ltd wish to expand the existing beef cattle feedlot on the subject land from the currently approved capacity of 999 head to 3,000 head when fully developed.

The proposed development comprises a permanent pen area with adjoining feed alley in which the beef cattle are housed in the open air and provided with their daily feed and water requirements. The pen area shall incorporate water, feeding and shade infrastructure.

There are two components of the proposed development being the infrastructure and waste utilisation area.

The infrastructure of the proposed development includes:

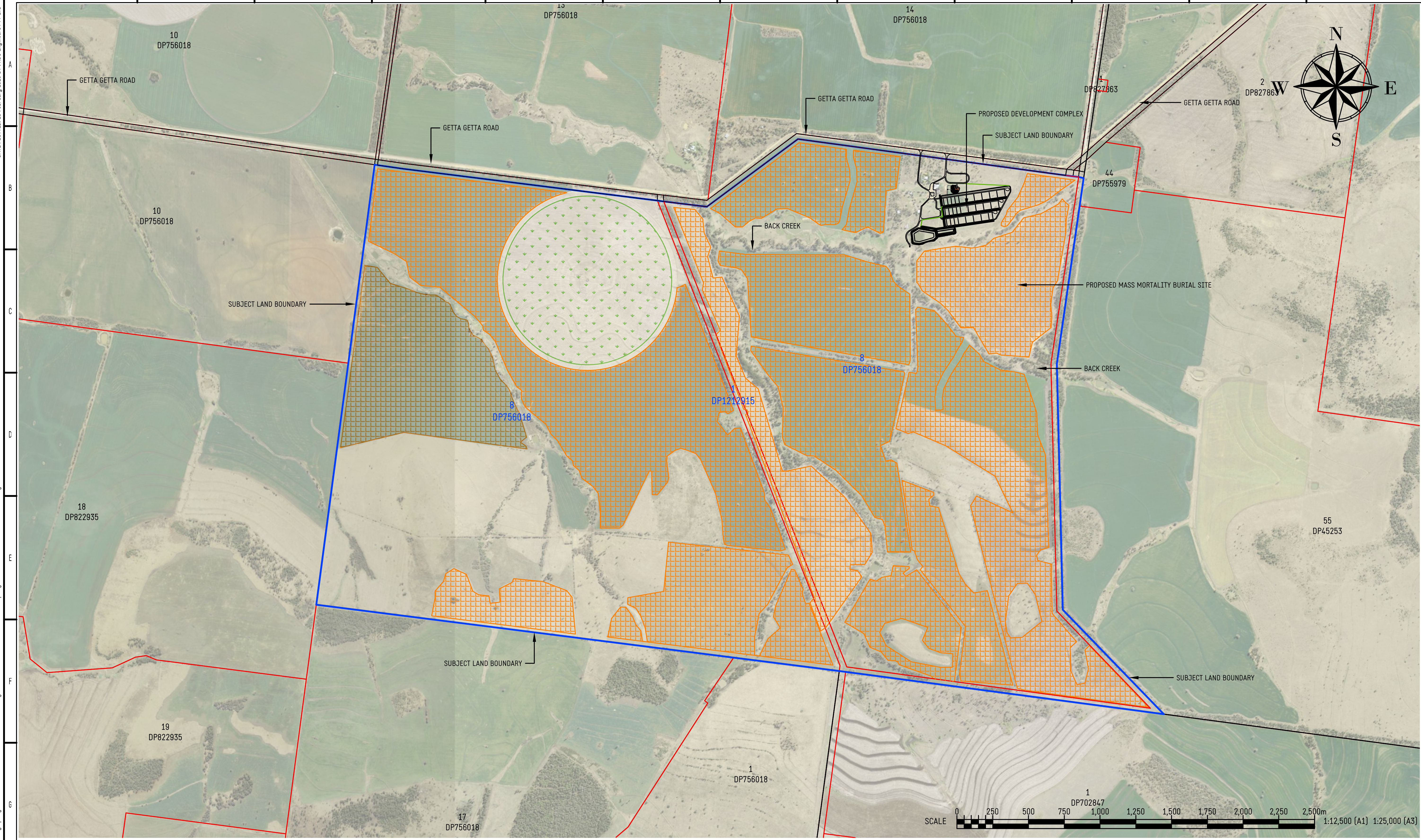
- Production pens for beef cattle;
- Drainage system incorporating catch drains, sedimentation basin and holding pond;
- A cattle handling facility with receival/dispatch infrastructure;
- Internal roadways connecting the subject land access to the cattle handling and commodity storage facilities;

The waste utilisation area includes:

- Effluent and solid waste (manure) utilisation areas. When available, effluent shall be applied to crops land via irrigation and solid waste applied to cropping land within the dedicated utilisation areas.

The layout of the proposed development is shown in Figure 1.

The proposed development shall be designed, constructed and managed as a Class One feedlot. A Class One feedlot has highest standard of design, operation, maintenance, pad management and cleaning frequency and is defined in the National Guidelines for Beef Cattle Feedlots in Australia (MLA, 2012).



LEGEND

- SUBJECT LAND BOUNDARY
- LAND PARCEL BOUNDARY
- PROPOSED EFFLUENT UTILISATION AREA
- PROPOSED SOLID WASTE UTILISATION AREA

NOTES:

1. CADASTRAL INFORMATION BASED ON THE NSW GOVERNMENT SPATIAL SERVICES DIGITAL CADASTRAL DATABASE (DCDB) 2022, PROVIDED BY THE NSW DEPARTMENT OF FINANCE, SERVICES AND INNOVATION (DFSI) SPATIAL INFORMATION eXCHANGE AND ACCURACY IS LIMITED.
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STATUS

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REV.	DATE	REVISION DESCRIPTION	DRAWN	CHECK	APPROVED
A	24/01/25	DRAFT ISSUE TO CLIENT	RJD	RJD	RJD
B	21/02/25	FINAL ISSUE FOR SUBMISSION TO GSC	RJD	RJD	RJD

SCALE	1:25,000 (A3)
DRAWN	RJD
DATE	21/02/2025
CHECKED	RJD
DATE	21/02/2025
APPROVED	RJD
DATE	21/02/2025

CLIENT: DOOLIN FARMING PTY LTD

PROJECT: PROPOSED 3,000 HEAD BEEF CATTLE FEEDLOT

TITLE: DEVELOPMENT APPLICATION FOR INTENSIVE LIVESTOCK AGRICULTURE
EIS APPENDIX N - PRELIMINARY RISK SCREENING ASSESSMENT
PROPOSED DEVELOPMENT - DEVELOPMENT LAYOUT

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 1		A3	E2-103-300-01	B

DATE PLOTTED: 20 February 2025 BY : RDC Engineers PTY LTD

FILE PATH: C:\RDC Engineers\RDCE - Projects\E2-103 Doolin Farming Springfield EIS\05 - ACAD MasterPlan\05.1 Drawings - CURRENT FILE NAME: E2-103 DF Springfield MASTERPLAN-00-20250108vB.dwg

4 Hazardous materials

Hazardous materials are defined within Department of Planning (2011) as substances falling within the classification of the Australian Code for Transportation of Dangerous Goods by Road and Rail (Dangerous Goods Code). Based on this definition and the classifications in Appendix 7 of Department of Planning (2011), the hazardous materials to be stored on the proposed development site, quantities and storage location and mode are summarised in Table 1 and Table 2 for the construction and operational phases of the proposed development respectively.

4.1 Construction

Table 1 – Hazardous materials storage during construction phase

Hazardous material	Classification	Description	Storage quantity	Storage location	Storage mode
Diesel fuel	Class 3 C1	Combustible liquids: flashpoint above 61°C but not exceeding 150°C	5,000L (4.43t)*	Development complex	Vehicle mounted tank
Lubricating oils and greases	Class 3 C2	Combustible liquids flashpoint above 150°C	60L (~0.055t)*	Development complex	Above-ground 205L drums

*Based on a specific gravity of 0.885 t/m^3 for diesel; *Based on a specific gravity of 0.910 t/m^3 for lubricating oils/greases.

Table 1 shows that the only types of hazardous materials to be stored on-site during the construction phase are diesel fuel and lubricating oils and greases.

4.2 Operation

Table 2 – Hazardous materials storage during operation phase

Hazardous Material	Classification	Description	Storage quantity	Storage location	Storage mode
Diesel Fuel	Class 3 C1	Combustible liquids: flashpoint above 61°C but not exceeding 150°C	5,000L (4.43t)*	Development complex	Above-ground tank
Lubricating oils and greases	Class 3 C2	Combustible liquids flashpoint above 150°C	205L (~0.187t)**	Development complex	Above-ground portable 205L drums

*Based on a specific gravity of 0.885 t/m^3 for diesel; **Based on a specific gravity of 0.910 t/m^3 for lubricating oils/greases.

** Combustible Liquid Class C1, treated as Class 3 PG II for assessment purposes, as it is stored together with petrol (within the fuel tank of a truck).

4.3 Hazardous materials transport

Table 3 and Table 4 show the average number of annual and weekly road movements of hazardous material to and from the proposed development, and the typical quantity in each load during construction and operation respectively.

Table 3 – Hazardous materials transport during construction phase

Hazardous material	No of loads	Load size	Vehicle type
Diesel fuel	2 per month	5 kL	Medium rigid truck
Lubricating oils and greases	2 per month	500kg	Medium rigid truck

*For duration of construction period being some 2 months.

Table 4 – Hazardous materials transport during operation phase

Hazardous material	No of loads per annum	Load size	Vehicle type
Diesel fuel	26	5 kL	Medium rigid truck
Lubricating oils and greases	6	205kg	Medium rigid truck

The distance of the stored material to the closest site boundary for all the materials listed in Table 1 and Table 2 (dangerous goods classes 3) is provided in Table 5 and shown in Figure 2.

Table 5 – Separation distances to site boundary

Hazardous Material	Distance to site boundary m
Diesel fuel	>100
Lubricating oils and greases	>100

DATE PLOTTED: 20 February 2025 BY : RDC Engineers PTY LTD

FILE PATH: C:\RDC Engineers\RDCE - Projects\E2-103 Doolin Farming Springfield EIS\05 - ACAD MasterPlan\05.1 Drawings - CURRENT FILE NAME: E2-103 DF Springfield MASTERPLAN-00-20250108v8.dwg

LEGEND

- SUBJECT LAND BOUNDARY
- LAND PARCEL BOUNDARY

NOTES:

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RPEQ

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AGRICULTURAL
ENVIRONMENTAL
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REV.	DATE	REVISION DESCRIPTION	DRAWN	CHECK	APPROVED
A	24/01/25	DRAFT ISSUE TO CLIENT	RJD	RJD	RJD
B	21/02/25	FINAL ISSUE FOR SUBMISSION TO GSC	RJD	RJD	RJD

SCALE	1:3,000 (A3)
DRAWN	RJD
DATE	21/02/2025
CHECKED	RJD
DATE	21/02/2025
APPROVED	RJD
DATE	21/02/2025

CLIENT: DOOLIN FARMING PTY LTD

PROJECT: PROPOSED 3,000 HEAD BEEF CATTLE FEEDLOT

TITLE: DEVELOPMENT APPLICATION FOR INTENSIVE LIVESTOCK AGRICULTURE
EIS APPENDIX N - PRELIMINARY RISK SCREENING ASSESSMENT
PROPOSED DEVELOPMENT - SEPARATION DISTANCE TO SITE BOUNDARY

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 2		A3	E2-103-300-02	B

5 Risk screening assessment

5.1 Threshold assessment

The screening method set out in "*Applying SEPP 33 Hazardous and Offensive Development Application Guidelines"* (Department of Planning, 2011) provides the first step in the analysis. The screening method is based on broad estimates of the possible off-site effects or consequences from hazardous materials present on site, taking into account locational characteristics.

If the quantity/distance is less than the screening threshold, then no further analysis is necessary. The safety management regime in this case relies on observance of the requirements of engineering codes and standards. If the quantities/distances exceed the screening threshold, further analysis is necessary.

5.2 Storage screening

5.2.1.1 Storage volume

5.2.1.1.1 Class 3 Materials (above ground)

As the diesel fuel (combustible Liquid Class C1) may be stored with the petrol (contained in the fuel tank of the vehicle), it is treated as Class 3 PG II for assessment purposes.

The proposed development involves the storage of approximately 4.43 tonnes of diesel fuel stored above ground. From the Department of Planning (2011), there is not greater than 5 tonnes stored above ground. Consequently, the development is not potentially hazardous on the basis of that material, alone.

The proposed development does not involve the storage of petrol fuel. From the Department of Planning (2011), there is less than 5 tonnes stored above ground. Consequently, the development is not potentially hazardous on the basis of that material, alone.

The proposed development involves the storage of approximately 0.19 tonne of lubricating oils stored above ground. As the lubricating oils and greases (Class C2) are not stored adjacent to any other hazardous materials, Department of Planning (2011) does not require these to be considered further.

5.2.1.2 Setback distance to site boundary

5.2.1.2.1 Class 3 Materials (above ground)

The total storage capacity of Class 3 PGII materials is some 4.4 t during operation. The materials shall be stored in bunded vehicle mounted above-ground tanks in accordance with relevant guidelines and Australian Standards. As the materials are stored above-ground, there is no adjustment to the screening capacity.

Figure 3 shows the minimum storage distance for Class 3 PGII and Class 3 PGIII as per Department of Planning (2011)

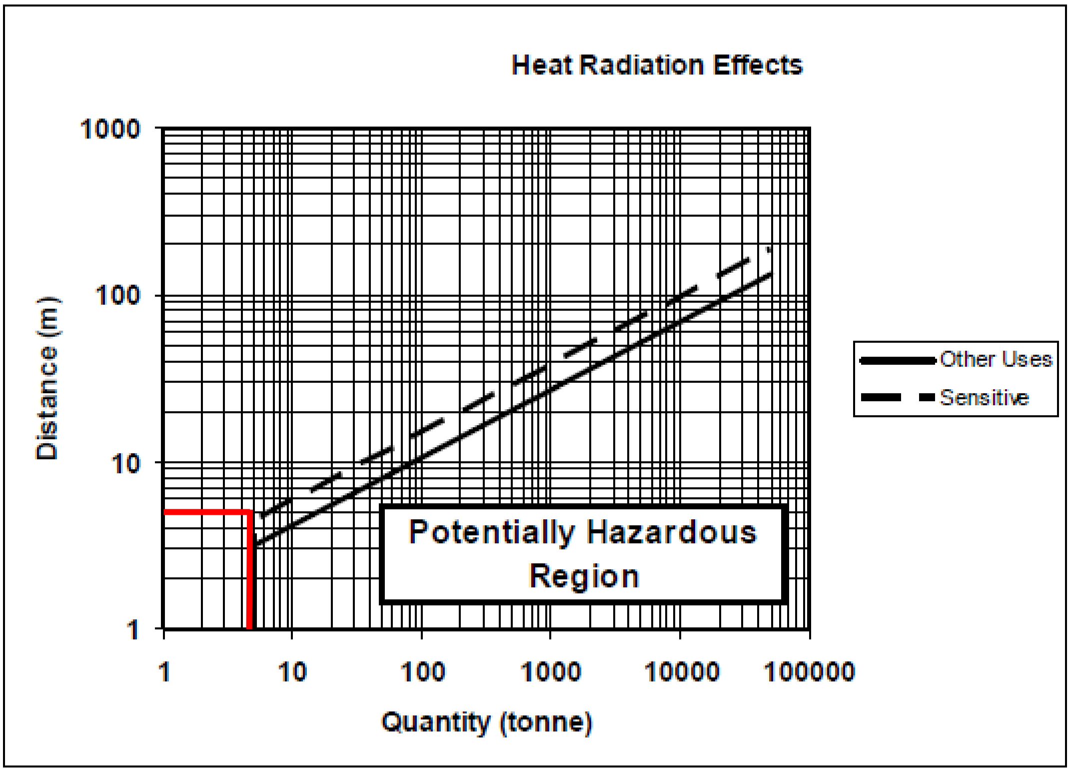

Figure 3 – Minimum storage distance Class 3 PGII and Class 3 PGIII flammable liquids (Department of Planning, 2011, Figure 9)

By utilising Figure 9 contained within "*Applying SEPP 33 Hazardous and Offensive Development Application Guidelines*" (Department of Planning, 2011) and measuring separation distances, it can be determined whether further analysis is required. For a screening quantity of 4.4 t, the minimum separation distance from site boundaries is about 5 m. Since there are no site boundaries within this separation distance as shown on Figure 2, the storage and dispensing of the fuel passes initial screening. Therefore, no further analysis is required.

5.2.2 Transport screening

Department of Planning (2011) methodology also requires assessment of the transporting/delivery frequencies, for the proposed development. As outlined in Table 4, it is envisaged that deliveries to the proposed development site, for Class 3 PG II substances will be about 6 per quarter, or 26 movements per year. According to the "Transportation Screening Thresholds", as shown in Table 6, up to 45 movements per week or 750 movements per year for Class 3 PG II substances are acceptable prior to becoming potentially hazardous. Since the expected number of deliveries is less than 750 per annum and less than 45 movements per week, expected deliveries transport threshold figures do not exceed the required amount.

Table 6 – Transport screening thresholds (Department of Planning, 2011, Table 2)

Class	Vehicle Movements: Cumulative Annual *or*	Vehicle Movements: Peak Weekly	Minimum quantity* per load (tonne): Bulk	Minimum quantity* per load (tonne): Packages
1	see note	see note	see note	
2.1	>500	>30	2	5
2.3	>100	>6	1	2
3PGI	>500	>30	1	1
3PGII	>750	>45	3	10
3PGIII	>1000	>60	10	no limit
4.1	>200	>12	1	2
4.2	>100	>3	2	5
4.3	>200	>12	5	10
5	>500	>30	2	5
6.1	all	all	1	3
6.2	see note	see note	see note	
7	see note	see note	see note	
8	>500	>30	2	5
9	>1000	>60	no limit	

Note: *Where proposals include materials of class 1, 6.2 or 7, the Department of Planning should be contacted for advice. Classes used are those referred to in the Dangerous Goods Code and are explained in Appendix 7.*

** If quantities are below this level, the potential risk is unlikely to be significant unless the number of traffic movements is high.*

5.3 Conclusion

Based on the risk screening method outlined by the Department of Planning (2011), the storage of fuel (diesel) and transportation to and from the site does not constitute a hazardous industry or a potentially hazardous industry. Subsequently, no Preliminary Hazard Assessment is required.

6 Potentially Offensive Industry

The proposed development is beef cattle feedlot and is considered a 'potentially offensive industry' because in the absence of safeguards, the proposed development would emit a polluting discharge which would cause a significant level of offence.

Information on the quantity and nature of any discharges, and the significance of the offence likely to be caused by the development, having regard to the nature of the surrounding land use and the proposed controls has been provided in the EIS. The proposed development exceeds the threshold of feeding more than 1,000 head of cattle under Schedule 1 of the POEO Act definition. Hence, pursuant to Section 48 of the POEO Act, an Environment Protection Licence (EPL) is required.

As outlined in the EIS, adequate safeguards are proposed to ensure emissions from the proposed development can be controlled to a level at which they are not significant.

All receptors are outside of the separation distances required for the proposed development. Therefore, the proposed development meets the conservative separation distance requirements for sensitive receptors calculated in accordance with the S-factor method outlined in the National Guidelines for Beef Cattle Feedlots in Australia (3rd Edition) (MLA, 2012).

It is considered that as separation distances exceed the requirements under the National Guidelines for Beef Cattle Feedlots in Australia (3rd Edition) (MLA, 2012) that the proposed development is not an 'offensive industry'.

7 References

Department of Planning (NSW), 2011, Hazardous and Offensive Development Application Guidelines, Applying, SEPP 33, Department of Planning (NSW), Sydney, NSW.

Meat and Livestock Australia, 2012, National Guidelines for Beef Cattle Feedlots in Australia 3rd Edition, Meat & Livestock Australia, North Sydney, NSW.

Appendix O

Waste Generation

1 - Production

Market

Standard description		User-defined	Unallocated	Unallocated	Unallocated	Unallocated	Unallocated	Unallocated	Unallocated
User-defined description		DF Export 150 Day							
User defined data									
Entry live weight	kg live weight/head	370							
Average daily weight gain	kg/head/d	1.75							
Days on feed									
Starter	d	7							
Intermediate	d	7							
Grower	d	30							
Finisher	d	106							
Total feeding period	d	150							

Market description		DF Export 150 Day	Unallocated	Unallocated	Unallocated	Unallocated	Unallocated	Unallocated	Unallocated	Totals
Cattle numbers [1]										
Number (full capacity)	head	3,000	0	0	0	0	0			3,000
Standard Cattle Units	SCU (full capacity)	2,621	0	0	0	0	0	0	0	2,621
Proportion of total head	%	100.00%	0.00%	0%	0%	0%	0%	0%	0%	100%
Days on feed										
Starter	d	7	0	0	0	0	0	0	0	
Intermediate	d	7	0	0	0	0	0	0	0	
Grower	d	30	0	0	0	0	0	0	0	
Finisher	d	106	0	0	0	0	0	0	0	
Total feeding period	d	150	0	0	0	0	0	0	0	
Cattle numbers [1]										
Starter	head	140	0	0	0	0	0	0	0	140
Intermediate	head	140	0	0	0	0	0	0	0	140
Grower	head	600	0	0	0	0	0	0	0	600
Finisher	head	2,120	0	0	0	0	0	0	0	2,120
Total cattle numbers		3,000	0	0	0	0	0	0	0	3,000
Occupancy	%	95%								95%
Mortality	(%in - %out)	0.25%								0.25%
Standard Cattle Units [2]	SCU (occupied)	2,490	0	0	0	0	0	0	0	2,490
No of cattle in per year [2]	head/yr	6,935	0	0	0	0	0	0	0	6,935
No of cattle out per year [2]	head/yr	6,918	0	0	0	0	0	0	0	6,918
Deaths [2]	head/yr	17	0	0	0	0	0	0	0	17
Cattle performance										
Entry live weight	kg live weight/head	370	0	0	0	0	0	0	0	
Average daily weight gain	kg/head/d	1.7500	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Exit live weight	kg live weight/head	632.50	0	0	0	0	0	0	0	
Average liveweight	kg live weight/head	501	0	0	0	0	0	0	0	
Average total live weight [2]	t	1,429	0	0	0	0	0	0	0	1,429
Daily Gain										
Starter	kg/head/d	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Intermediate	kg/head/d	0.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Grower	kg/head/d	1.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Finisher	kg/head/d	1.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

[1] Based on cattle numbers at full capacity. These values have not accounted for the occupancy % value entered by the user.
[2] Based on cattle numbers which have been reduced according to the occupancy % value entered by the user above.

2 - Feed

Feed		DF Export 150 Day	Unallocated	Unallocated	Unallocated	Unallocated	Unallocated	Unallocated	Unallocated	Totals
Dry matter fed - per head										
Typical values (Davis et al., 2012)										
Starter	kg DM/head/d	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	
Intermediate	kg DM/head/d	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	
Grower	kg DM/head/d	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	
Finisher	kg DM/head/d	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	
Selected values										
Starter	kg DM/head/d	**6.70**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	
Intermediate	kg DM/head/d	**7.30**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	
Grower	kg DM/head/d	**9.80**								
Finisher	kg DM/head/d	**10.30**								
Dry mater feed consumption - total [1]										
Starter	kg DM/d	938	0	0	0	0	0	0	0	**938**
Intermediate	kg DM/d	1,022	0	0	0	0	0	0	0	**1,022**
Grower	kg DM/d	5,880	0	0	0	0	0	0	0	**5,880**
Finisher	kg DM/d	21,836	0	0	0	0	0	0	0	**21,836**
Total	kg DM/d	499	0	0	0	0	0	0	0	**29,676**
	t DM/yr	182	0	0	0	0	0	0	0	**182**
Amount Fed (as fed) - per head										
Starter	kg as-fed/head/d	9.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Intermediate	kg as-fed/head/d	9.92	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Grower	kg as-fed/head/d	12.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Finisher	kg as-fed/head/d	12.64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Feed consumption (as fed) - total [1]										
Starter	kg as-fed/d	1,275	0	0	0	0	0	0	0	**1,275**
Intermediate	kg as-fed/d	1,389	0	0	0	0	0	0	0	**1,389**
Grower	kg as-fed/d	7,581	0	0	0	0	0	0	0	**7,581**
Finisher	kg as-fed/d	26,786	0	0	0	0	0	0	0	**26,786**
Total	kg as-fed/d	37,030	0	0	0	0	0	0	0	**37,030**
	t as-fed/yr	13,516	0	0	0	0	0	0	0	**13,516**

[1] Based on cattle numbers at full capacity. These values have 100%
0.25%

3 - Diet

Diet Ingredients (% fed weight)

	Starter	Intermediate	Grower								Finisher								Dry Matter	Ash	Dry Matter Digestability	Crude Protein	Phosphorus	Potassium
			DF Export 150 Day	Unallocated	Unallocated	Unallocated	Unallocated	Unallocated	Unallocated	Unallocated	DF Export 150 Day	Unallocated	Unallocated	Unallocated	Unallocated	Unallocated	Unallocated	Unallocated	(%)	(%)		(%)	(%)	(%)
Major grains																								
Barley 10%	45.00	45.00	57.00								70.00								88.00	2.40	0.82	11.00	0.31	0.45
Maize 8%																			88.00	1.50	0.90	9.00	0.28	0.33
Sorghum 10%																			90.00	1.50	0.85	10.00	0.34	0.37
Oats 8%																			89.00	2.90	0.75	8.00	0.32	0.40
Triticalae 12%																			90.00	1.90	0.88	12.00	0.37	0.45
Wheat 11%																			89.00	1.60	0.89	11.00	0.36	0.40
Wheat 13%																			89.00	1.60	0.89	13.00	0.36	0.46
Wheat 16%																			89.00	1.60	0.89	16.00	0.36	0.46
Hominy meal																			89.00	3.00	0.89	10.00	0.45	0.65
Millrun																			88.00	4.80	0.75	17.20	1.02	1.28
Rice pollard																			90.00	8.50	0.75	13.00	1.70	1.30
Protein sources																								
Chick peas																			89.00	3.40	0.85	22.00	0.35	0.80
Copra																			92.00	7.40	0.65	23.00	0.66	1.60
Canola 36																			92.00	7.50	0.75	36.00	1.00	1.17
Cotton 38																			90.00	7.20	0.75	38.00	1.04	1.25
Lupins																			89.00	2.80	0.85	29.00	0.30	0.80
Malt comb.																			90.00	2.50	0.70		0.70	
Navy beans																			89.00	4.00	0.85	25.00	0.60	1.24
Palm KM																			90.00	6.00	0.65	16.00	0.60	0.50
Peanut meal																			92.40	6.00	0.80	45.00	0.60	1.00
Soymeal 45%																			89.00	6.30	0.80	45.00	0.65	1.90
Soymeal 48%																			88.00	6.00	0.80	48.00	0.67	2.01
Sunflower 30																			92.50	6.70	0.65	32.00	1.03	1.48
Sunflower 36																			93.00	7.10	0.65	36.00	1.03	1.48
Roughage / miscellaneous																								
Peanut hull																			90.00	4.20	0.60	7.00	0.07	0.95
Oat hulls																			92.40	6.60	0.40	4.50	0.15	0.59
Rice hulls																			92.00	20.60	0.40	3.10	0.07	0.65
Cotton hulls																			90.40	2.90	0.40	4.20	0.09	0.88
Whole cottonseed	8.00	8.00	9.00								11.00								92.00	7.50	0.75	36.00	1.00	1.00
Brewers grain dehy																			90.20	4.30	0.65	29.20	0.70	0.58
Brewers grain wet																			24.80	1.06	0.65	25.00	0.32	2.60
Citrus dehyd																			91.10	6.60	0.65	6.70	0.13	0.77
Bagasse																			91.00	5.50	0.20	1.50	0.29	0.50
Forage / straw																								
Alfalfa / lucerne hay																			89.00	8.60	0.62	18.00	0.33	2.43
Barley straw																			91.20	7.50	0.15	4.40	0.07	2.36
Wheat hay																			88.70	7.90	0.62	8.70	0.20	0.99
Wheat straw																			91.30	7.70	0.30	3.50	0.05	1.40
Oat straw																			92.20	7.80	0.30	4.40	0.06	2.53
Grass hay																			93.00	6.00	0.60	8.30	0.44	0.18
Straw ammoniated																			87.00	7.50	0.15	6.00	0.70	1.00
Straw soda																			86.00	7.50	0.15	3.20	0.10	0.90
Sorhum hay																			89.00	5.90	0.61	9.40	0.22	0.28
Alfalfa / lucerne silage																			44.00	9.50	0.67	19.00	0.32	2.85
Barley silage	30.00	30.00	22.00								14.00								37.10	8.30	0.62	9.00	0.29	2.57
Corn silage																			34.60	3.59	0.68	8.00	0.22	1.14
Pasture silage																			39.00	5.00	0.62	14.00	0.32	0.06
Wheat silage																			34.20	7.50	0.64	12.50	0.29	2.24
Sorghum silage																			30.00	5.90	0.63	9.50	0.22	0.28
Liquids																								
Reclycled oil																			99.50		0.99			
Molasses																			75.00	9.50	0.70	4.40	0.08	3.20
Sunflower oil																			99.50		0.99		0.31	0.40
Tallow																			99.50		0.99			
Other ingredients																								
Ag-Lime																			90.00	100.00	0.70			
Bentonite																			90.00	100.00	0.00			0.11
Dicalphos																			96.00	94.00	0.80		18.00	0.07
KCL																			90.00	100.00	0.80			52.00
Kynaphos																			96.00	96.00	0.70		21.00	
Palphos																			99.00	96.00	0.80		17.30	
Pot Chl (Potash)																			90.00	100.00	0.90			52.00
Rock phosphate																			98.00	95.00	0.80		16.00	
Salt																			98.00	100.00	0.99			
Sodium bicarb.																			100.00		0.90			
Sulphate of amm.																			100.00	100.00	0.90	134.00		0.11
Sulphur (Ag)																			99.00	100.00	0.90			
Urea																			99.00		0.99	281.00		
Beef Premix																			95.00	90.00	0.80	7.50	0.36	0.42
Supp Fin 2.5% Dry																			91.70	61.00	0.80	7.00	0.21	0.30
Supp Start 4% Dry																			90.00	95.00	0.80			
Supp Fin 4% Dry	3.00	3.00	4.00								5.00								92.10	32.60	0.80	80.60	0.82	0.48
Supp start 5% Wet																			70.00	70.00	0.80			
Supp Fin 6% Wet																			70.00	70.00	0.80			
Additional ingredients																								
Oat Hay	14.00	14.00	8.00								0.00								91.00	7.60	0.62	9.30	0.22	1.51
Water																			0.00	0.00	0.00	0.00	0.00	0.00
Total (%)	100.00	100.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						

5 - Water and salt

Feedlot locality		**North Star**
Mean feed dry matter intake (DMI)	kg DM/head/day	9.89
Drinking water electrical conductivity (EC)	dS/m (= mS/cm)	**1.122**
Drinking water total dissolved salts (TDS)	mg/L	718

Month	Mean max temp[4] (°C)	Mean min temp[4] (°C)	Mean water intake[3] (L/head/d)
Jan	**33.2**	**18.8**	48.9
Feb	**32.6**	**18.5**	47.9
Mar	**30.4**	**16.1**	43.1
Apr	**26.5**	**11.6**	38.3
May	**22.0**	**7.4**	35.9
Jun	**18.5**	**4.7**	35.0
Jul	**17.9**	**3.3**	34.8
Aug	**19.7**	**4.5**	35.1
Sep	**23.4**	**7.5**	36.2
Oct	**27.0**	**11.8**	38.6
Nov	**30.0**	**14.9**	42.0
Dec	**32.2**	**17.4**	46.1

Mean daily water intake:	L/head/d	40.1
Annual water intake[2]	ML/yr	41.718
Annual water intake[2]	ML/1000 SCU/yr	16.75
Annual drinking water salt intake[2]	t/yr	29.957
Mean daily drinking water salt intake	kg/head/d	0.029
	kg/d	82.07

[2] Based on cattle numbers which have been reduced according to the occupancy % value entered by the user on the '1 - Production' worksheet.

[3] Watts, P., Tucker R., and Casey, K. (1994). Water System Design. Section 4.6 in Designing Better Feedlots, Ed. P. Watts and R. Tucker; State of Queensland, Department of Primary Industries, Conference and workshop series QC94002.

[4] Mean monthly minimum and maximum temperatures may be obtained from the Bureau of Meteorology website:

http://www.bom.gov.au/climate/data/

6 - Pen nutrient balance

Mineral content of cattle		N	P	K	Ash	Salt
Starter / Intermediate	g/kg live weight	27.0	6.7	1.7	50.0	1.4
Grower / Finisher	g/kg live weight	24.0	7.0	1.8	40.0	1.5

Market		DF Export 150 Day	Unallocated	Unallocated	Unallocated	Unallocated	Unallocated	Unallocated	Unallocated	Totals
Cattle numbers [2]										
No of cattle in per year	head/yr	6,935	0	0	0	0	0	0	0	**6,935**
No of cattle out per year	head/yr	6,918	0	0	0	0	0	0	0	**6,918**
Deaths	head/yr	17	0	0	0	0	0	0	0	**17**
Cattle live weights [2]										
Live weight in	kg/head	370	0	0	0	0	0	0	0	
Live weight out	kg/head	633	0	0	0	0	0	0	0	
Average live weight	kg/head	501	0	0	0	0	0	0	0	
Total live weight in	t/yr	2,566	0	0	0	0	0	0	0	**2,566**
Total live weight out	t/yr	4,375	0	0	0	0	0	0	0	**4,375**
Total live weight deaths	t/yr	8.690	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**8.690**
Cattle in [2]										
Cattle in N	t/yr	69.281	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**69.281**
Cattle in P	t/yr	17.192	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**17.192**
Cattle in K	t/yr	4.362	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**4.362**
Cattle in Ash	t/yr	128.298	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**128.298**
Cattle in salt	t/yr	3.592	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**3.592**
Cattle out [2]										
Cattle out N	t/yr	105.010	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**105.010**
Cattle out P	t/yr	30.628	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**30.628**
Cattle out K	t/yr	7.876	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**7.876**
Cattle out Ash	t/yr	175.017	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**175.017**
Cattle out salt	t/yr	6.563	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**6.563**
Cattle deaths [2]										
Cattle deaths N	t/yr	0.209	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**0.209**
Cattle deaths P	t/yr	0.061	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**0.061**
Cattle deaths K	t/yr	0.016	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**0.016**
Cattle deaths Ash	t/yr	0.348	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**0.348**
Cattle deaths salt	t/yr	0.013	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**0.013**
Feed in [2]										
Feed N	t/yr	337.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**337.964**
Feed P	t/yr	51.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**51.306**
Feed K	t/yr	114.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**114.587**
Feed Ash	t/yr	701.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**701.321**
Feed salt	t/yr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.000**
Drinking water salt	t/yr	29.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**29.957**
Manure [2]										
Manure N excreted	t/yr	302.026	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**302.026**
Manure P excreted	t/yr	37.809	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**37.809**
Manure K excreted	t/yr	111.058	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**111.058**
Manure Ash excreted	t/yr	654.254	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**654.254**
Manure salt excreted	t/yr	26.973	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**26.973**
Manure N excreted	kg/d	827	0	0	0	0	0	0	0	**827**
Manure P excreted	kg/d	104	0	0	0	0	0	0	0	**104**
Manure K excreted	kg/d	304	0	0	0	0	0	0	0	**304**
Manure Ash excreted	kg/d	1,792	0	0	0	0	0	0	0	**1,792**
Manure salt excreted	kg/d	74	0	0	0	0	0	0	0	**74**

[2] Based on cattle numbers which have been reduced according to the occupancy % value entered by the user on the '1 - Production' worksheet.

7 - Manure production and decomposition

			Total manure	TS	FS (Ash)	VS	N	P	K	Salt
Fresh manure [2]										
Moisture content	% wb	**85%**								
Excreted manure	kg/d		39,649	5,947	1,720	4,227	827	104	304	74
	t/yr		14,472	2,171	628	1,543	302	38	111	27
Concentrations	% db			100%	29%	71%	13.91%	1.74%	5.12%	1.24%
Production per SCU	t/SCU/yr	350	5.811	0.872	0.252	0.620	0.121	0.015	0.045	0.011
		2.25								
Harvested manure [2]										
Moisture content	% wb	**40%**								
Pen losses	%	7			**10%**	**40%**	**75%**	**50%**	**60%**	**30%**
Harvested manure	kg/d	7	6,807	4,084	1,548	2,536	207	52	122	52
	t/yr	0	2,485	1,491	565	926	76	19	44	19
Concentrations	% db	86		100%	38%	62%	5.06%	1.27%	2.98%	1.27%
Production per SCU	t/SCU/yr		0.998	0.599	0.227	0.372	0.030	0.008	0.018	0.008
Stockpiled manure [2]										
Moisture content	% wb	**20%**								
Stockpile losses	%	499			0%	**5%**	**30%**	**0%**	**0%**	**0%**
Manure for land application	kg/d		4,947	3,958	1,548	2,409	145	52	122	52
	t/yr		1,806	1,445	565	879	53	19	44	19
Concentrations	% db			100%	39%	61%	3.66%	1.31%	3.08%	1.31%
Production per SCU	t/SCU/yr		0.725	0.580	0.227	0.353	0.021	0.008	0.018	0.008

[2] Based on cattle numbers which have been reduced according to the occupancy % value entered by the user on the '1 - Production' worksheet.

100%
0.25%

8 - MEDLI inputs

This worksheet provides data for entry into versions of the Model for Effluent Disposal Using Land Irrigation (MEDLI) (Department of Environment and Science, Queensland Government) that include a feedlot module.
MEDLI is a Windows® program for designing effluent re-use schemes. It models the complex dynamics of an effluent irrigation system on a daily time-step, using historical climate data to determine the wet weather storage and irrigation area requirements for a specific location.

Model for Effluent Disposal Using Land Irrigation (MEDLI)

https://www.des.qld.gov.au/science/government/science-division/medli/

Livestock yard characteristics

Feedlot type		Beef Cattle
Maximum capacity	SCU	2,621
Mortality	%	0.25%

Market Type

Market Number		Market 1	Market 2	Market 3	Market 4	Market 5	Market 6	Market 7	Market 8
Name		DF Export 150 Day	Unallocated	Unallocated	Unallocated	Unallocated	Unallocated	Unallocated	Unallocated
Proportion of Total Head	%	100%	0%	0%	0%	0%	0%	0%	0%
Proportion of Pens Occupied	%	95%	0%	0%	0%	0%	0%	0%	0%
Entry Weight	kg/head	370	0	0	0	0	0	0	0
Exit Weight	kg/head	633	0	0	0	0	0	0	0
Daily Weight Gain	kg/head/day	1.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excreted N Per Head	kg/head/year	100.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Excreted P Per Head	kg/head/year	12.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Excreted Salt Per Head	kg/head/year	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Excreted VS Per Head	kg/head/year	541.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Excreted TS Per Head	kg/head/year	761.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Excreted Water Per Head	kg/head/year	4,316.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Drinking Water

Salinity	dS/m	1.122
Is average Water Uptake Used?		**Yes**
Daily Intake Per Head	L/head/day	40.1

Appendix P

Operation Environmental Management Plan (Draft)

Springfield Feedlot

Draft Operation Environmental Management Plan

"Springfield"
2513 Getta Getta Road
North Star NSW 2408

Doolin Farming Pty Ltd
"Glenhoma"
3202 Getta Getta Road
NORTH STAR NSW 2408

[February 2025]

RDC ENGINEERS | AGRICULTURAL ENVIRONMENTAL PROJECT MANAGEMENT

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Project No:	E2-103

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Disclaimer

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Definitions

Term or Acronym	Meaning
ANZECC	The Australian and New Zealand Environment Conservation Council
AR	Annual Return
ARMCANZ	Agriculture and Resource Management Council of Australia and New Zealand
AS	Australian Standard
AWS	Automatic weather station
CoA	Conditions of Approval means conditions listed in the Gwydir Shire Council Notice of Determination or Environmental Protection Licence under the Protection of the Environment Operations Act 1997.
CDA	Controlled Drainage Area
Compliance audit	Verification of how implementation is proceeding with respect to an operation environmental management plan (OEMP) (which incorporates the relevant approval conditions).
DoE	Commonwealth Department of the Environment
EIS	Environmental Impact Assessment
Effluent	Effluent means: Stormwater runoff from the controlled drainage areas that is collected in a holding pond/s pending sustainable utilisation to land by means of an irrigation system. Effluent is high in nutrients because it has been in contact with manure and has the potential to pollute surface water and groundwater.
Environmental aspect	Defined by AS/NZS ISO 14001:2015 as an element of an organisation's activities, products or services that can interact with the environment.
Environmental impact	Defined by AS/NZS ISO 14001:2015 as any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organisation's environmental aspects.
Environmental incident	An unexpected event that has, or has the potential to, cause harm to the environment and requires some action to minimise the impact or restore the environment.
EMS	Environmental Management System.
Environmental Management Plan (EMP)	Describes how the Project might impact on the natural environment in which it occurs and set out clear commitments from the person taking the action on how those impacts will be avoided, minimised and managed so that they are environmentally acceptable.
Environmental policy	Statement by an organisation of its intention and principles for environmental performance.
EPA	NSW Environment Protection Authority
ES	Environmental Specialist - A suitably qualified and experienced person independent of Project design and operation personnel engaged as required duration operation. The principal point of specialist advice in relation to all questions and complaints concerning environmental performance.
ESC	Erosion and Sediment Control.
ESCP	Erosion and Sediment Control Plan.
Environmental target	Defined by AS/NZS ISO 14001:2015 as a detailed performance requirement, applicable to the organisation or parts thereof, that arises

	from the environmental objectives and that needs to be set and met in order to achieve those objectives.
GHG	Greenhouse gases
Groundwater	Subsurface water contained within the saturated zone
GDE's	Groundwater Dependent Ecosystems.
GSC	Gwydir Shire Council
ISO	International Organization for Standardization
Liquid waste	Liquid waste generated on-site for example: • Domestic wastewater (e.g., sewage); and • Effluent
Manure	Manure is the faeces and urine excreted by the cattle.
MLA	Meat and Livestock Australia
NFAS	National Feedlot Accreditation Scheme. An independently audited quality assurance scheme to develop a Quality System for beef feedlots that impacts positively on product quality and acceptability and for which the lot feeders maintain responsibility.
Non-compliance	Failure to comply with the requirements of the Project approval or any applicable license, permit or legal requirements.
Non-conformance	Failure to conform to the requirements of Project system documentation including this OEMP or supporting documentation.
OEMP	Operation Environmental Management Plan. An Environmental Management Plan that addresses the control, training and monitoring measures to be implemented during the operation phase of a project in order to avoid, minimise or ameliorate potentially adverse impacts identified during environmental assessments.
OAQMP	Operation Air Quality Management Plan. An element of an Operation Environmental Management Plan that addresses the control, training and monitoring measures to be implemented during the operation phase of a project in order to avoid, minimise or ameliorate potentially adverse impacts to air quality identified during environmental assessments
OSWQMP	Operation Soil and Water Quality Management Plan. An element of an Operation Environmental Management Plan that addresses the control, training and monitoring measures to be implemented during the operation phase of a project in order to avoid, minimise or ameliorate potentially adverse impacts to soils and water quality identified during environmental assessments
OSLWMP	Operation Solid and Liquid Waste Management Plan. An element of an Operation Environmental Management Plan that addresses the control, training and monitoring measures to be implemented during the operation phase of a project in order to avoid, minimise or ameliorate potentially adverse impacts from solid and liquid waste identified during environmental assessments.
POEO Act	Protection of the Environment Operations Act 1997 (NSW)
Project	Springfield Feedlot
Project complex	The Project complex includes: • production pens, hospital pens, induction pens; • cattle handling facilities; • catch drains, sedimentation basin and holding pond; • cattle lanes and feed alleys; • solid waste stockpile and composting pad; and • feed mill and feed storage facilities.

	The Project complex does not include solid waste and effluent utilisation areas.
Project site	The Project site is the land on which the Project is located and includes the Project complex and solid waste and effluent utilisation areas.
Riparian zone	The vegetated corridor along streams and rivers.
Solid Waste	Solid wastes generated on-site for example: Controlled Solid (e.g., tyres) General Solid (putrescible) (e.g., domestic general litter and food waste, animal wastes (manure excreted by the cattle, solids that have settled from the stormwater runoff in the sedimentation basin, holding pond sludge, spilt feed and composted mortalities)). Solid wastes derived from beef cattle are valued as a source of nutrients for fertilising crops and are the predominant solid waste generated. General Solid (non-putrescible) (e.g., glass, paper, building demolition waste, concrete).
Stakeholders	Primary stakeholder groups include our workforce, our customers, and the broader community. Other important stakeholders include regulatory bodies, suppliers, industry organisations and peak bodies and environmental groups.
SOP	Environmental Standard Operating Procedure
TAPM	The Air Pollution Model
Water Act	Water Act 1912.
WM Act	Water Management Act 2000

Executive summary

Doolin Farming Pty Ltd own and operate a 10,000 ha mixed farming operation across several properties at North Star including “Glenhoma”, “Glenmodel”, “Springfield”, “Myall Downs” and “Yetman West” some 27 km east of Yetman and 45 km south-southeast of Goondiwindi (QLD) in NSW.

Doolin Farming Pty Ltd primarily engage in dryland and irrigated cropping and beef production. Doolin Farming Pty Ltd produces wheat, barley, oats and chickpeas in winter and cotton and maize in summer under pivot irrigation systems and dryland sorghum cropping.

Central to the beef production enterprise is the breeding, growing and lot-feeding of cattle for the domestic market. Currently the beef supply chain includes breeding and growing of beef cattle on land less suitable for dryland and irrigated cropping and grazing of stubble and lot feeding of cattle within a feedlot on the property ‘Springfield”.

There has been a beef cattle feedlot on “Springfield” for over three years after approval was granted for a 999 head feedlot by the Gwydir Shire Council in 2021 (DA31/2020).

Doolin Farming Pty Ltd is seeking approval to expand the existing beef cattle feedlot up to capacity of up to 3,000 head to supply quality grain fed cattle.

This Operation Environmental Management Plan (OEMP or Plan) is the overarching management plan for a suite of environmental management documents for the operation of the Springfield Feedlot. It provides a structured and systematic approach to environmental management.

1 Background

1.1 Introduction

Doolin Farming Pty Ltd own and operate a 10,000 ha mixed farming operation across several properties at North Star including "Glenhoma", "Glenmodel", "Springfield", "Myall Downs" and "Yetman West" some 27 km east of Yetman and 45 km south-southeast of Goondiwindi (QLD) in NSW.

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Central to the beef production enterprise is the breeding, growing and lot-feeding of cattle for the domestic market. The beef supply chain includes breeding and growing of beef cattle on land less suitable for dryland and irrigated cropping and grazing of stubble and lot feeding of cattle within a feedlot on the property 'Springfield".

"Springfield" comprises some 1,713 ha (~4,231 acres) and currently, a dryland and irrigated cropping business is undertaken on a large proportion of the property with extensive cattle breeding and grazing of beef cattle on the remaining land which is unsuitable for cropping and lot feeding of cattle within a beef cattle feedlot in the north-east of the property.

The feedlot is known as Springfield Feedlot and operates for 12 months of the year and employs approximately 4 full time staff. Casual staff and contractors are engaged as required during busy periods such as planting and harvesting of silage and fodder and to supply various associated services such as plant maintenance and veterinary requirements.

Springfield Feedlot includes one controlled drainage area with associated production pens and drainage system which includes catch drains, sedimentation basin and holding pond. Springfield Feedlot also has auxiliary infrastructure to support the use such as cattle handling and feed storage and processing facilities.

Springfield Feedlot is accredited under the National Feedlot Accreditation Scheme (NFAS) with audits conducted annually.

Under Schedule 1, Part 1, Item 22 of the Protection of the Environment Operations Act 1987, the Project is categorised as cattle, sheep or horse accommodation. The Environmental Impact Statement Assessment (RDC Engineers Pty Ltd 2024) identified the potential for minor impacts on air quality during operation typically associated with odour and dust. However, it concluded any potential impacts could be managed by standard mitigation and management measures.

2 Purpose, scope, and objectives

2.1 Purpose

Doolin Farming Pty Ltd has developed this Operational Environmental Management Plan (OEMP) to describe the Environmental Management System (EMS) for the Springfield Feedlot (the Project). A detailed description of the development is provided in section 4.

The Environmental Management System is a tool for managing the impacts of the Project activities on the environment. It provides a structured approach to planning and implementing environment protection measures and provides the documented policies and procedures that establish the requirements for management of environmental issues on the Project site. The EMS integrates environmental management into all daily operations, long term planning and other quality management systems of the Project.

The Project has not commenced operation. This Plan will be reviewed and updated once operations commence.

2.2 Scope

The OEMP describes how Doolin Farming Pty Ltd proposes to identify and manage the environmental aspects and potential impacts of the Project during its operational phase up to the maximum 3,000 head capacity, in accordance with applicable legislative requirements as described further in section 4.

2.3 Objectives

The key objective of the OEMP is to ensure that impacts on the environment are minimised and within the scope permitted by the CoA. To achieve this objective, Doolin Farming Pty Ltd will:

- Describe the Project in detail including activities to be undertaken and relative timing;
- Provide specific mitigation measures and controls that can be applied on-site to avoid or minimise negative environmental impacts;
- Provide specific mechanisms for compliance with applicable policies, approvals, licences, permits, consultation agreements and legislation;
- Define and implement all obligations contained in the deed (including all environmental obligations relevant to the Project and obligations in the Project's environmental management documents) and other legal and regulatory obligations relevant to the Project;
- Describe the environmental management related roles and responsibilities of personnel;

- Ensure that environmental policies, objectives and targets satisfy the requirements of approval authorities;
- Define processes for formulating, resourcing, and implementing Environmental Management Plans and associated Management Plans;
- State objectives and targets for issues that are important to the environmental performance of the Project;
- Define processes for auditing, recording and monitoring the performance and effectiveness of Environmental Management Plans and associated Management Plans; and
- Outline a monitoring regime to check the adequacy of controls as they are implemented during operation.

3 Project setting

3.1 Location

The Project is in the North Star Region of NSW approximately 367 km south-west of Brisbane and 690 km north of Sydney

The project is located on two land parcels which form the property known as "Springfield" located at 2513 Getta Getta Road approximately 15 km by road east of North Star and some 27 km west-southwest of Yetman in the Gwydir Shire Council.

The Project has primary frontage to Getta Getta Road (unsealed) of approximately 5 km in length. Getta Getta Road intersects with North Star Road some 14 km west of and with Warialda Road which intersects with the Bruxner Way some 25 km east of the site access for the Development site respectively. Road access to the Development is from Getta Getta Road, a council-controlled road.

Figure 1 is a locality plan highlighting the Project to roads and the nearby townships of North Star and Yetman and the main watercourses and drainage lines in the region.

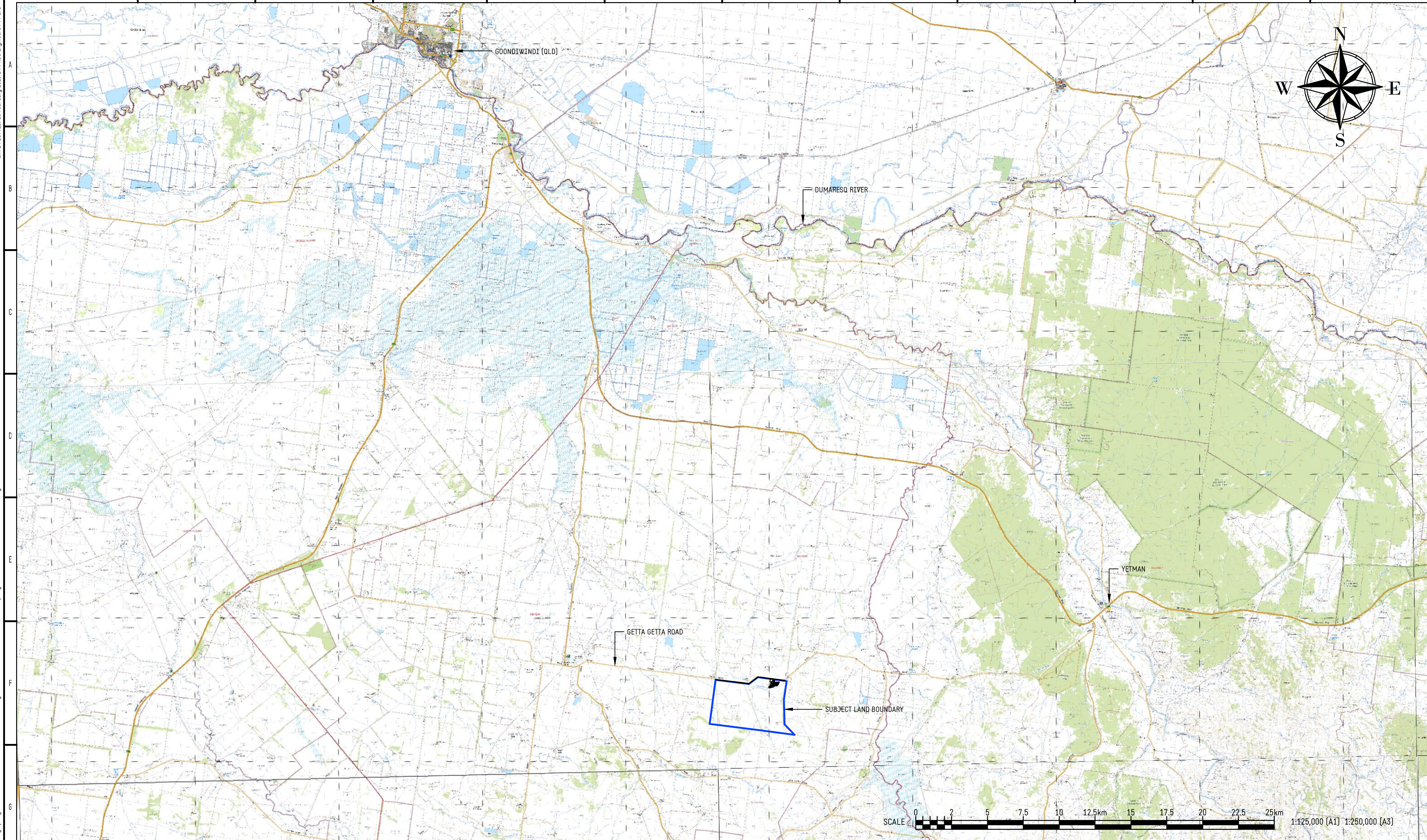
The subject land has been historically used for irrigated agriculture (cereals (maize, barley, oats, cotton) and dryland agriculture (cereals (wheat, barley) and extensive beef cattle grazing and intensive beef cattle feedlot is located in a rural area which encourages agricultural uses.

3.2 Site description

The Project site comprises of two (2) cadastral portions as outlined in Table 1. The total area of the Project site is about 1,713.2 ha (~4,231 acres). Figure 2 is an aerial plan of the Project site.

Table 1 – Project – Real property description

Property name	Lot no.	Plan no.	Easements	Area Ha	Local government area
"Springfield"	8	DP756018	DP1237694	~883.3	Gwydir Shire
"Springfield"	8	DP756018	DP1237694	~792.7	Gwydir Shire
"Springfield"	1	DP1212915	DP1237694	~37.2	Gwydir Shire
Total area				~1,713.2	



LEGEND

- SUBJECT LAND BOUNDARY
- LAND PARCEL BOUNDARY

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4. HORIZONTAL DATUM - UTM ZONE 56.

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DATE	21/02/2025
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DATE	21/02/2025
APPROVED	RJD
DATE	21/02/2025

CLIENT: DOOLIN FARMING PTY LTD
PROJECT: SPRINGFIELD BEEF CATTLE FEEDLOT
TITLE: DRAFT OPERATION ENVIRONMENTAL MANAGEMENT PLAN PROJECT - LOCALITY PLAN

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 1		A3	E2-103-400-01	B

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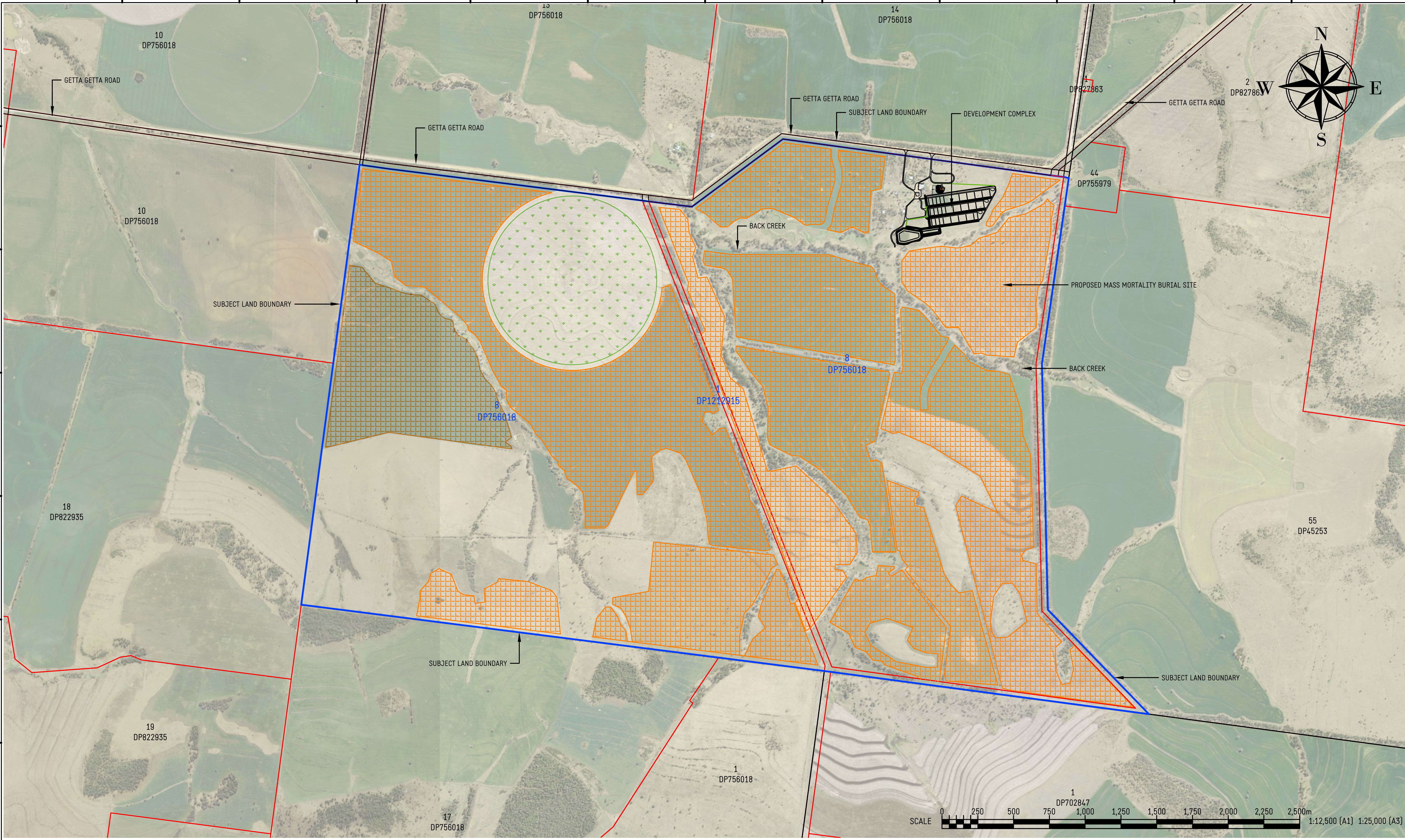

LEGEND

- SUBJECT LAND BOUNDARY
- LAND PARCEL BOUNDARY
- PROPOSED EFFLUENT UTILISATION AREA
- PROPOSED SOLID WASTE UTILISATION AREA

NOTES:

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APPROVED	RJD
DATE	21/02/2025

CLIENT DOOLIN FARMING PTY LTD

PROJECT SPRINGFIELD BEEF CATTLE FEEDLOT

TITLE DRAFT OPERATION ENVIRONMENTAL MANAGEMENT PLAN
PROJECT SITE - AERIAL PLAN

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 2		A3	E2-103-400-02	B

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4 Existing Environment

4.1 Climate

4.1.1 Rainfall

The climate of the region is between the tropical and temperate climatic zones. Under the Köppen-Geiger climate classification system this climate is classified as humid subtropical climate (Cfa), and experiences typical cool to mild dry winters and very warm to hot dry summers.

Rainfall varies with time of year due to the latitude of the region (-28.9^0) and tends to be summer dominant. Rainfall patterns are linked to high pressure systems over northern parts of Australia and rainfall typically occurs as thunderstorms or short and intense storm events during summer with the occasional cold fronts that brings periods of prolonged light rainfall.

Table 2 shows that the average annual rainfall interpolated by SILO for the period 1924 to 2023 is approximately 617 mm/year. The annual evaporation is approximately 1,876 mm/year. Monthly evaporation rates are lowest during the cool winter months and highest in the wet summer months (Table 2). The region has a nett deficit rainfall with rainfall less than the evaporation and transpiration rates.

Table 2 – Climatic data derived for Project site from SILO (1924-2023) (DSITIA, 2024)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Rainfall													
Mean rainfall (mm)	80.0	73.5	59.6	31.8	38.3	37.0	39.1	32.8	34.7	55.3	65.5	69.7	617.2
Median rainfall (mm)	63.9	57.1	49.4	20.6	32.0	28.1	36.2	28.8	26.9	44.6	54.3	65.2	598.6
Lowest rainfall (mm)	2	0	0	0	0	0	0	0	0	1	0.2	1.1	139.4
90% years at least rainfall (mm)	18.5	14.1	5.4	0.7	3.3	8.3	3.5	2.4	3.0	12.3	12.0	13.1	441.6
10% years at least rainfall (mm)	166.2	147.3	142.2	69.6	81.0	76.6	78.7	64.7	72.5	109.2	129.5	127.3	801.0
Highest rainfall (mm)	330.1	329	198.4	263	194.9	175.9	169.4	172.2	132.2	187.1	230.3	255.8	1118.6
Temperature, Humidity and Pan evaporation													
Mean pan evaporation (mm)	247.8	201.3	186.0	130.6	87.8	62.9	69.0	97.7	139.6	187.7	217.9	246.8	1875.7
Mean maximum temperature (deg C)	33.2	32.6	30.4	26.5	22.0	18.5	17.9	19.7	23.4	27.0	30.0	32.2	26.1
Mean minimum temperature (deg C)	18.8	18.5	16.1	11.6	7.4	4.7	3.3	4.5	7.5	11.8	14.9	17.4	11.4
Relative Humidity (%)	43.5	46.3	46.2	46.0	48.0	48.7	45.5	42.1	40.1	40.0	39.8	41.4	44.0

4.1.2 Wind

Wind speed and direction information obtained from The Air Pollution Model (TAPM) (Version 4) modelling is presented in the form of wind roses. Wind roses are a way of presenting a summary of wind speed and directional data for a time and location and show the frequency of occurrence of winds by direction and strength.

Figure 3 show wind roses from TAPM data for the Project site for all years between 2016 and 2020. Each bar shown on the wind rose represents winds blowing from that direction. The length of the bar represents the frequency of occurrence of winds from that direction and the colour and width of the bar sections correspond to wind speed categories as outlined in the legend.

During the year, the 9 am observations are dominated by winds from the east-northeast to east-southeast direction.

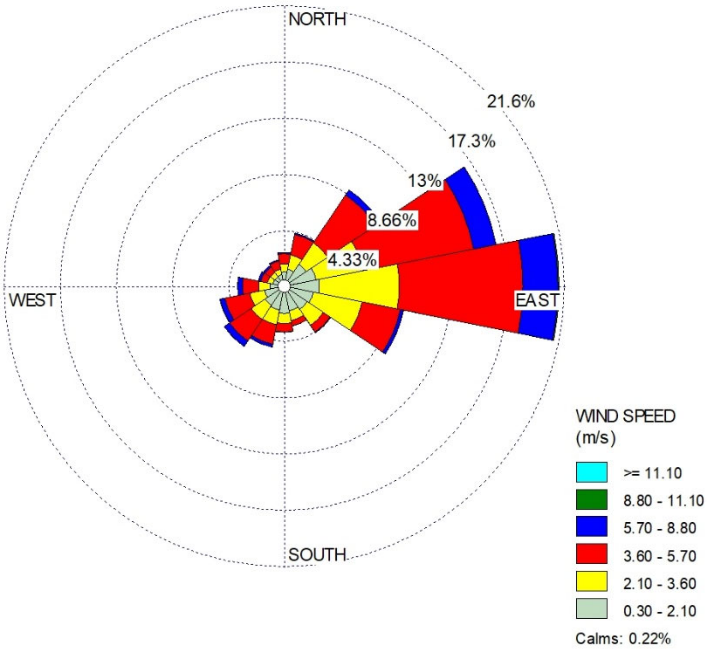


Figure 3 – Project site – Local wind direction (TAPM 2016-2020)

4.2 Sensitive receivers

The Project has been sited and designed to prevent or minimise adverse impacts on the amenity of the surrounding community and environmental values.

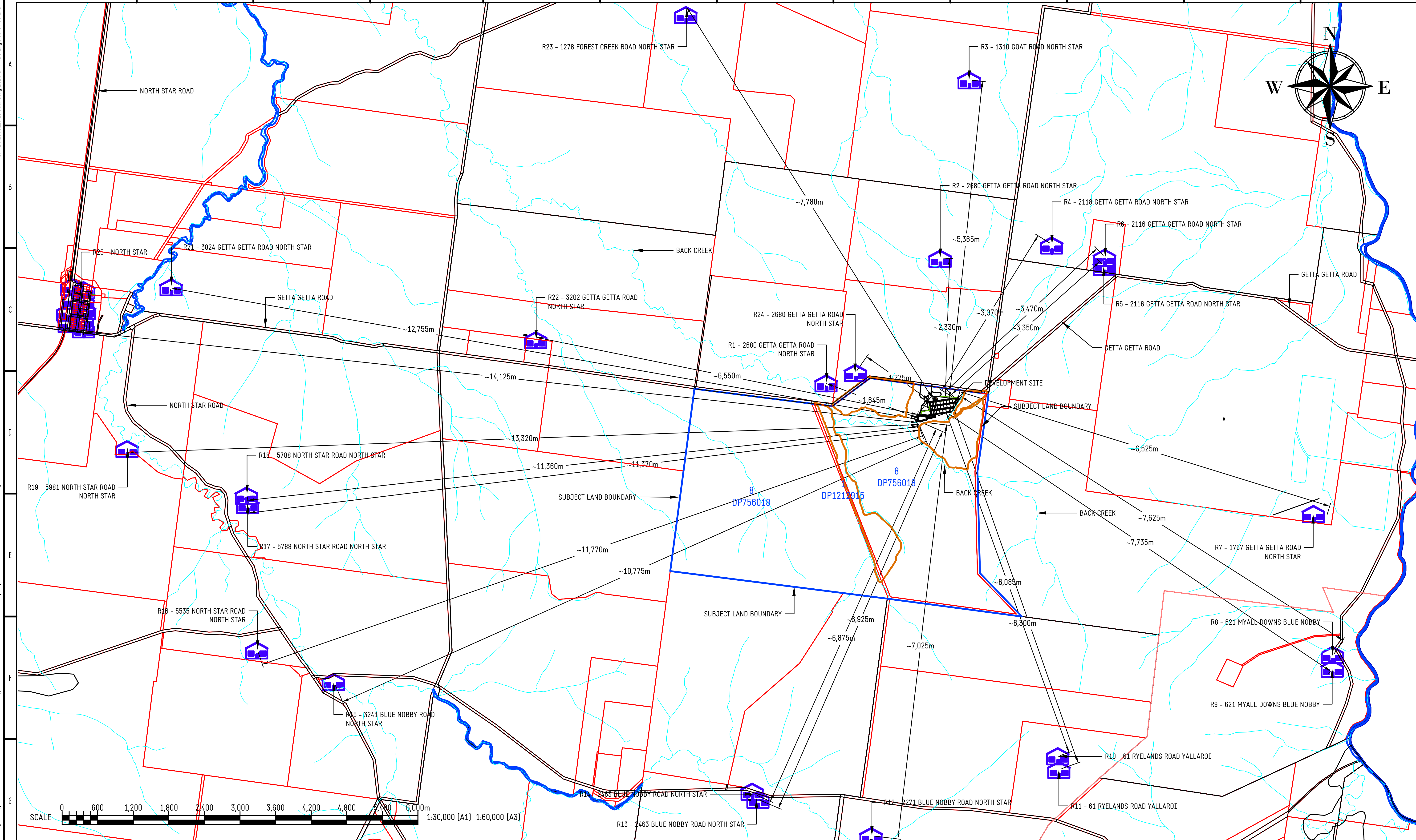
The Project site has a history of past disturbance (clearing) from land-uses associated with rural settlement and agricultural activities including timber cutting, cattle and sheep farming, dryland and irrigated cropping and infrastructure associated with those land uses.

The primary land use types within the subject land include pastoral activities such as beef cattle grazing and dryland and irrigated cropping activities. The majority of the subject land has been cleared of its pre-existing vegetation, and is now dominated by cropping areas, with some small areas of woodland fringing roads, drainage lines and areas less suitable for grazing and cropping as shown on Figure 4. The distribution of remnant vegetation is variable, mainly reflecting part disfavour of certain lands for agriculture such as the gravelly upland areas and riparian areas.

The Project development complex is on an area historically cleared of native vegetation and which currently contains pasture and infrastructure. A small area of native vegetation ecosystem credits have been retired as part of the Project.

Solid waste shall be applied sustainably to cropping land within the Project's solid waste utilisation area. A minimum buffer distance of 25 m between the solid waste utilisation areas and watercourses, drainage lines, native vegetation and public areas has been adopted.

Figure 4 shows the available separation distances for the Project for air quality. The Project is separated by over 1,000 m and 5,000 m to the closest rural residence and residential areas respectively.



LEGEND

- SUBJECT LAND BOUNDARY
- LAND PARCEL BOUNDARY
- RURAL RESIDENTIAL RECEPTOR
- SMALL TOWN RECEPTOR
- HYDROLINE

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APPROVED	RJD
DATE	21/02/2025

CLIENT: DOOLIN FARMING PTY LTD

PROJECT: SPRINGFIELD BEEF CATTLE FEEDLOT

TITLE: DRAFT OPERATION ENVIRONMENTAL MANAGEMENT PLAN
PROJECT SITE - SENSITIVE RECEPTORS PLAN

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 4		A3	E2-103-400-04	B

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4.3 Topography

The Project site is located within the Yetman (9040) 1:100,000 and Goondiwindi (8940) 1:100,000 topographic map sheets within the north east of the North West slopes and Plains region of NSW. The topography at a regional scale is generally flat to gently undulating, with elevations from 310 m to 360 m AHD. The Project site is on the eastern margins of the plains with slopes in the order of 1-2%.

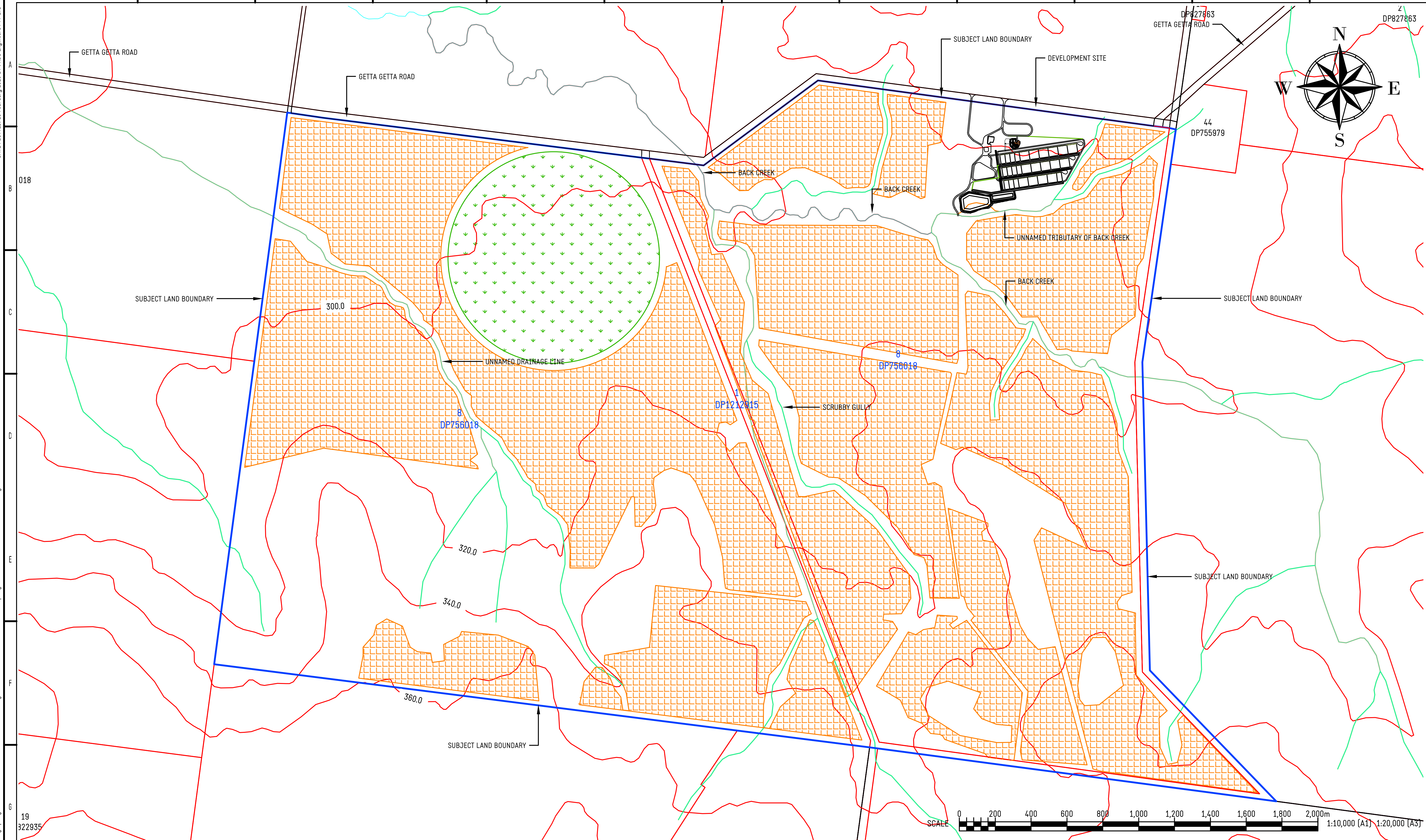
A topographic plan of the Project site was prepared from topographic data at a scale of 1:20,000 with a 5 m contour interval and is shown in Figure 5. This shows that the Project site has low relief landforms gently rising from the alluvial plains in the north west from approximately 300 m AHD towards the south – southeast to approximately 360 m AHD. There are few topographic highs.

The Project site has retained its historical topography. There has been no modification to the natural landform from mining, quarrying or other groundworks which may have altered its topography through the removal of soil or other materials other than vegetation clearing.

Drainage is confined to a north-north westerly direction towards the alluvial plains and to Back Creek. The higher elevations occur to the south of the Project site resulting in a generally northerly aspect across the Project site. The development complex site is located on a very gently sloping area with a southerly aspect and drains to a tributary of Back Creek.

The development complex is located geographically to the north-east of the Project site where the land is very gently sloping with a southerly aspect and falls towards an unnamed tributary of Back Creek. The site is inherently well drained due to the impermeable, predominantly clay soils and gradients of 2-3%.

The effluent utilisation area is located in the west of the subject land on relatively flat land as shown on Figure 5. The solid waste utilisation areas are located across the subject land where the land is relatively flat to gently sloping as shown on Figure 5.



LEGEND

- SUBJECT LAND BOUNDARY
- LAND PARCEL BOUNDARY
- EFFLUENT UTILISATION AREA
- SOLID WASTE UTILISATION AREA
- HYDROAREA
- HYDROLINE

NOTES:

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4. SITE SURVEY CONDUCTED BY ANTHONY GRAHAM VERTICAL DATUM AHD DERIVED
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CLIENT DOOLIN FARMING PTY LTD

PROJECT SPRINGFIELD BEEF CATTLE FEEDLOT

TITLE DRAFT OPERATION ENVIRONMENTAL MANAGEMENT PLAN PROJECT SITE - TOPOGRAPHIC PLAN

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 5		A3	E2-103-400-05	B

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4.4 Land resources

4.4.1 Soil-landscape mapping

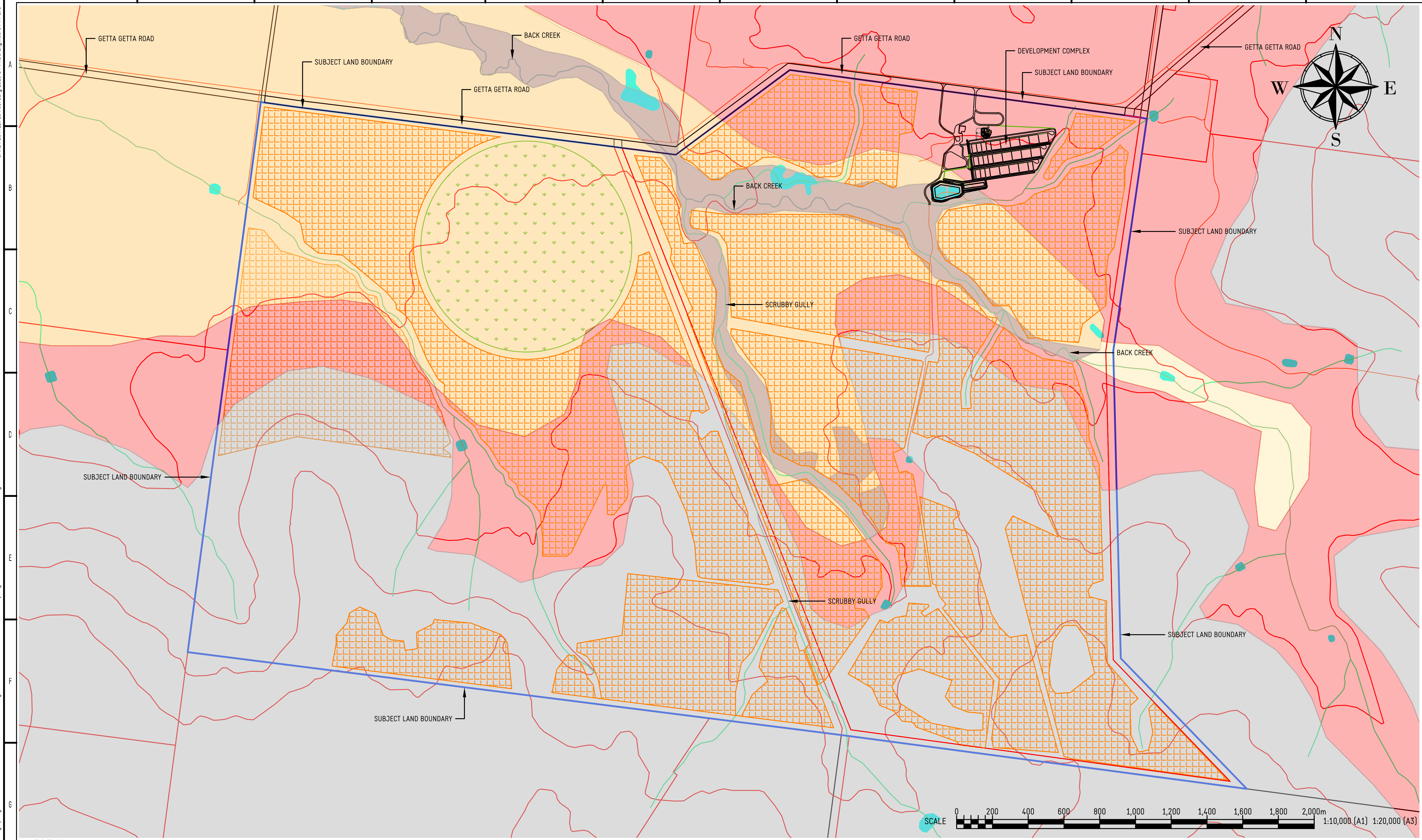
Broad scale soil and land resources of a portion of the subject land have been previously mapped as part of natural resource mapping for the Moree Plains at a scale of 1:250 000 by the Department of Climate Change, Energy, the Environment and Water 2016. The survey by the Office of Environment and Heritage (2015) is considered high data quality, midscale or imprecise mapping. The mapping provides an inventory of soil and landscape properties of the area and identifies major soil and landscape qualities and constraints. It integrates soil and topographic features into single units with relatively uniform land management requirements, allowing major soil and landscape qualities and constraints to be identified. Soils are described using the Australian Soil Classification (Isbell, 2002) and the Great Soil Groups systems (Stace et. al., 1968).

4.4.2 Site-specific soil assessment

A brief soil assessment and sampling was undertaken by JG Environmental Pty Ltd in 2024 in the solid waste and effluent utilisation areas respectively to validate the broadscale soil-landscape mapping information.

The dominant soils observed in the mid and lower slope positions were deep brown Dermosols (some Chromosols). Once again, these soils are currently being utilised for growing irrigated/dryland cotton and various fodder and grain crops. The mid to upper slope positions also contain deep reddish soils similar to the red and brown Ferrosols and Dermosols described in OEH (2015).

In the high crests and upper landscape positions, also observed were shallow to moderately deep soils (Tenosols and Rudosols). These soils are used for grazing only and have not been developed. These unsuitable soils have been excluded from the existing solid waste utilisation areas.



LEGEND

- SUBJECT LAND BOUNDARY
- LAND PARCEL BOUNDARY
- EFFLUENT UTILISATION AREA
- SOLID WASTE UTILISATION AREA
- SOIL LANDSCAPE UNIT - MUNDLE (mgh)
- SOIL LANDSCAPE UNIT - MOBBINDRY CREEK (mkt)
- SOIL LANDSCAPE UNIT - VERTOSOLS

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3. LAND RESOURCE UNIT MAPPING FROM THE SOIL AND LAND RESOURCES OF THE MOREE PLAINS (OFFICE OF ENVIRONMENT AND HERITAGE)
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CLIENT DOOLIN FARMING PTY LTD

PROJECT SPRINGFIELD BEEF CATTLE FEEDLOT

TITLE DRAFT OPERATION ENVIRONMENTAL MANAGEMENT PLAN
PROJECT SITE - SOIL LANDSCAPE OVERLAY

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 6		A3	E2-103-400-06	B

4.5 Water resources

4.5.1 Groundwater

The Project site is located within the Great Artesian Basin (GAB) one of the largest groundwater systems in the world. The GAB underlies parts of New South Wales, Queensland, South Australia and the Northern Territory.

The GAB is also acknowledged to have interactions with river systems in NSW which overly the Basin. It is highly likely that 'rejected recharge' water associated with the GAB is providing base-flow to rivers such as the Dumaresq, Macintyre, Castlereagh, Namoi, and Gwydir in their eastern reaches.

Groundwater recharge in NSW takes place chiefly along the eastern fringe of the GAB where the via the Pilliga and Mooga sandstone aquifers are exposed at the surface. In these areas the quality of the water is high and suitable for most purposes.

Groundwater extraction in the GAB is used for towns, stock, domestic use and irrigation. Agriculture is the largest user of GAB groundwater through pastoral (stock) and irrigation agricultural uses. In the past two decades an irrigation industry reliant on GAB water has been developed in the eastern recharge area where water quality is suitable.

In NSW the GAB is managed as five groundwater sources under the *Water Management Act 2000* through the Water Sharing Plan for the NSW Great Artesian Basin Groundwater Sources 2008. Two of these (the Eastern and Southern Recharge Groundwater Sources) are in the non-artesian part of Basin.

The Project site is located at North Star within the Eastern Recharge Groundwater Source. The Eastern Recharge Groundwater Source covers an area of some 5,600 km^2 extending about 150 km south from the Dumaresq River to north of Bingara, east to the Great Dividing Range and west to Boggabilla.

The Eastern Recharge Groundwater Source is characterised by better quality groundwater than other zones. Parts of these areas have been developed for high volume irrigation extraction at two main locations: North Star and Croppa Creek at the northern end of the Eastern Recharge.

Doolin Farming Pty Ltd has a water access licence (WAL 41169; Works approval 90AL834721) for 1,558 unit shares (1.3 ML/unit share) which authorises the use of groundwater on the Project site for any purpose.

4.5.2 Surface water

At a regional scale, the Project site is in the Barwon River catchment from the confluence of Macintyre River and Weir River (Qld) near Mungindi which is part of the NSW Border Rivers catchment. At a local scale, the subject land is in the Back Creek catchment which is a subcatchment of the Mobbindry Creek catchment, Whalan Creek catchment and the Boomi River catchment upstream of the Barwon River.

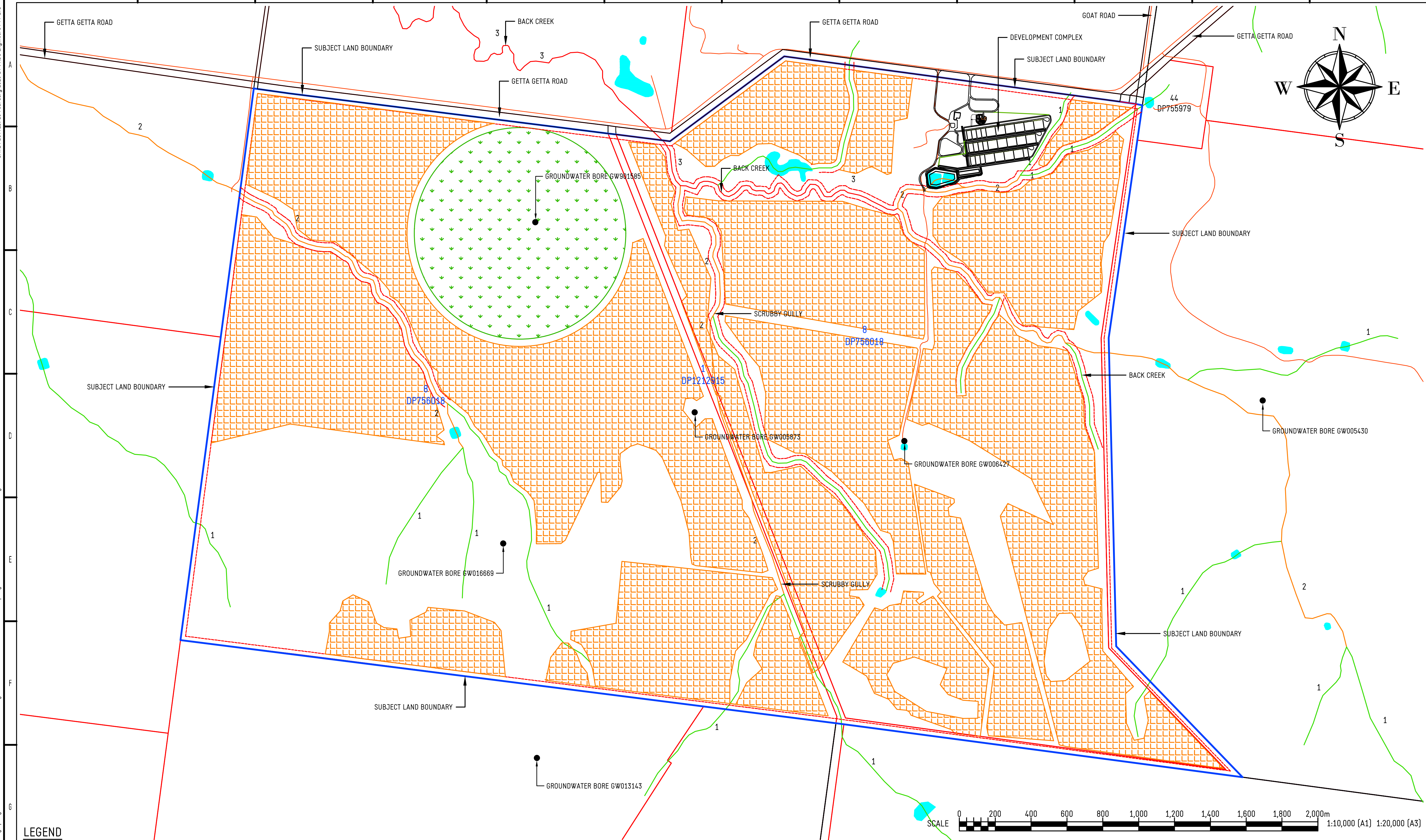
At a local scale, surface water is predominately comprised of ephemeral waterways. This is a resultant of the size of the contributing watercourse catchment area, rainfall pattern experienced in the region and no base flow resulting from groundwater expression.

The majority of smaller watercourses and drainage lines in the area are ephemeral and only flow during periods of prolonged rainfall.

Water planning in the NSW Border Rivers catchment is managed under the *Water Management Act 2000* through the NSW Border Rivers Unregulated and Alluvial Water Sources 2012.

Figure 7 shows that Back Creek flows through the centre of the subject land in a general north-westerly direction. There are various unnamed tributaries of Back Creek originating from the upper slopes of the subject land drain towards the alluvial plains in the north.

The subject land does not have access to surface water and there are no water access licences attached to the subject land.



LEGEND

- SUBJECT LAND BOUNDARY
- LAND PARCEL BOUNDARY
- HYDROAREA
- EFFLUENT UTILISATION AREA
- SOLID WASTE UTILISATION AREA
- 25m BUFFER TO HYDROLINE
- STREAM ORDER 1
- STREAM ORDER 2
- STREAM ORDER 3
- STREAM ORDER 4
- STREAM ORDER 5
- STREAM ORDER 6
- STREAM ORDER 7
- STREAM ORDER 8

NOTES:

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4. HORIZONTAL DATUM - MGA 94 (UTM ZONE 56).

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STATUS

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NOT TO BE USED FOR CONSTRUCTION PURPOSES

RPEQ

RDC ENGINEERS

AGRICULTURAL
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REV.	DATE	REVISION DESCRIPTION	DRAWN	CHECK	APPROVED
A	24/01/25	DRAFT ISSUE TO CLIENT	RJD	RJD	RJD
B	21/02/25	FINAL ISSUE FOR SUBMISSION TO GSC	RJD	RJD	RJD

SCALE	1:20,000 (A3)
DRAWN	RJD
DATE	21/02/2025
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DATE	21/02/2025
APPROVED	RJD
DATE	21/02/2025

CLIENT: DOOLIN FARMING PTY LTD

PROJECT: SPRINGFIELD BEEF CATTLE FEEDLOT

TITLE: DRAFT OPERATION ENVIRONMENTAL MANAGEMENT PLAN
PROJECT SITE - GROUNDWATER BORES AND SURFACE WATER DRAINAGE

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 7		A3	E2-103-400-07	B

4.5.3 Flooding

The climate and topography of the region results in some degree of flooding in all streams during heavy or prolonged rain events.

Flooding may be influenced by floods from two sources (or a combination of these sources):

- Riverine flooding caused by high flows in the major river (Macintyre) or its tributaries. These flood events inundate the riverine plains a complex distributary channel system some 50 km to the north west of the subject land. These events only result from rainfall over a significant portion of the respective river basin catchment.

- Local catchment flooding due to rainfall over the local catchment draining to drainage infrastructure (e.g. bridges, culverts, causeways etc) in isolation of regional flooding behaviour.

The Project site does not contain a major watercourse or situated adjacent to or on the riverine plains subject to riverine flooding as shown in Figure 7.

The Project complex has been sited and designed to:

- minimise concentration or restriction of local catchment flows; and
- avoid diversion of flow to adjoining landholders.

5 Project description

5.1 Overview

The Project is a Class One beef cattle feedlot. A Class One feedlot has the highest standard of design, construction, operation, maintenance, pad management and cleaning frequency. The Project shall have a maximum capacity of 3,000 head developed in two or more stages. The Project complex occupies a footprint of approximately 15 ha and includes the following components in a functional configuration:

- Water supply/storage and reticulation infrastructure – A reliable and uninterrupted supply of clean water of the required volume to sustain operations is provided;
- Pens - Fenced areas are required for accommodating beef cattle (production pens), cattle arriving to or being dispatched from the facility (induction/dispatch pens), and sick beef cattle (hospital pens);
- Livestock handling – Infrastructure and facilities are required for the arrival, processing and dispatch of cattle and stabling for horses;
- Feed processing and commodity storage - Feed rations are prepared on-site in a dedicated facility, with associated commodity storage, handling and ration delivery infrastructure;
- Access and internal roads - Access to the site and the layout of internal road systems are critical to the efficient and safe functioning of the proposed development;
- Administrative/maintenance infrastructure - Facilities are required for conducting management, maintenance and administrative functions at the development. This includes office, weighbridge and associated facilities for example;
- Controlled Drainage system - The controlled drainage system includes catch drains, sedimentation system and holding pond(s) for conveying stormwater, allow entrained sediment to 'settle out' and capture and storage of the stormwater from the controlled drainage areas until it can be sustainably utilised; and
- Solid waste and effluent management areas – Solid waste such as manure and mortalities are temporarily stockpiled and processed within the solid waste stockpile and carcass composting area prior to utilisation on-site or removed off-site for utilisation. Effluent is stored in holding ponds pending application to the effluent utilisation area.

The Project also includes an associated 15 ha of cropping land for solid waste and effluent utilisation. Solid waste generated is applied to an on-site utilisation area. Any solid waste not utilised on-site are removed off-site. When available, effluent is applied to land via irrigation within a dedicated effluent utilisation area.

Figure 8 shows the configuration of the Project complex.

LEGEND

- SUBJECT LAND BOUNDARY
- LAND PARCEL BOUNDARY

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CLIENT: DOOLIN FARMING PTY LTD
PROJECT: SPRINGFIELD BEEF CATTLE FEEDLOT
TITLE: DRAFT OPERATION ENVIRONMENTAL MANAGEMENT PLAN
PROJECT COMPLEX - LAYOUT PLAN

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 8		A3	E2-103-400-08	B

DATE PLOTTED: 19 February 2025 BY: RDC Engineers PTY LTD

FILE PATH: C:\RDC Engineers\RDCE - Projects\E2-103 Doolin Farming Springfield EIS\05 - ACAD MasterPlan\05.1 Drawings - CURRENT FILE NAME: E2-103 DF Springfield MASTERPLAN-00-20250108v8.dwg

5.2 Staging

The Project construction would be developed in two or more stages in line with the market demand for beef.

The Project development timeframes provided in Table 3 are indicative only and are no commitment to develop the Project within the timeframes given.

Table 3 – Project staging

Stage	Total capacity	Description	Timeframe
1	2,250 Head	Controlled Drainage Area 1. Production pen area for 1,500 Head with associated drainage system, feed bunks, water troughs, fencing, feed roads, shade structures, internal connection roads, solid waste and carcass composting area, expanded grain storage and processing facility, expended sedimentation basin and holding pond for CDA 1.	After development approvals
2	3,000 Head	Controlled Drainage Area 1. Production pen area for 1,000 Head with associated drainage system, feed bunks, water troughs, fencing, feed roads, shade structures, internal connection roads.	3-5 years

5.3 Operation activities

When fully developed, the Project includes the operation of a 3,000 head feedlot turning off approximately 6,920 head of cattle per year, including management and maintenance of pens, drainage system, and effluent and solid waste (manure, carcass compost, holding pond sludge).

The following activities are undertaken during operations.

5.3.1 Cattle management

The Project accommodates some 3,000 head of beef cattle at the design stocking density of 17.9 m^2/head on-site at any given time when fully constructed. The majority of cattle would be steers of *Bos taurus* cross genotypes. Breed composition is expected to change with time as market signals develop.

Cattle would be transported to the Project site at the entry weight of the target market, typically being an average range between 350-400 kg liveweight.

The cattle would be fed a ration specific to their market type until they reach the target exit weight when they would be transported from the site to the abattoir at Inverell for processing. Depending on the target market, the cattle would be fed for approximately 100 to 150 days to achieve an average of 625 to 650 kg liveweight.

Loaded or unloaded livestock transport vehicles enter the site from Getta Getta Road, travel along the access road, and unload or load cattle at the cattle handling facility. Empty or loaded livestock vehicles then travel along the ingress route to exit the site.

5.3.2 Feed management

The beef cattle are fed a scientifically formulated ration. Rations are prepared on-site in a dedicated facility, with associated commodity storage, handling and ration delivery infrastructure.

The ration contains grain, other high energy feedstuffs, protein meals, roughage (fibre), and minerals. Grain provides energy for weight gain. Roughage is essential in the diet to enable normal rumen activity and shall be provided by silage, hay or straw.

Commercial mineral/vitamin premixes shall also be added to the ration. These may contain calcium, urea, sulphur, salt and various trace minerals and vitamins (or just the trace minerals and vitamins) required for achieving optimal growth rates.

Loaded feed commodity transport vehicles enter the site from Getta Getta Road, travel along the access road and unload at the grain storage or commodity storage facility. Empty feed commodity vehicles then travel along the ingress route to exit the site.

All grain would be processed on-site through a dedicated grain processing facility. The facility consists of storage silos to store grain, a grain movement system and a grain processing system.

The grain processing system will be dry rolling. The grain movement and processing system would be powered by electricity. Hay would be processed during feedout in the tractor drawn feed mixer.

The processed feeds and commodities would be stored in storage bays within the commodity shed. When it is time for them to be used, they are loaded into the feed trucks by front-end loader. The feed trucks have on-board weighing and mixing equipment. The ration is then delivered to each production pen using feed trucks that place the feed directly into open feed bunks for cattle to consume.

5.3.3 Water management

Water is a vital resource for the Project. Most of the water used is for cattle to drink; it is also used for washdown of the cattle handling crush area and other general hygiene practices around the facility and in staff amenities.

Water from the Project is sourced from existing groundwater entitlements and pumped to storage tanks located towards the highest elevation at the Project complex site. Water storage of about 450,000 litres total capacity in three tanks is provided. The water within the storage tanks nest is reticulated around the Project complex via gravity or pressurised systems dependent on the proposed use.

The Project water supply, storage and reticulation is managed to:

- meet the total annual water requirement of the Project;
- provide an unrestricted, reliable supply of water to livestock at all times of the year;
- provide water that is clean, fresh and free from contamination for livestock;
- meet the peak water intake requirement for the cattle, especially during the summer period;
- minimise losses and maximise water use efficiency;
- ensure that the quality of the water (which includes temperature, salinity and impurities) does not affect cattle performance or welfare; and
- provide water that is clean, fresh and free from contamination for people.

Potable water at the Project site is provided by captured rainwater. Potable water will primarily be utilised for domestic purposes. However, it may also be required to supplement water captured and reused on the site where demand requires, and water quality allows. This may include dust suppression, fire protection and washdown activities.

5.3.4 Solid waste management

The Project produces significant amounts of solid wastes. Solid wastes include:

- Manure –the faeces and urine excreted by the cattle and the majority of all solid wastes. Manure accumulates on the pen surface and is deposited in drains and the sedimentation basin after runoff-producing rainfall.

- Waste feed – Very low levels of feed commodities or rations are wasted through spillage or spoilage. Feed in bunks may become wet and unpalatable in rainy weather and cattle may go off their feed. Under these circumstances the ration is spoiled and needs to be removed from the bunk and taken directly to the solid waste storage area.
- Mortalities – Lot fed cattle are vulnerable to sickness and disease. Whilst the Project has a high animal health maintenance and welfare program, periodically cattle deaths are experienced. The average mortality rate is around 0.5% expressed as a percentage of cattle throughput.

The various activities associated with solid waste management are outlined in the following sections.

5.3.4.1 Pen cleaning and maintenance

The pens are regularly cleaned to minimise the depth of manure on the pen surface. Pen cleaning and maintenance is not viewed as a cost, but as a method of minimising potential impacts to the environment and the potential to return income to the Project by the sale or sustainable utilisation of the harvested manure. Consequently, pen cleaning is a major on-going part of operational management.

Ideally, pen cleaning occurs at intervals not exceeding 10 weeks when the manure is moist but not wet, since moist manure is more easily scraped from the surface. However, more frequent cleaning may occur even when conditions are not ideal.

During pen cleaning, manure that has accumulated under fence lines and along the sides or feed bunks and water troughs is also removed and pen maintenance activities such as filling of potholes is undertaken.

The machinery to be used for pen and drain cleaning and maintenance activities includes:

- Skid-steer loader – under fence cleaning and removal of manure from around feed and water troughs
- front-end loader to remove manure out of the pens/drains and stockpile area
- rigid and articulated tip trucks for removing manure from the pens to the solid waste stockpile / carcass composting area, loading manure and compost for transport to the utilisation areas
- front-end loader for mixing and aerating the manure windrows and carcass compost.

5.3.4.2 Drain/Sedimentation basin cleaning

During rainfall runoff events, manure from the pen surface can be entrained in runoff water and deposited in drains rather than flowing to the sedimentation basin. Solids deposited in drains are removed after each rainfall runoff event. Typically, solids are removed using a skid-steer loader or similar equipment.

The sedimentation basin has been designed to separate larger solids in the stormwater runoff from the liquid component. Solids settle in the basin while the liquid drains into the holding pond. Over time, solids build up in the sedimentation basin and, if not removed, will begin to flow into the holding pond. The sedimentation basin is checked for efficacy after each runoff event.

Where practical, the sedimentation basin is allowed to dry out prior to removal of sediment. Typically, sediment is removed using a front-end loader or similar equipment.

5.3.4.3 Mortality management

Carcasses are removed from the pens on a daily basis and taken directly to the solid waste storage and carcass composting area. Typically, carcasses are lifted and carried using a front-end loader rather than being dragged away, which could result in the discharge of blood and other body fluids.

The majority of carcass mass is moisture and will evaporate, significantly reducing the mass remaining after composting. The mass of carcasses is considered negligible when compared to the mass and nutrient content of manure that will be handled. Carcasses are composted in separate windrows to the bulk manure windrows.

5.3.4.4 Manure stockpile/processing

The manure collected from the pens, drains and sedimentation basin is stockpiled in windrows in a dedicated solid waste storage and carcass composting area. The solid waste storage area is also used to store composting mortalities until the compost is cured.

The solid waste storage and processing area is within the controlled drainage area. Therefore, runoff from the storage area is prevented from flowing uncontrolled into the natural environment.

Providing a solid waste storage area allows for regular pen/drain/sedimentation basin cleaning even though it may not be possible to continually spread the solid waste or remove it from the site.

Solid waste stored in static piles may decompose aerobically or anaerobically, depending on its moisture content. Prior to utilisation, the solid waste would typically undergo a screening process which shall remove any rocks/gravel in the accumulated solids, bones from carcasses and reduce any large particles (including slabs of dry manure).

5.3.4.5 Utilisation

Solid waste (manure, carcass compost, holding pond sludge) is a valuable source of nutrients and organic matter for soil conditioning and growing crops or pastures. Careful management is needed to gain the most benefit from utilisation while also protecting the environment and amenity.

Utilisation of solid wastes (manure, carcass compost, holding pond sludge) substitutes a percentage of the synthetic fertilisers that would otherwise be trucked-in for use in the cropping area on the Project site. Various crops or pastures are grown on the solid waste utilisation area. Crops are harvested for hay, silage and / or grain to use as feed commodities in the ration.

Solid waste from the stockpile area is removed in line with cropping program demands and placed directly onto the available solid waste utilisation area when possible and favourable weather conditions permit. Solid waste is applied using a tractor-drawn manure spreader.

5.3.5 Liquid waste management

Stormwater run-off from the controlled drainage area is described as liquid waste ('effluent'). Because it has been in contact with manure, it has a high nutrient concentration and has the potential to pollute surface water and groundwater. Effluent is valued as a source of nutrients for fertilising crops and therefore shall be applied to land where it can improve soil agronomic properties be sustainably utilised by crops.

Effluent is collected, temporarily held in the sedimentation basin and then stored in the holding pond until it can be utilised.

Effluent from the holding pond is removed in line with cropping program demands and applied to the crops on the effluent utilisation area when favourable weather conditions permit. Effluent is applied using a low-pressure overhead sprinkler irrigation system (centre-pivot).

5.4 Administration and maintenance

The Project includes facilities for maintenance and administrative functions. This includes administration office, general goods, chemical and fuel storage and associated facilities.

The administration building is an existing cottage comprising a single storey structure containing an office, meeting room, general workstation areas, lunchroom, kitchen, first aid room and restrooms for about 6 people (i.e., allowance made for visitors, short term contractors and latent capacity).

The administration area is landscaped with selective tree plantings, gardens and grassed areas in keeping with the rural nature of the activities and location.

5.5 Access and Internal roads

The primary access to the Project is via an entry and exit point on Getta Getta Road as shown on Figure 2. This site access is via an entrance gate. A dedicated internal road connects the entrance to the administration area; the cattle receival/dispatch area and grain and commodity storage infrastructure.

Heavy vehicles larger than B-double configuration when exiting the site will be required to turn left onto Getta Getta Road towards North Star.

6 Legislative and other requirements

6.1 Legal and other requirements

A register of legal and other requirements for the Project is contained in Appendix A1. The relevance of legislation is maintained through the Environmental Management System.

The legal requirements register will be reviewed at regular intervals, such as after management review, and updated with any applicable changes. Any changes made to the legal requirements register will be communicated to the wider team where necessary through toolbox talks, specific training and other methods detailed in section 9.

6.2 Approvals, permits and licences

Several approvals, permits and licences have and/or will be obtained and maintained for the Project under relevant legislation and CoA. For example, these include:

- Development consent under the Environmental Planning and Assessment Act 1979 No 203; and
- Environmental Protection Licence under Chapter 3 of the Protection of the Environment Operations Act 1997.

Appendix A2 contains a register of all relevant environmental approvals, permits and licences. The register will be maintained by the Feedlot Manager and will be reviewed prior to the commencement of operation and at least annually as part of the management review.

6.3 Conditions of Approval

The CoA relevant to this Plan are outlined in Table 4. A cross reference is also included to indicate where the condition is addressed in this Plan or other Project management documents.

Table 4 – Conditions of Approval relevant to this plan

CoA	Condition requirements	Plan reference
Notice of Determination		
	To be completed after Notice of Determination is issued	
EPL		
	To be completed after EPL is issued	

7 Environmental management framework

The Environmental Management System is a tool for managing the impacts of the Project's activities on the environment. It provides a structured approach to planning and implementing environment protection measures and provides the documented procedures that establish the requirements for management of environmental issues on the Project site. The EMS integrates environmental management into all the Projects daily operations, long term planning and other quality management systems.

7.1 Environmental management system documentation

The OEMP is the overarching management plan for a suite of environmental management documents. It provides a structured and systematic approach to environmental management. The Environmental Document Register provided in Appendix A6 lists the environmental management documents that support the OEMP, as well as any other related environmental documentation.

The primary purpose of the system of documentation is to:

- Ensure compliance with all applicable environmental laws, obligations and approvals; and
- To minimise environmental impacts.

The schematic relationship between the OEMP, Project CoA and legislative requirements is shown in Figure 9 and described further in the sections following.

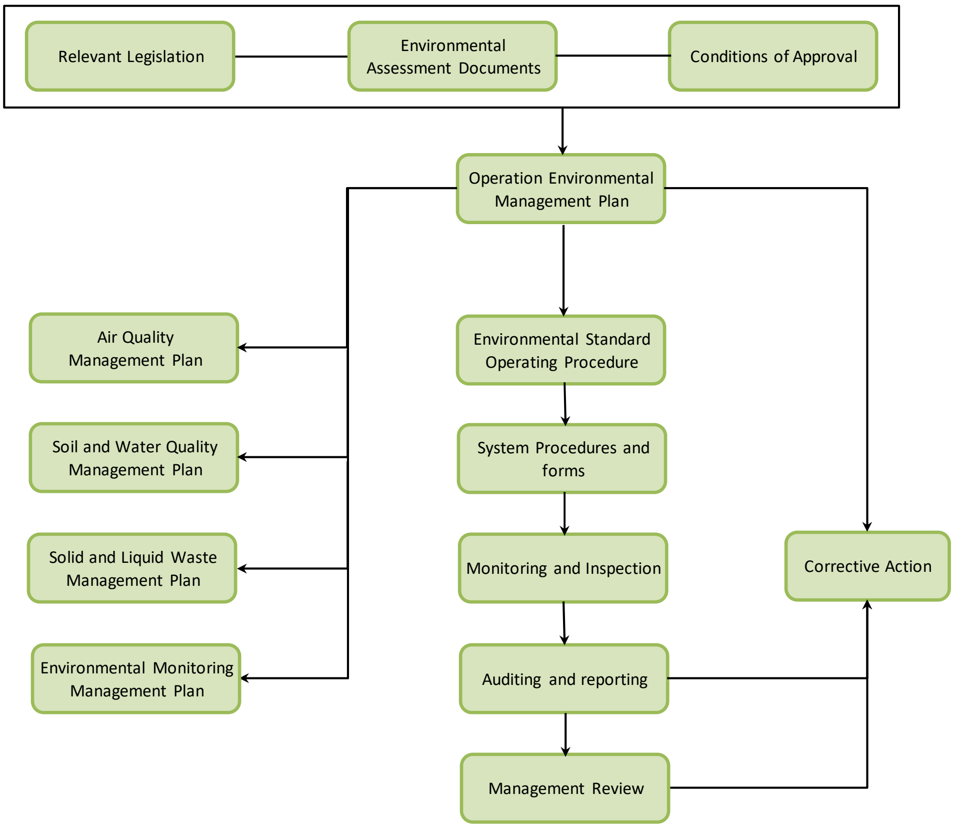

Figure 9 – Environmental management system flowchart

7.1.1 Operational environmental management plan

This OEMP is the overarching document in the environmental management system for the Project. This OEMP provides the system to manage and control the environmental aspects of the Project during operation. It identifies all requirements applicable to activities described in section 5.3. It also provides the overall framework for the system and procedures to ensure environmental impacts are minimised and legislative and other requirements are fulfilled. The strategies defined in this OEMP have been developed with consideration of the Project approval requirement, safeguards and mitigation measures presented in the environmental assessment and approval documents. This OEMP establishes the system for implementation, monitoring and continuous improvement to minimise impacts from the Project on the environment.

This OEMP is consistent with:

- Environmental Management Plan Guideline for Infrastructure Projects 2020;
- AS/NZS ISO14001:2016, 'Environmental management systems - Requirements with guidance for use'.

The OEMP and all associated plans required under CoA have been provided to the Gwydir Shire Council and the NSW EPA as the Department currently administering the *Protection of the Environment Operations Act 1997* for approval.

7.1.2 Supporting environmental management plans and strategies

Several environmental management plans support the OEMP. These documents were prepared to identify requirements and processes applicable to specific impacts or aspects of the activities described in section 4. These management plans have been prepared to meet the requirements of the CoA and mitigation measures and in consultation with stakeholders and regulatory agencies identified in the environment assessment documentation to ensure good practice environmental design and management measures are identified and implemented throughout the Project.

The management plans identify and assess the potential impacts of each significant risk / aspect as it relates to the Project, and outline the management and mitigation measures, responsibilities and monitoring requirements to be implemented to prevent or minimise potential environmental impacts.

Environmental strategies may also be developed as required throughout the Project. These will also guide environmental management of potential impacts on-site.

Relevant specific measures and requirements for the Project are included within the management plans attached to this OEMP. A list of relevant management plans and strategies for the Project, and their approval requirements, is provided in Appendix A6.

All management plans have been developed in accordance with section 6 of this OEMP and all environmental management documents will be regularly reviewed in accordance with section 13. The associated management plans are applicable to all staff and sub-contractors associated with the operation of the Project.

7.1.3 Environmental standard operational procedures

In addition to the overarching OEMP and management plans required by the CoA, a set of environmental procedures will be developed to provide further guidance for managing all activities that have the potential to negatively impact on the environment and to ensure consistency in approach and quality of outcome.

Standard operational procedures (SOPs) will be prepared by relevant members of the Project team progressively in the lead up to and during operational activities on site and will incorporate relevant mitigation measures and controls from management plans. SOPs are specifically designed to communicate requirements, actions, processes and controls to operations personnel using plans, diagrams and simply written instructions.

The SOPs are the main site documents used by Project personnel to identify and manage safety and environmental risks associated with all operational activities.

SOPs for activities likely to be considered high risk include:

- Pen cleaning and maintenance;
- Drain cleaning;
- Sedimentation basin management;
- Solid waste storage and stockpile management;
- Mortality management;
- Solid waste (manure, carcass compost, holding pond sludge) utilisation;
- Managing runoff from CDA;
- Holding pond management;
- Effluent utilisation;
- Soil monitoring;
- Solid waste (manure, carcass compost, holding pond sludge) sampling;
- Effluent sampling; and
- Groundwater and surface water sampling.

SOPs will be approved by the Feedlot Manager prior to works being undertaken. The requirement for approval by environmental personnel provides the opportunity to ensure that relevant controls required by the OEMP, management plans, procedures and relevant legislation have been considered and communicated to all personnel undertaking the associated tasks.

All Project personnel and sub-contractors undertaking a task governed by a SOP will undergo training on the SOP and acknowledge that they have read and understood their obligations prior to commencing work.

Regular monitoring, inspections and auditing against compliance with SOPs will be undertaken by Project management, quality and environmental personnel to ensure that all controls are being followed and that any non-conformances are recorded and corrective actions implemented.

A register of SOPs will be maintained in the Environmental Document Register (Appendix A6).

7.1.4 Forms, checklist and registers

Documents such as guidance notes, SOPs, checklists, forms and registers will be developed to assist in the implementation of processes described in the OEMP or supporting management plans. These types of documents will be further developed and continually improved to ensure consistency in approach and quality of outcome.

A register of relevant environmental forms and registers is maintained in Appendix A8.

7.2 Obligations, roles, responsibilities and authority

All Project personnel are responsible for protecting the environment by ensuring that environmental protection measures identified in the OEMP are planned for, resourced, communicated, installed, maintained and reviewed. All personnel working on the Project have the following general obligations:

- Undertaking work in accordance with relevant Doolin Farming Pty Ltd's policies, approved OEMP, procedures, management protocols and plans, statutory and contract requirements to minimise pollution of land, air and water;
- Implementing appropriate environmental and safety management measures;
- Use pollution control equipment and keep it in proper working order;
- Preserve the natural and cultural heritage environment;
- Minimise the occurrence of offensive odour;
- Minimise the occurrence of offensive noise; and
- Be a good neighbour to surrounding land users.
- Take all feasible and reasonable steps to ensure compliance with the requirements of this OEMP.
- Reporting of actual and potential environmental incidents to their relevant line manager or Feedlot Manager.

The key environmental management roles and responsibilities for the operation phase of the Project are described in Appendix A5.

7.3 Environmental specialists

The Project may also engage the services of technical specialists / consultants to provide advice, undertake monitoring and direct site activities as required. A description of the types of consultants that may be engaged for the Project is detailed in Table 5.

Table 5 – List of Environmental Specialists engaged

Specialist	Services provided
Soil scientist	Soil sampling/results interpretation
Environmental scientist	Groundwater sampling / surface water sampling / solid waste (manure, compost, holding pond sludge) sampling / effluent sampling
Agronomist	Crop sampling, analysis, nutrient budgeting

7.4 Sub-contractor management

Environmental requirements and responsibilities for sub-contractors are specified in their contract documentation.

All sub-contractors are required to attend Project and/or site inductions where the requirements and obligations of the OEMP are communicated. A record of all sub-contractor inductions will be maintained on the Project induction and training register.

During operation, contractors will be responsible for:

- Undertaking work in accordance with relevant Doolin Farming Pty Ltd policies, approved OEMP, procedures, management protocols and plans, statutory and contract requirements;
- Implementing appropriate environmental and safety management measures; and
- Reporting of actual and potential environmental incidents to the Feedlot Manager.

7.5 Certification and approval

The OEMP shall be approved by the Gwydir Shire Council and the NSW EPA as the Department currently administering the *Protection of the Environment Protection Act 1997* prior to the commencement of operation.

7.6 Documentation review

An ongoing informal process of environmental management documentation review ensures that environmental documentation including this OEMP is updated as appropriate for the specific works that are occurring on-site. The document review process is described in section 13.

Revised versions of the OEMP will be made available through the processes described in section 7.7.

7.7 Distribution

This OEMP is available to all personnel and sub-contractors via the Project document control management system.

The document is uncontrolled when printed. One controlled hard copy of the OEMP and supporting documentation will be maintained by the Feedlot Manager at the Project's on-site Administration office.

8 Environmental aspects and impacts

A risk management approach has been used to determine the severity and likelihood of an activity's impact on the environment and to prioritise its significance. This approach considers potential regulatory and legal risks as well as taking into consideration the concerns of community and other key stakeholders.

The objectives of risk assessment are to:

- Identify activities, events or outcomes that have the potential to adversely affect the local environment and/or human health/property;
- Qualitatively evaluate and categorise each risk item;
- Assess whether risk issues can be managed by environmental protection measures; and
- Qualitatively evaluate residual risk with implementation of measures.

The environmental risk assessment was undertaken in accordance with the following standards:

- Australian Standard/New Zealand Standard (AS/NZS) ISO 31000:2009 Risk management – Principles and guidelines; and
- Australian Standard/New Zealand Standard Handbook 203:2012 Managing environment-related risk (Standards Australia/Standards New Zealand 2012).

The main components of the risk assessment methodology include:

Hazard Identification: Identifying potential hazards that are applicable to the Project activities and determining the hazardous events to be evaluated.

Risk Assessment: Determining the possible causes that could lead to the hazardous events identified; the consequences of the hazardous events; and the safeguards and controls currently in place to mitigate the events and/or the consequences.

Risk Evaluation: Evaluating the risks using the Risk Prioritisation Matrix (section 8.1). The risk ranking is determined by a combination of the expected frequency of the hazard occurring (likelihood) and the consequence of its occurrence. Note that when assessing the consequence, no credit is given to the hazard controls. Hazard controls are taken into account in determining the likelihood of the event.

Residual Risk Treatment: Reviewing the proposed management controls for each of the risks identified and proposing additional controls or making recommendations, if required.

8.1 Risk analysis

The risk analysis was conducted using the semi-quantitative approach in the Australian/New Zealand Standard AS/NZS ISO 31000 (2009). Firstly, the 'likelihood' and 'consequence' definitions were defined for the risk analysis . These are presented in Table 6 and Table 7 for 'consequence' and 'likelihood' definitions respectively.

Table 6 – Consequence assessment

CONSEQUENCE	Personal Impact	Environmental Impact	Commercial Impact	Social Impact
Insignificant	No injuries	Low environmental impact within Project site.	Commercial Impact < $5,000.	Internal complaints received
Minor	Minor injuries, first aid treatment required (graze, scratch)	Minor environmental impact within Project site.	Commercial Impact - $5,000-$50,000	Multiple internal complaints received. External complaint received from client
Medium	Medical treatment (Off site)	Contained environmental impact within Project site.	High Commercial Loss - >$50,000	External complaints received from community. Loss of Client revenue.
Major	Permanent human damage, including concussion (amputation, loss of sight)	Major environment damage outside Project site.	Major commercial loss - $500,000	Local media coverage (Newspaper, TV). Loss of client / Contract.
Extreme	Fatality or multiple fatalities	Extensive environmental disaster outside Project site.	Extensive commercial loss >$1M	National media coverage (approached by Media, TV, Paper, Protestors, etc)

Table 7 – Likelihood definitions

Likelihood	Description	Frequency
Almost Certain	Expected to occur in most circumstances	Occur once in a day
Likely	Will probably occur in most circumstances	Occur once in a week
Possible	Might possibly occur at some time	Occur once in a month
Unlikely	Could occur at some time	Occur once in a year
Rare	May occur in exceptional circumstances	Occur once in 5 years

Table 8 – Risk assessment matrix

		Consequence				
Likelihood		**Insignificant**	**Minor**	**Medium**	**Major**	**Extreme**
		1	**2**	**3**	**4**	**5**
Almost certain	**5**	M8 Moderate	H16 High	H18 High	E23 Extreme	E25 Extreme
Likely	**4**	M7 Moderate	M10 Moderate	H17 High	H20 High	E24 Extreme
Possible	**3**	L3 Low	M9 Moderate	M12 Moderate	H19 High	H22 High
Unlikely	**2**	L2 Low	L5 Low	M11 Moderate	M14 Moderate	H21 High
Rare	**1**	L1 Low	L4 Low	L6 Low	M13 Moderate	M15 Moderate

8.2 Objectives and targets

Objectives and targets enable projects to meet defined levels of performance against identified criteria. Objectives are statements of intent, while targets define the specific performance requirements that need to be met in order to achieve the objectives. Environmental objectives and targets have been established as a means of assessing environmental performance during operation of the Project. These objectives and targets have been developed with consideration of key issues identified through the environmental assessment and risk assessment process. Environmental objectives and targets for the Project are provided in Table 9. The objectives and targets are consistent with Doolin Farming's Pty Ltd environmental policy (Appendix A4) and will assist in monitoring whether the commitments of the policy are being met.

Objectives and targets have been set to be specific, measurable, achievable, realistic and time bound. The performance of the Project against the objectives and targets will be documented in operation compliance reports, such as Annual return and at least on an annual basis as part of the management review.

The overall environmental objective is to undertake all aspects of the Project in an environmentally responsible manner and effectively manage risks to prevent or mitigate any impacts on the environment or surrounding communities.

Table 9 – Environmental objectives and targets

Objective	Target	Measurement tool
Compliance		
Ensure the Project operates in accordance with all relevant environment related approvals and legislation.	Full compliance with statutory approvals. No regulatory infringements (or prosecutions). No formal regulatory warning.	Audits, operation compliance reporting, annual return, management view.
Quality		
Implement a rigorous and comprehensive EMS.	Address non-conformances and corrective actions within specific timeframes.	Audits, management reviews.
Stakeholder and community relationships		
Engage with the potentially effected and broader community, minimise complaints and respond to any complaints within a suitable timeframe	Disseminate regular Project updates and other information through the Project website and other tools identified in this Plan and relevant sub-plans. Record and response to complaints within the timeframe specified in this Plan and relevant sub-plans.	Review complaints, operation compliance reporting, annual return, audits
Continual improvement		
Continuously improve environmental performance	Implement training and awareness programs that promote compliance, improving environmental performance and skill base of relevant Project staff on the Project and minimise environmental risk Capture lessons learnt from environmental incidents to minimise repeat issues.	Operation compliance reporting, annual return, audits, management review.

9 Competence, training and awareness

The successful training of Project personnel in environmental requirements outlined in this OEMP is a key factor in ensuring compliance with the objectives of this OEMP. Training can be both verbal and written and includes induction, meetings and specific training. The processes for communicating relevant environmental requirements to all project personnel prior to and during construction are outlined in the following sections.

The Feedlot Manager will review and approve the training program and monitor implementation.

9.1 Environmental induction

All personnel (including sub-contractors) are required to undergo a site induction that includes an environmental component which outlines key environmental issues prior to commencement of work on-site. This is done to ensure all personnel involved in the Project are aware of the requirements of the OEMP and to ensure the implementation of environmental management measures.

Short-term visitors on-site for purposes such as deliveries will be required to be accompanied by inducted personnel at all times.

The Feedlot Manager (or delegate) conducts the environmental induction and training to ensure that all personnel and sub-contractors working on the site achieve a level of awareness and competence appropriate to their assigned activities. The environmental induction will be reviewed for adequacy during project environmental management reviews.

The environmental component of the induction will include, but not be limited to, an overview of:

- Site orientation;
- Key issues relating to the Project and existing environment;
- Concepts of due diligence and duty of care;
- Relevant requirements of environmental documents and relevant conditions of environmental licences, permits and approvals;
- Relevant details of the OEMP including purpose and objectives;
- Mitigation measures for the control of environmental issues;
- The roles and responsibilities of those receiving the training in achieving conformance with the environmental policies and requirements, including emergency preparedness and incident response and reporting requirements;
- Environmental personnel and contacts;
- Information relating to the location of environmental constraints;
- Site-specific environmental management requirements and responsibilities, such as:

- location and protection of environmentally sensitive areas;
- waste management and minimisation;
- washing, refuelling and maintenance of vehicles, plant and equipment;
- efficient use of plant, equipment and materials;
- minimising potential environmental impacts including air and water quality;

- The potential environmental impacts of their work activities; and
- The potential consequences of non-compliance with relevant statutory requirements and this OEMP.

A record of all environment inductions, including the names and details of those who have been inducted, will be maintained and kept on-site. Amendments may be made to the induction at any time due to Project modifications, legislative changes or amendments to this OEMP or related documentation.

The Feedlot Manager will review and approve the induction program and monitor implementation.

9.2 Toolbox talks, training and awareness

Competency-based environmental awareness training is conducted regularly and is attended by Project staff and contractors. Content may include the points outlined above, as well as familiarisation with specific site environmental controls and community involvement/relation requirements. Employees and permanent full-time contractors also undergo specific training undertaken as tool-box training.

A program of toolbox talks will be used to raise awareness and educate personnel on issues related to all aspects of operation including environmental issues. This type of training is provided on an as-needed basis, for example, following the identification of a new environmental risk, relevant changes in legislation or a change in operation methodologies.

Toolbox talks will be of adequate duration to cover relevant information and structured to encourage full participation by all personnel. Additional toolbox meetings may be called at any time by the Feedlot Manager to discuss or highlight any aspects relating to safety, environment and quality.

The Feedlot Manager (or delegate) will be responsible for preparing and conducting toolbox talks which will focus on issues relating primarily to safety, quality and the environment.

Toolbox talks will include details of SOPs for relevant personnel or activities. Toolbox talks will also be tailored to specific environmental issues relevant to upcoming works in or near sensitive receivers or environmentally sensitive areas, or incidents that have occurred.

Relevant environmental issues may include (but are not limited to):

- Air quality – Odour / dust control;
- Pen, drain sedimentation basin cleaning;

- Solid waste management and utilisation;
- Hours of work;
- Emergency and spill response;
- Weed management;
- Noisy works or works outside of normal working hour;
- Effluent management and utilisation
- Soil and water quality;
- Environment incidents;
- Changes to previously communicated environmental mitigation measures; and
- Environmental procedures;

Toolbox talk attendance is mandatory and attendees of toolbox talks are required to sign an attendance form and the records maintained.

Targeted environmental awareness training will be provided to individuals or groups of workers with a specific authority or responsibility for environmental management or those undertaking an activity with a high risk of environmental impact. Topics covered may include those detailed above, or others deemed necessary during operation.

Operational personnel will also be informed of environmental issues through the development and distribution of awareness notes etc. These will typically take the form of a poster, email or similar.

9.3 Pre-start meetings

The pre-start meeting is a tool for informing the workforce of the day's activities, safe work practices, environmental protection practices, work area restrictions, activities that may affect the works, coordination issues with other trades, hazards and other information that may be relevant to the day's work. This type of training is provided on an as-needed basis.

The Feedlot Manager will conduct a pre-start meeting with the relevant site workforce before the commencement of work each day (or shift) or where changes occur during a shift as needed. Pre-start meetings are generally succinct in nature and take approximately 10-15 minutes.

The environmental component of pre-starts will be determined by the activity's relevant manager and /or environmental personnel and will include any environmental issues that could potentially be impacted by, or impact on, the day's activities. All attendees will be required to sign on to the pre-start and acknowledge their understanding of the issues explained.

Pre-start topics, dates delivered and a register of attendees will be recorded.

10 Consultation and communication

10.1 Consultation

Extensive consultation with relevant stakeholders and regulatory authorities has been undertaken through the development of this OEMP and associated management plans and prior to the submission and approval of the OEMP. Relevant stakeholders consulted are outlined in Table 10.

Table 10 – Relevant Stakeholders consulted

Stakeholder/ Authority consulted	Plan	Issue/Relevance
GSC / EPA	Air Quality Management Plan	Odour, Dust, GHG
GSC / EPA	Soil and Water Quality Management Plan	Water quality, erosion and sediment control, soil degradation
GSC / EPA	Solid and Liquid Waste Management Plan	Solid waste (putrescible, non-putrescible), special waste, liquid waste (effluent, sewage)
GSC / EPA	Environmental Monitoring Management Plan	Environmental monitoring (air quality, soils, groundwater, surface water, effluent and solid waste.

Consultation with relevant stakeholders and government authorities will continue throughout the Project and during subsequent revisions involving significant modifications.

Appropriate communication and notification with relevant stakeholders and regulatory authorities is an essential element in establishing constructive communication channels to ensure the impact of potential or actual issues and incidents are prevented or minimised and dealt with efficiently and amicably.

10.2 Communication

On-going and clear communication throughout all levels and functions (e.g., management, staff and sub-contractors, stakeholders and community) on environmental requirements and progress are key to minimising environmental impacts and achieving continual improvements in environmental performance. Communication is both verbal and written and is managed via various delivery mechanisms (e.g., website, signage, noticeboards, toolbox meetings and pre-start meetings.

Doolin Farming Pty Ltd recognise that environmental issues are important to relevant stakeholders, especially when the project interfaces with the general public. Consultation and communication activities are planned and approved before release to stakeholder groups.

10.2.1 Internal communication

The ongoing communication of environmental requirements and progress to project personnel is a key element in ensuring compliance with the objectives of this OEMP. Communication can be both verbal and written and can include meetings and notifications (e.g., Project alerts, bulletins) in addition to training discussed in section 9.

The Project management team will meet regularly to discuss any issues with environmental management on-site, any amendments to plans that might be required or any new / changes to operational activities.

Regular meetings may also be scheduled with environmental technical specialists and consultants. The purpose of these meetings would be to communicate ongoing environmental performance and to identify any issues to be addressed.

Further internal communications regarding environmental issues and aspects will be through awareness training as described in section 9.2.

10.2.2 External and regulatory authority consultation

The Feedlot Manager is the point of contact for external parties and regulatory authority regarding specific environmental issues.

The ongoing environmental performance of the Project including progress and any key environmental matters will be reported to the NSW EPA as the department currently administering the *Protection of the Environment Operations Act 1997* through an Annual Return.

External communications regarding specific environmental issues will be managed through the Feedlot Manager.

10.3 Stakeholder and community communication

Communication with stakeholders is an important element of any project to ensure all potentially affected stakeholders are made aware of predicted or potential impacts and that an avenue for stakeholder input is made available. A number of groups including our workforce, our customers, regulatory authorities, state agencies, local government, suppliers, industry organisations and peak bodies and residences nearby to the Project have been identified as stakeholders in relation to the operation phase of the Project.

10.3.1 Stakeholder communication strategy

Appropriate communication and notification with the relevant stakeholders are an essential element in establishing constructive communication channels to ensure the impact of potential or actual issues and incidents are prevented / minimised or dealt with efficiently and amicably.

Relevant stakeholders are outlined in section 10.3.

10.3.2 Community communication strategy

The community communications strategy includes a range of consultation and communication tools that are used for providing information and consulting with the community and stakeholders to inform the community of Project issues and receive comments and complaints during the operation phase of the Project. Key elements include:

- A phone number established and communicated to community and stakeholders for registering a comment / complaint and triggering the appropriate response procedure;
- Signage on Project boundary and entrance;
- Project website with a contact number, email and postal address;
- A postal address to which written complaints and enquiries might be sent;
- An email address to which electronic complaints and enquiries may be transmitted; and
- Advertisement with the number, email and postal address prior to commencement of operation.

10.3.3 Enquiries and complaints response

A Complaints and Enquiries Procedure consistent with AS/NZS 10002:2014 Guidelines for complaint management in organisations and will be developed prior to commencement of operational activities and maintained for the duration of operations.

Doolin Farming Pty Ltd has established a telephone number, postal address and email address for community complaints and enquiries. All community inquiries and complaints related to the operational activities will be referred to the community information line.

The telephone number, the postal address and the email address were published in newspapers circulating in the local area prior to the commencement of operation. The community is regularly informed of the phone, email and postal addresses via the Project website, newsletters and signage adjacent to the Project site.

Enquiries and complaints contact details are provided in Table 11.

Table 11 – Enquiries and complaints contact details

Contact method	Details
Postal	2513 Getta Getta Road, North Star NSW 2408
Email	TBA
Phone	TBA

In responding to enquiries or complaints, Doolin Farming Pty Ltd will:

- Record details of all complaints received in the Complaints Register, including how they were addressed, whether resolution was reached and whether mediation was required or used. The information contained within the register will be made available to the regulatory authorities on request.
- Investigate the complaint – site investigation to identify potential causes, researching any previous issues, checking whether any requirement has been breached, what corrective action, if appropriate, will be undertaken, a time frame for this action and the appropriate feedback/response to the complainant.
- Provide at least an initial response to the complainant regarding what has been found and what corrective and / or preventative action is proposed as soon as possible and within a maximum of 48 hours from the time of the complaint.
- Where appropriate, provide a detailed written response to the complainant within ten (10) days, outlining (but not limited to) whether a problem has been found, the reason for the problem and, if appropriate, corrective and preventative actions that have been implemented to resolve the issue. A signed electronic and hard copy of the written response will be kept in the Project's document control and data management system at the Project's on-site administration office.
- Complaints and enquiries feedback will be evaluated quarterly as part of the review process in order to assess and adjust communication methods if required.

Corrective actions will be applied in consultation with the appropriate operational staff to allow modifications and improvements in the management of any environmental issues resulting in community complaints.

10.3.4 Record of consultation and communication

External consultation via email will be undertaken using the Project's email system, which automatically records all email correspondence.

The uploading and management of documents is discussed further in section 14. In addition, any records of consultation including letters, review comments or the issue of approvals will be kept on-site in the relevant folder in the Project's on-site administration office.

Verbal consultation with stakeholders will be recorded using hard or soft diary notes or file notes and saved on-site in the filing system at the Project's on-site administration office.

Where relevant, verbal correspondence will also be entered in the community and stakeholder consultation register, as described in the section 14.

11 Incident and emergency management

All emergency and incident situations on the Project including actual or potential (near miss) for injury, or damage to equipment, property or the environment will be reported to the Facilities Manager or immediate supervisor as soon as practicable after the occurrence.

An emergency situation is an event that could present significant risk to the environment, personnel or the community, as determined by the Feedlot Manager.

All emergency and incident situations on the Project shall be managed according to the Project's Environmental Complaints, Incidents and Emergencies Procedure (Appendix A9).

All incidents will be investigated, and the appropriate course of action will be taken to address the issues. Environmental incidents that harm or are likely to harm the environment will be reported to the NSW EPA in accordance with Part 5.7 of the *Protection of the Environment Operations Act 1997.*

The Feedlot Manager has the authority and independence to require reasonable actions to avoid or minimise unintended or adverse environmental impacts, and failing the effectiveness of such actions, to instruct that relevant actions be ceased immediately should an adverse impact on the environment be likely to occur.

11.1 Incident investigation, reporting and recording

Environmental incidents do not necessarily comprise a breach of legislation and can involve (but not be limited to) the following:

- spills of fuels, oils, chemicals and other hazardous materials;
- unauthorised discharge from holding pond or other containment devices;
- any adverse health or well-being impacts on persons due to activities causing adverse environmental conditions ;
- an unexpected find of contaminated soils or other potentially hazardous substances;
- unauthorised damage or interference to native vegetation, threatened species, endangered ecological communities or critical habitat;
- potential contamination of waterways or land;
- accidental starting of a fire or a fire breaking out of containment;
- any breach of legislation including development consent conditions; or any government agency permit condition;
- works impacting outside an approved area or undertaken without appropriate approval or assessment under the *POEO Act 1997*; and
- unauthorised dumping of waste.

The incident shall be assessed immediately and action taken promptly to correct any existing danger and to prevent repetition.

Doolin Farming Pty Ltd has developed an Environmental Complaints, Incidents and Emergencies Procedure to classify and report environmental incidents that may occur during the Project's operational activities and to comply with its statutory obligations to report certain incidents. Incidents are reported, investigated and recorded according to this procedure. The procedure provides references to:

- Types of environmental incidents.
- Criteria for classifying of environmental incidents.
- Processes for systematically responding to and managing emergency situations.
- Processes and legal requirements (e.g., Acts, Regulations, EPL), for reporting and notification of an environmental incident.

The procedure is provided in Appendix A9.

Typically, the Feedlot Manager or in his absence the Environmental Specialist, will be immediately notified verbally of major environmental incidents and this will be followed up in writing within two hours of any incident occurring. All efforts will be undertaken immediately to avoid and reduce impacts of incidents and suitable controls put in place. Incidents will be closed out as quickly as possible, taking all required action to resolve each environmental incident.

The NSW EPA as the department currently administering the *POEO Act 1997* will be notified of any environmental incidents or pollution incidents on or around the site via the Environment Line (131 555 in NSW; 02 9995 5555 if outside NSW) in accordance with part 5.7 of the *POEO Act 1997*. The circumstances where this will take place include:

If a discharge of waste –

a) occurs as a result of an emergency, accident or malfunction; or
b) occurs otherwise than in accordance with a works approval or licence or with a requirement contained in an environmental protection notice; or
c) is of a prescribed kind or a kind notified in writing to the occupier concerned, and has caused or is likely to cause pollution, material environmental harm or serious environmental harm.

All records relating to environmental incidents shall be maintained on the Project's document control and data management system to remain legible, identifiable and traceable.

11.2 Environmental emergency

11.2.1 Preparation

Major environmental incidents, natural disasters or adverse weather events may require an emergency response. To ensure that all site personnel know their responsibilities during an emergency, an Emergency Plan (EP) for the Project is in place. The EP covers both WHS and environmental emergencies. The EP needs to be read in conjunction with this OEMP.

The EP is prepared in consultation with relevant Authorities to determine requirements in the event of a Project emergency as well as requirements in the event of an emergency advised by relevant Authorities.

11.2.2 Response

The EP details the preparation for emergency and the actions to be taken in the event of an actual emergency event and reporting requirements. Table 12 lists the key contacts for environmental emergencies.

Table 12 – Environmental emergency contact details

Emergency contact/Organisation	Contact details (Phone)
Police	000
Ambulance	000
Fire and Emergency Services	000
NSW Rural Fire Service	1800 NSW RFS (1800 679 737)
Environmental line	131 555

12 Inspections, monitoring and auditing

12.1 Environmental Inspections

Regular site inspections are an important part of maintaining an environmental presence and reviewing operation activities to ensure compliance with controls described in the OEMP, associated management plans and SOPs.

12.1.1 Site inspections

Typically, site inspections will be performed by the Feedlot Manager and Farm Manager during site attendance and will focus on the protection of environmentally sensitive areas, impact on sensitive receivers and compliance with all applicable environmental documentation and conditions.

Site inspections will be conducted on an on-going basis and prior to 'forecasted' and following heavy rainfall events to evaluate the effectiveness of environmental controls.

Site inspections provide a forum for the Feedlot Manager to liaise directly with operation personnel to ensure satisfactory environmental outcomes during works.

The Feedlot Manager will document any relevant or notable outcomes of site inspections by:

- Diary notes, which will be kept of work locations, activities, times, conversations or other relevant information that may be of environmental interest, both positive and negative;
- Photographs – which will be taken of environmental mitigation measures, operation activities or other areas of interest both positive and negative; and
- Any minor non-conformances and associated control actions required to be undertaken by operational personnel - these will be recorded in the Site Inspection and Non-conformance register (Appendix A8). Records will also include details of any maintenance required and undertaken, the nature of the deficiency, any actions required and an implementation priority.

The process for recording and managing a non-conformance with an SOP or other management document is described in section 12.5.

12.2 Monitoring

Environmental monitoring is important in ensuring that operational activities are not adversely affecting the environment or sensitive receivers and that control measures are working effectively. Monitoring will be undertaken to validate the impacts predicted for the Project, to measure the effectiveness of management plans, environmental controls and implementation of this OEMP, and to address approval requirements.

Environmental monitoring will involve routine collection and interpretation of data to assess operational performance, environmental performance and compliance with requirements.

The monitoring requirements for required aspects are included in the relevant management plans and summarised in Table 13. The program was established and implemented at the commencement of operation. The Feedlot Manager (or delegate) is responsible for the implementation of the operation environmental monitoring program.

Table 13 – Environmental monitoring required by Project approval

CoA	Description	Relevant Management Plan	Reporting requirements
Environmental Protection Licence			
-	Soil and water quality	OSWQMP	Refer Appendix B4 – Environmental monitoring management plan
	Groundwater and surface water	OSWQMP	Refer Appendix B4 – Environmental monitoring management plan

The requirements for environmental monitoring throughout the period of operation are detailed in the relevant management plans (Appendix B). The timing, frequency, methodology, location and responsibilities for the environmental monitoring programs is provided in the management plans and included as separate procedures where further information is required.

Monitoring procedures address how these activities will be undertaken and include:

- Purpose and scope;
- Minimum acceptable frequency and standards listed in CoA and Licence;
- Relevant EPA approved methods, Australian Standards or, in the absence of these, industry acceptable procedures;
- Targets and parameters;
- Processes for response to any exceedances of targets/standards; and
- Processes for recording and reporting results.

All environmental monitoring equipment will be maintained and calibrated according to manufacturer's specifications and appropriate records kept.

The Environmental Specialist will advise the Feedlot Manager of any non-conformances from monitoring and details reported in the Annual Return.

Where a non-conformance is detected or monitoring results are outside of the expected range and are directly attributable to the Project (i.e., are influenced by factors under the direct control of the Project e.g., surface water quality), the process described in section 12.5 will be implemented.

12.3 Auditing

12.3.1 Internal Audits

Internal auditing will be undertaken, generally on a twelve-monthly basis, with the initial audit to occur within six months of the commencement of operation and then at regular intervals thereafter. These internal audits will be timed to provide input into annual compliance tracking, so that the results can be used in annual returns.

The purpose of the internal audits is to:

- Check compliance with the conditions of approval requirements (CoA);
- Check compliance with any relevant legal and other requirements (e.g., Licence, regulations);
- Check compliance with the mitigation measures in the OEMP and management plans;
- Review the OEMP, management plans and all other environmental documentation to ensure relevance to current activities and recommend changes or improvements;
- Review results of monitoring against criteria;
- Review environmental incidents to determine trends or additional controls required;
- Review non-conformance information to determine trends or additional controls required; and
- Review Environment Action Register/s to ensure timely and adequate close-out of actions.

An audit checklist will be developed and amended as necessary to reflect changes to this OEMP, subsequent approvals and changes to Acts, regulations or guidelines.

The outcomes of the internal audit may trigger the requirement to update the OEMP and/or any associated environmental documents. Document revision will be done in accordance with section 13 of this OEMP.

12.3.2 External audits

External auditing may be undertaken by an independent environment auditor in accordance with ISO 19011:2014 - Guidelines for auditing management systems. The scope of an external audit will, as a minimum focus on compliance with the CoA, OEMP and other approval or management documents.

12.4 Reporting

Prior to and during operation, various reports will be prepared to fulfil reporting needs and requirements under the Project approval. Table 14 sets out the reporting requirement applicable to the Project, timing of the reporting, who is responsible for managing preparation of the reports and the intended recipient(s).

Additional reporting may be necessary as the operation continues. In such a circumstance, Table 14 will be amended to reflect these changes.

Table 14 – Project reporting requirements

Requirement	Timing	Responsibility	Recipient
Annual Return	Yearly	Feedlot Manager	NSW EPA

12.5 Non-conformances, corrective and preventative actions

A non-conformance is the failure or refusal to comply with the requirements of this OEMP and supporting documentation. Environmental non-conformance will be detected through verification processes such as monitoring, inspections, audits, receipt of complaints and Annual Return.

Any member of the Project team may raise a non-conformance /or improvement opportunity. The Environmental Specialist (consultant) or Regulatory Authority may also raise a non-conformance or improvement opportunity using the same process.

Non-conforming activities may be stopped, if necessary, by the Feedlot Manager, Farm Manager, Feedmill Supervisor, Livestock Supervisor or Maintenance Supervisor following consultation with the Feedlot Manager or delegate. The works will not commence until a corrective / preventative action has been closed out. The Environmental Specialist may also stop works in these circumstances.

For each non-conformance identified, a corrective/preventative action (or actions) will be implemented. In addition, any environmental management improvement opportunities can be initiated as a result of incidents or emergencies, monitoring and measurement, audit findings or other reviews. Improvement opportunities may also result in the implementation of corrective/preventative actions. Where a non-conformance is identified, the following process will be followed:

- An analysis of the issue by the Feedlot Manager in more detail with a view of determining possible causes for the non-conformance;

- A site inspection by the Feedlot Manager or delegate;
- Advising relevant personnel of the problem;
- Identifying and agreeing on actions to resolve or mitigate the non-conformance; and
- Implementing actions to rectify or mitigate the non-conformance.

Corrective/preventative actions and improvement opportunities will be entered in a database and include detail of the issue, action required and timing and responsibilities. The record will be updated with date of close out and any necessary notes. The database will be reviewed regularly to ensure actions are closed out as required.

The timing for any improvement will be agreed between the relevant manager and Feedlot Manager based on the level of risk (e.g., a significant risk will require immediate action). Tracking of environmental and associated corrective actions will be the responsibility of the Feedlot Manager.

Non-conformance to the requirements of this Plan is recorded as a non-compliance. Non-compliances are recorded in the Project non-compliance register (Appendix A8).

13 Review and improvement

An ongoing document review process ensures that environmental documentation including this OEMP is updated as appropriate for the specific activities that are occurring on-site.

Review of the OEMP may be undertaken as a result of one or more of the following types of trigger mechanisms:

- Issue of stop-work orders;
- Staff and agency/authority name changes;
- Non-compliance raised as part of the audits, monitoring, inspections; and
- Representations by on-site management staff.

As part of the continual improvement process, environmental management reviews are undertaken at least annually to confirm the continuing suitability and effectiveness of the OEMP to ensure that it meets current contractual and legislative requirements. The management review involves the Project management team including the Feedlot Manager, Livestock Supervisor, Feedmill Supervisor, Maintenance Supervisor, Farm Manager and Environmental Specialist and relevant project team members and stakeholders. The management review covers, but not limited to the following:

- A review of the aspects and impacts register, legal register and environmental induction;
- Communications from agencies, regulators and other external stakeholders;
- Consideration of monitoring, inspection and audit results;
- Consideration of incidents and any lessons learnt;
- Consideration of any new regulatory issues;
- Systemic issues arising from site inspections;
- A review of the effectiveness of environmental controls;
- Training needs;
- Consideration of issues raised by Project management team;
- Status of corrective and preventive actions;
- The extent to which objectives and targets have been met;
- Non-conformances and environmental incidents;
- Consideration of changes in operational needs such as resourcing; and
- Follow-up actions from previous management reviews (as applicable).
- Effectiveness of environmental management documentation implementation;
- Management effectiveness;
- Potential improvements to the environmental management documentation;
- Adequacy of resources;

- Findings of audits;
- Environmental objectives and targets;
- Environmental performance;
- Compliance with legal and other requirements;
- Critical non-conformance or repeated non-conformances;
- Organisation changes; and
- Effectiveness of training and inductions.

The outcomes of the management reviews could include amendments to this OEMP and related documentation, revision to the Project's environmental management system, risk assessment review, re-evaluation of the Project objectives and targets as well as amendments to other management plans.

Should the document review process identify any issues or items within the documents that are either redundant or in need of updating, it is the responsibility of the Facilities Manager (or delegate) to update the relevant management plans.

The revised document(s) will then be issued to the Feedlot Manager and the Environmental Specialist for certification of the changes. The Feedlot Manager can approve minor changes to the OEMP. Minor changes would typically include those that:

- Do not increase the magnitude of impacts on the environment when considered individually or cumulatively;
- Are editorial in nature e.g., staff and agency/authority name changes; and
- Do not compromise the ability of the Project to meet approval or legislative requirements.

Where the Feedlot Manager deems it necessary, the amended OEMP will be forwarded to the NSW EPA as the Department currently administering the *POEO Act 1997* for approval.

Where revisions to environmental management documentation are determined by the Feedlot Manager to be significant, these will be reviewed by relevant stakeholders for approval.

14 Document control and records management

Environmental documents and records will be maintained during the Project through the Doolin Farming Pty Ltd document control management system to remain legible, identifiable and traceable.

14.1 Document control

The Feedlot Manager (or delegate) will coordinate the preparation, review and distribution, as appropriate, of the environmental documents. During the Project, hard copies of all environmental documents will be stored on-site at the Project's administration office.

All environmental management documents are subject to ongoing review and continual improvement. This includes times of change to scheduled activities or to legislative or licensing requirements.

The OEMP, on approval, will be available on-site at the Project's administration office and will be subject to update and revision in accordance with the process described in section 13.

Doolin Farming Pty Ltd will implement a document control procedure to control the flow of documents within and between stakeholders and subcontractors. The procedure will ensure that documentation is:

- Developed, reviewed and approved prior to issue;
- Issued for use;
- Controlled and stored for the legally required timeframe;
- Removed from use when superseded or obsolete; and
- Archived.

A register and distribution list will identify the current revision of particular documents or data. If significant changes to the OEMP are required, a revised copy will be issued to controlled copy holders. The controlled copy will always remain on-site at the Project's on-site administration office. The Feedlot Manager will notify all relevant personnel of any revision of the OEMP or management plans. If any OEMP Appendices are required to be updated at any stage of the Project, a revised copy of the relevant Appendix only will be forwarded to controlled copy holders.

14.2 Environmental records

A range of environmental management records will be retained by the Project. The types of records include but not limited to those outlined in Table 15. The Feedlot Manager is responsible for maintaining all environmental management documents as current at the point of use. The person listed under "Responsibility" in Table 15 ensures that the record is appropriately identified, completed and systematically retained by the Project.

Table 15 – Environmental management records

Record Type	Activity	Responsibility
Induction and Training Records	Project inception / new staff / changed practices	Feedlot Manager
NSW EPA's online waste tracking system	Controlled waste required to be tracked	Feedlot Manager
Environmental Non-conformances, complaints and follow-up actions	Event basis	Feedlot Manager
Environmental monitoring records	Soil, water, air quality analysis results, solid waste stockpiled, effluent and solid waste applied, crop yields	Farm Manager
Annual Return	Yearly report to NSW EPA	Feedlot Manager

The approved OEMP will be maintained in the Project's document control and data management system with a document number and a revision number. At any given time, the latest version can be viewed with the ability to view the historical versions and track changes. All environmental records will be maintained electronically on the Project's document control and data management system. Environmental records are kept as a means of assessing the effectiveness of the Project's management of environmental issues and risks and to demonstrate compliance with Project approvals. Records that will be retained as evidence of environmental management implementation and effectiveness include, but not limited to:

- OEMP and management plans;
- Environmental SOPs, forms, checklists;
- Environmental Risk Register;
- Details of qualifications held by individuals responsible for environmental monitoring;
- Licences and permits;
- Records of environmental training and inductions;
- Environmental incident reports;
- Reports on compliance with CoA;
- Reports from environmental inspections (internal and external);
- Reports from environmental audits (internal and external);
- Details of complaints / non-conformance/ preventative / corrective and preventative actions;
- Monitoring data/assessment of results against compliance (dust, water, soil etc);
- Environmental inspections and reports; and
- Meteorological, soil and water monitoring results.

15 References

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Meat and Livestock Australia, 2015a, Beef Cattle Feedlots: Design and Construction, Meat and Livestock Australia, North Sydney, NSW.

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RDC Engineers Pty Ltd, 2025, Proposed Intensive livestock agriculture development (Expansion of beef cattle feedlot from 999 head to 3,000 head) on the property "Springfield", Development Application and Environmental Impact Statement, V1R2 RDC Engineers Pty Ltd, Toowoomba, QLD, 4350.

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Appendix A1 – Legal and other requirements

Legislation/Policy	Relevance
Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)	The EPBC Act provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places – defined in the EPBC Act as matters of national environmental significance and environmental impacts on Commonwealth land.
Contaminated Land Management Act 1997	The purpose of this Act is to establish a process for investigating and (where appropriate) remediating land that the EPA considers to be contaminated significantly enough to require regulation. In particular, to ensure that contaminated land is managed with regard to the principles of ecologically sustainable development.
National Greenhouse and Energy Reporting Act 2007	An Act to provide for the reporting and dissemination of information related to greenhouse gas emissions, greenhouse gas projects, energy production and energy consumption, and for other purposes.
NSW Environmental Planning and Assessment Act 1979 (EP&A Act)	The EP&A Act and Regulation include provisions to ensure that proposals which have the potential to impact the environment are subject to detailed assessment, and provide opportunity for public involvement. The EP&A Act requires compliance with the conditions of the project approval granted for the Project under Part 3A of the EP&A Act
Environmental Planning and Assessment Regulation 2000	This Regulation is made under the Environmental Planning and Assessment Act 1979 and plays an important role in the planning provisions of the Environmental Planning and Assessment Act 1979.
Local Government (General) Regulation 2005	This regulation is made under the Local Government Act 1993 and provides regulatory measures for sewage management facilities.
Protection of the Environment Operations Act 1997 (POEO Act)	The purpose of the POEO Act is to control pollution and set up a licensing regime for certain activities. An environmental protection licence will be required for scheduled activities (i.e. Livestock intensive activities - feedlot).
Protection of the Environment Legislation Amendment Act 2011 (POELA Act)	The POELA Act introduces several changes to improve the way pollution incidents are reported, managed and communicated to the general community. The Act includes a new requirement under Part 5.7A of the POEO Act to prepare, keep, test and implement a pollution incident response management plan.
Protection of the Environment Operations (Clean Air) Regulation 2010.	This regulation is made under the PoEO Act and provides regulatory measures to control emissions from wood heaters, open burning, motor vehicles and fuels and industry.
Protection of the Environment Operations Amendment (Illegal Waste disposal) Act 2013	This act amends the Protection of the Environment Operations Act 1997 to more effectively deal with illegal waste disposal and fraud in the waste sector.
Protection of the Environment Operations (Waste) Regulation 2014	This Regulation is made under the Protection of the Environment Operations Act 1997 and sets out provisions covering waste record keeping, tracking, reporting, transportation and miscellaneous topics.
Water Management Act 2000	This Act aims to provide for the sustainable and integrated management of the water sources of the state of NSW in line with ecologically sustainable development principles.
Water Act 1912	The Act came into force at the turn of the century and is being progressively phased out and replaced by the Water Management Act 2000 but some provisions are still in force.

AS/NZS ISO 14001:2016 Environmental management systems	All organisations have some impact on the environment. An EMS is a structured system or management tool designed to help an organisation to reduce its negative impacts on the environment and improve its environmental performance. The system can also provide a methodical approach to planning, implementing and reviewing an organisation's environmental management.
Waste Avoidance and Resource Recovery Act 2001	This Act promotes waste avoidance and resource recovery to achieve a continual reduction in waste generation. The Act provides for the development of a state-wide Waste Strategy and introduces a scheme to promote extended producer responsibility for the life-cycle of a product.

Appendix A2 – Approvals, permits and licences

This section has been left intentionally bank.
Copies of all relevant approvals, permits and licences to be included.

Appendix A3 – Environmental aspects and impacts register

Category	Operation Activities / Aspect	Potential Impacts	Risk level prior to mitigation	Indicative Mitigation Measures	Risk level after mitigation	Relevant Management Document / Training required
Air quality	• Dry commodity storage, handling and processing • High moisture commodity (e.g., silage, oils) storage and handling • Grain handling and processing • Pen, drain and sedimentation basin and holding pond cleaning • Mortality management • Split feed management • Solid waste handling, processing and spreading • Effluent storage • Effluent utilisation • Vehicular movements on unsealed roads • Ration delivery • Exposed bare earth areas • Vehicle emissions	Complaints from neighbours, including loss of amenity and impacts of dust.	**L5 – Low**	• All Development employees and contractors are given adequate training in environmental awareness, legal responsibilities, and air quality control methods. • The air quality and meteorological monitoring network is maintained, and results are routinely analysed, assessed and reported. • Pen cleaning and surface maintenance is undertaken on a planned basis to ensure that pen surfaces dry quickly following rainfall, can drain freely and do not become overly dry and cause excessive dust emissions. • Elimination of wet areas within the pens by repairing potholes, eliminating accumulated manure from under fence lines and fixing leaks from water troughs. • Spilt and spoilt feed and feedstuffs are regularly removed from around feed storage and preparation areas, feed bunks, feed processing equipment, etc. • Sedimentation basin control weirs are maintained in operational order to ensure that complete drainage occurs. • Solids are removed from the sedimentation basins as soon as practical after deposition. • Mortalities are placed within the solid waste stockpile and carcass composting area and covered with high carbon material as soon as practicable after placement. • Wet manure stockpiles are not turned to minimise release of emissions generated from the anaerobic decomposition process. • Controlled aeration of solid waste composting windrows. • Dewatering of the holding ponds by irrigation to crops as soon as possible after rainfall. • Receiving, reporting and responding to any complaints in relation to air quality. • Adapting the cattle stocking density in pens to maintain the moisture content of the manure on the pen surface at 25-35% to minimise dust generation. For example, stocking density may change from lighter rates in winter to heavy rates in summer. • Setting and enforcing speed limits on internal road network. • Dust suppression measures, such as watering access and feed roads and solid waste (manure) stockpiles as required. • Any operations involving the movement of dusty materials such as grain movement, solid waste (manure) turning and spreading shall be timed and managed where possible when materials have adequate moisture content.	**L2 - Low**	NFAS manual Meat and Livestock Australia, 2015b, Beef cattle feedlots: waste management and utilisation, Meat and Livestock Australia, North Sydney, NSW CoA Complaints Register Personnel training and awareness Personnel induction
		Impacts on residential sensitive receivers, including impacts on living areas, swimming pools and general amenities.	**L5 – Low**		**L2 - Low**	
		Potential adverse health effects.	**M11 – Moderate**		**L1 - Low**	
		Impacts on water quality and other aspects of the natural environment.	**L5 – Moderate**		**L1 - Low**	
		Dust on crops including broadacre crops or other agricultural crops.	**L5 – Low**		**L2 - Low**	

				• Ceasing dust generating activities such as pen cleaning, and solid waste (manure, carcass compost, pond sludge) stockpiling, screening and spreading during periods of high wind. • Any grain processing dust-suppression equipment is always well maintained and operational. • The loads on vehicles moving dusty materials (e.g., feedstuffs) onto or off the site are covered during transit. • All visual screens (e.g., vegetative buffers) are kept in good order (including the replanting of gaps in vegetative buffers due to trees failing to establish, the death or loss of established trees or other factors which would cause the buffer not the perform its intended function). • Application of solid (manure, carcass compost, holding pond sludge) and effluent to land when wind conditions and dispersion conditions are favourable. • The best animal production genetics shall be used - Improved production traits, particularly good feed conversion efficiency will contribute significantly to reducing animal emissions intensity. • Sourcing livestock and feed commodities from as close to the Development as practical as well as on-site production to minimise fugitive emissions during transport. • Rations formulated to minimise enteric methane emissions • Use of appropriately sized plant and equipment for respective processes • Where practical, solid wastes (manure, carcass compost, holding pond sludge) incorporated directly into the soil. • Routine service and maintenance of mobile equipment used on-site to ensure efficient operation • Continuous improvement of GHG intensity of production by identifying and controlling energy intensive processes • A suitable buffer is applied where effluent and solid waste (manure, carcass compost, holding pond sludge) applications take place within close proximity to roads, dwellings or other areas likely to be used by the public at that time (the appropriateness of the applied buffer distances is determined having consideration for the qualities of the materials being applied, weather conditions and other environmental factors; as well as the anticipated level of public usage or exposure at those times). • A complaints register is kept, including details of the nature of any complaint received, the response made, and any mitigation measures implemented. • Hazardous materials are stored and used in accordance with relevant guidelines and Australian Standards for the storage of hazardous and dangerous goods and spill management.		

Groundwater – Quantity and quality	• Groundwater use exceeding Subject Land's allocation and entitlements • Leachate of effluent through the liner underlying the controlled drainage area as a result of integrity failure or exceedance of design criteria. • Spills or leaks of hazardous materials stored or used on-site such as fuels, chemicals etc. • Inappropriate storage of solid wastes such as outside of the controlled drainage area. • Inappropriate utilisation of solid wastes (manure, carcass compost, holding pond sludge) and effluent on-site such as high application rates and ponding of effluent.	Potential for localised drawdown of groundwater resources.	**M13 – Moderate**	• Preparation of an environmental management framework for operation of the Development. • Development and implementation of emergency and contingency plans detailing methods to manage spills or other emergencies on site, such as pipe breakages, holding pond overflows, pump failures etc. • Sustainable use of groundwater in accordance with the Development's allocation and entitlements. • Bore extraction managed to ensure sustainable drawdown rates. • Groundwater monitoring (quantity and quantity) is undertaken as prescribed by the Licence to Take Water conditions. • Solid waste stockpiles established within controlled drainage area to prevent contaminated leachate into groundwater resources. • The land application of solid wastes and effluent is made at rates consistent with the ability of soils and crops grown in the on-site utilisation areas to sustainably utilise the applied nutrients, salts and organic matter, under the climatic conditions prevailing at the site. • Application rate of effluent is controlled to ensure that excessive ponding does not occur • Effluent and solid waste only applied to dedicated waste utilisation areas. • Application rate of effluent should not necessitate the routine and specific leaching of salts from the soil profile in order to obtain acceptable crop performance. • The liner of all elements of the controlled drainage area such as drains, sedimentation basin, flow control structures etc is maintained to ensure the integrity and ongoing compliance with specified design criteria • When available, effluent stored, treated and sustainably applied to land on-site by irrigation. • Hazardous materials are stored and used in accordance with relevant guidelines and Australian Standards for the storage of hazardous and dangerous goods and spill management.	**L6 – Low**	NFAS manual Water Access Licence Meat and Livestock Australia, 2015b, Beef cattle feedlots: waste management and utilisation, Meat and Livestock Australia, North Sydney, NSW CoA Personnel training and induction
		Impacts to the quality of groundwater in the vicinity of the Development.	**H19 – High**		**M13 – Moderate**	
Surface water – Quantity and quality	• Surface water use exceeding Development's allocation and entitlements • Uncontrolled release of liquid (effluent) wastes from controlled drainage	Potential for drawdown of surface water resources.	**M13 – Moderate**	• Preparation of environmental management framework for operation of the Development. • Development and implementation of emergency and contingency plans detailing methods to manage spills or other emergencies on site, such as pipe breakages, pond overflows, pump failures etc. • Liquid and solid wastes only applied to dedicated waste utilisation areas.	**L6 – Low**	NFAS manual Meat and Livestock Australia, 2015b, Beef cattle feedlots: waste

	area as a result of overflows, integrity failure or exceedance of design criteria • Spills or leaks of hazardous materials stored or used on-site such as fuels, chemicals etc • Surface runoff from the inappropriate application of liquid wastes (effluent) to land impacting water chemistry, clarity, nutrient and toxicants, for example • Inappropriate storage of solid wastes (manure, carcass compost, holding pond sludge) such as outside of the controlled drainage area • On-site utilisation of solid and liquid wastes	Loss of or damage to aquatic habitat.	**M11 – Moderate**	• Vegetative buffers around drainage lines designed to help protect surface water are maintained in their intended condition. • Solid waste (manure, carcass compost, holding pond sludge) stockpiles would be established within controlled drainage area to prevent contaminated runoff into clean water areas. • Sustainable use of surface water in accordance the Development's allocation and entitlements. • The land application of solid waste and effluent is made at rates consistent with the ability of soils and crops grown in the on-site utilisation areas to sustainably utilise the applied nutrients, salts and organic matter, under the climatic conditions prevailing at the site. • Soil condition is monitored periodically, and soil tests are used where there is potential for deterioration of soil condition • Application rates of effluent are controlled to ensure that excessive runoff does not occur • All elements of the controlled drainage area such as drains, sedimentation basin, flow control structures etc are cleaned and maintained to ensure their integrity and ongoing compliance with specified design criteria. • When available, effluent shall be stored, treated and sustainably applied to land on-site by irrigation. • Design discharge events from the holding ponds shall be directed to a natural grassed discharge area. This grassed area shall filter and disperse the liquid waste whilst allowing some infiltration. As the design discharge events are at a frequency of one in 10 years the concentration of nutrients shall be sustainably adsorbed and utilised by vegetation in between events. • DWER is notified of any overtopping event or similar threats to surface water quality • Hazardous materials are stored and used in accordance with relevant guidelines and Australian Standards for the storage of hazardous and dangerous goods and spill management.	**L6 – Low**	management and utilisation, Meat and Livestock Australia, North Sydney, NSW CoA Personnel training and induction
		Erosion of exposed soils causing sedimentation of waterways and aquatic environments	**M11 – Moderate**		**L6 – Low**	
		Changes to water chemistry, in particular pH values altering aquatic habitats, including threatened species habitats.	**M11 – Moderate**		**L6 – Low**	
		Impact to water quality due to fuels and leaks and inappropriate storage of hazardous material.	**M11 – Moderate**		**L6 – Low**	
Biodiversity	• Access and internal road alignments and traffic movements. • Dry commodity storage, handling and processing • High moisture commodity (e.g., silage, molasses, oils) storage and handling • Grain handling and processing • Mortality management • Split feed management	Loss of or damage to habitat for threatened species	**L5 – Low**	• Any significant flora and fauna habitat areas required to be protected shall be identified and marked. • Clearing restricted to those areas required for Development's operation and firebreaks. • Induct personnel on biodiversity issues and safeguards. • Implement ongoing weed monitoring and management program to remove pest plant species and weeds. Control shall be achieved by regular mowing or herbicide application. Knockdown or residual herbicides (or a combination of the two) shall be used depending on whether the weeds have emerged, the time of year and the weeds present. • Disturbed areas to be rehabilitated will be monitored for effective restoration and rehabilitation. • All habitat trees retained where practicable.	**L4 – Low**	NFAS manual Weed management procedure Vehicle hygiene procedures Personnel induction
		Potential impact on endangered ecological communities	**L5 – Low**		**L4 – Low**	
		Loss and fragmentation of riparian and aquatic habitat	**L5 - Low**		**L4 – Low**	
		Mortality of protected and threatened fauna	**M9 – Moderate**		**L5 – Low**	
		Creation of barriers to fauna movement	**L5 – Low**		**L4 – Low**	

	• Solid waste handling, processing and utilisation. • Liquid waste storage, handling and utilisation • Vehicular movements on unsealed roads • Use of chemicals • Noise impacts • Uncontrolled fires/bushfires	Edge effects from road noise and light	**L5 – Low**	• Major drainage lines are to be bridged and loss of riparian vegetation to be minimised.	**L4 – Low**	

		Introduction and spread of terrestrial and /or aquatic weeds and pest fauna species	**M9– Moderate**	• Waterway crossings for fish passage are maintained.
				• Implement vehicle hygiene procedures to prevent the introduction of pest plants, spread of pest plants and disease.
				• Provisions to limit heavy vehicle speeds and for signage along access roads.
				• Methods and communication tools to monitor road strike and mortality of wildlife.
				• Aquatic weeds in water storages shall be controlled via mechanical and/or chemical means. Chemical control shall be undertaken with considerable care, considering the identity of the weed, the effect of herbicides on desirable plants, fish and other aquatic life and the eventual use of the water.
				• Implement a pest management program to control pest animal species already present, using acceptable methods as well as identifying potential pest species, their likely distribution and methods to prevent their spread.
				• Wild dog, fox and vermin pest species populations on the Development site shall be monitored and managed to prevent proliferation and spread.
				• Pest animal control programs shall use the most humane, target specific, cost effective and efficacious techniques available.
				• Mice and rat populations will be mitigated:
				  • by minimising feed wastage and spillage to minimise likelihood of attracting vermin)
				  • implementing a baiting program if the vermin population reaches a nuisance level.
				• Fly breeding sites shall be mitigated using:
				  • Several control methods such as biological, chemical and physical methods following integrated pest management (IPM) principles shall be used.
				  • Best practice sanitation methods such as solid waste management practices (pen cleaning, under-fence cleaning) to minimise fly breeding sites.
				  • Controlling weeds and keeping grass and other vegetation short, particularly around pens, drains, sedimentation systems and holding ponds makes it more difficult for flies to find resting places and reduces the vegetation–manure interface, a preferred breeding substrate for stable flies.
				  • Moist silage provides a suitable substrate for fly breeding. Subsequently, silage spills particularly along the sides of silage pads shall be cleaned up, and the silage pads covered so that the edges are sealed to reduce fly breeding in this area.
				• Composting carcasses shall be covered with manure.
				• Domestic waste shall be managed appropriately and in accordance with any relevant statutory requirements.
					L5 – Low	

Hydrology and flooding	• Waterway and drainage line crossings • Transverse drainage	Restricted flow paths causing localised flooding due to access road infrastructure structures placed on floodplain	**L6 – Low**	• The Development is sited above the height of a 100-year average recurrence interval (Q_{100}) flood level. • Development designed, constructed and operated in accordance with the conditions of approval of the Development. • Evacuation and access assessed in consultation with landowners. • Monitor rain radar and flooding forecasts and ensure response preparedness. • Prepare site for flood and severe rainfall events (where forecast) to minimise inundation impacts. • Waterway and drainage crossings maintained to ensure the integrity and ongoing compliance with specified design criteria. • Solid waste and effluent application infrastructure sited so that they do not pose an unacceptable risk to flood afflux levels. • Solid waste and effluent are not applied to on-site utilisation areas where and when there is a reasonable probability that the applied materials will cause pollution of surface water (e.g., on land directly abutting a watercourse or when a flood event is imminent).	**L6 – Low**	NFAS manual National Guidelines for Beef Cattle Feedlots in Australia 3rd Edition, MLA, 2012a) Personnel induction and training
		Changes to flood afflux levels during flood events – increased impact to receivers	**L6 – Low**		**L6 – Low**	
		Flood damage to plant, equipment or infrastructure	**L6 – Low**		**L6 – Low**	
		Erosion of access road during large flood events	**L6 - Low**		**L6 – Low**	
		Change to flood regime due to topographical changes and modification of catchments	**L6 - Low**		**L6 – Low**	
		Impacts to flood evacuation and access movements	**L6 - Low**		**L6 – Low**	
Noise and vibration	• Livestock handling and movement • Feed processing and preparation equipment (electric motors, conveyors, roller mills) • Feed delivery mobile plant (feed trucks) • Solid waste management (front-end loaders, haulage trucks, screening equipment, tractors etc) • Effluent management (pumping and generators) • Water supply and reticulation (pumping) • Farming plant and equipment (tractors, front-end loaders etc)	Noise impacts on sensitive receivers during operation	**M11 – Moderate**	• Low-stress cattle handling techniques employed to manage cattle to ensure they are handled quietly and efficiently. • Adherence to working hours in conditions of approval unless otherwise approved. • Minimising heavy vehicles' entry to site and departure from site outside the nominated operational hours. • Respite periods for noisy activities (in accordance with regulatory guidelines). • Operation equipment selected, operated and maintained to minimise noise impacts and where necessary fitted with silencers and "smart" reversing safety devices. • Managing operation vehicle routes and speed of vehicles. • Establish and maintain complaints management system. • Awareness training for staff and contractors in environmental noise issues. • Minimising the use of horn signals and consideration of alternative methods of communication. • Switching off any equipment not in use for extended periods. • All plant and equipment required would be well maintained and regularly serviced. • Community consultation with local residents to assist in the alleviation of community concerns.	**L4 - Low**	NFAS manual Complaints Register Personnel induction and training
		Noise exceeding regulatory criteria levels	**M11 – Moderate**		**L4 - Low**	
		Vibration impacts on sensitive receptors during operation	**L6 - Low**		**L4 - Low**	

				• Selection of machines that are inherently free of or have low vibration. • Vibration-producing machinery shall be supported on stiff structural components and be provided with efficient vibration isolation systems. • Maintenance of plant and equipment machinery – ensuring rotating parts are balanced, vibration isolators are functioning as intended etc.		
Traffic and transport	• Light vehicle travel to / from site – staff, visitors etc • Heavy vehicle travel to and from site - livestock, commodities and general deliveries etc • Operation vehicle movements – feed trucks, solid waste management etc	Temporary disruptions / delays to local traffic	**L5 – Low**	• Identify and assess roads likely to be affected by Development's operation and develop methods to minimise traffic impacts. • Compliance with conditions of Development Approval. • All vehicles carrying materials to be adequately covered (using a tarpaulin) as required to prevent any loss of material, which may cause driver safety issues. • Maintain principal haulage route, advance and position intersection signage. • Monitoring of any traffic delays.	**L4 - Low**	NFAS manual CoA Complaints Register Personnel induction
		Temporary restrictions to private access roads	**L5 – Low**		**L4 – Low**	
		Permanent adjustment to some private property access roads and local/regional roads	**L5 – Low**		**L4 – Low**	
		Changed traffic patterns	**M11 – Moderate**		**L4 – Low**	
		Accidents - Safety of commuters, pedestrians, contractors and subcontractors.	**H22 – High**		**M15 – Moderate**	
Aboriginal heritage	• Routine maintenance activity • Excavation of soils	Impact to undiscovered or undocumented aboriginal sites, artefacts and cultural places	**L5 – Low**	• Induct personnel on heritage issues, safeguards, and the location of indigenous heritage items. • If design changes or operation activities impact on areas outside of those identified in the Development Consent, relevant stakeholders will be consulted. • Protect identified heritage items with protective fencing or flagging from being disturbed during operation. • Regular inspection of heritage protection fencing.	**L4 – Low**	NFAS manual Personnel induction
		Finding / disturbing burials or human remains	**L5 - Low**		**L4 – Low**	
Resource and waste management	• Water usage • Energy usage • Generation of general waste during operation activities including building materials, excess unsuitable spoil material, vegetation material • Generation of solid waste • Generation of liquid wastes (effluent/sewage)	Improper disposal of waste material	**M12 – Moderate**	• Sustainable use of groundwater and surface water in accordance with the subject Land's licence to take water. • Waste materials contained in waste bins or other suitable containers, and collected for recycling, reuse or disposal by the licensed waste contractor. • Use recycled products where possible. • Separate, contain, manage and dispose contaminated waste to prevent migration and further contamination whilst maintaining compliance with regulatory requirements. • Label and store all liquid waste containers in a bunded area prior to removal off-site. • Undertake inspections of the worksite and waste storage areas to ensure litter / debris is regularly cleaned up and contained on site.	**L6 – Low**	NFAS manual Nutrient and Irrigation Management Plan Meat and Livestock Australia, 2015b, Beef cattle feedlots: waste management and utilisation, Meat and Livestock Australia, North Sydney, NSW
		Direct impacts to land, groundwater or surface waters.	**M12 – Moderate**		**L6 – Low**	
		Depletion or sterilisation of non-renewable resources, including water and energy	**M11 – Moderate**		**L6 – Low**	
		Difficult disposal of waste material including hazardous waste.	**M13 – Moderate**		**L6 – Low**	

	• Handling of chemicals, waste and hazardous goods. • Fuel storage and distribution and waste oil disposal	Potential leaks and spills of fuels and/or hazardous materials.	**M12 – Moderate**	• Bunding of areas used for fuel, oil and chemical storage in accordance with Australian Standards and regulatory guidelines. • Locate appropriate waste removal contractor and/or appropriately licenced waste facilities in the area. • Sustainable on-site utilisation of effluent and solid waste. • Modern and well-maintained equipment is to be used to encourage fuel efficiency • Stormwater from roof structures captured for incidental uses. • Water recycling measures are implemented where practical.	**L6 – Low**	Personnel induction and training
		Impact to water quality due to inappropriate solid and/or liquid waste management.	**M12 – Moderate**		**L6 – Low**	
Visual amenity and landscaping	• Revegetation /landscaping • Solid waste management • Rehabilitation of disturbed land • Removal of visually prominent native vegetation • Evening / night activities	Change to landscape character and visual environment as a result of large embankments, disturbed areas, night activities, removal of vegetation, and access road.	**L5 – Low**	• Landscape revegetation will incorporate the surrounding landscape types and vegetation patterns and in accordance with conditions of Development Approval. • Embankments will be stabilised using appropriate landscape treatments. • The use of night-lighting will be minimised and directed away from rural residences where possible. • Site facilities and areas surrounding them will be kept tidy and be regularly mowed, cleaned and maintained. • Solid waste management in accordance with conditions of Works Approval. • Monitoring, evaluation and management of landscape revegetation areas including treatment of weeds.	**L2 – Low**	NFAS manual CoA Meat and Livestock Australia, 2015b, Beef cattle feedlots: waste management and utilisation, Meat and Livestock Australia, North Sydney, NSW Obtrusive Effects of Outdoor Lighting, Sydney, Australia. Personnel induction
		Visual impacts as a result of solid waste management	**L5 – Low**		**L2 – Low**	
		Poor management of revegetation	**L5 – Low**		**L2 – Low**	
		Visual impacts as a result of obtrusive lighting	**L5 – Low**		**L4 - Low**	
Fire	• Handling of hazardous materials. • Fuel storage and distribution • Hot works • Materials handling and storage e.g., hay storage, grain dust	Fire damage to plant, equipment or infrastructure	**M9 – Moderate**	• Establish fuel free zones around materials which are adjacent to bush fire hazard areas. • Provide fuel reduced zones in areas of high ignition potential (e.g., along roads, refuelling areas, infrastructure etc) to slow the development of fires. • Access tracks maintained on the site. • Ensure any hot works have been approved by site management beforehand and adequate controls are in place e.g., fire extinguishers • Hazardous materials are stored and used in accordance with relevant state guidelines and Australian Standards for the storage of hazardous and dangerous goods and spill management. • Fire-fighting equipment will be held on-site to respond to any fires that may occur during operation.	**L5 – Low**	NFAS manual Personnel induction and training
		Impacts to surrounding properties.	**M11 – Moderate**		**L6 – Low**	
Soils and sediments	• Rehabilitation of disturbed land • Solid waste handling, processing and utilisation.	Erosion of exposed soils causing sedimentation of waterways and aquatic environments	**M11 – Moderate**	• Clean and dirty water runoff will be adequately separated to avoid mixing where possible through the use of diversions, clean water drains, and the installation of permanent drainage infrastructure. • Exposed areas will be progressively rehabilitated. Methods will include permanent vegetation, or temporary protection with cover crops.	**L6 – Low**	NFAS manual IECA (2008) Best Practice Erosion and Sediment Control
		Impacts to the quality of soils in the solid	**M12 – Moderate**		**M11 – Moderate**	

	• Liquid waste storage, handling and utilisation • Handling of chemicals, waste and hazardous goods. • Fuel storage and distribution and waste oil disposal • Maintenance of plant and equipment, servicing and refuelling • Holding pond / sediment basin management • Noxious weed treatment	waste and effluent utilisation areas		• Exposed batter slopes and embankments, and other areas exposed but not worked, will be protected from erosion through implementation of permanent stabilisation measures e.g., seeding, revegetation. • A rumble grid will be provided at the access exit point from the Development site onto public roads to minimise the tracking of soil and particulates onto public roads. • Vehicle movements from site will be minimised during wet weather if the tracking of mud becomes an issue. • Hazardous materials storage meets regulatory requirements for bunding/storage and spill kits available. • Solid waste will be stored in designated solid waste stockpile and carcass composting area in accordance with conditions of Works Approval. • Solid waste will be sustainably applied to land within the solid waste utilisation area. • When available, effluent from the holding pond will be sustainably applied to land within the effluent utilisation area. • Domestic sewage shall be treated and disposed on-site by absorption within a dedicated land area adjacent to the respective source facility. • The land application of solid waste and effluent is made at rates consistent with the ability of soils and crops grown in the on-site utilisation areas to sustainably utilise the applied nutrients, salts and organic matter, under the climatic conditions prevailing at the site.		Meat and Livestock Australia, 2015b, Beef cattle feedlots: waste management and utilisation, Meat and Livestock Australia Personnel induction and training
		Contamination of soils due to spills and leaks and inappropriate storage of hazardous material	**M9 – Moderate**		**L4 – Low**	

Appendix A4 – Obligations, roles, responsibilities and authority

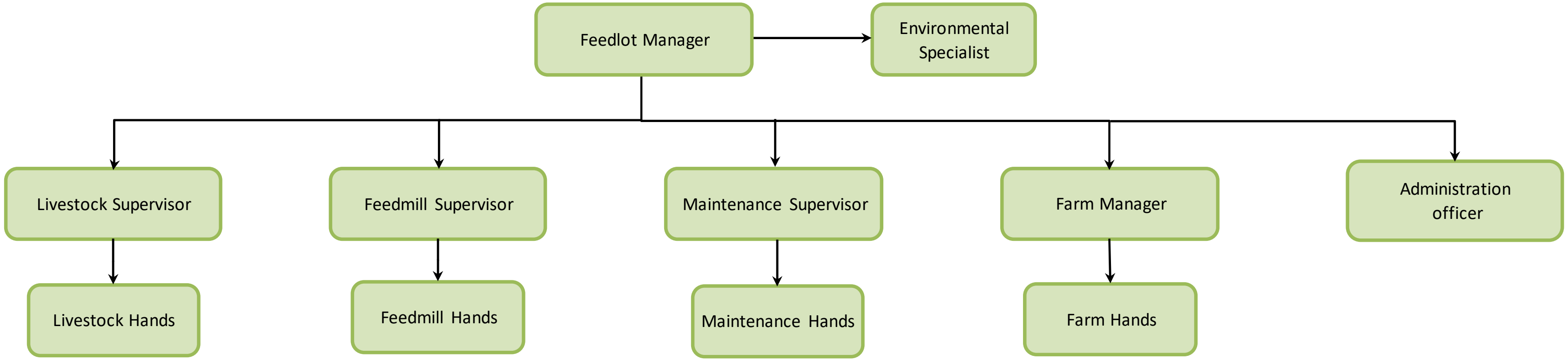

Figure A6.1 – Project management structure

Table A6.1 – Project personnel key environmental responsibilities

Roles	Responsibilities	Authority	Accountability
Feedlot Manager	Manage the Project to achieve an optimal return on funds invested. Ensure all activities comply with relevant regulatory and Project requirements. Ensure the requirements of the OEMP are fully implemented, and that environmental requirements are not secondary to other operation requirements. Liaise with relevant stakeholders as required. Participate and provide guidance in the regular review of this OEMP and supporting documentation. Provide adequate resources (personnel, financial and technological) to ensure effective development, implementation and maintenance of the OEMP. Ensure that all personnel receive appropriate induction training, including details of the environmental requirements. Ensure that complaints are investigated to ensure effective resolution. Stop any activity immediately if an unacceptable impact on the environment is likely to occur. Manage all of the day to day operations such as livestock, maintenance, feeding, administration. Communicate with all feedyard personnel and sub-contractors regarding compliance with the OEMP and site-specific environmental issues relating to feedyard activities. Ensure all feedyard workers attend an environmental induction prior to the commencement of works. Ensure feedyard personnel manage operation activities in accordance with statutory and approval requirements. Ensure environmental management procedures and protection measures are implemented within the feedyard and associated activities. Identify resources required for implementation of the OEMP and relevant associated sub-plans.	Stop work within the immediate vicinity of a major environmental incident or significant non-compliance with the CoA or EPL.	Doolin Farming Pty Ltd

	Report any feedyard activity that has resulted, or has the potential to result, in an environmental incident immediately to the Directors of Doolin Farming Pty Ltd. Undertake regular task observations to check compliance with SOPs. Coordinate action in emergency situations and allocate required resources.		
Livestock Supervisor	Supervise the receival, processing, handling, animal health and dispatch of all cattle in the feedyard. Communicate with all feedyard personnel and sub-contractors regarding compliance with the OEMP and site-specific environmental issues relating to feedyard activities. Supervise staff involved with receival, processing, handling, animal health and dispatch of cattle in the feedyard. Ensure all feedyard workers attend an environmental induction prior to the commencement of works. Plan and direct feedyard activities in a manner that avoids or minimises impact to environment. Ensure feedyard personnel manage operation activities in accordance with statutory and approval requirements. Ensure environmental management procedures and protection measures are implemented within the feedyard and associated activities. Identify resources required for implementation of the OEMP and relevant associated sub-plans. Report any feedyard activity that has resulted, or has the potential to result, in an environmental incident immediately to the Feedlot Manager. Undertake regular task observations to check compliance with SOPs. Coordinate action in emergency situations and allocate required resources.	Stop activities where there is an actual or immediate risk of harm to the environment and advise the Feedlot Manager. Direct implementation of environmental protection measures within the feedyard.	Feedlot Manager
Feedmill Supervisor	Manage the procurement, delivery, receivals and storage of all feed commodities required by the feeding facility. Supervise the operation of the grain processing plant and formulate rations and supervise their preparation and feeding to the cattle. Communicate with all feedmill personnel and sub-contractors regarding compliance with the OEMP and site-specific environmental issues relating to feed processing, preparation and delivery activities. Ensure all feedmill personnel attend an environmental induction prior to the commencement of works.	Stop activities where there is an actual or immediate risk of harm to the environment and advise the Feedlot Manager. Direct implementation of environmental protection measures within feed	Feedlot Manager

	Ensure feed processing, preparation and delivery personnel manage operation activities in accordance with statutory and approval requirements. Ensure environmental management procedures and protection measures are implemented within the feed processing and preparation facility and associated activities. Identify resources required for implementation of the OEMP and relevant associated sub-plans. Identify and implement opportunities to reduce water and energy usage in feed preparation and storage. Report any feed processing, preparation or ration delivery activity that has resulted, or has the potential to result, in an environmental incident immediately to the Operations Manager. Undertake regular task observations to check compliance with SOPs. Coordinate action in emergency situations and allocate required resources.	storage, processing and preparation areas.	
Maintenance Supervisor	Supervise staff involved with cleaning and maintenance activities of feedyard pens, troughs, roads, water supply and plant and equipment. Plan and direct maintenance activities in a manner that avoids or minimises impact to environment. Identify resources required for implementation of the OEMP and relevant associated sub-plans. Report any maintenance activity that has resulted, or has the potential to result, in an environmental incident immediately to the Feedlot Manager. Identify and implement opportunities to reduce water and energy usage in the feedyard and recycling opportunities for solid wastes. Undertake regular task observations to check compliance with SOPs. Coordinate action in emergency situations and allocate required resources	Stop activities where there is an actual or immediate risk of harm to the environment and advise the Feedlot Manager. Direct implementation of environmental protection measures within workshop, pens or around the development complex.	Feedlot Manager
Farm Manager	Manage the Koojan Downs property to optimise returns to the company through activities that are complementary to the company's feeding facility operations. Ensure the environmentally sustainable use of effluent and solid waste from feeding facility operations in accordance with statutory and approval requirements. Supervise staff involved with farming operations and gardens.	Stop activities where there is an actual or immediate risk of harm to the environment and advise the Feedlot Manager.	Feedlot Manager

	Communicate with all farm personnel and sub-contractors regarding compliance with the OEMP and site-specific environmental issues relating to farming activities. Ensure all farming personnel attend an environmental induction prior to the commencement of works. Plan and direct farming activities in a manner that avoids or minimises impact to environment. Ensure farm personnel manage operation activities in accordance with statutory and approval requirements. Ensure environmental management procedures and protection measures are implemented for farming activities. Identify resources required for implementation of the OEMP and relevant associated sub-plans. Report any farming activity that has resulted, or has the potential to result, in an environmental incident immediately to the Feedlot Manager. Undertake regular task observations to check compliance with SOP. Coordinate action in emergency situations and allocate required resources.	Direct implementation of environmental protection measures on the farm.	
Administration Officer	Oversee all administration operations to ensure compliance with relevant regulatory and Project requirements.	No specific environmental authority	Feedlot Manager
Environmental Specialist	Assist in preparing the OEMP (including revisions) in accordance with all relevant requirements. Undertake site inspections and carry out monitoring activities. Ensure monitoring records are appropriately maintained, reviewed and non-compliance issues addressed. Record and provide written reports to the Feedlot Manager of non-conformances or corrective actions with the OEMP. This may include the need to implement additional, or revise existing, mitigation measures. Assist in identifying environmental risks. Advise the Feedlot Manager of the need to stop work immediately if an unacceptable impact on the environment is likely to occur or to require other reasonable steps to be taken by the relevant Manager or personnel to avoid or minimise impacts. Provide reports to the Feedlot Manager on any major issues resulting from the Project. Assist all site staff with issues concerning Project environmental matters.	Stop activities where there is an actual or immediate risk of harm to the environment and advise the Feedlot Manager and relevant manager.	Feedlot Manager

	Assist in developing training programs regarding environmental requirements and deliver where required, including delivery of the environmental component of toolbox talks if required.		
Other Project Personnel including sub-contractors	Comply with the relevant requirements of the OEMP, or other environmental management guidance as instructed by a member of the Project's management. Participate in the mandatory Project/site induction program. Report any environmental incidents to the line manager immediately or as soon as practicable if reasonable steps can be adopted to control the incident. Undertake remedial action as required to ensure environmental controls are maintained in good working order. Stop activities where there is an actual or immediate risk of harm to the environment and advise their line manager or Feedlot Manager.	Report any activity that has resulted, or has the potential to result, in an environmental incident immediately to their line manager or Feedlot Manager.	Livestock Supervisor, Feedmill Supervisor, Maintenance Supervisor, Farm Manager

Appendix A5 – Environmental document register

Document name	Document number	Approval pathway
Operation Air Quality Management Plan (Appendix B1)	Springfield Feedlot OAQMP – E2-103EA	GSC / NSW EPA
Operation Soil and Water Quality (Appendix B2)	Springfield Feedlot OSWMP E2-103EB	GSC / NSW EPA
Operation Solid and Liquid Waste (Appendix B3)	Springfield Feedlot OSLWMP E2-103EC	GSC / NSW EPA
Environmental monitoring and Management Plan (Appendix B5)	Springfield Feedlot OEMMP E2-103ED	GSC / NSW EPA
NFAS Manual	Springfield Feedlot NFAS Manual	Aus-Meat

Appendix A6 – Environmental complaints, incidents and emergencies

This section has been left intentionally bank.
Copies of any complaints or incident reports to be included.

Appendix A7 – Environmental forms, checklists and registers

Form 1 – Induction and Training Record

Date	Induction and/or training content	Trainer name	Signature	Attendee name	Signature

Form 2 – Complaints Register

Time / Date	Method of communication and complainant name	Complainant contact details	Details of complaint	Action taken	Responsible person	Signature	Statutory authority notified (Y/N)

Form 3 – Site Inspection Record

Time / Date	Inspection person	Problem description	Action taken	Requirement/ Recommendation for changes to OEMP	Signature of responsible person

Form 4 – Non-Compliance Record

Time / Date	Inspection Officer	Compliance Problem Description	Corrective Actions Taken	Recommendation for Changes to OEMP	Signature

Form 5 – Incident reporting form

Date: ______________________

Reported by: ______________________

Site location: ______________________

Incident description: ______________________

What happened: ______________________

____

____

Why: ______________________

____

Incident date and time: ______________________

Where: ______________________

Actual and/or potential impact on off-site people and environment: ______________________

____

Authorities informed: ______________________

Manager informed and when: ______________________

Action taken / planned: ______________________

____

____

Name: ______________________

Signature: ______________________

Manager comment: ______________________

____

____

Manager signature: ______________________

Form 6 – Hazardous Material Register

Name of material and identification code	Other common names	Maximum quantity stored	Storage requirements and location	Purpose for which the material is used

Form 7 – Corrective action record

Corrective Action CAR No.	Originator:	Responsible Person:	
	Position:	Position:	
	Issue date of CAR:		
1. Non-conformance			**References**
1) Non-conformity:			
2) Reference ☐ Non-compliance: ☐ Audit report: ☐ Others:			
2. Planning and Implementation of Corrective Action			**References**
1) Cause of Non-conformity:			
2) Action taken to prevent reoccurrence:			
3) Controls to ensure that action is effective:			
4) Due Date:	Completion Date:		
3. Review of Corrective Action			**References**
1) Evaluation of effectiveness of action: ☐ Action Completed ☐ Not Completed Date of Evaluation:			
2) When the action is completed a) Revision to Project SOP ☐ No ☐ Yes b) If yes, name of SOP:			
3) Follow up action when corrective action is not completed:			

Appendix A8 – Environmental procedures

OEMP SOP 1 – Staff environmental induction, training and awareness

Aspect	Staff environmental induction, training and awareness
Objectives	To implement a staff environmental induction, training and awareness to ensure that new and existing personnel are adequately trained to perform the tasks assigned to them without leading to environmental or personal harm.
Potential Impacts	Occupational health and safety of employees and contractors. Animal health and performance. Receiving environment such as surface water and aquatic and terrestrial ecosystems affected by pollution events. Community amenity and health.
Control Actions	Training of employees to enable them to fulfil their duties in a competent manner and consistent with the aims of the environmental policy and environmental management system. Ensure that all staff are aware of their responsibilities in general environmental management. Provide staff training as required internally and allow for appropriate external environmental courses, seminars or workshops are available. Ensure that sub-contractors working on site have the necessary experience and competence with regard to environment and health & safety issues.
Relevant Standards, Management Plans, Records	Personnel induction, training and awareness record. Non-compliance record. Incident
Responsibility	As required by the specific requirements outlined in section 7.2.
Performance Indicators	Ensure all personnel are adequately trained with respect to the environmental management system and emergency preparedness. No non-compliances with CoA. No adverse impacts to environmental values.
Monitoring	As required by the specific requirements outlined in section 12.
Reporting	As required by the specific requirements outlined in section 12.
Corrective Actions	Review staff training program.

OEMP SOP 2 – Feedlot cattle numbers

Aspect	Feedlot cattle numbers
Objectives	To ensure that the number of cattle on feed does not exceed CoA.
Potential Impacts	Occupational health and safety of employees and contractors. Animal health and performance. Receiving environment such as surface water and aquatic and terrestrial ecosystems affected by pollution events. Community amenity and health.
Control Actions	The number of beef cattle-on-feed is checked on a daily basis and correlated with expected incoming and outgoing cattle numbers. Ensure beef cattle numbers on feed do not exceed CoA. Details of all cattle introduced to and removed from the site, including: • Number and actual or average live weight of cattle; • Date of introduction/removal; and • Sickness or deaths of animals.
Relevant Standards, Management Plans, Records	Personnel induction, training and awareness record. Non-compliance record. Incident
Responsibility	As required by the specific requirements outlined in section 7.2.
Performance Indicators	No non-compliances with CoA. No adverse impacts to environmental values.
Monitoring	As required by the specific requirements outlined in section 12.
Reporting	As required by the specific requirements outlined in section 12.
Corrective Actions	Review livestock management system.

OEMP SOP 3 – Environmental emergency preparedness and response

Aspect	Environmental emergency preparedness and response
Objectives	To implement a mechanism to contain and control an emergency incident to minimise the effects on personnel, livestock, facilities and the environment.
Potential Impacts	Occupational health and safety of employees and contractors. Animal health and performance. Receiving environment such as groundwater, surface water and aquatic and terrestrial ecosystems affected by pollution events. Community amenity and health.
Control Actions	All emergency scenarios relating to the Project will be identified and documented through the emergency response instruction. All significant emergency scenarios will be assessed in consultation with employees in the environmental induction and toolbox meeting. **Medical Emergency** • First Aid Officer to initiate usual first aid procedures. • Make sure the injured person is as comfortable as possible without moving them until the ambulance arrives. • The First Aid Officer is in charge of the casualty until the emergency services arrive. **Fire Emergency** • Contact the emergency services on "000" if required. • Use fire extinguisher to contain fire only if safe to do so. • Move all site personal to a safe area and await fire brigade. **Environmental Emergency Response** • In the event of a Spill or contamination of product causing reaction. • Assess damage/injury……contain spill if safe to do so. • Evacuate the area if necessary and await emergency services. **Emergency Service Contacts** • Emergency services contacts will be displayed near all phones. **Material/Product Spill** Hazardous material/dangerous good spills may occur on sites. • In the event that a hazardous material/dangerous good is spilt the Development Manager must be contacted immediately. • Attempt to clean up spill with spill kit, only if safe to do so.
Relevant Standards, Management Plans, Records	Personnel induction, training and awareness. Non-compliance Record. Corrective Action Report.
Responsibility	As required by the specific requirements outlined in section 7.2.

Performance Indicators	No adverse impacts to environmental values.
Monitoring	As required by the specific requirements outlined in section 12.
Reporting	As required by the specific requirements outlined in section 12.4.
Corrective Actions	Recommendations for safety improvements and changes to the emergency response instruction will be actioned via the specific requirements outlined in section 12.5.

OEMP SOP 4 – Environmental compliance monitoring

Aspect	Environmental compliance monitoring
Objectives	To implement a defined monitoring programme to obtain data for verification of environmental performance in accordance with the CoA.
Potential Impacts	Occupational health and safety of employees and contractors. Animal health and performance. Receiving environment such as groundwater, surface water and aquatic and terrestrial ecosystems affected by pollution events. Community amenity and health.
Control Actions	Develop and implement an appropriate monitoring program for environmental parameters in accordance with this Plan and sub-plans as a verification measure for preventive controls. Undertake routine environmental monitoring from the relevant monitoring points in accordance with the CoA. Collect, analyse and interpret environmental monitoring data in a standardised and technically sound manner. Review and evaluate the environmental monitoring program and results for compliance with CoA. Regular liaison with the NSW EPA on efficacy of the monitoring program and sustainability indicators. Develop and implement a corrective action plan before impacts to the receiving environment.
Relevant Standards, Management Plans, Records	CoA Personnel induction, training and awareness. Environmental data records
Responsibility	As required by the specific requirements outlined in section 7.2.
Performance Indicators	Ensure all personnel responsible for monitoring are adequately trained. No non-compliances with CoA. No adverse impacts to environmental values.
Monitoring	As required by the specific requirements outlined in section 12.
Reporting	As required by the specific requirements outlined in section 12.4.
Corrective Actions	Review environmental monitoring program. Seek specialist advice where a significant level of environmental risk or impact is identified with environmental indicators of sustainability.

OEMP SOP 5 – Environmental compliance reporting

Aspect	Environmental compliance reporting
Objectives	To implement a routine reporting system that provides accurate, reliable and timely environmental information in accordance with the CoA.
Potential Impacts	Non-compliance with CoA.
Control Actions	Develop and implement an appropriate reporting program for the assessment of the environmental management of the Project. Prepare and submit to the NSW EPA an Annual Return on the anniversary date every year. No false or misleading environmental monitoring data in a material respect is reported.
Relevant Standards, Management Plans, Records	CoA Annual Return Personnel induction, training and awareness Non-compliance Record Corrective Action Report
Responsibility	As required by the specific requirements outlined in section 7.2.
Performance Indicators	An Annual Audit Compliance Report is submitted each year.
Monitoring	As required by the specific requirements outlined in section 12.
Reporting	As required by the specific requirements outlined in section 12.4.
Corrective Actions	Review environmental reporting program.

OEMP SOP 6 – Environmental records management

Aspect	Environmental management records
Objectives	To implement an environmental records management system that meets minimum requirements for CoA.
Potential Impacts	Non-compliance with CoA.
Control Actions	Establish and maintain an effective and efficient environmental records management system to ensure the creation and capture of environmental records. To ensure sensitive information is managed appropriately. Apply sound records management practices including an appropriate governance framework to assist in effectively managing records.
Relevant Standards, Management Plans, Records	CoA Personnel induction, training and awareness
Responsibility	As required by the specific requirements outlined in section 7.2.
Performance Indicators	No non-compliances with CoA.
Monitoring	As required by the specific requirements outlined in section 12.3.
Reporting	As required by the specific requirements outlined in section 12.4.
Corrective Actions	Review environmental records management system.

Appendix B1 – Air quality management plan

Springfield Feedlot

Draft Operation Air Quality Management Plan

"Springfield"
2513 Getta Getta Road
North Star NSW 2408

Doolin Farming Pty Ltd
"Glenhoma"
3202 Getta Getta Road
NORTH STAR NSW 2408

[February 2025]

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Disclaimer

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1 Background

1.1 Introduction

Doolin Farming Pty Ltd own and operate a 10,000 ha mixed farming operation across several properties at North Star including “Glenhoma”, “Glenmodel”, “Springfield”, “Myall Downs” and “Yetman West” some 27 km east of Yetman and 45 km south-southeast of Goondiwindi (QLD) in NSW.

Doolin Farming Pty Ltd primarily engage in dryland and irrigated cropping and beef production. Doolin Farming Pty Ltd produces wheat, barley, oats and chickpeas in winter and cotton and maize in summer under pivot irrigation systems and dryland sorghum cropping.

Central to the beef production enterprise is the breeding, growing and lot-feeding of cattle for the domestic market. The beef supply chain includes breeding and growing of beef cattle on land less suitable for dryland and irrigated cropping and grazing of stubble and lot feeding of cattle within a feedlot on the property ‘Springfield”.

“Springfield” comprises some 1,713 ha (~4,231 acres) and currently, a dryland and irrigated cropping business is undertaken on a large proportion of the property with extensive cattle breeding and grazing of beef cattle on the remaining land which is unsuitable for cropping and lot feeding of cattle within a beef cattle feedlot in the north-east of the property.

The feedlot is known as Springfield Feedlot and operates for 12 months of the year and employs approximately 4 full time staff. Casual staff and contractors are engaged as required during busy periods such as planting and harvesting of silage and fodder and to supply various associated services such as plant maintenance and veterinary requirements.

Springfield Feedlot includes one controlled drainage area with associated production pens and drainage system which includes catch drains, sedimentation basin and holding pond. Springfield Feedlot also has auxiliary infrastructure to support the use such as cattle handling and feed storage and processing facilities.

Springfield Feedlot is accredited under the National Feedlot Accreditation Scheme (NFAS) with audits conducted annually.

1.2 Environmental management systems overview

The overall Environmental Management System for the Project is described in the Operation Environmental Management Plan (OEMP).

The OAQMP is part of Doolin Farming Pty Ltd’s environmental management framework for the Project, as described in section 4.2 of the OEMP. Management measures identified in this Plan will be incorporated into site or activity specific Environmental Standard Work Instruction (ESWIs).

ESWIs will be developed and signed off by Feedlot Manager or environment management representatives prior to associated works and operation personnel will be required to undertake works in accordance with the identified mitigation and management measures.

Used together, the OEMP, strategies, procedures and ESWIs form management guides that clearly identify required environmental management actions for reference by Doolin Farming Pty Ltd's personnel and contractors.

The review and document control processes for this Plan are described in Chapter 10 of the OEMP.

2 Purpose, scope, and objectives

2.1 Purpose

This Operation Air Quality Management Plan (OAQMP or Plan) forms part of the Operation Environmental Management Plan (OEMP) for the Springfield Feedlot (the Project).

This Plan has been prepared to address the Department of Planning and Environment (DPIE), Gwydir Shire Council (GSC) and the NSW Environment Protection Authority (NSWEPA) requirements of the Conditions of Approval (CoA) and the mitigation measures listed in the Springfield Feedlot EIS (RDC Engineers Pty Ltd, 2024) and all applicable legislation.

The Project has not commenced operation. This Plan will be reviewed and updated once operations commence.

2.2 Scope

This Operation Air Quality Management Plan (OAQMP) describes how Doolin Farming Pty Ltd will manage and control dust, odour and greenhouse emissions during operation of the Project.

2.3 Objectives

The key objective of the OAQMP is to ensure that impacts on air quality are minimised and kept within the scope permitted by the Development Consent and Environmental Protection Licence (EPL). To achieve this objective, Doolin Farming Pty Ltd will:

- ensure all CoA and Doolin Farming Pty Ltd Operations Policies and Standards are met in relation to air quality;
- ensure appropriate controls and procedures are implemented during operation activities to avoid or minimise air quality impacts and potential adverse impacts to sensitive receivers within the vicinity of the Project.
- ensure appropriate measures are implemented to comply with all relevant legislation and other requirements as described in section 5 of this Plan.
- implement applicable best practice air quality tools to manage and minimise the impact of dust from Project operations on the environment and nearby residences;
- maintain the highest practicable levels of amenity for surrounding residents; and
- maintain an effective response mechanism to deal with issues and complaints.

3 Legislative and other requirements

3.1 Legal requirements

Legislation relevant to air quality management includes:

- Environmental Planning and Assessment Act 1979 (EP&A Act);
- Protection of the Environment Operations Act 1997 (POEO Act);
- Protection of the Environment Legislation Amendment Act 2011 (POELA Act);
- Protection of the Environment Operations (Clean Air) Regulation 2021; and
- National Greenhouse and Energy Reporting Act 2007.

Relevant provisions of the above legislation are explained in the register of legal and other requirements included in Appendix A1 of the OEMP.

3.2 Guidelines and standards

The main guidelines, specifications and policy documents relevant to this OAQMP are outlined in Table 1.

Table 1 – Relevant guidelines and standards

Guideline/Standard	Relevance
NSW Clean Air Strategy 2021-30	The NSW Clean Air Strategy outlines the integrated approach to improving air quality and protecting communities by the NSW Government. There are 5 priority action areas including better preparedness for pollution events; cleaner industry; cleaner transport; healthier households and better planning and design.
NSW Environment Protection Authority, 2016, Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales, Environment Protection Authority, Sydney, NSW.	This document provides information on the statutory methods to be used for modelling and assessing emissions of air pollutants in NSW. The document contains information on how to prepare emissions inventory data and meteorological data; methods for accounting for and dealing with background concentrations; dispersion modelling methodology and interpretation; impact assessment criteria for common pollutants; procedures for developing site-specific emission limits, including those for hydrogen sulfide and worked examples.
NSW Dust Strategy 2020-2022	The NSW Dust Strategy 2020-2022 coordinates SafeWork NSW's dust exposure prevention activities, ensuring consistent application of best practice principles and controls relevant to different dust types.
AS 3580.1.1:2007 Methods for sampling and analysis of ambient air: Part 1.1: Guide to siting air monitoring equipment	This Standard sets out general guidelines for the siting of ambient air monitoring equipment and specifies a number of siting parameters for individual air pollutants.
AS 3580.10.1:2003 (R2014) Methods for sampling and analysis of ambient air: Method 10.1: Determination of particulate matter – Deposited matter – Gravimetric method	This Standard sets out a method for the sampling of particulate matter that is deposited from the atmosphere, and procedures for the gravimetric determination of the mass deposition rate of insoluble solids, ash, combustible matter, soluble solids and total solids from ambient air.
AS 3580.14:2014 Methods for sampling and analysis of ambient air - Meteorological monitoring for ambient air quality monitoring applications	This Standard sets out methods for the collection of meteorological data for use in ambient air quality monitoring and modelling applications. Requirements and guidance are provided for the in-situ monitoring of primary meteorological variables.
Environmental Health Risk Assessment (enHealth, 2012)	This enHealth document provides a national approach to environmental health risk assessment.

3.3 Conditions of approval

The Conditions of Approval (CoA) relevant to this Plan are listed in Table 2. A cross reference is also included to indicate where the condition is addressed in this Plan or other Project management documents.

Table 2 – Conditions of Approval relevant to this plan

CoA	Condition requirements	Plan reference
Notice of Determination		
	To be completed after Notice of Determination is issued	
EPL		
	To be completed after EPL is issued	

4 Air quality management strategy

4.1 Aspects and impacts

4.1.1 Risk analysis

A risk management approach was used to determine the severity and likelihood of the Project's operations impacting on air quality and to prioritise the significance of potential impacts. This process considered potential regulatory and legal risks as well the concerns of the community and other key stakeholders.

The objectives of the risk assessment were to:

- Identify activities, events or outcomes that have the potential to adversely affect the local environment and/or human health/property
- Qualitatively evaluate and categorise each risk item
- Assess whether risk issues can be managed by environmental protection measures
- Qualitatively evaluate residual risk with implementation of measures.

Appendix A3 of the OEMP contains a list of issues, related to air quality aspects and corresponding risks associated with the Project. Measures to mitigate the identified environmental risks are also provided.

4.2 Operation activities

Emissions to the atmosphere during operation that could result in adverse impacts to air quality are typically divided into two categories:

- Dust and particulates; and
- Gaseous.

Key aspects of the Project that could result in dust emissions include:

- Feed preparation including material handling of dry commodities, commodity processing such as grain milling;
- the movement of cattle within the pens etc;
- Solid waste material handling including pen cleaning, stockpiling, material loading, material haulage and material utilisation;
- Vehicular movements over unpaved surfaces (including unsealed access and internal roads); and
- Wind erosion of exposed areas such as vehicle parking and laydown areas, access and internal roads, commodity storage areas, pen surfaces, sedimentation basin and solid waste stockpiles.

Air emissions, other than dust, which may be generated by operation activities include:

- Vehicle and plant exhaust noise emissions, which may be excessive if vehicles and plant are poorly maintained.

Odours/gases released during:

- Decomposition of organic materials such as manure on pen surfaces, solid and liquid waste storage, handling and utilisation and feed commodities such as silage, spoilt feed etc; and
- livestock emissions (belching).

4.3 Factors likely to affect air quality and impacts

In addition to the inherent risks of specific operation activities creating the potential to generate odour and dust, several other environment factors also affect the likelihood of odour and dust emissions. These include:

- Wind direction – determines whether dust and suspended particles are transported in the direction of the sensitive receivers;
- Wind speed – governs the potential suspension and drift resistance of particles;
- Soil type – more erodible soil types have an increased soil or dust erosion potential;
- Soil moisture – increased soil moisture reduces soil or dust erosion potential;
- Rainfall or dew – rainfall or heavy dew that wets the manure and surface of exposed surfaces and reduces the risk of dust generation but increases odour generation;
- Stocking density – Impacts the rate at which moisture is added to the pen surface by manure. Stocking densities are managed so that they do not cause undue dust emissions in dry weather;
- Solid waste management – pen, drain and sedimentation basin cleaning frequency, stockpile management; and
- Effluent management – storage duration and application.

4.4 Impacts

The potential for impacts on air quality will depend on several factors. Primarily impacts will depend on the nature, extent and magnitude of operation activities and their interaction with the natural environment. Potential impacts attributable to operation might include:

- Deposition of dust on surfaces where it may cause damage and/or lead to a need for increased cleaning or repair;
- Aesthetic effects that arise from visible airborne dust plumes and from deposits of dust on surfaces;
- Need for increased maintenance of air filtering systems (e.g., air conditioners etc);

- Potential adverse human health effects including eye, nose and throat irritation from excessive inhalation of fine particles;
- Impacts on water quality and/or vegetation health from dust deposition;
- Impacts on residential sensitive receivers, including impacts on living areas, swimming pools and general amenities;
- Complaints from the public relating to dust or odours; and
- Dust deposition impacts on sensitive agricultural receivers, including cropping farms.

Some impacts on air quality attributable to the Project are anticipated and have been described in the Project's Environmental Impact Statement (RDC Engineers Pty Ltd, 2024).

Section 4.5 provides a suite of mitigation measures that will be implemented to avoid or minimise dust and odour impacts.

4.5 Mitigation measures

Table 3 describes the air quality mitigation measures for sources of wind-blown and activity-generated dust and odour due to Project operations and summarises the responsibilities that have been documented within this Plan.

A major management tool in all instances will be daily on-site visual inspections and the implementation of an on-site AWS with real-time observations and recording and web based display. This system will allow relevant staff access to current on-site data so that operational activities can be adjusted in line with weather conditions.

Table 3 – Air quality management and mitigation measures

Source	Mitigation measure	Responsibility	Timing	Reference
General				
	Training will be provided to all Project personnel, including relevant sub-contractors on air quality control practices and the requirements from this plan through inductions and targeted training.	Feedlot Manager /Farm Manager	Induction	OEMP
	An air quality specialist will be engaged and regularly consulted throughout operation to provide advice on air quality monitoring design, installation and maintenance.	Feedlot Manager	As required	Environmental Management System, Best practice
	An Environmental Protection Licence will be obtained for the Project. All relevant conditions relating to air quality management will be implemented as required by the EPL.	Feedlot Manager	Prior to Operation	*POEO Act 1997,* CoA
	During activities that have the potential to generate dust and/or during adverse weather conditions, visual observations of downwind dust emissions to the community or local residents will be undertaken. Further, the wind speed and direction sensors may be used, to verify when adverse weather conditions are occurring (i.e., where there are severe wind gusts or an hourly average wind of over 30km/hr). A temporary halt to dust generating activities will occur during adverse weather conditions and/or where visual dust emissions are sighted and/or when sensitive receptors are likely to be affected by dust emissions. Appropriate measures will be taken to mitigate/manage the potential for adverse air quality impacts.	Feedlot Manager/ Farm Manager	Operation	Environmental Management System, Best practice
Procedures and Plans				
	Procedures will be prepared and implemented for solid and liquid waste management to manage any adverse environmental impacts. Refer to OSLWMP and OSWMP.	Feedlot Manager	Operation - As required	Environmental Management System, Best practice
Roads				
	Internal roads shall be watered down as required to minimise nuisance dust, particularly during unfavourable weather conditions (e.g., > 30km/hr hourly average or in severe wind gust conditions, dry weather).	Feedlot Manager	Operation	Environmental Management System, Best practice

	Vehicles will only travel on designated roads to the maximum extent possible. The speed will be limited to 60 km/hr on on-site roads and 40 km/hr in off-road areas or otherwise as signed.	Feedlot Manager / Farm Manager	Operation	Environmental Management System, Best practice
	Setting and enforcing speed limits on internal road network.	Feedlot Manager / Farm Manager	Operation	Environmental Management System, Best practice
Plant and Equipment				
	All plant will be maintained and operated in line with the manufacturer's specifications in order to minimise the emission of air pollutants. Plant and operation vehicles will be turned off when not in use.	Feedlot Manager / Farm Manager	Operation	Best practice
	Routine service and maintenance of mobile equipment used on-site to ensure efficient operation.	Feedlot Manager	Operation	Best practice
	Use of appropriately sized plant and equipment for respective processes.	Feedlot Manager / Farm Manager	Operation	Best practice
Commodity Delivery/ Feed Processing and Delivery				
	Growing feed commodities on-site or on neighbouring farms to minimise fugitive emissions during transport.	Feedmill Supervisor / Farm Manager	Operation	Best practice
	All dry commodities entering the Project site will be covered and all tailgates will be securely fastened. Vehicles will not be loaded higher than the sides and tailboard.	Feedmill Supervisor / Farm Manager	Operation	Best practice
	Any operations involving the movement/processing of dusty materials such as grains, roughages shall be timed and managed where possible to minimise dust emissions. For example, adding moisture to grain prior to movement and/or low wind conditions.	Feedmill Supervisor	Operation	Best practice
	A temporary halt to dust generating activities such as hay processing and/or grain processing will occur during adverse weather conditions and/or where visual dust emissions are sighted and/or when sensitive receptors are likely to be affected by dust emissions.	Feedmill Supervisor	Operation	Best practice
Livestock				

	Sourcing livestock from as close to the development as practical as well as on-site production to minimise fugitive emissions during transport.	Feedlot Manager / Livestock Buyer / Farm Manager	Operation	Good practice
	Utilising the best animal production genetics - Improved production traits such as growth rate and carcass weight will contribute significantly to reducing emissions intensity.	Feedlot Manager / Livestock Buyer / Farm Manager	Operation	Best practice
	Rations formulated to minimise enteric methane emissions.	Feedlot Manager / Feedmill Supervisor	Operation	Best practice
	Maximise feed energy by eliminating parasites and nutrient deficiencies.	Livestock Supervisor	Operation	Best practice
Pen Area				
	Minimisation of wet areas in pens by fixing leaks from water troughs, filling potholes etc.	Maintenance Manager	Operation	Environmental Management System, Best practice
	Frequent removal of manure from the pens/drains and under-fences.	Maintenance Manager	Operation	Environmental Management System, Best practice
	Adapting the cattle stocking density in pens to maintain manure on pen surface at 25-35% moisture content to minimise dust nuisance. For example, stocking density may change from lighter rates in winter to heavy rates in summer.	Livestock Supervisor	Operation	Environmental Management System, Best practice
	Daily application of small amounts (<5mm) of water to the pen surface during the early evening hours during excessively dry periods to reduce dust nuisance if required.	Maintenance Manager	Operation	Environmental Management System, Best practice
Solid waste management				
	Minimising the accumulation of manure in pens/drains, under-fences and cattle lanes by cleaning more frequently than Class 1 requirements.	Maintenance Supervisor	Operation	Environmental Management System, Best practice
	All solid waste loads leaving the Project site will be covered and all tailgates will be securely fastened. Vehicles will not be loaded higher than the sides and tailboard.	Maintenance Supervisor	Operation	Environmental Management System, Best practice

	Generating and maintaining best practice management for solid waste storage, processing and utilisation.	Maintenance Supervisor / Farm Manager	Operation	Environmental Management System, Best practice
	Remove solids from the sedimentation basin as soon as practical.	Maintenance Supervisor	Operation	Environmental Management System, Best practice
	Potential dust generating handling/processing activities such as screening or spreading will be minimised during high wind events (i.e., > 30km/hr hourly average or in severe wind gust conditions).	Farm Manager	Operation	Environmental Management System, CoA
	Any operations involving the movement/processing of solid waste such as screening or spreading, shall be timed and managed where possible when materials have adequate moisture content.	Farm Manager	Operation	Environmental Management System, Best practice
	Application of solid wastes to land when wind conditions and dispersion conditions are favourable.	Farm Manager	Operation	Environmental Management System, Best practice
	Where practical, solid wastes incorporated directly into the soil.	Farm Manager	Operation	Environmental Management System, Best practice
Effluent management				
	Sedimentation basin control weir maintained in good operational order to ensure that complete drainage occurs allowing settled solids to dry out.	Maintenance Supervisor	Operation	Environmental Management System, Best Practice
	Dewatering of the holding pond by irrigation to crops or pastures as soon as practical after rainfall.	Farm Manager	Operation	Environmental Management System, CoA
	Application of effluent to crops when wind conditions and dispersion conditions are favourable.	Farm Manager	Operation	Environmental Management System, CoA
	Utilisation of effluent to crops on-site to minimise inorganic fertiliser requirements.	Farm Manager	Operation	Environmental Management System, CoA
Monitoring and Reporting				

	All air quality monitoring requirements will be undertaken in accordance with Licence requirements.	Feedlot Manager	Operation – As-required	AS3580.1.1-2016 AS3580.14-2014
	The on-site real time automatic weather station will operate throughout the operation works for wind direction and speed, temperature and humidity and rainfall (refer to Figure 1 for location).	Feedlot Manager	Operation – As-required	Environmental Management System, CoA
	Rainfall forecasts will be monitored daily, and the site managed to minimise air quality impacts from rainfall events.	Feedlot Manager / Farm Manager	Operation – Event basis	Environmental Management System, CoA
	A 24-hour community response telephone line shall be maintained.	Feedlot Manager	Operation – Daily	Environmental Management System, CoA
	In the event of an air quality complaint, records shall be kept in the complaints register and investigations will be undertaken to confirm the source of the issue. Additional mitigation measures will be investigated and implemented. In the event of ongoing air quality issues, operational activities will be reviewed and, if necessary, the activity stopped until suitable measures can be employed to manage this issue.	Facilities Manager / Operations Manager	Operation – Annually	Environmental Management System, CoA
	Pollution incidents posing material harm to the environment shall be notified to each 'relevant authority' as defined in section 148(8) of the POEO Act.	Feedlot Manager	Operation – Event basis	Environmental Management System, *POEO Act 1997*, CoA
Review and Improvement				
	In line with the Complaints and Enquiries Procedure, following a complaint and its subsequent investigation, feedback regarding the source and nature of the issue and corrective and / or preventative measures taken will be provided to the affected stakeholders and/or community members (refer also to section 5.5).	Facilities Manager	Operation – Event basis	Environmental Management System, CoA

5 Implementation

5.1 Roles and responsibilities

The organisational structure and overall roles and responsibilities of the Project team are outlined in section 6.3 of the OEMP. Specific responsibilities for the implementation of environmental controls are details in Table 3 of this OAQMP.

5.2 Induction

The Project has a site induction program that all contractors and employees are required to complete prior to undertaking any work on the Project site in accordance with section 8.1 of the OEMP.

Prior to their commencement of work on the Project site, all employees and subcontractors will undergo site induction relating to air quality management issues, including:

- Requirements of this Plan;
- Relevant legislation;
- Roles and responsibilities for air quality management; and
- Air quality mitigation measures

5.3 Training

Targeted training in the form of toolbox talks or specific training will be provided to all employees with a key role in air quality management. Examples of training topics include:

- Planning and preparedness for strong wind events / dust risk periods;
- Lessons learnt from dusty periods, incidents and other events e.g., strong wind (in excess of 40 km/hr); and
- Planning and preparedness for rainfall events.

Further details regarding employee training are outlined in section 8.2 of the OEMP.

5.4 Incident management

Doolin Farming Pty Ltd will continue to implement its existing incident management procedures, including response to, investigation and reporting of incidents.

A comprehensive Incident Management System is currently implemented at the Project site, with associated response and safety equipment held on-site in the event of an incident causing environmental harm occurs during operation. Key personnel are trained to support the implementation of the system.

Further details regarding environmental incident management are outlined in section 9 of the OEMP.

5.5 Complaints management

The investigation, response and reporting of complaints shall be undertaken in accordance with section 9.3 the OEMP.

All community complaints shall also be managed in accordance with the requirements of the CoA for the Project, including:

- Reporting complaints in the Annual Return;
- Keeping a legible record of all complaints made, including:
    - The date and time of the complaint;
    - The method by which the complaint was made;
    - Any personal details of the complainant which were provided or, if no such details were provided, a note to that effect;
    - The nature of the complaint;
    - The action taken in relation to the complaint, including any follow-up contact with the complainant; and
    - If no action was taken, the reasons why no action was taken.

Any feedback and complaint records will be logged in the Complaints Register, tracked and where relevant, responded to. Responses to complaints will be made, where reasonably possible, within 48 hours of receiving the complaint.

6 Performance evaluation

6.1 Performance indicators

The extent to which this Plan complies with CoA will be measured by the following performance indicators:

- Compliance with relevant air quality standards at monitoring locations, in particular those representative of sensitive receptor locations;
- Minimisation of air quality (odour, dust) complaints as evidenced by trends in the frequency and number of complaints; and
- Compliance with this plan, as indicated by internal and statutory reporting.

6.2 Monitoring

Regular monitoring and inspections will be undertaken during operation in accordance with Table 4. The proposed number of monitoring locations, frequency of monitoring and relevant monitoring methods are detailed in the Operation Environmental Monitoring and Management Plan in Appendix B5 of the OEMP.

Additional requirements and responsibilities in relation to inspections and monitoring are documented in sections 10.1 and 10.2 of the OEMP.

Table 4 – Air quality – Monitoring and Inspection

Monitoring details	Location	Responsibility	Frequency	Record	KPI
Weather data including daily rainfall, wind (direction and speed), temperature, relative humidity, barometric pressure	Development complex	Feedlot Manager	Daily	Daily rainfall record	N/A
Visual observations during site inspections, including activities outside of the Project that may impact on dust/odour levels near sensitive receivers	Project site	Feedlot Manager / Farm Manager	Daily	Complaints record	Number of dust and/or odour complaints

6.3 Reporting

Air quality management reporting is designed to comply with the CoA and provide stakeholder access to relevant air quality information and data.

Key stakeholders requiring access to this information include Doolin Farming Pty Ltd, state and local government agencies and the local community. Reporting will be undertaken in accordance with section 11.4 of the OEMP. Annual reporting will be undertaken in accordance with CoA and the Annual Return requirements detailed in the EPL.

Doolin Farming Pty Ltd will report on the performance of the Air Quality Monitoring Program and management of air quality in the Annual Return for the EPL.

The Annual Return for the EPL will include an air quality monitoring component covering the following items relating to air quality:

- Air quality monitoring results and comparison to performance criteria;
- An explanation for any missing air quality monitoring results;
- Air quality related complaints and management/mitigation measures undertaken;
- Management/mitigation measures undertaken in the event of any confirmed exceedance of performance criteria; and
- Review of the performance of management/mitigation measures and the monitoring program.

Doolin Farming Pty Ltd is required to report pollution incidents immediately and without delay in accordance with the requirements of the *POEO Act 1997*.

6.4 Auditing

Audits (both internal and external) will be undertaken to assess the effectiveness of environmental mitigation measures, compliance with this OAQMP, CoA and other relevant approvals, licences and guidelines. Audit requirements are detailed in section 11.4 of the OEMP.

The audit process will generally be designed to examine the status of the key components of the OAQMP, review air quality concerns management and evaluate the overall performance of air quality management for the Project.

The strategy for Doolin Farming Pty Ltd audit processes is to ensure compliance and promote continuous improvement as part of the Project's air quality management regime.

In addition, the Plan may be subject to audit by the Gwydir Shire Council or the Department administering the *Protection of the Environment Operations Act 1997* (currently EPA) during compliance inspections and other site inspections and as a possible component of a formal air quality concern investigation process.

7 Review and Improvement

7.1 Non-conformances and corrective actions

Any non-conformances related to air quality will be dealt with and documented in accordance with section 11.5 of the OEMP.

7.2 Continual improvement

This Plan and associated monitoring program will be reviewed and if necessary revised to the satisfaction of the NSW EPA, the Department administering the *Protection of the Environment Operations Act 1997* (in consultation with the Gwydir Shire Council) in accordance with section 12 of the OEMP:

- where a risk assessment identifies the requirement to alter the Plan;
- following changes to project approval or licence conditions relating to air quality management or monitoring;
- following any significant air quality related incident;
- where there is a relevant change in technology or legislation; or
- for necessary or any unforeseen changes to air quality monitoring locations.

8 References

NSW Environment Protection Authority, 2016, Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales, Environment Protection Authority, Sydney, NSW.

RDC Engineers Pty Ltd, 2024, Development Application and Environmental Impact Statement – Expansion of Beef Cattle Feedlot from 999 to 3,000 Head, "Springfield", North Star", E2-103/V1R1 RDC Engineers Pty Ltd, Toowoomba, QLD, 4350.

Standards Australia ,2007, AS 3580.1.1:2007: Methods for sampling and analysis of ambient air - Guide to siting air monitoring equipment, Sydney, NSW

Standards Australia, 2011, AS 3580.14-2011: Methods for sampling and analysis of ambient air – Meteorological monitoring for ambient air quality monitoring applications, Sydney NSW.

Standards Australia, 2015, AS/NZS 3580.9.3:2015, Methods for sampling and analysis of ambient air: Determination of suspended particulate matter - Total suspended particulate matter (TSP) - High volume sampler gravimetric method, Sydney, NSW.

Standards Australia, 2014, AS/NZS 3580.14:2014, Methods for sampling and analysis of ambient air: Meteorological monitoring for ambient air quality monitoring applications, Sydney, NSW.

Standards Australia, 2016, AS/NZS 3580.1.1:2016, Methods for sampling and analysis of ambient air: Guide to siting air monitoring equipment, Sydney, NSW.

Appendix A – Standard Operational Procedures

AQMP SOP 1 – Air Quality – Dust management

Aspect	Air quality – Dust
Objectives	To manage dust emissions such that impacts on community amenity, occupational health and the environment are minimised.
Potential Impacts	Occupational health and safety of employees and contractors. Animal health and performance. Receiving environment such as surface water and aquatic and terrestrial ecosystems affected by dust deposition. Community amenity and health including impacts on living areas, swimming pools and general amenities etc. Receiving environment such as agricultural crops impacted by dust deposition.
Control Actions	All development employees including relevant contractors are given adequate training in environmental awareness, legal responsibilities and air quality control methods through inductions and targeted training. Maintain vegetative cover over the site where practicable. Establish a tree break around the populated boundaries of the site. The air quality and meteorological monitoring network is maintained, and results are routinely analysed, assessed and reported. Seal access roads, vehicle manoeuvring surfaces and car parks as required. Limit cattle movement in high wind conditions. Pen cleaning and surface maintenance is undertaken on a planned basis to ensure that pen surfaces dry quickly following rainfall, can drain freely and do not become overly dry and cause excessive dust emissions. Receiving, reporting and responding to any complaints in relation to dust nuisance. Adapting the cattle stocking density in pens to maintain the moisture content of the manure on the pen surface at 25-35% to minimise dust generation. For example, stocking density may change from lighter rates in winter to heavy rates in summer. Setting and enforcing speed limits on internal road network. To the extent practical, vehicles will only travel on designated roads. Implement dust suppression measures, such as watering internal roads and solid waste (manure) stockpiles as required particularly in unfavourable weather conditions (e.g., > 30km/hr hourly average winds or in severe wind gust conditions, extended periods of dry weather). Dust suppression measures, such as watering access and feed roads and solid waste (manure) stockpiles as required. Operations involving the movement or processing of dusty materials such as hay processing, grain movement shall be timed and managed where possible when materials have adequate moisture content and/or low wind conditions.

	Operations involving the movement of dusty materials such as grain movement, solid waste (manure) turning and spreading shall be timed and managed where possible when materials have adequate moisture content. Ceasing dust generating activities such as hay processing, grain movement, pen cleaning, and solid waste (manure, carcass compost, pond sludge) stockpiling, screening and spreading during adverse weather conditions and/or when sensitive receptors are likely to be affected by dust emissions. Any grain processing dust-suppression equipment is always well maintained and operational. The loads on vehicles moving dry commodities or dusty materials (e.g., solid waste) onto or off the site are covered and all tailgates securely fastened during transit. Vehicles will not be loaded higher than the sides and tailboard. Operations involving the movement/processing of solid waste, such as screening or spreading, shall be timed and managed where possible when materials have adequate moisture content and when wind conditions are favourable (low speed and non-gusty). A suitable buffer is applied where solid waste (manure, carcass compost, holding pond sludge) applications take place within close proximity to roads, dwellings or other areas likely to be used by the public at that time (the appropriateness of the applied buffer distances is determined having consideration for the qualities of the materials being applied, weather conditions and other environmental factors; as well as the anticipated level of public usage or exposure at those times).
Relevant Standards, Management Plans, Records	CoA EPL conditions NFAS manual Complaints Register Personnel induction, training and awareness AS 3580 Methods of sampling and analysis of ambient air
Responsibility	As required by the OEMP and specific requirements outlined in section 5.1.
Performance Indicators	Ensure all personnel operating on the site are adequately trained. Personnel shall receive training in air quality control methods. No complaints relating to dust are received by the development.
Monitoring	As required by the OEMP and specific requirements outlined in section 6.2.
Reporting	As required by the OEMP and specific requirements outlined in section 6.3.
Corrective Actions	Review management of dust generating activities and dust control methods. Increase dust suppression activities. Seek specialist advice if high dust levels persist.

AQMP SOP 2 – Air Quality – Odour management

Aspect	Air quality – Odour
Objectives	To manage odour emissions such that impacts on community amenity, occupational health and the environment are minimised.
Potential Impacts	Occupational health and safety of employees and contractors from offensive odours. Community amenity and health impacts from offensive odours.
Control Actions	All development employees including relevant contractors are given adequate training in environmental awareness, legal responsibilities and air quality control methods through inductions and targeted training. Maintain vegetative cover over the site where practicable. Establish a vegetative buffer around the populated boundaries of the site. The air quality and meteorological monitoring network is maintained, and results are routinely analysed, assessed and reported. Ensuring cattle numbers do not exceed EPL conditions and proper management and regular maintenance of pens. Pen maintenance routines and registers kept. Pen cleaning and surface maintenance is undertaken on a planned basis to ensure that pen surfaces dry quickly following rainfall, can drain freely and dry rapidly. Odour generating activities, such as pen cleaning should not be undertaken when atmospheric conditions will cause strong odours to remain undiluted. Bright sunny mornings are the best time to undertake these activities. Minimise the accumulation of manure in pens, catch drains, under-fences and cattle lanes by cleaning in accordance with Class 1 requirements. (Refer OSLWMP SOP 1 – Solid waste (Putrescible) – Pen and sedimentation basin cleaning procedure). Elimination of wet areas within the pens by repairing potholes, eliminating accumulated manure from under fence lines and fixing leaks from water troughs. (Refer OSLWMP SOP 1 – Solid waste (Putrescible) – Pen and sedimentation basin cleaning procedure). Spilt and spoilt feed and feedstuffs are regularly removed from around feed storage and preparation areas, feed bunks, feed processing equipment, etc. Sedimentation basin control weir is maintained in operational order to ensure that complete drainage occurs allowing settled solids to dry out, thus reducing the potential for odour emissions. (Refer OSLWMP SOP 1 – Solid waste (Putrescible) – Pen and sedimentation basin cleaning procedure). Solids are removed from the sedimentation basins as soon as practical after deposition. Mortalities are placed within the solid waste stockpile and carcass composting area and covered with high carbon material as soon as practicable after placement. Controlled aeration of solid waste composting windrows. Wet solid waste composting windrows are not turned to minimise release of emissions generated from the anaerobic decomposition process.

	Moisture and temperature levels of solid waste composting windrows are monitored and kept at optimal levels to reduce odour. Dewatering of the holding pond by irrigation to crops or pastures in accordance OSLWMP SOP 6 – Liquid waste (Effluent) – Holding pond management. Receiving, reporting and responding to any complaints in relation to odour nuisance. Maintaining best practice management for effluent and solid waste storage, processing and utilisation (Refer OSLWMP SOP 6; SOP 7; SOP 8). A suitable buffer is applied where effluent and solid waste (manure, carcass compost, holding pond sludge) applications take place within close proximity to roads, dwellings or other areas likely to be used by the public at that time (the appropriateness of the applied buffer distances is determined having consideration for the qualities of the materials being applied, weather conditions and other environmental factors; as well as the anticipated level of public usage or exposure at those times).
Relevant Standards, Management Plans, Records	CoA EPL conditions NFAS manual Complaints Register Personnel induction, training and awareness AS 3580:2014 Methods of sampling and analysis of ambient air AS/NZS 3580.1.1:2016, Methods for sampling and analysis of ambient air: Guide to siting air monitoring equipment
Responsibility	As required by the OEMP and specific requirements outlined in section 5.1.
Performance Indicators	Ensure all personnel operating on the site are adequately trained. Personnel shall receive training in air quality control methods. No complaints relating to dust are received by the Project.
Monitoring	As required by the OEMP and specific requirements outlined in section 6.2.
Reporting	As required by the OEMP and specific requirements outlined in section 6.3.
Corrective Actions	Review management of odour generating activities and control actions. Seek specialist advice if high odour levels persist.

AQMP SOP 3 – Air Quality – GHG management

Aspect	Air quality – GHG
Objectives	To mitigate GHG emissions such that impacts on community amenity, occupational health and environment values are minimised.
Potential Impacts	Occupational health and safety of employees and contractors from the release of toxic air pollutants. Community amenity and health impacts from the release of toxic air pollutants. Contribution to atmospheric greenhouse gas emissions and the risk of environmental harm from man-made climate change
Control Actions	Adopting reasonable and practicable best practice design, technology and management measures appropriate to mitigate GHG emissions, having regard to the hierarchy to avoid, reduce and offset emissions. Commitment in supporting greenhouse gas emission reduction within the beef production industry. Map carbon emissions across the entire supply chain to identify opportunities for reducing emissions. All plant will be maintained and operated in line with the manufacturer's specifications to minimise emissions of air pollutants. Plant, mobile machinery and vehicles will be turned off when not in use. Routine service and maintenance of mobile equipment used on-site to ensure efficient operation. Investigate and implement renewable energy options such as small-scale options for renewable energy supply to offices and buildings. Investigate and implement water and energy efficiency measures. Sourcing livestock and feed commodities from on-farm or as close to the Project as practical to minimise fugitive emissions during transport. Utilising the best animal production genetics - Improved production traits such as growth rate and carcass weight will contribute significantly to reducing emissions intensity. Rations formulated to minimise enteric methane emissions and reduce nutrient excretion. Implement measures to reduce urinary nitrogen (e.g., using forages with a higher energy-to-protein ratio). Implement measures to reducing greenhouse gas emissions from manure management. Controlled aeration of solid waste stockpiles and composting windrows to reduce methane emissions. Increase soil organic carbon levels of soils in waste utilisation areas through management shifts such as management for increased yields; tillage and stubble management; crop rotation; pasture and grazing management; and organic matter additions.
Relevant Standards,	CoA NFAS manual

Management Plans, Records	Complaints Register Personnel induction, training and awareness
Responsibility	As required by the OEMP and specific requirements outlined in section 5.1.
Performance Indicators	Ensure all personnel operating on the site are adequately trained. Net reduction in greenhouse emissions in line with its adaptive management approach.
Monitoring	Monitor all Scope 1 GHG emissions.
Reporting	As required by the OEMP and specific requirements outlined in section 6.3.
Corrective Actions	Avoiding emissions through best practice design and benchmarking. Review management of GHG generating activities and control actions. Offsetting emissions (carbon offsets).

AQMP SOP 4 – Air Quality – Compliance monitoring

Aspect	Air quality – Compliance Monitoring
Objectives	To record site-specific weather data.
Potential Impacts	Non-compliance with CoA. Poor management of effluent and solid waste resulting in odour or dust nuisance Locating point sources of nuisance odour and dust emissions.
Control Actions	Implement and maintain a permanently located automatic weather station (AWS) on-site to continuously record weather data. A suitably trained person will perform the inspection of the AWS and download recorded data. Each day, data for each parameter shown on the real-time display system will be reviewed against existing meteorological conditions. Download meteorological data weekly and store in data management system. Review weekly the weather data for continuity / missing records and advise the Environmental Specialist of any spurious data as required. Inspect the AWS every week. At each inspection the following actions shall be performed: • Check the AWS is energised from power source; • Inspect the tipping bucket rain gauge and clean settled dust and/or clear blockages if required; • Inspect the wind speed and direction sensors for damage and clear any cobwebs if required; • Report any equipment damage to the Environmental Specialist.
Relevant Standards, Management Plans, Records	CoA Personnel induction, training and awareness AS 3580 Methods of sampling and analysis of ambient air
Responsibility	As required by the OEMP and specific requirements outlined in section 5.1.
Performance Indicators	Ensure all personnel responsible for the management of the meteorological station and metrological methods are adequately trained. The meteorological station provides long-term high quality, continuous meteorological data.
Monitoring	As required by the OEMP and specific requirements outlined in section 6.2.
Reporting	As required by the OEMP and specific requirements outlined in section 6.3.
Corrective Actions	Review weather data and management of the meteorological station. Seek specialist advice if inconsistent or spurious data is identified.

Appendix B2 – Soil and water quality management plan

Springfield Feedlot

Draft Operation Soil and Water Quality Management Plan

"Springfield"
2513 Getta Getta Road
North Star NSW 2408

Doolin Farming Pty Ltd
"Glenhoma"
3202 Getta Getta Road
NORTH STAR NSW 2408

[February 2025]

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Disclaimer

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1 Background

1.1 Introduction

Doolin Farming Pty Ltd own and operate a 10,000 ha mixed farming operation across several properties at North Star including “Glenhoma”, “Glenmodel”, “Springfield”, “Myall Downs” and “Yetman West” some 27 km east of Yetman and 45 km south-southeast of Goondiwindi (QLD) in NSW.

Doolin Farming Pty Ltd primarily engage in dryland and irrigated cropping and beef production. Doolin Farming Pty Ltd produces wheat, barley, oats and chickpeas in winter and cotton and maize in summer under pivot irrigation systems and dryland sorghum cropping.

Central to the beef production enterprise is the breeding, growing and lot-feeding of cattle for the domestic market. The beef supply chain includes breeding and growing of beef cattle on land less suitable for dryland and irrigated cropping and grazing of stubble and lot feeding of cattle within a feedlot on the property ‘Springfield”.

“Springfield” comprises some 1,713 ha (~4,231 acres) and currently, a dryland and irrigated cropping business is undertaken on a large proportion of the property with extensive cattle breeding and grazing of beef cattle on the remaining land which is unsuitable for cropping and lot feeding of cattle within a beef cattle feedlot in the north-east of the property.

The feedlot is known as Springfield Feedlot and operates for 12 months of the year and employs approximately 4 full time staff. Casual staff and contractors are engaged as required during busy periods such as planting and harvesting of silage and fodder and to supply various associated services such as plant maintenance and veterinary requirements.

Springfield Feedlot includes one controlled drainage area with associated production pens and drainage system which includes catch drains, sedimentation basin and holding pond. Springfield Feedlot also has auxiliary infrastructure to support the use such as cattle handling and feed storage and processing facilities.

Springfield Feedlot is accredited under the National Feedlot Accreditation Scheme (NFAS) with audits conducted annually.

1.2 Environmental management systems overview

The overall Environmental Management System for the Project is described in the Operation Environmental Management Plan (OEMP).

The OAQMP is part of Doolin Farming Pty Ltd’s environmental management framework for the Project, as described in section 4.2 of the OEMP. Management measures identified in this

Plan will be incorporated into site or activity specific Environmental Standard Work Instruction (ESWIs).

ESWIs will be developed and signed off by Feedlot Manager or environment management representatives prior to associated works and operation personnel will be required to undertake works in accordance with the identified mitigation and management measures.

Used together, the OEMP, strategies, procedures and ESWIs form management guides that clearly identify required environmental management actions for reference by Doolin Farming Pty Ltd's personnel and contractors.

The review and document control processes for this Plan are described in Chapter 10 of the OEMP.

2 Purpose, scope, and objectives

2.1 Purpose

This Operation Soil and Water Quality Management Plan (OSWQMP or Plan) forms part of the Operation Environmental Management Plan (OEMP) for the Springfield Feedlot (the Project).

This Plan has been prepared to address the Department of Planning and Environment (DPIE), Gwydir Shire Council (GSC) and the NSW Environment Protection Authority (NSWEPA) requirements of the Conditions of Approval (CoA) and the mitigation measures listed in the Springfield Feedlot EIS (2025) and all applicable legislation.

The Project has not commenced operation. This Plan will be reviewed and updated once operations commence.

2.2 Scope

This Operation Soil and Water Quality Management Plan (OSWQMP) describes how Doolin Farming Pty Ltd proposes to assess and manage soil and water quality impacts during operation of the Project.

2.3 Objectives

The key objective of the OSWQMP is to ensure that impacts on soil and water quality are minimised and within the scope permitted by the CoA. To achieve this objective, Doolin Farming Pty Ltd will:

- ensure all CoA and Doolin Farming Pty Ltd's Operations Policies and Standards are met in relation to soil and water quality;
- ensure appropriate controls and procedures are implemented during operation activities to avoid or minimise adverse impacts to soil quality and potential adverse impacts to groundwater and surface water quality within the vicinity of the Project.
- ensure measures are implemented to comply with all relevant legislation and other requirements as described in section 5 of this Plan.
- implement measures to minimise any adverse impacts of waste management and utilisation practices on soil, groundwater and surface water quality within the vicinity of the Project; and
- maintain an effective response mechanism to deal with issues and complaints

3 Legislative and other requirements

3.1 Legal requirements

Legislation relevant to soil and water quality management includes:

- Environmental Planning and Assessment Act 1979 (EP&A Act);
- Protection of the Environment Operations Act 1997 (POEO Act);
- Protection of the Environment Legislation Amendment Act 2011 (POELA Act);
- Water Management Act 2000;
- Water Act 1912; and
- Contaminated Land Management Act 1997.

Relevant provisions of the above legislation are explained in the register of legal and other requirements included in Appendix A1 of the OEMP.

3.2 Guidelines and standards

The main guidelines, specifications and policy documents relevant to this Plan are outlined in Table 1.

Table 1 – Relevant guidelines and standards

Guideline/Standard	Relevance
Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC and ARMCANZ 2000)	Provides a framework for recognising and protecting water quality for the full range of existing environmental values.
AS/NZS 5667.1—1998: Water Quality—Sampling— Part 1: Guidance on the Design of Sampling Programs, Sampling Techniques and the Preservation and Handling of Samples. Standards Association of Australia, Sydney	This Standard provides general principles to be applied in sampling for the physical, chemical, microbiological or radiological analysis of waters and waste waters, including bottom sediment and sludges, for the purposes of process control, quality characterization, identification of sources of pollution and the monitoring of background levels.
AS 5667.4-1998: Water quality - Sampling, Part 4: Guidance on sampling from lakes, natural and man-made, Sydney NSW.	This part of AS5667 sets out the principles to be applied to the design of sampling programmes, sampling techniques and the handling of water samples from lakes, natural and man-made for physical, chemical and microbiological assessment.
AS/NZS 5667.6—1998: Water Quality—Sampling—Guidance on sampling of rivers and streams. Standards Association of Australia, Sydney	This part of AS5667 sets out the principles to be applied to the design of sampling programmes, sampling techniques and the handling of water samples from rivers and streams for physical, chemical and microbiological assessment.
AS/NZS 5667.10—1998: Water Quality—Sampling—Guidance on sampling of waste waters. Standards Association of Australia, Sydney	This part of AS5667 contains details on the sampling of domestic and industrial waste water, i.e. the design of sampling programmes and techniques for the collection of samples. It covers waste water in all its forms, i.e. industrial waste water, and crude and treated domestic waste water.
EPA, 2004, Approved Methods for the Sampling and Analysis of Water Pollutants in NSW.	Lists the sampling and analysis methods to be used when complying with a requirement by, or under, the environment protection legislation, or a licence or notice under that legislation, to test for the presence or concentration of matter in water and the volume, depth and flow of water or wastewater.
Department of Environment and Conservation (NSW), 2004, Effluent Guidelines, Use of Effluent by Irrigation	Provides guidelines for planning, designing, installing, operating and monitoring effluent irrigation systems to diminish risks to public health, the environment and agricultural resources and outlines the statutory requirements that may be needed for an effluent irrigation system in NSW.
Landcom, 2004, The Blue Book – Managing Urban Stormwater: Soils and Construction Volume 1, 4th Edition, March 2004 (reprinted 2006) (the "Blue Book"). Volume 1 and Volume 2.	Provides guidance for the design, construction and implementation of measures to improve stormwater management, soil erosion risks and sediment control from disturbed sites.
International Erosion and Sediment Control (IECA) (Australasia) 2008. Best practice erosion and sediment control. International Erosion Control Association (Australasia), Picton, NSW.	Provides guidance for the design, construction and implementation of measures to improve stormwater management, soil erosion risks and sediment control from disturbed sites.
Resource manual of development of Indicators of sustainability for effluent	Provides readily available data and analysis techniques for evaluating the sustainability of effluent and manure and

reuse in the intensive livestock industries: Piggeries and Cattle Feedlots, Project No 1816, Australian Pork Limited, Canberra, Australia, May 2003.	carcass compost reuse for piggeries and cattle feedlots and suggested sustainability indicators for these intensive livestock industries.
Redding, MR (2003), Sampling Manual for environmental monitoring by intensive livestock industries. Agency for Food and Fibre Sciences, Department of Primary Industries, Toowoomba, Queensland.	This manual sets out the sample collection and preparation techniques needed to fulfil the monitoring requirements of intensive livestock licences (under the QLD EP Act) for soil, effluent, manure, sludge, surface water and groundwater samples.
Rayment, G.E. and Lyons, D.J. (2010). Soil Chemical Methods -Australasia, CSIRO Publishing, ISBN: 9780643067684.	This handbook describes laboratory and field chemical tests and guidance on soil sampling and choice and application of analytical methods from soil sampling through to the reporting of results.
Standards Australia, 2017, AS 1940:2017: The storage and handling of flammable and combustible liquids	This Standard provides general principles and requirements to be applied for bunding, placarding, safe operations, emergency management and fire protection for flammable and combustible liquids.
Standards Australia, 1998, AS 2507-1998: The storage and handling of agricultural and veterinary chemicals	This Standard provides requirements and recommendations for the storage and handling of agricultural and veterinary chemicals, which may be classified as dangerous goods under the Australian Dangerous Goods Code (ADG Code) or as scheduled poisons by the Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP).
Meat and Livestock Australia, 2012a, National Beef Cattle Feedlot Environmental Code of Practice 2nd Edition, Meat & Livestock Australia, North Sydney, NSW.	The *Code* is designed to be a companion document to the *National Guidelines for Beef Cattle Feedlots in Australia*. The *Code* is intended to provide requirements for the environmentally relevant aspects of the establishment and operation of beef cattle feedlots.
MLA, 2012b, National Guidelines for Beef Cattle Feedlots in Australia 3rd Edition, Meat & Livestock Australia, North Sydney, NSW	The *National Guidelines for Beef Cattle Feedlots in Australia* is designed to provide 'guidance' on how the *Code* requirements regarding the establishment and operation of beef cattle feedlots may be achieved
Meat and Livestock Australia, 2015a, Beef Cattle Feedlots: Design and Construction, Meat and Livestock Australia, North Sydney, NSW.	This manual outlines the stages of selecting a suitable site, designing the feedlot and its facilities, their construction and the overall management of the project.
Meat and Livestock Australia, 2015b, Beef cattle feedlots: waste management and utilisation, Meat and Livestock Australia, North Sydney, NSW.	This manual provides best-practice guidelines for waste management in beef cattle feedlots.
Standards Australia, 2008, AS 4897-2008: The design, installation and operation of underground petroleum storage systems	This Standard provides general principles and requirements for the safe, environmentally sound and efficient underground storage of petroleum products.

3.3 Conditions of approval

The CoA relevant to this Plan are listed in Table 2. A cross reference is also included to indicate where the condition is addressed in this Plan or other Project management documents.

Table 2 – Conditions of Approval relevant to this plan

CoA	Condition requirements	Plan reference
Notice of Determination		
	To be completed after Notice of Determination is issued	
EPL		
	To be completed after EPL is issued	

4 Soil and water quality management strategy

4.1 Aspects and impacts

4.1.1 Risk analysis

A risk management approach was used to determine the severity and likelihood of impacts from the operation's activities on soil and water quality and to prioritise its significance. This process considered potential regulatory and legal risks as well as the concerns of the community and other key stakeholders.

The objectives of the risk assessment were to:

- Identify activities, events or outcomes that have the potential to adversely affect the local environment and/or human health/property
- Qualitatively evaluate and categorise each risk item
- Assess whether risk issues can be managed by environmental protection measures
- Qualitatively evaluate residual risk with implementation of measures.

Appendix A3 of the OEMP contains a list of issues, related to soil and water quality aspects and corresponding risks associated with the Project. Measures to mitigate the identified environmental risks are also provided.

4.2 Operation activities

Key aspects of the Project that could result in impacts to soil and water quality include:

- solid waste (manure, mortalities, holding pond sludge) management including pen cleaning, storage and processing;
- poor maintenance and management of the low-permeability barrier (e.g. clay lining) in the controlled drainage area resulting in contamination of groundwater and/or surface waters;
- land application of solid waste at rates exceeding the ability of the soils and crops to sustainably utilise applied nutrients, salts and organic matter;
- impacts of improper management of liquid waste storage structures leading to uncontrolled releases of contaminants;
- poor maintenance and repair of effluent storage infrastructure and pumping and distribution equipment leading to uncontrolled releases of contaminants (including domestic sewage infrastructure);
- poor management of timing of effluent irrigation events and/or sludge accumulation leading to uncontrolled releases of contaminants;

- solid waste and/or effluent applied to land other than the nominated waste utilisation areas;
- land application of solid waste and or effluent at rates exceeding the ability of the soils and crops to sustainably utilise applied nutrients, salts and organic matter
- land application of effluent at rates exceeding the hydraulic capacity of the soils leading to ponding on the soil surface and/or runoff from the utilisation areas to drainage lines or watercourses;
- erosion and sedimentation of exposed areas; and
- storage and handling of fuel and chemicals resulting in accidental spills or leaks, failure of a control or inappropriate storage and handling.

4.3 Factors likely to affect soil and water quality and impacts

In addition to the inherent risks of specific operation activities creating potential impacts to soil and water quality, a number of other environment factors also affect the likelihood of soil and water quality impacts. These include:

- Wind direction – determines whether dust and suspended particles are transported in the direction of surface waters;
- Wind speed – governs the potential suspension and drift of particles;
- Soil type – more erodible soil types have an increased soil or dust erosion potential;
- Soil moisture – increased soil moisture reduces soil or dust erosion potential;
- Temperature – governs the growth rates of crops,
- Rainfall (intensity, frequency, duration)/flooding – extended periods of rainfall increase the risk of overtopping of holding liquid waste storages, deep drainage of nutrients within utilisation areas, offsite movement of contaminants, failure of low permeability barrier underlying pen surfaces, failure of crops and reduces dust from exposed surfaces. Intensity of rainfall increases erosion risk and sediment movement.

4.4 Impacts

The potential for impacts on soil and water quality will depend on a number of factors. Primarily impacts will be dependent on the nature, extent and magnitude of operation activities and their interaction with the natural environment. Potential impacts attributable to operation might include:

- Exposed soils, creating the potential for offsite transport of eroded sediments and pollutants.
- Impacts to soils and/or water quality and/or sensitive area damage from inappropriate storage, handling and utilisation of effluent and solid waste.

- Alteration of surface and subsurface flows that could cause disturbances to hydrology and hydraulics.
- Contamination of soils and surface and groundwater from accidental spills or oil leaks. This might include grease or fuel from machinery and vehicles, or spills of other materials that may be used during the course of operation.
- Contamination of soils, and surface and groundwater from compromise / loss of integrity of the low-permeability barrier within the controlled drainage area of the Project complex.
- Impacts to groundwater and surface water quantity from unsustainable use of these resources.

Some impacts to soil and water quality attributable to the Project are anticipated and have been described in the Project's Environmental Impact Statement (RDC Engineers Pty Ltd, 2025).

Section 4.5 provides a suite of mitigation measures that will be implemented to avoid or minimise impacts to soil and water quality.

4.5 Mitigation measures

Table 3 describes the mitigation measures for soil and water quality impacts due to facility operations and summarises the responsibilities that have been documented within this plan.

A major management tool in all instances will be on-site visual inspections and the regular soil and water quality monitoring. The soil and water quality monitoring results provides factual data that enables operational activities to be adjusted to avoid exceedances of regulatory soil and water quality criteria.

Table 3 – Soil and water quality management and mitigation measures

Source	Mitigation measure	Responsibility	Timing	Reference
General				
	Training will be provided to all Project personnel, including relevant sub-contractors, on soil and water quality control practices and the requirements from this plan through inductions and targeted training.	Feedlot Manager /Farm Manager	Operation - Induction	OEMP
	An environmental specialist will be engaged and regularly consulted throughout operation to provide advice on soil and water quality monitoring.	Feedlot Manager	Operation - As required	Best practice
	An Environmental Protection Licence will be obtained for the Project. All relevant conditions relating to soil and water quality management will be implemented as required by the EPL.	Feedlot Manager	Prior to Operation	*POEO Act 1997,* CoA
Procedures and Plans				
	Erosion and sediment control plans (ESCPs) will be prepared and implemented in advance of any significant earthworks being undertaken outside of the controlled drainage area during operations.	Maintenance Supervisor	Operation - As required	Best practice
	Procedures will be prepared and implemented for solid and liquid waste management to manage any adverse environmental impacts. Refer Appendix A.	Operations Manager / Maintenance Supervisor	Operation - As required	Best practice
Erosion and Sediment Control				
	Clean and dirty water runoff will be adequately separated to avoid mixing where possible through the use of diversions, clean water drains and the installation of permanent drainage infrastructure.	Feedlot Manager / Maintenance Supervisor	Pre-Operation	CoA, Best practice
	Exposed areas will be progressively rehabilitated. Methods will include permanent vegetation, or temporary protection with cover crops.	Feedlot Manager / Maintenance Supervisor / Farm Manager	Operation – ongoing	Good practice
	Exposed batter slopes and embankments and other areas exposed but not worked, will be protected from erosion through implementation of permanent stabilisation measures e.g. seeding, revegetation.	Feedlot Manager / Maintenance Supervisor	Pre-operation and Operation	Good practice

Pen areas, catch drains, contour and diversion drains will be maintained and shaped with an even gradient to facilitate drainage.	Maintenance Supervisor	Operation – Repairs and maintenance	Environmental Management System; CoA
Waste water or "dirty" water generated during operation will, wherever possible, be collected, treated and disposed of by appropriate means.	Feedlot Manager / Maintenance Supervisor	Operation	Environmental Management System
Flow discharge points will be designed with erosion controls to manage the flow velocities.	Feedlot Manager / Maintenance Supervisor / Farm Manager	Operation	Environmental Management System, Best practice
Roads			
A rumble grid will be provided at the access / exit point from the Project site onto public roads to minimise the tracking of soil and particulates onto public roads.	Feedlot Manager	Pre-Operation	Good practice
Vehicle movements from site will be minimised during wet weather if the tracking of mud may become an issue.	Feedlot Manager / Farm Manager	Operation	Good practice
Loose rock, soil, debris etc will be removed from public road surfaces (including sweeping of the road).	Feedlot Manager / Maintenance Supervisor / Farm Manager	Operation – As-required	Good practice
Material Storage and Management			
Where refuelling on-site is required, the following management practices will be implemented: • Refuelling will be undertaken on level ground and at least 40 metres from drainage lines, waterways and/or environmentally sensitive areas. • Refuelling will be undertaken within the designated refuelling areas, with appropriate bunding and/or absorbent material beneath the vehicle. • Will not be undertaken on or in the vicinity of vegetated areas (included roadside grasses). • Will be attended at all times. • Spill kits will be readily available and personnel trained in their use. A spill kit will be kept on the refuelling truck/ at all times. • Hand tools will be refuelled within lined trays of site vehicles wherever possible.	Feedlot / Feedmill Supervisor / Farm Manager	Operation	Good practice

	Washout of livestock and feed delivery trucks and cleaning of other vehicles, plant or equipment shall be undertaken on the designated impervious bunded vehicle washdown facility.	Livestock Supervisor / Feedmill Supervisor / Farm Manager	Operation	Best practice
	All oils, chemicals, toxic substances and combustible liquids associated with the operation will be stored in roofed and bunded areas. Spill kits will be provided at all chemical storage facilities.	Feedlot Manager / Feedmill Supervisor / Farm Manager	Operation	Best practice
	An emergency spill response plan will be developed. This plan will detail measures for the prevention, containment and clean-up of accidental spills of fuels and chemicals.	Feedlot Manager	Operation	Environmental Management System, Best practice
	The storage, handling and use of chemicals and fuels will be in accordance with the Occupational Safety and Health Regulations 1996 and relevant Australia Standards.	Feedlot Manager / Feedmill Supervisor / Farm Manager	Operation	AS1940; AS2507; AS4897
Controlled Drainage Area – Production Pens/Cattle handling/Hospital pens/Cattle Lanes / Drains				
	The low-permeability barrier forming the base of the pens (production, hospital, induction), cattle lanes and drains shall be checked after removal of manure to ensure its structure and integrity has not been damaged or compromised and ongoing compliance with specified design criteria. Any damage to the barrier will be repaired.	Maintenance Supervisor	Operation	CoA, Environmental Management System, Good practice
	Pen areas, cattle lanes/drains will be maintained and shaped with an even gradient to facilitate drainage.	Maintenance Supervisor	Operation	Environmental Management System, Good practice
	Manure, spoilt feed, carcasses and holding pond sludge will be stored in the designated solid waste stockpile/carcass composting area in accordance with relevant guidelines.	Maintenance Supervisor	Operation	CoA, Environmental Management System
Controlled Drainage Area – Sedimentation Basin / Holding Pond				
	The sedimentation basin and holding pond will be inspected at regular intervals and following rainfall events to assess available water storage capacity, water quality, structural integrity and solids levels.	Maintenance Supervisor / Farm Manager	Operation	Environmental Management System, Good practice

The low-permeability barrier shall be checked after removal of solids to ensure its structure and integrity has not been damaged or compromised and ongoing compliance with specified design criteria. Any damage to the low-permeability barrier will be repaired before waste water is reintroduced into the sedimentation basin/holding pond.	Maintenance Supervisor	Operation	Environmental Management System, Good practice
All inlet and outlet pipework, structures and pumps shall be checked regularly to ensure adequate functioning, e.g. flow rates, leaks.	Maintenance Supervisor / Farm Manager	Operation	Environmental Management System, Good practice
Solid waste from the sedimentation basin will be removed to the solid waste / carcass composting area and sustainably applied to land within the solid waste utilisation area.	Maintenance Supervisor / Farm Manager	Operation	Environmental Management System, CoA
Liquid waste from the holding pond will be sustainably applied to land within the liquid waste utilisation area.	Farm Manager	Operation	Environmental Management System, CoA
Design discharge events from the holding pond shall be directed to a natural grassed discharge area. This grassed area shall filter and disperse the liquid waste whilst allowing some infiltration. As the design discharge events are at a frequency of one in 10 years, the concentration of nutrients shall be sustainably adsorbed and utilised by vegetation in between events.	Farm Manager	Operation	Environmental Management System, CoA
Water quality and Use			
Groundwater drawdown and impacts on existing users will be minimised by: • Sustainable use of groundwater in accordance with the allocation and entitlements attached to the land on which the Project is located; • Monitoring groundwater levels; and • Monitoring groundwater quality.	Feedlot Manager / Farm Manager	Operation	Environmental Management System, CoA
Surface water use and impacts on existing users will be minimised by: • Sustainable use of surface water in accordance with the allocation and entitlements attached to the land on which the Project is located; and • Monitoring surface water quality.	Feedlot Manager / Farm Manager	Operation	Environmental Management System, CoA
Solid waste and effluent are only applied to designated solid waste and effluent utilisation areas.	Feedlot Manager / Farm Manager	Operation	Environmental Management System, CoA

Solid waste and effluent are applied to utilisation areas at rates that avoid runoff and excessive leaching.	Farm Manager	Operation	Environmental Management System, CoA
The land application of solid waste and effluent is made at rates consistent with the ability of soils and crops grown in the on-site utilisation areas to sustainably utilise the applied nutrients, salts and organic matter, under the climatic conditions prevailing at the site.	Farm Manager	Operation	Environmental Management System, CoA
Vegetative buffers around drainage lines designed to help protect surface water are maintained in their intended condition.	Farm Manager	Operation	Environmental Management System, Good Practice
Monitoring and Reporting			
All soil and water quality monitoring requirements will be undertaken in accordance with the following guidelines: • Environmental Guidelines: Use of Effluent By Irrigation (NSW DEC 2004) • Sampling Manual for environmental monitoring by intensive livestock industries (Redding (2003)	Feedlot Manager	Operation – As-required	Environmental Guidelines: Use of Effluent By Irrigation (NSW DEC 2004); Sampling Manual for environmental monitoring by intensive livestock industries (Redding 2003)
Monitoring of soil and water quality will be undertaken in accordance with EPL requirements.	Feedlot Manager	Operation – As-required	CoA, Environmental Management System
Records of soil and water quality monitoring will be maintained. Details will include: • Date, time and location of each sample. • Soil and/or water quality test results for each sample. • The personnel undertaking the sampling.	Feedlot Manager	Operation – Event basis	CoA, Environmental Management System
Rainfall forecasts will be monitored daily and the site managed to minimise soil and water quality impacts from rainfall events.	Farm Manager	Operation – Daily	Best practice
Ensure the soil and water quality results are routinely analysed, assessed and reported in accordance with the conditions of the EPL.	Farm Manager	Operation – Annually	CoA, Environmental Management System

A 24-hour community response telephone line shall be maintained.	Facilities Manager	Operation – On-going	*CoA,* Environmental Management System
In the event of a soil and/or water quality complaint, records shall be kept in the complaints register and investigations will be undertaken to confirm the source of the issue. Additional mitigation measures will be investigated and implemented. In the event of ongoing soil and water quality issues, operational activities will be reviewed and if necessary the activity stopped, until suitable measures can be employed to manage this issue.	Facilities Manager	Operation – Event basis	CoA, Environmental Management System
Pollution incidents posing material harm to the environment shall be notified to each 'relevant authority' as defined in section 148(8) of the *POEO Act 1997*.	Feedlot Manager	Operation – Event basis	Environmental Management System, *POEO Act 1997*, CoA
Review and Improvement			
In line with the Complaints and Enquiries Procedure, following a complaint and its subsequent investigation, feedback regarding the source and nature of the complaint will be provided to the affected stakeholders and/or community members (section 7).	Feedlot Manager	Operation – Event basis	Environmental Management System, CoA

5 Implementation

5.1 Roles and Responsibilities

The organisational structure of the Project and overall roles and responsibilities are outlined in Section 7.3 of the OEMP. Specific responsibilities for the implementation of environmental controls are details in Table 3 of this Plan.

5.2 Induction

Doolin Farming Pty Ltd has a site induction program that all contractors and employees are required to complete prior to undertaking any work on the Project site in accordance with section 9.1 of the OEMP.

5.3 Training

Doolin Farming Pty Ltd has a targeted training program for Project staff and contractors in accordance with section 9.2 of the OEMP.

Examples of training topics for employees and contractors with a key role in soil and water quality management include:

- Approved solid waste and effluent utilisation areas;
- Determination of sustainable application rates of solid waste and effluent to land;
- Planning and preparedness for adverse environment factors – e.g. high rainfall;
- Changes to operation activities that may impact soil and water quality; and
- Lessons learnt from incidents and other events e.g. high rainfall.

5.4 Incident management

A comprehensive Incident Management System is currently implemented at the Project site as outlined in section 12 of the OEMP.

5.5 Complaints management

The investigation, response and reporting of complaints shall be undertaken in accordance with section 10.3.3 of the OEMP.

6 Performance Evaluation

6.1 Performance Indicators

The extent to which this Plan complies with CoA will be measured by the following performance indicators:

- Compliance with relevant baseline standards at monitoring locations; and
- Compliance with this plan, as indicated by internal and statutory reporting.

6.2 Monitoring

Regular monitoring and inspections will be undertaken during operation in accordance with Table 4. The proposed number of monitoring locations, frequency of monitoring and relevant monitoring methods are detailed in the Operation Environmental Monitoring and Management Plan (OEMMP) in Appendix B5 of the OEMP.

Additional requirements and responsibilities in relation to inspections and monitoring are documented in sections 10.1 and 10.2 of the OEMP.

Table 4 – Soil and water quality monitoring details summary

Monitoring details	Location	Responsibility	Frequency	Record	KPI
Soil nutrient levels (Effluent utilisation areas)	Refer to OEMMP	Farm Manager	As outlined in OEMMP	AACR	No adverse impacts to soils
Soil nutrient levels (Solid waste utilisation areas)	Refer to OEMMP	Farm Manager	As outlined in OEMMP	AACR	No adverse impacts to soils
Surface water quality	Refer to OEMMP	Farm Manager	As outlined in OEMMP	AACR	No adverse impacts to surface waters
Groundwater quality	Refer to OEMMP	Farm Manager	As outlined in OEMMP	AACR	No adverse impacts to groundwater

6.3 Reporting

Soil and water quality management reporting is designed to comply with the CoA and provide stakeholder access to relevant soil and water quality information and data.

Key stakeholders requiring access to this information include Doolin Farming Pty Ltd, state and local government agencies and the local community. Reporting will be undertaken in accordance with section 9.4 of the OEMP and Table 5. Annual reporting will be undertaken in accordance with CoA and the Annual Return requirements detailed in the EPL.

Table 5 – Project reporting requirements

Instrument	Authority	Requirement	Frequency	Report
EPL	EPA	Management of soil and water quality	Every 12 months	Annual Return
EPL	EPA	Soil and water quality monitoring results	Every 12 months	Annual Return
EPL	EPA	Groundwater Monitoring Summary	Every 12 months	Annual Return
EPL	EPA	Surface water Monitoring Summary	Every 12 months	Annual Return
POEO Act 1997	EPA	Pollution incidents	Event basis	Notification

Doolin Farming Pty Ltd will report soil and water quality monitoring results in the Annual Return to EPA for the EPL.

Doolin Farming Pty Ltd will report on the management of soil and water quality in the Annual Return to EPA for the EPL.

The Annual Return for the EPL will include a soil and water quality monitoring component covering the following items:

- Soil and water quality monitoring results and comparison to baseline levels;
- An explanation for any missing soil and water quality monitoring results;
- Soil and water quality related complaints and management/mitigation measures undertaken;
- Management/mitigation measures undertaken in the event of any confirmed exceedance of performance criteria; and
- Review of the performance of management/mitigation measures and the monitoring program.

Doolin Farming Pty Ltd is required to report pollution incidents immediately and without delay in accordance with the requirements of the *POEO Act 1997*.

6.4 Auditing

Audits (both internal and external) will be undertaken to assess the effectiveness of environmental mitigation measures, compliance with this Plan, CoA and other relevant approvals, licences and guidelines. Audit requirements are detailed in section 11.4 of the OEMP.

The audit process will generally be designed to examine the status of the key components of this Plan, review soil and water quality concerns management and evaluate the overall performance of soil and water quality management for the Project.

The strategy for Doolin Farming Pty Ltd audit processes is to ensure compliance and promote continuous improvement as part of the Project's soil and water quality management regime.

In addition, the Plan may be subject to audit by the Gwydir Shire Council or the Department administering the *Protection of the Environment Operations Act 1997* (currently EPA) during compliance inspections and other site inspections and as a possible component of a formal soil and water quality concerns investigation process.

7 Review and Improvement

7.1 Non-conformances and corrective actions

Any non-conformances related to soil and water quality will be dealt with and documented in accordance with section 11.5 of the OEMP.

7.2 Continual improvement

This Plan and associated monitoring program will be reviewed, and if necessary revised to the satisfaction of the NSW EPA as the Department currently administering the *Protection of the Environment Operations Act 1997* in accordance with section 12 of the OEMP:

- where a risk assessment identifies the requirement to alter the Plan;
- following changes to project approval or licence conditions relating to soil and water quality management or monitoring;
- following any significant soil and/or water quality related incident;
- where there is a relevant change in technology or legislation; or
- for necessary or any unforeseen changes to soil and water quality monitoring locations.

8 References

Department of Environment and Conservation (NSW), 2004, Effluent Guidelines, Use of Effluent by Irrigation, Department of Environment and Conservation (NSW), Sydney, NSW.

Department of Environment and Conservation (NSW), 2004, Approved Methods for the Sampling and Analysis of Water Pollutants in New South Wales, Department of Environment and Conservation (NSW) Sydney South.

McGahan and Tucker, 2003, Resource manual of development of indicators of sustainability for effluent reuse in the intensive livestock industries: Piggeries and Cattle Feedlots, Project No 1816, Australian Pork Limited, Canberra, Australia, May 2003.

Meat and Livestock Australia, 2012a, National Guidelines for Beef Cattle Feedlots in Australia 3rd Edition, Meat & Livestock Australia, North Sydney, NSW.

Meat and Livestock Australia, 2012b, National Beef Cattle Feedlot Environmental Code of Practice 2nd Edition, Meat & Livestock Australia, North Sydney, NSW.

RDC Engineers Pty Ltd, 2025, Proposed Intensive livestock agriculture development (Expansion of beef cattle feedlot from 999 head to 3,000 head) on the property "Springfield", Development Application and Environmental Impact Statement, V1R2 RDC Engineers Pty Ltd, Toowoomba, QLD, 4350.

Redding, MR, 2003, Sampling Manual for environmental monitoring by intensive livestock industries. Agency for Food and Fibre Sciences, Department of Primary Industries, Toowoomba, Queensland.

Standards Australia, 2017, AS 1940:2017: The storage and handling of flammable and combustible liquids, Sydney, NSW.

Standards Australia, 1998, AS 2507-1998: The storage and handling of agricultural and veterinary chemicals, Sydney NSW.

Standards Australia, 1998, AS 5667.4-1998: Water quality - Sampling, Part 4: Guidance on sampling from lakes, natural and man-made, Sydney NSW.

Standards Australia, 1998, AS 5667.11-1998: Water quality - Sampling - Guidance on sampling of groundwaters, Sydney NSW.

Standards Australia, 2008, AS 4897-2008: The design, installation and operation of underground petroleum storage systems, Sydney NSW.

Appendix A – Standard Operational Procedures

OSWQMP SOP 1 - Soil and Water Quality – Soil quality monitoring procedure

Aspect	Soil and water quality – Soil quality monitoring
Objectives	To implement a soil quality monitoring program to monitor the quality of soils in the effluent and solid waste utilisation areas such that impacts on community amenity, occupational health and the environment are minimised.
Potential Impacts	Occupational health and safety of employees and contractors. Animal health and performance. Receiving environment such as groundwater or terrestrial ecosystems affected by pollution events. Receiving environment such as agricultural crops impacted by pollution events.
Control Actions	Implement a soil quality monitoring program for the effluent and solid waste utilisation areas in accordance with this Plan. Undertake soil quality monitoring from the relevant monitoring points in accordance with the EPL. Identify the location of monitoring points within the effluent and solid waste application areas using GPS. Prepare chain of custody form and sample bags for each sample. Identify parameters to be tested and outline on the relevant chain of custody form. Refer section 8.2 for requirements. Collect representative soil sample(s) and store in appropriate sample bags as per relevant monitoring and sampling guidelines. Samples are to be sent as soon as possible after collection to a NATA-accredited laboratory for the parameters to be analysed with the relevant chain of custody forms.
Relevant Standards, Management Plans, Records	CoA Non-compliance record Personnel induction, training and awareness Redding (2003) Sampling Manual for environmental monitoring by intensive livestock industries Annual Return
Responsibility	As required by the OEMP and specific requirements outlined in section 5.1.
Performance Indicators	Ensure all personnel responsible for monitoring are adequately trained. No non-compliances with CoA. No adverse impacts to environmental values.
Monitoring	As required by the OEMP and specific requirements outlined in section 6.2.
Reporting	As required by the OEMP and specific requirements outlined in section 6.3.
Corrective Actions	Review soil quality monitoring program. Seek specialist advice where a significant level of environmental risk or impact is identified with soil quality parameters.

OSWQMP SOP 2 – Soil and Water Quality – Water quality monitoring procedure

Aspect	Soil and water quality – Water quality monitoring
Objectives	To implement a water quality monitoring program to monitor and report on the quality of water from various sources such that impacts on community amenity, occupational health and the environment are minimised.
Potential Impacts	Occupational health and safety of employees and contractors. Animal health and performance. Receiving environment such as surface water and aquatic and terrestrial ecosystems affected by pollution events. Community amenity and health from impacts on water sources. Receiving environment such as agricultural crops impacted by pollution events.
Control Actions	Implement a water quality monitoring program for groundwater and surface water in accordance with this Plan. Undertake groundwater and surface water quality monitoring from the relevant monitoring points in accordance with the EPL. Prepare chain of custody form and sample bottle for each sample. Identify parameters to be tested and outline on the relevant chain of custody form. Refer section 8.2 for requirements. Collect representative water sample(s) and store in appropriate sample bottle as per relevant monitoring and sampling guidelines. Samples are to be sent as soon as possible after collection to a NATA-accredited laboratory for the parameters to be analysed with the relevant chain of custody forms.
Relevant Standards, Management Plans, Records	CoA Non-compliance record Personnel induction, training and awareness Redding (2003) Sampling Manual for environmental monitoring by intensive livestock industries Annual Return
Responsibility	As required by the OEMP and specific requirements outlined in section 5.1.
Performance Indicators	Ensure all personnel responsible for monitoring are adequately trained. No non-compliances with CoA. No adverse impacts to environmental values.
Monitoring	As required by the OEMP and specific requirements outlined in section 6.2.
Reporting	As required by the OEMP and specific requirements outlined in section 6.3.
Corrective Actions	Review water quality monitoring program. Seek specialist advice where a significant level of environmental risk or impact is identified with water quality parameters.

Appendix B3 – Solid and liquid waste management plan

Springfield Feedlot

Draft Operation Solid and Liquid Waste Management Plan

"Springfield"
2513 Getta Getta Road
North Star NSW 2408

Doolin Farming Pty Ltd
"Glenhoma"
3202 Getta Getta Road
NORTH STAR NSW 2408

[February 2025]

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V1R1	Doolin Farming Pty Ltd	Electronic	-
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Disclaimer

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1 Background

1.1 Introduction

Doolin Farming Pty Ltd own and operate a 10,000 ha mixed farming operation across several properties at North Star including “Glenhoma”, “Glenmodel”, “Springfield”, “Myall Downs” and “Yetman West” some 27 km east of Yetman and 45 km south-southeast of Goondiwindi (QLD) in NSW.

Doolin Farming Pty Ltd primarily engage in dryland and irrigated cropping and beef production. Doolin Farming Pty Ltd produces wheat, barley, oats and chickpeas in winter and cotton and maize in summer under pivot irrigation systems and dryland sorghum cropping.

Central to the beef production enterprise is the breeding, growing and lot-feeding of cattle for the domestic market. The beef supply chain includes breeding and growing of beef cattle on land less suitable for dryland and irrigated cropping and grazing of stubble and lot feeding of cattle within a feedlot on the property ‘Springfield”.

“Springfield” comprises some 1,713 ha (~4,231 acres) and currently, a dryland and irrigated cropping business is undertaken on a large proportion of the property with extensive cattle breeding and grazing of beef cattle on the remaining land which is unsuitable for cropping and lot feeding of cattle within a beef cattle feedlot in the north-east of the property.

The feedlot is known as Springfield Feedlot and operates for 12 months of the year and employs approximately 4 full time staff. Casual staff and contractors are engaged as required during busy periods such as planting and harvesting of silage and fodder and to supply various associated services such as plant maintenance and veterinary requirements.

Springfield Feedlot includes one controlled drainage area with associated production pens and drainage system which includes catch drains, sedimentation basin and holding pond. Springfield Feedlot also has auxiliary infrastructure to support the use such as cattle handling and feed storage and processing facilities.

Springfield Feedlot is accredited under the National Feedlot Accreditation Scheme (NFAS) with audits conducted annually.

1.2 Environmental management systems overview

The overall Environmental Management System for the Project is described in the Operation Environmental Management Plan (OEMP).

The Operation Solid and Liquid Waste Management Plan (OSLWMP or Plan) is part of Doolin Farming Pty Ltd’s environmental management framework for the Project, as described in section 4.2 of the OEMP. Management measures identified in this Plan will be incorporated into site or activity specific Environmental Standard Work Instruction (ESWIs).

ESWIs will be developed and signed off by Feedlot Manager or environment management representatives prior to associated works and operation personnel will be required to undertake works in accordance with the identified mitigation and management measures.

Used together, the OEMP, strategies, procedures and ESWIs form management guides that clearly identify required environmental management actions for reference by Doolin Farming Pty Ltd's personnel and contractors.

The review and document control processes for this Plan are described in Chapter 10 of the OEMP.

2 Purpose, scope, and objectives

2.1 Purpose

This Operation Solid and Liquid Waste Management Plan (OSLWMP or Plan) forms part of the Operation Environmental Management Plan (OEMP) for the Springfield Feedlot (the Project).

This Plan has been prepared to address the Department of Planning and Environment (DPIE), Gwydir Shire Council (GSC) and the NSW Environment Protection Authority (NSWEPA) requirements of the Conditions of Approval (CoA) and the mitigation measures listed in the Springfield Feedlot EIS (RDC Engineers Pty Ltd, 2025) and all applicable legislation.

The Project has not commenced operation. This Plan will be reviewed and updated once operations commence.

2.2 Scope

This Operation Solid and Liquid Waste Management Plan (OSLWMP) describes how Doolin Farming Pty Ltd will manage solid and liquid waste during operation of the Project.

Waste streams identified to be generated during the operations phase are outlined in Table 1.

Table 1 – Operations phase solid and liquid waste streams

Waste Type	Typical streams	Classification	Proposed Reuse/Recycling /Disposal Method
Solid			
	Tyres	Special waste	On-site reuse e.g., silage cover weight. Any surplus will be sent to an off-site recycler.
	Batteries	Hazardous waste	Off-site disposal at an approved facility
	Drained oil filters, oil drums and other drums	General solid waste (non-putrescible)	Off-site recycling
	Oil rags, oil-absorbent materials	General solid waste (non-putrescible)	Off-site disposal at an approved facility
	Animal wastes (manure/carcasses/spoilt feed)	General solid waste (putrescible)	Beneficial reuse on-site to designated land areas
	Domestic waste generated by workers	General solid waste (putrescible)	Beneficial reuse on-site to designated land areas
	Glass bottles and aluminium cans	General solid waste (non-putrescible)	Off-site recycling
	Paper, plastic and cardboard	General solid waste (non-putrescible)	Off-site recycling
Liquid			
	Wastewater from controlled drainage area	Effluent	Beneficial reuse on-site to designated land areas
	Sewage	Sewage	On-site disposal via approved treatment and disposal.
	Used motor oils, grease	Liquid waste	Off-site disposal at an approved facility

2.3 Objectives

The key objective of this Plan is to ensure that impacts on the environment from solid and liquid waste are minimised and within the scope permitted by the CoA.

To achieve this objective, Doolin Farming Pty Ltd will:

- ensuring all CoA and Doolin Farming Pty Ltd Operation Policies and Standards are met in relation to solid waste management;
- ensure appropriate controls and procedures are implemented during operation activities to avoid or minimise environmental impacts from solid and liquid waste and potential adverse impacts to sensitive receivers within the vicinity of the Project;
- ensure appropriate measures are implemented to comply with all relevant legislation and other requirements as described in section 3 of this Plan;
- implementing applicable best practice management to minimise the impact of solid waste utilisation from facility operations on the environment and nearby sensitive receivers;
- identifying and implementing reasonable and feasible measures to minimise the release of contaminants in solid and liquid waste to groundwater and surface waters; and
- maintaining an effective response mechanism to deal with incidents and complaints.

3 Legislative and other requirements

3.1 Legal requirements

Legislation relevant to waste management includes:

- Environmental Planning and Assessment Act 1979 (EP&A Act);
- Protection of the Environment Operations Act 1997 (POEO Act);
- Waste Avoidance and Resource Recovery Act 2001 No 58;
- Protection of the Environment Operations Amendment (Illegal Waste Disposal) Act 2013 No 60;
- Protection of the Environment Operations (Waste) Regulation 2014;
- Local Government (General) Regulation 2005.

Relevant provisions of the above legislation are explained in the register of legal and other requirements included in Appendix A1 of the OEMP.

3.2 Guidelines and standards

The main guidelines, specifications and policy documents relevant to this Plan are outlined in Table 2.

Table 2 – Relevant guidelines and standards

Guideline/Standard	Relevance
Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC and ARMCANZ 2000)	Provides a framework for recognising and protecting water quality for the full range of existing environmental values.
AS 4454 –2012 - Australian Standard for Composts, Soil Conditioners and Mulches Standards Association of Australia, Sydney	This Standard specifies physical, chemical, biological and labelling requirements for composts, mulches, soil conditioners and related products that have been derived largely from compostable organic materials and which meet the minimum requirements as set out in this Standard.
Department of Environment and Conservation (NSW), 2004, Effluent Guidelines, Use of Effluent by Irrigation	Provides guidelines for planning, designing, installing, operating and monitoring effluent irrigation systems to diminish risks to public health, the environment and agricultural resources and outlines the statutory requirements that may be needed for an effluent irrigation system in NSW.
International Erosion and Sediment Control (IECA) (Australasia) 2008. Best practice erosion and sediment control. International Erosion Control Association (Australasia), Picton, NSW.	Provides guidance for the design, construction and implementation of measures to improve stormwater management, soil erosion risks and sediment control from disturbed sites.
Landcom, 2004, The Blue Book – Managing Urban Stormwater: Soils and Construction Volume 1, 4th Edition, March 2004 (reprinted 2006) (the "Blue Book"). Volume 1 and Volume 2.	Provides guidance for the design, construction and implementation of measures to improve stormwater management, soil erosion risks and sediment control from disturbed sites.
NSW Department of Primary Industries, 2004, Landform and soil requirements for biosolids and effluent reuse, Agnote DPI-493, NSW Government.	Outlines the landform and soil physical and chemical characteristic requirements for the reuse of biosolids and effluent.
McGahan EJ and Tucker RW, 2003, Resource manual of development of Indicators of sustainability for effluent reuse in the intensive livestock industries: Piggeries and Cattle Feedlots, Project No 1816, Australian Pork Limited, Canberra, Australia, May 2003.	Provides readily available data and analysis techniques for evaluating the sustainability of effluent and solid by-product reuse for piggeries and cattle feedlots and suggested sustainability indicators for these intensive livestock industries.
Meat and Livestock Australia, 2012a, National Beef Cattle Feedlot Environmental Code of Practice 2nd Edition, Meat & Livestock Australia, North Sydney, NSW.	The *Code* is designed to be a companion document to the *National Guidelines for Beef Cattle Feedlots in Australia*. The *Code* is intended to provide requirements for the environmentally relevant aspects of the establishment and operation of beef cattle feedlots.
MLA, 2012b, National Guidelines for Beef Cattle Feedlots in Australia 3rd Edition, Meat & Livestock Australia, North Sydney, NSW	The *National Guidelines for Beef Cattle Feedlots in Australia* is designed to provide 'guidance' on how the *Code* requirements regarding the establishment and operation of beef cattle feedlots may be achieved
Meat and Livestock Australia, 2015a, Beef Cattle Feedlots: Design and Construction, Meat and Livestock Australia, North Sydney, NSW.	This manual outlines the stages of selecting a suitable site, designing the feedlot and its facilities, their construction and the overall management of the project.

Meat and Livestock Australia, 2015b, Beef cattle feedlots: waste management and utilisation, Meat and Livestock Australia, North Sydney, NSW.	This manual provides best-practice guidelines for waste management in beef cattle feedlots.
Redding, MR (2003), Sampling Manual for environmental monitoring by intensive livestock industries. Agency for Food and Fibre Sciences, Department of Primary Industries, Toowoomba, Queensland.	This manual sets out the sample collection and preparation techniques needed to fulfil the monitoring requirements of intensive livestock licences (under the QLD EP Act) for soil, effluent, manure, sludge, surface water and groundwater samples.
Rayment, G.E. and Lyons, D.J. (2010). Soil Chemical Methods -Australasia, CSIRO Publishing, ISBN: 9780643067684.	This handbook describes laboratory and field chemical tests and guidance on soil sampling and choice and application of analytical methods from soil sampling through to the reporting of results.

3.3 Conditions of approval

The CoA relevant to this Plan are listed in Table 3. A cross reference is also included to indicate where the condition is addressed in this Plan or other Project management documents.

Table 3 – Conditions of Approval relevant to this plan

CoA	Condition requirements	Plan reference
Notice of Determination		
	To be completed after Notice of Determination is issued	
EPL		
	To be completed after EPL is issued	

4 Waste management strategy

All waste generated during operation and maintenance of the site shall be dealt with in an environmentally sensitive manner and in accordance with relevant legislation. Waste management shall consider the waste hierarchy of reduction, reuse and recycling of wastes prior to disposal.

Where activities are likely to generate waste, appropriate procedures shall be implemented to ensure responsible disposal of waste is undertaken or, where possible, appropriate recycling of waste. Likely and expected waste streams for the site include putrescible and non-putrescible general solid waste as outlined in Table 1.

4.1 Waste streams

Waste streams identified to be generated during the operation phase of the Project are outlined in Table 1. Waste streams shall be identified in accordance with NSW Environment Protection Authority (EPA) Waste Classification Guidelines (NSW EPA, 2014).

4.2 Waste management hierarchy

Waste management shall be accomplished through hierarchical application of the practices of source reduction, re-use, recycling/recovery, treatment and responsible disposal. Elements of these practices are detailed below.

Reduction at source: Eliminate or decrease where practicable, the volume, concentration, or toxicity of a waste stream through:

- Process optimisation and proper maintenance;
- Substitution;
- Material elimination;
- Management and control of inventories; and
- Improved housekeeping.

Where wastes cannot be reduced at source, the next preferred waste stream options are reuse or recycle/recovery if they are correctly segregated.

Re-use: Use materials or products more than once, in their original form.

Recycle/Recovery: Convert wastes into usable materials and/or extract energy or materials from wastes

The least preferred waste management options are treatment and responsible disposal.

Treatment: destroy, detoxify, and/or neutralise residues through processing.

Responsible disposal: Use appropriate methods to responsibly dispose of any waste streams that remain after all practicable source reduction, re-use, recycle/recovery and treatment options have been implemented

4.3 Waste management processes

Figure 1 broadly summarises the stages of waste management for the Project associated with the scope of this Plan. For further detail on individual waste streams and treatment methods refer to section 4.4.

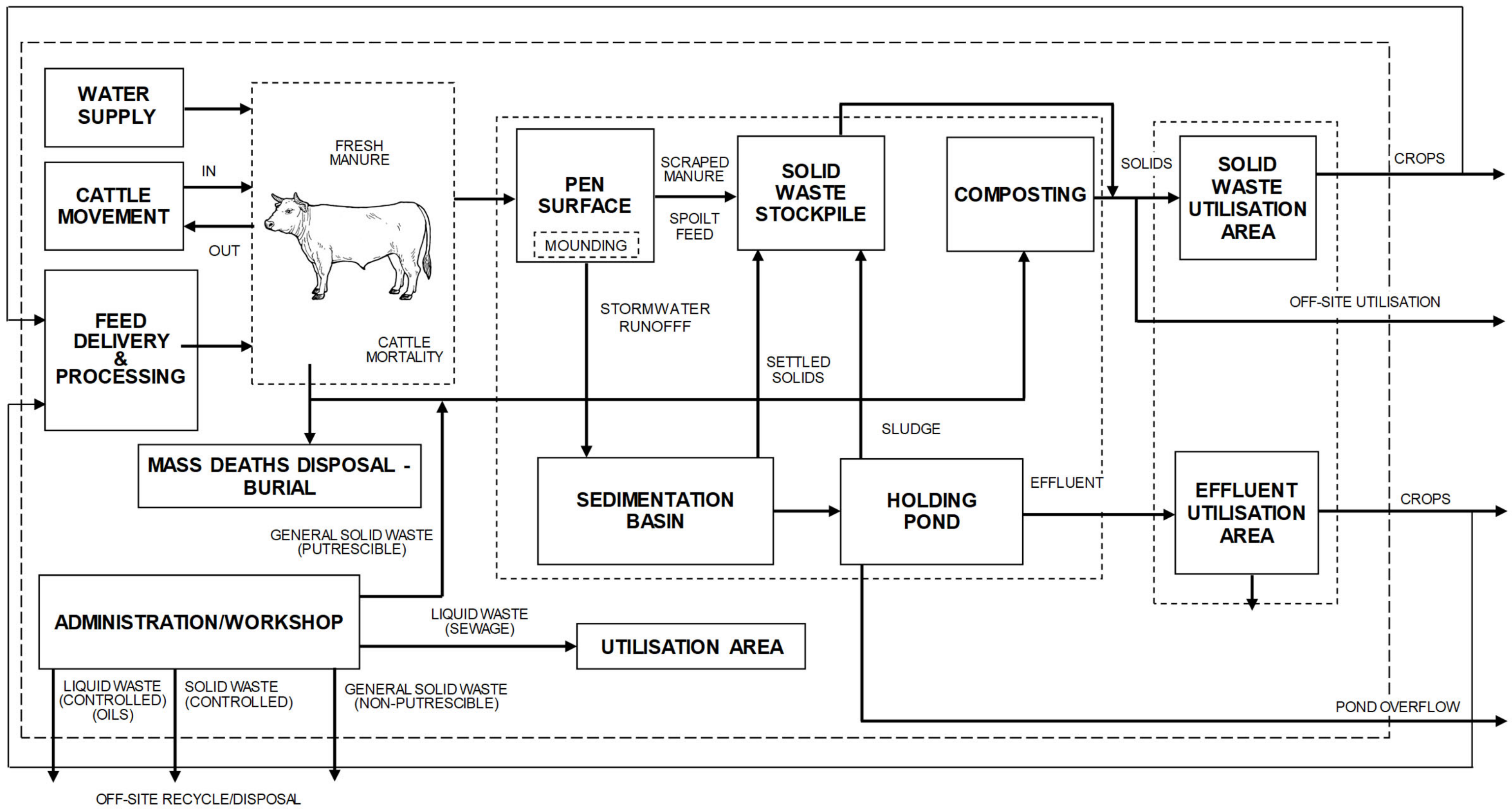

Figure 1 – Waste management process summary

4.4 Waste management facilities and activities

4.4.1 Overview

The following waste management facilities will be provided on-site for the storage, treatment, and utilisation of wastes from the Project. Waste management and monitoring requirements for these facilities are detailed in section 6.2.

4.4.2 Waste storage and handling

4.4.2.1 General

The principal waste management activity for the Project will be storage and handling of generated solid (putrescible) waste from manure and composted mortalities, prior to utilisation on the Project site.

Waste storage facilities on the Project site will be appropriate in size for the expected volumes of waste. The location of waste storage and handling facilities at the site are shown on Figure 2.

The following storage and handling facilities shall be used:

- solid waste storage areas – manure/carcass compost/spoilt feed, general waste etc.
- liquid waste storage areas – sewage, waste oils etc.

LEGEND

- SUBJECT LAND BOUNDARY
- LAND PARCEL BOUNDARY

NOTES:

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REV.	DATE	REVISION DESCRIPTION	DRAWN	CHECK	APPROVED
A	24/01/25	DRAFT ISSUE TO CLIENT	RJD	RJD	RJD
B	21/02/25	FINAL ISSUE FOR SUBMISSION TO GSC	RJD	RJD	RJD

SCALE	1:3,000 (A3)
DRAWN	RJD
DATE	21/02/2025
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DATE	21/02/2025
APPROVED	RJD
DATE	21/02/2025

CLIENT DOOLIN FARMING PTY LTD

PROJECT SPRINGFIELD BEEF CATTLE FEEDLOT

TITLE DRAFT OPERATION SOLID AND LIQUID WASTE MANAGEMENT PLAN
PROJECT SITE - WASTE STORAGE AND HANDLING FACILITIES LOCATION

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 2		A3	E2-103-450-02	B

4.4.3 Waste treatment

Domestic greywater and blackwater (sewage) will be treated via an on-site domestic wastewater treatment plant (WWTP). Sewage will be treated to ensure that it meets the required specifications for on-site application to land.

Solid waste shall be stockpiled in the solid waste storage and processing area within the controlled drainage area. Solid waste shall be stockpiled and passively composted pending application to the land within the solid waste utilisation area.

Effluent will be temporarily stored in the holding pond pending application to the land within the effluent utilisation area. Effluent shall be pre-treated through a passive sedimentation system where the majority of suspended solids shall settle. After drying the settled solids shall be removed from the sedimentation basin and added to the solid waste stockpiles in the solid waste stockpile and carcass composting area.

4.4.4 Waste removal

Solid and liquid waste streams that are not re-used, recycled or utilised on-site as described in sections 4.4.2 and 4.4.3 will be sent to approved facilities for recycling, treatment, or disposal.

Section 143 of the *POEO 1997* requires waste to be transported to a place that can lawfully accept it. Any waste sent to landfill will only be disposed of to a relevant licensed facility.

Additionally, all transport and disposal of ‘controlled’ or ‘trackable’ wastes will be undertaken in compliance with the *POEO 1997.*

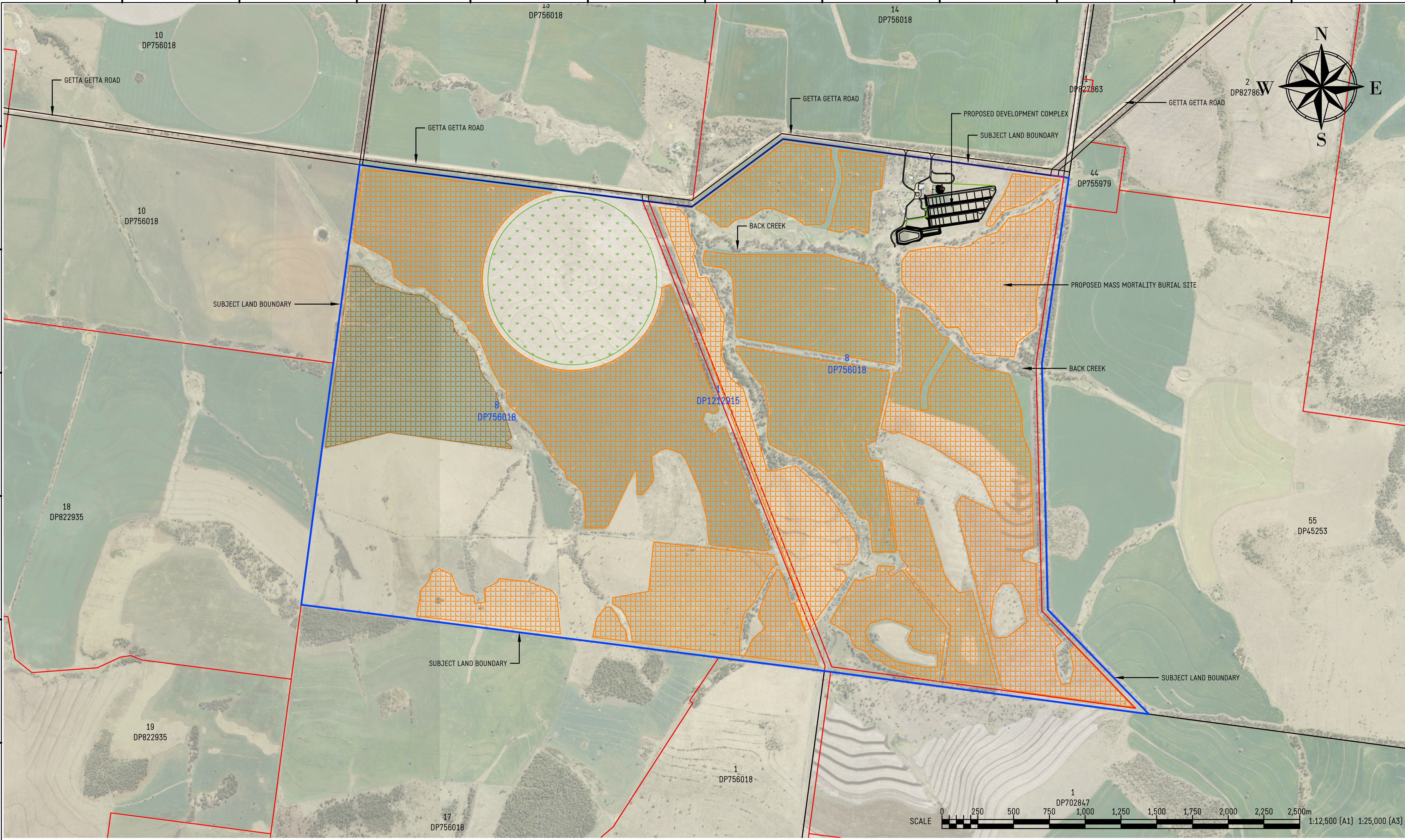
4.4.5 Waste utilisation

Animal solid waste and effluent is valued as a source of nutrients for fertilising crops or pasture and therefore, shall be applied to land where it can be sustainably utilised by crops, pasture and soil. Land is required for the long term application of water, nutrients, salts and organic loads in the effluent and solid wastes.

The solid waste and effluent utilisation areas have been selected and sized to be ecologically sustainable to prevent environmental harm, especially to soils, groundwater and surface water.

The effluent utilisation system is a full utilisation system. In this system, the effluent is fully used (thereby no discharge to surface water), with the area required for irrigation determined by calculating the limiting land area using a water and nutrient balance.

The solid waste and effluent utilisation areas are shown in Figure 3.



LEGEND

- SUBJECT LAND BOUNDARY
- LAND PARCEL BOUNDARY
- PROPOSED EFFLUENT UTILISATION AREA
- PROPOSED SOLID WASTE UTILISATION AREA

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DATE	21/02/2025

CLIENT: DOOLIN FARMING PTY LTD

PROJECT: SPRINGFIELD BEEF CATTLE FEEDLOT

TITLE: DRAFT OPERATION AND ENVIRONMENTAL MANAGEMENT PLAN
PROJECT SITE - EFFLUENT AND SOLID WASTE UTILISATION AREA

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 3		A3	E2-103-450-03	B

DATE PLOTTED: 19 February 2025 BY : RDC Engineers PTY LTD
FILE PATH: C:\RDC Engineers\RDCE - Projects\E2-103 Doolin Farming Springfield EIS\05 - ACAD MasterPlan\05.1 Drawings - CURRENT FILE NAME: E2-103 DF Springfield MASTERPLAN-00-20250108vB.dwg

4.5 Aspects and impacts

4.5.1 Risk analysis

A risk management approach was used to determine the severity and likelihood of the operation's solid waste management on the environment and to prioritise its significance. This process considered potential regulatory and legal risks as well as the concerns of the community and other key stakeholders.

The objectives of the risk assessment were to:

- Identify activities, events or outcomes that have the potential to adversely affect the local environment and/or human health/property;
- Qualitatively evaluate and categorise each risk item;
- Assess whether risk issues can be managed by environmental protection measures; and
- Qualitatively evaluate residual risk with implementation of measures.

Appendix A3 of the OEMP contains a list of aspects upon which solid waste management may impact and corresponding risks associated with the Project. Measures to mitigate the identified environmental risks are also provided.

4.6 Operation activities

4.6.1 Solid waste management

Key aspects of solid waste management that could result in environmental impacts include:

- poor maintenance and management of the low-permeability barrier (e.g., clay lining) in the controlled drainage area resulting in contamination of groundwater and/or surface water;
- poor management (storage and handling) of non-putrescible solid waste on-site leading to uncontrolled releases of contaminants (batteries, tyres, oil rags/drums, paper, bottles);
- poor management of timing of sludge removal from the holding pond leading to air quality (odour) impacts;
- animal solid waste applied to land other than the nominated solid waste utilisation area;
- land application of animal solid waste at rates exceeding the ability of the soils and crops to sustainably utilise applied nutrients, salts and organic matter; and

- poorly timed and managed animal solid waste application practices resulting in air quality (odour and aerosol) impacts to sensitive receivers.

4.6.2 Liquid waste management

Key aspects of liquid waste management that could result in environmental impacts include:

- poor maintenance and management of the low-permeability barrier (e.g., clay lining) in the controlled drainage area resulting in contamination of groundwater and/or surface water;
- poor maintenance and repair of effluent storage infrastructure and pumping and distribution equipment leading to uncontrolled releases of contaminants (including domestic sewage infrastructure);
- poor management of timing of irrigation events and/or sludge accumulation leading to uncontrolled releases of effluent and/or air quality (odour) impacts;
- effluent applied to land other than the nominated effluent utilisation area;
- land application of effluent at rates exceeding the ability of the soils and crops to sustainably utilise applied nutrients, salts and organic matter;
- poorly timed and managed effluent application practices resulting in air quality (odour and aerosol) impacts to sensitive receivers; and
- land application of effluent at rates exceeding the hydraulic capacity of the soils leading to ponding on the soil surface and/or runoff from the utilisation areas to drainage lines or watercourses.

4.7 Factors likely to affect solid and liquid waste management and impacts

In addition to the inherent risks of specific operation activities creating potential environmental impacts from solid waste management, a number of other environment factors also influence the management of solid waste. These include:

- Wind direction – determines whether solid waste particles, liquid waste aerosols or odours are transported in the direction of the sensitive receivers;
- Wind speed – governs the potential suspension and drift resistance of particles;
- Soil type – physical and chemical properties govern the uptake of nutrients, leaching of contaminants;
- Soil moisture – increased soil moisture reduces soil or dust erosion potential;
- Temperature – governs the growth rates of crops;
- Rainfall (intensity, frequency, duration)/ flooding – extended periods of rainfall increase the risk of overtopping of liquid waste storages, deep drainage of nutrients within utilisation areas, offsite movement of contaminants, failure of low permeability

barrier underlying pen surfaces, failure of crops and reduces dust from solid waste stockpiles/spreading.

4.7.1 Impacts

The potential for environmental impacts will depend on several factors. Primarily impacts will be dependent on the nature, extent and magnitude of operation activities and their interaction with the natural environment. Potential impacts attributable to operation might include:

- Excessive waste being directed to landfill;
- Various wastes being inappropriately disposed or handled on-site resulting in possible contamination of land, groundwater or surface water;
- Aesthetic effects that arise from visible airborne dust plumes and from deposits of dust on surfaces;
- Potential adverse health effects including eye, nose and throat irritation from excessive inhalation of fine particles, nitrogenous aerosols;
- Runoff of solid waste to the surface water, resulting in a reduction of water quality;
- Contaminants from solid waste leaching into the groundwater, resulting in a reduction of water quality;
- Impacts to flora and fauna from improper storage, handling and utilisation of solid waste;
- Complaints from the public relating to odours from solid waste management; and
- Dust deposition impacts on residential sensitive receivers, including impacts on living areas, swimming pools and general amenities.

Some impacts from solid and liquid waste management are anticipated and have been described in the Project's Environmental Impact Statement (RDC Engineers Pty Ltd, 2024).

Section 4.5 provides a suite of mitigation measures that will be implemented to avoid or minimise environmental impacts from liquid waste management.

4.8 Mitigation measures

Table 4 describes the solid waste mitigation measures due to Project operations and summarises the responsibilities that have been documented within this Plan.

Table 4 – Solid and liquid waste management and mitigation measures

Source	Mitigation measure	Responsibility	Timing	Reference
General				
	Training will be provided to all Project personnel, including relevant sub-contractors on solid and liquid waste management practices and the requirements from this plan through inductions and targeted training.	Feedlot Manager /Farm Manager	Operation - Induction	OEMP
	An environmental specialist will be engaged and consulted throughout operation to provide advice on solid and liquid waste management.	Feedlot Manager	Operation - As required	Best practice
	An EPL will be obtained for the Project. All relevant conditions relating to solid and liquid waste management will be implemented as required by the EPL.	Feedlot Manager	Prior to Operation	*POEO Act 1997,* CoA
	Develop waste management strategies for each waste stream based on the waste management hierarchy (see section 4.2).	Feedlot Manager	Operation	*POEO Act 1997,* CoA
	Ensure worksites are kept free of litter and that any litter is cleaned up immediately.	Feedlot Manager / Feedmill Supervisor / Farm Manager	Operation	*POEO Act 1997,* CoA
	Manage controlled wastes as required by the *POEO Act 1997.*	Feedlot Manager	Operation	*POEO Act 1997,* CoA
Procedures and Plans				
	Procedures will be prepared and implemented for solid and liquid waste management to manage any adverse environmental impacts. Refer Appendix A.	Feedlot Manager	Operation - As required	CoA, Best practice
	Pollution Incident Management Response plan (PIMRP) will be prepared and implemented for the on-site application of effluent to land.	Feedlot Manager	Operation - As required	CoA, *POEO Act 1997*
	An emergency spill response plan will be developed. This plan will detail measures for the prevention, containment and clean-up of accidental spills of solid and liquid wastes.	Feedlot Manager	Operation	OEMP
Storage and Handling – Controlled / General solid waste (non-putrescible) / General liquid waste (non-putrescible)				
	Comply with applicable regulatory requirements and standards regarding the design and operation of all solid and liquid waste storage areas.	Feedlot Manager	Operation	*POEO Act 1997, CoA*

	Quantities of waste stored onsite will be kept to a minimum. Maximum volume of each waste stored will be consistent with regulations and guidelines.	Feedlot Manager/ Farm Manager	Operation	*POEO Act 1997, CoA*
	Segregate all waste streams at source, where practicable.	Feedlot Manager / Operation Manager / Farm Manager	Operation – ongoing	Best practice
	Store all solid and liquid waste in appropriately designed and clearly labelled receptacles.	Feedlot Manager	Operation	Best practice
	Securely store hazardous waste within contained storage areas with closed drainage systems.	Feedlot Manager / Feedmill Supervisor / Farm Manager	Operation	*POEO Act 1997, CoA*
	Separate combustible waste from ignition sources to minimise fire hazards.	Feedlot Manager / Farm Manager	Operation	OEMP, Best practice
	Ensure that only compatible wastes are stored together	Feedlot Manager / Feedmill Supervisor / Farm Manager	Operation	OEMP, Best practice
	Locate spill kits at hazardous liquid waste storage areas.	Feedlot Manager / Feedmill Supervisor / Farm Manager	Operation	OEMP, Best practice
	All waste oils, chemicals, toxic substances and combustible liquids associated with operation will be stored in roofed and bunded areas. Spill kits will be provided at all chemical storage facilities.	Feedlot Manager / Feedmill Supervisor / Farm Manager	Operation	Best practice
Storage and Handling – General solid waste (putrescible) / General liquid waste (putrescible)				
	Comply with applicable regulatory requirements and standards regarding the design and operation of all solid and liquid waste storage areas.	Feedlot Manager	Operation	OEMP, Best practice
	Solid waste will be stored in designated solid waste stockpile/carcass composting area in accordance with relevant guidelines.	Feedlot Manager	Operation	CoA, Best practice

Cover or close putrescible waste receptacles that may present an issue for fauna attraction and rainfall.	Feedlot Manager/ Feedmill Supervisor	Operation – Repairs and maintenance	Environmental Management System, Best practice
Regular removal of accumulated manure from pens, under fence-lines, cattle lanes and drains in accordance with Class 1 specifications.	Maintenance Supervisor	Operation	CoA, Environmental Management System, Best practice
Manure will be scraped from the pen surface by a suitably trained employee, ensuring not to disturb the interface layer or the low-permeability barrier.	Maintenance Supervisor	Operation	Environmental Management System, Best practice
Under-fence cleaning will be undertaken on an as required basis not exceeding 4 weeks or as soon as practically possible after accumulated manure obstructs pen drainage.	Maintenance Supervisor	Operation	Environmental Management System, Best practice
Material is removed from any pot holes and gravel/clay placed and compacted in and around the affected areas.	Maintenance Supervisor	Operation	Environmental Management System, Best practice
Manure is removed to the solid waste stockpile area located within the controlled drainage area.	Maintenance Supervisor	Operation	CoA, Environmental Management System, Best practice
Spoilt or wet feed is removed from the feed bunks using a shovel on a daily basis. The material is thrown into the pen area and removed during pen cleaning.	Maintenance Supervisor	Operation	Environmental Management System, Best practice
Manure stockpiles are to be constructed with the long axes perpendicular to the contours within the stockpile to ensure free drainage.	Maintenance Supervisor	Operation	Environmental Management System, Best practice
Silage, solid (manure, spoilt feed, mortalities) and effluent storage shall be located within the controlled drainage area.	Maintenance Supervisor / Feedmill Manager	Operation	CoA, Environmental Management System, Best practice
The low-permeability barrier shall be checked after removal of manure to ensure its structure and integrity has not been damaged or compromised and ongoing compliance with specified design criteria. Any damage to the barrier will be repaired.	Maintenance Supervisor	Operation	CoA, Environmental Management System, Best practice

	Pen areas, cattle lanes/drains will be maintained and shaped with an even gradient to facilitate drainage.	Maintenance Supervisor	Operation	Environmental Management System, Best practice
	All carcasses from normal mortality losses are taken to the solid waste stockpile and carcass compost area on the day of death if practical.	Maintenance Supervisor	Operation	Environmental Management System, Best practice
	Wet manure or sludge will not be placed in the main stockpile until it is sufficiently dry.	Maintenance Supervisor	Operation	Environmental Management System, Best practice
	The carcass is placed on a straw or sawdust bed and covered with at least 500 mm of manure on all sides.	Maintenance Supervisor	Operation	Environmental Management System, Best practice
	The carcass windrow shall be no more than two levels of carcasses high. The second level of carcasses shall be placed on top of 50 mm of manure covering the first level of carcasses and covered with at least 500 mm of manure.	Maintenance Supervisor	Operation	Environmental Management System, Best practice
	Carcass compost windrows shall be periodically inspected, and any exposed carcasses recovered to facilitate the composting process.	Maintenance Supervisor	Operation	Environmental Management System, Best practice
	The carcass composting area shall be monitored from scavenging animals.	Maintenance Supervisor	Operation	Environmental Management System, Best practice
	If mass mortalities are suspected to be caused by an emergency/infectious disease AUSVETPLAN procedures shall be implemented and disposal managed under the AUSVETPLAN.	Maintenance Supervisor	Operation	Environmental Management System, Best practice
	A suitable site for mass burial of mortalities shall be identified and established on the subject property in low permeability soils on a site well removed from surface waters, drainage lines, gullies, groundwater bores and the Project complex.	Maintenance Supervisor	Operation	Environmental Management System, Best practice
	After rainfall, the solid waste storage and carcass compost area shall be checked to ensure no runoff is retained and that no pooling of liquid waste occurs. When conditions permit, re-configure the stockpile if free drainage is not occurring.	Maintenance Supervisor	Operation	Environmental Management System, Best practice

	The sedimentation basin and holding pond will be inspected at regular intervals and following rainfall events to assess available water storage capacity, water quality, structural integrity and solids levels.	Maintenance Supervisor / Farm Manager	Operation	Environmental Management System, Best practice
	The low-permeability barrier shall be checked after removal of settled solids to ensure its structure and integrity has not been damaged or compromised and ongoing compliance with specified design criteria. Any damage to the low-permeability barrier will be repaired before wastewater is reintroduced into the sedimentation basin/holding pond.	Maintenance Supervisor	Operation	Environmental Management System, Best practice
	All inlet and outlet pipework, structures and pumps shall be checked regularly to ensure adequate functioning, e.g., flow rates, leaks.	Maintenance Supervisor / Farm Manager	Operation	Environmental Management System, Best practice
	Solid waste from the sedimentation basin will be removed to the solid waste / carcass composting area and sustainably applied to land within the solid waste utilisation area.	Maintenance Supervisor / Farm Manager	Operation	CoA, Environmental Management System, Best practice
	The floor of the sedimentation basin will be maintained and shaped with a smooth, even gradient to the outlet weir to facilitate drainage.	Maintenance Supervisor	Operation	Environmental Management System, Best practice
	The sedimentation basin outlet weir shall be regularly cleaned by removing, cleaning and then replacing timber slats to retain efficacy.	Maintenance Supervisor	Operation	Environmental Management System, Best practice
	Effluent from the holding pond will be sustainably applied to land within the effluent utilisation area.	Feedlot Manager / Farm Manager	Operation	CoA, Environmental Management System, Best practice
	The holding pond shall be kept at a low level. At the start of the May (winter rainfall period), the holding pond shall be pumped out in readiness for anticipated inflows, although at least 500 mm of effluent shall be retained in the pond to maintain its biological function. Irrigation will reduce the volume of effluent in the pond, thereby maximising the capacity available to store further inflows while reducing the risk of pond spills.	Farm Manager	Operation	CoA, Environmental Management System, Best practice
	If the holding pond fills during wet weather and an overflow is imminent or spills, it is generally preferable to irrigate effluent onto a wet effluent utilisation area rather than allow the pond to further spill. Irrigation will assist in dispersing the effluent over a large area and provide a greater opportunity for filtering by vegetation and dilution from stormwater.	Farm Manager	Operation	CoA, Environmental Management System, Best practice

	At least 500 mm of effluent shall be retained in the holding pond after irrigation to maintain its biological function. When effluent accumulates to be within 1500 mm of the embankment crest, irrigations shall be planned, and the storage level decreased. The water level should not come within 500 mm of the bywash level as far as practical.	Farm Manager	Operation	Environmental Management System, Best practice
	As an emergency procedure, if extended wet periods prevent emptying of the holding pond, then off - site disposal to local farms or a waste facility capable of accepting effluent of this nature may be initiated as required.	Farm Manager	Operation	Environmental Management System, Best practice
	The sludge level within the holding pond shall be monitored and the holding pond de-sludged once the accumulated sludge takes up a maximum of 10% of the design capacity of the holding pond.	Farm Manager	Operation	Environmental Management System, Best practice
	Design discharge events from the holding pond shall be directed to a natural grassed discharge area. This grassed area shall filter and disperse the effluent whilst allowing some infiltration. As the design discharge events are at a frequency of one in 10 years the concentration of nutrients shall be sustainably adsorbed and utilised by vegetation in between events.	Farm Manager	Operation	CoA, Environmental Management System, Best practice
	The domestic liquid waste (sewage) system shall be regularly inspected for potential spills and overflows of untreated wastewater.	Maintenance Supervisor / Feedmill Supervisor	Operation	CoA, Environmental Management System, Best practice
Recycling/Reuse or Disposal on-site				
	Solid waste (animal) and effluent only applied to designated solid waste and effluent utilisation areas.	Feedlot Manager / Farm Manager	Operation	CoA, Environmental Management System, Best practice
	Solid waste and effluent are applied to utilisation areas at rates that avoid runoff and excessive leaching.	Farm Manager	Operation	CoA, Environmental Management System, Best practice
	The land application of solid waste and effluent is made at rates consistent with the ability of soils and crops grown in the on-site utilisation areas to sustainably utilise the applied nutrients, salts and organic matter, under the climatic conditions prevailing at the site.	Farm Manager	Operation	CoA, Environmental Management System, Best practice
	Vegetative buffers around drainage lines designed to help protect surface water are maintained in their intended condition.	Farm Manager	Operation	Environmental Management System, Best practice

	No on-site disposal or burying of waste relating to operations with the exception of unexpected mass deaths of beef cattle if required.	Feedlot Manager / Farm Manager	Operation	CoA, Environmental Management System, Best practice
	No on-site incineration of waste shall be undertaken.	Feedlot Manager / Farm Manager	Operation	Environmental Management System, Best practice
	Application rate of liquid waste is controlled to ensure that excessive ponding does not occur.	Farm Manager	Operation	Environmental Management System, Best practice
	The domestic liquid waste (sewage) system shall be regularly checked for potential spills and overflows of untreated wastewater.	Maintenance Supervisor / Feedmill supervisor	Operation	Environmental Management System, Best practice
Recycling/Reuse or Disposal (Off-site)				
	All solid waste that cannot be sustainable utilised on-site shall be taken off-site by an operator licensed to remove that waste and transported to a suitably licensed facility for recycling, reuse or disposal.	Feedlot Manager / Farm Manager	Operation	CoA, Environmental Management System, Best practice
	All solid waste to be transported off-site shall be assessed to determine whether the waste requires tracking under the Protection of the *Environment Operations (Waste) Regulation 2014.*	Feedlot Manager / Farm Manager	Operation	*POEO Act 1997*, Environmental Management System, Best practice
	All waste requiring tracking shall only be transported after all necessary documentation such as consignment authorisation and transport certificates have been obtained from the relevant authorities.	Feedlot Manager / Farm Manager	Operation	*POEO Act 1997*, Environmental Management System, Best practice
	All loads of waste removed from the site will be covered to prevent spillage.	Operations Manager	Operation	Environmental Management System, Best practice
Monitoring and Reporting				
	All solid waste and effluent monitoring requirements will be undertaken in accordance with the following guidelines: • Sampling Manual for environmental monitoring by intensive livestock industries. (Redding, MR, 2003)	Farm Manager	Operation – As-required	Sampling Manual for environmental monitoring by intensive livestock

				industries. (Redding, MR, 2003)
	Monitoring of solid waste and effluent will be undertaken in accordance with Licence requirements.	Farm Manager	Operation – As-required	CoA, Environmental Management System
	Records of solid waste and effluent management monitoring will be maintained. Details will include: • Date, time and location of each sample. • Solid waste and/or effluent quality test results for each sample. • The personnel undertaking the sampling.	Feedlot Manager	Operation – Event basis	CoA, Environmental Management System,
	Rainfall forecasts will be monitored daily and the site managed to minimise impacts from solid waste and effluent management from rainfall events.	Farm Manager	Operation – Daily	Environmental Management System, Best practice
	Ensure the solid waste and effluent management results are routinely analysed, assessed and reported in accordance with the conditions of the Licence.	Farm Manager	Operation – Annually	CoA, Environmental Management System
	Records or a material register shall be retained detailing the quantity, classification method of transport of waste material removed from the site. The register will record the waste type, quantity, classification, contractor, licence details and details of the licensed receiving facility.	Feedlot Manager	Operation – Annually	POEO Act 1997, CoA, Environmental Management System
	A 24-hour community response telephone line shall be maintained.	Feedlot Manager	Operation – Daily	Environmental Management System, *CoA*
	In the event of an air quality complaint, records shall be kept in the complaints register and investigations will be undertaken to confirm the source of the issue. Additional mitigation measures will be investigated and implemented. In the event of ongoing air quality issues, operational activities will be reviewed and, if necessary, the activity stopped until suitable measures can be employed to manage this issue.	Feedlot Manager	Operation – Event basis	Environmental Management System, CoA
	Pollution incidents posing material harm to the environment shall be notified to each 'relevant authority' as defined in section 148(8) of the *POEO Act 1997*.	Feedlot Manager	Operation – Event basis	Environmental Management System, POEO Act 1997, CoA
Review and Improvement				

	In line with the Complaints and Enquiries Procedure, following a complaint and its subsequent investigation, feedback regarding the source and nature of the complaint will be provided to the affected stakeholders and/or community members (section 7).	Feedlot Manager	Operation – Event basis	Environmental Management System, CoA

5 Implementation

5.1 Roles and Responsibilities

The organisational structure and overall roles and responsibilities of the Project team are outlined in section 7.3 of the OEMP. Specific responsibilities for the implementation of environmental controls are details in Table 4 of this Plan.

5.2 Induction

Doolin Farming Pty Ltd has a site induction program that all contractors and employees are required to complete prior to undertaking any work in accordance with section 9.1 of the OEMP.

5.3 Training

Doolin Farming Pty Ltd has a targeted training program for Project staff and contractors in accordance with section 9.2 of the OEMP.

Examples of training topics for employees and contractors with a key role in solid waste management include:

- Pen cleaning and stockpile management;
- Management of carcasses;
- Approved solid waste utilisation areas;
- Sustainable application rates for solid waste;
- Planning and preparedness for emergency/environment events; and
- Lessons learnt from incidents and other events e.g., high rainfall, mass mortalities.

5.4 Incident management

A comprehensive Incident Management System is currently implemented at the Project site as outlined in section 12 of the OEMP.

5.5 Complaints management

The investigation, response and reporting of complaints shall be undertaken in accordance with section 10.3.3 of the OEMP.

6 Performance Evaluation

6.1 Performance Indicators

The extent to which this Plan complies with CoA will be measured by the following performance indicators:

- Compliance with relevant baseline standards at monitoring locations;
- Minimisation of complaints relating to solid waste management such as air (odour) and water quality, as evidenced by trends in the frequency and extent of complaints;
- Compliance with this plan, as indicated by internal and statutory reporting.

6.2 Monitoring

Regular monitoring and inspections will be undertaken during operation in accordance with Table 5. The proposed number of monitoring locations, frequency of monitoring and relevant monitoring methods are detailed in the Operation Environmental Monitoring and Management Plan (OEMMP) in Appendix B5 of the OEMP.

Additional requirements and responsibilities in relation to inspections and monitoring are documented in sections 11.1 and 11.2 of the OEMP.

Table 5 – Solid and liquid waste – Monitoring details

Monitoring details	Location	Responsibility	Frequency	Record	KPI
Solid waste quality	Refer to OEMMP	Farm Manager	As outlined in OEMMP	Annual Return	No adverse impacts to soils
Mass of solid waste utilised on-site	Refer to OEMMP	Farm Manager	As outlined in OEMMP	Annual Return	No adverse impacts to soils and/or sensitive receivers
Mass of solid waste removed off-site	Refer to OEMMP	Farm Manager	As outlined in OEMMP	Annual Return	Sustainable accumulation of solid waste in solid waste storage and processing area
Volume of sludge accumulating in holding pond(s)	Refer to OEMMP	Farm Manager	As outlined in OEMMP	Annual Return	Wet weather storage capacity of holding pond is maintained
Effluent quality	Refer to OEMMP	Farm Manager	As outlined in OEMMP	Annual Return	No adverse impacts to soils
Effluent applied to utilisation area	Refer to OEMMP	Farm Manager	As outlined in OEMMP	Annual Return	No adverse impacts to soils, groundwater, surface water and/or sensitive receivers
Holding pond(s) overflow volume	Refer to OEMMP	Farm Manager	Each overflow event	Annual Return	No adverse impacts to surface water
Holding pond(s) overflow effluent quality	Refer to OEMMP	Farm Manager	As outlined in OEMMP	Annual Return	No adverse impacts to surface water

6.3 Reporting

Effluent and solid waste management reporting is designed to comply with the CoA and provide stakeholder access to relevant effluent and solid waste information and data.

Key stakeholders requiring access to this information include Doolin Farming Pty Ltd, state and local government agencies, and the local community. Reporting will be undertaken in accordance with section 9.4 of the OEMP. Annual reporting will be undertaken in accordance with CoA and the Annual Return requirements detailed in the EPL.

Doolin Farming Pty Ltd will report soil and water quality monitoring results in the Annual Return for the EPL.

The Annual Return will include an effluent and solid waste monitoring component covering the following items relating to effluent and solid waste management:

- Effluent and solid waste monitoring results and comparison with previous monitoring results;
- An explanation for any missing soil and liquid waste monitoring results;
- Effluent and/or solid waste management related complaints and management/mitigation measures undertaken;
- Management/mitigation measures undertaken in the event of any confirmed exceedance of performance criteria; and
- Review of the performance of management/mitigation measures and the monitoring program.

Doolin Farming Pty Ltd is required to report pollution incidents immediately and without delay in accordance with the requirements of the *POEO Act 1997*.

6.3.1 Nutrient Balance

To ensure the long-term sustainability of a solid waste utilisation area, a nutrient balance should be calculated regularly. Ideally, the amount of nutrients applied through solid waste should match the amount of nutrients removed by the crop. The two most important nutrients to consider are nitrogen and phosphorus. Once the monitoring results are known, the amounts of these nutrients applied and removed can be estimated quite easily. If different solid waste utilisation areas receive significantly different application rates, a separate nutrient balance should be calculated for each area. Also, for the nutrient balance concept to work, only the crop harvested from the fields which had solid waste applied should be included in the calculation (i.e., additional crop which may be cut from other areas should not be considered in the nutrient balance).

6.3.1.1 Nutrients applied

6.3.1.1.1 Nitrogen

6.3.1.1.1.1 Effluent

To estimate the mass of nitrogen proposed to be applied to the crop via irrigation, the following equation can be used:

Nitrogen applied (kg/ha) = Total Nitrogen (mg/L) – (Volatilistion loss % x Ammonia Nitrogen (mg/L)) x Volume irrigated (ML/ha)

where: Total Nitrogen (mg/L) and Ammonia Nitrogen (mg/L) are taken from the results of the effluent analysis for that period (Table 5); and

Volume irrigated (ML/ha) is measured from the irrigation records for that period (Table 5).

6.3.1.1.1.2 Solid waste

To calculate the mass of nitrogen proposed to be applied to the crop via solid waste, the following equation can be used:

Nitrogen applied (kg/ha) = Total Nitrogen (mg/kg) x Quantity applied (kg/ha)

where: Total Nitrogen (mg/kg) are taken from the results of the aged solid waste analysis for that period (Table 5); and

Quantity applied (kg/ha) is quantity of aged solid waste available from the solid waste stockpile proposed to be applied (Table 5).

6.3.1.1.2 Phosphorus

6.3.1.1.2.1 Effluent

The mass of phosphorus applied can be calculated by:

Phosphorus applied (kg/ha) = Total Phosphorus (mg/L) x Volume irrigated (ML/ha)

where: Total Phosphorus (mg/L) are taken from the results of the effluent analysis for that period (Table 5); and

Volume irrigated (ML/ha) is measured from the irrigation records for that period (Table 5).

6.3.1.1.2.2 Solid waste

The mass of phosphorus proposed to be applied to the crop via aged solid waste, the following equation can be used:

Phosphorus applied (kg/ha) = Phosphorus (mg/kg) x Quantity applied (kg/ha)

where: Total Nitrogen (mg/kg) are taken from the results of the aged solid waste analysis for that period (Table 5); and

Quantity applied (kg/ha) is quantity of aged solid waste available from the solid waste stockpile proposed to be applied. (Table 5).

Solid waste contains organic and inorganic phosphate compounds. The inorganic phosphorus is initially quite soluble and available; however, when it comes in contact with soil, various reactions begin to take place. The adsorbed phosphate and the newly formed compounds are only slowly available to plants.

NB These equations only work if the quantities are in the correct units.

6.3.1.2 Nutrients removed

To calculate the mass of nitrogen removed by the crop, the following equation can be used:

Mass of N removed (kg) = Plant nitrogen content (%) x Plant mass harvested (kg)

where: Plant Nitrogen Content (%) is the amount of nitrogen present in the harvested crop. For accurate determination of the nutrient balance, tissue analysis should be performed on the harvested crop. It is recommended that this be undertaken initially and if results appear to be consistent, then the average results can be used for future calculations. As a guide, typical values for the nutrient content of most crops range between 3-5% for nitrogen, and 0.2-0.4% for phosphorus.

Plant Mass Harvested (kg) can be calculated from the harvest records for that period e.g., if 20 bales of hay are harvested from the dryland or irrigated area, and each bale weighs around 250 kg, then the plant mass harvested is 5,000 kg (5 t). NB If the plant nutrient analysis is given on a dry matter basis, the plant yield harvested needs to be converted to a dry matter basis before performing this calculation.

6.3.1.3 Mass balance

The mass balance principle is to be adopted when determining appropriate application rates for effluent and solid waste.

The mass balance principle is:

Applied nutrient ≤ (Nutrient removed in crop + Nutrient safely stored in soil + Acceptable nutrient losses to external environment)

Acceptable nutrient losses to external environment include nitrogen gas to the air and safe soil storage (phosphorus storage in the root zone).

The mass balance is used to identify whether there is an excess or deficit of nutrients within each management unit of the waste utilisation area and shall be used for planning the management strategy for each individual unit.

The aim of calculating the nutrient balance is to ensure that the amount of nutrients applied over the long term closely matches the amount of nutrients removed.

Application rates shall follow the 'Fertcare' guidelines for application only to crop phosphorus requirement as phosphorus is most likely to be the limiting factor in calculations and not nitrogen.

6.3.2 Assessment of performance indicators

The results of the nutrient balance should be considered in conjunction with regular solid waste and soil quality monitoring to properly assess the performance of the solid waste utilisation area. If the solid waste utilisation is managed in such a way that the nutrient balance is maintained, then the soil nutrient status should remain fairly constant from one sampling period to the next. These parameters should be graphed to compare results from year to year.

The results of the any groundwater monitoring should also be graphed to ensure that the groundwater below the solid waste utilisation area is not showing signs of contamination. Refer to the OSWQMP.

6.4 Auditing

Audits (both internal and external) will be undertaken to assess the effectiveness of environmental mitigation measures, compliance with this Plan, CoA and other relevant approvals, licences and guidelines. Audit requirements are detailed in section 9.4 of the OEMP.

The audit process will generally be designed to examine the status of the key components of this Plan, review solid and/or liquid waste management concerns, and evaluate the overall performance of solid and liquid waste management for the Project.

The strategy for Doolin Farming Pty Ltd audit processes is to ensure compliance and promote continuous improvement as part of the Project's solid and liquid waste management regime.

In addition, the Plan will potentially be subject to audit by the Gwydir Shire Council or the Department administering the *Protection of the Environment Operations Act 1997* (currently EPA) during compliance inspections and other site inspections and as a possible component of a formal solid waste and/or liquid waste management concerns investigation process.

7 Review and Improvement

7.1 Non-conformances and corrective actions

Any non-conformances related to solid and liquid waste management will be dealt with and documented in accordance with section 11.5 of the OEMP.

7.2 Continual improvement

This Plan and associated monitoring program will be reviewed, and if necessary revised to the satisfaction of the NSW EPA as the Department currently administering the *Protection of the Environment Operations Act 1997* in accordance with section 12 of the OEMP:

- where a risk assessment identifies the requirement to alter the plan;
- following changes to project approval or licence conditions relating to solid and/or liquid waste management or monitoring;
- following any significant solid and/or liquid waste management related incident;
- where there is a relevant change in technology or legislation; or
- for necessary or any unforeseen changes to solid and/or liquid waste monitoring locations.

8 References

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Standards Australia 1998, AS/NZS 5667.10—1998: Water quality—Sampling—Guidance on sampling of waste waters. Standards Association of Australia, Sydney.

Standards Australia 2012, AS 4454 –2012 - Australian Standard for Composts, Soil Conditioners and Mulches Standards Association of Australia, Sydney.

Appendix A – Standard Operational Procedures

OSLWMP SOP 1 - Solid waste (Putrescible) - Pen and sedimentation basin cleaning

Aspect	Solid waste (Putrescible) – Pen and sedimentation basin cleaning
Objectives	To manage the cleaning of pens and sedimentation basins such that impacts on community amenity, occupational health and the environment are minimised.
Potential Impacts	Occupational health and safety of employees and contractors. Animal health and performance. Community amenity and health impacts from offensive odours. Community amenity and health impacts from dust. Receiving environment impacts from dust, leaching of contaminants in solid wastes.
Control Actions	All development employees including relevant contractors are given adequate training in environmental awareness, legal responsibilities and solid waste management through inductions and targeted training. Pen cleaning and surface maintenance is undertaken on a planned basis to ensure that pen surfaces dry quickly following rainfall, can drain freely and do not become overly dry and cause excessive dust emissions. Weather permitting, pen cleaning will be undertaken at an interval not exceeding 8 weeks as per Class 1 specifications. Material is removed from potholes and gravel/clay placed and compacted in and around the affected areas. Pen cleaning operations should ensure that the highly dense, plastic, manure-soil interface layer remains intact. Manure will be scraped from the pen surface down to the manure interface layer by a suitably trained employee, ensuring not to disturb the interface layer. Manure is removed to the stockpile area located within the controlled drainage area of the Project site. Under-fence cleaning will be undertaken on an as required basis not exceeding 4 weeks or as soon as practically possible after accumulated manure obstructs pen drainage, as per Class 1 specifications. Manure is pushed from under the fence lines and collected during pen cleaning operations. The sedimentation basin shall be inspected after runoff producing rainfall or at intervals not exceeding 8 weeks. At each inspection the following actions shall be performed: Estimate the depth of sedimentation accumulation to assess is sediment accumulation is substantially reducing active volume and whether cleaning needs to be performed. Inspect embankment batters and crest for scouring/dispersive failure.

	Inspect of inlet and outlet points to identify any areas of scour, sediment build up and blockages. Remove any blockages from the outlet structure. Any potential structural integrity issues are to be reported to the Maintenance Supervisor. If the sedimentation basin requires cleaning, the operations shall be applied: • Allow the accumulated sediment to dry as wet sludge is difficult to handle, store and will not dry out. • Remove the accumulated sediment from the basin to the solid waste stockpile and carcass composting area. • Ensure the sedimentation basin surface retains a smooth uniform slope to the outlet structure. • Backfill and compact any potholes or low areas in the sedimentation basin surface. If the sedimentation basin requires maintenance, the operations that apply are: Schedule repairs to embankments, inlet / outlet structures as soon as practically possible. The low-permeability clay lining in the pens and sedimentation basin shall be checked after removal of manure to ensure its structure and integrity has not been damaged or compromised and ongoing compliance with specified design criteria. Any damage to the barrier will be repaired.
Relevant Standards, Management Plans, Records	CoA NFAS manual Complaints Register Personnel induction, training and awareness Pen cleaning record
Responsibility	As required by the OEMP and specific requirements outlined in section 5.1.
Performance Indicators	Ensure all personnel operating on the site are adequately trained. Personnel shall receive training in pen and sedimentation basin cleaning. No complaints relating to pen cleaning are received by the Project.
Monitoring	As required by the OEMP and specific requirements outlined in section 6.2.
Reporting	As required by the OEMP and specific requirements outlined in section 6.3.
Corrective Actions	Review management of pen and sedimentation basin cleaning methods. Seek specialist advice from an environmental specialist on solid and liquid waste management.

OSLWMP SOP 2 – Solid waste (Putrescible) – Stockpiling and stockpile management

Aspect	Solid waste (Putrescible) – Stockpiling and stockpile management
Objectives	To manage stockpiling of solid waste (Putrescible) such that impacts on community amenity, occupational health and the environment are minimised.
Potential Impacts	Occupational health and safety of employees and contractors. Animal health and performance. Community amenity and health impacts from offensive odours. Community amenity and health impacts from offensive odours. Community amenity and health impacts from dust. Receiving environment impacts from dust, uncontrolled runoff of stormwater with high organic matter, soil leachate with high organic pollutant concentrations etc.
Control Actions	All development employees including relevant contractors are given adequate training in environmental awareness, legal responsibilities and air quality control methods through inductions and targeted training. Solid waste (manure) shall only be stockpiled within the solid waste stockpile and carcass composting area and/or temporarily within pens (mounding) prior to removal to the solid waste stockpile and carcass composting area. These areas are within the controlled drainage area of the Project complex. Solid waste stockpiles are to be constructed with the long axes perpendicular to the contours within the stockpile to ensure free drainage. Solid waste stockpiles will be shaped to avoid ponding of rain or runoff water. As layers of solid waste are placed in the stockpile they will be compacted. Wet solid waste or sludge will not be placed in the main stockpile until it is sufficiently dry. Check the base of the stockpile and carcass composting area for potholes and areas of shallow gravel cover. If inadequate, repair the base when conditions permit. The stockpile and carcass composting area shall be inspected daily and after rainfall events. When conditions permit, re-configure the stockpile(s) if free drainage is not occurring. If a solid waste stockpile has ignited the following actions shall be taken: • Remove the ignited particles from the stockpile with appropriate machinery. • Extinguish the ignited particles. • Record the event and actions taken on the Non Compliance Record. • Record any maintenance procedures performed on the solid waste storage and processing area.

Relevant Standards, Management Plans, Records	CoA NFAS manual Complaints Register Personnel induction, training and awareness
Responsibility	As required by the OEMP and specific requirements outlined in section 5.1.
Performance Indicators	Ensure all personnel operating on the site are adequately trained. Personnel shall receive training in solid waste stockpiling and stockpile management. No complaints relating to solid waste stockpiling are received by the Project. No non-compliances with CoA.
Monitoring	As required by the OEMP and specific requirements outlined in section 6.2.
Reporting	As required by the OEMP and specific requirements outlined in section 6.3.
Corrective Actions	Review management of solid waste stockpiling and stockpile management.

OSLWMP SOP 3 - Solid waste (Putrescible) – Mortality management

Aspect	Solid waste (Putrescible) – Mortality management
Objectives	To manage livestock mortalities such that impacts on community amenity, occupational health and the environment are minimised.
Potential Impacts	Occupational health and safety of employees and contractors. Community amenity and health impacts from offensive odours. Receiving environment impacts from uncontrolled runoff of stormwater with high organic matter, high organic matter soil leachate etc.
Control Actions	All development employees including relevant contractors are given adequate training in environmental awareness, legal responsibilities and mortality management through inductions and targeted training. **<u>Typical mortalities</u>** Mortalities shall only be stockpiled within the solid waste stockpile and carcass composting area and/or temporarily within pens (mounding) prior to removal to the solid waste stockpile and carcass composting area. These areas are within the controlled drainage area of the Project complex. Carcasses are removed from the pens on a daily basis and taken to the hospital area for post-mortem or directly to the solid waste stockpile and carcass composting area for composting. Following autopsy, the carcass is taken to the solid waste stockpile and carcass composting area for composting. A bed of at least 300 mm of the material being used as the carbon source (e.g., sawdust or straw) is placed on the base of the composting area. This bed of material absorbs leachate from the carcasses. A carcass is placed on the straw or sawdust bed and covered with at least 500 mm of manure on all sides. The carcass windrow shall be no more than two levels of carcasses high. The second level of carcasses shall be placed on top of 50 mm of manure covering the first level of carcasses and covered with at least 500 mm of manure. The top of the windrow shall be shaped to an apex to shed rainfall. The carcass composting area will be checked on a weekly basis to ensure carcasses are sufficiently covered with manure. Any exposed carcases shall be recovered with solid waste. Composting can be carried out in an intensively managed way (which will rapidly break down the carcasses) or with low management input which is a slower process. Low input management can still effectively decompose the carcasses if there is adequate time for the process to occur (usually 12-18 months). The carcasses are allowed to decompose for around 12 weeks before turning or 12 months if the windrows are not going to be turned. The. Typically, a front-end loader shall be used for turning carcass compost. Active composting may last for up to 4-8 months. The windrow shall be turned every 2-3 months.

	After active composting the composted windrow is left to mature for at least 3-4 months. The carcass composting area shall be monitored from scavenging animals and livestock. If any carcasses have become uncovered, recover them with approximately 500 mm of manure. **<u>Mass mortality events</u>** Where the mortalities are suspected to be caused by an emergency/infectious disease AUSVETPLAN procedures shall be implemented and disposal managed under the AUSVETPLAN. A suitable site for mass burial of mortalities shall be identified on the Project site. The burial pits shall be established in low permeability soils on a site well removed from surface waters, drainage lines, gullies, groundwater bores and the Project complex. The pit shall be located so that all water runoff is directed away from the pit. Use of diversion bunds or trenches may be required. Pits shall be deep but relatively narrow and excavated using an excavator. The carcass of each animal shall be opened at the time of placing in the pit and the carcass immediately covered by at least 500 mm of soil to reduce odour and exclude flies and vermin. Each pit shall be progressively filled with carcasses until sufficient pit capacity remains for the pit to be sealed with clay and compacted to a minimum depth of 1 m. Soil shall be mounded over the top and replenished should the pit subside to below ground level. The site where mass mortalities are buried shall be recorded for future reference.
Relevant Standards, Management Plans, Records	CoA NFAS manual Complaints Register Personnel induction, training and awareness
Responsibility	As required by the OEMP and specific requirements outlined in section 5.1.
Performance Indicators	Ensure all personnel operating on the site are adequately trained. Personnel shall receive training in solid waste stockpiling and stockpile management. No complaints relating to solid waste stockpiling are received by the Project. No non-compliances with CoA.
Monitoring	As required by the OEMP and specific requirements outlined in section 6.2.
Reporting	As required by the OEMP and specific requirements outlined in section 6.3.
Corrective Actions	Review management of mortalities. Review composting management, increase or decrease watering and turning of the windrow.

OSLWMP SOP 4 – Solid Waste (Putrescible) – On-site utilisation

Aspect	Solid waste (Putrescible) – On-site utilisation
Objectives	To manage the on-site utilisation of solid wastes such that impacts on community amenity, occupational health and the environment are minimised.
Potential Impacts	Occupational health and safety of employees and contractors. Community amenity and health impacts from offensive odours. Receiving environment impacts from uncontrolled runoff of stormwater with high organic matter, high organic matter soil leachate etc.
Control Actions	All development employees including relevant contractors are given adequate training in environmental awareness, legal responsibilities, and solid waste utilisation through inductions and targeted training. Solid waste shall only be applied to the approved solid waste utilisation area. When solid waste utilisation is necessary, select an appropriate area for application. Do not select an area that has already had sufficient nutrients applied through solid waste or areas that are showing elevated nutrient levels. Review weather forecasts and on-site meteorological conditions including wind speed and direction, rain forecasts etc. Do not select an area where the prevailing wind direction will carry any odours towards dwellings or other areas likely to be used by the public at that time. Do not spread solid waste when heavy rain is predicted. Do not spread solid waste too soon after heavy rain has been received (less than 48 hours). Solid waste shall be incorporated if applied to cultivated areas. The land application of solid waste is made at rates consistent with the ability of soils and crops grown in the on-site utilisation areas to sustainably utilise the applied nutrients, salts and organic matter, under the climatic conditions prevailing at the site. Review soil monitoring results prior to applications to ensure that over application of solid waste does not occur. Ensure solid waste is not applied to vegetative buffers around sensitive receivers (e.g., drainage lines / watercourses / property boundaries / native vegetation). Do not apply solid waste after heavy rain until soil moisture conditions allow the ability to traffic and work the soil to incorporate the solid waste.
Relevant Standards, Management Plans, Records	CoA NFAS manual Complaints Register Personnel induction, training and awareness
Responsibility	As required by the OEMP and specific requirements outlined in section 5.1.
Performance Indicators	Ensure all personnel operating on the site are adequately trained.

	Personnel shall receive training in solid waste utilisation. No complaints relating to solid waste utilisation are received by the Project. No non-compliances with CoA.
Monitoring	As required by the OEMP and specific requirements outlined in section 6.2.
Reporting	As required by the OEMP and specific requirements outlined in section 6.3.
Corrective Actions	Review management of solid waste utilisation. Seek specialist advice where a significant level of environmental risk or impact is identified for solid waste utilisation in indicators of sustainability.

OSLWMP SOP 5 – Solid and Liquid Waste (Non-putrescible) – Storage and handling

Aspect	Solid and liquid waste (Non-Putrescible) management – Storage and handling
Objectives	To manage the storage and handling of non-putrescible solid waste and liquid waste (Controlled/General) such that impacts on community amenity, occupational health and the environment are minimised.
Potential Impacts	Occupational health and safety of employees and contractors. Animal health and performance. Receiving environment impacts from uncontrolled runoff of hazardous materials, soil leachate with inorganic pollutant concentrations etc.
Control Actions	All development employees including relevant contractors are given adequate training in environmental awareness, legal responsibilities and storage and handling of solid waste and liquid waste (Non-Putrescible) methods through inductions and targeted training. Comply with applicable regulatory requirements and standards regarding the design and operation of all solid and liquid waste storage areas Quantities of waste stored onsite will be kept to a minimum. Maximum volume of each waste stored will be consistent with regulations and guidelines. Segregate all waste streams at source, where practicable. Store all solid and liquid waste in appropriately designed and clearly labelled receptacles. Securely store hazardous wastes within contained storage areas with closed drainage systems. Separate combustible wastes from ignition sources to minimise fire hazards. Ensure that only compatible wastes are stored together. Locate spill kits at hazardous liquid waste storage areas. All waste oils, chemicals, toxic substances and combustible liquids associated with operation will be stored in roofed and bunded areas. Spill kits will be provided at all hazardous materials storage facilities. All waste oils, chemicals, toxic substances and combustible liquids associated with operation will be stored in roofed and bunded areas. Spill kits will be provided at all chemical storage facilities.
Relevant Standards, Management Plans, Records	CoA POEO Act 1997 OEMP Personnel induction, training and awareness
Responsibility	As required by the OEMP and specific requirements outlined in section 5.1.

Performance Indicators	Ensure all personnel operating on the site are adequately trained in hazardous material storage and handling. No complaints relating to solid waste and liquid waste (Controlled / General) are received by the Project. No non-compliances with CoA.
Monitoring	As required by the OEMP and specific requirements outlined in section 6.2.
Reporting	As required by the OEMP and specific requirements outlined in section 6.3.
Corrective Actions	Review management of solid waste and liquid waste (Controlled/ General) storage and handling.

OSLWMP SOP 6 – Liquid waste (Effluent) – Holding pond management

Aspect	Liquid waste (Effluent) – Holding pond management
Objectives	To manage the holding ponds such that impacts on community amenity, occupational health and the environment are minimised.
Potential Impacts	Occupational health and safety of employees and contractors. Community amenity and health impacts from offensive odours. Receiving environment impacts from uncontrolled releases of effluent via overflows or leachate etc.
Control Actions	All relevant development employees including relevant contractors are given adequate training in environmental awareness, legal responsibilities and holding pond management through inductions and targeted training. The holding pond shall be inspected prior to rainfall events, after runoff producing rainfall and at each irrigation event or at intervals not exceeding 1 week. At each inspection the following actions shall be performed: • Estimate the volume of liquid waste in the holding pond and compare with future irrigation demands. • Schedule irrigation events when liquid waste accumulates to be within 1500 mm of the embankment crest and the liquid waste level decreased. • The holding pond should be kept at a low level. The pond will never be completely emptied during irrigation. Always leave at least 500 mm of effluent in the pond. The effluent level should not come within 500 mm of the bywash level as far as practical. • Inspect embankment batters, crest, bywash and inlet areas for scouring and structural integrity. • Assess structural stability and any other conditions that constitute or could constitute a hazard to the integrity of the structure. • Ensure outlet structures are operating satisfactorily. • Estimate the volume of liquid waste in the holding pond and compare with future irrigation demands. • Any potential structural integrity issues are to be reported to the Facilities Manager. If the holding pond fills during wet weather and an overflow is imminent or spills, it is generally preferable to irrigate liquid waste onto a wet irrigation area rather than allow the pond to further spill. Irrigation will assist in dispersing the liquid waste over a large area and provide a greater opportunity for filtering by vegetation and dilution from stormwater. Vegetation and floating debris (emergent or otherwise) are prevented from encroaching onto pond surfaces or inner pond embankments The low-permeability clay lining in the holding pond shall be checked after removal of sludge to ensure its structure and integrity has not been damaged or compromised and ongoing compliance with specified design criteria.
Relevant Standards, Management Plans, Records	CoA Complaints Register Personnel induction, training and awareness

Responsibility	As required by the OEMP and specific requirements outlined in section 5.1.
Performance Indicators	Ensure all personnel operating on the site are adequately trained. Personnel shall receive training in holding pond cleaning and maintenance. No non-compliances with CoA.
Monitoring	As required by the OEMP and specific requirements outlined in section 6.2.
Reporting	As required by the OEMP and specific requirements outlined in section 6.3.
Corrective Actions	Schedule repairs to embankments, inlet / outlet structures as soon as practically possible. De-sludge the holding pond once the accumulated sludge takes up a maximum of 10% of the design capacity of the holding pond. Seek specialist advice if the low-permeability clay lining in the holding pond is compromised. Repair any damage to the low-permeability clay lining in the holding pond.

OSLWMP SOP 7 - Solid waste management – Holding pond sludge management

Aspect	Solid waste management – Holding pond sludge management
Objectives	To manage sludge accumulation in holding ponds such that impacts on community amenity, occupational health and the environment are minimised.
Potential Impacts	Occupational health and safety of employees and contractors. Community amenity and health impacts from offensive odours. Receiving environment impacts from leaching of contaminants in holding pond sludge.
Control Actions	Relevant development employees including contractors are given adequate training in environmental awareness, legal responsibilities and holding pond sludge management through inductions and targeted training. Sludge level monitoring is an important part of holding pond management to ensure that the wet-weather capacity of the pond is maintained. The depth and spatial variability of sludge in the holding pond can vary widely depending on loading rates and the position of the inflow and outflow points. The sludge level shall be measured annually by: • Probing at a number of points within the holding pond – points close to the inlet weir from the sedimentation basin and irrigation take-off pipes shall assessed. • Somewhere between 8 and 40 depth measurements shall be taken using the measuring apparatus in a grid pattern across the pond. The measuring apparatus shall be a clear PVC pipe with a GPS receiver attached to the top. The length of the pipe to the GPS shall be recorded. • The measuring apparatus shall be, passed through the water column until the sludge layer is identified by feel. The relative level (RL) at each location shall be recorded on the GPS. • On completion of the assessment, the GPS data shall be reduced. • The RL of the sludge shall be incorporated into the as-constructed 3D model of the holding pond. • Using the difference in RL of the sludge height and the as-constructed holding pond bed and embankments RL the sludge volume shall be calculated. • The sludge volume shall be compared with the wet-weather storage capacity of the holding pond. • The holding pond shall be de-sludged once the accumulated sludge takes up a maximum of 10% of the design capacity of the holding pond. As this method is subjective, possessing an element of “feel,” and requiring the opinion of the operator, the Environmental Specialist shall oversee the measurement and where possible the same person shall be used to measure the sludge layer year to year.
Relevant Standards, Management Plans, Records	CoA Complaints Register Personnel induction, training and awareness

Responsibility	As required by the OEMP and specific requirements outlined in section 5.1.
Performance Indicators	Ensure all personnel operating on the site are adequately trained. Personnel shall receive training in holding pond sludge management. No complaints relating to holding pond sludge management are received by the Project. No non-compliances with the CoA.
Monitoring	As required by the OEMP and specific requirements outlined in section 6.2.
Reporting	As required by the OEMP and specific requirements outlined in section 6.3.
Corrective Actions	Review management of holding pond sludge management methods. Review efficacy of sedimentation basin if sludge is accumulating rapidly.

OSLWMP SOP 8 – Liquid waste (Effluent) and solid waste – On-site utilisation

Aspect	Solid waste and Effluent – On-site utilisation
Objectives	To manage the on-site utilisation of solid waste and effluent such that impacts on community amenity, occupational health and the environment are minimised.
Potential Impacts	Occupational health and safety of employees and contractors. Community amenity and health impacts from offensive odours. Receiving environment impacts from uncontrolled runoff of effluent, leaching of effluent below the root zone etc.
Control Actions	All development employees including relevant contractors are given adequate training in environmental awareness, legal responsibilities and solid waste utilisation through inductions and targeted training. Solid waste and effluent shall only be applied to the approved respective utilisation areas. When solid waste and/or effluent utilisation is necessary, select an appropriate area for application. Do not select an area that has already had sufficient nutrients applied through solid waste or effluent or areas that are showing elevate nutrient levels. Review weather forecasts and on-site meteorological conditions including wind speed and direction, rain forecasts etc. Do not select an area where the prevailing wind direction will carry any odours towards dwellings or other areas likely to be used by the public at that time. Do not irrigate effluent when heavy rain is predicted. Do not spread solid waste too soon after heavy rain has been received (less than 48 hours). Solid waste shall be incorporated if applied to cultivated areas. The land application of solid waste is made at rates consistent with the ability of soils and crops grown in the on-site utilisation areas to sustainably utilise the applied nutrients, salts and organic matter, under the climatic conditions prevailing at the site. Review soil monitoring results prior to applications to ensure that over application of solid waste does not occur. Ensure effluent is not applied to vegetative buffers around sensitive receivers (e.g., drainage lines / watercourses / property boundaries / native vegetation). Do not apply effluent until soil moisture conditions permit irrigation e.g., not allow surface runoff.
Relevant Standards, Management Plans, Records	CoA Complaints Register Personnel induction, training and awareness
Responsibility	As required by the OEMP and specific requirements outlined in section 5.1.
Performance Indicators	Ensure all personnel involved with effluent utilisation are adequately trained. Personnel shall receive training in effluent utilisation.

	No complaints relating to effluent utilisation are received by the Project. No non-compliances with CoA. No adverse impacts to environmental values from effluent utilisation.
Monitoring	As required by the OEMP and specific requirements outlined in section 6.2.
Reporting	As required by the OEMP and specific requirements outlined in section 6.3.
Corrective Actions	Review management of effluent utilisation. Seek specialist advice where a significant level of environmental risk or impact is identified with effluent utilisation in indicators of sustainability.

Appendix B4 – Environmental monitoring management plan

Springfield Feedlot

Draft Operation Environmental Monitoring Management Plan

"Springfield"
2513 Getta Getta Road
North Star NSW 2408

Doolin Farming Pty Ltd
"Glenhoma"
3202 Getta Getta Road
NORTH STAR NSW 2408

[February 2025]

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Disclaimer

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1 Background

1.1 Introduction

Doolin Farming Pty Ltd own and operate a 10,000 ha mixed farming operation across several properties at North Star including “Glenhoma”, “Glenmodel”, “Springfield”, “Myall Downs” and “Yetman West” some 27 km east of Yetman and 45 km south-southeast of Goondiwindi (QLD) in NSW.

Doolin Farming Pty Ltd primarily engage in dryland and irrigated cropping and beef production. Doolin Farming Pty Ltd produces wheat, barley, oats and chickpeas in winter and cotton and maize in summer under pivot irrigation systems and dryland sorghum cropping.

Central to the beef production enterprise is the breeding, growing and lot-feeding of cattle for the domestic market. The beef supply chain includes breeding and growing of beef cattle on land less suitable for dryland and irrigated cropping and grazing of stubble and lot feeding of cattle within a feedlot on the property ‘Springfield”.

“Springfield” comprises some 1,713 ha (~4,231 acres) and currently, a dryland and irrigated cropping business is undertaken on a large proportion of the property with extensive cattle breeding and grazing of beef cattle on the remaining land which is unsuitable for cropping and lot feeding of cattle within a beef cattle feedlot in the north-east of the property.

The feedlot is known as Springfield Feedlot and operates for 12 months of the year and employs approximately 4 full time staff. Casual staff and contractors are engaged as required during busy periods such as planting and harvesting of silage and fodder and to supply various associated services such as plant maintenance and veterinary requirements.

Springfield Feedlot includes one controlled drainage area with associated production pens and drainage system which includes catch drains, sedimentation basin and holding pond. Springfield Feedlot also has auxiliary infrastructure to support the use such as cattle handling and feed storage and processing facilities.

Springfield Feedlot is accredited under the National Feedlot Accreditation Scheme (NFAS) with audits conducted annually.

2 Purpose, scope, and objectives

2.1 Purpose

This Operation Environmental Monitoring Management Plan (OEMMP or Plan) forms part of the Operation Environmental Management Plan (OEMP) for the Springfield Feedlot (the Project).

This Plan has been prepared to address the Department of Planning and Environment (DPIE), Gwydir Shire Council (GSC) and the NSW Environment Protection Authority (NSWEPA) requirements of the Conditions of Approval (CoA) and the mitigation measures listed in the Springfield Feedlot EIS (2025) and all applicable legislation.

The Project has not commenced operation. This Plan will be reviewed and updated once operations commence.

2.2 Scope

This OEMMP outlines the environmental monitoring requirements and how Dolin Farming Pty Ltd will manage and control environmental monitoring during operation of the Project.

2.3 Objectives

The key objective of the OAQMP is to ensure that environmental impacts are minimised and kept within the scope permitted by CoA. To achieve this objective, Doolin Farming Pty Ltd will:

- ensure appropriate measures are implemented to comply with all relevant legislation and other requirements as described in section 5 of this Plan.
- ensure all CoA and Doolin Farming Pty Ltd's Operations Policies and Standards are met in relation to environmental monitoring;
- ensure appropriate controls and procedures are implemented during operation activities to avoid or minimise air quality, soil and water quality, and groundwater and surface water impacts and potential adverse impacts to sensitive receivers within the vicinity of the Project.
- implement applicable best practice environmental monitoring techniques and procedures to manage and minimise adverse environmental impacts; and
- maintain an effective response mechanism to deal with issues and complaints.

3 Legislative and other requirements

3.1 Legal requirements

Legislation relevant to environmental monitoring and management includes:

- Environmental Planning and Assessment Act 1979 (EP&A Act);
- Protection of the Environment Operations Act 1997 (POEO Act);
- Protection of the Environment Legislation Amendment Act 2011 (POELA Act);
- Water Management Act 2000;
- Water Act 1912; and
- Contaminated Land Management Act 1997.

Relevant provisions of the above legislation are explained in the register of legal and other requirements included in Appendix A1 of the OEMP.

3.2 Guidelines and standards

The main guidelines, specifications and policy documents relevant to this OEMMP include:

Table 1 – Air quality – Relevant guidelines and standards

Guideline/Standard	Relevance
NSW Clean Air Strategy 2021-30	The NSW Clean Air Strategy outlines the integrated approach to improving air quality and protecting communities by the NSW Government. There are 5 priority action areas including better preparedness for pollution events; cleaner industry; cleaner transport; healthier households and better planning and design.
NSW Environment Protection Authority, 2016, Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales, Environment Protection Authority, Sydney, NSW.	This document provides information on the statutory methods to be used for modelling and assessing emissions of air pollutants in NSW. The document contains information on how to prepare emissions inventory data and meteorological data; methods for accounting for and dealing with background concentrations; dispersion modelling methodology and interpretation; impact assessment criteria for common pollutants; procedures for developing site-specific emission limits, including those for hydrogen sulfide and worked examples.
NSW Dust Strategy 2020-2022	The NSW Dust Strategy 2020-2022 coordinates SafeWork NSW's dust exposure prevention activities, ensuring consistent application of best practice principles and controls relevant to different dust types.
AS 3580.1.1:2007 Methods for sampling and analysis of ambient air: Part 1.1: Guide to siting air monitoring equipment	This Standard sets out general guidelines for the siting of ambient air monitoring equipment and specifies a number of siting parameters for individual air pollutants.
AS 3580.10.1:2003 (R2014) Methods for sampling and analysis of ambient air: Method 10.1: Determination of particulate matter – Deposited matter – Gravimetric method	This Standard sets out a method for the sampling of particulate matter that is deposited from the atmosphere, and procedures for the gravimetric determination of the mass deposition rate of insoluble solids, ash, combustible matter, soluble solids and total solids from ambient air.
AS 3580.14:2014 Methods for sampling and analysis of ambient air - Meteorological monitoring for ambient air quality monitoring applications	This Standard sets out methods for the collection of meteorological data for use in ambient air quality monitoring and modelling applications. Requirements and guidance are provided for the in-situ monitoring of primary meteorological variables.
Environmental Health Risk Assessment (enHealth, 2012)	This enHealth document provides a national approach to environmental health risk assessment.

Table 2 – Soil and water quality – Relevant guidelines and standards

Guideline/Standard	Relevance
Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC and ARMCANZ 2000)	Provides a framework for recognising and protecting water quality for the full range of existing environmental values.
AS/NZS 5667.1—1998: Water Quality—Sampling— Part 1: Guidance on the Design of Sampling Programs, Sampling Techniques and the Preservation and Handling of Samples. Standards Association of Australia, Sydney	This Standard provides general principles to be applied in sampling for the physical, chemical, microbiological or radiological analysis of waters and waste waters, including bottom sediment and sludges, for the purposes of process control, quality characterization, identification of sources of pollution and the monitoring of background levels.
AS 5667.4-1998: Water quality - Sampling, Part 4: Guidance on sampling from lakes, natural and man-made, Sydney NSW.	This part of AS5667 sets out the principles to be applied to the design of sampling programmes, sampling techniques and the handling of water samples from lakes, natural and man-made for physical, chemical and microbiological assessment.
AS/NZS 5667.6—1998: Water Quality—Sampling—Guidance on sampling of rivers and streams. Standards Association of Australia, Sydney	This part of AS5667 sets out the principles to be applied to the design of sampling programmes, sampling techniques and the handling of water samples from rivers and streams for physical, chemical and microbiological assessment.
AS/NZS 5667.10—1998: Water Quality—Sampling—Guidance on sampling of waste waters. Standards Association of Australia, Sydney	This part of AS5667 contains details on the sampling of domestic and industrial waste water, i.e. the design of sampling programmes and techniques for the collection of samples. It covers waste water in all its forms, i.e. industrial waste water, and crude and treated domestic waste water.
EPA, 2004, Approved Methods for the Sampling and Analysis of Water Pollutants in NSW.	Lists the sampling and analysis methods to be used when complying with a requirement by, or under, the environment protection legislation, or a licence or notice under that legislation, to test for the presence or concentration of matter in water and the volume, depth and flow of water or wastewater.
Department of Environment and Conservation (NSW), 2004, Effluent Guidelines, Use of Effluent by Irrigation	Provides guidelines for planning, designing, installing, operating and monitoring effluent irrigation systems to diminish risks to public health, the environment and agricultural resources and outlines the statutory requirements that may be needed for an effluent irrigation system in NSW.
Landcom, 2004, The Blue Book – Managing Urban Stormwater: Soils and Construction Volume 1, 4th Edition, March 2004 (reprinted 2006) (the "Blue Book"). Volume 1 and Volume 2.	Provides guidance for the design, construction and implementation of measures to improve stormwater management, soil erosion risks and sediment control from disturbed sites.
International Erosion and Sediment Control (IECA) (Australasia) 2008. Best practice erosion and sediment control. International Erosion Control Association (Australasia), Picton, NSW.	Provides guidance for the design, construction and implementation of measures to improve stormwater management, soil erosion risks and sediment control from disturbed sites.
Resource manual of development of Indicators of sustainability for effluent reuse in the intensive livestock industries: Piggeries and Cattle Feedlots,	Provides readily available data and analysis techniques for evaluating the sustainability of effluent and manure and carcass compost reuse for piggeries and cattle feedlots and suggested sustainability indicators for these intensive livestock industries.

Project No 1816, Australian Pork Limited, Canberra, Australia, May 2003.	
Redding, MR (2003), Sampling Manual for environmental monitoring by intensive livestock industries. Agency for Food and Fibre Sciences, Department of Primary Industries, Toowoomba, Queensland.	This manual sets out the sample collection and preparation techniques needed to fulfil the monitoring requirements of intensive livestock licences (under the QLD EP Act) for soil, effluent, manure, sludge, surface water and groundwater samples.
Rayment, G.E. and Lyons, D.J. (2010). Soil Chemical Methods -Australasia, CSIRO Publishing, ISBN: 9780643067684.	This handbook describes laboratory and field chemical tests and guidance on soil sampling and choice and application of analytical methods from soil sampling through to the reporting of results.
Standards Australia, 2017, AS 1940:2017: The storage and handling of flammable and combustible liquids	This Standard provides general principles and requirements to be applied for bunding, placarding, safe operations, emergency management and fire protection for flammable and combustible liquids.
Standards Australia, 1998, AS 2507-1998: The storage and handling of agricultural and veterinary chemicals	This Standard provides requirements and recommendations for the storage and handling of agricultural and veterinary chemicals, which may be classified as dangerous goods under the Australian Dangerous Goods Code (ADG Code) or as scheduled poisons by the Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP).
Meat and Livestock Australia, 2012a, National Beef Cattle Feedlot Environmental Code of Practice 2nd Edition, Meat & Livestock Australia, North Sydney, NSW.	The *Code* is designed to be a companion document to the *National Guidelines for Beef Cattle Feedlots in Australia*. The *Code* is intended to provide requirements for the environmentally relevant aspects of the establishment and operation of beef cattle feedlots.
MLA, 2012b, National Guidelines for Beef Cattle Feedlots in Australia 3rd Edition, Meat & Livestock Australia, North Sydney, NSW	The *National Guidelines for Beef Cattle Feedlots in Australia* is designed to provide 'guidance' on how the *Code* requirements regarding the establishment and operation of beef cattle feedlots may be achieved
Meat and Livestock Australia, 2015a, Beef Cattle Feedlots: Design and Construction, Meat and Livestock Australia, North Sydney, NSW.	This manual outlines the stages of selecting a suitable site, designing the feedlot and its facilities, their construction and the overall management of the project.
Meat and Livestock Australia, 2015b, Beef cattle feedlots: waste management and utilisation, Meat and Livestock Australia, North Sydney, NSW.	This manual provides best-practice guidelines for waste management in beef cattle feedlots.
Standards Australia, 2008, AS 4897-2008: The design, installation and operation of underground petroleum storage systems	This Standard provides general principles and requirements for the safe, environmentally sound and efficient underground storage of petroleum products.

Table 3 – Solid and liquid waste quality – Relevant guidelines and standards

Guideline/Standard	Relevance
Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC and ARMCANZ 2000)	Provides a framework for recognising and protecting water quality for the full range of existing environmental values.
AS 4454 –2012 - Australian Standard for Composts, Soil Conditioners and Mulches Standards Association of Australia, Sydney	This Standard specifies physical, chemical, biological and labelling requirements for composts, mulches, soil conditioners and related products that have been derived largely from compostable organic materials and which meet the minimum requirements as set out in this Standard.
Department of Environment and Conservation (NSW), 2004, Effluent Guidelines, Use of Effluent by Irrigation	Provides guidelines for planning, designing, installing, operating and monitoring effluent irrigation systems to diminish risks to public health, the environment and agricultural resources and outlines the statutory requirements that may be needed for an effluent irrigation system in NSW.
International Erosion and Sediment Control (IECA) (Australasia) 2008. Best practice erosion and sediment control. International Erosion Control Association (Australasia), Picton, NSW.	Provides guidance for the design, construction and implementation of measures to improve stormwater management, soil erosion risks and sediment control from disturbed sites.
Landcom, 2004, The Blue Book – Managing Urban Stormwater: Soils and Construction Volume 1, 4th Edition, March 2004 (reprinted 2006) (the "Blue Book"). Volume 1 and Volume 2.	Provides guidance for the design, construction and implementation of measures to improve stormwater management, soil erosion risks and sediment control from disturbed sites.
NSW Department of Primary Industries, 2004, Landform and soil requirements for biosolids and effluent reuse, Agnote DPI-493, NSW Government.	Outlines the landform and soil physical and chemical characteristic requirements for the reuse of biosolids and effluent.
McGahan EJ and Tucker RW, 2003, Resource manual of development of Indicators of sustainability for effluent reuse in the intensive livestock industries: Piggeries and Cattle Feedlots, Project No 1816, Australian Pork Limited, Canberra, Australia, May 2003.	Provides readily available data and analysis techniques for evaluating the sustainability of effluent and solid by-product reuse for piggeries and cattle feedlots and suggested sustainability indicators for these intensive livestock industries.
Meat and Livestock Australia, 2012a, National Beef Cattle Feedlot Environmental Code of Practice 2nd Edition, Meat & Livestock Australia, North Sydney, NSW.	The *Code* is designed to be a companion document to the *National Guidelines for Beef Cattle Feedlots in Australia*. The *Code* is intended to provide requirements for the environmentally relevant aspects of the establishment and operation of beef cattle feedlots.
MLA, 2012b, National Guidelines for Beef Cattle Feedlots in Australia 3rd Edition, Meat & Livestock Australia, North Sydney, NSW	The *National Guidelines for Beef Cattle Feedlots in Australia* is designed to provide 'guidance' on how the *Code* requirements regarding the establishment and operation of beef cattle feedlots may be achieved
Meat and Livestock Australia, 2015a, Beef Cattle Feedlots: Design and Construction, Meat and Livestock Australia, North Sydney, NSW.	This manual outlines the stages of selecting a suitable site, designing the feedlot and its facilities, their construction and the overall management of the project.

Meat and Livestock Australia, 2015b, Beef cattle feedlots: waste management and utilisation, Meat and Livestock Australia, North Sydney, NSW.	This manual provides best-practice guidelines for waste management in beef cattle feedlots.
Redding, MR (2003), Sampling Manual for environmental monitoring by intensive livestock industries. Agency for Food and Fibre Sciences, Department of Primary Industries, Toowoomba, Queensland.	This manual sets out the sample collection and preparation techniques needed to fulfil the monitoring requirements of intensive livestock licences (under the QLD EP Act) for soil, effluent, manure, sludge, surface water and groundwater samples.
Rayment, G.E. and Lyons, D.J. (2010). Soil Chemical Methods -Australasia, CSIRO Publishing, ISBN: 9780643067684.	This handbook describes laboratory and field chemical tests and guidance on soil sampling and choice and application of analytical methods from soil sampling through to the reporting of results.

3.3 Conditions of approval

The Conditions of Approval (CoA) relevant to this Plan are listed in Table 4. A cross reference is also included to indicate where the condition is addressed in this Plan or other Project management documents.

Table 4 – Conditions of Approval relevant to this plan

CoA	Condition requirements	Plan reference
Notice of Determination		
	To be completed after Notice of Determination is issued	
EPL		
	To be completed after EPL is issued	

4 Monitoring requirements

4.1 Air quality

Regular monitoring and inspections will be undertaken during operation in accordance with Table 4. Additional requirements and responsibilities in relation to inspections and monitoring are documented in sections 10.1 and 10.2 of the OEMP.

The proposed locations of air quality monitoring equipment for the Project are presented in Figure 1. The final locations of the air quality monitoring sites are subject to agreement with NSW EPA and final development design.

The proposed monitoring equipment, frequency of monitoring and relevant monitoring standards are summarised in Table 6. The siting and installation of air quality monitoring instruments will be in accordance with the requirements of AS/NZS 3580.1.1:2007 Methods for sampling and analysis of ambient air. Part 1.1: Guide to siting air monitoring equipment.

Table 5 – Project site – Air quality monitoring and inspection requirements

Monitoring details	Location	Responsibility	Frequency	Record	KPI
Weather data including daily rainfall, wind (direction and speed), temperature, relative humidity, barometric pressure	Automatic Weather Station (Figure 1) Manual rain gauges	Feedlot Manager	Daily	Daily rainfall record	N/A
Visual observations during site inspections, including activities outside of the Project that may impact on dust/odour levels near sensitive receivers	All	Feedlot Manager / Farm Manager	Daily	Complaints record	Number of dust and/or odour complaints

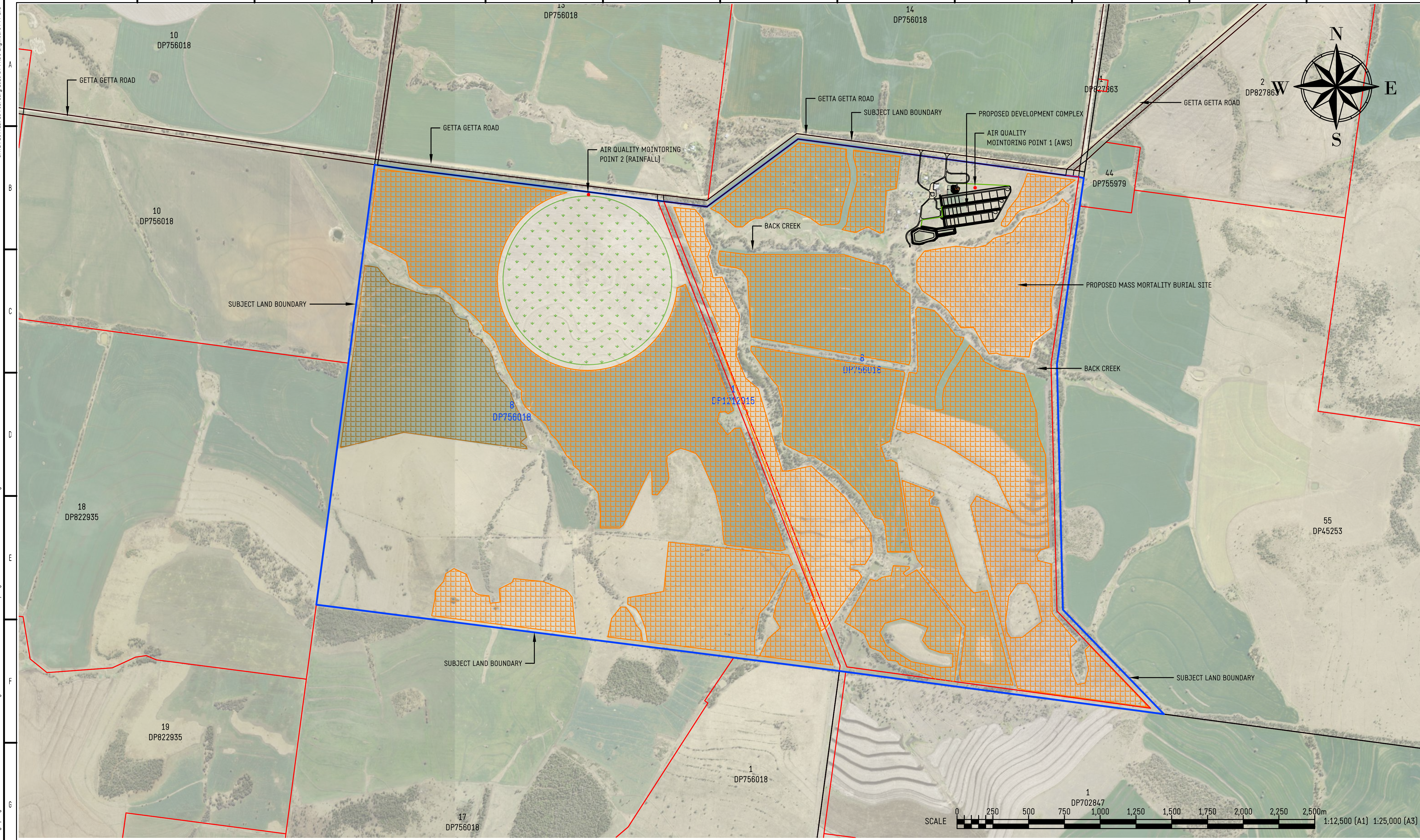
Table 6 – Project site – Air quality meteorological parameters monitoring

Instrument	Parameter	Frequency	Period	Relevant Standard / Method
Automatic Weather Station	Air temperature	Continuous	1 hour	AS 3580.14:2011
Automatic Weather Station	Wind direction	Continuous	15 minute	AS 3580.14:2011
Automatic Weather Station	Sigma theta	Continuous	15 minute	AS 3580.14:2011
Automatic Weather Station	Wind speed	Continuous	15 minute	AS 3580.14:2011
Automatic Weather Station	Rainfall	Continuous	24 hour	AS 3580.14:2011
Automatic Weather Station	Relative humidity	Continuous	1 hour	AS 3580.14:2011
Automatic Weather Station	Solar radiation	Continuous	1 hour	AS 3580.14:2011
Automatic Weather Station	Barometric pressure	Continuous	1 hour	AS 3580.14:2011
Automatic Weather Station	Black globe	Continuous	1 hour	AS 3580.14:2011

The justification for monitoring equipment and location are summarised in Table 7.

Table 7 – Project site – Air quality monitoring justification

Monitoring details	Location	Reference	Justification
Weather data including daily rainfall, wind (direction and speed), temperature, relative humidity, barometric pressure	Representative area within the Development Complex	Refer to Figure 2	Reviewed to assess climatic conditions - wind speed & direction, rainfall, temperature for dust, odour and cropping management, livestock heat load management, solid waste and effluent management
Visual observations during site inspections, including activities outside of the Project that may impact on dust/odour levels near sensitive receivers	Development Complex, solid waste and effluent utilisation areas and adjoining sensitive receivers	Refer to Figure 1	Level of risk presented by air emissions to sensitive receivers.



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- LAND PARCEL BOUNDARY
- PROPOSED EFFLUENT UTILISATION AREA
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DATE	21/02/2025

CLIENT: DOOLIN FARMING PTY LTD

PROJECT: SPRINGFIELD BEEF CATTLE FEEDLOT

TITLE: DRAFT OPERATION ENVIRONMENTAL MONITORING MANAGEMENT PLAN
PROJECT SITE - AIR QUALITY MONITORING POINTS

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 1		A3	E2-103-425-01	B

DATE PLOTTED: 19 February 2025 BY : RDC Engineers PTY LTD

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CLIENT DOOLIN FARMING PTY LTD

PROJECT SPRINGFIELD BEEF CATTLE FEEDLOT

TITLE DRAFT OPERATION ENVIRONMENTAL MONITORING MANAGEMENT PLAN
PROJECT COMPLEX - AIR QUALITY MONITORING POINTS

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 2		A3	E2-103-425-02	B

4.2 Soil and water quality

Regular monitoring and inspections will be undertaken during operation in accordance with Table 8. Additional requirements and responsibilities in relation to inspections and monitoring are documented in sections 10.1 and 10.2 of the OEMP.

In lieu of NSW specific guidelines, the Gourley and Weaver (2019) guidelines "*A guide for 'fit for purpose' soil sampling*" shall be used to design a soil sample collection plan to fulfil the monitoring requirements for soils in the effluent and solid waste utilisation area.

In lieu of NSW specific guidelines, the QLD sampling manual for environmental monitoring by intensive livestock industries by Redding (2003) shall be used for sample collection and preparation techniques needed to fulfil the monitoring requirements for surface water and groundwater samples.

The proposed locations of soil and water quality monitoring sites for the Project are presented in Figure 3 to Figure 6 inclusive. The final locations of the soil and water quality monitoring sites are subject to agreement with NSW EPA.

The proposed number of monitoring sites, frequency of monitoring and relevant monitoring methods are summarised in Table 8 to Table 13. The soil and water sampling methods will be in accordance with the respective guidelines and standards detailed in Table 1.

Table 8 – Project site – Soil and water quality monitoring details summary

Monitoring details	Location	Responsibility	Frequency	Record	KPI
Soil nutrient levels (Effluent utilisation areas)	Refer to Figure 3	Farm Manager	As outlined in Table 15	Annual Return	No adverse impacts to soils from nutrient leaching or accumulation of nutrients in the soil profile
Soil nutrient levels (Solid waste utilisation areas)	Refer to Figure 3	Farm Manager	As outlined in Table 16	Annual Return	No adverse impacts to soils from nutrient leaching or accumulation of nutrients in the soil profile
Surface water quality	Refer to Figure 5	Farm Manager	As outlined in Table 10	Annual Return	No adverse impacts to surface waters from salts, nutrients or sediment deposition
Groundwater quality	Refer to Figure 6	Farm Manager	As outlined in Table 11	Annual Return	No adverse impacts to groundwater quality from high levels of nutrients.
Groundwater level	Refer to Figure 6	Farm Manager	As outlined in Table 13	Annual Return	Groundwater levels not within 2m of ground level

4.2.1 Surface and groundwater

4.2.1.1 Water quality

Water quality monitoring locations are outlined in Table 9.

Table 9 – Project site – Water quality monitoring locations

Monitoring details	Location	Reference	Justification
Surface water quality	SFSWMP1 – Back Creek	Refer to Figure 5	Upstream of utilisation area – surface water quality baseline
Surface water quality	SFSWMP2 – Back Creek	Refer to Figure 5	Downstream of Development complex / Solid utilisation areas - impacts to surface waters
Surface water quality	SFSWMP3 – Back Creek	Refer to Figure 5	Downstream of Development complex/ Effluent and Solid waste utilisation areas - impacts to surface water quality
Groundwater quality	SFMB 1	Refer to Figure 6	Effluent utilisation areas - impacts to groundwater
Groundwater quality	SFMB 2	Refer to Figure 6	Assess any potential seepage from effluent containment structures - impacts to groundwater

Table 10 – Project site – Surface water quality monitoring

Instrument	Parameter	Frequency	Location	Sampling Method
Manual	pH	Special Frequency 2	Figure 5	Representative sample
Manual	Total Suspended Solids	Special Frequency 2	Figure 5	Representative sample
Manual	Total Kjeldahl Nitrogen	Special Frequency 2	Figure 5	Representative sample
Manual	Nitrogen (ammonia)	Special Frequency 2	Figure 5	Representative sample
Manual	Nitrate (NO_3)	Special Frequency 2	Figure 5	Representative sample
Manual	Nitrate-nitrogen (NO_3-N)	Special Frequency 2	Figure 5	Representative sample
Manual	Total Phosphorus	Special Frequency 2	Figure 5	Representative sample
Manual	Reactive Phosphorus	Special Frequency 2	Figure 5	Representative sample
Manual	Potassium	Special Frequency 2	Figure 5	Representative sample
Manual	Electrical Conductivity	Special Frequency 2	Figure 5	Representative sample
Manual	Chloride	Special Frequency 2	Figure 5	Representative sample
Manual	Sodium Adsorption Ratio	Special Frequency 2	Figure 5	Representative sample
Manual	Sodium	Special Frequency 2	Figure 5	Representative sample
Manual	Magnesium	Special Frequency 2	Figure 5	Representative sample
Manual	Calcium	Special Frequency 2	Figure 5	Representative sample

For the purposes of Table 10, Special Frequency 2 means the collection of samples shall occur:

1) after every overflow event from the holding pond(s); and
2) at least every six (6) months.

A groundwater quality and standing water level monitoring program as shown in Table 10 is recommended to ensure any groundwater protection measures incorporated within the Project adequately protect groundwater beneath the site from pollution.

Table 11 – Project site – Groundwater quality monitoring

Instrument	Parameter	Frequency	Location	Sampling method
Manual	pH	6 months	Figure 6	Representative sample
Manual	Total Dissolved Solids	6 months	Figure 6	Representative sample
Manual	Nitrogen (total)	6 months	Figure 6	Representative sample
Manual	Nitrogen (ammonia)	6 months	Figure 6	Representative sample
Manual	Nitrate (NO_3)	6 months	Figure 6	Representative sample
Manual	Nitrate-nitrogen (NO_3-N)	6 months	Figure 6	Representative sample
Manual	Total Phosphorus	6 months	Figure 6	Representative sample
Manual	Electrical Conductivity	6 months	Figure 6	Representative sample
Manual	Sodium (Na)	6 months	Figure 6	Representative sample
Manual	Potassium (K)	6 months	Figure 6	Representative sample
Manual	Calcium (Ca)	6 months	Figure 6	Representative sample
Manual	Magnesium (Mg)	6 months	Figure 6	Representative sample
Manual	Chlorine (Cl)	6 months	Figure 6	Representative sample
Manual	Sulphate (SO_4)	6 months	Figure 6	Representative sample
Manual	Bicarbonate (HCO_3)	6 months	Figure 6	Representative sample
Manual	Arsenic (As)	6 months	Figure 6	Representative sample
Manual	BOD	6 months	Figure 6	Representative sample
Manual	Standing water level	6 months	Figure 6	In-situ

An irrigation water quality monitoring program as shown in Table 12 is recommended to ensure groundwater is suitable for irrigation.

Table 12 – Project site – Irrigation water quality monitoring

Instrument	Parameter	Frequency	Location	Sampling method
Manual	pH	12 months	Figure 6	Representative sample
Manual	Total Dissolved Solids	12 months	Figure 6	Representative sample
Manual	Nitrogen (total)	12 months	Figure 6	Representative sample
Manual	Nitrogen (ammonia)	12 months	Figure 6	Representative sample
Manual	Nitrate (NO_3)	12 months	Figure 6	Representative sample
Manual	Nitrate-nitrogen (NO_3-N)	12 months	Figure 6	Representative sample
Manual	Total Phosphorus	12 months	Figure 6	Representative sample
Manual	Electrical Conductivity	12 months	Figure 6	Representative sample
Manual	Sodium (Na)	12 months	Figure 6	Representative sample
Manual	Potassium (K)	12 months	Figure 6	Representative sample
Manual	Calcium (Ca)	12 months	Figure 6	Representative sample
Manual	Magnesium (Mg)	12 months	Figure 6	Representative sample
Manual	Chlorine (Cl)	12 months	Figure 6	Representative sample
Manual	Sulphate (SO_4)	12 months	Figure 6	Representative sample
Manual	Bicarbonate (HCO_3)	12 months	Figure 6	Representative sample
Manual	Arsenic (As)	12 months	Figure 6	Representative sample
Manual	BOD	12 months	Figure 6	Representative sample

4.2.1.2 Groundwater level

Monitoring of groundwater level shall be undertaken within the Development site for environmental purposes as outlined in Table 13.

Table 13 – Project site – Groundwater level monitoring locations

Monitoring details	Location	Reference	Justification
Groundwater level	SFMB 1	Refer to Figure 6	Assess any potential seepage from effluent containment structures - impacts to groundwater.
Groundwater level	SFMB 2	Refer to Figure 6	Assess any potential seepage from effluent containment structures - impacts to groundwater.

4.2.2 Soils monitoring

Soil quality monitoring shall be undertaken within the effluent utilisation and solid waste utilisation areas for environmental and agronomic purposes as outlined in Table 14. Land suitable for effluent n and solid waste utilisation has been identified on the Project site as shown in Figure 3 and Figure 4.

Table 14 – Project site – Soil quality monitoring locations

Monitoring details	Location	Reference	Justification
Soil nutrient levels (Effluent utilisation)	Effluent utilisation area	Refer to Figure 3	Measured impacts to soils and assessment of system sustainability and sustainable application rates.
Soil nutrient levels (Solid waste utilisation)	Solid waste utilisation area	Refer to Figure 4	Measured impacts to soils and assessment of system sustainability and sustainable application rates.

4.2.2.1 Environmental monitoring

The proposed waste utilisation areas are relatively large. Consequently, to ensure a representative sample is obtained within each management unit, a representative, GPS located, sampling program shall be developed.

The sampling program shall be developed in accordance with the methodology determined by Gourley & Weaver (2019) based on the diameter of the sampler and the number of cores.

The proposed parameters to be measured, frequency of monitoring and relevant monitoring methods are summarised in Table 15 and Table 16.

Table 15 – Project site – Effluent utilisation area – Soils monitoring

Instrument	Parameter	Frequency	Location	Sampling method
Manual	Moisture content	Special Frequency 1	Refer to Figure 3	Special Method 1
Manual	pH	Special Frequency 1	Refer to Figure 3	Special Method 1
Manual	Nitrogen (total)	Special Frequency 1	Refer to Figure 3	Special Method 1
Manual	Nitrate (NO_3)	Special Frequency 1	Refer to Figure 3	Special Method 1
Manual	Nitrate-nitrogen (NO_3-N)	Special Frequency 1	Refer to Figure 3	Special Method 1
Manual	Organic Carbon	Special Frequency 1	Refer to Figure 3	Special Method 1
Manual	Electrical conductivity	Special Frequency 1	Refer to Figure 3	Special Method 1
Manual	Chloride	Special Frequency 1	Refer to Figure 3	Special Method 1
Manual	Cation exchange capacity	Special Frequency 1	Refer to Figure 3	Special Method 1
Manual	Exchangeable calcium	Special Frequency 1	Refer to Figure 3	Special Method 1
Manual	Exchangeable magnesium	Special Frequency 1	Refer to Figure 3	Special Method 1
Manual	Exchangeable potassium	Special Frequency 1	Refer to Figure 3	Special Method 1
Manual	Exchangeable sodium	Special Frequency 1	Refer to Figure 3	Special Method 1
Manual	Exchangeable sodium percentage	Special Frequency 1	Refer to Figure 3	Special Method 1
Manual	Total Phosphorus	Special Frequency 1	Refer to Figure 3	Special Method 1
Manual	Available Phosphorus (Colwell)	Special Frequency 2	Refer to Figure 3	Special Method 1
Manual	Phosphorus sorption capacity	Special Frequency 2	Refer to Figure 3	Special Method 1

For the purposes of Table 16, Special Frequency 1 means the collection of samples shall occur:

- prior to effluent application; and
- at least once every two (2) years.

For the purposes of Table 16, Special Frequency 2 means the collection of samples shall occur:

- prior to effluent application; and
- at least once every three (3) years.

For the purposes of environmental monitoring, Table 16, Special Method 1 means that, for each management unit within the effluent utilisation area representative composite samples must be taken of the: (a) top soils 0-10 cm; 10-20cm and (b) sub soils at 20-30 cm, 50-60 cm, 90-100 cm.

For the purposes of agronomic soil testing, Table 16, Special Method 1 means that, for each management unit within the effluent utilisation area representative composite samples must be taken of the: (a) top soils 0-10 cm.

Table 16 – Project site – Solid waste utilisation area – Soils monitoring

Instrument	Parameter	Frequency	Location	Sampling Method
Manual	Moisture content	Special Frequency 1	Refer to Figure 4	Special Method 1
Manual	pH	Special Frequency 1	Refer to Figure 4	Special Method 1
Manual	Nitrogen (total)	Special Frequency 1	Refer to Figure 4	Special Method 1
Manual	Nitrate (NO_3)	Special Frequency 1	Refer to Figure 4	Special Method 1
Manual	Nitrate-nitrogen (NO_3-N)	Special Frequency 1	Refer to Figure 4	Special Method 1
Manual	Organic Carbon	Special Frequency 1	Refer to Figure 4	Special Method 1
Manual	Electrical conductivity	Special Frequency 1	Refer to Figure 4	Special Method 1
Manual	Chloride	Special Frequency 1	Refer to Figure 4	Special Method 1
Manual	Cation exchange capacity	Special Frequency 1	Refer to Figure 4	Special Method 1
Manual	Exchangeable calcium	Special Frequency 1	Refer to Figure 4	Special Method 1
Manual	Exchangeable magnesium	Special Frequency 1	Refer to Figure 4	Special Method 1
Manual	Exchangeable potassium	Special Frequency 1	Refer to Figure 4	Special Method 1
Manual	Exchangeable sodium	Special Frequency 1	Refer to Figure 4	Special Method 1
Manual	Exchangeable sodium percentage	Special Frequency 1	Refer to Figure 4	Special Method 1
Manual	Total Phosphorus	Special Frequency 2	Refer to Figure 4	Special Method 1
Manual	Available Phosphorus (Colwell)	Special Frequency 2	Refer to Figure 4	Special Method 1
Manual	Phosphorus sorption capacity	Special Frequency 2	Refer to Figure 3	Special Method 1

For the purposes of Table 16, Special Frequency 1 means the collection of samples shall occur:

1) prior to solid waste application; and
2) at least once every two (2) years.

For the purposes of Table 16, Special Frequency 2 means the collection of samples shall occur:

1) prior to solid waste application; and

2) at least once every three (3) years.

For the purposes of environmental monitoring, Table 16, Special Method 1 means that, for each management unit within the effluent utilisation area representative composite samples must be taken of the: (a) top soils 0-10 cm; 10-20cm and (b) sub soils at 20-30 cm, 50-60 cm.

For the purposes of agronomic soil testing, Table 16, Special Method 1 means that, for each management unit within the effluent utilisation area representative composite samples must be taken of the: (a) top soils 0-10 cm.

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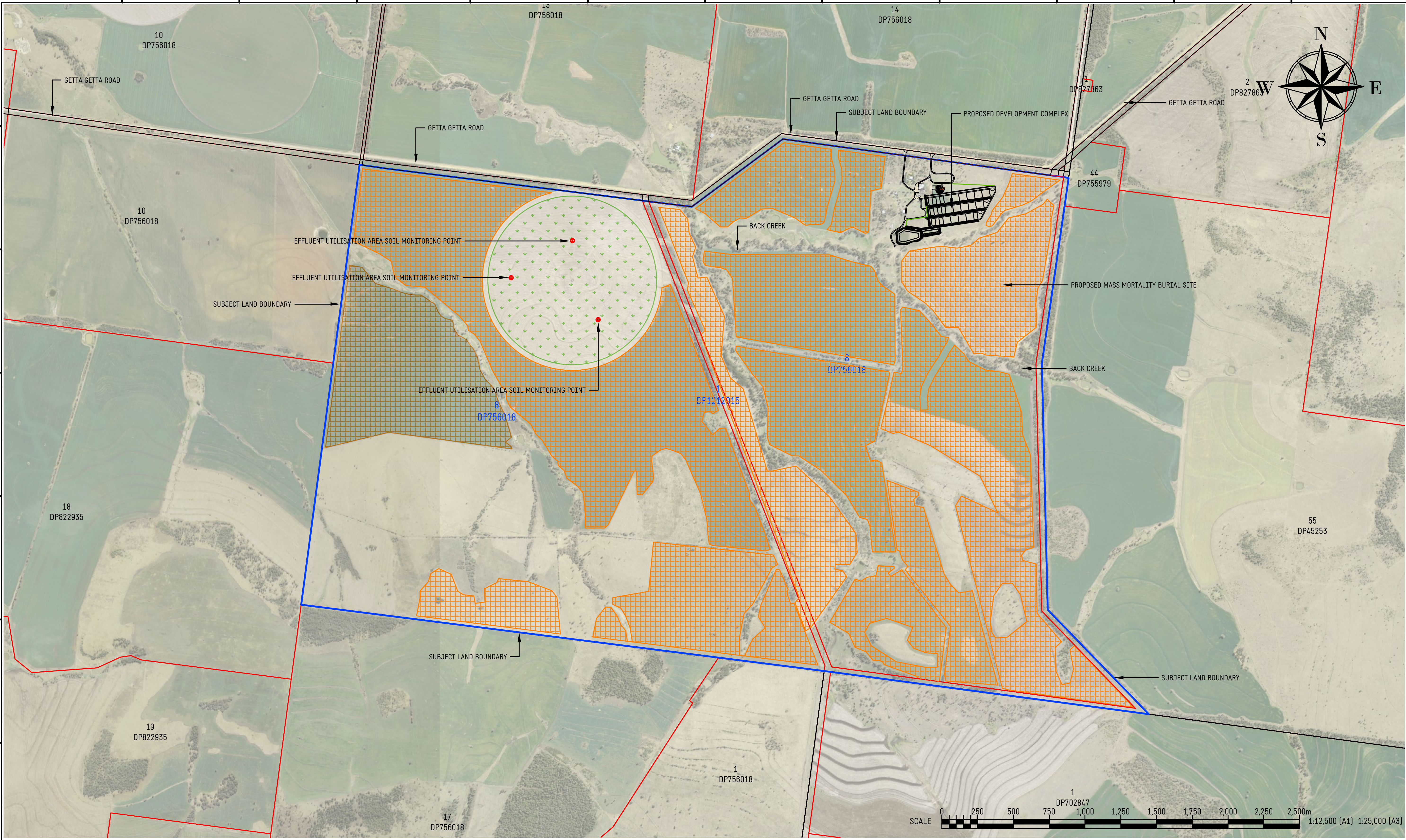

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PROJECT SITE - EFFLUENT UTILISATION AREA SOIL MONITORING POINTS

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FIGURE 3		A3	E2-103-425-03	B

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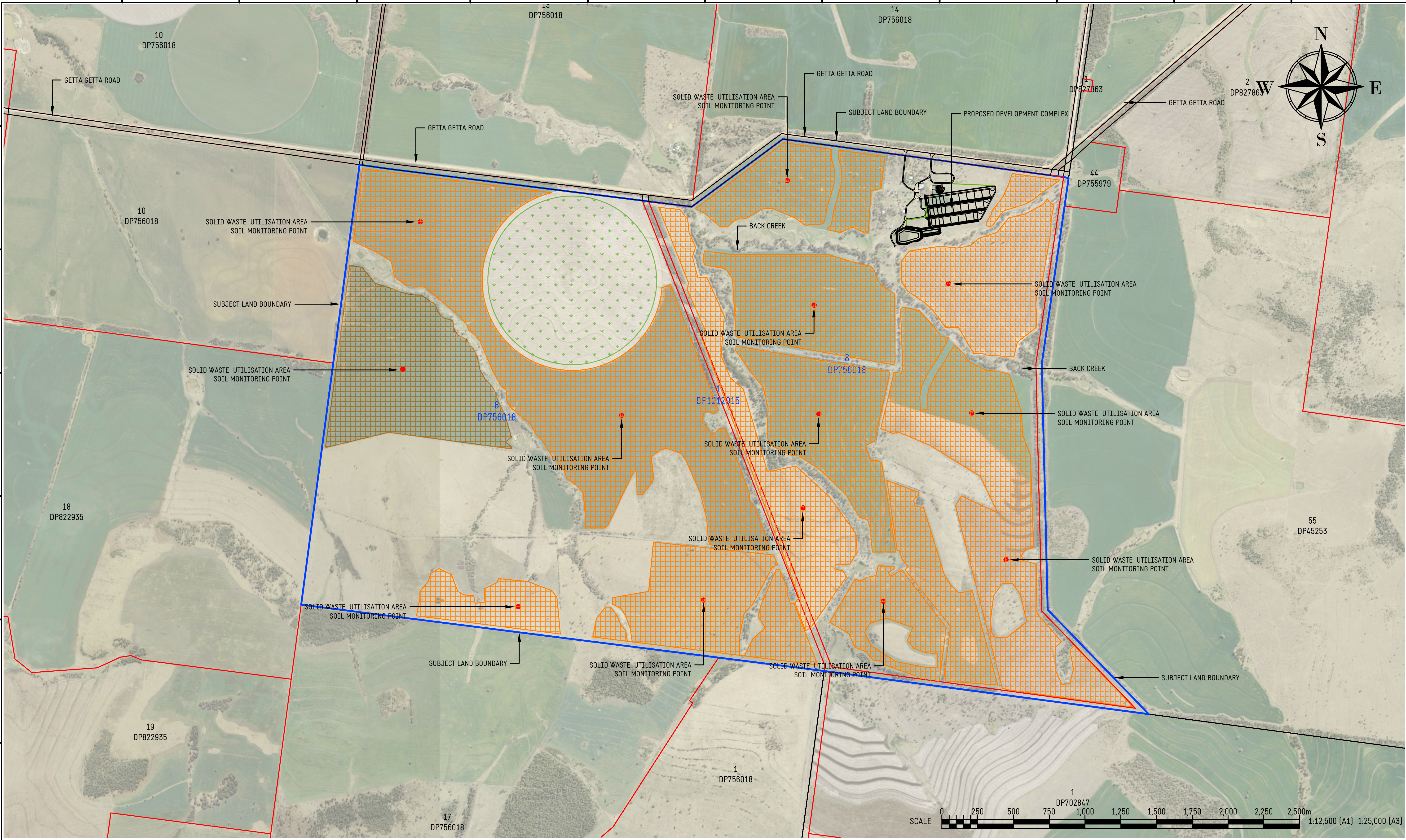

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TITLE DRAFT OPERATION ENVIRONMENTAL MONITORING MANAGEMENT PLAN
PROJECT SITE - SOLID WASTE UTILISATION AREA SOIL MONITORING POINTS

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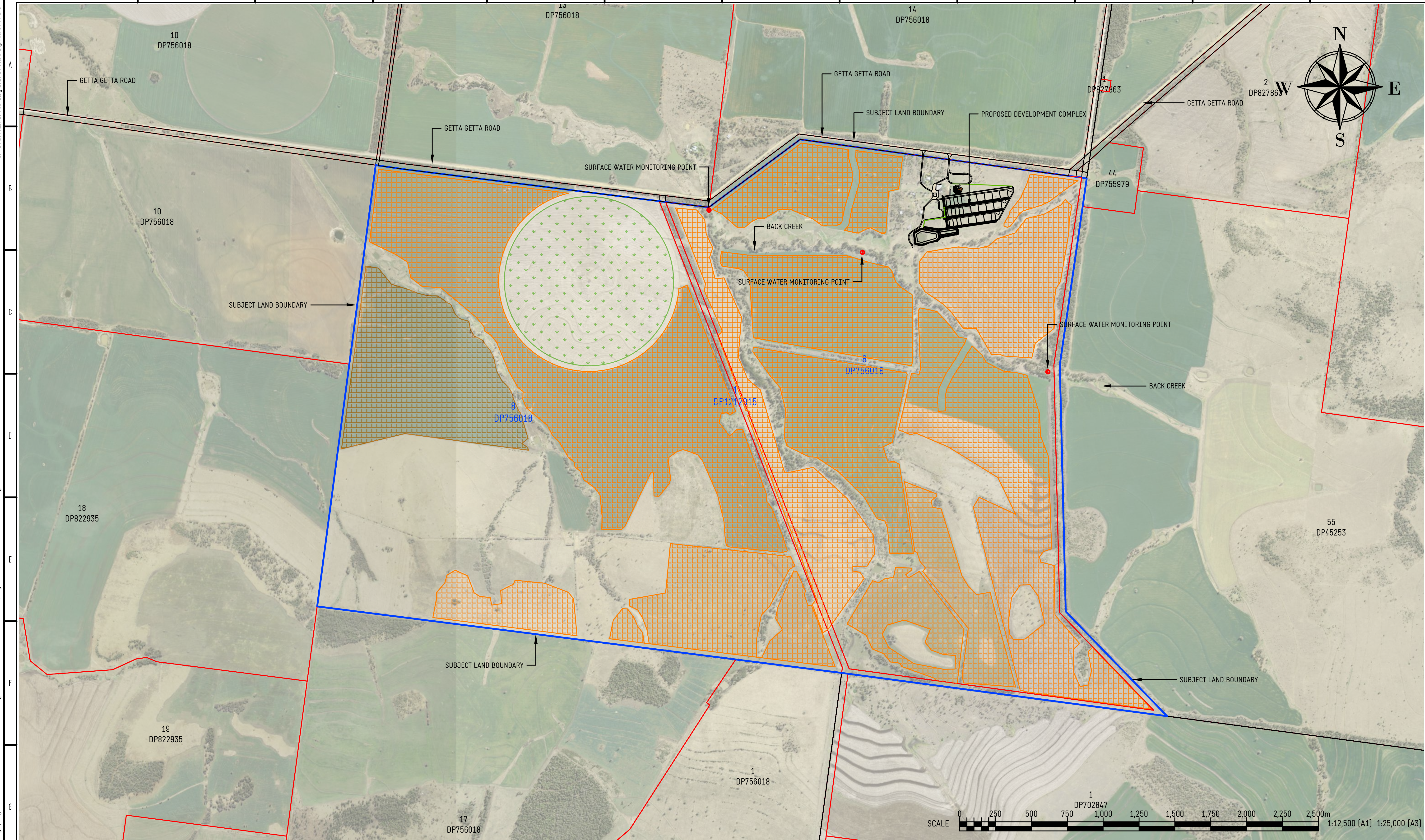
FIGURE 4		A3	E2-103-425-04	B



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CLIENT: DOOLIN FARMING PTY LTD

PROJECT: SPRINGFIELD BEEF CATTLE FEEDLOT

TITLE: DRAFT OPERATION ENVIRONMENTAL MONITORING MANAGEMENT PLAN
PROJECT SITE - SURFACE WATER MONITORING POINTS

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 5		A3	E2-103-425-05	B

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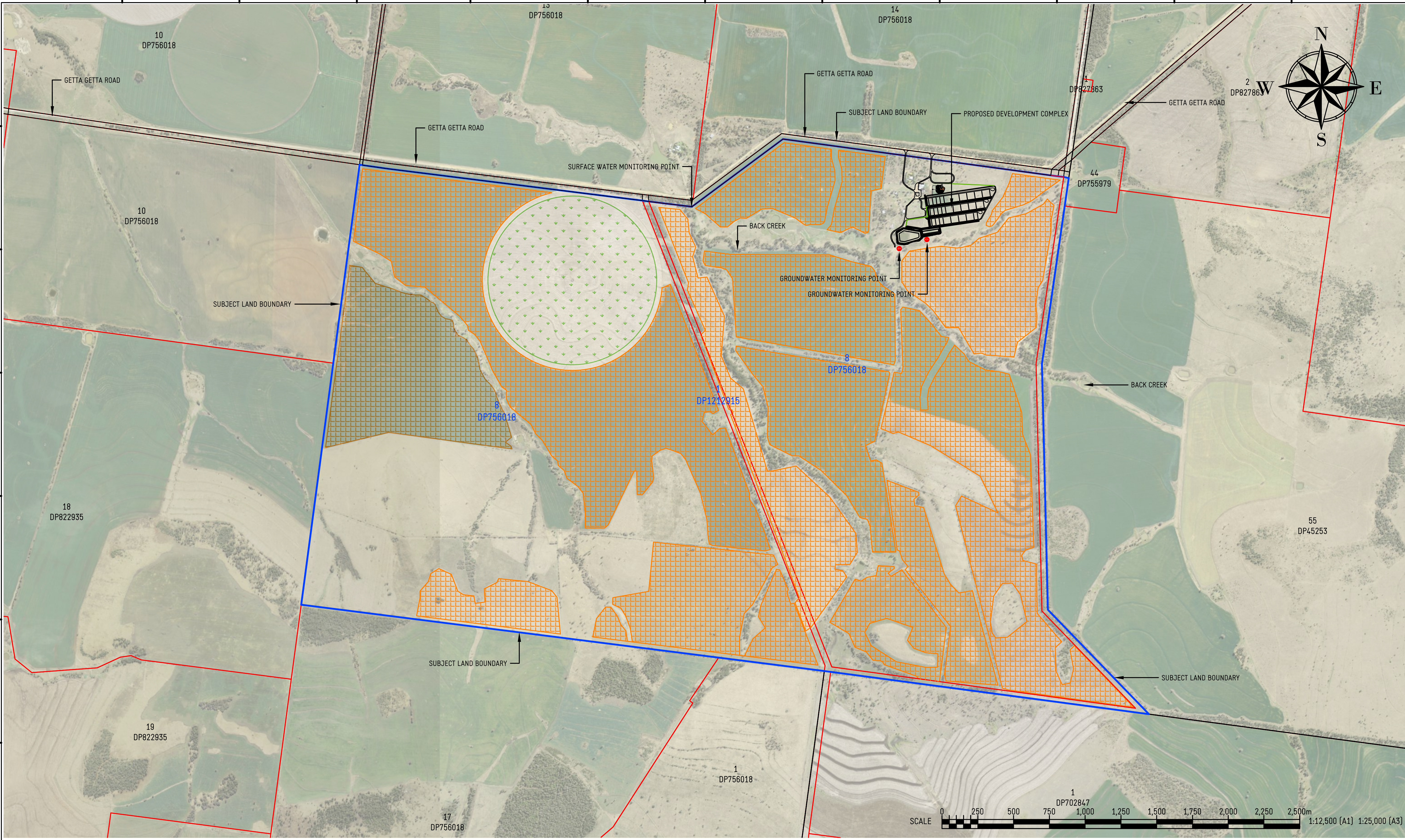

LEGEND

- SUBJECT LAND BOUNDARY
- LAND PARCEL BOUNDARY
- PROPOSED EFFLUENT UTILISATION AREA
- PROPOSED SOLID WASTE UTILISATION AREA

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CLIENT: DOOLIN FARMING PTY LTD

PROJECT: SPRINGFIELD BEEF CATTLE FEEDLOT

TITLE: DRAFT OPERATION ENVIRONMENTAL MONITORING MANAGEMENT PLAN
PROJECT SITE - GROUNDWATER MONITORING POINTS

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 6		A3	E2-103-425-06	B

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4.3 Solid and effluent waste quality

Regular monitoring and inspections will be undertaken during operation in accordance with Table 17. Additional requirements and responsibilities in relation to inspections and monitoring are documented in sections 11.1 and 11.2 of the OEMP.

The proposed locations of solid waste monitoring sites for the Project are presented in Figure 7 and Figure 8. The final locations of the solid waste monitoring sites are subject to agreement with NSW EPA.

The proposed number of monitoring locations, frequency of monitoring and relevant monitoring standards are summarised in Table 17. The solid waste sampling methods will be in accordance with the respective guidelines and standards detailed in Table 1.

The justification for the locations of solid and effluent monitoring sites are provided in Table 17.

Table 17 – Project site – Effluent and solid waste monitoring details

Monitoring details	Location	Responsibility	Frequency	Record	KPI
Solid waste quality	Refer to Figure 7	Farm Manager	As outlined in Table 19	Annual Return	No adverse impacts to soils
Mass of solid waste utilised on-site	Refer to Figure 8	Farm Manager	As outlined in Table 20	Annual Return	No adverse impacts to soils and/or sensitive receivers
Mass of solid waste removed off-site	Refer to Figure 7	Farm Manager	As outlined in Table 20	Annual Return	Sustainable accumulation of solid waste in solid waste storage and processing area
Volume of sludge accumulating in holding pond(s)	Refer to Figure 7	Farm Manager	As outlined in Table 20	Annual Return	Wet weather storage capacity of holding pond is maintained
Effluent quality	Refer to Figure 7	Farm Manager	As outlined in Table 22	Annual Return	No adverse impacts to soils
Effluent applied to utilisation area	Refer to Figure 8	Farm Manager	As outlined in Table 21	Annual Return	No adverse impacts to soils, groundwater, surface water and/or sensitive receivers
Holding pond(s) overflow volume	Refer to Figure 7	Farm Manager	Each overflow event	Annual Return	No adverse impacts to surface water
Holding pond(s) overflow effluent quality	Refer to Figure 7	Farm Manager	As outlined in Table 22	Annual Return	No adverse impacts to surface water

Table 18 – Project site – Effluent and solid waste monitoring justification

Monitoring details	Location	Reference	Justification
Solid waste quality	Solid waste stockpile	Refer to Table 19	Analysed for nutrient levels to calculate nutrient applied
Mass of solid waste utilised on-site	Loader scales / Truck numbers	Refer to Table 20	Dry matter by nutrient level to calculate nutrient applied
Mass of solid waste removed off-site	Loader scales / Truck numbers	Refer to Table 20	To calculate solid waste removed off-site
Volume of sludge accumulating in holding pond	Holding pond(s)	Refer to Table 20	Measured to ensure storage capacity of holding pond is maintained
Effluent quality	Holding pond(s)	Refer to Table 22	Analysed for nutrient levels to calculate nutrient applied
Effluent applied to utilisation area	Pumping time / pump capacity / Flow meter	Refer to Table 21	Volume by nutrient level to calculate nutrient applied
Holding pond(s) overflow volume	Holding pond bywash - overflow event	Refer to Table 21	Overflow volume estimated level of risk presented by overflow to downstream receivers
Holding pond(s) overflow effluent quality	Holding pond bywash – overflow event	Refer to Table 22	Overflow quality estimated level of risk presented by overflow to downstream receivers

Table 19 – Project site – Solid waste quality monitoring

Instrument	Parameter	Frequency	Location	Sampling method
Manual	Calcium	Every 12 months	Figure 7	Representative sample
Manual	Chloride	Every 12 months	Figure 7	Representative sample
Manual	Electrical conductivity	Every 12 months	Figure 7	Representative sample
Manual	Magnesium	Every 12 months	Figure 7	Representative sample
Manual	Moisture content	Every 12 months	Figure 7	Representative sample
Manual	Nitrate-nitrogen	Every 12 months	Figure 7	Representative sample
Manual	Nitrogen (total)	Every 12 months	Figure 7	Representative sample
Manual	Organic carbon	Every 12 months	Figure 7	Representative sample
Manual	pH	Every 12 months	Figure 7	Representative sample
Manual	Phosphorus(total)	Every 12 months	Figure 7	Representative sample
Manual	Potassium	Every 12 months	Figure 7	Representative sample
Manual	Sodium	Every 12 months	Figure 7	Representative sample
Manual	Sulfur	Every 12 months	Figure 7	Representative sample

Table 20 – Project site – Solid waste mass monitoring

Location	Frequency	Units of Measure	Sampling method
Mass of solid waste utilised on-site	Yearly	kg / ha	Special Method 1
Mass of solid waste removed off-site	Yearly	tonnes	Special Method 2
Sludge accumulation	Every 3 years	m^3	Special Method 3

For the purposes of Table 20 above Special Method 1 means that the mass of:

1. Solid waste (dry matter) and nutrient (Total Phosphorus, Total Nitrogen and Potassium) applied to each management unit of the solid waste utilisation area; and
2. Crop yield (dry matter) and nutrients removed (Total Phosphorus, Total Nitrogen and Potassium) for each management unit of the solid waste utilisation area;

For the purposes of Table 20 above Special Method 2 means that

a) the quantity of solids taken from the solid waste stockpile and removed off-site.
b) Date / Identity of person removing solids and destination

For the purposes of Table 20 above Special Method 3 means that

a) the volume of sludge accumulating in the holding pond as determined by the measurement method outlined in Appendix A.
b) Date / Identity of person removing sludge from the holding pond and destination.

Table 21 – Project site – Effluent volume monitoring

Location	Frequency	Units of Measure	Sampling Method
Volume of effluent applied to utilisation area	Yearly	ML, kg /ha	Special Method 3

For the purposes of Table 21 above Special Method 3 means that:

1. Volume data is calculated by volume flow rate or pump capacity multiplied by operating time;
2. Mass of nutrients (Total Phosphorus, Total Nitrogen and Potassium) applied to each the effluent utilisation area; and
3. Crop yield (dry matter) and nutrients removed (Total Phosphorus, Total Nitrogen and Potassium) from the effluent utilisation area;

Table 22 – Project site – Effluent quality monitoring (Holding Pond)

Instrument	Parameter	Frequency	Location	Sampling method
Manual	Calcium	12 months	Figure 7	Representative sample
Manual	Chloride	12 months	Figure 7	Representative sample
Manual	Electrical conductivity	Special Frequency 1	Figure 7	Representative sample
Manual	Magnesium	12 months	Figure 7	Representative sample
Manual	Nitrate-nitrogen	Special Frequency 1	Figure 7	Representative sample
Manual	Nitrogen (ammonia)	Special Frequency 1	Figure 7	Representative sample
Manual	pH	Special Frequency 1	Figure 7	Representative sample
Manual	Phosphorus(total)	Special Frequency 1	Figure 7	Representative sample
Manual	Phosphorus (reactive)	Special Frequency 1	Figure 7	Representative sample
Manual	Potassium	12 months	Figure 7	Representative sample
Manual	Sodium	12 months	Figure 7	Representative sample
Manual	Sodium adsorption ratio	12 months	Figure 7	Representative sample
Manual	Total Kjeldahl Nitrogen	12 months	Figure 7	Representative sample
Manual	Total suspended solids	Special Frequency 1	Figure 7	Representative sample

For the purposes of Table 22 above Special Frequency 1 means that the collection of samples shall occur at

a) Each overflow event; and
b) Every 12 months

LEGEND

- SUBJECT LAND BOUNDARY
- LAND PARCEL BOUNDARY

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PROJECT: SPRINGFIELD BEEF CATTLE FEEDLOT

TITLE: DRAFT OPERATION ENVIRONMENTAL MONITORING MANAGEMENT PLAN
PROJECT COMPLEX - SOLID AND LIQUID WASTE MONITORING POINTS

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 7		A3	E2-103-425-07	B

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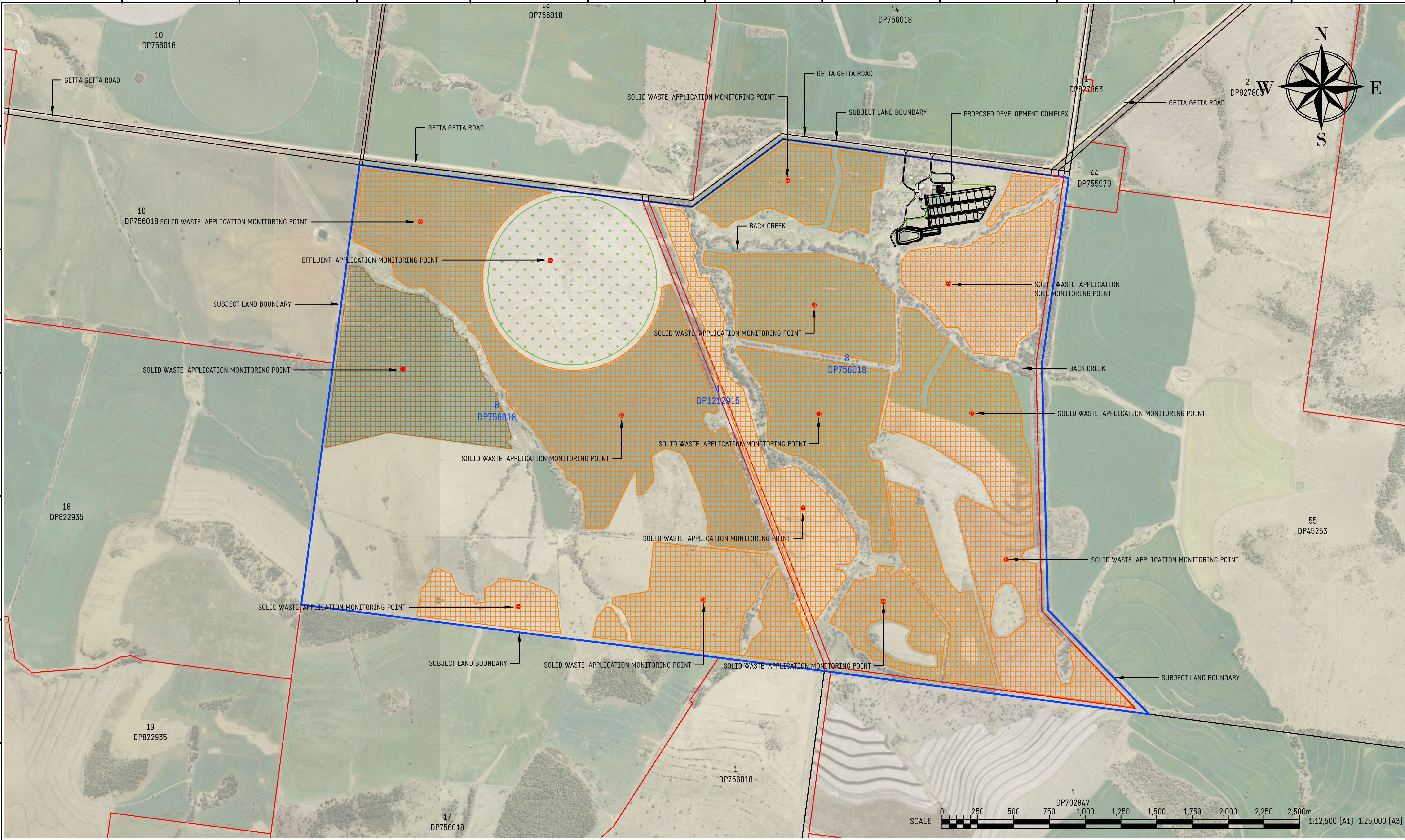

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PROJECT: SPRINGFIELD BEEF CATTLE FEEDLOT

TITLE: DRAFT OPERATION ENVIRONMENTAL MONITORING MANAGEMENT PLAN
PROJECT SITE - EFFLUENT AND SOLID WASTE
APPLICATION MONITORING POINTS

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 8		A3	E2-103-425-08	B

5 Implementation

5.1 Roles and responsibilities

The organisational structure and overall roles and responsibilities of the Project team are outlined in section 6.3 of the OEMP. Specific responsibilities for the implementation of environmental controls are detailed in Table 5, Table 8 and Table 17.

5.2 Induction

The Project has a site induction program that all contractors and employees are required to complete prior to undertaking any work on the Project site in accordance with section 8.1 of the OEMP.

Prior to conducting environmental monitoring for the Project, all employees and/or subcontractors will undergo site induction relating to environmental monitoring and management issues, including:

- Requirements of this Plan;
- Relevant legislation; and
- Roles and responsibilities for environmental monitoring.

5.3 Training

All employees and/or subcontractors that undertake environmental monitoring shall be suitably qualified and experienced.

Further details regarding employee training are outlined in section 8.2 of the OEMP.

6 Performance evaluation

6.1 Performance indicators

The extent to which this Plan complies with CoA will be measured by the following performance indicators:

- Compliance with relevant air quality standards at monitoring locations, in particular those representative of sensitive receptor locations;
- Minimisation of air quality (odour, dust) complaints as evidenced by trends in the frequency and number of complaints;
- Compliance with relevant baseline standards at monitoring locations; and
- Compliance with this plan, as indicated by internal and statutory reporting.

6.2 Reporting

Environmental monitoring reporting is designed to comply with the CoA and provide stakeholder access to relevant quality information and data.

Key stakeholders requiring access to this information include Doolin Farming Pty Ltd, state and local government agencies and the local community. Annual reporting will be undertaken in accordance with CoA and the Annual Return requirements detailed in the EPL.

Doolin Farming Pty Ltd will report on the performance of the environmental monitoring program in the Annual Return for the EPL.

Doolin Farming Pty Ltd is required to report pollution incidents immediately and without delay in accordance with the requirements of the *POEO Act 1997*.

6.3 Auditing

The auditing requirements of environmental monitoring are outlined in section 6.3 of the OEMP.

7 Review and Improvement

7.1 Non-conformances and corrective actions

Any non-conformances related to environmental monitoring will be dealt with and documented in accordance with section 11.5 of the OEMP.

7.2 Continual improvement

This Plan and associated monitoring program will be reviewed and if necessary revised to the satisfaction of the NSW EPA as the Department currently administering the *Protection of the Environment Operations Act 1997*) in accordance with section 12 of the OEMP:

- where a risk assessment identifies the requirement to alter the plan;
- following changes to project approval or EPL conditions relating to environmental monitoring;
- following any significant air quality, soil or water quality related incident;
- where there is a relevant change in technology or legislation; or
- for necessary or any unforeseen changes to environmental monitoring locations.

8 References

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Appendix A – Standard Operational Procedures

OEMMP SOP 1 – Air Quality – Compliance monitoring

Aspect	Air quality – Compliance Monitoring
Objectives	To record site-specific weather data.
Potential Impacts	Non-compliance with CoA. Poor management of effluent and solid waste resulting in odour or dust nuisance Locating point sources of nuisance odour and dust emissions.
Control Actions	Implement and maintain a permanently located automatic weather station (AWS) on-site to continuously record weather data. A suitably trained person will perform the inspection of the AWS and download recorded data. Each day, data for each parameter shown on the real-time display system will be reviewed against existing meteorological conditions. Download meteorological data weekly and store in data management system. Review weekly the weather data for continuity / missing records and advise the Environmental Specialist of any spurious data as required. Inspect the AWS every week. At each inspection the following actions shall be performed: • Check the AWS is energised from power source; • Inspect the tipping bucket rain gauge and clean settled dust and/or clear blockages if required; • Inspect the wind speed and direction sensors for damage and clear any cobwebs if required; • Report any equipment damage to the Environmental Specialist.
Relevant Standards, Management Plans, Records	CoA Personnel induction, training and awareness AS 3580 Methods of sampling and analysis of ambient air
Responsibility	As required by the OEMP and specific requirements outlined in section 5.1.
Performance Indicators	Ensure all personnel responsible for the management of the meteorological station and metrological methods are adequately trained. The meteorological station provides long-term high quality, continuous meteorological data.
Monitoring	As required by the OEMP and specific requirements outlined in section 4.1.
Reporting	As required by the OEMP and specific requirements outlined in section 6.2.
Corrective Actions	Review weather data and management of the meteorological station. Seek specialist advice if inconsistent or spurious data is identified.

OEMMP SOP 2 - Soil and Water Quality – Soil quality monitoring procedure

Aspect	Soil and water quality – Soil quality monitoring
Objectives	To implement a soil quality monitoring program to monitor the quality of soils in the effluent and solid waste utilisation areas such that impacts on community amenity, occupational health and the environment are minimised.
Potential Impacts	Occupational health and safety of employees and contractors. Animal health and performance. Receiving environment such as groundwater or terrestrial ecosystems affected by pollution events. Receiving environment such as agricultural crops impacted by pollution events.
Control Actions	Implement a soil quality monitoring program for the effluent and solid waste utilisation areas in accordance with this Plan. Undertake soil quality monitoring from the relevant monitoring points in accordance with the EPL. Identify the location of monitoring points within the effluent and solid waste application areas using GPS. Prepare chain of custody form and sample bags for each sample. Identify parameters to be tested and outline on the relevant chain of custody form. Refer section 8.2 for requirements. Collect representative soil sample(s) and store in appropriate sample bags as per relevant monitoring and sampling guidelines. Samples are to be sent as soon as possible after collection to a NATA-accredited laboratory for the parameters to be analysed with the relevant chain of custody forms.
Relevant Standards, Management Plans, Records	CoA Non-compliance record Personnel induction, training and awareness Redding (2003) Sampling Manual for environmental monitoring by intensive livestock industries Annual Return
Responsibility	As required by the OEMP and specific requirements outlined in section 4.2.
Performance Indicators	Ensure all personnel responsible for monitoring are adequately trained. No non-compliances with CoA. No adverse impacts to environmental values.
Monitoring	As required by the OEMP and specific requirements outlined in section 4.2.
Reporting	As required by the OEMP and specific requirements outlined in section 6.2.
Corrective Actions	Review soil quality monitoring program. Seek specialist advice where a significant level of environmental risk or impact is identified with soil quality parameters.

OEMMP SOP 3 – Soil and Water Quality – Water quality monitoring procedure

Aspect	Soil and water quality – Water quality monitoring
Objectives	To implement a water quality monitoring program to monitor and report on the quality of water from various sources such that impacts on community amenity, occupational health and the environment are minimised.
Potential Impacts	Occupational health and safety of employees and contractors. Animal health and performance. Receiving environment such as surface water and aquatic and terrestrial ecosystems affected by pollution events. Community amenity and health from impacts on water sources. Receiving environment such as agricultural crops impacted by pollution events.
Control Actions	Implement a water quality monitoring program for groundwater and surface water in accordance with this Plan. Undertake groundwater and surface water quality monitoring from the relevant monitoring points in accordance with the EPL. Prepare chain of custody form and sample bottle for each sample. Identify parameters to be tested and outline on the relevant chain of custody form. Refer section 8.2 for requirements. Collect representative water sample(s) and store in appropriate sample bottle as per relevant monitoring and sampling guidelines. Samples are to be sent as soon as possible after collection to a NATA-accredited laboratory for the parameters to be analysed with the relevant chain of custody forms.
Relevant Standards, Management Plans, Records	CoA Non-compliance record Personnel induction, training and awareness Redding (2003) Sampling Manual for environmental monitoring by intensive livestock industries Annual Return
Responsibility	As required by the OEMP and specific requirements outlined in section 4.2.
Performance Indicators	Ensure all personnel responsible for monitoring are adequately trained. No non-compliances with CoA. No adverse impacts to environmental values.
Monitoring	As required by the OEMP and specific requirements outlined in section 4.2.
Reporting	As required by the OEMP and specific requirements outlined in section 6.2.
Corrective Actions	Review water quality monitoring program. Seek specialist advice where a significant level of environmental risk or impact is identified with water quality parameters.

OEMMP SOP 4 - Solid waste and effluent – Compliance monitoring

Aspect	Solid waste and effluent management – Compliance monitoring
Objectives	To implement a solid waste and effluent monitoring program to monitor and report on solid waste and effluent such that impacts on community amenity, occupational health and the environment are minimised.
Potential Impacts	Occupational health and safety of employees and contractors. Animal health and performance. Receiving environment such as groundwater, surface water and aquatic and terrestrial ecosystems affected by pollution events. Community amenity and health from impacts on water sources. Receiving environment such as agricultural crops impacted by pollution events. Non-compliance with CoA.
Control Actions	Implement an effluent and solid waste monitoring program in accordance with this Plan. Undertake solid waste and effluent monitoring from the relevant monitoring points in accordance with the EPL. Prepare chain of custody form and sample bottle/bag for each sample. Identify parameters to be tested and outline on the relevant chain of custody form. Refer section 8.2 for requirements. Collect representative solid waste / effluent sample(s) and store in appropriate sample bag/bottle as per relevant monitoring and sampling guidelines. Samples are to be sent as soon as possible after collection to a NATA-accredited laboratory for the parameters to be analysed with the relevant chain of custody forms. Review and evaluate the solid waste and effluent monitoring program and results for compliance with CoA. Regular liaison with the NSW EPA on efficacy of monitoring program and sustainability indicators.
Relevant Standards, Management Plans, Records	CoA Redding (2003) Sampling Manual for environmental monitoring by intensive livestock industries Personnel induction, training and awareness Annual Return
Responsibility	As required by the OEMP and specific requirements outlined in section 4.3.
Performance Indicators	Ensure all personnel responsible for monitoring are adequately trained. No non-compliances with CoA. No adverse impacts to environmental values.

Monitoring	As required by the OEMP and specific requirements outlined in section 4.3.
Reporting	As required by the OEMP and specific requirements outlined in section 6.2.
Corrective Actions	Review solid waste and effluent monitoring program. Seek specialist advice where a significant level of environmental risk or impact is identified with solid waste and effluent utilisation in indicators of sustainability.

Appendix Q

Traffic Impact Assessment

Proposed Intensive livestock agriculture development (Expansion of beef cattle feedlot from 999 head to 3,000 head) on the property "Springfield"

Traffic Impact Assessment

"Springfield"
2513 Getta Getta Road
North Star NSW 2408

Doolin Farming Pty Ltd
"Glenhoma"
3202 Getta Getta Road
NORTH STAR NSW 2408

[February 2025]

RDC ENGINEERS
AGRICULTURAL
ENVIRONMENTAL
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Document Information Record

Project details

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Project:	Proposed expansion of Springfield Feedlot from 999 to 3,000 head
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Version	Recipient	Lodgement	Copies
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Disclaimer

Citation

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Executive summary

Doolin Farming Pty Ltd own and operate a 10,000 ha mixed farming operation across several properties at North Star including "Glenhoma", "Glenmodel", "Springfield", "Myall Downs" and "Yetman West" some 27 km east of Yetman and 45 km south-southeast of Goondiwindi (QLD) in NSW.

Doolin Farming Pty Ltd primarily engage in dryland and irrigated cropping and beef production. Doolin Farming Pty Ltd produces wheat, barley, oats and chickpeas in winter and cotton and maize in summer under pivot irrigation systems and dryland sorghum cropping. Doolin Farming Pty Ltd also have onsite storage to accommodate almost the entire grain produced and operate a fleet of trucks to transport their grain.

Central to the beef production enterprise is the breeding, growing and lot-feeding of cattle for the domestic market. Currently the beef supply chain includes breeding and growing of beef cattle on land less suitable for dryland and irrigated cropping and grazing of stubble and lot feeding of cattle within a feedlot on the property 'Springfield".

"Springfield" comprises some 1,713 ha (~4,231 acres) and currently, a dryland and irrigated cropping business is undertaken on a large proportion of the property with extensive cattle breeding and grazing of beef cattle on the remaining land which is unsuitable for cropping and lot feeding of cattle within a beef cattle feedlot in the north-east of the property. In the last few years, beef cattle bred on several adjoining properties have been walked into a feeding program on "Springfield" upon weaning. "Springfield" has built infrastructure such as a dwelling, machinery sheds, silos, cattle yards and feedlot etc to support the feeding program.

There has been a beef cattle feedlot on "Springfield" for over three years after approval was granted for a 999 head feedlot by the Gwydir Shire Council in 2021 (DA31/2020). Under Schedule 3, Part 1 Item 27 of the *Environmental Planning and Assessment Regulation 2021*, as the capacity of the existing development does not exceed 1000 head it is not a designated development and an environmental licence from NSW EPA is not required.

The existing feedlot is known as Springfield Feedlot. Springfield Feedlot is used to finish the Doolin Farming's own cattle for the domestic and export markets.

Springfield Feedlot currently operates for 12 months of the year and employs approximately 2 full time staff. Casual staff and contractors are engaged as required during busy periods such as planting and harvesting of silage and fodder and to supply various associated services such as plant maintenance and veterinary requirements.

Springfield Feedlot includes one controlled drainage area with associated production pens and drainage system which includes catch drains, sedimentation basin and holding pond. Springfield Feedlot also has auxiliary infrastructure to support the use such as cattle handling and feed storage and processing facilities.

Springfield Feedlot is accredited under the National Feedlot Accreditation Scheme (NFAS) with audits conducted annually.

Doolin Farming Pty Ltd wish to expand Springfield Feedlot from the current approved capacity of 999 head by gaining development approval for intensive livestock agriculture to operate as a 3,000 head beef cattle feedlot on the site. The proposed development is to be developed in two stages with the first stage having a capacity of 1,251 head. The second stage will provide an additional 750 head, bringing the capacity of Springfield Feedlot to 3,000 head.

The proposed development will include additional production pens and redeveloped cattle handling facility within an expanded controlled drainage area, additional sedimentation basin and holding pond capacity. The proposed development will incorporate best practice design, construction and environmental management.

Existing infrastructure such as the grain storage and processing facilities have sufficient capacity to cater for the demands of the proposed development.

The property "Springfield" is within the Gwydir Shire Council local government area and relevant environmental planning instrument is the *Gwydir Local Environmental Plan 2013* (GLEP).

Doolin Farming Pty Ltd have access to a secure and appropriately licensed water supply provided by groundwater from the NSW Great Artesian Basin Eastern recharge groundwater source for irrigation and stock intensive use on the subject land under access licence 90AL834721.

Beef cattle feedlots which exceed 1,000 head capacity are defined as designated development under Schedule 3 (Part 1 section 21a) of the Environmental Planning and Assessment Regulation 2000 and therefore require a full Environmental Impact Statement (EIS) to accompany the development application.

This Traffic Impact Assessment has been prepared as part of an EIS to support the Development Application to the Gwydir Shire Council for the proposed development and assesses the impact and mitigation treatments (if any) required for the external road network.

The traffic impact assessment determined that no upgrades are recommended within the sealed section of Getta Getta Road, North Star Road, Warialda Road or Bruxner Way as these roads meet the minimum standard and existing road order classification commensurate with existing and proposed traffic volumes. The segments of these roads which shall be impacted by the proposed development are a minimum of 6 m pavement width on a 7 m formation width.

No intersection upgrades to the local road network would be warranted due to the low additional volume of development traffic and intersection geometry is able to accommodate the largest vehicle proposed to access the site.

The following mitigation measures are proposed or maintained:

- Access for light and heavy vehicles be maintained via a new dedicated subject land entrance off Getta Getta Road approximately 200 m east of the existing subject land entrance to provide sufficient sight distances to and from the intersection.
- Advisory signage (Truck crossing or entering) be implemented on each approach to the dedicated entrance off Getta Getta Road in accordance with AS1742.2 to advise motorists of truck turning movements.
- A Traffic Management Plan shall be implemented for the proposed development.

In conclusion, the proposed development will not adversely impact on the operational performance of the surrounding road network and the proposed road access arrangements are considered adequate and suitable for the proposed use.

1 Background

1.1 Introduction

Doolin Farming Pty Ltd own and operate a 10,000 ha mixed farming operation across several properties at North Star including “Glenhoma”, “Glenmodel”, “Springfield”, “Myall Downs” and “Yetman West” some 27 km east of Yetman and 45 km south-southeast of Goondiwindi (QLD) in NSW.

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Springfield Feedlot includes one controlled drainage area with associated production pens and drainage system which includes catch drains, sedimentation basin and holding pond. Springfield Feedlot also has auxiliary infrastructure to support the use such as cattle handling and feed storage and processing facilities.

Springfield Feedlot is accredited under the National Feedlot Accreditation Scheme (NFAS) with audits conducted annually.

Doolin Farming Pty Ltd wish to expand Springfield Feedlot from the current approved capacity of 999 head by gaining development approval for intensive livestock agriculture to operate as a 3,500 head beef cattle feedlot on the site. The proposed development is to be developed in two stages with the first stage having a capacity of 1,475 Head. The second stage will provide an additional 1,025 Head, bringing the capacity of Springfield Feedlot to 3,500 Head.

The proposed development will include additional pens within an expanded controlled drainage area, additional sedimentation basin and holding pond capacity. The proposed development will incorporate best practice design, construction and environmental management.

Existing infrastructure such as the grain storage and processing and cattle handling facilities have sufficient capacity to cater for the demands of the proposed development.

The property "Springfield" is within the Gwydir Shire Council local government area and relevant environmental planning instrument is the *Gwydir Local Environmental Plan 2013* (GLEP).

Doolin Farming Pty Ltd have access to a secure and appropriately licensed water supply provided by groundwater from the NSW Great Artesian Basin Eastern recharge groundwater source for irrigation and stock intensive use on the subject land under access licence 90AL834721.

Beef cattle feedlots which exceed 1,000 head capacity are defined as designated development under Schedule 3 (Part 1 section 21a) of the Environmental Planning and Assessment Regulation 2000 and therefore require a full Environmental Impact Statement (EIS) to accompany the development application.

This Traffic Impact Assessment forms part of an EIS prepared to support the Development Application to the Gwydir Shire Council for the proposed development and assesses the impact and mitigation treatments (if any) required for the external road network.

1.1.1 Scope

The objective of this report is to identify the traffic and transport impacts associated with the proposed expansion of Springfield Feedlot from 999 Head to 3,200 Head and the proposed on-site and off-site measures proposed to mitigate the impacts of the development on any road or rail related infrastructure. The report will form part of the Environmental Impact Statement (EIS) for the proposed development and provides the Gwydir Shire Council and the TfNSW the opportunity to adequately consider any traffic or transport related impacts.

The assessment is based on the following general scope for matters to consider in a TIA which is defined by the NSW Roads and Maritime Services (RMS) Guide to Traffic Generating Developments (RTA 2002):

- The existing locality and surrounding land uses;
- Review the existing road network to understand the current road connections and conditions.
- Estimation of the traffic generation of the proposed development based on the proposed activities and car parking requirements;
- Estimate the traffic distribution onto the surrounding road network;
- Provide engineering advice on access arrangements into the development site and geometric requirements including upgrade requirements (if any) to adjacent roads and intersections.
- Assessment of the impact of the additional trips generated from the proposed development on the local road network and any traffic management measures; and
- Analysis of the impact of the existing and proposed development on the road network with consideration for a 10 year horizon.

1.1.2 References and guidelines

In preparing this report, references are made to the following traffic engineering and council sources:

- Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections, (Austroads, 2021);
- Guide to Road Design Part 3: Geometric Design (Austroads, 2021);
- Gwydir Local Environment Plan 2013 (Gwydir Shire Council, 2013);
- Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings Management, (Austroads, 2020);
- Guide to Traffic Engineering Practice – Part 5 – Intersections at Grade (Austroads, 2009);
- Guide to Traffic Management Part 12: Integrated Transport Assessments for Developments (Austroads, 2020); and
- Austroads Supplement for Guide to Traffic Management Roads and Maritime Services (Roads and Maritime Services, 2013); and
- Roads and Traffic Authority, 2002, Guide to Traffic Generating Developments, Version 2.2 (RTA, 2002).

This report has been prepared by Rod Davis (FIEAust, CPEng, RPEQ#20256, CPESC).

2 Site and locality

2.1 Subject land

The proposed development is to be located on two land parcels which form the property known as "Springfield".

"Springfield" is located on Getta Getta Road, North Star approximately 15 km by road east of North Star and some 27 km west-southwest of Yetman in the North Star region of New South Wales.

The subject land has primary frontage to Getta Getta Road (sealed) of approximately 5 km in length. Getta Getta Road intersects with North Star Road some 14 km west and with Warialda Road some 25 km east of the entrance for the proposed development complex respectively.

Getta Getta Road is a sealed road from the bridge crossing over Ottleys Creek to North Star and generally runs in an east-west direction.

Figure 1 is a locality plan highlighting the subject land to roads and the nearby townships of North Star and Yetman.

2.1.1 Real property description

The subject land comprises of two (2) cadastral portions. The description of the subject land is provided in Table 1. The total area of the subject land is about 1,713.2 ha (~4,231 acres). The subject land is in the Gwydir Shire.

Figure 2 is a cadastral plan highlighting the cadastral parcels that comprise the subject land.

Table 1 – Subject land – Description

Property name	Lot no.	Plan no.	Easements	Area Ha	Local government area
"Springfield"	8	DP756018	DP1237694	~883.3	Gwydir Shire
"Springfield"	8	DP756018	DP1237694	~792.7	Gwydir Shire
"Springfield"	1	DP1212915	-	~37.2	Gwydir Shire
Total area				~1,713.2	

2.1.1.1 Limitations/Interests/Encumbrances

The subject land does contain an easement for overhead power line for 20 m wide (DP1237694) and is subject to reservations and interests in favour of the crown.

2.1.1.2 Road reserve

The subject land does not contain a road reserve under the *Roads Act 1993* as shown in Figure 2.

2.1.1.3 Travelling Stock Reserve

There are no Travelling Stock Reserves (TSR) declared on or adjoining the subject land or along or adjoining Getta Getta Road on parcels of Crown land reserved under the Crown Land Management Act 2016.

2.1.1.4 Tenure

The subject land is owned by Jennifer Susan Doolin (ABN 48 278 018 042) in freehold land tenure.

2.1.1.5 Landuse and zoning

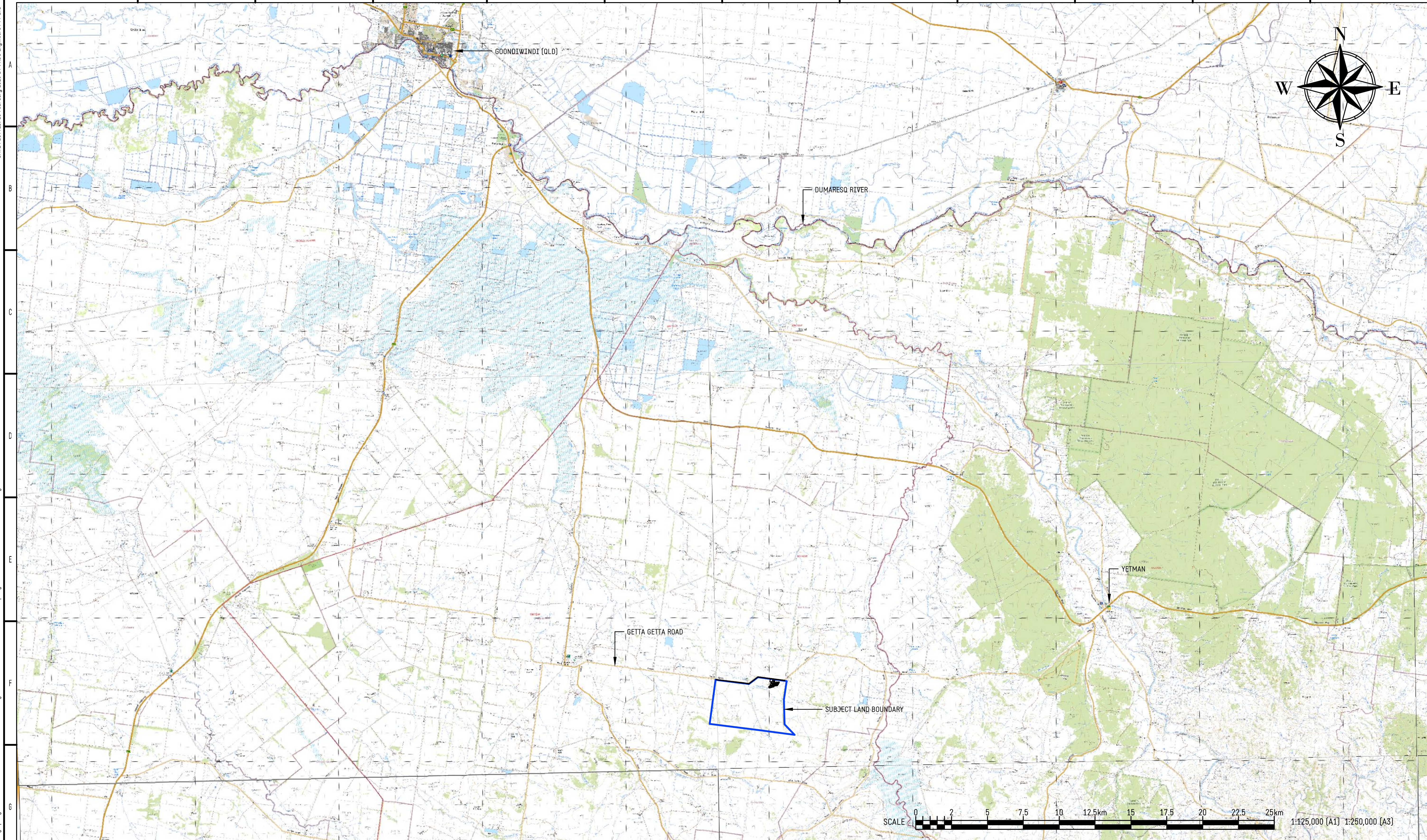
The proposed development site falls within the RU1 Primary Production zone of the *Gwydir Local Environment Plan 2013* (Gwydir Shire Council, 2013). The anticipated traffic growth rate of the surrounding area is considered to be relatively low.

2.1.1.6 Road network

The subject land is accessed directly from Getta Getta Road. The Gwydir Shire Council is the roads authority for Getta Getta Road from the bridge crossing on Ottleys Creek to North Star.

The existing development is accessed via the existing subject land entrance off Getta Getta Road. All light (staff and support services) and heavy vehicles (livestock and commodity delivery) enter the existing development complex site via the Getta Getta Road entrance.

DATE PLOTTED: 19 February 2025 BY : RDC Engineers PTY LTD



LEGEND

- SUBJECT LAND BOUNDARY
- LAND PARCEL BOUNDARY

NOTES:

1. CADASTRAL INFORMATION BASED ON THE NSW GOVERNMENT SPATIAL SERVICES DIGITAL CADASTRAL DATABASE (DCDB) 2022, PROVIDED BY THE NSW DEPARTMENT OF FINANCE, SERVICES AND INNOVATION (DFSI) SPATIAL INFORMATION eXCHANGE AND ACCURACY IS LIMITED.
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4. HORIZONTAL DATUM - UTM ZONE 56.

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STATUS

FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION PURPOSES

RPEQ

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REV.	DATE	REVISION DESCRIPTION	DRAWN	CHECK	APPROVED
A	24/01/25	DRAFT ISSUE TO CLIENT	RJD	RJD	RJD
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DATE	21/02/2025
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DATE	21/02/2025

CLIENT: DOOLIN FARMING PTY LTD

PROJECT: PROPOSED 3,000 HEAD BEEF CATTLE FEEDLOT

TITLE: DEVELOPMENT APPLICATION FOR INTENSIVE LIVESTOCK AGRICULTURE
EIS APPENDIX Q - TRAFFIC IMPACT ASSESSMENT
SUBJECT LAND - LOCALITY PLAN

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 1		A3	E2-103-500-01	B

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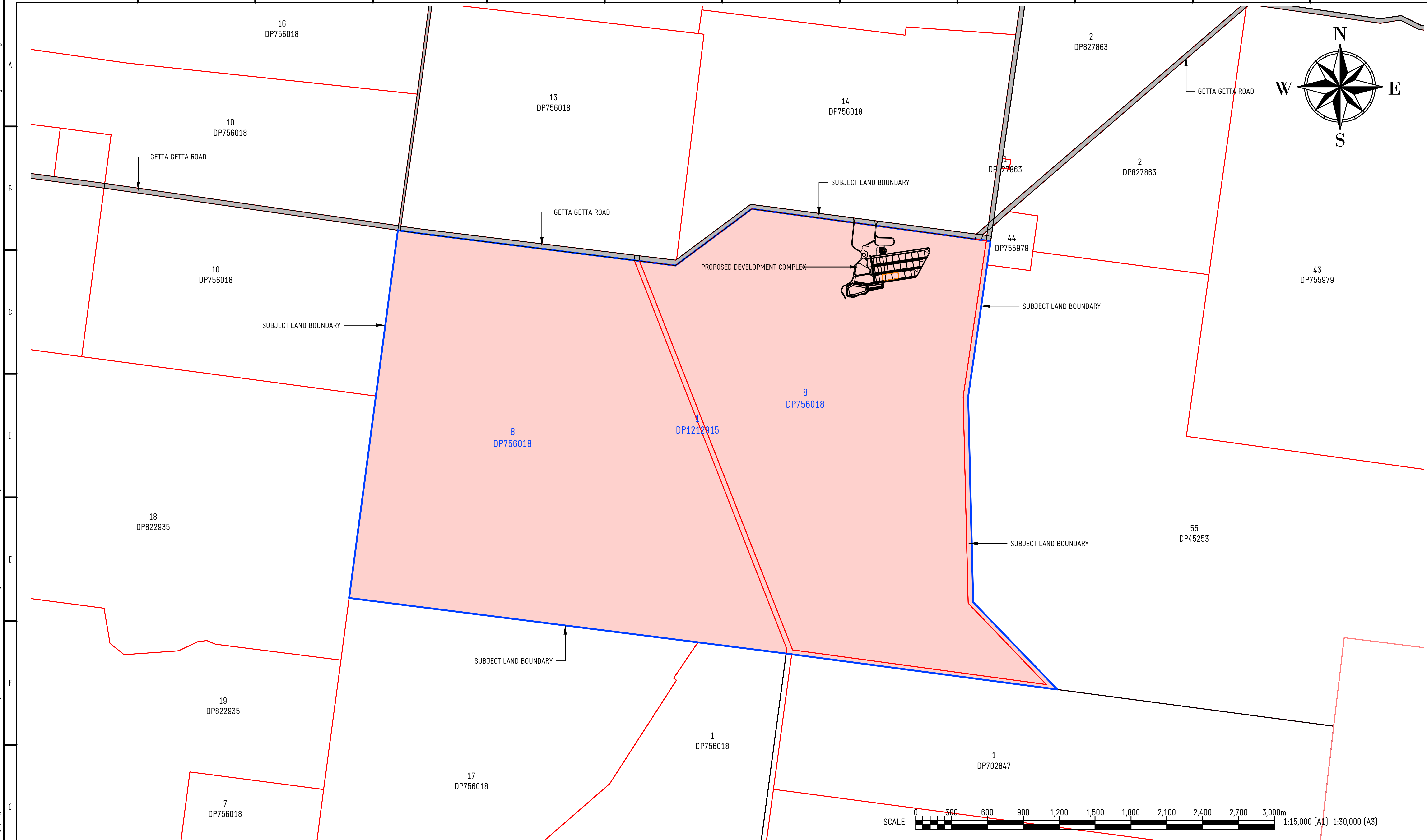

LEGEND

- SUBJECT LAND BOUNDARY
- LAND PARCEL BOUNDARY
- SUBJECT LAND AREA
- ROAD RESERVE
- EASEMENT

NOTES:

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CLIENT: DOOLIN FARMING PTY LTD

PROJECT: PROPOSED 3,000 HEAD BEEF CATTLE FEEDLOT

TITLE: DEVELOPMENT APPLICATION FOR INTENSIVE LIVESTOCK AGRICULTURE
EIS APPENDIX Q - TRAFFIC IMPACT ASSESSMENT
SUBJECT LAND - CADASTRAL PLAN

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 2		A3	E2-103-500-02	B

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3 Proposed development

3.1 Overview

Doolin Farming Pty Ltd wish to expand the existing beef cattle feedlot on the subject land from 999 head up to a maximum capacity of 3,000 head. The proposed development will allow flexibility of use with the ability to increase or decrease the number of animals within the development in line with market and economic factors.

The proposed development complex would occupy a footprint of approximately 14.5 ha and include the following components in a functional configuration:

- Water reticulation infrastructure – A reliable and uninterrupted supply of clean water of the required volume to sustain operations is provided;
- Pens – Fenced areas are constructed for accommodating beef cattle (production pens), cattle arriving to or being dispatched from the proposed development (induction/dispatch pens), and sick beef cattle (hospital pens);
- Internal road – An internal road network is constructed to provide al-weather access to the proposed development complex;
- Controlled drainage area – Rainfall runoff from areas such as pens that has a high organic matter and therefore a high pollution potential is controlled within a system that collects and conveys this runoff to a sedimentation system and holding pond prior to environmentally sustainable utilisation;
- Drainage system - The controlled drainage area contains a system including catch drains, sedimentation system and holding pond for conveying stormwater, allow entrained sediment to 'settle out' and capture and storage of the stormwater from the controlled drainage area until it can be sustainably utilised; and
- Solid waste and effluent management areas – Solids wastes such as manure and mortalities shall be temporarily stockpiled and processed within the solid waste stockpile and carcass composting area prior to utilisation on-site. Effluent is stored in the holding pond pending application to the effluent utilisation area.

The proposed development also includes an associated 1,020 ha of cropping land for effluent and solid waste utilisation. Solid wastes generated are applied to an on-site utilisation area. Any solid wastes not utilised on-site are removed off-site to adjoining properties owned by the proponent. When available, effluent is applied to land via irrigation within a dedicated effluent utilisation area.

3.2 Access

Access to the homestead and existing development complex on the subject land is directly off Getta Getta Road a local controlled road some 13.5 km east of the intersection with North Star Road as shown in Figure 3.

Access to the proposed development shall be from a new dedicated subject land entrance off Getta Getta Road some 200 m east of the existing subject land entrance as shown in Figure 3. A purpose built internal road shall be constructed to connect the new development entrance to the infrastructure of the existing and proposed development.

The existing subject land entrance shall be maintained for light and heavy vehicles servicing the subject land homestead and agricultural commodities produced on the subject land and not destined for the proposed development.

All livestock and commodity delivery vehicles associated with the proposed development shall be required to enter the site via the proposed development entrance. The proposed development entrance shall be designed to provide an efficient, functional and safe access to the proposed development site for the type of traffic generated by the proposed development. The proposed entrance shall accommodate vehicle up to a Type 1 road train configuration.

The entrance shall be constructed and maintained to an industrial standard in accordance with AS/NZS 2890.1: 2004, Parking facilities, Part 1: Off-street car parking or AS:2890.2—2018, Parking facilities or other relevant standards prescribed by Gwydir Shire Council.

3.3 Parking

A vehicle parking area is located along the northern and western sides of the development complex site adjacent to the grain storage and processing facility, with at least 5 informal parking spaces provided for operational and maintenance staff as shown on Figure 3.

3.4 Staging

The proposed development involves a staged construction in up to two (2) stages depending on operational requirements, market demand for beef and other considerations. The timing and duration of each stage maybe contiguous or discrete periods depending on the factors mentioned previously.

Indicative staging to reach full capacity of the proposed development (3,000 head) are shown in Table 2.

Table 2 – Proposed development – Staging

Stage	Total capacity	Description	Timeframe
1	2,250 Head	Controlled Drainage Area 1. Production pen area for 1,251 head with associated drainage system, feed bunks, water troughs, fencing, feed roads, shade structures, internal connection roads, solid waste and carcass composting area, expanded grain storage and processing facility, expended sedimentation basin and holding pond for CDA 1 when fully developed.	After development approvals
2	3,000 Head	Controlled Drainage Area 1. Production pen area for 750 head with associated drainage system, feed bunks, water troughs, fencing, feed roads, shade structures, internal connection roads.	5-7 years

3.5 Construction

Infrastructure shall be developed as part of the proposed development and therefore earthworks, pen infrastructure and internal roads shall be constructed.

All heavy vehicles associated with the construction of the proposed development travelling from the west would be routed along the Bruxner Way from Boggabilla to North Star Road to Getta Getta Road. All heavy vehicles associated with the construction of the proposed development travelling from the south would be routed from Warialda along the Warialda Road to North Star Road to Getta Getta Road. Typically, a low-loader type vehicle would deliver the construction equipment to the site as required and backload with equipment that has completed operations and is to be demobilised from the site. Delivery of items of construction equipment would be staggered throughout the construction period in line with sequencing of activities.

3.6 Decommissioning

There is no proposed operational lifespan of the existing development. The existing development shall continue to operate based on demand for lot-fed beef and economic viability. Consequently, the existing development complex site and all above ground infrastructure is not proposed to be decommissioned and shall be utilised in the proposed development.

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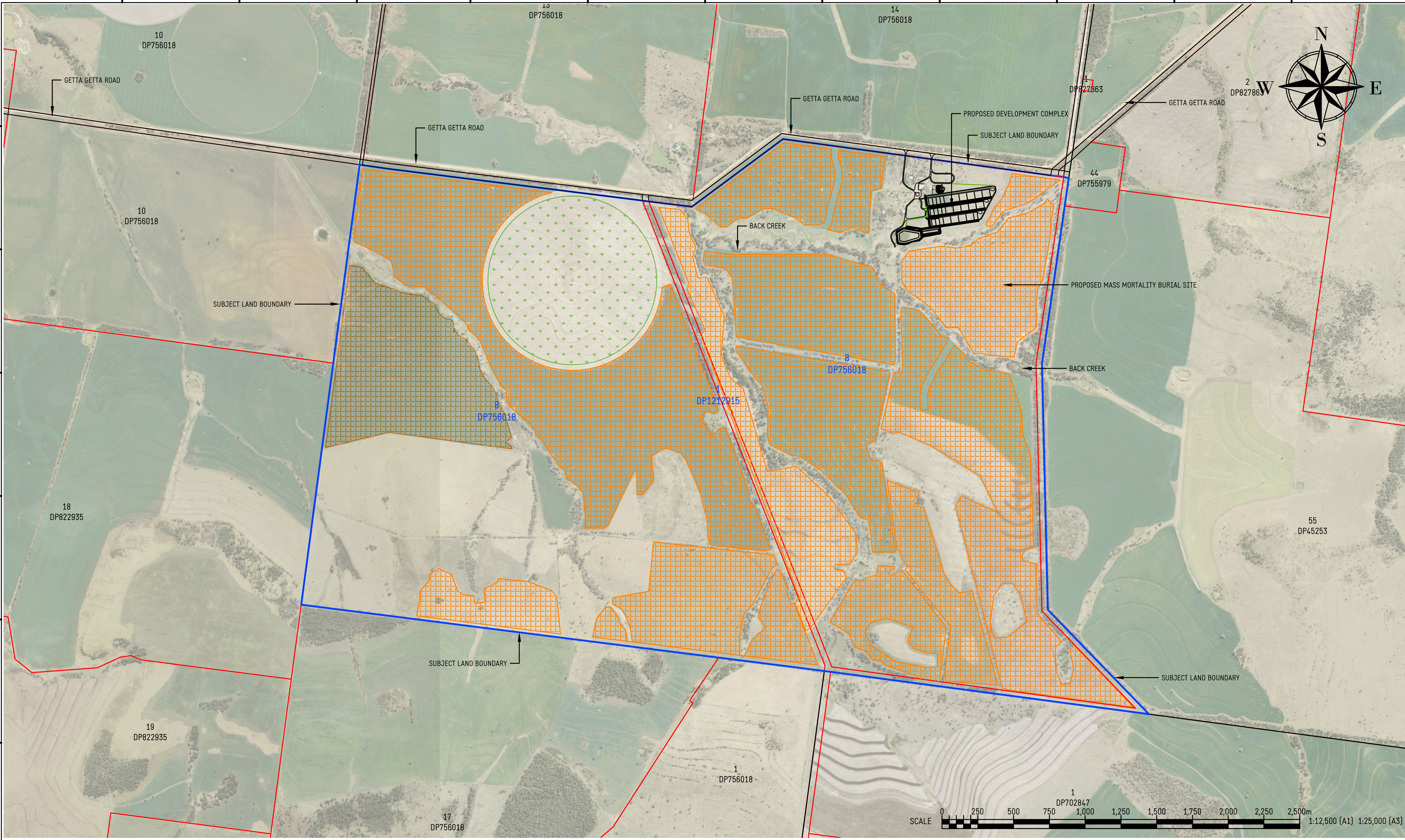

LEGEND

- SUBJECT LAND BOUNDARY
- LAND PARCEL BOUNDARY
- PROPOSED EFFLUENT UTILISATION AREA
- PROPOSED SOLID WASTE UTILISATION AREA

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CLIENT: DOOLIN FARMING PTY LTD

PROJECT: PROPOSED 3,000 HEAD BEEF CATTLE FEEDLOT

TITLE: DEVELOPMENT APPLICATION FOR INTENSIVE LIVESTOCK AGRICULTURE
EIS APPENDIX Q - TRAFFIC IMPACT ASSESSMENT
PROPOSED DEVELOPMENT - DEVELOPMENT LAYOUT

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 3		A3	E2-103-500-03	B

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4 Traffic Impact Assessment

4.1 Existing road network

This section describes the existing road network including traffic conditions, volumes, intersection performance, road accesses, relevant intersection type and operation, as well as public and active transport provisions.

The locality of the proposed development is shown in Figure 1 and Figure 2.

Access to the proposed development by vehicles travelling from/to the north and west such as Goondiwindi (QLD) is via the Bruxner Way to the North Star Road (Warialda to Goondiwindi MR7705) to North Star to Getta Getta Road.

Access to the proposed development by vehicles travelling from the south such as Inverell, Tamworth and Gunnedah regions is via the Allan Cunningham Road (Tamworth-Yetman MR63) to the Gwydir Highway (Gwydir MR12), the Gwydir Highway to Warialda, Warialda Road (Tamworth-Yetman MR63) to North Star Road (Warialda to Goondiwindi MR7705) to North Star to Getta Getta Road.

Access to the proposed development by vehicles travelling to/from the east such as Texas (QLD), Tenterfield and Yetman. Vehicles travelling from/to these areas shall use the Bruxner Way to Warialda Road (Tamworth-Yetman MR63) to Getta Getta Road.

Local roads such as Milkomi Road, Yetman West Road, Blue Nobby Road will not be used by light or heavy vehicles generated by the proposed development.

The existing road network surrounding the subject land is shown in Figure 4 and includes the roads outlined in the following sections. The haulage routes are shown on Figure 4.

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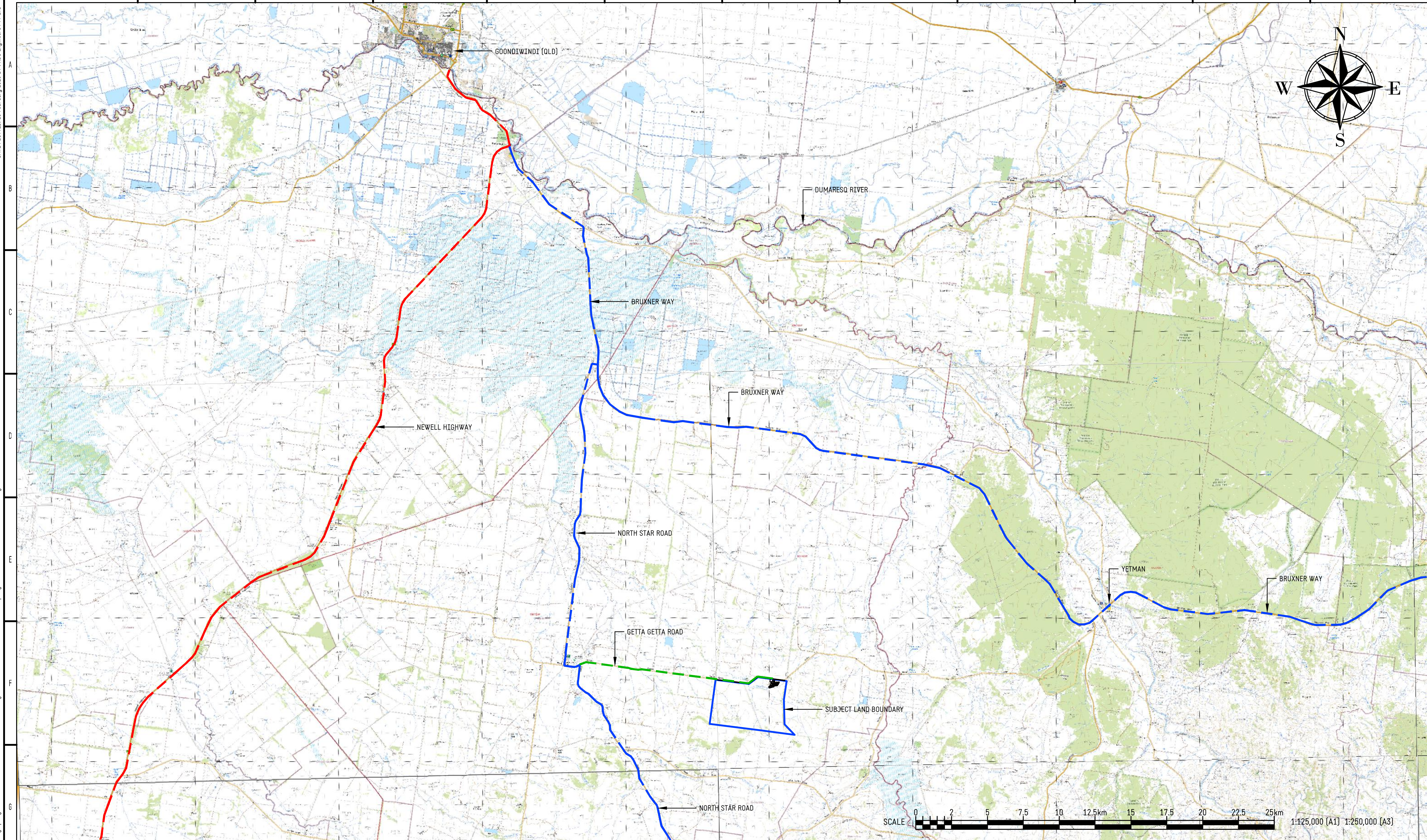

LEGEND

- SUBJECT LAND BOUNDARY
- LAND PARCEL BOUNDARY
- HAULAGE ROUTE - LOCAL ROAD
- HAULAGE ROUTE - REGIONAL ROAD
- HAULAGE ROAD - STATE ROAD

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EIS APPENDIX Q - TRAFFIC IMPACT ASSESSMENT
SUBJECT LAND - LOCAL CONTEXT PLAN

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 4		A3	E2-103-500-04	B

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4.1.1 Local roads

All livestock and commodity delivery vehicles shall enter the proposed development complex site via the proposed new dedicated entrance off Getta Getta Road some 200 m east of the existing subject land entrance. All heavy vehicles other than supplements originating from Warwick in Qld shall enter the site from the west. Heavy vehicles hauling supplements shall enter the proposed development complex site from the east.

Local roads such as Croppa Creek Road, I B Bore Road, Yetman West Road, Milkoni Road, Goat Road, Peates Road, Hibernia Road, Myall Downs Road and Blue Nobby Road will not be used by development traffic in particular heavy vehicles. On this basis, the existing local road network that may be impacted by the proposed development is limited to Getta Getta Road.

4.1.1.1 Getta Getta Road

Getta Getta Road is a local road. The Gwydir Shire Council is the roads authority for Getta Getta Road in accordance with Section 7 of the Roads Act 1993.

Getta Getta Road is two-lane, two-way undivided local road about 38.75 km long. Getta Getta Road provides connection from Warialda Road (CH0 km) to North Star Road at North Star (CH38.75 km). Getta Getta Road is unsealed from Warialda Road (CH 0 km) to the eastern abutment of the bridge crossing over Ottleys Creek (CH15 km) and is bitumen sealed from the western abutment to North Star Road (CH38.75 km). Getta Getta Road terminates at the intersection with North Star Road and runs generally in an east west direction from Warialda Road to North Star Road. Getta Getta Road has no posted speed limit.

Getta Getta Road has recently been sealed between the western abutment of the bridge crossing over Ottleys Creek (CH15 km) to North Star Road (CH38.75 km). Getta Getta Road is generally 6-6.5 m seal on an 7-8 m formation as shown in Photograph 1, Photograph 2 and Photograph 5. Getta Getta Road has no line markings (centreline or edge lines).

The pavement is in very good condition along the entire length reviewed as shown in Photograph 1 to Photograph 5 inclusive.

Development traffic comprising predominantly heavy vehicles is expected to travel to/from the proposed development along the segment of Getta Getta Road from North Star Road to the development complex entrance (CH25.13 km). The principal haulage route is along Getta Getta Road.

Getta Getta Road is an approved for up to Type 1 road train (Road train 36.5 m network) with conditions from the Ottleys Creek bridge (GSC boundary) to the intersection with North Star Road. Getta Getta Road from the intersection of Warialda Road to the North Star Road intersection is approved for up to B-double (25/26m).

Austroads (Austroads, 2021a) nominates one 3.7 m traffic lane on 8.7 m carriageway for roads servicing 1-150vpd with more than 15% heavy vehicles. No upgrades are recommended under existing or proposed traffic conditions within the sealed section based on the pavement width of 6 m seal. The formation width does not meet Austroads requirements for shoulder and carriageway width.

Photograph 1 – Getta Getta Road – Formation CH15 km (Ottleys Creek bridge crossing)

Photograph 2 – Getta Getta Road – Formation CH24 km (“Springfield”)

Photograph 3 – Getta Getta Road – Formation CH26.5 km (“Springfield”)

Photograph 4 – Getta Getta Road – Formation CH26.5 km

Photograph 5 – Getta Getta Road – Formation CH38.75 km (Getta Getta Road / North Star Road intersection)

4.1.2 Regional roads

4.1.2.1 North Star Road

North Star Road is a classified (Regional) road (Road Number 0007705). The Gwydir Shire Council is the roads authority for North Star Road in accordance with Section 7 of the Roads Act 1993.

North Star Road is two-lane, two-way undivided local road about 85 km long and is bitumen sealed for its entire the length. It provides connection from the Bruxner Way (CH 0 km) to Warialda Road (CH 85 km) and passes through the village of North Star (CH 21.9 km). The intersection with Warialda Road is located some 19.5 km north of Warialda. North Star Road has no posted speed limit.

North Star is fully sealed between the Bruxner Way and Warialda Road. North Star Road is generally 6.5-7.0 m seal on a 9-9.5 m formation between the Bruxner Way and North Star as shown in Photograph 6 and Photograph 7.

North Star Road is generally 6.5-7.5 m seal on a 9-10 m formation between Warialda Road and North Star as shown in Photograph 8, Photograph 9 and Photograph 10.

Other than between CH2.6 km and CH3.5 km; CH38.1 km and CH43 km and CH 79.3 km and CH85.0 km)) North Star Road has no centreline line markings and has no edge lines for its entire length.

The pavement is in very good condition along the entire length reviewed as shown in Photograph 6, Photograph 7, Photograph 9, Photograph 10 and Photograph 11.

North Star Road is an approved 4.6m high vehicle route and approved Type 1 road train route (Road train 36.5 m network) and approved for modular B-triples with and without conditions from the Bruxner Way to Warialda Road.

Austroads (Austroads, 2021a) nominates a minimum 7.0 m seal on 9.2 m formation for roads servicing 150-500vpd with more than 15% heavy vehicles. No upgrades are recommended under existing or proposed traffic conditions within the sealed section which is a minimum of 6.5 m seal on a 9 m formation.

Photograph 6 – Bruxner Way / North Star Road intersection

Photograph 7 – North Star Road formation (CH13 km)

Photograph 8 – North Star Road formation (CH24 km)

Photograph 9 – North Star Road formation (CH47 km)

Photograph 10 – North Star Road formation (CH75 km)

Photograph 11 – North Star Road / Warialda Road intersection

4.1.2.2 Bruxner Way

The western alignment of the Bruxner Highway from Tenterfield to Boggabilla was named the Bruxner Way (Road Number 0000462) in 2011. The Bruxner Way is a classified (Regional) road. The Tenterfield Shire Council, Inverell Shire Council, Gwydir Shire Council and Moree Plains Shire Council are the roads authority for the Bruxner Way between Tenterfield and Boggabilla in accordance with Section 7 of the Roads Act 1993.

The Bruxner Way and its eastern alignment the Bruxner Highway (Route B60) is a 420 km state highway in northern New South Wales. The route forms a vital east–west link across the Northern Tablelands in northern New South Wales, close to the border with Queensland, to the Northern Rivers coast.

The Bruxner Way traverses the Northern Tablelands region and commences at the intersection with Newell Highway in Boggabilla and heads in a south-easterly direction, tracking close to the southern bank of the Macintyre River until it reaches Yetman, then heads east where it reaches the Texas Road intersection, then continues in an easterly direction, tracking close to the southern bank of the Dumaresq River and Tenterfield Creek until it eventually terminates at an intersection with New England Highway some 4 km north of Tenterfield.

The Bruxner Way is two-lane, two-way undivided local road about 230 km long and is bitumen sealed along the length reviewed from the Texas Road intersection to Boggabilla. The intersection with Warialda Road is at CH40.5 km and North Star Road is at CH83.5 km with the intersection with Texas Road CH 0km. The Bruxner Way has a 100 km/hr posted speed limit.

The Bruxner Way has the following characteristics:

- two-lane, two-way undivided road with a posted speed limit of 100 km/h (North Star Road to Yetman);
- 7m sealed pavement generally approximately 10 m formation, with 3.5 m wide lanes and 1.0-1.5 m wide unsealed shoulders, centre line marking and intermittent edge line marking;
- The road is currently in good condition, with no significant signs of pavement breakup within the vicinity of the Texas Road, Warialda Road or North Star Road intersections due to heavy vehicle turning movements.

The Bruxner Way is an approved 4.6m high vehicle route and approved with conditions for up to Type 1 road train route (Road train 36.5 m network) and approved for B-triple and modular B-triple from Ottleys Creek west to the intersection with North Star Road.

Vehicle count data for the Bruxner Way was obtained from TfNSW at traffic count site Id 91506: Boggabilla, 370m South of Merriwa Street. These data were collected in April and May 2006 and 2009 respectively. The AADT recorded was 668 vpd with 99 vpd (~15%) being heavy vehicles (Class 3 to 10) during this period. The tube count data for the Gwydir Highway is provided in Appendix A.

Photograph 12 – Bruxner Way / North Star Road intersection

Photograph 13 – Bruxner Way

Photograph 14 – Bruxner Way / Warialda Road intersection

4.1.2.3 Warialda Road

Warialda Road is a classified (Regional) road ((Road Number 0000063). The Gwydir Shire Council is the roads authority for Warialda Road in accordance with Section 7 of the Roads Act 1993.

Warialda Road is two-lane, two-way undivided local road about 82 km long and is bitumen sealed for its entire the length. It provides connection from the Bruxner Way (CH 0 km) to Warialda (CH 82 km) and passes through the village of Coolatai (CH41.7 km). The intersection with North Star Road is located some 19.5 km north of Warialda. The intersection with the Bruxner Way is located some 1.2 km west of Yetman. Warialda Road has a 100 km/hr posted speed limit.

The segment of Warialda Road to be used by the development generated light vehicles would be from the intersection of the Bruxner Way to North Star Road (CH0.75 km). The segment of Warialda Road to be used by the development generated heavy vehicles would from the intersection of North Star Road to the Gwydir Highway.

Warialda Road is generally 8 m seal on a 10 m formation along the segment reviewed as shown in Photograph 16 to Photograph 21 inclusive.

Warialda Road has centreline line markings between the Gwydir Highway and Gournama Road, the Bruxner Highway to Getta Getta Road and at the intersection with North Star Road. Warialda Road has edge lines between the Gwydir Highway and Gragin Road and at the North Star intersection.

Warialda Road is an approved 4.6m high vehicle route and approved Type 1 road train route (Road train 36.5 m network) from Warialda to North Star Road. Warialda Road is an approved 4.6m high vehicle route and approved B-double (25/26m) route from the Bruxner Way to Getta Getta Road intersection only.

The pavement is in very good condition along the entire length reviewed as shown in Photograph 11 to Photograph 21 inclusive.

Heavy Vehicle heading to/from Inverell or Tamworth would take the heavy vehicle bypass (CH79.5 km) to the northeast of Warialda to bypass the township and connect with the Gwydir Highway.

Vehicle count data for the Warialda Road was obtained from TfNSW at traffic count site Id 91591: Warialda, 630m North of J A Mcgregor Drive. These data were collected in April and May 2007 and 2008 respectively. The AADT recorded was 538 vpd with 139 vpd (~26%) being heavy vehicles (Class 3 to 10) during this period. The tube count data for the Gwydir Highway is provided in Appendix A.

Photograph 15 – Warialda Road / Bruxner Way intersection

Photograph 16 – Warialda Road / North Star Road intersection (CH0.75 km)

Photograph 17 – Warialda Road / Getta Getta Road intersection (CH0.75 km)

Photograph 18 – Warialda Road formation (CH72 km)

Photograph 19 – Warialda Road / Heavy vehicle bypass intersection (CH79 km)

Photograph 20 – Gwydir Highway / Heavy vehicle bypass intersection (CH 85km)

4.1.3 State Road

4.1.3.1 Gwydir Highway

The Gwydir Highway (MR12) is a classified (State) road. The TfNSW is the roads authority for the Gwydir Highway in accordance with Section 7 of the Roads Act 1993.

The Gwydir Highway designated Route B76 is a 568 km state highway in northern New South Wales and was named after the Gwydir River. The Gwydir Highway provides a vital link between the east coast of New South Wales and the New England tablelands and western plains. Gwydir Highway traverses the New England region from the inland plains to the coastal region, linking Walgett, Collarenebri, Moree, Warialda, Inverell, Glen Innes and Grafton. The western termination of the highway is at the junction with Castlereagh Highway, 14 km north of Walgett.

The Gwydir Highway has the following characteristics:

- two-lane, two-way undivided road with a posted speed limit of 100 km/h (Warialda to Inverell);
- sealed, generally approximately 9 m wide, with 3.5 m wide lanes and 0.7-1.0 m wide sealed shoulders, centre line marking and edge line marking;

- The road is currently in good condition, with no significant signs of pavement breakup within the vicinity of the Warialda Heavy Vehicle Bypass to Inverell.

The Gwydir Highway is an approved 4.6m high vehicle route and approved with conditions for up to Type 1 road train route (Road train 36.5 m network) and approved with conditions for B-triple and modular B-triple from Moree to Inverell.

Photograph 21 – Gwydir Highway / Warialda heavy vehicle bypass intersection (Aerial)

Vehicle count data for the Gwydir Highway was obtained from TfNSW at traffic count site Site 14: Warialda, 1.9km West of Cranky Rock Road. These data were collected in March 2020. The AADT recorded was 942 vpd with 173 vpd (~18%) being heavy vehicles (Class 3 to 10) during this period. The tube count data for the Gwydir Highway is provided in Appendix A.

Photograph 22 – Gwydir Highway formation (Warialda)

4.1.4 Crash History

4.1.4.1 Crash history

A review of the crash data for the past five (5) years for the road network around the proposed development site has been undertaken and is summarised in Table 3. Table 3 shows there has been 4 reported road traffic crashes on the Bruxner Way along the segment reviewed, 2 reported road traffic crashes on the North Star Road and 4 reported road traffic crashes on the Warialda Road along the segment reviewed in the 5 year reporting period up to 2022.

There have been 2 reported traffic crashes at T-junctions being the Bruxner Way / Peates Road intersection and Warialda Road / Warialda Heavy vehicle bypass intersection.

Table 3 – Road Network – Crash history (2018-2022)

Shire	Location	Year (Crash ID)	RUM – code and (description)	Casualty
Gwydir	Bruxner Way*	2018 (1161086)	20 (Head on)	Non-casualty (towaway)
Gwydir	Bruxner Way*	2018 (1182132)	53 (overtake turning) T-junction	Minor/other injury
Gwydir	Bruxner Way*	2018 (1168386)	67 (Struck animal)	Non-casualty (towaway)
Gwydir	North Star Road**	2019 (1215587)	86 (Off left/left bend)	Moderate injury
Gwydir	North Star Road **	2022 (1257591)	87 (Off left/left bend)	Fatal
Gwydir	Warialda Road***	2020 (1287591)	86 (Off left/left bend)	Moderate injury
Gwydir	Warialda Road***	2020 (1232735)	87 (Off left/left bend)	Moderate injury
Gwydir	Warialda Road***	2022 (1212052)	74 (On road/Out of control)	Serious injury
Gwydir	Warialda Road***	2022 (1312052)	74 (On road/Out of control) T-junction	Serious injury
Inverell	Bruxner Way****	2022 (1298689)	67 (Struck animal)	Minor/Other injury

*Segment of Bruxner Way between North Star Road/Bruxner Highway intersection and Scrubby Creek.
**Segment of North Star Road between Yallaroi Creek and North Star Road/Warialda Road intersection.
*** Segment of Warialda Road between Warialda and North Star Road / Warialda Road intersection.
**** Segment of Bruxner Way between Yetman and Trigamon Road.

4.1.5 Key intersections

There are several intersections within the local, regional and state road network. These include T-intersections from regional roads onto Getta Getta Road as discussed in previous sections and intersections with regional roads further afield such as the North Star Road / Bruxner Way, Warialda Road / Bruxner Highway, Bruxner Highway / Texas Road, North Star Road / Warialda Road, Warialda Road / Gwydir Highway and Allan Cunningham Road / Gwydir Highway. From a traffic route perspective the key intersections have been determined as the North Star Road / Getta Getta Road; North Star Road / Bruxner Way; North Star Road / Warialda Road; Getta Getta Road / Warialda Road T-intersections. These intersections have been assessed in section 4.4.3.

4.1.6 Public transport

The proposed development is not expected to have any significant impact on public transport infrastructure. There are no public passenger bus services along the Bruxner Way, Warialda Road and North Star Road along the segment reviewed. There is a passenger bus service along the Gwydir Highway.

Warialda Road and North Star Road are designated school bus routes.

4.2 Existing rail network

The Camurra Boggabilla Railway is a disused railway line that branches from the Werris Creek Mungindi line at Camurra northeast of Moree and runs for some 120 km to the township of Boggabilla.

The Moree to North Star section of the railway line is to be upgraded as part of the Inland rail project. The railway line crosses the I B Bore Road at North Star. The public crossing has warning signage, flashing lights and boom gates. The proposed development shall not add traffic to the I B Bore Road.

The Camurra Boggabilla Railway runs generally in an east-northeasterly then north-northeasterly direction then north-northwesterly direction. For part of its length it runs parallel with the North Star Road north of North Star.

There are two former public low level crossings on North Star Road over the disused Camurra Boggabilla Railway as shown in Photograph 24 and Photograph 23. Both of these former crossings have had all traffic control signage removed.

The former public level crossings are used by light vehicles and heavy vehicles in rigid body, semi-trailer, B-double and Type 1 road train configuration using the North Star Road.

Photograph 23 – North Star Road – Former public level crossing (CH0.10 km)(Looking east)

Photograph 24 – North Star Road – Former public level crossing (CH13.5 km) (Looking north)

Photograph 25 – I B Bore Road – Public level crossing North star (Looking west)

4.2.1 Short stacking

As the proposed development shall not add traffic to the I B bore road and the Camurra Boggabilla railway north of North star is currently disused no further assessment of the level crossings is deemed warranted.

4.3 Traffic generation and distribution

To establish the impact of the development on the adjacent road network and assess the need for improvements to accommodate traffic generated by the proposed development, traffic generation and trip distribution have been determined.

4.3.1 Generation

The subject land is currently used for lot feeding of cattle and dryland and irrigated cropping. The existing traffic generation for the subject land site comprises the following:

- Several residential dwellings;
- Beef cattle feedlot (999 head); and
- Cropping operations – irrigated and dryland winter cropping (grain / hay /silage) and cotton production.

The type and configuration of vehicles currently utilising the existing development comprise light and heavy vehicles as outlined in Table 4. Getta Getta Road, North Star Road and Warialda Road are an approved Type 1 Road Train route and heavy vehicles in this configuration regularly access the existing development. Heavy vehicles in B-double configuration also regularly access the existing development.

Table 4 – Existing development – Vehicle configuration

Light vehicles	The light vehicle movements are comprised of employees, support services and other visitors to the existing development. There are 2 dwellings on the subject land.
Light vehicles	Support services: These include livestock buyers, veterinarians, nutritionists etc. These are estimated to be 2 light vehicles per day.
Heavy vehicles	The heavy vehicle movements are comprised of cattle movements, as well as movements for grain, protein, roughage, liquids and supplements. Solid waste in the form of manure stays on-site and is applied to cropping land on the subject land. The traffic generation was based on B-doubles.

The traffic generation for the existing development comprises light and heavy vehicles as outlined in Table 5.

Table 5 – Existing development – Estimated traffic generation (999 head)

Stage Development capacity Activity	Vehicle Type & (Configuration)	Head GVM t	Capacity	Existing 999 Movements per day	Existing 999 Movements per week	Existing 999 Movements per year
Incoming cattle	B-double (3 deck)	62.5	90 head	<0.1	~0.6	~29
Incoming cattle	Type 1 road train (4 deck)	81	120 head	-	-	-
Outgoing cattle	B-double (3 deck)	62.5	60 head	~0.2	~1.8	~77
Outgoing cattle	Type 1 road train (4 deck)	81	80 head	-	-	-
Grain^	Type 1 road train	81	48 t	<0.1	~0.4	~19
Protein	Type 1 road train	81	48 t	<0.1	~0.4	~23
Roughages*	Semi-trailer	42.5	24 t	-	-	-
Liquids (Oil/Molasses)	B-double	62.5	36 t	-	-	-
Supplements (Dry)	B-double	62.5	36 t	<0.1	~0.3	~14
Outgoing solid waste**	Semi-trailer	42.5	24 t	~0	~0	~0
Employees	Light vehicles	<4.5	-	~0	~0	~0
Support services	Light vehicles	<4.5	-	~0.3	~2	~104
Total	Total heavy vehicles		-	~0.4	~2.9	~151
Total	Total light and heavy vehicles		-	~0.7	~4.9	~255

* 100% of roughages (silage/hay/straw) are produced on subject land and adjoining land and does not use local road network.
** 100% of the solid waste is utilised on the subject land.

The type and configuration of vehicles accessing the proposed development shall be identical to the type and configuration accessing the existing development and comprise light and heavy vehicles as outlined in Table 6. Heavy vehicles in Type 1 road train and B-double configuration shall access the proposed development.

Table 6 – Proposed development – Vehicle configuration

Light vehicles	The light vehicle movements are comprised of employees, support services and other visitors to the proposed development. There are two dwellings on the subject land. It is estimated that some 4 full time equivalent employees will be required when the development is fully developed to 3,000 head. About 50% of the staff shall not reside on-site. There will be staff on-site 7 days a week, with less staff on the weekends. Typically hours of work vary, with staff working between 6:30 or 7 am and 3:30 or 4:30 pm.
Light vehicles	Support services: These include livestock buyers, veterinarians, nutritionists etc. These are estimated to be 3 light vehicles per week on average.
Heavy vehicles	The heavy vehicle movements are comprised of cattle movements, as well as movements for grain, protein, roughage, liquids and supplements. Solid waste in the form of manure will stay on-site. The heavy vehicle traffic generation was based on vehicles in Type 1 road trains and B-double configuration.

The estimated staffing levels for the proposed development are provided in Table 7. Not all staff work every day of the year, thus the yearly volume for staff living off-site is less than 365 multiplied by two movements per staff per day.

Table 7 – Proposed development – Estimated staffing levels

Stage	Development capacity Head	No of staff during weekdays FTE	No of staff living on-site FTE	No of staff on weekend FTE
Existing	999	2	2	1
1	2,250	3	2	2
2	3,000	4	2	2

The heavy vehicle traffic generation is summarised in Table 11 for the proposed development when fully developed to 3,000 head.

The table includes all inbound and outbound loaded and unloaded vehicles. A vehicle entering and exiting the development site is two movements. The heavy vehicle movements have been modelled on Type 1 road train and B-double vehicles. Due to its rural location, the use of semi-trailers as-of-right access will not be practical or an efficient method for heavy goods transport. Further, the principal haulage route is approved for Type 1 road train vehicles.

The proposed development shall operate 12 hours per day between 6.00 am and 6.00 pm, 7 days per week including public holidays for general activities such as cattle feeding, waste management and cropping operations. Transport activities such as feed commodity delivery would typically occur between 7:00 am and 4:30 pm on a weekday. Incoming livestock transport would typically occur between 7:00 am and 4:30 pm on a weekday. Outgoing livestock are typically transported on Sunday to Thursday between 7:00 am and 3:00 pm. Operating hours will be applied with any noise limitations and requirements taken into consideration. Staff shall be on-site 24 hours a day, 7 days a week.

Periodically, heavy vehicle movements do occur outside of normal operating hours (e.g. in summer), as it is desirable to transport cattle either at night or in the early hours of the morning for animal welfare reasons.

The peak vehicle movements were based on 2 times average weekly movements spread across five days. The volumes are triple the average to represent a reasonable amount of peaking throughout the year.

The principal haulage route is currently approved as a designated road train route and Type 1 road trains and B-doubles regularly access the existing development. Consequently, separate approval through the National Heavy Vehicle Regulator (NHVR) is not required. Type 1 road trains are approved for use on all roads on the haulage routes to/from the proposed development other than Getta Getta Road east of Ottley's Creek bridge.

As shown in Table 8, the AADT for the proposed development is estimated to be in the order of 5.2 vpd with 1.5 vpd heavy vehicles when fully developed.

Table 8 – Proposed development – Estimated AADT*

Stage	Development capacity SCUs	AADT		Peak daily		Peak hourly	
		Total	Heavy vehicles	Total	Heavy vehicles	Total	Heavy vehicles
	Head	vpd	vpd	vpd	vpd	vph	vph
Existing	999	~0.7	~0.4	~0.27	~0.15	~0.05	~0.03
1	2,250	~3.5	~1.3	~1.4	~0.5	~0.3	~0.1
2	3,000	~5.2	~1.5	~2.1	~0.6	~0.4	~0.1

*Note these data include the existing development traffic

As shown in Table 9, the additional peak daily and peak hourly movements for the proposed development when compared with the existing development is estimated to be up to 4.6 vpd with 1.2 vpd heavy vehicles when fully developed.

Table 9 – Proposed development – Additional estimated AADT

Stage	Development capacity SCUs	AADT		Peak daily		Peak hourly	
		Total	Heavy vehicles	Total	Heavy vehicles	Total	Heavy vehicles
	Head	vpd	vpd	vpd	vpd	vph	vph
Existing	999	-	-	-	-	-	-
1	2,250	2.9	0.9	1.2	0.4	0.2	0.1
2	3,000	4.6	1.2	1.8	0.5	0.4	0.1

Table 10 – Proposed development – Estimated additional traffic generation (2,250 head)

Stage				1	1	1
Development capacity		**Head**		**2,250**	**2,250**	**2,250**
Activity	**Vehicle Type & (Distribution)**	**GVM t**	**Capacity**	**Movements per day**	**Movements per week**	**Movements per year**
Incoming cattle	B-double (3 deck)	62.5	84 head	~0.1	~0.7	~37
Incoming cattle	Type 1 road train (4 deck)	81	112 head	0.0	0.0	0
Outgoing cattle	B-double (3 deck)	62.5	54 head	~0.3	~1.8	~96
Outgoing cattle	Type 1 road train (4 deck)	81	72 head	0.0	0.0	0
Grain^	Type 1 road train	81	55 t	~0.4	~2.9	~149
Protein	Type 1 road train	81	55 t	~0.1	~0.5	~26
Roughages*	Type 1 road train	81	49 t	0.0	0.0	0
Liquids (Oil/Molasses)	B-double	62.5	39.5 t	0.0	0.0	0
Supplements (Liquid)	B-double	62.5	39.5 t	0.0	~0.3	~16
Outgoing solid waste**	Semi-trailer	81	55 t	0.0	0.0	0
Employees	Light vehicles	81	45 t	~1.4	~10.0	~520
Support services	Light vehicles	<4.5	-	~0.6	~4.0	~208
Total	Heavy vehicles	<4.5	-	~0.9	~6.2	~324
Total	Light and heavy vehicles	-	-	~2.9	~20.2	~1,052

Table 11 – Proposed development – Estimated additional traffic generation (3,000 head)

Stage				2	2	2
Development capacity		**Head**		**3,000**	**3,000**	**3,000**
Activity	**Vehicle Type & (Distribution)**	**GVM t**	**Capacity**	**Movements per day**	**Movements per week**	**Movements per year**
Incoming cattle	B-double (3 deck)	62.5	84 head	~0.2	~1.1	~59
Incoming cattle	Type 1 road train (4 deck)	81	112 head	0.0	0.0	0
Outgoing cattle	B-double (3 deck)	62.5	54 head	~0.4	~3.0	~154
Outgoing cattle	Type 1 road train (4 deck)	81	72 head	0.00	0.0	0
Grain^	Type 1 road train	81	55 t	~0.4	~3.1	~164
Protein	Type 1 road train	81	55 t	~0.1	~0.5	~28
Roughages*	Type 1 road train	81	49 t	0.0	0.0	0
Liquids (Oil/Molasses)	B-double	62.5	39.5 t	0.0	0.0	0
Supplements (Liquid)	B-double	62.5	39.5 t	0.0	~0.3	~18
Supplements (Liquid)	Type 1 road train	81	55 t	0.0	0.0	0
Outgoing solid waste**	Semi-trailer	81	45 t	0.0	0.0	0
Employees	Light vehicles	<4.5	-	~2.8	~20.0	~1,040
Support services	Light vehicles	<4.5	-	~0.6	~4.0	~208
Total	Heavy vehicles	-	-	~1.2	8.1	~422
Total	Light and heavy vehicles	-	-	~4.6	32.1	~1,670

^ 50% of the grain produced on the subject land and vehicles do not use state, regional or local controlled road network.
*100% of roughages (silage/hay/straw) produced on subject land and vehicles do not use state, regional or local controlled road network.
** Solid waste vehicles use Getta Getta Road only as solid waste is utilised on adjoining land owned by the applicant.

4.3.2 Traffic growth rates

Traffic growth applied to the background traffic volumes represents the increase in traffic associated with the surrounding area.

No growth factor has been adopted as the actual growth between the TfNSW Traffic Volume viewer counts in 2011 (1,275vpd) and TfNSW advised classified counts in 2020 for the Gwydir Highway (704vpd) was negative.

4.3.3 Haulage routes

The proposed development shall have three heavy vehicle haulage routes to/from the proposed development site. The principal haulage route is route A.

Haulage Route A will be used by heavy vehicles travelling from/to the north such as southern QLD / Northwestern NSW. These vehicles shall travel via the Newell Highway to the Bruxner Way to North Star Road to Getta Getta Road with vehicles entering the development site using the proposed entrance onto Getta Getta Road. Route A is used by light vehicles, and heavy vehicles in semi-trailer, B-double and Type 1 road train configuration primarily transporting livestock and commodities such as protein (whole cottonseed) to the proposed development.

Haulage Route B will be used by heavy vehicles travelling to/from the proposed development site from the east such as Texas (QLD) and Tenterfield (NSW). Vehicles travelling from/to these areas shall use the Bruxner Way to Warialda Road to Getta Getta Road using the proposed entrance onto Getta Getta Road. Route B is used by light vehicles, and heavy vehicles in semi-trailer, and B-double configuration primarily transporting livestock and commodities such as supplements to the proposed development.

Haulage Route C from the southern, central or New England region of NSW via the Allan Cunningham Road, Gwydir Highway to Warialda Road to North Star Road to Getta Getta Road to the proposed entrance off Getta Getta Road. Route B is used by light vehicles, and heavy vehicles in semi-trailer, B-double and Type 1 road train configuration primarily transporting livestock and commodities such as grain to the proposed development and transporting livestock out to slaughter at Inverell.

Local roads such as Milkomi Road, Yetman West Road, Blue Nobby Road will not be used by heavy vehicles generated by the proposed development.

A heavy vehicle code of conduct shall be implemented to ensure heavy vehicles utilise either Haulage Route A, Haulage Route B or C.

4.3.4 Distribution

Figure 5 shows the local, regional and state controlled road network potentially impacted by the traffic generated by the proposed development.

Local roads being Getta Getta Road (Segment A) will be regularly used by heavy vehicles to gain access to the proposed development site. No other local controlled roads will be regularly used by vehicles generated by the proposed development.

The employees will come mainly from local farms in the area or the township of North Star or reside on adjoining properties owned by the applicant.

Table 12 shows the estimated distribution of heavy vehicle traffic to and from the proposed development site with reference to Figure 5.

The haulage route for incoming grains and roughages shall be from the North Star region originating from the properties Myall Downs and Yetman West which are owned by the applicant or related entities via Getta Getta Road.

The haulage route for incoming cattle from Central NSW will be from the south via the Allan Cunninham Road, Gwydir Highway to Warialda Road to North Star Road to Getta Getta Road. The haulage route for incoming cattle from Northern NSW will be from the north via the Bruxner Way to North Star Road to Getta Getta Road.

The haulage route for outgoing livestock vehicles will be Getta Getta Road west to the North Star Road then south to Warialda Road and the Gwydir Highway to processing facilities located at Inverell (Bindaree Processing facility).

The haulage route for incoming supplements shall be from Warwick (QLD) to the Bruxner Way via Texas Road to Warialda Road to Getta Getta Road.

The haulage route for incoming proteins (whole cottonseed) shall be from Goondiwindi via the Bruxner Way to North Star Road to Getta Getta Road.

Table 12 – Proposed development – Traffic generation distribution – Getta Getta Road (Loaded vehicles)

	Getta Getta Road (E, F, G)			
	To west North Star Road %	From west North Star Road %	To east Warialda Road %	From east Warialda Road %
Cattle				
Incoming	**0**	**100**	**0**	**0**
Outgoing	**100**	**0**	**0**	**0**
Commodities				
Grains	**0**	**100**	**0**	**0**
Proteins	**0**	**100**	**0**	**0**
Roughages	**0**	**0**	**0**	**0**
Liquids	**0**	**0**	**0**	**0**
Supplements	**0**	**50**	**0**	**50**

Table 13 – Proposed development – Traffic generation distribution – Bruxner Way and North Star Road (Loaded vehicles)

	Bruxner Way (A, B, C)				North Star Road (D, H)			
	To west Boggabilla	From west Boggabilla	To east Yetman	From east Yetman	To north Bruxner Way	From north Bruxner Way	To south Warialda Road	From south Warialda Road
	%	%	%	%	%	%	%	%
Cattle								
Incoming	0	0	0	0	0	0	0	100
Outgoing	0	0	0	0	0	0	100	0
Commodities								
Grains	0	0	0	0	0	0	0	0
Proteins	0	100	0	0	0	100	0	0
Roughages	0	0	0	0	0	0	0	0
Liquids	0	0	0	0	0	0	0	0
Supplements	0	0	0	100	0	100	0	0

Table 14 – Proposed development – Traffic generation distribution – Warialda Road (Loaded vehicles)

	Warialda Road (G, I)			
	From south Warialda %	To south Warialda %	From north Bruxner Way %	To north Bruxner Way %
Cattle				
Incoming	**100**	**0**	**0**	**0**
Outgoing	**0**	**100**	**0**	**0**
Commodities				
Grains	**100**	**0**	**0**	**0**
Proteins	**0**	**0**	**0**	**0**
Roughages	**0**	**0**	**0**	**0**
Liquids	**0**	**0**	**0**	**0**
Supplements	**0**	**0**	**50**	**0**

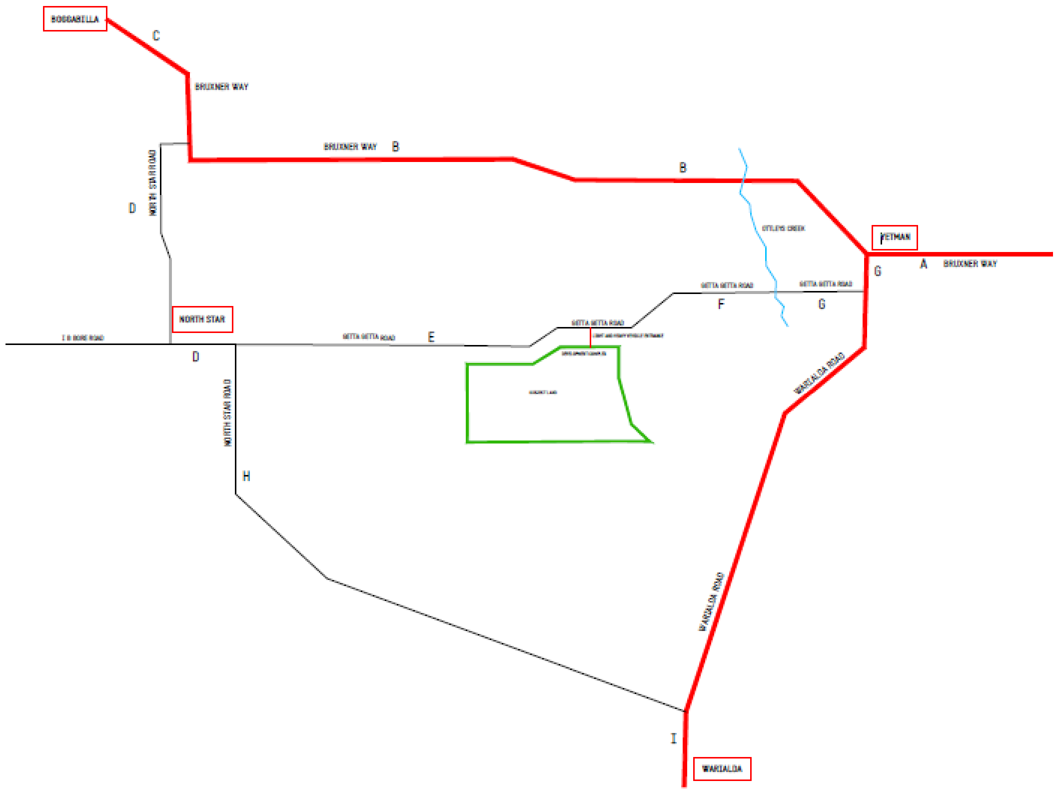

Figure 5 – Proposed development – Road network and segments schematic

4.4 Traffic impacts

The traffic impact analysis is focused on the impacts of the traffic generated by proposed development on three key intersections close to the development site access. The impacts of the proposed development on public transport, active transport, parking and traffic safety have also been assessed.

4.4.1 Assessment scenarios

It is standard practice when analysing future year traffic operations to adopt a ten-year design horizon from the year of full operation. The proposed development shall be developed in one stage.

Traffic conditions have been assessed for operation at the expected year of opening of the first stage (2024) through to 10 years to 2034, which represents the 10-year design horizon.

Traffic associated with construction activities of the proposed development have not been assessed as the proposed development shall be accommodated within the existing development built infrastructure by reducing the approved stocking density. Consequently, there are no construction generated movements.

4.4.2 Road network performance

The traffic generation and distribution from the site has been assessed and the impacts of the proposed development on the local road network and state controlled road network, namely Getta Getta Road, North Star Road, Warialda Road and Bruxner Way have been reviewed.

The impact on performance of the existing road network by the proposed development has been assessed in terms of the Levels of Service (LOS) of the roads and key intersections.

4.4.2.1 LOS criteria

The LOS criteria for roads have been based on peak hour flows per direction for rural roads as defined in RTA's Guide to Traffic Generating Developments (RTA, 2002) and detailed in Table 15 for a design speed of 100 km/hr and heavy vehicle percentage of 15.

Table 15 – Peak hour flow on two-lane rural roads

Terrain	Level of service (LOS)	Percent of heavy vehicles 15	Performance standard
Flat	B	530	
	C	870	Weekday peak hour flows
	D	1,410	Recreational peak hours (weekends)
	E	2,290	

The performance standards recommended by RTA (2002), reflect the fact that recreational peak hour periods (weekend peaks, or peaks associated with particular tourist or recreational activity), occur less frequently than weekday commuter peak hour periods.

4.4.2.2 Getta Getta Road

Traffic count data is not available for existing traffic on Getta Getta Road. The peak hour flow capacity has been assumed to be in the order of 11% of AADT. With a capacity of up to 50 vpd, the peak hour flow is in the order of 8.25 vph. The development generated traffic would increase the peak hour two-way traffic volume on Getta Getta Road by about 1.1 vph to the east of the entrance and about 1.07 vph to the west of the entrance as shown in Table 16.

This is well below the performance standard of LOS C recommended by RTA (2002).

Given the rural nature of the area and the seasonality of the rural / agricultural activities in the area it could be expected that the traffic movements will reflect the grain planting and harvest windows which occur between September to January and April to June and December to February and October to November for summer and winter cropping programs respectively.

The rural nature of the area and the seasonality of the rural / agricultural uses may result in a degree of unevenness in the traffic distribution across the year due to planting and harvesting periods, however.

Table 16 – Proposed Development – Additional traffic generation on local road network (All vehicles)

Road	Classification vpd	Development trips AADT	Development trips Peak hour
Getta Getta Road (west of entrance)	Sealed – Low volume	~2.62	~1.07
Getta Getta Road (east of entrance)	Sealed – Low volume	~1.47	~1.10

4.4.2.3 North Star Road

The peak hour flow capacity has been assumed to be in the order of 11% of AADT. With a capacity of up to 150 vpd, the peak hour flow is in the order of 16.5 vehicles per hour (vph) as a worst case scenario. The development generated traffic would increase the peak hour two-way traffic volume on North Star Road by about 0.4 vph (Table 17).

Table 17 – Proposed Development – Additional traffic generation on regional road network (All vehicles)

Road	Classification vpd	Development trips AADT	Development trips Peak hour
North Star Road (north of North Star)	Sealed – Regional	~0.4	~0.22
North Star Road (south of North Star)	Sealed – Regional	~1.10	~0.61

Given the rural nature of the area and the seasonality of the rural / agricultural activities in the area it could be expected that the traffic movements will reflect the grain planting and harvest windows which occur between September to January and April to June and December to February and October to November for summer and winter cropping programs respectively.

4.4.2.4 Warialda Road

The AADT recorded on Warialda Road in 2008 was 538 vpd with 139 vpd (~26%) being heavy vehicles (Class 3 to 10). The peak hour flow was obtained from the NSW traffic viewer and was 48 vph (8% of AADT). The development generated traffic would increase the peak hour two-way traffic volume on Warialda Road south of North star Road by about 0.61 vph (Table 18).

Table 18 – Proposed Development – Additional traffic generation on regional road network (All vehicles)

Road	Classification	Development trips	
	vpd	AADT	Peak hour
Warialda Road (north of Getta Getta Road)	Sealed – Regional	~0.04	~0.02
Warialda Road (south of North Star Road)	Sealed – Regional	~1.10	~0.61

This is well below the performance standard of LOS C recommended by RTA (2002).

4.4.2.5 Bruxner Way

The AADT recorded on the Bruxner Way in 2008 was 668 vpd with 99 vpd (~15%) being heavy vehicles (Class 3 to 10). The peak hour flow was obtained from the NSW traffic viewer and was 598 vph (8% of AADT). The development generated traffic would increase the peak hour two-way traffic volume on the Bruxner Way west of North Star Road by about 0.4 vph (Table 19).

Table 19 – Proposed Development – Additional traffic generation on regional road network (All vehicles)

Road	Classification	Development trips	
	vpd	AADT	Peak hour
Bruxner Way (west of North Star Road)	Sealed – Regional	~0.4	~0.22
Bruxner Way (east of North Star Road)	Sealed – Regional	~0.04	~0.02

This is well below the performance standard of LOS C recommended by RTA (2002).

4.4.3 Assessed intersections

4.4.3.1 North Star Road / Getta Getta Road intersection

North Star Road forms a T-intersection with Getta Getta Road at North Star with the Getta Getta Road. The North Star Road / Getta Getta Road intersection is an uncontrolled T-intersection and is shown in Photograph 26. The intersection has the following properties:

- Give way signage on the North Star Road southern approach;
- The intersection has no posted speed limit;
- The intersection has adequate visibility (>300m) to the east and west to meet Austroads requirements for a 100 km/h design speed as shown in Photograph 26 and Photograph 28.
- There is a simple right turn treatment (SR) southbound and simple left turn treatment (SL) northbound on North Star Road; and
- Photograph 26 show that the North Star Road / Getta Getta Road T-intersection has no signs of pavement breakup in the throat of the intersection due to vehicle turning movements.

Photograph 26 – North Star Road / Getta Getta Road Intersection (Looking south)

Photograph 27 – North Star Road / Getta Getta Road Intersection (Looking west)

Photograph 28 – North Star Road / Getta Getta Road Intersection (Looking east)

Figure 6 illustrates an aerial view of the North Star Road / Getta Getta Road T intersection.

Figure 6 – North Star Road / Getta Getta Road Intersection – Aerial image (QLD Globe)

4.4.3.2 North Star Road / Bruxner Way intersection

The North Star Road / Bruxner Way intersection is a priority sign-controlled T-intersection with North Star Road the terminating leg as shown in Photograph 29, Photograph 30 and Photograph 31. The intersection has the following properties:

- Give way signage on the North Star Road approach;
- Advanced warning signage on all approaches;
- The intersection has no posted speed limit;
- There is a simple left turn treatment (SL) westbound on the Bruxner Way and simple right turn treatment (SR) eastbound on the Bruxner Way;
- Photograph 29, Photograph 30 show that the North Star Road / Bruxner Way T-intersection has signs of pavement breakup in the throat of the intersection due to left out vehicle turning movements.

Photograph 29 – North Star Road / Bruxner Way Intersection (Looking south)

Photograph 30 – North Star Road / Bruxner Way Intersection (Looking east)

Photograph 31 – North Star Road / Bruxner Way Intersection (Looking west)

Figure 7 illustrates an aerial view of the North Star Road / Bruxner Way T intersection.

Figure 7 – North Star Road / Bruxner Way Intersection – Aerial image (QLD Globe)

4.4.3.3 North Star Road / Warialda Road intersection

The North Star Road / Warialda Road intersection is a priority sign-controlled T-intersection with North Star Road the terminating leg as shown in Photograph 32. The intersection has the following properties:

- Give way signage on the North Star Road approach;
- Advanced warning signage on all approaches;
- The intersection has no posted speed limit;
- There is an Auxiliary Left Turn (AUL) and Channelised Right Turn (CHR) treatment northbound and southbound on Warialda Road respectively.
- Photograph 32, Photograph 33 and Photograph 34show that the North Star Road / Warialda Road T-intersection has no signs of pavement breakup in the throat of the intersection due to vehicle turning movements.

Photograph 32 – North Star Road / Warialda Road Intersection (Looking north)

Photograph 33 – North Star Road / Warialda Road Intersection (Looking south)

Photograph 34 – North Star Road / Warialda Road Intersection (Looking east)

Figure 8 illustrates an aerial view of the North Star Road / Warialda Road T intersection.

Figure 8 – North Star Road / Warialda Road Intersection – Aerial image (QLD Globe)

4.4.3.4 Getta Getta Road / Warialda Road intersection

The Getta Getta Road / Warialda Road intersection is a priority sign-controlled T-intersection with Getta Getta Road the terminating leg as shown in Figure 9. The intersection has the following properties:

- Give way signage on the Getta Getta Road approach;
- Advanced warning signage on all approaches;
- The intersection has no posted speed limit;
- There is a simple left turn treatment (SR) and simple right turn treatment (BR) northbound and southbound on Warialda Road respectively.
- Photograph 35, Photograph 36 and Photograph 37 show that the Getta Getta Road / Warialda Road T-intersection has no signs of pavement breakup in the throat of the intersection due to vehicle turning movements.

Photograph 35 – Getta Getta Road / Warialda Road Intersection (Looking south)

Photograph 36 – Getta Getta Road / Warialda Road Intersection (Looking north)

Photograph 37 – Getta Getta Road / Warialda Road Intersection (Looking east)

Figure 9 illustrates an aerial view of the Getta Getta Road / Warialda Road T intersection.

Figure 9 – Getta Getta Road / Warialda Road Intersection – Aerial image (QLD Globe)

4.4.4 Rail safety

The closest railway is the Moree to North Star section of the inland rail. This railway line crosses the I B Bore Road at North Star. The proposed development shall not add any additional traffic to the I B Bore Road.

The disused Camurra Boggabilla railway cross North Star Road north of North Star. As the railway is used there are no safety related aspects to be considered for this railway line.

4.4.5 Road safety

There is likely to be no significant impacts on road safety as the proposed development does not make any changes to the local roads, access is from a local road and traffic volumes are not significant. The analysis for the crash data during the past five years shows that the crash rates at the local intersections are very low.

4.4.5.1 Warrants

4.4.5.1.1 North Star Road / Getta Getta Road

The North Star Road / Getta Getta Road intersection is a brownfield site and has been historically constructed with no pavement widening (or turning treatments) and hence does not meet the current standard for a BAL when turning left into North Star Road. Further, whilst there is some widening as a result of the intersection generally, the intersection does not meet the current standard for a BAR when turning right into North Star Road.

The North Star Road / Getta Getta Road intersection is considered a brownfield site with low turning volumes (

Table 12) and existing constraints.

Consequently, with reference to Figure 11 and Figure 11, a of simple left (SL) and simple right (SR) turning movement provision is acceptable.

Further, as the traffic volume at the intersection is low, the conflicts between through and turning vehicles are considered rare enough not to warrant the cost of upgrade the intersection. Further, there is no pre-existing safety record at the intersection.

Consequently, no upgrades or improvements works are required to be provided at the North Star Road / Getta Getta Road intersection for the proposed development from a safety perspective.

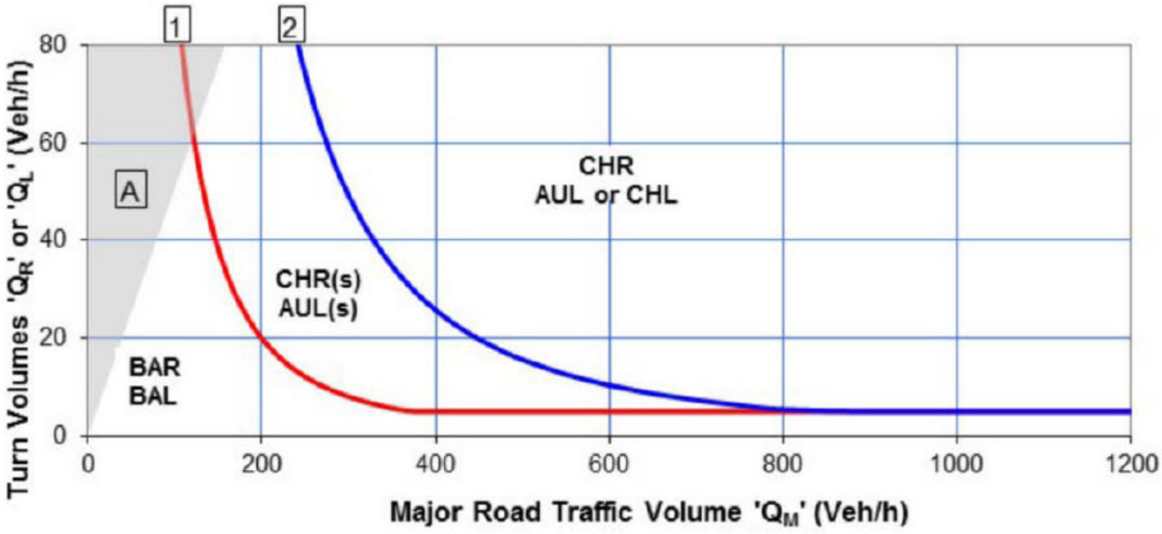

Figure 10 – Warrants for turn treatments on major roads at unsignalised intersections (Austroads, 2017)

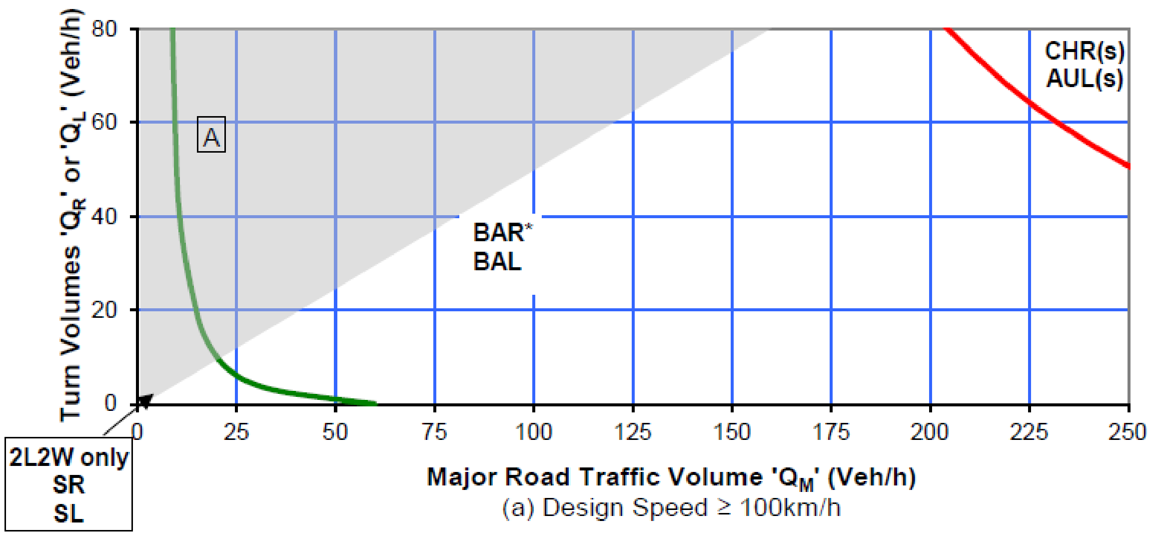

Figure 11 – Warrants for turn treatments on major roads at unsignalised intersections (Austroads, 2017)

4.4.5.1.2 North Star Road / Bruxner Way

The North Star Road / Bruxner Way intersection is a brownfield site and has been historically constructed with no pavement widening (or turning treatments) and hence does not meet the current standard for a BAL when turning left into North Star Road. Further, whilst there is some widening as a result of the intersection generally, the intersection does not meet the current standard for a BAR when turning right into North Star Road.

The North Star Road / Bruxer Way intersection is considered a brownfield site with low turning volumes (Table 13).

Consequently, with reference to Figure 11 and Figure 11, a of simple left (SL) and simple right (SR) turning movement provision is acceptable.

Further, as the traffic volume at the intersection is low, the conflicts between through and turning vehicles are considered rare enough not to warrant the cost of upgrade the intersection. Further, there is no pre-existing safety record at the intersection.

Consequently, no upgrades or improvements works are required to be provided at the North Star Road / Bruxner Way intersection for the proposed development from a safety perspective.

4.4.5.1.3 North Star Road / Warialda Road

Evaluation of the safety performance of the North Star Road / Warialda Road intersection is not deemed warranted given the existing AUL/CHR treatment levels at this intersection.

4.4.5.1.4 Getta Getta Road / Warialda Road

The Getta Getta Road / Warialda Road intersection is a brownfield site and has been historically constructed with no pavement widening (or turning treatments) and hence does not meet the current standard for a BAL when turning left into Getta Getta Road. Further, whilst there is some widening as a result of the intersection generally, the intersection does not meet the current standard for a BAR when turning right into Getta Getta Road.

The Getta Getta Road / Warialda intersection is considered a brownfield site with low turning volumes (Table 16 and Table 18).

Consequently, with reference to Figure 11 and Figure 11, a of simple left (SL) and simple right (SR) turning movement provision is acceptable.

Further, as the traffic volume at the intersection is low, the conflicts between through and turning vehicles are considered rare enough not to warrant the cost of upgrade the intersection. Further, there is no pre-existing safety record at the intersection.

Consequently, no upgrades or improvements works are required to be provided at the North Star Road / Getta Getta Road intersection for the proposed development from a safety perspective.

4.4.5.2 Signage

To further improve road safety, additional safety measures are proposed due to the additional volume of heavy vehicles imposed on the road network. These include:

- It is recommended that advanced warning signage (Truck crossing or entering) as shown in Figure 12 be implemented on each approach to the development site entrance on Getta Getta Road in accordance with AS1742.2 Clause 4.11.2.5 to warn motorists and improve road safety.

W5-22

Figure 12 – Truck crossing or entering sign (AS1742.2 Clause 4.11.2.5

4.4.6 Access arrangements

4.4.6.1 Location

Access to the proposed development shall be from a new dedicated subject land entrance off Getta Getta Road some 200 m east of the existing subject land entrance as shown in Figure 3 respectively. The purpose built internal road shall be constructed to connect the new development entrance to the infrastructure of the proposed development.

The existing subject land entrance shall be maintained for light and heavy vehicles servicing the subject land homestead and agricultural commodities produced on the subject land and not destined for the proposed development.

The proposed development entrance off Getta Getta Road is to be located some 200 m east of the existing subject land entrance (2513 Getta Getta Road). The proposed development entrance shall be the principal light and heavy vehicle access to and from the proposed development. All livestock and commodity delivery vehicles associated with the proposed development shall be required to enter the site via the proposed development entrance. The proposed development entrance shall be designed to provide an efficient, functional and safe access to the proposed development site for the type of traffic generated by the proposed development. The largest vehicle configuration proposed to access the site is a Type 1 road train. Consequently, the proposed entrance shall accommodate vehicle up to a Type 1 road train configuration. This access shall also be used by light vehicles such as staff and service vehicles. This entrance is directly off Getta Getta Road a local controlled road.

The proposed entrance is shown on Figure 3. The proposed entrance is located on a straight downhill (from the west) section of Getta Getta Road and is not located on a bend with a radius of less than 450 m.

The proposed entrance shall be constructed and is maintained to an industrial standard in accordance with Chapter 7 Property access Subsection 7.2.3 Rural Roads of Guide to Road Design Part 4: Intersections and Crossings – General, edn 2.2 2023 (Austroads, 2023).

The proposed entrance shall be of sufficient width (8 m) to allow for two vehicles to pass on the road to ensure that Type 1 road trains will not be required to queue when turning off the Getta Getta Road to wait for a vehicle to exit the site.

Further, the proposed entrance off Getta Getta Road is not located within 15 m of a signalised road intersection, 10 m from an un-signalised road intersection, within 2 m of any adjoining property access or within 1 m of any street signage, power pole, street light or other council infrastructure.

Photograph 38 – Proposed development site – Proposed entrance (looking east)

Photograph 39 – Proposed development site – Proposed entrance (looking west)

The road access safety assessment shall be undertaken in accordance with clause 3.4 of Austroads Guide to Road Design Part4A: Unsignalised and Signalised Intersections August 2017 (Austroads, 2017), with consideration of the proposed entrance as an intersection. The following sections outline the assessment.

4.4.6.2 Safety assessment

The road safety assessment shall determine the following types of sight distance required for the existing entrance:

- approach sight distance (ASD); and
- safe intersection sight distance (SISD);

4.4.6.2.1 Angle of approach

The proposed entrance onto the Getta Getta Road for northbound vehicles is at 90 degrees as shown in Figure 3. This is the most desirable angle of egress as this will usually produce the best sight distance for road vehicles.

4.4.6.2.2 Vertical geometry

Getta Getta Road has a downhill vertical grade of about 0.25% to the east in the vicinity of the proposed entrance as shown in Photograph 38 and Photograph 39. There are no floodway dips or crests in the sight distance section.

4.4.6.2.3 Horizontal geometry

Getta Getta Road has a straight horizontal approach to the east and west in the vicinity of the proposed entrance as shown in Photograph 38 and Photograph 39.

4.4.6.2.4 Approach Sight Distance (ASD)

4.4.6.2.4.1 Cars

The minimum level of sight distance available on the minor road approaches to all intersections to ensure that drivers are aware of the presence of an intersection is defined as the Approach Sight Distance (ASD). The ASD has been calculated as it assumed that not all light vehicles using Getta Getta Road would be aware of the access. The ASD has been calculated in accordance with Austroads (2021b) and Equation 1.

$$ASD = \frac{R_T \times V}{3.6} + \frac{V^2}{254 \times (d + 0.01 \times a)}$$ ……………………………Equation 1

Where:-

ASD = approach sight distance (m)
R_T = reaction time (sec);
V = operating (85th percentile) speed (km/h);
D = coefficient of deceleration;
a = a longitudinal grade in % (in direction of travel: positive for uphill grade, negative for downhill grade) (Austroads, 2021b)

The desirable speed environment for a sealed rural – low volume road is 100 km/hr.

Table 20 – Proposed development – Getta Getta Road entrance – Approach sight distance – Design criteria

Parameter	**Units**	**Approach site distance (ASD) design criteria**			
		Westbound		**Eastbound**	
		Light Vehicle Car	**Heavy Vehicle Trucks**	**Light Vehicle Car**	**Heavy Vehicle Trucks**
Design operating speed, V	km/hr	100	90	100	90
Reaction time, R_T	s	2.5	2.5	2.5	2.5
Coefficient of deceleration, *D*		0.46	0.29	0.46	0.29
Longitudinal grade, a	%	0.25	0.25	-0.25	-0.25
ASD	m	**155**	**172**	**155**	**173**

4.4.6.2.4.2 Trucks

Obtaining an Approach Sight Distance (ASD) is not deemed necessary for heavy vehicles as the users are familiar with the access location to the proposed development.

4.4.6.2.5 Safe Intersection Sight Distance (SISD)

SISD is the minimum sight distance which should be provided on Getta Getta Road at the proposed development site entrance to the subject land. An analysis of the existing geometry for SISD (both directions) was undertaken on-site. The SISD was calculated for Normal Design Domain (NDD) and Extended Design Domain (EDD) for both cars and trucks (B-Double/Type 1 road train) using the following equation and design factors as shown in Table 21 and Table 22 respectively. Tables 3 and 4 detail the finding of the SISD assessment. An object height for the application of SISD of 1.25 m has been used. The SISD has been calculated in accordance with Austroads (2021b) and Equation 2.

$$SISD = \frac{D_T \times V}{3.6} + \frac{V^2}{254 \times (d + 0.01 \times a)}$$ ……………………Equation 2

Where:-

SISD = safe intersection sight distance (m);
D_T = decision time (sec) = observation time O_T (3 sec) + reaction time R_T (sec);
V = operating (85_{th} percentile) speed (km/h)
D = coefficient of deceleration
a = a longitudinal grade in % (in direction of travel: positive for uphill grade, negative for downhill grade) (Austroads, 2021b).

An operating (85_{th} percentile) speed of Getta Getta Road of 100 km/hr has been used for light vehicles and 90 km/hr for heavy vehicles. This represents a representative scenario for this section of the road as the road is sealed and is not speed sign posted.

Table 21 – Proposed development – Getta Getta Road entrance – SISD NDD design criteria

Parameter	Units	Normal Design Domain (NDD) design criteria Westbound Light Vehicle Car	Westbound Heavy Vehicle Trucks	Eastbound Light Vehicle Car	Eastbound Heavy Vehicle Trucks
Design speed, *V*	km/hr	100	90	100	90
Reaction time, R_T	s	2.5	2.5	2.5	2.5
Observation time, O_T	s	3	3	3	3
Decision time, D_T	s	5.5	5.5	5.5	5.5
Coefficient of deceleration, *D*		0.46	0.29	0.46	0.29
Driver height	m	1.1	2.4	1.1	2.4
Object height	m	1.25	1.25	1.25	1.25
Longitudinal grade, a	%	0.25	0.25	-0.25	-0.25
SISD	m	**238**	**248**	**239**	**248**

Table 22 – Proposed development – Getta Getta Road entrance – SISD EDD design criteria

Parameter	Units	Extended Design Domain (NDD) Westbound Light Vehicle Car	Westbound Heavy Vehicle Trucks	Eastbound Light Vehicle Car	Eastbound Heavy Vehicle Trucks
Design speed, V	km/hr	100	90	100	90
Reaction time, R_T	s	2.5	2.5	2.5	2.5
Observation time, O_T	s	1	1	1	1
Decision time, D_T	s	3.5	3.5	3.5	3.5
Coefficient of deceleration, *D*		0.46	0.29	0.46	0.29
Driver height	m	1.1	2.4	1.1	2.4
Object height	m	1.25	1.25	1.25	1.25
Longitudinal grade, a	%	0.25	0.25	-0.25	-0.25
SISD	m	**182**	**197**	**183**	**198**

[#] EDD SISD – an observation time (O_T) of 0.5 sec less than the values given in Appendix A.3 (Austroads, 2021b) has been used.

4.4.6.2.6 Queue assessment

Heavy vehicles shall have no requirement to queue across Getta Getta Road. As shown on Figure 3, there is sufficient queuing distance for northbound vehicles on the subject land prior to the crossover.

4.4.6.2.7 Summary

A summary of the sight distance assessment results for the proposed development site entrance off Getta Getta Road are provided in Table 23.

Table 23 – Proposed development – Getta Getta Road entrance – Sight distance summary

Parameter	Units	Proposed entrance			
		Eastbound		Westbound	
		Light Vehicle Car	Heavy Vehicle Trucks	Light Vehicle Car	Heavy Vehicle Trucks
ASD	m	155	172	155	173
SISD NDD required	m	238	248	239	248
SISD EDD required	m	182	197	183	198
Available sight distance	m	+300	+300	+250	+250

The analysis of the westbound and eastbound approaches demonstrates that for the adopted design speed of 100 km/hr for light vehicles and 90km/hr for heavy vehicles that the SISD is achieved as shown in Table 23.

The available sight distance at the entrance is good due to the straight alignment of Getta Getta Road and the relatively flat topography at this location as shown in Photograph 38 and Photograph 39. A sight distance in excess of 250 m safe intersection sight distance (SISD) has been measured in both directions. Consequently, no upgrades are recommended.

4.4.6.2.8 Geometric layout

The proposed entrance off Getta Road to the proposed development complex site shall be all weather and shall be designed and constructed generally in accordance with geometric designs referenced in Austroads (2023).

4.4.7 Parking

4.4.7.1 Parking arrangements

To ensure the provision for parking adequately services the proposed development, the parking demand has been estimated at 4 full time equivalent staff members plus the provision of parking for the loading and unloading of goods including livestock and commodities within the site. A conservative assumption has been adopted as each staff member will require an individual parking space.

The proposed development has a large site area which is sufficient to provide for at least 5 informal carparking areas located across the development complex site. Further, the site area provides sufficient area for light and heavy vehicles up to a Type 1 road train to manoeuvre and turn around on-site and enter / exit the proposed development site in a forward direction.

4.4.7.2 Adequacy of car parking

Figure 3 indicates several informal gravel car parking areas of which dimensions are able to accommodate a total of over 5 staff parking spaces, plus heavy vehicle spaces. Due to the nature of the proposed development and its location in a rural area this provision is considered to be appropriate in accordance with the requirements of staff and the expected delivery of commodities and livestock.

Provision of parking for persons with disability and general access shall be made in accordance with the requirements of Australian Standards AS1428 – Design for access and mobility and AS2890.6 – Parking facilities as far as they are relevant to the proposed development.

There is no requirement to have a formal pedestrian connection to buildings from parking areas.

There is no requirement for allocation of specific service areas for waste collection, deliveries and loading and unloading of other goods.

4.4.8 Public transport

Due to the rural location of the subject land there is no scheduled public transport operations such as passenger / school bus or train services along haulage routes comprising Getta Road, North Star Road, Warialda Road (Warialda to North Star Road), Bruxner Way (Texas Road to North Star Road) or the Gwydir Highway.

Due to the nature of the proposed development provision for public transport infrastructure is not deemed warranted.

Consequently, the proposed development shall have no impact on public transport services.

4.4.9 Cyclists and pedestrians

Due to the rural location of the subject land there are no pedestrian paths, bicycle lanes or bicycle awareness zones provided on Getta Road. Further afield there are no pedestrian paths, bicycle lanes or bicycle awareness zones provided within rural segment of North Star Road, Warialda Road, Bruxner Way or the Gwydir Highway.

Due to the nature of the proposed development provision for pedestrian paths or bicycle infrastructure is not deemed warranted.

Consequently, the proposed development shall have no impact on cyclist or pedestrian infrastructure.

4.4.10 Conclusion

The impact of traffic generated by the proposed development on the external transport network has been assessed. Consideration has been given to operational performance, road safety and access arrangements.

The assessment was carried out of the trips likely to be generated by the proposed development and the estimated distribution of trips on the existing road network. The impact of the proposed development on the road network has been analysed using procedures set out in Austroads.

Results of the assessment indicate that the road network continues to operate with capacity as the additional levels will be within the standard of the existing road design. Consequently, the impact of development traffic on the operational performance of the local road network is not significant.

No upgrades are recommended under proposed additional traffic within the sealed section of Getta Getta Road. No intersection upgrades to the local or state controlled road network would be warranted due to the low additional volume of development traffic.

The following mitigation measures are proposed or maintained:

- Access for light and heavy vehicles be maintained via a new dedicated subject land entrance off Getta Getta Road approximately 200 m east of the existing subject land entrance to provide sufficient sight distances to and from the intersection.
- Advisory signage (Truck crossing or entering) be implemented on each approach to the new entrance on Getta Getta Road in accordance with AS1742.2 to advise motorists of truck turning movements.
- A Traffic Management Plan shall be implemented to ensure heavy vehicles utilise the principal haulage routes.

In conclusion, the proposed development will not adversely impact on the operational performance of the surrounding road network and the proposed road access arrangements are considered adequate and suitable for the proposed use and estimated traffic generated.

5 References

Austroads, 2020a, Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings Management, Austroads, Sydney, NSW.

Austroads, 2020b, Guide to Traffic Management Part 12: Integrated Transport Assessments for Developments , Austroads, Sydney, NSW.

Austroads 2021a, Guide to Road Design Part 3: Geometric Design, AGTM04A-17, Austroads, Sydney, NSW.

Austroads 2021b, Guide to traffic management: part 4A: Unsignalised and Signalised Intersections, AGTM04A-17, Austroads, Sydney, NSW.

Austroads, 2023, Guide to Road Design Part 4: Intersections and Crossings – General, edn 2.2 2023, AGRD04-23, Austroads, Sydney, NSW. https://austroads.com.au/publications/road-design/agrd04

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Roads and Traffic Authority, 2002, Guide to Traffic Generating Developments, Version 2.2, Transport Planning Section, Sydney Client Services, Roads and Traffic Authority, Sydney NSW.

Roads and Maritime Services, 2013, Austroads Supplement for Guide to Traffic Management Roads and Maritime Services, Sydney NSW.

Roads and Traffic Authority, 2011, RTA Supplement to the Austroads Guide to Road Transport Planning, Roads and Traffic Authority, Sydney NSW.

Appendix A – TfNSW Traffic volume reports

Gwydir Highway (91078) Data

04/02/2011 - 13/02/2011 | All Days | 00:00 - 24:00 | All Vehicles | Both Directions | Reset

Yearly Views | Monthly Views | Weekly Table | Raw Data Table

YEAR	DIRECTION	VEHICLE TYPE	TOTAL	00:00	01:00	02:00	03:00	04:00	05:00	06:00	07:00	08:00
2011	Eastbound	All Vehicles	636	4	2	2	3	3	5	14	29	56
2011	Eastbound	Heavy Vehicles	98	2	2	2	2	1	2	3	5	8
2011	Eastbound	Light Vehicles	563	4	2	1	2	2	4	13	25	49
2011	Westbound	All Vehicles	640	4	3	2	2	3	9	21	34	39
2011	Westbound	Heavy Vehicles	87	2	2	1	2	2	3	4	6	6
2011	Westbound	Light Vehicles	569	3	2	2	1	3	7	18	28	33

Data Table | Daily Profile | Yearly Profile | Export Data as CSV file | Close

Warialda Road (91591) Data

11/04/2007 - 21/05/2008 | All Days | 00:00 - 24:00 | All Vehicles | Both Directions | Reset

Yearly Views | Monthly Views | Weekly Table | Raw Data Table

YEAR	DIRECTION	VEHICLE TYPE	TOTAL	00:00	01:00	02:00	03:00	04:00	05:00	06:00	07:00	08:00
2007	Northbound	All Vehicles	288	2	2	2	2	2	5	12	18	19
2007	Northbound	Heavy Vehicles	68	2	2	1	2	2	3	3	4	4
2007	Northbound	Light Vehicles	250	2	2	2	2	2	4	9	15	16
2007	Southbound	All Vehicles	285	2	2	2	2	2	2	4	12	27
2007	Southbound	Heavy Vehicles	71	2	2	2	2	2	2	2	3	5
2007	Southbound	Light Vehicles	248	2	2	2	2	2	2	3	10	23
2008	Northbound	All Vehicles	281	2	2	2	2	2	5	11	17	18
2008	Northbound	Heavy Vehicles	66	2	1	2	2	2	2	3	3	4
2008	Northbound	Light Vehicles	249	2	2	2	2	2	4	10	15	15

Data Table | Daily Profile | Yearly Profile | Export Data as CSV file | Close


Warialda Road (91591) Data
Yearly Views
Monthly Views
Weekly Table
Raw Data Table
00:00 01:00 02:00 03:00 04:00 05:00 06:00 07:00 08:00 09:00 10:00 11:00 12:00 13:00 14:00 15:00 16:00 17:00 18:00 19:00 20:00 21:00 22:00 23:00
20
10
0
10
20
30
40
Northbound Light Vehicles
Northbound Heavy Vehicles
Southbound Light Vehicles
Southbound Heavy Vehicles
Data Table
Daily Profile
Yearly Profile
Export Chart as PNG
Close

Bruxner Highway (91506) Data

01/01/2006 - 25/05/2009 | All Days | 00:00 - 24:00 | All Vehicles | Both Directions | Reset

Yearly Views | Monthly Views | Weekly Table | Raw Data Table

YEAR	DIRECTION	VEHICLE TYPE	TOTAL	00:00	01:00	02:00	03:00	04:00	05:00	06:00	07:00	08:00
2006	Eastbound	All Vehicles	328	4	3	3	5	2	5	8	9	14
2006	Eastbound	Heavy Vehicles	52	1	1	1	1	1	1	2	2	3
2006	Eastbound	Light Vehicles	299	5	3	3	4	2	4	7	8	12
2006	Westbound	All Vehicles	340	4	4	2	3	4	3	4	9	14
2006	Westbound	Heavy Vehicles	47	1				1	1	1	2	2
2006	Westbound	Light Vehicles	319	4	4	2	3	3	3	4	8	14
2008	Eastbound	All Vehicles	391	3	2	2	2	3	6	13	21	25
2008	Eastbound	Heavy Vehicles	78	2	2	2	2	2	2	3	4	4
2008	Eastbound	Light Vehicles	339	3	2	2	2	2	4	11	17	22

Data Table | Daily Profile | Yearly Profile | Export Data as CSV file | Close

Appendix B – Traffic Management Plan

Development Application and Environmental Impact Statement

Expansion of Beef Cattle Feedlot from 999 head to 3,000 head

Operation Traffic Management Plan and Truck Driver Code of Conduct

"Springfield"
2513 Getta Getta Road
NORTH STAR NSW 2408

Doolin Farming Pty Ltd
"Glenhoma"
3202 Getta Getta Road
NORTH STAR NSW 2408

[February 2025]

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AGRICULTURAL
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Approved by:	Rod Davis	**Position:**	Director
Signature:	R.J. Davis	**Date:**	21/02/2025

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V1R2	21/02/2025	Final for lodgement to GSC	Rod Davis	Rod Davis	Rod Davis

Distribution

Version	Recipient	Lodgement	Copies
V1R1	Doolin Farming Pty Ltd	Electronic	-
V1R2	Doolin Farming Pty Ltd / Gwydir Shire Council (GSC)	Electronic	-

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Citation

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Executive Summary

Doolin Farming Pty Ltd own and operate a 10,000 ha mixed farming operation across several properties at North Star including “Glenhoma”, “Glenmodel”, “Springfield”, “Myall Downs” and “Yetman West” some 27 km east of Yetman and 45 km south-southeast of Goondiwindi (QLD) in NSW.

Doolin Farming Pty Ltd primarily engage in dryland and irrigated cropping and beef production. Doolin Farming Pty Ltd produces wheat, barley, oats and chickpeas in winter and cotton and maize in summer under pivot irrigation systems and dryland sorghum cropping. Doolin Farming Pty Ltd also have onsite storage to accommodate almost the entire grain produced and operate a fleet of trucks to transport their grain.

Central to the beef production enterprise is the breeding, growing and lot-feeding of cattle for the domestic and export markets. Currently the beef supply chain includes breeding and growing of beef cattle on land less suitable for dryland and irrigated cropping and grazing of stubble and lot feeding of cattle within a feedlot on the property ‘Springfield”.

“Springfield” comprises some 1,713 ha (~4,231 acres) and currently, a dryland and irrigated cropping business is undertaken on a large proportion of the property with extensive cattle breeding and grazing of beef cattle on the remaining land which is unsuitable for cropping and lot feeding of cattle within a beef cattle feedlot in the north-east of the property. In the last few years, beef cattle bred on several adjoining properties have been walked into a feeding program on “Springfield” upon weaning. “Springfield” has built infrastructure such as a dwelling, machinery sheds, silos, cattle yards and feedlot etc to support the feeding program.

There has been a beef cattle feedlot on “Springfield” for over three years after approval was granted for a 999 head feedlot by the Gwydir Shire Council in 2021 (DA31/2020). The existing feedlot is known as Springfield Feedlot. Springfield Feedlot is used to finish the Doolin Farming’s own cattle for the domestic and export markets.

Springfield Feedlot currently operates for 12 months of the year and employs approximately 2 full time staff.

Springfield Feedlot includes one controlled drainage area with associated production pens and drainage system which includes catch drains, sedimentation basin and holding pond. Springfield Feedlot also has auxiliary infrastructure to support the use such as cattle handling and feed storage and processing facilities.

Springfield Feedlot is accredited under the National Feedlot Accreditation Scheme (NFAS) with audits conducted annually.

Doolin Farming Pty Ltd wish to expand Springfield Feedlot from the current approved capacity of 999 head by gaining development approval for intensive livestock agriculture to operate as a 3,000 head beef cattle feedlot on the site. The proposed development is to be developed in two stages with the first stage having a capacity of 1,251 head. The second stage will provide an additional 750 head, bringing the capacity of Springfield Feedlot to 3,000 head.

The proposed development will include additional production pens and redeveloped cattle handling facility within an expanded controlled drainage area, additional sedimentation basin and holding pond capacity. The proposed development will incorporate best practice design, construction and environmental management.

Existing infrastructure such as the grain storage and processing facilities have sufficient capacity to cater for the demands of the proposed development.

The property "Springfield" is within the Gwydir Shire Council local government area and relevant environmental planning instrument is the *Gwydir Local Environmental Plan 2013* (GLEP).

Beef cattle feedlots which exceed 1,000 head capacity are defined as designated development under Schedule 3 (Part 1 section 21a) of the Environmental Planning and Assessment Regulation 2000 and therefore require a full Environmental Impact Statement (EIS) to accompany the development application.

This Traffic Management Plan and Truck Driver Code of Conduct forms part of the Traffic Impact Assessment prepared as part of an EIS to support the Development Application to the Edward River Council.

A Traffic Management Plan and Truck Driver Code of Conduct shall be implemented to ensure heavy vehicles utilise the approved haulage routes.

1 Background

1.1 Introduction

Doolin Farming Pty Ltd own and operate a 10,000 ha mixed farming operation across several properties at North Star including “Glenhoma”, “Glenmodel”, “Springfield”, “Myall Downs” and “Yetman West” some 27 km east of Yetman and 45 km south-southeast of Goondiwindi (QLD) in NSW.

Central to the beef production enterprise is the breeding, growing and lot-feeding of cattle for the domestic and export markets. Currently the beef supply chain includes breeding and growing of beef cattle on land less suitable for dryland and irrigated cropping and grazing of stubble and lot feeding of cattle within a feedlot on the property ‘Springfield”.

“Springfield” comprises some 1,713 ha (~4,231 acres) and currently, a dryland and irrigated cropping business is undertaken on a large proportion of the property with extensive cattle breeding and grazing of beef cattle on the remaining land which is unsuitable for cropping and lot feeding of cattle within a beef cattle feedlot in the north-east of the property.

There has been a beef cattle feedlot on “Springfield” for over three years after approval was granted for a 999 head feedlot by the Gwydir Shire Council in 2021 (DA31/2020).

The existing feedlot is known as Springfield Feedlot. Springfield Feedlot is used to finish the Doolin Farming’s own cattle for the domestic export market.

Springfield Feedlot currently operates for 12 months of the year and employs approximately 2 full time staff. Casual staff and contractors are engaged as required during busy periods such as planting and harvesting of silage and fodder and to supply various associated services such as plant maintenance and veterinary requirements.

Springfield Feedlot is accredited under the National Feedlot Accreditation Scheme (NFAS) with audits conducted annually.

The property “Springfield” is within the Gwydir Shire Council local government area and relevant environmental planning instrument is the *Gwydir Local Environmental Plan 2013* (GLEP).

Doolin Farming Pty Ltd wish to expand Springfield Feedlot from the current approved capacity of 999 head by gaining development approval for intensive livestock agriculture to operate as a 3,000 head beef cattle feedlot on the site. The proposed development is to be developed in two stages with the first stage having a capacity of 1,251 head. The second stage will provide an additional 750 head, bringing the capacity of Springfield Feedlot to 3,000 head.

Under Schedule 1, Part 1, Item 22 of the Protection of the Environment Operations Act 1987, the Project is categorised as cattle, sheep or horse accommodation. The Environmental Impact Statement Assessment (RDC Engineers Pty Ltd, 2025) identified the potential for minor impacts on the external road network. However, it concluded any potential impacts could be managed by standard mitigation and management measures.

2 Purpose, scope, and objectives

2.1 Purpose

The purpose of this Operation Traffic Management Plan and Truck Driver Code of Conduct (OTMP) is to outline how Doolin Farming Pty Ltd shall manage traffic risks associated with vehicle traffic associated with the operational phase of the Development and minimise impacts of the heavy vehicle traffic on the road network, on the community and to manage the movement of heavy vehicles using best industry practice.

2.2 Scope

This OTMP applies to the operational phase of the Development including all Development personnel, subcontractors and visitors who use light vehicles and heavy vehicles on the designated haulage routes of the Development.

2.3 Objectives

The key objective of the OTMP is to ensure that impacts on the road network are minimised and within the scope permitted by the CoA. To achieve this objective, Doolin Farming Pty Ltd will:

- Ensure compliance with all relevant CoA, statements of commitment and reasonable community expectations;
- detail the measures that are to be implemented to ensure road safety and network efficiency during operation;
- detail the measures that are to be implemented to ensure delivery vehicle arrival times are appropriately staggered;
- detail heavy vehicle routes, access and parking arrangements and queuing procedures;
- encourage and enforce compliance and acceptance of the Truck Driver Code of Conduct by all heavy vehicle drivers using the Development;
- Protect and enhance public safety through compliance with relevant road rules and minimise conflicts with other road users;
- Minimise the heavy vehicle impacts on the community;
- Increase occupational health and safety (OH&S) understanding in relation to fatigue, vehicle operation in public areas and obligation to the general public;
- Foster an understanding and awareness within the Development of community expectations and legislative requirements in regard to heavy vehicle movements; and
- include a program to monitor the effectiveness of these measures.

3 Proposed development

3.1 Location

The Development is located at North Star approximately some 15 km by road east of the village of North Star and some 27 km west-southwest of Yetman. Regional access to the Development is from the Bruxner Way or Warialda road to North Star Road onto Getta Getta Road.

The subject land has primary frontage to Getta Getta Road (sealed) of approximately 5 km in length. Getta Getta Road intersects with North Star Road some 14 km west and with Warialda Road some 25 km east of the entrance for the proposed development complex respectively.

Getta Getta Road is a sealed road from the bridge crossing over Ottleys Creek to North Star and generally runs in an east-west direction providing one (1) lane of travel in both directions and has an unsigned speed limit.

Figure 1 is a locality plan highlighting the subject land to roads and the nearby townships of North Star and Yetman.

3.2 Description

The Development comprises a permanent pen area with adjoining feed alley in which the beef cattle are housed in the open air and provided with their daily feed and water requirements. The pen area shall incorporate water, feeding and shade infrastructure.

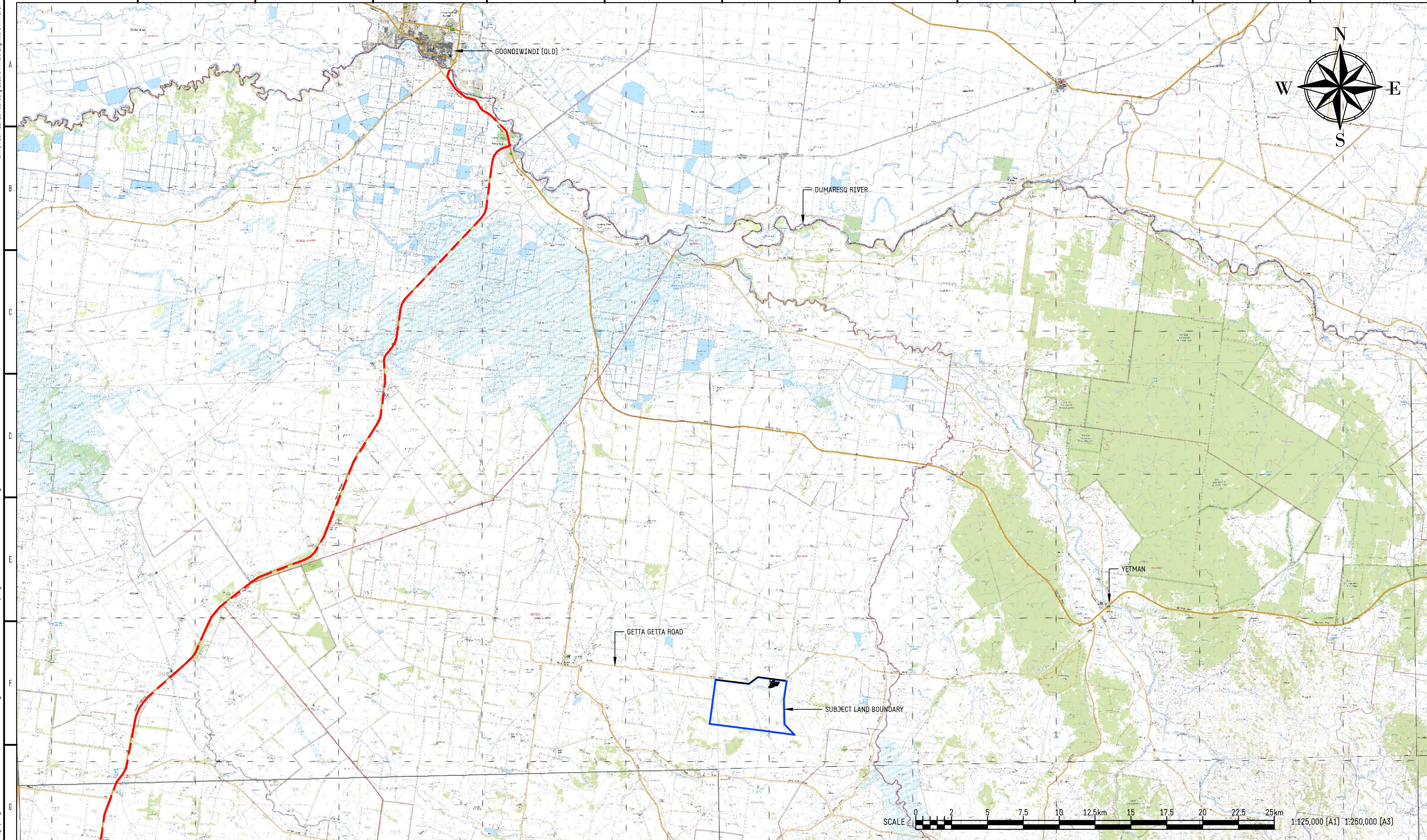
There are two components of the Development being the infrastructure and waste utilisation area.

The infrastructure of the Development includes:

- Production pens for beef cattle;
- Drainage system incorporating catch drains, sedimentation basin and holding pond;
- A cattle handling facility with receival/dispatch infrastructure;
- Internal roadways connecting the subject land access to the cattle handling and commodity storage facilities;

The waste utilisation area includes:

- Effluent and solid waste (manure) utilisation areas. When available, effluent shall be applied to crops land via irrigation and solid waste applied to cropping land within the dedicated utilisation areas.



LEGEND

- SUBJECT LAND BOUNDARY
- LAND PARCEL BOUNDARY

NOTES:

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A	24/01/25	DRAFT ISSUE TO CLIENT	RJD	RJD	RJD
B	21/02/25	FINAL ISSUE FOR SUBMISSION TO GSC	RJD	RJD	RJD

SCALE	1:250,000 (A3)
DRAWN	RJD
DATE	21/02/2025
CHECKED	RJD
DATE	21/02/2025
APPROVED	RJD
DATE	21/02/2025

CLIENT DOOLIN FARMING PTY LTD

PROJECT PROPOSED 3,000 HEAD BEEF CATTLE FEEDLOT

TITLE DEVELOPMENT APPLICATION FOR INTENSIVE LIVESTOCK AGRICULTURE
TRAFFIC IMPACT ASSESSMENT - APPENDIX B - TRAFFIC MANAGEMENT PLAN
DEVELOPMENT - LOCALITY PLAN

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 1		A3	E2-103-550-01	B

4 Traffic Management Plan

4.1 Introduction

The OTMP is a tool for managing the impacts of the Development's activities on the road network. It provides a structured approach to planning and implementing traffic management measures.

4.2 Transport limitations

The purpose of the proposed development is to produce high-quality grain fed beef in an environmentally sustainable manner. This requires transportation of livestock to and from the site, commodities for the feed ration to the site and solid waste from the site using various sized heavy vehicles and the generation of light vehicle movements associated with staff and support services to and from the Development.

All liquid waste (effluent and domestic sewage) shall be utilised on-site. When available effluent shall be applied to crops.

The capacity of the Development is limited to 3,000 head-on-feed per day averaged over a month and controlled by the livestock management system.

4.3 Transportation routes and destinations

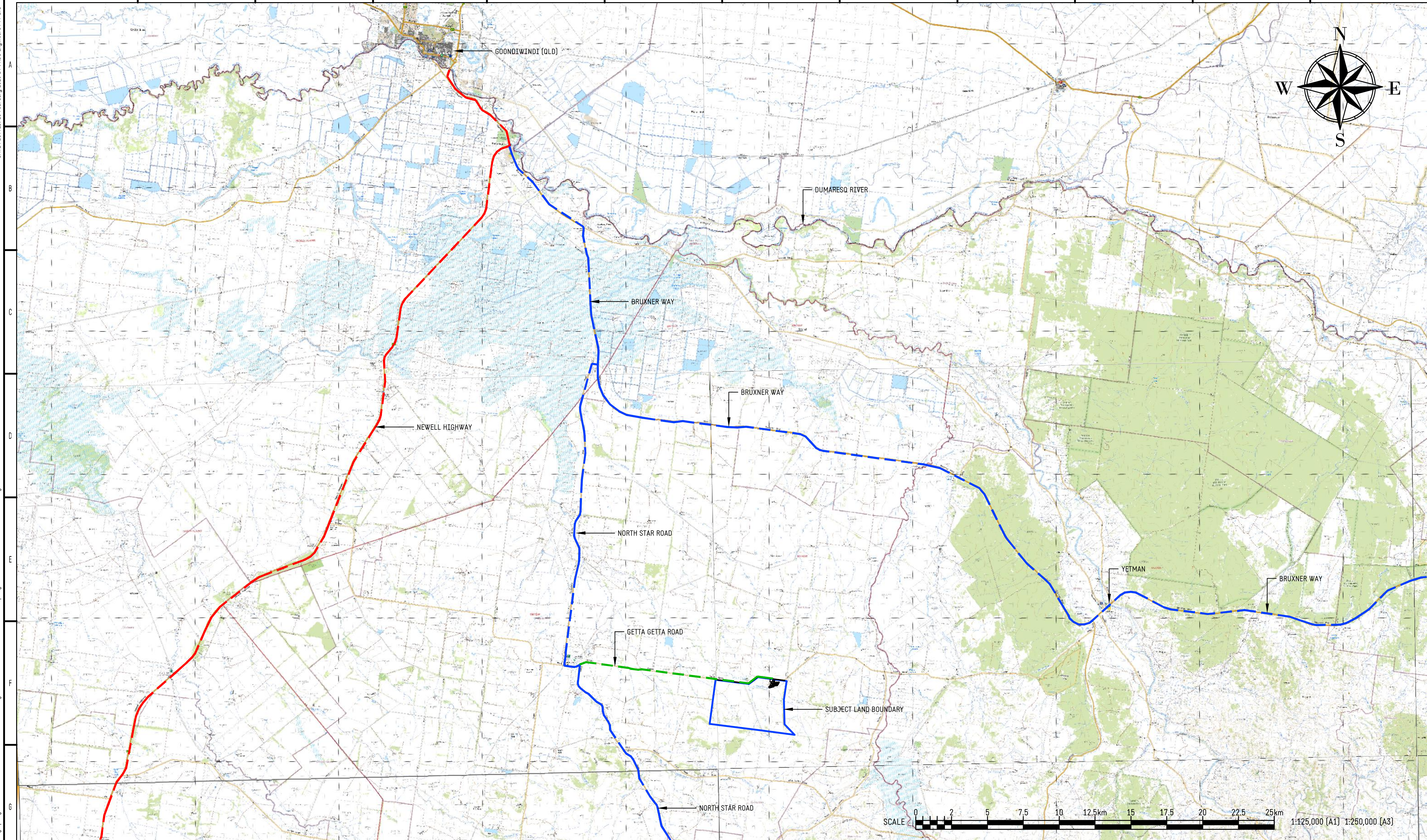
The transportation route for regional deliveries of livestock and feed commodities (proteins, supplements) has been determined as the State road network to Warialda using the Gwydir Highway as well as the regional road network (Warialda Road, North Star Road, Bruxner Way) and Getta Getta Road a local controlled road.

The transportation route for local deliveries of feed commodities such as grain has been determined as the local controlled road of Getta Getta Road.

All these roads have been assessed as suitable for heavy vehicle traffic.

As these are all public roads the road authority being either Gwydir Shire Council or Transport for NSW will be responsible for maintenance of the transportation routes.

Figure 22 identifies the main haulage routes to and from the Development site.



LEGEND

- SUBJECT LAND BOUNDARY
- LAND PARCEL BOUNDARY
- HAULAGE ROUTE - LOCAL ROAD
- HAULAGE ROUTE - REGIONAL ROAD
- HAULAGE ROAD - STATE ROAD

NOTES:

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CLIENT DOOLIN FARMING PTY LTD

PROJECT PROPOSED 3,000 HEAD BEEF CATTLE FEEDLOT

TITLE DEVELOPMENT APPLICATION FOR INTENSIVE LIVESTOCK AGRICULTURE
TRAFFIC IMPACT ASSESSMENT - APPENDIX B - TRAFFIC MANAGEMENT PLAN
DEVELOPMENT - TRANSPORTATION ROUTES

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 2		A3	E2-103-550-02	B

4.4 Identified hazards

Always be alert for these hazards and make adjustments as necessary. Identified hazards on or near roadways include:

- Narrow or winding roads;
- Low wires or awnings;
- Low bridges, underpasses, tunnels etc;
- Agricultural equipment;
- Blind crests and/or corners;
- Road works;
- Road pavement conditions – rough, slippery surfaces;
- Low level crossings;
- Vehicle interaction;
- Poor signage; and
- Livestock and native fauna at dusk and dawn;

The vehicle itself may become a road hazard when it is parked on a roadway, broken down or otherwise.

4.5 Restricted entry and areas

All areas of the Development complex are to be considered restricted areas and must not be entered unless instructed otherwise by the Feedlot Manager.

Vehicles and drivers shall comply with all project requirements (i.e. dress code, PPE, etc.).

Drivers not complying with project requirements will not be permitted to leave the cab.

4.6 Vehicle entry

Entry of vehicles to Development site is restricted to the following:

- Vehicles registered by an Australian State or Territory vehicle licensing authority or vehicle exempt from registration by new South Wales Government regulation.

- Vehicles ridden or driven by staff or visitors with a valid reason to park on the Development site;

- Vehicles delivering livestock and commodities, vehicles dispatching livestock and solid waste; vehicles operated by contracting companies and service providers to the Development.

- Vehicles picking up or setting down passengers who are Staff or Visitors to the Development site.
- Emergency services vehicles; and
- Police vehicles.

4.7 Light vehicle operators

The driver of a light vehicle must:

- Not be under the influence of alcohol or other drugs;
- Hold a current Australian licence for the appropriate class of vehicle;
- Adhere to all sign posted speed limits;
- Not exceed more than 80kmh on any unsealed roads;
- Ensure all passengers wear seat-belts at all times;
- Not transport more passengers than the vehicle manufacturers specification;
- Ensure all light vehicles are parked in a safe location, fundamentally stable, in gear and with handbrake applied;
- Give way to heavy vehicles on the Site; and
- Not use mobile communication devices such as phones, personal music devices, UHF radios or satellite navigation whilst the vehicle is in motion.

4.8 Operating hours

The approved operating hours are outlined in Table 1.

Table 1 – Development – Operating hours

Activity	Hours
Transportation of livestock and solid waste from the site	7.00 am to 4.00 pm, Monday to Sunday
Transportation of commodities to the site	7.00 am to 4.00 pm, Monday to Sunday
Other Feedyard operations	7.00 am to 6.00 pm, Monday to Sunday

The following activities may be carried out on the site outside these hours of operation:

(a) Delivery or dispatch of livestock for protection of animal welfare; and
(b) Emergency work to avoid the loss of lives, property and/or to prevent environmental harm.

In such circumstances the Development Management shall notify any affected residents prior to undertaking the activities or as soon as practical thereafter.

4.9 Monitoring of transport commodities

Monitoring of commodity transport is through the Livestock Management System that records the time and date of arrival and dispatch as well as truck, commodity type and weight.

The holder of the Environmental Protection Licence is to provide EPA with the annual volumes via the standard form with annual data reproduced within each Annual Return.

The Livestock Management System allows the Development's management to monitor the number of head-on-feed through the year to ensure compliance with CoA.

4.10 Vehicle arrival and departure – Queueing

All heavy vehicles arriving to the site will require scheduling or pre-notification of arrival allowing for management of livestock and commodity arrival.

All heavy vehicles arriving to the site will require scheduling or pre-notification of arrival allowing for management of livestock or solid waste departure.

If heavy vehicles arrive to site without scheduling and no capacity is available, they will be turned away.

Drivers will be made aware they are not to queue on Getta Getta Road and advised to proceed to a suitable truck parking area on the Development site before being advised by management that the Development has capacity to accept their load.

Whilst on site, all vehicles are to abide by the traffic management system and undertake all listed procedures required. Some of these requirements involve compliance with the one-way directions and speed limit.

5 Legislative and other requirements

5.1 Legal and other requirements

A register of legal and other requirements for the Project is contained in Appendix A – Legal and other requirements. The relevance of legislation is maintained through the Environmental Management System.

The legal requirements register will be reviewed at regular intervals, such as after management review, and updated with any applicable changes. Any changes made to the legal requirements register will be communicated to the wider team where necessary through toolbox talks, specific training and other methods detailed in the Project's Operation Environmental Management Plan.

5.2 Approvals, permits and licences

Several approvals, permits and licences have and/or will be obtained and maintained for the Project under relevant legislation and CoA. For example, these include:

- Development consent under the Environmental Planning and Assessment Act 1979 No 203; and
- Environmental Protection Licence under Chapter 3 of the Protection of the Environment Operations Act 1997.

Appendix A2 of the OEMP contains a register of all relevant environmental approvals, permits and licences.

5.3 Conditions of Approval

Relevant transport and traffic related CoA are outlined in Table 2. A cross reference is also included to indicate where the condition is addressed in this Plan or other Project management documents.

Table 2 – Conditions of Approval – Relevant to the OTMP

CoA	Condition requirements	Plan reference
Notice of Determination		
	To be completed after Notice of Determination is issued	
EPL		
	To be completed after EPL is issued	

6 Truck Driver Code of Conduct

6.1 General requirements

Heavy vehicle drivers delivering livestock or commodities to or transporting livestock from the Development must:

(a) Have undertaken a site induction carried out by an authorised member of the Development staff or suitably qualified person under the direction of the Development management;
(b) Hold a valid driver's licence for the class of vehicle that they operate;
(c) Operate the vehicle in a safe manner within and external to the Development site;
(d) Comply with the direction of authorised site personnel when within the site;
(e) Comply with the *Road Transport Act 2013* and its associated regulations in regard to drug use and alcohol consumption; and
(f) Comply with the Australian Road Rules external to the site.

6.2 Heavy vehicle speed

Evidence has shown that speeding increases both the risk of crash involvement as well as the severity of a crash when one occurs (Aarts & van Schagen, 2006).

There are two types of speeding:
a) Where a heavy vehicle travels faster than the posted speed limit; and
b) Where a driver travels within the speed limit but because of environmental or road conditions (e.g. fog, rain, pavement condition) this speed is inappropriate.

In NSW the maximum speed limit for a vehicle more than 4.5 tonnes Gross Vehicle Mass (GVM) is 100 km/h.

Drivers are to observe the posted speed limits, with speed adjusted to suit the road environment and prevailing weather conditions, to comply with the Australian Road Rules. The vehicle speed must be suitable to ensure the safe movements of the vehicle based on the vehicle configuration.

Vehicle speed on public roads is enforced by the NSW Police Service. Penalties on drivers failing to comply with speed limits include demerit points, licence suspension, cancellation or disqualification and fines.

The speed limits on the immediate local road network are presented in Table 3.

Table 3 – Development – Transportation route – Speed limit

Road	Posted speed limit	Regulatory speed limit
Bruxner Way	100 km/hr	100 km/hr
North Star Road	Unsigned	100 km/hr
Warialda Road	100 km/hr	100 km/hr
Getta Getta Road	Unsigned	100 km/hr
Gwydir Highway	100 km/hr	100 km/hr

All vehicle drivers are to adhere to the posted speed limits on-site.

Road vehicle drivers are to adhere to the following speed limits on-site:
- 25 km/h for light vehicles;
- 15 km/h for heavy vehicles.

6.3 Heavy vehicle driver fatigue

Driver fatigue is a major heavy vehicle safety hazard and one of the largest contributors to causes of accidents for heavy vehicle drivers. Driver fatigue, defined as driving while feeling sleepy, physically or mentally tired, or lacking energy.

The Heavy Vehicle National Law (HVNL) applies in New South Wales. The Heavy Vehicle (Fatigue Management) National Regulation commenced in 2014 and applies to trucks and truck combinations over 12 tonne GVM.

Under the HVNL, industry has the choice of operating under three fatigue management schemes:
a) Standard hours;
b) Basic Fatigue Management (BFM); or
c) Advanced Fatigue Management (AFM).

Standard hours are the maximum work hours and minimum work hours under the HVNL; BFM allows flexible work and rest hours; and AFM allows a person to work their own hours in a compliant fatigue management system.

All heavy vehicle drivers are to be aware of their adopted Fatigue Management Scheme and operate within its requirements. By law, all drivers have a duty to not drive a fatigue-regulated heavy vehicle on a road while impaired by fatigue.

6.4 Heavy vehicle compression breaking

Noise from engine or compression brakes can be intrusive, especially at night or early morning. Heavy vehicle drivers should avoid using exhaust brakes, engine compression or 'jake' brakes near residential areas and noise-sensitive areas such as hospitals and schools, unless they are necessary for safety reasons.

Due to the relative proximity to homes, drivers are requested to limit the noise created in built-up areas as much as possible with compression braking only used if required for safety reasons.

All heavy vehicle drivers delivering livestock or commodities to or transporting livestock from the Development are to ensure engine or compression brakes are applied so as not to create excessive noise that could lead to community complaints.

6.5 Heavy vehicle noise

If drivers are required to wait for their next load they are to wait with engines turned off within the Development site in the designated on-site truck parking area. There is to be no trucks stopping on Getta Getta Road at anytime.

6.6 Load covering

Uncovered loads represent the greatest risk to loose material on the road and an increase in dust impacts on neighbouring residents along transportation routes.

To prevent these issues all heavy vehicles transporting dusty materials (e.g. grain) must be covered, when loaded.

All trucks arriving at or departing from the Development site when loaded with dusty materials are required to have an effective cover over their load for the duration of the trip.

All care is to be taken to ensure that all loose debris from the vehicle body and wheels is removed prior to leaving the site.

Drivers must ensure that following tipping that the tailgate is locked before leaving the site.

6.7 Vehicle arrival and departure

Heavy vehicles travelling in close proximity on single lane public roads can be of concern to light vehicle drivers as well as increasing noise through or adjacent to residential areas. To alleviate public concern and increase road safety, heavy vehicles leaving the Development site will be separated by a minimum ten minute interval.

It is difficult to schedule arrivals to the Development Site (except at the commencement of the day) due to the different directions of approach of suppliers and the varying delivery times.

However, when a driver becomes aware, through visual contact or two-way contact between trucks, that they will arrive at approximately the same time then they are to ensure that there is a gap between vehicles (Note that no trucks are allowed to stop along Getta Getta Road).

All heavy vehicles must enter and exit the Development site in a forward direction. Any heavy vehicle that is seen attempting to enter or exit the site in any direction apart from forward will be stopped and given the correct action.

To alleviate public concern and increase road safety heavy vehicles leaving the Development Site should be separated by a minimum five minute interval. All Development-related heavy vehicles must enter and exit the site in a forward direction.

6.8 Breakdowns and incidents

All breakdowns shall be reported to the TfNSW Incident Reporting Line (131700) and the vehicle protected in accordance with the Truck Emergency Breakdown and Road Safety (ATA, 2013).

To ensure that traffic impacts are minimised in the event of an incident, rapid response from the haulage company is required. In order to ensure rapid response to incidents drivers must contact the TfNSW Incident Reporting Line (131700) and the Feedlot Manager as soon as the stranded vehicle and load is safely secured.

If there is a commodity spill while en-route the driver must:

- If this occurs on Getta Getta Road or the vehicle is owned or contracted by Doolin Farming Pty Ltd, the Feedlot Manager must be immediately informed so that emergency services can be contacted and a cleanup initiated;
- All spills must be adequately cleaned up and waste disposed of in an acceptable and environmental manner;
- Put out warning triangles where it is safe to do so;
- Contact the NSW Police Service.

6.9 Contact numbers

Contact numbers for relevant stakeholders are provided in Table 4.

Table 4 – Stakeholders – Contact details

Stakeholder	Contact number
TfNSW Transport Management Centre	131700
National Heavy Vehicle Regulator(NHVR)	1300 696 487
Development Management	(0428 889 994) Angus Doolin
Doolin Farming Pty Ltd	(0428 889 994) Angus Doolin
NSW Police Service	000
Gwydir Shire Council	(02) 6724 0000

7 Inspections, monitoring and auditing

7.1 Inspections

7.1.1 Road maintenance

The road pavement in both Getta Getta Road and North Star Road is generally in good condition.

7.1.1 Dust generation

All local and regional roads are sealed.

7.2 Monitoring measures

Monitoring is important in ensuring that operational activities are not adversely affecting the external road network or sensitive receivers and that control measures are working effectively.

Monitoring in the form of observations will be undertaken to measure the effectiveness of this OTMP.

7.3 Compliance measures

To assist in the orderly resolution of complaints Development management will keep a register itemising all reported incidents relating to complaints in regard to heavy vehicle driver conduct external to the Development.

The incident register is to include (where possible):

(a) Date of the complaint;
(b) Time of the complaint;
(c) Name of the complainant (if available);
(d) How the complaint was received;
(e) Detailed description of the complaint (including location, driver/heavy vehicle details);
(f) What / when actions were taken to resolve the issue; and
(g) The reply to the person / organisation that made the complaint.

An investigation of the location and causes of the complaint will be undertaken and be completed within 7 days of receiving the complaint. It is important to note that in some situations the nature of the complaint could require more than 7 days of investigation, if this occurs the Feedlot Manager will notify the complainant with an update on the progress within 7 days of receiving the complaint.

Immediately following the completion of the investigation, the Development Manager will provide feedback to the complainant that details the investigations undertaken, the result of the investigation and measures implemented to ensure that operations remain compliant. A description of any follow-up investigations and the response provided to the complainant will also be recorded in the Complaints Register upon closure of the issue.

The incident register is to be audited annually by management of the Development and made available, upon request, to an authorised Council officer. The incident register is to be included within the complaints register.

Any acts of gross misconduct will result in an immediate ban from site.

8 Incidents and emergency management

8.1 Incident reporting

All emergency and incident situations associated with the Project including actual or potential (near miss) for injury, or damage to equipment or property will be reported to the Feedlot Manager as soon as practicable after the occurrence.

All emergency and incident situations associated with the Development shall be managed according to the Project's Environmental Complaints, Incidents and Emergencies Procedure contained within Appendix A9 of the OEMP.

All incidents will be investigated, and the appropriate course of action will be taken to address the issues.

In the event that an initial investigation concludes that an exceedance of a criterion was directly attributed to activities associated with the Development the event will be reported to NSW Department of Planning, Infrastructure and Environment within 24 hours of confirming the incident/non-compliance/exceedance.

9 Review and improvement

An ongoing document review process ensures that environmental documentation including this OTMP is updated as appropriate for the specific activities that are occurring on-site.

Review of the OTMP may be undertaken as a result of one or more of the following types of trigger mechanisms:

- Submission of an incident report;
- Staff and agency/stakeholder name changes;
- Non-compliance raised as part of the audits, monitoring, inspections; and
- Any modification to the CoA relevant to traffic management.

If it is determined that a review leads to a revision of the OTMP, the Proponent must submit the revisited document within four weeks of the review.

The document is to be signed by individual drivers and an authorised representative of Doolin Farming Pty Ltd the first time they enter Development site at the time when heavy vehicle haulage drivers attend their site induction or shortly thereafter.

10 References

Aarts, L & van Schagen, I, 2006, Driving speed and the risk of road crashes: A review. Accident Analysis & Prevention, 38(2), 215-224. doi: 10.1016/j.aap.2005.07.004.

Appendix A – Legal and other requirements

Legislation/Policy	Relevance
NSW Environmental Planning and Assessment Act 1979 (EP&A Act)	The EP&A Act and Regulation include provisions to ensure that proposals which have the potential to impact the environment are subject to detailed assessment, and provide opportunity for public involvement. The EP&A Act requires compliance with the conditions of the project approval granted for the Project under Part 3A of the EP&A Act
Environmental Planning and Assessment Regulation 2000	This Regulation is made under the Environmental Planning and Assessment Act 1979 and plays an important role in the planning provisions of the Environmental Planning and Assessment Act 1979.
Local Government (General) Regulation 2005	This regulation is made under the Local Government Act 1993 and provides regulatory measures for sewage management facilities.
Protection of the Environment Operations Act 1997 (POEO Act)	The purpose of the POEO Act is to control pollution and set up a licensing regime for certain activities. An environmental protection licence will be required for scheduled activities (i.e. Livestock intensive activities - feedlot).
Protection of the Environment Legislation Amendment Act 2011 (POELA Act)	The POELA Act introduces several changes to improve the way pollution incidents are reported, managed and communicated to the general community. The Act includes a new requirement under Part 5.7A of the POEO Act to prepare, keep, test and implement a pollution incident response management plan.
Protection of the Environment Operations (Clean Air) Regulation 2010.	This regulation is made under the PoEO Act and provides regulatory measures to control emissions from wood heaters, open burning, motor vehicles and fuels and industry.
Protection of the Environment Operations Amendment (Illegal Waste disposal) Act 2013	This act amends the Protection of the Environment Operations Act 1997 to more effectively deal with illegal waste disposal and fraud in the waste sector.
Protection of the Environment Operations (Waste) Regulation 2014	This Regulation is made under the Protection of the Environment Operations Act 1997 and sets out provisions covering waste record keeping, tracking, reporting, transportation and miscellaneous topics.
Road Transport Act 2013	This act provides for the following (i) a driver licensing system as part of a uniform national approach to driver licensing (including uniform driver licence classes and licence eligibility criteria), (ii) a vehicle registration system as part of a uniform national approach to vehicle registration and standards, (iii) systems for the improvement of road safety and transport efficiency, (iv) the reduction of costs relating to administering road transport.
Waste Avoidance and Resource Recovery Act 2001	This Act promotes waste avoidance and resource recovery to achieve a continual reduction in waste generation. The Act provides for the development of a state-wide Waste Strategy and introduces a scheme to promote extended producer responsibility for the life-cycle of a product.

Appendix B – Code of Conduct Induction

To all truck drivers entering Development site:

- All heavy vehicle drivers operating out of Development are to observe the posted speed limits, with speed adjusted to suit the road environment and prevailing weather conditions, to comply with the NSW Road Rules & Heavy Vehicle National Law. The vehicle speed must be suitable to the conditions and requirements of the law to ensure the safe movements of the vehicle based on the vehicle configuration.
- The speed limit within the Development site is 15 km/hr with 25 km/hr on internal access roads.
- On entering the Development, trucks must communicate via UHF 10. Conversations must be kept to a minimum. Watch out for Machines working.
- No children are permitted on site without prior permission from the Feedlot Manager.
- Whilst waiting to load or unload, if drivers exit their cabin they must be cautious of other vehicles moving around the site. Drivers must be wearing adequate PPE such as high visibility clothing, long sleeve shirt and long pants, safety boots and a safety helmet.
- If undertaking a U-turn or reversing into the appropriate unloading/loading area, trucks must use all appropriate means of communicating their movements.
- Due to space limitations around loading / unloading areas, trucks are expected to slow down to a speed which will ensure they are able to stop quickly if required. Visibility may be reduced around buildings, take extra care in these areas.
- No driver is to climb into or onto the back of truck bodies or trailers.
- All care is to be taken to ensure that all loose debris from the vehicle body and wheels are removed prior to leaving the site. Drivers must ensure that following tipping that the tailgate is locked before leaving the site. Never drive with the body in a raised position.
- All drivers are to show respect for our neighbours in the local area. Take care around high pedestrian and traffic areas. Please give pedestrians a wide berth, be aware of their safety and other road users.
- All heavy vehicle drivers operating out of the Development are to minimise the use of compression brakes, so as not to create excessive noise that could disturb local residents, where possible. Compression braking within or adjacent to residential areas must only be used if required for safety reasons
- Heavy vehicle drivers are to carefully plan their routes and so that State and regional roads are given priority for route selection.
- All heavy vehicle drivers operating out of the Development site are to be aware of their adopted Fatigue Management Scheme and operate within its requirements. By law, all drivers have a duty to not drive a fatigue-regulated heavy vehicle on a road while impaired by fatigue.
- All drivers should be familiar with their Chain of Responsibility.
- Failure to comply with the above will result in immediate removal from site.

Appendix C – Code of Conduct Declaration

DECLARATION

I, the undersigned, hereby agree to abide by Doolin Farming Pty Ltd Springfield Feedlot's Truck Driver Code of Conduct under section 6 of this Operation Transport Management Plan for the:

- transportation of livestock and solid waste from Springfield Feedlot, North Star to their final destination(s) in a safe manner.
- transportation of livestock and feed commodities to the Springfield Feedlot, North Star from their place of origin(s) in a safe manner.

I have read and understand the requirements outlined in the attached document and will, to the best of my ability, comply and assist with their implementation, requirements and ongoing administration.

The subject document to which this declaration relates is attached as part of the overall document and signing of this declaration confirms that the signee has read and understood the entire document:

TRUCK DRIVER

Full Name: ____

Organisation: ____

Signature:

Date:

DOOLIN FARMING PTY LTD

Company Witness: ____

Date:

Appendix R

Waterfront e Tool

Rod Davis

From: Google Forms <forms-receipts-noreply@google.com>
Sent: Thursday, 23 January 2025 2:33 PM
To: rod.davis@rdcengineers.com.au
Subject: Waterfront land e-tool

Thanks for filling in Waterfront land e-tool

Here's what was received.

Edit response

Waterfront land e-tool

Version 1 - 2020

Email *

rod.davis@rdcengineers.com.au

Is this the right e-tool for me?

This waterfront land e-tool has been developed to help controlled activity applicants and consultants determine if a controlled activity approval is required under the provisions of the Water Management Act 2000. The tool can be used to help identify:

- if there is waterfront land
- the location of top of bank of the waterfront land and
- if an exemption applies for works within certain mapped areas under clause 36 of Schedule 4 of the Regulation

The e-tool is recommended for use by people who are familiar with environmental assessment and suitably qualified consultants. Members of the general public who are planning works near waterfront land should seek professional advice.

The e-tool must be completed separately for each individual mapped or visible watercourse on, or near, your property. If you have multiple properties or multiple watercourses on or near your property, submit your response for the first assessment and then re-start the tool from the beginning to assess another watercourse or property. This will ensure each property and watercourse receives its own separate emailed result outcome that you can keep as a record.

Using the tool

Some of the questions in this e-tool can be answered using materials online. Depending on your circumstances, you may also need to the visit the site of the proposed work in person to gather supporting evidence.

There is a PDF version of the tool available that you can download and take into the field at: https://water.nsw.gov.au/__data/assets/pdf_file/0009/367272/waterfront-land-tool.pdf

The e-tool must be completed separately for each individual mapped or visible watercourse on the property. Each watercourse assessed with the e-tool will then receive a separate emailed result outcome.

Stopping and returning

You can choose to exit the tool at certain questions where field work is recommended. You will be asked if you wish to exit, and, if you agree, be emailed a link that you can use to return to the tool later to complete the rest of the questions.

If you close the tool anywhere else - without completing it and clicking the 'Submit' button - your data will not be retained. Please ensure you only close the tool when prompted if you wish to retain your answers.

Supporting evidence

When you complete the tool, you will receive email confirmation containing your answers, which you must keep as a record of your decision-making. You must also keep all reference material and information used–including maps, photos and observations to answer the tool questions. You will be prompted throughout the tool about what information to keep.

NSW Department of Climate Change, Energy, the Environment and Water may request copies of the Waterfront land tool answers and supporting documents from landholders where works are carried out without a controlled activity approval under the Water Management Act 2000.

The Waterfront land e-tool will store your email address so you can be emailed a record of your answers on completion. It will also record your answers but it will not identify your location or any other personal details. If you do not wish to supply your email address, please use the hard copy version of the tool at:
https://water.nsw.gov.au/__data/assets/pdf_file/0009/367272/waterfront-land-tool.pdf

More information

- about this e-tool, contact NSW Department of Climate Change, Energy, the Environment and Water via email: waterlicensing.servicedesk@dpie.nsw.gov.au
- about controlled activity approvals, visit https://water.dpie.nsw.gov.au/licensing-and-trade/controlled-activity-approvals

Disclaimer

- This tool is intended for guidance purposes only and cannot be used as evidence of compliance with the Water Management Act 2000.
- Users of this tool will be responsible for making their own assessment of the material and should verify all relevant representations, statements and information with their own professional advisers.
- This tool only applies controlled activities on waterfront land—it does not apply to water access licences or water supply work and/or water use approvals.
- This is not an approval to undertake work on waterfront land and you will still need to obtain relevant approvals as required under the Water Management Act 2000 (WM Act).
- The use of this tool does not remove the obligation to obtain approval under any other relevant

legislation.

- Users should also refer to the disclaimer on the department’s website at: https://www.industry.nsw.gov.au/disclaimer

Description or Reference

Please enter a description or reference number below for the property or watercourse you are going to assess. This will allow you to easily identify this assessment from any other assessments you undertake using the tool. *

Expansion of Springfield Feedlot

Question 1 - Department of Planning and Environment—Water waterfront land maps

After answering the question, click next at the bottom of the screen.

Is your property located on a watercourse, lake or estuary within the area marked in orange in any of the Department of Planning and Environment—Water waterfront land maps below? *

Yes, Botany Bay

Yes, Brisbane Water

Yes, Hunter River

Yes, Lake Macquarie

Yes, Lake Mulwala

Yes, Port Hacking

Yes, Port Jackson

Yes, Port Stephens

Yes, Tuggerah Lakes

Yes, Wallis Lakes

No, none of the above

Using the maps below

Using your browser zoom in to any of the maps below to help you identify the location of your property.

Alternatively you can access the maps at the below link:
https://www.dpie.nsw.gov.au/water/licensing-and-trade/controlled-activity-approvals/controlled-activity-exemptions

What supporting evidence do I need?

- Saved or printed screenshot of aerial photo of your property
- Saved or printed copy of any maps to identify property boundary
- Saved or printed screenshot of the location of your property on the waterfront land map

Botany Bay

Brisbane Water

Hunter River

Lake Macquarie

Lake Mulwala

Port Hacking

Port Jackson

Port Stephens

Tuggerah Lakes

Wallis Lakes

Question 2a - Hydro Line spatial data map

Open the link provided below for the Hydro Line spatial data map and enter your property address.

Is there a blue line on your property or within 40m of the proposed work? *

Yes

No

What supporting evidence do I need?

- Saved or printed screenshot of aerial photo of your property
- Saved or printed copy of any maps to identify property boundary
- Saved or printed screenshot of the location of your property on the Hydro Line spatial data map

The Hydroline spatial data is used to determine the Strahler stream order of a watercourse.
https://trade.maps.arcgis.com/apps/webappviewer/index.html?id=07b967fd0bdc4b0099fc5be45b6d1392

Collecting evidence in the field

For this part of the tool, you may need to go to your site to collect evidence and answers.

What to take into the field

The following equipment will be required to complete field work:

- Digital camera
- Note taking equipment - notebook or computer
- Measuring tape or equipment able to measure 50m
- Saved or printed screenshot of aerial photo of your property and the watercourse

If you can't do the field work right now, you can save your answers

To save your answers so far in the e-tool, select 'Yes, save my answers' below and click 'Submit' on the next page.

You will then be emailed a copy of the answers and a link you can use to return to the e-tool when in the field or after your field work is completed.

The link is at the top of the email 'Edit response'.

This is the only point in the tool where you can stop and return to your answers

If you close the tool anywhere else - other than the final 'Submit' page - the data you have entered so far will not be retained.

Can't take this tool into the field?

A PDF version is available at:
https://water.nsw.gov.au/__data/assets/pdf_file/0009/367272/waterfront-land-tool.pdf

Would you like to save your answers? *

Yes, save my answers so I can return here later

No, keep going, I'm ready to answer the field-based questions

Question 3 - Determining stream order

Read the Determining stream order fact sheet at the below link.

Then open the link below to the Hydro Line spatial data map.

Zoom out from your property on the map to work out the stream order of your watercourse.

What is the stream order? *

1st or 2nd order stream

3rd order or greater stream

Determining Strahler stream order fact sheet
https://www.industry.nsw.gov.au/__data/assets/pdf_file/0020/172091/Determining-Strahler-stream-order-fact-sheet.pdf

The Hydro Line spatial data is used to determine the Strahler stream order of a watercourse
trade.maps.arcgis.com/apps/webappviewer/index.html?id=07b967fd0bdc4b0099fc5be45b6d1392

What supporting evidence do I need?

- Saved or printed screenshot of aerial photo of your property
- Saved or printed copy of any maps to identify property boundary
- Saved or printed screenshot of the location of your property on the Hydro Line spatial data map
- Saved or printed screenshot of annotated Hydro Line spatial data map showing the determination of Strahler stream order

Question 4a - Watercourse defined bed or bank

Does the watercourse have a defined bed or bank?

Yes

No

What supporting evidence do I need?

- Current site photos looking up and downstream. Photos should be taken within one month of completing this tool and include a date stamp or metadata and a short location description.
- Saved or printed screenshot of aerial photo of your property and the watercourse

- Written observations of the watercourse including bed, bank and erosion features and flow conditions

Question 5c - Watercourse features

Using the photos below, are there any watercourse features present? *

Yes

No

After answering the question, click next at the bottom of the screen.

Using the photos below

Use your browser to zoom in to the photos below.

What supporting evidence do I need?

- Current site photos looking up and downstream. Photos should be taken within one month of completing this tool and include a date stamp or metadata and a short location description.
- Saved or printed screenshot of aerial photo of your property and the watercourse
- Saved or printed screenshot of the watercourse type from the Department of Planning and Environment—Water Guide—Watercourse features at appendix 6
- Written observations of the watercourse including bed, bank and erosion features and flow conditions

Pools

Riffles

Erosion and deposition

Inside or outside bend

Question 8 - Determining the high bank

Using the photos and diagrams below, locate the high bank of the watercourse type identified in Question 4b.

Are the proposed works within 40m of the high bank? *

Yes

No

After answering the question, click next at the bottom of the screen.

Using photos and diagrams below

Use your browser to zoom in to the photos and diagrams below.

What supporting evidence do I need?

- Record of the measurement from high bank to the nearest location of the proposed works
- Annotated aerial photo of the property showing:
  - location of the proposed works
  - location of the watercourse, lake or wetland, and
  - measured distance to the high bank.
- Current site photos looking up and downstream. Photos should be taken within one month of completing this tool and include a date stamp or metadata and a short location description.
- Saved or printed screenshot of the watercourse type from the Department of Planning and Environment—Water Guide— Determining the high bank of a watercourse
- Written observations of the watercourse including bed, bank and erosion features and flow conditions
- Saved or printed screenshot of aerial photo of your property and the watercourse

Type 1 - Confined Valley Headwater

Type 2 - Confined Valley Floodplain Pockets

Type 3a - Laterally Unconfined Continuous - Bank Confined

Type 3b - Laterally Unconfined Continuous - Low Sinuosity

Type 3c - Laterally Unconfined Continuous - Meandering

Type 4 - Laterally Unconfined Discontinuous

Type 5 - Partly Confined Valley

Lakes

Wetlands

Result 14 - Controlled activity approval likely required

Based on your answers, the result is:

CONTROLLED ACTIVITY APPROVAL LIKELY REQUIRED

Statements

When completing the e-tool you provided the following answers:

- One or more of the following features are on this property or a neighbouring property:
  - watercourse
  - lake
  - wetland
  - mapped Strahler 3rd order or greater hydro line as defined by the Hydro Line spatial data map
- The proposed works are located within 40m of the high bank of the watercourse

Are ALL of the above statements correct? *

Yes

No (restart tool)

Result 13 - Controlled activity approval not required - the proposed works are more than 40m from the high bank of a watercourse

Based on your answers, the result is:

CONTROLLED ACTIVITY APPROVAL NOT REQUIRED - THE PROPOSED WORKS ARE MORE THAN 40M FROM THE HIGH BANK OF A WATERCOURSE

Statements

When completing the e-tool you provided the following answers:

- One or more of the following features are on this property or a neighbouring property:
  - o watercourse
  - o lake
  - o wetland
  - o mapped Strahler 3rd order or greater hydro line as defined by the Hydro Line spatial data map
- The proposed works are not located within 40m of the high bank of the watercourse

Are ALL of the above statements correct? *

Yes

No (restart tool)

Record keeping and Disclaimer

Please ensure you keep the electronic and/or printed copies of all supporting evidence required for questions answered in this tool and the confirmation email you receive after clicking submit.

NOTE:

- The results given by this tool are generated using the answers you have provided. If any answers are incorrect or incomplete, the result produced may be incorrect.
- This tool is intended for guidance purposes only and cannot be used as evidence of compliance with the Water Management Act 2000.
- Users of this tool will be responsible for making their own assessment of the material and should verify all relevant representations, statements and information with their own professional advisers.
- This is not an approval to undertake work on waterfront land and you will still need to obtain relevant approvals as required under the Water Management Act 2000 (WM Act).
- The use of this tool does not remove the obligation to obtain approval under any other relevant legislation.
- Users should also refer to the disclaimer on the department's website at industry.nsw.gov.au/disclaimer.

If ANY of your assessments identify that a controlled activity approval is required for your proposed works, you must complete the following tasks:

- Confirm if an exemption applies to your site or proposed works by using the Department's Controlled activity exemption e-tool at: https://forms.office.com/pages/responsepage.aspx?id=IYjvljkqHEe4mmewgz3TuaJ8VvZiyYZKiR3x1NniFCZUQ0lWTUZRUVpWMFhHTIBEM05aNFVOVlFSOC4u or refer to exemption information here: https://www.dpie.nsw.gov.au/water/licensing-and-trade/controlled-activity-approvals/controlled-activity-exemptions
- For matters requiring a development application (DA) from Council, you should lodge your DA as Integrated Development.
- For matters NOT requiring a DA, please refer to the Department of Planning and Environment—Water website for instructions on how to apply for a Controlled Activity Approval: https://www.dpie.nsw.gov.au/water/licensing-and-trade/controlled-activity-approvals/how-to-apply

You MUST click Submit to be emailed a copy of your answers and your result.

Reminder: The e-tool must be completed separately for each individual mapped or visible watercourse on, or near, your property. If you have multiple properties or multiple watercourses on or near your property, submit your response for the first assessment and then re-start the tool from the beginning to assess another watercourse or property. This will ensure each property and watercourse receives its own separate emailed result outcome that you can keep as a record.

Feedback

Please let us know whether you found this tool helpful and what we could do to make it better. Your comments will help us to improve the tool further.

Thankyou for your feedback.

How helpful was this tool?

Additional feedback about this tool

If you have a question or require further information regarding your specific circumstances, please email waterlicensing.servicedesk@dpie.nsw.gov.au

If you wish to undertake another assessment, please click 'Submit' below and then select 'Submit another response'.

Appendix S

Stormwater Impact Assessment

Doolin Farming Pty Ltd

Proposed Intensive Livestock Agriculture Development on the Property "Springfield"

(Expansion of Beef Cattle Feedlot from 999 Head to 3,000 Head)

HYDRAULIC ASSESSMENT AND CATCHMENT ANALYSIS

February 2025

Bernie Martin

Registered Professional Engineer of Queensland

Registration Number 25862

Tahlee Consulting Services

PO Box 539 Gunnedah NSW 2380

Phone: 0499 437 984

email: bernie@tahlee.com.au

DISCLAIMER

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VERSION CONTROL

Revision	Date	Comment
A	07/02/2025	Draft for Client Review
B	20/02/2025	Final
C		
D		

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1. INTRODUCTION

This study investigates overland flow behaviour on the property, *Springfield* and includes an assessment of the effects the proposed expansion of the feedlot development complex has on overland flow conditions. It has been prepared as part of the Development Application for Intensive Livestock Agriculture and forms part of the Environmental Impact Statement.

2. PROPERTY DETAILS

2.1. Study Area

Springfield is a grazing, dryland and irrigated cropping and intensive livestock property located on Getta Getta Road, 15 km East of North Star, New South Wales (NSW).

The property is located in the catchment area of the ephemeral streams, Scrubby Gully and Back Creek.

The property is located in the Gwydir Shire Council Local Government Area. The property location is shown in **Figure 2.1** and the layout is shown on **Drawing No. 0828_1**.

2.2. Available Topographic Data

The topographical information used in this study was based on aerial laser survey collected by NSW Government Spatial Services, a unit of Department of Finance, Services and Innovation in August 2011. The reference system is GDA94/MGA Zone

56. The model ground surface is based on the 5m digital elevation model (DEM). The existing ground surface contours are shown on **Drawing No. 0828_2**.

Figure 2-1 Springfield Location (source: Google Earth)

2.3. DEVELOPMENT HISTORY

The 999 head beef cattle feedlot on Springfield was established in 2022 after approval for intensive livestock agriculture was granted by the Gwydir shire Council in 2021 (DA 31/2020).

2.4. Existing and Proposed Works

The proposed works are shown on **Drawing No. 0828_1**. The proposed works include expansion of the feedlot development complex footprint and a diversion bank to redirect rainfall runoff around the feedlot development complex. The diversion bank is designed to not be overtopped in a 1 in 100 year rainfall event.

3. HYDRAULIC ASSESSMENT

3.1. Catchment Area

A watershed analysis was undertaken to determine the catchment area upstream of the proposed feedlot development complex. The existing contour banks were removed from the 5m DEM terrain surface and the natural stream flow lines for the catchments are shown on **Drawing No. 0828_2.1**.

The existing catchment upstream of the feedlot development complex varies from the natural catchment area as contour banks have altered the flow paths. There are existing contour banks that divert water into the natural catchment and other contour banks that divert water out of the natural catchment. As shown on **Drawing No. 0828_2.1**, contour banks along the south western and north eastern sides of the existing catchment area intercept overland flow from other catchments and divert it towards the feedlot development complex. Existing contour banks on the adjacent property on the south eastern side of the modelled area intercept overland flow and divert it south away from the feedlot development complex catchment.

The catchment area is 209 Hectares (Ha) as shown on **Drawing No. 0828_2.1**.

3.2. Rainfall Event Details

3.2.1. Rainfall Events and Duration

Rainfall events with Annual Exceedance Probabilities (AEP) of 10%, 1%, 0.5%, 0.2% and 0.05% were analysed and modelled as required by the Planning Secretary's Environmental Assessment Requirements (SEAR) 1687.

The design rainfall event duration was calculated using the Generalised Short-Duration Method (BoM, 2003, p.7). The design rainfall event duration for the catchment area is 4 hours 34 minutes.

3.2.2. Rainfall Event Intensity

The intensities for the rainfall events modelled were calculated using the Bureau of Meteorology Design Rainfall System (BoM, 2016). The rainfall intensity for each of the rainfall events modelled is shown in **Table 3-1**. These rainfall intensities were kept constant for the duration of the rainfall event.

Rainfall Event Annual Exceedance Probability	Rainfall Intensity (mm/hr)
10%	14.6
1%	22.6
0.5%	26.0
0.2%	30.5
0.05%	38.0

Table 3-1 Rainfall Intensity for Modelled Rainfall Events

3.3. Landscape Characteristics

3.3.1. Land Cover

The land cover classifications for the modelled area are shown on **Drawing No. 0828_2.2**. The existing land cover within the catchment area are easily classifiable and readily defined as changes in land cover are typically separated by field boundaries or roads. In the pre-development modelling it has been assumed that the feedlot development complex area is pasture/grassland.

3.3.2. Infiltration Classification

The infiltration characteristics of the soils within the catchment area was based on the NSW statewide land and soil mapping hydrologic soil groups (eSPADE, 2025). The soil classifications within the catchment area ranges from moderate infiltration to very slow infiltration as shown on **Drawing No. 0828_2.3**.

3.4. Model Details

3.4.1. Model Setup

The works were assessed using the HEC-RAS Two Dimensional River Analysis Model. Rainfall runoff in the HEC-Ras Two Dimensional Model is calculated using the US Department of Agriculture Soil Conservation Service (SCS) Curve Number Runoff Method.

Break lines were used to define the terrain surface, existing contour banks and the proposed feedlot development complex. The model layout and the location of the break lines are shown on **Drawing No. 0828_3.**

The two layouts modelled were;

1) Pre-development (no feedlot development complex) on Springfield
2) Proposed development (existing and proposed expanded feedlot development complex) on Springfield

The model input parameters used are;

Hec Ras Version: 6.3.1
Maximum cell size: 2 m
Model time step: 1 second
Model equation set: Full momentum equations
Model soil parameters: As shown in **Table 3-2**

The modelled rainfall intensities were held constant for the duration of the design rainfall events to simulate peak flows from the catchment area.

All public roads have been defined in the model surface. The model cell size in the vicinity of all roads and primary flow paths was 2m.

The LiDAR surface has been modified for the pre-development modelling. All works associated with the existing feedlot development complex area on Springfield have been removed. The existing contour banks in the catchment area were included in all models.

3.4.2. Model Calibration

There were no known overland flow water surface levels available in the catchment area for any rainfall events. Without any known levels or measured flow rates an accurate model calibration could not be undertaken. The soil infiltration parameters and Mannings n values are considered representative of the soil types and typical vegetation cover within the catchment area. A large range in the magnitudes of the rainfall events modelled also affords a sensitivity analysis for any potential effects the development has on the overland flows.

Land Cover	Soil Infiltration Group	SCS Curve Number	Abstraction Ratio	Minimum Infiltration Rate (mm/hr)	Mannings n	Percent Impervious
Feedlot	Very Slow	90	0.1	1.5	0.04	5
Feedlot	Slow	90	0.1	2	0.04	0
Feedlot	Moderate	90	0.1	2	0.04	0
Cultivation	Very Slow	84	0.1	1.5	0.04	0
Cultivation	Slow	81	0.1	2	0.04	0
Cultivation	Moderate	73	0.1	3	0.04	0
Trees	Very Slow	83	0.1	1.5	0.05	0
Trees	Slow	77	0.1	2	0.05	0
Trees	Moderate	66	0.1	3	0.05	0
Road	Very Slow	92	0.05	1.5	0.03	5
Road	Slow	90	0.05	2	0.03	0
Road	Moderate	90	0.05	2	0.03	0
Pasture	Very Slow	84	0.1	1.5	0.04	0
Pasture	Slow	79	0.1	2	0.04	0
Pasture	Moderate	69	0.1	3	0.04	0
Water	Very Slow	100	0.1	1.5	0.04	100
Water	Slow	100	0.1	2	0.04	100
Water	Moderate	100	0.1	3	0.04	100

Table 3-2 Model Soil Parameters

3.5. Modelling Results

3.5.1. Modelled Flow Distribution

As shown in **Table 3-3**, the proposed feedlot development complex has no effect on flow distribution. Regardless of the rainfall event magnitude all rainfall runoff follows the natural flow paths and flows into Back Creek downstream of the proposed feedlot development complex. The proposed development does not divert any water out of the catchment area or change the flow distribution.

Development Condition	Rainfall Event				
	10% AEP (m^3/s)	1% AEP (m^3/s)	0.5% AEP (m^3/s)	0.2% AEP (m^3/s)	0.05% AEP (m^3/s)
Pre-Development	5	10	12	15	19
Proposed Development	5	10	12	15	19
Change from Pre-Development	0	0	0	0	0

Table 3-3 Modelled Catchment Discharge

There are no changes in flow distribution and this complies with the Water Management Act 2000.

3.5.2. Modelled Flow Depth

The effect of the proposed feedlot development complex on flow depth in the design rainfall events are shown in **Figures 3-1 to 3-30**. When compared to pre-development flow depths there is no off property depth increases with the proposed feedlot development in any of the modelled rainfall events. This complies with the Water Management Act 2000.

The proposed diversion bank does not get overtopped in the 0.05% AEP Rainfall Event.

The proposed sedimentation basin has enough capacity to capture all the runoff from the proposed feedlot area in a 0.1% AEP rainfall event. The proposed sedimentation basin bywashes excess runoff in the 1% AEP and larger rainfall events.

3.5.3. Modelled Flow Velocity

The modelled flow velocities are shown in **Figures 3-1 to 3-30**. The results show that in the design rainfall events, with pre-development conditions, the flow velocities over the majority of the catchment area are in the range 0.1 to 0.3 m/s in the field areas and 0.3 m/s to 1.5 m/s in the contour bank drains and the unnamed gully that flows adjacent to the southern side of the proposed feedlot development complex.

When compared to pre-development flow velocities there is no off property velocity increases with the proposed feedlot development complex in any of the modelled rainfall events. There are some small localised velocity increases in the immediate vicinity of the proposed diversion bank. Flow depths adjacent to diversion bank on the north, east and western sides of the proposed feedlot development complex are typically less than 0.1m. The velocities adjacent to the north, east and western sides of the proposed levee in a 1% AEP or smaller rainfall event are less than 0.4 m/s and are non erosive. There is a small increase in velocity in the unnamed gully adjacent to the sedimentation basin. The maximum velocity increase in the area to the south of the sedimentation basin in a 1% AEP or smaller rainfall event is 15% (a velocity increase from approximately 0.7 m/s to 0.8 m/s).

Having no off property changes in flow velocity in all modelled rainfall events complies with the Water Management Act 2000.

3.5.4. Community Infrastructure

There are no houses or other farm buildings within the modelled area that are impacted by overland flows in the rainfall events. The modelling results show that the flow conditions in the vicinity of all public roads and community infrastructure are unchanged by the proposed feedlot development complex.

3.5.5. Flood Hazard Assessment

The flood Hazard has been mapped and is shown in **Figures 3.31 and 3.32** for the 1% AEP Rainfall Event. The flood hazard maps have been prepared in accordance with Australian Disaster Resilience Guideline 7-3: Technical flood risk management guideline: Flood hazard, 2014. The definitions of the flood hazard vulnerability classifications are shown in **Table 3-4**.

The results show there is virtually no change in flood hazard with the proposed feedlot development. All of the catchment except a small area in the unnamed gully to the south of the proposed feedlot development complex is classified H1 (Generally safe for vehicles, people and buildings). The small area in the unnamed gully is classified H2 (unsafe for small vehicles). The flood hazard with pre-development and the proposed development is essentially the same.

Hazard Vulnerability Classification	Description
H1	Generally safe for vehicles, people and buildings.
H2	Unsafe for small vehicles
H3	Unsafe for vehicles, children and the elderly.
H4	Unsafe for vehicles and people.
H5	Unsafe for vehicles and people. All building types vulnerable to structural damage. Some less robust building types vulnerable to failure.
H6	Unsafe for vehicles and people. All building types considered vulnerable to failure.

Table 3-4 - Flood Hazard Vulnerability Classifications.

4. ENVIRONMENT

The existing 999 head beef cattle feedlot was established in 2022. The additional area protected by the proposed diversion bank is currently used as holding pens for stock. No further clearing or changes to land cover are required. There will be no further impact on existing native flora and fauna.

The proposed feedlot development complex is aligned with the natural flow paths through the property. This ensures that local drainage is not inhibited

5. CONCLUSION

The proposed feedlot development complex on Springfield has minimal impact on overland flow events in the catchment. In all the modelled rainfall events the flow distribution with the proposed feedlot development complex is essentially the same as that of pre-development and complies with the Water Management Act 2000.

The proposed feedlot development complex does not change any off property flow depths or velocities. Any velocity changes within the property are localised adjacent to the proposed levee and velocities with the proposed feedlot development complex are non erosive.

The proposed diversion bank does not get overtopped in any of the modelled rainfall events. The proposed sedimentation basin has enough capacity to capture all the runoff from the proposed feedlot area in a 0.1% AEP rainfall event. The proposed sedimentation basin bywashes excess runoff in the 1% AEP and larger rainfall events.

All changes in flow depths and velocities are within the Water Management Act 2000 guidelines.

The proposed feedlot development complex does not change the flow conditions in the vicinity of any community infrastructure.

The proposed feedlot development complex does not change the flood hazard classification for the overland flows in the catchment area. Virtually all of the catchment area is classified H1 in a 1% AEP rainfall event.

The proposed feedlot development complex is aligned with the flow paths through the property. This minimises any effects that it has on overland flows and ensures that local drainage is not inhibited.

Based on the assessment outlined above the proposed works are considered to be acceptable development.

6. REFERENCES

Australian Disaster Resilience Guideline 7-3: Technical Flood Risk Management Guideline: Flood Hazard, 2014, Australian Institute for Disaster Resilience CC BY-NC

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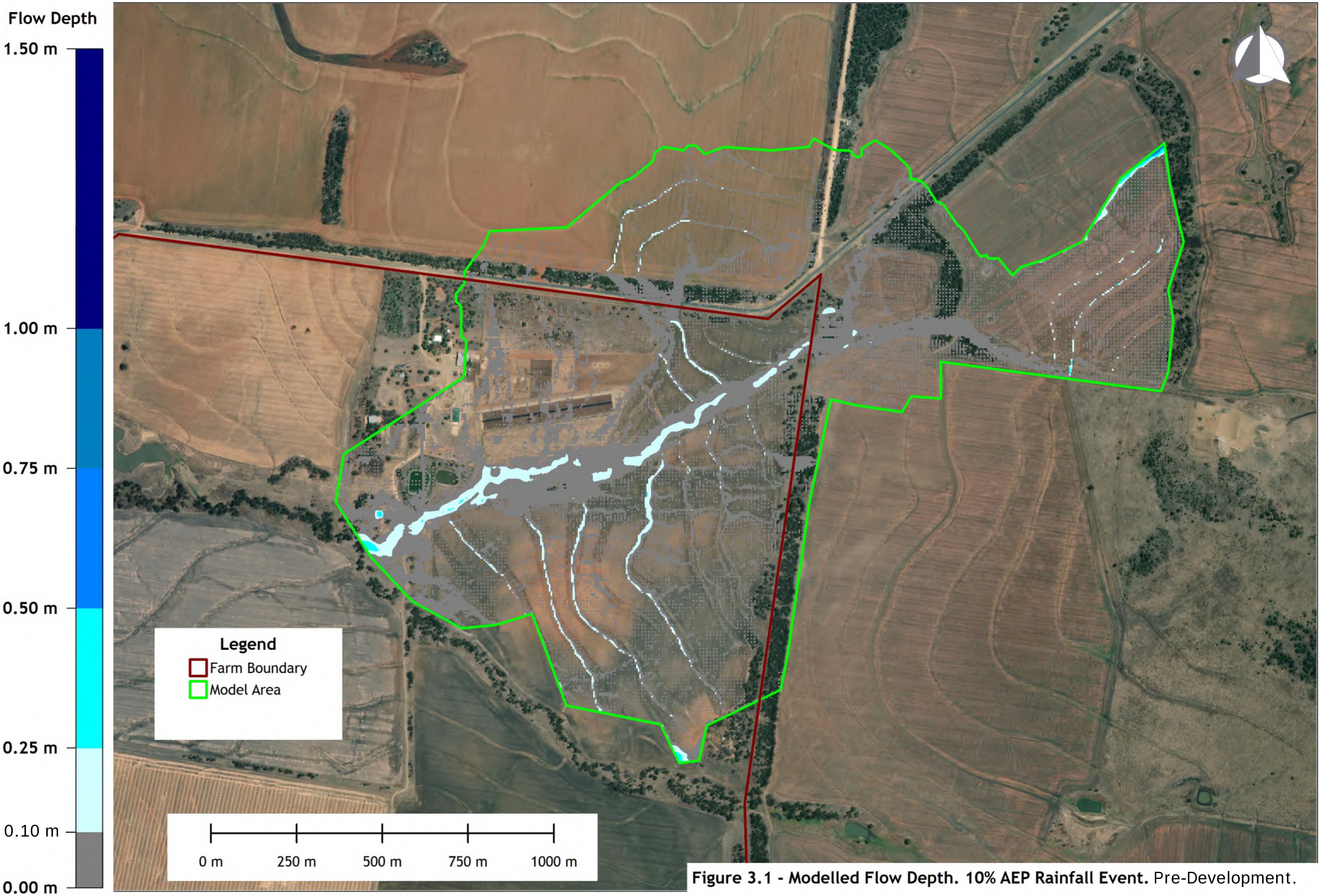


Figure 3.1 - Modelled Flow Depth. 10% AEP Rainfall Event. Pre-Development.

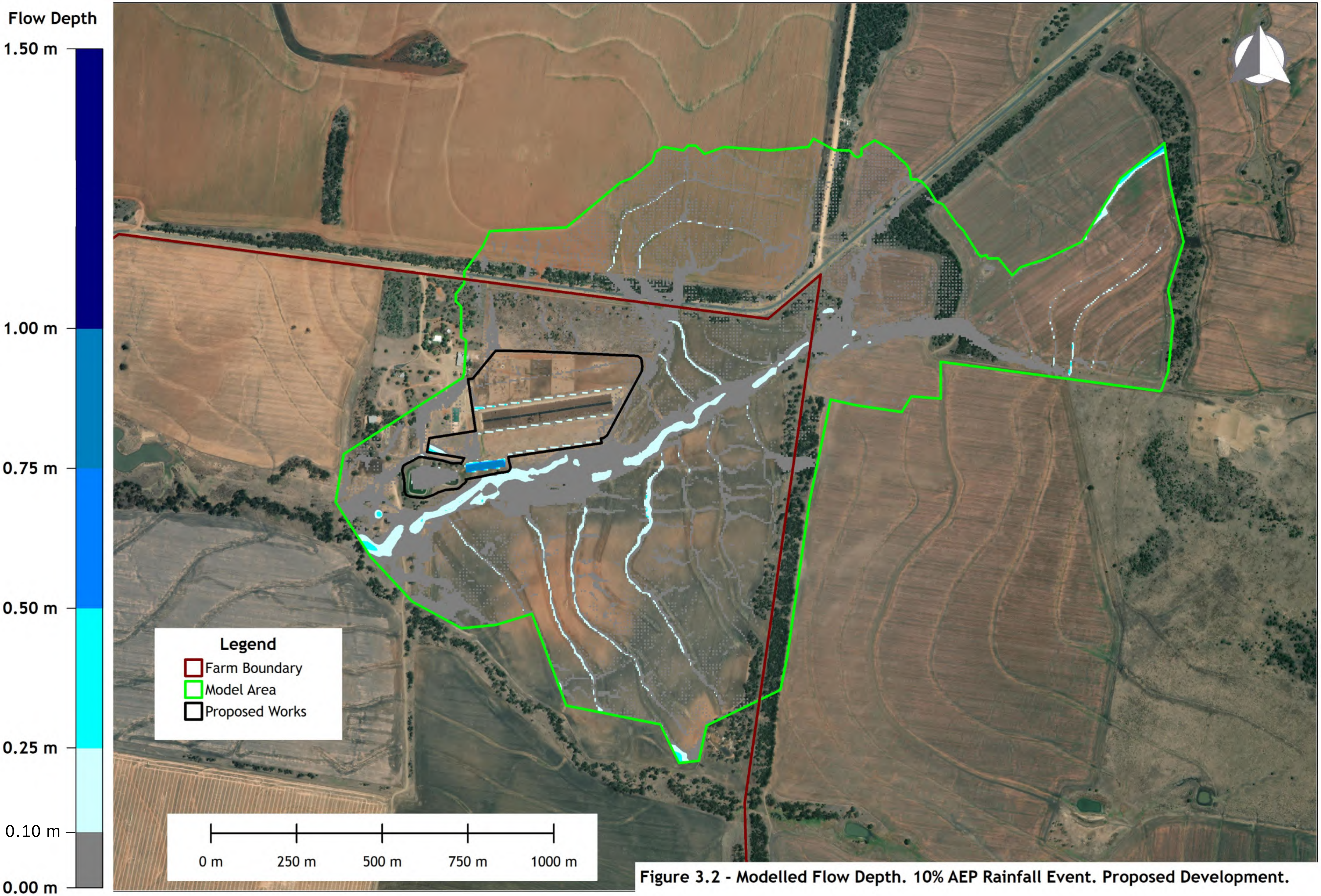


Figure 3.2 - Modelled Flow Depth. 10% AEP Rainfall Event. Proposed Development.

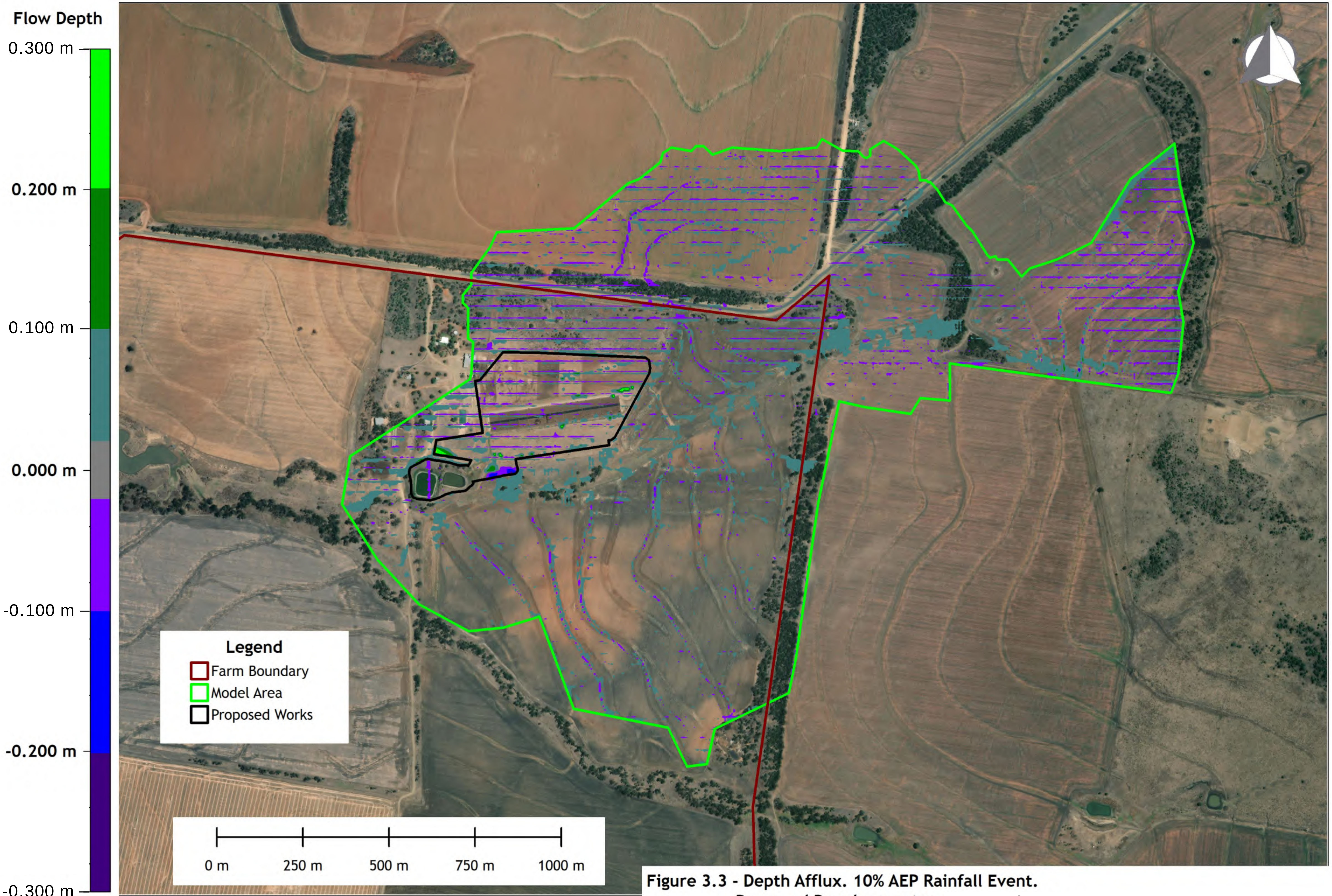


Figure 3.3 - Depth Afflux. 10% AEP Rainfall Event.
Proposed Development vs Pre-Development.

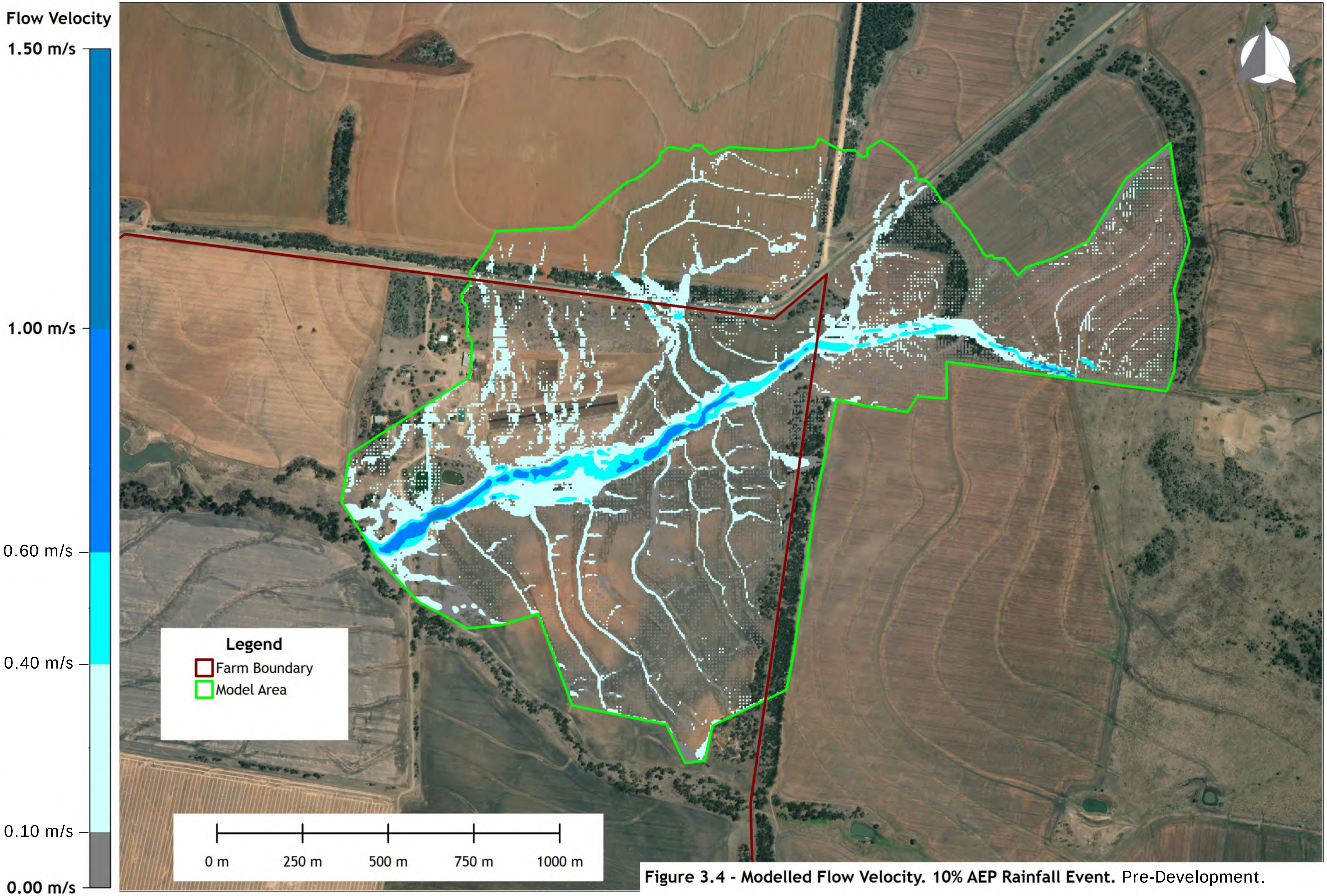


Figure 3.4 - Modelled Flow Velocity. 10% AEP Rainfall Event. Pre-Development.

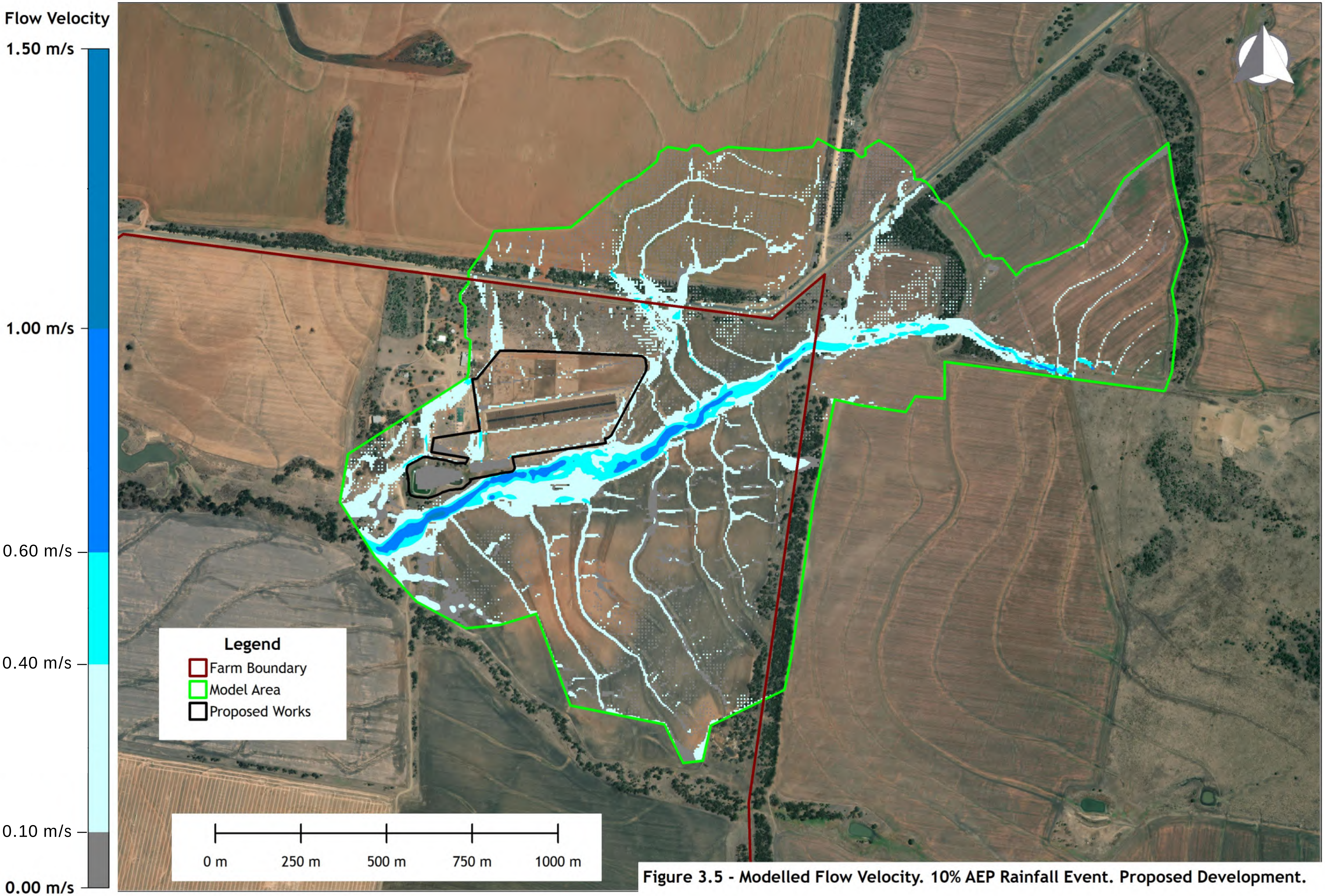


Figure 3.5 - Modelled Flow Velocity. 10% AEP Rainfall Event. Proposed Development.

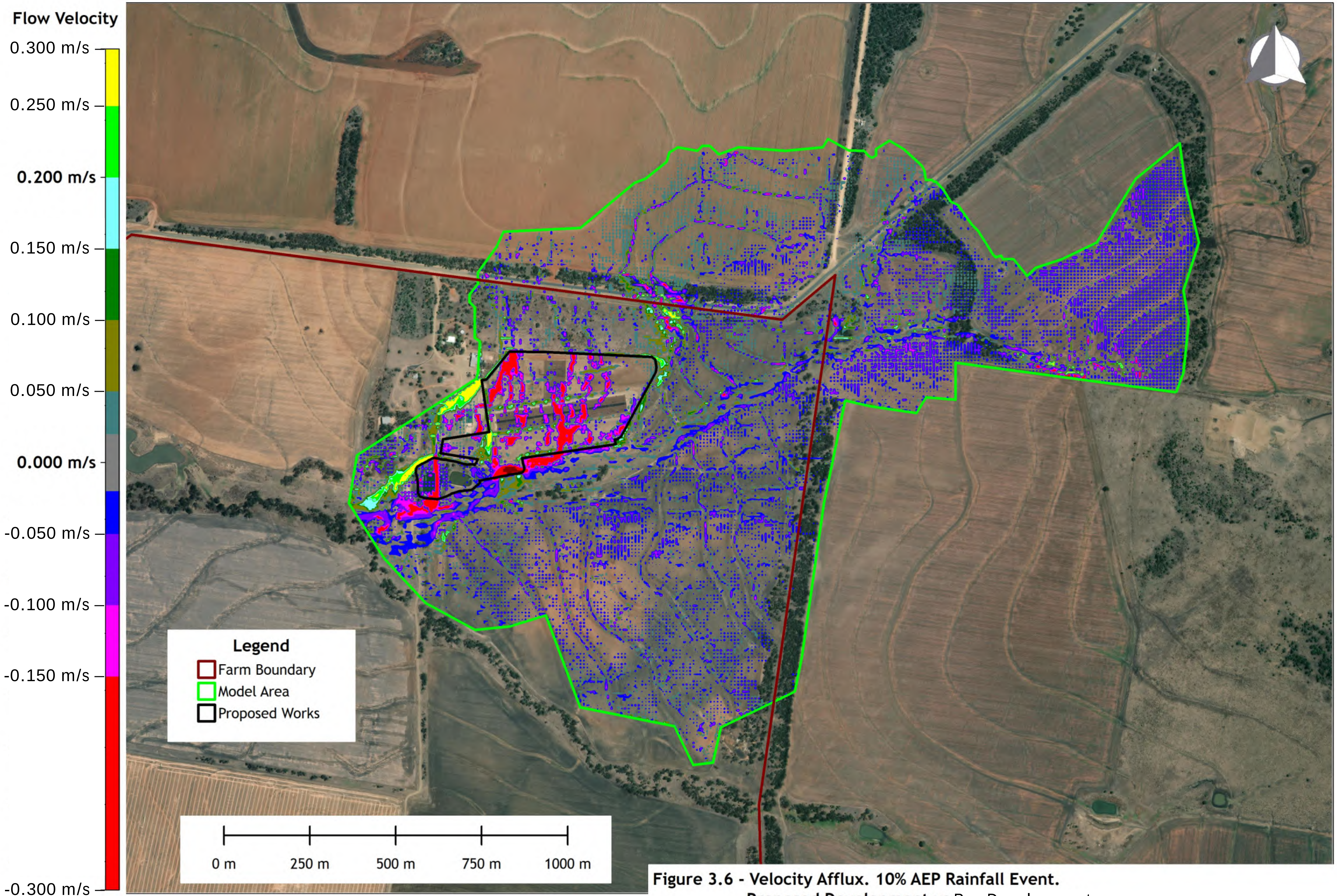


Figure 3.6 - Velocity Afflux. 10% AEP Rainfall Event.
Proposed Development vs Pre-Development.

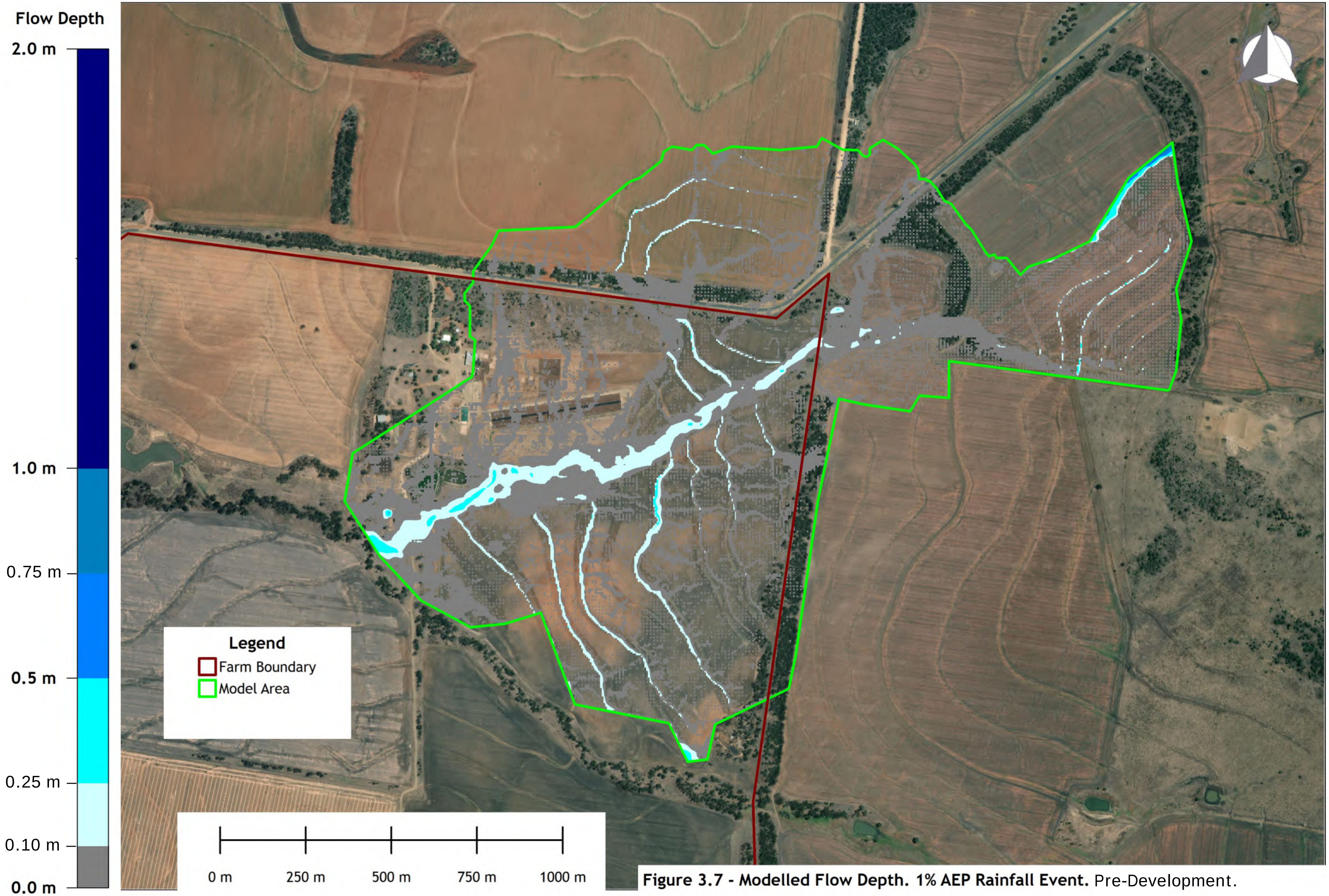


Figure 3.7 - Modelled Flow Depth. 1% AEP Rainfall Event. Pre-Development.

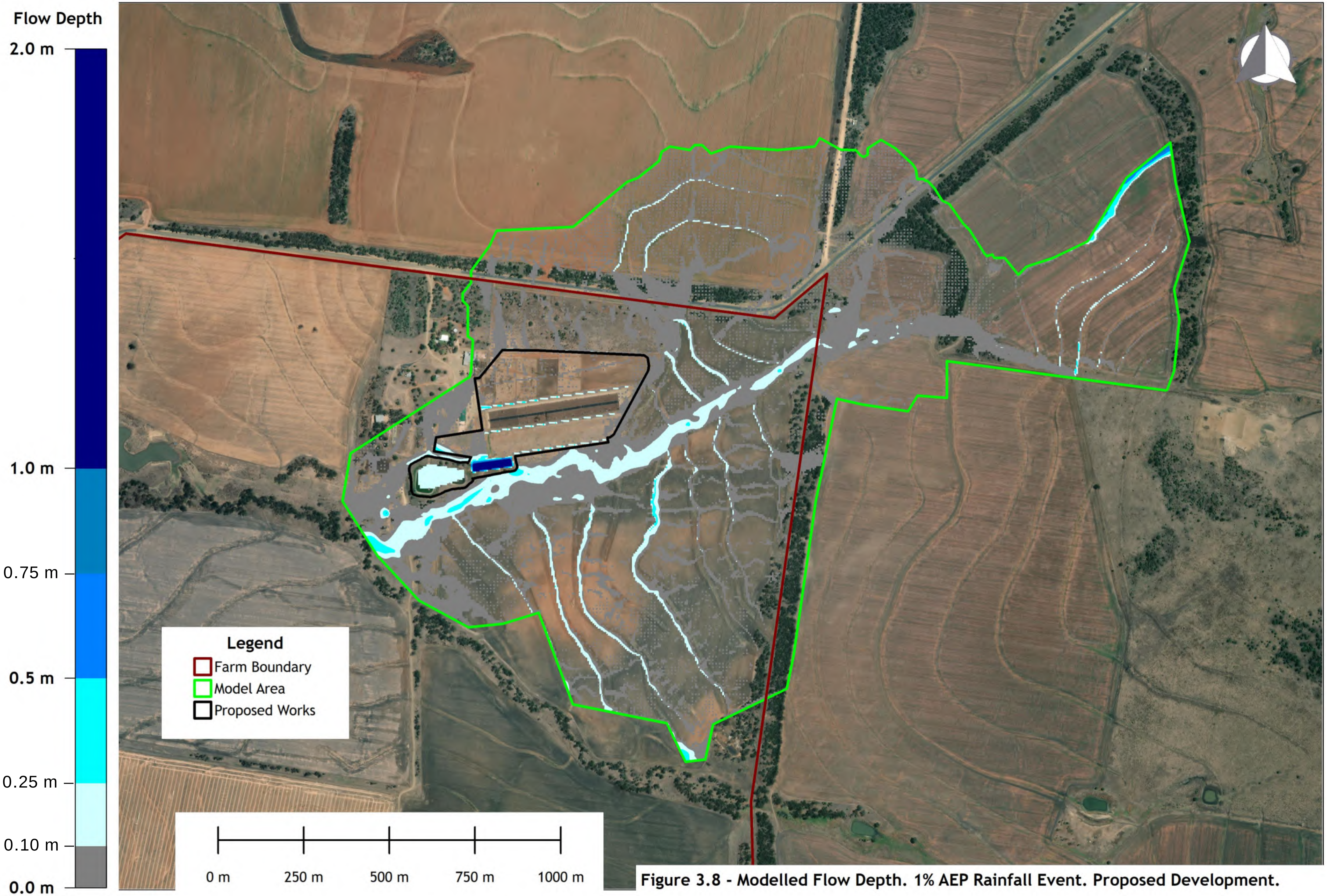


Figure 3.8 - Modelled Flow Depth. 1% AEP Rainfall Event. Proposed Development.

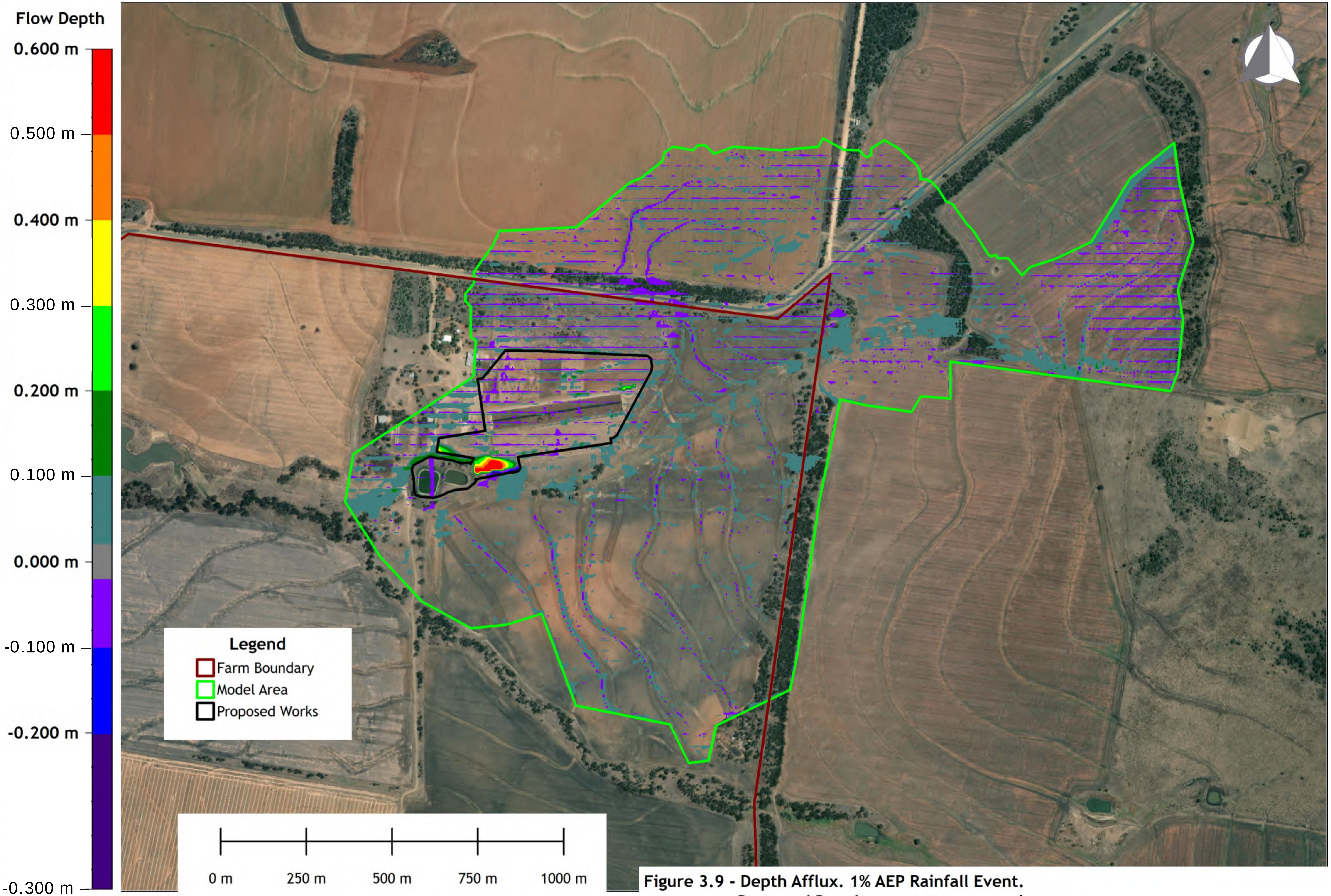


**Figure 3.9 - Depth Afflux. 1% AEP Rainfall Event.
Proposed Development vs Pre-Development.**

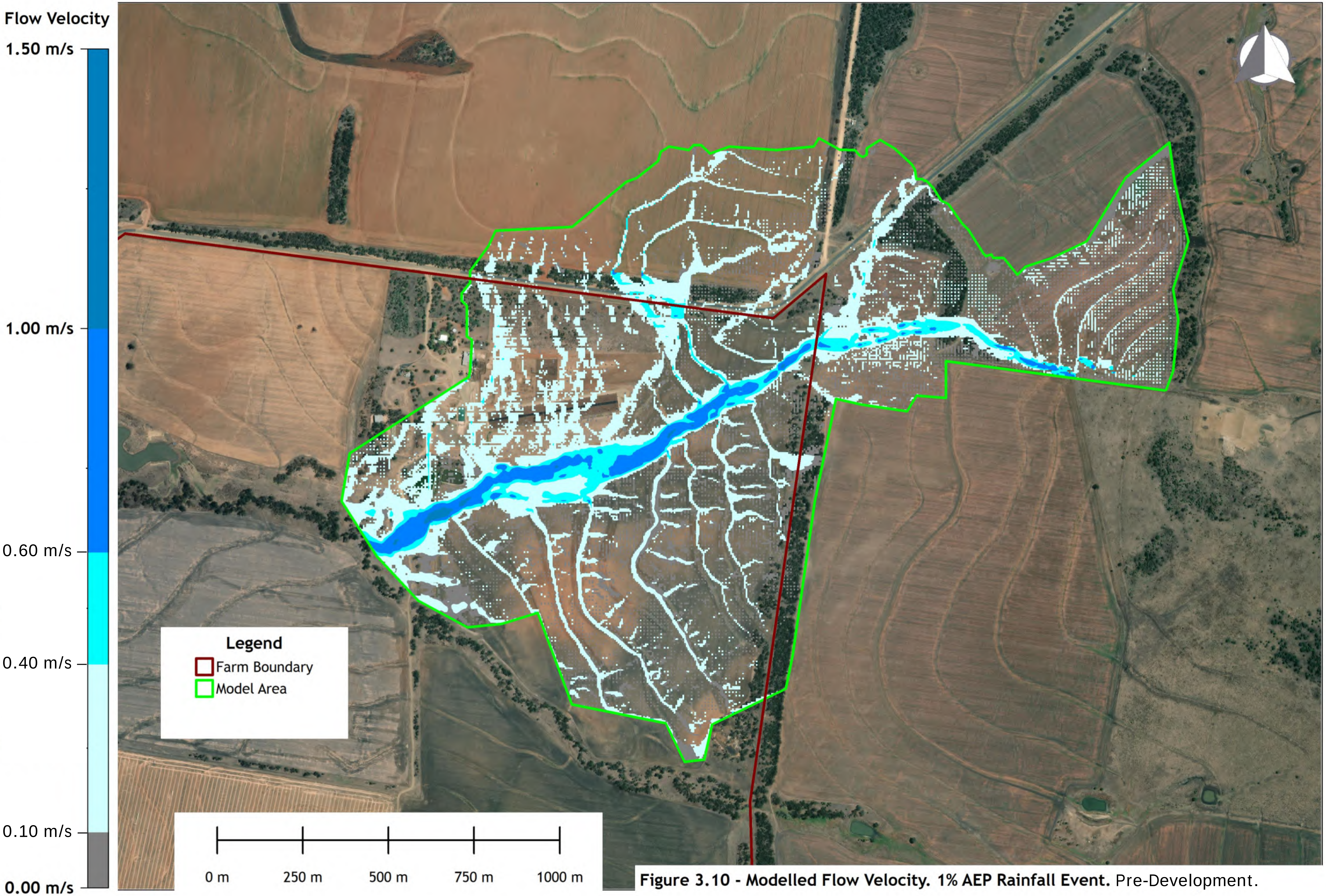


Figure 3.10 - Modelled Flow Velocity. 1% AEP Rainfall Event. Pre-Development.

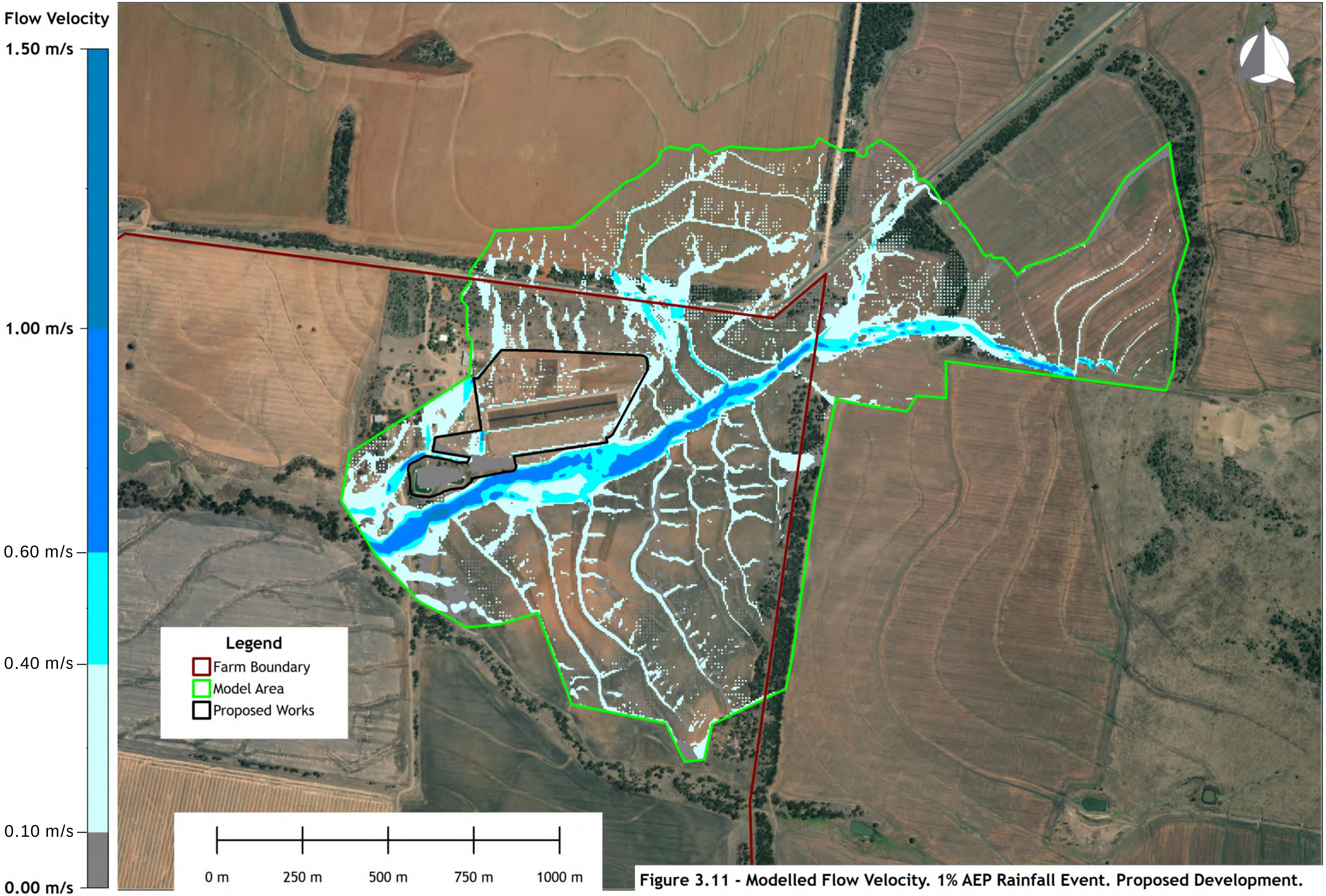


Figure 3.11 - Modelled Flow Velocity. 1% AEP Rainfall Event. Proposed Development.

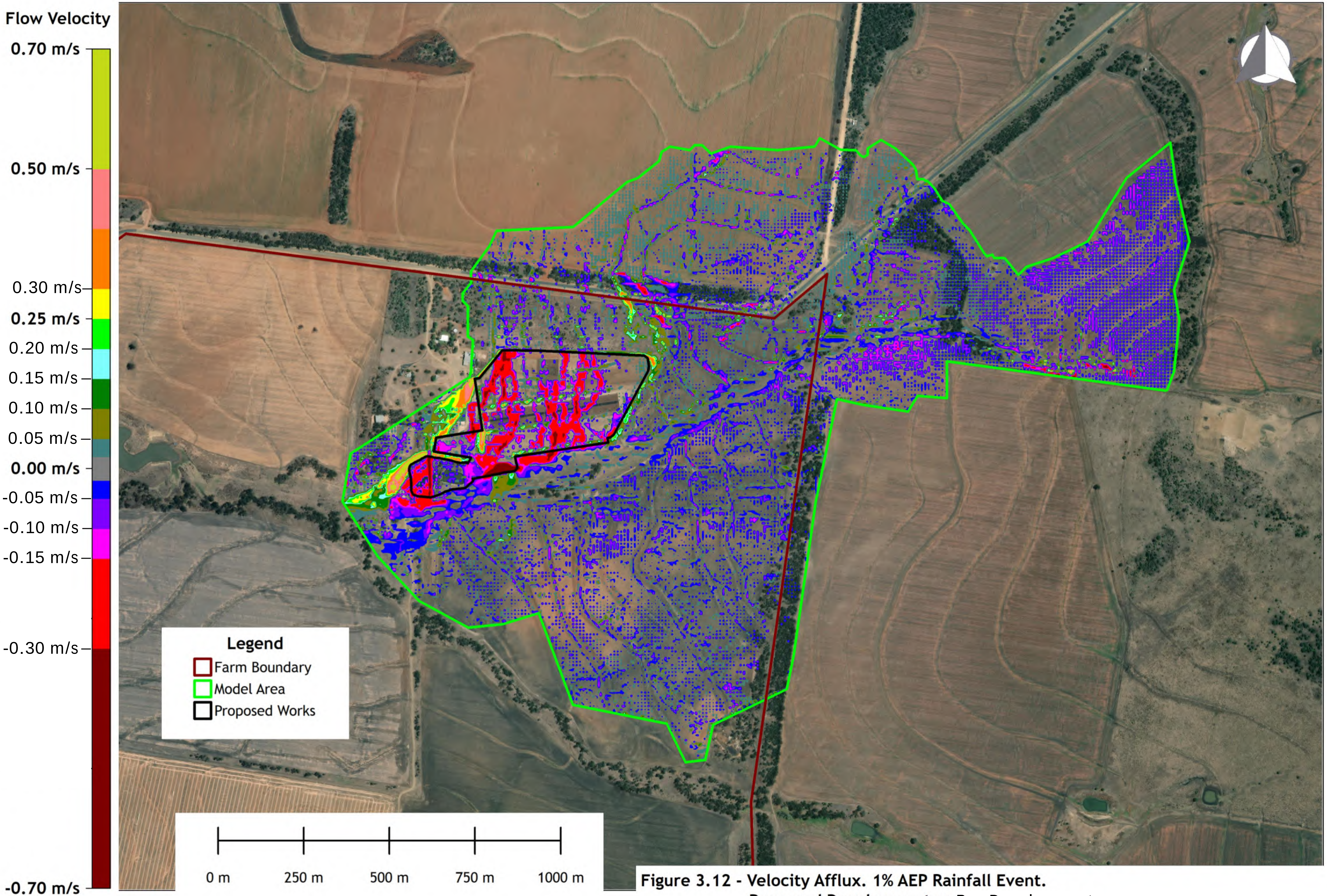


Figure 3.12 - Velocity Afflux. 1% AEP Rainfall Event. Proposed Development vs Pre-Development.

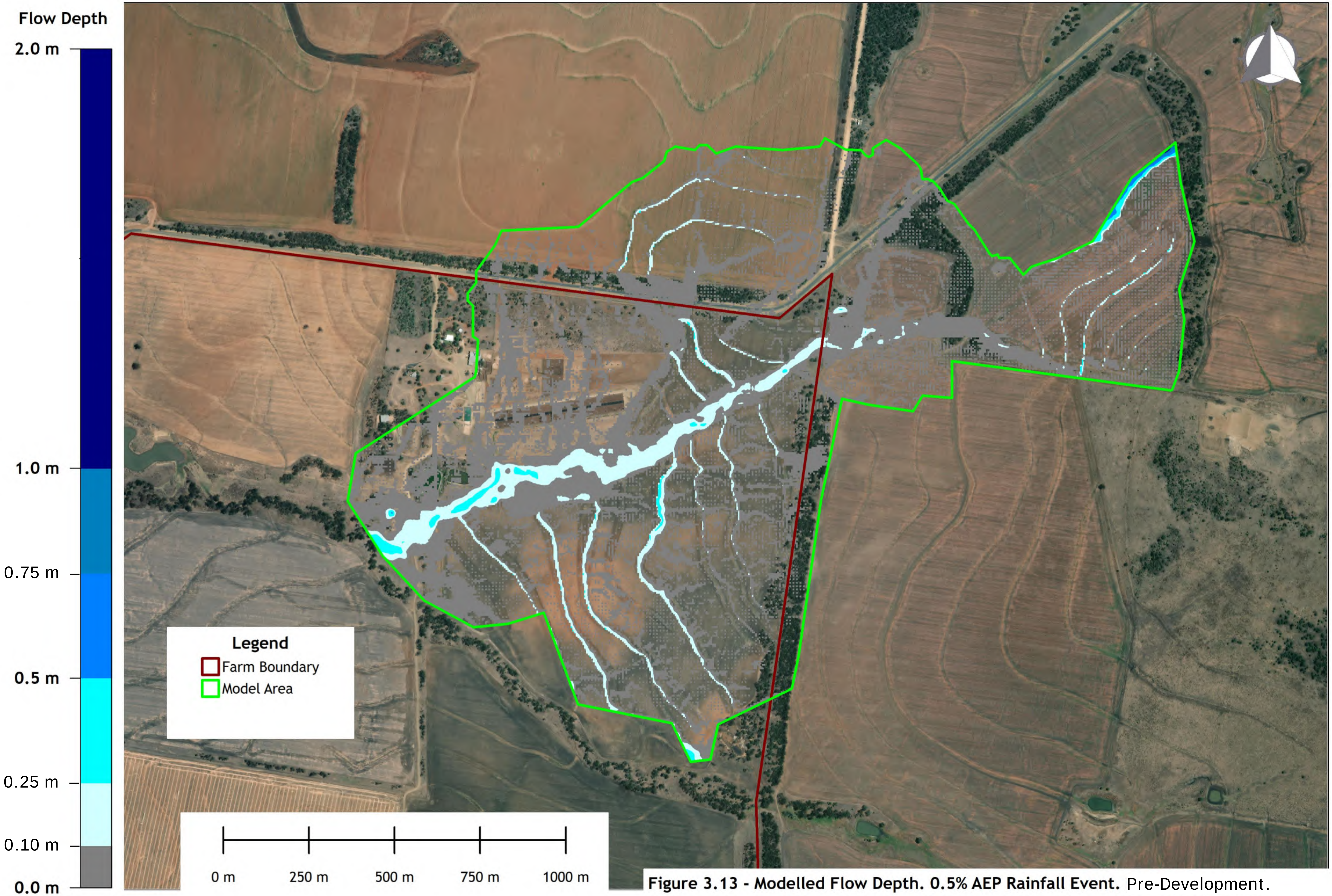


Figure 3.13 - Modelled Flow Depth. 0.5% AEP Rainfall Event. Pre-Development.

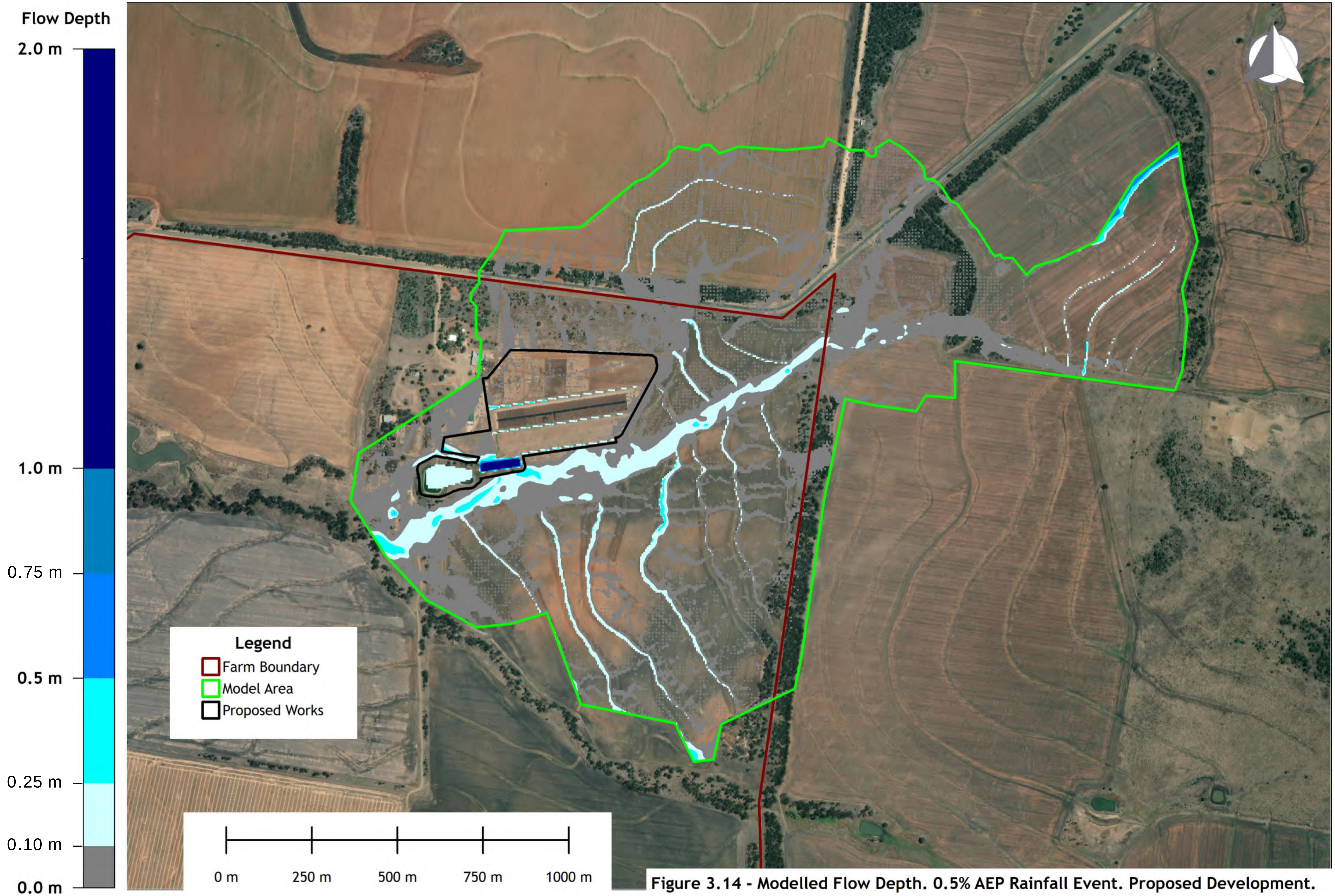


Figure 3.14 - Modelled Flow Depth. 0.5% AEP Rainfall Event. Proposed Development.

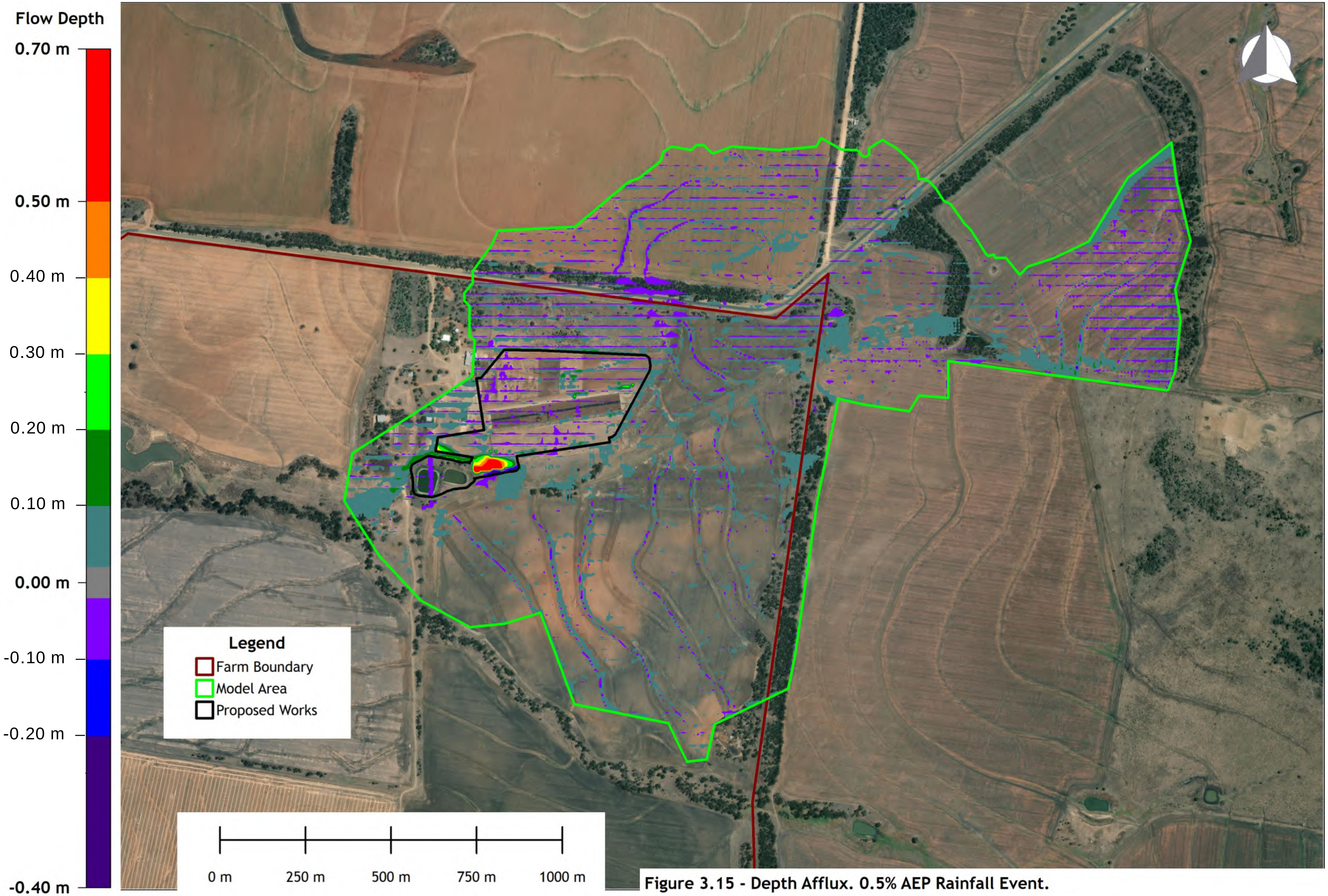


Figure 3.15 - Depth Afflux. 0.5% AEP Rainfall Event. Proposed Development vs Pre-Development.

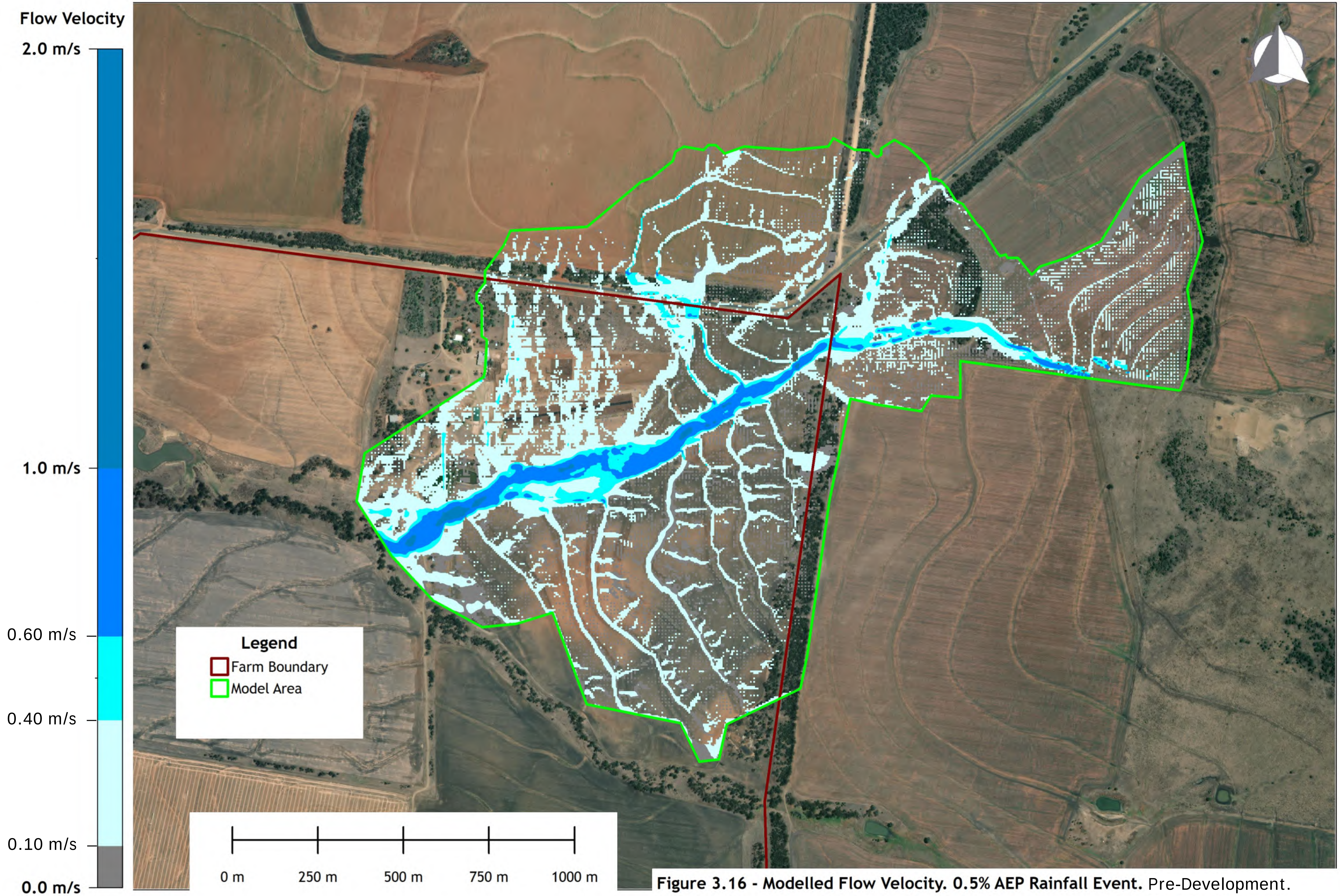


Figure 3.16 - Modelled Flow Velocity. 0.5% AEP Rainfall Event. Pre-Development.

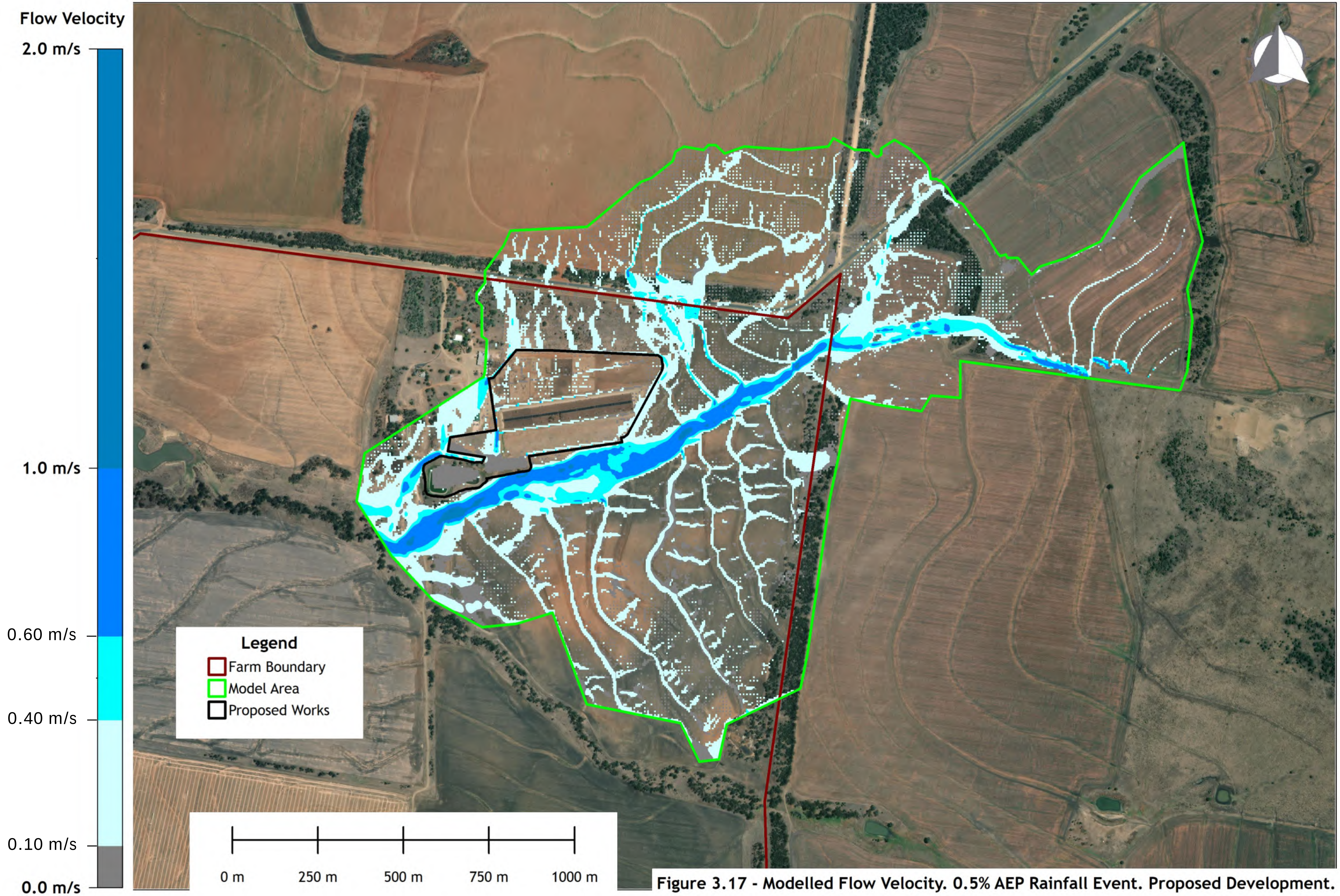


Figure 3.17 - Modelled Flow Velocity. 0.5% AEP Rainfall Event. Proposed Development.

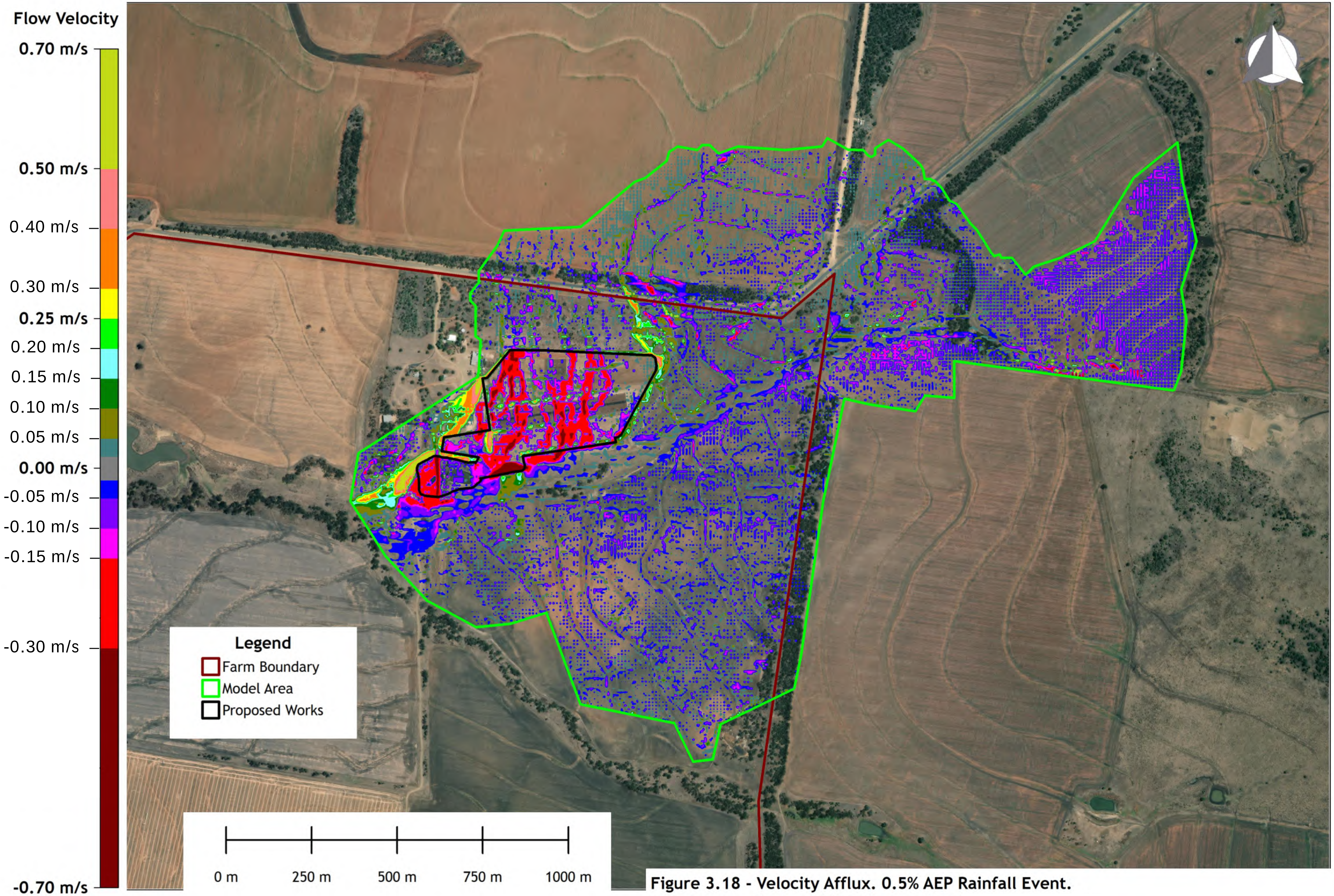


Figure 3.18 - Velocity Afflux. 0.5% AEP Rainfall Event. Proposed Development vs Pre-Development.

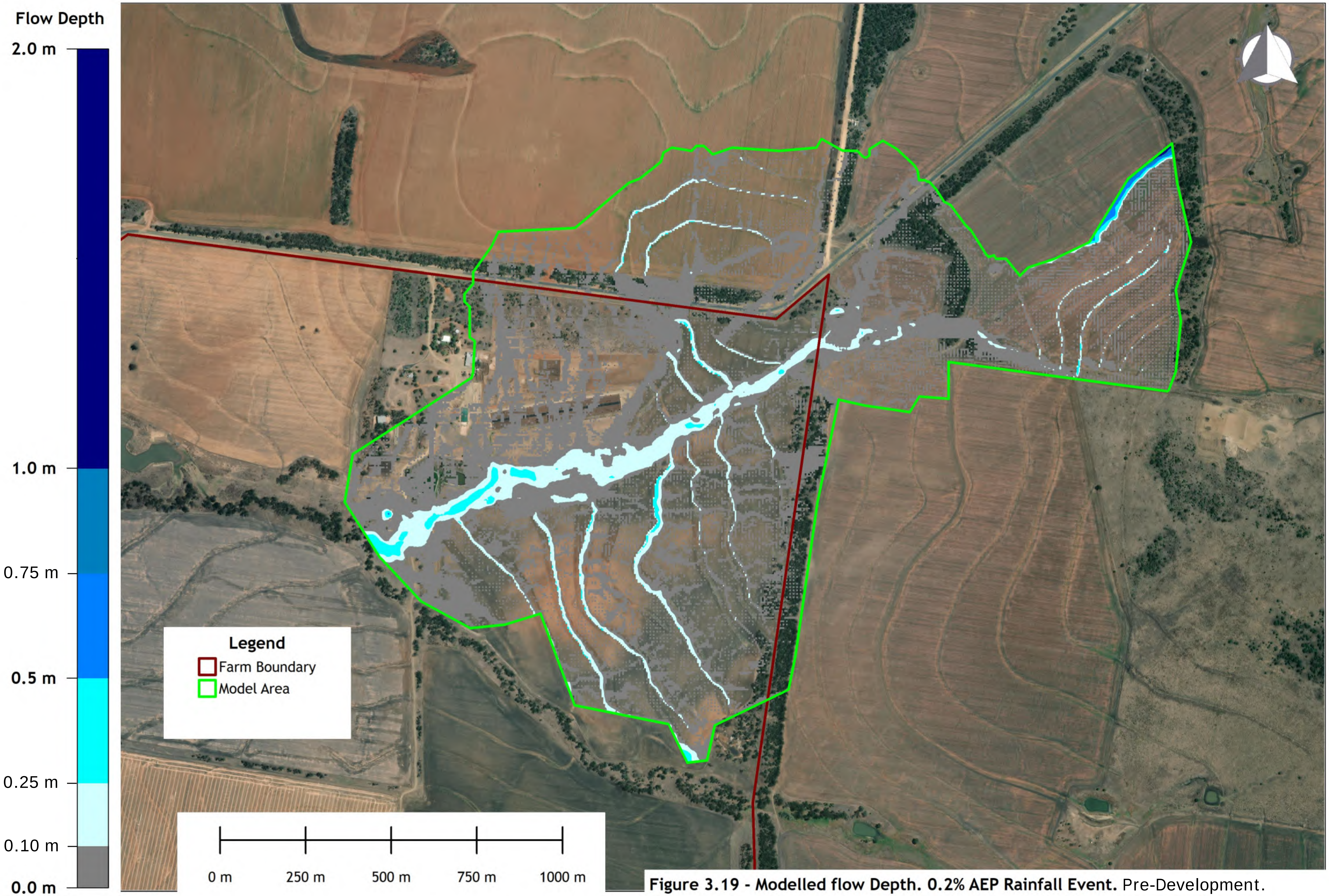


Figure 3.19 - Modelled flow Depth. 0.2% AEP Rainfall Event. Pre-Development.

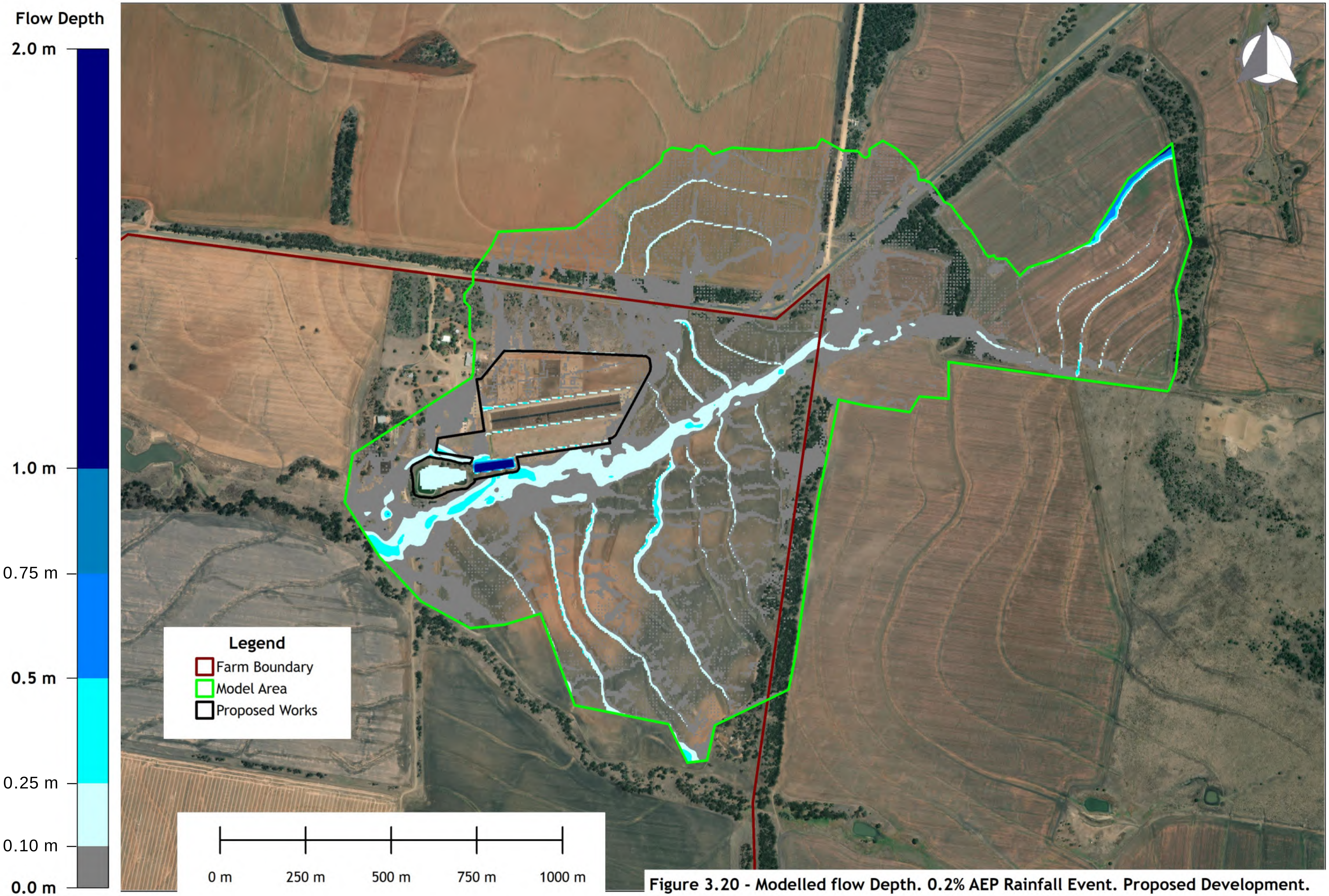


Figure 3.20 - Modelled flow Depth. 0.2% AEP Rainfall Event. Proposed Development.

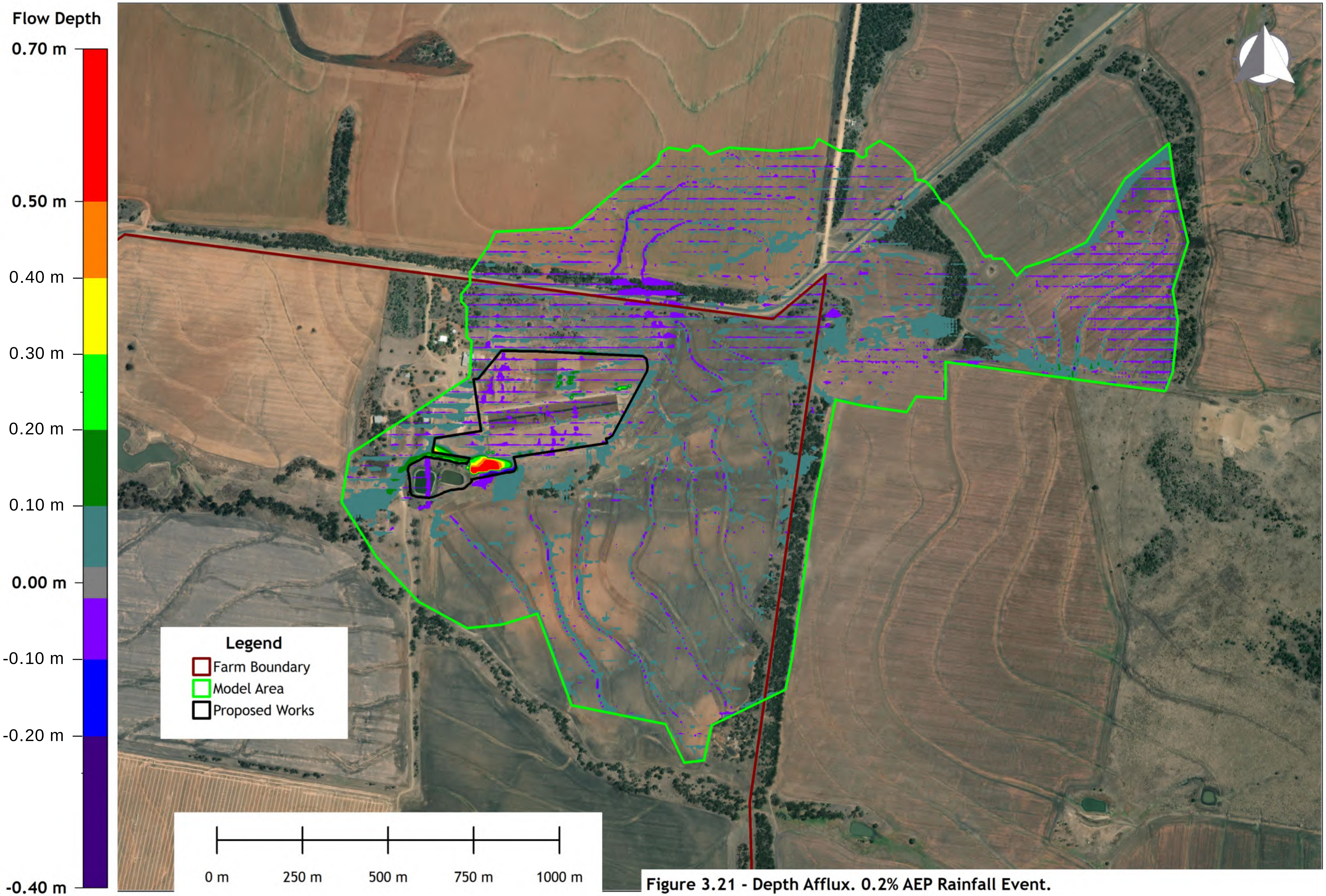


Figure 3.21 - Depth Afflux. 0.2% AEP Rainfall Event. Proposed Development vs Pre-Development.

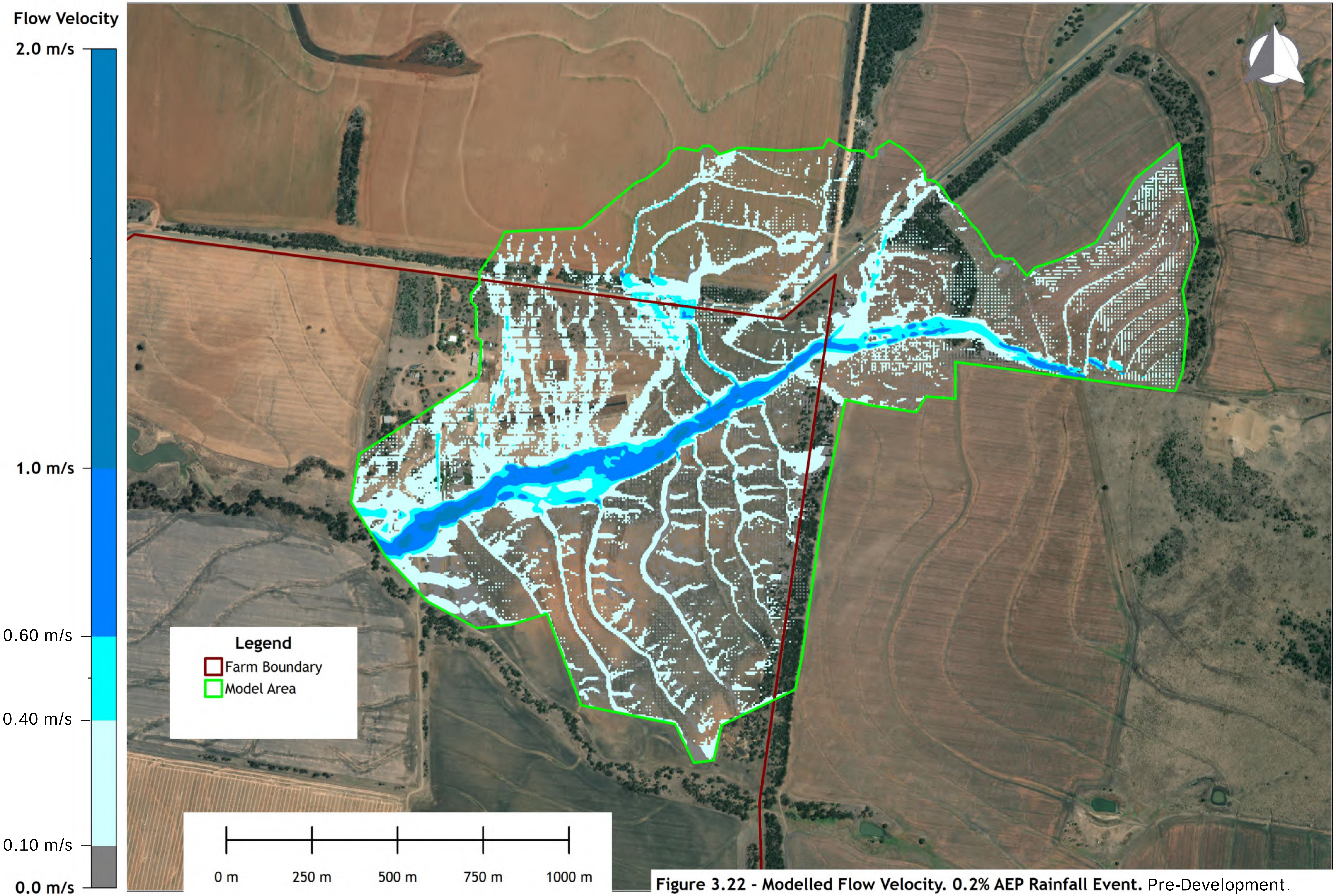


Figure 3.22 - Modelled Flow Velocity. 0.2% AEP Rainfall Event. Pre-Development.

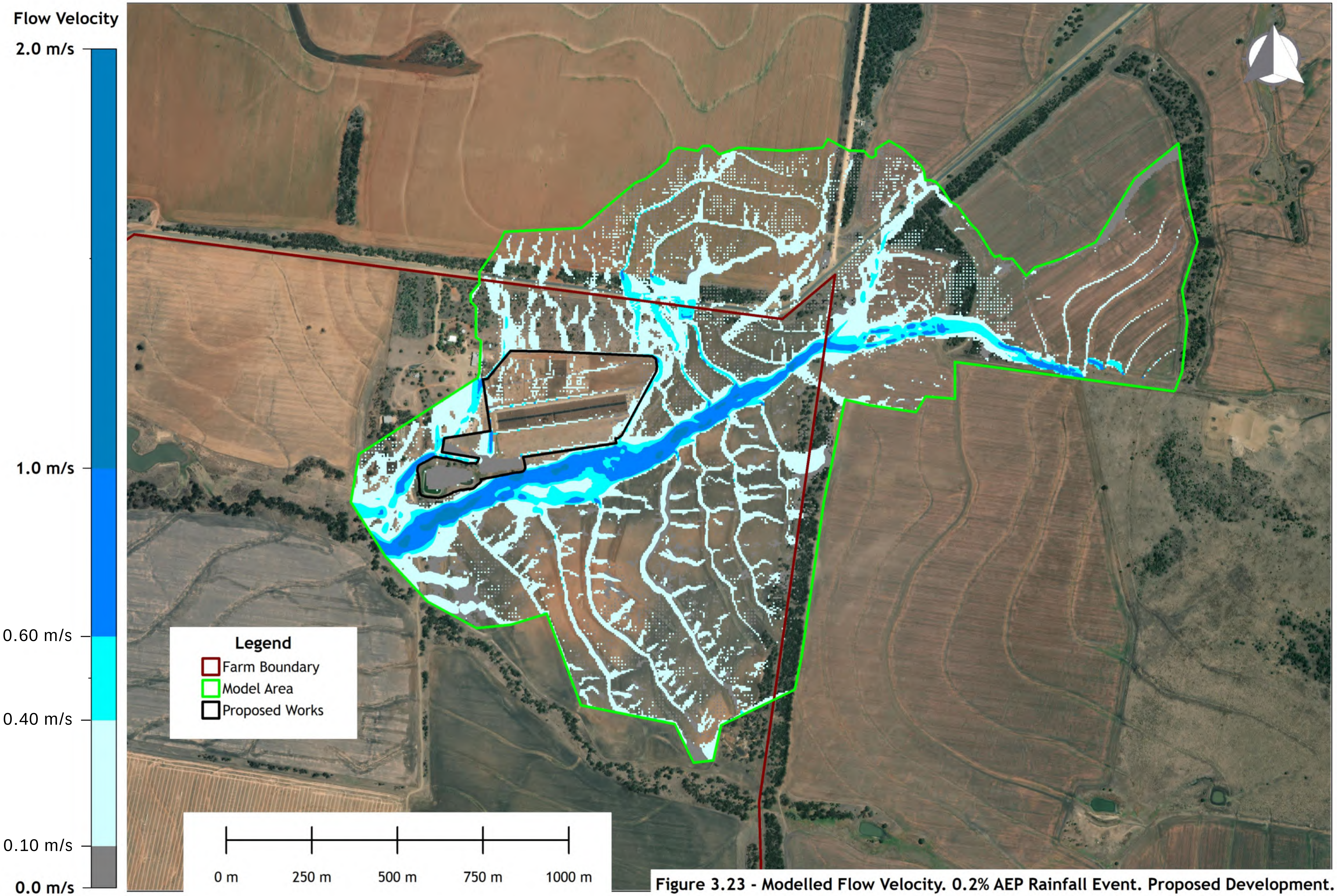


Figure 3.23 - Modelled Flow Velocity. 0.2% AEP Rainfall Event. Proposed Development.

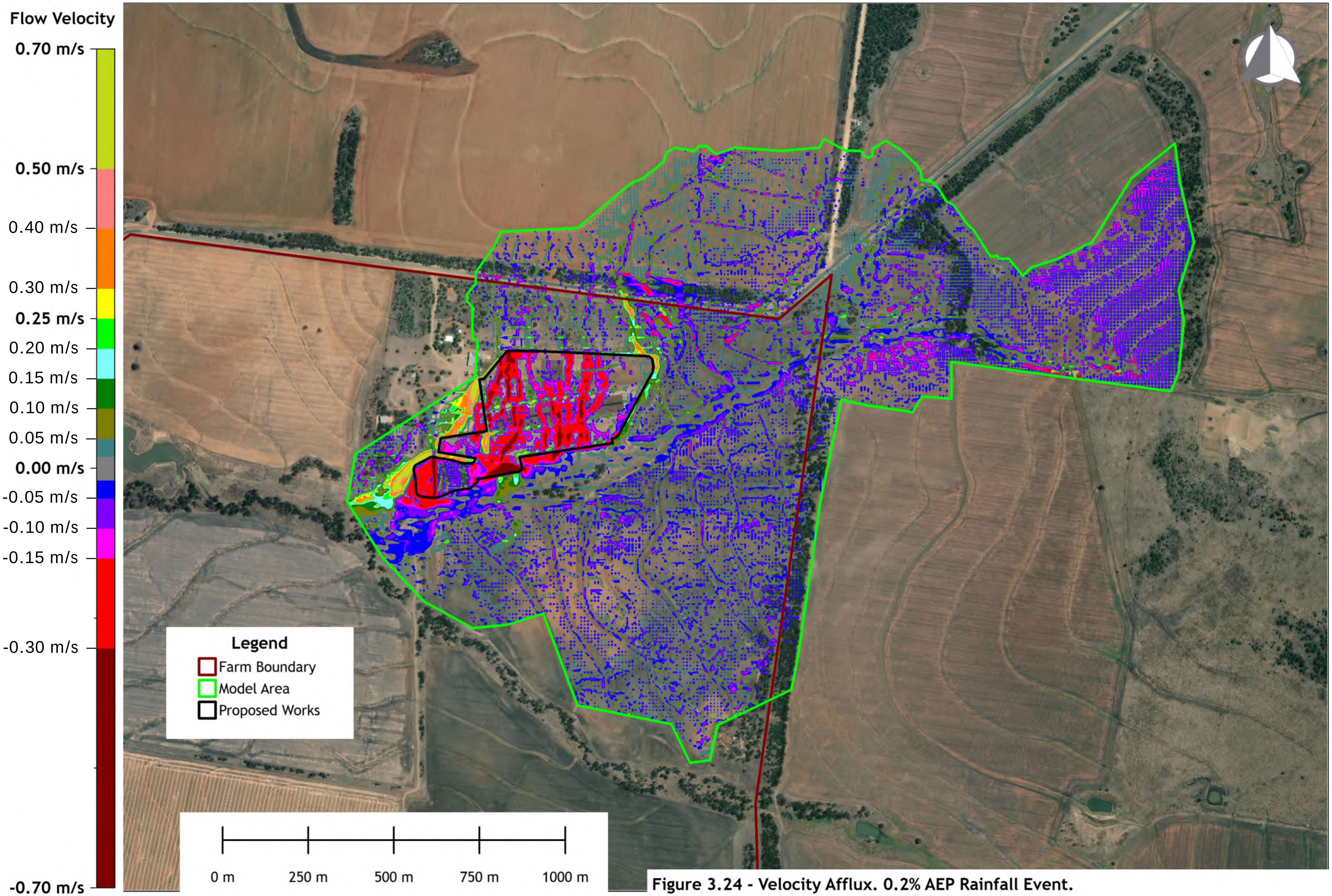


Figure 3.24 - Velocity Afflux. 0.2% AEP Rainfall Event.
Proposed Development vs Pre-Development.

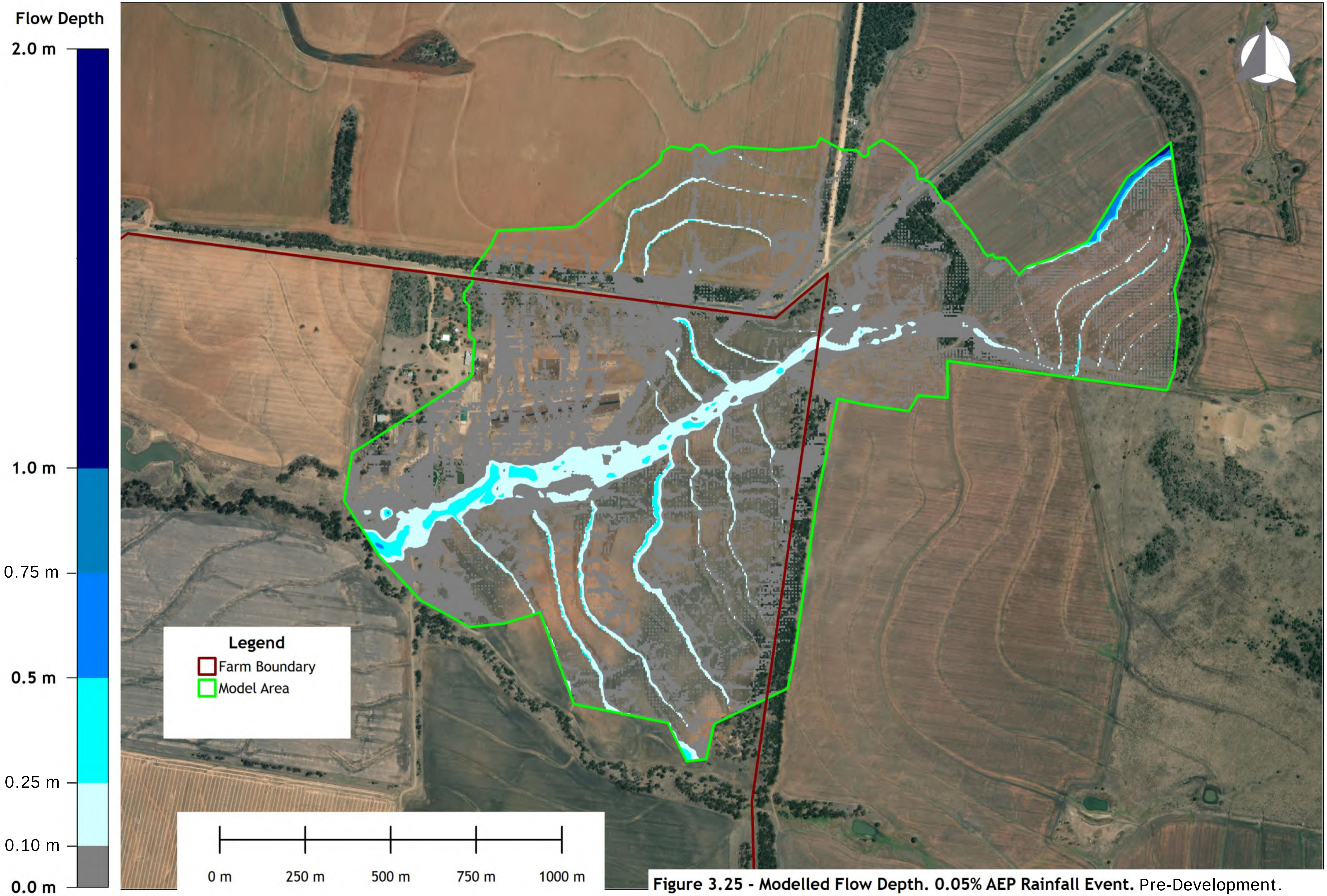


Figure 3.25 - Modelled Flow Depth. 0.05% AEP Rainfall Event. Pre-Development.

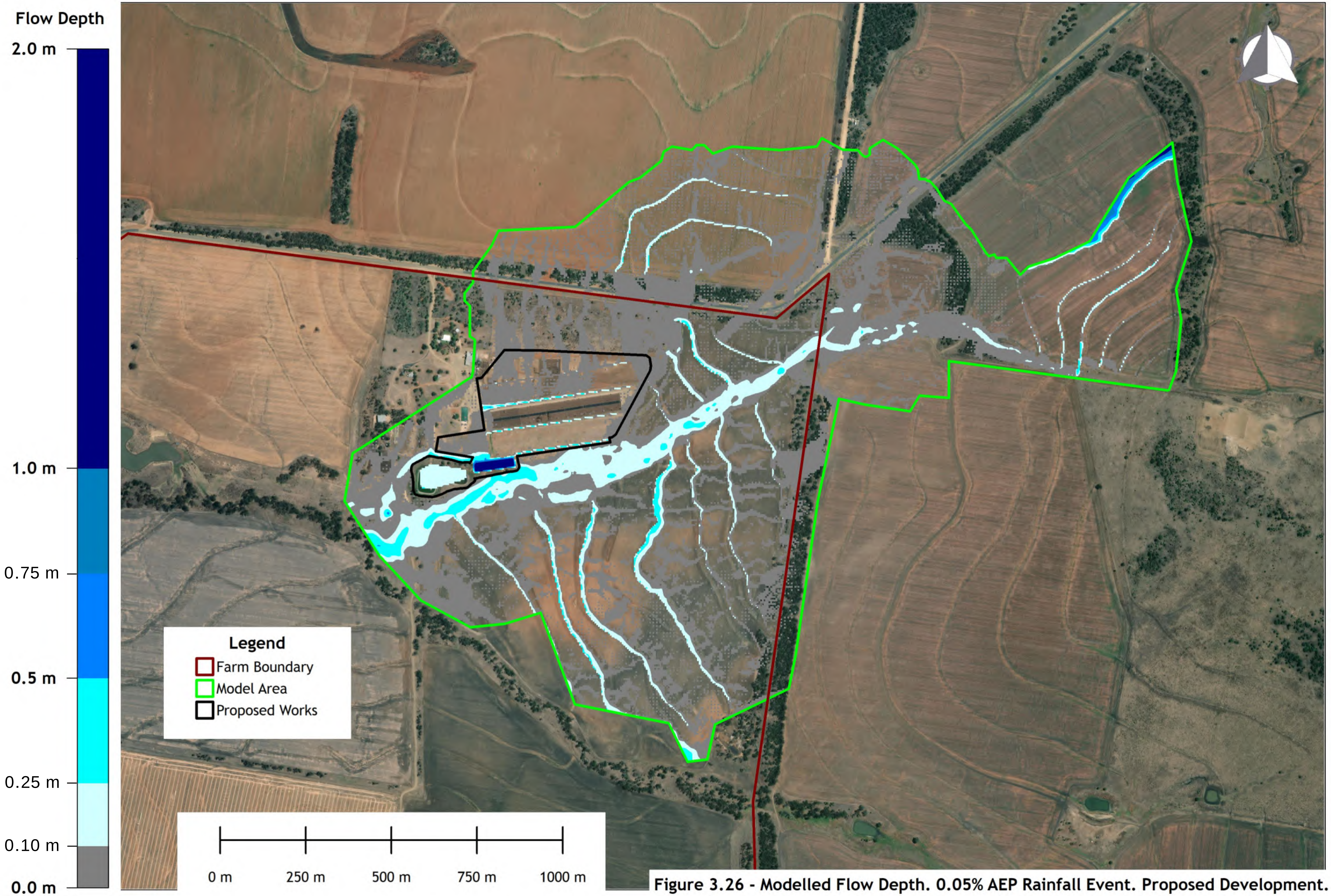


Figure 3.26 - Modelled Flow Depth. 0.05% AEP Rainfall Event. Proposed Development.

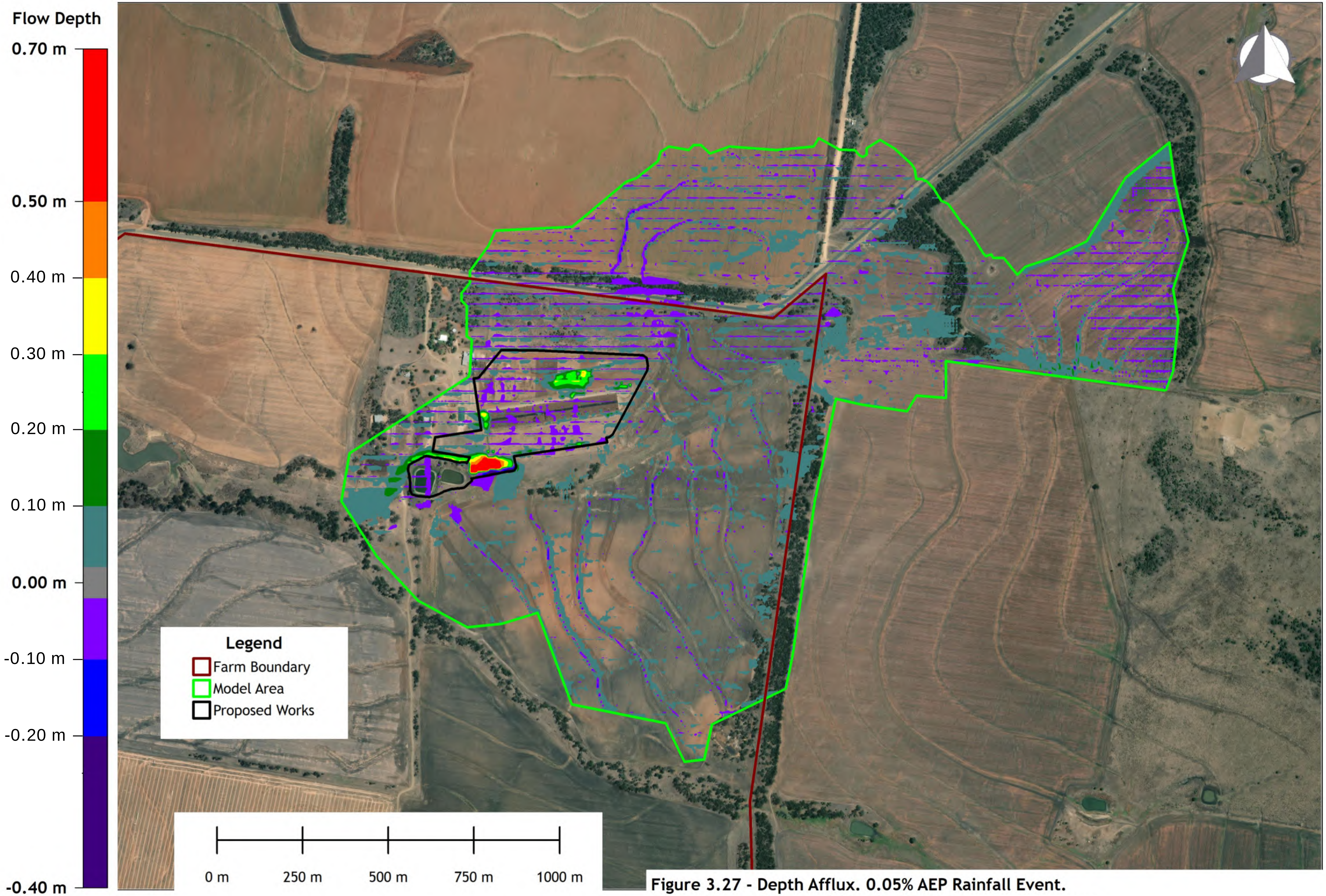


Figure 3.27 - Depth Afflux. 0.05% AEP Rainfall Event. Proposed Development vs Pre-Development.

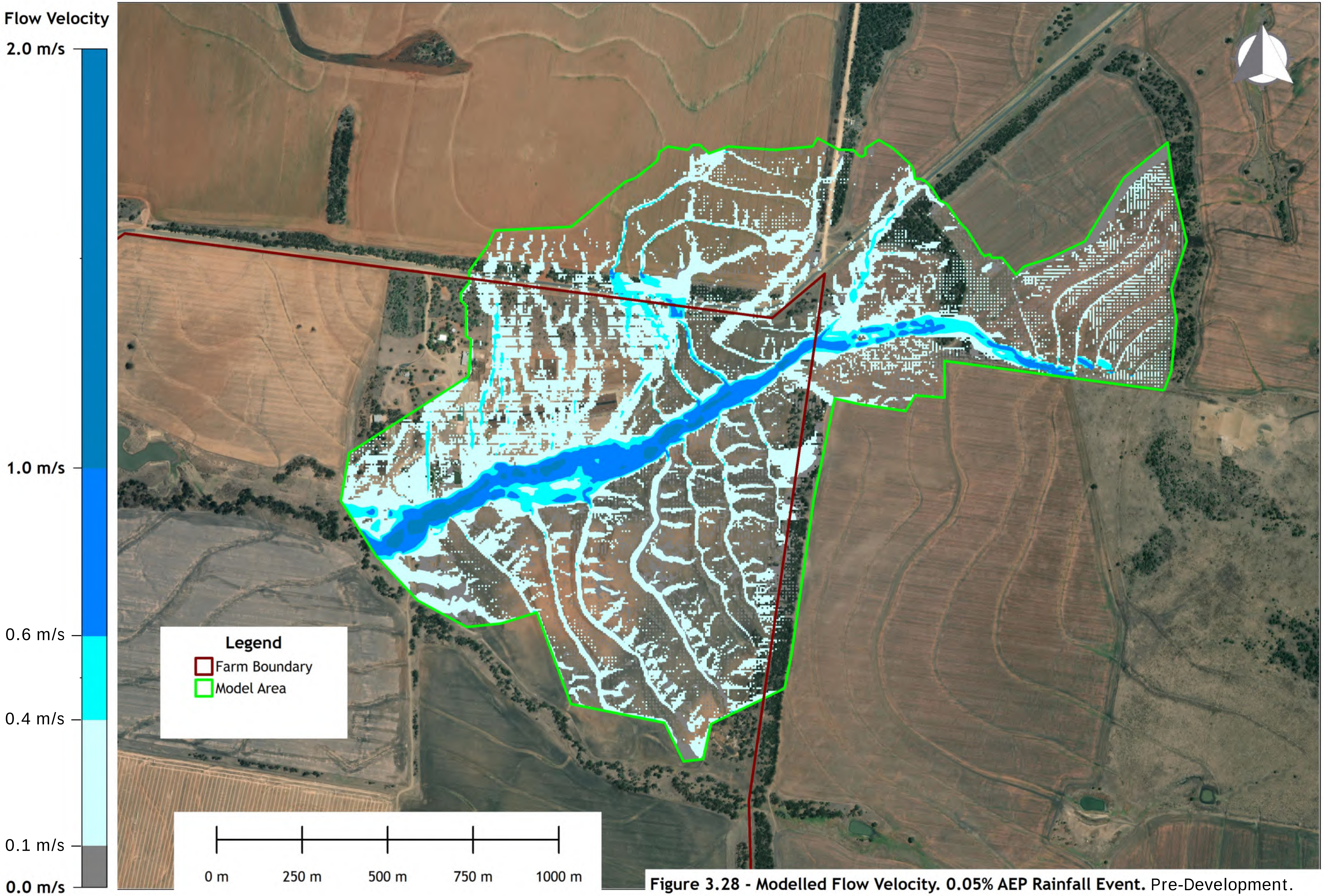


Figure 3.28 - Modelled Flow Velocity. 0.05% AEP Rainfall Event. Pre-Development.

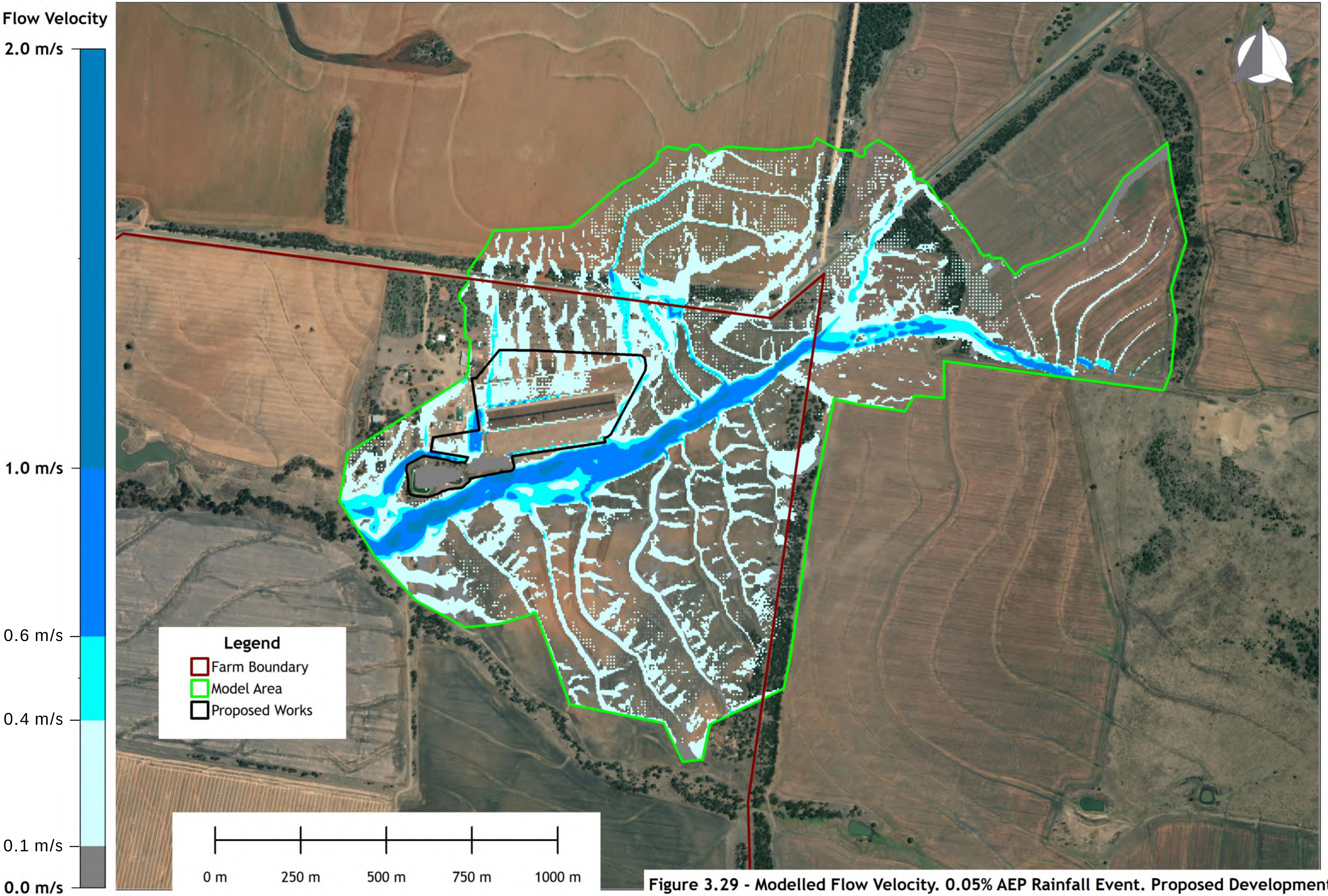


Figure 3.29 - Modelled Flow Velocity. 0.05% AEP Rainfall Event. Proposed Development.

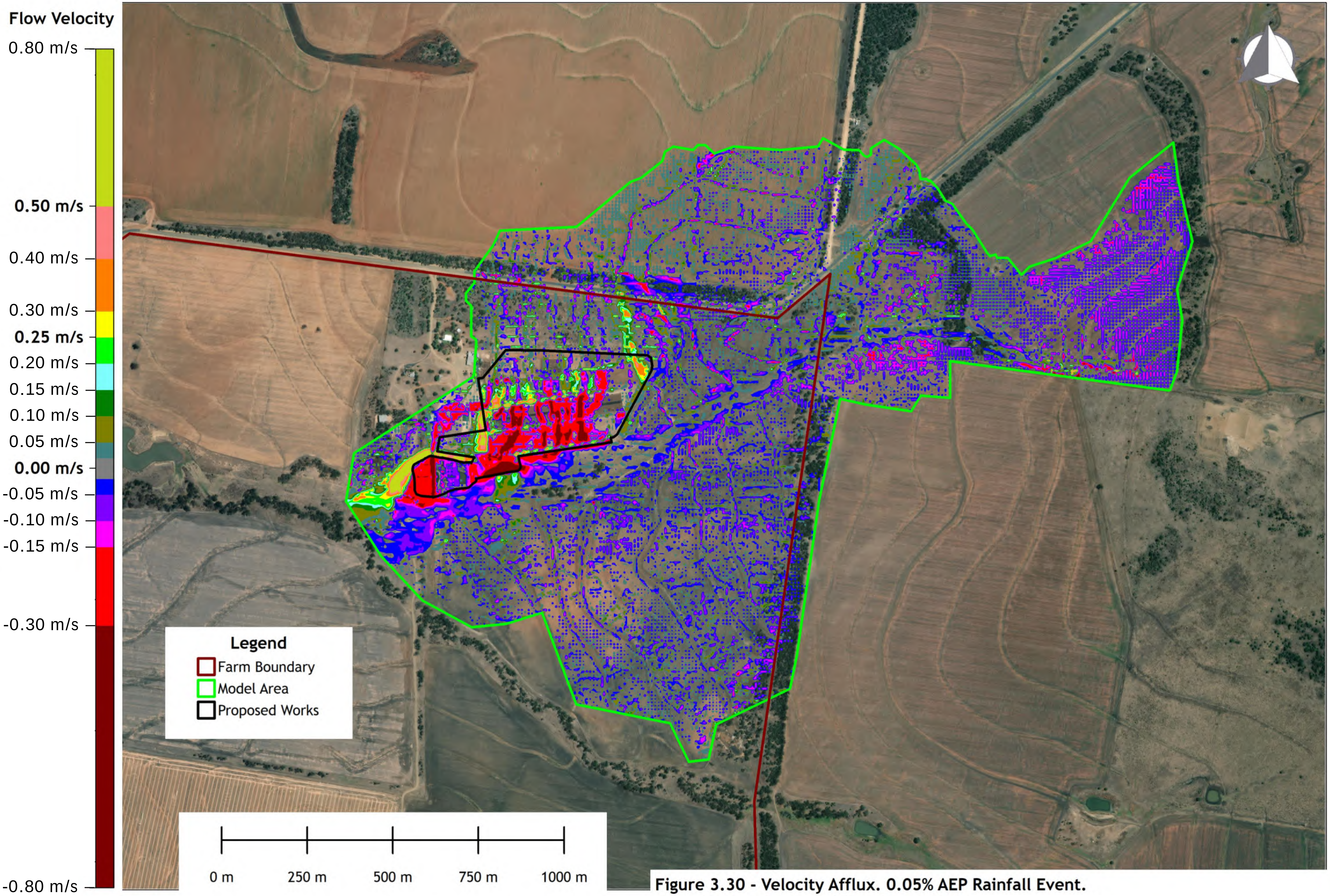


Figure 3.30 - Velocity Afflux. 0.05% AEP Rainfall Event. Proposed Development vs Pre-Development.

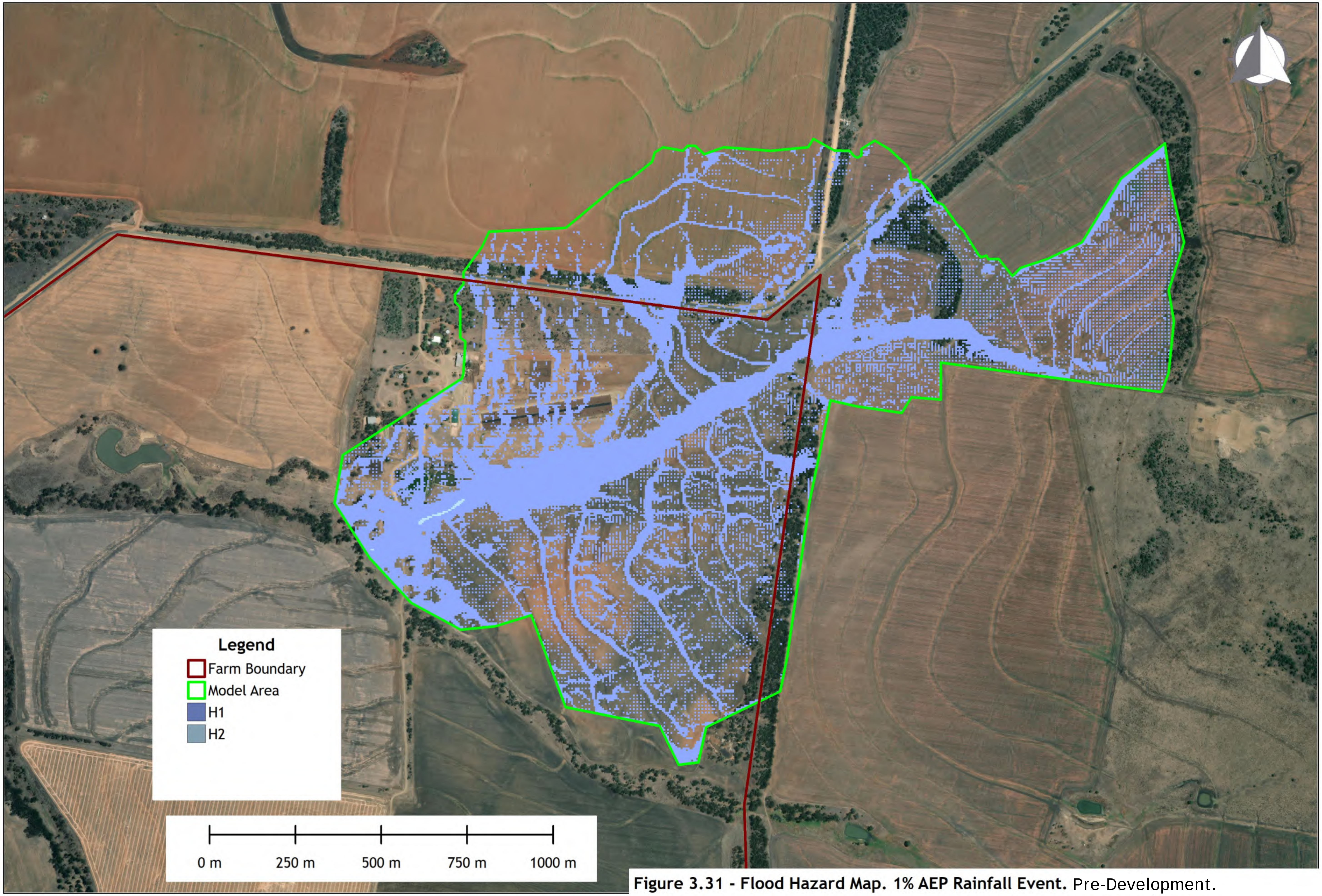


Figure 3.31 - Flood Hazard Map. 1% AEP Rainfall Event. Pre-Development.

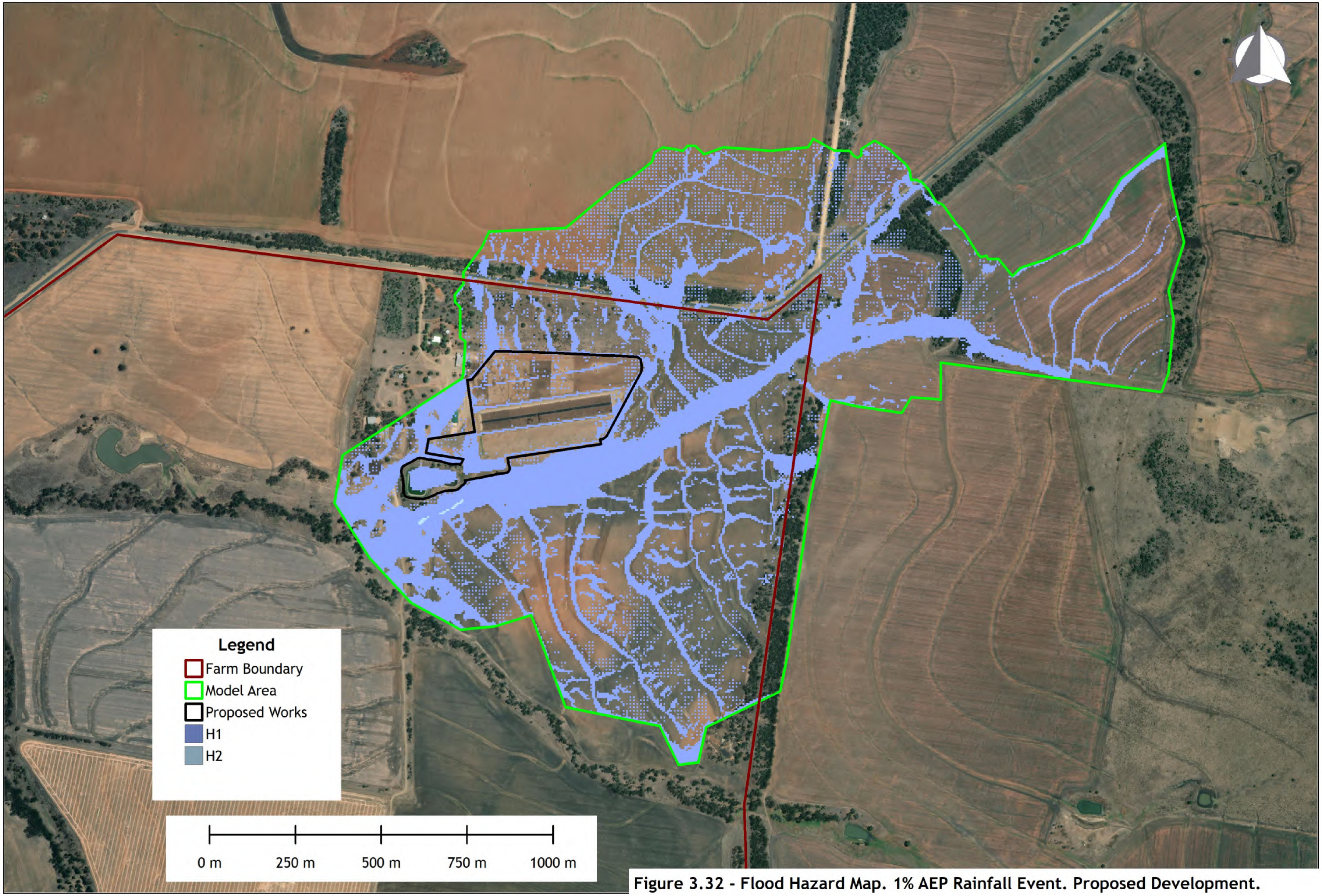
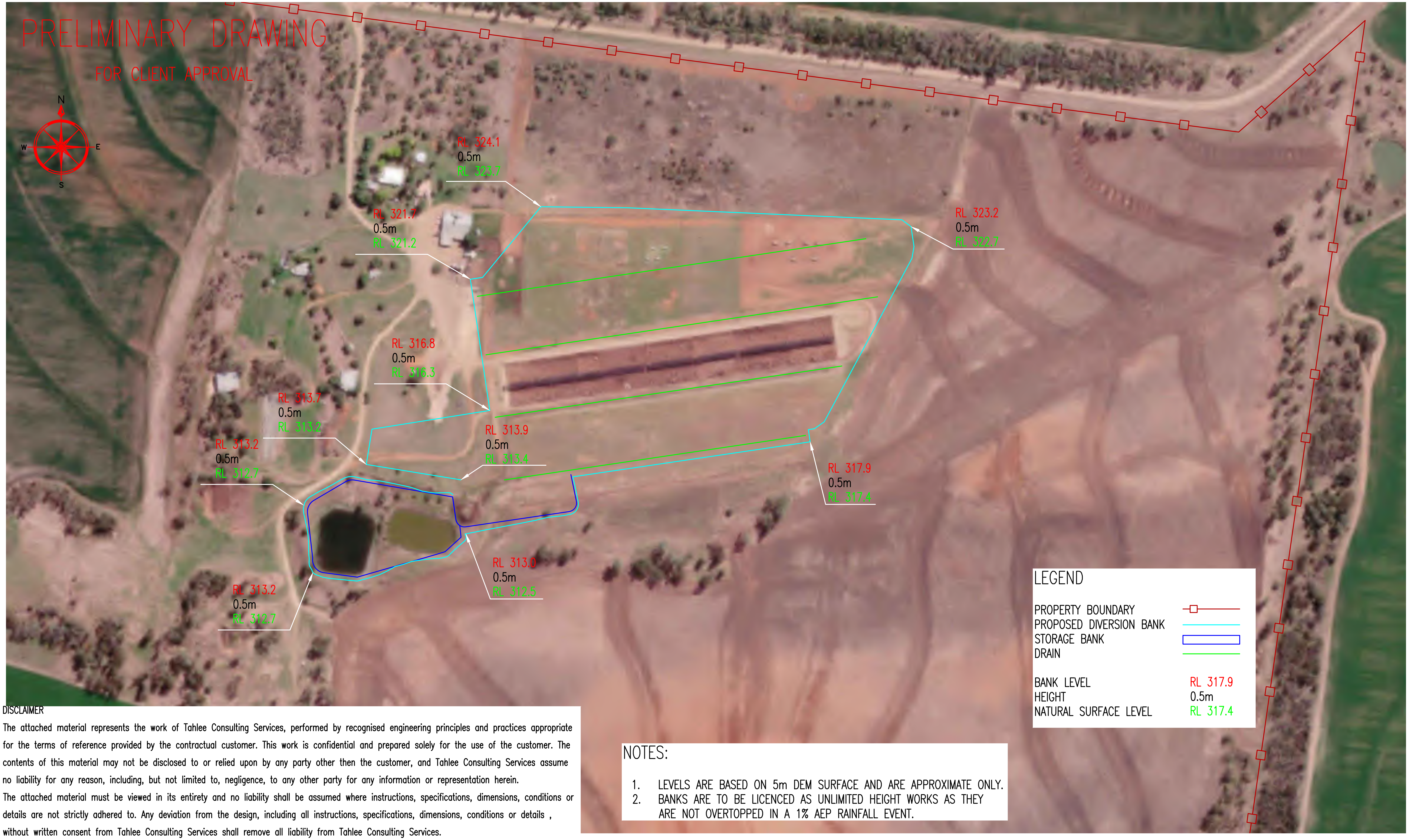


Figure 3.32 - Flood Hazard Map. 1% AEP Rainfall Event. Proposed Development.



LEGEND

PROPERTY BOUNDARY	
PROPOSED DIVERSION BANK	
STORAGE BANK	
DRAIN	
BANK LEVEL	RL 317.9
HEIGHT	0.5m
NATURAL SURFACE LEVEL	RL 317.4

NOTES:

1. LEVELS ARE BASED ON 5m DEM SURFACE AND ARE APPROXIMATE ONLY.
2. BANKS ARE TO BE LICENCED AS UNLIMITED HEIGHT WORKS AS THEY ARE NOT OVERTOPPED IN A 1% AEP RAINFALL EVENT.

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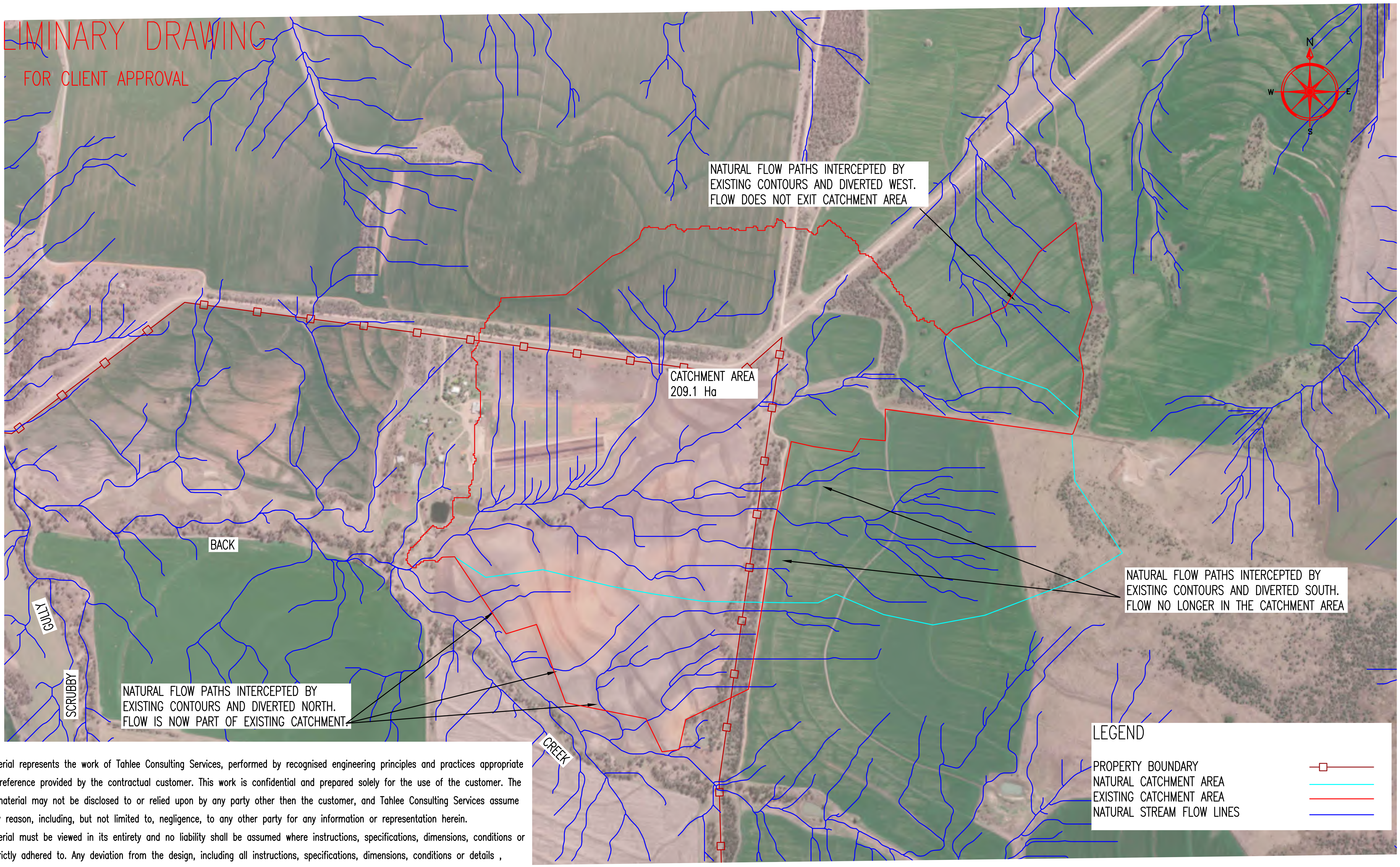
PROJECT
DOOLIN FARMING PTY LTD
SPRINGFIELD

SCALE
1:4,000 (A3 SHEET)

TITLE
PROPOSED FEEDLOT DEVELOPMENT COMPLEX EIS
WORKS LOCATIONS
LAYOUT
SHEET 1 OF 1

DRAWING NO. 0828_1.1

AMDT. B



No.	REVISION	DATE	BY
D	NOTES ADDED	17/2/25	ARF
C	STREAM LINES ADDED	31/1/25	ARF
B	CATCHMENT AREA ADJUSTED TO INCLUDE ADDITIONAL CONTOUR	9/9/23	ARF
A	ORIGINAL ISSUE	15/08/23	ARF

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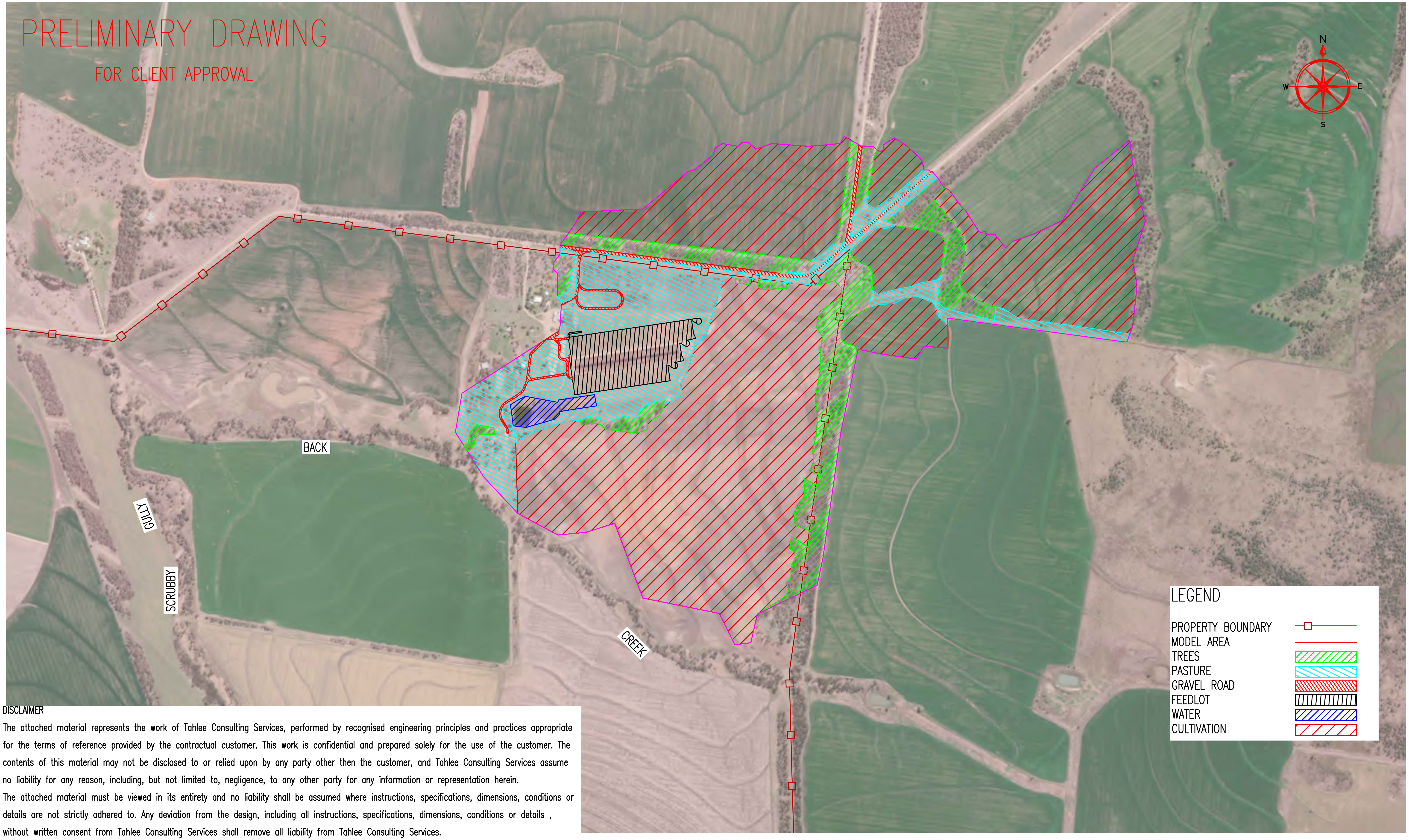
1:12,500 (A3 SHEET)

TITLE
PROPOSED FEEDLOT DEVELOPMENT COMPLEX EIS
CATCHMENT AREA
LAYOUT
SHEET 1 OF 3

DRAWING NO.
0828_2.1

AMDT.
D



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PROJECT
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SPRINGFIELD

SCALE
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TITLE
PROPOSED FEEDLOT DEVELOPMENT COMPLEX EIS
MODEL AREA
GROUND COVER
SHEET 2 OF 3

DRAWING NO. 0828_2.2

AMDT. D

NOTE:

HYDROLOGIC SOIL GROUP CLASSIFICATION TAKEN FROM STATEWIDE LAND AND SOIL MAPPING
NSW GOVERNMENT DEPARTMENT of CLIMATE CHANGE, ENERGY, the ENVIRONMENT and WATER
eSPADE SOIL MAPPING DATABASE

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PROJECT
DOOLIN FARMING PTY LTD
SPRINGFIELD

TITLE
PROPOSED FEEDLOT DEVELOPMENT COMPLEX EIS
MODEL AREA
HYDROLOGIC SOIL GROUP CLASSIFICATION
SHEET 3 OF 3

SCALE 1:12,500 (A3 SHEET)

DRAWING NO. 0828_2.3

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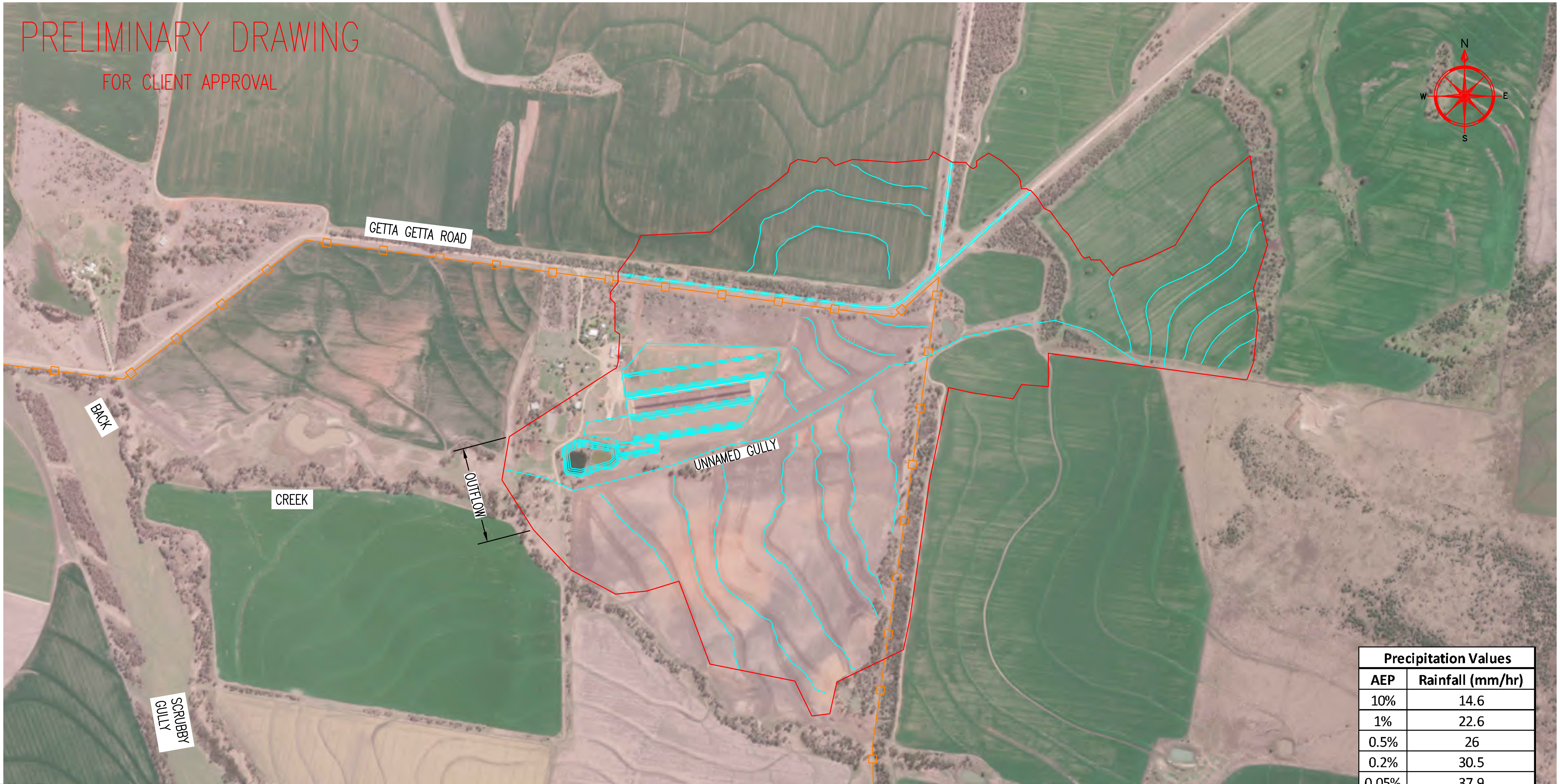

Precipitation Values	
AEP	Rainfall (mm/hr)
10%	14.6
1%	22.6
0.5%	26
0.2%	30.5
0.05%	37.9

LEGEND

PROPERTY BOUNDARY
BREAK LINES
MODEL AREA

No.	REVISION	DATE	BY
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PROJECT
DOOLIN FARMING PTY LTD
SPRINGFIELD

TITLE
PROPOSED FEEDLOT DEVELOPMENT COMPLEX EIS
MODEL SETUP
LAYOUT
SHEET 1 OF 2

SCALE 1:12,500 (A3 SHEET)

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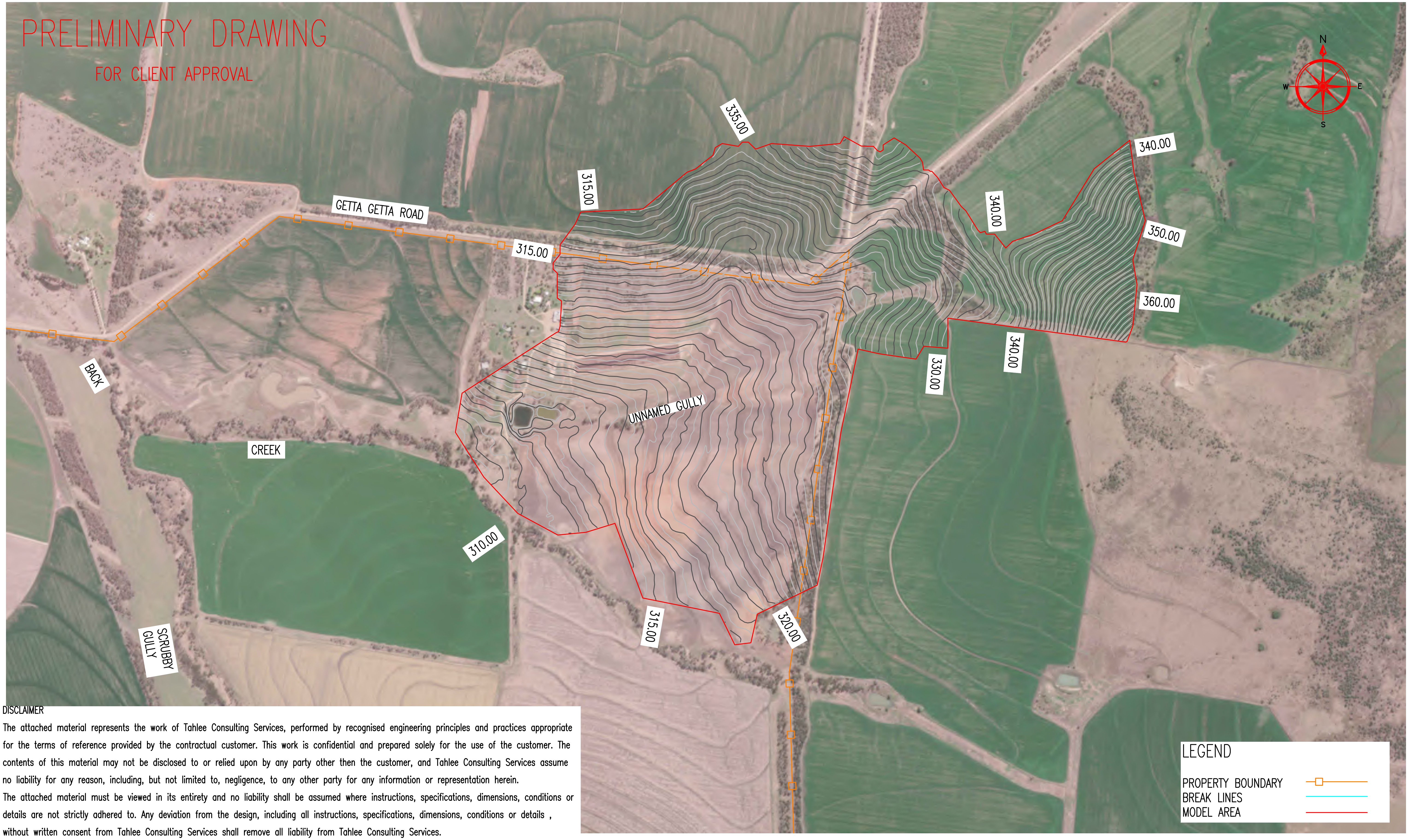

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SCALE
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TITLE
PROPOSED FEEDLOT DEVELOPMENT COMPLEX EIS
TERRAIN CONTOURS
LAYOUT
SHEET 2 OF 2

DRAWING NO. 0828_3.2

AMDT. C

Appendix T

Cost Estimate

Element	Cost (excluding GST)	
Excavation and site preparation Includes clearing vegetation, topsoil stripping, bulk earthworks, clay lining etc.	$	260,510.00
Substructure, columns, external walls and upper floors Substructure is the structurally sound and watertight base upon which to build. Substructure includes all work up to but excluding the lowest floor finish. Columns include internal and external columns from tops to bases, column casings and all protective non-decorative coatings. External walls include structural walls, basement walls, glazed screen walls, any balcony walls and balustrades. Upper floors are the floor structures above the lowest level.	NA	
Staircases Structural connections between two or more floor levels or to roof, plant rooms and motor rooms together with associated finishes.	NA	
Shade Structurally sound shade infrastructure over the pens.	$	275,000.00
Windows, internal walls, doors and screens	NA	
Surface finishes Finishes and decoration applied to internal and external surfaces such as walls, floors and ceilings (e.g., painting, cladding, rendering, carpeting, etc).	NA	
Fencing Install pen fencing, cattle lane fencing, pen, bunk and cattle lane gates, fence assembly over water troughs.	$	240,625.00
Special equipment Special equipment is fixed equipment that is necessary to the use for which consent is sought.	NA	
Building works Procure and install pre-cast feed bunks, feed bunk apron	$	203,900.00
Water storage and reticulation works Procure water storage tanks, precast water troughs, supply and install water pipelines, connection to water troughs.	$	198,190.00
Professional fees Professional service fees associated with the design and construction of a development (e.g., architect, project manager, town planning consultant, etc).	$	100,000.00
Estimated development cost (The sum of the above cost elements, exclusive of GST*)	**$**	**1,278,225**
GST	**$**	**127,823**
Estimated development cost plus GST	**$**	**1,406,048**

Appendix U

Land Use Conflict Risk Assessment

Proposed Intensive livestock agriculture development (Expansion of beef cattle feedlot from 999 head to 3,000 head) on the property "Springfield"

Land Use Conflict Risk Assessment (LUCRA)

"Springfield"
2513 Getta Getta Road
North Star NSW 2408

Doolin Farming Pty Ltd
"Glenhoma"
3202 Getta Getta Road
NORTH STAR NSW 2408

[February 2025]

RDC ENGINEERS
AGRICULTURAL
ENVIRONMENTAL
PROJECT MANAGEMENT

PO Box 1223
TOOWOOMBA QLD 4350

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DOCUMENT INFORMATION RECORD

Project details

Client name:	Doolin Farming Pty Ltd (ABN 28 137 603 064)
Project:	Proposed expansion of Springfield Feedlot from 999 to 3,000 head
Project No:	E2-103

Document control

Document title:	Proposed Intensive livestock agriculture development (Expansion of beef cattle feedlot from 999 head to 3,000 head) on the property "Springfield" – Land Use Conflict Risk Assessment (LUCRA)		
File name:	E2-103 DF Springfield FL LUCRA V1R2.docx		
Revision:	V1R2		
Author:	Rod Davis (FIEAust, CP Eng RPEQ)	**Position:**	Director
Signature:	R.J.Davis	**Date:**	21/02/2025
Reviewed by:	Rod Davis	**Position:**	Director
Signature:	R.J.Davis	**Date:**	21/02/2025
Approved by:	Rod Davis	**Position:**	Director
Signature:	R.J.Davis	**Date:**	21/02/2025

Revision history

Version	Issue date	Reason for issue	Author	Reviewed	Approved
V1R1	24/01/2025	Draft for client review	Rod Davis	Rod Davis	Rod Davis
V1R2	21/02/2025	Final for lodgement to GSC	Rod Davis	Rod Davis	Rod Davis

Distribution

Version	Recipient	Lodgement	Copies
V1R1	Doolin Farming Pty Ltd	Electronic	-
V1R2	Doolin Farming Pty Ltd / Gwydir Shire Council (GSC)	Electronic	-

Disclaimer

Citation

RDC Engineers Pty Ltd, 2025, Proposed Intensive livestock agriculture development (Expansion of beef cattle feedlot from 999 head to 3,000 head) on the property "Springfield" – Land Use Conflict Risk Assessment (LUCRA), E2-103F/V1R2, RDC Engineers Pty Ltd, Toowoomba, QLD, 4350.

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Executive summary

Doolin Farming Pty Ltd own and operate a 10,000 ha mixed farming operation across several properties at North Star including “Glenhoma”, “Glenmodel”, “Springfield”, “Myall Downs” and “Yetman West” some 27 km east of Yetman and 45 km south-southeast of Goondiwindi (QLD) in NSW.

Doolin Farming Pty Ltd primarily engage in dryland and irrigated cropping and beef production. Doolin Farming Pty Ltd produces wheat, barley, oats and chickpeas in winter and cotton and maize in summer under pivot irrigation systems and dryland sorghum cropping. Doolin Farming Pty Ltd also have onsite storage to accommodate almost the entire grain produced and operate a fleet of trucks to transport their grain.

Central to the beef production enterprise is the breeding, growing and lot-feeding of cattle for the domestic market. Currently the beef supply chain includes breeding and growing of beef cattle on land less suitable for dryland and irrigated cropping and grazing of stubble and lot feeding of cattle within a feedlot on the property ‘Springfield”.

“Springfield” comprises some 1,713 ha (~4,231 acres) and currently, a dryland and irrigated cropping business is undertaken on a large proportion of the property with extensive cattle breeding and grazing of beef cattle on the remaining land which is unsuitable for cropping and lot feeding of cattle within a beef cattle feedlot in the north-east of the property. In the last few years, beef cattle bred on several adjoining properties have been walked into a feeding program on “Springfield” upon weaning. “Springfield” has built infrastructure such as a dwelling, machinery sheds, silos, cattle yards and feedlot etc to support the feeding program.

There has been a beef cattle feedlot on “Springfield” for over three years after approval was granted for a 999 head feedlot by the Gwydir Shire Council in 2021 (DA31/2020). Under Schedule 3, Part 1 Item 27 of the *Environmental Planning and Assessment Regulation 2021*, as the capacity of the existing development does not exceed 1000 head it is not a designated development and an environmental licence from NSW EPA is not required.

The existing feedlot is known as Springfield Feedlot. Springfield Feedlot is used to finish the Doolin Farming’s own cattle for the domestic and export markets.

Springfield Feedlot currently operates for 12 months of the year and employs approximately 2 full time staff. Casual staff and contractors are engaged as required during busy periods such as planting and harvesting of silage and fodder and to supply various associated services such as plant maintenance and veterinary requirements.

Springfield Feedlot includes one controlled drainage area with associated production pens and drainage system which includes catch drains, sedimentation basin and holding pond. Springfield Feedlot also has auxiliary infrastructure to support the use such as cattle handling and feed storage and processing facilities.

Springfield Feedlot is accredited under the National Feedlot Accreditation Scheme (NFAS) with audits conducted annually.

Doolin Farming Pty Ltd wish to expand Springfield Feedlot from the current approved capacity of 999 head by gaining development approval for intensive livestock agriculture to operate as a 3,000 head beef cattle feedlot on the site. The proposed development is to be developed in two stages with the first stage having a capacity of 1,251 head. The second stage will provide an additional 750 head, bringing the capacity of Springfield Feedlot to 3,000 head.

The proposed development will include additional production pens and redevelop the cattle handling facility within an expanded controlled drainage area, additional sedimentation basin and holding pond capacity. The proposed development will incorporate best practice design, construction and environmental management.

Existing infrastructure such as the grain storage and processing facilities have sufficient capacity to cater for the demands of the proposed development.

The property "Springfield" is within the Gwydir Shire Council local government area and relevant environmental planning instrument is the *Gwydir Local Environmental Plan 2013* (GLEP).

Beef cattle feedlots which exceed 1,000 head capacity are defined as designated development under Schedule 3, Part 1 Item 27 of the *Environmental Planning and Assessment Regulation 2021*, and therefore require a full Environmental Impact Statement (EIS) to accompany the development application.

This Land Use Conflict Risk Assessment (LUCRA) has been prepared as part of an EIS to support the Development Application to the Gwydir Shire Council for the proposed development and identify and assess the potential for land conflict to occur between neighbouring land uses.

This LUCRA has identified potential land use conflicts and evaluated their risk. The overall risk ranking (revised, to account for management strategies) for potential land use conflict ranges from low to moderate.

1 Background

1.1 Introduction

Doolin Farming Pty Ltd own and operate a 10,000 ha mixed farming operation across several properties at North Star including "Glenhoma", "Glenmodel", "Springfield", "Myall Downs" and "Yetman West" some 27 km east of Yetman and 45 km south-southeast of Goondiwindi (QLD) in NSW.

Doolin Farming Pty Ltd primarily engage in dryland and irrigated cropping and beef production. Doolin Farming Pty Ltd produces wheat, barley, oats and chickpeas in winter and cotton and maize in summer under pivot irrigation systems and dryland sorghum cropping. Doolin Farming Pty Ltd also have onsite storage to accommodate almost the entire grain produced and operate a fleet of trucks to transport their grain.

Central to the beef production enterprise is the breeding, growing and lot-feeding of cattle for the domestic market. Currently the beef supply chain includes breeding and growing of beef cattle on land less suitable for dryland and irrigated cropping and grazing of stubble and lot feeding of cattle within a feedlot on the property 'Springfield".

"Springfield" comprises some 1,713 ha (~4,231 acres) and currently, a dryland and irrigated cropping business is undertaken on a large proportion of the property with extensive cattle breeding and grazing of beef cattle on the remaining land which is unsuitable for cropping and lot feeding of cattle within a beef cattle feedlot in the north-east of the property. In the last few years, beef cattle bred on several adjoining properties have been walked into a feeding program on "Springfield" upon weaning. "Springfield" has built infrastructure such as a dwelling, machinery sheds, silos, cattle yards and feedlot etc to support the feeding program.

There has been a beef cattle feedlot on "Springfield" for over three years after approval was granted for a 999 head feedlot by the Gwydir Shire Council in 2021 (DA31/2020). Under Schedule 3, Part 1 Item 27 of the *Environmental Planning and Assessment Regulation 2021*, as the capacity of the existing development does not exceed 1000 head it is not a designated development and an environmental licence from NSW EPA is not required.

The existing feedlot is known as Springfield Feedlot. Springfield Feedlot is used to finish the Doolin Farming's own cattle for the domestic export market.

Springfield Feedlot currently operates for 12 months of the year and employs approximately 2 full time staff. Casual staff and contractors are engaged as required during busy periods such as planting and harvesting of silage and fodder and to supply various associated services such as plant maintenance and veterinary requirements.

Springfield Feedlot includes one controlled drainage area with associated production pens and drainage system which includes catch drains, sedimentation basin and holding pond. Springfield Feedlot also has auxiliary infrastructure to support the use such as cattle handling and feed storage and processing facilities.

Springfield Feedlot is accredited under the National Feedlot Accreditation Scheme (NFAS) with audits conducted annually.

Doolin Farming Pty Ltd wish to expand Springfield Feedlot from the current approved capacity of 999 head by gaining development approval for intensive livestock agriculture to operate as a 3,500 head beef cattle feedlot on the site. The proposed development is to be developed in two stages with the first stage having a capacity of 1,475 Head. The second stage will provide an additional 1,025 Head, bringing the capacity of Springfield Feedlot to 3,500 Head.

The proposed development will include additional pens within an expanded controlled drainage area, additional sedimentation basin and holding pond capacity. The proposed development will incorporate best practice design, construction and environmental management.

Existing infrastructure such as the grain storage and processing and cattle handling facilities have sufficient capacity to cater for the demands of the proposed development.

The property "Springfield" is within the Gwydir Shire Council local government area and relevant environmental planning instrument is the *Gwydir Local Environmental Plan 2013* (GLEP).

Doolin Farming Pty Ltd have access to a secure and appropriately licensed water supply provided by groundwater from the NSW Great Artesian Basin Eastern recharge groundwater source for irrigation and stock intensive use on the subject land under access licence 90AL834721.

Beef cattle feedlots which exceed 1,000 head capacity are defined as designated development under Schedule 3, Part 1 Item 27 of the *Environmental Planning and Assessment Regulation 2021*, and therefore require a full Environmental Impact Statement (EIS) to accompany the development application.

This Land Use Conflict Risk Assessment (LUCRA) has been prepared as part of an EIS to support the Development Application to the Gwydir Shire Council for the proposed development and identify and assess the potential for land conflict to occur between neighbouring land uses.

1.1.1 Purpose

The purpose of a LUCRA is to identify land use and potential land use conflicts with neighbouring land uses and implement mitigation measures to minimise potential impacts.

This is defined by the NSW Department of Primary Industry as to:

- Accurately identify and address potential land use conflict issues and risk of occurrence before a new land use proceeds or a dispute arises.
- Objectively assess the effect of a proposed land use on neighbouring land uses.

- Increase the understanding of potential land use conflict to inform and complement development control and buffer requirements, and
- Highlight or recommend strategies to help minimise the potential for land use conflicts to occur and contribute to the negotiation, proposal, implementation and evaluation of separation strategies.

1.1.2 Scope

This LUCRA has been prepared to address relevant requirements of the consultation with DPI Agriculture issued to support the project Environmental Impact Statement (EIS).

"A Land Use Conflict Risk Assessment is expected to be prepared to identify potential impacts on neighbouring properties, both residential and agricultural, and vice versa".

It should be noted that this LUCRA addresses the requirement to prepare a LUCRA but does not include a detailed consideration of site selection and suitability, zoning provisions or assessment of impacts; those matters are addressed in the EIS.

1.1.3 References and guidelines

In preparing this LUCRA, references are made to the following sources:

- Land Use Conflict Risk Assessment Guide Resource Planning & Development Unit (Department of Trade and Investment, Regional Infrastructure and Services NSW Department of Primary Industries, 2011);

This report has been prepared by Rod Davis (FIEAust, CPEng, RPEQ#20256, CPESC).

1.1.4 Methodology

This LUCRA has been prepared in accordance with the Land Use Conflict Risk Assessment Guide (Department of Trade and Investment, Regional Infrastructure and Services NSW DPI, 2011) (LUCRA Guide).

The LUCRA is a system to identify and assess the potential for land conflict to occur between neighbouring land uses. Land use conflicts occur when one land user is perceived to infringe upon the rights, values or amenity of another. The LUCRA enables a systematic, consistent, and site-specific conflict assessment approach. Through evaluating land use compatibility and potential land use conflicts appropriate risk reduction management strategies can be identified.

As stated in the LUCRA Guide, a LUCRA aims to:

- accurately identify and address potential land use conflict issues and risk of occurrence before a new land use proceeds or a dispute arises
- objectively assess the effect of a proposed land use on neighbouring land uses

- increase the understanding of potential land use conflict to inform and complement development control and buffer requirements, and
- highlight or recommend strategies to help minimise the potential for land use conflicts to occur and contribute to the negotiation, proposal, implementation and evaluation of separation strategies.

The assessment process in the LUCRA Guide has been applied to achieve the above aims. These steps are provided in Table 1, including a reference column to the section where each step is addressed in this report.

Table 1 – LUCRA Steps (NSW DPI, 2011)

Steps	Requirements	Report section
1: Gather information	• Describe the nature of the proposed land use change and the proposed development. • Describe and record the major activities associated with the land use change and their frequency. Include periodic and seasonal activities that have the potential to be a source of a complaint or conflict • Appraise the topography, climate and natural features of the site and broader locality • Undertake a site history search, review the previous environmental assessments and approvals for the site • Inspect the site and interview relevant owners/operators of adjacent properties • Describe and record the main activities of the adjacent properties and their frequency. Include water-based activities that may be adversely impacted, such as oyster farming; and, • Compare and contrast the proposed and adjoining/surrounding land uses and activities for incompatibility and conflict issues.	section 2
2: Evaluate the risk level for each activity	Each proposed activity is recorded, and potential land use conflict is evaluated with in consideration of the: • Probability of occurrence; and • Consequence of the impact The risk ranking matrix is utilised to determine a risk ranking for each activity and results are recorded into an initial risk evaluation table.	section 3
3: Risk reduction management strategies	Management strategies and mitigation measures that affect the probability and consequence of activities are identified. Revised risk rankings are calculated, and performance targets are set, detailing how the effectiveness of the strategy will be monitored. The objective of this step is to identify and define controls that lower the risk ranking score to 10 or below.	section 3
4: Record LUCRA results	Key issues, risk level and recommended management measures are recorded and summarised. This record provides a valuable planning document for managers and planners and should be included in any relevant management plan.	section 3

1.1.4.1 Study areas

The study areas for this LUCRA includes the proposed Development complex site, the Subject land and the Locality. These terms are defined in Table 2.

The study areas were determined by considering surrounding land uses and the likely spatial extent of potential impacts of the proposed development that may cause land use conflict.

Table 2 – Study areas terminology

Term	Meaning
Development complex site	The area occupied by the proposed development complex and associated infrastructure including: The proposed development complex. This area contains the: Cattle pens for accommodating beef cattle (production pens), cattle arriving to or being dispatched from the proposed development (induction/dispatch pens), and sick beef cattle (hospital pens); Internal road network to provide all-weather access; Controlled drainage area – Rainfall runoff containing a high pollution potential is controlled within a system that collects and conveys this runoff to a sedimentation system and holding pond; Drainage system – The controlled drainage area contains a system including catch drains, sedimentation system and holding pond; and Solid waste and effluent management areas – Solids wastes such as manure and mortalities shall be temporarily stockpiled and processed within the solid waste stockpile and carcass composting area prior to utilisation on-site. Effluent is stored in the holding pond pending application to the effluent utilisation area. Ancillary infrastructure such as cattle handling facility, grain storage and feed processing, office, water storage etc. The site is located within Lot 8 DP 756018.
Subject land	An area of approximately 1,035 ha within Lot 8 DP766018 to be occupied by the proposed development complex site and effluent and manure utilisation areas.
Locality	Land within 2 km of the subject land boundary.

2 Land Use Conflict Risk Assessment

2.1 Gather information

2.1.1 Site and locality

The proposed development is to be located on two land parcels which form the property known as "Springfield".

"Springfield" is located on Getta Getta Road, North Star approximately 15 km by road east of North Star and some 27 km west-southwest of Yetman in the North Star region of New South Wales.

The subject land has primary frontage to Getta Getta Road (sealed) of approximately 5 km in length. Getta Getta Road intersects with North Star Road some 14 km west and with Warialda Road some 25 km east of the entrance for the proposed development complex respectively.

Getta Getta Road is unsealed between Warialda Road and the bridge crossing over Ottleys Creek. Getta Getta Road is a sealed road from the bridge crossing over Ottleys Creek to North Star and generally runs in an east-west direction.

Figure 1 is a locality plan highlighting the subject land to roads and the nearby townships of North Star and Yetman.

2.1.1.1 Real property description

The subject land comprises of two (2) cadastral portions. The description of the subject land is provided in Table 3. The total area of the subject land is about 1,713.2 ha (~4,231 acres). The subject land is in the Gwydir Shire.

Figure 2 is a cadastral plan highlighting the cadastral parcels that comprise the subject land.

Table 3 – Subject land – Description

Property name	Lot no.	Plan no.	Easements	Area Ha	Local government area
"Springfield"	8	DP756018	DP1237694	~883.3	Gwydir Shire
"Springfield"	8	DP756018	DP1237694	~792.7	Gwydir Shire
"Springfield"	1	DP1212915	DP1237694	~37.2	Gwydir Shire
Total area				~1,713.2	

2.1.1.1.1 Limitations/Interests/Encumbrances

The subject land does contain an easement for overhead power line for 20 m wide (DP1237694) and is subject to reservations and interests in favour of the crown.

2.1.1.1.2 Road reserve

The subject land does not contain a road reserve under the *Roads Act 1993* as shown in Figure 2.

2.1.1.1.3 Travelling Stock Reserve

There are no Travelling Stock Reserves (TSR) declared on or adjoining the subject land or along or adjoining Getta Getta Road on parcels of Crown land reserved under the Crown Land Management Act 2016.

2.1.1.1.4 Tenure

The subject land is owned by Jennifer Susan Doolin (ABN 48 278 018 042) in freehold land tenure.

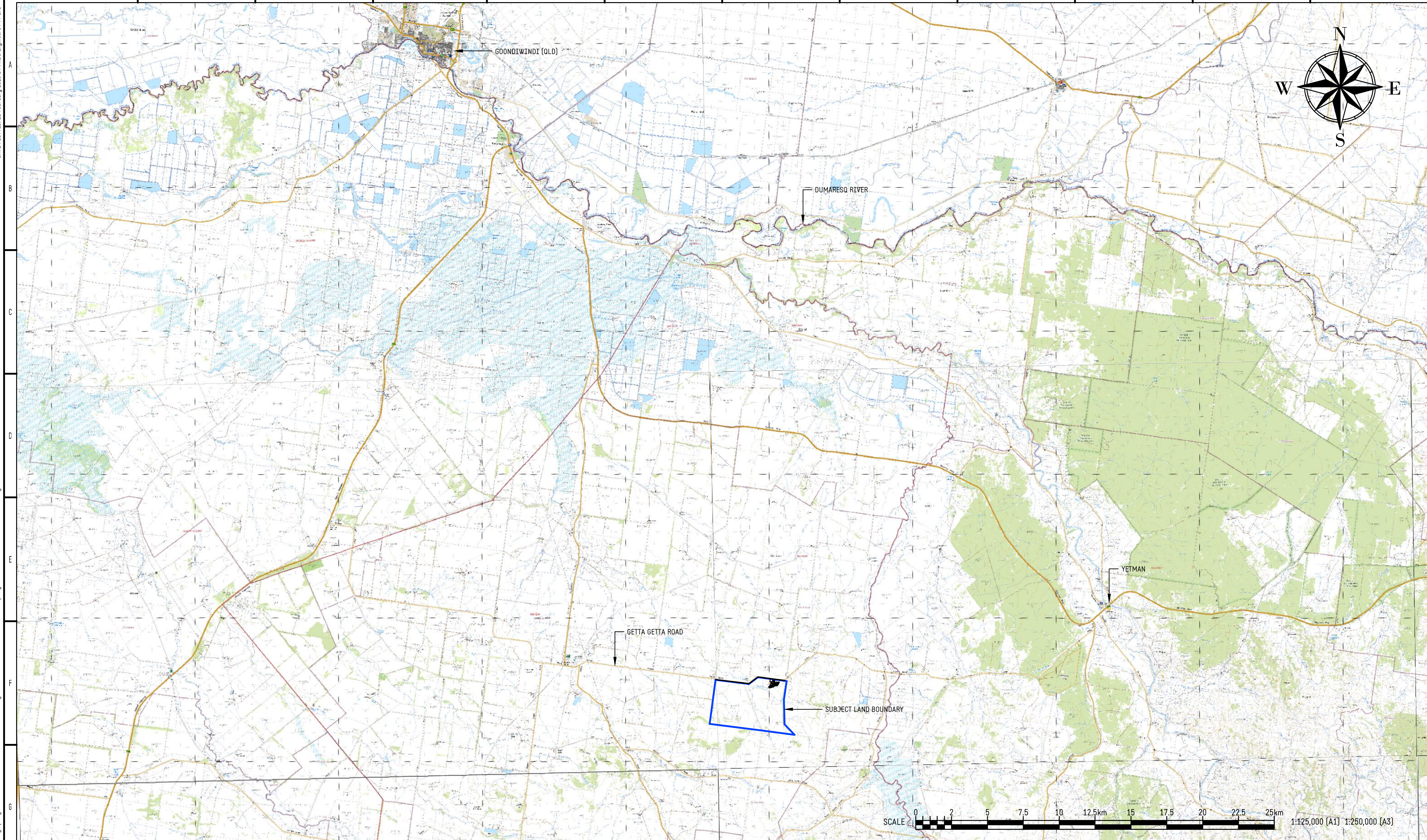
2.1.1.1.5 Landuse and zoning

The proposed development site falls within the RU1 Primary Production zone of the *Gwydir Local Environment Plan 2013* (Gwydir Shire Council, 2013). The anticipated traffic growth rate of the surrounding area is considered to be relatively low.

2.1.1.1.6 Road network

The subject land is accessed directly from Getta Getta Road. The Gwydir Shire Council is the roads authority for Getta Getta Road from the bridge crossing on Ottleys Creek to North Star.

The existing development is accessed via the existing subject land entrance off Getta Getta Road. All light (staff and support services) and heavy vehicles (livestock and commodity delivery) enter the existing development complex site via the Getta Getta Road entrance.



LEGEND

- SUBJECT LAND BOUNDARY
- LAND PARCEL BOUNDARY

NOTES:

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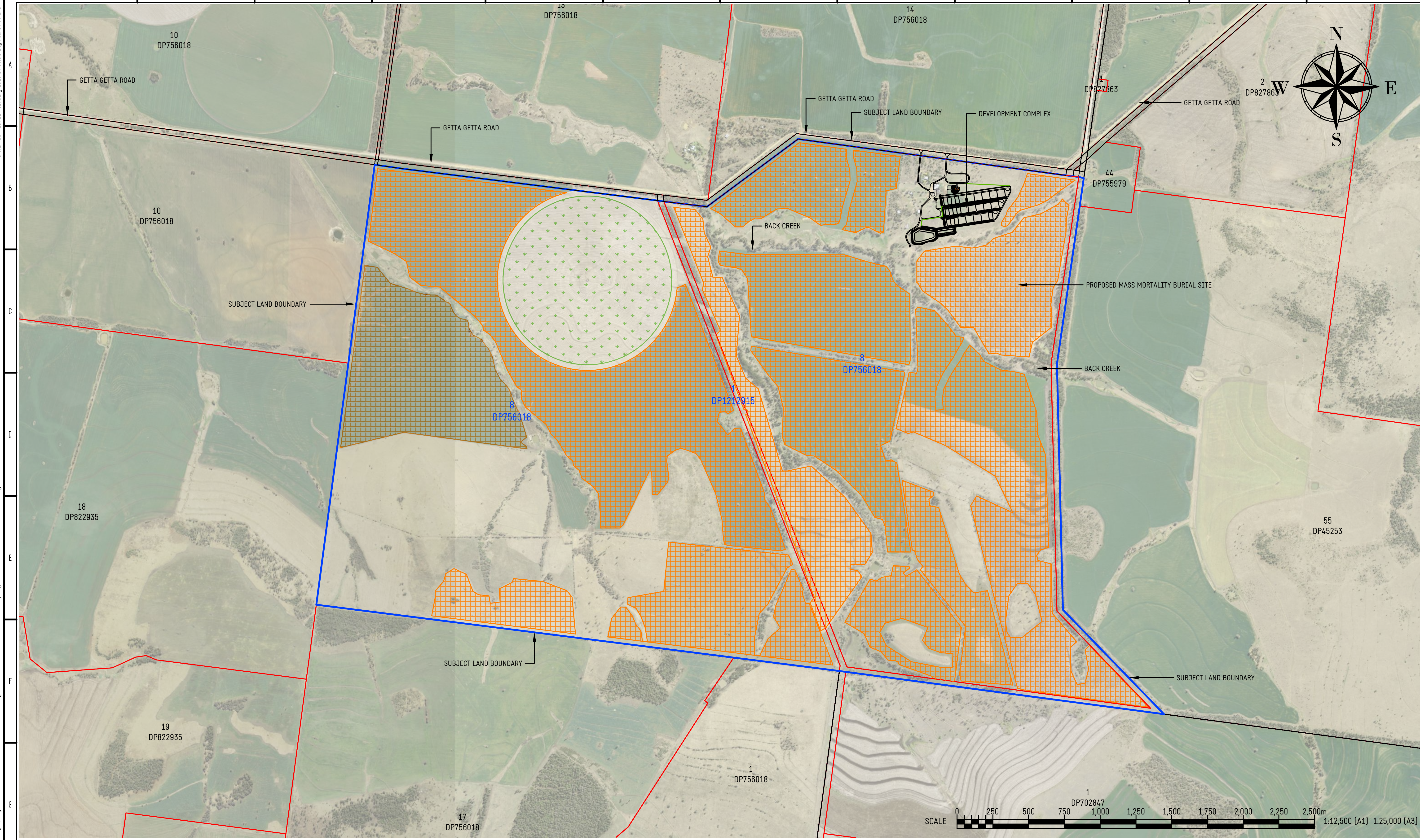
DATE	21/02/2025
APPROVED	RJD
DATE	21/02/2025

CLIENT: DOOLIN FARMING PTY LTD

PROJECT: PROPOSED 3,000 HEAD BEEF CATTLE FEEDLOT

TITLE: DEVELOPMENT APPLICATION FOR INTENSIVE LIVESTOCK AGRICULTURE
EIS APPENDIX U - LAND USE CONFLICT RISK ASSESSMENT
SUBJECT LAND - LOCALITY PLAN

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 1		A3	E2-103-600-01	B



LEGEND

- SUBJECT LAND BOUNDARY
- LAND PARCEL BOUNDARY
- EXISTING AND PROPOSED EFFLUENT UTILISATION AREA
- EXISTING AND PROPOSED SOLID WASTE UTILISATION AREA

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TITLE: DEVELOPMENT APPLICATION FOR INTENSIVE LIVESTOCK AGRICULTURE
EIS APPENDIX U - LAND USE CONFLICT RISK ASSESSMENT
SUBJECT LAND - LOCALITY PLAN

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 2		A3	E2-103-600-02	B

DATE PLOTTED: 21 February 2025 BY: RDC Engineers PTY LTD

FILE PATH: C:\RDC Engineers\RDCE - Projects\E2-103 Doolin Farming Springfield EIS\05 - ACAD MasterPlan\05.1 Drawings - CURRENT FILE NAME: E2-103 DF Springfield MASTERPLAN-00-20250109-B.dwg

2.1.2 Proposed development

2.1.2.1 Overview

Doolin Farming Pty Ltd wish to expand the existing beef cattle feedlot on the subject land from 999 head up to a maximum capacity of 3,000 head. The proposed development will allow flexibility of use with the ability to increase or decrease the number of animals within the development in line with market and economic factors.

The proposed development complex would occupy a footprint of approximately 14.5 ha and include the following components in a functional configuration:

- Water reticulation infrastructure – A reliable and uninterrupted supply of clean water of the required volume to sustain operations is provided;
- Pens – Fenced areas are constructed for accommodating beef cattle (production pens), cattle arriving to or being dispatched from the proposed development (induction/dispatch pens), and sick beef cattle (hospital pens);
- Internal road – An internal road network is constructed to provide al-weather access to the proposed development complex;
- Controlled drainage area – Rainfall runoff from areas such as pens that has a high organic matter and therefore a high pollution potential is controlled within a system that collects and conveys this runoff to a sedimentation system and holding pond prior to environmentally sustainable utilisation;
- Drainage system - The controlled drainage area contains a system including catch drains, sedimentation system and holding pond for conveying stormwater, allow entrained sediment to 'settle out' and capture and storage of the stormwater from the controlled drainage area until it can be sustainably utilised; and
- Solid waste and effluent management areas – Solids wastes such as manure and mortalities shall be temporarily stockpiled and processed within the solid waste stockpile and carcass composting area prior to utilisation on-site. Effluent is stored in the holding pond pending application to the effluent utilisation area.

The proposed development also includes an associated 1,020 ha of cropping land for effluent and solid waste utilisation. Solid wastes generated are applied to an on-site utilisation area. Any solid wastes not utilised on-site are removed off-site to adjoining properties owned by the proponent. When available, effluent is applied to land via irrigation within a dedicated effluent utilisation area.

2.1.2.2 Access

Access to the homestead and existing development complex on the subject land is directly off Getta Getta Road a local controlled road some 13.5 km east of the intersection with North Star Road as shown in Figure 3.

Access to the proposed development complex shall be from a new dedicated subject land entrance off Getta Getta Road some 200 m east of the existing subject land entrance as shown in Figure 3. A purpose built internal road shall be constructed to connect the new development entrance to the infrastructure of the existing and proposed development.

2.1.2.3 Staging

The proposed development involves a staged construction in up to two (2) stages depending on operational requirements, market demand for beef and other considerations. The timing and duration of each stage maybe contiguous or discrete periods depending on the factors mentioned previously.

2.1.2.4 Construction

Infrastructure shall be developed as part of the proposed development and therefore earthworks, pen infrastructure and internal roads shall be constructed.

2.1.2.5 Operation

Once fully operational the proposed development shall accommodate up to 3,000 head of cattle at the design stocking density.

The proximity of the proposed development to the New England and Central NSW grazing district leaves it well positioned for livestock procurement. It is expected that cattle would be sourced locally as far as possible. A proportion of cattle shall be bred on properties owned and operated by Doolin Farming Pty Ltd.

Lot fed cattle are fed a predominantly grain based diet. Winter cereals such as wheat and barley shall be the predominant grains used in the ration. The level of each grain in the ration depends on the availability and cost of the grain sourced from the Site or adjacent properties owned by the applicant.

The location of the proposed development within the northern NSW cropping region known as the 'Golden Triangle' leaves it well positioned for grain and commodities procurement. The applicant is a large producer of cereal and pulse crops on their cropping aggregation at North Star.

The proposed development shall produce effluent and solid waste (manure) which shall be sustainably utilised on-site.

LEGEND

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CLIENT DOOLIN FARMING PTY LTD

PROJECT PROPOSED 3,000 HEAD BEEF CATTLE FEEDLOT

TITLE DEVELOPMENT APPLICATION FOR INTENSIVE LIVESTOCK AGRICULTURE
EIS APPENDIX U - LAND USE RISK CONFLICT ASSESSMENT
PROPOSED DEVELOPMENT - DEVELOPMENT COMPLEX SITE

REPORT REFERENCE	SUPPLIED DRAWING NUMBER		DRAWING NUMBER	REV.
FIGURE 3		A3	E2-103-600-03	B

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2.1.3 Nature and land use change

As the current land use is for intensive livestock agriculture (beef cattle feedlot), irrigated and dryland cropping and beef cattle grazing, the construction and operation of the proposed development does not change the existing land use of the site. Areas outside the subject land within the locality are expected to continue to support their existing land use where practicable.

2.1.4 Nature of the locality

2.1.4.1 Land use zones

The site is zoned RU1 – Primary Production Gwydir Local Environmental Plan 2013 (GLEP). The permissibility of the development is addressed within the EIS.

There is only one land use zone within the locality being RU1 – Primary Production as shown in Figure 4.

Gwydir Local Environmental Plan 2013

GWYDIR SHIRE COUNCIL

Land Zoning Map - Sheet LZN_001

Zone

- E1 National Parks and Nature Reserves
- IN1 General Industrial
- R5 Large Lot Residential
- RE1 Public Recreation
- RE2 Private Recreation
- RU1 Primary Production
- RU5 Village

Cadastre

Cadastre 01/08/2013
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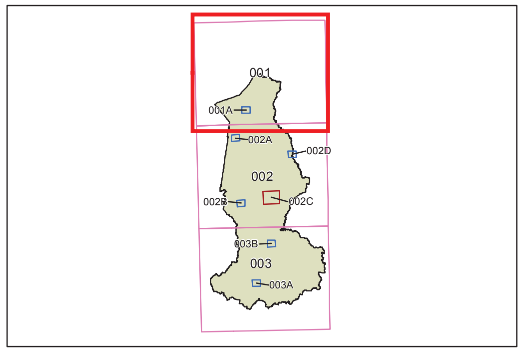

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MGA Zone 56

Scale: 1:320,000 @ A3

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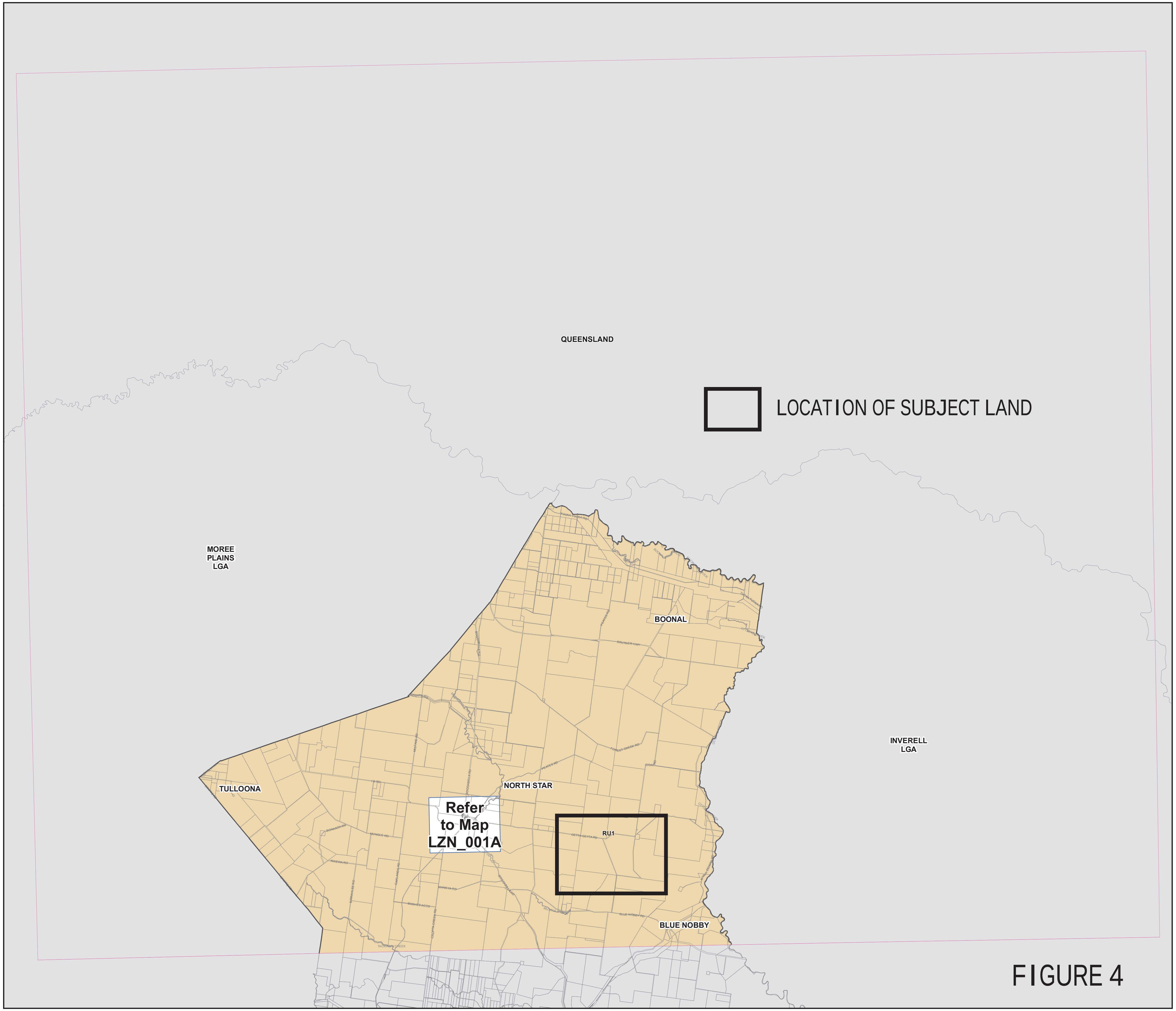

FIGURE 4

2.1.5 Land ownership

Crown reserves and tenure of land holdings within the locality are shown in Figure 5. Land ownership to the east and west agricultural holdings is freehold title. There are no Crown reserves within the locality as shown on Figure 5.

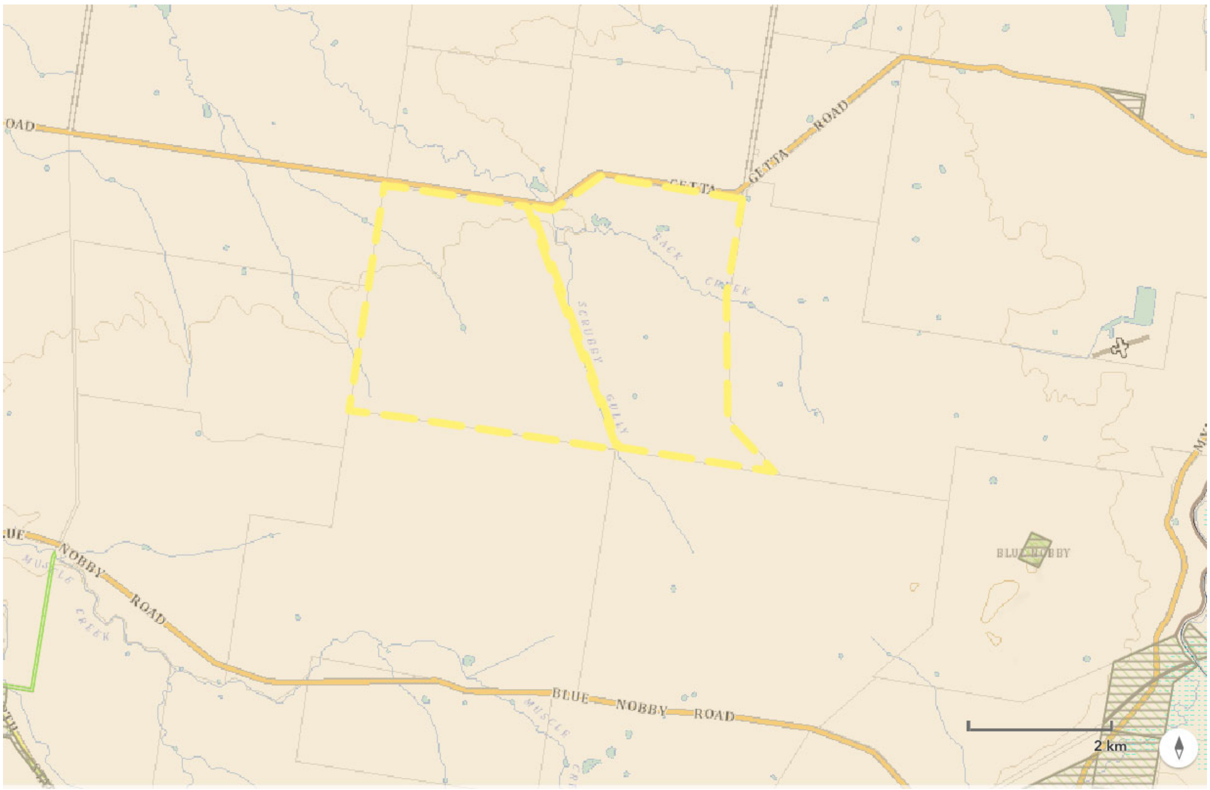

Figure 5 – Subject land – Crown reserves

2.1.6 Existing land uses

A review of the NSW Landuse 2017 v1.2 mapping from the NSW Government SEED Portal identified a range of land uses in the locality. Land uses within the subject land and locality (1 km radius of the subject land) are outlined in Table 3 and Figure 6.

Table 4 – Subject land – Land uses

Land use code	Land use description
2.1.0	Grazing native vegetation
3.3.0	Cropping
4.3.0	Irrigated cropping
5.2.0	Intensive animal production
5.4.0	Residential and farm infrastructure

The subject land predominantly consists of 3.3.0 Cropping, with the existing development complex site mapped as 5.2.0 Intensive animal production and the existing dwellings mapped as 5.4.0 Residential and farm infrastructure as shown on Figure 6.

Review of land uses within the locality indicate land use is predominately for the purposes of cropping and irrigated cropping and grazing native pastures as shown on Figure 6.

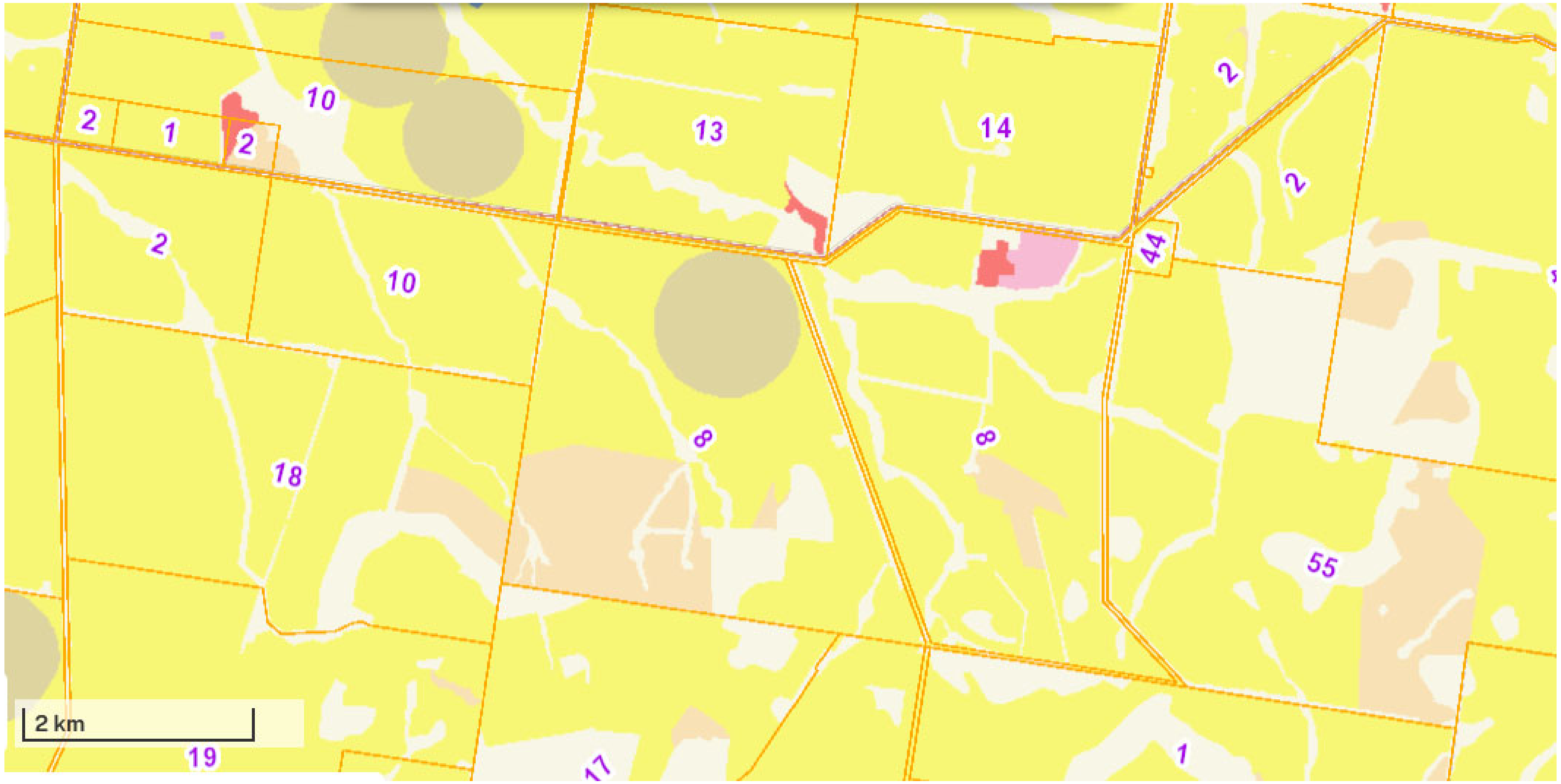

Figure 6 – Subject land – Land use 2017

2.1.6.1 Residential and farm infrastructure

There are residential dwellings and farm infrastructure located within the subject Land adjacent to the Proposed Development Complex.

There are several groundwater bores on the Subject land and within the locality (refer to section 2.1.12.7).

As shown in Figure 6, there are two non-associated residential receivers located within 2,000 m of the proposed development complex, located on land zoned RU1.

The land impacted by the proposed development is land currently used for Intensive animal production being the existing beef cattle feedlot (999 head) and associated infrastructure. The Subject land contains biophysical strategic agricultural land (BSAL) as shown on Figure 7.

The Locality contains land zoned for agricultural purposes, RU1 – Primary Production to the south-east and north-west of the Subject land as shown on Figure 4.

Figure 7 – Subject land – BSAL

2.1.6.2 Infrastructure

An overview of infrastructure impacting the Subject land and Locality is provided below. These features are depicted in Figure 2.

2.1.7 Road network

Getta Getta Road is the key road that would be utilised during the construction and operation of the proposed development.

The expected transportation route for construction materials and operation commodities is Getta Getta Road to North Star Road to the Bruxner Way or Warialda Road and vice versa.

There are internal access roads, within the Subject land which provides access to the proposed development complex.

A review of the NSW Road Network Classification map provided by the Transport for NSW NSW Road Network Classifications portal identifies the Bruxner Way, Warialda Road and North Star Road as Regional roads. Getta Getta Road is a local road.

2.1.7.1 Rail corridors

The closest rail corridor to the Subject land is the inland rail which currently terminates at North Star some 15 km to the west of the Subject land.

2.1.7.2 Substation

There are no substations located adjacent to the Subject land or Locality.

2.1.7.3 Electrical infrastructure

A Dial Before You Dig search has identified electrical infrastructure assets owned by Essential Energy within the Locality and Subject land. Ongoing liaison with Essential Energy would occur through detailed design to ensure that any impacts to infrastructure is limited and managed to the satisfaction of the provider.

There are no high voltage transmission lines that transect the Subject land.

2.1.7.4 Telecommunications infrastructure

A Dial Before You Dig search has identified telecommunication assets owned by Telstra QLD Regional within the Locality and Subject land. Ongoing liaison with Telstra would occur through detailed design to ensure that any impacts to infrastructure is limited and managed to the satisfaction of the provider.

2.1.7.5 Drainage infrastructure

A Dial Before You Dig search has not identified any drainage infrastructure assets within the locality and the Site.

2.1.7.6 Protected and conservation areas

There are no protected and conservation areas within the Locality.

The closest conservation estates to the proposed development complex site are the Yetman State Forest, Planchonella Nature Reserve, Burral Yurral Nature Reserve and Dthinna Dthinnawan National Park and Nature Reserve which are located some 17.5 km east, 16 km to the south southeast, 24 km east southeast and 24 km northeast respectively.

2.1.7.7 Rivers

A review of the NSW Landuse 2017 dataset does not identify any rivers within the Locality or the Subject land.

2.1.7.8 Services and recreation

There are no areas within the locality mapped as services or recreation on the via the NSW Landuse 2017 dataset as shown on Figure 6.

2.1.8 Future land uses

Review of approval documents and consultation with surrounding stakeholders has identified no future developments in the locality.

All other existing land uses surrounding the Proposed development complex site are expected to continue into the future. The Subject land would be able to support a variety of future land uses in the event that the proposed development is decommissioned such as agriculture, or other developments subject to consent.

2.1.9 Land tenure

2.1.9.1 Crown land

No portions of crown land are contained within the Subject land or Locality.

2.1.10 Mining and exploration titles

There are no mining or exploration tiles mapped over the Subject land or Locality as shown in Figure 8.

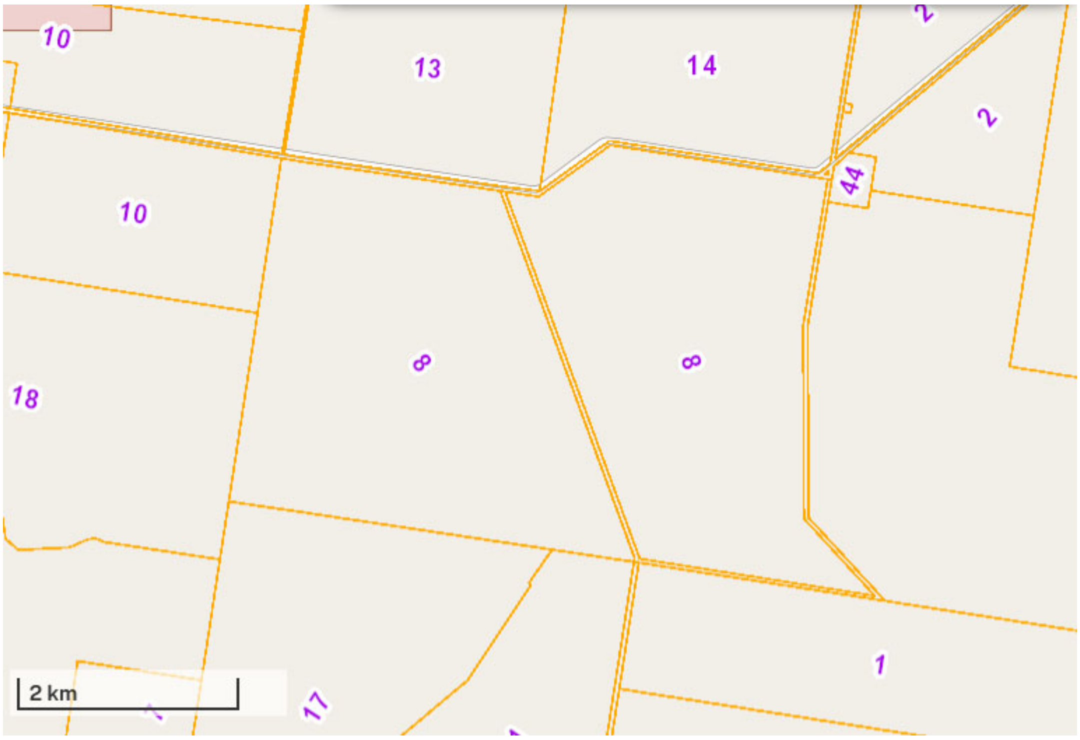

Figure 8 – Subject land – Mining and exploration titles

2.1.11 Native title

Division 2 of the NSW Aboriginal Lands Act 1983 (AL Act) provides conditions under which the NSW Aboriginal Land Council and Local Aboriginal Land Councils may make a formal claim for land to the Native Title Registrar.

A review of Native Title Vision mapping and the National Native Title Tribunal's Native Title Register identified:

One Native Title Claim applying to the Proposed development site as shown in Table 5.

Table 5 – Locality – Native title claim

Applications (Schedule):	NC2011/006
Name	Gomeroi People
Tribunal No	NC2011/006
Type	Claimant
Status	Active
Lodged	20 Dec 2011
Reg Test Status	Accepted for registration
Reg Test Decision	24 Jul 2023
Date Registered	20 Jan 2012
Area sq km	111,317.60

Given no crown reserves are located on the Subject land, no aboriginal land claims to crown land are anticipated to impact the proposed development.

2.1.12 Environmental Features

2.1.12.1 Topography

The topography at a regional scale is generally flat to gently undulating, with elevations from 310 m to 360 m AHD. The Subject land is on the eastern margins of the plains and comprises gently undulating topography with slopes in the order of 1-2%.

2.1.12.2 Climate

Climatic data sourced from SILO from 1924-2023 indicates that the area has a summer dominant rainfall pattern with an annual average of some 617 mm with average monthly maximum temperatures range from a maximum of 33.2°C in January (summer) to a minimum of 3.3°C in July (winter). The annual evaporation is approximately 1,876 mm/year. The region has nett deficit rainfall with rainfall less than the evaporation and transpiration rates.

2.1.12.3 Geology and soil

A Land and Soil Capability (LSC) assessment has been prepared in accordance with the NSW Office of Environment and Heritage (OEH, 2012) Land and Soil Capability Assessment Scheme: Second Approximation (LSC Scheme) and accompanies the EIS (JG Environmental Pty Ltd, 2024).

The LSC assessment determines that the land and soil classes mapped on the Subject land include LSC Class 2 – Very high capability land, LSC Class 4 – Moderate capability land and LSC Class 5 – Moderate–low capability land (JG Environmental, 2024).

2.1.12.4 Contaminated land

A review of the NSW EPA Contaminated Land Record and List of NSW contaminated sites notified to the EPA confirms there are no known contaminated sites at or near the Site.

A desktop assessment of contamination risk has been undertaken and is provided as part of the EIS. The site is unlikely to be contaminated due to significant distances from known contaminated sites listed under the NSW EPA contaminated land record and list of notified sites and known previous land uses.

2.1.12.5 Native vegetation

A Biodiversity Development Assessment Report (BDAR) prepared by Birdwing Ecological Services (2024) accompanies the EIS and outlines that the Site contains:

- PCT 589 - White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion
- PCT 429 - White Cypress Pine - Poplar Box - Silver-leaved Ironbark viney shrub woodland of the Brigalow Belt South Bioregion
- PCT 441 - Carbeen - White Box +/- Silver-leaved Ironbark grassy tall woodland on basalt hills, Brigalow Belt South Bioregion
- PCT 56 - Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
- PCT 36 - River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion

The proposed development complex site requires the offsetting of 0.21 ha of Plant Community Type (PCT) PCT 429 White Cypress Pine - Poplar Box - Silver-leaved Ironbark viney shrub woodland of the Brigalow Belt South Bioregion.

These areas do not conform to any threatened ecological communities listed under the BC Act or the EPBC Act.

2.1.12.6 Surface water

The Subject land is located in the NSW Murray basin within the Border Rivers (NSW) catchment and at a local scale is in the Back Creek catchment which is a subcatchment of the Mobbindry Creek catchment, Whalan Creek catchment and the Boomi River catchment upstream of the Barwon River. The Back Creek catchment is comprised of ephemeral waterways.

The headwaters of Back Creek and Scrubby Gully rise on adjoining properties to the east and south of the Subject land respectively. Back Creek and Scrubby Gully merge in the centre north of the Subject land some 280 m from the boundary. Back Creek flows generally in a north-westerly direction to its confluence with Mobbindry Creek some 9.7 km north of North

Star. Mobbindry Creek flows north then northwest to its confluence with Whalan Creek some 21.5 km downstream of the confluence with Back Creek.

A review of the GLEP did not identify any mapped sensitive riparian land within the subject land or Locality.

Key Fish Habitat (KFH) is located within the Locality and Subject land. Figure 9 is a KFA map for the Subject land and shows the lower reach of Back Creek to the confluence with Scrubby Gully is mapped as a KFH area. The proposed development site shall be located some 1,500 m upstream and outside of the KFH area. The proposed effluent and solid waste utilisation areas are not located within a KFH area respectively.

There is no aquatic habitat within or directly adjacent to the subject land, therefore the project will not result in any impacts, direct or indirect, to threatened aquatic species, populations, communities, habitats.

Given the conclusions of the BDAR no significant impacts and/or land use conflicts associated with Key Fish Habitat (KFH) are anticipated.

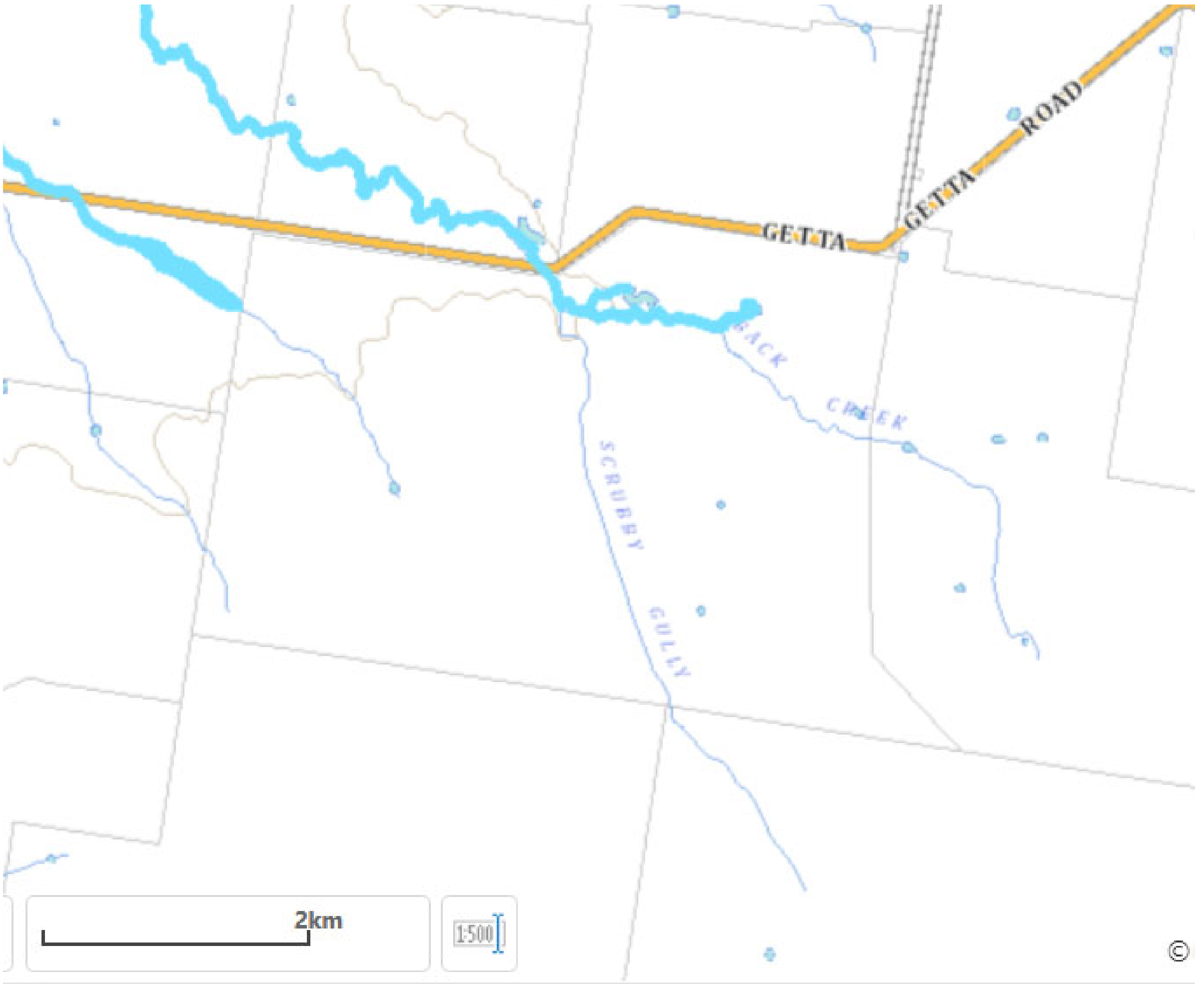

Figure 9 – Subject land – Key Fish Habitat map

2.1.12.7 Groundwater

At a regional scale, the Site is located within the Eastern Recharge Groundwater Source of the Great Artesian Basin (GAB).

The Subject land is located within an established irrigation area with the aquifers supporting considerable consumptive use. As such, there are numerous bores in the Locality. There are 4 groundwater work records on the Subject land. The average known depth of bores in the locality is 150-380 m but no standing water levels are available.

Impacts to groundwater resources, including recharge areas, from the operation of the proposed activity are managed and possible impacts mitigated.

2.1.12.8 Flooding

The subject land is not located on the riverine plains and not subject to riverine flooding. The closest floodplain inundation is along Ottleys Creek over 6 km from the Development complex site.

Consequently, the Development complex site will not be affected by the 1%AEP riverine flood event.

The Development complex site is located within the Back Creek catchment. Back Creek is located some 190 m to the southwest of the Development complex site.

Back Creek and its tributaries incorporate a significant catchment to the east of the proposed development complex.

A minor tributary of Back Creek meanders past the eastern side of the Development complex site at a distance of approximately 25 m from the closest infrastructure.

A stormwater impact assessment has been undertaken by Tahlee Consulting Services (Tahlee Consulting Services Pty Ltd, 2025) on Back Creek and its tributaries in the vicinity of the proposed development site. The modelling indicates that a 1 in 100 year rainfall event does not inundate the proposed development complex site.

2.1.12.9 Bushfire

The Subject land comprises a mix of Category 2, Category 3 and excluded vegetation as defined by the NSW Rural Fire Service. Consequently, the Site is mapped as bushfire prone land.

The Development complex site comprises Category 3 and excluded vegetation. Consequently, the proposed development site is not considered bush fire prone.

At this preliminary design stage of the proposed development, potential incidents and adequate precautions have been identified to manage and resolve incidents and for emergency response. Ongoing design processes would further consider these issues and any conditions of approval would need to be achieved before construction could commence.

Mitigation measures such as the preparation of a emergency response and incident management plan (ERIMP) have been recommended to minimise incidents, hazards and risk during construction and operation of the proposed development.

The implementation of mitigation measures is anticipated to minimise the potential for land use conflicts.

2.1.12.10 Heritage

An Aboriginal and non-aboriginal heritage assessment has been prepared by Artefact & Aspect (2024) and provided in the EIS.

The Aboriginal due diligence assessment (Artefact & Aspect, 2024) concluded that;

- No items of Aboriginal and or non-Aboriginal cultural heritage are recorded on any available data base;
- No items of Aboriginal and or non-Aboriginal cultural heritage were observed on the site;
- All proposed developments associated with the feedlot expansion are sited on disturbed land; and
- Several of the activities necessary for the proposed development to proceed are deemed low impact activities.

No items of historic heritage are located within the Site as evidence by:

- A search of Schedule 5 Environmental heritage of the Gwydir Shire Council Local Environment Plan (LEP) 2013. (www.legislation.nsw.gov.au – accessed 23rd September 2023); and
- A search of the State Heritage Inventory as specified in Division 2 section 21 of the NSW Heritage Act – (State Heritage Inventory | NSW Environment and Heritage – accessed 23rd December 2023) returned two records in the Gwydir local government area being the Myall Creek Massacre and Memorial Site and Roxy Theatre and Peters Creek Café Complex located at Bingara.

2.2 Site history

2.2.1 Historical context

A review of the NSW Governments Historical Imagery Viewer (NSW Government, 2024) confirms the site has been historically used for dryland agricultural purposes, including cropping for barley, wheat, oats, and pasture, and grazing livestock since at least 1960's and irrigated cropping since the mid 1990's as shown in Figure 10 and Figure 11.

The existing intensive livestock agriculture development (999 head beef cattle feedlot) was established in 2022.

The site and locality have historically been comprised of native vegetation, agricultural pursuits and rural dwellings.

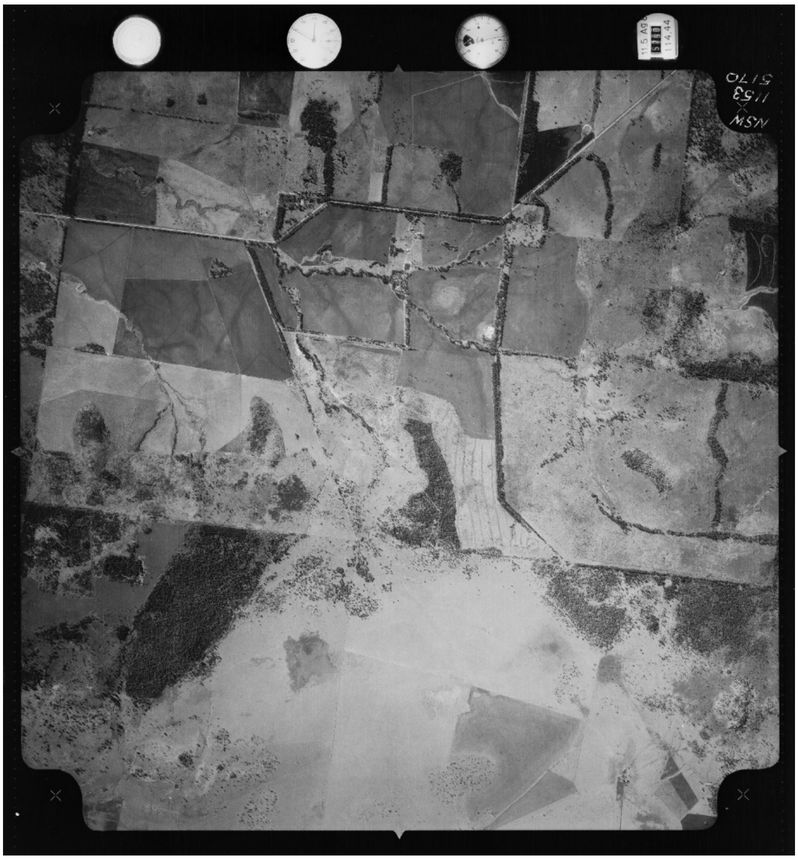

Figure 10 – Subject land – Historical imagery 1962

Figure 11 – Subject land – Historical imagery 1999

2.2.2 Approvals

Gwydir Shire Council issued development consent DA31/2020 for the existing intensive livestock agriculture development (999 head beef cattle feedlot) in February 2021.

There are no current development applications impacting the site.

2.3 Site inspection

A site inspection was undertaken by RDC Engineers Pty Ltd on 4th and 21st July 2024. The inspection provided insight into the current nature, use and activities occurring within the Subject land and locality.

It was observed that the Subject land was generally undulating. Some fenced off planted stands of native vegetation were observed along the road frontage. These have been planted as a visual screen of the existing development.

The dryland cropping area was under winter crop (oats) and the irrigated cropping area was recently cropped and harvested with stubble retained to provide ground cover.

Representative photographs for built and environmental features, and land uses in the locality are provided in **Appendix B**.

2.4 Consultation

A detailed overview of engagement for the proposed development is included within the EIS.

Consultation with regulatory authorities, the community and other relevant stakeholders will continue throughout construction and operation, as required, to ensure that future concerns are appropriately identified and addressed.

Feedback and concerns raised during consultation include operational impacts associated with odour from the proposed Development complex site.

The above feedback and concerns have been considered in the risk assessment in section 3.

2.5 Potential incompatibility and conflict issues

Potential conflict can arise from incompatibility of land uses or conflicting interests over the use of land by the land occupier, surrounding landowners or users, or other stakeholders with an interest in the site and locality.

The proposed development will not alter existing land uses on the Subject land but result in an intensification of the existing use.

Current land uses on the Subject land will predominately remain the same. The existing land use could be considered compatible with the current surrounding land uses.

Below are the potential incompatibilities (without mitigation) between the surrounding land use and proposed land use.

2.5.1 During construction

During construction the main incompatibilities identified (without mitigation) include the following:

- Increased noise from construction vehicles (additional to what is reasonably expected from agricultural production);
- Dust generated by construction vehicles;
- Visual impacts during construction activities;
- Erosion and sediment runoff and impacts on surface water quality;
- Damage to local roads from vehicles, including light vehicle and trucks;
- Road incidents with livestock and/or farm machinery crossing or using roads at slow speeds.

The proposed development intends to use the natural topography of the Development complex site, with earthworks limited to the cutting and filling to achieve the design grades and construction of the expanded sedimentation basin and holding pond.

2.5.2 During operation

During operation the main incompatibilities identified (without mitigation) include the following:

- inadequate management of invasive weed and feral pest management on the Subject land;
- visual impacts associated with the Development complex for surrounding land users;
- air quality impacts associated with the Development complex such as odour and dust for surrounding land users;

- increased bushfire risks for surrounding lands;
- traffic movements and impacts to the local traffic network.

The potential land use conflicts are described in detail in the full risk assessment table in Appendix A.

The LUCRA environmental risk assessment methodology, including mitigating management strategies, has been implemented with reference to the following documents:

- NSW Department of Climate Change, Energy, the Environment and Water, 2024, Local Government Air Quality Toolkit Beef cattle feedlots guidance note (DCCEEW, 2024);
- National Guidelines for Beef Cattle Feedlots in Australia 3rd Edition (MLA, 2012a);
- National Beef Cattle Feedlot Environmental Code of Practice, 2nd Edition (MLA, 2012b);
- NSW Waste and Sustainable Materials Strategy 2041 (DPIE, 2021);
- Effluent reuse management, strategic environmental compliance and performance review (DECCW, 2010); and
- Environmental Guidelines, Use of Effluent by Irrigation (DEC, 2004).

These documents identify the likely environmental risks and subsequent impacts to the receiving environment, including receptors, and the appropriate industry practices and subsequent performance measures that must be implemented to minimise the identified environmental risks. This includes the risks and appropriate performance measures related to feedlot specific matter of community amenity.

Table 6 – Sensitive receptors of effluent irrigation schemes (DEC, 2004)

Sensitive area	Impacts of concern
Natural water bodies (e.g. rivers, lakes)	Water quality, aquatic ecosystems, relevant beneficial uses
Other waters: e.g. artificial waters with beneficial uses, drainage channels, small streams, intermittent streams, farm dams	Water quality, ecosystems, relevant beneficial uses
Domestic well used for household water	Water quality and public health
Town water supply bore	Water quality and public health
Houses, schools, playing fields, public roads, public open space	Odour, noise, Water quality (pathogens, contaminants)
Environmentally sensitive areas: e.g. drinking water catchments, wetlands, stands of native vegetation	Water quality, ecosystems, soil and water nutrient status, biodiversity
Livestock and crops	Pathogens, heavy metals, organic compounds

When determining the size of a separation distance the nature of the buffer zone and techniques to avoid impacts must be considered. Where a buffer zone for a spray irrigation proposal is characterised by flat, open country where ground cover is predominantly pasture separation distances may need to be in the order of hundreds of metres to protect sensitive receptors. The same irrigation scheme may require a separation distance of only tens of metres if impact mitigation strategies such as tree and shrub planting in the buffer zone, lower height and pressure of sprayers and larger droplet sizes are incorporated (DEC, 2004).

A review of relevant State and National Guidelines for environmental buffers between sensitive sites and feedlot waste utilisation areas has identified the following recommendations:

Table 7 – Proposed development – Guideline consideration of feedlot waste disposal and appropriate buffers

Cattle Feedlot-EIS Guideline - New South Wales (DUAP, 1996)	Describes feedlot waste as a key issue due to amenity and environmental impacts. Discusses the need to consider climate, land capability, flood prone nature of the site, feedlot design and management, the existing landscape and environment features such as surface and ground water proximity. No specific setbacks or buffers are described.
NSW Feedlot manual (NSW Agriculture, 1997)	Recommends a 30m buffer to surface water for manure if incorporated within 48hours
Effluent reuse management – strategic environmental compliance and performance review (DECCW, 2010)	When selecting a site for effluent irrigation, consider the potential impacts on surrounding land uses and sensitive environments. These include neighbouring properties, public roads, surface and groundwater and environmentally sensitive areas such as drinking-water catchments, wetlands and native vegetation. Does not prescribe buffers for waste reuse areas related to feedlots.
NSW Beef Cattle Feedlot Guidance Note (DCCEEW, 2024)	Describes feedlot waste utilisation as a risk for offsite odour impacts. The potential for air emissions to impact on receptors depends largely on the proximity of receptors to the application area and the dispersion conditions at the time of application. The document also recommends timing waste management activities to reduce the risk of down wind impacts. Makes no specific buffer recommendations.
MLA Beef Cattle Feedlots: Waste Management and Utilisation (MLA, 2016)	Makes no specific recommendations on buffers other than stating that buffers need to be suitable to reduce the risk of impacts to sensitive sites, surface and ground waters and to provide adequate separation between nearby residences to reduce the likelihood of odour nuisance.
Victorian Code for Cattle Feedlots (Victoria, 1995)	Specifies a minimum site boundary buffer for liquid and solid feedlots of 20m and 100m to a public area.
National Guidelines for Beef Cattle Feedlots in Australia 3rd Edition (MLA, 2012a), the	The National Feedlot Guideline (3rd edition) does not specify buffers between sensitive sites and waste reuse areas. The document focus on performance based management measures to reduce the risk of offsite impacts from the management of feedlot waste products.
National Beef Cattle Feedlot Environmental Code of Practice, 2nd Edition (MLA, 2012b),	The National Feedlot Code (2nd edition) does not specify buffers between sensitive sites and waste reuse areas. The document focuses on performance based management measures to reduce the risk of offsite impacts from the management of feedlot waste products.

It is noted that Table 4.9 of the Environmental Guidelines, Use of Effluent by Irrigation (DEC, 2004) recommends a 50m buffer to neighbouring residences and roads when spray irrigating high and low strength effluent (DEC, 2004).

Table 8 – Recommended buffer distances to water resources and public areas (DEC, 2004)

Sensitive area	Separation distance (low strength effluent)	Separation distance (medium to high strength)	Impact of concern/comments
Where spray irrigation gives rise to aerosols near houses, schools, playing fields, roads, public open space and waterbodies	50 m	50m	Avoidance of spray drift of effluent containing pathogens offsite. Buffers for odours and noise have separate assessment criteria and these are assessed on a site specific basis.

Odour and dust impacts to neighbouring residents from the application of feedlot waste products on the subject land has been identified as a moderate environmental risk in the LUCRA risk assessment below. The documents identified above assist in identifying and mitigating the impact of the feedlot on community amenity, including from onsite waste reuse areas, and achieve compliance with the NSW Waste and Sustainable Materials Strategy 2041 (DPIE, 2021), specifically the adoption of the circular economy principles of production, consume, collect and recycle by reusing organic matter waste products generated onsite.

Effluent irrigation using any sprinklers is not proposed. As described in the Environmental Guidelines, Use of Effluent by Irrigation (DEC, 2004) and the 2010 document "Effluent reuse management Strategic environmental compliance and performance review" (DECCW, 2010) a 50 m buffer from the reuse area to neighbouring residences, roadways and public areas will be enforced but is not considered applicable as the effluent irrigation method (low pressure overhead) will not result in spray drift.

The proposed effluent utilisation strategy for the proposed development will rely on the low pressure overhead spray system (Centre Pivot) onto existing irrigated cropping land and will not use high pressure overhead sprays. Low pressure overhead spray of effluent results in very low aerosol generation and consequently low odour impacts to possible receptors. The irrigation of effluent will be done in accord with *National Guidelines for Beef Cattle Feedlots in Australia 3rd Edition* (MLA, 2012a), the *National Beef Cattle Feedlot Environmental Code of Practice, 2nd Edition* (MLA, 2012b), and the effluent reuse management, strategic environmental compliance and performance review (DECCW, 2010). The nearest residence is more than 500 m from the proposed effluent utilisation area and is considered at very low risk of odour impacts from effluent utilisation.

Solid waste utilisation practices will be conducted in a manner that reduces the risk of impacts to sensitive sites, including neighbouring residences. Solid waste will be applied to cropping land and incorporated into the soil within 48 hours.

The potential land use conflicts are described in detail in the full risk assessment table in Appendix A.

3 Land use and conflict risk assessment

3.1 Introduction

The LUCRA assessment process based on the Land Use Conflict Risk Assessment Guide (2011) utilises a 'probability and consequence' risk assessment matrix (Table 3.1) to estimate the potential for land use conflicts. It assesses the environmental, public health and amenity impacts according to the probability of occurrence and consequence of the impact.

The LUCRA process evaluates the probability and consequence of potential land use conflicts and uses a matrix to estimate risk, provided in Table 11. Associated tables for determining probability and consequence are provided in Table 9 and Table 10, respectively.

A risk ranking of 25 is the highest magnitude of risk; a highly likely, very serious event. A rank of 1 represents the lowest magnitude or risk an almost impossible, very low consequence event.

Risk Rankings have been categorised in terms of their probability and consequence as:

- Low Risk, risk ranking between 1 and 10;
- Moderate Risk, risk ranking between 11 and 19; and
- High Risk, risk ranking between 20 and 25

3.2 Risk assessment

3.3 Environmental risk assessment process

A risk management approach has been used to determine the severity and likelihood of any impacts the proposed development may have on the environment and to prioritise their significance.

This approach considers potential regulatory and legal risks as well as taking into consideration the concerns of community, vulnerability of site resources and the design and management of the proposed development and other key stakeholders.

The objectives of risk assessment are to:

- Identify activities, events or outcomes that have the potential to adversely affect the local environment or human health or property;
- Qualitatively evaluate and categorise each risk item;
- Assess whether risk issues can be managed by environmental protection measures; and
- Qualitatively evaluate residual risk with implementation of measures.

The environmental risk assessment was undertaken in accordance with the following standards:

- Australian Standard/New Zealand Standard (AS/NZS) ISO 31000:2009 Risk management – Principles and guidelines; and
- Australian Standard/New Zealand Standard Handbook 203:2012 Managing environment-related risk (Standards Australia/Standards New Zealand 2012).

The main components of the risk assessment methodology include:

- **Hazard Identification**: Identifying potential hazards that are applicable to the proposed development activities and determining the hazardous events to be evaluated.
- **Risk Assessment**: Determining the possible causes that could lead to the hazardous events identified; the consequences of the hazardous events; and the safeguards and controls currently in place to mitigate the events and/or the consequences.
- **Risk Evaluation**: Evaluating the risks using the Risk Prioritisation Matrix (section 3.5). The risk ranking is determined by a combination of the expected frequency of the hazard occurring (likelihood) and the consequence of its occurrence. Note that when assessing the consequence, no credit is given to the hazard controls. Hazard controls are considered in determining the likelihood of the event.
- **Residual Risk Treatment**: Reviewing the proposed management controls for each of the risks identified and proposing additional controls or making recommendations, if required.

3.4 Hazard identification

The potential impacts on the existing environment by the proposed development include:

- Community amenity (air quality; visual, noise and vibration, traffic and transport);
- Air quality (odour, dust, GHG);
- Groundwater quality and quantity;
- Surface water quality and quantity;
- Cultural heritage;
- Biodiversity (flora & fauna, regulated vegetation); and
- Soil (land capability).

The potential impacts on the human health by the proposed development include:

- Zoonotic Diseases.

3.5 Risk analysis

The risk analysis was conducted using the semi-quantitative approach in the Australian/New Zealand Standard AS/NZS ISO 31000 (2009). Firstly, the 'likelihood' and 'consequence' definitions were defined for the risk analysis. These are presented in Table 9 and Table 10 for 'consequence' and 'likelihood' definitions respectively.

Table 9 – Consequence assessment

Consequence	Description
Insignificant	Very minor impact to the environment and community Can be managed effectively as part of typical operations Neighbour disputes unlikely
Minor	Minor and/or short term impact to the environment and community Can be managed effectively as part of typical operations Infrequent disputes between neighbours
Moderate	Moderate and/or medium-term impact to the environment and community Ongoing management implication Neighbour disputes likely
Major	Serious and/or long-term impact to the environment and community Long-term management implications Neighbours are in serious disputes
Extreme	High-level serious environmental harm Irreversible impact Neighbours are in prolonged dispute and legal action involved

Table 10 – Likelihood definitions

Likelihood	Description	Frequency
Almost certain	Expected to occur in most circumstances	Occur once in a day or more often
Likely	Will probably occur in most circumstances	Occur once in a week or more often
Possible	Might possibly occur at some time	Occur once in a month or more often
Unlikely	Could occur at some time	Occur once in a year or more often
Rare	May occur in exceptional circumstances	Occur once in 5 years or more often

Risk characterisation describes the likelihood of exposure and consequences of exposure.

Risk is described as the "hazard characterisation multiplied by the exposure characterisation".

Risks are characterised as Low, Medium or High based on the risk assessment matrix in Table 11.

The risk rating matrix also yields a risk ranking from 1 to 25. It covers each combination of five levels of 'likelihood' and 5 levels of 'consequence' to identify the risk ranking of each impact. For example an activity with a 'likelihood' of possible (3) and a 'consequence' of Major (4) yields a risk rank of 12.

Table 11 – Risk Assessment Matrix

LIKELIHOOD		CONSEQUENCE				
		Insignificant	Minor	Moderate	Major	Extreme
		1	2	3	4	5
ALMOST CERTAIN	5	M8 – Moderate (5)	H16 – High (10)	H18 – High (15)	E23 – Extreme (20)	E25 – Extreme (25)
LIKELY	4	M7 – Moderate (4)	M10 – Moderate (8)	H17 – High (12)	H20 – High (16)	E24 – Extreme (20)
POSSIBLE	3	L3 – Low (3)	M9 – Moderate (6)	M12 – Moderate (9)	H19 – High (12)	H22 – High (15)
UNLIKELY	2	L2 – Low (2)	L5 – Low (4)	M11 – Moderate (6)	M14 – Moderate (8)	H21 – High (10)
RARE	1	L1 – Low (1)	L4 – Low (2)	L6 – Low (3)	M13 – Moderate (4)	M15 – Moderate (5)

A summary of the initial risk evaluation and risk rating of activities that may cause a conflict, potential conflict arising from that activity, and a risk rating generated without mitigation or management measure put in place for the project as described in Table 12 and Table 13 respectively. Table 14 and Table 15 in Appendix A provides more detail of the potential risks and performance outcomes associated with the construction and operation of the proposed development. The choice for the probability and consequence ratings are based on specific management strategies that will be undertaken within the proposed development to reduce the impacts and are also based on the siting, design and construction of the development.

Table 12 – Risk assessment summary – Construction

Land use	Stakeholders	Identified potential risk	Initial risk level	Revised risk level
Agriculture	Private property owners	Health and safety	H22 – High (15)	M5-Moderate (5)
• Dryland and irrigated cropping	Individuals (i.e., occupants of residential dwellings)	Air quality – Dust	L6 – Low (3)	L1 – Low (1)
• Grazing of livestock	Business operators	Groundwater – Quantity and quality	M14 – Moderate (8)	L6 – Low (4)
• Intensive livestock industries	Public authorities	Surface water – Quantity and quality	M14 – Moderate (8)	L6 – Low (3)
Residential	Service providers	Biodiversity – Flora and fauna	H19 – High (12)	L5 – Low (4)
Rural dwellings	Indigenous community	Hydrology and flooding	M11 – Moderate (6)	L6 – Low (3)
• Farm Infrastructure		Noise and vibration	M11 – Moderate (6)	L2 – Low (2)
Public utilities		Traffic and transport – increased vehicle movements to and from the Subject land	H22 – High (15)	M15 – Moderate (5)
• Electricity		Heritage – Aboriginal and non-aboriginal	L5 – Low (4)	L1 – Low (1)
• Telephone		Waste and resource management	M14 – Moderate (8)	L6 – Low (3)
Infrastructure		Hazards – Fire risk to property, Spills or leaks of hazardous materials	M11 – Moderate (6)	L6 – Low (3)
• Roads		Visual amenity and landscaping	M9 – Moderate (6)	L4 – Low (2)
• Substations		Soils and sediments	H19 – High (12)	M13 – Moderate (9)
Conservation areas and public reserves				

Table 13 – Risk assessment summary – Operation

Land use	Stakeholders	Identified potential risk	Initial risk level	Revised risk level
Agriculture	Private property owners	Health and safety	H22 – High (15)	M5-Moderate (5)
• Dryland and irrigated cropping	Individuals (i.e., occupants of residential dwellings)	Air quality – Dust	M11 -Moderate (6)	L3 – Low (3)
• Grazing of livestock	Business operators	Groundwater – Quantity and quality	H19 – High (12)	M13 – Moderate (4)
• Intensive livestock industries	Public authorities	Surface water – Quantity and quality	M14 – Moderate (8)	L6 – Low (3)
Residential	Service providers	Biodiversity – Flora and fauna	M9 – Moderate (6)	L5 – Low (4)
Rural dwellings	Indigenous community	Hydrology and flooding	L6 – Low (3)	L6 – Low (3)
• Farm Infrastructure		Noise and vibration	L6 – Low (3)	L4 – Low (2)
Public utilities		Traffic and transport – increased vehicle movements to and from the Subject land	H22 – High (15)	M15 – Moderate (5)
• Electricity		Heritage – Aboriginal and non-aboriginal	L5 – Low (4)	L4 – Low (2)
• Telephone		Waste and resource management	M12 – Moderate (9)	L6 – Low (3)
Infrastructure		Hazards – Fire risk to property, Spills or leaks of hazardous materials	M11 – Moderate (6)	L6 – Low (3)
• Roads		Visual amenity and landscaping	L5 – Low (4)	L4 – Low (2)
• Substations		Soils and sediments	M12 – Moderate (9)	M11 – Moderate (6)
Conservation areas and public reserves				

3.6 Risk reduction management strategies

Consistent with the LUCRA Guide, an objective of the LUCRA is to identify and define management strategies that lower the risk ranking score to low risk (10 or below).

Management strategies are developed to minimise the effects or potential for land use conflict to occur.

Performance targets are identified for each management strategy, detailing how the effectiveness of the strategy will be monitored.

Management strategies and performance targets are defined below and detailed in Appendix A.

3.7 Performance monitoring

Performance monitoring is required to ensure management strategies minimise the risk of potential land use conflicts during all stages of the proposed development.

Various management plans will be prepared and implemented during the construction, operational and decommissioning phases of the project, including:

- Construction Environmental Management Plan (CEMP)
- Operational Environmental Management Plan (OEMP)
- Any other management plan specified in the EIS or conditions of consent (if approved)

The management plans will address all requirements specified in the EIS and supporting documents, as well as any consent conditions (if approved). These plans will provide documented requirements for performance measures and monitoring during each stage of the proposed development.

Performance will also be monitored through the outcomes of consultation during all phases of the project. Monitoring community feedback and concerns are key to assessing the performance of management strategies.

3.8 Limitations and assumptions

This LUCRA has relied on the following information to evaluate potential land use conflicts:

- Observations made via a site inspection.
- Consultation with surrounding landowners and stakeholders.
- Desktop research and mapping of the site and locality.
- Information provided by Doolin Farming Pty Ltd.

The following limitations apply to this LUCRA:

- Mitigation measures from the EIS and supporting impact assessments, where implemented effectively, are likely to reduce the risk of potential land use conflicts. However, the implementation of mitigation measures may not reduce the risk of all potential land use conflicts.
- The identification of land uses and conflicts within this LUCRA may be limited by the detail and number of responses received during consultation. There is potential for other land uses and conflicts, not previously identified, to occur within the locality.

3.9 Key documents

The following documents have been prepared to support the EIS. The assessments are designed to identify and mitigate the potential environmental, social and economic impacts of the project. The performance targets in Table 12 and Table 13 are also in the following assessments:

- Visual Impact Assessment;
- Noise Impact Assessment;
- Stormwater Impact Assessment;
- Odour Impact Assessment;
- Traffic Impact Assessment;
- Biodiversity Assessment;
- Heritage Assessment; and
- Soil and Land Capability Assessment.

To ensure compliance and establish performance monitoring of the mitigation and management strategies, the following management plans will be established:

- Construction Environmental Management Plan
- Operational Environmental Management Plan
- Traffic Management Plan.

4 Conclusions and Recommendations

This assessment has examined the potential land use conflicts that may arise from the proposed development which involves the expansion of an existing beef cattle feedlot on the property “Springfield” located at 2513 Getta Getta Road, North Star NSW. It has considered two phases of the development including construction and operations.

The proposed development is proposed to be established on land deemed to be moderate to high capability land. The proposed development will change not change the land use of the subject land.

There are, however, land use conflicts that may arise through the development. A risk identification and ranking process has been undertaken in accordance with DPIE Guidelines. Key risks include odour generation, noise generation, dust generation, erosion control and sediment runoff, increased traffic and impact on visual amenity.

The specialists’ reports that have been developed to assess the impact for the EIS have recommended management/mitigation measures. Should these mitigation measures be implemented the potential impact of the proposed development on the surrounding land use and land users will be minimal.

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Appendix A – Risk Assessment

Table 14 – Proposed development – Construction environmental aspects and impacts

Category	Construction Activities / Aspect	Potential Impacts	Risk level prior to mitigation	Indicative Mitigation Measures	Risk level after mitigation	Relevant Management Document / Training required
Air quality	• Site establishment • Vegetation clearing • Topsoil stripping • General earthworks • Crushing and screening • Bulk earthworks • Stockpiling • Vehicular movements on unsealed roads • Material haulage • Vehicle emissions • Exposed bare earth areas • Rehabilitation activities	Complaints from neighbours, including loss of amenity and impacts of dust.	L5 - Low	• All Construction Contractor personnel including employees and contractors are given adequate training in environmental awareness, legal responsibilities, and air quality control methods. • Air quality issues and safeguards area component of Construction Contractor personnel including staff and sub-contractors' induction. • Suppress dust on unsealed road surfaces, stockpiles and other exposed surfaces. • Modify or cease operations when high winds generate dust. • Vehicle movements will be restricted to designated and approved routes. • Setting and enforcing speed limits on internal road network. • The loads on vehicles moving dusty materials onto or off the site are covered during transit. • Vehicles, equipment, machinery used and all facilities – designed, operated and maintained to control the emission of smoke, dust and fumes. • All disturbed areas stabilised and rehabilitated as soon as practicable after completion. • Ensure there is an adequate supply of water for dust suppression. • Erosion controls are inspected regularly. • Machinery and equipment to comply with Australian Standards for air emissions and be maintained to original equipment manufacturer (OEM) specifications to ensure efficient operation. • A complaints register is kept, including details of the nature of any complaint received, the response made, and any mitigation measures implemented. • Hazardous materials are stored and used in accordance with relevant guidelines and Australian Standards for the storage of hazardous and dangerous goods and spill management. • Any operations involving the movement of dusty materials such as topsoil stripping, stockpiling, shall be timed and managed where possible when materials have adequate moisture content. • Clearing of the minimum area for construction of site works only. Before clearing commences, the limits of clearing shall be marked by pegs placed at 25 m intervals around the area to be cleared.	L1 - Low	Construction Environmental Management Plan Development approval conditions Personnel training and induction Complaints Register Personnel induction
		Impacts on residential sensitive receivers, including impacts on living areas, swimming pools and general amenities.	L5 – Low		L1 - Low	
		Potential adverse health effects.	L5 – Low		L1 - Low	
		Impacts on water quality and other aspects of the natural environment.	L5 – Low		L1 - Low	
		Dust on crops including broadacre crops or other agricultural crops.	L2 – Low		L1 - Low	
		Greenhouse gases emitted from construction plant, equipment and vehicles.	L5 - Low		L1 - Low	
		Greenhouse gases embodied in materials consumed in construction or impacted by the proposed development, such as vegetation removal and soil disturbance.	L2 – Low		L1 - Low	

Groundwater – Quantity and quality	• Groundwater use exceeding proposed development's allocation and entitlements • Spills or leaks of hazardous materials stored or used on-site such as fuels, chemicals etc.	Potential for localised drawdown of groundwater resources.	M13 – Moderate	• Development and implementation of emergency and contingency plans detailing methods to manage spills or other emergencies on site, such as storage vessel rupture, pipe breakages, pump failures etc • Sustainable use of groundwater in accordance with the Development's entitlements. • Groundwater extraction managed to ensure sustainable drawdown rates. • Hazardous materials are stored and used in accordance with relevant guidelines and Australian Standards for the storage of hazardous and dangerous goods and spill management.	L1 – Low	Construction Environmental Management Plan Development Consent Complaints procedure Personnel induction
		Impacts to the quality of groundwater in the vicinity of the proposed development.	M13 – Moderate		L6 – Low	
Surface water – Quantity and quality	• Surface water use exceeding proposed development's allocation and entitlements • Uncontrolled release of	Potential for drawdown of surface water resources.	L6 – Low	• Appropriately designed erosion control structures such as sediment basin, straw bales, silt fences and sandbags will be installed, maintained and cleaned regularly. • Locate spoil stockpiles, plant and equipment away from drainage lines, watercourses or stormwater drains in accordance with established best management guidelines.	L1 – Low	Construction Environmental Management Plan Development approval conditions

	• 'dirty' stormwater runoff off-site • Spills or leaks of hazardous materials stored or used on-site such as fuels, chemicals etc	Loss of or damage to aquatic habitat.	M14 – Moderate	• Development and implementation of emergency and contingency plans detailing methods to manage spills or other emergencies on site, such as storage failure, pipe breakages, pump failures etc. • Wheel cleaning measures at exit of all sites where required. • Buffer zones of vegetation will be maintained adjacent to waterways for as long as practical and maintained in their intended condition. • Rehabilitation and landscaping works of disturbed areas undertaken as soon as the works are completed. • No extraction of surface water from waterways or drainage lines. • Implement concrete washout process within bunded areas. • Vegetative buffers around drainage lines designed to help protect surface water are maintained in their intended condition. • Sustainable use of surface water in accordance the Development's allocation and entitlements. • Hazardous materials are stored and used in accordance with relevant guidelines and Australian Standards for the storage of hazardous and dangerous goods and spill management.	L2 – Low	Hazardous Substances Risk Assessment Personnel Induction
		Erosion of exposed soils causing sedimentation of waterways and aquatic environments	M14 – Moderate		L2 – Low	
		Changes to water chemistry, in particular pH values altering aquatic habitats, including threatened species habitats.	M13 – Moderate		L5 – Low	
		Impact to water quality due to fuels and leaks and inappropriate storage of hazardous material.	M14 – Moderate		L5 – Low	
Biodiversity	• Clearing of native vegetation • Stockpile / haul road construction near vegetation • General earthworks near vegetation • Vehicular movements on unsealed roads • Open excavation works • Access and internal road alignments and traffic movements. • Use of chemicals • Noise impacts • Uncontrolled fires/bushfires	Loss of or damage to habitat for threatened species	M11 – Moderate	• Biodiversity issues and safeguards are a component of Construction Contractor personnel including staff and sub-contractors' induction. • Prior to construction – identify and fence all significant flora and fauna habitat areas required to be protected. • Minimise clearing of all vegetation. • Implement ongoing weeding and weed monitoring programs to remove noxious plant species and weeds. • Disturbed areas will be monitored for effective soil stabilisation and restoration and rehabilitation. • Retain all habitat trees where practicable. • Implement vehicle hygiene procedures to prevent the spread of pests and disease. • Provisions to limit heavy vehicle speeds and for signage along access roads • Methods and communication tools to monitor road strike and mortality of wildlife • Implement a pest management program to control pest animal species already present, using acceptable methods as well as identifying potential pest species, their likely distribution and methods to prevent their spread • Monitor and manage pest animal species populations on the Development site to prevent proliferation and spread.	L4 – Low	Construction Environmental Management Plan Weed management Procedure Vehicle hygiene procedures Personnel induction
		Potential impact on endangered ecological communities	M12 – Moderate		L4 – Low	
		Loss and fragmentation of riparian habitat	M9 – Moderate		L4 – Low	
		Mortality of protected and threatened fauna	M9 – Moderate		L4 – Low	
		Creation of barriers to fauna movement	M9 – Moderate		L4 – Low	
		Edge effects from construction noise, light and wind turbulence	M9 – Moderate		L4 – Low	
		Introduction and spread of terrestrial weeds and pest fauna species	H19 – High		L5 – Low	

				• Pest animal control programs shall use the most humane, target specific, cost effective and efficacious techniques available • Sewage and domestic putrescibles shall be managed appropriately and in accordance with any relevant statutory requirements.		
Hydrology and flooding	• General earthworks and construction • Transverse drainage	Restricted flow paths causing localised flooding due to changes in topographical changes and modification of catchments	M11 – Moderate	• The Development is sited above the height of a 100-year average recurrence interval (Q_{100}) flood level. • Design drainage structures to cope with design flood events. • Locate plant / storage above the 100yr ARI flood level events. • Any temporary crossings required shall be designed, constructed and stabilised to minimise scour / erosion during flow events. • Development designed and constructed in accordance with development approval conditions. • Evacuation and access assessed in consultation with landowners. • Monitor rain radar and flooding forecasts and ensure response preparedness. • Prepare site for flood and severe rainfall events (where forecast) to minimise inundation impacts. • Waterway and drainage crossings maintained to ensure the integrity and ongoing compliance with specified design criteria.	L6 – Low	Construction Environmental Management Plan Development approval conditions Personnel Induction
		Changes to flood afflux levels during flood events – increased impact to receivers	M11 - Moderate		L4 – Low	
		Flood damage to plant, equipment or infrastructure	M11 – Moderate		L4 – Low	
Noise and vibration	• Site establishment • Clearing and grubbing • Earthworks and drainage • Saw cutting • Vehicular movements • Crushing or screening • Pumping and generators	Noise impacts on sensitive receivers during construction	M11 – Moderate	• Awareness training for Construction Contractor personnel including staff and contractors in environmental noise issues. • Adherence to working hours in development approval conditions unless otherwise approved. • Respite periods for noisy activities (in accordance with regulatory guidelines). • Construction equipment selected, operated and maintained to minimise noise impacts and where necessary fitted with silencers and "smart" reversing safety devices. • Reduced use of horns to signal trucks loaded where residences are close by. • Managing construction vehicle routes and speed of vehicles. • Establish and maintain complaints management system. • Operation equipment selected, operated and maintained to minimise noise impacts and where necessary fitted with silencers and "smart" reversing safety devices. • Minimising the use of horn signals and consideration of alternative methods of communication. • Switching off any equipment not in use for extended periods. • All plant and equipment required would be well maintained and regularly serviced. • Community consultation with local residents to assist in the alleviation of community concerns as required.	L2 - Low	Construction Environmental Management Plan Environment Protection (Noise) Policy 2019 Complaints register Personnel induction
		Noise exceeding regulatory criteria levels	L5 – Low		L2 - Low	
		Vibration impacts on sensitive receptors during construction	L6 - Low		L1 - Low	

				• Selection of machines that are inherently free of or have low vibration. • Vibration-producing machinery shall be supported on stiff structural components and be provided with efficient vibration isolation systems. • Maintenance of plant and equipment machinery – ensuring rotating parts are balanced, vibration isolators are functioning as intended etc.		
Traffic and transport	• Temporary access roads • General earthworks and construction • Haulage of material • Import of material / plant / equipment • Construction vehicle movements and deliveries • Travel to / from site	Temporary disruptions / delays to local traffic	L3 – Low	• Identify and assess roads likely to be affected by Development construction and develop methods to minimise traffic impacts. • Signage for both egress and ingress off the Development site. • All vehicles carrying materials to be adequately covered as required to prevent any loss of material, which may cause driver safety issues. • Maintain heavy vehicle route, advance and position intersection signage. • Monitoring of any traffic delays.	L2 - Low	Construction Environmental Management Plan Development approval conditions Complaints register Personnel induction
		Temporary restrictions to private access roads	L5 – Low		L2 – Low	
		Permanent adjustment to some private property access roads and local/regional roads	L6 – Low		L2 – Low	
		Changed traffic patterns	M11 – Moderate		L6 – Low	
		Accidents - Safety of commuters, pedestrians, contractors and subcontractors.	H21 – High		M15 – Moderate	
Indigenous cultural heritage	• Early works including non-substantial construction activities • Initial clearing and/or grubbing of vegetation • Initial removal of topsoil • Construction of equipment/material laydown stockpile areas • Temporary access roads during construction.	Impact to undiscovered or undocumented aboriginal sites, artefacts and cultural places	L5 – Low	• Prior to construction – identify and assess aboriginal cultural heritage items and potential archaeological deposits on the development site and predict potential impacts. • Induct personnel on aboriginal cultural heritage issues, safeguards, and the location of heritage items (if required). • If design changes or construction activities impact on areas outside of those identified in the Development approval conditions, relevant stakeholders will be consulted. • Protect identified aboriginal heritage items with protective fencing or flagging from being disturbed during construction.	L4 – Low	Construction Environmental Management Plan Personnel induction
		Finding / disturbing burials or human remains	L5 – Low		L4 – Low	
Resource and waste management	• Vegetation clearing • Generation of waste during construction activities including building materials, excess unsuitable spoil material, vegetation material etc • Spoil handling • Stockpiling • Material haulage	Improper disposal of waste material	M11 – Moderate	• Refine cut-and-fill balance and maximise reuse of material on-site. • Develop and implement a resource management strategy. • Waste materials contained in waste bins or other suitable containers, and collected for recycling, reuse or disposal by the licensed waste contractor. • Use recycled products where possible. • Separate, contain, manage and dispose contaminated waste to prevent migration and further contamination whilst maintaining compliance with regulatory requirements. • Label and store all liquid waste containers in a bunded area prior to removal off-site.	L6 – Low	Construction Environmental Management Plan Development approval conditions Personnel Induction
		Direct impacts to land, groundwater or surface waters.	M12 – Moderate		L6 – Low	
		Depletion or sterilisation of non-renewable resources, including water and energy	M14 – Moderate		L6 – Low	
		Difficult disposal of waste material including hazardous waste.	M13 – Moderate		L6 – Low	

	• Handling of chemicals, waste and hazardous goods. • Fuel storage and distribution & waste oil disposal • Water usage • Energy usage	Potential leaks and spills of fuels and/or hazardous materials.	M12 – Moderate	• Undertake inspections of the worksite and waste storage areas to ensure litter / debris is regularly cleaned up and contained on site. • Bunding of areas used for fuel and oil and chemical storage in accordance with Australian Standards and relevant state guidelines. • Locate appropriate waste removal contractor and/or appropriately licenced waste facilities in the area. • Sustainable use of groundwater in accordance with the Development's allocation and entitlements. • Sustainable use of surface water in accordance with the Development's allocation and entitlements. • Maintain a waste register. • Modern and well-maintained equipment is to be used to encourage fuel efficiency • Water recycling measures are implemented where practical.	L6 – Low	
		Impact to water quality due to inappropriate solid and/or liquid waste management.	M12 – Moderate		L6 – Low	
Visual amenity and landscaping	• General earthworks and construction • Stockpiling • Open excavation works • Clearing of vegetation • Construction site material laydown areas • Rehabilitation of disturbed land • Cuttings and cut finishes • Revegetation /landscaping • Removal of visually prominent native vegetation • Evening / night works	Change to landscape character and visual environment as a result of large embankments, disturbed areas, night activities, removal of vegetation, and access road.	L5 – Low	• Landscape treatments will incorporate the surrounding landscape types and vegetation patterns. • Embankments and cuttings will be stabilised by the use of appropriate landscape treatments. • Adherence to working hours in Development approval conditions unless otherwise approved. No night-time works. • Site office, machinery and material laydown and areas surrounding them will be kept tidy and be regularly cleaned and maintained. • Monitoring, evaluation and management of landscape revegetation areas including treatment of weeds. • Clearing of the minimum area required for construction of site works only.	L4 – Low	Construction Environmental Management Plan Personnel induction
		Poor management of revegetation	M9 – Moderate		L2 – Low	
Fire	• Handling of hazardous materials. • Fuel storage and distribution • Hot works • Clearing of vegetation	Fire damage to plant, equipment or infrastructure	M9 – Moderate	• Establish fuel free zones around materials which are adjacent to bush fire hazard areas. • Provide fuel reduced zones in areas of high ignition potential (e.g. along roads, refuelling areas etc) to slow the development of fires. • Access tracks maintained on the site. • Ensure any hot works have been approved by site management beforehand and adequate controls are in place e.g. fire extinguishers • Hazardous materials are stored and used in accordance with relevant guidelines and Australian Standards for the storage of hazardous and dangerous goods and spill management. • Fire-fighting equipment will be held on-site to respond to any fires that	L5 – Low	Construction Environmental Management Plan Personnel Induction
		Impacts to surrounding properties.	M11 – Moderate		L6 – Low	

				may occur during construction.		
Soils and sediments	• Clearing and grubbing • Earthworks • Material stockpiles • Maintenance of plant and equipment, servicing and refuelling • Handling of chemicals, waste and hazardous goods. • Fuel storage and distribution and waste oil disposal • Management of temporary or permanent sediment basins • Drainage works • Water use / extraction • Concrete works • Temporary access road • Landscaping • Noxious weed treatment	Erosion of exposed soils causing sedimentation of waterways.	M14 – Moderate	• Appropriately designed erosion control structures such as sediment basin, straw bales, silt fences and sandbags shall be installed, maintained and cleaned regularly.	L4 – Low	Construction Environmental Management Plan IECA (2008) Best Practice Erosion and Sediment Control Personnel induction
		Disturbance of contaminated material causing pollution.	H19 – High	• Clean and dirty water runoff will be adequately separated to avoid mixing where possible using diversions, clean water drains, and the installation of permanent drainage infrastructure.	M13 – Moderate	
		Contamination of soils due to spills and leaks and inappropriate storage of hazardous material.	M12 – Moderate	• Locate topsoil stockpiles, plant and equipment away from drainage lines, watercourses or stormwater drains in accordance with established criteria. • Wheel cleaning measures at exit of the site to minimise the tracking of soil and particulates onto public roads where required. • Vehicle movements from site will be minimised during wet weather if the tracking of mud may become an issue. • Buffer zones of vegetation will be maintained adjacent to waterways for as long as practical. • Exposed batter slopes and embankments, and other areas exposed but not worked, will be protected from erosion through implementation of permanent stabilisation measures e.g. seeding, revegetation. • Rehabilitation and landscaping works of disturbed areas undertaken as soon as the works are completed. • Implement concrete washout process within bunded areas if undertaken on-site. • Establish clean water diversions early in the construction works to ensure clean and dirty water are not mixed on-site. • Design drainage to take all dirty water to sediment basins. • Engage suitably qualified soil erosion specialist to advise on ESC issues if required. • Install signage at discharge points to assist workers to understand implications of dirty water release in sensitive areas. • Hazardous materials storage meets Australian Standard and relevant state guidelines for bunding and storage and spill kits available. • Waste materials contained in waste bins or other suitable containers, and collected for recycling, reuse or disposal by the licensed waste contractor. • Separate, contain, manage and dispose contaminated waste to prevent migration and further contamination whilst maintaining compliance with regulatory requirements. • Label and store all liquid waste containers in a bunded area prior to removal off-site.	L6 – Low	

Table 15 – Proposed development – Operation environmental aspects and impacts

Category	Operation Activities / Aspect	Potential Impacts	Risk level prior to mitigation	Indicative Mitigation Measures	Risk level after mitigation	Relevant Management Document / Training required
Air quality	• Dry commodity storage, handling and processing • High moisture commodity (e.g. silage, molasses, oils) storage and handling • Grain handling and processing • Pen, drain and sedimentation basin cleaning • Mortality management • Split feed management • Solid waste handling, processing and spreading • Effluent storage • Effluent utilisation • Vehicular movements on unsealed roads • Ration delivery • Exposed bare earth areas • Vehicle emissions	Complaints from neighbours, including loss of amenity and impacts of dust.	**M9 – Moderate**	• All Development employees and contractors are given adequate training in environmental awareness, legal responsibilities, and air quality control methods. • The air quality and meteorological monitoring network is maintained, and results are routinely analysed, assessed and reported. • Pen cleaning and surface maintenance is undertaken on a planned basis to ensure that pen surfaces dry quickly following rainfall, can drain freely and do not become overly dry and cause excessive dust emissions. • Elimination of wet areas within the pens by repairing potholes, eliminating accumulated manure from under fencelines and fixing leaks from water troughs. • Spilt and spoilt feed and feedstuffs are regularly removed from around feed storage and preparation areas, feed bunks, feed processing equipment, etc. • Sedimentation basin control weirs are maintained in operational order to ensure that complete drainage occurs. • Solids are removed from the sedimentation basins as soon as practical after deposition. • Mortalities are placed within the solid waste stockpile and carcass composting area and covered with high carbon material as soon as practicable after placement. • Wet manure stockpiles are not turned to minimise release of emissions generated from the anaerobic decomposition process. • Controlled aeration of solid waste composting windrows. • Dewatering of the holding ponds by irrigation to crops as soon as possible after rainfall. • Receiving, reporting and responding to any complaints in relation to air quality. • Adapting the cattle stocking density in pens to maintain the moisture content of the manure on the pen surface at 25-35% to minimise dust generation. For example, stocking density may change from lighter rates in winter to heavy rates in summer. • Setting and enforcing speed limits on internal road network. • Dust suppression measures, such as watering access and feed roads and solid waste (manure) stockpiles as required. • Any operations involving the movement of dusty materials such as grain movement, solid waste (manure) turning and spreading shall be timed and managed where possible when materials have adequate moisture content. • Ceasing dust generating activities such as pen cleaning, and solid	**L3 - Low**	Site Based Environmental Management Plan Meat and Livestock Australia, 2015b, Beef cattle feedlots: waste management and utilisation, Meat and Livestock Australia, North Sydney, NSW Development approval conditions Environment Protection (Air quality) Policy 2019 Complaints Register Personnel training and awareness Personnel induction
		Impacts on residential sensitive receivers, including impacts on living areas, swimming pools and general amenities.	**M9 – Moderate**		**L2 - Low**	
		Potential adverse health effects.	**M11 – Moderate**		**L1 - Low**	
		Impacts on water quality and other aspects of the natural environment.	**L5 – Moderate**		**L1 - Low**	
		Dust on crops including broadacre crops or other agricultural crops.	**L5 – Low**		**L2 - Low**	

				waste (manure, carcass compost, pond sludge) stockpiling, screening and spreading during periods of high wind. • Any grain processing dust-suppression equipment is maintained and operational at all times. • The loads on vehicles moving dusty materials (e.g. feedstuffs) onto or off the site are covered during transit. • All visual screens (e.g. vegetative buffers) are kept in good order (including the replanting of gaps in vegetative buffers due to trees failing to establish, the death or loss of established trees or other factors which would cause the buffer not the perform its intended function). • Application of solid (manure, carcass compost, holding pond sludge) and effluent to land when wind conditions and dispersion conditions are favourable. • The best animal production genetics shall be used - Improved production traits, particularly good feed conversion efficiency will contribute significantly to reducing animal emissions intensity. • Sourcing livestock and feed commodities from as close to the Development as practical as well as on-site production to minimise fugitive emissions during transport. • Rations formulated to minimise enteric methane emissions • Use of appropriately sized plant and equipment for respective processes • Where practical, solid wastes (manure, carcass compost, holding pond sludge) incorporated directly into the soil. • Routine service and maintenance of mobile equipment used on-site to ensure efficient operation • Continuous improvement of GHG intensity of production by identifying and controlling energy intensive processes • A suitable buffer is applied where effluent and solid waste (manure, carcass compost, holding pond sludge) applications take place within close proximity to roads, dwellings or other areas likely to be used by the public at that time (the appropriateness of the applied buffer distances is determined having consideration for the qualities of the materials being applied, weather conditions and other environmental factors; as well as the anticipated level of public usage or exposure at those times). • A complaints register is kept, including details of the nature of any complaint received, the response made, and any mitigation measures implemented. • Hazardous materials are stored and used in accordance with relevant guidelines and Australian Standards for the storage of hazardous and dangerous goods and spill management.		

Groundwater – Quantity and quality	• Groundwater use exceeding Development's allocation and entitlements • Leachate of effluent through the liner underlying the controlled drainage area as a result of integrity failure or exceedance of design criteria. • Spills or leaks of hazardous materials stored or used on-site such as fuels, chemicals etc. • Inappropriate storage of solid wastes such as outside of the controlled drainage area. • Inappropriate utilisation of solid wastes (manure, carcass compost, holding pond sludge) and effluent on-site such as high application rates and ponding of effluent.	Potential for localised drawdown of groundwater resources.	**M13 – Moderate**	• Preparation of an environmental management framework for operation of the Development. • Development and implementation of emergency and contingency plans detailing methods to manage spills or other emergencies on site, such as pipe breakages, holding pond overflows, pump failures etc. • Sustainable use of groundwater in accordance with the Development's allocation and entitlements. • Bore extraction managed to ensure sustainable drawdown rates. • Groundwater monitoring (quantity and quantity) is undertaken as prescribed by the Development approval conditions. • Solid waste stockpiles established within controlled drainage area to prevent contaminated leachate into groundwater resources. • The land application of solid wastes and effluent is made at rates consistent with the ability of soils and crops grown in the on-site utilisation areas to sustainably utilise the applied nutrients, salts and organic matter, under the climatic conditions prevailing at the site. • Application rate of effluent is controlled to ensure that excessive ponding does not occur • Effluent and solid waste only applied to dedicated waste utilisation areas. • Application rate of effluent should not necessitate the routine and specific leaching of salts from the soil profile in order to obtain acceptable crop performance. • The liner of all elements of the controlled drainage area such as drains, sedimentation basin, flow control structures etc is maintained to ensure the integrity and ongoing compliance with specified design criteria • When available, effluent stored, treated and sustainably applied to land on-site by irrigation. • Hazardous materials are stored and used in accordance with relevant guidelines and Australian Standards for the storage of hazardous and dangerous goods and spill management.	**L6 – Low**	Site Based Environmental Management Plan Meat and Livestock Australia, 2015b, Beef cattle feedlots: waste management and utilisation, Meat and Livestock Australia, North Sydney, NSW Development approval conditions Personnel training and induction
		Impacts to the quality of groundwater in the vicinity of the Development.	**H19 – High**		**M13 – Moderate**	
Surface water – Quantity and quality	• Surface water use exceeding Development's allocation and entitlements • Uncontrolled release of liquid (effluent) wastes from controlled drainage	Potential for drawdown of surface water resources.	**M11 – Moderate**	• Preparation of environmental management framework for operation of the Development. • Development and implementation of emergency and contingency plans detailing methods to manage spills or other emergencies on site, such as pipe breakages, pond overflows, pump failures etc. • Liquid and solid wastes only applied to dedicated waste utilisation	**L6 – Low**	Site Based Environmental Management Plan Meat and Livestock

	area as a result of overflows, integrity failure or exceedance of design criteria • Spills or leaks of hazardous materials stored or used on-site such as fuels, chemicals etc • Surface runoff from the inappropriate application of liquid wastes (effluent) to land impacting water chemistry, clarity, nutrient and toxicants, for example • Inappropriate storage of solid wastes (manure, carcass compost, holding pond sludge) such as outside of the controlled drainage area • On-site utilisation of solid and liquid wastes	Loss of or damage to aquatic habitat.	**M11 – Moderate**	areas. • Vegetative buffers around drainage lines designed to help protect surface water are maintained in their intended condition. • Solid waste (manure, carcass compost, holding pond sludge) stockpiles would be established within controlled drainage area to prevent contaminated runoff into clean water areas. • Sustainable use of surface water in accordance the Development's allocation and entitlements. • The land application of solid waste and effluent is made at rates consistent with the ability of soils and crops grown in the on-site utilisation areas to sustainably utilise the applied nutrients, salts and organic matter, under the climatic conditions prevailing at the site. • Soil condition is monitored periodically, and soil tests are used where there is potential for deterioration of soil condition • Application rates of effluent are controlled to ensure that excessive runoff does not occur • All elements of the controlled drainage area such as drains, sedimentation basin, flow control structures etc are cleaned and maintained to ensure their integrity and ongoing compliance with specified design criteria. • When available, effluent shall be stored, treated and sustainably applied to land on-site by irrigation. • Design discharge events from the holding ponds shall be directed to a natural grassed discharge area. This grassed area shall filter and disperse the liquid waste whilst allowing some infiltration. As the design discharge events are at a frequency of one in 10 years the concentration of nutrients shall be sustainably adsorbed and utilised by vegetation in between events. • DAF is notified of any overtopping event or similar threats to surface water quality • Hazardous materials are stored and used in accordance with relevant guidelines and Australian Standards for the storage of hazardous and dangerous goods and spill management.	**L6 – Low**	Australia, 2015b, Beef cattle feedlots: waste management and utilisation, Meat and Livestock Australia, North Sydney, NSW Development approval conditions Personnel training and induction
		Erosion of exposed soils causing sedimentation of waterways and aquatic environments	**M14 – Moderate**		**L6 – Low**	
		Changes to water chemistry, in particular pH values altering aquatic habitats, including threatened species habitats.	**M14 – Moderate**		**L6 – Low**	
		Impact to water quality due to fuels and leaks and inappropriate storage of hazardous material.	**M11 – Moderate**		**L6 – Low**	
Biodiversity	• Access and internal road alignments and traffic movements. • Dry commodity storage, handling and processing • High moisture commodity (e.g. silage, molasses, oils) storage and handling • Grain handling and processing • Mortality management • Split feed management	Loss of or damage to habitat for threatened species	**L5 – Low**	• Any significant flora and fauna habitat areas required to be protected shall be identified and marked. • Clearing restricted to those areas required for Development's operation and firebreaks. • Induct personnel on biodiversity issues and safeguards. • Implement ongoing weed monitoring and management program to remove pest plant species and weeds. Control shall be achieved by regular mowing or herbicide application. Knockdown or residual herbicides (or a combination of the two) shall be used depending on whether the weeds have emerged, the time of year and the weeds present. • Disturbed areas to be rehabilitated will be monitored for effective restoration and rehabilitation.	**L4 – Low**	Site Based Environmental Management Plan Weed management procedure Vehicle hygiene procedures Personnel induction
		Potential impact on endangered ecological communities	**L5 – Low**		**L4 – Low**	
		Loss and fragmentation of riparian and aquatic habitat	**L5 - Low**		**L4 – Low**	
		Mortality of protected and threatened fauna	**M9 – Moderate**		**L5 – Low**	
		Creation of barriers to fauna movement	**L5 – Low**		**L4 – Low**	

	• Solid waste handling, processing and utilisation.
	• Liquid waste storage, handling and utilisation
	• Vehicular movements on unsealed roads
	• Use of chemicals
	• Noise impacts
	• Uncontrolled fires/bushfires
		Edge effects from road noise and light	**L5 – Low**	• All habitat trees retained where practicable.
				• Major drainage lines are to be bridged and loss of riparian vegetation to be minimised.
				• Waterway crossings for fish passage are maintained.
				• Implement vehicle hygiene procedures to prevent the introduction of pest plants, spread of pest plants and disease.
				• Provisions to limit heavy vehicle speeds and for signage along access roads.
				• Methods and communication tools to monitor road strike and mortality of wildlife.
				• Aquatic weeds in water storages shall be controlled via mechanical and/or chemical means. Chemical control shall be undertaken with considerable care, considering the identity of the weed, the effect of herbicides on desirable plants, fish and other aquatic life and the eventual use of the water.
				• Implement a pest management program to control pest animal species already present, using acceptable methods as well as identifying potential pest species, their likely distribution and methods to prevent their spread.
				• Wild dog, fox and vermin pest species populations on the Development site shall be monitored and managed to prevent proliferation and spread.
				• Pest animal control programs shall use the most humane, target specific, cost effective and efficacious techniques available.
				• Mice and rat populations will be mitigated:
				  • by minimising feed wastage and spillage to minimise likelihood of attracting vermin)
				  • implementing a baiting program if the vermin population reaches a nuisance level.
				• Fly breeding sites shall be mitigated using:
				  • Several control methods such as biological, chemical and physical methods following integrated pest management (IPM) principles shall be used.
				  • Best practice sanitation methods such as solid waste management practices (pen cleaning, under-fence cleaning) to minimise fly breeding sites.
				  • Controlling weeds and keeping grass and other vegetation short, particularly around pens, drains, sedimentation systems and holding ponds makes it more difficult for flies to find resting places and reduces the vegetation–manure interface, a preferred breeding substrate for stable flies.
				  • Moist silage provides a suitable substrate for fly breeding. Subsequently, silage spills particularly along the sides of silage pads shall be cleaned up, and the silage pads covered so that the edges are sealed to reduce fly breeding in this area.
				• Composting carcasses shall be covered with manure.
				• Domestic waste shall be managed appropriately and in accordance
					L4 – Low	

		Introduction and spread of terrestrial and /or aquatic weeds and pest fauna species	**M9– Moderate**		**L5 – Low**	

				with any relevant statutory requirements.		
Hydrology and flooding	• Waterway and drainage line crossings • Transverse drainage	Restricted flow paths causing localised flooding due to access road infrastructure structures placed on floodplain	**L6 – Low**	• The Development is sited above the height of a 100-year average recurrence interval (Q_{100}) flood level. • Development designed, constructed and operated in accordance with the conditions of approval of the Development. • Evacuation and access assessed in consultation with landowners. • Monitor rain radar and flooding forecasts and ensure response preparedness. • Prepare site for flood and severe rainfall events (where forecast) to minimise inundation impacts. • Waterway and drainage crossings maintained to ensure the integrity and ongoing compliance with specified design criteria. • Solid waste and effluent application infrastructure sited so that they do not pose an unacceptable risk to flood afflux levels. • Solid waste and effluent are not applied to on-site utilisation areas where and when there is a reasonable probability that the applied materials will cause pollution of surface water (e.g. on land directly abutting a watercourse or when a flood event is imminent).	**L6 – Low**	Site Based Environmental Management Plan National Guidelines for Beef Cattle Feedlots in Australia 3rd Edition, MLA, 2012a) Personnel induction and training
		Changes to flood afflux levels during flood events – increased impact to receivers	**L6 – Low**		**L6 – Low**	
		Flood damage to plant, equipment or infrastructure	**L6 – Low**		**L6 – Low**	
		Erosion of access road during large flood events	**L6 - Low**		**L6 – Low**	
		Change to flood regime due to topographical changes and modification of catchments	**L6 - Low**		**L6 – Low**	
		Impacts to flood evacuation and access movements	**L6 - Low**		**L6 – Low**	
Noise and vibration	• Livestock handling and movement • Feed processing and preparation equipment (electric motors, conveyors, roller mills) • Feed delivery mobile plant (feed trucks) • Solid waste management (front-end loaders, haulage trucks, screening equipment, tractors etc) • Effluent management (pumping and generators) • Water supply and reticulation (pumping) • Farming plant and	Noise impacts on sensitive receivers during operation	**L5 – Low**	• Low-stress cattle handling techniques employed to manage cattle to ensure they are handled quietly and efficiently. • Adherence to working hours in conditions of approval unless otherwise approved. • Minimising heavy vehicles' entry to site and departure from site outside the nominated operational hours. • Respite periods for noisy activities (in accordance with regulatory guidelines). • Operation equipment selected, operated and maintained to minimise noise impacts and where necessary fitted with silencers and "smart" reversing safety devices. • Managing operation vehicle routes and speed of vehicles. • Establish and maintain complaints management system. • Awareness training for staff and contractors in environmental noise issues. • Minimising the use of horn signals and consideration of alternative methods of communication. • Switching off any equipment not in use for extended periods.	**L4 - Low**	Operational Environmental Management Plan Environment Protection (Noise) Policy 2019 Complaints register Personnel induction and training
		Noise exceeding regulatory criteria levels	**L5 – Low**		**L4 - Low**	
		Vibration impacts on sensitive receptors during operation	**L6 - Low**		**L4 - Low**	

	equipment (tractors, front-end loaders etc)			• All plant and equipment required would be well maintained and regularly serviced. • Community consultation with local residents to assist in the alleviation of community concerns. • Selection of machines that are inherently free of or have low vibration. • Vibration-producing machinery shall be supported on stiff structural components and be provided with efficient vibration isolation systems. • Maintenance of plant and equipment machinery – ensuring rotating parts are balanced, vibration isolators are functioning as intended etc.		
Traffic and transport	• Light vehicle travel to / from site – staff, visitors etc • Heavy vehicle travel to and from site - livestock, commodities and general deliveries etc • Operation vehicle movements – feed trucks, solid waste management etc	Temporary disruptions / delays to local traffic	**L5 – Low**	• Identify and assess roads likely to be affected by Development's operation and develop methods to minimise traffic impacts. • All vehicles carrying materials to be adequately covered (using a tarpaulin) as required to prevent any loss of material, which may cause driver safety issues. • Maintain principal haulage route, advance and position intersection signage. • Monitoring of any traffic delays.	**L4 - Low**	Site Based Environmental Management Plan Complaints register Personnel induction
		Temporary restrictions to private access roads	**L5 – Low**		**L4 – Low**	
		Permanent adjustment to some private property access roads and local/regional roads	**L5 – Low**		**L4 – Low**	
		Changed traffic patterns	**M11 – Moderate**		**L4 – Low**	
		Accidents - Safety of commuters, pedestrians, contractors and subcontractors.	**H22 – High**		**M15 – Moderate**	
Indigenous cultural heritage	• Routine maintenance activity • Excavation of soils	Impact to undiscovered or undocumented aboriginal sites, artefacts and cultural places	**L5 – Low**	• Induct personnel on heritage issues, safeguards, and the location of indigenous heritage items. • If design changes or operation activities impact on areas outside of those identified in the Development Consent, relevant stakeholders will be consulted. • Protect identified heritage items with protective fencing or flagging from being disturbed during operation. • Regular inspection of heritage protection fencing.	**L4 – Low**	Site Based Environmental Management Plan Personnel induction
		Finding / disturbing burials or human remains	**L5 - Low**		**L4 – Low**	
Resource and waste management	• Water usage • Energy usage • Generation of general waste during operation activities including building materials, excess unsuitable spoil	Improper disposal of waste material	**M12 – Moderate**	• Sustainable use of groundwater and surface water in accordance with the Development's allocation and entitlements. • Waste materials contained in waste bins or other suitable containers, and collected for recycling, reuse or disposal by the licensed waste contractor. • Use recycled products where possible. • Separate, contain, manage and dispose contaminated waste to prevent	**L6 – Low**	Site Based Environmental Management Plan Meat and Livestock Australia, 2015b, Beef cattle feedlots: waste management and
		Direct impacts to land, groundwater or surface waters.	**M12 – Moderate**		**L6 – Low**	
		Depletion or sterilisation of non-renewable resources,	**M11 – Moderate**		**L6 – Low**	

	material, vegetation material • Generation of solid waste • Generation of liquid wastes (effluent/sewage) • Handling of chemicals, waste and hazardous goods. • Fuel storage and distribution and waste oil disposal	including water and energy		migration and further contamination whilst maintaining compliance with regulatory requirements. • Label and store all liquid waste containers in a bunded area prior to removal off-site. • Undertake inspections of the worksite and waste storage areas to ensure litter / debris is regularly cleaned up and contained on site. • Bunding of areas used for fuel, oil and chemical storage in accordance with Australian Standards and regulatory guidelines. • Locate appropriate waste removal contractor and/or appropriately licenced waste facilities in the area. • Sustainable on-site utilisation of effluent and solid waste. • Modern and well-maintained equipment is to be used to encourage fuel efficiency • Stormwater from roof structures captured for incidental uses. • Water recycling measures are implemented where practical.		utilisation, Meat and Livestock Australia, North Sydney, NSW Personnel induction and training
		Difficult disposal of waste material including hazardous waste.	**M13 – Moderate**		**L6 – Low**	
		Potential leaks and spills of fuels and/or hazardous materials.	**M12 – Moderate**		**L6 – Low**	
		Impact to water quality due to inappropriate solid and/or liquid waste management.	**M12 – Moderate**		**L6 – Low**	
Visual amenity and landscaping	• Revegetation /landscaping • Solid waste management • Rehabilitation of disturbed land • Removal of visually prominent native vegetation • Evening / night activities	Change to landscape character and visual environment as a result of large embankments, disturbed areas, night activities, removal of vegetation, and access road.	**L5 – Low**	• Landscape revegetation will incorporate the surrounding landscape types and vegetation patterns. • Embankments will be stabilised by appropriate landscape treatments. • The use of night-lighting will be minimised and directed away from rural residences where possible. • Site facilities and areas surrounding them will be kept tidy and be regularly mowed, cleaned and maintained. • Solid waste management in accordance with DAF guidelines. • Monitoring, evaluation and management of landscape revegetation areas including treatment of weeds.	**L2 – Low**	Site Based Environmental Management Plan Meat and Livestock Australia, 2015b, Beef cattle feedlots: waste management and utilisation, Meat and Livestock Australia, North Sydney, NSW Obtrusive Effects of Outdoor Lighting, Sydney, Australia. Personnel induction
		Visual impacts as a result of solid waste management	**L5 – Low**		**L2 – Low**	
		Poor management of revegetation	**L5 – Low**		**L2 – Low**	
		Visual impacts as a result of obtrusive lighting	**L5 – Low**		**L4 - Low**	
Fire	• Handling of hazardous materials. • Fuel storage and distribution • Hot works • Materials handling and storage e.g. hay storage, grain dust	Fire damage to plant, equipment or infrastructure	**M9 – Moderate**	• Establish fuel free zones around materials which are adjacent to bush fire hazard areas. • Provide fuel reduced zones in areas of high ignition potential (e.g. along roads, refuelling areas, infrastructure etc) to slow the development of fires. • Access tracks maintained on the site. • Ensure any hot works have been approved by site management beforehand and adequate controls are in place e.g. fire extinguishers • Hazardous materials are stored and used in accordance with relevant state guidelines and Australian Standards for the storage of hazardous and dangerous goods and spill management. • Fire-fighting equipment will be held on-site to respond to any fires that may occur during operation.	**L5 – Low**	Site Based Environmental Management Plan Personnel induction and training
		Impacts to surrounding properties.	**M11 – Moderate**		**L6 – Low**	
Soils and	• Rehabilitation of	Erosion of exposed	**M11 –**	• Clean and dirty water runoff will be adequately separated to avoid	**L6 – Low**	Site Based

sediments	disturbed land • Solid waste handling, processing and utilisation. • Liquid waste storage, handling and utilisation • Handling of chemicals, waste and hazardous goods. • Fuel storage and distribution and waste oil disposal • Maintenance of plant and equipment, servicing and refuelling • Holding pond / sediment basin management • Noxious weed treatment	soils causing sedimentation of waterways and aquatic environments	**Moderate**	mixing where possible through the use of diversions, clean water drains, and the installation of permanent drainage infrastructure. • Exposed areas will be progressively rehabilitated. Methods will include permanent vegetation, or temporary protection with cover crops. • Exposed batter slopes and embankments, and other areas exposed but not worked, will be protected from erosion through implementation of permanent stabilisation measures e.g. seeding, revegetation. • A rumble grid will be provided at the access exit point from the Development site onto public roads to minimise the tracking of soil and particulates onto public roads. • Vehicle movements from site will be minimised during wet weather if the tracking of mud becomes an issue. • Hazardous materials storage meets regulatory requirements for bunding/storage and spill kits available. • Solid waste will be stored in designated solid waste stockpile/carcass composting area in accordance with relevant guidelines. • Solid waste will be sustainably applied to land within the solid waste utilisation area. • When available, effluent from the holding pond will be sustainably applied to land within the effluent utilisation area. • The land application of solid waste and effluent is made at rates consistent with the ability of soils and crops grown in the on-site utilisation areas to sustainably utilise the applied nutrients, salts and organic matter, under the climatic conditions prevailing at the site.		Environmental Management Plan IECA (2008) Best Practice Erosion and Sediment Control Meat and Livestock Australia, 2015b, Beef cattle feedlots: waste management and utilisation, Meat and Livestock Australia Personnel induction and training
		Impacts to the quality of soils in the solid waste and effluent utilisation areas	**M12 – Moderate**		**M11 – Moderate**	
		Contamination of soils due to spills and leaks and inappropriate storage of hazardous material	**M9 – Moderate**		**L4 – Low**	

Appendix B – Site Inspection photos

Photograph 1 – Subject land - Current entrance off Getta Getta Road

Photograph 2 – Subject land current land use - Cropping and beef cattle grazing

Photograph 3 – Subject land current land use – Beef cattle feedlot and cropping

Photograph 4 – Subject land current land use – Beef cattle feedlot and dryland cropping

Photograph 5 – Subject land current land use – riparian areas

Photograph 6 – Subject land current land use – Infrastructure

Photograph 7 – Subject land - Current land use – irrigation areas

Photograph 8 – Subject land - Current land use – Vegetated buffer along Getta Getta Road

Photograph 7 – Locality land use – Dryland cropping

Photograph 8 – Locality land use (east) – Dryland cropping / Native vegetation

Photograph 9 – Locality land use (east) – Dryland cropping / rural infrastructure

Photograph 10 – Locality land use (west) – Dryland cropping / Native vegetation