Hydrobiology

AQUATIC MSES ASSESSMENT

BRISBANE | PERTH | SINGAPORE | BRAZIL

CENTURION NORTH PROJECT



B25239

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JANUARY 2026

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EXECUTIVE SUMMARY

Hydrobiology was commissioned by Centurion Coal Mining Pty Ltd (a subsidiary of Peabody Energy Australia Pty Ltd) to undertake an aquatic ecology assessment to support an Environmental Authority (EA) and Progressive Rehabilitation and Closure Plan (PRCP) amendment under the *Environmental Protection Act 1994* for the proposed exploration and early works associated with the Centurion North Development (CND). The Project, located approximately 40 km north of Moranbah within Mining Lease (ML) 1790, involves coal seam gas exploration, construction of gas risers, service and sampling boreholes, a bleeder shaft, disturbance for future surface works, construction of gate roads, and underground in-seam gas drainage works.

The assessment was undertaken in accordance with relevant Queensland environmental legislation, including the *Environmental Protection (Water and Wetland Biodiversity) Policy 2019*, *Nature Conservation Act 1992*, *Fisheries Act 1994*, *Water Act 2000*, and *Environmental Offsets Act 2014*. The study aimed to identify aquatic ecological values, groundwater-dependent ecosystems (GDEs), and Matters of State Environmental Significance (MSES), and to assess potential environmental impacts arising from the proposed activities.

A detailed desktop review and two-season field survey program (early-wet and late-wet 2024) were conducted across six aquatic sites and nine groundwater bores. Survey methods included assessments of aquatic habitat, water quality, macroinvertebrates, fish, turtles, platypus, aquatic flora, and stygofauna, following relevant State monitoring guidelines. No true stygofauna or threatened aquatic species were recorded, and the field results confirmed that the waterways within the Project Area—Goonyella Creek, Kennedy Creek, Charlie Creek, and Skull Creek—are highly intermittent and lack the permanent aquatic habitats required to support species of conservation significance such as the white-throated snapping turtle, Fitzroy River turtle, or platypus.

A combination of desktop review, elevation analysis, and two-season field surveys (early-wet and late-wet 2024) were undertaken to characterise aquatic habitats and groundwater dependency. The elevation analysis demonstrated that sections of Kennedy Creek and Charlie Creek lie within lower-lying areas and geomorphic depressions, coinciding with mapped potential GDE polygons in the Bureau of Meteorology's GDE Atlas (2024). This suggests that these reaches may intermittently receive groundwater inputs following recharge events. However, field verification confirmed that both systems are highly intermittent, with surface flow limited to short-duration rainfall events and no evidence of persistent baseflow or groundwater seepage. Consequently, while aquatic GDEs may occur intermittently, their expression is limited and of low ecological persistence under current climatic and hydrological conditions.

The impact assessment concluded that the proposed exploration and early works are unlikely to result in any measurable or residual impacts on aquatic ecosystems, groundwater-dependent ecosystems, or Matters of State Environmental Significance (MSES). Within the Project Area, the only MSES value present is waterways providing for fish passage, associated with Goonyella Creek, Kennedy Creek, and Charlie Creek (low to moderate impact waterways). No other MSES values, such as wetlands of High Ecological Significance, High Ecological Value waters, or habitat for threatened aquatic species, are supported within or downstream of the Project Area.

No in-stream or riparian disturbance is proposed, and the subsidence assessment (SCT Operations, 2025) determined that there are no predicted subsidence-related impacts to waterways providing for fish passage. Furthermore, no waterway barrier works or hydraulic modifications are proposed that would impede connectivity or restrict fish movement.

Predicted groundwater drawdown within the alluvium (SLR, 2025b) and the Tertiary basalt aquifer of up to approximately 2 m and 5 m, respectively, has been modelled along Kennedy Creek. Along Charlie Creek, where other mapped aquatic groundwater-dependent ecosystems (GDEs) may occur, drawdown in the basalt aquifer is predicted to be up to approximately 1 m. In some locations, the model indicates that the alluvium is not saturated under base-case conditions, meaning that predicted drawdown represents a conceptual response rather than a reduction in an established groundwater table. Kennedy Creek and Charlie Creek are intermittent, lower-order watercourses with low GDE value, reflecting their modified condition, limited groundwater dependency, and the absence of state-significant aquatic species or habitat features. Consequently, any groundwater-related changes to flow or hydraulic conditions are expected to be minor, highly localised, and subordinate to climatic controls.

Surface water impacts, including sediment-laden runoff, drilling fluids, or contaminants, are also expected to be of low risk and will be effectively managed through best-practice erosion, sediment, and spill management measures consistent with the Best Practice Erosion and Sediment Control Guidelines (IECA, 2008). Overall, the Project is not expected to result in any significant or residual impacts to MSES, groundwater-dependent ecosystems, or aquatic environmental values.

Overall, the Project presents a low risk of adverse impacts to aquatic ecological values and MSES. No significant residual impacts are predicted for any aquatic fauna, flora, or groundwater-dependent ecosystems. With the implementation of standard management and monitoring measures, the Project is not expected to compromise the environmental values or aquatic and GDE ecological function.

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1. INTRODUCTION

1.1 PROJECT OVERVIEW

In late 2022, Peabody Energy Australia Pty Ltd (Peabody) initiated the redevelopment of the Centurion Coal Mine (CCM), a premium hard-coking coal longwall operation in Australia. Centurion Coal Mining Pty Ltd (a subsidiary of Peabody Energy Australia Pty Ltd) has secured the rights to explore resources within Mining Lease ML 1790 and ML 70495, located immediately adjacent to and directly north of the CCM. This new development area is referred to as the Centurion North Development (CND) or Major Amendment 2 Surface Activity in figures.

Centurion Coal Mining Pty Ltd is seeking authorisation to undertake exploration activities and early works to support future longwall extraction. Exploration and early work activities include coal seam gas exploration, construction of gas risers, service boreholes, sampling boreholes, a bleeder shaft, disturbance for future surface works, construction of gate roads, and Underground In-Seam gas drainage works on ML 1790. The activities and infrastructure associated with the early works program are referred to as 'the Project'.

To obtain authorisation for these activities, an amendment is required under the Queensland *Environmental Protection Act 1994* (EP Act) to the current Environmental Authority (EA) P EA 100658735 and Progressive Rehabilitation and Closure Plan (PRCP) P PRCP 100669070_V3.

An application to amend the EA and PRCP will be submitted to the Department of Environment, Tourism, Science and Innovation (DETSI) as the administering authority for approval.

1.2 SCOPE AND OBJECTIVES

To support the amendment to the EA, Hydrobiology was commissioned to prepare the following scope items:

- Review and present findings of the desktop assessment including any available previous monitoring of the area to compliment survey results. This focused on available water quality, groundwater dependant ecosystems (GDE – groundwater surface expressions), stygofauna, macroinvertebrate, and aquatic habitat datasets, which will be used to characterise Matters of State Environmental Significance (MSES) of the Project Area and surrounds;
- Undertake field surveys to collect current baseline data on aquatic and subterranean (i.e. stygofauna) ecosystems potentially impacted by the Project;
- Baseline report. This characterised the current condition of aquatic and subterranean ecosystems within the Project Area; and
- Impact assessment. This includes a significant residual impact (SRI) assessment of MSES in accordance with State guidelines/criteria. Based on any identified SRI to MSES, potential offset requirements will be outlined.

1.3 LOCATION

The Project is located approximately 40 km north of Moranbah, QLD (Figure 1-1). Surface and underground activities are shown in Figure 1-2 and Figure 1-3, respectively. The Project objectives will be to gain external approvals to develop the Project initially within the Mining Lease (ML) 1790 (via the EA amendment) and ultimately across tenements comprising ML1790 and ML70495 and part of Mineral Development Licence (MDL) 3010 (Project Area), to be obtained through separate approvals at a later date.

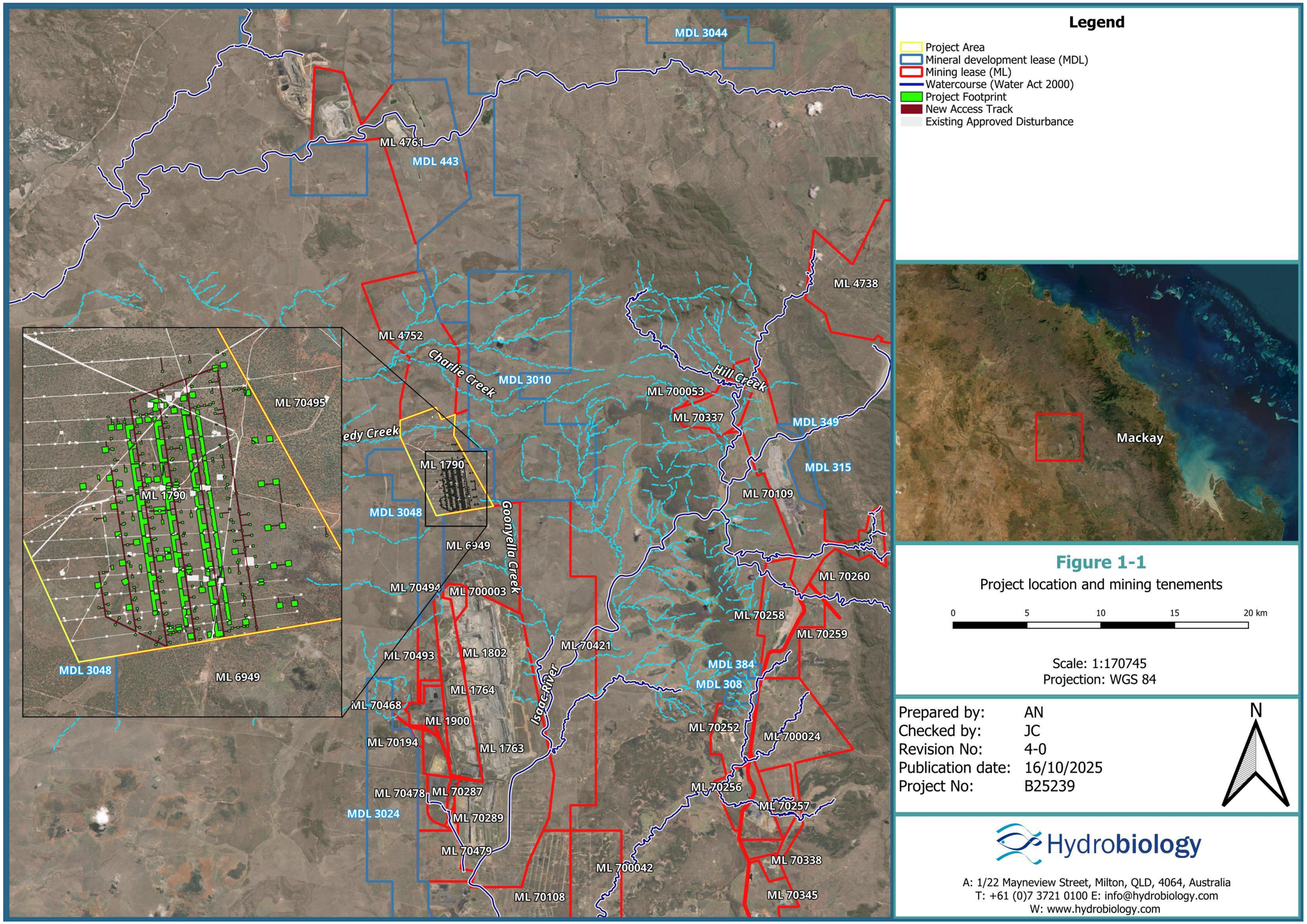


Figure 1-1 Project location and mining tenements.

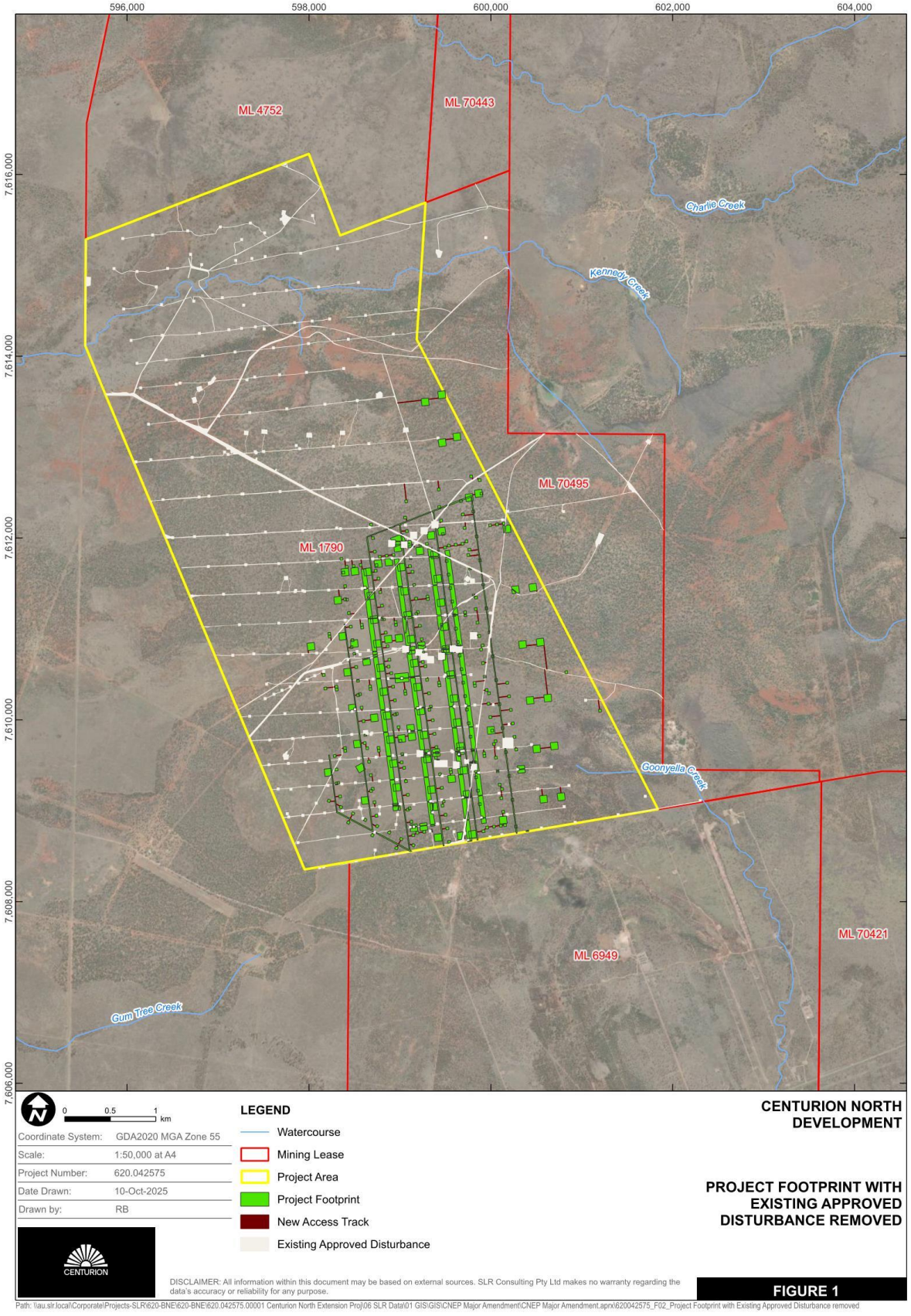


Figure 1-2 Surface activities to be undertaken

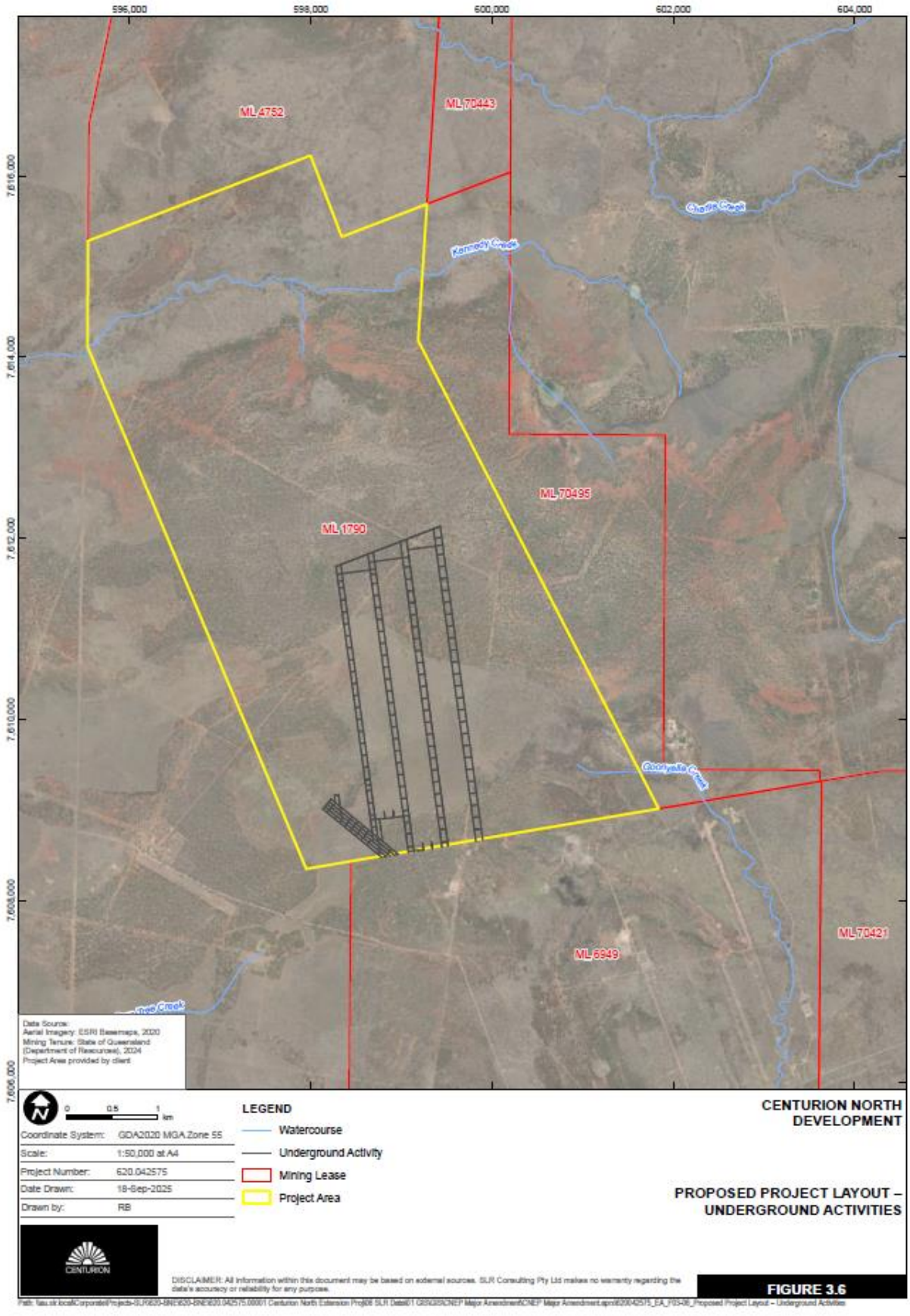


Figure 1-3 Underground activities to be undertaken.

2. REGULATORY ENVIRONMENT

2.1 BACKGROUND

MSES relevant to the Project are defined below. A summary table concerning such matters can be viewed in Table 2-1.

2.1.1 *ENVIRONMENTAL PROTECTION ACT 1994* (EP ACT)

The EP Act provides the legislative framework for ecologically sustainable development in Queensland. Its purpose is to protect Queensland's environment while allowing for development that improves the total quality of life, now and in the future, in a way that maintains the ecological processes on which life depends.

Section 319 of the EP Act defines the General Environmental Duty and states that a person must not carry out any activity that causes, or is likely to cause, environmental harm unless the person takes all reasonable and practicable measures to prevent or minimise the harm. Section 320 of the EP Act also includes a duty to notify, where a person is required to give notice where serious or material environmental harm is caused or there is a risk of such harm, and that harm is not authorised.

The mechanisms by which the EP Act achieve its objectives include the General Environmental Duty, regulation of contaminated land, licencing of Environmentally Relevant Activities (ERAs) as outlined

under Schedule 2 of the EP Regulation and issuing the Environmental Protection Policies (EPPs) and Regulations under the Act.

2.1.2 ENVIRONMENTAL PROTECTION (WATER AND WETLAND BIODIVERSITY) POLICY 2019 (EPP (WWB))

The EPP (WWB) provides for the achievement of the objectives of the EP Act in relation to Queensland waters. Environmental values for Queensland waters include the protection of aquatic ecosystems. The components of aquatic ecosystems to be protected are generally specified under the EPP (WWB) for a given waterway if water quality objectives have been listed under Schedule 1 of the EPP (WWB).

2.1.3 *NATURE CONSERVATION ACT 1992* (NC ACT)

The purpose of the NC Act is the conservation of nature while allowing for the involvement of indigenous people in the management of protected areas in which they have an interest under Aboriginal tradition or Island custom. The NC Act provides the framework for the declaration and management of protected areas, and the protection of wildlife listed under the Nature Conservation Regulation (Plants) 2020 and Nature Conservation Regulation (Animals) 2020.

The NC Act, section 71 describes the classes of wildlife to which the Act applies as protected wildlife, which is:

- Extinct wildlife;
- Extinct in the wild wildlife;
- Critically endangered wildlife;
- Endangered wildlife;
- Vulnerable wildlife;
- Near threatened wildlife;
- Least concern wildlife;
- International wildlife; and
- Prohibited wildlife.

2.1.4 NATURE CONSERVATION REGULATION (PLANTS) 2020 AND NATURE CONSERVATION REGULATION (ANIMALS) 2020

These NC Regulations prescribe the status of particular species in accordance with the categories set out in the Act. It also discusses special least concern animals which are defined as:

- echidna (*Tachyglossus aculeatus*);
- platypus (*Ornithorhynchus anatinus*) – relevant to this study; and
- least concern birds.

It is an offence to 'take' protected wildlife without a license, permit or other authority (section 320), where take is defined in the NC Act. It is also an offence for a person, without a reasonable excuse, to tamper with an animal breeding place that is being used by a protected animal to incubate or rear the animal's offspring.

2.1.5 *FISHERIES ACT 1994*

The *Fisheries Act 1994* provides for the management and protection of fisheries resources, including regulating development that might impact declared fish habitat areas and fish passage. It regulates the taking and possession of specific fishes, removal of marine vegetation, the control of development in areas of fish habitat and listed noxious fish species.

The Fisheries Act establishes a risk hierarchy for waterway barrier works across Queensland and guides the design and assessment process for the implementation of new and altered waterway crossings. Development potentially impacting fish passage is either:

- Accepted development, where the design of infrastructure strictly conforms to the Department of Primary Industries' (DPI) Accepted Development Requirements for Operational Work that is Constructing or Raising a Waterway Barrier Works (2017); or
- Assessable development, where the proposed development requires assessment by DPI and the design of the development is required to demonstrate compliance with the State Development Assessment Provisions (SDAP State code 18).

The Queensland Waterways for Waterway Barrier Works spatial data layer assists in the determination of whether the site of proposed waterway barrier works requires assessment and approval under the Act. Waterways are colour coded to show the risk of adverse impact from in-stream barriers on fish movement and whether waterway barrier works can potentially proceed under the accepted development requirements or whether the works will require a development approval. Culverts, bridges, dams and other temporary or permanent waterway barrier works that cannot comply with accepted development requirements will result in waterway barrier works designs requiring approval from DPI.

2.1.6 *ENVIRONMENTAL OFFSETS ACT 2014* (EO ACT) QUEENSLAND

The EO Act provides for environmental offsets to counterbalance significant residual impacts of activities on MSES and establishes a framework in relation to environmental offsets. The EO Act defines a significant residual impact in Section 8 as an adverse impact, whether direct or indirect, of a prescribed activity on all or part of a prescribed environmental matter that:

- Remains, or will or is likely to remain, (whether temporarily or permanently) despite on-site mitigation measures for the prescribed activity; and
- Is, or will or is likely to be, significant.

In identifying whether an activity will, or is likely to have, a significant residual impact, an administering agency may refer to:

- The State guideline that provides guidance on what constitutes a significant residual impact for MSES (DETSI, 2014).

For State matters where a Project is determined to have an SRI on MSES, an environmental offset is required in accordance with the EO Act. Offsets under the EO Act may be delivered through a financial settlement, a proponent-driven offset, or a combination of both.

2.2 OTHER LEGISLATION

2.2.1 *QUEENSLAND WATER ACT 2000*

The Queensland *Water Act 2000* provides for the sustainable management of water resources in Queensland, including requiring permits for works within watercourses and providing for the sustainable allocation of water for environmental purposes (i.e. environmental flows to protect ecological functions in rivers). Many of these functions are documented in Water Plans for a catchment, which include ecological outcomes and obligations for water licence holders or water scheme operators. For example, in relation to the Project, the Water Plan (Fitzroy Basin) 2011 details how the water in the plan area is to be allocated and sustainably managed. They also include obligations on the infrastructure owner to undertaken monitoring to assess the performance of implemented management measures. This includes environmental matters such as threatened species.

2.2.1.1 GENERAL ECOLOGICAL OUTCOMES

The Water Plan (Fitzroy Basin) 2011 aims to maintain the ecological integrity of the region's water systems by minimising changes to the natural variability of flows that sustain aquatic ecosystems. It emphasises maintaining connectivity within the river system to enable the movement of native aquatic species and support ecosystem functions, river-forming processes, and flow-related health. The plan also prioritises preserving freshwater delivery to estuaries and the Great Barrier Reef lagoon, supporting the productivity of these receiving waters. Additionally, it seeks to protect ecological assets and refugia, such as waterholes and wetlands, from the impacts of water extraction, enhance understanding of ecosystem health drivers, and support vital surface water-groundwater interactions, particularly for ecosystems dependent on groundwater like riparian vegetation and wetlands.

2.2.1.2 ENVIRONMENTAL FLOW OBJECTIVES

Environmental Flow Objectives (EFOs) in the Water Plan are assessed using a range of performance indicators tailored to different flow conditions. For low-flow periods, the key indicator is base flow, which reflects the minimum sustained flow in a system. For medium-to-high flow, several indicators are used, including mean annual flow, median annual flow ratio, annual proportional flow deviation, mean wet season flow, and specific flow volumes expected to occur on a daily basis over 2, 5, and 20-year periods. Additionally, exceedance duration flows (i.e. flows exceeding 4% and 10% of the time) are considered.

Relative to the Project Area, the EFOs that must be maintained are specific to Node 9 (Isaac River at Yatton), as defined in the Water Plan. The Project must ensure that proposed activities do not result in any impacts to the EFOs at this node.

These obligations are further outlined in the Water Plan (Fitzroy Basin) 2011.

2.2.2 *BIOSECURITY ACT 2014*

The purpose of the *Biosecurity Act 2014* (QLD) (Biosecurity Act) is to provide a framework for minimising and managing biosecurity risks in Queensland, ensure the safety of agricultural inputs, align responses to biosecurity events to national and international obligations, and manage risks associated with:

- Emerging, endemic and exotic pests and diseases that impact the built, social and natural environment;
- The transfer of diseases from animals to humans and vice versa; and
- Biological, chemical, and physical contaminants in carriers.

The Biosecurity Act establishes a General Biosecurity Obligation that requires all people in Queensland to be responsible for managing biosecurity risks that are under their control and that they know about or should reasonably be expected to know about. It also defines prohibited and restricted biosecurity matters and places. Prohibited matters are listed in Schedule 1 of the Biosecurity Act, and restricted matters are listed in Schedule 2.

Under the General Biosecurity Obligation, individuals and organisations who undertake activities that present a biosecurity risk must:

- Take all reasonable and practical measures to prevent or minimise the risk;
- Prevent or minimise the adverse effects on a biosecurity consideration;
- Minimise the likelihood of causing a biosecurity event, and limit the consequences of a biosecurity event; and
- Not do or omit to do something if it is known, or ought to reasonably be known, that this may exacerbate adverse effects.

Aquatic pests that are restricted biosecurity matters listed in Schedule 2 of the Act include:

- Various pathogens;
- Fish, including but not limited to eastern gambusia (*Gambusia holbrooki*), carp (*Cyprinus carpio*) and tilapia (*Oreochromis mossambicus*);
- Aquatic plants, including but not limited to salvinia (*Salvinia molesta*), water hyacinth (*Eichhornia crassipes*), and cabomba (*Cabomba caroliniana*); and
- Other plants that are common weeds of riparian areas.

2.2.3 *BIOSECURITY REGULATION 2016* (QLD)

The *Biosecurity Regulation 2016* (QLD) prescribes the ways in which the General Biosecurity Obligation can be met to prevent or minimise a biosecurity risk, including measures to prevent or control the spread of biosecurity matter and maximum acceptable levels of contaminants in carriers.

Table 2-1 Legislation relevant to aquatic ecological matters of the Project.

Legislation	Environmental value	Notes
Matters of State Environmental Significance from Schedule 2 of the Environmental Offset Regulation 2014		
Environmental Protection Act 1994	A wetland in a wetland protection area (WPA)	There are no mapped WPA within the Project Area, CND or surrounds.
	A wetland of high ecological significance (HES) shown on the map of Queensland wetland environmental values	The closest MSES High Ecological Significance (HES) wetland is 25 km East of the Project Area (Figure 2-1). Given this distance from the Project Area and that it is located upstream of where Goonyella Creek joins the Isaac River, no impacts are expected. There is also a HES wetland located west of the Project Area; however, they are located upstream of where Eaglefield Creek joins the Suttor River, therefore no impacts are expected.
	A wetland or watercourse in high ecological value (HEV) waters	The closest MSES declared High Ecological Value (HEV) waters are 30 km northeast of the Project Area (Figure 2-1). As with the western HES wetlands, no impacts are expected to the HEV wetland as it is located further upstream of where Eaglefield Creek joins the Suttor River.
Nature Conservation Act 1992	A habitat for an animal that is critically endangered wildlife, endangered wildlife or vulnerable wildlife or a special least concern animal	Protected species (two turtles) or species habitat may occur within the Project Area and its surrounds (Section 4.10). Special least concern flora, known to occur in the wider Isaac River and Suttor River drainage sub-basins: • *Aponogeton queenslandicus;* • *Caldesia oligococca;* • *Ceratopteris thalictroides;* • *Cycnogeton dubius;* • *Cycnogeton multifructus;* • *Cycnogeton procerus;* • *Hydrilla verticillata;* • *Najas tenuifolia;* • *Nymphaea gigantea;* • *Nymphaea jacobsii;* • *Nymphaea violacea;* • *Nymphoides crenata;* • *Nymphoides exilifiiora;* • *Nymphoides geminata;* • *Nymphoides indica;* • *Ottelia ovalifolia;* • *Ottelia ovalifolia subsp. ovalifolia;* • *Potamogeton crispus;* • *Potamogeton octandrus;* • *Potamogeton tepperi;* • *Potamogeton tricarinatus; and* • *Triglochin nana* The special least concern platypus is also noted to occur in the wider Isaac River sub-basin. These species are further described in Section 4.10.
	A protected area	There are no protected areas within the Project Area, CND or surrounds.
Fisheries Act 1994	An area declared under the *Fisheries Act 1994* to be a fish habitat area	There are no protected fish habitat areas within the Project Area, CND or surrounds.
	Any part of a waterway providing for passage of fish only if the construction, installation or modification of waterway barrier works carried out under an authority will limit the passage of fish along the waterway.	The waterways potentially impacted by the Project are classified as follows (Figure 2-2): • Goonyella Creek – Low impact waterway • Kennedy Creek – Low to moderate impact waterway • Charlie Creek – Low to moderate impact waterway If waterway barriers (e.g., road crossings, culverts etc) are proposed for the Project the accepted development requirements for each waterway will require assessment.

Legislation	Environmental value	Notes
Other Relevant Legislation		
Environmental Protection (Water and Wetland Biodiversity) Policy 2019	The policy lists the EVs and WQOs for Queensland waters. These are a part of the legislation and therefore considered by planners and managers when making decisions about waters and/or water quality.	The policy has listed environmental values and water quality objectives for the Fitzroy Basin which include listings for biota. The environmental values and water quality objectives relevant to water quality and biota are included and compared to in this report (Section 5.4).
Environmental Offsets Act 2014	Aquatic MSES listed in Section 8 of the EO Act Environmental Offsets Regulation 2014, Schedule 2	There are aquatic MSES present with relevance to the Project. These are listed in Section 4.10.
Water Act 2000 **Water Plan Fitzroy Basin 2011**	Surface and groundwater flow	The Fitzroy Basin Water Plan list the following ecological outcomes specific to aquatic species: • To protect flows and water quality for flow-spawning fish and endemic species, including the Fitzroy golden perch (*Macquaria ambigua oriens*) • To provide for flows necessary for estuarine ecosystem functions, including flows for: – barramundi (*Lates calcarifer*) and king threadfin salmon (*Polydactylus macrochir*) recruitment; and – banana prawn (*Penaeus merguiensis*) growth. The water plan lists outcomes for groundwater dependent ecosystems (GDEs). For the Project, the EFOs relevant to Node 9 (Isaac River at Yatton), as specified in the Water Plan, must be upheld.
Biosecurity Act 2014	Aquatic pest fauna and flora	Invasive aquatic flora and fauna are known to occur within the Project Area, CND and surrounds: • Various pathogens; • Fish, including but not limited to eastern gambusia (*Gambusia holbrooki*), carp (*Cyprinus carpio*) and tilapia (*Oreochromis mossambicus*); • Aquatic plants, including but not limited to salvinia (*Salvinia molesta*), water hyacinth (*Eichhornia crassipes*), and cabomba (*Cabomba caroliniana*); and Other plants that are common weeds of riparian areas.

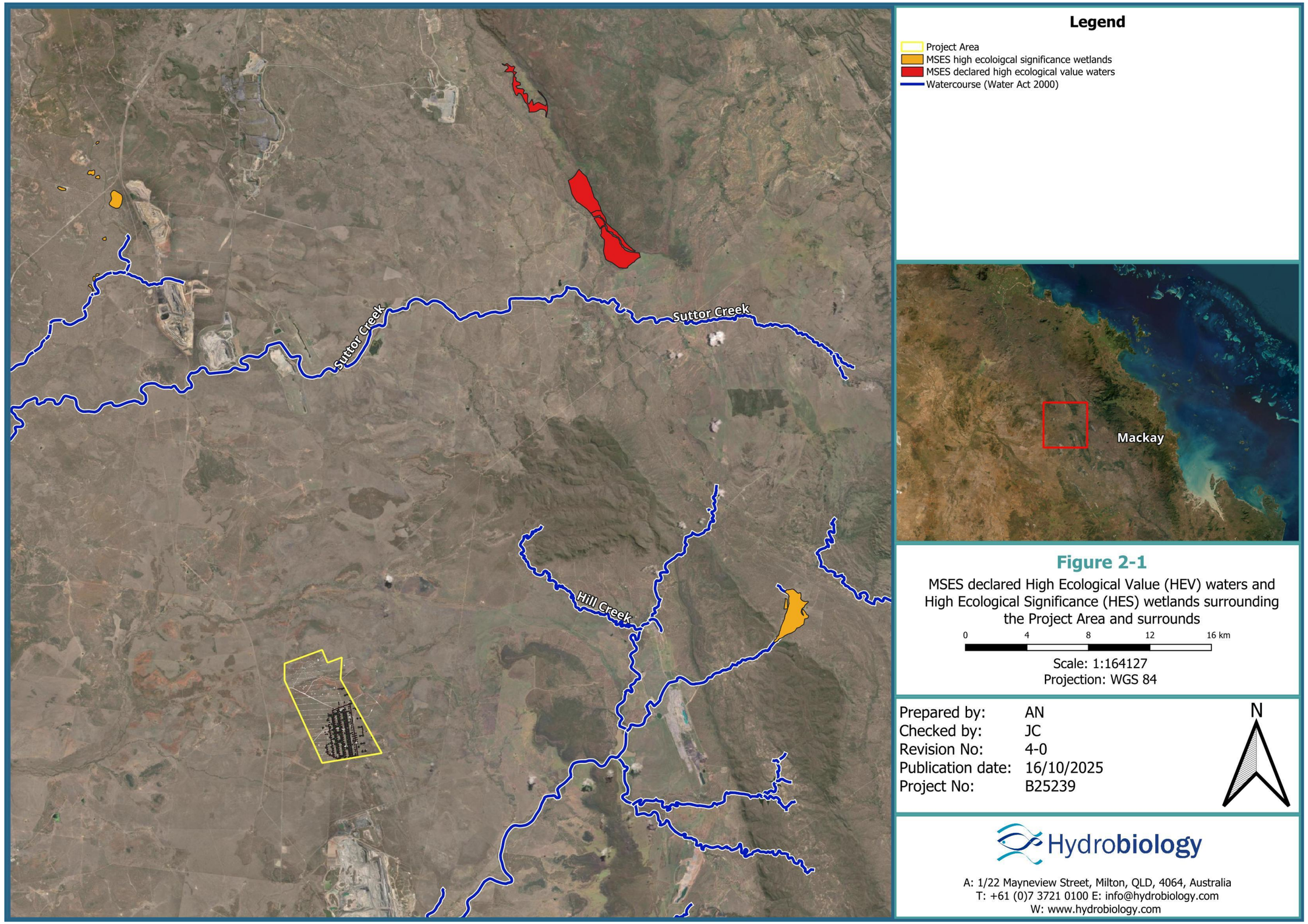


Figure 2-1 MSES declared High Ecological Value (HEV) waters and High Ecological Significance (HES) wetlands surrounding the Project Area, CND and surrounds.

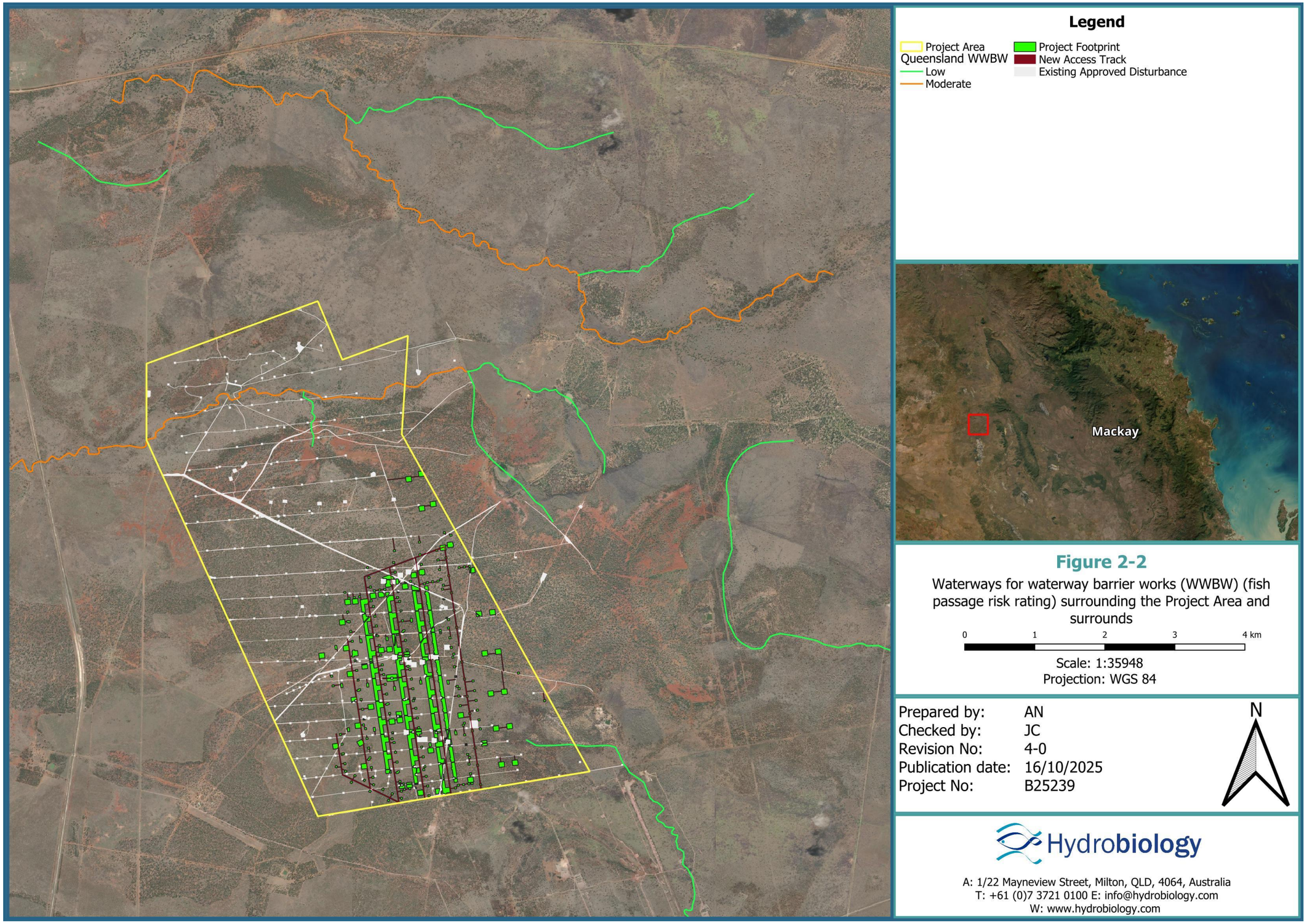


Figure 2-2 Waterways for waterway barrier works (fish passage risk rating) surrounding the Project Area, CND and surrounds

3. METHODOLOGY

3.1 DESKTOP ASSESSMENT

The aquatic ecological values were initially identified through review of regulatory instruments, which have identified the likely relevant MSES and biosecurity risks. In this section the mapping and databases associated with those values is further investigated. The following were reviewed:

- Species Profile and Threats Database (SPRAT) database;
- Wildlife online database;
- Atlas of Living Australia (ALA) database;
- Recovery plan for the various listed threatened species, where one exists;
- Schedule 1 of EPP (WWB); and
- Resources such as the Queensland Matters of State Environmental Significance Search Tool, were used to identify conservation significant species that occur or could occur in the Project Area and CND from State government dataset.

Most of the available literature/data were associated with:

- Recovery plans/programs for threatened aquatic species and their habitats;
- Published scientific papers;
- Consultants' reports (Peabody, etc.);
- Aerial photographs of the Project Area; and
- Monitoring programs, which include historical datasets.

3.2 GAP ANALYSIS AND FIELD PLAN

Based on the desktop assessment, a field program was developed to confirm desktop findings and address identified knowledge gaps. Table 3-1 defines the identified knowledge gaps based on the current literature review and details the actions and methods to address the identified gaps.

Table 3-1 Identified gaps and means to address them.

Items	Comment	Action	Method and/or Reference
Knowledge Gaps			
Habitat	Limited understanding of instream habitat features and macrohabitats within the Project Area.	Undertake systematic habitat and condition assessments	Parsons et al., (2001) – Australian River Assessment System: AusRivAS Physical Assessment Protocol NRMMRRD (2001) – AusRivAS protocols for Queensland streams
Aquatic GDEs	Limited understanding of potential aquatic GDEs in the Project Area.	Groundtruthing of surface GDE presence based on the series of questions described in Eamus et al. (2006) and Doody et al. (2018) in IESC (2018) Groundwater depth analysis	Eamus et al. (2006) Doody et al. (2018) IESC (2018)
Macrophytes	Very limited understanding of macrophyte species present within the Project Area and species coverage.	Undertake systematic macrophyte surveys including species identification and cover estimates	Cover estimate methods as per NRMMRRD, (2001) – AusRivAS protocols for Queensland streams
Water Quality	Very limited understanding of the water quality within the Project Area	In-situ physiochemical data to be collected during field surveys.	(DETSI, 2018) – Monitoring and sampling manual (ANZG, 2018) – Australian and New Zealand Water Quality Guidelines
Fish	Limited information on fish within the Project Area.	Undertake systematic freshwater fish surveys using both passive and active survey techniques and likelihood of assessment analysis based on collected habitat information.	(DETSI, 2018) – Monitoring and sampling manual (DCCEEW, 2011a) – Survey guidelines for Australia's Threatened Fish
Turtles/platypus	Limited information from the Project Area.	Undertake systematic reptile surveys and for platypus and likelihood of assessment analysis based on collected habitat information.	(DETSI, 2018) – Monitoring and sampling manual (DCCEEW, 2011b) – Survey guidelines for Australia's Threatened Reptiles

Items	Comment	Action	Method and/or Reference
Macroinvertebrates	Limited information from the Project Area.	Single edge sample at each site - AUSRIVAS field picked – 10 m sampled edge area • Single bed sample at each site – AUSRIVAS field picked – 10 m sampled bed area • Description of macro and microhabitat features where samples are collected • Bed and bank substrate analysis • Lab identification of collected individuals	NRMMRRD (2001) – AUSRIVAS sampling DETSI (2018) – Monitoring and sampling manual, macroinvertebrate sampling
Stygofauna	Limited information from the Project Area.	A pilot survey will be undertaken across ten sites either via plankton netting techniques or low flow purging of the bores. At each site, groundwater depth and in-situ physicochemical water parameters will be recorded.	DETSI (2018) – Sampling bores for stygofauna DETSI (2015) – Guideline for the Environmental Assessment of Subterranean Aquatic Fauna

3.3 SURVEY TIMING

3.3.1 AQUATIC HABITAT

Surface aquatic ecological sampling surveys were timed to adequately capture the nature and spatial extent of seasonal ecological/hydrological changes. These included an early-wet survey (once flows have initiated) from the 12th to the 16th of February and a late-wet survey (post peak flows) from the 22nd to the 25th of April seasonal surveys. This made sure that surveys were conducted at times where the aquatic habitat(s) and/or wetland(s) were assessed at their full range of productivity and inherent seasonal variation, while also capturing the dynamics of fish and other aquatic biota migratory responses to seasonal variability. The requirement for seasonal surveys is specifically detailed in current guidelines (DETSI, 2018) for such submissions.

3.3.2 THREATENED SPECIES

The protected turtle species known to occur within the Project Area have specific nesting and breeding periods, The nesting and spawning periods coincide with the greatest movement extents. Additionally, turtles slow down substantially in winter with cooler waters and therefore trapping success may be reduced due to reduced movements. In general, surveys for reptiles should be conducted at times when the target species or communities are known to be active (i.e. during breeding, nesting and summer/warmer periods) because periods of reptile activity are more likely to lead to capture success (for most species) (DSWPC, 2011b). The surveys undertaken were during summer/warmer periods and overlap with the nesting season for one of the assessed threatened turtle species, the white-throated snapping turtle.

3.3.3 MACROINVERTEBRATES

This surveys undertaken aligns with the AusRivAS protocol for early and late-wet season surveys in Queensland streams, as outlined by the Department of Natural Resources, Mines, Manufacturing and Regional and Rural Development (NRMMRRD, formerly DNRM) (2001).

3.3.4 AQUATIC GDES

Aquatic GDEs were assessed during both the early- and late-wet season surveys. Monitoring during the early-wet period enables identification of areas where baseflow re-establishes surface connectivity, supporting early colonisation and recruitment of aquatic biota. Conversely, late-wet assessments allow evaluation of residual groundwater contributions once peak flows have receded, helping to distinguish persistent groundwater inputs and groundwater-sustained habitats from those maintained solely by surface runoff.

This two-season approach enhances aquatic GDE monitoring by:

- Allowing detection of temporal changes in groundwater expression and associated ecological responses;
- Improving the ability to distinguish between ephemeral and groundwater-maintained habitats across varying hydrological conditions;
- Supporting refined mapping of groundwater-sustained zones through identification of visual and physical indicators (e.g. seepage zones, iron oxide precipitates, temperature or clarity contrasts); and
- Providing a more comprehensive dataset for assessing the resilience of aquatic communities and hydrological connectivity under different flow regimes.

3.3.5 STYGOFAUNA

A single initial stygofauna pilot survey was undertaken in conjunction with the surface aquatic ecology survey during the early-wet season of 2024. Conducting the stygofauna survey during the early-wet period provides several advantages. Rising groundwater levels and increased hydraulic connectivity following initial rainfall events can enhance the dispersal and detectability of stygofaunal taxa within aquifers and bore systems. Sampling during this period therefore increases the likelihood of detecting species that may be less active or isolated during dry conditions. Additionally, early-wet surveys provide valuable baseline data on groundwater quality and habitat characteristics prior to peak recharge.

3.4 FIELD SURVEY DESIGN AND ASSESSED PARAMETERS

3.4.1 AQUATIC VALUES

To address the identified gaps, a field survey was undertaken within and just outside the Project Area. During the fieldwork planning phase, potential sites within representative habitats and relevant localities were identified that appeared to be accessible. Specifically, the site locations were selected on the basis that:

- They encompass all four creeks relevant to the Project Area, these being; Kennedy Creek, Charlie Creek, Goonyella Creek and Skull Creek;
- They best represent identified habitat variation within the Project Area (determined from aerial imagery and review, historical reports and State databases);
- They encompassed the range of potential GDE types present in the Project Area (based on the BOM GDE Atlas, BOM 2019);
- They could be readily accessed through existing infrastructure; and
- The selected survey techniques could be safely carried out.

SURVEY SITES

Sites surveyed for aquatic values are listed in Table 3-2 and shown in Figure 3-1. All sites were within the Project Area except for site 4, located approximately 350 m northwest from the Project Area boundary. Sites 2 and 3 were dams and sites 1, 4, 5 and 6 were identified aerially as containing potential creek habitat.

Table 3-2 Aquatic values survey sites

Site	Latitude	Longitude	Lot and Plan	Survey Techniques
1	-21.6181	147.989	2 SP214117	H, G, L
2	-21.5978	148.0005	2 SP214117	H, G, M, IW, E, F, B, C, L
3	-21.5677	147.9812	2 SP214117	H, G, M, IW, E, F, B, C, L
4	-21.5598	147.9907	8 GV807254	H, G, L
5	-21.5489	147.9772	2 SP214117	H, G, L
6	-21.5715	147.9253	2 SP214117	H, G, M, IW, E, F, L

H: Habitat, G: Aquatic - GDEs, M: Macroinvertebrate, IW: Insitu water, E: electrofishing, F: fyke netting, B: Box traps, C: Cathedral traps and L: likelihood of occurrence

METHODS

An overview of implemented methods is displayed in Table 3-3. Method implementation is detailed in Appendix A.

The implemented survey methods for the identified threatened and special least concern species included both passive (habitat assessments, visual assessment) and active (cathedral trapping and fyke netting) survey techniques. Identified active survey methods for the survey of *Elseya albagula* – white throated snapping turtle; *Rheodytes leukops* – Fitzroy River turtle; and *Ornithorhynchus anatinus* – platypus followed current defined guidelines as detailed in Appendix A.

Although other survey techniques, such as snorkelling are commonly used for assessing threatened turtle species, poor water clarity at the time of surveys precluded the use of this method.

Regarding aquatic GDEs, it would also have been preferable to undertake stable isotope and chemical speciation analyses to confirm their presence; however, a suitable bore network was not available at the time of the surveys to support such an assessment.

Table 3-3 Sampling method breakdown for the Project Area and guidelines/subject matter advice guiding each method.

Species	Method	Guideline and Standards
Aquatic Fauna		
Fish	• Overnight fyke netting; • Overnight box trapping; • Visual observations; and • Likelihood of occurrence assessments based off areas occurrence and presence of preferred habitat features.	(DETSI, 2018) Monitoring and sampling manual (DCCEEW, 2011a) Guidelines for Threatened Fish
Turtles	• Overnight cathedral trapping; • Overnight fyke netting; • Visual observations; and • Likelihood of occurrence assessments based off areas occurrence and presence of preferred habitat features.	(DCCEEW, 2011b) Guidelines for threatened reptiles DETSI (2018a) Monitoring and sampling manual
Platypus	• Overnight fyke netting; • Burrow searches and visual observations; and • Likelihood of occurrence assessments based off areas occurrence and presence of preferred habitat features.	(DETSI, 2018) Monitoring and sampling manual
Habitat and Water Quality		
Aquatic habitat (including macrophytes) and stream condition	Habitat and condition assessments in accordance with AUSRIVAS and State of the Rivers protocols. • Macro (riffles, pools, runs, dry, etc.) and micro habitat (large woody debris, leaf litter, etc.) presence/cover. • Macrophyte identification and density • River bioassessment condition assessment • Bank and stream morphology • Identification of local land use and pressures • Documentation of erosion and sedimentation • Substrate analysis	Parsons et al., (2001) Australian River Assessment System: AusRivAS Physical Assessment Protocol NRMMRRD, (2001) AusRivAS for Queensland streams Cover estimate methods as per NRMMRRD, (2001)
Aquatic GDEs	• Analysis of aerial imagery to identify water permanence. • Groundtruthing of surface GDE presence based on the series of questions described in Eamus et al. (2006) and Doody et al. (2018) in IESC (2018) • GDE value characterisation as per the criteria identified in IESC (2018) • Groundwater depth analysis.	Eamus et al. (2006) Doody et al. (2018) IESC (2018)

Species	Method	Guideline and Standards
In-situ water quality	In-situ physiochemical analysis including temperature, pH, turbidity, dissolved oxygen, electrical conductivity.	(DETSI, 2018) Monitoring and sampling manual

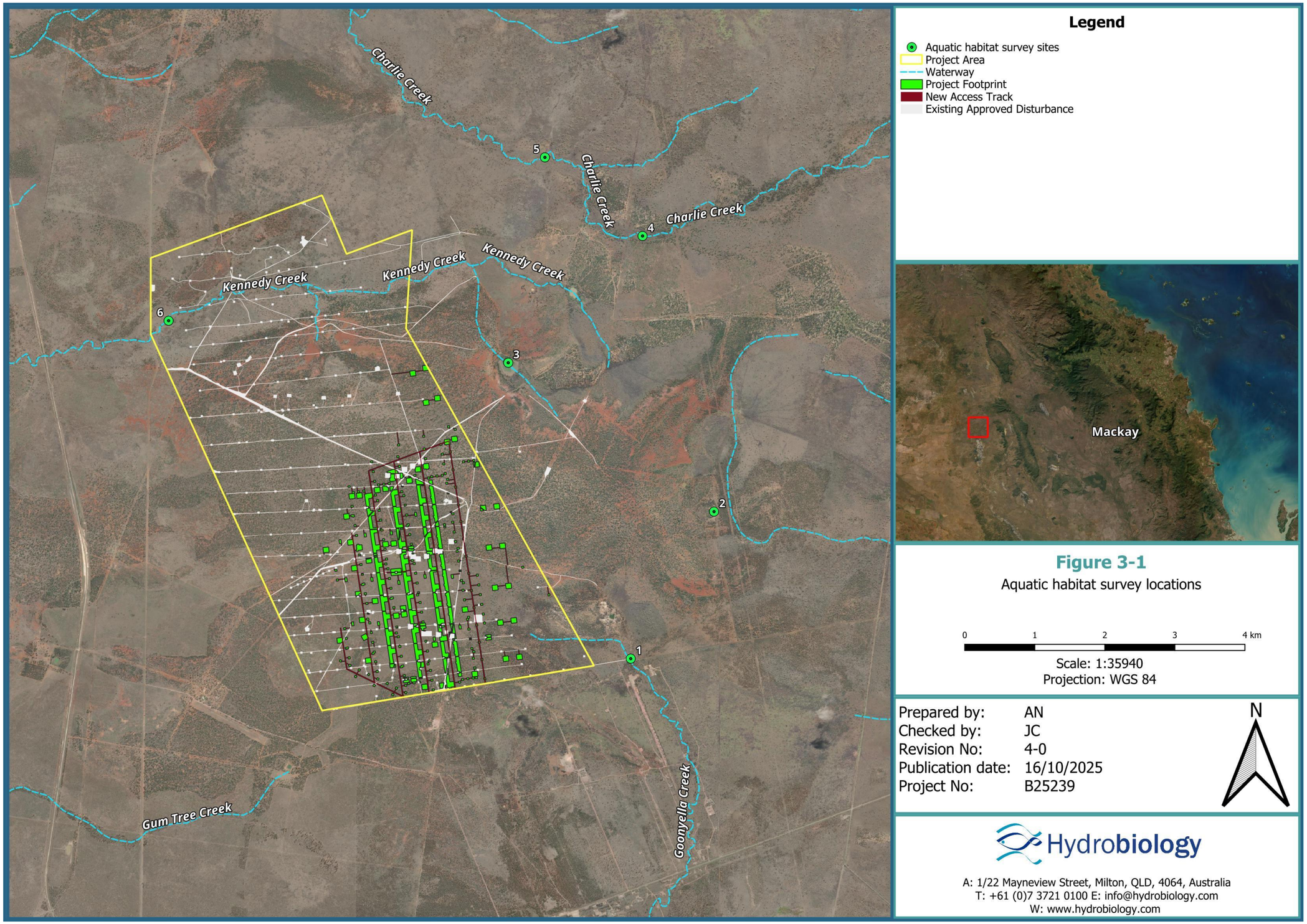


Figure 3-1 Aquatic habitat survey locations.

3.4.2 STYGOFAUNA

The stygofauna pilot survey was conducted in accordance with the Guideline for the Environmental Assessment of Subterranean Aquatic Fauna (DETSI, 2015) using the methods described in (DETSI, 2018). A single sampling event was undertaken during the early-wet season between the 12th to the 17th of February 2024.

SURVEY SITES

A total of 19 bores were visited, however only 9 groundwater bores could be sampled for stygofauna with sampling sites located both on-lease and off-lease (Table 3-4 and Figure 3-2). The remaining 10 bores were either too narrow for sampling or not present at the registered coordinates and could not be located.

Table 3-4 Stygofauna bore sampling sites

Bore ID	Latitude	Longitude	Lot and Plan	Standing Water Level (SWL) (m)	Type	Sampled?
141163	-21.5775	147.9348	2SP214117	-26.02	Deep	Y
162053	-21.5250	147.9342	2SP214117	-11.07	Shallow	Y
162062	-21.5482	147.9665	2SP214117	-13.53	Shallow	Y
162065	-21.5233	147.9354	411SP285383	-11.54	Shallow	Y
162630	-21.6250	147.9965	411SP285383	-20.33	Shallow	Y
162631	-21.6303	147.9994	411SP285383	-18.32	Shallow	Y
162632	-21.6327	147.9973	411SP285383	-15.76	Shallow	Y
182311	-21.6035	147.9565	11SP235906	-25	Deep	Y
206201	-21.5508	147.9245	2SP214117	-25.93	Deep	Y
100081	-21.6021	148.0022	9GV807254	-	Deep	Bore unlocatable
162061	-21.6158	147.9434	11SP235906	-	Deep	Bore unlocatable
162060	-21.5981	147.9431	11SP235906	-	Deep	Bore unlocatable
162063	-21.5616	147.9427	2SP214117	-	Deep	Bore unlocatable
141162	-21.5516	147.9499	2SP214117	-	Deep	Bore unlocatable
85418	-21.5414	147.9567	2SP214117	-	Shallow	Bore unlocatable
141161	-21.5687	147.9184	-	-	-	Bore unlocatable

Bore ID	Latitude	Longitude	Lot and Plan	Standing Water Level (SWL) (m)	Type	Sampled?
162179	-21.6527	147.9683	-	-	-	Bore diameter too narrow
162056	-21.5181	147.9646	-	-	-	Bore unlocatable
85417	-21.5206	147.9943	-	-	-	Bore unlocatable

3.5 RISK AND IMPACT ASSESSMENT

The risk assessment for aquatic ecology and groundwater-dependent ecosystems (GDEs) was undertaken in accordance with the principles of *AS/NZS ISO 31000:2018 – Risk Management – Guidelines* and relevant Department of Environment, Tourism, Science and Innovation (DETSI) guidance (Table 3-5 to Table 3-7). The assessment applied a qualitative likelihood–consequence framework to evaluate potential environmental risks associated with the Project. Consequence ratings were defined based on the scale, intensity, and duration of potential effects on aquatic habitats, species, and GDE function, while likelihood ratings reflected the probability of each impact occurring under proposed management and mitigation controls. These two factors were combined using a standard risk matrix to determine an overall risk level (Low, Moderate, High, or Extreme). The assessment considered both the construction (exploration and early works) and operational phases of the Project, integrating outcomes of desktop review, field survey data, and professional ecological judgement. This process enables a transparent, repeatable, and defensible evaluation of potential project-related risks to aquatic and groundwater-dependent environmental values.

Table 3-5 Consequence Ratings – Aquatic Ecology and GDEs

Consequence Rating	Description of Environmental Effect
1 – Negligible	No measurable change to aquatic habitat, water quality, or GDE condition. Ecological values remain intact.
2 – Minor	Minor, short-term and reversible changes to habitat or biota with full recovery expected following mitigation. No long-term reduction in ecosystem function.
3 – Moderate	Localised and measurable reduction in aquatic or groundwater ecosystem condition or diversity. Recovery expected within one to two seasons following remediation.
4 – Major	Widespread or long-term degradation of aquatic or groundwater habitats or species populations. Partial recovery possible following intensive management.
5 – Severe	Irreversible or regional-scale loss of aquatic or GDE function or species populations. No recovery without external restoration or offset.

Table 3-6 Likelihood Ratings – Aquatic Ecology and GDEs

Likelihood Rating	Description
1 – Rare	May occur only in exceptional circumstances (≤ 5 % chance). No historical precedent or pathway highly unlikely.
2 – Unlikely	Could occur at some time (5–20 % chance). Requires multiple failures of controls or unusual conditions.
3 – Possible	Might occur at some time (20–50 % chance). Pathway plausible under normal operations or if controls are ineffective.
4 – Likely	Will probably occur under certain conditions (50–80 % chance). Observed in similar projects or field settings.
5 – Almost Certain	Expected to occur frequently or continuously (> 80 % chance). Historically observed and consistent with expected outcomes.

Table 3-7 Risk Level Matrix – Determination of Risk Rating

Likelihood → / Consequence ↓	1 Negligible	2 Minor	3 Moderate	4 Major	5 Severe
5 - Almost Certain	Moderate	High	High	Extreme	Extreme
4 - Likely	Low	Moderate	High	High	Extreme
3 - Possible	Low	Moderate	Moderate	High	High
2 - Unlikely	Low	Low	Moderate	Moderate	High
1 - Rare	Low	Low	Low	Moderate	Moderate

Table 3-8 Risk Level Definitions

Risk Level	Interpretation / Management Response
Low	Impact unlikely to be significant. Manage through routine controls and standard operating procedures.
Moderate	Manageable impact requiring specific mitigation and monitoring. Include in the environmental management plan.
High	Potentially significant impact requiring detailed mitigation measures, frequent monitoring, and senior oversight.
Extreme	Unacceptable impact without redesign, avoidance, or substantial offsets. Immediate management or redesign required before approval.

3.6 SIGNIFICANT RESIDUAL IMPACT ASSESSMENT - MSES

Ina addition to the above aquatic and GDE risk and impact assessment, the impacts associated with the Project were assessed against the significant residual impact (SRI) criteria and guidelines for the identified MSES (DES, 2014).

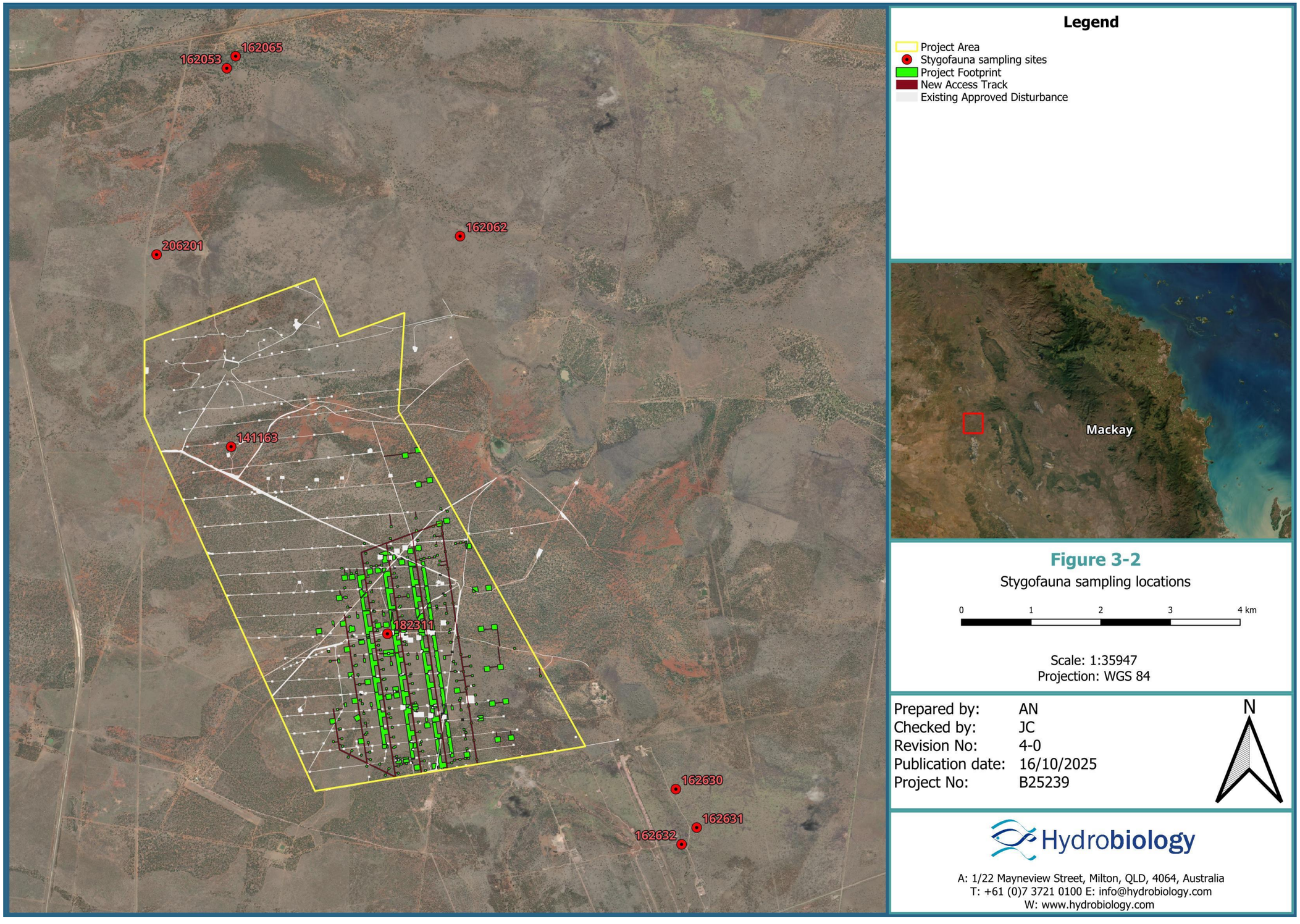


Figure 3-2 Stygofauna sampling locations.

4. EXISTING ENVIRONMENT

4.1 DRAINAGE BASIN AND SUB-BASINS

The Project Area is situated within the Suttor and Isaac River sub-basins, which collectively span approximately 96,274 km² (73,949 km² and 22,325 km² respectively). The majority of the CND lies within the Suttor River sub-basin (Figure 4-1), a major component of the larger Burdekin Basin. In contrast, the Isaac River sub-basin forms a smaller part of the Fitzroy River Basin. The Great Dividing Range marks the western boundary of the Suttor sub-basin, separating it from the Barcoo and Thomson River sub-basins, while the Denham Range to the east forms the divide with the Isaac sub-basin.

The Isaac River originates southeast of Glenden, Queensland, flowing south past Moranbah and Iffley. Near Leichhardt Downs, it transitions into a braided channel system before continuing southeast past Junee State Forest and eventually discharging into the Mackenzie River. The Suttor River rises in the Leichhardt Range northwest of Glenden and flows into Lake Dalrymple, where it becomes a tributary of the Burdekin River.

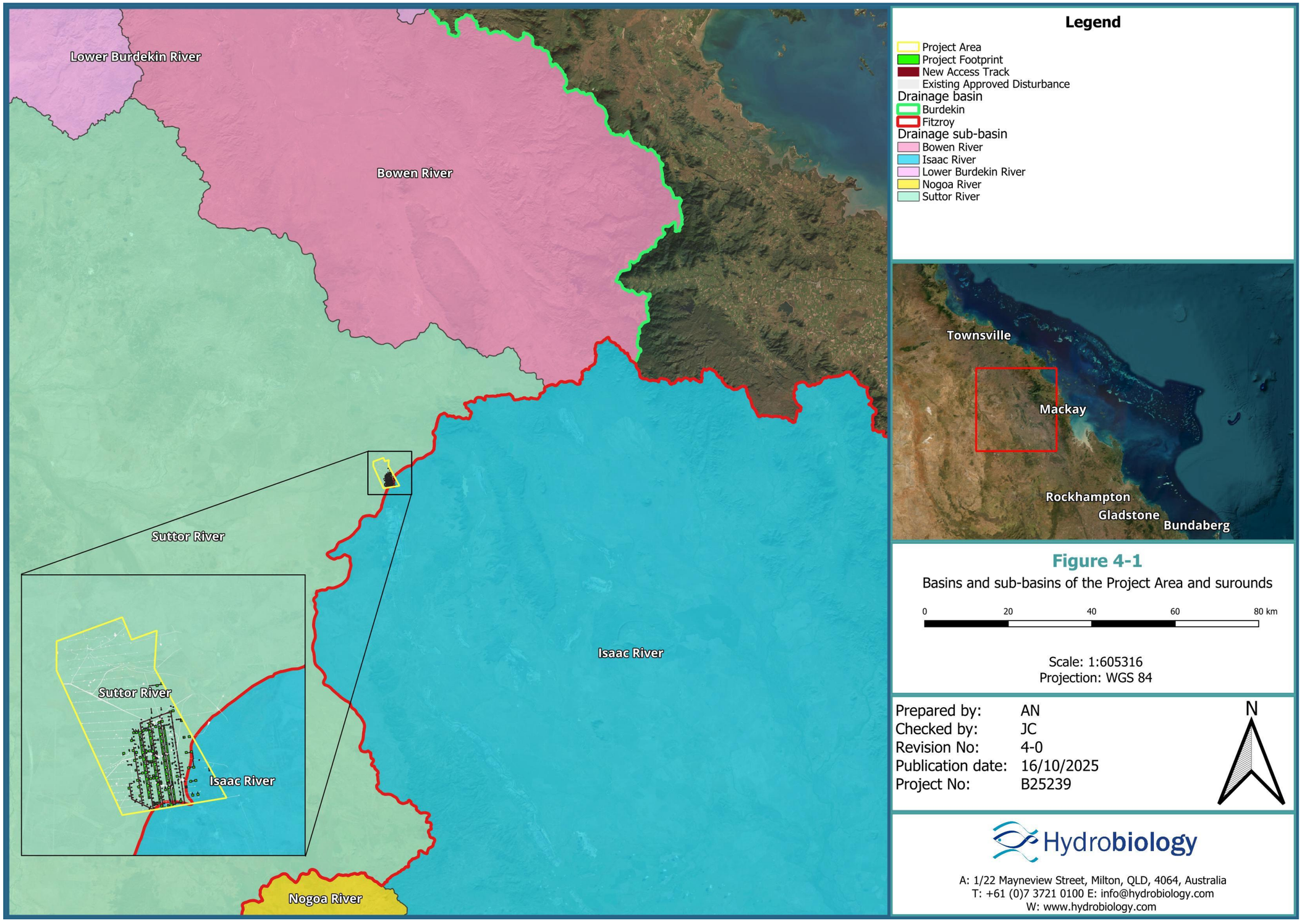


Figure 4-1 Basins and sub basins of the Project Area and surrounds.

4.2 REGIONAL GEOLOGY

Table 4-1 summarises the stratigraphic sequence of the Project Area including a brief lithological description of each unit. The detailed surface geology of the Project Area and its surrounds is shown in Figure 4-2.

A significant portion of the Project Area is underlain by Quaternary soils, while the CND is primarily covered by Late Tertiary to Quaternary soils. These units typically comprise a mix of sands, silts, and clays formed from floodplain alluvium associated with creek and river systems. In particular, alluvial sediments are prominent along Charlie, Kennedy, and Goonyella creeks within the Project Area. Goonyella Creek is also geologically associated with the Fort Cooper Coal Measures (Pwt).

The Tertiary Suttor Formation and its equivalents are distributed across the region, although surface outcrop is discontinuous, with much of the formation obscured by younger alluvial and colluvial deposits. These Tertiary strata include basalt, clay, silt, sand, weakly cemented sandstones, lignite, and laterite (Peabody, 2011).

Table 4-1 Summary of Stratigraphic Sequence

Age	Group	Unit	Locally Present Coal Seam	Lithology	Thickness (m)
Quaternary	N/A	Alluvial deposits.	N/A	Residual soils and colluvium units include all blanketing sandy, loamy and clay soils.	0 m - 20m
Tertiary	N/A	Suttor Formation.	N/A	Mainly unconsolidated sand and clay alluvial deposits, minor basalt flows.	0 m - 120 m
Permian	Blackwater Group.	Rangal Coal Measures.	N/A	Gray sandstone and siltstone, mudstone, carbonaceous mudstone and coal.	0 m – 60 m
		Fort Cooper Coal Measures.	Fairhill Seam.	Grey tuffaceous sandstone and siltstone, mudstone, tuffaceous mudstone, carbonaceous mudstone and coal.	0 m - 120 m
		Moranbah Coal Measures.	GU, GM and GL Seams.	Grey sandstone and siltstone, mudstone, carbonaceous mudstone and coal.	~250 m

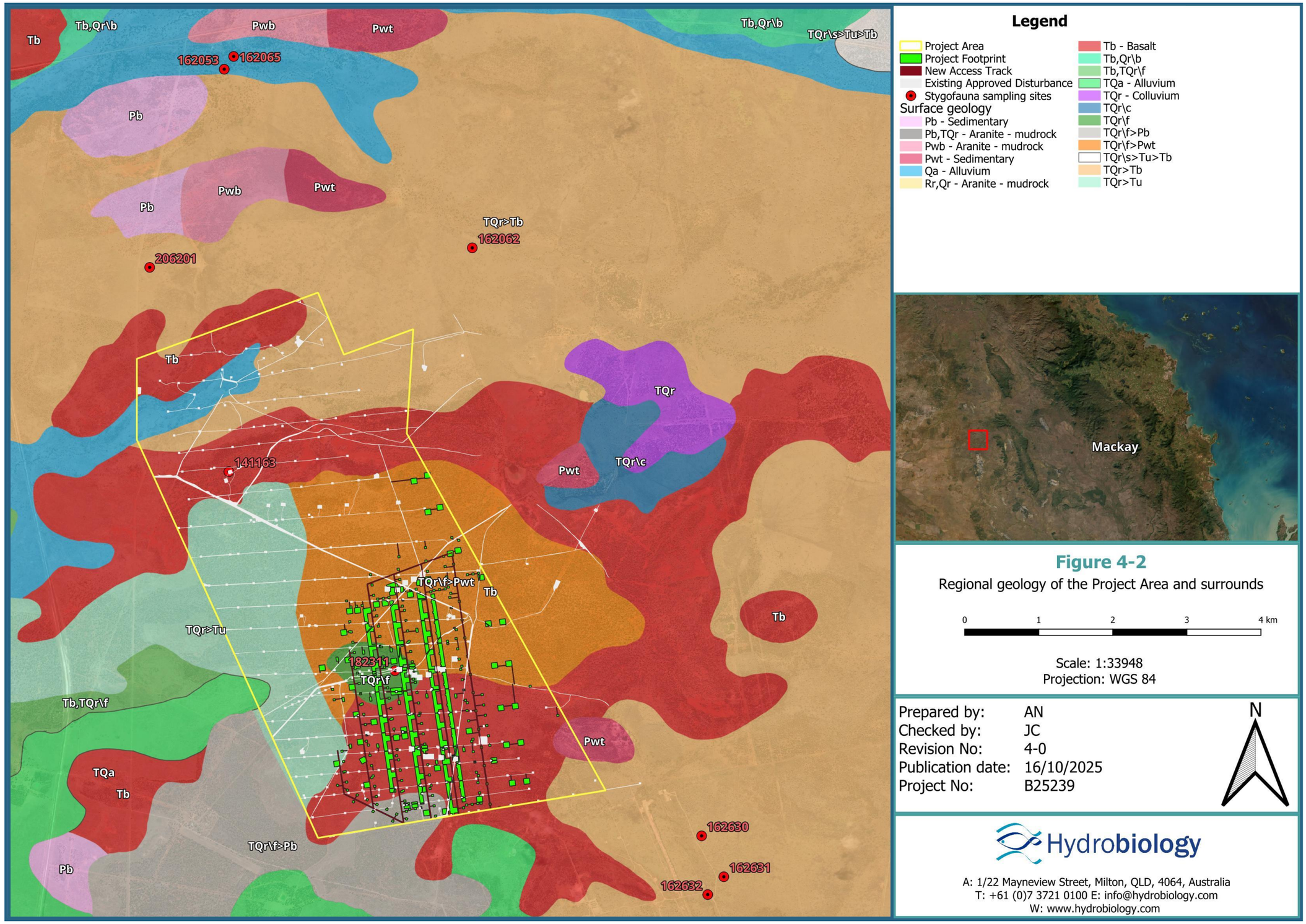


Figure 4-2 Regional geology of the Project Area and surrounds.

4.3 AQUIFERS

No significant aquifer systems have been identified in close proximity to the Project Area and CND. The two main hydrogeological units identified in the Project Area are as follows:

- Quaternary Alluvium and Tertiary Suttor Formation Aquifers:
  - dissociated minor sand lenses and basalt units where present.
- Permian Coal Measures:
  - interbedded layers of low permeability sandstone / siltstone (aquitards) and coal seams (aquifers).

A description of these units is provided below.

4.3.1 QUATERNARY ALLUVIUM AQUIFER

The Quaternary alluvium aquifer unit consists of clay, sand, minor gravel, residual soil and colluvium. The unit occurs throughout much of the Project Area in association with Goonyella Creek, Charlie Creek and Goonyella Creek, and is typically between 15 to 25 m thickness (Golder Associates, 2020).

Regionally, groundwater flow within the Quaternary aquifer is expected to follow topography and drainage patterns. Recharge to the units is via rainfall and some infiltration from creek beds. After recharge, the Quaternary and Tertiary units most likely discharge to creeks and rivers (Peabody, 2011).

4.3.2 TERTIARY SUTTOR FORMATION AQUIFERS

There is very limited data within the model domain regarding the hydrogeological properties of the Tertiary Suttor Formation aquifer. It has been noted from exploration drilling that the occurrence of groundwater within the Tertiary unit is often sporadic, most likely owing to deep weathering profiles and a resulting clay matrix; therefore, groundwater levels are likely to be systemic across the aquifer. It is considered that in areas of deeper paleochannel, more significant saturation will occur in the sediment and basalt components (Peabody, 2011).

Previous investigations have indicated that groundwater seepage in the cemented sand appears to be concentrated in localised areas towards the base of the sand layer.

Recharge to the Tertiary Suttor Formation aquifers will occur in areas of thin soil cover or along creek beds (i.e. Isaac River and Goonyella Creek) where surface water can readily permeate into the aquifer during and following rainfall events. Previous investigations have noted occasional air lifted flow rates between 1 - 2 litres per second (L/s) (Peabody, 2011).

4.4 GDES

4.4.1 AQUATIC GDES

According to GDE mapping data by the BOM Atlas (2024), high potential GDEs are present along much of Kennedy and Charlie Creek, where they pass through the Project Area (Figure 4-3). No GDEs are present along any part of Goonyella Creek within the Project Area.

4.4.2 SUBTERRANEAN GDES & STYGOFAUNA

No subterranean GDEs are mapped by the BOM Atlas (2024) within or near (>100 km) the Project Area.

No stygofauna have been recorded within the Project Area. The closest bores where stygofauna have been surveyed in the Queensland subterranean aquatic fauna database are both approximately 34

km south of the Project Area (Figure 4-4). The only aquatic fauna found at these two bores were *Berosus* sp. and *Cryptocephalus* sp., which were found at bore DDH080 and DDH321 respectively. Neither of these genera are considered true stygofauna.

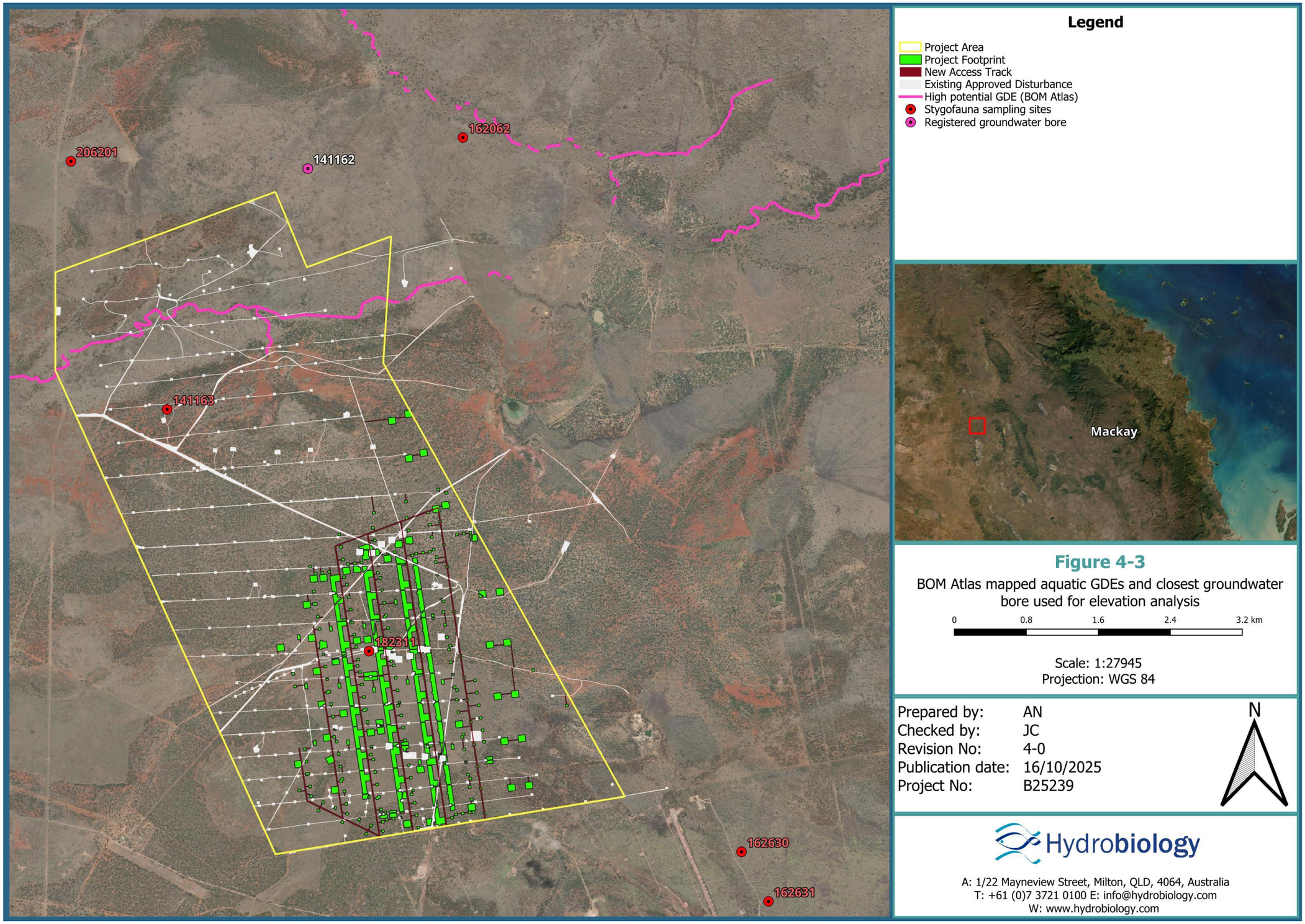


Figure 4-3 BOM Atlas mapped aquatic GDEs and closest groundwater bores used for elevation analysis.

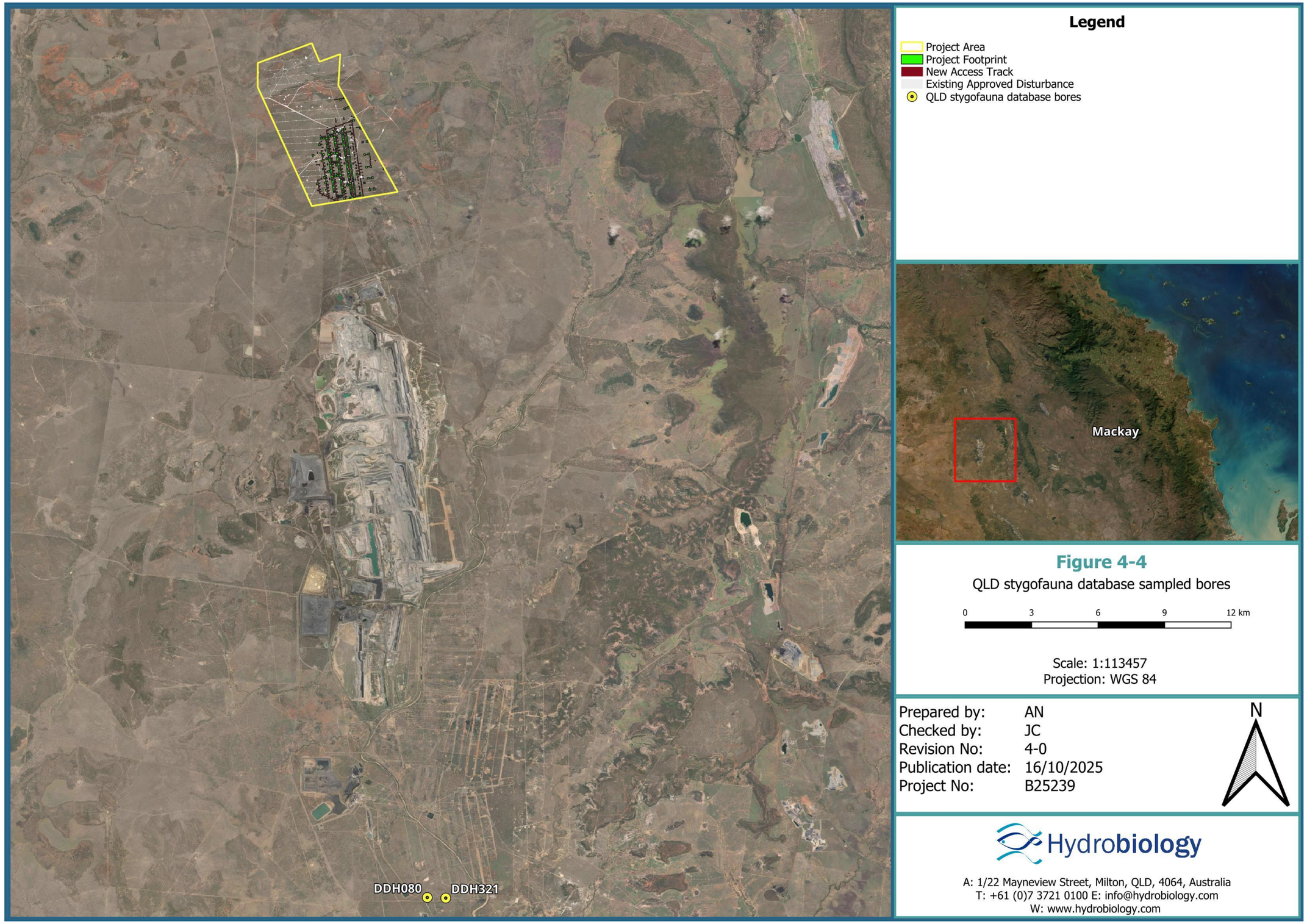


Figure 4-4 QLD Stygofauna database sampled bores.

4.5 WATERCOURSES

Under the Water Act 2000, the Isaac River, Twelve Mile Gully, and Hill Creek are recognised as Watercourses. Four creeks pass through the Project Area: Kennedy Creek, Charlie Creek, Skull Creek, and Goonyella Creek (Figure 4-5). Kennedy and Charlie Creeks drain into Eaglefield Creek, which feeds the Suttor River, while Goonyella and Skull Creeks flow directly into the Isaac River.

Of the creeks within the Project Area, only Goonyella Creek is recognised under the Water Act 2000 as a Drainage Feature. The other creeks, Kennedy and Charlie creeks include sections of both stream order 1 and 2 while Goonyella and Skull Creeks are classified as stream order 1.

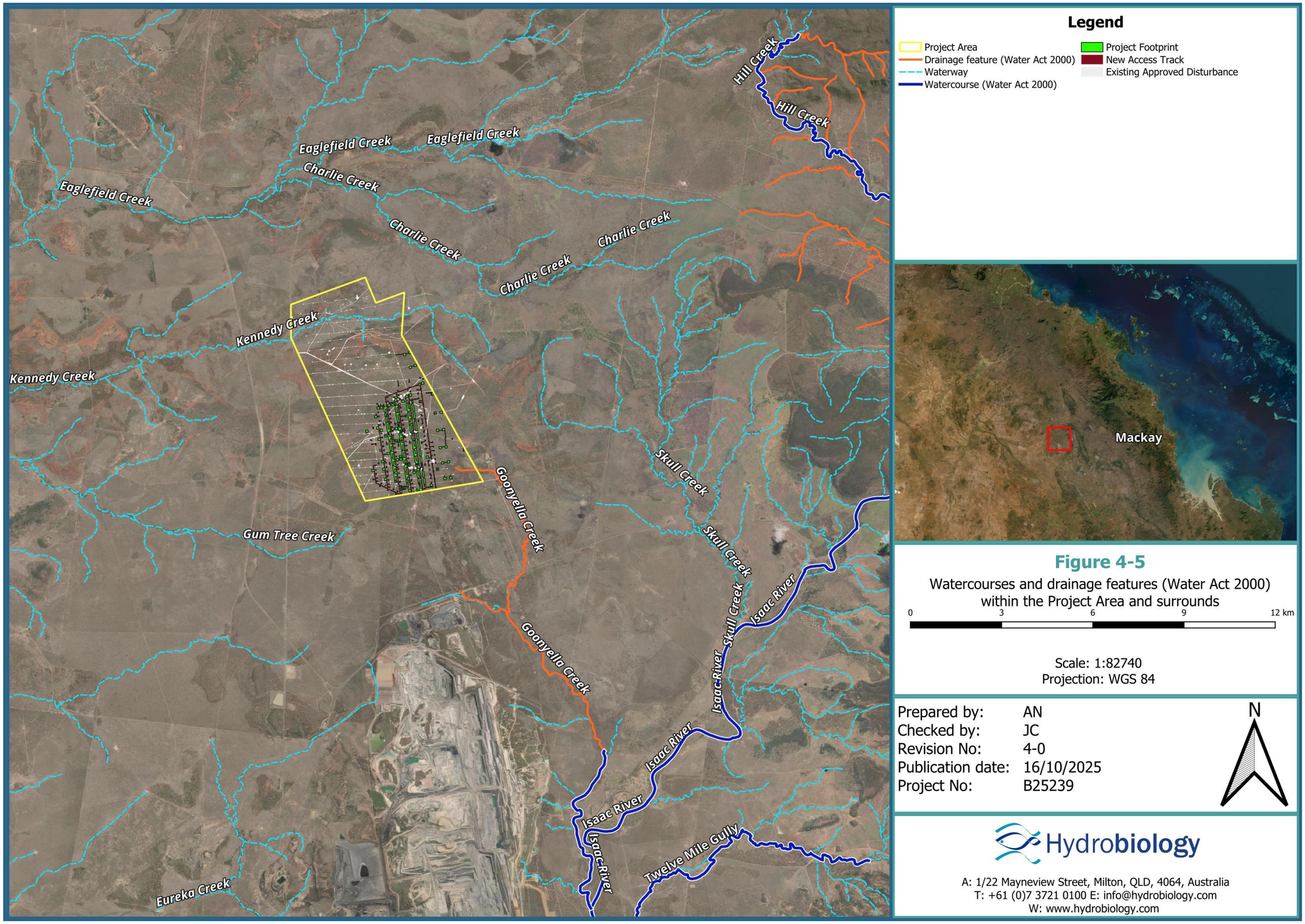


Figure 4-5
Watercourses and drainage features (Water Act 2000) within the Project Area and surrounds

Figure 4-5 Watercourses and drainage features (*Water Act 2000*) within the Project Area and surrounds.

4.6 CLIMATE

The closest climate monitoring station to the Project Area is Moranbah Airport Station (#034035). Moranbah experiences a subtropical semi-arid climate with hot summers with moderate precipitation and mild, dry winters. Mean annual rainfall is 560.8 mm. Above average rainfall was experienced in January 2024, the month prior to the early-wet survey in February while below than average rainfall was experienced in March and April prior to the post-wet survey, which occurred at the end of April 2024 (Figure 4-6).

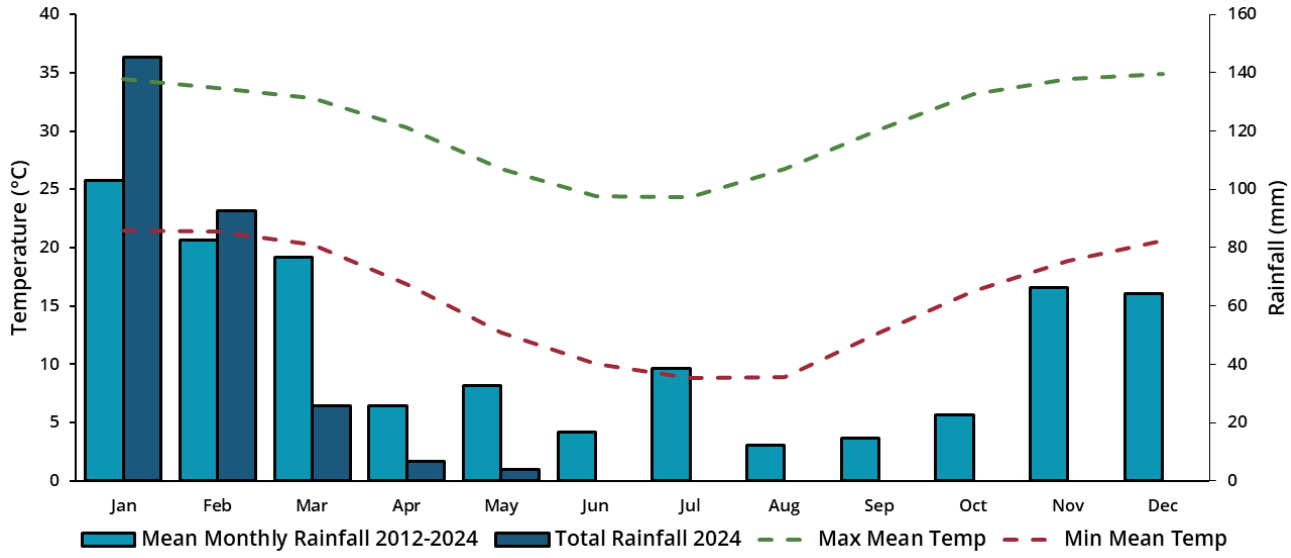


Figure 4-6 Average monthly climate statistics, sourced from Moranbah Airport Station (#034035). Historical data inclusive from 2012 to present.

4.7 LAND USE

Queensland land use mapping (2017) indicates that land use on the Project Area and CND is almost entirely grazing of native vegetation (Figure 4-7). Small areas of farming and residential infrastructure and reservoirs used as a water source for grazing livestock are also present. Centurion coal mine is located directly south of the Project Area.

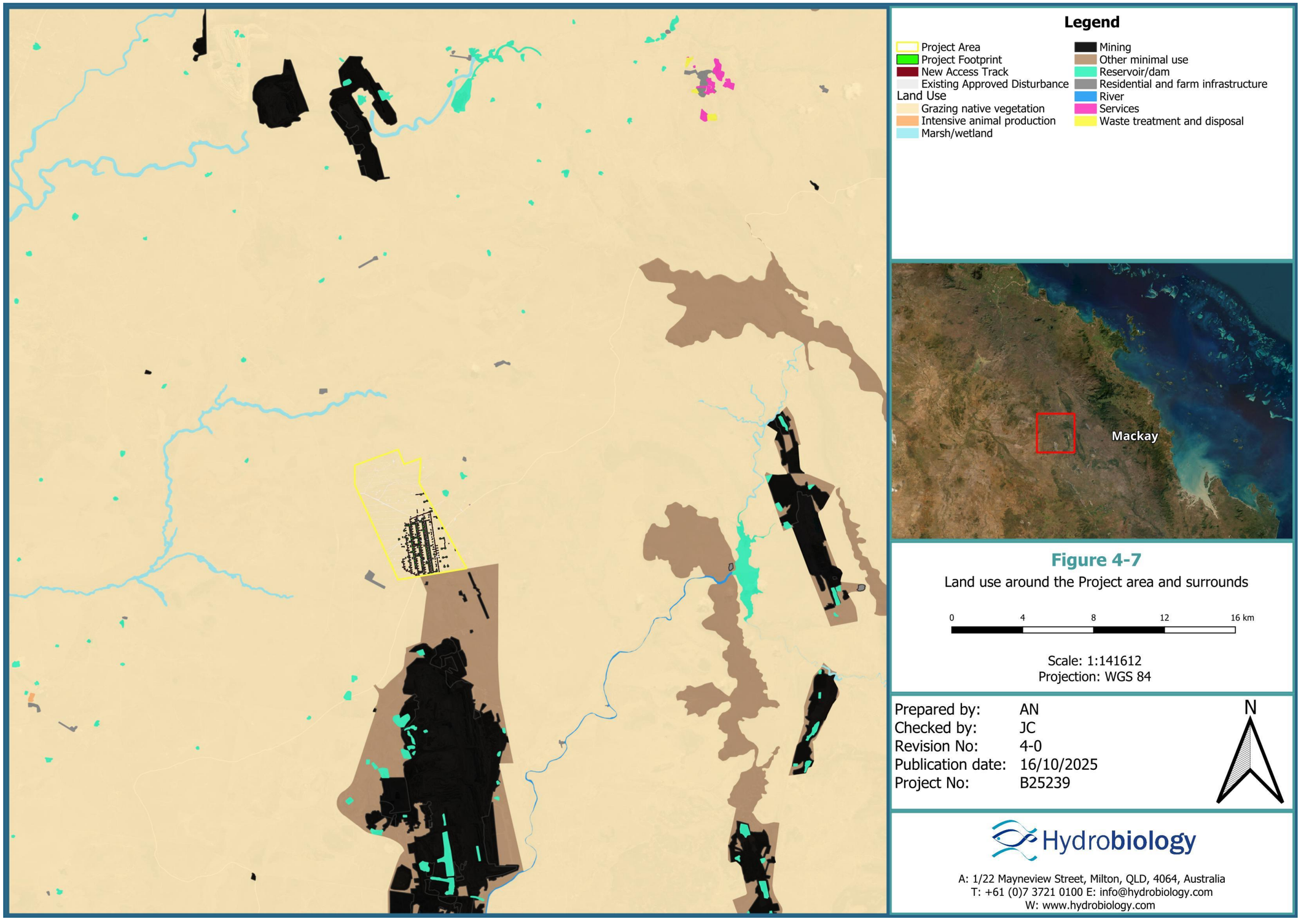


Figure 4-7 Land use around the Project area and surrounds.

4.8 HYDROLOGY

Similar to the Isaac and Suttor Rivers and the remainder of their catchment, the creeks of the Project Area are intermittent in nature, being characterised by long periods of no flow with periodic spikes in flow, following short baseflow and low flow periods (Figure 4-8 to Figure 4-11). Pools left behind following flow events are generally short lived and dry quickly, however, pools can generally persist for longer periods in higher order watercourses such as the Isaac River.

Analysis of 7 years of flow data collected approximately 25 km South of the Project Area at Isaac River (Station 130410A) from 2018 to 2024 indicates that peak flows often occurred between December to April with several peak flows in early 2021 and 2023. Flows outside of these periods were generally low and intermittent. The waterways of the Project Area have much smaller catchment areas than the Isaac and Suttor River and thus are likely to flow more infrequently.

Surface water monitoring of the Suttor River (Station 120304A) from 2018 to 2024 indicates peak flows generally occur from January to April. However, 2022 exhibited far more flow than typical during the dry season months of June to August. Flow and discharge of the Suttor River in 2024 so far has been typical of past hydrological patterns.

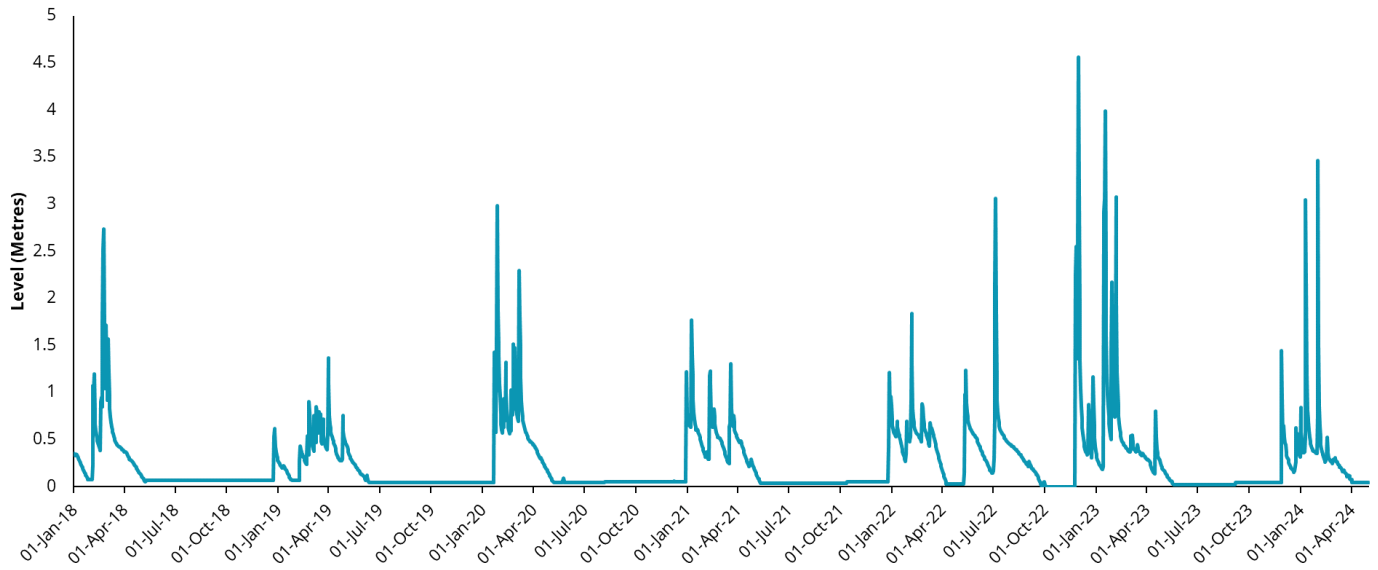


Figure 4-8 Water level recorded at Suttor River (station number 120304A).

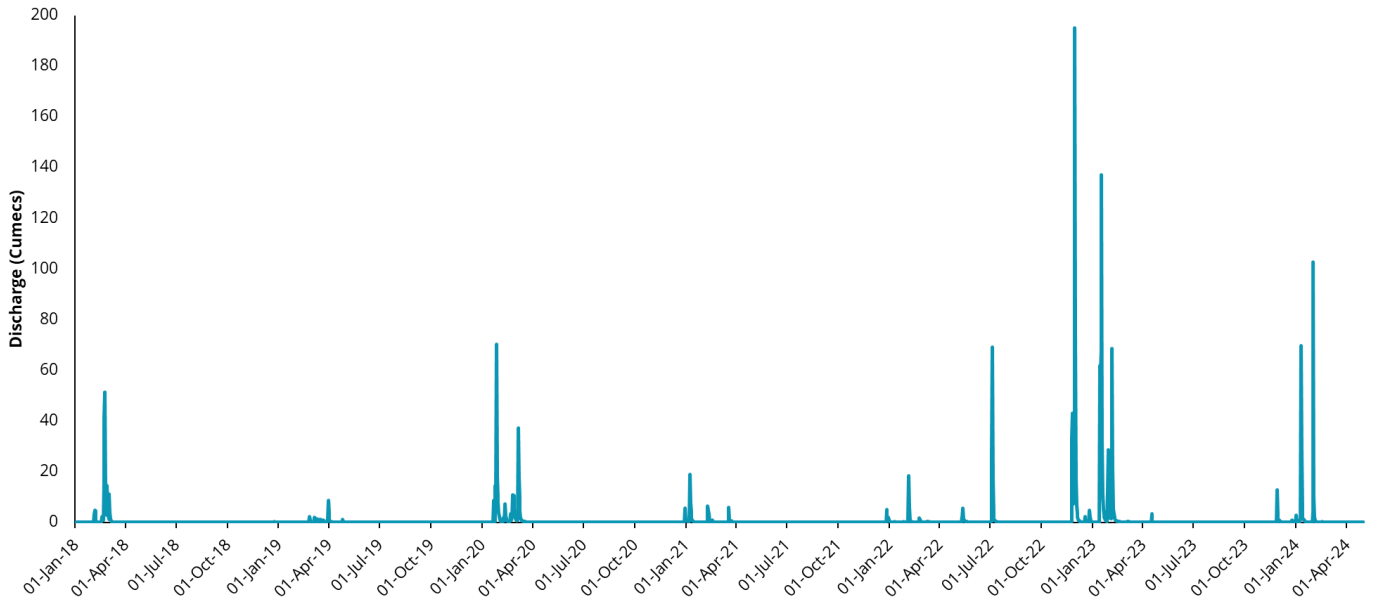


Figure 4-9 Discharge recorded at Suttor River (station number 120304A).

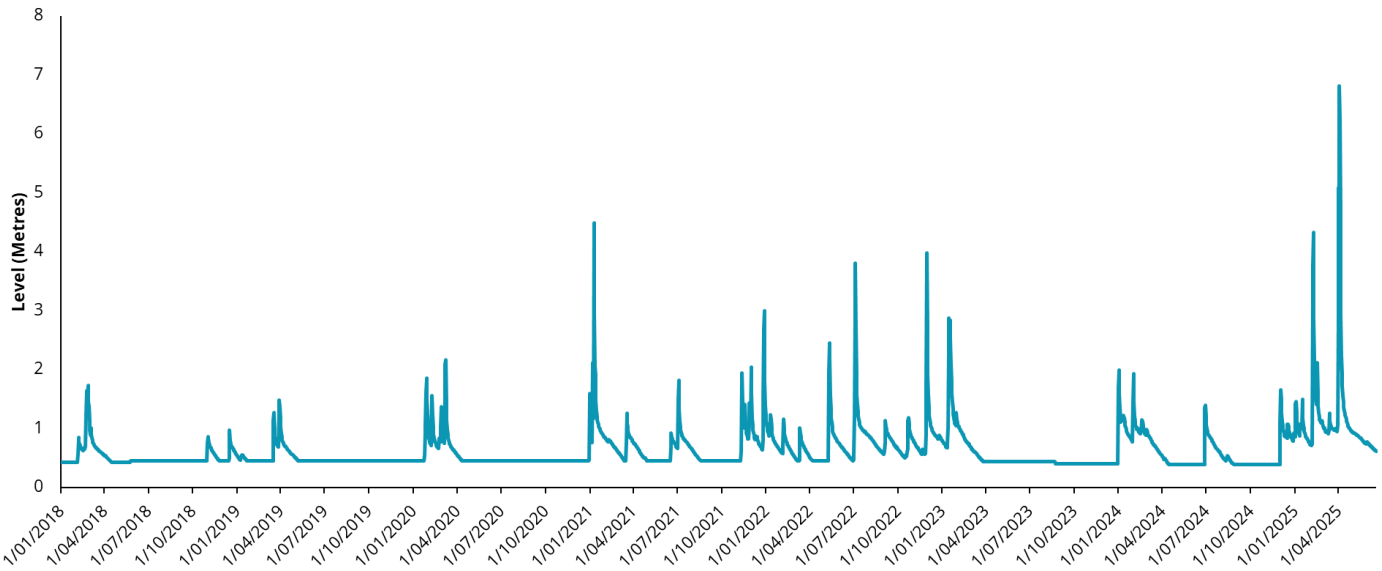


Figure 4-10 Water level recorded at Isaac River at Deverill (station number 130410A).

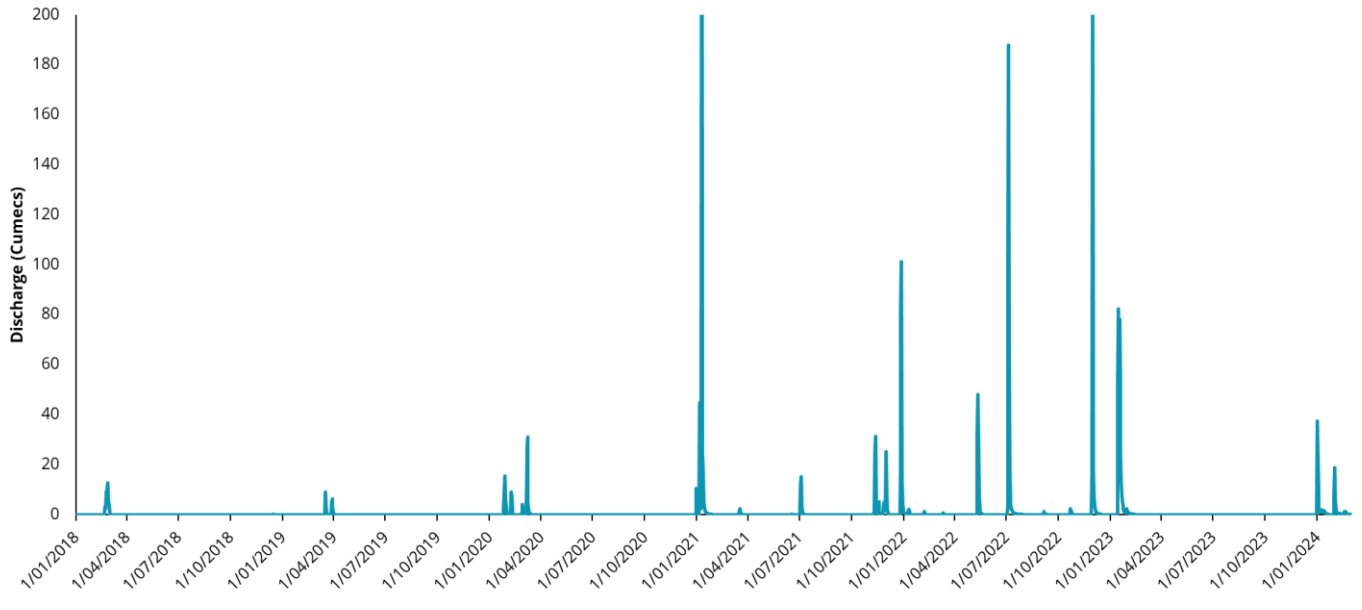


Figure 4-11 Discharge recorded at Isaac River at Deverill (station number 130410A).

4.9 AQUATIC HABITAT

No existing information about the aquatic habitat values of the Project Area and CND are available.

4.10 MATTERS OF STATE ENVIRONMENTAL SIGNIFICANCE

The MSES Environmental Reports for the Project Area can be found in Appendix C.

4.10.1 AQUATIC FLORA

A number of conservation significant species are known to occur in the wider Isaac River and Suttor River drainage sub-basins (Table 4-2). These are all listed as "Special Least Concern" under the Nature Conservation (Plant) Regulation 2020. The below species listed are yet to be identified in the Project Area and surrounds.

Table 4-2 Conservation significant macrophytes known to occur in the Issac River and Suttor River drainage sub-basins (ALA, 2023)

Species	Common Name	Status NC Act
Aponogeton queenslandicus		Special Least Concern
Caldesia oligococca		Special Least Concern
Ceratopteris thalictroides		Special Least Concern
Cycnogeton dubius		Special Least Concern
Cycnogeton multifructus		Special Least Concern
Cycnogeton procerus		Special Least Concern
Hydrilla verticillata	Hydrilla	Special Least Concern
Najas tenuifolia	water nymph	Special Least Concern
Nymphaea gigantea		Special Least Concern
Nymphaea jacobsii		Special Least Concern
Nymphaea violacea		Special Least Concern
Nymphoides crenata	wavy marshwort	Special Least Concern
Nymphoides exilifiora		Special Least Concern
Nymphoides geminata		Special Least Concern
Nymphoides indica	water snowflake	Special Least Concern
Ottelia ovalifolia	swamp lily	Special Least Concern
Ottelia ovalifolia subsp. ovalifolia		Special Least Concern
Potamogeton crispus	curly pondweed	Special Least Concern
Potamogeton octandrus		Special Least Concern

Species	Common Name	Status NC Act
Potamogeton tepperi		Special Least Concern
Potamogeton tricarinatus	floating pondweed	Special Least Concern
Triglochin nana		Special Least Concern
Utricularia aurea	golden bladderwort	Special Least Concern
Utricularia caerulea	blue bladderwort	Special Least Concern
Utricularia dichotoma	fairy aprons	Special Least Concern
Utricularia fenshamii		Special Least Concern
Utricularia gibba	floating bladderwort	Special Least Concern
Vallisneria caulescens		Special Least Concern

4.10.2 AQUATIC FAUNA

WHITE-THROATED SNAPPING TURTLE

The preferred habitat of the white-throated snapping turtle is clear, flowing well-oxygenated waters, with increased suspended sediment inhibiting the turtle's ability to utilise dissolved oxygen through cloacal respiration (Schaffer et al., 2015). While this habitat is preferred, they are known to inhabit both clear and turbid waters with varying depths and flow rates. According to Fitzroy and Mary River catchment records, the white throated snapping turtle is regularly associated with shallow riffle zones at night and submerged logs and log jams during the day (Tracey, 2017). Permanent riverine water bodies are extremely important to this species, as it has not yet been recorded in ephemeral and/or intermittent systems. Nor have they been recorded in off river dams. A strong preference for certain microhabitats is exhibited in the catch records such as undercut banks/overhanging banks, mid or high density of log jams/submerged boulders, overhanging riparian vegetation, and high cover of macrophytes (Hamann et al., 2007).

The highly intermittent waterways of the Project Area and surrounds are likely unsuitable for the white-throated snapping turtle. The closest record of the species is in the Connors River approximately 126 km southeast of the CND (ALA, 2022a).

FITZROY RIVER TURTLE

The Fitzroy River turtle (*Rheodytes leukops*) is listed as Endangered under the Nature Conservation (Animals) Regulation 2020 and may occur within the Project Area; however, the highly intermittent waterways of the Project Area and surrounds are likely unsuitable for this species. The closest record is in the Connors River, approximately 120 km southeast of the CND (ALA 2022b), and the likelihood of occurrence within the Project Area is summarised in Table 4-3. The species inhabits rivers characterised by large, deep pools with rocky, gravelly, or sandy substrates, connected by shallow riffles. Preferred habitats have high water clarity and are often associated with beds of ribbonweed (Vallisneria sp.) (Tucker et al., 2001). Riparian vegetation commonly associated with the Fitzroy River turtle includes blue gums (*Eucalyptus tereticornis*), river oaks (*Casuarina cunninghamiana*), weeping bottlebrushes (*Melaleuca viminalis*), and paperbarks (*Melaleuca linariifolia*) (Tucker et al., 2001). The species appears to have an affinity for well-oxygenated riffle zones, moving into deeper pools when riffles cease to flow, and several individuals have been captured from deep pools in previous studies (Gordos et al., 2004, 2011a, 2011b).

PLATYPUS

The Special Least Concern platypus (*Ornithorhynchus anatinus*) and/or its habitat may occur within the Project Area. The Platypus is endemic to Australia, generally being limited to eastern Australia. Within Queensland, Platypuses inhabit eastern flowing watercourses with limited occurrences elsewhere throughout the state (Hawke et al., 2020). They are known to inhabit permanent freshwater streams and banks, shallow lakes, isolated pools in intermittent streams, wetlands, and artificial water sources except for water storage lakes, weir pools, artificial ponds and farm dams. Platypuses are also known to occasionally inhabit caves and brackish areas of estuaries for nesting (Furlan et al., 2013; Grant, 2015).

Table 4-3 Threatened species listed under the schedules of the Nature Conservation Act – Likelihood of Occurrence.

Species	Status	Distribution / Habitat	Likelihood of Occurrence
White-throated snapping turtle (*Elseya albagula*)	NC Act: Critically Endangered	The white-throated snapping turtle is found only in Queensland in the Fitzroy, Mary, Burnett Basins and associated smaller drainages in south-eastern Queensland (Limpus et al. 2011).	**Unlikely,** habitat is absent from the Project Area, and no nearby records have been noted. Project Area is highly intermittent which is unsuitable habitat for the species.
Fitzroy River turtle (*Rheodytes leukops*)	NC Act: Endangered	The Fitzroy River turtle is only found in the drainage system of the Fitzroy Basin, Queensland (Tucker et al. 2001).	**Unlikely,** habitat is absent from the Project Area, and no nearby records have been noted. Project Area is highly intermittent which is unsuitable habitat for the species.
Platypus (*Ornithorhynchus anatinus*)	NC Act: Special Least Concern	The platypus occurs in eastern-flowing freshwater streams, rivers, wetlands, and isolated pools in Queensland, occasionally using caves or brackish estuarine areas for nesting. The closest record of platypus to the Project Area is approximately 30 km northeast	**Possible,** habitat is present in the Project Area, but no records have been documented within 10 km. The highly intermittent nature of the waterways provides suitable habitat for the species.

4.11 OTHER AQUATIC FAUNA

4.11.1 FISH

A total of 29 native and 3 non-native fish species are known to occur in the Isaac River sub-basin and 22 native, and 1 non-native fish are known to occur in the Suttor River sub-basin (Table 4-4). It should be noted that the state database (Wetlandinfo) includes records from a wide area containing many different habitats (e.g. lakes, wetlands, creeks and riverine reaches) encompassing the entire river length. It is highly unlikely that many of these species, particularly those associated with estuarine waters or large perennial reaches will be present in the intermittent creeks of the Project Area and surrounds.

Silver perch is listed as Endangered under the schedules of the Nature Conservation Act 1992 (NC Act). While the species has been recorded within the broader Isaac River sub-basin, it is primarily associated with permanent, free-flowing riverine habitats that provide sustained connectivity and suitable hydraulic conditions. The Project Area comprises lower-order tributary streams that are

intermittent in nature and do not provide the permanent flow or habitat characteristics required to support this species. This species is therefore not considered any further.

4.11.2 AQUATIC REPTILES

It should be noted that the state database (WetlandInfo) includes records from a wide area containing many different habitats encompassing the entire river length. It is highly unlikely that many of these species, particularly those associated with estuarine waters or large perennial reaches will be present in the Project Area and surrounds.

Eleven aquatic reptile species are known to occur in the wider Suttor River and Isaac River sub-basins. They are:

- Cann's longneck turtle (*Chelodina canni*);
- *Chelodina* sp.;
- eastern snake-necked turtle (*Chelodina longicollis*);
- *Elseya* sp.;
- Krefft's river turtle (*Emydura macquarii krefftii*);
- *Emydura* sp.;
- saw-shelled turtle (*Wollumbinia latisternum*);
- broad-shelled turtle (*Chelodina expansa*);
- white-throated snapping turtle (*Elseya albagula*);
- Fitzroy turtle (*Rheodytes leukops*); and
- estuarine crocodile (*Crocodylus porosus*)

4.11.3 AQUATIC/SEMI-AQUATIC MAMMALS

In the Suttor and Isaac River sub-basins, two aquatic/semi-aquatic mammals are listed to occur: water rat (*Hydromys chrysogaster*) and platypus (*Ornithorhynchus anatinus*).

Table 4-4 Fish recorded from the Isaac River and Suttor River sub-basins (WetlandInfo, 2013, 2021).

Family	Scientific Name	Common Name	NC Act	Endemicity	Isaac sub-basin	Suttor River sub-basin
Ambassidae	*Ambassis agassizii*	Agassiz's glassfish	-	QA	✓	✓
Anguillidae	*Anguilla reinhardtii*	longfin eel	-	QAI	✓	✓
Apogonidae	*Glossamia aprion*	mouth almighty	-	QAI	✓	
Ariidae	*Neoarius graeffei*	blue catfish	-	QAI	✓	
Atherinidae	*Craterocephalus stercusmuscarum*	flyspecked hardyhead	-	QA	✓	✓
Belonidae	*Strongylura krefftii*	freshwater longtom	-	QAI	✓	
Centropomidae	*Lates calcarifer*	barramundi	-	QAI		✓
Cichlidae	*Oreochromis mossambicus*	Mozambique mouthbrooder	-	II	✓	✓
Clupeidae	*Nematalosa erebi*	bony bream	-	QA	✓	✓
Eleotridae	*Hypseleotris compressa*	empire gudgeon	-	QAI	✓	
	Hypseleotris galii	firetail gudgeon	-	QA	✓	✓
	Hypseleotris klunzingeri	western carp gudgeon	-	QA	✓	
	Hypseleotris species 1	Midgley's carp gudgeon	-	QA	✓	✓
	Hypseleotris species 3	Murray-Darling carp gudgeon		QA	✓	

Family	Scientific Name	Common Name	NC Act	Endemicity	Isaac sub-basin	Suttor River sub-basin
	Hypseleotris sp.	carp gudgeon	-	U	✓	
	Mogurnda adspersa	southern purplespotted gudgeon	-	QA	✓	✓
	Mogurnda mogurnda	northern purplespotted gudgeon	-	QAI		✓
	Oxyeleotris aruensis	Aru gudgeon	-	QI	✓	
	Oxyeleotris lineolata	sleepy cod	-	QA	✓	✓
	Philypnodon grandiceps	flathead gudgeon	-	QA	✓	
Hemiramphidae	*Arrhamphus sclerolepis*	snubnose garfish	-	QAI	✓	
Melanotaeniidae	*Melanotaenia splendida splendida*	eastern rainbowfish	-	Q	✓	✓
Mugilidae	*Mugil cephalus*	Sea mullet	-	QAI		✓
Osteoglossidae	*Scleropages leichardti*	southern saratoga	-	Q	✓	
Percichthyidae	*Macquaria ambigua*	golden perch	-	QA	✓	✓
Plotosidae	*Neosilurus ater*	black catfish		QAI	✓	✓
	Neosilurus hyrtlii	Hyrtl's catfish	-	QA	✓	✓
	Porochilus rendahli	Rendahl's Catfish	-	QA	✓	✓

Family	Scientific Name	Common Name	NC Act	Endemicity	Isaac sub-basin	Suttor River sub-basin
	Tandanus tandanus	freshwater catfish	-	QA	✓	
Poeciliidae	*Xiphophorus maculatus*	platy	-	II	✓	
	Gambusia holbrooki	mosquitofish	-	II	✓	✓
Pseudomugilidae	*Pseudomugil signifer*	Pacific blue eye	-	QA	✓	
Terapontidae	*Amniataba percoides*	barred grunter	-	QA	✓	✓
	Bidyanus bidyanus	silver perch	E	QA	✓	
	Hephaestus fuliginosus	Sooty grunter	-	QA		✓
	Leiopotherapon unicolor	spangled perch	-	QA	✓	✓
	Scortum hillii	leathery grunter	-	Q	✓	
	Scortum parviceps	smallhead grunter	-	Q		✓
Toxotidae	*Toxotes chatareus*	sevenspot archerfish	-	QAI		✓

E = Endangered

CE = Critically endangered

Q = Queensland endemic - naturally occurs in Queensland

QA = Intranational - naturally occurs in Queensland and interstate

QAI = Not endemic to Australia - naturally occurs in Queensland, interstate and overseas

QI = Regional endemic - naturally occurs in Queensland and overseas

II = Introduced (International) - naturalised from overseas

5. FIELD SURVEY RESULTS

5.1 AQUATIC HABITAT

5.1.1 HABITAT CONDITION ASSESSMENT

The creek sites 1, 4 and 5 were dry during both surveys, and creek site 6 was dry during the late-wet survey, however, bioassessment was still undertaken to determine what habitat would potentially be present when these creeks contain water. Habitat bioassessment is not appropriate for dams, therefore sites 2 and 3 were not assessed. Habitat bioassessment scores ranged from poor to fair Figure 5-1. Generally, most sites were impacted by grazing, heavily eroded, dominated by fine sediment and affected by scouring and channelisation, leading to a lower score. There was no change in habitat bioassessment score from the early-wet to late-wet survey. Photos of all sites are shown in Appendix B.

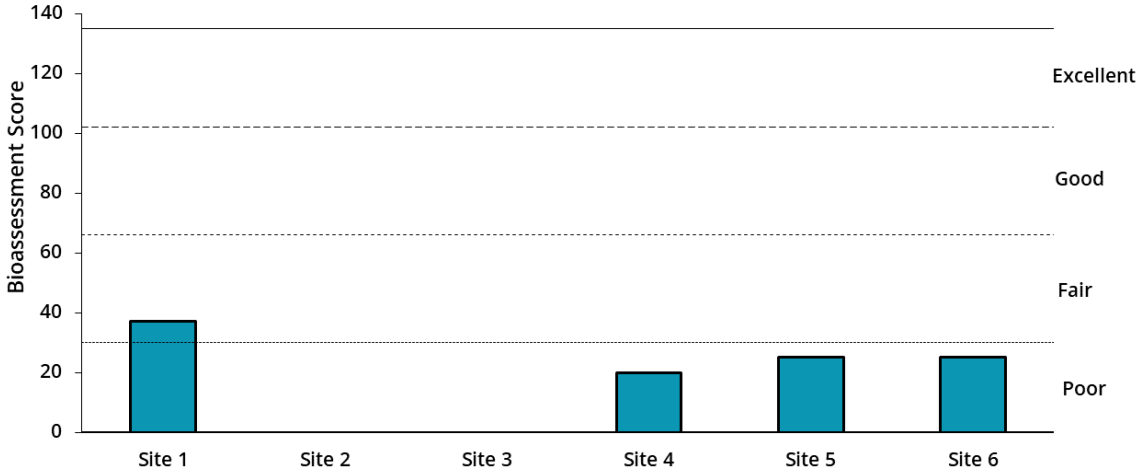


Figure 5-1 Habitat bioassessment scores of each site.

5.1.2 MACROHABITAT

Macrohabitat diversity was low across the Project Area with all sites that contained water having sand/silt pool habitat (Figure 5-2). Sites 1, 4 and 5 were dry during the early-wet survey. Note that site 6 was a sandy/silty pool when surveyed in the early-wet, however became dry by the late-wet survey.

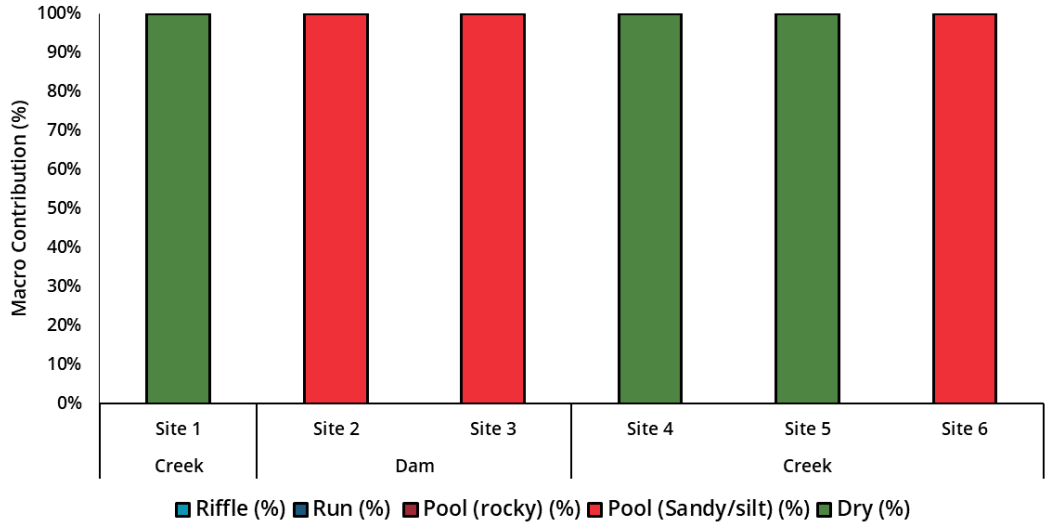


Figure 5-2 Macrohabitat composition at each site during the early-wet survey.

5.1.3 MICROHABITAT

Detritus was the only microhabitat present at sites 2 and 3, as these were dams with dense macrophyte growth, allowing for buildup of organic detritus over time (Figure 5-3). LWD was the dominant microhabitat at sites 1, 4, 5 and 6, though SWD was also present at sites 1, 4 and 5 to a lesser degree. Note that sites 1, 4, 5 and 6 were dry in the late-wet survey. There was no change in microhabitat from the early-wet to the late-wet surveys.

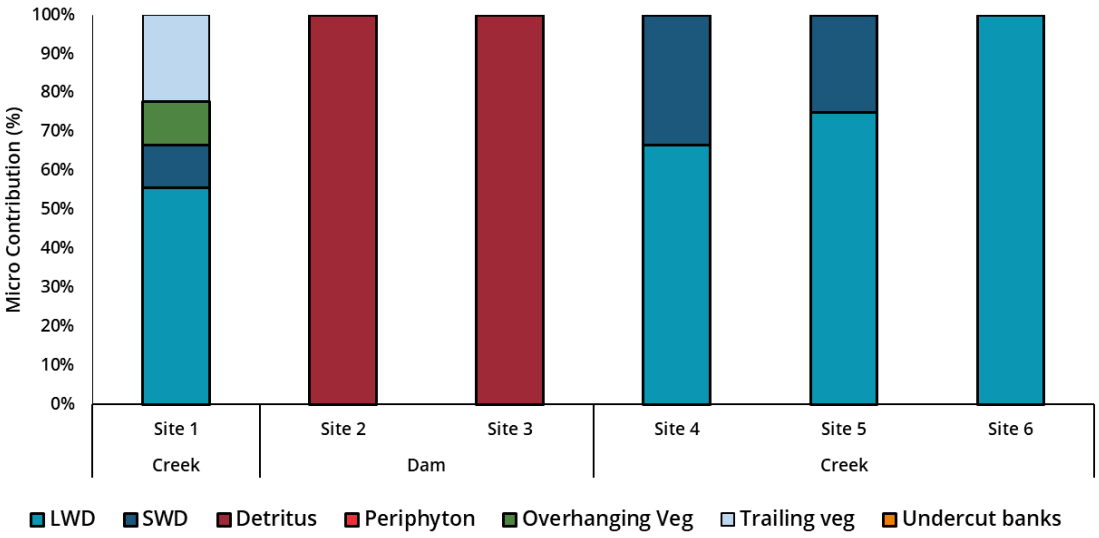


Figure 5-3 Microhabitat composition at each site during both the late-wet and early-wet surveys.

5.1.4 SUBSTRATE COMPOSITION

The substrate of all sites was composed of almost entirely a fine silt and clay substrate (Figure 5-4). Sites 1 to 5 all had smaller components of slightly larger substrates, though this constituted only a small component of the entire substrate. No change in substrate was observed from the early-wet to the late-wet survey.

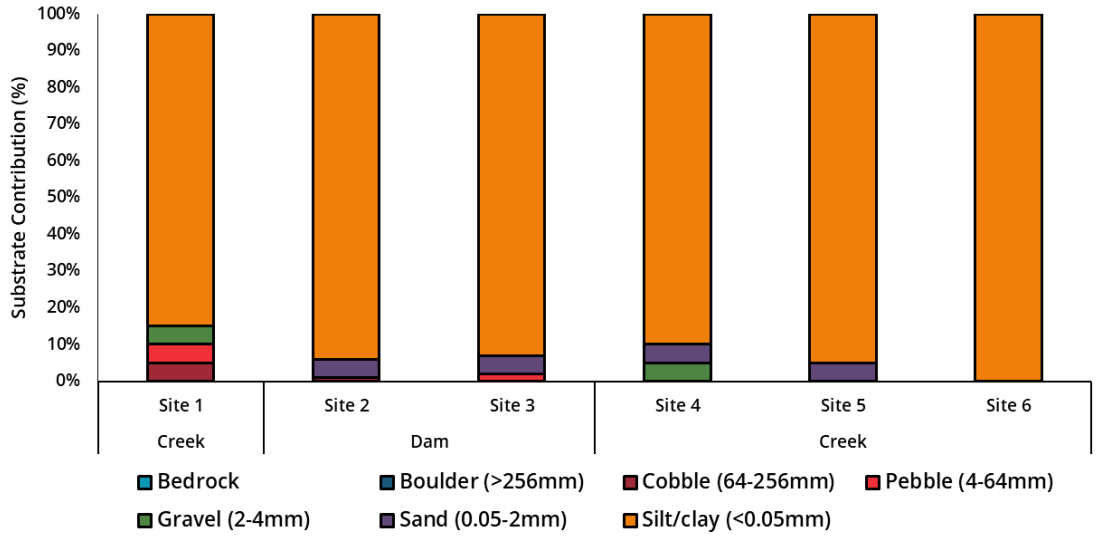


Figure 5-4 Substrate composition at each site during both the late-wet and early-wet surveys.

5.1.5 RIPARIAN STRUCTURE AND COVERAGE

The riparian structure of all sites was dominated by grasses and bare ground (Figure 5-5). This is typical for creeks prone to erosion, of which was noted during the field survey, as trees and their roots provide a more stable bank. Shrubs, small trees and large trees were also present at some sites, though in lesser amounts. There was no change in riparian structure between the early-wet and late-wet surveys.

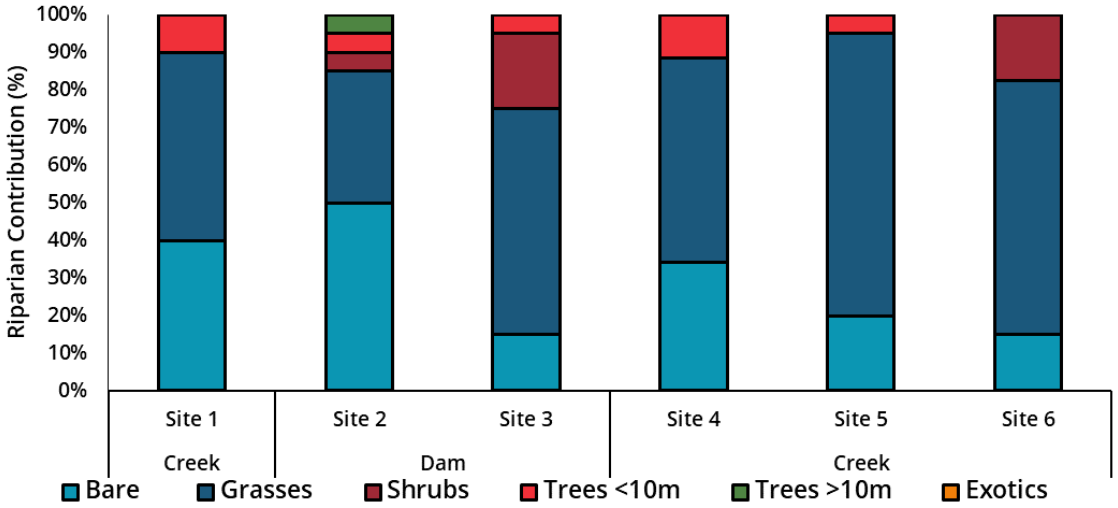


Figure 5-5 Riparian structure and coverage at each site during both the late-wet and early-wet surveys.

5.2 GROUNDWATER DEPENDENT ECOSYSTEMS (GDES)

5.2.1 AQUATIC GDES – GROUNDTRUTHING

Based on groundtruthing of surface GDE presence based on the series of questions described in Eamus et al. (2006) and Doody et al. (2018) in IESC (2018), no GDEs were identified at any of the surveyed sites within the Project Area. Additionally, site 5 and 6, which are located on Charlie Creek and Kennedy Creek respectively, were both dry during the late-wet survey, indicating that water is not sustained perennially by groundwater. Furthermore, the ecological community of site 6 is indicative of a highly intermittent system, given the life history of the species present. Fairy shrimp (*Anostraca* sp.), a macroinvertebrate, and the freshwater crab (*Austrothelphusa transversa*), a macrocrustacean, were both recorded at site 6. Anostraca sp. are capable of producing eggs (cysts) that can enter diapause, allowing them to survive desiccation and hatch when conditions are suitable, i.e. high rainfall leading to pooling (Alekseev & Starobogatov, 1996). The freshwater crab is readily adapted to living in intermittent systems via aestivation in deep burrows (Waltham, 2016).

The aquatic habitat present in Kennedy Creek and Charlie Creek is unlikely to be dependent on groundwater, particularly as there was no substantial aquatic habitat present. There were no macrophytes and no aquatic fauna present that would be dependent on groundwater.

5.2.2 AQUATIC GDES – GROUNDWATER ELEVATION ANALYSIS

The surface water-groundwater interaction of high potential Aquatic GDEs present within the Project Area was assessed using groundwater levels of neighbouring registered groundwater bores (Department of Local Government, Water and Volunteers and private bores) (Figure 4-3). Generally, these bores had a recorded water level at their inception which was used for the elevation analysis. The depth of some nearby bores was also recorded during the stygofauna collection in the early-wet survey (Table 5-1). These were compared to the elevation of mapped aquatic GDEs.

Bore water level data at the time of inception from bore 141162 indicates that groundwater may potentially reach the surface along the western part of Kennedy Creek within the Project Area. This is because the elevation in metres with respect to the Australian Height Datum (mAHD) of bore 141162 is higher than the elevation of the western parts of Kennedy Creek (Table 5-1 and Table 5-2). However, bore 141163, indicates the opposite and is a closer bore to Kennedy Creek. Both the inception water

level measurements and the early-wet survey measurements indicated that the groundwater level is around 10 m below the surface of Kennedy Creek.

Bore water level data from bore 162062 suggests that groundwater is around 1 m below the surface of the western parts of Charlie Creek (Table 5-1 and Table 5-2). This is close enough to indicate a potential groundwater-surface water interaction, especially given the expected seasonal fluctuations in groundwater level. Bore 206201 is the furthest bore from Kennedy Creek and its water level was recorded to be 6 m below Kennedy Creek, suggesting no groundwater-surface water interaction.

Overall, elevation analysis of groundwater level data suggests that there may potentially be an interaction between groundwater and surface water in both Kennedy and Charlie Creek. However, field surveys confirmed that both creeks were dry at the time of assessment and lacked observable features typically associated with GDEs, such as sustained baseflow, saturated soils, or groundwater-supported vegetation. While localised surface expressions of groundwater may occur, these are considered minimal and short-lived, likely only following significant rainfall events and not indicative of persistent groundwater dependence.

Table 5-1 Bores used for elevation analysis.

Bore	Water level at inception (mAHD)	Inception date	Water level at early wet survey (mAHD)	Survey date	Distance to closest Creek
141163	290	Oct 2011	292	Feb 2024	1 km S of Kennedy Creek
141162	303	Oct 2011	N/A	N/A	1.8 km N of Kennedy Creek
206201	Unknown	Dec 2023	295	Feb 2024	2 km N of Kennedy Creek
162062	322	Dec 2011	313	Feb 2024	0.5 km S of Charlie Creek

Note: Bore 141162 was not found during the early wet stygofauna survey.

Table 5-2 Elevation range of BOM mapped aquatic GDEs present in the Project Area.

Creek	Elevation Range (mAHD)	Notes
Kennedy Creek	301 to 331 m	Elevation increases from west to east
Charlie Creek	323 to 331 m	Elevation increases from west to east

5.2.3 SUBTERRANEAN GDES – STYGOFAUNA SURVEY

No true stygofauna or short-range endemic stygofauna were collected during the pilot survey of 9 bores during the early-wet survey. *Nematoda* spp. were collected from one bore in the Project Area (bore 182311). Some of these nematodes may potentially be stygofauna, however identification of nematodes is not conducted further than phylum, following standard practice as it is not practicable to identify to species.

5.2.4 GDE VALUE

Results of the GDE value assessment (Table 5-3) indicate that both the aquatic and subterranean systems within the Project area are of low ecological value. Aquatic GDEs, represented by ephemeral habitats along Kennedy and Charlie Creeks, were assessed as low sensitivity to groundwater change, as these systems do not rely on continuous groundwater inputs to sustain aquatic biota. Species recorded, including *Anostraca* sp. and *Austrothelphusa transversa*, are characteristic of temporary waterbodies and tolerant of fluctuating hydrological conditions. Subterranean assemblages were similarly low value, with only *Nematoda* sp. recorded—likely stygoxenes not reliant on groundwater. The assessment also determined that all GDEs occur outside protected areas and within landscapes heavily modified by grazing, with no endemic or threatened taxa identified. Given the limited connectivity and ecosystem service function of these systems, overall GDE value for both aquatic and subterranean environments is classified as low.

Table 5-3 GDE Value Assessment

Attributes	Description	Aquatic GDEs	Subterranean GDEs
Sensitivity	The sensitivity of GDE communities to changes in groundwater (high value—GDEs for which only slight changes in groundwater level will result in loss of biota and/or services; moderate value—GDEs that require a moderate change in groundwater to cause changes in their distribution, biota, services and/or condition	**Low Value**: Potential GDEs on Kennedy Creek and Charlie Creek are low value as they are likely not susceptible to slight changes in groundwater level. Charlie Creek was dry during both surveys and no sign of seasonal aquatic habitat was present. The Kennedy Creek site does not sustain water year-round; therefore it does not require continuous input of groundwater to maintain the biota and environmental services it provides. Furthermore, the biota present (Anostraca sp. and *Austrothelphusa transversa*) are adapted to live in an ephemeral environment, meaning they do not require a perennial supply of groundwater.	**Low Value**: Only Nematoda sp. were identified during the stygofauna pilot survey. They are likely stygoxenes, therefore they are not dependent on groundwater. Therefore, changes in groundwater will not result in a loss of biota.
Location	Location of GDEs (high value—GDEs in state reserves)	**Low Value**: The Project Area and surrounding GDEs are not located in a state or national reserve/park.	
Condition	High value—GDEs that are relatively unaltered and in good condition; low value—GDEs that are highly modified from their natural state and declining in ecosystem condition)	**Low Value**: The Project Area and surrounding GDEs are heavily modified from land clearing for grazing, and is currently being grazed by cattle.	

Attributes	Description	Aquatic GDEs	Subterranean GDEs
Uniqueness	Uniqueness (high value—GDEs that contain endemic, relictual, rare or endangered species; moderate value— GDEs that contain vulnerable or threatened biota)	**Low Value**: No endemic, relictual, rare, endangered, vulnerable or threatened biota were recorded in the aquatic GDEs or groundwater of the Project Area and adjacent surrounds.	
Services	High Value – Delivers ecosystem services through biogeochemical processes: carbon processing, nitrification / denitrification, biodegradation through aquifer connectivity.	**Low Value**: Likely limited groundwater-surface water interactions, therefore any environmental services the aquifer provides i.e. carbon processing, nitrification / denitrification, biodegradation, are not likely to benefit any surface aquatic ecosystems.	

5.3 MATTERS OF STATE ENVIRONMENTAL SIGNIFICANCE

As discussed above in Section 4.10, the Fitzroy River turtle, white-throated snapping turtle, and platypus were not caught or observed in the Project Area and suitable habitat was not present.

THREATENED FAUNA (REPTILES)

Neither the white-throated snapping turtle (*Elseya albagula*) or the Fitzroy River turtle (*Rheodytes leukops*) were caught or observed during either the early-wet or late-wet surveys. A combination of all suitable habitat characteristics for both of these species were not identified at any site (Table 5-4 and Table 5-5). Additionally, the creeks within the Project Area are highly intermittent, a significant disqualifier of potential habitat for both species which require a perennial water source.

Neither white-throated snapping turtles or the Fitzroy River turtle are not known to occur in off-stream habitats such as farm dams, billabongs or floodplains (Limpus et al. 2011; DOEE, 2017). The white-throated snapping turtle also has limited capacity to cross dry paddocks or follow dry streambeds for extended distances (DOEE, 2017).

Table 5-4 White-throated turtle habitat suitability assessment.

	Isaac River sub-basin		Suttor River sub-basin			
Attribute	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6
Submerged/ emergent vegetation [8,11]		✓	✓			
Undercut banks [20]						
Overhanging vegetation [9]						
Riffles [9,11]						
Permanent water body [10]		✓	✓			
Fast/slow flow waters [10, 11]						
Sand-gravel substrate with crevices						
Large woody debris [10, 12]	✓			✓	✓	✓

Attribute	Isaac River sub-basin		Suttor River sub-basin			
	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6
Impoundment of stream [8, 13]		✓	✓			
Extensive riparian clearing [9, 13]		✓				
Livestock/ feral animals [9, 13]	✓	✓	✓	✓	✓	✓

Note: red attributes are considered unsuitable habitat characteristics.

References: 8, (Hamann et al., 2004); 9, (Limpus, 2011); 10, (M. A. Gordos et al., 2007); 11, (Micheli-Campbell, 2012); 12, (Tucker et al., 2000); 13, (Beukeboom, 2015); 20, (DAWE, 2020).

Table 5-5 Fitzroy turtle habitat suitability assessment.

Attribute	Isaac River sub-basin		Suttor River sub-basin			
	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6
Large deep permanent pools [1]		✓	✓			
Rocky, gravelly or sandy substrates[1]						
Shallow riffles [1]						
High water clarity [1]						
Ribbonweed beds [1]			✓			
Riparian vegetation (blue gums, river oaks, weeping bottle brushes, paperbark) [1]						
Impoundment of stream [8,13]		✓	✓			
Extensive riparian clearing [9,13]		✓				
Livestock/ feral animals [9,13]	✓	✓	✓	✓	✓	✓

Note: red attributes are considered unsuitable habitat characteristics.

References: 1, (DCCEEW, 2022). 8, (Hamann et al., 2004); 9, (Limpus, 2011); 13, (Beukeboom, 2015).

THREATENED MAMMALS

Suitable habitat for the platypus was not identified in the Project Area (Table 5-6). The only perennial water bodies present within the Project Area were two constructed farm dams, both of which platypus were not caught or observed and habitat where platypus are not generally found (Grant, 2015). These dams are unlikely to contain Platypus due to the following:

- The tributary which would provide connectivity to SP7 is considered poor with the Moura-Theodore Road dissecting the landscape. Additionally the tributary is poorly defined, highly cleared and considered degraded.
- Consistent access by cattle, degrading bed and bank areas and degrading water quality and habitat;
- Lack of debris along banks further limiting food availability (i.e. habitat for macroinvertebrates);
- Lack of overhang on banks limiting nesting and shelter burrow creation;
- Lack of vegetation along banks providing debris input for food resources; and
- Limited LWD providing habitat and food for benthic invertebrate prey.

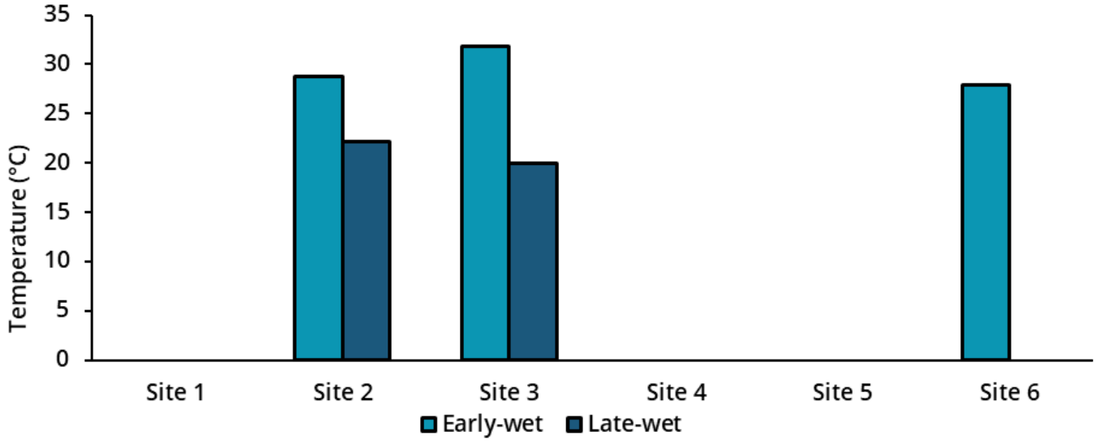
Table 5-6 Platypus habitat suitability assessment

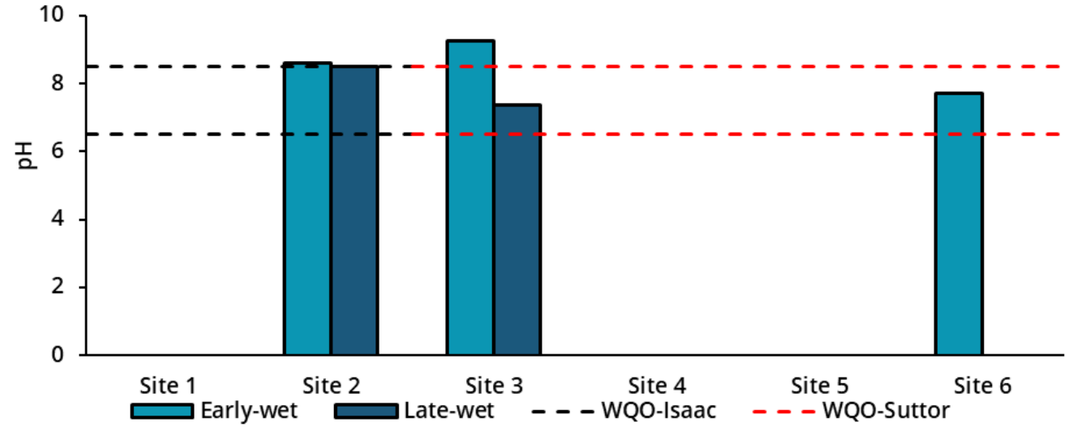
Attribute	Isaac River sub-basin		Suttor River sub-basin			
	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6
Consolidated banks with vegetation						
Large woody debris	✓			✓	✓	✓
Coarse rocky substrate (e.g. pebbles, cobbles, gravel						
Bank profile at water level (concave/vertical/overhang)						
Debris at water level at bank						
Permanent waterbody		✓	✓			
Deep pool/run habitat						
Barriers present		✓	✓			
Riparian clearing		✓				

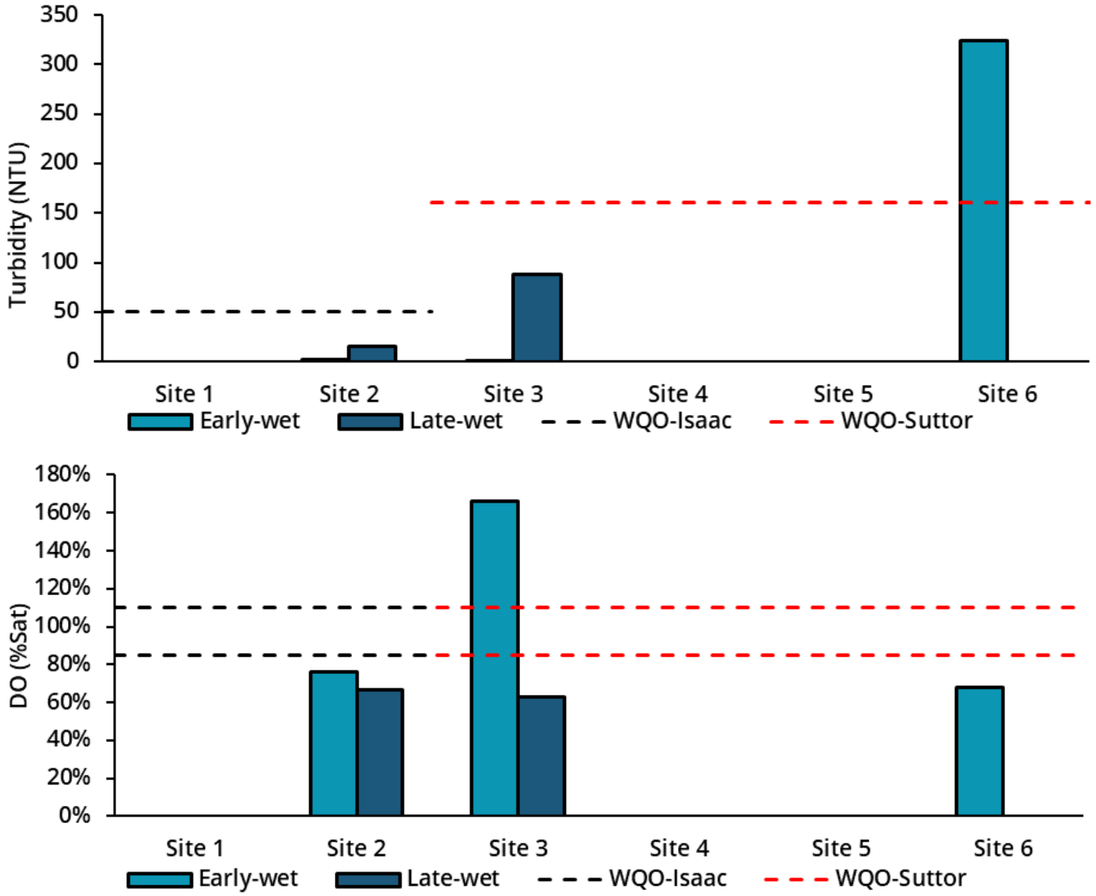
Note: red attributes are considered unsuitable habitat characteristics.

5.4 WATER QUALITY

Only sites 2 and 3, which are man-made dams, retained water during both the earl-wet and late-wet surveys. Site 6 had water during the early-wet survey but was dry by the late-wet survey. Water temperature was normal given the time of year of the surveys and the physical characteristics of each site. During the early-wet surveys, pH was above water quality objectives (WQOs) at sites 2 and 3, however the high density of submerged macrophytes present at both sites may have influenced these readings. Sites 2 and 3 were below turbidity WQOs at both surveys, however site 6 exceeded the turbidity WQO by more than double, though this is typical for a highly intermittent creek. All sites were below WQOs for dissolved oxygen except for site 3 which showed an exceedingly high dissolved oxygen level, attributed to the dense macrophytes present where the readings were taken.







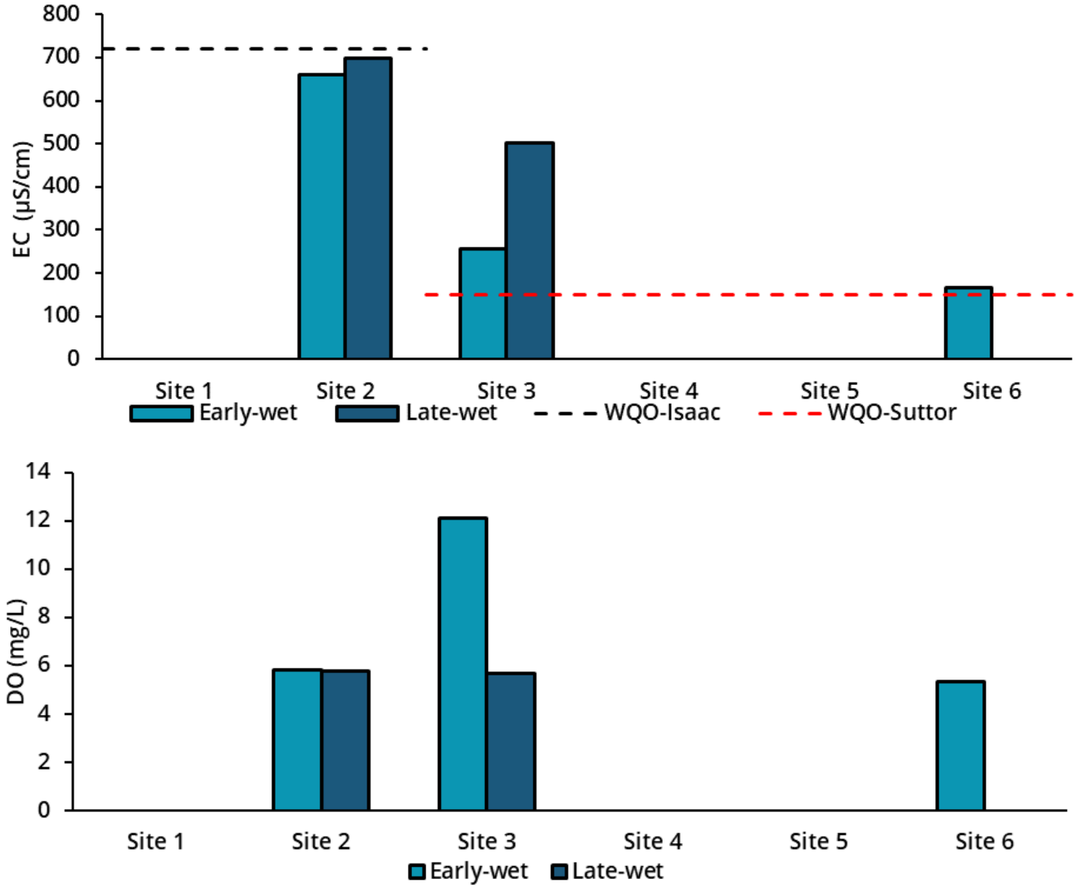


Figure 5-6 In-situ water quality recorded at each site. Black dotted lines represent Isaac River sub-basin WQOs (DETSI, 2011). Red dotted lines represent Suttor River sub-basin WQOs (DETSI, 2011).

5.5 MACROINVERTEBRATES

5.5.1 BIOLOGICAL OBJECTIVE COMPARISONS

Sites 1, 4 and 5 were dry during both surveys, therefore no macroinvertebrates could be collected. Site 6 was dry during the late-wet survey; therefore it could not be sampled for macroinvertebrates. Macroinvertebrate taxonomic richness was within defined Isaac River Sub-basin specific biological quality indicators (BQOs) at site 2 only during the late-wet season, for both edge and bed habitat (Figure 5-7 & Figure 5-8). This may be due to the receding water level in the dam which concentrated nutrient levels, allowing for a more productive ecosystem for macroinvertebrate richness. Taxonomic richness remained similar between the two surveys at site 3. Site 6 showed the second highest taxonomic richness across all sites and surveys, notably recording the presence of an Anostraca species, also known as fairy shrimp. Given their presence and life history, this would suggest that site 6 is highly intermittent. Additionally, the presence of Anostraca in such a habitat indicates the lack of fish presence in this waterbody. There are no BQOs for macroinvertebrates in aquatic ecosystems in the Suttor River sub-basin.

The BQOs for tolerant macroinvertebrate taxa were exceeded during both surveys at site 2 for bed samples and is also exceeded in the late-wet bed sample. PET richness was below the BQO in the bed sample of site 2 during the early-wet survey; additionally, PET richness was generally quite low across all sites. The SIGNAL2 score of the edge samples at site 2 was below the BQO during both surveys. SIGNAL2 scores were generally low across all sites and both surveys.

The low PET richness, SIGNAL2 score and taxonomic richness observed across most sites is generally typical of intermittent creek systems of the wider region.

5.5.2 FUNCTIONAL FEEDING GROUPS

Predators consistently dominate across both surveys, particularly in the Early-wet period, with high proportions observed in the edge habitat (Figure 5-9). Scrapers are also a significant group, especially in bed habitats, where they are present across both field surveys. Filtering collectors, along with gathering & filtering collectors, show noticeable variation, becoming more prominent in the late-wet season, particularly in bed habitat. Other groups like predators combined with scrapers and shredders appear sporadically across the field surveys and habitats. Overall, FFG composition was typical of intermittent systems and showed natural seasonal variation between survey events.

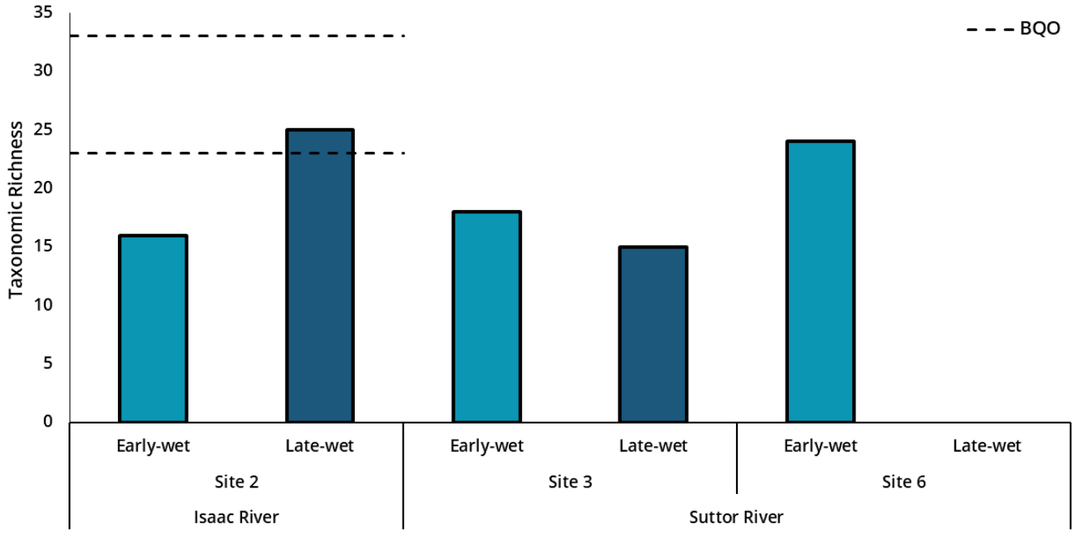
5.5.3 COMMUNITY ASSEMBLAGE

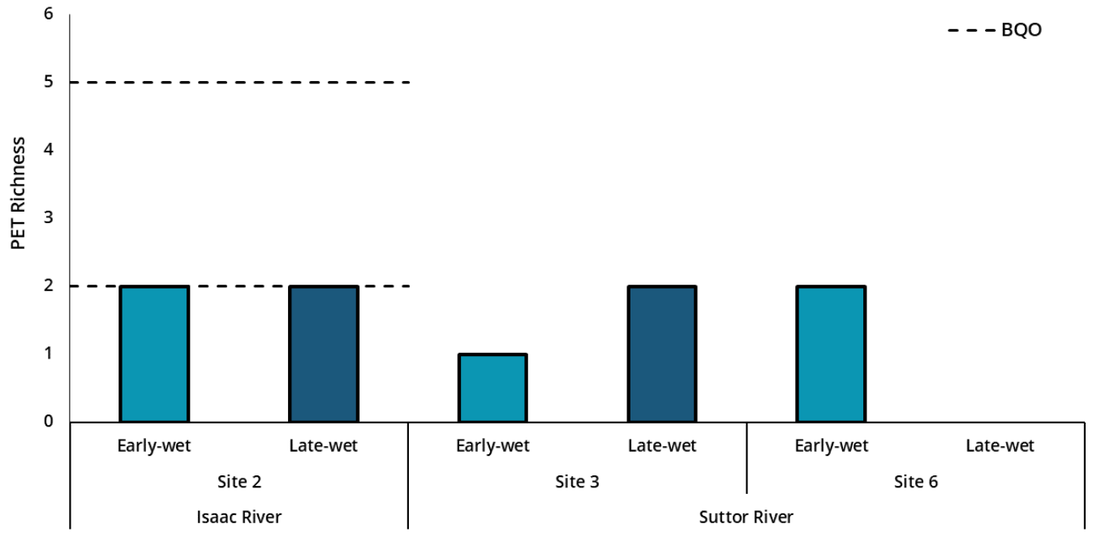
Macroinvertebrate communities of the Project Area were dominated by microcrustaceans such as copepods, cladocerans and ostracods, as well as chironomid fly larvae, beetles and true bugs (Figure 5-10). These taxa are typical of intermittent systems in the wider region and are characterised by their tolerance to a wide variety of conditions and their ability to rapidly colonise temporary habitats. More sensitive taxa and/or those that have specific habitat preferences including flowing water, riffle and coarse sediments were rare, reflecting the limited habitat available in the area.

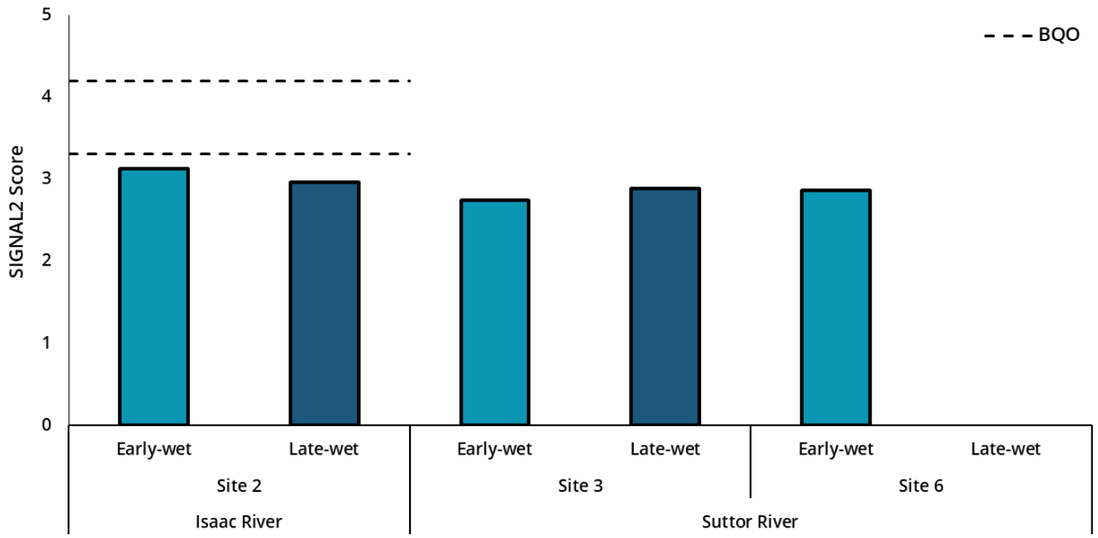
5.5.4 AUSRIVAS ANALYSIS

Both edge and bed habitat sampled from Kennedy Creek site 6 scored in AUSRIVAS band B, indicating that the habitat was significantly impaired, with fewer macroinvertebrate families than expected recorded (Table 5-7). Low AUSRIVAS scores are typical for ephemeral systems like those of the Project Area where both macrohabitat and microhabitat contain little diversity. Factors that influence the low scores likely include the lack of substrate and microhabitat diversity, with pools dominated by fine sediments with little debris, macrophytes and algae or coarser sediments such as gravel and pebbles.

It should be noted that the AUSRIVAS model is applicable to waterways (creeks, rivers etc.) only and not to wetlands, ponds or dams, therefore the model could not be applied to dam sites 2 and 3.







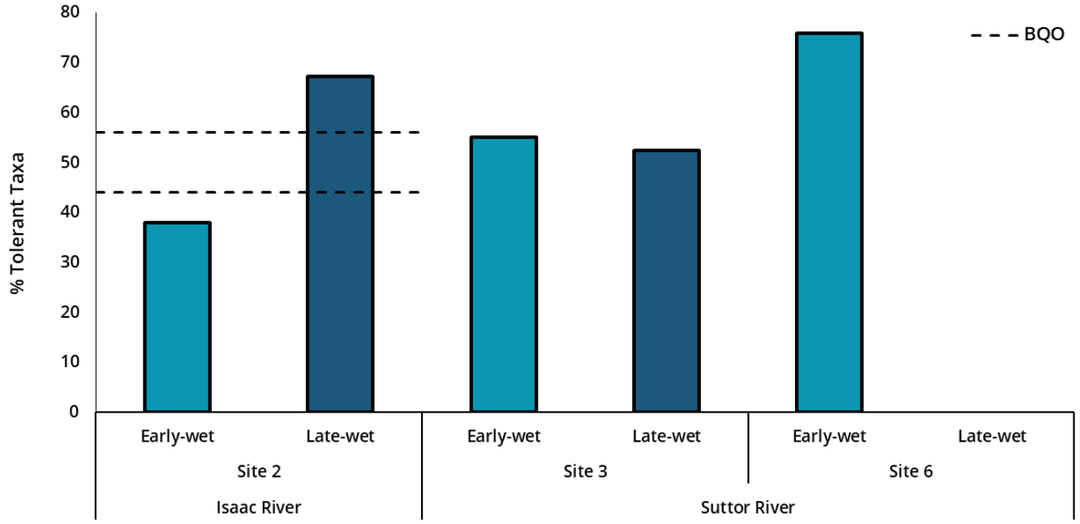
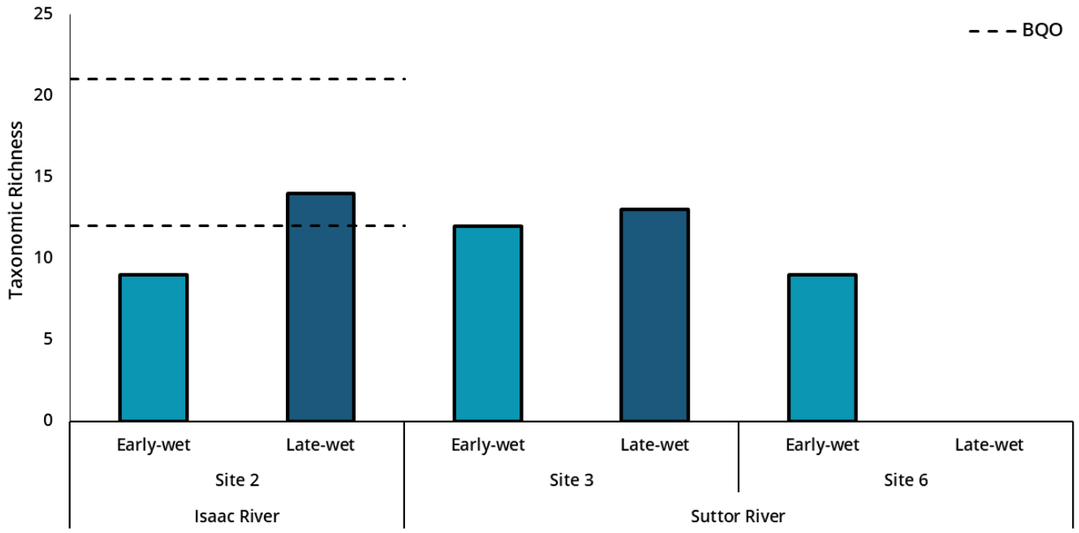
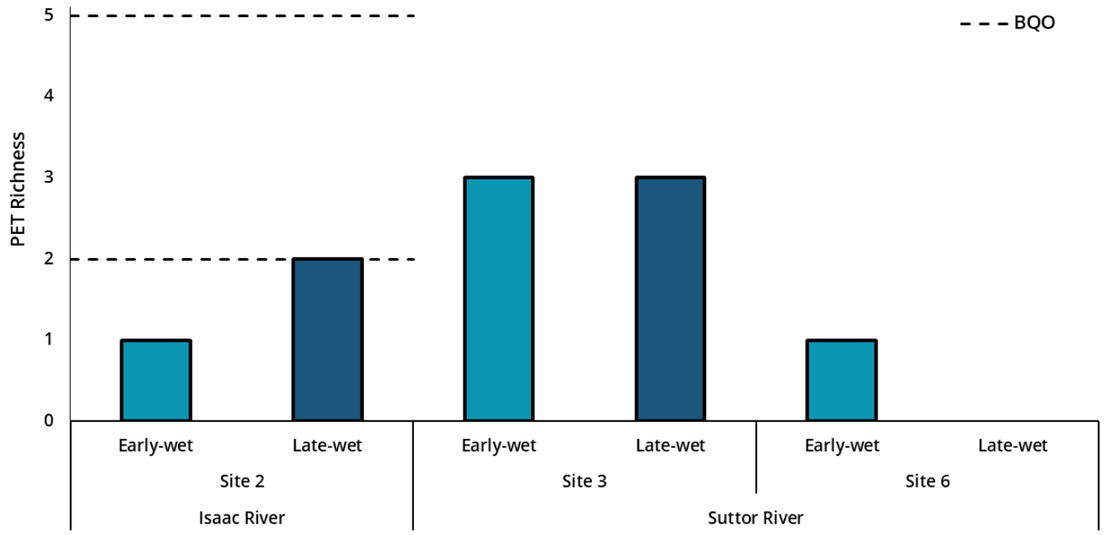
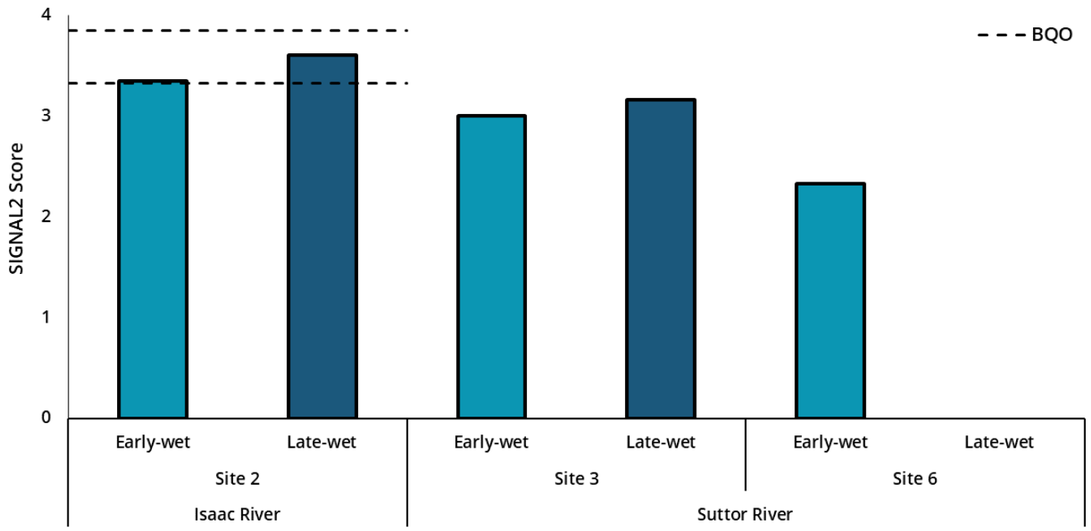


Figure 5-7 Edge macroinvertebrate univariate analysis. Dotted lines represent Isaac River sub-basin BQOs (DETSI, 2011). No such BQOs exist for the Suttor River sub-basin.







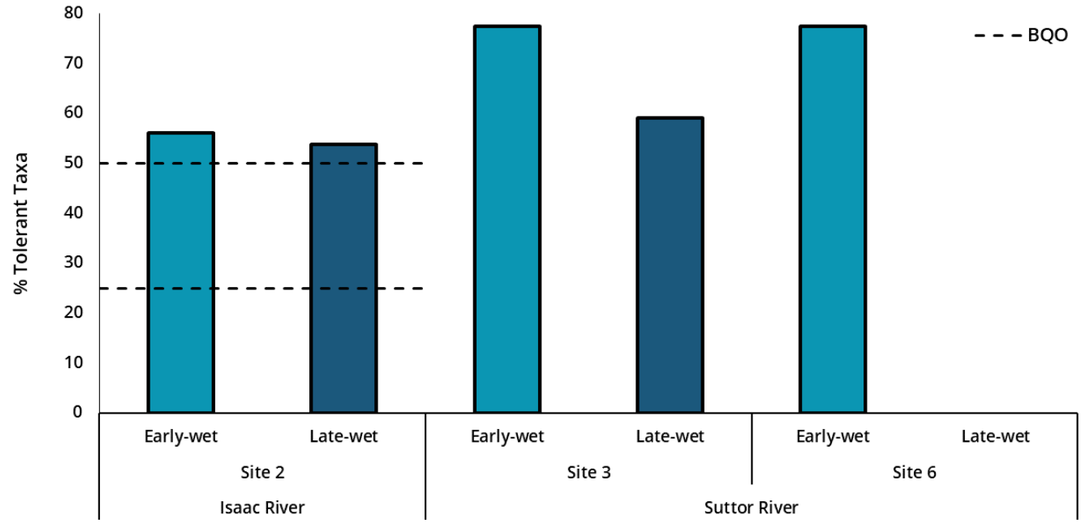


Figure 5-8 Bed macroinvertebrate univariate analysis. Dotted lines represent Isaac River sub-basin BQOs (DETSI, 2011). No such BQOs exist for the Suttor River sub-basin.

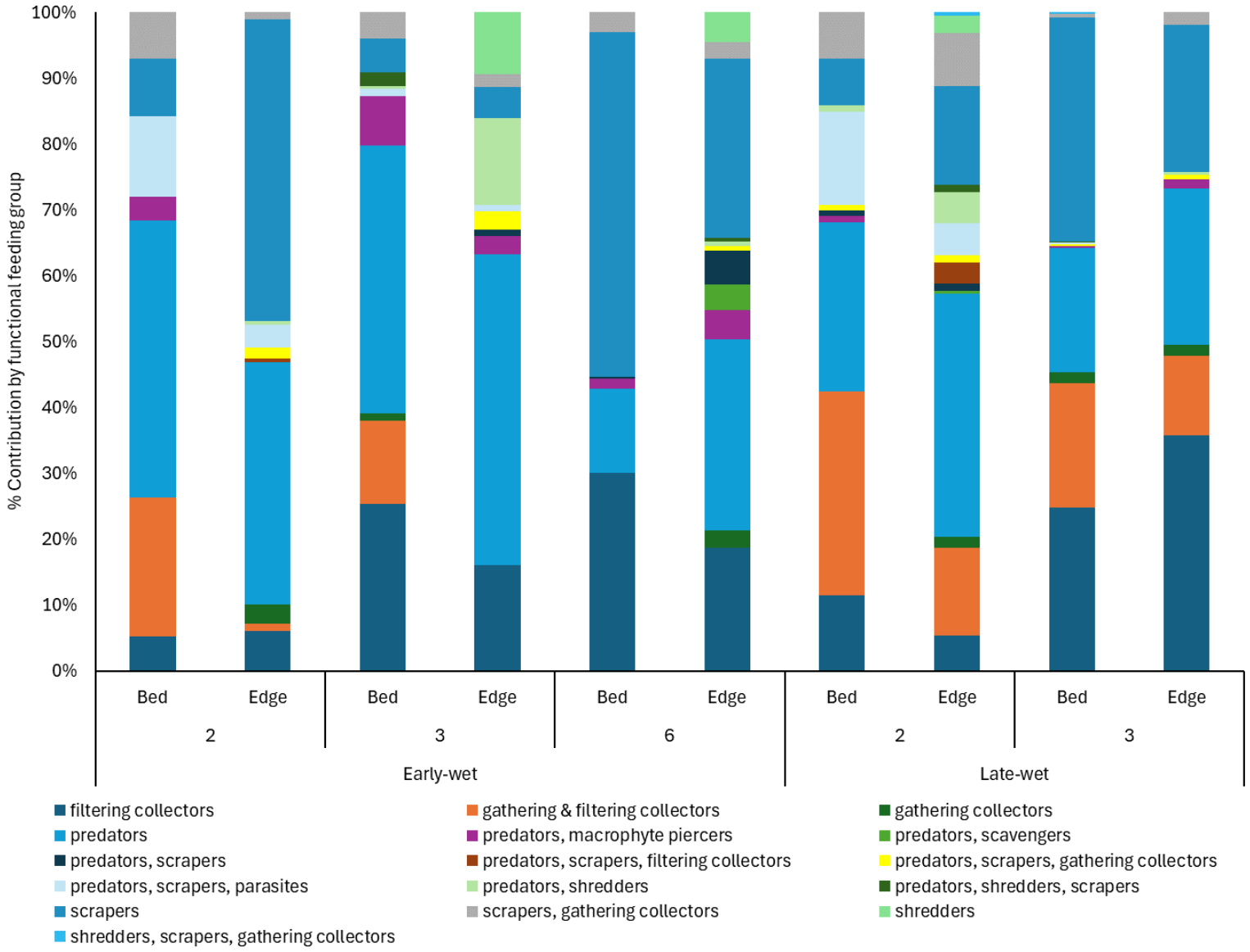


Figure 5-9 Functional feeding groups of all sites during the 2024 surveys.

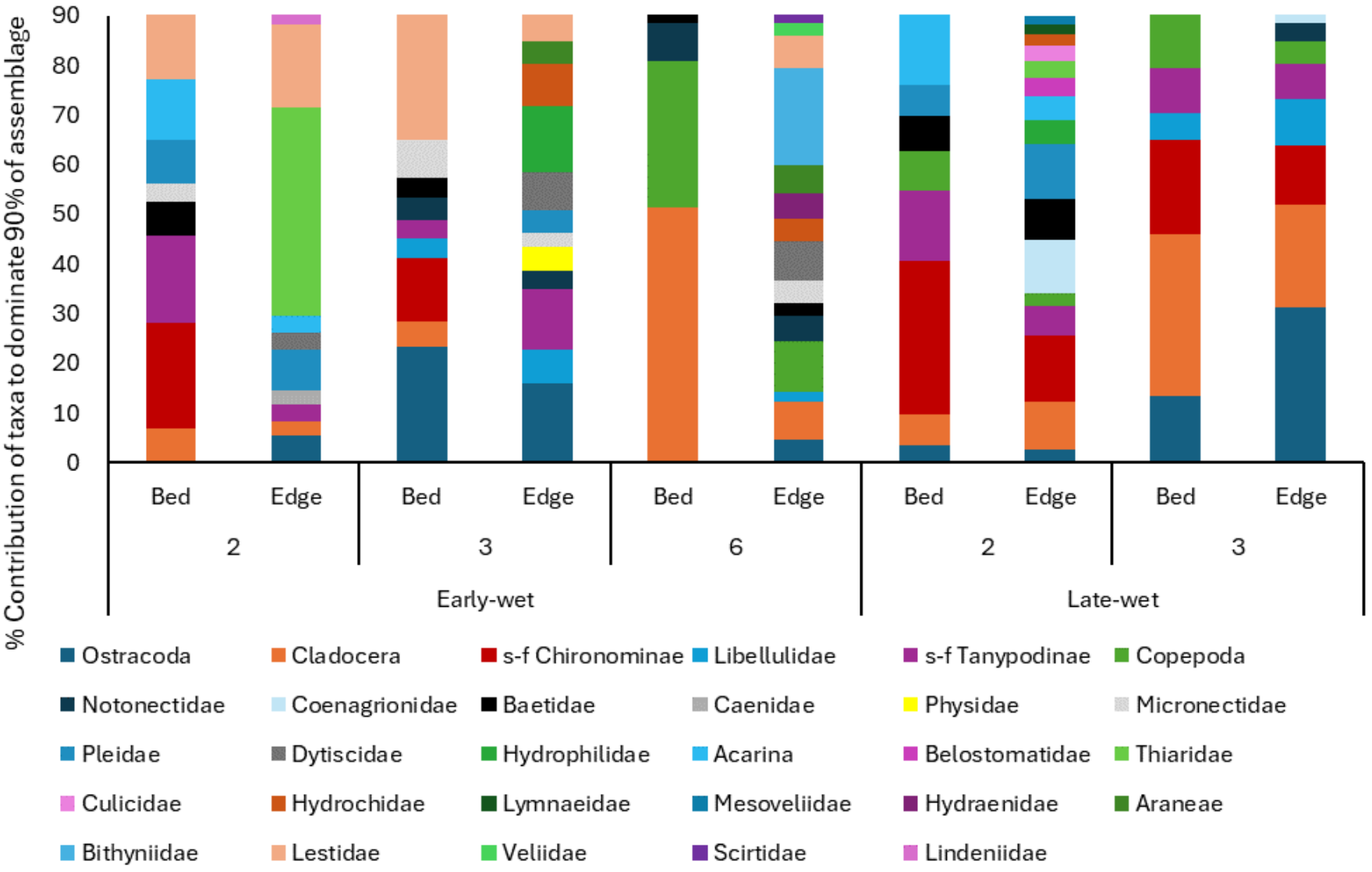
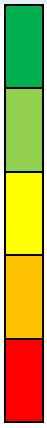


Figure 5-10 Contribution of individual taxa to macroinvertebrate assemblage (top 90%).

Table 5-7 AUSRIVAS OE50 scores and band condition of macroinvertebrate assemblages recorded during the 2024 early-wet and late-wet surveys.

Watercourse	Site	Early-wet		Late-wet	
		Edge Habitat	Bed Habitat	Edge Habitat	Bed Habitat
Kennedy Creek	6	0.70	0.32	Dry	Dry



Band X: more biologically diverse than the AUSRIVAS database reference site. Could be associated to mild organic enrichment

Band A: AUSRIVAS database reference condition. Most/all of the expected families found

Band B: significantly impaired. Fewer families than expected.

Band C: severely impaired. Many fewer families than expected.

Band D: extremely impacted: few of the expected families remain.

5.6 AQUATIC FLORA

The two dam sites (site 2 and 3) were the only sites to record considerable macrophyte presence (Table 5-8). Site 6 also recorded small amounts of the semi-aquatic *Pseudoraphis spinescens*. Site 2 was essentially a monoculture of *Potamogeton sulcatus* around the entire littoral zone of the dam, with a small patch of *Typha domingensis* present. Site 2 was dominated by thickets of *Najas tenuifolia*, with an occasional patch of *Vallisneria nana*. Less abundant species present at site 2 were *Cyperus sp*., *Ludwigia peploides* and *Myriophyllym sp*. Of these species present, only *N. tenuifolia* and *P. sulcatus* are listed species and are considered special least concern under the Nature Conservation (Plant) Regulation 2020. Both species are common and have a widespread distribution.

Table 5-8 Aquatic flora recorded at the survey sites.

Species	Common name	Family	Form	1	2	3	4	5	6
Cyperus sp.	sedge	Cyperaceae	Emergent			✓			
Ludwigia peploides	floating primrose-willow	Onagraceae	Floating-attached			✓			
Myriophyllym sp.	water milfoil	Haloragaceae	Submerged / emergent			✓			
Najas tenuifolia	water nymph	Hydrocharitaceae				✓			
Potamogeton sulcatus	furrowed pondweed	Potamogetonaceae			✓				
Pseudoraphis spinescens	spiny mudgrass	Poaceae	Emergent						✓
Typha domingensis	cumbungi	Typhaceae	Emergent		✓				

Species	Common name	Family	Form	1	2	3	4	5	6
Vallisneria nana	eelgrass	Hydrocharitaceae	Submerged			✓			

5.7 AQUATIC FAUNA

Only the site 2 dam recorded any fish during both field surveys (Table 5-9). The fish recorded, namely spangled perch and eastern rainbowfish, with some Agassiz's glassfish and Hyrtl's catfish also caught, are typical of the catchment. Though, considering site 2 is an artificial excavated dam, and that the Project Area is highly intermittent, these species were potentially stocked, especially since there is limited connectivity to other creeks given the steep and high embankment. All species caught are listed as least concern.

Many redclaw crayfish were also caught in dam 2 and are a common species found in dams across Queensland. Of note, the Project Area is outside of the natural range of the redclaw crayfish, therefore it is considered a pest species within the Project Area.

Freshwater crabs were caught at site 6 during the early-wet survey. They are predominantly found throughout ephemeral rivers, creeks, and waterholes throughout QLD, therefore provide an indication that site 6 is highly intermittent (Waltham, 2016).

Table 5-9 Fish and macrocrustacean species captured within the Project Area

Species	Common name	Site 1		Site 2		Site 3		Site 4		Site 5		Site 6	
		Early	Late	Early	Late	Early	Late	Early	Late	Early	Late	Early	Late
FISH													
Ambassidae													
Ambassis agassizii	Agassiz's glassfish	-	-	✓	-	-	-	-	-	-	-	-	-
Melanotaeniidae													
Melanotaenia splendida	eastern rainbowfish	-	-	✓	✓	-	-	-	-	-	-	-	-
Plotosidae													
Neosilurus hyrtlii	Hyrtl's catfish	-	-	✓	✓	-	-	-	-	-	-	-	-
Terapontidae													
Leiopotherapon unicolor	spangled perch	-	-	✓	✓	-	-	-	-	-	-	-	-
MACROCRUSTACEANS													
Gecarcinucidae													
Austrothelphusa transversa	freshwater crab	-	-	-	-	-	-	-	-	-	-	✓	-
Parastacidae													
Cherax quadricarinatus	redclaw crayfish	-	-	✓	✓	-	-	-	-	-	-	-	-

6. IMPACT ASSESSMENT

6.1 POTENTIAL IMPACTS AND MITIGATION MEASURES

The proposed exploration and early works activities by Centurion Coal Mining Pty Ltd are expected to result in localised and temporary environmental impacts that are largely confined to the immediate project footprint. No surface disturbance will occur within riparian zones or waterways, and no stygofauna habitat is present within the Project area, substantially reducing ecological risk. The primary potential impacts relate to groundwater drawdown, temporary aquifer pressure changes, and short-term soil disturbance from drilling and infrastructure installation. These impacts are of low to moderate risk and can be effectively managed through the implementation of best-practice erosion and sediment controls, strict spill management procedures, weed hygiene measures, and a comprehensive groundwater monitoring and adaptive management program. Overall, the project is not anticipated to result in any long-term or irreversible impacts to groundwater-dependent ecosystems, surface water environments, or regional aquifer integrity.

Table 6-1 Potential environmental impacts by project phase (Early Works and Exploration Program).

Project Phase	Project Activity / Impact Pathway	Description of Potential Impact	Risk Level	Typical Management / Mitigation Measures
Construction / Early Works	Coal seam gas exploration and drilling (service, sampling, and gas drainage bores)	Localised drawdown or depressurisation of groundwater and potential minor impact to adjacent GDEs during drilling or short-term testing.	Moderate	Baseline groundwater level and quality monitoring prior to works; all waste products generated from surface activities will be managed and disposed of in accordance with the CCM Waste Management Procedure; backfill and seal boreholes post-use in accordance eligibility criteria and standard conditions for exploration and mineral development projects (ESR/2016/1985) and will address the requirements and conditions of the existing EA.
		Temporary alteration of aquifer pressures during drilling or completion phases.	Moderate	Controlled drilling rates and pressures; compliance with *Code of Practice for constructing and abandoning CSG wells and associated bores in Queensland*.
		Potential contamination from drilling muds, fuels, or lubricants at drill pads.	Low	Bunded chemical and fuel storage; spill containment and emergency response plan; staff training.
	Construction of gas risers and surface infrastructure	Vegetation clearing and soil disturbance within approved disturbance footprints (outside riparian zones).	Moderate	Limit clearing to surveyed and approved areas; progressive rehabilitation; topsoil and vegetation management and re-use in rehab programs.
		Increased erosion risk and sediment mobilisation from earthworks and unsealed access tracks, though no direct connection to waterways.	Low–Moderate	Erosion and sediment control as per IECA (2008); diversion drains and sediment basins; regular inspection during rainfall events.
	Bleeder shaft and gate road construction	Excavation or trenching may locally alter aquifer structure or flow paths.	Moderate	Design to maintain structural integrity; groundwater and pressure monitoring; sealing and stabilisation post-construction.
	Disturbance for future surface works	Soil compaction, dust generation, and minor surface drainage changes within upland areas.	Low	Dust suppression (watering, speed limits); drainage design to prevent runoff concentration.
	Underground in-seam gas drainage works	Temporary reduction in groundwater pressure within coal seams and surrounding formations during gas drainage.	Moderate	Controlled drainage rates; pressure and water-level monitoring; adaptive management if thresholds exceeded.
	General construction activity	Introduction or spread of weeds through vehicle and equipment movement. Water use	Low	Weed management plan; wash-down procedures; periodic site inspections; no take of water from waterways.
Operation (Exploration Wells / In-seam Drainage Active Phase)	Gas production testing / groundwater abstraction	Sustained but localised changes in groundwater pressure or flow are predicted within the target seams, with limited upward propagation into overlying aquifers. Modelling indicates that groundwater drawdown within the alluvial aquifer is up to approximately 2 m along Kennedy Creek, although in some locations the alluvium is not saturated under base-case conditions and predicted drawdown is therefore conceptual. In the Tertiary basalt aquifer, drawdown of up to approximately 5 m along Kennedy Creek and up to approximately 1 m along Charlie Creek, where mapped GDEs may occur, has been modelled. These changes are expected to be minor, highly localised and subordinate to climatic controls. (SLR, 2025b) (Figure 6-1 and Figure 6-2).	Moderate	Ongoing groundwater monitoring network; trigger thresholds and response protocols; gradual ramp-up of extraction. Verify predictions with event-based monitoring of pool persistence and shallow-flow connectivity following representative rainfall events
	Ongoing site access and maintenance	Minor ongoing disturbance from vehicle movement, causing dust and weed spread.	Low	Maintain access tracks; regular weed control; dust suppression.
	Residual groundwater quality change	Low risk of alteration in aquifer chemistry (e.g., pH, salinity) due to temporary gas–water interactions during drainage.	Low–Moderate	Groundwater chemistry monitoring; comparison against baseline data; adaptive management response if trigger levels exceeded.
	Ecological effects	Given absence of stygofauna and avoidance of riparian zones, ecological impacts limited to minor indirect changes in local vegetation condition adjacent to disturbance footprints.	Low	Rehabilitation and re-vegetation of cleared areas; ongoing inspection and monitoring of vegetation condition.

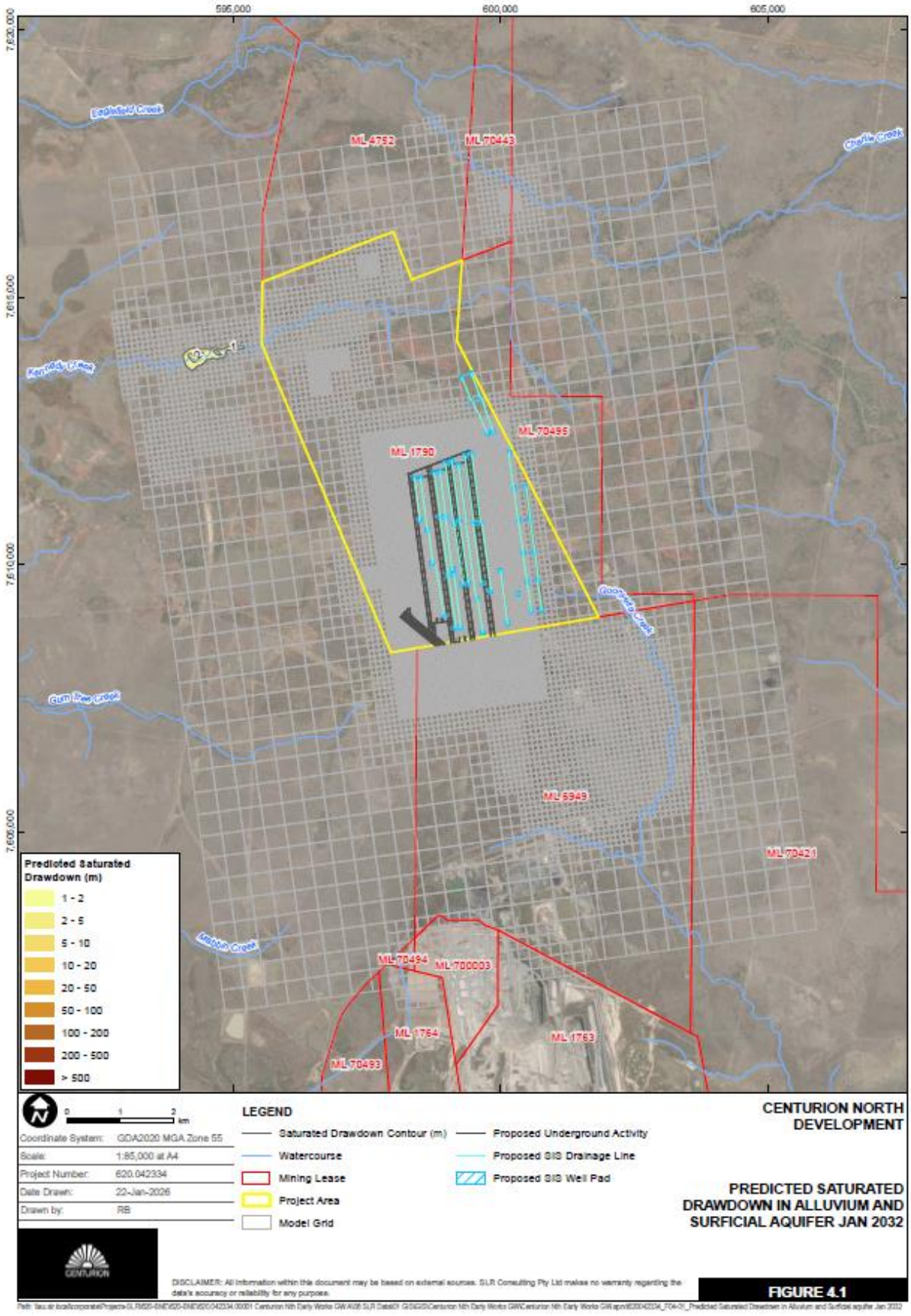


Figure 6-1 Projected groundwater drawdown extents of the alluvium (SLR, 2025b).

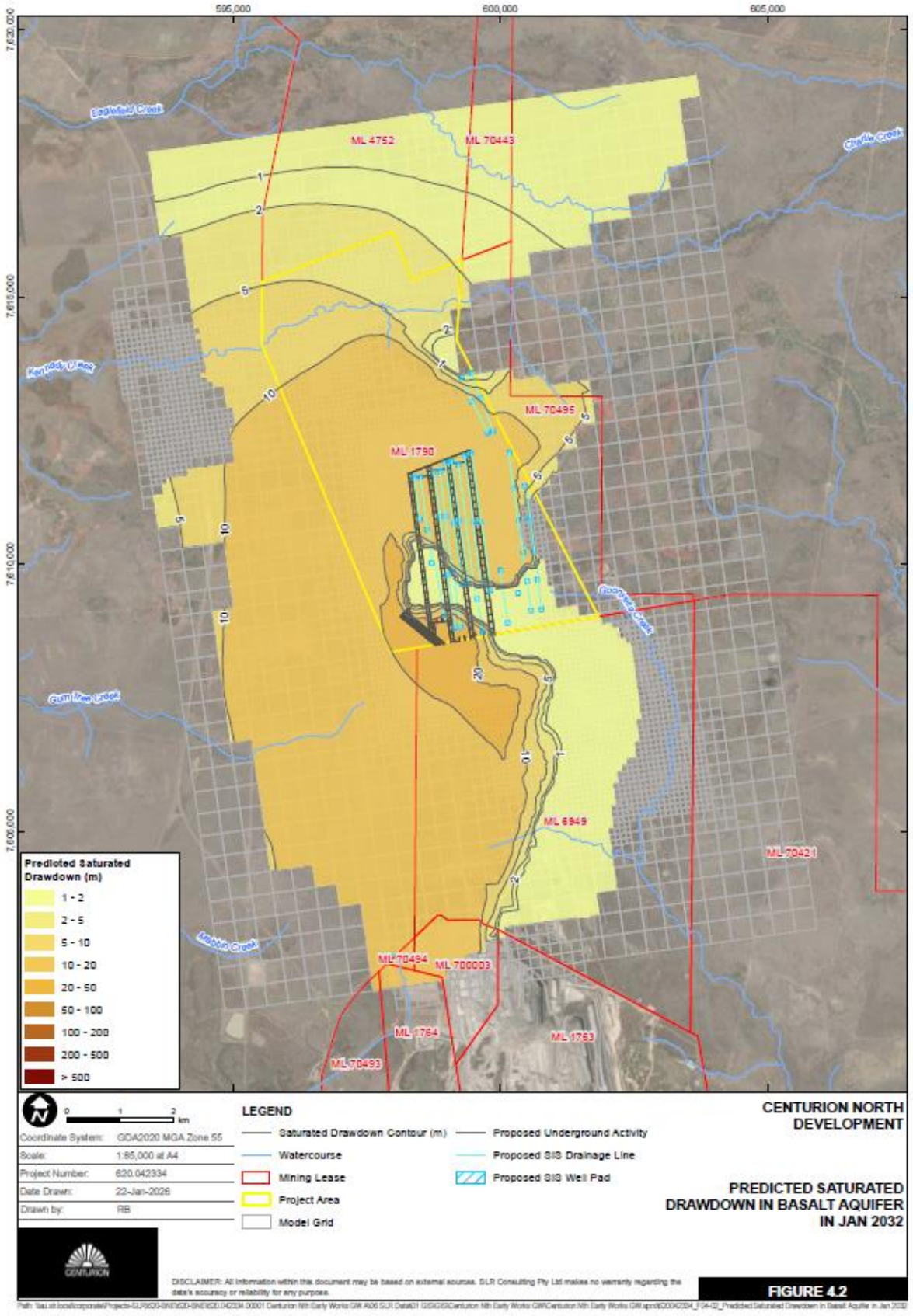


Figure 6-2 Projected groundwater drawdown extents of the tertiary basalt (SLR, 2025b). Note: only Kennedy and Charlie Creeks are mapped aquatic GDEs.

6.2 SRI - MSES

The following section outlines the MSES relevant to the Project and identifies where an SRI assessment has been undertaken.

SRI undertaken for:

- Waterways providing for fish passage – Several mapped waterways traverse the Project Area, including Goonyella Creek, Kennedy Creek, and Charlie Creek. These waterways have been assessed in the context of potential impacts to fish passage arising from changes to baseflow, sedimentation, or hydraulic connectivity associated with the proposed exploration and early works.

SRI not undertaken for:

- Groundwater Dependent Ecosystems (GDEs) – Aquatic and subterranean (stygofaunal) GDEs are not classified as MSES. However, potential indirect impacts have been qualitatively considered where changes to baseflow could influence hydraulic conditions within waterways that support fish passage.
- Threatened aquatic fauna – Species such as the white-throated snapping turtle, Fitzroy River turtle, and platypus are considered unlikely to occur within or near the Project Area. These species were not recorded during recent field surveys, and no historical records exist within the vicinity. Habitat assessments confirm the absence of permanent, structurally complex aquatic environments required to support these taxa.
- Aquatic flora – Special least concern plant species are not addressed under the SRI guideline. Furthermore, due to the highly intermittent nature of local waterways and the absence of persistent aquatic habitats, in-stream macrophytes are unlikely to occur. Should macrophyte removal ever be required, a Protected Plant Clearing Permit under the Nature Conservation Act 1992 would be obtained, although this is highly unlikely as no in-stream works are proposed.
- Wetlands of High Ecological Significance (HES) – The nearest mapped HES wetland is located 25 km east of the Project Area, upstream of the confluence of Goonyella Creek and the Isaac River. Another HES wetland occurs to the west, also upstream of Eaglefield Creek's confluence with the Suttor River. Given their distance and upstream position, no impacts are expected.
- High Ecological Value (HEV) waters – The nearest HEV waters are located approximately 30 km northeast of the Project Area and are upstream of Eaglefield Creek's confluence with the Suttor River. Therefore, no potential impacts are anticipated.

6.2.1 WATERWAYS WHICH PROVIDE FOR FISH PASSAGE

The outcomes of the SRI assessment presented in Table 6-2 indicate that the proposed exploration and early works are unlikely to result in any measurable or residual impacts on fish passage or aquatic habitat. No in-stream or riparian works are proposed, and the subsidence assessment (SCT Operations, 2025) predicted no subsidence-related impacts to waterways that provide for fish passage. Surface water impacts, including potential contamination or sediment-laden runoff, are expected to be minor in scale and of low risk (SLR, 2025a).

Predicted groundwater drawdown within the alluvium (SLR, 2025b) is up to approximately 2 m along Kennedy Creek, noting that in some locations the alluvium is not saturated under base-case conditions and predicted drawdown is therefore conceptual rather than indicative of a reduction in an established groundwater table. In the Tertiary basalt aquifer, drawdown of up to approximately 5 m along Kennedy Creek and up to approximately 1 m along Charlie Creek, where mapped groundwater-dependent ecosystems (GDEs) may occur, has been modelled. Kennedy Creek is an intermittent, lower-order waterway of low GDE value, reflecting its modified condition, limited groundwater dependency, and the absence of state-significant aquatic species or habitat features. Consequently,

any changes in groundwater–surface water interaction along Kennedy Creek or Charlie Creek are expected to be minor and highly localised.

On this basis, the proposed activities are not expected to cause significant impacts to aquatic ecological values or result in the loss or degradation of MSES.

Table 6-2 Risk assessment including management actions and mitigation measures.

Impact Criteria	Response
Mortality or injury of fish	No – There are no proposed instream or riparian works. The subsidence assessment predicted no subsidence impacts to waterways which provide for fish passage (SCT Operations, 2025). Surface water impacts in terms of contamination are minor scale and consider to be low risk (SLR, 2025a). Sediment laden runoff, contaminants and drilling fluids will be managed as defined above.
Increased risks to fish health, wellbeing and productivity (e.g., energy depletion, stranding, predation, entrapment, or confined schooling behaviour)	No – There are no proposed instream or riparian works. The subsidence assessment predicted no subsidence impacts to waterways which provide for fish passage (SCT Operations, 2025). Surface water impacts are minor scale and consider to be low risk (SLR, 2025a). Sediment laden runoff, contaminants and drilling fluids will be managed as defined above.
Reduction in the extent, frequency, or duration of fish passage previously occurring at a site	No – There are no proposed instream or riparian works. The subsidence assessment predicted no subsidence impacts to waterways which provide for fish passage (SCT Operations, 2025). Kennedy and Charlie Creeks are lower order, intermittent waterway mapped as an aquatic GDE and contains both low and moderate impact waterways for fish passage. Hydrology is dominated by direct rainfall and short-lived surface runoff, with pools and shallow flows persisting only briefly after rain. The waterway is of low GDE value due to existing disturbance and the absence of state significant aquatic species. The potential impacts to the extent, frequency and duration of fish passage are discussed below.: • Extent: The projected alluvial and basalt drawdown is expected to marginally reduce the spatial extent of shallow post-rain flow connectivity within short reaches where depths are already limited. Any effect would be confined to localised sections of the creek and would not introduce new permanent barriers. • Frequency: Given that flow events are triggered by rainfall rather than groundwater discharge, the frequency of fish passage opportunities is unlikely to change appreciably. Rainfall events will continue to generate episodic connection, although the number of very short low-depth connections within an event may decrease slightly. • Duration: Minor groundwater drawdown may marginally shorten the persistence of post-event pools and shallow connecting runs following rainfall events. Any such effect is expected to be small, highly localised, and subordinate to climatic controls, particularly during drier periods.

Impact Criteria	Response
	Risk characterisation Overall risk of a reduction in the extent, frequency, or duration of fish passage is low. Any incremental change is expected to be minor, localised and temporary relative to the natural intermittency of Kennedy and Charlie Creeks and the dominance of rainfall in the water balance. Proposed monitoring as defined in Table 6-1 will verify predictions with event-based monitoring of pool persistence and shallow-flow connectivity following representative rainfall events
Substantial modification, destruction, or fragmentation of fish habitat (e.g., in-stream vegetation, woody debris, substrate, banks, or riffle formations) required for breeding and survival	No – There are no proposed instream or riparian works. The subsidence assessment predicted no subsidence impacts to waterways which provide for fish passage (SCT Operations, 2025).
Substantial and measurable change to the hydrological regime (e.g., volume, depth, timing, duration, frequency of flows)	No – There are no proposed instream or riparian works. The subsidence assessment predicted no subsidence impacts to waterways which provide for fish passage (SCT Operations, 2025). The predicted alluvial and tertiary basalt drawdown may result in minor reductions in groundwater contribution to surface water expression within Kennedy and Charlie Creeks. This could slightly reduce the persistence of post-rain pools and shallow connecting runs that provide short-term habitat and passage opportunities. However, the creek is an intermittent, lower-order system that relies predominantly on direct rainfall for flow generation, with groundwater providing only a limited supporting role. Given these hydrological characteristics, the low ecological value of the waterway, and the absence of state significant aquatic species or high-value habitat features, any reduction in pool persistence or shallow-flow extent is expected to be minor and localised. The predicted changes are subordinate to climatic controls for an intermittent creek and will not lead to substantial modification, destruction, or fragmentation of fish habitat. Proposed monitoring as defined in Table 6-1 will verify predictions with event-based monitoring of pool persistence and shallow-flow connectivity following representative rainfall events.

Impact Criteria	Response
Significant changes in water quality parameters (e.g., temperature, dissolved oxygen, pH, conductivity) that provide cues for fish movement	No – There are no proposed instream or riparian works. The subsidence assessment predicted no subsidence impacts to waterways which provide for fish passage (SCT Operations, 2025). Surface water impacts in terms of contamination are minor scale and consider to be low risk (SLR, 2025a). Sediment laden runoff, contaminants and drilling fluids will be managed as defined above. Flow events in Kennedy and Charlie Creeks are primarily rainfall-driven, with limited influence from groundwater discharge. The predicted alluvial and tertiary basalt drawdown may marginally reduce groundwater contribution to surface water pools but is not expected to materially alter the dominant rainfall-runoff water balance or the physicochemical characteristics of surface water following rainfall. Given the intermittent nature of the creeks, water quality parameters that provide movement cues (e.g. temperature, dissolved oxygen, pH, conductivity) are primarily governed by rainfall inputs, catchment runoff, and seasonal conditions rather than groundwater inflows. Any minor reduction in groundwater expression is therefore unlikely to produce measurable or ecologically significant changes in these parameters. As such, no significant change in water quality cues for fish movement is expected, and the potential risk is assessed as low.

7. CONCLUSIONS

The aquatic ecology assessment undertaken by Hydrobiology for Centurion Coal Mining Pty Ltd determined that the proposed exploration and early works associated with the Centurion North Development (CND) pose a low risk to aquatic ecosystems, groundwater-dependent ecosystems (GDEs), and Matters of State Environmental Significance (MSES)**.** Comprehensive desktop and field investigations confirmed that waterways within the Project Area—Goonyella Creek, Kennedy Creek, Charlie Creek, and Skull Creek—are highly intermittent and lack the permanent aquatic habitats necessary to support threatened aquatic fauna or ecologically significant aquatic flora. While elevation analysis indicated that sections of Kennedy and Charlie Creeks may intermittently receive groundwater inputs, field validation found no evidence of persistent baseflow or groundwater discharge, suggesting that aquatic GDE expression is limited and of low ecological persistence.

The only MSES value supported within the Project Area is waterways providing for fish passage, which are not expected to be adversely affected. No in-stream or riparian disturbance is proposed, and the subsidence assessment (SCT Operations, 2025) predicted no subsidence-related impacts to mapped waterways. In addition, no barrier works or hydraulic modifications are planned that would restrict aquatic connectivity or fish movement.

Predicted groundwater drawdown within the alluvium (SLR, 2025b) and the Tertiary basalt aquifer of up to approximately 2 m and 5 m, respectively, has been modelled along Kennedy Creek. Along Charlie Creek, where other mapped aquatic GDEs may occur, drawdown in the basalt aquifer is predicted to be up to approximately 1 m. In some locations, the model indicates that the alluvium is not saturated under base-case conditions, meaning that predicted drawdown represents a conceptual response rather than a reduction in an established groundwater table. Kennedy Creek and Charlie Creek are intermittent, lower-order watercourses with low GDE value, reflecting their modified condition, limited groundwater dependency, and the absence of state-significant aquatic species or

habitat features. Consequently, any groundwater-related changes to flow or hydraulic conditions are expected to be minor, highly localised, and subordinate to climatic controls. Consequently, any groundwater-related changes to flow or hydraulic conditions are expected to be minor, localised and subordinate to climatic controls.

In summary, the Project is not anticipated to cause significant or residual impacts to aquatic environmental values, fish passage, or GDEs. With the adoption of recommended management and monitoring measures, the Project will remain compliant with relevant Queensland environmental legislation and is not expected to compromise the ecological function or environmental values of surrounding surface water or groundwater systems.

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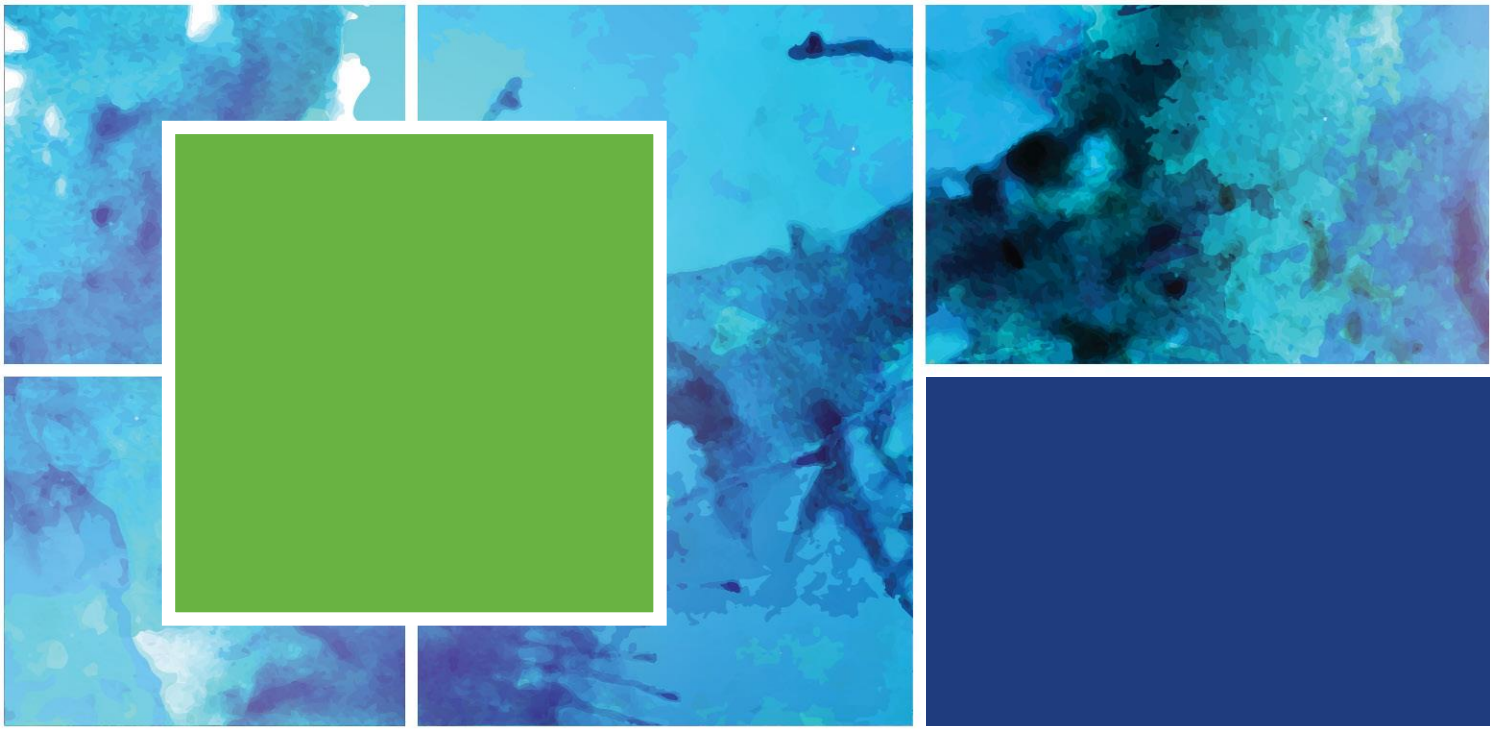
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APPENDIX A. SURVEY METHODOLOGY



GDE PRESENCE

In order to identify the presence of GDEs at each site, an assessment relative to that developed by Eamus et al. (2006) was implemented. The below assessment was undertaken specifically for surface GDEs and the series of questions relevant to Queensland and freshwater systems (Table A1). Questions relevant to terrestrial GDEs are being assessed by other consultants. In addition to Eamus et al. (2006), the presence of cracking clays can also indicate that a waterbody is less likely to be groundwaters (Doody et al. 2018). As this could be easily identified in the field, it was included in the GDE presence assessment.

Table A1 Questions to guide the assessment of groundwater use in ecosystems (Eamus et al. 2006; Doddy et al. 2018).

Item	Positive answers to the following questions suggest an ecosystem may use groundwater:
1	Does a stream/river continue to flow all year, despite prolonged periods of zero or very low rainfall?
2	Does the volume of flow in a stream/river increase downstream in the absence of inflow from a tributary?
3	Is the level of water in a wetland/swamp maintained during extended dry periods?*
4	Were cracking clays present? Where cracking clay soils exist or Holocene muds, waterbodies are less likely to be groundwater fed

In order to define the inherent value of any identified GDEs, The Serov et al (2012) method for attributing low, moderate or high value to GDEs was adopted as defined in Doody et al. (2018), including:

- The sensitivity of GDE communities to changes in groundwater (i.e. *high value* - GDEs for which only slight changes in groundwater level can result in loss of biota or services; *moderate value* - GDEs that require a moderate change in groundwater to cause change in their distribution, composition or condition);
- Location of GDEs (i.e. *high value* - within State Reserves);
- Condition (i.e. *high value* - GDE is relatively unaltered with good condition; *low value* - highly modified from natural state and declining in ecosystem condition);
- Uniqueness (i.e. *high value* - GDE contains endemic, rare or endangered species; *moderate value* - GDEs contain vulnerable or threatened biota); and
- Services (i.e. *high value* - GDEs that provide multiple ecosystem services to society).

GDE VALUE

In the absence of a Queensland-specific guideline, GDE value was determined using the NSW framework outlined by Serov et al. (2012). The method integrates ecological attributes, risk factors, and adaptive management principles to assign a value category (high, moderate, or low) for both aquatic and subterranean GDEs.

IDENTIFICATION

Potential GDEs were identified from desktop mapping (National GDE Atlas, groundwater data), field surveys, and hydrogeological assessment. Aquatic GDEs were defined as surface habitats sustained by groundwater discharge; subterranean GDEs as groundwater systems supporting biota within the saturated zone.

ATTRIBUTE ASSESSMENT

Each GDE was assessed against five attributes:

1. Sensitivity to groundwater change
2. Location within conservation or sensitive areas
3. Condition relative to natural state
4. Uniqueness or presence of threatened taxa
5. Ecosystem services supported by groundwater

Attributes were scored qualitatively (high, moderate, low) based on field data, species composition, and hydrogeological context.

VALUE CLASSIFICATION

The combined attribute scores were used to assign an overall GDE value following Serov et al. (2012):

- High – intact, groundwater-dependent systems with threatened or unique taxa
- Moderate – partially dependent systems with generalist species
- Low – disturbed or ephemeral systems with limited dependence or services

HABITAT

DATA COLLECTION

Modified State of the River-style and AUSRIVAS habitat descriptions of bed, banks, and riparian zones were completed along a 100 m reach at each site. This included descriptions of:

- Macro and microhabitat;
- Bed and bank conditions as well as the identification of the major types of instability (eroding, slumping and aggrading). Information relating to the slope and shape of the banks.
- Bed substrate composition and embeddedness;
- Adjacent land use and the condition that prevailed at the time of sampling;
- Riparian cover and composition, noting percentage cover of trees, shrubs, grasses/herbs/sedges and bare areas; and
- Channel alteration, including presence of scouring and/or deposition.

Additional notes regarding the level and types of disturbance evident (human habitation, activity, feral animals, etc), diversity and abundance of weeds and the general bank morphology were made at each site. Site information sheets were compiled for each monitoring site, which describe the above listed features.

To assist with interpreting habitat classification, the River Bioassessment Program scores (bioassessment scores) (out of 135) were calculated for all sites based on nine AUSRIVAS categories, including: habitat availability (pool/riffle, run/bend ratio); bank stability; streamside cover; bed substrate composition and embeddedness; channel alteration; and presence of scouring and/or deposition. From these scores, an aquatic habitat condition rating was calculated and categorised into poor, fair, good or excellent habitat conditions.

DATA ANALYSIS

Qualitative habitat assessment sheets were digitised and along with photos and field observations, supported a narrative assessment of in-stream and riparian habitat types. This information is used to contextualise results of the aquatic fauna sampling and also provide a basis of monitoring.

WATER QUALITY

DATA COLLECTION

At each site, physicochemical parameters were measured in-situ with a calibrated YSI DSS Pro water quality meter. The following parameters were assessed:

- Temperature (°C);
- Electrical conductivity @ 25°C (µS/cm);
- pH (pH unit);
- Turbidity (NTU); and
- Dissolved oxygen (% saturation and mg/L).

Physicochemical measurements were collected from below the water's surface (0.2 to 0.4 m). The following in-situ QA/QC measures were used to ensure the accuracy and reliability of collected samples:

- The water quality meter was fully calibrated a day prior to use. The water quality meter was checked prior to the collection of data at each site to assess for any anomalies;
- The water quality meter was cleaned at the end of each field day and between sites; and
- Physico-chemical readings were recorded once values stabilised (approximately three minutes).

DATA ANALYSIS

Collected water quality data was compared to the Environment Protection Policy (Water) – Water Quality Objectives (WQOs) defined for the Isaac River sub-catchment (DETSI 2011) and Suttor River sub-catchment (DETSI, 2011).

MACROINVERTEBRATES

SAMPLE COLLECTION AND PROCESSING

Macroinvertebrate sampling was undertaken in accordance with AUSRIVAS protocols for Queensland streams (NRMMRRD, 2001b) and more recent macroinvertebrate sampling manuals (DETSI, 2018). In order to target macroinvertebrates occurring in different freshwater habitats and to assess varying impacts processes, both kick (pool/bed habitat) and sweep (edge habitat) samples were collected from each site (where habitat was available). Collected samples were live-picked and returned to the laboratory for identification to family and sub-family (chironomids only) level, where possible.

DATA ANALYSIS

GUIDELINE COMPARISON

Collected macroinvertebrate data were used to calculate several diversity indices including:

- Taxonomic richness (the number of individual taxa recorded at each site);
- Total abundance (the number of macroinvertebrates at each site);
- Plecoptera, Ephemeroptera and Trichoptera (PET) richness (the number of pollution-sensitive taxa at each site); and
- SIGNAL (the condition score calculated for each site based on present macroinvertebrates and their associated sensitivity grades).

Calculated diversity index values were compared to relevant biological quality objectives (BQO) for edge and composite (includes run, riffle, pools) habitats, which for all catchments in the Isaac River sub-basin are based on the 20:80 percentile values defined in DETSI (2011).

AURIVAS PREDICTIVE MODEL

The macroinvertebrate and predictor variable (habitat) data were analysed using the AUSRIVAS macroinvertebrate predictive modelling program, version 3.2.2 (Ransom & Blackman, 2003).

AUSRIVAS predictive model produces various outputs, of which the most valuable for interpretation is the observed to expected ratio (OE50) score. It provides a measure of biological impairment at each site (Coyush et al., 2000). The OE50 scores are assigned to band sections provided by the model, ranging from Band X (better than AUSRIVAS database reference condition) to Band D (extremely impaired).

FUNCTIONAL FEEDING GUILDS

Macroinvertebrates are often grouped into functional feeding guilds (FFGs) for ease of conceptualisation. FFGs classification of aquatic organisms enhances the knowledge of trophic dynamics in streams by simplifying the benthic community into FFGs. The pattern of FFG distribution has been related to the environmental gradient in the river (River Continuum Concept) (Vannote et al., 1980) and can therefore provide an indication of the health of a river system (i.e. should there be changes to the expected distribution of guilds).

Functional feeding guilds were assigned to each taxa recorded in edge and bed habitat, graphed and compared visually among sites and habitats. Taxa were assigned to FFGs on the basis of those described in MDFRC (2021).

STYGOFAUNA

SAMPLE COLLECTION AND PROCESSING

A 50 mm diameter phreatobiological net was used for stygofauna sampling in all groundwater bores that were greater than 50 mm in diameter. For bores that were 50 mm in diameter, a bailer was used for stygofauna sampling. The bottom of the bores was disturbed with the nets to suspend any animals and then the sample was collected and strained through a 50 µm mesh brass sieve and preserved in a sample jar with 100% AR Grade ethanol, this was repeated three times per site. Field samples were processed in a laboratory using Sedgewick-Rafter counting trays and all animals removed and identified to Order/Family level or lower (if possible).

VERTEBRATES AND MACROCRUSTACEANS

DATA COLLECTION

Vertebrate surveys were conducted in accordance with Hydrobiology's then-current General Fisheries Permit (no. 206951), Animal Ethics approval (CA 2021/02/1462) and Research Permit (WA0047340), all of which were valid at the time of the survey and have since been renewed.

The selected range of gear is suitable and commonly used apparatus for the survey of fish (small and large bodies species), aquatic reptiles and platypus (DETSI, 2018a). The below methods are also efficient methods for the capture of macrocrustaceans, and while not specifically used for this reason, were commonly caught as by-catch.

All native species were released after identification and measurement near to where they were captured. All exotic and voucher specimens were euthanised via a lethal dose of Aqui-S® solution in

accordance with Hydrobiology's Animal Ethics approval. Exotics were disposed of in accordance with current State legislative requirements.

FYKE NETTING

Where sufficient water levels were present, a single fyke net was deployed at each site. Two fyke net sizes were used in this study. One had two 5 m wings, with a 0.9 m drop and the other with a single 5 m wing and a 0.6 m drop. Both nets had 2 mm mesh. The fyke net size deployed was dependent on the water level and habitat present at each site. A float was placed in the cod end of each fyke net to provide an air space for air breathing fauna (turtles, etc). Fyke nets were set in the afternoon and cleared the following morning.

BAIT TRAPS

Five box-style bait traps were set at each site where water levels were sufficient. Traps were baited with dry cat food, placed within a range of available habitats and collected the next morning.

CATHEDRAL TRAPS

Cathedral traps could not be deployed at any site due to the limited water depths noted at all sites.

CATCH PROCESSING

The following processing methods were employed at all sites:

- Fish and macrocrustaceans were identified to species level, enumerated, and assessed for obvious wounds, lesions, or deformities; and
- Each specimen was weighed and measures until 20 individuals of each species were recorded for the particular site and capture method. Following this, the individuals would be counted.

DATA ANALYSIS

Total species richness and abundances was summarised from all methods and all sites. The conservation significance of collected fauna was assessed by reference to State and Federal databases and in-house knowledge of the distribution of species from previous studies in the area.

THREATENED SPECIES LIKELIHOOD OF OCCURRENCE ASSESSMENT

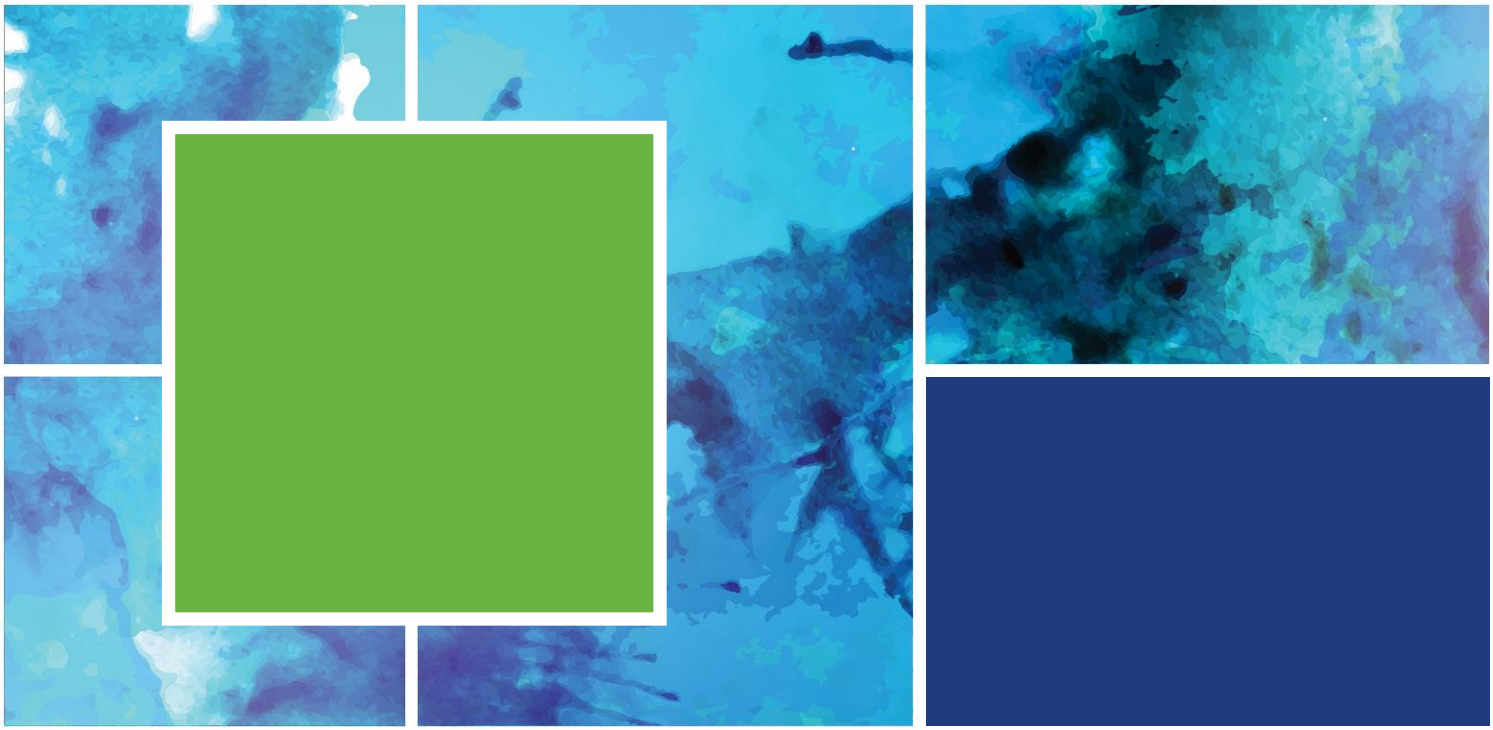
At each site habitat assessments were undertaken for conservation significant (State and/or Federally listed endangered, vulnerable, near threatened, and MSES species identified during the desktop assessment which included the classification of the likelihood of any one species occurring at each site. The likelihood of species occurring was considered under four categories; (i) unlikely; (ii) possible; (iii) likely; and (iv) Known. The criterion used to define each category is provided in Table A2.

Table A2. Criteria used for assigning likelihood of occurrences relevant to EVNT and special least concern species.

Likelihood of occurrence category	Criteria
Unlikely	• No suitable habitat present.
Possible	• Suitable species habitat present.
Likely	• Suitable species habitat present and; • A record occurs nearby (10 km) in similar habitat.

Likelihood of occurrence category	Criteria
Known	• Species recorded during field surveys or previous past records.

APPENDIX B. SITE PHOTOS



SITE PHOTOS: EARLY-WET

Site	Upstream	Downstream
1		
2		

Site	Upstream	Downstream
3		
4		

Site	Upstream	Downstream
5		
6		

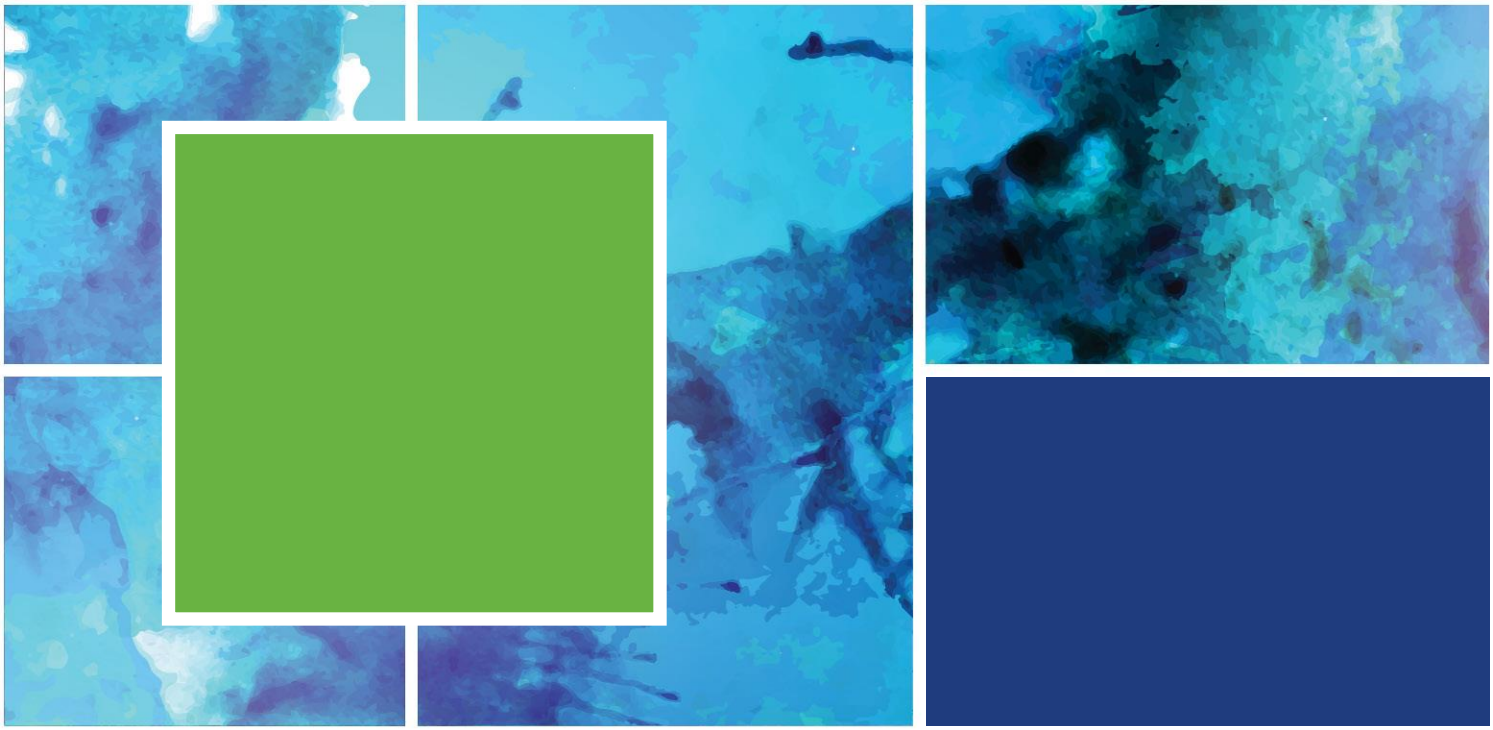
SITE PHOTOS: LATE-WET

Site	Upstream	Downstream
1		
2		

Site	Upstream	Downstream
3		
4		

Site	Upstream	Downstream
5		
6		

APPENDIX C.
MSES REPORTS



Queensland Government

Department of the Environment, Tourism, Science and Innovation

Environmental Reports

Matters of State Environmental Significance

For the selected area of interest

Lot: 2 Plan: SP260061

Environmental Reports - General Information

The Environmental Reports portal provides for the assessment of selected matters of interest relevant to a user specified location, or area of interest (AOI). All area and derivative figures are relevant to the extent of matters of interest contained within the AOI unless otherwise stated. Please note, if a user selects an AOI via the "central coordinates" option, the resulting assessment area encompasses an area extending for a 2km radius from the point of interest.

All area and area derived figures included in this report have been calculated via reprojecting relevant spatial features to Albers equal-area conic projection (central meridian = 146, datum Geocentric Datum of Australia 2020). As a result, area figures may differ slightly if calculated for the same features using a different co-ordinate system.

Figures in tables may be affected by rounding.

The matters of interest reported on in this document are based upon available state mapped datasets. Where the report indicates that a matter of interest is not present within the AOI (e.g. where area related calculations are equal to zero, or no values are listed), this may be due either to the fact that state mapping has not been undertaken for the AOI, that state mapping is incomplete for the AOI, or that no values have been identified within the site.

The information presented in this report should be considered as a guide only and a field survey may be required to validate values on the ground.

Please direct queries about these reports to: Planning.Support@des.qld.gov.au

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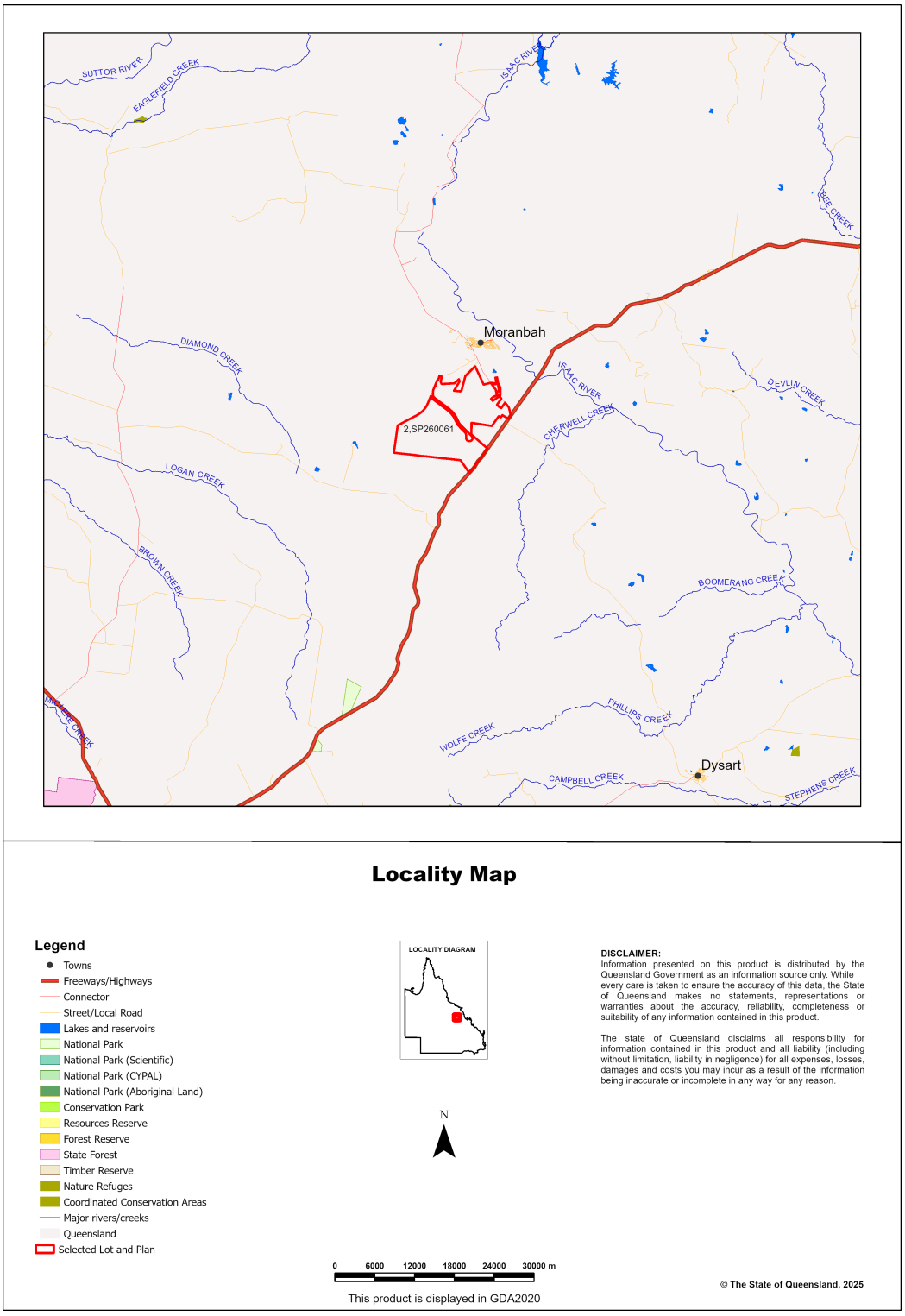
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Assessment Area Details

The following table provides an overview of the area of interest (AOI) with respect to selected topographic and environmental values.

Table 1: Summary table, details for AOI: Lot: 2 Plan: SP260061, with area 12540.8 ha

Local Government(s)	Catchment(s)	Bioregion(s)	Subregion(s)
Isaac Regional	Fitzroy	Brigalow Belt	Northern Bowen Basin



Matters of State Environmental Significance (MSES)

MSES Categories

Queensland's State Planning Policy (SPP) includes a biodiversity State interest that states:

'The sustainable, long-term conservation of biodiversity is supported. Significant impacts on matters of national or state environmental significance are avoided, or where this cannot be reasonably achieved; impacts are minimised and residual impacts offset.'

The MSES mapping product is a guide to assist implementation of the SPP biodiversity policy. While it supports the SPP, the mapping does not replace the regulatory mapping or environmental values specifically called up under other laws or regulations.

The SPP defines matters of state environmental significance as:

- Protected areas (including all classes of protected area except coordinated conservation areas) under the *Nature Conservation Act 1992;*

- Marine parks and land within a 'marine national park', 'conservation park', 'scientific research', 'preservation' or 'buffer' zone under the Marine Parks Act 2004 ;

- Areas within declared fish habitat areas that are management A areas or management B areas under the Fisheries Regulation 2008;

- *Threatened wildlife under the Nature Conservation Act 1992* and special least concern animals under the Nature Conservation (Wildlife) Regulation 2006;

- Regulated vegetation under the *Vegetation Management Act 1999* that is:

  - Category B areas on the regulated vegetation management map, that are 'endangered' or 'of concern' regional ecosystems;
  - Category C areas on the regulated vegetation management map that are 'endangered' or 'of concern' regional ecosystems;
  - Category R areas on the regulated vegetation management map;
  - Regional ecosystems that intersect with watercourses identified on the vegetation management watercourse and drainage feature map;
  - Regional ecosystems that intersect with wetlands identified on the vegetation management wetlands map;

- Strategic Environmental Areas under the *Regional Planning Interests Act 2014* ;

- Wetlands in a wetland protection area of wetlands of high ecological significance shown on the Map of Queensland Wetland Environmental Values under the Environment Protection Regulation 2019;

- Wetlands and watercourses in high ecological value waters defined in the Environmental Protection (Water) Policy 2009, schedule 2;
- Legally secured offset areas.

MSES Values Present

The MSES values that are present in the area of interest are summarised in the table below:

Table 2: Summary of MSES present within the AOI

1a Protected Areas- estates	0 ha	0.0%
1b Protected Areas- nature refuges	0 ha	0.0%
1c Protected Areas- special wildlife reserves	0 ha	0.0%
2 State Marine Parks- highly protected zones	0 ha	0.0%
3 Fish habitat areas (A and B areas)	0 ha	0.0%
4 Strategic Environmental Areas (SEA)	0 ha	0.0%
5 High Ecological Significance wetlands on the Map of Queensland Wetland Environmental Values	0 ha	0.0%
6a High Ecological Value (HEV) wetlands	0 ha	
6b High Ecological Value (HEV) waterways	0 km	Not applicable
7a Threatened (endangered or vulnerable) wildlife	1054.27 ha	8.4%
7b Special least concern animals	13.46 ha	0.1%
7c i Koala habitat area - core (SEQ)	0 ha	0.0%
7c ii Koala habitat area - locally refined (SEQ)	0 ha	0.0%
7d Sea turtle nesting areas	0 km	Not applicable
8a Regulated Vegetation - Endangered/Of concern in Category B (remnant)	988.95 ha	7.9%
8b Regulated Vegetation - Endangered/Of concern in Category C (regrowth)	46.48 ha	0.4%
8c Regulated Vegetation - Category R (GBR riverine regrowth)	222.77 ha	1.8%
8d Regulated Vegetation - Essential habitat	1071.49 ha	8.5%
8e Regulated Vegetation - intersecting a watercourse	91.7 km	Not applicable
8f Regulated Vegetation - within 100m of a Vegetation Management Wetland	0 ha	0.0%
9a Legally secured offset areas- offset register areas	0 ha	0.0%
9b Legally secured offset areas- vegetation offsets through a Property Map of Assessable Vegetation	0 ha	0.0%

Additional Information with Respect to MSES Values Present

MSES - State Conservation Areas

1a. Protected Areas - estates

(No results)

1b. Protected Areas - nature refuges

(No results)

1c. Protected Areas - special wildlife reserves

(No results)

2. State Marine Parks - highly protected zones

(No results)

3. Fish habitat areas (A and B areas)

(No results)

Refer to **Map 1 - MSES - State Conservation Areas** for an overview of the relevant MSES.

MSES - Wetlands and Waterways

4. Strategic Environmental Areas (SEA)

(No results)

5. High Ecological Significance wetlands on the Map of Queensland Wetland Environmental Values

(no results)

6a. Wetlands in High Ecological Value (HEV) waters

(no results)

6b. Waterways in High Ecological Value (HEV) waters

(no results)

Refer to **Map 2 - MSES - Wetlands and Waterways** for an overview of the relevant MSES.

MSES - Species

7a. Threatened (endangered or vulnerable) wildlife

Values are present

7b. Special least concern animals

Values are present

7c i. Koala habitat area - core (SEQ)

Not applicable

7c ii. Koala habitat area - locally refined (SEQ)

Not applicable

7d. Wildlife habitat (sea turtle nesting areas)

Not applicable

Threatened (endangered or vulnerable) wildlife habitat suitability models

Species	Common name	NCA status	Presence
Boronia keysii	Keys boronia	V	None
Calyptorhynchus lathami	Glossy black cockatoo	V	None
Casuarius casuarius johnsonii	Sthn population cassowary	E	None
Crinia tinnula	Wallum froglet	V	None
Denisonia maculata	Ornamental snake	V	Core
Euastacus bindal	Mount Elliot crayfish	CR	None
Euastacus binzayedi		CR	None
Euastacus eungella		E	None
Euastacus hystricosus		E	None
Euastacus jagara	Jagara hairy crayfish	CR	None
Euastacus maidae		CR	None
Euastacus monteithorum		E	None
Euastacus robertsi		E	None
Taudactylus pleione	Kroombit tinkerfrog	E	None
Litoria freycineti	Wallum rocketfrog	V	None
Litoria olongburensis	Wallum sedgefrog	V	None
Macadamia integrifolia		V	None
Melaleuca irbyana	swamp tea-tree	E	None
Macadamia ternifolia		V	None
Macadamia tetraphylla	bopple nut	V	None
Petrogale penicillata	brush-tailed rock-wallaby	V	None
Petrogale coenensis	Cape York rock-wallaby	E	None
Petrogale purpureicollis	purple-necked rock-wallaby	V	None
Petrogale sharmani	Sharmans rock-wallaby	V	None
Petrogale xanthopus celeris	yellow-footed rock-wallaby (Qld subspecies)	V	None
Petaurus gracilis	Mahogany Glider	E	None
Petrogale persephone	Proserpine rock-wallaby	E	None
Phascolarctos cinereus	Koala - outside SEQ*	E	None
Pezoporus wallicus wallicus	Eastern ground parrot	V	None
Xeromys myoides	Water Mouse	V	None

*For koala model, this includes areas outside SEQ. Check 7c SEQ koala habitat for presence/absence.

Threatened (endangered or vulnerable) wildlife species records

Scientific name	Common name	NCA status	EPBC status	Migratory status
Geophaps scripta scripta	squatter pigeon (southern subspecies)	V	V	None
Phascolarctos cinereus	koala	E	E	None
Dichanthium queenslandicum		V	E	None

Special least concern animal species records

Scientific name	Common name	Migratory status
Tachyglossus aculeatus	short-beaked echidna	None

Shorebird habitat (critically endangered/endangered/vulnerable)

Not applicable

Shorebird habitat (special least concern)

Not applicable

**Nature Conservation Act 1992 (NCA) Status- Endangered (E), Vulnerable (V) or Special Least Concern Animal (SL). Environment Protection and Biodiversity Conservation Act 1999 (EPBC) status: Critically Endangered (CE) Endangered (E), Vulnerable (V)*

Migratory status (M) - China and Australia Migratory Bird Agreement (C), Japan and Australia Migratory Bird Agreement (J), Republic of Korea and Australia Migratory Bird Agreement (R), Bonn Migratory Convention (B), Eastern Flyway (E)

To request a species list for an area, or search for a species profile, access Wildlife Online at:

https://www.qld.gov.au/environment/plants-animals/species-list/

Refer to **Map 3a - MSES - Species - Threatened (endangered or vulnerable) wildlife and special least concern animals** and **Map 3b - MSES - Species - Koala habitat area (SEQ)** and **Map 3c - MSES - Wildlife habitat (sea turtle nesting areas)** for an overview of the relevant MSES.

MSES - Regulated Vegetation

For further information relating to regional ecosystems in general, go to:

https://www.qld.gov.au/environment/plants-animals/plants/ecosystems/

For a more detailed description of a particular regional ecosystem, access the regional ecosystem search page at:

https://environment.ehp.qld.gov.au/regional-ecosystems/

8a. Regulated Vegetation - Endangered/Of concern in Category B (remnant)

Regional ecosystem	Vegetation management polygon	Vegetation management status
11.3.1	E-dom	rem_end
11.4.9/11.4.8	E-dom	rem_end
11.5.3/11.5.9c/11.4.9/11.3.25	E-subdom	rem_end
11.8.11	O-dom	rem_oc
11.8.11/11.3.21	O-dom	rem_oc
11.8.11/11.8.5	O-dom	rem_oc

8b. Regulated Vegetation - Endangered/Of concern in Category C (regrowth)

Regional ecosystem	Vegetation management polygon	Vegetation management status
11.3.1	E-dom	hvr_end
11.3.2	O-dom	hvr_oc
11.4.9/11.4.8	E-dom	hvr_end
11.5.3/11.5.9c/11.4.9/11.3.25	E-subdom	hvr_end
11.8.11	O-dom	hvr_oc
11.8.11/11.3.21	O-dom	hvr_oc
11.8.11/11.8.5	O-dom	hvr_oc
11.8.3	O-dom	hvr_oc

8c. Regulated Vegetation - Category R (GBR riverine regrowth)

Regulated vegetation map category	Map number
R	8453
R	8553

8d. Regulated Vegetation - Essential habitat

Values are present

8e. Regulated Vegetation - intersecting a watercourse**

A vegetation management watercourse is mapped as present

8f. Regulated Vegetation - within 100m of a Vegetation Management wetland

Not applicable

Refer to **Map 4 - MSES - Regulated Vegetation** for an overview of the relevant MSES.

MSES - Offsets

9a. Legally secured offset areas - offset register areas

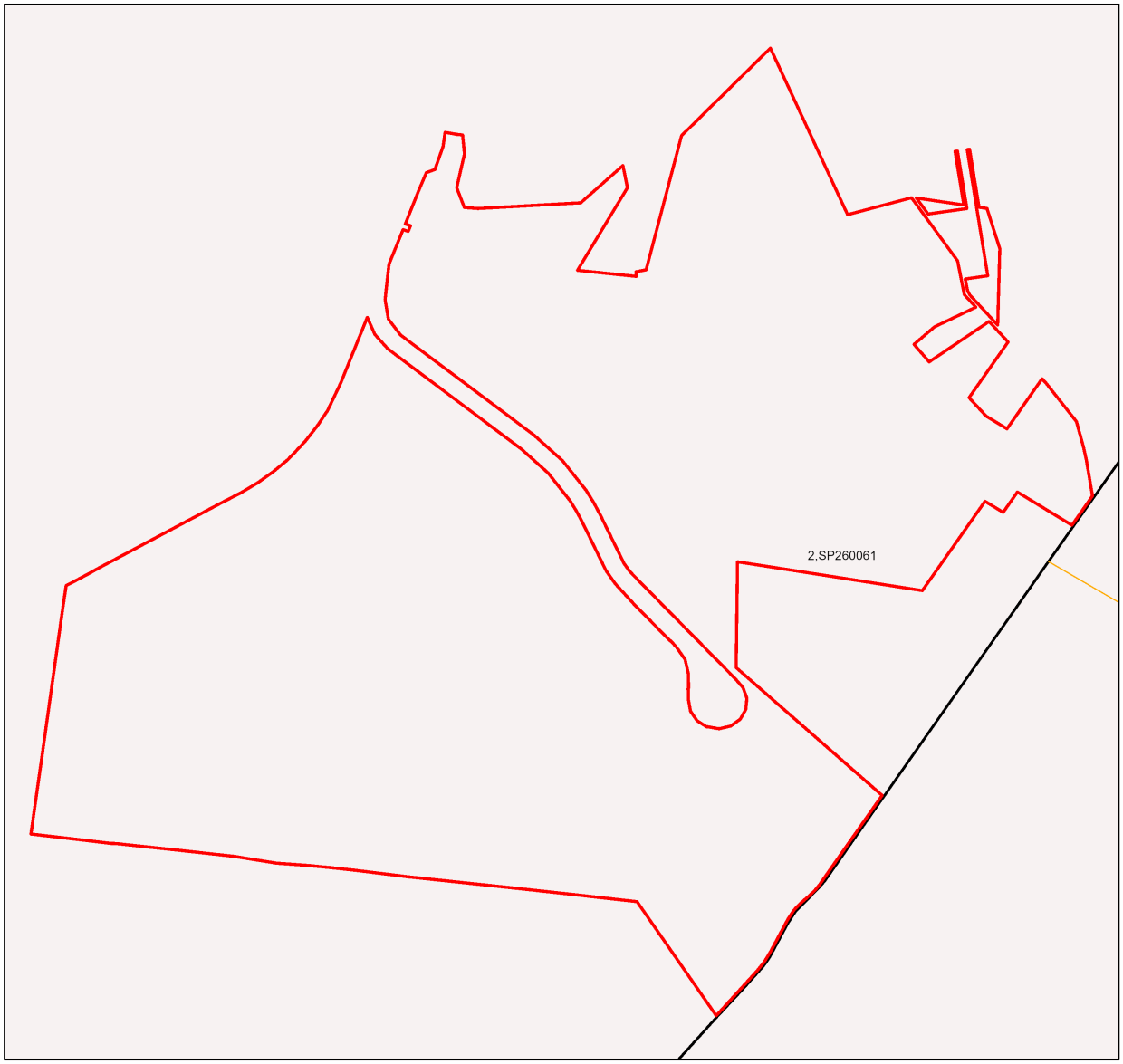
(No results)

9b. Legally secured offset areas - vegetation offsets through a Property Map of Assessable Vegetation

(No results)

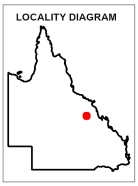
Refer to **Map 5 - MSES - Offset Areas** for an overview of the relevant MSES.

Map 1 - MSES - State Conservation Areas



MSES - State Conservation Areas

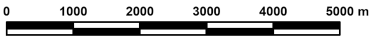
- Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Protected area (estates, nature refuges, special wildlife reserves)
- Declared fish habitat area (A and B areas)
- Marine park (highly protected)
- Selected Lot and Plan



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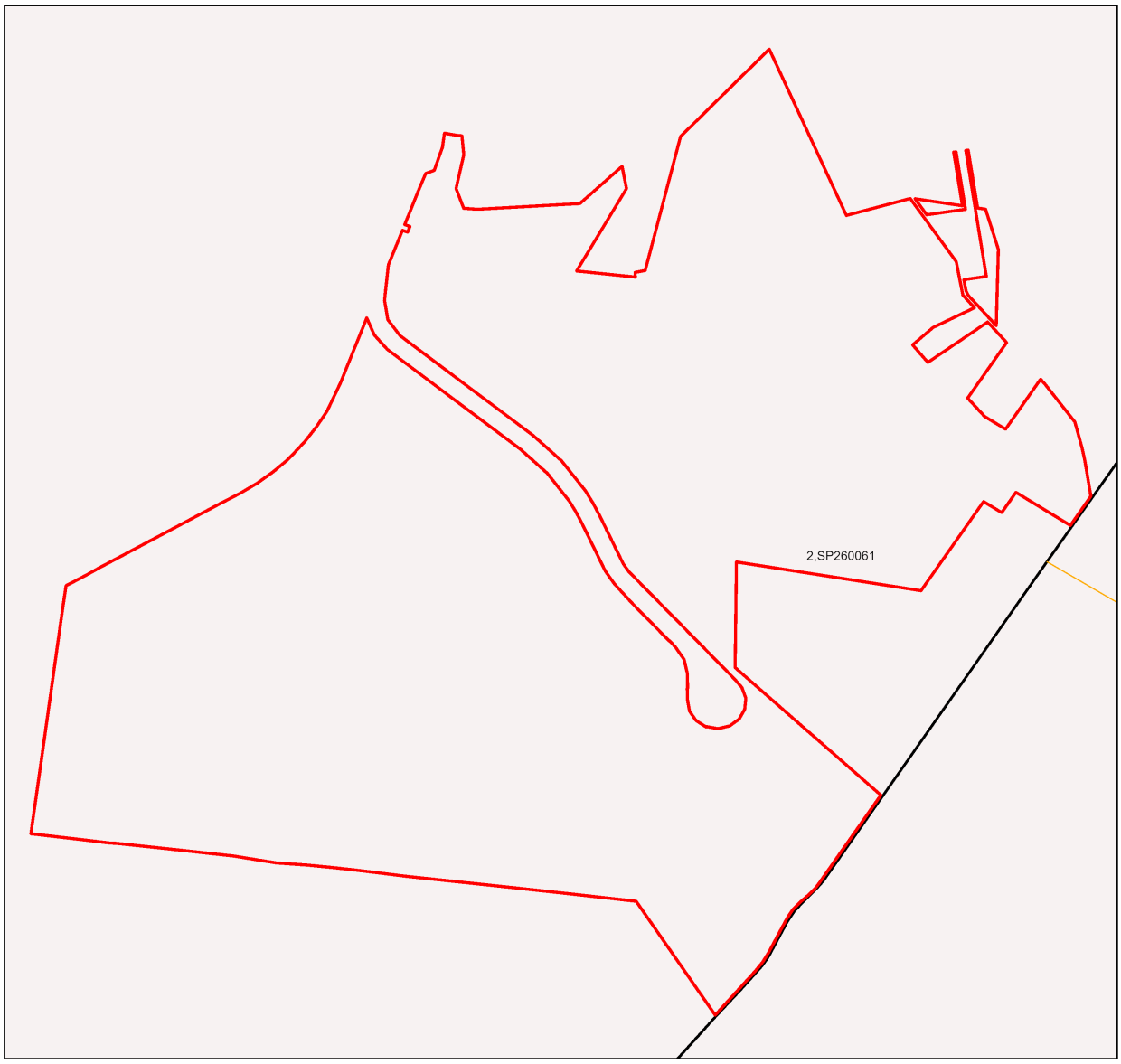




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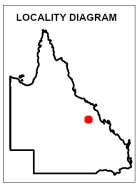
Map 2 - MSES - Wetlands and Waterways



MSES - Wetlands and Waterways

- Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Declared high ecological value waters (watercourse)
- Strategic environmental area (designated precinct)
- Declared high ecological value waters (wetland)
- High ecological significance wetlands
- Selected Lot and Plan

LOCALITY DIAGRAM



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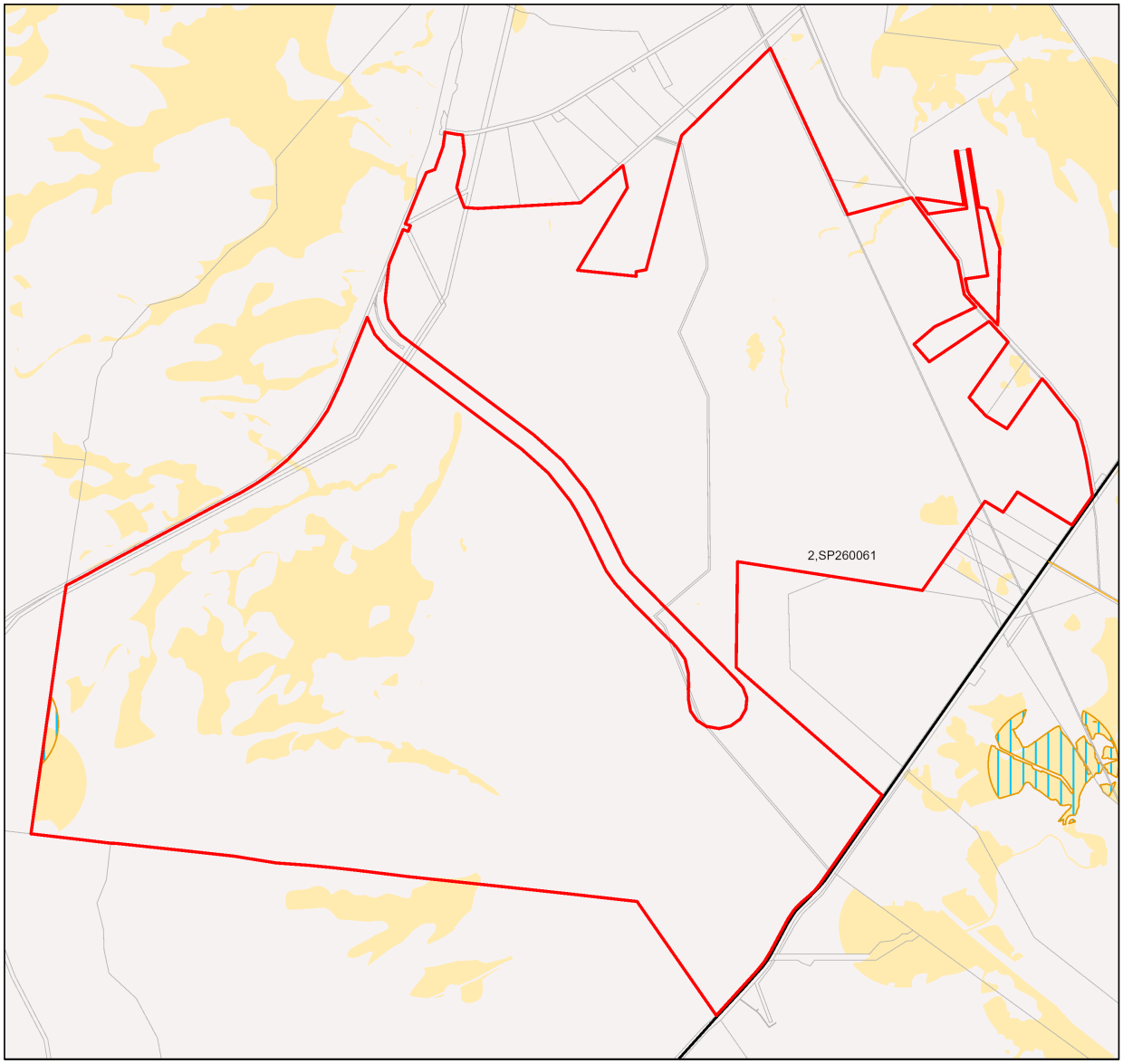
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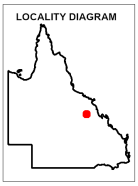
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Map 3a - MSES - Species - Threatened (endangered or vulnerable) wildlife and special least concern animals



MSES - Species
Threatened (endangered or vulnerable) wildlife and special least concern animals

- Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Wildlife habitat (special least concern)
- Wildlife habitat (endangered or vulnerable)
- Selected Lot and Plan



N

0 1000 2000 3000 4000 5000 m

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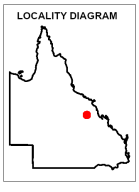
Map 3b - MSES - Species - Koala habitat area (SEQ)



MSES - Species
Koala habitat area (SEQ)

- Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Koala habitat area (core)
- Koala habitat area (locally refined)
- Selected Lot and Plan

LOCALITY DIAGRAM



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The represented layers for SEQ 'koala habitat area-core' and 'koala habitat area- locally refined' in MSES are sourced directly from the regulatory mapping under the Nature Conservation (Koala) Conservation Plan 2017. Whilst every effort is made to ensure the information remains current, there may be delays between updating versions. Please refer to the original mapping for the most recent version. See https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/mapping

The koala habitat mapping within South East Queensland uses regional ecosystem linework compiled at a scale varying from 1:25,000 to 1:100,000. Linework should be used as a guide only. The positional accuracy of regional ecosystem data mapped at a scale of 1:100,000 is +/- 100 metres.

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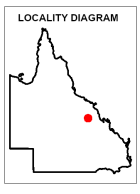
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Map 3c - MSES - Species - Wildlife habitat (sea turtle nesting areas)



MSES - Wildlife habitat (sea turtle nesting areas)

- Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Wildlife habitat (sea turtle nesting areas)
- Selected Lot and Plan



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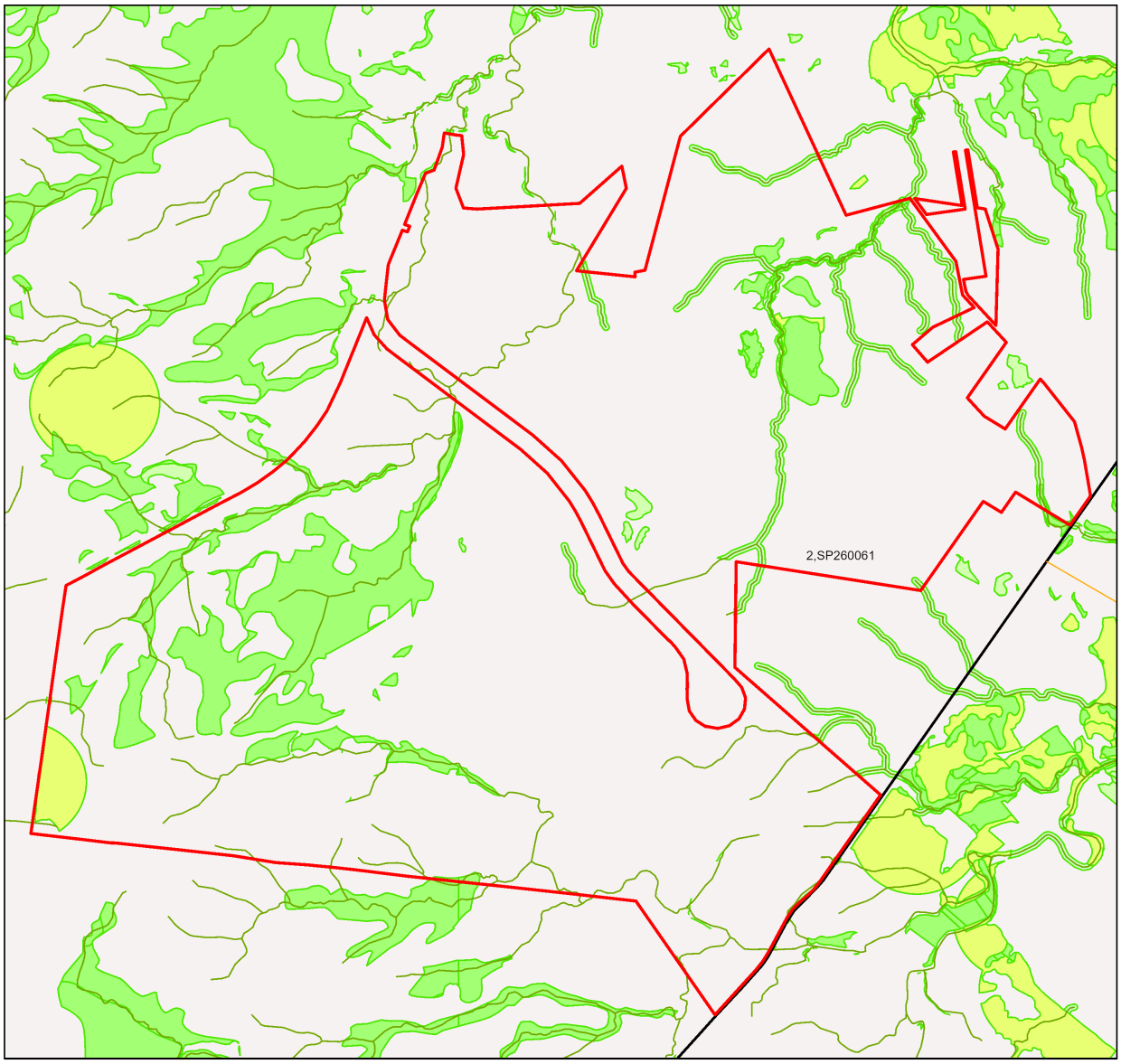
MSES mapping of sea turtle nesting areas identifies beaches where the recorded number of turtle nests are over 1% of the turtle species or genetic stock. The linework is also deliberately extended along nearby rocky coastlines and headlands to recognise that significant numbers of nesting adults and hatchlings can become disoriented by light pollution from development on rocky coastlines and headlands while navigating offshore from nesting beaches.

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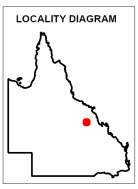
Map 4 - MSES - Regulated Vegetation



MSES - Regulated Vegetation

- ▲ Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Regulated vegetation (intersecting a watercourse)
- Regulated vegetation (100m from wetland)
- Regulated vegetation (category B - endangered or of concern)
- Regulated vegetation (category C - endangered or of concern)
- Regulated vegetation (category R - GBR riverine)
- Regulated vegetation (essential habitat)
- Selected Lot and Plan

LOCALITY DIAGRAM



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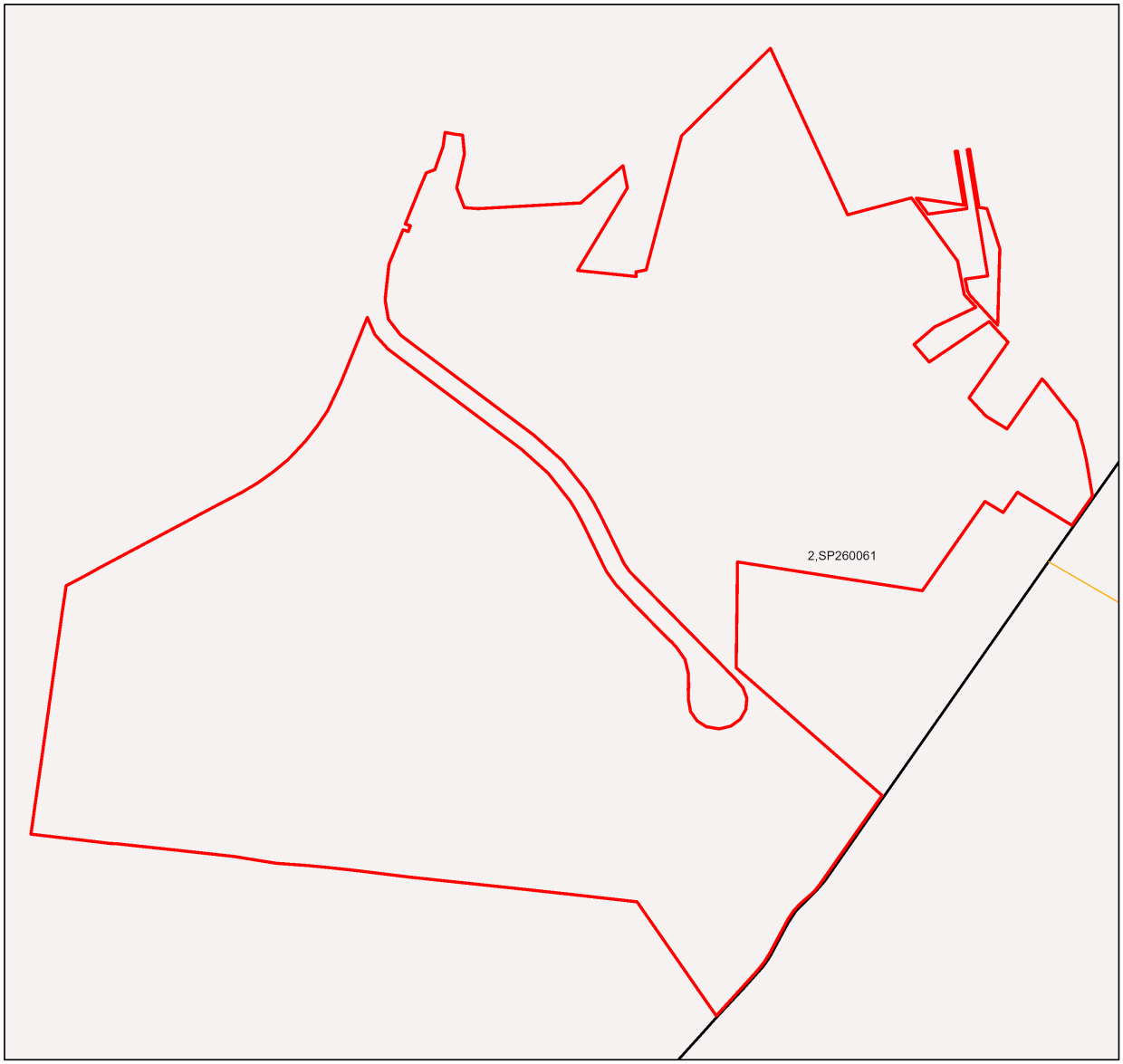
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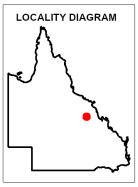
Map 5 - MSES - Offset Areas



MSES - Offsets

- Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Legally secured offset area (offset register)
- Legally secured offset area (vegetation offsets)
- Selected Lot and Plan

LOCALITY DIAGRAM



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Appendices

Appendix 1 - Matters of State Environmental Significance (MSES) methodology

MSES mapping is a regional-scale representation of the definition for MSES under the State Planning Policy (SPP). Its primary purpose is to support implementation of the SPP biodiversity policy.

MSES mapping does not replace the regulatory mapping or environmental values specifically called up under other laws or regulations.

MSES mapping does not determine whether state or local development assessment is required. For state assessment triggers refer to the Development Assessment Mapping System (DAMS). For local assessment triggers, refer to the relevant local planning scheme.

The Queensland Government's "Method for mapping - matters of state environmental significance can be downloaded from:

http://www.ehp.qld.gov.au/land/natural-resource/method-mapping-mses.html .

Appendix 2 - Source Data

The datasets listed below are available on request from:

http://qldspatial.information.qld.gov.au/catalogue/custom/index.page

- Matters of State environmental significance

Note: MSES mapping is not based on new or unique data. The primary mapping product draws data from a number of underlying environment databases and geo-referenced information sources. MSES mapping is a versioned product that is updated generally on a twice-yearly basis to incorporate the changes to underlying data sources. Several components of MSES mapping made for the current version may differ from the current underlying data sources. To ensure accuracy, or proper representation of MSES values, it is strongly recommended that users refer to the underlying data sources and review the current definition of MSES in the State Planning Policy, before applying the MSES mapping.

Individual MSES layers can be attributed to the following source data available at QSpatial:

MSES layers	**current QSpatial data (http://qspatial.information.qld.gov.au)**
Protected Areas-Estates, Nature Refuges, Special Wildlife Reserves	- Protected areas of Queensland - Nature Refuges - Queensland - Special Wildlife Reserves- Queensland
Marine Park-Highly Protected Zones	Moreton Bay marine park zoning 2008
Fish Habitat Areas	Queensland fish habitat areas
Strategic Environmental Areas-designated	Regional Planning Interests Act - Strategic Environmental Areas
HES wetlands	Map of Queensland Wetland Environmental Values
Wetlands in HEV waters	HEV waters: - EPP Water intent for waters Source Wetlands: - Queensland Wetland Mapping (Current version 5) Source Watercourses: - Vegetation management watercourse and drainage feature map (1:100000 and 1:250000)
Wildlife habitat (threatened and special least concern)	-WildNet database species records - habitat suitability models (various) - SEQ koala habitat areas under the Koala Conservation Plan 2019
VMA regulated regional ecosystems	Vegetation management regional ecosystem and remnant map
VMA Essential Habitat	Vegetation management - essential habitat map
VMA Wetlands	Vegetation management wetlands map
Legally secured offsets	Vegetation Management Act property maps of assessable vegetation. For offset register data-contact DETSI
Regulated Vegetation Map	Vegetation management - regulated vegetation management map

Appendix 3 - Acronyms and Abbreviations

AOI	- Area of Interest
DETSI	- Department of the Environment, Tourism, Science and Innovation
EP Act	- Environmental Protection Act 1994
EPP	- Environmental Protection Policy
GDA2020	- Geocentric Datum of Australia 2020
GEM	- General Environmental Matters
GIS	- Geographic Information System
MSES	- Matters of State Environmental Significance
NCA	- Nature Conservation Act 1992
RE	- Regional Ecosystem
SPP	- State Planning Policy
VMA	- Vegetation Management Act 1999

Queensland Government

Department of the Environment, Tourism, Science and Innovation

Environmental Reports

Matters of State Environmental Significance

For the selected area of interest

Lot: 1 Plan: SP117775

Environmental Reports - General Information

The Environmental Reports portal provides for the assessment of selected matters of interest relevant to a user specified location, or area of interest (AOI). All area and derivative figures are relevant to the extent of matters of interest contained within the AOI unless otherwise stated. Please note, if a user selects an AOI via the "central coordinates" option, the resulting assessment area encompasses an area extending for a 2km radius from the point of interest.

All area and area derived figures included in this report have been calculated via reprojecting relevant spatial features to Albers equal-area conic projection (central meridian = 146, datum Geocentric Datum of Australia 2020). As a result, area figures may differ slightly if calculated for the same features using a different co-ordinate system.

Figures in tables may be affected by rounding.

The matters of interest reported on in this document are based upon available state mapped datasets. Where the report indicates that a matter of interest is not present within the AOI (e.g. where area related calculations are equal to zero, or no values are listed), this may be due either to the fact that state mapping has not been undertaken for the AOI, that state mapping is incomplete for the AOI, or that no values have been identified within the site.

The information presented in this report should be considered as a guide only and a field survey may be required to validate values on the ground.

Please direct queries about these reports to: Planning.Support@des.qld.gov.au

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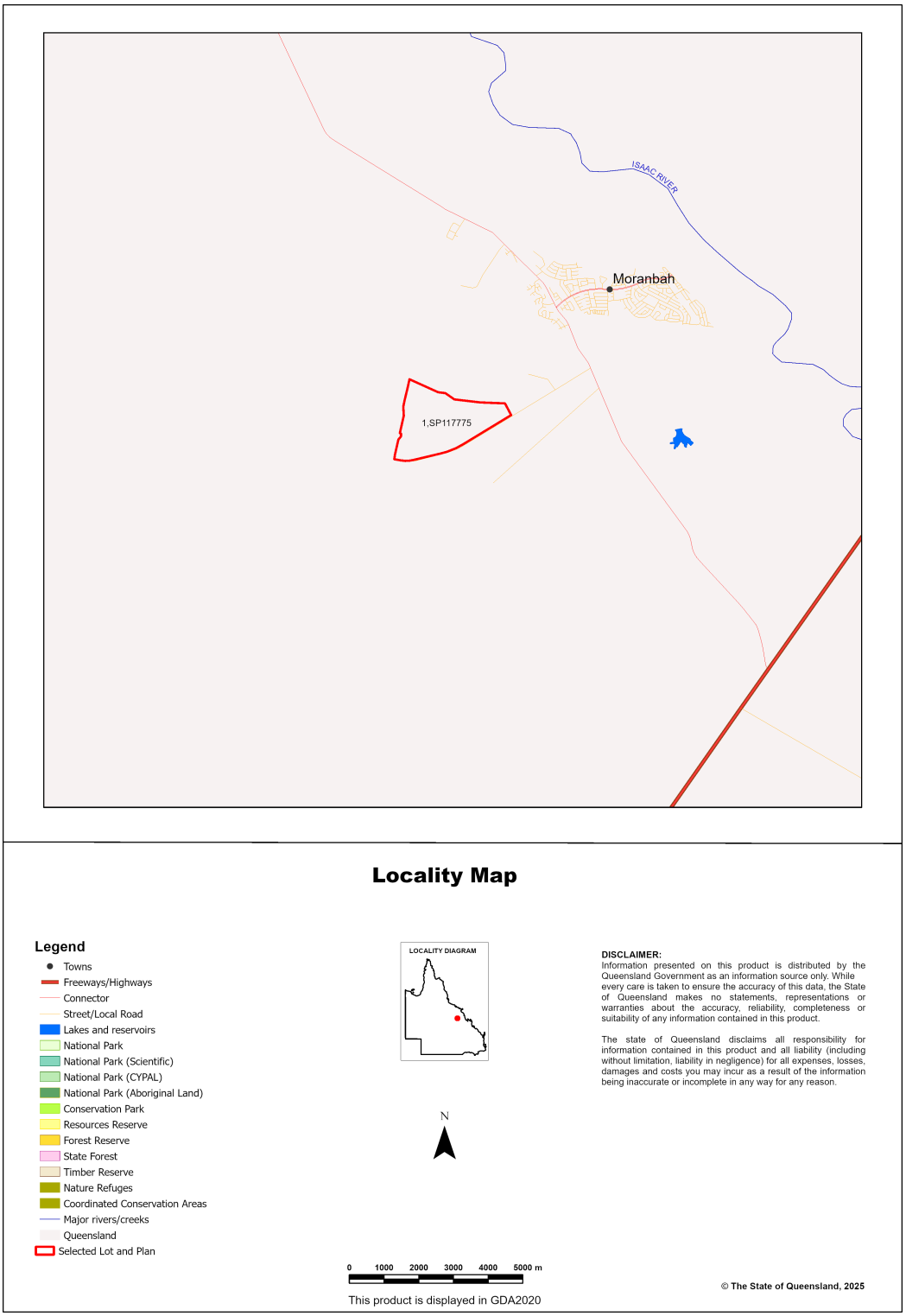
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Assessment Area Details

The following table provides an overview of the area of interest (AOI) with respect to selected topographic and environmental values.

Table 1: Summary table, details for AOI: Lot: 1 Plan: SP117775, with area 404.19 ha

Local Government(s)	Catchment(s)	Bioregion(s)	Subregion(s)
Isaac Regional	Fitzroy	Brigalow Belt	Northern Bowen Basin



Matters of State Environmental Significance (MSES)

MSES Categories

Queensland's State Planning Policy (SPP) includes a biodiversity State interest that states:

'The sustainable, long-term conservation of biodiversity is supported. Significant impacts on matters of national or state environmental significance are avoided, or where this cannot be reasonably achieved; impacts are minimised and residual impacts offset.'

The MSES mapping product is a guide to assist implementation of the SPP biodiversity policy. While it supports the SPP, the mapping does not replace the regulatory mapping or environmental values specifically called up under other laws or regulations.

The SPP defines matters of state environmental significance as:

- Protected areas (including all classes of protected area except coordinated conservation areas) under the *Nature Conservation Act 1992;*

- Marine parks and land within a 'marine national park', 'conservation park', 'scientific research', 'preservation' or 'buffer' zone under the Marine Parks Act 2004 ;

- Areas within declared fish habitat areas that are management A areas or management B areas under the Fisheries Regulation 2008;

- *Threatened wildlife under the Nature Conservation Act 1992* and special least concern animals under the Nature Conservation (Wildlife) Regulation 2006;

- Regulated vegetation under the *Vegetation Management Act 1999* that is:

  - Category B areas on the regulated vegetation management map, that are 'endangered' or 'of concern' regional ecosystems;
  - Category C areas on the regulated vegetation management map that are 'endangered' or 'of concern' regional ecosystems;
  - Category R areas on the regulated vegetation management map;
  - Regional ecosystems that intersect with watercourses identified on the vegetation management watercourse and drainage feature map;
  - Regional ecosystems that intersect with wetlands identified on the vegetation management wetlands map;

- Strategic Environmental Areas under the *Regional Planning Interests Act 2014* ;

- Wetlands in a wetland protection area of wetlands of high ecological significance shown on the Map of Queensland Wetland Environmental Values under the Environment Protection Regulation 2019;

- Wetlands and watercourses in high ecological value waters defined in the Environmental Protection (Water) Policy 2009, schedule 2;
- Legally secured offset areas.

MSES Values Present

The MSES values that are present in the area of interest are summarised in the table below:

Table 2: Summary of MSES present within the AOI

1a Protected Areas- estates	0 ha	0.0%
1b Protected Areas- nature refuges	0 ha	0.0%
1c Protected Areas- special wildlife reserves	0 ha	0.0%
2 State Marine Parks- highly protected zones	0 ha	0.0%
3 Fish habitat areas (A and B areas)	0 ha	0.0%
4 Strategic Environmental Areas (SEA)	0 ha	0.0%
5 High Ecological Significance wetlands on the Map of Queensland Wetland Environmental Values	0 ha	0.0%
6a High Ecological Value (HEV) wetlands	0 ha	
6b High Ecological Value (HEV) waterways	0 km	Not applicable
7a Threatened (endangered or vulnerable) wildlife	6.86 ha	1.7%
7b Special least concern animals	0 ha	0.0%
7c i Koala habitat area - core (SEQ)	0 ha	0.0%
7c ii Koala habitat area - locally refined (SEQ)	0 ha	0.0%
7d Sea turtle nesting areas	0 km	Not applicable
8a Regulated Vegetation - Endangered/Of concern in Category B (remnant)	6.11 ha	1.5%
8b Regulated Vegetation - Endangered/Of concern in Category C (regrowth)	0.75 ha	0.2%
8c Regulated Vegetation - Category R (GBR riverine regrowth)	10.31 ha	2.6%
8d Regulated Vegetation - Essential habitat	6.86 ha	1.7%
8e Regulated Vegetation - intersecting a watercourse	5.5 km	Not applicable
8f Regulated Vegetation - within 100m of a Vegetation Management Wetland	0 ha	0.0%
9a Legally secured offset areas- offset register areas	0 ha	0.0%
9b Legally secured offset areas- vegetation offsets through a Property Map of Assessable Vegetation	0 ha	0.0%

Additional Information with Respect to MSES Values Present

MSES - State Conservation Areas

1a. Protected Areas - estates

(No results)

1b. Protected Areas - nature refuges

(No results)

1c. Protected Areas - special wildlife reserves

(No results)

2. State Marine Parks - highly protected zones

(No results)

3. Fish habitat areas (A and B areas)

(No results)

Refer to **Map 1 - MSES - State Conservation Areas** for an overview of the relevant MSES.

MSES - Wetlands and Waterways

4. Strategic Environmental Areas (SEA)

(No results)

5. High Ecological Significance wetlands on the Map of Queensland Wetland Environmental Values

(no results)

6a. Wetlands in High Ecological Value (HEV) waters

(no results)

6b. Waterways in High Ecological Value (HEV) waters

(no results)

Refer to **Map 2 - MSES - Wetlands and Waterways** for an overview of the relevant MSES.

MSES - Species

7a. Threatened (endangered or vulnerable) wildlife

Values are present

7b. Special least concern animals

Not applicable

7c i. Koala habitat area - core (SEQ)

Not applicable

7c ii. Koala habitat area - locally refined (SEQ)

Not applicable

7d. Wildlife habitat (sea turtle nesting areas)

Not applicable

Threatened (endangered or vulnerable) wildlife habitat suitability models

Species	Common name	NCA status	Presence
Boronia keysii	Keys boronia	V	None
Calyptorhynchus lathami	Glossy black cockatoo	V	None
Casuarius casuarius johnsonii	Sthn population cassowary	E	None
Crinia tinnula	Wallum froglet	V	None
Denisonia maculata	Ornamental snake	V	Core
Euastacus bindal	Mount Elliot crayfish	CR	None
Euastacus binzayedi		CR	None
Euastacus eungella		E	None
Euastacus hystricosus		E	None
Euastacus jagara	Jagara hairy crayfish	CR	None
Euastacus maidae		CR	None
Euastacus monteithorum		E	None
Euastacus robertsi		E	None
Taudactylus pleione	Kroombit tinkerfrog	E	None
Litoria freycineti	Wallum rocketfrog	V	None
Litoria olongburensis	Wallum sedgefrog	V	None
Macadamia integrifolia		V	None
Melaleuca irbyana	swamp tea-tree	E	None
Macadamia ternifolia		V	None
Macadamia tetraphylla	bopple nut	V	None
Petrogale penicillata	brush-tailed rock-wallaby	V	None
Petrogale coenensis	Cape York rock-wallaby	E	None
Petrogale purpureicollis	purple-necked rock-wallaby	V	None
Petrogale sharmani	Sharmans rock-wallaby	V	None
Petrogale xanthopus celeris	yellow-footed rock-wallaby (Qld subspecies)	V	None
Petaurus gracilis	Mahogany Glider	E	None
Petrogale persephone	Proserpine rock-wallaby	E	None
Phascolarctos cinereus	Koala - outside SEQ*	E	None
Pezoporus wallicus wallicus	Eastern ground parrot	V	None
Xeromys myoides	Water Mouse	V	None

*For koala model, this includes areas outside SEQ. Check 7c SEQ koala habitat for presence/absence.

Threatened (endangered or vulnerable) wildlife species records

(No results)

Special least concern animal species records

(No results)

Shorebird habitat (critically endangered/endangered/vulnerable)

Not applicable

Shorebird habitat (special least concern)

Not applicable

**Nature Conservation Act 1992 (NCA) Status- Endangered (E), Vulnerable (V) or Special Least Concern Animal (SL). Environment Protection and Biodiversity Conservation Act 1999 (EPBC) status: Critically Endangered (CE) Endangered (E), Vulnerable (V)*

Migratory status (M) - China and Australia Migratory Bird Agreement (C), Japan and Australia Migratory Bird Agreement (J), Republic of Korea and Australia Migratory Bird Agreement (R), Bonn Migratory Convention (B), Eastern Flyway (E)

To request a species list for an area, or search for a species profile, access Wildlife Online at:

https://www.qld.gov.au/environment/plants-animals/species-list/

Refer to **Map 3a - MSES - Species - Threatened (endangered or vulnerable) wildlife and special least concern animals** and **Map 3b - MSES - Species - Koala habitat area (SEQ)** and **Map 3c - MSES - Wildlife habitat (sea turtle nesting areas)** for an overview of the relevant MSES.

MSES - Regulated Vegetation

For further information relating to regional ecosystems in general, go to:

https://www.qld.gov.au/environment/plants-animals/plants/ecosystems/

For a more detailed description of a particular regional ecosystem, access the regional ecosystem search page at:

https://environment.ehp.qld.gov.au/regional-ecosystems/

8a. Regulated Vegetation - Endangered/Of concern in Category B (remnant)

Regional ecosystem	Vegetation management polygon	Vegetation management status
11.5.3/11.5.9c/11.4.9/11.3.25	E-subdom	rem_end

8b. Regulated Vegetation - Endangered/Of concern in Category C (regrowth)

Regional ecosystem	Vegetation management polygon	Vegetation management status
11.5.3/11.5.9c/11.4.9/11.3.25	E-subdom	hvr_end

8c. Regulated Vegetation - Category R (GBR riverine regrowth)

Regulated vegetation map category	Map number
R	8453
R	8553

8d. Regulated Vegetation - Essential habitat

Values are present

8e. Regulated Vegetation - intersecting a watercourse**

A vegetation management watercourse is mapped as present

8f. Regulated Vegetation - within 100m of a Vegetation Management wetland

Not applicable

Refer to **Map 4 - MSES - Regulated Vegetation** for an overview of the relevant MSES.

MSES - Offsets

9a. Legally secured offset areas - offset register areas

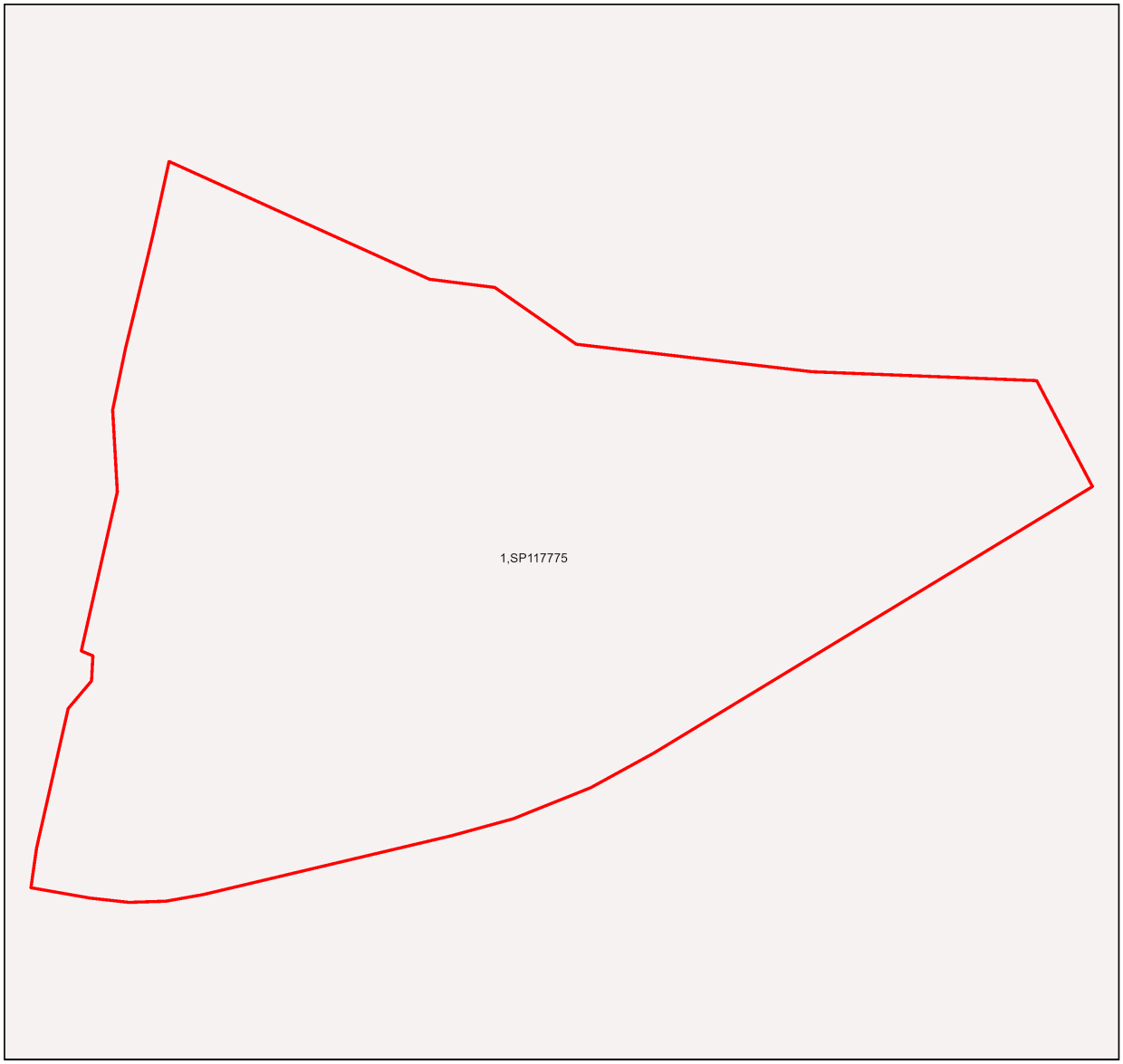
(No results)

9b. Legally secured offset areas - vegetation offsets through a Property Map of Assessable Vegetation

(No results)

Refer to **Map 5 - MSES - Offset Areas** for an overview of the relevant MSES.

Map 1 - MSES - State Conservation Areas



MSES - State Conservation Areas

- Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Protected area (estates, nature refuges, special wildlife reserves)
- Declared fish habitat area (A and B areas)
- Marine park (highly protected)
- Selected Lot and Plan



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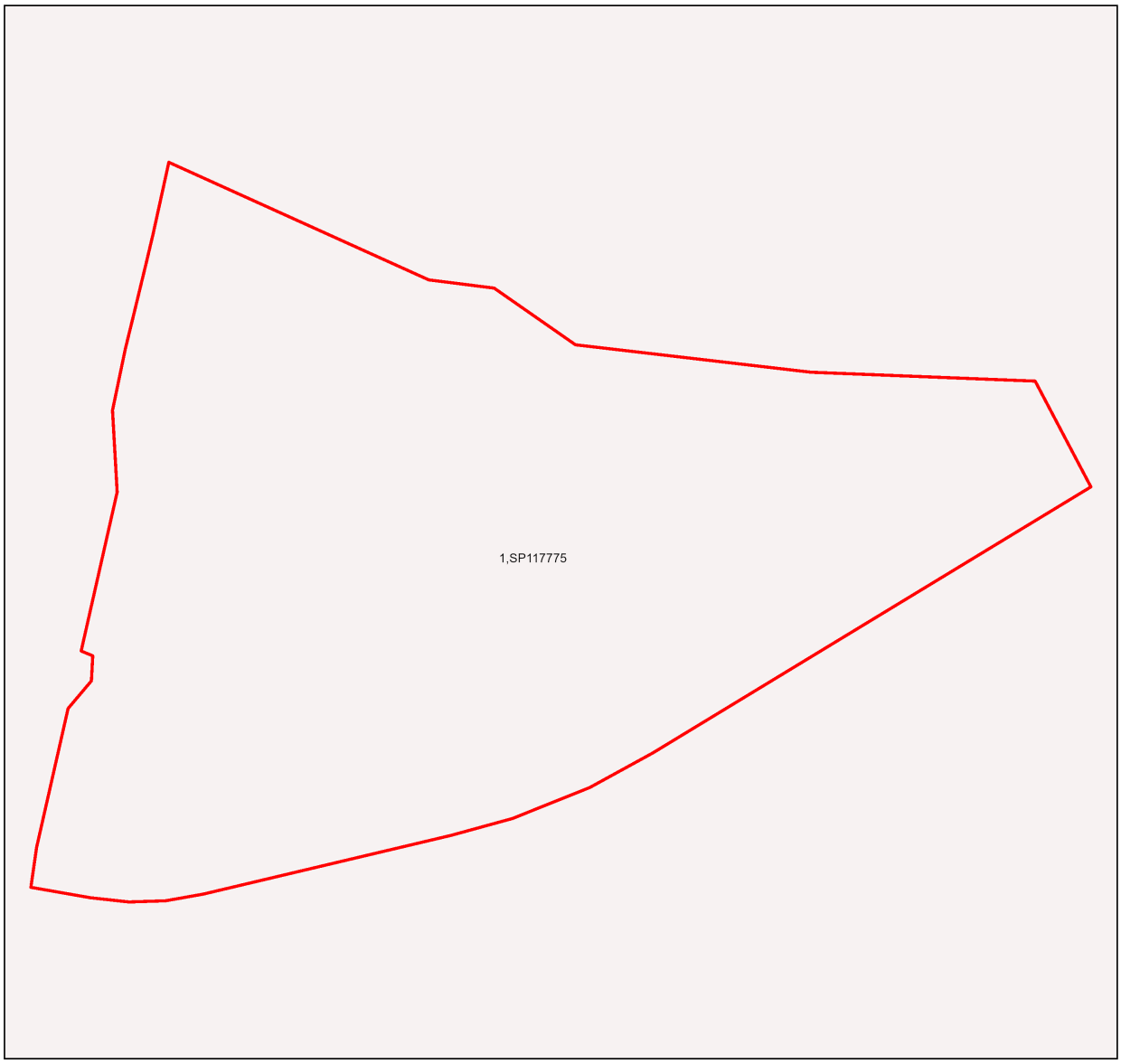
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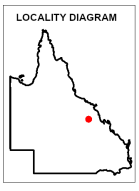
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Map 2 - MSES - Wetlands and Waterways



MSES - Wetlands and Waterways

- Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Declared high ecological value waters (watercourse)
- Strategic environmental area (designated precinct)
- Declared high ecological value waters (wetland)
- High ecological significance wetlands
- Selected Lot and Plan



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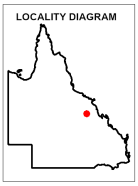
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Map 3a - MSES - Species - Threatened (endangered or vulnerable) wildlife and special least concern animals



MSES - Species
Threatened (endangered or vulnerable) wildlife and special least concern animals

- Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Wildlife habitat (special least concern)
- Wildlife habitat (endangered or vulnerable)
- Selected Lot and Plan



N

0 190 380 570 760 950 m

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Map 3b - MSES - Species - Koala habitat area (SEQ)



MSES - Species
Koala habitat area (SEQ)

- Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Koala habitat area (core)
- Koala habitat area (locally refined)
- Selected Lot and Plan



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The represented layers for SEQ 'koala habitat area-core' and 'koala habitat area- locally refined' in MSES are sourced directly from the regulatory mapping under the Nature Conservation (Koala) Conservation Plan 2017. Whilst every effort is made to ensure the information remains current, there may be delays between updating versions. Please refer to the original mapping for the most recent version. See https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/mapping

The koala habitat mapping within South East Queensland uses regional ecosystem linework compiled at a scale varying from 1:25,000 to 1:100,000. Linework should be used as a guide only. The positional accuracy of regional ecosystem data mapped at a scale of 1:100,000 is +/- 100 metres.

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0 180 360 540 720 900 m

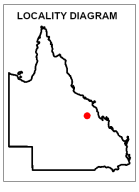
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Map 3c - MSES - Species - Wildlife habitat (sea turtle nesting areas)



MSES - Wildlife habitat (sea turtle nesting areas)

- Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Wildlife habitat (sea turtle nesting areas)
- Selected Lot and Plan



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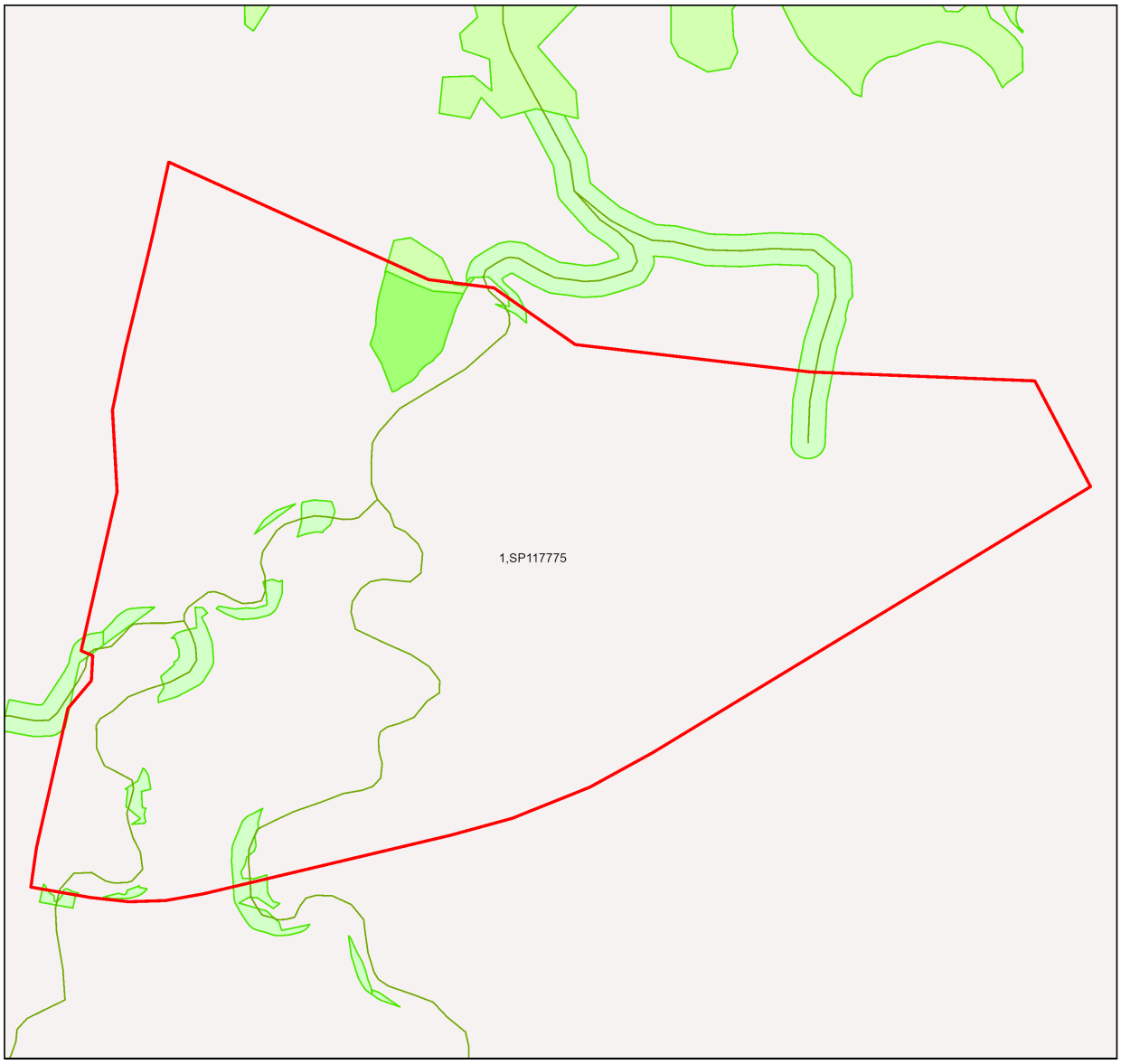
MSES mapping of sea turtle nesting areas identifies beaches where the recorded number of turtle nests are over 1% of the turtle species or genetic stock. The linework is also deliberately extended along nearby rocky coastlines and headlands to recognise that significant numbers of nesting adults and hatchlings can become disoriented by light pollution from development on rocky coastlines and headlands while navigating offshore from nesting beaches.

0 180 360 540 720 900 m

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Map 4 - MSES - Regulated Vegetation



MSES - Regulated Vegetation

- ▲ Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Regulated vegetation (intersecting a watercourse)
- Regulated vegetation (100m from wetland)
- Regulated vegetation (category B - endangered or of concern)
- Regulated vegetation (category C - endangered or of concern)
- Regulated vegetation (category R - GBR riverine)
- Regulated vegetation (essential habitat)
- Selected Lot and Plan

LOCALITY DIAGRAM



N

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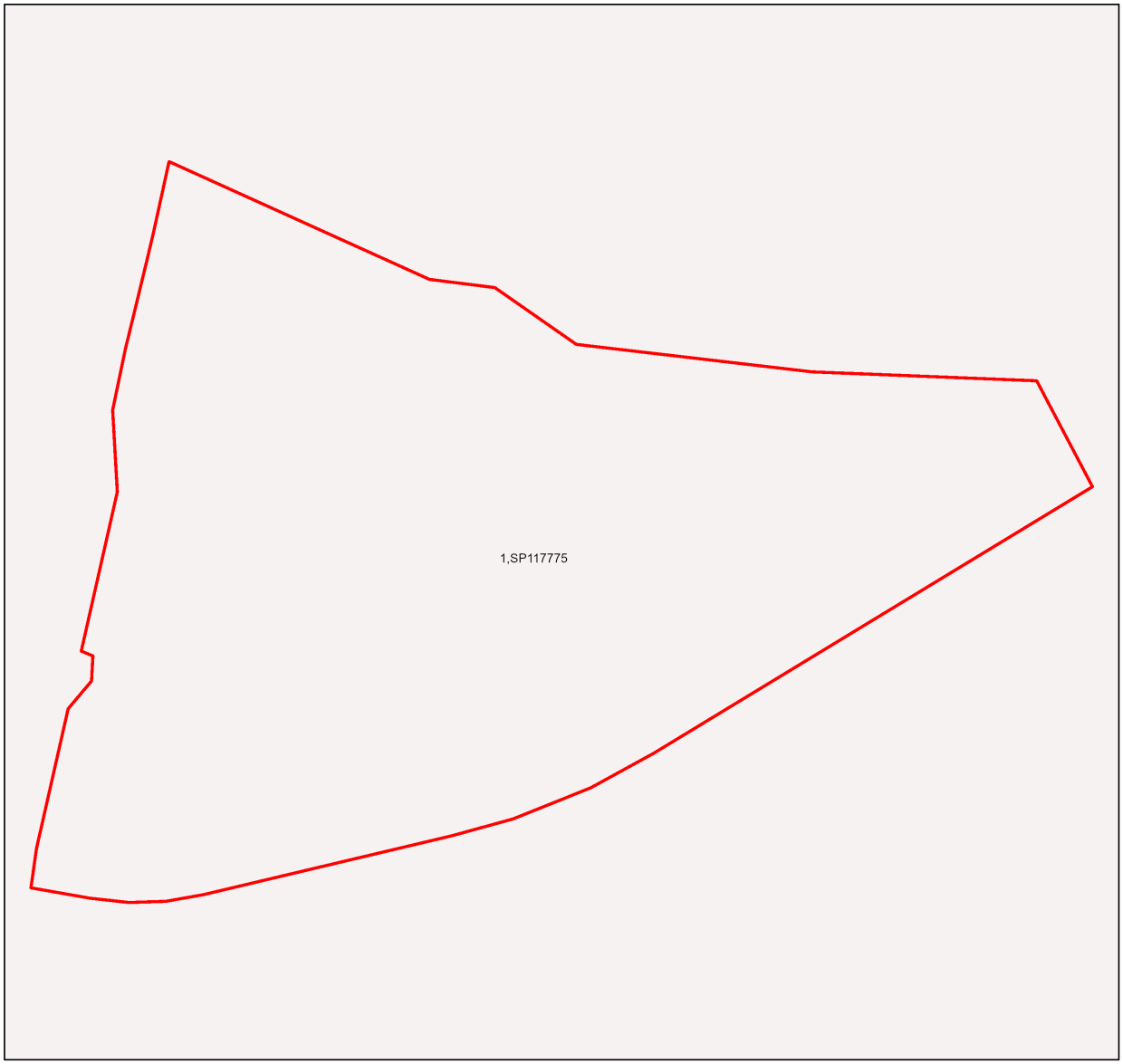
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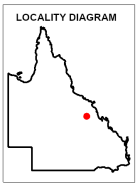
Map 5 - MSES - Offset Areas



MSES - Offsets

- Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Legally secured offset area (offset register)
- Legally secured offset area (vegetation offsets)
- Selected Lot and Plan

LOCALITY DIAGRAM



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Appendices

Appendix 1 - Matters of State Environmental Significance (MSES) methodology

MSES mapping is a regional-scale representation of the definition for MSES under the State Planning Policy (SPP). Its primary purpose is to support implementation of the SPP biodiversity policy.

MSES mapping does not replace the regulatory mapping or environmental values specifically called up under other laws or regulations.

MSES mapping does not determine whether state or local development assessment is required. For state assessment triggers refer to the Development Assessment Mapping System (DAMS). For local assessment triggers, refer to the relevant local planning scheme.

The Queensland Government's "Method for mapping - matters of state environmental significance can be downloaded from:

http://www.ehp.qld.gov.au/land/natural-resource/method-mapping-mses.html .

Appendix 2 - Source Data

The datasets listed below are available on request from:

http://qldspatial.information.qld.gov.au/catalogue/custom/index.page

- Matters of State environmental significance

Note: MSES mapping is not based on new or unique data. The primary mapping product draws data from a number of underlying environment databases and geo-referenced information sources. MSES mapping is a versioned product that is updated generally on a twice-yearly basis to incorporate the changes to underlying data sources. Several components of MSES mapping made for the current version may differ from the current underlying data sources. To ensure accuracy, or proper representation of MSES values, it is strongly recommended that users refer to the underlying data sources and review the current definition of MSES in the State Planning Policy, before applying the MSES mapping.

Individual MSES layers can be attributed to the following source data available at QSpatial:

MSES layers	**current QSpatial data (http://qspatial.information.qld.gov.au)**
Protected Areas-Estates, Nature Refuges, Special Wildlife Reserves	- Protected areas of Queensland - Nature Refuges - Queensland - Special Wildlife Reserves- Queensland
Marine Park-Highly Protected Zones	Moreton Bay marine park zoning 2008
Fish Habitat Areas	Queensland fish habitat areas
Strategic Environmental Areas-designated	Regional Planning Interests Act - Strategic Environmental Areas
HES wetlands	Map of Queensland Wetland Environmental Values
Wetlands in HEV waters	HEV waters: - EPP Water intent for waters Source Wetlands: - Queensland Wetland Mapping (Current version 5) Source Watercourses: - Vegetation management watercourse and drainage feature map (1:100000 and 1:250000)
Wildlife habitat (threatened and special least concern)	-WildNet database species records - habitat suitability models (various) - SEQ koala habitat areas under the Koala Conservation Plan 2019
VMA regulated regional ecosystems	Vegetation management regional ecosystem and remnant map
VMA Essential Habitat	Vegetation management - essential habitat map
VMA Wetlands	Vegetation management wetlands map
Legally secured offsets	Vegetation Management Act property maps of assessable vegetation. For offset register data-contact DETSI
Regulated Vegetation Map	Vegetation management - regulated vegetation management map

Appendix 3 - Acronyms and Abbreviations

AOI	- Area of Interest
DETSI	- Department of the Environment, Tourism, Science and Innovation
EP Act	- Environmental Protection Act 1994
EPP	- Environmental Protection Policy
GDA2020	- Geocentric Datum of Australia 2020
GEM	- General Environmental Matters
GIS	- Geographic Information System
MSES	- Matters of State Environmental Significance
NCA	- Nature Conservation Act 1992
RE	- Regional Ecosystem
SPP	- State Planning Policy
VMA	- Vegetation Management Act 1999

Queensland Government

Department of the Environment, Tourism, Science and Innovation

Environmental Reports

Matters of State Environmental Significance

For the selected area of interest

Lot: 2 Plan: RP616987

Environmental Reports - General Information

The Environmental Reports portal provides for the assessment of selected matters of interest relevant to a user specified location, or area of interest (AOI). All area and derivative figures are relevant to the extent of matters of interest contained within the AOI unless otherwise stated. Please note, if a user selects an AOI via the "central coordinates" option, the resulting assessment area encompasses an area extending for a 2km radius from the point of interest.

All area and area derived figures included in this report have been calculated via reprojecting relevant spatial features to Albers equal-area conic projection (central meridian = 146, datum Geocentric Datum of Australia 2020). As a result, area figures may differ slightly if calculated for the same features using a different co-ordinate system.

Figures in tables may be affected by rounding.

The matters of interest reported on in this document are based upon available state mapped datasets. Where the report indicates that a matter of interest is not present within the AOI (e.g. where area related calculations are equal to zero, or no values are listed), this may be due either to the fact that state mapping has not been undertaken for the AOI, that state mapping is incomplete for the AOI, or that no values have been identified within the site.

The information presented in this report should be considered as a guide only and a field survey may be required to validate values on the ground.

Please direct queries about these reports to: Planning.Support@des.qld.gov.au

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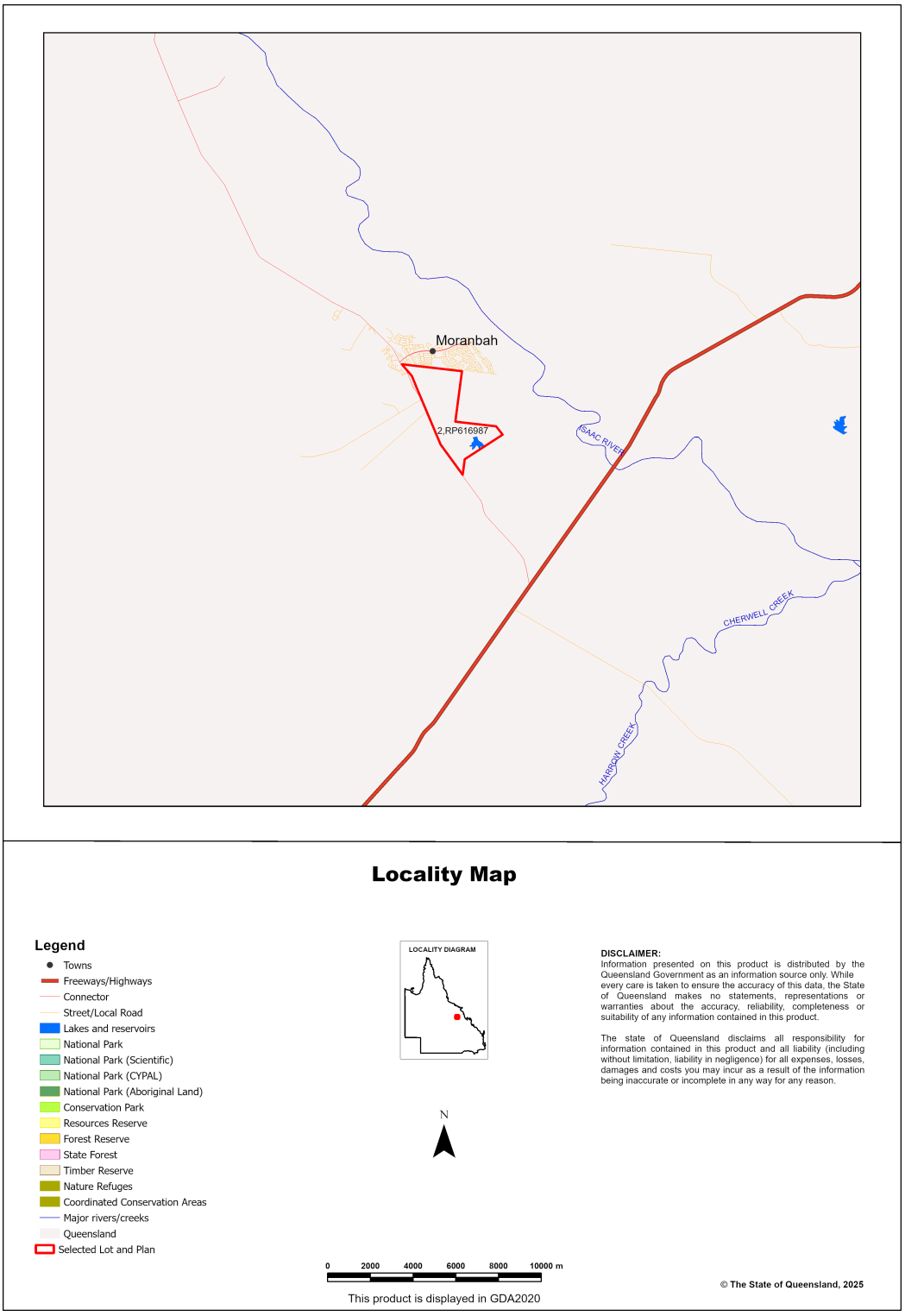
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Assessment Area Details

The following table provides an overview of the area of interest (AOI) with respect to selected topographic and environmental values.

Table 1: Summary table, details for AOI: Lot: 2 Plan: RP616987, with area 803.76 ha

Local Government(s)	Catchment(s)	Bioregion(s)	Subregion(s)
Isaac Regional	Fitzroy	Brigalow Belt	Northern Bowen Basin



Matters of State Environmental Significance (MSES)

MSES Categories

Queensland's State Planning Policy (SPP) includes a biodiversity State interest that states:

'The sustainable, long-term conservation of biodiversity is supported. Significant impacts on matters of national or state environmental significance are avoided, or where this cannot be reasonably achieved; impacts are minimised and residual impacts offset.'

The MSES mapping product is a guide to assist implementation of the SPP biodiversity policy. While it supports the SPP, the mapping does not replace the regulatory mapping or environmental values specifically called up under other laws or regulations.

The SPP defines matters of state environmental significance as:

- Protected areas (including all classes of protected area except coordinated conservation areas) under the *Nature Conservation Act 1992;*

- Marine parks and land within a 'marine national park', 'conservation park', 'scientific research', 'preservation' or 'buffer' zone under the Marine Parks Act 2004 ;

- Areas within declared fish habitat areas that are management A areas or management B areas under the Fisheries Regulation 2008;

- *Threatened wildlife under the Nature Conservation Act 1992* and special least concern animals under the Nature Conservation (Wildlife) Regulation 2006;

- Regulated vegetation under the *Vegetation Management Act 1999* that is:

  - Category B areas on the regulated vegetation management map, that are 'endangered' or 'of concern' regional ecosystems;
  - Category C areas on the regulated vegetation management map that are 'endangered' or 'of concern' regional ecosystems;
  - Category R areas on the regulated vegetation management map;
  - Regional ecosystems that intersect with watercourses identified on the vegetation management watercourse and drainage feature map;
  - Regional ecosystems that intersect with wetlands identified on the vegetation management wetlands map;

- Strategic Environmental Areas under the *Regional Planning Interests Act 2014* ;

- Wetlands in a wetland protection area of wetlands of high ecological significance shown on the Map of Queensland Wetland Environmental Values under the Environment Protection Regulation 2019;

- Wetlands and watercourses in high ecological value waters defined in the Environmental Protection (Water) Policy 2009, schedule 2;
- Legally secured offset areas.

MSES Values Present

The MSES values that are present in the area of interest are summarised in the table below:

Table 2: Summary of MSES present within the AOI

1a Protected Areas- estates	0 ha	0.0%
1b Protected Areas- nature refuges	0 ha	0.0%
1c Protected Areas- special wildlife reserves	0 ha	0.0%
2 State Marine Parks- highly protected zones	0 ha	0.0%
3 Fish habitat areas (A and B areas)	0 ha	0.0%
4 Strategic Environmental Areas (SEA)	0 ha	0.0%
5 High Ecological Significance wetlands on the Map of Queensland Wetland Environmental Values	0 ha	0.0%
6a High Ecological Value (HEV) wetlands	0 ha	
6b High Ecological Value (HEV) waterways	0 km	Not applicable
7a Threatened (endangered or vulnerable) wildlife	167.05 ha	20.8%
7b Special least concern animals	0 ha	0.0%
7c i Koala habitat area - core (SEQ)	0 ha	0.0%
7c ii Koala habitat area - locally refined (SEQ)	0 ha	0.0%
7d Sea turtle nesting areas	0 km	Not applicable
8a Regulated Vegetation - Endangered/Of concern in Category B (remnant)	12.29 ha	1.5%
8b Regulated Vegetation - Endangered/Of concern in Category C (regrowth)	2.2 ha	0.3%
8c Regulated Vegetation - Category R (GBR riverine regrowth)	19.52 ha	2.4%
8d Regulated Vegetation - Essential habitat	157.89 ha	19.6%
8e Regulated Vegetation - intersecting a watercourse	7.1 km	Not applicable
8f Regulated Vegetation - within 100m of a Vegetation Management Wetland	3.78 ha	0.5%
9a Legally secured offset areas- offset register areas	0 ha	0.0%
9b Legally secured offset areas- vegetation offsets through a Property Map of Assessable Vegetation	0 ha	0.0%

Additional Information with Respect to MSES Values Present

MSES - State Conservation Areas

1a. Protected Areas - estates

(No results)

1b. Protected Areas - nature refuges

(No results)

1c. Protected Areas - special wildlife reserves

(No results)

2. State Marine Parks - highly protected zones

(No results)

3. Fish habitat areas (A and B areas)

(No results)

Refer to **Map 1 - MSES - State Conservation Areas** for an overview of the relevant MSES.

MSES - Wetlands and Waterways

4. Strategic Environmental Areas (SEA)

(No results)

5. High Ecological Significance wetlands on the Map of Queensland Wetland Environmental Values

(no results)

6a. Wetlands in High Ecological Value (HEV) waters

(no results)

6b. Waterways in High Ecological Value (HEV) waters

(no results)

Refer to **Map 2 - MSES - Wetlands and Waterways** for an overview of the relevant MSES.

MSES - Species

7a. Threatened (endangered or vulnerable) wildlife

Values are present

7b. Special least concern animals

Not applicable

7c i. Koala habitat area - core (SEQ)

Not applicable

7c ii. Koala habitat area - locally refined (SEQ)

Not applicable

7d. Wildlife habitat (sea turtle nesting areas)

Not applicable

Threatened (endangered or vulnerable) wildlife habitat suitability models

Species	Common name	NCA status	Presence
Boronia keysii	Keys boronia	V	None
Calyptorhynchus lathami	Glossy black cockatoo	V	None
Casuarius casuarius johnsonii	Sthn population cassowary	E	None
Crinia tinnula	Wallum froglet	V	None
Denisonia maculata	Ornamental snake	V	Core
Euastacus bindal	Mount Elliot crayfish	CR	None
Euastacus binzayedi		CR	None
Euastacus eungella		E	None
Euastacus hystricosus		E	None
Euastacus jagara	Jagara hairy crayfish	CR	None
Euastacus maidae		CR	None
Euastacus monteithorum		E	None
Euastacus robertsi		E	None
Taudactylus pleione	Kroombit tinkerfrog	E	None
Litoria freycineti	Wallum rocketfrog	V	None
Litoria olongburensis	Wallum sedgefrog	V	None
Macadamia integrifolia		V	None
Melaleuca irbyana	swamp tea-tree	E	None
Macadamia ternifolia		V	None
Macadamia tetraphylla	bopple nut	V	None
Petrogale penicillata	brush-tailed rock-wallaby	V	None
Petrogale coenensis	Cape York rock-wallaby	E	None
Petrogale purpureicollis	purple-necked rock-wallaby	V	None
Petrogale sharmani	Sharmans rock-wallaby	V	None
Petrogale xanthopus celeris	yellow-footed rock-wallaby (Qld subspecies)	V	None
Petaurus gracilis	Mahogany Glider	E	None
Petrogale persephone	Proserpine rock-wallaby	E	None
Phascolarctos cinereus	Koala - outside SEQ*	E	None
Pezoporus wallicus wallicus	Eastern ground parrot	V	None
Xeromys myoides	Water Mouse	V	None

*For koala model, this includes areas outside SEQ. Check 7c SEQ koala habitat for presence/absence.

Threatened (endangered or vulnerable) wildlife species records

Scientific name	Common name	NCA status	EPBC status	Migratory status
Petauroides armillatus	central greater glider	E	E	None

Special least concern animal species records

(No results)

Shorebird habitat (critically endangered/endangered/vulnerable)

Not applicable

Shorebird habitat (special least concern)

Not applicable

**Nature Conservation Act 1992 (NCA) Status- Endangered (E), Vulnerable (V) or Special Least Concern Animal (SL). Environment Protection and Biodiversity Conservation Act 1999 (EPBC) status: Critically Endangered (CE) Endangered (E), Vulnerable (V)*

Migratory status (M) - China and Australia Migratory Bird Agreement (C), Japan and Australia Migratory Bird Agreement (J), Republic of Korea and Australia Migratory Bird Agreement (R), Bonn Migratory Convention (B), Eastern Flyway (E)

To request a species list for an area, or search for a species profile, access Wildlife Online at:

https://www.qld.gov.au/environment/plants-animals/species-list/

Refer to **Map 3a - MSES - Species - Threatened (endangered or vulnerable) wildlife and special least concern animals** and **Map 3b - MSES - Species - Koala habitat area (SEQ)** and **Map 3c - MSES - Wildlife habitat (sea turtle nesting areas)** for an overview of the relevant MSES.

MSES - Regulated Vegetation

For further information relating to regional ecosystems in general, go to:

https://www.qld.gov.au/environment/plants-animals/plants/ecosystems/

For a more detailed description of a particular regional ecosystem, access the regional ecosystem search page at:

https://environment.ehp.qld.gov.au/regional-ecosystems/

8a. Regulated Vegetation - Endangered/Of concern in Category B (remnant)

Regional ecosystem	Vegetation management polygon	Vegetation management status
11.4.9	E-dom	rem_end
11.8.11	O-dom	rem_oc

8b. Regulated Vegetation - Endangered/Of concern in Category C (regrowth)

Regional ecosystem	Vegetation management polygon	Vegetation management status
11.3.2	O-dom	hvr_oc

8c. Regulated Vegetation - Category R (GBR riverine regrowth)

Regulated vegetation map category	Map number
R	8553

8d. Regulated Vegetation - Essential habitat

Values are present

8e. Regulated Vegetation - intersecting a watercourse**

A vegetation management watercourse is mapped as present

8f. Regulated Vegetation - within 100m of a Vegetation Management wetland

Regulated vegetation map category	Map number
B	8553
R	8553

Refer to **Map 4 - MSES - Regulated Vegetation** for an overview of the relevant MSES.

MSES - Offsets

9a. Legally secured offset areas - offset register areas

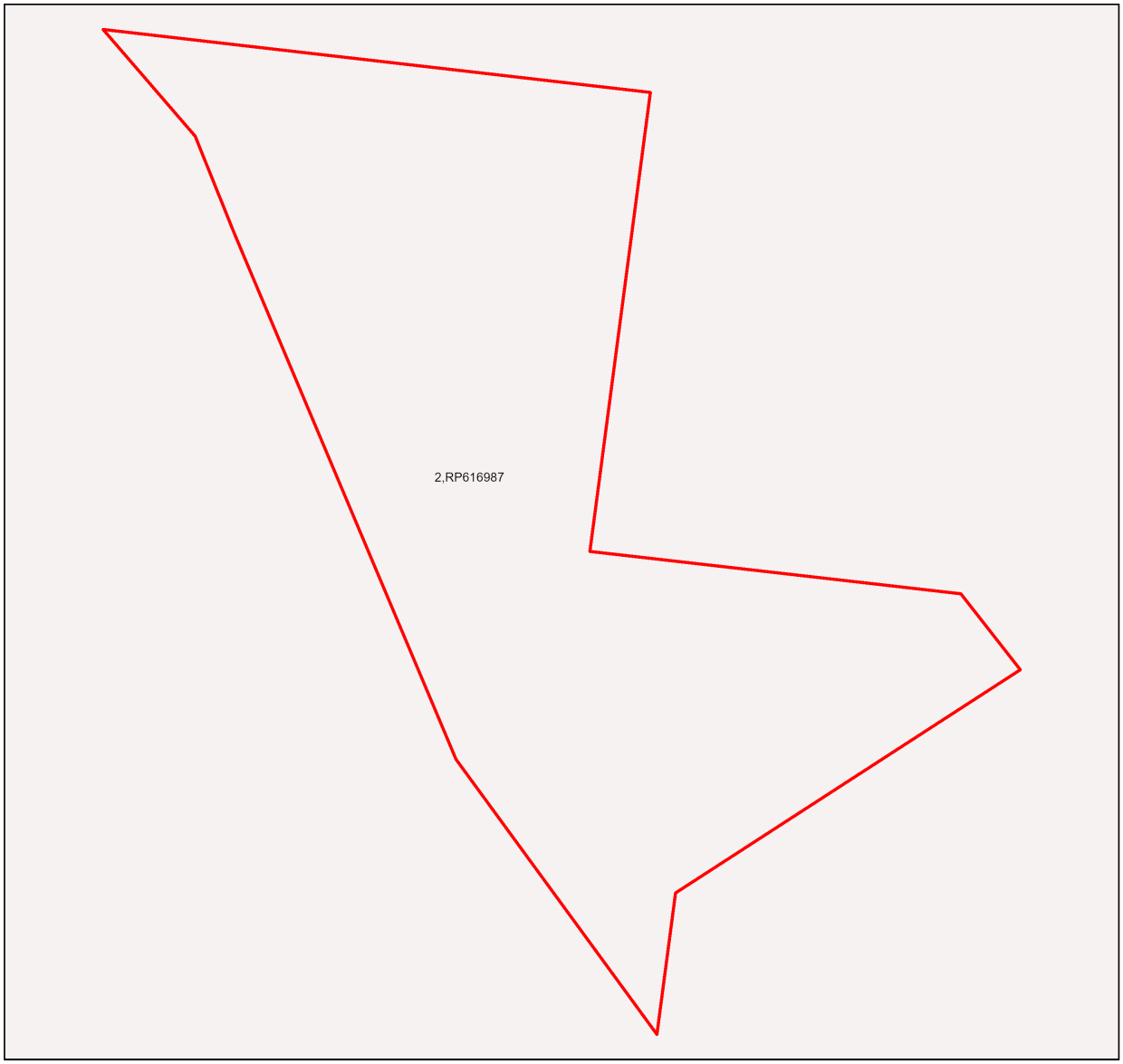
(No results)

9b. Legally secured offset areas - vegetation offsets through a Property Map of Assessable Vegetation

(No results)

Refer to **Map 5 - MSES - Offset Areas** for an overview of the relevant MSES.

Map 1 - MSES - State Conservation Areas



MSES - State Conservation Areas

- Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Protected area (estates, nature refuges, special wildlife reserves)
- Declared fish habitat area (A and B areas)
- Marine park (highly protected)
- Selected Lot and Plan



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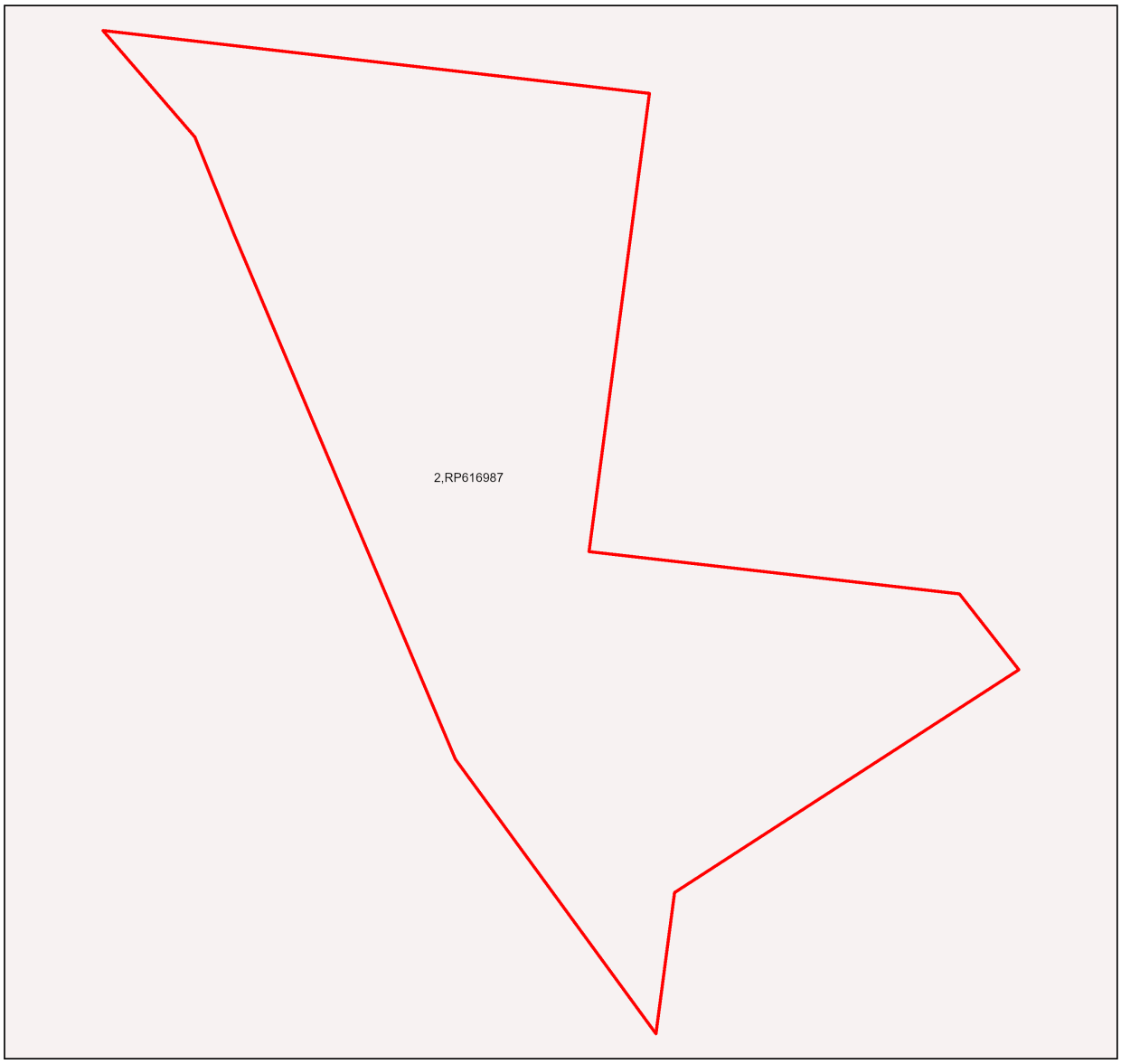
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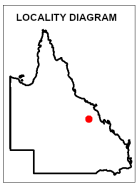
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Map 2 - MSES - Wetlands and Waterways



MSES - Wetlands and Waterways

- Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Declared high ecological value waters (watercourse)
- Strategic environmental area (designated precinct)
- Declared high ecological value waters (wetland)
- High ecological significance wetlands
- Selected Lot and Plan



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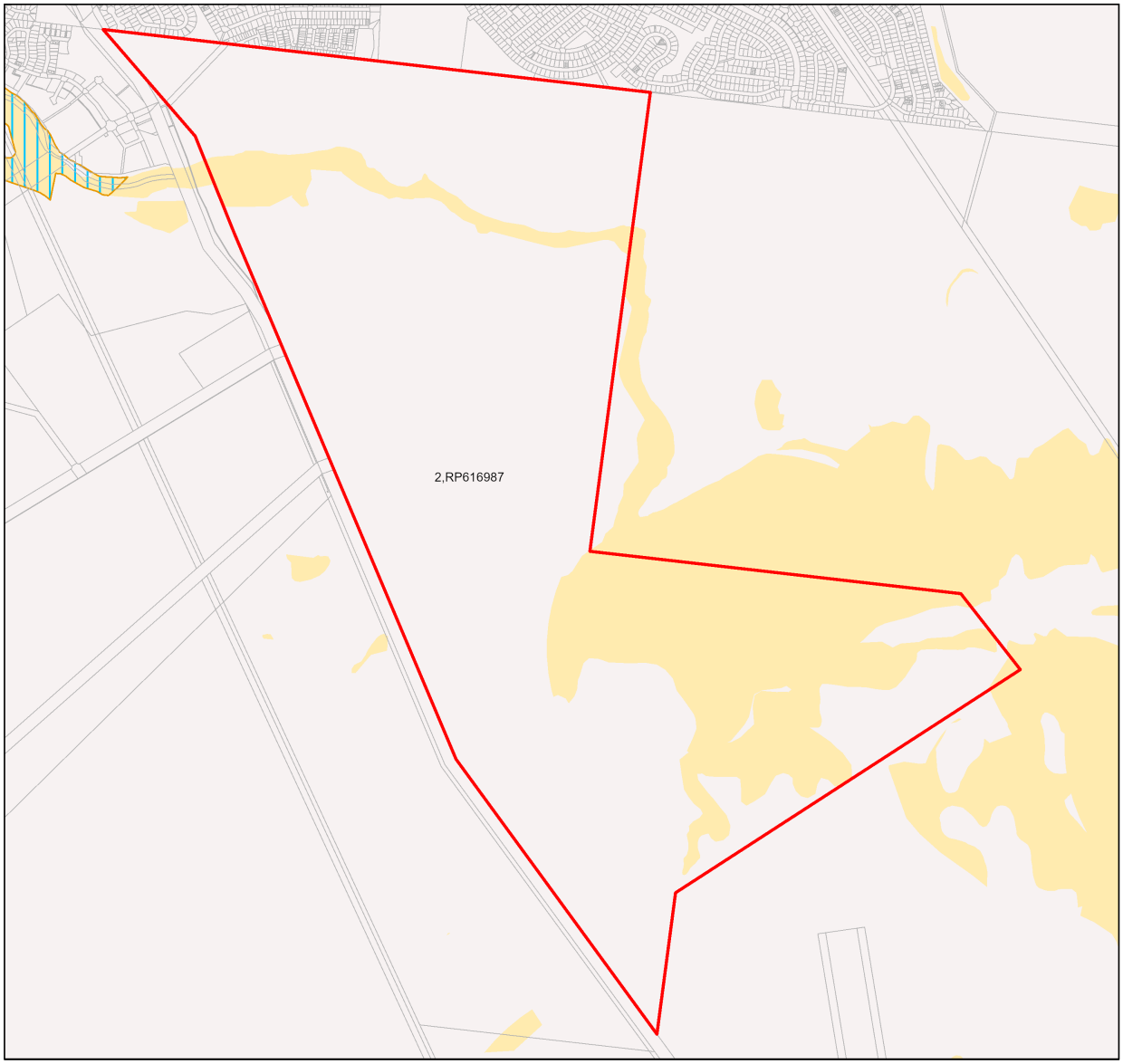
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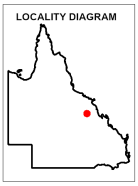
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Map 3a - MSES - Species - Threatened (endangered or vulnerable) wildlife and special least concern animals



MSES - Species
Threatened (endangered or vulnerable) wildlife and special least concern animals

- Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Wildlife habitat (special least concern)
- Wildlife habitat (endangered or vulnerable)
- Selected Lot and Plan



N

0 310 620 930 1240 1550 m

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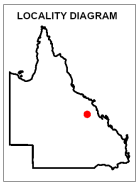
Map 3b - MSES - Species - Koala habitat area (SEQ)



MSES - Species
Koala habitat area (SEQ)

- Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Koala habitat area (core)
- Koala habitat area (locally refined)
- Selected Lot and Plan

LOCALITY DIAGRAM



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The represented layers for SEQ 'koala habitat area-core' and 'koala habitat area- locally refined' in MSES are sourced directly from the regulatory mapping under the Nature Conservation (Koala) Conservation Plan 2017. Whilst every effort is made to ensure the information remains current, there may be delays between updating versions. Please refer to the original mapping for the most recent version. See https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/mapping

The koala habitat mapping within South East Queensland uses regional ecosystem linework compiled at a scale varying from 1:25,000 to 1:100,000. Linework should be used as a guide only. The positional accuracy of regional ecosystem data mapped at a scale of 1:100,000 is +/- 100 metres.

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0 275 550 825 1,100 1,375 m

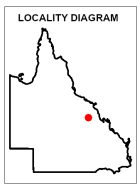
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Map 3c - MSES - Species - Wildlife habitat (sea turtle nesting areas)



MSES - Wildlife habitat (sea turtle nesting areas)

- Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Wildlife habitat (sea turtle nesting areas)
- Selected Lot and Plan



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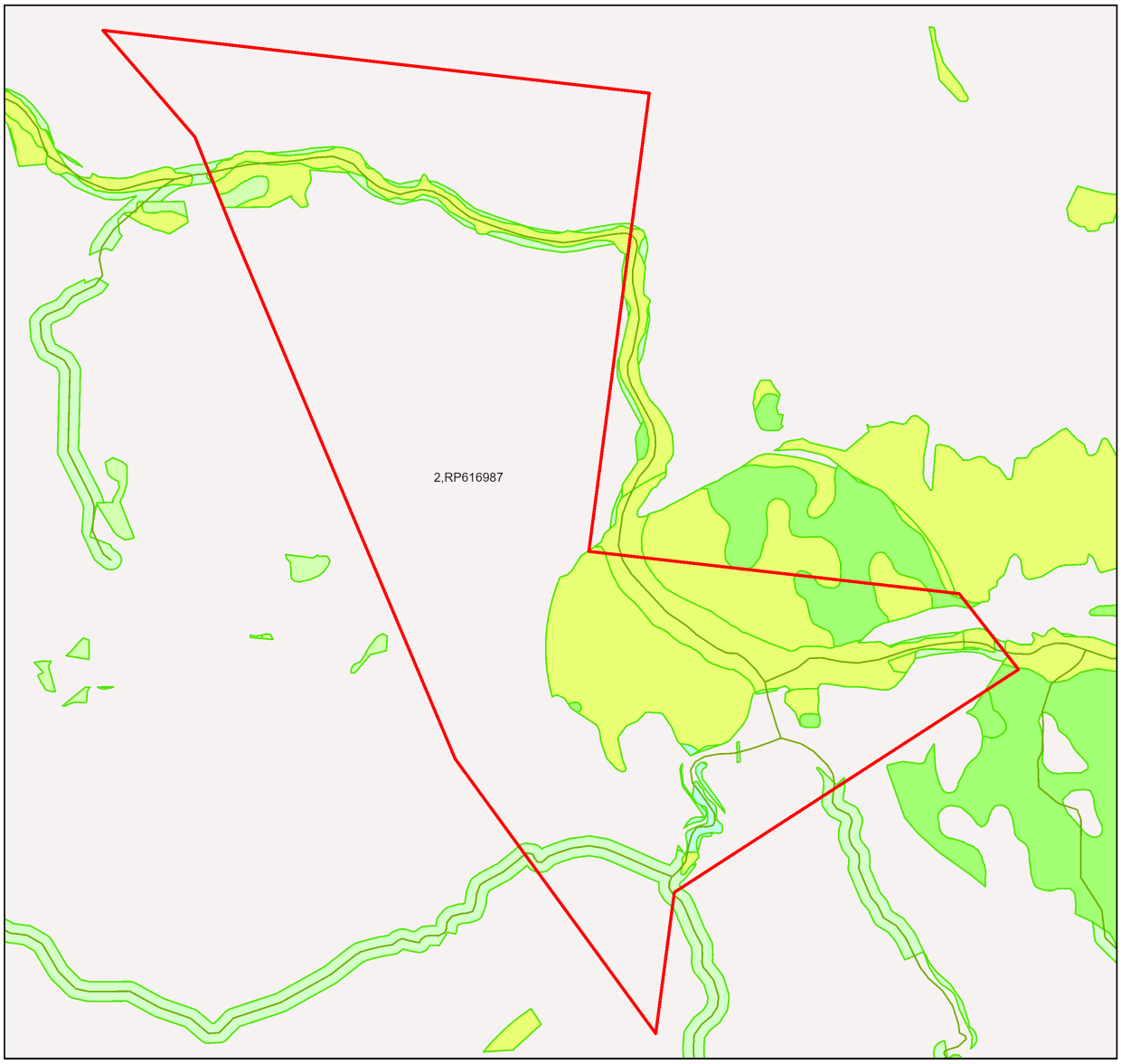
MSES mapping of sea turtle nesting areas identifies beaches where the recorded number of turtle nests are over 1% of the turtle species or genetic stock. The linework is also deliberately extended along nearby rocky coastlines and headlands to recognise that significant numbers of nesting adults and hatchlings can become disoriented by light pollution from development on rocky coastlines and headlands while navigating offshore from nesting beaches.

0 275 550 825 1,100 1,375 m

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Map 4 - MSES - Regulated Vegetation



MSES - Regulated Vegetation

- ▲ Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Regulated vegetation (intersecting a watercourse)
- Regulated vegetation (100m from wetland)
- Regulated vegetation (category B - endangered or of concern)
- Regulated vegetation (category C - endangered or of concern)
- Regulated vegetation (category R - GBR riverine)
- Regulated vegetation (essential habitat)
- Selected Lot and Plan

LOCALITY DIAGRAM



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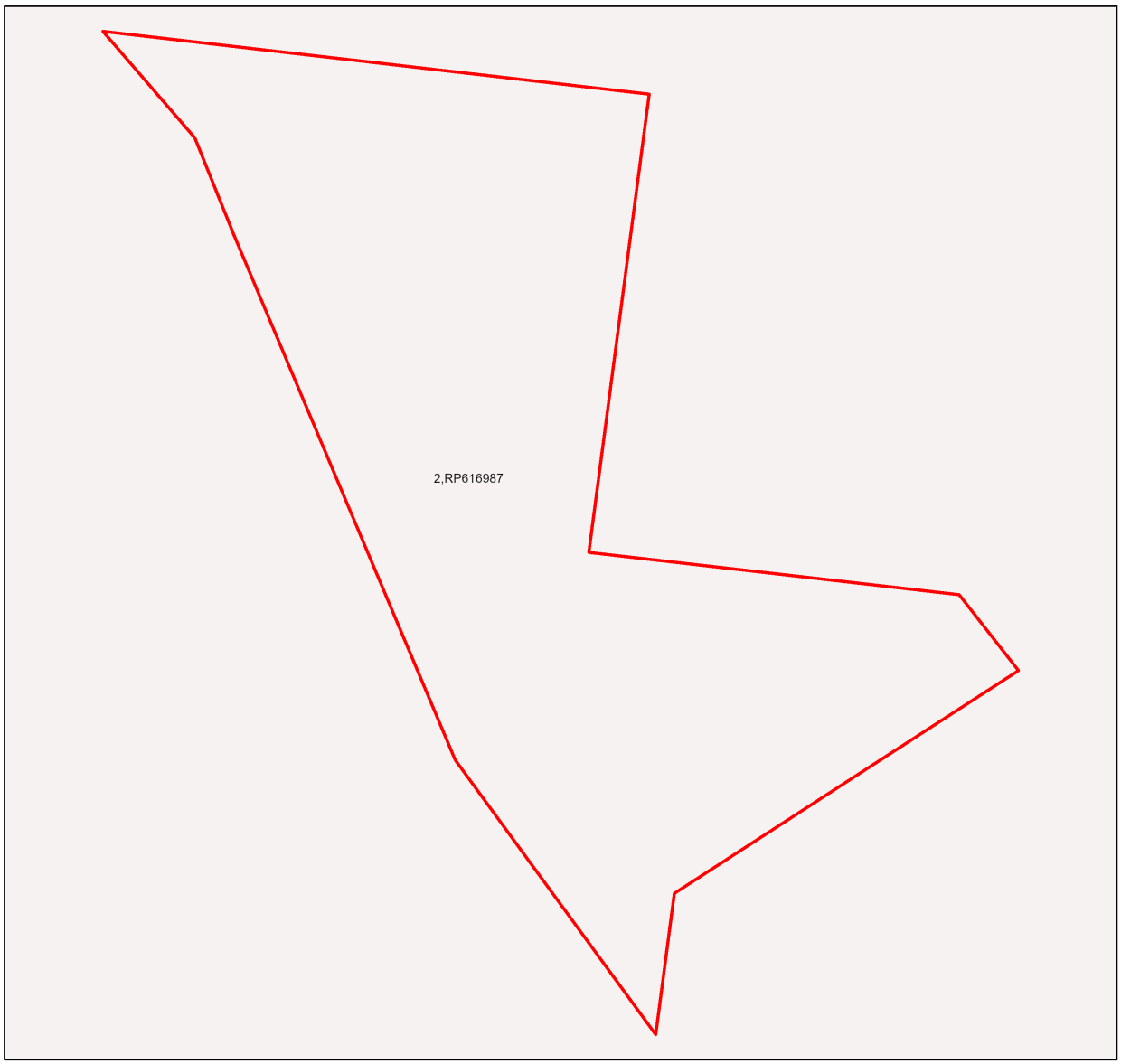
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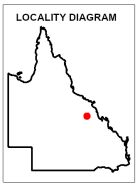
Map 5 - MSES - Offset Areas



MSES - Offsets

- Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Legally secured offset area (offset register)
- Legally secured offset area (vegetation offsets)
- Selected Lot and Plan

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Appendices

Appendix 1 - Matters of State Environmental Significance (MSES) methodology

MSES mapping is a regional-scale representation of the definition for MSES under the State Planning Policy (SPP). Its primary purpose is to support implementation of the SPP biodiversity policy.

MSES mapping does not replace the regulatory mapping or environmental values specifically called up under other laws or regulations.

MSES mapping does not determine whether state or local development assessment is required. For state assessment triggers refer to the Development Assessment Mapping System (DAMS). For local assessment triggers, refer to the relevant local planning scheme.

The Queensland Government's "Method for mapping - matters of state environmental significance can be downloaded from:

http://www.ehp.qld.gov.au/land/natural-resource/method-mapping-mses.html .

Appendix 2 - Source Data

The datasets listed below are available on request from:

http://qldspatial.information.qld.gov.au/catalogue/custom/index.page

- Matters of State environmental significance

Note: MSES mapping is not based on new or unique data. The primary mapping product draws data from a number of underlying environment databases and geo-referenced information sources. MSES mapping is a versioned product that is updated generally on a twice-yearly basis to incorporate the changes to underlying data sources. Several components of MSES mapping made for the current version may differ from the current underlying data sources. To ensure accuracy, or proper representation of MSES values, it is strongly recommended that users refer to the underlying data sources and review the current definition of MSES in the State Planning Policy, before applying the MSES mapping.

Individual MSES layers can be attributed to the following source data available at QSpatial:

MSES layers	**current QSpatial data (http://qspatial.information.qld.gov.au)**
Protected Areas-Estates, Nature Refuges, Special Wildlife Reserves	- Protected areas of Queensland - Nature Refuges - Queensland - Special Wildlife Reserves- Queensland
Marine Park-Highly Protected Zones	Moreton Bay marine park zoning 2008
Fish Habitat Areas	Queensland fish habitat areas
Strategic Environmental Areas-designated	Regional Planning Interests Act - Strategic Environmental Areas
HES wetlands	Map of Queensland Wetland Environmental Values
Wetlands in HEV waters	HEV waters: - EPP Water intent for waters Source Wetlands: - Queensland Wetland Mapping (Current version 5) Source Watercourses: - Vegetation management watercourse and drainage feature map (1:100000 and 1:250000)
Wildlife habitat (threatened and special least concern)	-WildNet database species records - habitat suitability models (various) - SEQ koala habitat areas under the Koala Conservation Plan 2019
VMA regulated regional ecosystems	Vegetation management regional ecosystem and remnant map
VMA Essential Habitat	Vegetation management - essential habitat map
VMA Wetlands	Vegetation management wetlands map
Legally secured offsets	Vegetation Management Act property maps of assessable vegetation. For offset register data-contact DETSI
Regulated Vegetation Map	Vegetation management - regulated vegetation management map

Appendix 3 - Acronyms and Abbreviations

AOI	- Area of Interest
DETSI	- Department of the Environment, Tourism, Science and Innovation
EP Act	- Environmental Protection Act 1994
EPP	- Environmental Protection Policy
GDA2020	- Geocentric Datum of Australia 2020
GEM	- General Environmental Matters
GIS	- Geographic Information System
MSES	- Matters of State Environmental Significance
NCA	- Nature Conservation Act 1992
RE	- Regional Ecosystem
SPP	- State Planning Policy
VMA	- Vegetation Management Act 1999

Queensland Government

Department of the Environment, Tourism, Science and Innovation

Environmental Reports

Matters of State Environmental Significance

For the selected area of interest

Lot: 5 Plan: GV148

Environmental Reports - General Information

The Environmental Reports portal provides for the assessment of selected matters of interest relevant to a user specified location, or area of interest (AOI). All area and derivative figures are relevant to the extent of matters of interest contained within the AOI unless otherwise stated. Please note, if a user selects an AOI via the "central coordinates" option, the resulting assessment area encompasses an area extending for a 2km radius from the point of interest.

All area and area derived figures included in this report have been calculated via reprojecting relevant spatial features to Albers equal-area conic projection (central meridian = 146, datum Geocentric Datum of Australia 2020). As a result, area figures may differ slightly if calculated for the same features using a different co-ordinate system.

Figures in tables may be affected by rounding.

The matters of interest reported on in this document are based upon available state mapped datasets. Where the report indicates that a matter of interest is not present within the AOI (e.g. where area related calculations are equal to zero, or no values are listed), this may be due either to the fact that state mapping has not been undertaken for the AOI, that state mapping is incomplete for the AOI, or that no values have been identified within the site.

The information presented in this report should be considered as a guide only and a field survey may be required to validate values on the ground.

Please direct queries about these reports to: Planning.Support@des.qld.gov.au

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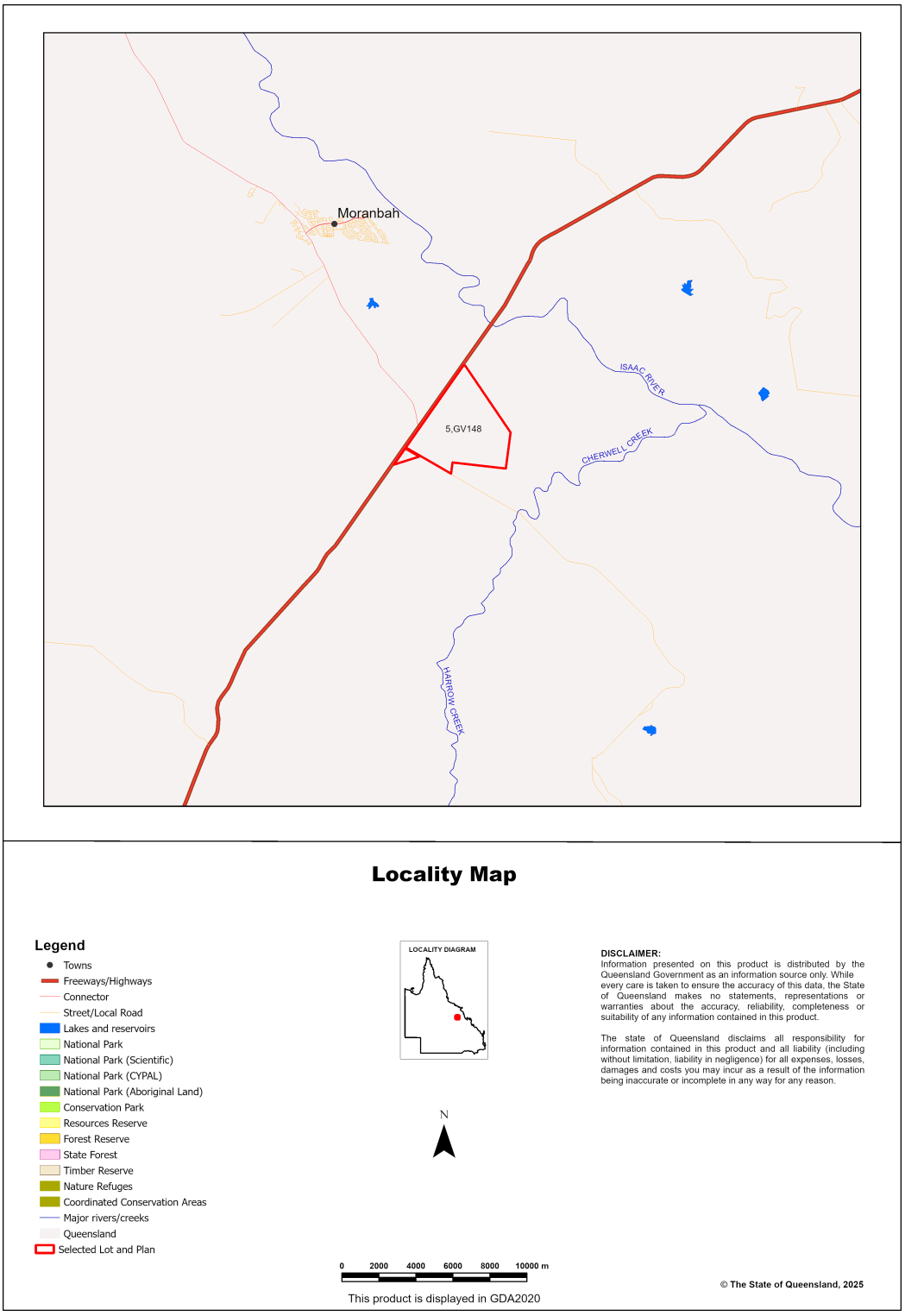
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Assessment Area Details

The following table provides an overview of the area of interest (AOI) with respect to selected topographic and environmental values.

Table 1: Summary table, details for AOI: Lot: 5 Plan: GV148, with area 1740.22 ha

Local Government(s)	Catchment(s)	Bioregion(s)	Subregion(s)
Isaac Regional	Fitzroy	Brigalow Belt	Northern Bowen Basin



Matters of State Environmental Significance (MSES)

MSES Categories

Queensland's State Planning Policy (SPP) includes a biodiversity State interest that states:

'The sustainable, long-term conservation of biodiversity is supported. Significant impacts on matters of national or state environmental significance are avoided, or where this cannot be reasonably achieved; impacts are minimised and residual impacts offset.'

The MSES mapping product is a guide to assist implementation of the SPP biodiversity policy. While it supports the SPP, the mapping does not replace the regulatory mapping or environmental values specifically called up under other laws or regulations.

The SPP defines matters of state environmental significance as:

- Protected areas (including all classes of protected area except coordinated conservation areas) under the *Nature Conservation Act 1992;*

- Marine parks and land within a 'marine national park', 'conservation park', 'scientific research', 'preservation' or 'buffer' zone under the Marine Parks Act 2004 ;

- Areas within declared fish habitat areas that are management A areas or management B areas under the Fisheries Regulation 2008;

- *Threatened wildlife under the Nature Conservation Act 1992* and special least concern animals under the Nature Conservation (Wildlife) Regulation 2006;

- Regulated vegetation under the *Vegetation Management Act 1999* that is:

  - Category B areas on the regulated vegetation management map, that are 'endangered' or 'of concern' regional ecosystems;
  - Category C areas on the regulated vegetation management map that are 'endangered' or 'of concern' regional ecosystems;
  - Category R areas on the regulated vegetation management map;
  - Regional ecosystems that intersect with watercourses identified on the vegetation management watercourse and drainage feature map;
  - Regional ecosystems that intersect with wetlands identified on the vegetation management wetlands map;

- Strategic Environmental Areas under the *Regional Planning Interests Act 2014* ;

- Wetlands in a wetland protection area of wetlands of high ecological significance shown on the Map of Queensland Wetland Environmental Values under the Environment Protection Regulation 2019;

- Wetlands and watercourses in high ecological value waters defined in the Environmental Protection (Water) Policy 2009, schedule 2;
- Legally secured offset areas.

MSES Values Present

The MSES values that are present in the area of interest are summarised in the table below:

Table 2: Summary of MSES present within the AOI

1a Protected Areas- estates	0 ha	0.0%
1b Protected Areas- nature refuges	0 ha	0.0%
1c Protected Areas- special wildlife reserves	0 ha	0.0%
2 State Marine Parks- highly protected zones	0 ha	0.0%
3 Fish habitat areas (A and B areas)	0 ha	0.0%
4 Strategic Environmental Areas (SEA)	0 ha	0.0%
5 High Ecological Significance wetlands on the Map of Queensland Wetland Environmental Values	0 ha	0.0%
6a High Ecological Value (HEV) wetlands	0 ha	
6b High Ecological Value (HEV) waterways	0 km	Not applicable
7a Threatened (endangered or vulnerable) wildlife	625.64 ha	36.0%
7b Special least concern animals	0 ha	0.0%
7c i Koala habitat area - core (SEQ)	0 ha	0.0%
7c ii Koala habitat area - locally refined (SEQ)	0 ha	0.0%
7d Sea turtle nesting areas	0 km	Not applicable
8a Regulated Vegetation - Endangered/Of concern in Category B (remnant)	469.29 ha	27.0%
8b Regulated Vegetation - Endangered/Of concern in Category C (regrowth)	0 ha	0.0%
8c Regulated Vegetation - Category R (GBR riverine regrowth)	35.06 ha	2.0%
8d Regulated Vegetation - Essential habitat	534.38 ha	30.7%
8e Regulated Vegetation - intersecting a watercourse	10.1 km	Not applicable
8f Regulated Vegetation - within 100m of a Vegetation Management Wetland	28.48 ha	1.6%
9a Legally secured offset areas- offset register areas	0 ha	0.0%
9b Legally secured offset areas- vegetation offsets through a Property Map of Assessable Vegetation	0 ha	0.0%

Additional Information with Respect to MSES Values Present

MSES - State Conservation Areas

1a. Protected Areas - estates

(No results)

1b. Protected Areas - nature refuges

(No results)

1c. Protected Areas - special wildlife reserves

(No results)

2. State Marine Parks - highly protected zones

(No results)

3. Fish habitat areas (A and B areas)

(No results)

Refer to **Map 1 - MSES - State Conservation Areas** for an overview of the relevant MSES.

MSES - Wetlands and Waterways

4. Strategic Environmental Areas (SEA)

(No results)

5. High Ecological Significance wetlands on the Map of Queensland Wetland Environmental Values

(no results)

6a. Wetlands in High Ecological Value (HEV) waters

(no results)

6b. Waterways in High Ecological Value (HEV) waters

(no results)

Refer to **Map 2 - MSES - Wetlands and Waterways** for an overview of the relevant MSES.

MSES - Species

7a. Threatened (endangered or vulnerable) wildlife

Values are present

7b. Special least concern animals

Not applicable

7c i. Koala habitat area - core (SEQ)

Not applicable

7c ii. Koala habitat area - locally refined (SEQ)

Not applicable

7d. Wildlife habitat (sea turtle nesting areas)

Not applicable

Threatened (endangered or vulnerable) wildlife habitat suitability models

Species	Common name	NCA status	Presence
Boronia keysii	Keys boronia	V	None
Calyptorhynchus lathami	Glossy black cockatoo	V	None
Casuarius casuarius johnsonii	Sthn population cassowary	E	None
Crinia tinnula	Wallum froglet	V	None
Denisonia maculata	Ornamental snake	V	Core
Euastacus bindal	Mount Elliot crayfish	CR	None
Euastacus binzayedi		CR	None
Euastacus eungella		E	None
Euastacus hystricosus		E	None
Euastacus jagara	Jagara hairy crayfish	CR	None
Euastacus maidae		CR	None
Euastacus monteithorum		E	None
Euastacus robertsi		E	None
Taudactylus pleione	Kroombit tinkerfrog	E	None
Litoria freycineti	Wallum rocketfrog	V	None
Litoria olongburensis	Wallum sedgefrog	V	None
Macadamia integrifolia		V	None
Melaleuca irbyana	swamp tea-tree	E	None
Macadamia ternifolia		V	None
Macadamia tetraphylla	bopple nut	V	None
Petrogale penicillata	brush-tailed rock-wallaby	V	None
Petrogale coenensis	Cape York rock-wallaby	E	None
Petrogale purpureicollis	purple-necked rock-wallaby	V	None
Petrogale sharmani	Sharmans rock-wallaby	V	None
Petrogale xanthopus celeris	yellow-footed rock-wallaby (Qld subspecies)	V	None
Petaurus gracilis	Mahogany Glider	E	None
Petrogale persephone	Proserpine rock-wallaby	E	None
Phascolarctos cinereus	Koala - outside SEQ*	E	None
Pezoporus wallicus wallicus	Eastern ground parrot	V	None
Xeromys myoides	Water Mouse	V	None

*For koala model, this includes areas outside SEQ. Check 7c SEQ koala habitat for presence/absence.

Threatened (endangered or vulnerable) wildlife species records

Scientific name	Common name	NCA status	EPBC status	Migratory status
Geophaps scripta scripta	squatter pigeon (southern subspecies)	V	V	None
Dichanthium queenslandicum		V	E	None

Special least concern animal species records

(No results)

Shorebird habitat (critically endangered/endangered/vulnerable)

Not applicable

Shorebird habitat (special least concern)

Not applicable

**Nature Conservation Act 1992 (NCA) Status- Endangered (E), Vulnerable (V) or Special Least Concern Animal (SL). Environment Protection and Biodiversity Conservation Act 1999 (EPBC) status: Critically Endangered (CE) Endangered (E), Vulnerable (V)*

Migratory status (M) - China and Australia Migratory Bird Agreement (C), Japan and Australia Migratory Bird Agreement (J), Republic of Korea and Australia Migratory Bird Agreement (R), Bonn Migratory Convention (B), Eastern Flyway (E)

To request a species list for an area, or search for a species profile, access Wildlife Online at:

https://www.qld.gov.au/environment/plants-animals/species-list/

Refer to **Map 3a - MSES - Species - Threatened (endangered or vulnerable) wildlife and special least concern animals** and **Map 3b - MSES - Species - Koala habitat area (SEQ)** and **Map 3c - MSES - Wildlife habitat (sea turtle nesting areas)** for an overview of the relevant MSES.

MSES - Regulated Vegetation

For further information relating to regional ecosystems in general, go to:

https://www.qld.gov.au/environment/plants-animals/plants/ecosystems/

For a more detailed description of a particular regional ecosystem, access the regional ecosystem search page at:

https://environment.ehp.qld.gov.au/regional-ecosystems/

8a. Regulated Vegetation - Endangered/Of concern in Category B (remnant)

Regional ecosystem	Vegetation management polygon	Vegetation management status
11.3.2	O-dom	rem_oc
11.3.2/11.3.3	O-dom	rem_oc
11.3.3	O-dom	rem_oc
11.4.9	E-dom	rem_end
11.8.11	O-dom	rem_oc
11.8.11/11.3.21	O-dom	rem_oc
11.8.11/11.8.5	O-dom	rem_oc
11.8.13	E-dom	rem_end
11.8.13/11.8.5	E-dom	rem_end
11.8.5/11.8.11	O-subdom	rem_oc
11.9.5	E-dom	rem_end

8b. Regulated Vegetation - Endangered/Of concern in Category C (regrowth)

Not applicable

8c. Regulated Vegetation - Category R (GBR riverine regrowth)

Regulated vegetation map category	Map number
R	8553

8d. Regulated Vegetation - Essential habitat

Values are present

8e. Regulated Vegetation - intersecting a watercourse**

A vegetation management watercourse is mapped as present

8f. Regulated Vegetation - within 100m of a Vegetation Management wetland

Regulated vegetation map category	Map number
B	8553

Refer to **Map 4 - MSES - Regulated Vegetation** for an overview of the relevant MSES.

MSES - Offsets

9a. Legally secured offset areas - offset register areas

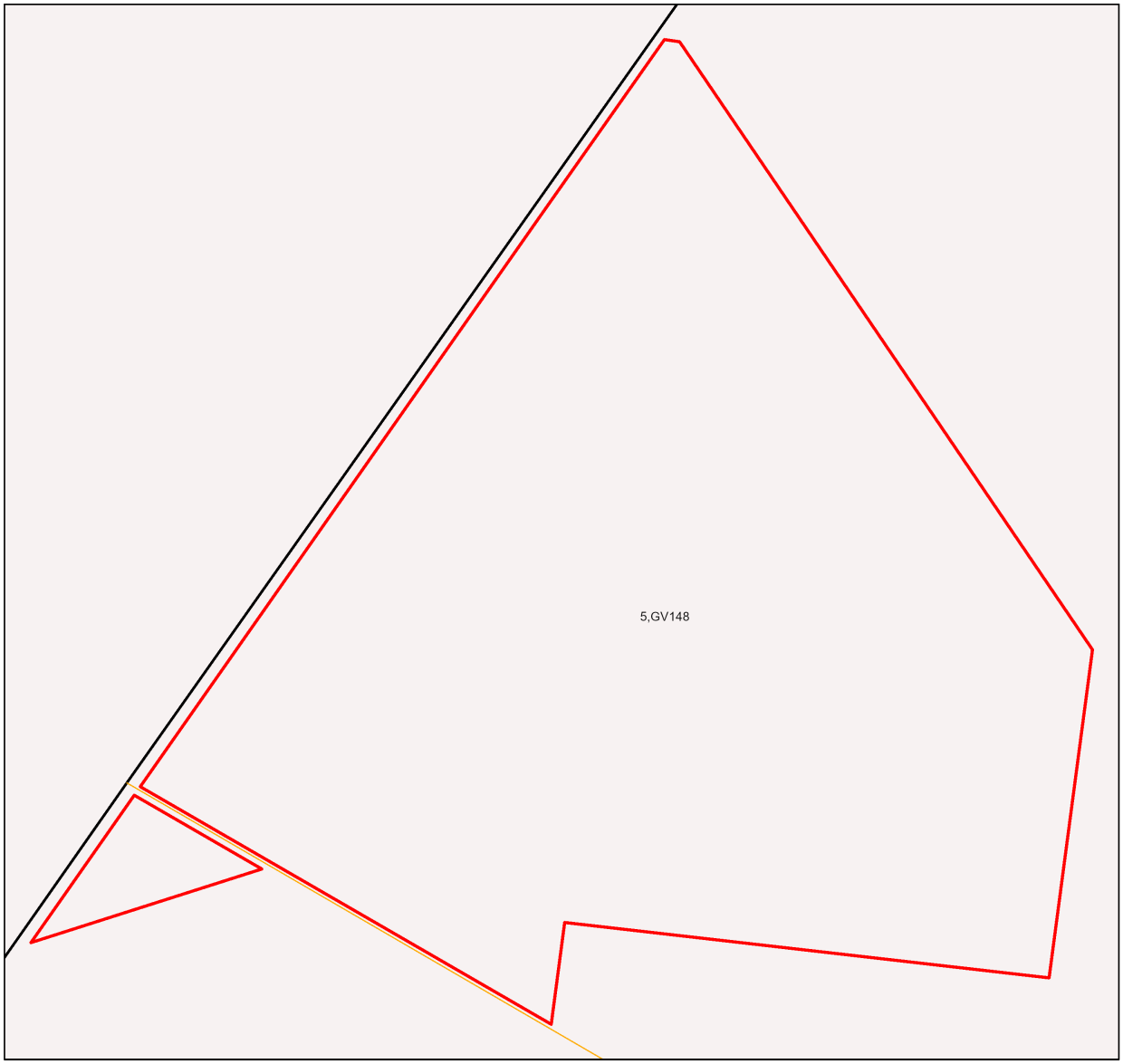
(No results)

9b. Legally secured offset areas - vegetation offsets through a Property Map of Assessable Vegetation

(No results)

Refer to **Map 5 - MSES - Offset Areas** for an overview of the relevant MSES.

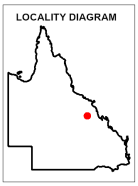
Map 1 - MSES - State Conservation Areas



MSES - State Conservation Areas

- Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Protected area (estates, nature refuges, special wildlife reserves)
- Declared fish habitat area (A and B areas)
- Marine park (highly protected)
- Selected Lot and Plan

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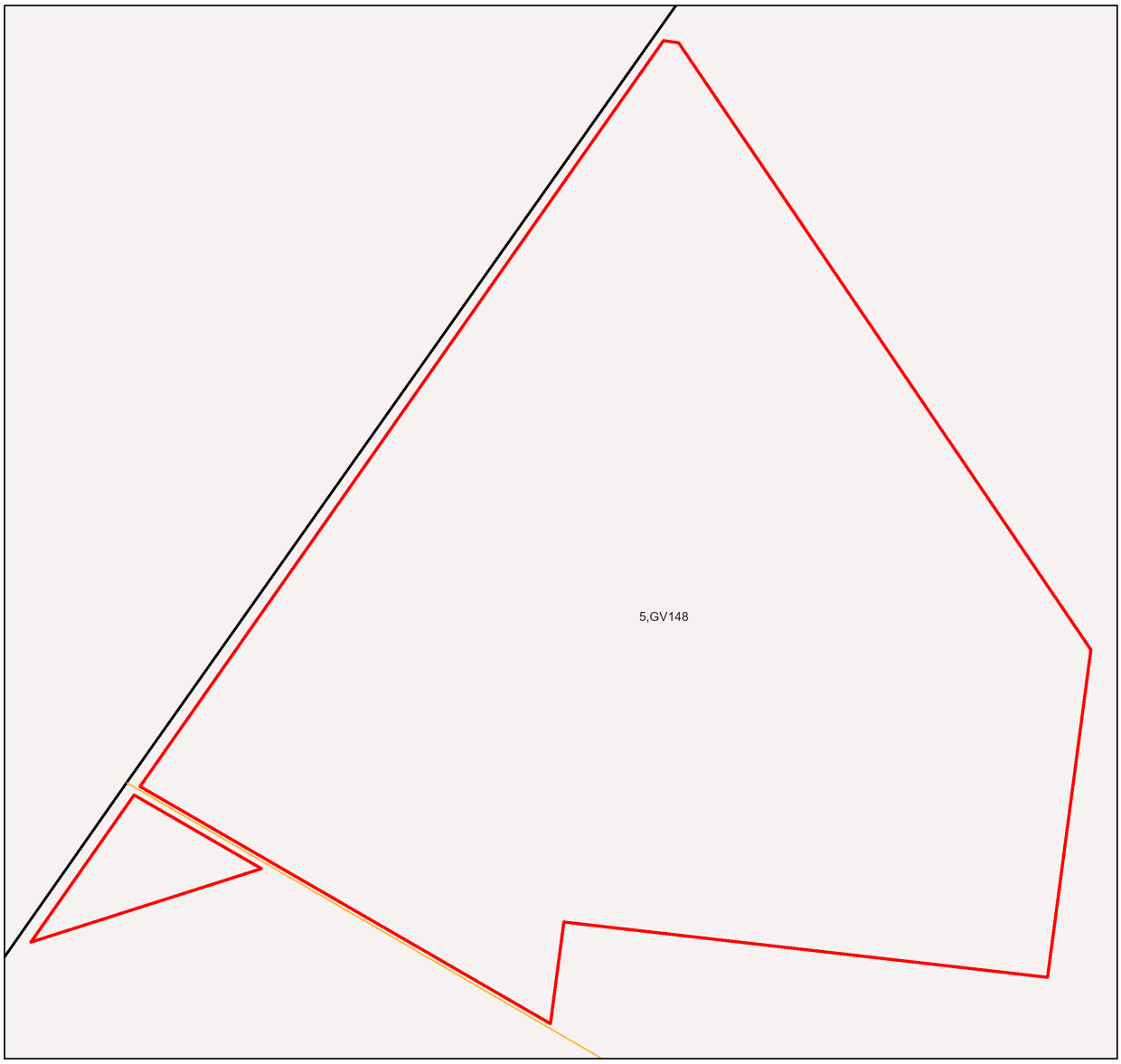
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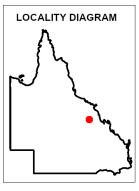
Map 2 - MSES - Wetlands and Waterways



MSES - Wetlands and Waterways

- Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Declared high ecological value waters (watercourse)
- Strategic environmental area (designated precinct)
- Declared high ecological value waters (wetland)
- High ecological significance wetlands
- Selected Lot and Plan

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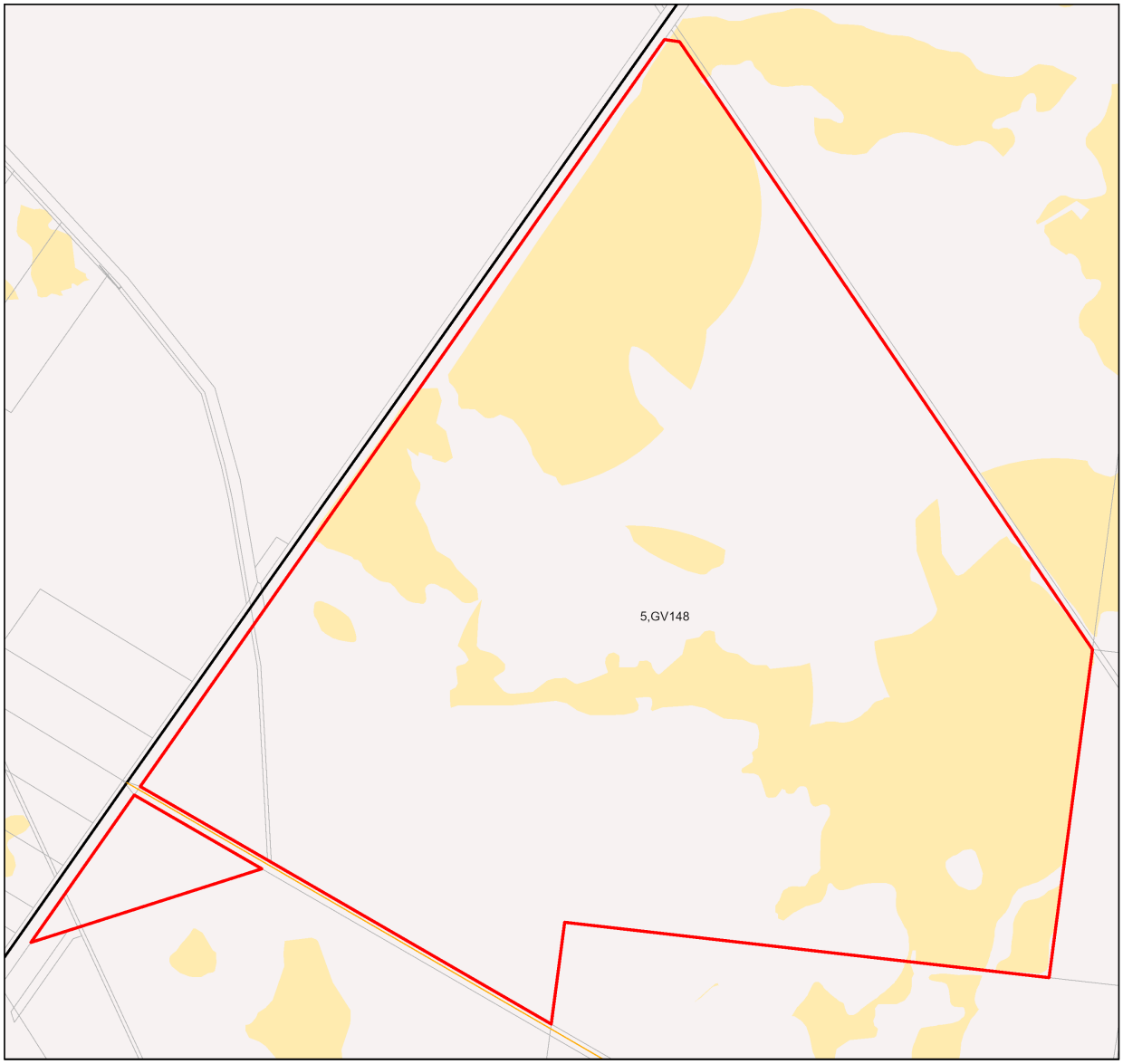
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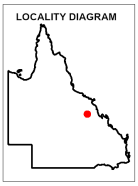
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Map 3a - MSES - Species - Threatened (endangered or vulnerable) wildlife and special least concern animals



MSES - Species
Threatened (endangered or vulnerable) wildlife and special least concern animals

- Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Wildlife habitat (special least concern)
- Wildlife habitat (endangered or vulnerable)
- Selected Lot and Plan



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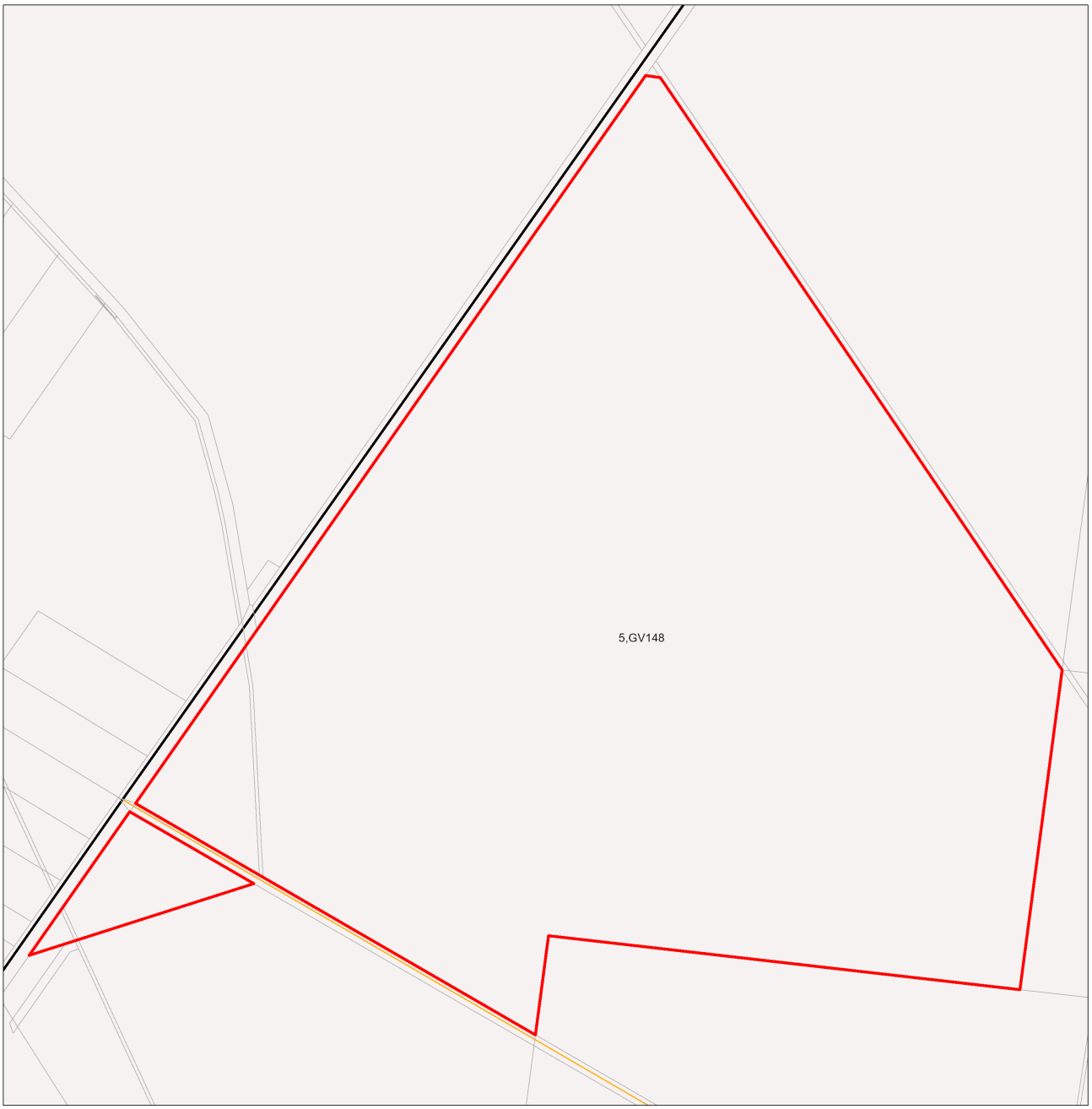
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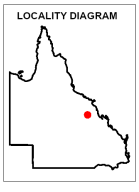
Map 3b - MSES - Species - Koala habitat area (SEQ)



MSES - Species
Koala habitat area (SEQ)

- Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Koala habitat area (core)
- Koala habitat area (locally refined)
- Selected Lot and Plan

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The represented layers for SEQ 'koala habitat area-core' and 'koala habitat area- locally refined' in MSES are sourced directly from the regulatory mapping under the Nature Conservation (Koala) Conservation Plan 2017. Whilst every effort is made to ensure the information remains current, there may be delays between updating versions. Please refer to the original mapping for the most recent version. See https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/mapping

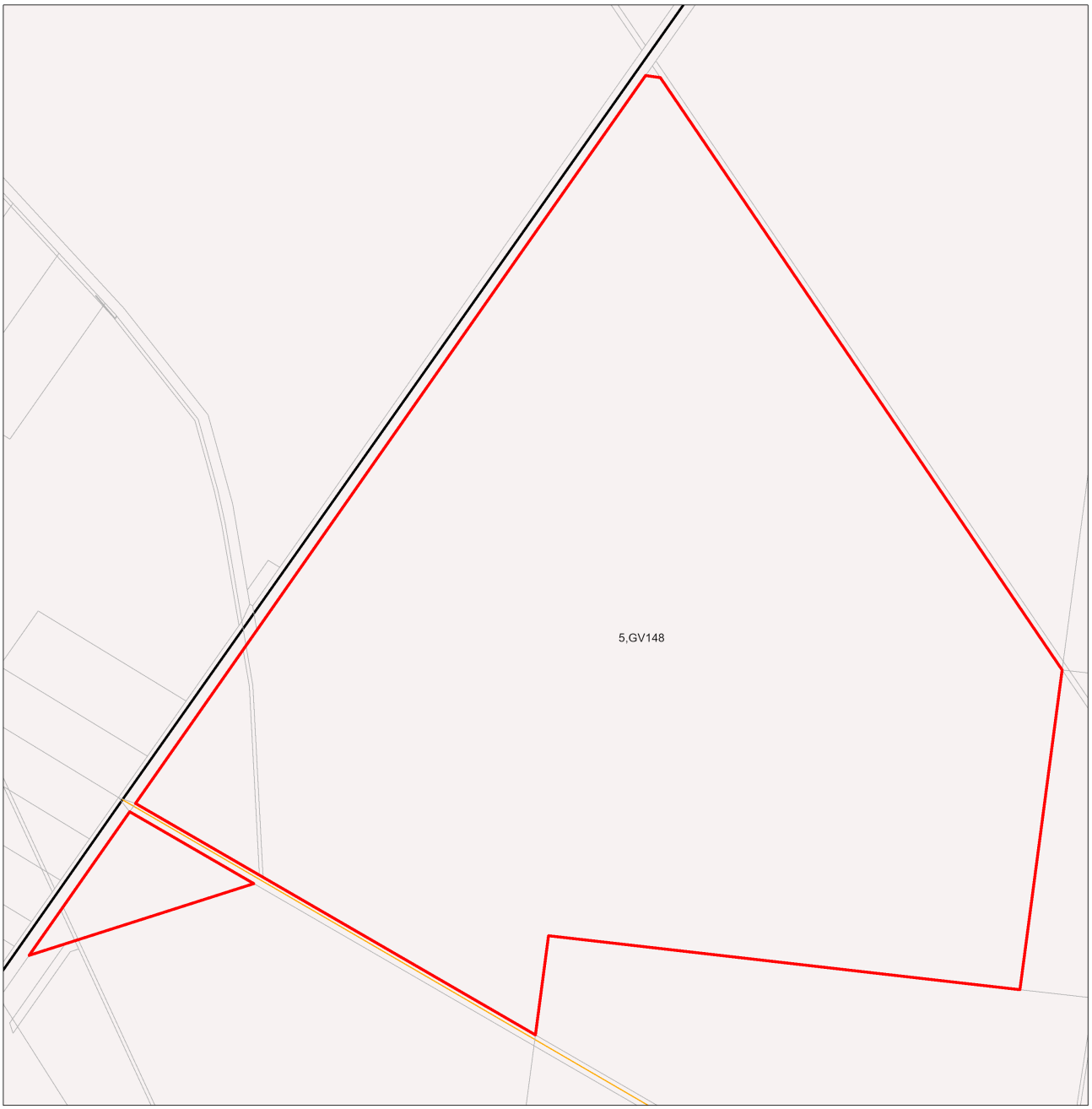
The koala habitat mapping within South East Queensland uses regional ecosystem linework compiled at a scale varying from 1:25,000 to 1:100,000. Linework should be used as a guide only. The positional accuracy of regional ecosystem data mapped at a scale of 1:100,000 is +/- 100 metres.

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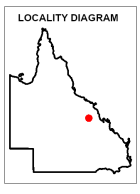
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Map 3c - MSES - Species - Wildlife habitat (sea turtle nesting areas)



MSES - Wildlife habitat (sea turtle nesting areas)

- Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Wildlife habitat (sea turtle nesting areas)
- Selected Lot and Plan



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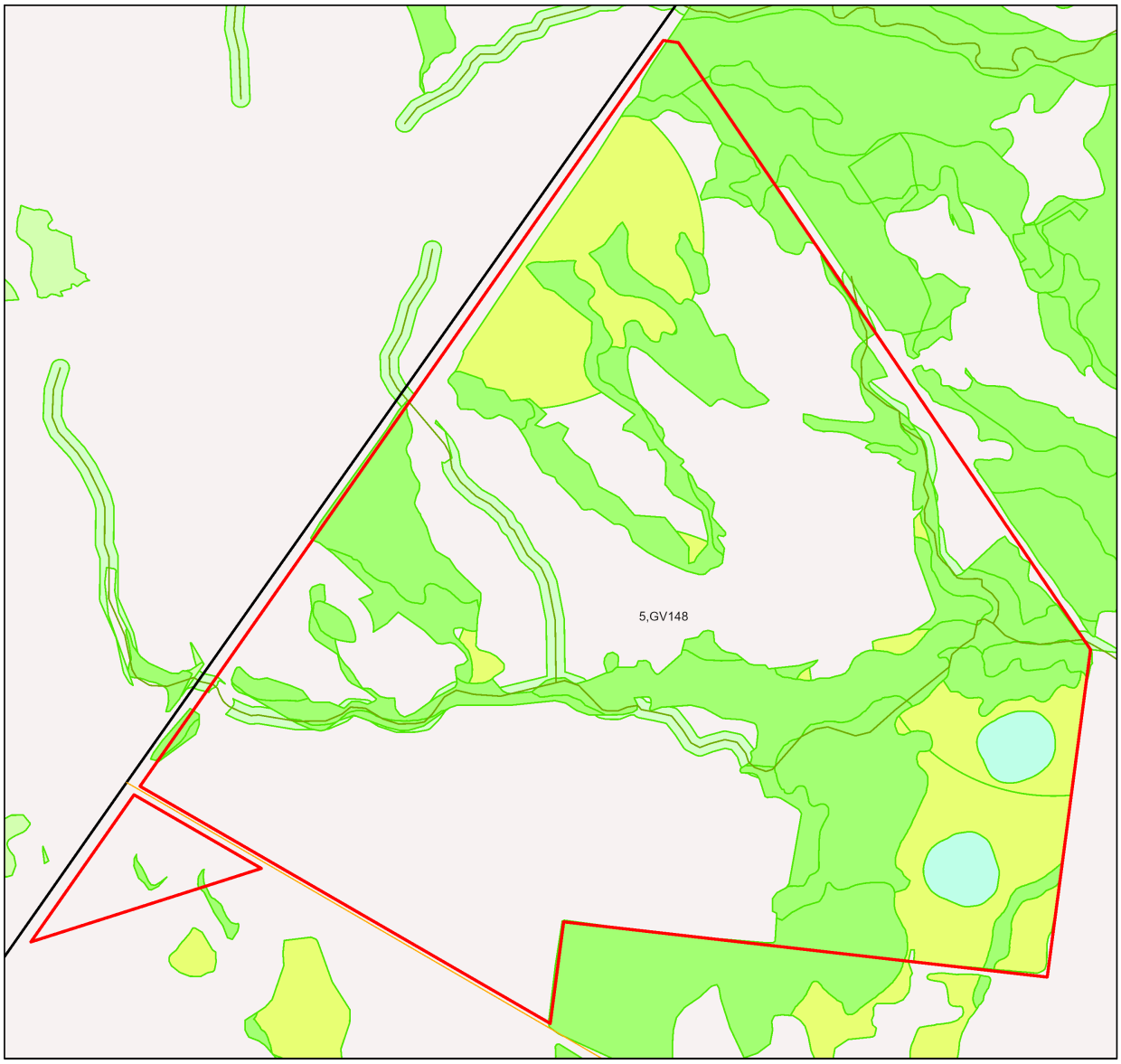
MSES mapping of sea turtle nesting areas identifies beaches where the recorded number of turtle nests are over 1% of the turtle species or genetic stock. The linework is also deliberately extended along nearby rocky coastlines and headlands to recognise that significant numbers of nesting adults and hatchlings can become disoriented by light pollution from development on rocky coastlines and headlands while navigating offshore from nesting beaches.

0 340 680 1,020 1,360 1,700 m

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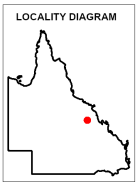
Map 4 - MSES - Regulated Vegetation



MSES - Regulated Vegetation

- ▲ Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Regulated vegetation (intersecting a watercourse)
- Regulated vegetation (100m from wetland)
- Regulated vegetation (category B - endangered or of concern)
- Regulated vegetation (category C - endangered or of concern)
- Regulated vegetation (category R - GBR riverine)
- Regulated vegetation (essential habitat)
- Selected Lot and Plan

LOCALITY DIAGRAM



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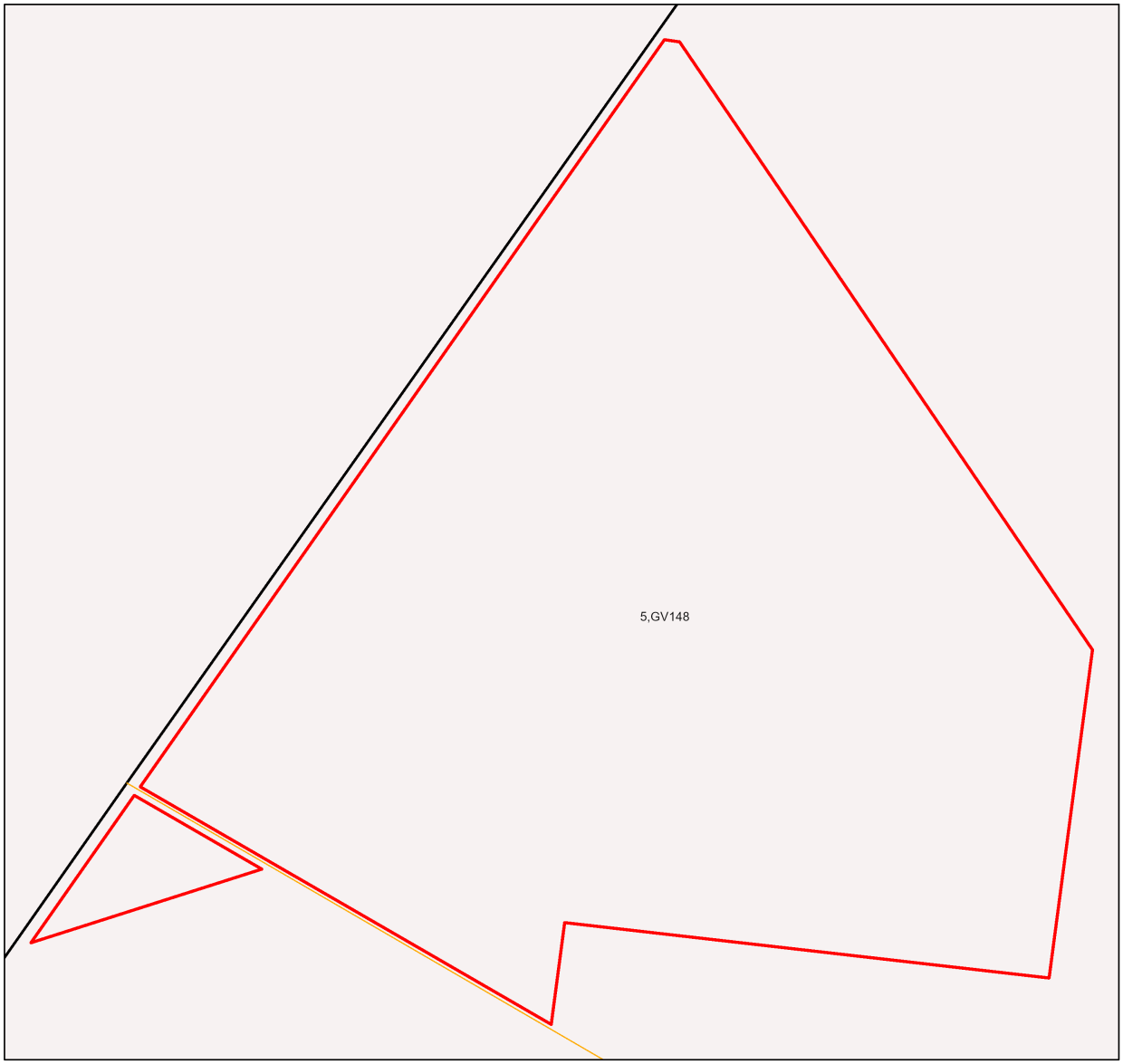
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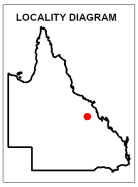
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Map 5 - MSES - Offset Areas



MSES - Offsets

- Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Legally secured offset area (offset register)
- Legally secured offset area (vegetation offsets)
- Selected Lot and Plan



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Appendices

Appendix 1 - Matters of State Environmental Significance (MSES) methodology

MSES mapping is a regional-scale representation of the definition for MSES under the State Planning Policy (SPP). Its primary purpose is to support implementation of the SPP biodiversity policy.

MSES mapping does not replace the regulatory mapping or environmental values specifically called up under other laws or regulations.

MSES mapping does not determine whether state or local development assessment is required. For state assessment triggers refer to the Development Assessment Mapping System (DAMS). For local assessment triggers, refer to the relevant local planning scheme.

The Queensland Government's "Method for mapping - matters of state environmental significance can be downloaded from:

http://www.ehp.qld.gov.au/land/natural-resource/method-mapping-mses.html .

Appendix 2 - Source Data

The datasets listed below are available on request from:

http://qldspatial.information.qld.gov.au/catalogue/custom/index.page

- Matters of State environmental significance

Note: MSES mapping is not based on new or unique data. The primary mapping product draws data from a number of underlying environment databases and geo-referenced information sources. MSES mapping is a versioned product that is updated generally on a twice-yearly basis to incorporate the changes to underlying data sources. Several components of MSES mapping made for the current version may differ from the current underlying data sources. To ensure accuracy, or proper representation of MSES values, it is strongly recommended that users refer to the underlying data sources and review the current definition of MSES in the State Planning Policy, before applying the MSES mapping.

Individual MSES layers can be attributed to the following source data available at QSpatial:

MSES layers	**current QSpatial data (http://qspatial.information.qld.gov.au)**
Protected Areas-Estates, Nature Refuges, Special Wildlife Reserves	- Protected areas of Queensland - Nature Refuges - Queensland - Special Wildlife Reserves- Queensland
Marine Park-Highly Protected Zones	Moreton Bay marine park zoning 2008
Fish Habitat Areas	Queensland fish habitat areas
Strategic Environmental Areas-designated	Regional Planning Interests Act - Strategic Environmental Areas
HES wetlands	Map of Queensland Wetland Environmental Values
Wetlands in HEV waters	HEV waters: - EPP Water intent for waters Source Wetlands: - Queensland Wetland Mapping (Current version 5) Source Watercourses: - Vegetation management watercourse and drainage feature map (1:100000 and 1:250000)
Wildlife habitat (threatened and special least concern)	-WildNet database species records - habitat suitability models (various) - SEQ koala habitat areas under the Koala Conservation Plan 2019
VMA regulated regional ecosystems	Vegetation management regional ecosystem and remnant map
VMA Essential Habitat	Vegetation management - essential habitat map
VMA Wetlands	Vegetation management wetlands map
Legally secured offsets	Vegetation Management Act property maps of assessable vegetation. For offset register data-contact DETSI
Regulated Vegetation Map	Vegetation management - regulated vegetation management map

Appendix 3 - Acronyms and Abbreviations

AOI	- Area of Interest
DETSI	- Department of the Environment, Tourism, Science and Innovation
EP Act	- Environmental Protection Act 1994
EPP	- Environmental Protection Policy
GDA2020	- Geocentric Datum of Australia 2020
GEM	- General Environmental Matters
GIS	- Geographic Information System
MSES	- Matters of State Environmental Significance
NCA	- Nature Conservation Act 1992
RE	- Regional Ecosystem
SPP	- State Planning Policy
VMA	- Vegetation Management Act 1999

Queensland Government

Department of the Environment, Tourism, Science and Innovation

Environmental Reports

Matters of State Environmental Significance

For the selected area of interest

Lot: 1 Plan: SP256574

Environmental Reports - General Information

The Environmental Reports portal provides for the assessment of selected matters of interest relevant to a user specified location, or area of interest (AOI). All area and derivative figures are relevant to the extent of matters of interest contained within the AOI unless otherwise stated. Please note, if a user selects an AOI via the "central coordinates" option, the resulting assessment area encompasses an area extending for a 2km radius from the point of interest.

All area and area derived figures included in this report have been calculated via reprojecting relevant spatial features to Albers equal-area conic projection (central meridian = 146, datum Geocentric Datum of Australia 2020). As a result, area figures may differ slightly if calculated for the same features using a different co-ordinate system.

Figures in tables may be affected by rounding.

The matters of interest reported on in this document are based upon available state mapped datasets. Where the report indicates that a matter of interest is not present within the AOI (e.g. where area related calculations are equal to zero, or no values are listed), this may be due either to the fact that state mapping has not been undertaken for the AOI, that state mapping is incomplete for the AOI, or that no values have been identified within the site.

The information presented in this report should be considered as a guide only and a field survey may be required to validate values on the ground.

Please direct queries about these reports to: Planning.Support@des.qld.gov.au

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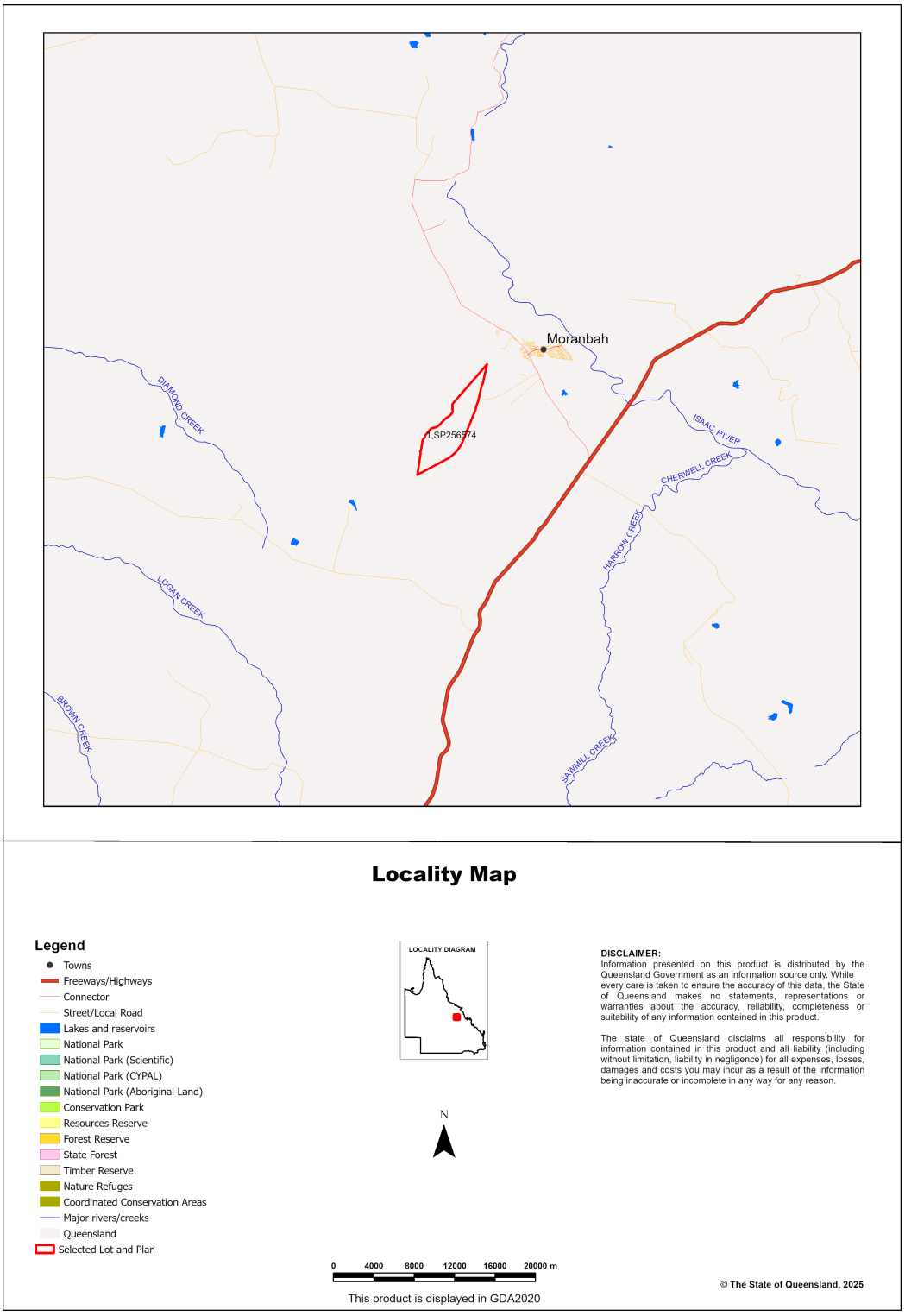
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Assessment Area Details

The following table provides an overview of the area of interest (AOI) with respect to selected topographic and environmental values.

Table 1: Summary table, details for AOI: Lot: 1 Plan: SP256574, with area 2245.11 ha

Local Government(s)	Catchment(s)	Bioregion(s)	Subregion(s)
Isaac Regional	Fitzroy	Brigalow Belt	Northern Bowen Basin



Matters of State Environmental Significance (MSES)

MSES Categories

Queensland's State Planning Policy (SPP) includes a biodiversity State interest that states:

'The sustainable, long-term conservation of biodiversity is supported. Significant impacts on matters of national or state environmental significance are avoided, or where this cannot be reasonably achieved; impacts are minimised and residual impacts offset.'

The MSES mapping product is a guide to assist implementation of the SPP biodiversity policy. While it supports the SPP, the mapping does not replace the regulatory mapping or environmental values specifically called up under other laws or regulations.

The SPP defines matters of state environmental significance as:

- Protected areas (including all classes of protected area except coordinated conservation areas) under the *Nature Conservation Act 1992;*

- Marine parks and land within a 'marine national park', 'conservation park', 'scientific research', 'preservation' or 'buffer' zone under the Marine Parks Act 2004 ;

- Areas within declared fish habitat areas that are management A areas or management B areas under the Fisheries Regulation 2008;

- *Threatened wildlife under the Nature Conservation Act 1992* and special least concern animals under the Nature Conservation (Wildlife) Regulation 2006;

- Regulated vegetation under the *Vegetation Management Act 1999* that is:

  - Category B areas on the regulated vegetation management map, that are 'endangered' or 'of concern' regional ecosystems;
  - Category C areas on the regulated vegetation management map that are 'endangered' or 'of concern' regional ecosystems;
  - Category R areas on the regulated vegetation management map;
  - Regional ecosystems that intersect with watercourses identified on the vegetation management watercourse and drainage feature map;
  - Regional ecosystems that intersect with wetlands identified on the vegetation management wetlands map;

- Strategic Environmental Areas under the *Regional Planning Interests Act 2014* ;

- Wetlands in a wetland protection area of wetlands of high ecological significance shown on the Map of Queensland Wetland Environmental Values under the Environment Protection Regulation 2019;

- Wetlands and watercourses in high ecological value waters defined in the Environmental Protection (Water) Policy 2009, schedule 2;
- Legally secured offset areas.

MSES Values Present

The MSES values that are present in the area of interest are summarised in the table below:

Table 2: Summary of MSES present within the AOI

1a Protected Areas- estates	0 ha	0.0%
1b Protected Areas- nature refuges	0 ha	0.0%
1c Protected Areas- special wildlife reserves	0 ha	0.0%
2 State Marine Parks- highly protected zones	0 ha	0.0%
3 Fish habitat areas (A and B areas)	0 ha	0.0%
4 Strategic Environmental Areas (SEA)	0 ha	0.0%
5 High Ecological Significance wetlands on the Map of Queensland Wetland Environmental Values	0 ha	0.0%
6a High Ecological Value (HEV) wetlands	0 ha	
6b High Ecological Value (HEV) waterways	0 km	Not applicable
7a Threatened (endangered or vulnerable) wildlife	703.47 ha	31.3%
7b Special least concern animals	0 ha	0.0%
7c i Koala habitat area - core (SEQ)	0 ha	0.0%
7c ii Koala habitat area - locally refined (SEQ)	0 ha	0.0%
7d Sea turtle nesting areas	0 km	Not applicable
8a Regulated Vegetation - Endangered/Of concern in Category B (remnant)	681.48 ha	30.4%
8b Regulated Vegetation - Endangered/Of concern in Category C (regrowth)	20.11 ha	0.9%
8c Regulated Vegetation - Category R (GBR riverine regrowth)	0.86 ha	0.0%
8d Regulated Vegetation - Essential habitat	852.24 ha	38.0%
8e Regulated Vegetation - intersecting a watercourse	22.1 km	Not applicable
8f Regulated Vegetation - within 100m of a Vegetation Management Wetland	0 ha	0.0%
9a Legally secured offset areas- offset register areas	0 ha	0.0%
9b Legally secured offset areas- vegetation offsets through a Property Map of Assessable Vegetation	0 ha	0.0%

Additional Information with Respect to MSES Values Present

MSES - State Conservation Areas

1a. Protected Areas - estates

(No results)

1b. Protected Areas - nature refuges

(No results)

1c. Protected Areas - special wildlife reserves

(No results)

2. State Marine Parks - highly protected zones

(No results)

3. Fish habitat areas (A and B areas)

(No results)

Refer to **Map 1 - MSES - State Conservation Areas** for an overview of the relevant MSES.

MSES - Wetlands and Waterways

4. Strategic Environmental Areas (SEA)

(No results)

5. High Ecological Significance wetlands on the Map of Queensland Wetland Environmental Values

(no results)

6a. Wetlands in High Ecological Value (HEV) waters

(no results)

6b. Waterways in High Ecological Value (HEV) waters

(no results)

Refer to **Map 2 - MSES - Wetlands and Waterways** for an overview of the relevant MSES.

MSES - Species

7a. Threatened (endangered or vulnerable) wildlife

Values are present

7b. Special least concern animals

Not applicable

7c i. Koala habitat area - core (SEQ)

Not applicable

7c ii. Koala habitat area - locally refined (SEQ)

Not applicable

7d. Wildlife habitat (sea turtle nesting areas)

Not applicable

Threatened (endangered or vulnerable) wildlife habitat suitability models

Species	Common name	NCA status	Presence
Boronia keysii	Keys boronia	V	None
Calyptorhynchus lathami	Glossy black cockatoo	V	None
Casuarius casuarius johnsonii	Sthn population cassowary	E	None
Crinia tinnula	Wallum froglet	V	None
Denisonia maculata	Ornamental snake	V	Core
Euastacus bindal	Mount Elliot crayfish	CR	None
Euastacus binzayedi		CR	None
Euastacus eungella		E	None
Euastacus hystricosus		E	None
Euastacus jagara	Jagara hairy crayfish	CR	None
Euastacus maidae		CR	None
Euastacus monteithorum		E	None
Euastacus robertsi		E	None
Taudactylus pleione	Kroombit tinkerfrog	E	None
Litoria freycineti	Wallum rocketfrog	V	None
Litoria olongburensis	Wallum sedgefrog	V	None
Macadamia integrifolia		V	None
Melaleuca irbyana	swamp tea-tree	E	None
Macadamia ternifolia		V	None
Macadamia tetraphylla	bopple nut	V	None
Petrogale penicillata	brush-tailed rock-wallaby	V	None
Petrogale coenensis	Cape York rock-wallaby	E	None
Petrogale purpureicollis	purple-necked rock-wallaby	V	None
Petrogale sharmani	Sharmans rock-wallaby	V	None
Petrogale xanthopus celeris	yellow-footed rock-wallaby (Qld subspecies)	V	None
Petaurus gracilis	Mahogany Glider	E	None
Petrogale persephone	Proserpine rock-wallaby	E	None
Phascolarctos cinereus	Koala - outside SEQ*	E	None
Pezoporus wallicus wallicus	Eastern ground parrot	V	None
Xeromys myoides	Water Mouse	V	None

*For koala model, this includes areas outside SEQ. Check 7c SEQ koala habitat for presence/absence.

Threatened (endangered or vulnerable) wildlife species records

(No results)

Special least concern animal species records

(No results)

Shorebird habitat (critically endangered/endangered/vulnerable)

Not applicable

Shorebird habitat (special least concern)

Not applicable

**Nature Conservation Act 1992 (NCA) Status- Endangered (E), Vulnerable (V) or Special Least Concern Animal (SL). Environment Protection and Biodiversity Conservation Act 1999 (EPBC) status: Critically Endangered (CE) Endangered (E), Vulnerable (V)*

Migratory status (M) - China and Australia Migratory Bird Agreement (C), Japan and Australia Migratory Bird Agreement (J), Republic of Korea and Australia Migratory Bird Agreement (R), Bonn Migratory Convention (B), Eastern Flyway (E)

To request a species list for an area, or search for a species profile, access Wildlife Online at:

https://www.qld.gov.au/environment/plants-animals/species-list/

Refer to **Map 3a - MSES - Species - Threatened (endangered or vulnerable) wildlife and special least concern animals** and **Map 3b - MSES - Species - Koala habitat area (SEQ)** and **Map 3c - MSES - Wildlife habitat (sea turtle nesting areas)** for an overview of the relevant MSES.

MSES - Regulated Vegetation

For further information relating to regional ecosystems in general, go to:

https://www.qld.gov.au/environment/plants-animals/plants/ecosystems/

For a more detailed description of a particular regional ecosystem, access the regional ecosystem search page at:

https://environment.ehp.qld.gov.au/regional-ecosystems/

8a. Regulated Vegetation - Endangered/Of concern in Category B (remnant)

Regional ecosystem	Vegetation management polygon	Vegetation management status
11.5.3/11.5.9c/11.4.9/11.3.25	E-subdom	rem_end

8b. Regulated Vegetation - Endangered/Of concern in Category C (regrowth)

Regional ecosystem	Vegetation management polygon	Vegetation management status
11.5.3/11.5.9c/11.4.9/11.3.25	E-subdom	hvr_end

8c. Regulated Vegetation - Category R (GBR riverine regrowth)

Regulated vegetation map category	Map number
R	8453

8d. Regulated Vegetation - Essential habitat

Values are present

8e. Regulated Vegetation - intersecting a watercourse**

A vegetation management watercourse is mapped as present

8f. Regulated Vegetation - within 100m of a Vegetation Management wetland

Not applicable

Refer to **Map 4 - MSES - Regulated Vegetation** for an overview of the relevant MSES.

MSES - Offsets

9a. Legally secured offset areas - offset register areas

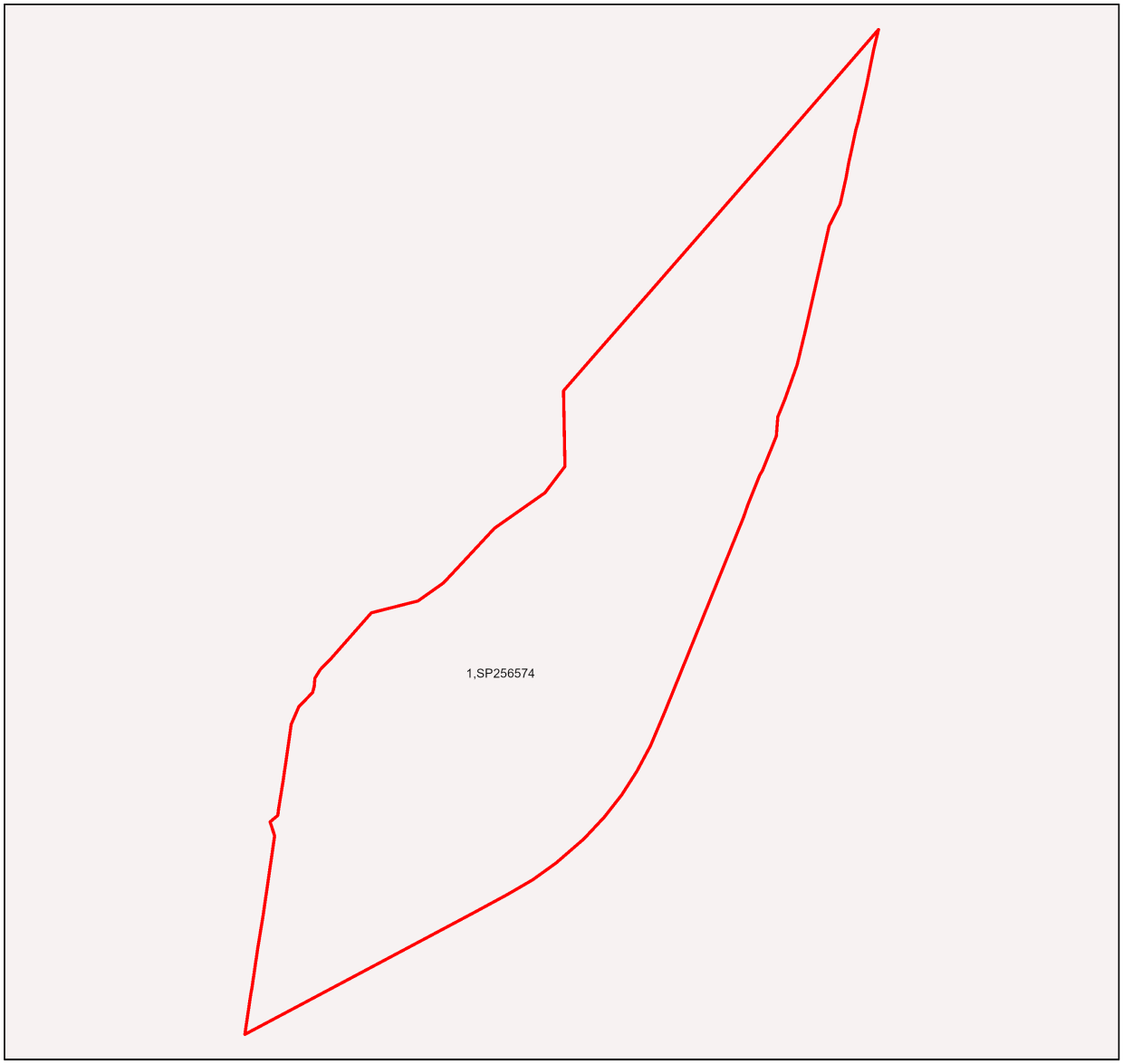
(No results)

9b. Legally secured offset areas - vegetation offsets through a Property Map of Assessable Vegetation

(No results)

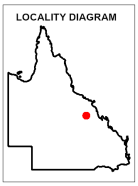
Refer to **Map 5 - MSES - Offset Areas** for an overview of the relevant MSES.

Map 1 - MSES - State Conservation Areas



MSES - State Conservation Areas

- Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Protected area (estates, nature refuges, special wildlife reserves)
- Declared fish habitat area (A and B areas)
- Marine park (highly protected)
- Selected Lot and Plan



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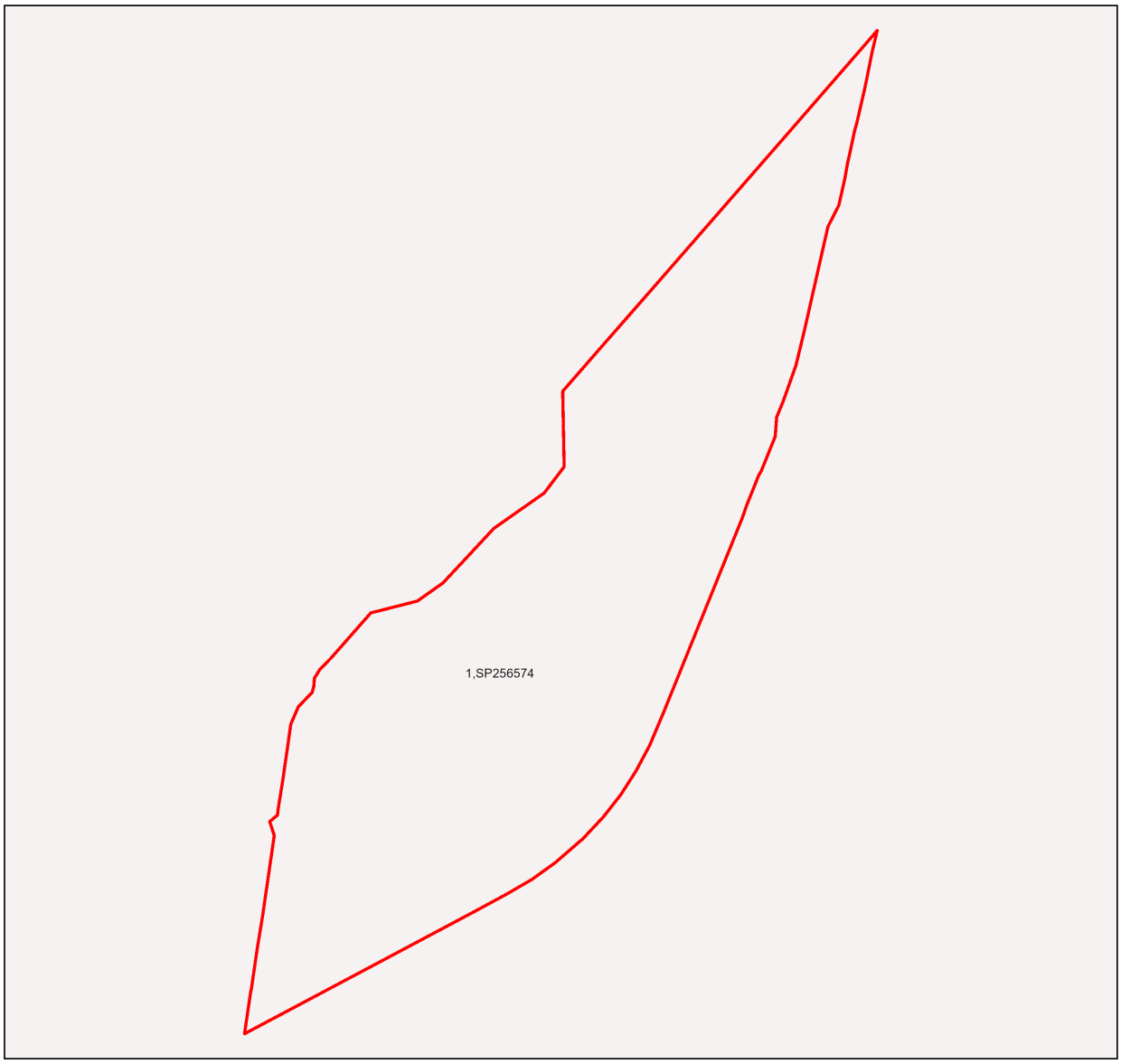
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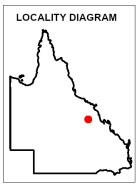
Map 2 - MSES - Wetlands and Waterways



MSES - Wetlands and Waterways

- Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Declared high ecological value waters (watercourse)
- Strategic environmental area (designated precinct)
- Declared high ecological value waters (wetland)
- High ecological significance wetlands
- Selected Lot and Plan

LOCALITY DIAGRAM



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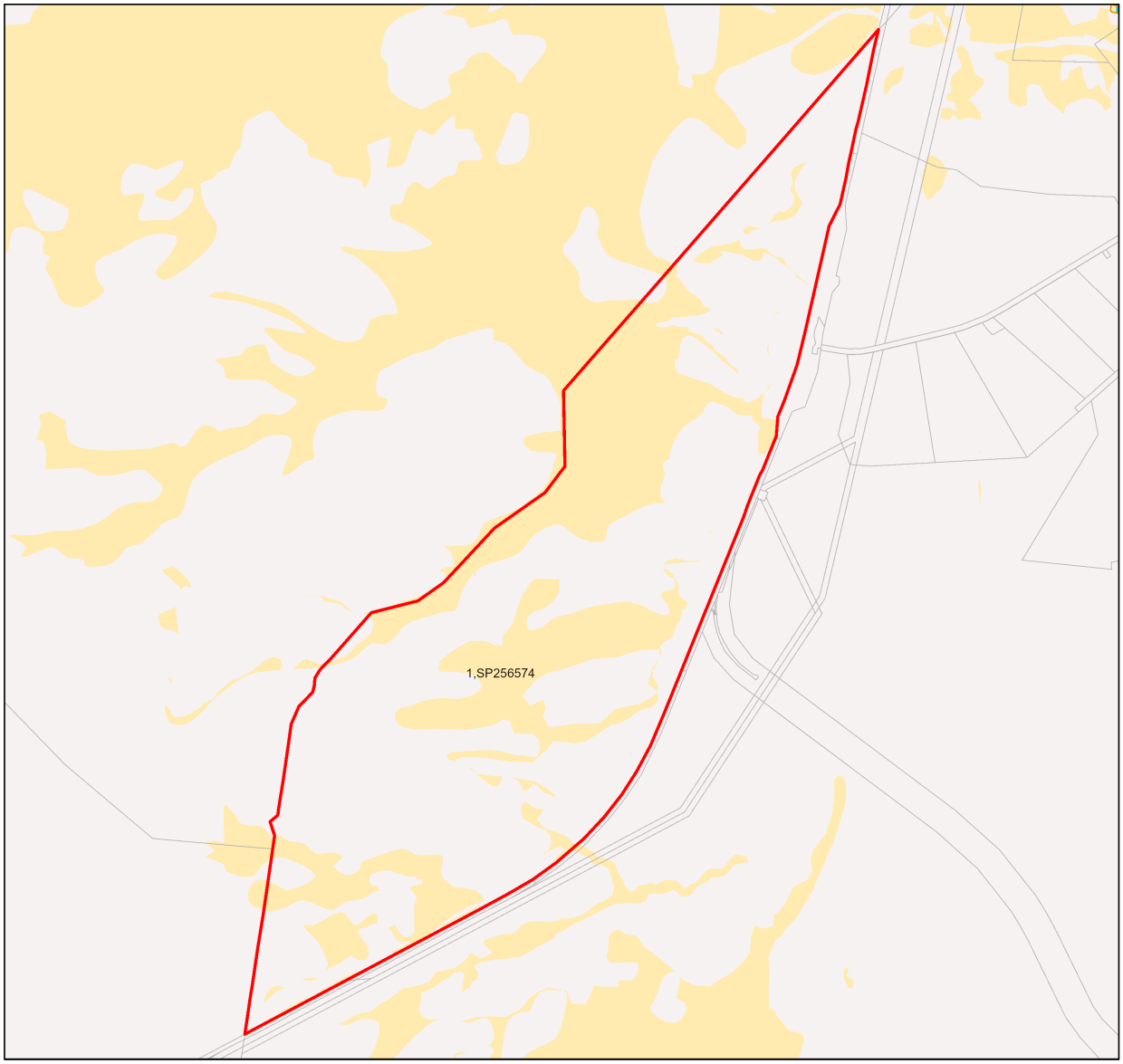
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Map 3a - MSES - Species - Threatened (endangered or vulnerable) wildlife and special least concern animals



MSES - Species
Threatened (endangered or vulnerable) wildlife and special least concern animals

- Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Wildlife habitat (special least concern)
- Wildlife habitat (endangered or vulnerable)
- Selected Lot and Plan



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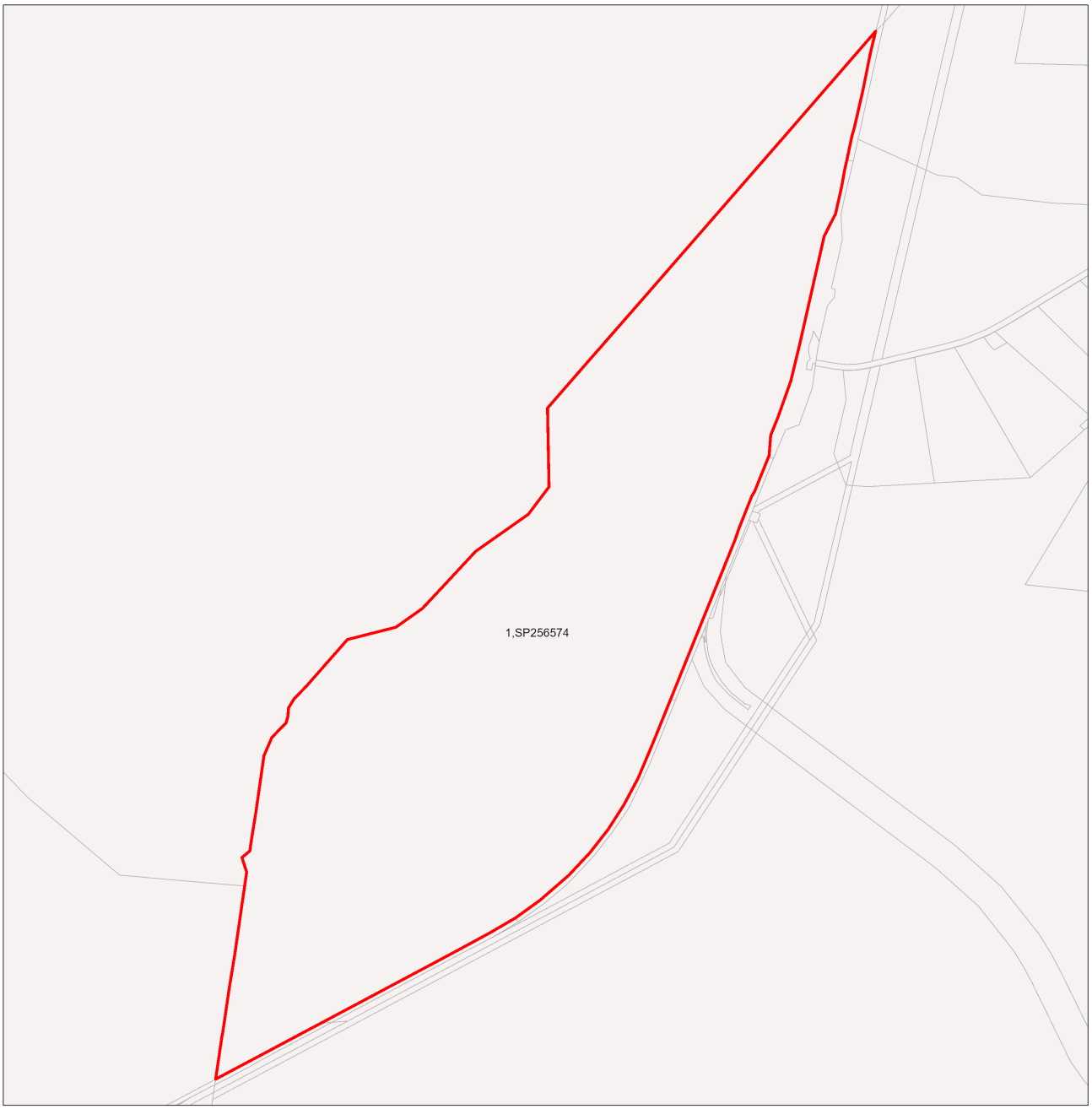
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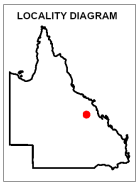
Map 3b - MSES - Species - Koala habitat area (SEQ)



MSES - Species
Koala habitat area (SEQ)

- Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Koala habitat area (core)
- Koala habitat area (locally refined)
- Selected Lot and Plan

LOCALITY DIAGRAM



0 590 1,180 1,770 2,360 2,950 m

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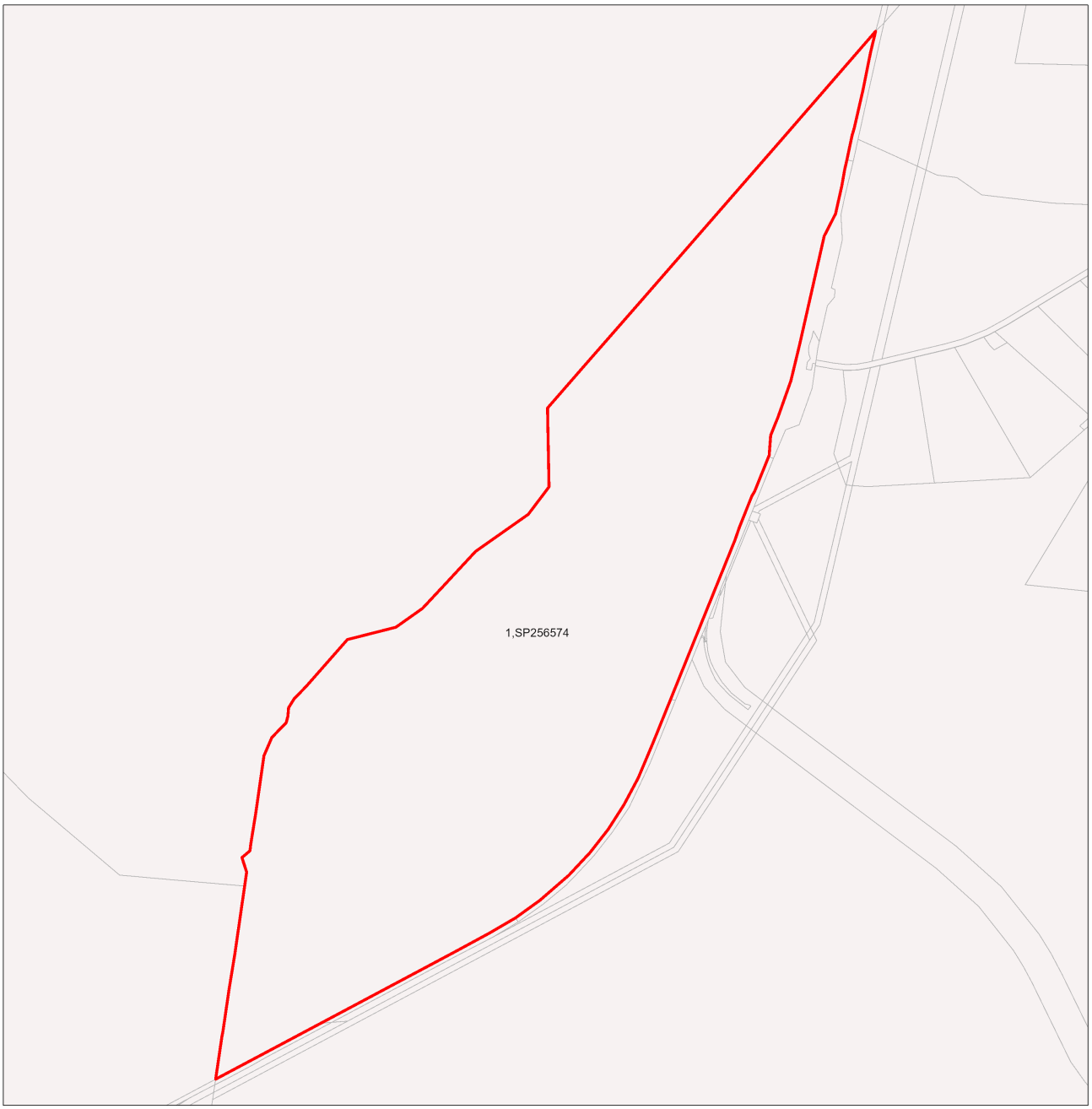
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The represented layers for SEQ 'koala habitat area-core' and 'koala habitat area- locally refined' in MSES are sourced directly from the regulatory mapping under the Nature Conservation (Koala) Conservation Plan 2017. Whilst every effort is made to ensure the information remains current, there may be delays between updating versions. Please refer to the original mapping for the most recent version. See https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/mapping

The koala habitat mapping within South East Queensland uses regional ecosystem linework compiled at a scale varying from 1:25,000 to 1:100,000. Linework should be used as a guide only. The positional accuracy of regional ecosystem data mapped at a scale of 1:100,000 is +/- 100 metres.

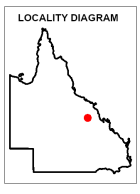
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Map 3c - MSES - Species - Wildlife habitat (sea turtle nesting areas)



MSES - Wildlife habitat (sea turtle nesting areas)

- Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Wildlife habitat (sea turtle nesting areas)
- Selected Lot and Plan



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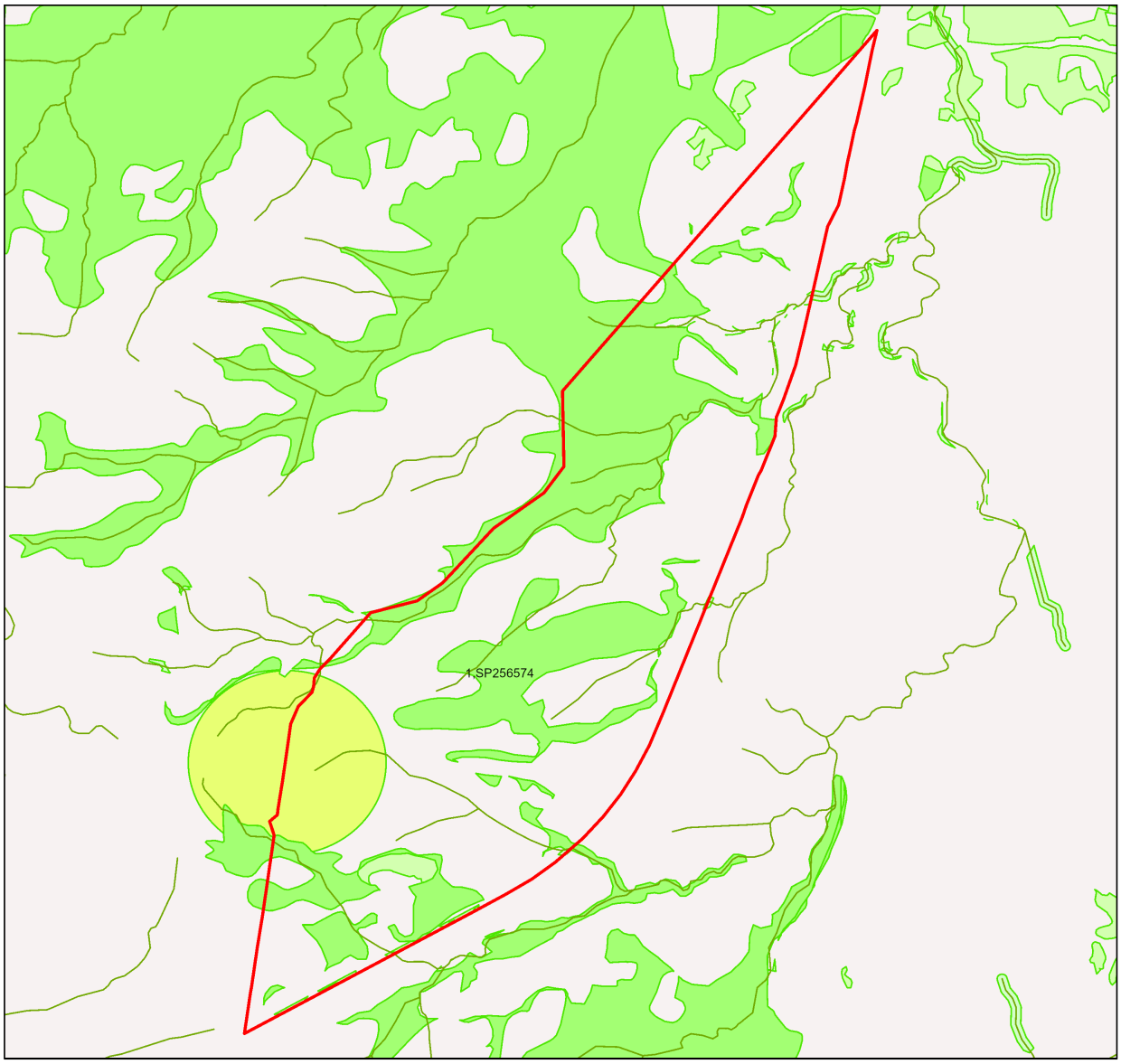
MSES mapping of sea turtle nesting areas identifies beaches where the recorded number of turtle nests are over 1% of the turtle species or genetic stock. The linework is also deliberately extended along nearby rocky coastlines and headlands to recognise that significant numbers of nesting adults and hatchlings can become disoriented by light pollution from development on rocky coastlines and headlands while navigating offshore from nesting beaches.

0 590 1,180 1,770 2,360 2,950 m

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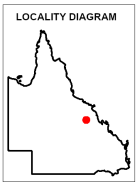
This product is displayed in GDA2020

Map 4 - MSES - Regulated Vegetation



MSES - Regulated Vegetation

- ▲ Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Regulated vegetation (intersecting a watercourse)
- Regulated vegetation (100m from wetland)
- Regulated vegetation (category B - endangered or of concern)
- Regulated vegetation (category C - endangered or of concern)
- Regulated vegetation (category R - GBR riverine)
- Regulated vegetation (essential habitat)
- Selected Lot and Plan



N

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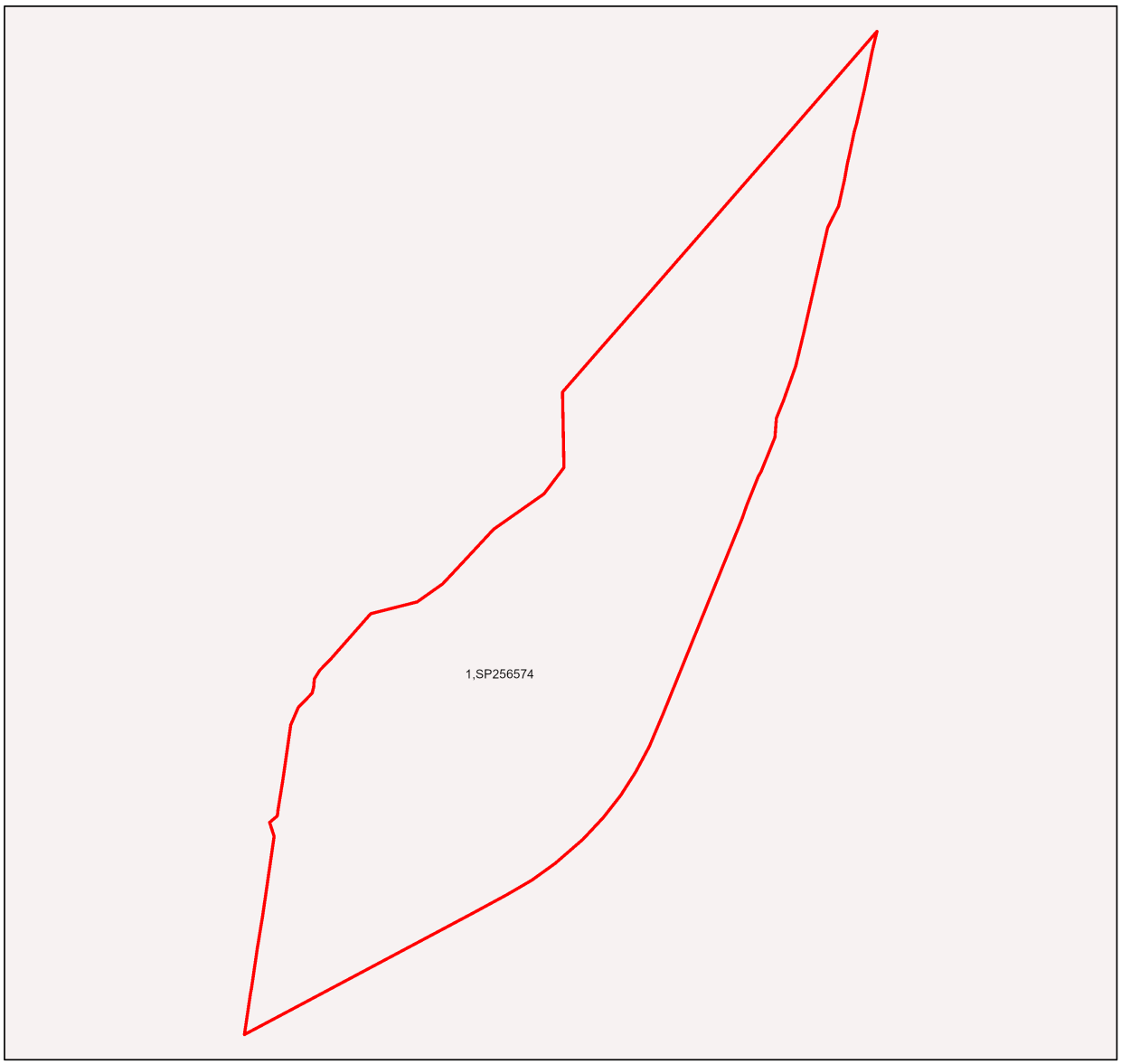
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0 660 1320 1980 2640 3300 m

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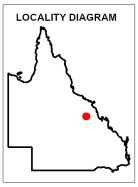
Map 5 - MSES - Offset Areas



MSES - Offsets

- Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Legally secured offset area (offset register)
- Legally secured offset area (vegetation offsets)
- Selected Lot and Plan

LOCALITY DIAGRAM



N

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0 660 1320 1980 2640 3300 m

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Appendices

Appendix 1 - Matters of State Environmental Significance (MSES) methodology

MSES mapping is a regional-scale representation of the definition for MSES under the State Planning Policy (SPP). Its primary purpose is to support implementation of the SPP biodiversity policy.

MSES mapping does not replace the regulatory mapping or environmental values specifically called up under other laws or regulations.

MSES mapping does not determine whether state or local development assessment is required. For state assessment triggers refer to the Development Assessment Mapping System (DAMS). For local assessment triggers, refer to the relevant local planning scheme.

The Queensland Government's "Method for mapping - matters of state environmental significance can be downloaded from:

http://www.ehp.qld.gov.au/land/natural-resource/method-mapping-mses.html .

Appendix 2 - Source Data

The datasets listed below are available on request from:

http://qldspatial.information.qld.gov.au/catalogue/custom/index.page

- Matters of State environmental significance

Note: MSES mapping is not based on new or unique data. The primary mapping product draws data from a number of underlying environment databases and geo-referenced information sources. MSES mapping is a versioned product that is updated generally on a twice-yearly basis to incorporate the changes to underlying data sources. Several components of MSES mapping made for the current version may differ from the current underlying data sources. To ensure accuracy, or proper representation of MSES values, it is strongly recommended that users refer to the underlying data sources and review the current definition of MSES in the State Planning Policy, before applying the MSES mapping.

Individual MSES layers can be attributed to the following source data available at QSpatial:

MSES layers	**current QSpatial data (http://qspatial.information.qld.gov.au)**
Protected Areas-Estates, Nature Refuges, Special Wildlife Reserves	- Protected areas of Queensland - Nature Refuges - Queensland - Special Wildlife Reserves- Queensland
Marine Park-Highly Protected Zones	Moreton Bay marine park zoning 2008
Fish Habitat Areas	Queensland fish habitat areas
Strategic Environmental Areas-designated	Regional Planning Interests Act - Strategic Environmental Areas
HES wetlands	Map of Queensland Wetland Environmental Values
Wetlands in HEV waters	HEV waters: - EPP Water intent for waters Source Wetlands: - Queensland Wetland Mapping (Current version 5) Source Watercourses: - Vegetation management watercourse and drainage feature map (1:100000 and 1:250000)
Wildlife habitat (threatened and special least concern)	-WildNet database species records - habitat suitability models (various) - SEQ koala habitat areas under the Koala Conservation Plan 2019
VMA regulated regional ecosystems	Vegetation management regional ecosystem and remnant map
VMA Essential Habitat	Vegetation management - essential habitat map
VMA Wetlands	Vegetation management wetlands map
Legally secured offsets	Vegetation Management Act property maps of assessable vegetation. For offset register data-contact DETSI
Regulated Vegetation Map	Vegetation management - regulated vegetation management map

Appendix 3 - Acronyms and Abbreviations

AOI	- Area of Interest
DETSI	- Department of the Environment, Tourism, Science and Innovation
EP Act	- Environmental Protection Act 1994
EPP	- Environmental Protection Policy
GDA2020	- Geocentric Datum of Australia 2020
GEM	- General Environmental Matters
GIS	- Geographic Information System
MSES	- Matters of State Environmental Significance
NCA	- Nature Conservation Act 1992
RE	- Regional Ecosystem
SPP	- State Planning Policy
VMA	- Vegetation Management Act 1999



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