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DEVELOPMENT APPLICATION:

OPERATIONAL WORK FOR PRESCRIBED TIDAL WORKS AND THE REMOVAL, DESTRUCTION OR DAMAGE OF MARINE PLANTS (ASSOCIATED WITH DAINTREE RIVER STREAMBANK REMEDIATION)

27 NOVEMBER 2024

Document Control

Details and distribution

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1	27 November 2024	Kristina Ihme Monica Pollock	Original Issue	Brett Twycross	Adam Neilly

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1 Introduction

Neilly Group Pty Ltd (Neilly Group) has prepared this planning report on behalf of Terrain NRM (the applicant) to support a development application made under section 50 of the *Planning Act 2016* for a Development Permit for Operational Work for Prescribed Tidal Works and the Removal, destruction or damage of marine plants.

The project is part of the Australian Government's Reef Coastal Restoration Program, aimed at undertaking habitat restoration and stabilisation works on the Daintree River (the project). It focusses on the restoration and rehabilitation of Great Barrier Reef (GBR) coastal habitats and ecosystems, specifically defined as being blue carbon systems. The project is funded through the Australian Government's Department of Climate Change, Energy, the Environment and Water under the Reef Coastal Restoration Program grants. The grants support initiatives to rehabilitate and restore blue carbon ecosystems, including seagrasses, mangroves, saltmarsh and wetlands.

The proposed works will remediate a 100m section of riverbank in the Daintree River (the proposed works) that has been impacted by erosion. The proposed works are located on the southern bank of the Daintree River and Road Reserve adjacent 41 and 49 McDowall Lane – Esplanade, Lower Daintree, Douglas Shire (the project area). The erosion has led to sediment contamination, vegetation loss and poses a threat to several private dwellings and a local government road that serves as the only access to these residential properties.

Neilly Group was commissioned by Terrain NRM to provide an engineering solution for the eroded site. The proposed works will involve a combination of rock toe protection (with a bench and rootballs), and riparian revegetation.

The proposed works will prevent further erosion, restore vegetation and visual amenity, reduce sediment export to the GBR, and protect economic and environmental resources.

This planning report outlines the scope and importance of the project and demonstrates compliance with the applicable assessment benchmarks and relevant legislation. The technical issues associated with the project are addressed in the attached appendices. Based on this assessment the proposed works are recommended for approval subject to reasonable and relevant conditions.

1.1 Property Details

Table 1 below provides details of the subject properties.

Table 1. Property Details

Local Government Area	Street Address	Lot Plan	Land Use	Adjoining Land Use
Douglas Shire	Daintree River	Unallocated State Land	River	Road Reserve
Douglas Shire	Road Reserve	Road Reserve	Road	Rural Residential / Cropping
Douglas Shire	Adjacent 41 McDowall Lane – Esplanade, Lower Daintree	6RP888615	Rural Residential / Cropping	Road Reserve
Douglas Shire	Adjacent 49 McDowall Lane – Esplanade, Lower Daintree	7RP888615	Rural Residential / Cropping	Road Reserve

1.2 Pre-lodgement Advice

Pre-lodgement engagement with relevant stakeholders has been conducted to determine approval requirements and the preferred design option for the site, and included the following:

- On 8 July 2024, the State Assessment and Referral Agency (SARA) provided written pre-lodgement advice (2406-41077 SPL) for the project (Appendix C – SARA Pre-lodgement Advice).
- On 6 August 2024, Neilly Group held a meeting with Douglas Shire Council to present the proposed design solution and identify requirements for the local road. On 10 September 20024, the council issued a Works on Road Permit for works in the road reserve.
- Engagement with the Department of Environment, Tourism and Science (DETSI), Marine Parks Works, throughout July – September 2024 regarding Great Barrier Reef Coast Marine Park (GBR Coast MP) permit requirements. On 11 October 2024, a development application was lodged with DETSI for a Marine Park Permit.
- On 11 October 2024, a cultural heritage walk over was undertaken by the Jabalbina Yalanji Aboriginal Corporation RNTBC, the Jabalbina Yalanji Land Trust and Jabalbina heritage Trust. The survey included a 200m buffer around the project area and it was cleared of any cultural heritage values.

1.3 Supporting Information

The following technical reports and documentation have been included in support of this development application:

- Appendix A – DA Forms (DA Form 1)
- Appendix B – Owners Consent
- Appendix C – SARA Pre-lodgement Advice
- Appendix D – Code for development that is prescribed tidal works
- Appendix E – State Code 7 Response (Maritime safety)
- Appendix F – State Code 8 Response (Coastal development and tidal works)
- Appendix G – State Code 11 Response (Removal, destruction or damage of marine plants)
- Appendix H – Detailed Design Report and Design Plans (Neilly Group, 2024a)
- Appendix I – Technical Ecology Report (Neilly Group, 2024b)
- Appendix J – Erosion and Sediment Control Plan (Neilly Group, 2024c)
- Appendix K – Environmental Management Plan (Neilly Group, 2024d)
- Appendix L – Marine Plant Clearance Report (Neilly Group, 2024e)
- Appendix M – Revegetation Plan and Report (Neilly Group, 2024f)
- Appendix N – Acid Sulphate Soil (ASS) (Neilly Group, 2024g).

1.4 Application Particulars

This development application has been prepared to collate, present, and evaluate the project in accordance with the requirements of the *Planning Act 2016* for consideration by Douglas Shire Council as Assessment Manager and the State Assessment and Referral Agency (SARA) as a Referral Agency.

The Development Application seeks a Development Permit for Operational works for Prescribed tidal works and the Removal, destruction or damage of marine plants.

A summary of the Development Application and site particulars is contained in (Table 2).

Table 2. Development Application Summary

Development Application Summary	
Aspect of Development	Operational Work
Proposal	Prescribed Tidal Works and the Removal, destruction or damage of marine plants
Local Government Area	Douglas Shire
Site Address	Daintree River and Road Reserve adjacent 41 & 49 McDowall Lane – Esplanade, Lower Daintree, Douglas Shire
Real Property Description	Daintree River and Road Reserve adjacent to Lot 6 on RP888615 and Lot 7 on RP888615
Project Area	1,574m^2
Assessment Manager	Douglas Shire Council
Applicant	Terrain NRM (registered charity)
Category of Assessment	Code Assessment
Assessment Benchmarks	Coastal Protection and Management Regulation 2017 - Code for assessable development that is prescribed tidal works State Development Assessment Provisions
Public Notification	Not required
Referral Requirements	Schedule 10, Part 6, Division 3, Subdivision 3, Table 1, Item 1 – Operational work involving marine plants Schedule 10, Part 17, Division 3, Table 1, Item 1 – Tidal works Schedule 10, Part 17, Division 3, Table 2, Item 1 – Tidal works in tidal waters

1.5 Contact

The applicant contact for this development application is:

Monica Pollock (Principal Planner, Neilly Group Pty Ltd)

228-244 Riverside Boulevard, Douglas Qld 4814

P: 0408 987 346

E: monica@neillygroup.com.au

2 Project Overview

2.1 Project Need

Erosion at the project area has led to the loss of mangroves and riparian vegetation, contaminated the Daintree River with sediment, and impacted water quality at the Great Barrier Reef (GBR). Additionally, the erosion threatens several private residences, one public access road (McDowall Lane - esplanade), two privately owned sections of agricultural land and the Daintree River public access ferry infrastructure.

Furthermore, this section of the Daintree River is visited by thousands of locals and tourists annually and represents a significant environmental eyesore within the location of a Wet Tropics World Heritage Area. As such, the issue is adversely affecting multiple stakeholder groups, including the environment, private land holders, the council, tourism and business operators, and tourists.

A summary of the project benefits include:

- streambank erosion control resulting in reduced suspended sediment loads to the Daintree River and the GBR;
- revegetation of the project area's riparian vegetation (that is currently absent) to integrate the riparian corridor with surrounding naturally vegetated areas, once established there will be a net gain of marine plant communities;
- increased connectivity for species movement in the Daintree River riparian area;
- reduction of weeds and species listed under the *Biosecurity Act 2015;*
- long term socio environmental benefits, such as local jobs during establishment and ongoing maintenance of the access road to the residential areas;
- Reducing the imminent threat to several private residences, their only public access road and nearby Daintree River public access ferry infrastructure;
- protection of broad scale values to the Daintree River and GBR Coastal Marine Park.

2.2 Location Context

The project area is located on the Daintree River in Far North Queensland, as shown in Figure 1.

Figure 1. Regional location of the project area on the Daintree River

More specifically, the project area is situated on the southern bank of the Daintree River and Road Reserve adjacent 41 and 49 McDowall Lane – Esplanade, Lower Daintree, Douglas Shire (as shown in Figure 4). The location is more formally described as the Daintree River and Road Reserve adjacent to Lot 6 on RP888615 and Lot 7 on RP888615 but does not encroach the adjacent lots. The project area is approximately 10km upstream from the river mouth and 12km downstream from Daintree Village. The Daintree River ferry crossing to Cape Tribulation is located 700m upstream.

2.3 Site Condition

The project area has been heavily modified in the past due to erosion, land use (from bordering cane farms and residential areas), road reserve (requiring mowing and slashing) and is represented by a bare area with limited tree and shrub cover as shown in Figure 2. Instead, the area is dominated by weeds and other introduced species.

Figure 2. Recent drone image of the project area and active erosion

The project area shows active erosion that is progressing and causing the loss of marine plants (refer to Figure 3). This disturbance is reflected in the low marine species diversity present.

Figure 3. Active erosion causing loss of marine plants

2.4 Surrounding Land Uses

The project area is zoned Rural in the *Douglas Shire Planning Scheme 2018*, and the surrounding area is characterised by rural uses including cropping and low-density residential dwellings. The Daintree River ferry crossing is approx. 700m upstream.

2.5 Cultural and Environmental Values

The cultural and environmental values relevant to the project area that may be impacted by the proposed works include:

- Matters of National Environmental Significance (MNES)
  - Tidal watercourse – Stream Order 6. The waterway (Daintree River) is not identified to provide for fish passage
  - Endangered, Vulnerable and Near Threatened (EVNT) species
- Matters of State Environmental Significance (MSES)
  - Marine plants
  - Riparian connectivity
  - Protected plants
  - GBR Wetlands of High Ecological Significance. There are Wetland Protection Areas (WPAs) within 1km of the project area, but none are located within the construction footprint.
  - Regulated vegetation
- Great Barrier Reef Coastal Marine Park – Conservation Zone (both MNES and MSES)
- Water quality objectives
- Potential Acid Sulphate soils (ASS)
- Cultural heritage values:
  - The project area contains no Aboriginal or Torres Strait Islander cultural heritage sites. However, the project area is located within 1km of the Eastern Kuku Yalanji Indigenous Protected Area (CWTH_IPA55) and a Cultural Heritage Site Point (pre 2015) (Site ID EN:A30), represented by the Eastern Kuku Yalanji People #2 (ref no. QC2002/007). Consultation with the Eastern Kuku Yalanji People has occurred, and a site walkover was completed on 11 October 2024, which cleared the project area form containing any cultural heritage significance.
  - There are no Queensland Heritage Places located within 1km of the project area.
  - The Daintree Ferry Landing and Crossing Site (Site 6a), located at Cape Tribulation Road and Daintree River is considered an area of local significance under the *Douglas Shire Planning Scheme 2018*. Douglas Shire Council was consulted about the project and raised no concerns regarding potential impacts to the site.

In addition, the project area is listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) as being within a GBR World Heritage Area and GBR National Heritage Place. It is within 1km of the Wet Tropics of Queensland World Heritage Area / National Heritage Place and the Wet Tropics World Heritage Area (Indigenous Values) National Heritage Place.

Under the EPBC Act, a referral to the Australian Government Department of Climate Change, Energy, the Environment and Water (DCCEEW) is required if the project has the potential to cause a 'significant impact' on MNES. **Error! Reference source not found.**, identifies MNES relevant to the project area and provides a self-assessment on the likelihood of the project having a significant

impact. As per the EPBC self-assessment provided, the proposed works are unlikely to cause a significant impact to any MNES.

A self-assessment using the Queensland Environmental Offset Policy, Significant Residual Impact Guideline (December 2014)(SRI Guideline), determines whether the project will have a Significant Residual Impact (SRI) on MSES. Appendix I – Technical Ecology Report, identifies MSES relevant to the project area and concludes that the project will unlikely have an SRI on a prescribed environmental matter that is MSES.

The project satisfies the SRI criteria of the SRI Guideline for marine plants and works in a highly protected zone of marine park because:

- the project is considered habitat restoration;
- the marine plant disturbance area has been limited to 14.22m^2;
- the project area will be restored and revegetated; and
- the project will offer a net gain of marine plants after about 5 years.

In this context, it is considered that an environmental offset is not required.

As per the supporting technical report appendices, above mentioned consultation with the Eastern Kuku Yalanji People, and in conjunction with the mitigation measures outlined in Appendix K – Environmental Management Plan (EMP), it is expected that the proposed works will have no adverse impacts on these cultural and environmental values.

3 Proposed Development

The proposed works will enable the remediation of a 100m section of riverbank in the Daintree River that has been affected by erosion. The project area is shown in Figure 4 below and has an area of 1574m^2.

Figure 4. Project area on the streambank of the Daintree River

3.1 Options Analysis

Various options were considered for rehabilitating the active erosion on the Daintree River streambank. The following options were considered and assessed:

- Do nothing
- Bank reprofiling
- Rock armouring
- Log jams
- Rootballs
- Timber pile field
- Timber log fillets
- Revegetation only

Do Nothing

The "do nothing" option involves no work and leaving the bank to stabilise naturally. There would be no cost involved however the site is laterally unconfirmed, so the future extent of erosion is unknown. The site will continue to experience ecological degradation and declining water quality due to sediment input. The adjacent road infrastructure will continue to fail.

Bank reprofiling

Involves bank battering to a flatter grade and providing an even surface profile to accommodate construction of other streambank remediation works and revegetation of the bank. Generally, it is low cost and there is no requirement to import material. However, due to the potential of the soils at this site being highly erosive, this approach will not be effective without further intervention.

Rock armouring

Usually involves the placement of angular rock against a bank to prevent erosion at the toe. Alternatively, it can be used to aid in protection of engineered infrastructures such as log jams. It provides immediate, direct erosion protection and has a small construction footprint compared to other options. It is considered the most suitable option for this site. A protected bench will be included in the design to facilitate deposition of sediment which will promote natural recruitment and establishment of mangroves.

Log jams

Diverts flow away from the toe of the eroding bank by locally increasing hydraulic roughness, which results in increased sediment deposition on the bank. They can be supported by timber piles to improve longer-term stability. They provide habitat diversity but there can be a risk of erosion between log jam structures due to wave/boat wake action.

Rootballs

Consists of timber trunks with the root balls intact, placed in the stream to provide habitat diversity. They offer ecological benefits and are a low-cost option. While erosion on this site is caused by both fluvial and tidal influences, and rootballs do not have sufficient capacity to address the issue, they have been included in the design to enhance the ecological benefits.

Timber pile field

The approach involves driving rows of wooden piles into the streambank to redirect high velocity flows away from the bank, thereby reducing erosion and encouraging sediment deposition. It requires accompanying revegetation to stabilise the bank in the long term. Overtime, as piles rot

away, they leave behind a vegetated toe, which can facilitate good ecological outcomes. This method has a smaller construction footprint compared to other options like rock beaching however, for this site, the bed load in the system is too fine for pile fields to effectively settle out sediment.

Timber log fillets

When placed longitudinally onto the bank, log fillets can reduce erosion and support mangrove regeneration. Log fillets dissipate wave action and create a still zone behind them for sediment and seed deposition. Overlapping sections of the log fillet structures allow for the passage of water in and out with the tide. These structures encourage the regeneration of vegetation and provide improved habitat diversity. They offer positive ecological outcomes and could be feasible in the project area environment. Typically, log fillets are secured using timber piles driven into the substrate. However, site investigations have revealed the presence of shallow bedrock, prompting the proposal of an alternative ballast or pinning option using rock.

Revegetation only

Restores the riparian corridor with key species representative of the mapped remnant or pre-clearing regional ecosystems. It enhances the longitudinal connectivity of the riparian corridor and provide long term resilience. It is cost effective and provides good terrestrial ecology outcomes. However, due to the bank slope and site hydraulics, it is not viable as a standalone solution and must be combined with engineering interventions to be effective.

3.2 Preferred Option

A Detailed Design Report and Design Plans (Appendix H – Detailed Design Report and Design Plans) have been prepared for the preferred option which broadly includes:

- installation of rock beaching (approx. 3,500t of rock) along the toe of the bank to prevent further erosion and stop the imminent threat to the local road and residential properties. A bench will be incorporated and will include a sill on the outer edge to create a basin for sediment deposition which will encourage natural recruitment of mangroves;
- installation of five (5) rootballs along the bench (anchored to rock beaching) to provide direct fish habitat and longitudinal habitat connectivity;
- cover spreading to provide immediate short-term ground cover protection after earthworks and aid revegetation of riparian species; and
- Revegetation of the re-profiled bank behind the mangroves with riparian species, rock protection and root-balls to increase hydraulic roughness and improve the connectivity of the riparian corridor at the site.

As shown in Figure 5, the works will not encroach the adjoining lots and will be restricted to the bank of the Daintree River and road reserve (McDowall Lane).

The preferred option will not have a permanent impact on the environment but will rehabilitate the existing conditions. Without intervention, the active erosion will lead to further soil loss, loss of marine plants and continued disconnection of the riparian corridor. The design aims to restore the actively eroding streambank by deflecting the wave action away from the eroding bank and back towards the centre of the waterway. The design will support revegetation that will provide long term stability for the site.

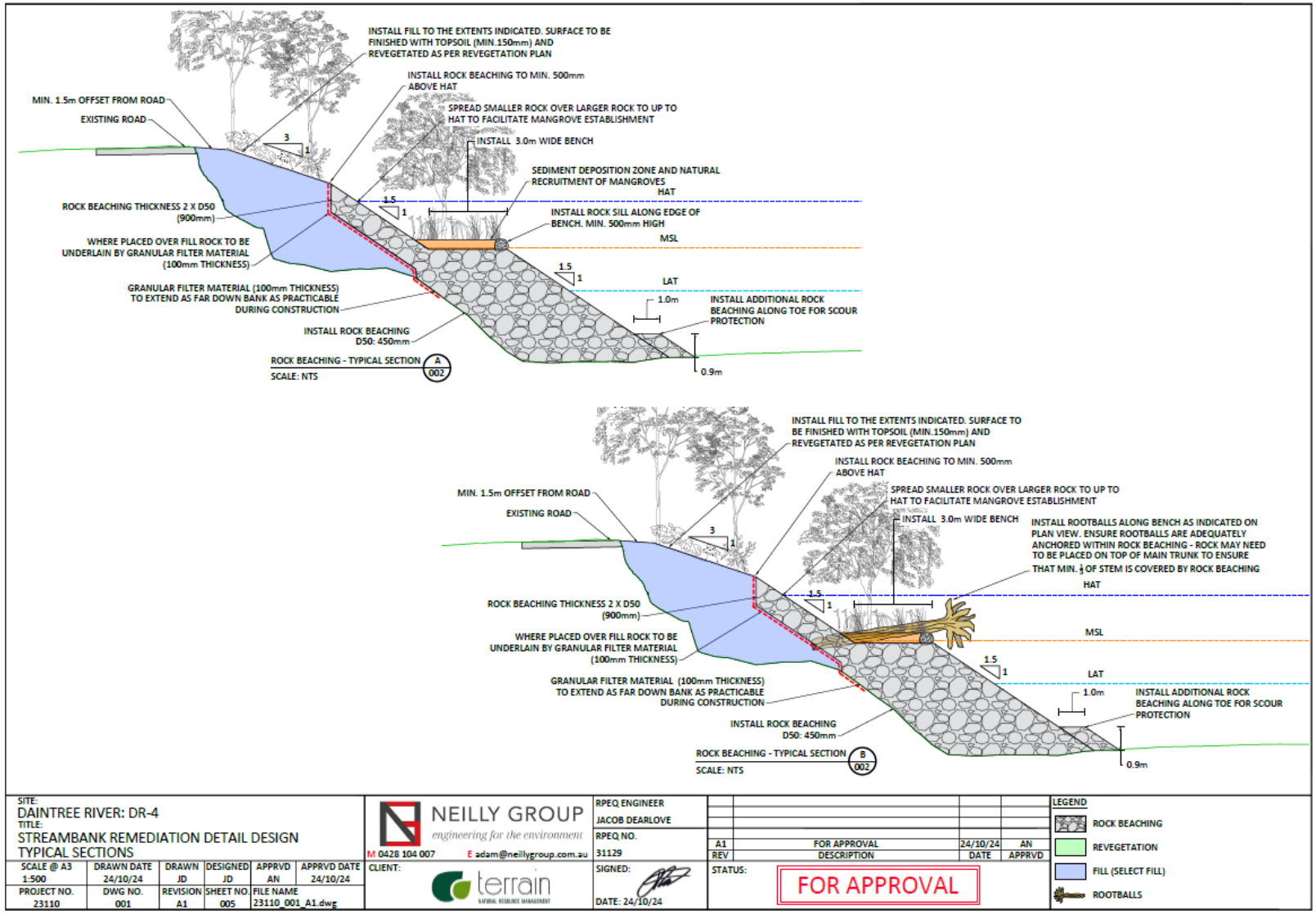


Figure 5. Proposed remediation detail design

4 Construction, Ancillary Activities and Timeline

4.1 Proposed Works

An overview of the proposed erosion control works for the Daintree River project area is outlined below:

- Site set out.
- Placement of Rock Beaching inclusive of rock sill for bench protection.
- Installation of rootballs to protect the outside bank from continuing erosion and encourage sediment deposition, bank and upper bench development and vegetation establishment.
- Revegetation to support the works and bank resilience in the long-term.

4.2 Timing of works

Construction of the proposed works is scheduled to commence in the dry season of 2025 (July/ August) and will be completed within 6 weeks of commencement. Demobilisation will be carried out by the end of September 2025.

4.3 Construction Methodology

Table 3 below outlines the discrete construction activities. Construction will be completed during the dry season with any works within the tidal zone to occur during low tide.

Table 3. Construction Activities

Construction Activity	Details
Mobilisation	Mobilisation of construction equipment and personnel to site
Site preparation	Site access and material laydown/stockpile areas to be established. All Erosion and Sediment Control Plan (ESCP) controls to be put in place as per the EMP (Appendix K – Environmental Management Plan).
Site set out	Setout of proposed works including fill extents, root balls and rock beaching locations.
Clearing	Clearing of marine plants within the construction footprint (note: only minimal clearing is required for the proposed works, exact clearing extents will be confirmed on site with the contractor prior to clearing).
Install rock beaching (Stage 1)	Placement of granular filter and rock beaching to the bench level.
Installation of rootballs	Installation of rootballs
Install rock beaching (Stage 2) and fill	Placement of rock beaching above bench level following the installation of the rootballs and fill in accordance with specification.
Placement of topsoil	Placement of imported topsoil.
Revegetation	Revegetation in accordance with Appendix M – Revegetation Plan and Report.
Site reinstatement	Site reinstatement prior to the demobilisation of the earthwork's contractor and any revegetation activities.
Demobilisation	Demobilisation of construction equipment and personnel from site.

The machinery anticipated for use in the proposed works may include (subject to the appointment of the final contractor):

- 2 x 15t Excavators (orange / yellow) operating on the roadway only
- Several semi side tippers for rock delivery operating between the Mossman Quarry and McDowall Lane.

- Light vehicles.

Works will occur from the bank of the Daintree River, with access gained via Cape Tribulation Road and onto McDowall Road (a local road). No marine watercraft will be used for construction.

4.4 Ecology Assessment

Two suitably qualified ecologists undertook an ecology assessment for the project area in July 2024 (Appendix I – Technical Ecology Report). The assessment included:

- Survey of flora, fauna, vegetation communities and species listed under the *Biosecurity Act 2014*.
- Habitat assessments to identify any significant habitat features and potential breeding places for conservation significant and other least concern fauna (e.g. nests, hollows).
- Ground-truthing mapped remnant vegetation and verifying the current regional ecosystem mapping.
- Targeted flora and fauna surveys/habitat assessments for conservation significant species.
- Protected Plant Surveys.
- Recording animal breeding places.
- MSES Significant Residual Impact Assessment.
- EPBC Significant Impact Assessment.

The aim of the ecology assessment was to identify the flora and fauna values within the area and determine the potential impact of the project on these values. Remnant vegetation and aquatic habitat were identified as primary constraints during the design of the preferred option. The detailed design and associated construction footprint have been minimised to avoid environmental constraints. The key findings of the ecology assessment broadly include:

- The regional ecosystems within the project footprint were found to differ from the current Queensland Herbarium RE mapping. The project site was found to almost entirely comprised of non-remnant grassland habitat.
- Revegetation within the project area following construction will stabilise the stream banks and enhance habitat values for local flora and fauna species.
- No threatened flora or fauna species were recorded within the project area.
- Four fauna species of conservation significance have been assessed as having a moderate probability of occurring within the project area but clearing associated with the project is unlikely to result in a significant impact to any important populations of these species.
- The construction footprint avoids significant habitat features and does not contain any known animal breeding places.
- It is unlikely that the project will result in any significant impacts to any matters of MNES or MSES.

4.5 Acid Sulphate Soils

An Acid Sulphate Soils (ASS) investigation was undertaken in conjunction with the geotechnical assessment (Appendix N – Acid Sulphate Soil (ASS) (Neilly Group, 2024g). The ASS investigation assessed the subsurface soil and groundwater conditions at selected test locations in the project area to analyse the presence or otherwise of ASS. The criteria used to assess the screening test results (pH_F and pH_{fox}) as possibly indicating actual ASS (AASS) or potential ASS (PASS) were based on

the *National Acid Sulfate Soils Sampling and Identification Methods Manual*, (Water Quality Australia, 2018).

The ASS investigation found:

- The National ASS risk mapping (as per Queensland Globe) indicates that the project area is located within an area mapped as having a "low probability" of ASS occurrence.
- The screening test results indicated that AASS and PASS conditions may be present, subject to more rigorous testing.
- For less than 1000t of soil disturbance, as is expected to be the case for the proposed work, the action criterion which triggers a requirement for management of ASS is dependent upon soil type:
    - for clays is ≥0.1% sulfur;
    - for silt is >0.06% sulfur; and
    - for sands is ≥0.03% sulfur.
- The chromium suite testing results for 1000t or less soil disturbance indicated that 17 of the 24 tested samples had an "existing plus potential" acidity that met the associated criteria.
- However, it was also acknowledged that the project design does not require excavation and the proposed works comprise mostly of placement of rock against the bank. Therefore, it was recommended that the requirement to develop an ASS Management Plan is not required.
- General environmental duty obligations and appropriate neutralisation measures to mitigate potential environmental impacts were recommended.

Overall, the disturbance of ASS is primarily avoided because the engineering design of the project aims to minimise deep ground disturbance. Further the EMP includes mitigation measures to address potential impacts to ASS, including:

- Avoid disturbance of ASS wherever possible
- Minimise and maintain disturbances to those areas required for construction
- Do not disturb soils unless they are identified as non-ASS
- Implement appropriate measures to treat and neutralise ASS that must be disturbed to implement design.
- Liming is proposed for neutralising acidity in the detailed design report.
- For these reasons an ASS management plan has not been prepared for the project.

4.6 MNES

As per Section 2.5 and Appendix I – Technical Ecology Report, the proposed works are unlikely to cause a significant impact to any Matters of National Environmental Significance (MNES).

4.7 MSES

As per section 2.5 and Appendix I – Technical Ecology Report, a Significant Residual Impact is unlikely on Matters of State Environmental Significance (MSES).

4.8 Erosion and Sediment Control Measures

In accordance with Best Practice Erosion and Sediment Control (BPESC) guidelines for Australia (International Erosion Control Association), erosion and sediment control measures are to be installed and maintained to prevent the release of sediment to waters (Neilly Group, 2024c) (as per the EMP). These measures include:

- Minimise ground disturbance by designating areas for clearing, access tracks, laydown areas and stockpiles for the site prior to construction commencing.
- Stabilise exposed slopes as soon as practicable.
- Avoid disturbance to watercourse beds and banks, including removal of vegetation.
- Strip topsoil and subsoil separately during excavation.
- Cover exposed subsoils with topsoil during stockpiling or rehabilitation to avoid dispersion and erosion.
- To reduce the risk of soils or other materials entering the surrounding environment, cover and appropriately contain any stockpiles.
- During windy conditions, use watering trucks for dust suppression.
- To remediate compaction during site rehabilitation, rip surface soils for access tracks and infrastructure areas.
- Dispose any excess spoil material that cannot be re-used at an appropriately licensed facility.
- Undertake progressive rehabilitation and revegetation as early as possible.
- The revegetation works must be undertaken generally in accordance with Revegetation Plan.
- Avoid excavation during high rainfall and cyclonic events.

4.9 Environmental Management

An Environmental Management Plan (EMP) has been prepared for the project (Appendix K – Environmental Management Plan). The EMP is used for the management of potential environmental risks, which may arise from necessary works during the completion of the project, including:

- Air quality;
- Noise;
- Vibration;
- Hydrology and water quality;
- Cultural heritage;
- Soil and land management;
- Flora and fauna; and
- Waste management.

The EMP will provide management measures for the environmental values present to avoid, minimise and mitigate any potential impacts. The EMP will be a tool to achieve compliance with conditions of the Development Permit under the *Planning Act 2016*, as well as various environmental and cultural heritage duty of care requirements. If required, the EMP will be updated according to development approval conditions.

A range of mitigation measures will be implemented to minimise the level of impact to fauna habitat, including:

- Suitably qualified fauna spotter-catchers who will be engaged to undertake pre-clearance habitat searches (including nest searches within non-remnant grassland habitat) and be present during vegetation clearing activities to minimise fauna harm.

- Clearing will occur in a sequential manner, allowing any fauna to move into adjacent habitat of its own volition.
- The EMP provides clear guidance on areas to be cleared and retained, methods for clearing, role of the spotter-catcher and other relevant environmental protection matters.
- The EMP will identify and map clear no-go zones to avoid unauthorised disturbance of areas of sensitive vegetation and habitat, such as identified nests and trees that are to be retained.

The project is considered unlikely to disrupt important movement corridors at a regional scale.

The EMP will also outline requirements for working in and adjacent to the aquatic habitat at the site to avoid other potential impacts, including waste management, fuel storage and handling, erosion vegetation clearing requirements, erosion and sedimentation control and water quality protection.

4.10 Revegetation

Appendix M – Revegetation Plan and Report, outlines the requirements for implementing revegetation works as part of the project. The Revegetation Plan sets out the requirements for:

- Weed control
- Clearing and topsoil stripping
- Preparation of batters and ground surfaces
- Cover spreading
- Seeding & Bonded Fibre Matrix
- Direct seeding
- Planting
- Establishment of vegetation
- Monitoring
- As built handover
- Completion.

The project area is 1,574m^2 and vegetation clearing has been limited as much as possible while still allowing construction activities to occur. The area is nearly devoid of vegetation, as noted in **Error! Reference source not found.**, and is dominated by introduced grasses with a lack of shrub or canopy species due to active erosion.

Marine plant clearing calculations (areas below HAT) are based on the worst-case scenario and have been reduced to 14.22 m^2. Clearing will occur in accordance with the EMP (Appendix K – Environmental Management Plan), which includes measures to identify areas designated for clearing and those to be preserved.

The following revegetation areas are proposed as identified in Table 4.

Table 4. Revegetation Areas Versus Marine Plant Clearing

Description	Total area (m^2)
Marine (below HAT)	314
Upper bank and local road (above HAT)	184
Total revegetation area	**498**
Marine plant clearing	**14.22**

The proposed revegetation of the 498m^2 is significantly larger than actual marine plant clearance of 14.22m^2 and aims to establish the same structure and composition as the typical riparian regional ecosystems surrounding the project area. Revegetation works will therefore lead to a net gain of marine plants.

Revegetation works are proposed to occur in the late dry season / early wet season, to promote rapid establishment and reduce the need to irrigate or water. Vegetation establishment and monitoring is recommended as outlined in Appendix M – Revegetation Plan and Report.

4.11 Operation, Maintenance, Monitoring

Maintenance will be carried out from the end of construction and revegetation in the dry season of 2025, until the funding program concludes on 31 March 2026. No further maintenance will occur beyond this date due to the absence of additional funding.

5 Statutory Context

This section provides an overview of the legislative context of the application under the *Planning Act 2016* (Planning Act) and the Planning Regulations 2017 (Planning Regulation).

5.1 Planning Act 2016

This development application is made pursuant to section 50 of the Planning Act. In accordance with Section 51 of the Planning Act, this development application is supported by:

- DA Form 1 (Appendix A – DA Forms)
- the required fee
- the written consent of the owner (Appendix B – Owners Consent).

5.2 Planning Regulation 2017

The Planning Regulation, Schedule 8, Table 2, Item 1(c), identifies the local government as the Assessment Manager for prescribed tidal works completely in the tidal area for the local government area. The assessment benchmark set by the Planning Regulation (Schedule 10, Part 17, Division 2, Table 1) for local government is the Coastal Protection and Management Regulation 2017, Schedule 3 – Code for development that is prescribed tidal works (the Code). A local government must use the Code when assessing prescribed tidal works to ensure consistency of development assessment state-wide.

A development application response to the Code is provided in Appendix D – Code for development that is prescribed tidal works.

In accordance with Schedule 10 of the Planning Regulation, referral of the development application is required to the State Assessment Referral Agency (SARA) under:

- Schedule 10, Part 6, Division 3, Subdivision 3, Table 1, Item 1 – Operational work that includes the removal, destruction or damage of marine plants
- Schedule 10, Part 17, Division 3, Table 1, Item 1 – Tidal works
- Schedule 10, Part 17, Division 3, Table 2, Item 1 – Tidal works in tidal waters.

The Planning Regulation identifies the relevant assessment benchmark as the State Development Assessment Provisions (SDAP). Further information about the SDAP is provided below.

5.3 State Development Assessment Provisions

The State Development Assessment Provisions (SDAP) provide assessment benchmarks for the assessment of development applications involving the Chief Executive through the State Assessment and Referral Agency (SARA).

The proposed development will be assessed against the relevant SDAP State codes, including:

- State code 7 – Maritime safety (Appendix E)
- State code 8 – Coastal development and tidal works (Appendix F)
- State code 11 – Removal, destruction or damage of marine plants (Appendix G)

The proposed works are considered to satisfy the performance outcomes of the above codes.

6 State Code 7: Maritime Safety

The proposed works involve the remediation and stabilisation of a 100m section of the Daintree River streambank and involves tidal works in tidal waters. The Daintree River is identified as a navigation corridor however the proposed works will not involve marine watercraft entering the waterway therefore, any potential impact to this state interest is not anticipated.

Further, Appendix K – Environmental Management Plan includes management measures to avoid and minimise any potential impact to the Daintree River / Navigation Corridor, including avoiding night construction works.

A detailed assessment against State Code 7 is provided in Appendix E – State Code 7 Response. The proposed works are considered to satisfy the performance outcomes of the code.

7 State Code 8: Coastal Development and Tidal Works

The project area is located entirely within the Coastal Management District (CMD) and Erosion Prone Area (EPA). The project is part of the Australian Government's Reef Coastal Restoration Program which involves remediation of a tidal streambank and cannot be feasibly relocated, as it is coastal-dependent development, which is development that must be located in tidal waters to function effectively.

The proposed works are considered coastal protection work because it is permanent work undertaken to the streambank to manage the impacts of coastal erosion. Additionally, while the proposed works may be considered an erosion control structure (e.g. rock beaching along the toe of the bank to prevent further erosion), it is not considered a typical erosion control structure that the SDAP is generally built to assess. The rock beaching design is considered necessary to protect infrastructure from imminent threat including:

- the only public access road to several properties;
- occupied dwellings used for residential purposes; and
- the Daintree River public access ferry infrastructure.

It is expected that the project area will continue to erode from storm events even smaller than 1:100. By protecting the above infrastructure, a social and economic benefit is gained. The erosion control structure will also improve the amenity of the riverbank in the long-term by remediating the active erosion and promoting revegetation of the site.

While the Detailed Design (Appendix H – Detailed Design Report and Design Plans) considered several alternative design solutions, the erosion control structure was selected to help reduce suspended sediment loss from the susceptible estuarine bank. A protected bench, including rootballs will be included in the design to facilitate deposition of sediment which will promote natural recruitment and establishment of mangroves. This will reduce the total suspended sediment exported to the downstream environment.

A detailed assessment against State Code 8 is provided in Appendix F – State Code 8 Response. Overall, the proposed works are considered to satisfy the performance outcomes of the code.

8 State Code 11: Removal, Destruction or Damage of Marine Plants

Marine plants are defined and protected under the *Fisheries Act 1994* (Fisheries Act) and generally include all plants/plant material that are tidally connected and located below the level of a highest astronomical tide contour, unless they are weeds specifically excluded by section 8(2) of the Fisheries Act. Two suitably qualified ecologists conducted a marine plant clearance survey during July 2024 which confirmed a low presence of marine plants within the project area. Typical marine plant species such as mangroves, saltwater couch and succulents were mostly absent. Nevertheless, the proposed works will involve the temporary disturbance of 14.22m^2 of marine plants.

The proposed works cannot comply with the Accepted Development Requirements (ADR) as the removal, damage or destruction of marine plants for the purpose of erosion control does not constitute any of the prescribed work types. The impact is considered temporary, because there is currently a low presence of marine plants in the project area, which reflects the active erosion onsite. Without intervention, the active erosion will lead to further soil loss, loss of marine plants, and continued disconnection of the riparian corridor. An overview of the proposed temporary marine plant disturbance is outline below:

- The project area is 1574m^2.
- Appendix L – Marine Plant Clearance Report has been prepared to document the presence of marine plants and the extent of impact (removal/damage) from the proposed works in the project area.
- Marine plant areas were mapped and divided into survey polygons, as demonstrated in Figure 6.
- Each polygon described marine plants by species assemblage, projected cover, polygon area, impact area and condition (based on disturbance factors).
- The total area of temporary marine plant disturbance across the project area has been reduced to 14.22m^2, which is based on a worst-case scenario and considered unavoidable.
- The proposed works are described in Appendix H – Detailed Design Report and Design Plans. The report addresses possible alternative design solutions and associated impact scenarios and describes how impacts to marine plants have been minimised.

Once the proposed works are completed and conditions are suitable for the recolonisation of marine plants, the banks will re-establish with marine plants and re-connect with upstream and downstream marine plant communities. An EMP will be implemented to protect the sites environmental values (Appendix K – Environmental Management Plan) during the project.

It is anticipated that the project will have achieved a net gain of marine plant communities at the site in around five years. The restored marine plant communities at this site are anticipated to hold the streambanks together, reduce erosion and provide important fish habitat into the future.

The project can satisfy the SRI criteria of the SRI Guideline for marine plants and works in a highly protected zone of marine park because:

- the project is considered habitat restoration;
- the marine plant disturbance area has been limited to 14.22 m^2;
- the project area will be restored and revegetated; and
- the project will offer a net gain of marine plants in around 5 years.

In this context, it is considered that an environmental offset is not required.

A detailed assessment against State Code 11 is provided in Appendix G – State Code 11 Response. Overall, the proposed works are considered to satisfy the performance outcomes of the code.

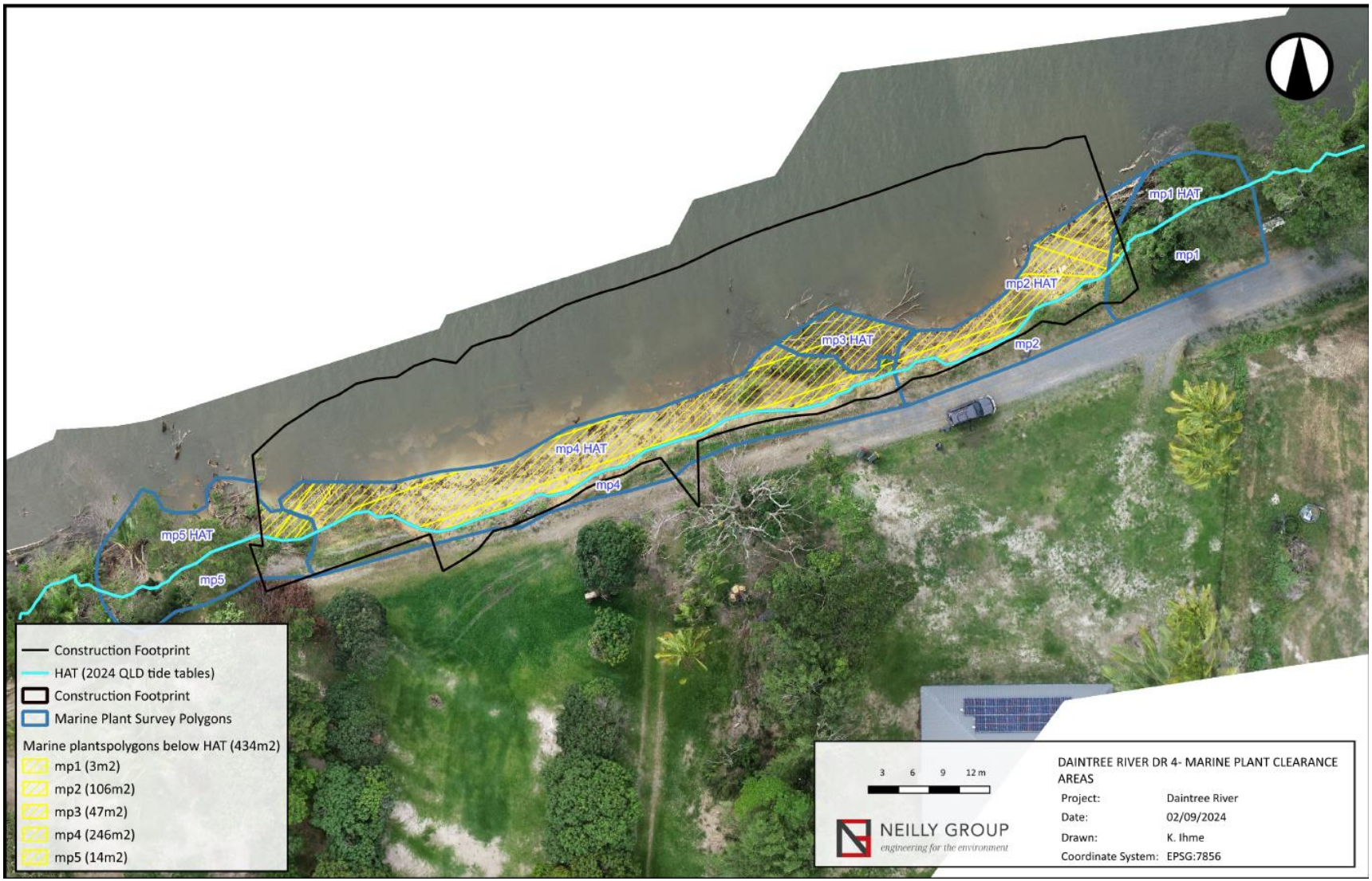


Figure 6. Project area and extent of temporary marine plant clearance (proposed clearance of 14.22m^2 marine plants)

9 Other Regulatory Requirements

This section outlines other regulatory requirements that are relevant to the project.

9.1 Native Vegetation Clearing

The subject site is mapped as containing Category B of concern regional ecosystem and Category R regulated regrowth vegetation. However, clearing associated with the development constitutes exempt clearing work and accepted development as follows:

- Category B regional ecosystem 7.1.4 comprises mangroves and vine forest. In accordance with Section 8(c) of the *Vegetation Management Act 1999* (VMA) the VMA does not apply to the clearing of marine plants.
- Clearing associated with the development constitutes necessary environmental clearing under the Department of Resources *Accepted Development Vegetation Clearing Code* (ADVCC).

Necessary environmental clearing is defined as:

Clearing of vegetation that is necessary to -

> ***a) restore the ecological and environmental condition of land****; or Example— stabilising banks of watercourses, works to rehabilitate eroded areas, works to prevent erosion of land or for ecological fire management*
>
> *b) divert existing natural channels in a way that replicates the existing form of the natural channels; or*
>
> *c) prepare for the likelihood of a natural disaster; or Example— removal of silt to mitigate flooding*
>
> *d) remove contaminants from land.*

9.2 Great Barrier Reef Wetland Protection Areas

While the Planning Regulation makes operational work in a Wetland Protection Area assessable development, the site itself is not located in a Wetland Protection Area but rather a Wetland protection area trigger area. Additionally, the proposed works are situated on the streambank of the Daintree River, within tidal waters. Furthermore, the definition of High impact earthworks provides an exemption for operational work in tidal water as follows:

> High impact earthworks is defined in the Planning Regulation as:
>
> *(a) operational work that changes the form of land, or involves placing a structure on land,*
>
> *in a way that diverts water to or from a wetland in a wetland protection area and involves*
>
> *excavating or filling—*
>
> > *(i) if the work is carried out in the wetland or within 200m of the wetland—more than*
> >
> > *100m^3; or*
> >
> > *(ii) otherwise—more than 1,000m^3; but*
>
> ***(b) does not include operational work—***
>
> > ***(vi) in tidal water;***

In this context, no Wetland Protection Area assessment is required for the proposed works.

9.3 Waterway Barrier Works

The proposed works are not considered waterway barrier works because the design will have minimal impact to fish passage. Furthermore, the proposed works meet the criteria outlined by the Department of Primary Industries (DPI) as *bank stabilisation works* that are not considered waterway barrier works.

9.4 Marine Park Permit

The project area is located within the Great Barrier Reef (GBR) Coast Marine Park (MP) which provides protection for Queensland tidal lands and tidal waters.

The GBR Coast MP is regulated by the *Marine Parks (Great Barrier Reef Coast) Zoning Plan 2004* (Zoning Plan.) The Commonwealth *Great Barrier Reef Marine Parks Zoning Map 5 – Cairns* (Zoning Map), is used in conjunction with the Zoning Plan to help visually interpret the zone boundaries referred to in the Zoning Plan. The Zoning Map identifies the project area within the "Conservation Park Zone" as shown in Figure 7.

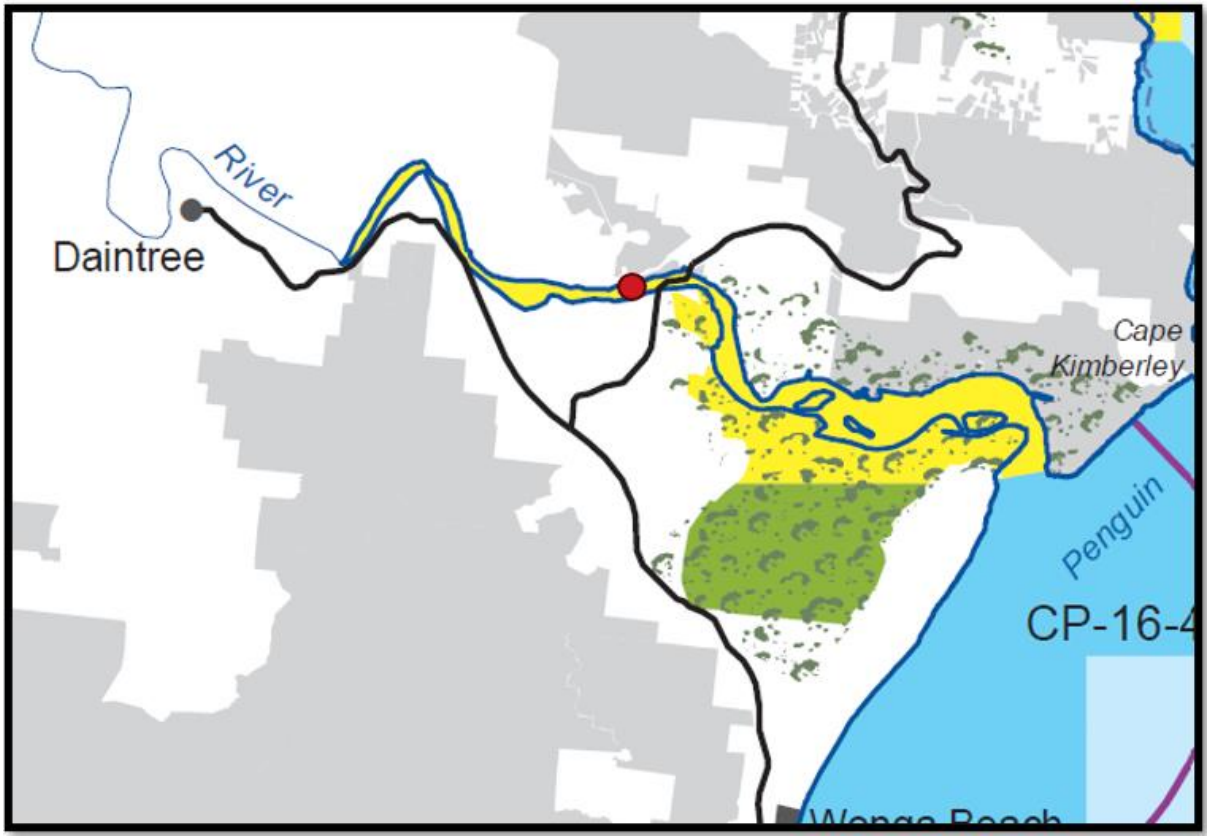


Figure 7. Project Area (red) within Conservation Park Zone (yellow)

Section 29 of the Zoning Plan states that the Department of Environment, Tourism, Science and Innovation (DETSI), acting as the chief executive, can grant permission for works within the Conservation Park Zone if the works are consistent with the objectives of the zone. Therefore, a separate application (ref: A-MPP-NEW-100713481) has been made to DETSI for a Marine Park Works Permit to support the project.

9.5 MSES

As per section 2.5 and Appendix I – Technical Ecology Report, a Significant Residual Impact is unlikely on Matters of State Environmental Significance (MSES).

9.6 Protected Plants

Targeted surveys were undertaken in accordance with the Flora Survey Guidelines – Protected Plants. The survey by two suitably qualified ecologist did not detect any protected plants within the Project area or surrounding landscape (Neilly Group, 2024b).

A separate protected plant survey report will be prepared for the project area, as it's located within a protected plant trigger area. The report will be submitted to apply for a protected plant clearance exemption, as no protected plants occur within the survey area.

9.7 Species Management Program

The ecological desktop assessment and field investigations determined the proposed works may tamper with the breeding places of least concern species where that breeding place is being used by a protected animal to incubate or rear the animal's offspring and where the impacts from tampering are not likely to affect the broader population of the species.

No breeding places were recorded during the ecological surveys, hence an SMP is not required.

9.8 Cultural Heritage Duty of Care

Aboriginal and Torres Strait Islander cultural heritage is protected under the *Aboriginal Cultural Heritage Act 2003* and the *Torres Strait Islander Cultural Heritage Act 2003* (Cultural Heritage Acts). Under the Cultural Heritage Acts, a person carrying out an activity must take all reasonable and practicable measures to ensure the activity does not harm Aboriginal or Torres Strait Islander cultural heritage. To ensure duty of care, a Cultural Heritage Risk Assessment has been undertaken.

The project area contains no Aboriginal or Torres Strait Islander cultural heritage site. However, the project area is located within 1km of the Eastern Kuku Yalanji Indigenous Protected Area (CWTH_IPA55) and a Cultural Heritage Site Point (pre 2015) (Site ID EN: A30), represented by the Eastern Kuku Yalanji People #2 (ref no. QC2002/007). Consultation with the Eastern Kuku Yalanji People has occurred, and a site walkover was completed on 11 October 2024 which cleared the project area from containing any cultural heritage significance.

There are no Queensland Heritage Places located within 1km of the project area.

The Daintree Ferry Landing and Crossing Site (Site 6a), located at Cape Tribulation Road and Daintree River is considered an area of local significance under the *Douglas Shire Planning Scheme 2018*. The Douglas Shire Council was consulted regarding the project and raised no concerns about its potential impact on the site.

The cultural heritage risk assessment therefore did not identify any European or First Nations Heritage within the construction footprint.

If during construction, an item of heritage significance is found, Section 89 of the *Queensland Heritage Act 1992* requires a person to notify DETSI of an archaeological artefact that is an important source of information about an aspect of Queensland history.

This notice must be given as soon as practicable after the person discovers the item. Section 90 stipulates that it is an offence to interfere with an archaeological artefact once notice has been given of the artefact to the chief executive. This duty of care obligation is reflected in the EMP.

10 Conclusion and Recommendations

In summary, Terrain NRM has funding under the Australian Government's Reef Coastal Restoration Program to undertake restoration and stabilisation works as the Daintree River. Neilly Group Pty Ltd has prepared this report and supporting information on behalf of Terrain NRM for a Development Permit for Operational Works for Prescribed Tidal Works and the Removal, destruction or damage of marine plants under the *Planning Act 2016*. this report and supporting information comprise an application for a Development Permit for Operational Works for Prescribed Tidal Works and the Removal, destruction or damage of marine plants. Benefits of the works are anticipated to include the following:

- A reversal of land degradation by rehabilitating the actively eroding banks.
- Erosion control resulting in reduced suspended sediment loads to the Daintree River and the Great Barrier Reef Coastal Marine Park.
- The proposed works will lead to long term stabilisation of the project area, reduced sediment loads as well as improved water quality.
- Reducing the imminent threat to several private residences, their only public access road and nearby Daintree River public access ferry infrastructure;
- Impacts to the 1,574m^2 project area have been limited to the following clearing:
  - 29m^2 RE 7.1.4a
  - 1324m^2 Estuary (Daintree River)
  - 221m^2 non remnant vegetation
  - 14.22m^2 marine plants (below HAT)
- Revegetation includes a larger area than project impacts:
  - Revegetation area: 498m^2 (including 314m^2 below HAT and 184m^2 above HAT)
  - Revegetation will therefore lead to a net gain of native vegetation, to integrate the riparian corridor with surrounding naturally vegetated areas. Once established there will be a net gain of plant communities in about 5 years.
- Increased connectivity for species movement into the Daintree River riparian area, reduction of weeds and species listed under the *Biosecurity Act 2015*.
- Long term socio environmental benefits, local jobs during establishment and ongoing maintenance of the project area.

Assessment has been carried out against the following assessment benchmarks:

- Code for development that is prescribed tidal works (Appendix D – Code for development that is prescribed tidal works)
- SDAP State code 7 Maritime safety Response (Appendix E – State Code 7 Response)
- SDAP State code 8 Coastal development and tidal works Response (Appendix F – State Code 8 Response)
- SDAP State Code 11 Removal, destruction or damage of marine plants Response (Appendix G – State Code 11 Response).

Based on the assessment provided within this report and supporting information, it is recommended that the proposed works are found generally compliant with the above assessment criteria and are recommended for approval subject to reasonable and relevant conditions.

Appendix A – DA Forms

Appendix B – Owners Consent

Appendix C – SARA Pre-lodgement Advice

Appendix D – Code for development that is prescribed tidal works

Appendix E – State Code 7 Response

Appendix F – State Code 8 Response

Appendix G – State Code 11 Response

Appendix H – Detailed Design Report and Design Plans

Appendix I – Technical Ecology Report

Appendix J – Erosion and Sediment Control Plan

Appendix K – Environmental Management Plan

Appendix L – Marine Plant Clearance Report

Appendix M – Revegetation Plan and Report

Appendix N – Acid Sulphate Soil

DA Form 1 – Development application details

Approved form (version 1.6 effective 2 August 2024) made under section 282 of the Planning Act 2016.

This form **must** be used to make a development application **involving code assessment or impact assessment**, except when applying for development involving only building work.

For a development application involving **building work only**, use *DA Form 2 – Building work details*.

For a development application involving **building work associated with any other type of assessable development (i.e. material change of use, operational work or reconfiguring a lot)**, use this form (*DA Form 1*) **and** parts 4 to 6 of *DA Form 2 – Building work details*.

Unless stated otherwise, all parts of this form **must** be completed in full and all required supporting information **must** accompany the development application.

One or more additional pages may be attached as a schedule to this development application if there is insufficient space on the form to include all the necessary information.

This form and any other form relevant to the development application must be used to make a development application relating to strategic port land and Brisbane core port land under the *Transport Infrastructure Act 1994*, and airport land under the *Airport Assets (Restructuring and Disposal) Act 2008.* For the purpose of assessing a development application relating to strategic port land and Brisbane core port land, any reference to a planning scheme is taken to mean a land use plan for the strategic port land, Brisbane port land use plan for Brisbane core port land, or a land use plan for airport land.

Note: *All terms used in this form have the meaning given under the Planning Act 2016, the Planning Regulation 2017, or the Development Assessment Rules (DA Rules).*

PART 1 – APPLICANT DETAILS

1) Applicant details	
Applicant name(s) (*individual or company full name*)	Terrain Natural Resources Management
Contact name *(only applicable for companies)*	Monica Pollock c/- Neilly Group
Postal address *(P.O. Box or street address)*	228-244 Riverside Boulevard
Suburb	Douglas
State	QLD
Postcode	4814
Country	Australia
Contact number	0408987346
Email address *(non-mandatory)*	Monica@neillygroup.com.au
Mobile number *(non-mandatory)*	0408987346
Fax number *(non-mandatory)*	
Applicant's reference number(s) *(if applicable)*	23110
1.1) Home-based business	
☐ Personal details to remain private in accordance with section 264(6) of *Planning Act 2016*	

2) Owner's consent
2.1) Is written consent of the owner required for this development application?
☒ Yes – the written consent of the owner(s) is attached to this development application ☐ No – proceed to 3)

PART 2 – LOCATION DETAILS

3) Location of the premises *(complete 3.1) or 3.2), and 3.3) as applicable)*

***Note**: Provide details below and attach a site plan for any or all premises part of the development application. For further information, see DA Forms Guide: Relevant plans.*

3.1) Street address and lot on plan

☐ Street address **AND** lot on plan (*all lots must be listed*), ***or***

☒ Street address **AND** lot on plan for an adjoining or adjacent property of the premises *(appropriate for development in water but adjoining or adjacent to land e.g. jetty, pontoon. All lots must be listed).*

a)	Unit No.	Street No.	Street Name and Type	Suburb
			Daintree River and Road Reserve adjacent 41 & 49 McDowall Lane, Esplanade	Lower Daintree
	Postcode	Lot No.	Plan Type and Number *(e.g. RP, SP)*	Local Government Area(s)
		6	RP888615	Douglas Shire
b)	Unit No.	Street No.	Street Name and Type	Suburb
			Daintree River and Road Reserve adjacent 41 & 49 McDowall Lane, Esplanade	Lower Daintree
	Postcode	Lot No.	Plan Type and Number *(e.g. RP, SP)*	Local Government Area(s)
		7	RP888615	Douglas Shire

3.2) Coordinates of premises *(appropriate for development in remote areas, over part of a lot or in water not adjoining or adjacent to land e.g. channel dredging in Moreton Bay)*

***Note**: Place each set of coordinates in a separate row.*

☐ Coordinates of premises by longitude and latitude

Longitude(s)	Latitude(s)	Datum	Local Government Area(s) *(if applicable)*
		☐ WGS84 ☐ GDA94 ☐ Other:	

☐ Coordinates of premises by easting and northing

Easting(s)	Northing(s)	Zone Ref.	Datum	Local Government Area(s) *(if applicable)*
		☐ 54 ☐ 55 ☐ 56	☐ WGS84 ☐ GDA94 ☐ Other:	

3.3) Additional premises

☐ Additional premises are relevant to this development application and the details of these premises have been attached in a schedule to this development application

☒ Not required

4) Identify any of the following that apply to the premises and provide any relevant details

☒ In or adjacent to a water body or watercourse or in or above an aquifer

Name of water body, watercourse or aquifer:	Daintree River

☐ On strategic port land under the *Transport Infrastructure Act 1994*

Lot on plan description of strategic port land:	
Name of port authority for the lot:	

☒ In a tidal area

Name of local government for the tidal area *(if applicable)*:	Douglas Shire
Name of port authority for tidal area *(if applicable)*	

☐ On airport land under the *Airport Assets (Restructuring and Disposal) Act 2008*	
Name of airport:	
☐ Listed on the Environmental Management Register (EMR) under the *Environmental Protection Act 1994*	
EMR site identification:	
☐ Listed on the Contaminated Land Register (CLR) under the *Environmental Protection Act 1994*	
CLR site identification:	

5) Are there any existing easements over the premises?

Note: Easement uses vary throughout Queensland and are to be identified correctly and accurately. For further information on easements and how they may affect the proposed development, see DA Forms Guide.

☐ Yes – All easement locations, types and dimensions are included in plans submitted with this development application

☒ No

PART 3 – DEVELOPMENT DETAILS

Section 1 – Aspects of development

6.1) Provide details about the first development aspect

a) What is the type of development? *(tick only one box)*

☐ Material change of use ☐ Reconfiguring a lot ☒ Operational work ☐ Building work

b) What is the approval type? *(tick only one box)*

☒ Development permit ☐ Preliminary approval ☐ Preliminary approval that includes a variation approval

c) What is the level of assessment?

☒ Code assessment ☐ Impact assessment *(requires public notification)*

d) Provide a brief description of the proposal *(e.g. 6 unit apartment building defined as multi-unit dwelling, reconfiguration of 1 lot into 3 lots)*:

Prescribed Tidal works and the removal, destruction or damage of marine plants

e) Relevant plans

***Note**: Relevant plans are required to be submitted for all aspects of this development application. For further information, see DA Forms guide: Relevant plans.*

☒ Relevant plans of the proposed development are attached to the development application

6.2) Provide details about the second development aspect

a) What is the type of development? *(tick only one box)*

☐ Material change of use ☐ Reconfiguring a lot ☐ Operational work ☐ Building work

b) What is the approval type? *(tick only one box)*

☐ Development permit ☐ Preliminary approval ☐ Preliminary approval that includes a variation approval

c) What is the level of assessment?

☐ Code assessment ☐ Impact assessment *(requires public notification)*

d) Provide a brief description of the proposal *(e.g. 6 unit apartment building defined as multi-unit dwelling, reconfiguration of 1 lot into 3 lots)*:

e) Relevant plans

***Note**: Relevant plans are required to be submitted for all aspects of this development application. For further information, see DA Forms Guide: Relevant plans.*

☐ Relevant plans of the proposed development are attached to the development application

6.3) Additional aspects of development
☐ Additional aspects of development are relevant to this development application and the details for these aspects that would be required under Part 3 Section 1 of this form have been attached to this development application
☒ Not required
6.4) Is the application for State facilitated development?
☐ Yes - Has a notice of declaration been given by the Minister?
☒ No

Section 2 – Further development details

7) Does the proposed development application involve any of the following?	
Material change of use	☐ Yes – complete division 1 if assessable against a local planning instrument
Reconfiguring a lot	☐ Yes – complete division 2
Operational work	☒ Yes – complete division 3
Building work	☐ Yes – complete *DA Form 2 – Building work details*

Division 1 – Material change of use

***Note**: This division is only required to be completed if any part of the development application involves a material change of use assessable against a local planning instrument.*

8.1) Describe the proposed material change of use			
Provide a general description of the proposed use	Provide the planning scheme definition *(include each definition in a new row)*	Number of dwelling units *(if applicable)*	Gross floor area (m^2) *(if applicable)*

8.2) Does the proposed use involve the use of existing buildings on the premises?
☐ Yes
☐ No

8.3) Does the proposed development relate to temporary accepted development under the Planning Regulation?	
☐ Yes – provide details below or include details in a schedule to this development application	
☐ No	
Provide a general description of the temporary accepted development	Specify the stated period dates under the Planning Regulation

Division 2 – Reconfiguring a lot

***Note**: This division is only required to be completed if any part of the development application involves reconfiguring a lot.*

9.1) What is the total number of existing lots making up the premises?

9.2) What is the nature of the lot reconfiguration? *(tick all applicable boxes)*	
☐ Subdivision *(complete 10)*	☐ Dividing land into parts by agreement *(complete 11)*
☐ Boundary realignment *(complete 12)*	☐ Creating or changing an easement giving access to a lot from a constructed road *(complete 13)*

10) Subdivision				
10.1) For this development, how many lots are being created and what is the intended use of those lots:				
Intended use of lots created	Residential	Commercial	Industrial	Other, please specify:
Number of lots created				

10.2) Will the subdivision be staged?	
☐ Yes – provide additional details below ☐ No	
How many stages will the works include?	
What stage(s) will this development application apply to?	

11) Dividing land into parts by agreement – how many parts are being created and what is the intended use of the parts?				
Intended use of parts created	Residential	Commercial	Industrial	Other, please specify:
Number of parts created				

12) Boundary realignment			
12.1) What are the current and proposed areas for each lot comprising the premises?			
Current lot		Proposed lot	
Lot on plan description	Area (m^2)	Lot on plan description	Area (m^2)
12.2) What is the reason for the boundary realignment?			

13) What are the dimensions and nature of any existing easements being changed and/or any proposed easement? *(attach schedule if there are more than two easements)*				
Existing or proposed?	Width (m)	Length (m)	Purpose of the easement? *(e.g. pedestrian access)*	Identify the land/lot(s) benefitted by the easement

Division 3 – Operational work

***Note**: This division is only required to be completed if any part of the development application involves operational work.*

14.1) What is the nature of the operational work?		
☐ Road work	☐ Stormwater	☐ Water infrastructure
☐ Drainage work	☒ Earthworks	☐ Sewage infrastructure
☐ Landscaping	☐ Signage	☐ Clearing vegetation
☐ Other – please specify:		

14.2) Is the operational work necessary to facilitate the creation of new lots? *(e.g. subdivision)*	
☐ Yes – specify number of new lots:	
☒ No	

14.3) What is the monetary value of the proposed operational work? *(include GST, materials and labour)*

$ <$150,000

PART 4 – ASSESSMENT MANAGER DETAILS

15) Identify the assessment manager(s) who will be assessing this development application

Douglas Shire Council

16) Has the local government agreed to apply a superseded planning scheme for this development application?

- ☐ Yes – a copy of the decision notice is attached to this development application
- ☐ The local government is taken to have agreed to the superseded planning scheme request – relevant documents attached
- ☒ No

PART 5 – REFERRAL DETAILS

17) Does this development application include any aspects that have any referral requirements?

***Note**: A development application will require referral if prescribed by the* Planning Regulation 2017.

- ☐ No, there are no referral requirements relevant to any development aspects identified in this development application – proceed to Part 6

Matters requiring referral to the **Chief Executive of the *Planning Act 2016***:

- ☐ Clearing native vegetation
- ☐ Contaminated land *(unexploded ordnance)*
- ☐ Environmentally relevant activities (ERA) *(only if the ERA has not been devolved to a local government)*
- ☐ Fisheries – aquaculture
- ☐ Fisheries – declared fish habitat area
- ☒ Fisheries – marine plants
- ☐ Fisheries – waterway barrier works
- ☐ Hazardous chemical facilities
- ☐ Heritage places – Queensland heritage place *(on or near a Queensland heritage place)*
- ☐ Infrastructure-related referrals – designated premises
- ☐ Infrastructure-related referrals – state transport infrastructure
- ☐ Infrastructure-related referrals – State transport corridor and future State transport corridor
- ☐ Infrastructure-related referrals – State-controlled transport tunnels and future state-controlled transport tunnels
- ☐ Infrastructure-related referrals – near a state-controlled road intersection
- ☐ Koala habitat in SEQ region – interfering with koala habitat in koala habitat areas outside koala priority areas
- ☐ Koala habitat in SEQ region – key resource areas
- ☐ Ports – Brisbane core port land – near a State transport corridor or future State transport corridor
- ☐ Ports – Brisbane core port land – environmentally relevant activity (ERA)
- ☐ Ports – Brisbane core port land – tidal works or work in a coastal management district
- ☐ Ports – Brisbane core port land – hazardous chemical facility
- ☐ Ports – Brisbane core port land – taking or interfering with water
- ☐ Ports – Brisbane core port land – referable dams
- ☐ Ports – Brisbane core port land – fisheries
- ☐ Ports – Land within Port of Brisbane's port limits *(below high-water mark)*
- ☐ SEQ development area
- ☐ SEQ regional landscape and rural production area or SEQ rural living area – tourist activity or sport and recreation activity
- ☐ SEQ regional landscape and rural production area or SEQ rural living area – community activity
- ☐ SEQ regional landscape and rural production area or SEQ rural living area – indoor recreation
- ☐ SEQ regional landscape and rural production area or SEQ rural living area – urban activity
- ☐ SEQ regional landscape and rural production area or SEQ rural living area – combined use
- ☐ SEQ northern inter-urban break – tourist activity or sport and recreation activity

☐ SEQ northern inter-urban break – community activity
☐ SEQ northern inter-urban break – indoor recreation
☐ SEQ northern inter-urban break – urban activity
☐ SEQ northern inter-urban break – combined use
☒ Tidal works or works in a coastal management district
☐ Reconfiguring a lot in a coastal management district or for a canal
☒ Erosion prone area in a coastal management district
☐ Urban design
☐ Water-related development – taking or interfering with water
☐ Water-related development – removing quarry material *(from a watercourse or lake)*
☐ Water-related development – referable dams
☐ Water-related development –levees *(category 3 levees only)*
☐ Wetland protection area

Matters requiring referral to the **local government:**
☐ Airport land
☐ Environmentally relevant activities (ERA) (*only if the ERA has been devolved to local government)*
☐ Heritage places – Local heritage places

Matters requiring referral to the **Chief Executive of the distribution entity or transmission entity:**
☐ Infrastructure-related referrals – Electricity infrastructure

Matters requiring referral to:
- The **Chief Executive of the holder of the licence**, if not an individual
- The **holder of the licence**, if the holder of the licence is an individual

☐ Infrastructure-related referrals – Oil and gas infrastructure

Matters requiring referral to the **Brisbane City Council:**
☐ Ports – Brisbane core port land

Matters requiring referral to the **Minister responsible for administering the *Transport Infrastructure Act 1994*:**
☐ Ports – Brisbane core port land *(where inconsistent with the Brisbane port LUP for transport reasons)*
☐ Ports – Strategic port land

Matters requiring referral to the **relevant port operator**, if applicant is not port operator**:**
☐ Ports – Land within Port of Brisbane's port limits *(below high-water mark)*

Matters requiring referral to the **Chief Executive of the relevant port authority:**
☐ Ports – Land within limits of another port *(below high-water mark)*

Matters requiring referral to the **Gold Coast Waterways Authority:**
☐ Tidal works or work in a coastal management district *(in Gold Coast waters)*

Matters requiring referral to the **Queensland Fire and Emergency Service:**
☐ Tidal works or work in a coastal management district *(involving a marina (more than six vessel berths))*

18) Has any referral agency provided a referral response for this development application?

☐ Yes – referral response(s) received and listed below are attached to this development application
☒ No

Referral requirement	Referral agency	Date of referral response

Identify and describe any changes made to the proposed development application that was the subject of the referral response and this development application, or include details in a schedule to this development application *(if applicable).*

PART 6 – INFORMATION REQUEST

19) Information request under the DA Rules

☒ I agree to receive an information request if determined necessary for this development application

☐ I do not agree to accept an information request for this development application

***Note**: By not agreeing to accept an information request I, the applicant, acknowledge:*

- *that this development application will be assessed and decided based on the information provided when making this development application and the assessment manager and any referral agencies relevant to the development application are not obligated under the DA Rules to accept any additional information provided by the applicant for the development application unless agreed to by the relevant parties*
- *Part 3 under Chapter 1 of the DA Rules will still apply if the application is an application listed under section 11.3 of the DA Rules or*
- *Part 2under Chapter 2 of the DA Rules will still apply if the application is for state facilitated development*

Further advice about information requests is contained in the DA Forms Guide.

PART 7 – FURTHER DETAILS

20) Are there any associated development applications or current approvals? *(e.g. a preliminary approval)*

☐ Yes – provide details below or include details in a schedule to this development application

☒ No

List of approval/development application references	Reference number	Date	Assessment manager
☐ Approval ☐ Development application			
☐ Approval ☐ Development application			

21) Has the portable long service leave levy been paid? *(only applicable to development applications involving building work or operational work)*

☐ Yes – a copy of the receipted QLeave form is attached to this development application

☐ No – I, the applicant will provide evidence that the portable long service leave levy has been paid before the assessment manager decides the development application. I acknowledge that the assessment manager may give a development approval only if I provide evidence that the portable long service leave levy has been paid

☒ Not applicable *(e.g. building and construction work is less than $150,000 excluding GST)*

Amount paid	Date paid (dd/mm/yy)	QLeave levy number (A, B or E)
$		

22) Is this development application in response to a show cause notice or required as a result of an enforcement notice?

☐ Yes – show cause or enforcement notice is attached

☒ No

23) Further legislative requirements

Environmentally relevant activities

23.1) Is this development application also taken to be an application for an environmental authority for an **Environmentally Relevant Activity (ERA)** under section 115 of the *Environmental Protection Act 1994*?

☐ Yes – the required attachment (form ESR/2015/1791) for an application for an environmental authority accompanies this development application, and details are provided in the table below

☒ No

***Note**: Application for an environmental authority can be found by searching "ESR/2015/1791" as a search term at www.qld.gov.au. An ERA requires an environmental authority to operate. See www.business.qld.gov.au for further information.*

Proposed ERA number:		Proposed ERA threshold:	
Proposed ERA name:			

☐ Multiple ERAs are applicable to this development application and the details have been attached in a schedule to this development application.

Hazardous chemical facilities

23.2) Is this development application for a **hazardous chemical facility**?

☐ Yes – *Form 536: Notification of a facility exceeding 10% of schedule 15 threshold* is attached to this development application

☒ No

***Note**: See www.business.qld.gov.au for further information about hazardous chemical notifications.*

Clearing native vegetation

23.3) Does this development application involve **clearing native vegetation** that requires written confirmation that the chief executive of the *Vegetation Management Act 1999* is satisfied the clearing is for a relevant purpose under section 22A of the *Vegetation Management Act 1999*?

☐ Yes – this development application includes written confirmation from the chief executive of the *Vegetation Management Act 1999* (s22A determination)

☒ No

***Note**: 1. Where a development application for operational work or material change of use requires a s22A determination and this is not included, the development application is prohibited development.*

2. See https://www.qld.gov.au/environment/land/vegetation/applying for further information on how to obtain a s22A determination.

Environmental offsets

23.4) Is this development application taken to be a prescribed activity that may have a significant residual impact on a **prescribed environmental matter** under the *Environmental Offsets Act 2014*?

☐ Yes – I acknowledge that an environmental offset must be provided for any prescribed activity assessed as having a significant residual impact on a prescribed environmental matter

☒ No

***Note**: The environmental offset section of the Queensland Government's website can be accessed at www.qld.gov.au for further information on environmental offsets.*

Koala habitat in SEQ Region

23.5) Does this development application involve a material change of use, reconfiguring a lot or operational work which is assessable development under Schedule 10, Part 10 of the Planning Regulation 2017?

☐ Yes – the development application involves premises in the koala habitat area in the koala priority area

☐ Yes – the development application involves premises in the koala habitat area outside the koala priority area

☒ No

***Note**: If a koala habitat area determination has been obtained for this premises and is current over the land, it should be provided as part of this development application. See koala habitat area guidance materials at www.desi.qld.gov.au for further information.*

Water resources

23.6) Does this development application involve **taking or interfering with underground water through an artesian or subartesian bore, taking or interfering with water in a watercourse, lake or spring, or taking overland flow water under the *Water Act 2000***?

☐ Yes – the relevant template is completed and attached to this development application and I acknowledge that a relevant authorisation or licence under the *Water Act 2000* may be required prior to commencing development

☒ No

***Note**: Contact the Department of Resources at www.resources.qld.gov.au for further information.*

DA templates are available from planning.statedevelopment.qld.gov.au. If the development application involves:

- *Taking or interfering with underground water through an artesian or subartesian bore: complete DA Form 1 Template 1*
- *Taking or interfering with water in a watercourse, lake or spring: complete DA Form1 Template 2*
- *Taking overland flow water: complete DA Form 1 Template 3.*

Waterway barrier works

23.7) Does this application involve **waterway barrier works?**

☐ Yes – the relevant template is completed and attached to this development application

☒ No

DA templates are available from planning.statedevelopment.qld.gov.au. For a development application involving waterway barrier works, complete DA Form 1 Template 4.

Marine activities

23.8) Does this development application involve **aquaculture, works within a declared fish habitat area or removal, disturbance or destruction of marine plants?**

☒ Yes – an associated *resource* allocation authority is attached to this development application, if required under the *Fisheries Act 1994*

☐ No

***Note**: See guidance materials at www.daf.qld.gov.au for further information.*

Quarry materials from a watercourse or lake

23.9) Does this development application involve the **removal of quarry materials from a watercourse or lake** under the *Water Act 2000?*

☐ Yes – I acknowledge that a quarry material allocation notice must be obtained prior to commencing development

☒ No

***Note**: Contact the Department of Resources at www.resources.qld.gov.au and www.business.qld.gov.au for further information.*

Quarry materials from land under tidal waters

23.10) Does this development application involve the **removal of quarry materials from land under tidal water** under the *Coastal Protection and Management Act 1995?*

☐ Yes – I acknowledge that a quarry material allocation notice must be obtained prior to commencing development

☒ No

***Note**: Contact the Department of Environment, Science and Innovation at www.desi.qld.gov.au for further information.*

Referable dams

23.11) Does this development application involve a **referable dam** required to be failure impact assessed under section 343 of the *Water Supply (Safety and Reliability) Act 2008* (the Water Supply Act)?

☐ Yes – the 'Notice Accepting a Failure Impact Assessment' from the chief executive administering the Water Supply Act is attached to this development application

☒ No

***Note**: See guidance materials at www.resources.qld.gov.au for further information.*

Tidal work or development within a coastal management district

23.12) Does this development application involve **tidal work or development in a coastal management district**?

☒ Yes – the following is included with this development application:
- ☒ Evidence the proposal meets the code for assessable development that is prescribed tidal work *(only required if application involves prescribed tidal work)*
- ☐ A certificate of title

☐ No

***Note**: See guidance materials at www.desi.qld.gov.au for further information.*

Queensland and local heritage places

23.13) Does this development application propose development on or adjoining a place entered in the **Queensland heritage register** or on a place entered in a local government's **Local Heritage Register**?

☐ Yes – details of the heritage place are provided in the table below

☒ No

***Note**: See guidance materials at www.desi.qld.gov.au for information requirements regarding development of Queensland heritage places.*

For a heritage place that has cultural heritage significance as a local heritage place and a Queensland heritage place, provisions are in place under the Planning Act 2016 that limit a local categorising instrument from including an assessment benchmark about the effect or impact of, development on the stated cultural heritage significance of that place. See guidance materials at www.planning.statedevelopment.qldgov.au for information regarding assessment of Queensland heritage places.

Name of the heritage place:		Place ID:	

Decision under section 62 of the *Transport Infrastructure Act 1994*

23.14) Does this development application involve new or changed access to a state-controlled road?

☐ Yes – this application will be taken to be an application for a decision under section 62 of the *Transport Infrastructure Act 1994* (subject to the conditions in section 75 of the *Transport Infrastructure Act 1994* being satisfied)

☒ No

Walkable neighbourhoods assessment benchmarks under Schedule 12A of the Planning Regulation

23.15) Does this development application involve reconfiguring a lot into 2 or more lots in certain residential zones (except rural residential zones), where at least one road is created or extended?

☐ Yes – Schedule 12A is applicable to the development application and the assessment benchmarks contained in schedule 12A have been considered

☒ No

***Note**: See guidance materials at www.planning.statedevelopment.qld.gov.au for further information.*

PART 8 – CHECKLIST AND APPLICANT DECLARATION

24) Development application checklist	
I have identified the assessment manager in question 15 and all relevant referral requirement(s) in question 17 ***Note**: See the Planning Regulation 2017 for referral requirements*	☒ Yes
If building work is associated with the proposed development, Parts 4 to 6 of *DA Form 2 – Building work details* have been completed and attached to this development application	☐ Yes ☒ Not applicable
Supporting information addressing any applicable assessment benchmarks is with the development application ***Note**: This is a mandatory requirement and includes any relevant templates under question 23, a planning report and any technical reports required by the relevant categorising instruments (e.g. local government planning schemes, State Planning Policy, State Development Assessment Provisions). For further information, see DA Forms Guide: Planning Report Template.*	☒ Yes
Relevant plans of the development are attached to this development application ***Note**: Relevant plans are required to be submitted for all aspects of this development application. For further information, see DA Forms Guide: Relevant plans.*	☒ Yes
The portable long service leave levy for QLeave has been paid, or will be paid before a development permit is issued *(see 21)*	☐ Yes ☒ Not applicable

25) Applicant declaration
☒ By making this development application, I declare that all information in this development application is true and correct ☒ Where an email address is provided in Part 1 of this form, I consent to receive future electronic communications from the assessment manager and any referral agency for the development application where written information is required or permitted pursuant to sections 11 and 12 of the *Electronic Transactions Act 2001* ***Note**: It is unlawful to intentionally provide false or misleading information.*
Privacy – Personal information collected in this form will be used by the assessment manager and/or chosen assessment manager, any relevant referral agency and/or building certifier (including any professional advisers which may be engaged by those entities) while processing, assessing and deciding the development application. All information relating to this development application may be available for inspection and purchase, and/or published on the assessment manager's and/or referral agency's website. Personal information will not be disclosed for a purpose unrelated to the *Planning Act 2016*, Planning Regulation 2017 and the DA Rules except where: • such disclosure is in accordance with the provisions about public access to documents contained in the *Planning Act 2016* and the Planning Regulation 2017, and the access rules made under the *Planning Act 2016* and Planning Regulation 2017; or • required by other legislation (including the *Right to Information Act 2009*); or • otherwise required by law. This information may be stored in relevant databases. The information collected will be retained as required by the *Public Records Act 2002.*

PART 9 – FOR COMPLETION OF THE ASSESSMENT MANAGER – FOR OFFICE USE ONLY

Date received: | Reference number(s):

Notification of engagement of alternative assessment manager	
Prescribed assessment manager	
Name of chosen assessment manager	
Date chosen assessment manager engaged	
Contact number of chosen assessment manager	
Relevant licence number(s) of chosen assessment manager	

QLeave notification and payment *Note: For completion by assessment manager if applicable*			
Description of the work			
QLeave project number			
Amount paid ($)		Date paid (dd/mm/yy)	
Date receipted form sighted by assessment manager			
Name of officer who sighted the form			

File / Ref number: 2024/003694

26 November 2024

Queensland Government

Department of Resources

Neilly Group Engineering Pty Ltd
Attn: Monica Pollock
228-244 Riverside Boulevard
Douglas QLD 4814

Email: Monica@neillygroup.com.au

Dear Monica,

Application for Owners Consent – Development Application for Prescribed Tidal Works in a Coastal Management District involving Removal, Destruction or Damage of Marine Plants within Erosion Prone Area in a Coastal Management District within McDowall Lane adjoining Lot 6 and 7 on Registered Plan RP888615.

Reference is made to the request for owners consent required to accompany the development application for prescribed tidal works in a Coastal Management District involving Removal, Destruction or Damage of Marine Plants within Erosion Prone Area in a Coastal Management District within McDowall Lane adjoining Lot 6 and 7 on Registered Plan RP888615.

The department hereby gives owner's consent as the owner to accompany the development application for the purpose of section 51(2) of the *Planning Act 2016* for prescribed tidal works in a Coastal Management District involving Removal, Destruction or Damage of Marine Plants within Erosion Prone Area in a Costal Management District within McDowall Lane adjoining Lot 6 and 7 on Registered Plan RP888615.

Although owner's consent to the development application has been provided and no tenure under the Land Act is required, your client is to undertake works on the land only if and when the development or change application has been approved by the assessment manager or responsible entity, and in accordance with the conditions of that approval.

A copy of this letter is to be attached to your DA Form 1 as the required evidence of owners consent.

Your client will also need to comply with all other legislative and regulatory requirements which may also include approvals that are not part of the assessment of the development application under the *Planning Act 2016* e.g. a marine park permit if in a marine park.

Further, please note that the above consent will expire on **26 May 2025**. Should the development application not be lodged with the assessment manager prior to this date, your client will be required again to lodge the DA Form 1 and any attachments with this Department with a further request for owner's consent - any further request will need to be reconsidered by the Department.

Postal Address:
Resources Cairns
PO Box 937
Cairns
4870 QLD

Telephone: (07) 4222 5427

It is also advised that any land use activities must comply with the *Aboriginal Cultural Heritage Act 2003* or the *Torres Strait Islander Heritage Act 2003*.

Finally, owner's consent is required under the *Planning Act 2016* to enable the application to be considered properly made for lodging with the assessment manager and is a completely separate process to assessment of the application under the *Planning Act 2016*.

Accordingly, the State may act at a later date as assessment manager in the assessment of the development application - providing owner's consent will not influence any role the State may have in this development assessment.

If you wish to discuss this matter please contact Gerry Mcdonald on (07) 4222 5427.

All future correspondence relative to this matter is to be referred to the contact Officer at the address below or by email to Lasslsteam1enq@resources.qld.gov.au . Any hard copy correspondence received will be electronically scanned and filed. For this reason, it is recommended that any attached plans, sketches or maps be no larger than A3-sized.

Please quote reference number **2024/003694** in any future correspondence.

Yours sincerely

D. Camilleri

Dianne Camilleri
Senior Land Officer
A duly authorised delegate of the Minister
under the current Land Act (Ministerial) Delegation

DA Form 1 – Development application details

Approved form (version 1.6 effective 2 August 2024) made under section 282 of the Planning Act 2016.

This form **must** be used to make a development application **involving code assessment or impact assessment**, except when applying for development involving only building work.

For a development application involving **building work only**, use *DA Form 2 – Building work details*.

For a development application involving **building work associated with any other type of assessable development (i.e. material change of use, operational work or reconfiguring a lot)**, use this form (*DA Form 1*) **and** parts 4 to 6 of *DA Form 2 – Building work details*.

Unless stated otherwise, all parts of this form **must** be completed in full and all required supporting information **must** accompany the development application.

One or more additional pages may be attached as a schedule to this development application if there is insufficient space on the form to include all the necessary information.

This form and any other form relevant to the development application must be used to make a development application relating to strategic port land and Brisbane core port land under the *Transport Infrastructure Act 1994*, and airport land under the *Airport Assets (Restructuring and Disposal) Act 2008.* For the purpose of assessing a development application relating to strategic port land and Brisbane core port land, any reference to a planning scheme is taken to mean a land use plan for the strategic port land, Brisbane port land use plan for Brisbane core port land, or a land use plan for airport land.

Note: *All terms used in this form have the meaning given under the Planning Act 2016, the Planning Regulation 2017, or the Development Assessment Rules (DA Rules).*

PART 1 – APPLICANT DETAILS

1) Applicant details	
Applicant name(s) (*individual or company full name*)	Neilly Group c/- Terrain NRM
Contact name *(only applicable for companies)*	Monica Pollock
Postal address *(P.O. Box or street address)*	228-244 Riverside Boulevard
Suburb	Douglas
State	QLD
Postcode	4814
Country	Australia
Contact number	0408987346
Email address *(non-mandatory)*	Monica@neillygroup.com.au
Mobile number *(non-mandatory)*	0408987346
Fax number *(non-mandatory)*	
Applicant's reference number(s) *(if applicable)*	23110
1.1) Home-based business	
☐ Personal details to remain private in accordance with section 264(6) of *Planning Act 2016*	

2) Owner's consent
2.1) Is written consent of the owner required for this development application?
☒ Yes – the written consent of the owner(s) is attached to this development application ☐ No – proceed to 3)

PART 2 – LOCATION DETAILS

3) Location of the premises *(complete 3.1) or 3.2), and 3.3) as applicable)*

***Note**: Provide details below and attach a site plan for any or all premises part of the development application. For further information, see DA Forms Guide: Relevant plans.*

3.1) Street address and lot on plan

☐ Street address **AND** lot on plan (*all lots must be listed*), ***or***

☒ Street address **AND** lot on plan for an adjoining or adjacent property of the premises *(appropriate for development in water but adjoining or adjacent to land e.g. jetty, pontoon. All lots must be listed).*

a)	Unit No.	Street No.	Street Name and Type	Suburb
			Daintree River and Road Reserve adjacent 41 & 49 McDowall Lane, Esplanade	Lower Daintree
	Postcode	Lot No.	Plan Type and Number *(e.g. RP, SP)*	Local Government Area(s)
		6	RP888615	Douglas Shire
b)	Unit No.	Street No.	Street Name and Type	Suburb
			Daintree River and Road Reserve adjacent 41 & 49 McDowall Lane, Esplanade	Lower Daintree
	Postcode	Lot No.	Plan Type and Number *(e.g. RP, SP)*	Local Government Area(s)
		7	RP888615	Douglas Shire

3.2) Coordinates of premises *(appropriate for development in remote areas, over part of a lot or in water not adjoining or adjacent to land e.g. channel dredging in Moreton Bay)*

***Note**: Place each set of coordinates in a separate row.*

☐ Coordinates of premises by longitude and latitude

Longitude(s)	Latitude(s)	Datum	Local Government Area(s) *(if applicable)*
		☐ WGS84 ☐ GDA94 ☐ Other:	

☐ Coordinates of premises by easting and northing

Easting(s)	Northing(s)	Zone Ref.	Datum	Local Government Area(s) *(if applicable)*
		☐ 54 ☐ 55 ☐ 56	☐ WGS84 ☐ GDA94 ☐ Other:	

3.3) Additional premises

☐ Additional premises are relevant to this development application and the details of these premises have been attached in a schedule to this development application

☒ Not required

4) Identify any of the following that apply to the premises and provide any relevant details

☒ In or adjacent to a water body or watercourse or in or above an aquifer

Name of water body, watercourse or aquifer:	Daintree River

☐ On strategic port land under the *Transport Infrastructure Act 1994*

Lot on plan description of strategic port land:	
Name of port authority for the lot:	

☒ In a tidal area

Name of local government for the tidal area *(if applicable)*:	Douglas Shire
Name of port authority for tidal area *(if applicable)*	

☐ On airport land under the *Airport Assets (Restructuring and Disposal) Act 2008*	
Name of airport:	
☐ Listed on the Environmental Management Register (EMR) under the *Environmental Protection Act 1994*	
EMR site identification:	
☐ Listed on the Contaminated Land Register (CLR) under the *Environmental Protection Act 1994*	
CLR site identification:	

5) Are there any existing easements over the premises?

Note: Easement uses vary throughout Queensland and are to be identified correctly and accurately. For further information on easements and how they may affect the proposed development, see DA Forms Guide.

☐ Yes – All easement locations, types and dimensions are included in plans submitted with this development application

☒ No

PART 3 – DEVELOPMENT DETAILS

Section 1 – Aspects of development

6.1) Provide details about the first development aspect

a) What is the type of development? *(tick only one box)*

☐ Material change of use ☐ Reconfiguring a lot ☒ Operational work ☐ Building work

b) What is the approval type? *(tick only one box)*

☒ Development permit ☐ Preliminary approval ☐ Preliminary approval that includes a variation approval

c) What is the level of assessment?

☒ Code assessment ☐ Impact assessment *(requires public notification)*

d) Provide a brief description of the proposal *(e.g. 6 unit apartment building defined as multi-unit dwelling, reconfiguration of 1 lot into 3 lots)*:

Prescribed Tidal works and the removal, destruction or damage of marine plants

e) Relevant plans

***Note**: Relevant plans are required to be submitted for all aspects of this development application. For further information, see DA Forms guide: Relevant plans.*

☒ Relevant plans of the proposed development are attached to the development application

6.2) Provide details about the second development aspect

a) What is the type of development? *(tick only one box)*

☐ Material change of use ☐ Reconfiguring a lot ☐ Operational work ☐ Building work

b) What is the approval type? *(tick only one box)*

☐ Development permit ☐ Preliminary approval ☐ Preliminary approval that includes a variation approval

c) What is the level of assessment?

☐ Code assessment ☐ Impact assessment *(requires public notification)*

d) Provide a brief description of the proposal *(e.g. 6 unit apartment building defined as multi-unit dwelling, reconfiguration of 1 lot into 3 lots)*:

e) Relevant plans

***Note**: Relevant plans are required to be submitted for all aspects of this development application. For further information, see DA Forms Guide: Relevant plans.*

☐ Relevant plans of the proposed development are attached to the development application

6.3) Additional aspects of development
☐ Additional aspects of development are relevant to this development application and the details for these aspects that would be required under Part 3 Section 1 of this form have been attached to this development application
☒ Not required
6.4) Is the application for State facilitated development?
☐ Yes - Has a notice of declaration been given by the Minister?
☒ No

Section 2 – Further development details

7) Does the proposed development application involve any of the following?	
Material change of use	☐ Yes – complete division 1 if assessable against a local planning instrument
Reconfiguring a lot	☐ Yes – complete division 2
Operational work	☒ Yes – complete division 3
Building work	☐ Yes – complete *DA Form 2 – Building work details*

Division 1 – Material change of use

***Note**: This division is only required to be completed if any part of the development application involves a material change of use assessable against a local planning instrument.*

8.1) Describe the proposed material change of use			
Provide a general description of the proposed use	Provide the planning scheme definition *(include each definition in a new row)*	Number of dwelling units *(if applicable)*	Gross floor area (m^2) *(if applicable)*

8.2) Does the proposed use involve the use of existing buildings on the premises?
☐ Yes
☐ No

8.3) Does the proposed development relate to temporary accepted development under the Planning Regulation?	
☐ Yes – provide details below or include details in a schedule to this development application	
☐ No	
Provide a general description of the temporary accepted development	Specify the stated period dates under the Planning Regulation

Division 2 – Reconfiguring a lot

***Note**: This division is only required to be completed if any part of the development application involves reconfiguring a lot.*

9.1) What is the total number of existing lots making up the premises?

9.2) What is the nature of the lot reconfiguration? *(tick all applicable boxes)*	
☐ Subdivision *(complete 10)*	☐ Dividing land into parts by agreement *(complete 11)*
☐ Boundary realignment *(complete 12)*	☐ Creating or changing an easement giving access to a lot from a constructed road *(complete 13)*

10) Subdivision				
10.1) For this development, how many lots are being created and what is the intended use of those lots:				
Intended use of lots created	Residential	Commercial	Industrial	Other, please specify:
Number of lots created				

10.2) Will the subdivision be staged?	
☐ Yes – provide additional details below ☐ No	
How many stages will the works include?	
What stage(s) will this development application apply to?	

11) Dividing land into parts by agreement – how many parts are being created and what is the intended use of the parts?				
Intended use of parts created	Residential	Commercial	Industrial	Other, please specify:
Number of parts created				

12) Boundary realignment			
12.1) What are the current and proposed areas for each lot comprising the premises?			
Current lot		Proposed lot	
Lot on plan description	Area (m^2)	Lot on plan description	Area (m^2)
12.2) What is the reason for the boundary realignment?			

13) What are the dimensions and nature of any existing easements being changed and/or any proposed easement? *(attach schedule if there are more than two easements)*				
Existing or proposed?	Width (m)	Length (m)	Purpose of the easement? *(e.g. pedestrian access)*	Identify the land/lot(s) benefitted by the easement

Division 3 – Operational work

***Note**: This division is only required to be completed if any part of the development application involves operational work.*

14.1) What is the nature of the operational work?		
☐ Road work	☐ Stormwater	☐ Water infrastructure
☐ Drainage work	☒ Earthworks	☐ Sewage infrastructure
☐ Landscaping	☐ Signage	☐ Clearing vegetation
☐ Other – please specify:		

14.2) Is the operational work necessary to facilitate the creation of new lots? *(e.g. subdivision)*	
☐ Yes – specify number of new lots:	
☒ No	

14.3) What is the monetary value of the proposed operational work? *(include GST, materials and labour)*

$ >$150,000

PART 4 – ASSESSMENT MANAGER DETAILS

15) Identify the assessment manager(s) who will be assessing this development application

Douglas Shire Council

16) Has the local government agreed to apply a superseded planning scheme for this development application?

☐ Yes – a copy of the decision notice is attached to this development application
☐ The local government is taken to have agreed to the superseded planning scheme request – relevant documents attached
☒ No

PART 5 – REFERRAL DETAILS

17) Does this development application include any aspects that have any referral requirements?
***Note**: A development application will require referral if prescribed by the* Planning Regulation 2017.

☐ No, there are no referral requirements relevant to any development aspects identified in this development application – proceed to Part 6

Matters requiring referral to the **Chief Executive of the *Planning Act 2016***:

☐ Clearing native vegetation
☐ Contaminated land *(unexploded ordnance)*
☐ Environmentally relevant activities (ERA) *(only if the ERA has not been devolved to a local government)*
☐ Fisheries – aquaculture
☐ Fisheries – declared fish habitat area
☒ Fisheries – marine plants
☐ Fisheries – waterway barrier works
☐ Hazardous chemical facilities
☐ Heritage places – Queensland heritage place *(on or near a Queensland heritage place)*
☐ Infrastructure-related referrals – designated premises
☐ Infrastructure-related referrals – state transport infrastructure
☐ Infrastructure-related referrals – State transport corridor and future State transport corridor
☐ Infrastructure-related referrals – State-controlled transport tunnels and future state-controlled transport tunnels
☐ Infrastructure-related referrals – near a state-controlled road intersection
☐ Koala habitat in SEQ region – interfering with koala habitat in koala habitat areas outside koala priority areas
☐ Koala habitat in SEQ region – key resource areas
☐ Ports – Brisbane core port land – near a State transport corridor or future State transport corridor
☐ Ports – Brisbane core port land – environmentally relevant activity (ERA)
☐ Ports – Brisbane core port land – tidal works or work in a coastal management district
☐ Ports – Brisbane core port land – hazardous chemical facility
☐ Ports – Brisbane core port land – taking or interfering with water
☐ Ports – Brisbane core port land – referable dams
☐ Ports – Brisbane core port land – fisheries
☐ Ports – Land within Port of Brisbane's port limits *(below high-water mark)*
☐ SEQ development area
☐ SEQ regional landscape and rural production area or SEQ rural living area – tourist activity or sport and recreation activity
☐ SEQ regional landscape and rural production area or SEQ rural living area – community activity
☐ SEQ regional landscape and rural production area or SEQ rural living area – indoor recreation
☐ SEQ regional landscape and rural production area or SEQ rural living area – urban activity
☐ SEQ regional landscape and rural production area or SEQ rural living area – combined use
☐ SEQ northern inter-urban break – tourist activity or sport and recreation activity

☐ SEQ northern inter-urban break – community activity
☐ SEQ northern inter-urban break – indoor recreation
☐ SEQ northern inter-urban break – urban activity
☐ SEQ northern inter-urban break – combined use
☒ Tidal works or works in a coastal management district
☐ Reconfiguring a lot in a coastal management district or for a canal
☒ Erosion prone area in a coastal management district
☐ Urban design
☐ Water-related development – taking or interfering with water
☐ Water-related development – removing quarry material *(from a watercourse or lake)*
☐ Water-related development – referable dams
☐ Water-related development –levees *(category 3 levees only)*
☐ Wetland protection area

Matters requiring referral to the **local government:**
☐ Airport land
☐ Environmentally relevant activities (ERA) (*only if the ERA has been devolved to local government)*
☐ Heritage places – Local heritage places

Matters requiring referral to the **Chief Executive of the distribution entity or transmission entity:**
☐ Infrastructure-related referrals – Electricity infrastructure

Matters requiring referral to:
- The **Chief Executive of the holder of the licence**, if not an individual
- The **holder of the licence**, if the holder of the licence is an individual

☐ Infrastructure-related referrals – Oil and gas infrastructure

Matters requiring referral to the **Brisbane City Council:**
☐ Ports – Brisbane core port land

Matters requiring referral to the **Minister responsible for administering the *Transport Infrastructure Act 1994*:**
☐ Ports – Brisbane core port land *(where inconsistent with the Brisbane port LUP for transport reasons)*
☐ Ports – Strategic port land

Matters requiring referral to the **relevant port operator**, if applicant is not port operator**:**
☐ Ports – Land within Port of Brisbane's port limits *(below high-water mark)*

Matters requiring referral to the **Chief Executive of the relevant port authority:**
☐ Ports – Land within limits of another port *(below high-water mark)*

Matters requiring referral to the **Gold Coast Waterways Authority:**
☐ Tidal works or work in a coastal management district *(in Gold Coast waters)*

Matters requiring referral to the **Queensland Fire and Emergency Service:**
☐ Tidal works or work in a coastal management district *(involving a marina (more than six vessel berths))*

18) Has any referral agency provided a referral response for this development application?

☐ Yes – referral response(s) received and listed below are attached to this development application
☒ No

Referral requirement	Referral agency	Date of referral response

Identify and describe any changes made to the proposed development application that was the subject of the referral response and this development application, or include details in a schedule to this development application *(if applicable).*

PART 6 – INFORMATION REQUEST

19) Information request under the DA Rules

☒ I agree to receive an information request if determined necessary for this development application

☐ I do not agree to accept an information request for this development application

***Note**: By not agreeing to accept an information request I, the applicant, acknowledge:*

- *that this development application will be assessed and decided based on the information provided when making this development application and the assessment manager and any referral agencies relevant to the development application are not obligated under the DA Rules to accept any additional information provided by the applicant for the development application unless agreed to by the relevant parties*
- *Part 3 under Chapter 1 of the DA Rules will still apply if the application is an application listed under section 11.3 of the DA Rules or*
- *Part 2under Chapter 2 of the DA Rules will still apply if the application is for state facilitated development*

Further advice about information requests is contained in the DA Forms Guide.

PART 7 – FURTHER DETAILS

20) Are there any associated development applications or current approvals? *(e.g. a preliminary approval)*

☐ Yes – provide details below or include details in a schedule to this development application

☒ No

List of approval/development application references	Reference number	Date	Assessment manager
☐ Approval ☐ Development application			
☐ Approval ☐ Development application			

21) Has the portable long service leave levy been paid? *(only applicable to development applications involving building work or operational work)*

☐ Yes – a copy of the receipted QLeave form is attached to this development application

☒ No – I, the applicant will provide evidence that the portable long service leave levy has been paid before the assessment manager decides the development application. I acknowledge that the assessment manager may give a development approval only if I provide evidence that the portable long service leave levy has been paid

☐ Not applicable *(e.g. building and construction work is less than $150,000 excluding GST)*

Amount paid	Date paid (dd/mm/yy)	QLeave levy number (A, B or E)
$		

22) Is this development application in response to a show cause notice or required as a result of an enforcement notice?

☐ Yes – show cause or enforcement notice is attached

☒ No

23) Further legislative requirements

Environmentally relevant activities

23.1) Is this development application also taken to be an application for an environmental authority for an **Environmentally Relevant Activity (ERA)** under section 115 of the *Environmental Protection Act 1994*?

☐ Yes – the required attachment (form ESR/2015/1791) for an application for an environmental authority accompanies this development application, and details are provided in the table below

☒ No

***Note**: Application for an environmental authority can be found by searching "ESR/2015/1791" as a search term at www.qld.gov.au. An ERA requires an environmental authority to operate. See www.business.qld.gov.au for further information.*

Proposed ERA number:		Proposed ERA threshold:	
Proposed ERA name:			

☐ Multiple ERAs are applicable to this development application and the details have been attached in a schedule to this development application.

Hazardous chemical facilities

23.2) Is this development application for a **hazardous chemical facility**?

☐ Yes – *Form 536: Notification of a facility exceeding 10% of schedule 15 threshold* is attached to this development application

☒ No

***Note**: See www.business.qld.gov.au for further information about hazardous chemical notifications.*

Clearing native vegetation

23.3) Does this development application involve **clearing native vegetation** that requires written confirmation that the chief executive of the *Vegetation Management Act 1999* is satisfied the clearing is for a relevant purpose under section 22A of the *Vegetation Management Act 1999*?

☐ Yes – this development application includes written confirmation from the chief executive of the *Vegetation Management Act 1999* (s22A determination)

☒ No

***Note**: 1. Where a development application for operational work or material change of use requires a s22A determination and this is not included, the development application is prohibited development.*

2. See https://www.qld.gov.au/environment/land/vegetation/applying for further information on how to obtain a s22A determination.

Environmental offsets

23.4) Is this development application taken to be a prescribed activity that may have a significant residual impact on a **prescribed environmental matter** under the *Environmental Offsets Act 2014*?

☐ Yes – I acknowledge that an environmental offset must be provided for any prescribed activity assessed as having a significant residual impact on a prescribed environmental matter

☒ No

***Note**: The environmental offset section of the Queensland Government's website can be accessed at www.qld.gov.au for further information on environmental offsets.*

Koala habitat in SEQ Region

23.5) Does this development application involve a material change of use, reconfiguring a lot or operational work which is assessable development under Schedule 10, Part 10 of the Planning Regulation 2017?

☐ Yes – the development application involves premises in the koala habitat area in the koala priority area

☐ Yes – the development application involves premises in the koala habitat area outside the koala priority area

☒ No

***Note**: If a koala habitat area determination has been obtained for this premises and is current over the land, it should be provided as part of this development application. See koala habitat area guidance materials at www.desi.qld.gov.au for further information.*

Water resources

23.6) Does this development application involve **taking or interfering with underground water through an artesian or subartesian bore, taking or interfering with water in a watercourse, lake or spring, or taking overland flow water under the *Water Act 2000***?

☐ Yes – the relevant template is completed and attached to this development application and I acknowledge that a relevant authorisation or licence under the *Water Act 2000* may be required prior to commencing development

☒ No

***Note**: Contact the Department of Resources at www.resources.qld.gov.au for further information.*

DA templates are available from planning.statedevelopment.qld.gov.au. If the development application involves:

- *Taking or interfering with underground water through an artesian or subartesian bore: complete DA Form 1 Template 1*
- *Taking or interfering with water in a watercourse, lake or spring: complete DA Form1 Template 2*
- *Taking overland flow water: complete DA Form 1 Template 3.*

Waterway barrier works

23.7) Does this application involve **waterway barrier works?**

☐ Yes – the relevant template is completed and attached to this development application

☒ No

DA templates are available from planning.statedevelopment.qld.gov.au. For a development application involving waterway barrier works, complete DA Form 1 Template 4.

Marine activities

23.8) Does this development application involve **aquaculture, works within a declared fish habitat area or removal, disturbance or destruction of marine plants?**

☒ Yes – an associated *resource* allocation authority is attached to this development application, if required under the *Fisheries Act 1994*

☐ No

***Note**: See guidance materials at www.daf.qld.gov.au for further information.*

Quarry materials from a watercourse or lake

23.9) Does this development application involve the **removal of quarry materials from a watercourse or lake** under the *Water Act 2000?*

☐ Yes – I acknowledge that a quarry material allocation notice must be obtained prior to commencing development

☒ No

***Note**: Contact the Department of Resources at www.resources.qld.gov.au and www.business.qld.gov.au for further information.*

Quarry materials from land under tidal waters

23.10) Does this development application involve the **removal of quarry materials from land under tidal water** under the *Coastal Protection and Management Act 1995?*

☐ Yes – I acknowledge that a quarry material allocation notice must be obtained prior to commencing development

☒ No

***Note**: Contact the Department of Environment, Science and Innovation at www.desi.qld.gov.au for further information.*

Referable dams

23.11) Does this development application involve a **referable dam** required to be failure impact assessed under section 343 of the *Water Supply (Safety and Reliability) Act 2008* (the Water Supply Act)?

☐ Yes – the 'Notice Accepting a Failure Impact Assessment' from the chief executive administering the Water Supply Act is attached to this development application

☒ No

***Note**: See guidance materials at www.resources.qld.gov.au for further information.*

Tidal work or development within a coastal management district

23.12) Does this development application involve **tidal work or development in a coastal management district**?

☒ Yes – the following is included with this development application:
- ☒ Evidence the proposal meets the code for assessable development that is prescribed tidal work *(only required if application involves prescribed tidal work)*
- ☐ A certificate of title

☐ No

***Note**: See guidance materials at www.desi.qld.gov.au for further information.*

Queensland and local heritage places

23.13) Does this development application propose development on or adjoining a place entered in the **Queensland heritage register** or on a place entered in a local government's **Local Heritage Register**?

☐ Yes – details of the heritage place are provided in the table below

☒ No

***Note**: See guidance materials at www.desi.qld.gov.au for information requirements regarding development of Queensland heritage places.*

For a heritage place that has cultural heritage significance as a local heritage place and a Queensland heritage place, provisions are in place under the Planning Act 2016 that limit a local categorising instrument from including an assessment benchmark about the effect or impact of, development on the stated cultural heritage significance of that place. See guidance materials at www.planning.statedevelopment.qldgov.au for information regarding assessment of Queensland heritage places.

Name of the heritage place:		Place ID:	

Decision under section 62 of the *Transport Infrastructure Act 1994*

23.14) Does this development application involve new or changed access to a state-controlled road?

☐ Yes – this application will be taken to be an application for a decision under section 62 of the *Transport Infrastructure Act 1994* (subject to the conditions in section 75 of the *Transport Infrastructure Act 1994* being satisfied)

☒ No

Walkable neighbourhoods assessment benchmarks under Schedule 12A of the Planning Regulation

23.15) Does this development application involve reconfiguring a lot into 2 or more lots in certain residential zones (except rural residential zones), where at least one road is created or extended?

☐ Yes – Schedule 12A is applicable to the development application and the assessment benchmarks contained in schedule 12A have been considered

☒ No

***Note**: See guidance materials at www.planning.statedevelopment.qld.gov.au for further information.*

PART 8 – CHECKLIST AND APPLICANT DECLARATION

24) Development application checklist	
I have identified the assessment manager in question 15 and all relevant referral requirement(s) in question 17 ***Note**: See the Planning Regulation 2017 for referral requirements*	☒ Yes
If building work is associated with the proposed development, Parts 4 to 6 of *DA Form 2 – Building work details* have been completed and attached to this development application	☐ Yes ☒ Not applicable
Supporting information addressing any applicable assessment benchmarks is with the development application ***Note**: This is a mandatory requirement and includes any relevant templates under question 23, a planning report and any technical reports required by the relevant categorising instruments (e.g. local government planning schemes, State Planning Policy, State Development Assessment Provisions). For further information, see DA Forms Guide: Planning Report Template.*	☒ Yes
Relevant plans of the development are attached to this development application ***Note**: Relevant plans are required to be submitted for all aspects of this development application. For further information, see DA Forms Guide: Relevant plans.*	☒ Yes
The portable long service leave levy for QLeave has been paid, or will be paid before a development permit is issued *(see 21)*	☒ Yes ☐ Not applicable

25) Applicant declaration
☒ By making this development application, I declare that all information in this development application is true and correct ☒ Where an email address is provided in Part 1 of this form, I consent to receive future electronic communications from the assessment manager and any referral agency for the development application where written information is required or permitted pursuant to sections 11 and 12 of the *Electronic Transactions Act 2001* ***Note**: It is unlawful to intentionally provide false or misleading information.*
Privacy – Personal information collected in this form will be used by the assessment manager and/or chosen assessment manager, any relevant referral agency and/or building certifier (including any professional advisers which may be engaged by those entities) while processing, assessing and deciding the development application. All information relating to this development application may be available for inspection and purchase, and/or published on the assessment manager's and/or referral agency's website. Personal information will not be disclosed for a purpose unrelated to the *Planning Act 2016*, Planning Regulation 2017 and the DA Rules except where: • such disclosure is in accordance with the provisions about public access to documents contained in the *Planning Act 2016* and the Planning Regulation 2017, and the access rules made under the *Planning Act 2016* and Planning Regulation 2017; or • required by other legislation (including the *Right to Information Act 2009*); or • otherwise required by law. This information may be stored in relevant databases. The information collected will be retained as required by the *Public Records Act 2002.*

PART 9 – FOR COMPLETION OF THE ASSESSMENT MANAGER – FOR OFFICE USE ONLY

Date received: | Reference number(s):

Notification of engagement of alternative assessment manager	
Prescribed assessment manager	
Name of chosen assessment manager	
Date chosen assessment manager engaged	
Contact number of chosen assessment manager	
Relevant licence number(s) of chosen assessment manager	

QLeave notification and payment *Note: For completion by assessment manager if applicable*			
Description of the work			
QLeave project number			
Amount paid ($)		Date paid (dd/mm/yy)	
Date receipted form sighted by assessment manager			
Name of officer who sighted the form			

DRAWING SCHEDULE		
SHEET NO.	REVISION	DRAWING TITLE
001	A1	OVERVIEW, NOTES & DRAWING SCHEDULE
002	A1	PLAN VIEW
003	A1	CROSS SECTIONS - SHEET 1
004	A1	CROSS SECTIONS - SHEET 2
005	A1	TYPICAL SECTIONS

GENERAL NOTES

1. REFER TO TECHNICAL SPECIFICATION: DR4 REMEDIATION DETAILED DESIGN.
2. COORDINATES ARE GDA94 MGA ZONE 55.
3. LIDAR SURVEY CAPTURED IN FEBRUARY 2024 BY NGE WAS USED TO CREATE THE DTM UPON WHICH THE DESIGN IS BASED. DUE TO THICK VEGETATION AT TIME OF ACQUISITION THIS DTM MAY NOT REPRESENT THE GROUND CONDITIONS AT THE TIME OF COMMENCEMENT OF WORKS. BASE POINT FOR SURVEY E:178502.922 N:7993753.422 H:355.738 mAHD (TOP OF SOUTH-WEST POOL FENCE POLE)
4. AERIAL IMAGERY CAPTURED IN FEBRUARY 2024 BY NGE WAS USED. AERIAL IMAGERY DOES NOT ALIGN WITH SURVEY SO IS TO BE USED AS A GUIDE ONLY
5. THE CONTRACTOR IS RESPONSIBLE FOR CONFIRMING THE LOCATION AND DEPTH OF ALL UNDERGROUND SERVICES PRIOR TO THE COMMENCEMENT OF WORKS.
6. DISTURBANCE TO VEGETATION SHALL BE MINIMISED AND SHALL ONLY BE UNDERTAKEN IN ACCORDANCE WITH THE TECHNICAL SPECIFICATION AND AT THE DIRECTION OF THE PRINCIPAL CONTRACTOR.
7. WHERE WORKS ARE NOT PROPOSED DISTURBANCE TO CHANNEL BED AND BANKS SHALL BE MINIMISED.

SITE:
DAINTREE RIVER: DR-4
TITLE:
STREAMBANK REMEDIATION DETAIL DESIGN
OVERVIEW, NOTES & DRAWING SCHEDULE

SCALE @ A3	DRAWN DATE	DRAWN	DESIGNED	APPRVD	APPRVD DATE
NTS	05/08/24	JD	JD	AN	05/08/24
PROJECT NO.	DWG NO.	REVISION	SHEET NO.	FILE NAME	
23110	001	A1	001	23110_001_A1.dwg	

NEILLY GROUP
engineering for the environment
M 0428 104 007 E adam@neillygroup.com.au

CLIENT: terrain NATURAL RESOURCE MANAGEMENT

RPEQ ENGINEER
JACOB DEARLOVE
RPEQ NO.
31129
SIGNED:
DATE: 19/08/24

REV	DESCRIPTION	DATE	APPRVD
A1	FOR APPROVAL	05/08/24	AN

STATUS: FOR APPROVAL

SITE:
DAINTREE RIVER: DR-4
TITLE:
STREAMBANK REMEDIATION DETAIL DESIGN
PLAN VIEW

SCALE @ A3	DRAWN DATE	DRAWN	DESIGNED	APPRVD	APPRVD DATE
1:500	05/08/24	JD	JD	AN	05/08/24
PROJECT NO.	DWG NO.	REVISION	SHEET NO.	FILE NAME	
23110	001	A1	002	23110_001_A1.dwg	

NEILLY GROUP
engineering for the environment
M 0428 104 007 E adam@neillygroup.com.au

RPEQ ENGINEER
JACOB DEARLOVE
RPEQ NO.
31129

CLIENT: terrain NATURAL RESOURCE MANAGEMENT

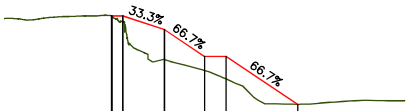
SIGNED:

DATE: 19/08/24

REV	DESCRIPTION	DATE	APPRVD
A1	FOR APPROVAL	05/08/24	AN

STATUS: FOR APPROVAL

LEGEND
- ROCK BEACHING
- REVEGETATION
- FILL (SELECT FILL)
- ROOTBALLS



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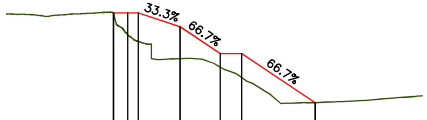
SECT 10.00



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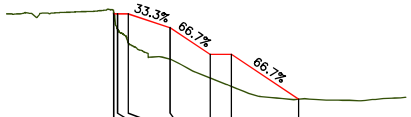
SECT 30.00



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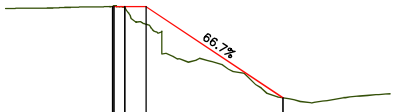
SECT 50.00



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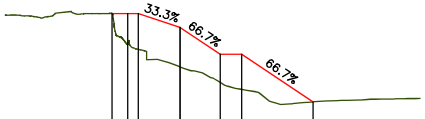
SECT 0.00



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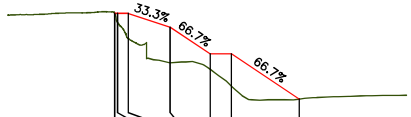
SECT 20.00



Datum RL -7								
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CENTRELINE OFFSET	-0.28	0.00	1.00	4.90	8.65	10.65	16.99	

SECT 40.00

SITE:
DAINTREE RIVER: DR-4
TITLE:
STREAMBANK REMEDIATION DETAIL DESIGN
CROSS SECTIONS - SHEET 1

SCALE @ A3	DRAWN DATE	DRAWN	DESIGNED	APPRVD	APPRVD DATE
1:500	05/08/24	JD	JD	AN	05/08/24
PROJECT NO.	DWG NO.	REVISION	SHEET NO.	FILE NAME	
23110	001	A1	003	23110_001_A1.dwg	

NEILLY GROUP
engineering for the environment
M 0428 104 007 E adam@neillygroup.com.au

RPEQ ENGINEER
JACOB DEARLOVE
RPEQ NO.
31129

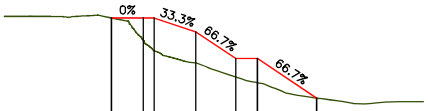
CLIENT: terrain NATURAL RESOURCE MANAGEMENT

SIGNED:

DATE: 19/08/24

REV	DESCRIPTION	DATE	APPRVD
A1	FOR APPROVAL	05/08/24	AN

STATUS: FOR APPROVAL



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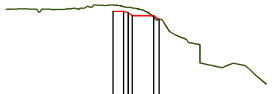
SECT 70.00



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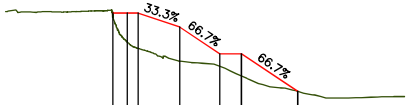
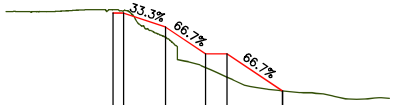
CENTRELINE OFFSET	0.00	1.00	1.41	1.80	3.80	4.32	

SECT 90.00



Datum RL -7								
DESIGN (m AHD)	3.80	3.80	3.80	2.50	0.00	0.00	-3.51	
EXISTING (m AHD)	3.80	1.08	0.50	-0.69	-1.17	-2.07	-3.51	
CENTRELINE OFFSET	-1.37	0.00	1.00	4.90	8.65	10.65	15.92	

SECT 60.00



Datum RL -7							
DESIGN (m AHD)	3.80	3.80	2.50	0.00	0.00	-3.47	
EXISTING (m AHD)	4.13	4.02	1.55	-1.29	-2.18	-3.47	
CENTRELINE OFFSET	0.00	1.00	4.90	8.65	10.65	15.85	

SECT 80.00

Datum RL -7					
DESIGN (m AHD)	3.80	3.80	3.80	2.51	
EXISTING (m AHD)	4.33	4.34	3.30	2.51	
CENTRELINE OFFSET	0.00	1.00	3.00	4.93	

SECT 91.17

SITE:
DAINTREE RIVER: DR-4
TITLE:
STREAMBANK REMEDIATION DETAIL DESIGN
CROSS SECTIONS - SHEET 2

SCALE @ A3	DRAWN DATE	DRAWN	DESIGNED	APPRVD	APPRVD DATE
1:500	05/08/24	JD	JD	AN	05/08/24
PROJECT NO.	DWG NO.	REVISION	SHEET NO.	FILE NAME	
23110	001	A1	004	23110_001_A1.dwg	

NEILLY GROUP
engineering for the environment
M 0428 104 007 E adam@neillygroup.com.au

RPEQ ENGINEER
JACOB DEARLOVE
RPEQ NO.
31129

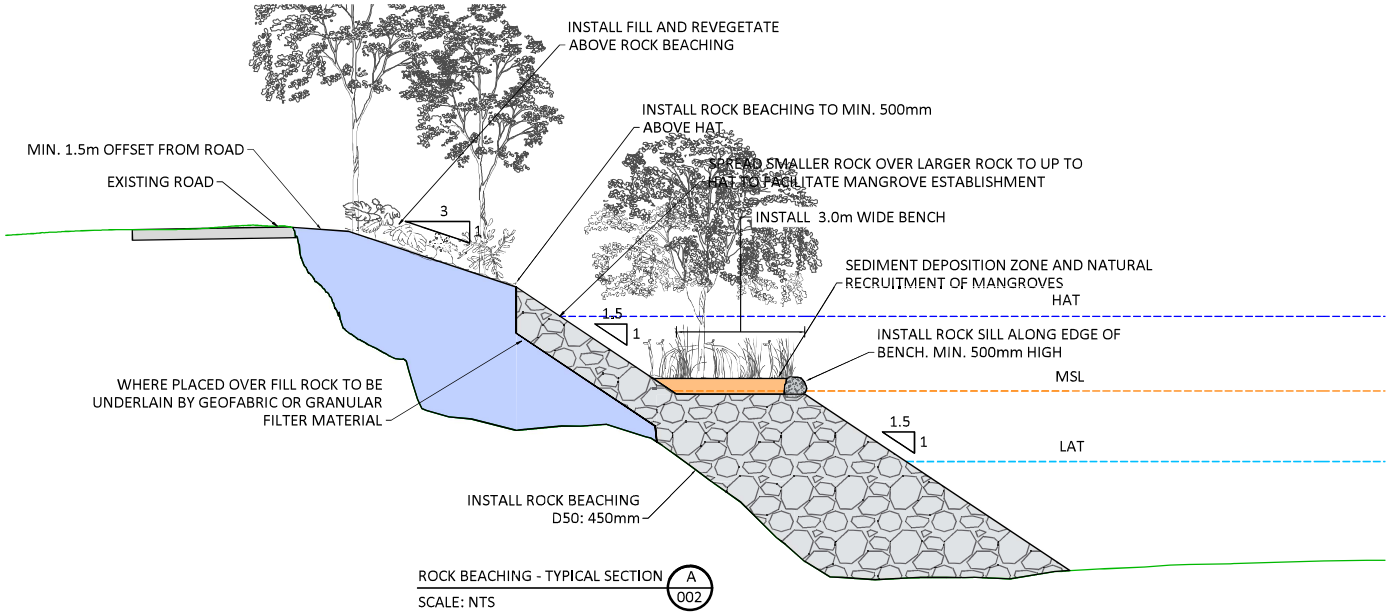
CLIENT: terrain NATURAL RESOURCE MANAGEMENT

SIGNED:

DATE: 19/08/24

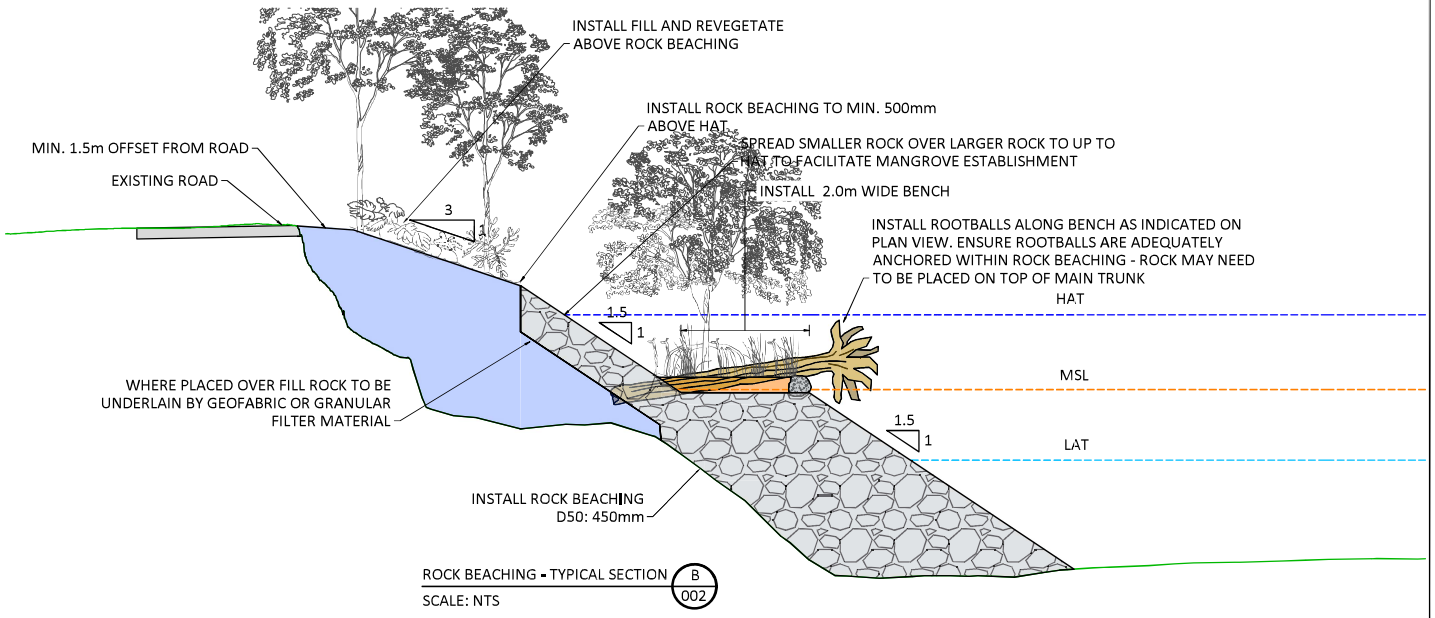
REV	DESCRIPTION	DATE	APPRVD
A1	FOR APPROVAL	05/08/24	AN

STATUS: FOR APPROVAL



ROCK BEACHING - TYPICAL SECTION A/002

SCALE: NTS



ROCK BEACHING - TYPICAL SECTION B/002

SCALE: NTS

SITE:
DAINTREE RIVER: DR-4

TITLE:
STREAMBANK REMEDIATION DETAIL DESIGN
TYPICAL SECTIONS

SCALE @ A3	DRAWN DATE	DRAWN	DESIGNED	APPRVD	APPRVD DATE
1:500	05/08/24	JD	JD	AN	05/08/24
PROJECT NO.	DWG NO.	REVISION	SHEET NO.	FILE NAME	
23110	001	A1	005	23110_001_A1.dwg	

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engineering for the environment
M 0428 104 007 E adam@neillygroup.com.au

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JACOB DEARLOVE
RPEQ NO.
31129

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SIGNED:

DATE: 19/08/24

REV	DESCRIPTION	DATE	APPRVD
A1	FOR APPROVAL	05/08/24	AN

STATUS: FOR APPROVAL

LEGEND
- ROCK BEACHING
- REVEGETATION
- FILL (SELECT FILL)
- ROOTBALLS

Code for assessable development that is prescribed tidal works

An assessment against the Coastal Protection and Management Regulation 2017, Schedule 3 – Code for assessable development that is prescribed tidal works is addressed in the table below.

Schedule 3 – Code for assessable development that is prescribed tidal works		
Performance Outcomes	**Acceptable Outcomes**	**Response**
Character and amenity (generally) - prescribed tidal works in a canal – N/A		
Character and amenity (generally) – prescribed tidal works not in a canal		
2.1 Prescribed tidal works not in a canal are compatible with their location, having regard to the following— (a) the character and amenity of the works' immediate surroundings and the locality within which the works are located; (b) if the relevant planning scheme states the desired character or amenity for the works' immediate surroundings or the locality within which the works are located—the stated desired character or amenity.	The design and construction of the prescribed tidal works is consistent with the following standards— (a) subject to paragraph (d), prescribed tidal works do not extend past the side boundary or extended side boundary of the lot connected to the works; (b) subject to paragraph (d), prescribed tidal works are the only works of their type along the edge of the tidal water fronting the lot connected to the works; (c) subject to paragraph (d)— (i) for prescribed tidal works for a private purpose—the works are not roofed; or (ii) for prescribed tidal works for a non-private purpose—the works are not roofed unless they are the main access to land; (d) if a relevant planning scheme standard is more stringent than the standard mentioned in paragraph (a), (b) or (c)— the relevant planning scheme standard, to the extent it is more stringent than the standard mentioned in paragraph (a), (b) or (c);	**Complies** The proposal is for remediation of a 100m section of riverbank in the Daintree River (the proposed works) that has been impacted by erosion. Douglas Shire Planning Scheme 2018 does not have a Development Code for Prescribed Tidal Works. The proposed works are located on the bank of the river and encroach into the local road reserve. They do not connect to adjacent lots. Regardless, the proposed works align within the adjacent lot boundaries. The proposed works are the only tidal works of their type along the edge of the tidal water fronting the adjacent lots and are not roofed. The proposed works are considered compatible with the character and amenity of the location as they use natural construction materials e.g. sand, timber and rock to blend in the within the surrounding environment.

Character and amenity (height, scale and size)		
3.1 Prescribed tidal works are of a height, scale and size to ensure the works are compatible with the character and amenity of their location, having regard to the following— (a) the height, scale and size of the natural features of the works' immediate surroundings and the locality within which the works are located; (b) the height, scale and size of the existing buildings or other structures in the works' immediate surroundings and the locality within which the works are located; (c) if the relevant planning scheme states the desired height, scale or size of buildings or other structures in the works' immediate surroundings or the locality within which the works are located—the stated desired height, scale or size.	The height, scale and size of the prescribed tidal works is consistent with each relevant planning scheme standard.	**Complies** The proposed works involve streambank erosion remediation. Douglas Shire Planning Scheme 2018 does not have a Development Code for Prescribed Tidal Works. The proposed works are considered compatible with the character and amenity of the location regarding height, scale and size in that they align with the bank of the river and use natural materials consistent with rural surrounds. The intent is for the works to integrate with the natural environment and promote regeneration of riparian vegetation along the streambank.
Character and amenity (material and colours)		
4.1 The materials used for, and the colours of, prescribed tidal works are compatible with the character and amenity of the works' location, having regard to the following— (a) the natural features of the works' immediate surroundings and the locality within which the works are located; (b) the existing buildings or other structures in the works' immediate surroundings and the locality within which the works are located; (c) if the relevant planning scheme states the desired materials to be used for, or desired colours of, buildings or other structures in the works'	The materials used for, and colours of, the prescribed tidal works are consistent with each relevant planning scheme standard.	**Complies** The proposed works involve streambank erosion remediation. Douglas Shire Planning Scheme 2018 does not have a Development Code for Prescribed Tidal Works. The proposed works will use natural materials that are ordinarily found in the natural environment e.g. timber, rock and sand which is commensurate with the immediate surrounds and Rural zoning.

immediate surroundings or the locality within which the works are located—the stated desired materials or colors.		
Lighting – N/A		
Signage – N/A		
Earthwork, vegetation and rehabilitation		
7.1 Excavation and filling for prescribed tidal works— (a) is carried out only to the extent reasonably necessary for the works; and (b) does not have a significant adverse effect on— (i) the natural features, including the banks, of the tidal water in the works' immediate surroundings; or (ii) the level of the surface of the land under the tidal water in the works' immediate surroundings or any foreshore near the works.	The earthwork and filling for the prescribed tidal works is consistent with each relevant planning scheme standard.	**Complies** Douglas Shire Planning Scheme 2018 does not have a Development Code for Prescribed Tidal Works. The works are in the estuarine reaches of the Daintree River approximately 10km upstream from the river mouth so are not located near a shoreline or foreshore. The proposed works do not involve excavation, only placement of rock beaching (rip rap) and clean fill (refer to Appendix H – Detailed Design Report and Design Plans). The works are not anticipated to accelerate or compromise natural processes, rather they will improve them by preventing further erosion and sediment export and encouraging sediment accretion and riparian vegetation regeneration. The design ties in smoothly with the existing bank geometry at the upstream and downstream extents to avoid an abrupt change in bank profile, therefore reducing the risk of erosion adjacent the rock beaching works. The works also tie into areas of dense, existing vegetation that are resistant to erosion. The rootballs included in the design also provide some additional flow redirection away from the more vulnerable tie in locations.

7.2 The location and construction of prescribed tidal works ensures vegetation is cleared or disturbed only to the extent reasonably necessary for the works.	Vegetation on land affected by the prescribed tidal works is dealt with in a way consistent with the following standards— (a) subject to paragraph (b), the clearing or disturbance of vegetation for a purpose associated with the construction of prescribed tidal works, including, for example, parking for construction or workers' vehicles or stockpiling of construction materials— (i) is avoided; or (ii) if the clearing or disturbance of vegetation for a purpose associated with the construction of the works can not be avoided—the clearing or disturbance is limited to the smallest area of land reasonably necessary for the purpose; (b) any other relevant planning scheme standard that is not inconsistent with the standard mentioned in paragraph (a).	**Complies** Douglas Shire Planning Scheme 2018 does not have a Development Code for Prescribed Tidal Works. Access to the project area will be gained via Cape Tribulation Road and onto McDowall Road (a local road). The detailed design and associated construction footprint have been reduced as much as possible with the aim to avoid environmental constraints. Appendix K – Environmental Management Plan (EMP) outlines ancillary activities, such as establishment of stockpile and spoil areas, laydown areas, site office and workshops, must be located in existing cleared areas as a priority. Where this is not possible, they will be located outside environmentally sensitive areas, such as regrowth vegetation, habitat for flora and fauna species and fauna movement corridors, to minimise environmental impacts.
7.3 After the construction of prescribed tidal works, any land damaged or destabilised by, and any vegetation damaged, destroyed or removed by, the construction of the works is rehabilitated.	Land or vegetation affected by the prescribed tidal works is dealt with in a way consistent with the following standards— (a) subject to paragraph (b)— (i) land surfaces damaged or destabilised by the prescribed tidal works are restored and stabilised; and (ii) vegetation damaged, destroyed or removed by prescribed tidal works is replaced with native vegetation for the locality within which the works are located, to the extent it is reasonably practicable to replace the vegetation	**Complies** Douglas Shire Planning Scheme 2018 does not have a Development Code for Prescribed Tidal Works. Appendix M – Revegetation Plan and Report, outlines the requirements for implementing revegetation works as part of the project. The project area is 1,574m^2 and vegetation clearing has been limited as much as possible while still allowing construction activities to occur. Marine plant clearing calculations (areas below HAT) are based on the worst-case scenario and have been reduced to 14.22 m^2. The proposed revegetation of the 498m^2 is larger than actual marine plant clearance of 14.22m^2

	with native vegetation. (b) if a relevant planning scheme standard is more stringent than the standard mentioned in paragraph (a)—the relevant planning scheme standard, to the extent it is more stringent than the standard mentioned in paragraph (a); (c) any other relevant planning scheme standard that is not inconsistent with the standards mentioned in paragraphs (a) and (b).	and aims to establish the same structure and composition as the typical riparian regional ecosystems surrounding the project area. Revegetation works will therefore lead to a net gain of marine plants.
Public access – availability		
8.1 Prescribed tidal works do not have a significant adverse effect on the availability of public access to, along or across State coastal land.	The design and construction of the prescribed tidal works is consistent with the following standards— (a) subject to paragraph (b), prescribed tidal works do not involve the erection or placement of any physical barrier preventing existing public access to, along or across State coastal land near the works; (b) if a relevant planning scheme standard is more stringent than the standard mentioned in paragraph (a)—the relevant planning scheme standard, to the extent it is more stringent than the standard mentioned in paragraph (a); (c) any other relevant planning scheme standard that is not inconsistent with the standards mentioned in paragraphs (a) and (b).	**Complies** Douglas Shire Planning Scheme 2018 does not have a Development Code for Prescribed Tidal Works. The project area is located on State coastal land (land in a coastal management district and covered by tidal water). However, the streambank is eroding, making it unsafe and undesirable for public use or access - it has already been barricaded. The proposed works will last 6 weeks and will not have an adverse impact on public use of or access to State coastal land as formal access for the community has not been, and is not intended to be, provided at this location. The main community access point is downstream at the location of the Daintree River ferry operations where public infrastructure is located. The proposed works will make the location safer for current and future generations. Works will occur from the bank of the Daintree River, with access gained by an already established local road. Waterway access will remain available along the Daintree River during the construction works.

Public access – safety		
9.1 The location and design of prescribed tidal works does not adversely affect the safety of members of the public accessing State coastal land.	Public access to State coastal land near the prescribed tidal works is consistent with each relevant planning scheme standard.	**Complies** Douglas Shire Planning Scheme 2018 does not have a Development Code for Prescribed Tidal Works. Please refer to the response to 8.1.
Navigable access to, or egress from, lots that adjoin, or are in the immediate surroundings of, a lot connected to prescribed tidal works – N/A		
Infrastructure, including, access, parking, sewerage and water services – N/A		
Design, construction and safety—all prescribed tidal works		
12.1 Prescribed tidal works are designed and constructed in a way to ensure they are structurally sound, having regard to the following— (i) relevant engineering standards; (ii) the location of the works; (iii) the purpose for which the works are to be used; (iv) the impact of flooding, storm tide, overtopping by waves, projected sea level rise, tidal influences and hydrodynamic forces; (v) the design life of the works; (vi) the dead load of the works and the intended live load for the works; (vii) the impact of hydrostatic pressures on the works; (viii) the stability of individual components of the works, including, for example, boulders, concrete blocks or sandbags.	The design and construction of the prescribed tidal works is consistent with the following standards— (a) subject to paragraph (c), each Australian Standard relevant to the design or construction of structures, to the extent requirements stated in the Standard apply to the design or construction of prescribed tidal works; (b) subject to paragraph (c), the projected sea level rise is factored into the design and construction of the prescribed tidal works; (c) if a relevant planning scheme standard is more stringent than the standard mentioned in paragraph (a) or (b)—the relevant planning scheme standard, to the extent it is more stringent than the standard mentioned in paragraph (a) or (b).	**Complies** The proposed works involve streambank erosion remediation. The proposed works have been designed to the relevant Australian Standards and are structurally sound with the relevant impacts and loads being assessed as part of the design process. The works will not be negatively impacted by projected sea level rise. Refer to Appendix H – Detailed Design Report and Design Plans which are RPEQ certified. Douglas Shire Planning Scheme 2018 does not have a Development Code for Prescribed Tidal Works.

12.2 Prescribed tidal works do not adversely affect the structural integrity of any existing revetment or seawall or another existing structure.	The design and construction of the prescribed tidal works is consistent with the following standards— (a) subject to paragraph (b), prescribed tidal works, including any abutment, piling or other structure connected with the works— (i) do not place an additional load on any existing revetment or seawall or another existing structure; or (ii) can be structurally supported by an existing revetment or seawall or another existing structure; (b) if a relevant planning scheme standard is more stringent than the standard mentioned in paragraph (a)—the relevant planning scheme standard, to the extent it is more stringent than the standard mentioned in paragraph (a).	**Not Applicable** There is no existing structure in the project area.
12.3 Prescribed tidal works are designed and constructed in a way to ensure they do not adversely affect the stability of the bed and banks of tidal water	The design and construction of the prescribed tidal works is consistent with the following standards— (a) subject to paragraph (b), prescribed tidal works do not cause, by changing the flow of water, the removal of, or disturbance to, the sediment on the bed and banks of tidal water; (b) if a relevant planning scheme standard is more stringent than the standard mentioned in paragraph (a)—the relevant planning scheme standard, to the extent it is more stringent than the standard mentioned in paragraph (a).	**Complies** The proposed works do not involve excavation, only rock beaching (rip rap) and fill (refer to Appendix H – Detailed Design Report and Design Plans). The works are not anticipated to accelerate or compromise natural processes, rather they will improve them by preventing further erosion and sediment export and encouraging sediment accretion and riparian vegetation regeneration. The design ties in smoothly with the existing bank geometry at the upstream and downstream extents to avoid an abrupt change in bank profile, therefore reducing the risk of erosion adjacent the rock beaching works. The works also tie into areas of dense, existing vegetation that are resistant to

		erosion. The rootballs included in the design also provide some additional flow redirection away from the more vulnerable tie in locations.
12.4 Prescribed tidal works are designed and constructed using materials suitable for marine environments, having regard to their ability to resist the following— (a) attack by marine organisms; (b) corrosion; (c) deterioration or breakage resulting from exposure to environmental conditions including, for example, the following— (i) abrasion; (ii) immersion in seawater; (iii) wave action.	The design and construction of the prescribed tidal works is consistent with the following standards— (a) subject to paragraph (b), each Australian Standard relevant to the materials that should be used, or the measures that should be taken to treat materials used, for structures, to the extent the requirements stated in the Standard apply to structures located in a marine environment; (b) if a relevant planning scheme standard is more stringent than the standard mentioned in paragraph (a)—the relevant planning scheme standard, to the extent it is more stringent than the standard mentioned in paragraph (a).	**Complies** The proposed works involve streambank erosion remediation. The proposed works have been designed to the relevant Australian Standards. Refer to Appendix H – Detailed Design Report and Design Plans which are RPEQ certified. Douglas Shire Planning Scheme 2018 does not have a Development Code for Prescribed Tidal Works.
12.5 Prescribed tidal works are designed and constructed in a way to ensure they do not adversely affect the operation or maintenance of any existing stormwater outlet.	The design and construction of the prescribed tidal works is consistent with the following standards— (a) subject to paragraph (c), vessels moored at prescribed tidal works do not impede the discharge of stormwater; (b) subject to paragraph (c), prescribed tidal works do not restrict access to any stormwater outlet; (c) if a relevant planning scheme standard is more stringent than the standard mentioned in paragraph (a) or (b)—the relevant planning scheme standard, to the extent it is more stringent than the standard mentioned in paragraph (a) or (b).	**Complies** The proposed works involve streambank erosion remediation. Douglas Shire Planning Scheme 2018 does not have a Development Code for Prescribed Tidal Works. No marine watercraft will be used on the worksite for construction. The proposed works will not interfere or impede the discharge of stormwater. Confirmation of existing council infrastructure (including stormwater) locations will be checked prior to commencing the proposed works.

12.6 Prescribed tidal works are designed and constructed in a way to ensure they do not adversely affect the water quality of tidal water, including, in particular, as a result of— (a) release, into the tidal water, of materials used in the construction of the works; or (b) disturbance to the sediment on the bed and banks of the tidal water; or (c) exposure to acid sulphate soils.	The design and construction of the prescribed tidal works is consistent with the following standards— (a) subject to paragraph (b), each Australian Standard relevant to the design or construction of structures under, within or over tidal water, to the extent the requirements stated in the Standard are directed at maintaining the water quality of tidal water; (b) if a relevant planning scheme standard is more stringent than the standard mentioned in paragraph (a)—the relevant planning scheme standard, to the extent it is more stringent than the standard mentioned in paragraph (a).	**Complies** The proposed works involve streambank erosion remediation. The proposed works have been designed to the relevant Australian Standards. Refer to Appendix H – Detailed Design Report and Design Plans which are RPEQ certified. The nature of the proposed erosion control structure involves rock beaching (rip rap) and fill which will not impact on soils. No excavation is required. Appendix K – Environmental Management Plan (EMP), requires avoiding disturbance of Acid Sulfate Soils (ASS) and provides management measures for working in and adjacent to the aquatic habitat at the site, including activities involving sediment control, stockpiling, clearing vegetation, re-fuelling machinery and handling waste or hazardous materials which have the potential to impact water quality. The proposed rehabilitation aims to significantly minimise the volume of sediment released from the riverbank than if it was left in its current condition. The mitigation measures outlined in the EMP will minimise the impact of constructing the works on surface water quality and will minimise risk to water quality objectives during construction. ASS investigations were undertaken in conjunction with geotechnical assessments (**Error! Reference source not found.** (ASS) (Neilly Group, 2024g). The test results indicate that actual ASS and potential ASS may be present, subject to more rigorous testing. However, it was acknowledged that the project design does not require excavation and the proposed works comprise mostly of placement of rock against the bank, so the preparation of an ASS Management

		Plan was not required. General environmental duty obligations and appropriate neutralisation measures to mitigate potential environmental impacts were recommended. Therefore, the detailed design report recommends liming for neutralising acidity. Further, disturbance of material in areas exposed to tides will not result in oxidation of ASS if present, as regular tidal movements will occur. Material above the tide line is assumed to be a combination of natural insitu soils as well as historically imported fill for the construction of McDowall Lane. No contaminants are proposed to be used in the tidal area. The development aims to halt erosion of the riverbank, minimising the potential for the weak acid sulfates found to be exposed to air. Appendix J – Erosion and Sediment Control Plan (ESCP) incorporates control measures during the construction phase in line with Best Practice ESCP guidelines for Australia (International Erosion Control Association) to prevent the release of sediment to waters. Douglas Shire Planning Scheme 2018 does not have a Development Code for Prescribed Tidal Works.
12.7 Prescribed tidal works are designed and constructed in a way to ensure they are safe for persons using the works.	The design and construction of the prescribed tidal works is consistent with the following standards— (a) subject to paragraph (d), each Australian Standard relevant to the design or construction of structures, the materials that should be used, or the measures that should be taken to treat materials used, for structures, to the extent the requirements stated in the Standard are directed at ensuring any surface of prescribed tidal works	**Not applicable** The proposed works involve streambank erosion remediation not prescribed tidal works infrastructure. Where applicable the works have been designed to the relevant Australian Standards (refer design report) Public use of the project area as formal access for the community has not been, and is not intended to be, provided

	on which a person may stand or walk is— (i) not slippery; and (ii) does not have any feature that may cause the person to trip or fall; (b) subject to paragraph (d), any part of prescribed tidal works that is unsafe for persons using the works is surrounded by adequate barriers to deter persons from entering the part; (c) subject to paragraph (d), each Australian Standard relevant to the design or construction of structures, to the extent the requirements stated in the Standard are directed at ensuring prescribed tidal works provide safety ladders or other design features for the safety of a person who falls off the works into water; (d) if a relevant planning scheme standard is more stringent than the standard mentioned in paragraph (a), (b) or (c)— the relevant planning scheme standard, to the extent it is more stringent than the standard mentioned in paragraph (a), (b) or (c).	at this location. It is currently unsafe and has been barricaded. The proposed works will make the location safer for current and future generations. Waterway access will remain available along the Daintree River during the construction works. Douglas Shire Planning Scheme 2018 does not have a Development Code for Prescribed Tidal Works.
12.8 Appropriate measures are taken for prescribed tidal works for a non-private purpose to ensure an unsupportable live load is not applied to the works by persons or vehicles.	The design and construction of the prescribed tidal works is consistent with the following standards— (a) subject to paragraph (b), prescribed tidal works have erected or placed in position on or near the works, a sign that— (i) is visible at all times; and states the maximum live load that may be applied to the works, in terms of the maximum number of persons that may be on the works at any given time or the	**Not applicable** The proposed works involve streambank erosion remediation not prescribed tidal works infrastructure. Public use of the project area as formal access for the community has not been, and is not intended to be, provided at this location. It is currently unsafe and has been barricaded. The proposed works will make the location safer for current and future generations. Waterway access will remain available along the Daintree River during the construction works.

	maximum number of vehicles of a particular type that may be on or moored at the works at any given time; (b) if a relevant planning scheme standard is more stringent than the standard mentioned in paragraph (a)—the relevant planning scheme standard, to the extent it is more stringent than the standard mentioned in paragraph (a).	Douglas Shire Planning Scheme 2018 does not have a Development Code for Prescribed Tidal Works.
12.9 Prescribed tidal works, other than a prescribed deck for a private purpose, are designed and constructed in a way to ensure the use of tidal water in a canal for a non-maritime purpose is minimised.	The design and construction of the prescribed tidal works is consistent with each relevant planning scheme standard.	**Not applicable** The project area is not located in a canal.
12.10 Prescribed tidal works that are a prescribed deck and for a private purpose, are designed and constructed in a way to ensure the use of tidal water in a canal for a non-maritime purpose is minimised.	(s 5(2) outcome) The design and construction of the prescribed deck is consistent with the following standards— (a) subject to paragraph (c), a prescribed deck does not extend more than 3m from the waterfront boundary of the lot connected to the deck; (b) subject to paragraph (c), a prescribed deck is at least 3m inside of the side boundary or extended side boundary of the lot connected to the deck; (c) if a relevant planning scheme standard is more stringent than the standard mentioned in paragraph (a) or (b)—the relevant planning scheme standard, to the extent it is more stringent than the standard mentioned in paragraph (a) or (b).	**Not applicable** The proposed works do not involve a deck for a private purpose.
Design, construction and safety—boat ramps and slipways for private purpose – N/A		

Design, construction and safety—bridges – N/A
Design, construction and safety—prescribed decks – N/A
Design, construction and safety—jetties and piers – N/A
Design, construction and safety—pipelines and other underground services – N/A
Design, construction and safety—pontoons
Design, construction and safety—revetments and seawalls – N/A
Design, construction and safety—wharves – N/A

State code 7: Maritime safety

State Development Assessment Provisions Supporting Guideline – State code 7: Maritime Safety which provides direction on how to address this code.

Table 7.1: Operational work

Performance outcomes	Acceptable outcomes	Response
Visibility		
PO1 Lighting does not distract attention away from, or otherwise reduce the effectiveness of, **aids to navigation**.	**AO1.1** Lights are shielded to prevent glare or reflection. AND **AO1.2** Development does not include flood lighting, flashing lights, flickering lights, or lights coloured green, blue or red.	**Complies** The works will take place on the bank of the Daintree River and road reserve adjacent 41 and 49 McDowall Lane – Esplanade, Lower Daintree, Douglas Shire. The project area is shown in Figure 4 of the DA Report. The Daintree River is identified as a navigation corridor however the proposed works will not involve marine watercraft entering the waterway therefore, any potential impact to this state interest is not anticipated. As documented in Appendix K – Environmental Management Plan (EMP), the proposed works will not require lighting as construction activities aim to be restricted to between the hours of 7.00am to 6.00pm Monday to Friday (excluding public holidays) and restricted to the hours of 7.00am and 5.00pm Saturday with no construction occurring on Sunday or public holidays (outside the Code of Practice Volume 2 hours).
PO2 Development is designed and constructed to be visible to mariners, to avoid the risk of collision.	No acceptable outcome is prescribed.	**Complies** As above, the works will take place on the bank of the Daintree River and road reserve. The project area is shown in Figure 4 of the DA Report. The

Performance outcomes	Acceptable outcomes	Response
		proposed works will not involve marine watercraft entering the waterway and the works will be visible on the bank of the river, therefore removing the risk of collision. Therefore, any potential impact to this state interest is not anticipated.
Aids to navigation		
PO3 Development does not interfere with the operation of **aids to navigation**.	**AO3.1** Development does not destabilise **aids to navigation, including** ground tackle. AND **AO3.2** Development does not obstruct sight lines to **aids to navigation**. AND **AO3.3** Development keeps sight lines of any **aids to navigation** which cross the land clear of obstructions. AND **AO3.4** Development does not interfere with existing access to **aids to navigation** for maintenance purposes. AND **AO3.5** Development does not result in electrical or electro-magnetic emissions that impede the operation of **aids to navigation**.	**Complies** As above, the works will take place on the bank of the Daintree River and road reserve. The project area is shown in Figure 4 of the DA Report. The proposed works will not involve marine watercraft entering the waterway therefore the works will not obstruct sight lines or interfere with aids to navigation.
Protection of navigable waterways		
PO4 Development does not obstruct the safe movement of vessels in a **navigable waterway**.	No acceptable outcome is prescribed.	**Complies**

Performance outcomes	Acceptable outcomes	Response
		As above, the works will take place on the bank of the Daintree River and road reserve. The project area is shown in Figure 4 of the DA Report. The proposed works will not involve marine watercraft entering the waterway therefore the works will not obstruct the safe movement of vessels in a navigable waterway.

State code 8: Coastal development and tidal works

State Development Assessment Provisions Guidance Material: State code 8: Coastal Development and tidal works provides direction on how to address this code.

Table 8.1: All development

Performance outcomes	Response
Development in the erosion prone area	
PO1 Development is only permitted in the **erosion prone area** where it: 1. is one of the following types of development: a. **coastal-dependent development**; or b. **temporary, readily relocatable or able to be abandoned**; or c. **essential community infrastructure**; or d. **redevelopment** of an existing permanent building or structure that cannot be relocated or abandoned; and 2. cannot feasibly be located elsewhere; or 3. is located landward of: a. a **fit for purpose revetment**; or b. a proposed revetment that is consistent with: i. an **agreement with a local government**; or ii. the alignment of adjacent lawful revetments; or 4. is on a lot less than 2000m^2 where a **coastal building line** is present.	**Complies** The project is part of the Australian Government's Reef Coastal Restoration Program. The proposed works will provide for the remediation of a 100m section of riverbank in the Daintree River (the proposed works) that has been impacted by erosion. The proposed works will involve a combination of rock toe protection (with a bench and rootballs incorporated) and riparian revegetation. The project area is located wholly within the Erosion Prone Area (EPA). However, the proposed works involve remediation of a tidal streambank and cannot be feasibly relocated, as it is coastal-dependent development, which is development that must be located in tidal waters to function effectively. The proposed works aim to improve the risks to people and property by remediating the eroding streambank of the river that currently threatens environmental values, people, public infrastructure and private property. The works will not increase population or development to the area.
PO2 Development (other than **coastal protection work**) in the **erosion prone area**: 1. does not adversely impact **coastal processes**; and 2. ensures that the protective function of landforms and vegetation is maintained. Note: In considering reconfiguring a lot applications, the State may require land in the **erosion prone area** to be surrendered to the State for coastal management purposes under the *Coastal Protection and Management Act 1995*. Where the planning chief executive receives a copy of a land surrender requirement or proposed land surrender notice under the *Coastal Protection and Management Act 1995*, this must be considered in assessing the application.	**Not applicable** The proposed works are considered coastal protection work because it is permanent work undertaken to manage the impacts of coastal erosion. Therefore, this PO is understood not to be applicable.
PO3 Development is sited, designed and constructed to limit the risk of impacts of **coastal erosion** to an acceptable level by: 1. locating development outside the **erosion prone area**; or	**Complies**

Performance outcomes	Response
2. mitigating or otherwise accommodating the risks posed by **coastal erosion.**	The project area is located wholly within the EPA. However, the proposed works involve remediation of a tidal streambank and cannot be feasibly relocated, as it is coastal-dependent development, which is development that must be located in tidal waters to function effectively. A functional design for the remediation of the streambank has been prepared (refer to Appendix H – Detailed Design Report and Design Plans) and broadly includes: • Installation of rock beaching (approx. 3,500t of rock) as a hard-engineering solution along the toe of the bank to prevent the imminent threat of further erosion. A bench will be incorporated and will include a sill on the outer edge to create a basin for sediment deposition which will encourage natural recruitment of mangroves; • Installation of rootballs (anchored to rock beaching) to provide direct fish habitat and longitudinal habitat connectivity; • cover spreading to provide immediate short term ground-cover protection after earthworks and aid revegetation of riparian species. • Revegetation with riparian species on the bank behind the mangroves, rock protection and root-balls will increase hydraulic roughness and improve the connectivity of the riparian corridor at the site. The works will not increase population or development to the area. The remediation works are proposed to prevent further erosion and increase resilience to the threat and are considered to satisfy the purpose of State code 8.
PO4 Development in the **erosion prone area** does not significantly increase the risk or impacts to people and property from **coastal erosion**.	**Complies** The project area is located wholly within an EPA. However, the proposed works involve remediation of a tidal streambank and cannot be

Performance outcomes	Response
	feasibly relocated, as it is coastal-dependent development, which is development that must be located in tidal waters to function effectively. The proposed works aim to improve the risks to people and property by remediating the eroding streambank of the river that currently threatens environmental values, people, public infrastructure and private property. The proposed works will not increase the number of premises or dwellings or the number of people living or working in the project area. Nor will it increase the value of assets as it is redevelopment. The remediation works are proposed to prevent further erosion and are considered to satisfy the purpose of State code 8.
PO5 Development (other than **coastal protection work**) in the **erosion prone area** does not directly or indirectly increase the severity of **coastal erosion** either on or off the site.	**Not applicable** The proposed works are considered coastal protection work because it is permanent work undertaken to manage the impacts of coastal erosion. Therefore, this PO is understood not to be applicable.
PO6 In **erosion prone areas** where a **coastal building line** is present, building work is located landward of the **coastal building line** unless **coastal protection work** has been constructed to protect the development.	**Not applicable** The project area is located wholly within the EPA however, there is no coastal building line present and building works are not proposed. Therefore, this PO is understood not to be applicable.
Artificial waterways	
PO7 Development of **artificial waterways**, canals and **dry-land marinas** conserves **coastal resources** by: 1. ensuring changes to water flows, water levels and sediment movement do not adversely impact the natural waterway to which it is connected; 2. demonstrating appropriate storage, treatment and disposal of **dredged material** for the life of the development.	**Not applicable** The proposed works do not involve development of artificial waterways, canals or dry-land marinas. Therefore, this PO is understood not to be applicable.
Coastal protection work	
PO8 Works for **beach nourishment** minimises adverse impacts on **coastal processes**.	**Not appliable**

Performance outcomes	Response
	The proposed works do not involve beach nourishment. The project area is located within an estuary. Therefore, this PO is understood not to be applicable.
PO9 Works for **beach nourishment** do not increase the severity of erosion on adjacent land.	**Not appliable** The proposed works do not involve beach nourishment. The project area is located within an estuary. Therefore, this PO is understood not to be applicable.
PO10 Erosion control structures (excluding revetments) are only constructed where there is an **imminent threat** to **significant buildings or infrastructure**, and there is no feasible option for either: 1. **beach nourishment**; or 2. relocation or abandonment of structures.	**Complies** The project area is located wholly within an EPA and partially within the storm tide inundation area. However, the proposed works involve remediation of a tidal streambank and cannot be feasibly relocated, as it is coastal-dependent development, which is development that must be located in tidal waters to function effectively. Beach nourishment is not viable given the streambank is located within an estuary. The design may be considered an erosion control structure as rock beaching will be used along the toe of the bank to prevent further erosion of the site. However, it is not considered a typical erosion control structure that the SDAP framework is generally built to assess. However the rock beaching design is considered necessary to protect infrastructure from imminent threat including: • the only public access road to several properties • occupied dwellings used for residential purposes • Daintree River public access ferry infrastructure It is expected that the project area will continue to erode from storm events even smaller than 1:100. Relocation is not feasible or economically viable, particularly for the occupied dwellings.

Performance outcomes	Response
	This section of the Daintree River is frequented by thousands of locals and tourists annually and is considered of high economic value to the region as it supports tourism and business operators. Therefore, by protecting the above infrastructure an economic benefit is gained. Further, the erosion control structure will improve the amenity of the riverbank in the long-term (rather than degrade it) by remediating the active erosion and promoting revegetation of the site. As per Appendix H – Detailed Design Report and Design Plans, several alternative design solutions were considered. Due to the geomorphic conditions and erosion mechanisms, as well as the challenging site constraints (namely the presence of a mapped state road and private property boundaries immediately adjacent the eroding bank) the preferred option is rock beaching (rip rap) combined with active riparian revegetation. A protected bench, including rootballs will be included in the design to facilitate deposition of sediment which will promote natural recruitment and establishment of mangroves. This will reduce the total suspended sediment export from the local area and downstream environment. This together with active revegetation will lead to a net gain of marine plants within the project area. Douglas Shire Council has approved a Works on Roads Permit to support the project and works proposed in the local road reserve. Overall, the remediation works are proposed to prevent further erosion and are considered to satisfy the purpose of State code 8.
PO11 Erosion control structures (revetments only) are only constructed where: 1. there is an **imminent threat** to **significant buildings or infrastructure**, and there is no feasible option for either: a. **beach nourishment**; or b. relocation or abandonment of structures; or 2. the development: a. is in a consistent alignment with adjacent lawful revetments; or	**Not appliable** The proposed works involve streambank erosion remediation, and the preferred engineering solution contains rock beaching (rip rap) combined with fill and active riparian revegetation and is not considered a typical revetment. Therefore, this PO is understood not to be applicable.

Performance outcomes	Response
b. is consistent with an **agreement with a local government** that a revetment is appropriate in the proposed location.	
PO12 Erosion control structures minimise interference with **coastal processes** and reduce the severity of erosion on adjacent land.	**Complies** As per Appendix H – Detailed Design Report and Design Plans, several alternative design solutions were considered but the erosion control structure was selected to reduce sediment loss to the susceptible estuarine bank. The design option broadly includes: • Installation of rock beaching (approx. 3,500t of rock) as a hard-engineering solution along the toe of the bank to prevent further erosion. A bench will be incorporated and will include a sill on the outer edge to create a basin for sediment deposition which will encourage natural recruitment of mangroves; • Installation of rootballs (anchored to rock beaching) to provide direct fish habitat and longitudinal habitat connectivity; • Cover spreading to provide immediate short term ground-cover protection after earthworks and aid revegetation of riparian species. • Revegetation with riparian species on the bank behind the mangroves, rock protection and root-balls will increase hydraulic roughness and improve the connectivity of the riparian corridor at the site. The works will be located on the bank of the river within metres of the local government road and will extend linearly approx.100m. The design incorporates characteristics (e.g. bench) to minimise interference with coastal processes and will facilitate deposition of sediment which will promote natural recruitment and establishment of mangroves. Mangroves also provide additional benefits in terms of reducing risk against hazards such as flooding and erosion. They effectively attenuate wave energy and provide roughness which, in an estuarine setting, protects riverbanks from erosion against flood flows. The design will also reduce total suspended sediment export from the local area and to the

Performance outcomes	Response
	downstream environment. Overall, the remediation works are proposed to prevent further erosion and are considered to satisfy the purpose of State code 8.
Water quality	
PO13 Development: 1. maintains or enhances **environmental values** of receiving waters; 2. achieves the **water quality objectives** of Queensland waters; 3. avoids the release of **prescribed water contaminants** to **tidal waters**.	**Complies** Schedule 1 of the Environmental Protection (Water and Wetland Biodiversity) Policy 2019 (EPP), identifies the Daintree River Basin, including all waters of the basin and adjacent coastal land as having environmental values to be enhanced or protected. The project area is located within the Daintree River Basin (Basin 108) which includes the surface and groundwaters in the Daintree River catchment. The Environmental Values (EVs) for estuarine waters in the Daintree River basin include: • Aquatic ecosystems • Human consumer • Secondary recreation • Visual recreation • Cultural and spiritual values The Water Quality Objectives (WQOs) are identified in the EPP, Daintree and Mossman River Basins Environmental Values and Water Quality Objectives, Basins Nos. 108 and 109 adjacent coastal waters, produced by the Department of Environment, Tourism, Science and Innovation (DETSI). The project will provide long-term environmental benefits as remediation and protection to the bank will significantly reduce erosion and the loss of suspended sediment to the Daintree and GBR Marine Park, therefore improving water quality.

Performance outcomes	Response
	Appendix K – Environmental Management Plan (EMP), provides management measures for activities such as sediment control, stockpiling, clearing vegetation, re-fuelling machinery and handling waste or hazardous materials which have the potential to impact water quality. Appendix J – Erosion and Sediment Control Plan (ESCP) incorporates control measures during the construction phase in line with Best Practice ESCP guidelines for Australia (International Erosion Control Association) to prevent the release of sediment to waters. The proposed rehabilitation aims to significantly minimise the volume of sediment released from the riverbank than if it was left in it's current condition. The mitigation measures outlined in the EMP will minimise the impact of constructing the works on surface water quality and will minimise risk to water quality objectives during construction. The remediation works are proposed to prevent further erosion and are considered to satisfy the purpose of State code 8.
Public use of and access to State coastal land	
PO14 Development maintains or enhances public use of and access to and along **State coastal land** (except where this is contrary to the protection of **coastal resources** or public safety).	**Complies** The project area is located on State coastal land (land in a coastal management district and covered by tidal water). However the streambank is eroding, making it unsafe and undesirable for public use or access. It is currently unsafe and has been barricaded. The proposed works will last 6 weeks and will not have an adverse impact on public use of or access to State coastal land as formal access for the community has not been, and is not intended to be, provided at this location. The main community access point is downstream at the location of the Daintree River ferry operations where public infrastructure is located. Further, the proposed works will not involve marine watercraft entering the waterway. Waterway access will remain available along the

Performance outcomes	Response
	Daintree River during the construction works and will make the location safer for current and future generations. The remediation works are proposed to prevent further erosion and are considered to satisfy the purpose of State code 8.
PO15 Private marine development does not reduce public use of and access to **State coastal land** and ensures that works: 1. are used for **marine access purposes** only; 2. minimise the use of **State coastal land**; 3. are designed to accommodate the berthing of one vessel only per waterfront residence; 4. do not interfere with access between **navigable waterways** and adjacent properties.	**Not appliable** The proposed works do not include private marine development. Therefore, this PO is understood not to be applicable.
PO16 Development does not reduce public use of and access to **State coastal land** and ensures that **erosion control structures**, intended to protect a freehold or leasehold (not State land) premises, are wholly located within the lot: 1. except where impeded by **significant buildings or infrastructure** that cannot be removed or relocated; or 2. for revetments the development is: a. in a consistent alignment with adjacent lawful revetments; or b. consistent with an **agreement with a local government** that a revetment is appropriate in the proposed location.	**Complies** Refer to PO14 response. Additionally, the proposed works involve remediation of the tidal streambank and therefore cannot be feasibly located elsewhere as it involves coastal-dependent development which is development that must be located in tidal waters in order to function effectively. The proposed works are considered necessary to protect infrastructure from the imminent threat of further erosion including: • the only public access road to several properties • occupied dwellings used for residential purposes • Daintree River public access ferry infrastructure The project is part of the Australian Government's Reef Coastal Restoration Program and Douglas Shire Council has already approved a Works on Roads Permit to support the project and works proposed in the local road reserve. Owner's consent has also been obtained from the State for the works proposed on State coastal land below the high-water mark.
Matters of state environmental significance	
PO17 Development is designed and sited to: 1. avoid impacts on **matters of state environmental significance**; or 2. minimise and mitigate impacts on **matters of state environmental significance** after demonstrating avoidance is not reasonably possible; and	**Complies**

Performance outcomes	Response
3. provide an **offset** if, after demonstrating all reasonable avoidance, minimisation and mitigation measures are undertaken, the development results in an acceptable **significant residual impact** on a **matter of state environmental significance**. Statutory note: For Brisbane core port land, an offset may only be applied to development on land identified as E1 Conservation/Buffer, E2 Open Space or Buffer/Investigation in the Brisbane Port LUP precinct plan.	MSES that have the potential to be impacted by the proposed works include: • Great Barrier Reef Coastal Marine Park – Conservation Zone • Marine plants • Riparian connectivity • Protected plants – were not detected in the project area. • GBR Wetlands of High Ecological Significance. No Wetland Protected Areas are located within the project area (but are located within 1km). • Regulated vegetation • Tidal watercourse – Stream Order 6. The waterway (Daintree River) is not identified to provide for fish passage • Endangered, Vulnerable and Near Threatened (EVNT) species The project is part of the Australian Government's Reef Coastal Restoration Program. The proposed works aim to remediate an eroding streambank in the Daintree River which is located within the GBR Coastal MP – Conservation Zone. The works cannot be feasibly located elsewhere as it involves coastal-dependent development which is development that must be located in tidal waters in order to function effectively. The project area is 1,574m^2 and vegetation clearing has been limited as much as possible while still allowing construction activities to occur. Temporary marine plant clearing calculations (areas below HAT) are based on the worst-case scenario and have been reduced to 14.22 m^2. The total proposed revegetation area is 498m^2 (comprising 314m^2 below HAT and 184m^2 above HAT). The revegetation area is greater than the marine plant clearance area, resulting in a net gain of marine plants. Revegetation of the project area will improve the longitudinal connectivity of the riparian corridor and provide long term resilience for the project area.

Performance outcomes	Response
	As per Appendix I – Technical Ecology Report, no threatened flora or fauna species were recorded within the project area. A self-assessment using the Queensland Environmental Offset Policy, Significant Residual Impact Guideline (December 2014)(SRI Guideline), assists to determine whether the project will have a Significant Residual Impact (SRI) on MSES. Appendix I – Technical Ecology Report, identifies MSES relevant to the project area and concludes that the project will unlikely have a SRI on a prescribed environmental matter that is MSES. The project can satisfy the SRI criteria of the SRI Guideline for marine plants and works in a highly protected zone of marine park because: • the project is considered habitat restoration • the marine plant disturbance area has been limited to 14.22 m^2 • the project area will be restored and revegetated • the project will offer a net gain of marine plants after about 5 years. In this context, it is considered that an environmental offset is not required. As per the supporting technical report appendices and in conjunction with the mitigation measures outlined in Appendix K – Environmental Management Plan (EMP), no adverse impacts on MSES is expected from the proposed works. The remediation works are proposed to prevent further erosion and are considered to satisfy the purpose of State code 8.

Table 8.2: All operational work

Performance outcomes	Response
Private marine development	
PO18 Private marine development is designed and constructed to maintain existing waterway banks in their natural state and not require: 1. **coastal protection work**; 2. shoreline or riverbank hardening; 3. **dredging** for **marine access purposes**.	**Not applicable** The proposed works do not include private marine development. Therefore, this PO is understood not to be applicable.
Disposal of solid waste or dredged material from artificial waterways	
PO19 Solid waste from land and **dredged material** from **artificial waterways** is not disposed of in **tidal water** unless it is for **beneficial reuse**.	**Not applicable** The proposed works do not include artificial waterways. Therefore, this PO is understood not to be applicable.
Disposal of dredged material other than from artificial waterways	
PO20 Dredged material is returned to **tidal water** where the material is needed to maintain **coastal processes** and sediment volume.	**Not applicable** The proposed works do not include dredging. Operational works will include placement of rock beaching, inclusive of rock sill for bench protection and fill. Therefore, this PO is understood not to be applicable.
PO21 Where the **dredged material** is not needed to maintain **coastal processes** and sediment volume, the quantity of **dredged material** disposed to **tidal water** is minimised through **beneficial reuse** or disposal on land.	**Not applicable** The proposed works do not include dredging. Operational works will include placement of rock beaching, inclusive of rock sill for bench protection and fill. Therefore, this PO is understood not to be applicable.
All dredging and any disposal of dredged material in tidal water	
PO22 Dredging or disposal of **dredged material** in tidal waters does not adversely impact on **coastal processes** and **coastal resources**.	**Not applicable** The proposed works do not include dredging. Operational works will include placement of rock beaching, inclusive of rock sill for bench protection and fill. Therefore, this PO is understood not to be applicable.
Reclamation	
PO23 Development does not involve **reclamation** of land below **tidal water**, other than for the purposes of: 1. **coastal-dependent development**, **public marine development** or **essential community infrastructure**; or	**Not applicable** The proposed works do not include reclamation. Therefore, this PO is understood not to be applicable.

Performance outcomes	Response
2. strategic ports, priority ports, boat harbours or strategic airports and aviation facilities, in accordance with a statutory land use plan or master plan; or 3. **coastal protection work** or work necessary to protect **coastal resources** or **coastal processes**.	

Table 8.3: Operational work for tidal works which is not assessed by local government

Performance outcomes	Acceptable outcomes	Response
PO24 Tidal works are sited and designed to operate safely during and following a **defined storm tide event**.	**AO24.1** Tidal work is designed and located in accordance with the Guideline: Building and engineering standards for tidal works, Department of Environment and Heritage Protection, 2017.	**Not applicable** The proposed works will be assessed by the local government. Therefore, this PO is understood not to be applicable.

State code 11: Removal, destruction or damage of marine plants

State Development Assessment Provisions guideline - State Code 11: Removal, destruction or damage of marine plants**.** This guideline provides direction on how to address State Code 11 below.

Table 11.1 Operational works

Performance outcomes	Acceptable outcomes	Response
All development - Impacts to marine plants		
PO1 The design, construction and maintenance of the development does not result in adverse impacts to **marine plants** and **fish habitat**.	No acceptable outcome is prescribed.	**Complies** The project is part of the Australian Government's Reef Coastal Restoration Program. The project aims to remediate streambank erosion on a 100m section of the Daintree River and therefore cannot be feasibly located elsewhere (avoided). The project area shows active erosion and consequently the option "to do nothing" is not viable because subsequent marine plants and fish habitat loss is expected without the proposed works proceeding. As outlined in Appendix L - Marine Plant Clearance Report, there is currently very low marine plant species diversity in the project area compared to bordering ecosystems which is contributed to erosion. Typical marine species such as mangroves, saltwater couch and succulents were mostly absent. As per Appendix H – Detailed Design Report and Design Plans, several alternative design solutions were assessed. Due to the geomorphic conditions and erosion mechanisms, as well as the challenging site constraints

Performance outcomes	Acceptable outcomes	Response
		(namely the presence of a mapped state road and private property boundaries immediately adjacent the eroding bank) the preferred option is rock beaching (rip rap) combined with active riparian revegetation. To maintain and improve fish habitat and reduce impacts to marine plants the design incorporates rootballs and a bench into the design. The rootballs provide direct fish habitat and longitudinal habitat connectivity. The bench has been designed to provide a low energy zone that will allow for sediment deposition which facilitates natural recruitment of mangroves therefore linking the existing fragmented riparian vegetation. The construction footprint is 1,574m^2 and temporary marine plant clearance was reduced to 14.22 m^2 which is based on a worst-case impact scenario and considered unavoidable. The impact is considered temporary because there is currently a low presence of marine plants in the project area which can be attributed to the active erosion at the site. Appendix K – Environmental Management Plan (EMP) includes measures to identify areas that are marked for clearing versus areas to remain. If possible, stumps and roots are to be left in situ and large woody debris are to be relocated to appropriate locations outside the project area but within the waterway to maintain habitat value. As per appendix M – Revegetation Plan and Report, the area proposed for revegetation is 498m^2 and incorporates 314m^2 below HAT and 184m^2 above HAT which is greater than the clearance area. Through ongoing engagement with Douglas Shire Council, the

Performance outcomes	Acceptable outcomes	Response
		most appropriate riparian species will be selected to plant. Revegetation will broaden the riparian zone and improve existing connectivity. The project will ultimately provide an overall net gain of marine plants after about 5 years. The EMP also details measures during the operation and maintenance phase of the project, including regular visual inspections, monitoring of revegetation and weed management measures.
PO2 Development is designed, constructed and maintained to avoid and minimise impacts on **matters of state environmental significance (MSES)**	No acceptable outcome is prescribed.	**Complies** The project is part of the Australian Government's Reef Coastal Restoration Program. The program aims to rehabilitate and restore blue carbon ecosystems, including seagrasses, mangroves, saltmarsh and wetlands. MSES includes marine plants. As demonstrated in PO1, the location cannot be avoided due to the nature of the works and the degradation of marine plants will continue if nothing is done. Further Appendix L – Marine Plant Clearance Report, identifies that marine plants within the project area are mostly absent due to the active erosion and sediment loss. Appendix H – Detailed Design Report and Design Plans, considers several alternative design solutions and the preferred option (rock beaching (including bench for sediment deposit), rootballs, cover spreading and active riparian rehabilitation) is considered to reduce the extent of impact to MSES to the smallest extent possible. Additionally, laydown areas are located outside MSES

Performance outcomes	Acceptable outcomes	Response
		and access is provided via an existing local road. The total area of marine plants proposed to be temporarily cleared within the construction footprint is 14.22 m^2 which is based on a worst-case impact scenario and considered unavoidable. A self-assessment using the Queensland Environmental Offset Policy, Significant Residual Impact Guideline (December 2014)(SRI Guideline), assists to determine whether the project will have a Significant Residual Impact (SRI) on MSES. Appendix I – Technical Ecology Report, identifies MSES relevant to the project area and concludes that the project will unlikely have a SRI on a prescribed environmental matter that is MSES. The project can satisfy the SRI criteria of the SRI Guideline for marine plants because: • the project is considered habitat restoration • the marine plant disturbance area has been limited to 14.22 m2 • the project area will be restored and revegetated • the project will offer a net gain of marine plants after about 5 years. In this context, it is considered that an environmental offset is not required. An extensive revegetation regime will be undertaken (refer to Appendix M – Revegetation Plan and Report) that involves riparian species, retaining and replanting species that are within the construction footprint, as well as natural regeneration. A net gain of marine plants will be achieved after about 5 years. Additionally, the proposed works will reduce suspended sediment loads to

Performance outcomes	Acceptable outcomes	Response
		the GBR Coastal Marine Park and improve water quality for marine plant recruitment. The proposed works will be managed through implementation of Appendix K – Environmental Management Plan, to identify and mitigate potential environmental risks which may arise during the project.
PO3 Where development impacts on **matters of state environmental significance**, development mitigates impacts and provides an **offset** for any acceptable **significant residual impact** on **matters of state environmental significance**. Statutory note: For Brisbane core port land, an offset may only be applied to development on land identified as E1 Conservation/Buffer, E2 Open Space or Buffer/Investigation in the Brisbane Port LUP precinct plan.	No acceptable outcome is prescribed.	**Not applicable** Refer to PO1 and PO2. The location cannot be avoided, and the degradation of marine plants will continue if nothing is done. The construction footprint was minimised to prevent excess marine plant clearance. The total area of temporary marine plant disturbance within the construction footprint is 14.22m^2 which is based on a worst-case scenario and considered unavoidable. Further, the proposed works aim to provide a net gain of marine plants after about 5 years. There is not expected to be a SRI as the proposed works do not exceed the SRI Criteria in the Queensland Environmental Offset Policy Significant Residual Impact Guideline (December 2014). In this context, it is considered that an environmental offset is not required.
All development in general		
PO4 Aspects of development are only permitted on **tidal land** where there is a functional requirement and the development cannot be feasibly located elsewhere. Ancillary elements (such as rest rooms and offices) are to be located outside of **tidal land**.	No acceptable outcome is prescribed.	**Complies** The proposed works involve remediation of a tidal streambank and therefore cannot be feasibly located elsewhere. Erosion of the streambank and degradation of marine plants will continue if nothing is done.

Performance outcomes	Acceptable outcomes	Response
		The structure will be located on the bank of the river within metres of the local government road and will extend a linear distance of approx.100m. There are no ancillary aspects of development to accompany the prescribed tidal works.
PO5 The development does not result in adverse impacts on **fish** movement or fragmentation of **fish habitats**.	No acceptable outcome is prescribed.	**Complies** The existing fish habitat is degrading, fragmented and threatened by active erosion. As outlined in Appendix L – Marine Plant Clearance Report, there is currently very low marine plant species diversity in the project area compared to bordering ecosystems. Typical marine species such as mangroves, saltwater couch and succulents were mostly absent. The proposed works are not classified as a waterway barrier work as they involve bank stabilisation works and do not extend beyond 10% of the width of the waterway or raise the bed level of the waterway above its natural profile. As per Appendix H – Detailed Design Report and Design Plans, the preferred option will include rock beaching, as this is the only option to promptly prevent further erosion at the site. The works are for a linear length of 100 metres and will extend from the top of bank to just past the toe (refer to Design Plans). These works will not present a barrier to fish movement or become a factor for fish stranding. The design incorporates rootball structures which provide immediate fish habitat. Long-term the design intent is to

Performance outcomes	Acceptable outcomes	Response
		facilitate mangrove establishment along the whole extent of the design works, therefore creating a continuous fish habitat area. The proposed works aim to provide a net gain of marine plants after about 5 years. Further, the EMP provides management measures to ensure works are constructed and maintained to avoid fish injury, mortality and/or entrapment and that revegetation works revegetate disturbed areas as soon as practicable after works.
PO6 The design, construction and maintenance of the development does not result in adverse impacts on **fisheries resources.**	No acceptable outcome is prescribed.	**Complies** Please refer to PO1 and PO5 responses. The proposed works are not anticipated to adversely impact fisheries resources (which includes fish and marine plants).
PO7 The development is designed, constructed and maintained to encourage **fish habitats** and **fisheries resource** values to naturally regenerate.	No acceptable outcome is prescribed.	**Complies** Please refer to the responses to PO1, PO5 and PO6. The preferred option design will provide areas of low flow and velocity along the streambank. These low flow/velocity areas will create suitable conditions to facilitate the re-colonisation of marine plants at the site. The structures will also encourage the deposition of suspended sediment flowing from the catchment upstream. This deposition occurs on the downstream side of the log structures, providing ideal substrate for the colonisation of marine plant communities in the regions below the bank. The proposed works aim to provide a net gain of marine plants after about 5 years Works will occur from the bank of the Daintree River, with access gained by an already established local road.

Performance outcomes	Acceptable outcomes	Response
		An extensive revegetation regime will be undertaken (refer to Appendix M – Revegetation Plan and Report) within the construction footprint, as well as natural regeneration. A net gain of marine plants will be achieved after about 5 years. The EMP also details measures during the operation and maintenance phase of the project, including regular visual inspections, monitoring of revegetation and weed management measures.
PO8 Development likely to cause drainage or disturbance to acid sulfate soils, prevents the release of contaminants and impacts on **fisheries resources** and **fish habitats**.	No acceptable outcome is prescribed.	**Complies** The project involves remediating an eroding streambank. As per section 4.5 of the DA Report, Acid Sulphate Soils (ASS) investigations (Appendix N – Acid Sulfate Soil) were undertaken in conjunction with geotechnical assessments. The screening test results indicated that Actual ASS and Potential ASS conditions may be present, subject to more rigorous testing. However, it was also acknowledged that the project design does not require excavation and the proposed works comprise mostly of placement of rock against the bank, so the preparation of an ASS Management Plan was not required. General environmental duty obligations and appropriate neutralisation measures to mitigate potential environmental impacts were recommended. Therefore a ASS Management Plan was not prepared. Further, disturbance of material in areas exposed to tides will not result in oxidation of ASS if present, as regular tidal movements will occur. Material above the tide line is

Performance outcomes	Acceptable outcomes	Response
		assumed to be a combination of natural insitu soils as well as historically imported fill for the construction of McDowall Lane. No contaminants are proposed to be used in the tidal area. The development aims to halt erosion of the riverbank, minimising the potential for the weak acid sulfates found to be exposed to air. The Environmental Management Plan (EMP) also includes mitigation measures to address potential impacts to ASS and the detailed design report recommends liming for neutralising acidity.
PO9 The development maintains or restores drainage patterns, the extent and timing of tidal and freshwater inundation.	*For bridges:* **AO9.1** Bridges are designed with abutments above the **highest astronomical tide**. AND *For water, sewer or stormwater infrastructure:* **AO9.2** Infrastructure is placed below the existing natural substrate surface level, and natural substrate, surface levels and habitat condition and values are reinstated. *For any other development, no acceptable outcome is prescribed.*	**Complies** The design is situated on a section of the main riverbank and does not impede any tidal or freshwater flow paths.
PO10 The design, construction and maintenance of the development maintains natural erosion and accretion processes.	No acceptable outcome is prescribed.	**Complies** At present the site is experiencing accelerated erosion due to anthropogenic activities i.e. riparian clearing. The proposed works are not anticipated to accelerate or compromise natural processes, rather they will improve them by preventing further erosion and sediment export

Performance outcomes	Acceptable outcomes	Response
		and encouraging sediment accretion and riparian vegetation regeneration. The design ties in smoothly with the existing bank geometry at the upstream and downstream extents to avoid an abrupt change in bank profile, therefore reducing the risk of erosion adjacent the rock beaching works. The works also tie into areas of dense, existing vegetation that are resistant to erosion. The rootballs included in the design also provide some additional flow redirection away from the more vulnerable tie in locations. Measures to avoid and minimise impacts to fish habitats and fisheries resources is addressed in PO1, PO5 and PO6. Appendix H – Detailed Design Report and Design Plans provides design plans and Appendix L – Marine Plant Clearance Report outlines marine plant impacts.
PO11 The development is designed, constructed and maintained so that it does not increase the risk of scour or erosion of **waterway** bed or banks.	No acceptable outcome is prescribed.	**Complies** The design ties in smoothly with the existing bank geometry at the upstream and downstream extents to avoid an abrupt change in bank profile, therefore reducing the risk of erosion adjacent the rock beaching works. The works also tie into areas of dense, existing vegetation that are resistant to erosion. The rootballs included in the design also provide some additional flow redirection away from the more vulnerable tie in locations. Appendix H – Detailed Design Report and Design Plans provides design plans.

Performance outcomes	Acceptable outcomes	Response
PO12 The development is designed, constructed and maintained so that it does not increase the risk of shoreline or **foreshore** erosion.	No acceptable outcome is prescribed.	**Complies** The works are located in the estuarine reaches of the Daintree River approximately 10km upstream from the river mouth so do not increase the risk of shoreline or foreshore erosion.
PO13 Development does not have an adverse impact on **public use** of or access to **tidal land** and **waterways**.	*For development for a material change of use or reconfiguration of a lot:* **AO13.1 Tidal land** and **fish habitats** are separated from development and are available for **public use**. *For any other development, no acceptable outcome is prescribed.*	**Complies** The streambank is eroding, making it unsafe and undesirable for public use or access. The proposed works will last 6 weeks and will not have an adverse impact on public use of or access to tidal land and waterways as formal access for the community has not been, and is not intended to be, provided at this location. It is currently unsafe and has been barricaded. The main community access point is downstream at the location of the Daintree River ferry operations where public infrastructure is located. The proposed works will make the location safer for current and future generations. Waterway access will remain available along the Daintree River during the construction works. The project is part of the Australian Government's Reef Coastal Restoration Program. Douglas Shire Council has approved a Works on Roads Permit to support the project and works proposed in the local road reserve. Owners consent has been applied for from the State of Queensland, represented by the Department of Resources for works proposed below the high-water mark. A Marine Park Permit application has been made

Performance outcomes	Acceptable outcomes	Response
		to DESI for conducting works in the Great Barrier Reef Coastal Marine Park.
PO14 Development does not adversely impact on community access to **fisheries resources** and **fish habitats** including recreational and indigenous **fishing** access.	**AO14.1** The development does not alter existing infrastructure or existing community access arrangements.	**Complies** Please refer to PO13 response. Waterway access will remain available along the Daintree River during the construction works. In addition, it is recognised that the project area is located within 1km of the Eastern Kuku Yalanji Indigenous Protected Area (CWTH_IPA55) and a Cultural Heritage Site Point (pre 2015) (Site ID EN: A30), represented by the Eastern Kuku Yalanji People #2 (ref no. QC2002/007). Consultation with the Eastern Kuku Yalanji People has occurred, and a site walkover on the 11 October 2024 cleared the project area of any cultural heritage value. Mitigation measures are also outlined in Appendix K – Environmental Management Plan, to ensure cultural and environmental values are protected.
PO15 Development does not adversely impact on commercial **fishing** access and linkages between a commercial **fishery** and infrastructure, services and facilities.	No acceptable outcome is prescribed.	**Complies** The Daintree River is identified as a navigation corridor however the proposed works will not involve marine watercraft entering the waterway and waterway access will remain available during construction (6 weeks) so any potential impact to this state interest is not anticipated.
Erosion control structures and beach replenishment		
PO16 Removal, destruction or damage to **marine plants** as a result of erosion control structures or beach replenishment only occurs	No acceptable outcome is prescribed.	**Complies** Refer to PO1 response.

Performance outcomes	Acceptable outcomes	Response
where there is an immediate and significant threat of erosion to: 1. the use of the **land** for its existing or approved purpose; 2. infrastructure, structures or buildings are not expendable or not able to be relocated.		The project aims to remediate streambank erosion. The option “to do nothing” is not viable because marine plants and fish habitat loss is expected without the proposed works proceeding. It is currently unsafe and has been barricated. It is expected that the project area will continue to erode from storm events even smaller than 1:100. Impacts to marine plants have been reduced as much as possible and revegetation is proposed to provide a net gain to marine plants. The erosion control structure was selected to prevent sediment loss to the susceptible estuarine bank and help reduce the total suspended sediment export from the local area and downstream environment. The proposed works are considered necessary to protect infrastructure including: • the only public access road to several properties • occupied dwellings used for residential purposes • Daintree River public access ferry infrastructure Relocation or abandonment of the above infrastructure is not considered feasible and/or economically viable, particularly the occupied residential dwellings.
PO17 The area that the beach replenishment is to be carried out on is a high-energy, sandy sediment shoreline with biological communities adapted to mobile sediments.	No acceptable outcome is prescribed.	**Not appliable** The proposed works do not involve beach replenishment. Therefore, this PO is understood not to be applicable.
PO18 Erosion control structures including beach replenishment does not create terrestrial **land**, unless they form an integral part of the erosion control design.	No acceptable outcome is prescribed.	**Complies** The proposed works involve rock beaching (including bench for sediment deposit), rootballs, cover spreading

Performance outcomes	Acceptable outcomes	Response
		and riparian rehabilitation) and forms an integral part of the erosion control design. Design plans are available in Appendix H – Detailed Design Report and Design Plans.
PO19 The beach replenishment work is undertaken in a way that minimises the frequency of any ongoing replenishment requirements.	**AO19.1** Beach replenishment will not require maintenance more often than every two years. AND **AO19.2** A source of replenishment material for future maintenance is identified and secured.	**Not appliable** The proposed works do not involve beach replenishment. Therefore, this PO is understood not to be applicable.
PO20 Erosion control structures are located as far landward as possible to reduce adverse impacts to **tidal land** and **marine plants**.	No acceptable outcome is prescribed.	**Complies** The proposed works involve remediation of a tidal streambank and therefore cannot be feasibly located elsewhere. Erosion of the streambank and degradation of marine plants will continue if nothing is done. The structure will be located on the bank of the river within metres of the local government road and will extend a linear distance of approx.100m. Design plans are available in Appendix H – Detailed Design Report and Design Plans. Further Appendix L – Marine Plant Clearance Report, details information about HAT and marine plant locations in relation to the proposed works and the limited impacts to marine plants expected.
Dredging		
PO21 Disposal of dredge spoil does not cause adverse impacts on **marine plants**.	No acceptable outcome is prescribed.	**Not appliable** The proposed works do not involve dredging. Therefore, this PO is understood not to be applicable.

Performance outcomes	Acceptable outcomes	Response
Temporary works		
PO22 Temporary works are designed, constructed and maintained to be in place for the shortest possible time or are undertaken for a specified period.	No acceptable outcome is prescribed.	**Complies** The project does not involve temporary works. However, the proposed works will involve the temporary disturbance of marine plants. The response to PO1 outlines the extent of temporary disturbance. Construction of the proposed works is scheduled to commence in the dry season of 2025 (July/ August) with any works within the tidal zone to occur during low tide. Works are to be completed within 6 weeks of commencement with demobilisation executed by the end of September 2025. Construction methodology is outlined in section 4.3 of the DA Report and section 4.1 in Appendix K – Environmental Management Plan.
PO23 A temporary structure is in place for a specified period and is designed to be completely removed and fish habitat is restored to pre-existing or improved condition on completion.	No acceptable outcome is prescribed.	**Not appliable** The proposed works do not involve a temporary structure. Therefore, this PO is understood not to be applicable.
Restoration		
PO24 Restoration works do not result in: 1. substitution of **fish habitats**; 2. adverse impacts to the condition of **fish habitats** or **fisheries productivity**.	No acceptable outcome is prescribed.	**Complies** The project is part of the Australian Government's Reef Coastal Restoration Program. The project aims to remediate streambank erosion. As outlined in Appendix L - Marine Plant Clearance Report, there is currently very low marine plant species diversity in the project area compared to bordering ecosystems which is attributed to the erosion. Typical marine species such as mangroves, saltwater couch and succulents were mostly absent. The construction footprint is 1,574m^2 and temporary marine

Performance outcomes	Acceptable outcomes	Response
		plant clearance was reduced to 14.22 m^2 which is based on a worst-case impact scenario and considered unavoidable. Appendix M – Revegetation Plan and Report outlines the area proposed for revegetation is 498m^2 and incorporates 314m^2 below HAT and 184m^2 above HAT which is greater than the clearance area. Through ongoing engagement with Douglas Shire Council, the most appropriate riparian species will be selected to plant. Revegetation will broaden the riparian zone and improve existing connectivity. The project will ultimately provide an overall net gain of marine plants after about 5 years. The EMP also details measures during the operation and maintenance phase of the project, including regular visual inspections, monitoring of revegetation and weed management measures. Maintenance will be carried out from the end of construction and revegetation in the dry season of 2025, until the funding program concludes on 31 March 2026. No further maintenance will occur beyond this date due to the absence of funding.
PO25 Marine plants to be used for revegetation purposes have local provenance.	No acceptable outcome is prescribed.	**Complies** Please refer to PO24 response and Appendix M – Revegetation Plan and Report. Revegetation will only include species that have been recorded immediately within or surrounding the project area. The revegetation strategy will ensure that species composition mimics the surrounding environment.

NEILLY GROUP

engineering for the environment

DETAIL DESIGN REPORT:

REEF COASTAL RESTORATION PROGRAM – DAINTREE RIVER STREAMBANK REMEDIATION

25 NOVEMBER 2024

Document Control

Details and distribution

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1	25 October 2024	Jacob Dearlove	Original Issue	Brett Twycross	Adam Neilly
2	25 November 2024	Jacob Dearlove	Updated geotechnical information	Brett Twycross	Adam Neilly

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1.0 Introduction

Neilly Group has been engaged by Terrain NRM (Terrain) to complete the detail design of bank remediation and blue carbon ecosystem restoration works for a section of riverbank situated on the Daintree River in Queensland.

The project is funded as part of the Department of Climate Change, Energy, the Environment and Water's (DCCEEW) Reef Coastal Restoration Program grants. The grants support projects to rehabilitate and restore blue carbon ecosystems including seagrasses, mangroves, saltmarsh and wetlands.

The detail design proposes to remediate a section of actively eroding river bank by installing rock beaching (riprap) to provide direct erosion protection for the bank and adjacent road. A bench with a rock sill has been incorporated into the profile of the rock beaching works to facilitate natural mangrove recruitment (restoration of blue carbon ecosystems) as well as regrading and actively revegetating the upper bank to prevent further erosion, subsequently improving water quality and biodiversity aspects of the site. It is also proposed to install rootballs along the bench to further improve aquatic habitat at the site.

1.1 Background

The project site, referred to as DR-4, is situated on the right bank (looking downstream) of the Daintree River, adjacent McDowall Lane approximately 900m upstream of The Daintree River ferry, Queensland (Figure 1). The site comprises approximately 90m of steep, near vertical, actively eroding river bank (Figure 2).

Anthropogenic activities, such as riparian clearing, combined with a series of large flood events (particularly in the last ~10 years) and ongoing wind wave and tidal impacts has meant the site experienced lateral bank migration. The site is highly susceptible to future flood events and is experiencing continuing bank erosion due to highly erodible subsoils being exposed to tidal fluvial forces (up to 6.5m tidal range) and inundation (wetting/drying) as well as wind/boat wave actions.

The erosion is causing direct, large scale ecological degradation of the site in the form of mangrove and riparian vegetation loss as well as contributing large quantities of fine sediment losses annually, thereby impacting the quality of water delivered to the Great Barrier.

A detailed assessment of the site using the Queensland River Rehabilitation Management Guideline (Department of Environment and Science, 2022), an options assessment and the concept design that this detail design is based on are presented in the report; *Reef Coastal Restoration Program: Daintree River Streambank Remediation (Neilly Group, 2023)*.

1.2 Report structure

This report includes the following sections:

- **Section 1 (Introduction)**
- **Section 2 (functional requirements for detail design)** describes the design objectives, design extent, and design standards.
- **Section 3 (Design inputs)** describes the input data/information used for the development of the detail design.
- **Section 4 (Detail design)** describes the proposed detailed design.
- **Section 5 (Design methodology)** describes design methodology used for the development of the detail design.

Figure 1. Site location

Figure 2. Drone photograph of site (2024, Neilly Group)

2.0 Functional Requirements for Detail Design

2.1 Design objectives

2.1.1 Blue carbon restoration

The proposed remediation works will facilitate the restoration of blue carbon ecosystems, specifically the restoration of mangrove ecosystems. This will be achieved through the implementation of nature-based, ecologically sustainable (or soft-engineering) design techniques that facilitate the natural recruitment and establishment of mangroves.

2.1.2 Improve water quality

The proposed remediation works will improve the quality of water entering the Great Barrier Reef lagoon, specifically reducing the export of fine sediment from the site. This will be achieved by directly reducing erosion at the site.

2.2 Design standards

2.2.1 Relevant Standards, guidelines and reference documents

Development of the proposed detail design considers the relevant Australian standards detailed in Table 1 as well as current best practice design guidance and information sources listed below:

- Queensland River Rehabilitation Management Guideline, Version 1.0, Department of Environment and Science (2022)
- The Australian guide to nature-based methods for reducing risk from coastal hazards, Earth Systems and Climate Change Hub Report No. 26. NESP Earth Systems and Climate Change Hub, Australia (2021)
- Mimicking Natural Process to Deliver Energy Dissipation and Sustainable Mangrove Nurseries, Shaun Morris, (2023)
- Design guidelines for the reintroduction of wood into Australian Streams, Brooks, A. et al. (2006)
- Environmentally Friendly Seawalls A Guide to Improving the Environmental Value of Seawalls and Seawall-lined Foreshores in Estuaries, Office of Environment and Heritage on behalf of Sydney Metropolitan Catchment Management Authority (2012)
- Scott's Pine Rock Fillets (NSW Government, 2017)
- Mangrove Cover and Extent of Protection Influence Lateral Erosion Control at Hybrid Mangrove Living Shorelines, Sophie C. Y. Chan, Stephen E. Swearer, Rebecca L. Morris (2024)
- Fisheries guidelines for fish-friendly structures (FHG 006), Department of Primary Industries and Fisheries (2006)
- Lewis RR. 2005. Ecological engineering for successful management and restoration of mangrove forests. *Ecological Engineering* 24: 403-418.
- Winterwerp H*, et al.* 2016. Building with nature: sustainable protection of mangrove coasts. *Terra et Aqua* 144: 5-15.

Table 1. Australian standards reference as part of detail design development

Australian Standard	Title	Design applicability
AS 4678-2002	Earth-retaining structures	Design criteria and guidance
AS 3798-2007	Guidelines on earthworks for commercial and residential developments	Guidance on design and specification and testing
AS 2758.6:2019	Aggregates and rock for engineering purposes. Part 6: guidelines for the specification of armourstone	Guidance for investigating and specifying armourstone.

2.3 Performance standards

2.3.1 Geotechnical stability

Due to the works being located immediately adjacent a road they have been designed to have a factor of safety (FoS) of greater than 1.5 in regards to geotechnical slope stability as per Queensland Department of Transport and Main Roads (DTMR) Geotechnical Design Standard (GDS) (DTMR, 2020). Refer to section 5.1.3 for details.

2.3.2 Structural stability

The works have been designed to have a factor of safety (FoS) of greater than 1.2 in regards to structural stability. Refer to section 5.2.1.

2.3.3 Hydraulic and flooding impacts

In terms of hydraulics and flooding the works have been design so that they:

- Do not increase hydraulic parameters adjacent (upstream and downstream) the site;
- Do not cause afflux off site; and
- Do not affect overland flow paths and/or any negative potential impacts are mitigated.

2.4 Safety in design

A Safety in Design Assessment for the full project lifecycle has been completed using risk assessment and applying the hierarchy of hazard control approach. It is included as Attachment C.

2.5 Design life

The design life for material used in the proposed works is a minimum of 50 years for rocks and 20 years for timber structures.

The intent of the design is that it will support vegetation establishment that will provide long term stability of the site.

Despite this design life, the remediation works may still require maintenance during the vegetation establishment phase.

3.0 Design inputs

3.1 Topographical data

Topographical data for the site was obtained using UAV mounted LiDAR. The data was collected on the 8th of July 2024 by Neilly Group. The survey is in coordinate system Map Grid of Australia (MGA) zone 55 (GDA2020). The height datum is metres Australian Height Datum (mAHD).

3.2 Bathymetry

Bathymetry data for the site was obtained using UAV mounted bathymetry survey equipment. The data was collected July 2024 by Ray Gillinder (Helimetrex) and John Drysdale (Neilly Group). The survey is in coordinate system Map Grid of Australia (MGA) zone 55 (GDA2020). The height datum is metres Australian Height Datum (mAHD).

3.3 Hydraulic data

3.3.1 Tide levels

AHD tidal levels were determined using tidal levels sourced from the Queensland Tide Tables 2024 for Port Douglas (Table 2).

Table 2. Tidal levels for Port Douglas

	HAT	MHWS	MHWN	MSL	MLWN	MLWS	LAT
Level (LAT datum)	3.4	2.54	1.88	1.65	1.42	0.75	0
Level (mAHD)	1.819	0.959	0.299	0.069	-0.161	-0.831	-1.581

3.3.2 Two dimensional hydraulic assessment

A two-dimensional (2D) TUFLOW hydraulic model was constructed to determine the flow velocity at the site. A TUFLOW model was developed of the catchment from the Daintree River at Bairds DNRM water monitoring gauge to the outlet of the Daintree River. Relevant model parameters are provided in Table 3.

2D model results for velocity for the design event (2% AEP) are presented in Figure 3, they indicate that during such an event flows overtop the bank with velocity at the site reaching 0.8 m/s against the bank to 1.0m/s where the proposed rock beaching extends out into the channel.

Table 3. TUFLOW model parameters

Model	Parameter
Topography	2009 LIDAR available from Geoscience Australia for the entire catchment 2024 LIDAR captured by Neilly Group for the local site 2024 Bathymetry captured by Helimetrex for the local site
Cell Size	10m cell size
Manning's Roughness	High Density Vegetation 0.8 Open Channel 0.03
Inflow Boundary	Steady state hydrograph
Downstream Boundary	MHWN – -0.161m AHD

Model	Parameter
TUFLOW Version	2023-03-AE
Events Modelled	4000m3/s, approximately the 2% AEP as determined by "Daintree River at Bairds" FFA.

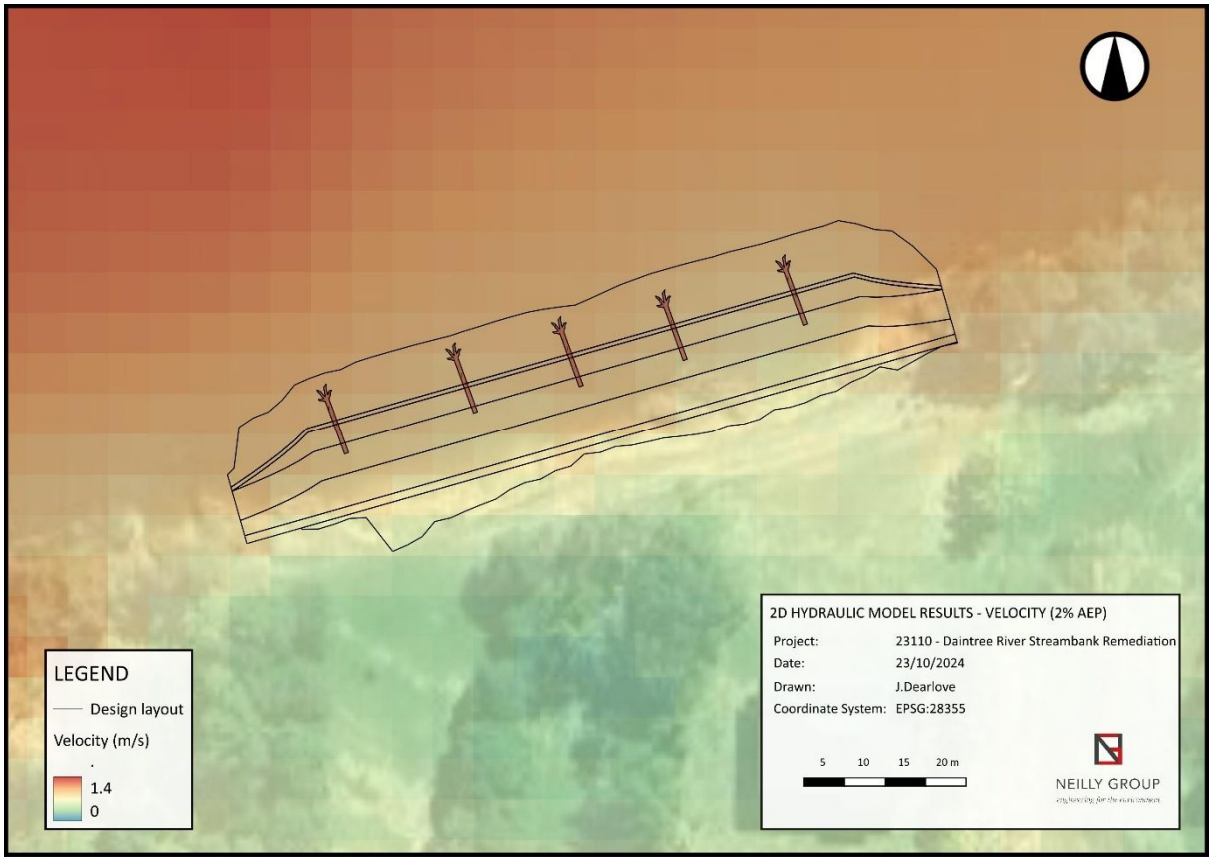


Figure 3. 2D hydraulic modelling results for velocity (2% AEP)

3.4 Geotechnical assessment

Neilly Group commissioned Douglas Partners to complete a geotechnical assessment for the proposed bank stabilisation works. The geotechnical assessment involved:

- A geotechnical site investigation – consisted of five cone penetration tests (CPTs), the excavation of five test pits and laboratory testing of selected samples;
- Determination of ground conditions;
- Determination of geotechnical strength parameters based on field data and published correlations;
- Establishing if Acid Sulfate Soils (ASS) are present and recommendations for ASS management plan if ASS present;
- Soil agronomic testing; and
- Completing slope stability analysis of proposed bank regrading section using results from geotechnical site assessment.

A summary of the geotechnical assessment outcomes is detailed below with the full geotechnical assessment being detailed in the report *Report on Geotechnical Investigation: Daintree River at*

McDowall Lane, Lower Daintree, QLD (Douglas Partners 2024, Rev 1) which is attached as Attachment D.

3.4.1 Ground conditions

Investigations determined that subsurface conditions are broadly characterised by variable amounts of fill, overlying cohesive soils comprising stiff or stronger (occasionally firm) clays and silts, which were variably interbedded with loose or medium dense sands, inferred to depths of between 4.2m to 5.0m. These soils were inferred to be overlying generally loose to medium dense sands to depths of between 14.2m and 14.5m which overlying stiff silty soils to investigation termination depth of between 24.62m and 25.60m.

Where groundwater was encountered, it was between at 3.2m and 3.9m depth. It should be noted that groundwater levels are affected by climatic conditions, soil permeability and tidal fluctuation, and will therefore vary with time.

3.4.2 Geotechnical strength parameters

The drained and undrained strength parameters for the range of materials encountered/inferred during the intrusive investigation and adopted for slope stability analysis are presented in Table 4. These parameters are based on presumptive values presented in published literature, including Appendix D of AS 45678 (2002), iterative slope stability analysis and Douglas' previous experience with similar materials.

Table 4. Indicative strength parameters

Material	Strength consistency/Relative density	Bulk Unit Weight (kN/m^3)	Effective Unit Weight (kN/m^3)	Undrained Shear Strength, c_u (kPa)	Effective Friction Angle, Φ' (degrees)	Effective Cohesion, c' (kPa)*
Clayey silt to silty clay	Firm	18	8	25	24	3
	Stiff	19	9	50	26	5
	Very Stiff	20	10	100	28	6
Sands and silty sands	Loose	17	7	-	30	0
	Medium Dense	18	8	-	34	0

3.4.3 Acid sulfate soils

The criteria used to assess the screening test results (pHF and pHFOX) as possibly indicating AASS or PASS were based on NASSG (WQA, 2018a) as follows:

- pHF ≤ 4 and no jarosite observed in the soil may indicate reduced inorganic sulfur (RIS) oxidation has occurred in the past and therefore AASS may be present. Of the 48 samples subject to field screening, 46 retuned a pHF ≤ 4 indicating that AASS may be present at the site.
- Where pHFOX < 3, along with a strong reaction (reaction strength of 3 or 4) to peroxide, and pHFOX reading at least one pH unit below pHF, this is a strong indicator of potential acid sulfate soil (PASS) conditions.
  Of the 48 samples subject to field screening, 36 retuned a pHFOX < 3, of which only three (3) samples had a strong reaction with peroxide. As such PASS conditions may be present at the site, subject to more rigorous testing.

Based upon the results of the field screening tests, 24 chromium suite tests were undertaken on selected samples and the calculated 'existing plus potential' acidity of each of these tests determined. For less than 1000 t of soil disturbance, as is expected to be the case of the proposed

riverbank remedial works, the action criteria which trigger a requirement for ASS management depends upon soil type as below:

- for clays is ≥0.1% sulfur
- for silt is ≥0.06% sulfur; and
- for sands is ≥0.03% sulfur.

If, however, greater than 1000 t of soil is to be disturbed, the action criterion triggering ASS management is ≥0.03% sulfur, no matter the soil type (further geotechnical advice must be sought in this case).

The chromium suite testing results indicate that for 1000 t or less soil disturbance, 17 of the 24 tested samples had an 'existing plus potential' acidity that met the associated action criteria. However, because no excavations are proposed during the work, the requirement to develop an ASSMP is not triggered.

The NASSG (WQA, 2018a) indicates that ASS investigation is required for excavations greater than 100m^3. Noting that investigation has been completed, any disturbances less than 100m^3 could theoretically be completed without formal ASS management, however a general environmental duty would apply requiring appropriate neutralisation to mitigate environmental impacts. As such to appropriately neutralise potential ASS the application and mixing of lime at a rate 2.2 kg/tonne to 110 kg/tonne of soil is recommended as part of the remediation works.

4.0 Detail Design

The detail design is based on the previous concept design and has been developed in conjunction with the client using applicable design philosophies, previous design and construction experience and relevant design guidelines and standards.

In order to satisfy the design objectives, the proposed detail design consists of the following elements that will be discussed in further detail below:

- Rock beaching and fill (including a bench and sill to facilitate natural mangrove recruitment);
- Rootballs; and
- Active terrestrial revegetation works.

An overview of the detail design is shown in Figure 4 with the detailed design drawings provided in Attachment A, with technical specifications provided in Attachment B.

Figure 4. Detail design overview of DR-4

4.1 Rock beaching (RipRap)

4.1.1 General

Rock beaching (riprap) involves the placement of imported, angular rock material against an eroding riverbank to provide direct protection against erosion. The rock beaching is typically underlain by a filter layer (i.e. geofabric or granular material) to prevent movement of bank material from behind the rock beaching material.

4.1.2 Detail Design

The proposed detail design includes placement of rock along the toe of the eroded bank up to 500mm above the highest astronomical tide (HAT). The rock beaching is designed to have a finished slope of 1V:1.5H. A 3m wide bench set at the mean sea level (MSL) is included in the finished profile to provide an area for the natural recruitment of mangroves. The height of the bench was selected based on assessment of the available data (Section 4) and standards, guidelines and references (Section 2.2) to achieve a solution that will promote natural mangrove recruitment. To further encourage sediment deposition along the bench a rock sill will be created along the outer edge of the bench by placing larger rocks (min. 500mm).

Above lowest astronomical tide (LAT) and behind the rock beaching fill material will be placed to from the new bank profile and reduce the amount of rock material required. Granular filter material will be installed underneath the rock beaching material above the LAT level (or to the level practicable during construction).

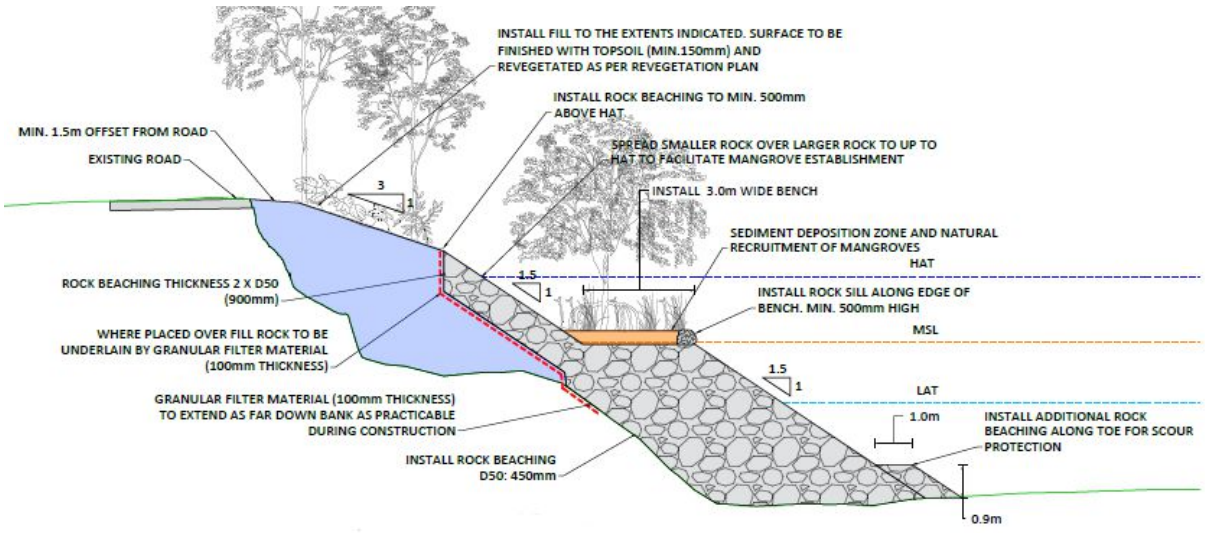


Figure 5. Typical rock beaching cross section

4.2 Large wood placement (Rootballs)

4.2.1 General

In terms of waterway management, large wood placement is implemented for various reasons including increasing hydraulic roughness, deflecting flow away from the bank, and increasing geomorphic diversity. Native hardwood logs at least 300mm in diameter and 3m in length with the rootballs still attached are typically used. In some cases multiple logs can be combined to form a single larger structure.

Depending on the density of the timber used and the loads it is subjected to stabilisation of the structure may be required using either vertically driven timber piles or ballast blocks.

4.2.2 Detail Design

The proposed detail design includes the installation of 5 rootballs along the full length of the site. Rootballs will be installed along the bench, within the rock beaching to provide ballast. The primary function of the rootballs is to provide in-stream ecological benefits, by creating fish and aquatic micro invertebrate habitat. The rootballs are not necessarily installed to provide bank erosion protection however in combination with rock beaching they will provide some localised stabilisation benefits by reducing flow velocity against the bank.

It is proposed that the timber rootballs will be constructed using locally sourced timber felled during other works (i.e. Cyclone Jasper recovery works).

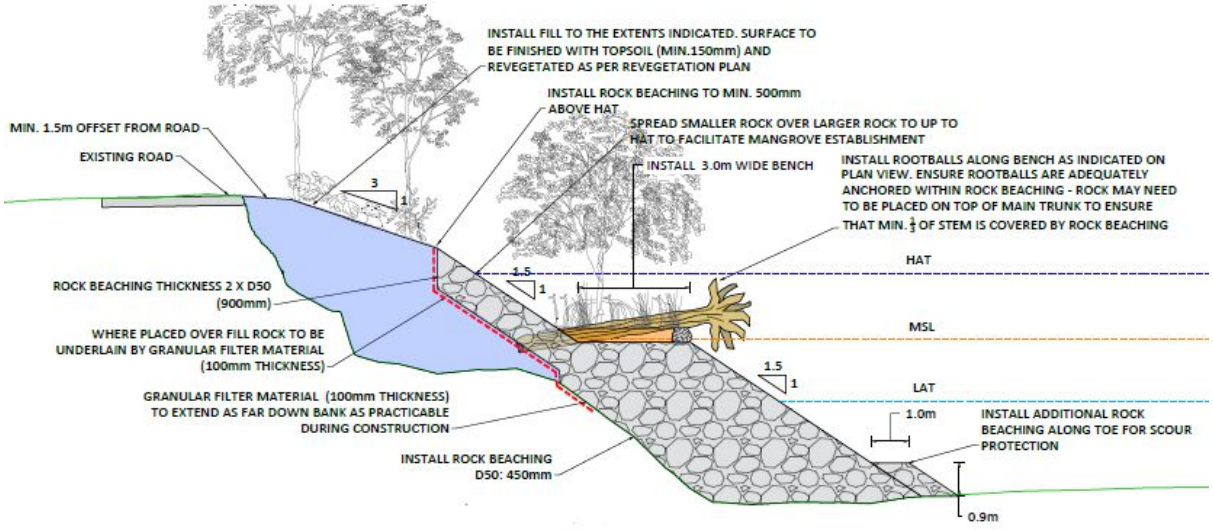


Figure 6. Cross section of rootball design

Figure 7. Rootball installation on the Herbert River, QLD (Neilly Group 2024)

4.3 Revegetation plan

A revegetation has been developed by Neilly Group and is detailed in the report *Terrain NRM Reef Coastal Restoration Program Daintree River Streambank Remediation, Revegetation Plan and Report (Neilly Group 2024)*.

The proposed revegetation plan aims to establish the same composition and structure as the regional ecosystems within the site area. The revegetation rationale is based on field assessments of vegetation structure and composition present within the proposed clearing footprint.

The native plants used in the revegetation works will be sourced from the DSC nursery or other local supplier.

Individuals will be planted between rocks into soils mixed with absorbent material and fertiliser compatible for use near aquatic habitats. Personnel will hand dig in tube stock, placing plants approximately one metre apart where possible. Initially, the soil will be restricted to crevices between rocks, so that sediment run off to the Daintree River will not occur during applied watering and rainfall events.

Over time, as the vegetation stabilises the soils, organic material and plants will build up and cover the exposed rocks. At this time the ground coverage will have become stabilised and the risk of sediment run off will be reduced.

5.0 Design development Methodology

The following section describes design methodology used for the development of each component of the detail design.

5.1 Rock beaching (riprap)

5.1.1 Rock sizing

The rock beaching was sized for the 2% AEP event using velocity and depth outputs from the hydraulic modelling (as well as bank angle and material properties) in eWater's RIPRAP toolkit and the *"Hydraulic Toolbox"* software package.

Review of the results whilst also considering previous nearby works in the Daintree River determined that the required D_{50} rock size for the rock beaching works is 450mm.

RIPRAP - Input Table

A design program for stabilisation of river banks with rip- rap

About

Input Table			
Variable Name	Allowed Range	Value	Units
Energy Slope		2.00E-04	-
Bank Angle		33.7	degrees
Rock Specific Gravity	>1	2.4	-
Rock Angle of Repose	1-46	42	degrees
Maximum Depth		10	m
Depth of Interest		0.6	m
Factor of Safety	1-5	1.2	-
Maximum Safe Bank Angle	Calculated	36.88224233	degrees

Figure 8. RIPRAP Toolkit inputs

5.1.2 Scour assessment

A scour assessment was completed to assess the predicted scour depth off the toe of the rock beaching. The Lacey equation as described in the document *Supplement to Austroads Guide to Bridge Technology Part 8, Chapter 5: Bridge Scour (2018)* was used to calculate a scour depth of 0.6m.

To account for predicted scour an extra allowance has been included in rock beaching volume calculations.

5.1.3 Geotechnical stability assessment

Geotechnical stability analysis was carried out to estimate the factor of safety (FoS) against global stability for a representative cross section of the proposed remediated riverbank at low tide conditions, which is considered to be the critical groundwater condition with respect to slope stability for normal tidal events (i.e. rapid drawdown conditions).

The analyses considered a circular slip as the potential failure mode and were carried out using the proprietary software SLOPE/W.

Following review of the CPT results, the soil profile in CPT 2 was considered to probably represent the worst case for global stability assessment purposes as it had the thickest firm clay layer

(between 3.4 m and 4.3 m depth). The stability analysis has considered the remediated riverbank with two different river/groundwater level conditions:

- Groundwater and river flows at highest astronomical tide (HAT) levels; and
- Groundwater and river flows at lowest astronomical tide (LAT) levels.

The analyses were undertaken using conservative drained strength parameters, as presented in Table 4. The rock fill source for remediation is unknown, however the following parameters were adopted in absence of material specific information, based upon DTMR GDS (DTMR, 2020) guidance:

- Bulk unit weight = 20 kN/m3
- Effective friction angle = 40 degrees
- Effective cohesion = 0 kPa.

As per the DTMR (2020) guidance, a minimum surcharge load of 20 kPa was applied to the existing surface gravel road (McDowall Lane) to simulate existing traffic loads for both the existing and remediated river-bank analysis. In addition, for the remediated river-bank analysis a short-term construction load of 10 kPa was applied between McDowall Lane and the riverbank crest to simulate construction traffic loads as per the guidance.

The stability analysis results are presented in Table 5.

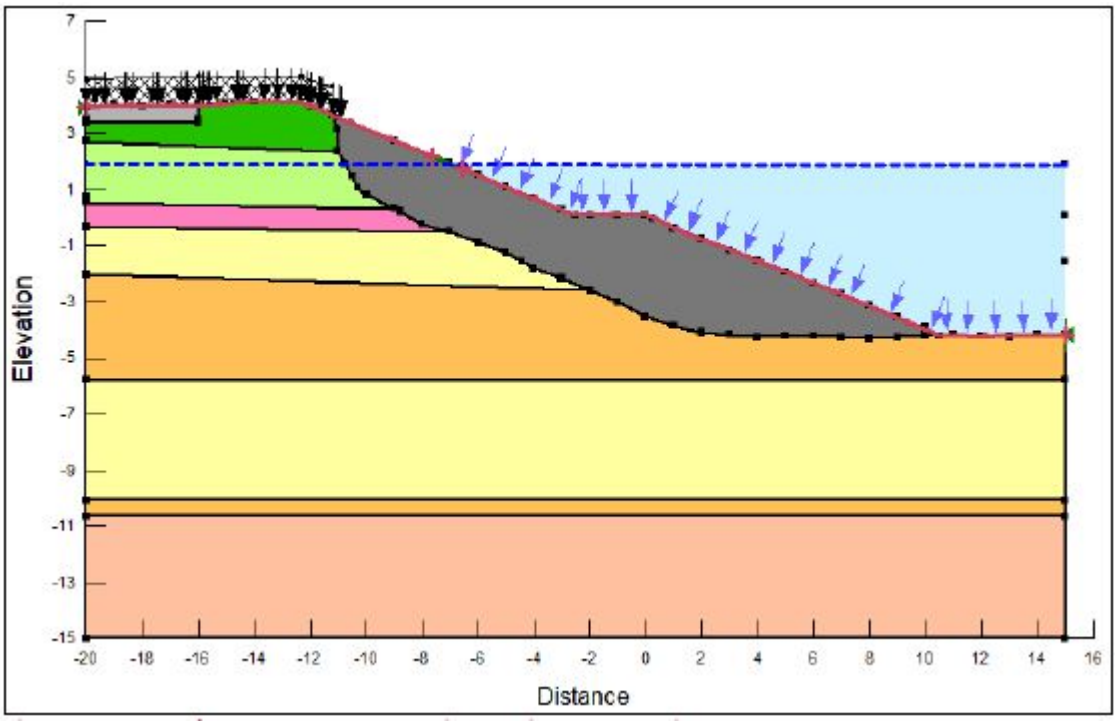


Figure 9. SLOPE/W analysis for proposed reprofiled river bank (Douglas Partners, 2024)

Table 5. Stability assessment results, FoS

Groundwater level	Achieved FoS
Groundwater and river flows at HAT level	1.74
Groundwater and river flows at LAT level	1.62

5.1.4 Bench height

The function of the bench is to facilitate natural mangrove recruitment therefore the level (mAHD) at which it is installed is dependent on the inundation regime requirements of the local mangrove species. Generally mangroves grow approximately between mean sea level (MSL) and the level of the highest astronomical tide (HAT) so guidelines typically suggest that the finished height of the fillet structure should typically aim to be around these values. It should be noted that these guidelines are focused on southern states of Australia where tide levels fluctuate ~1m between high and low tide – in the Daintree River the difference between HAT and MSL is 1.75m.

Comparison of aerial imagery and levels which were both collected during the Lidar survey determined that the water height at the time of site inspection was approximately -0.6 mAHD. Assessment of mangroves growing downstream of the site at the same time determined that they were growing at approximately -0.5 mAHD to 1.5 mAHD (Figure 10 and Figure 11).

Considering the above information the bench height has been installed at 0mAHD with the sill extending 500mm. This will allow for approximately 500mm of sediment to deposit along the bench placing the long-term bench height at 0.5mAHD.

Figure 10. Drone imagery of mangrove community in Daintree River approximately 700m downstream of DR-4

Figure 11. Mangrove community in Daintree River approximately 700m downstream of DR-4. Water level in photo is -0.6mAHD.

5.2 Large wood (rootballs)

5.2.1 Structural Stability Assessment

An adapted version of the methodology described in *Stability of ballasted woody debris habitat structures* (D'Aoust, S.G. & Millar, R.G., 2000) has been adopted for the structural stability analysis for the timber rootball structures.

The timber rootball structures will be subject to a combination of hydrodynamic, frictional and gravitational forces which can be accounted for by considering the following principal forces acting on the structure in the vertical and horizontal plane:

- Vertical
    - Buoyancy force of structure (timber log/s)
    - Vertical lift force acting on ballast boulder/s
    - Immersed weight of ballast boulder/s
- Horizontal
    - Drag force acting on timber log/s
    - Drag force acting on ballast boulder/s
    - Frictional force of structure that resists sliding

Failure of the structure occurs when the resisting forces are greater than the driving forces in both the vertical and horizontal directions.

The structural stability assessment parameters are shown in Table 6 with the results in Table 7.

By placing a minimum of 0.25m^3 of rock beaching material on top of the rootball stem or having the stem buried within the rock beaching a minimum of 2m ensures the structures are structurally stable with the required factor of safety's (FOS) being achieved.

Table 6. Structural stability analysis parameters

Parameter	Units	Value	Comments
Velocity	m/s	1.0	5% AEP event (Refer section 4.4.4)
Drage coefficient (logs)		1.2	Upper end of range of values quoted in D'Aoust, S.G. & Millar, R.G.(2000)
Fluid density	kg/m^3	1020	Assume brackish
Gravitational acceleration	m/s^2	9.81	
Required ballast	kg	Min. 537	
Angle, in horizontal plane, between the fillet and stream flow	degrees	90	
Dry density of timber used	kg/m^3	990	Likely will be denser however have assumed worst case scenario of timber being buoyant – could occur if timber allowed to dry for period before install.
Friction angle of ballast bed	degrees	40	Angle of repose of ballast material
Specific gravity (ballast material)		2.65	Based on consultation with local quarry
Drag coefficient (ballast)		0.2	Assumed turbulent flow
Structure dimensions			

Stem length	m	6
Log diameter	m	0.5
Rootball diameter	m	2

Table 7. Calculated magnitude of forces acting on rootball structures, including FOS checks

Calculated Forces	Units	Value
Vertical		
Buoyancy	N	537
Vertical Lift	N	N/A
Immersed Ballast weight	N	4,128
Horizontal		
Drag (timber)	N	1,879
Drag (Ballast)	N	N/A
Frictional	N	3,013
Stability check (FOS)		
Buoyancy		7.7
Sliding		1.6

6.0 Schedule of quantities

Item	Description	Units	Quantity
1	**Rock Beaching and Large Wood Works**		
1.1	Clear and grub footprint	m^2	-
1.2	Strip and stockpile topsoil (nominal 150mm thickness)	m^3	-
1.3	Excavation to foundation design profile	m^3	-
1.4	Supply of fill material	m^3	2,060
1.5	Placement of fill material (including moisture conditioning where required and compaction to 95% maximum dry density at OMC)	m^3	2,060
1.6	Supply of granular filter (D_{50} = 25)	m^3	82
1.7	Placement of granular filter in 100mm thick layer	m^3	82
1.8	Supply of rock (D_{50} = 450mm)	m^3	2,151
1.9	Placement of rock in 0.9m thick layer	m^3	2,151
1.10	Supply of topsoil (nominal 150mm thickness)	m^3	53
1.11	Placement of topsoil on upper batters (nominal 150mm thickness)	m^3	53
1.12	Supply of Large Wood	ea	5
1.13	Large Wood Installation	ea	5

Attachment A: Drawings

DRAWING SCHEDULE		
SHEET NO.	REVISION	DRAWING TITLE
001	A1	OVERVIEW, NOTES & DRAWING SCHEDULE
002	A1	PLAN VIEW & LONGITUDINAL SECTION
003	A1	CROSS SECTIONS - SHEET 1
004	A1	CROSS SECTIONS - SHEET 2
005	A1	TYPICAL SECTIONS

GENERAL NOTES

1. REFER TO TECHNICAL SPECIFICATION: DAINTREE RIVER STREAMBANK REMEDIATION.
2. COORDINATES ARE GDA2020 MGA ZONE 55.
3. BATHYMETRY SURVEY CAPTURED BY HELIMETREX IN JULY 2024 AND LIDAR SURVEY CAPTURED IN JULY 2024 BY NGE WAS USED TO CREATE THE DTM UPON WHICH THE DESIGN IS BASED. DUE TO THICK VEGETATION AT TIME OF ACQUISITION THIS DTM MAY NOT REPRESENT THE GROUND CONDITIONS AT THE TIME OF COMMENCEMENT OF WORKS.
4. AERIAL IMAGERY CAPTURED IN JULY 2024 BY NGE WAS USED. AERIAL IMAGERY DOES NOT ALIGN WITH SURVEY SO IS TO BE USED AS A GUIDE ONLY
5. THE CONTRACTOR IS RESPONSIBLE FOR CONFIRMING THE LOCATION AND DEPTH OF ALL UNDERGROUND SERVICES PRIOR TO THE COMMENCEMENT OF WORKS.
6. DISTURBANCE TO VEGETATION SHALL BE MINIMISED AND SHALL ONLY BE UNDERTAKEN IN ACCORDANCE WITH THE TECHNICAL SPECIFICATION AND AT THE DIRECTION OF THE PRINCIPAL CONTRACTOR.
7. WHERE WORKS ARE NOT PROPOSED DISTURBANCE TO CHANNEL BED AND BANKS SHALL BE MINIMISED.

SITE:
DAINTREE RIVER: DR-4
TITLE:
STREAMBANK REMEDIATION DETAIL DESIGN
OVERVIEW, NOTES & DRAWING SCHEDULE

SCALE @ A3	DRAWN DATE	DRAWN	DESIGNED	APPRVD	APPRVD DATE
NTS	24/10/24	JD	JD	AN	24/10/24
PROJECT NO.	DWG NO.	REVISION	SHEET NO.	FILE NAME	
23110	001	A1	001	23110_001_A1.dwg	

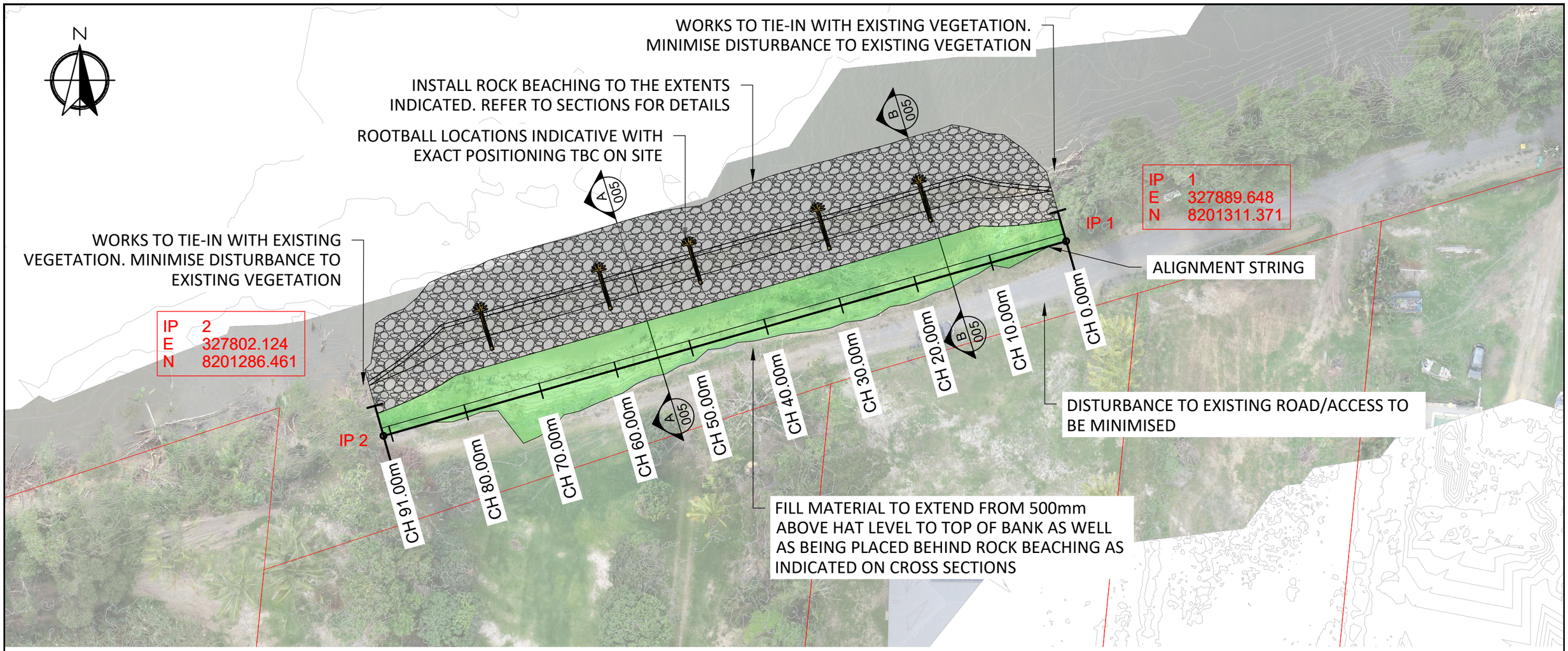
NEILLY GROUP
engineering for the environment
M 0428 104 007 E adam@neillygroup.com.au

CLIENT: terrain NATURAL RESOURCE MANAGEMENT

RPEQ ENGINEER
JACOB DEARLOVE
RPEQ NO.
31129
SIGNED:
DATE: 24/10/24

REV	DESCRIPTION	DATE	APPRVD
A1	FOR APPROVAL	24/10/24	AN

STATUS: FOR APPROVAL



Horizontal Scale 1:1000
Vertical Scale 1:1000

Datum RL -10

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CHAINAGE (m)	0.00	10.00	20.00	30.00	40.00	50.00	60.00	70.00	80.00	90.00	91.00	

ALIGNMENT STRING LONGITUDINAL SECTION

SITE:
DAINTREE RIVER: DR-4
TITLE:
STREAMBANK REMEDIATION DETAIL DESIGN
PLAN VIEW & LONGITUDINAL SECTION

SCALE @ A3	DRAWN DATE	DRAWN	DESIGNED	APPRVD	APPRVD DATE
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PROJECT NO.	DWG NO.	REVISION	SHEET NO.	FILE NAME	
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engineering for the environment
M 0428 104 007 E adam@neillygroup.com.au

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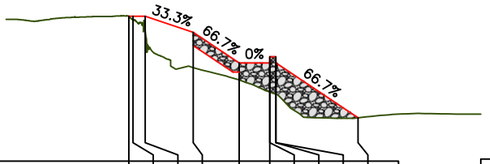
A1	FOR APPROVAL	24/10/24	AN

STATUS: FOR APPROVAL

LEGEND
- ROCK BEACHING
- CADASTRE
- REVEGETATION
- FILL (SELECT FILL)
- ROOTBALLS



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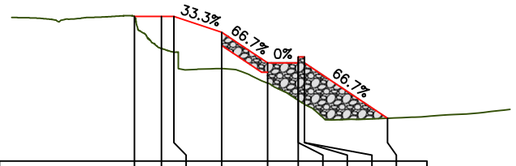
SECT 10.00



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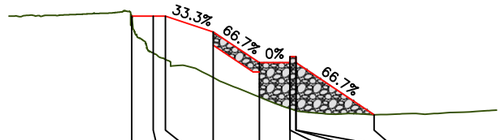
SECT 30.00



Datum RL -7

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EXISTING (m AHD)	3.80	0.79	0.26	-1.21	-2.79	-3.74	-3.74	-3.91	-3.91	-4.24		
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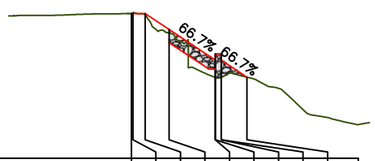

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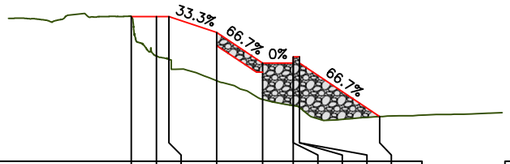
SECT 0.00



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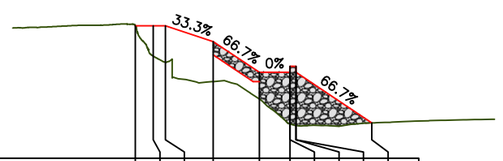

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SECT 40.00

SITE:
DAINTREE RIVER: DR-4
TITLE:
STREAMBANK REMEDIATION DETAIL DESIGN
CROSS SECTIONS - SHEET 1

SCALE @ A3	DRAWN DATE	DRAWN	DESIGNED	APPRVD	APPRVD DATE
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PROJECT NO.	DWG NO.	REVISION	SHEET NO.	FILE NAME	
23110	001	A1	003	23110_001_A1.dwg	

NEILLY GROUP
engineering for the environment
M 0428 104 007 E adam@neillygroup.com.au

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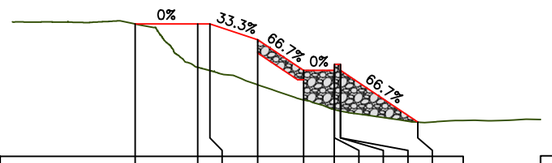
SIGNED:
DATE: 24/10/24

REV	DESCRIPTION	DATE	APPRVD
A1	FOR APPROVAL	24/10/24	AN

STATUS: FOR APPROVAL



Datum RL -7

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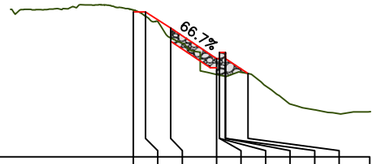

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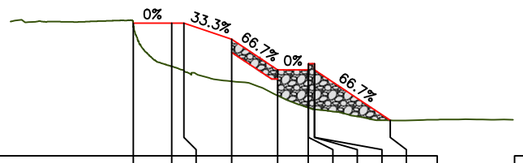
SECT 90.00



Datum RL -7

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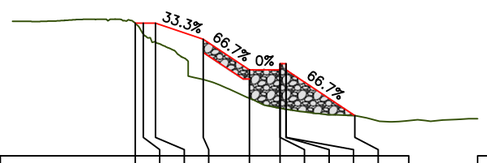
SECT 60.00



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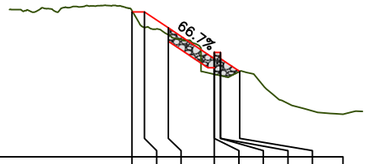
SECT 80.00



Datum RL -8

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SECT 91.00

SITE:
DAINTREE RIVER: DR-4
TITLE:
STREAMBANK REMEDIATION DETAIL DESIGN
CROSS SECTIONS - SHEET 2

SCALE @ A3	DRAWN DATE	DRAWN	DESIGNED	APPRVD	APPRVD DATE
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PROJECT NO.	DWG NO.	REVISION	SHEET NO.	FILE NAME	
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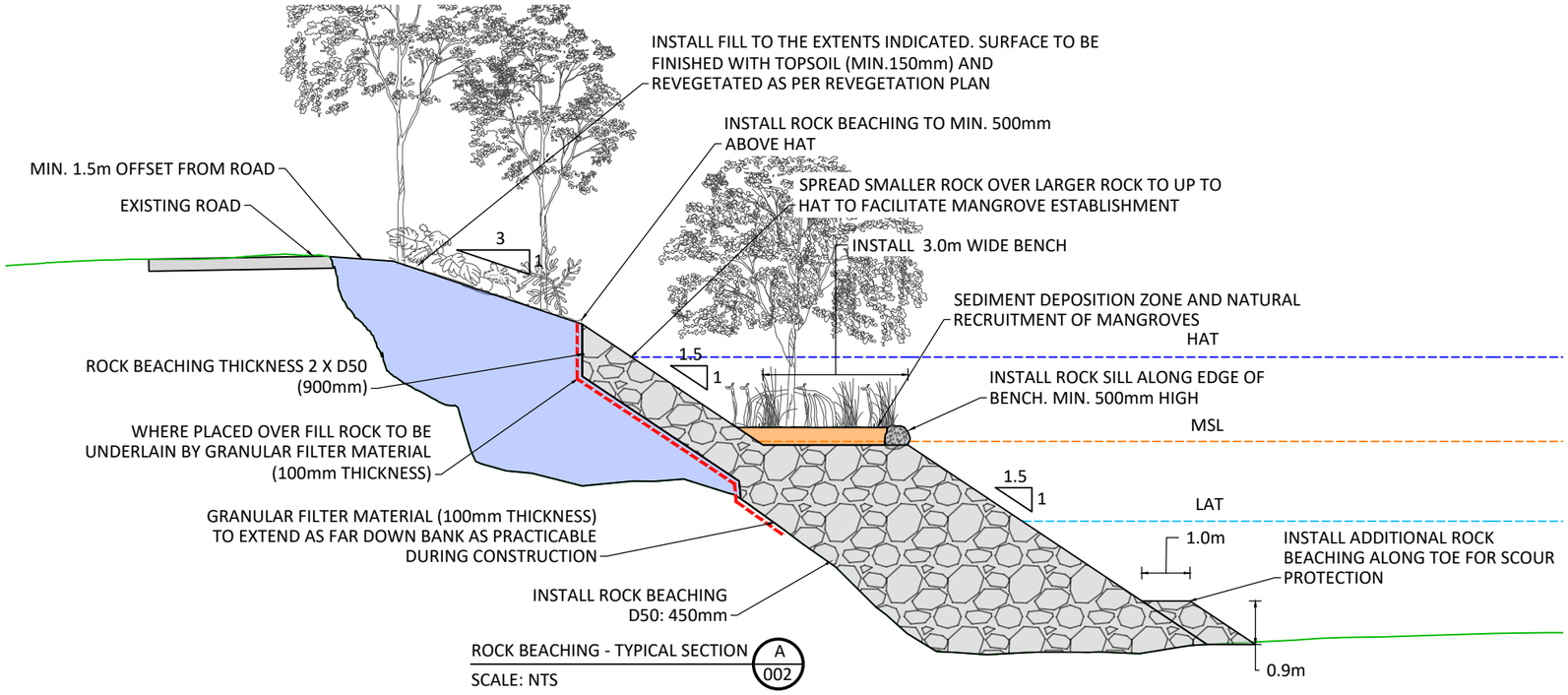
NEILLY GROUP
engineering for the environment
M 0428 104 007 E adam@neillygroup.com.au

CLIENT: terrain NATURAL RESOURCE MANAGEMENT

RPEQ ENGINEER
JACOB DEARLOVE
RPEQ NO.
31129
SIGNED:
DATE: 24/10/24

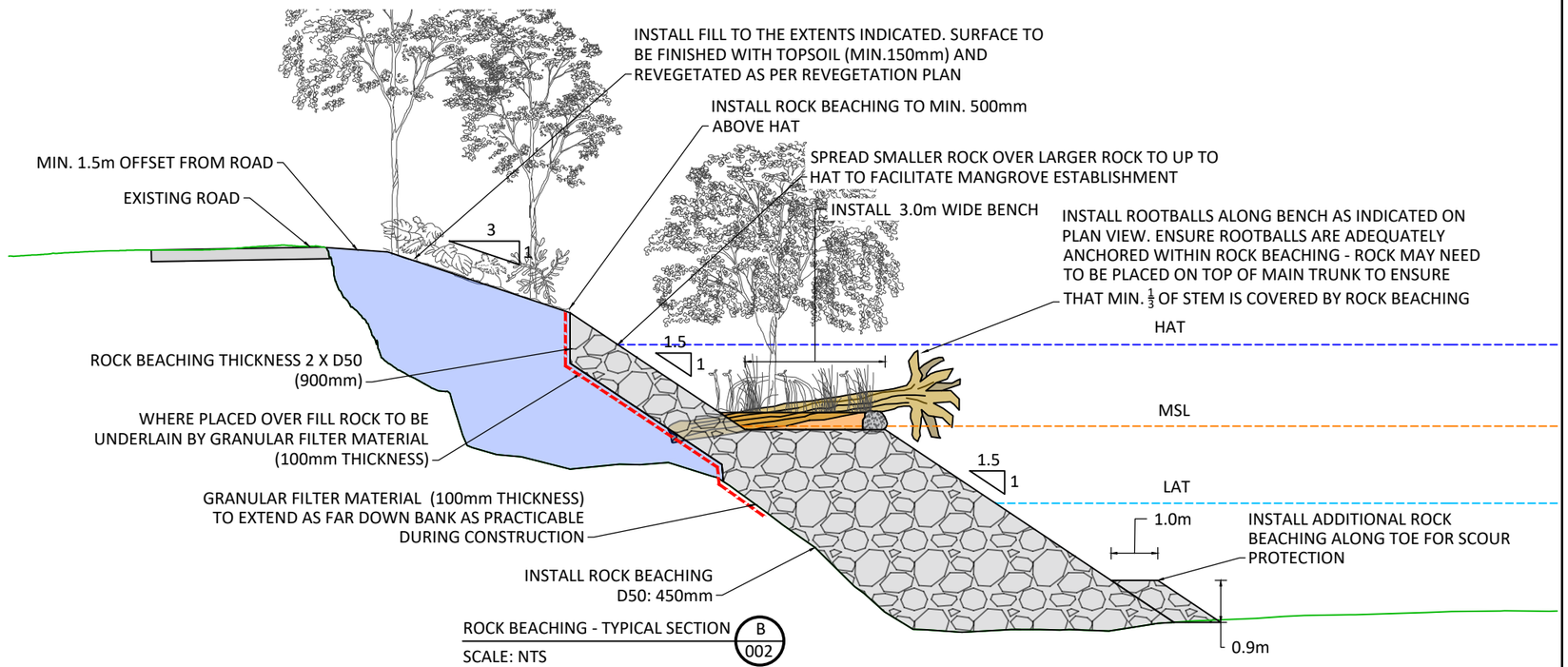
REV	DESCRIPTION	DATE	APPRVD
A1	FOR APPROVAL	24/10/24	AN

STATUS: FOR APPROVAL



ROCK BEACHING - TYPICAL SECTION A/002

SCALE: NTS



ROCK BEACHING - TYPICAL SECTION B/002

SCALE: NTS

SITE:
DAINTREE RIVER: DR-4

TITLE:
STREAMBANK REMEDIATION DETAIL DESIGN
TYPICAL SECTIONS

SCALE @ A3	DRAWN DATE	DRAWN	DESIGNED	APPRVD	APPRVD DATE
1:500	24/10/24	JD	JD	AN	24/10/24
PROJECT NO.	DWG NO.	REVISION	SHEET NO.	FILE NAME	
23110	001	A1	005	23110_001_A1.dwg	

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SIGNED:

DATE: 24/10/24

REV	DESCRIPTION	DATE	APPRVD
A1	FOR APPROVAL	24/10/24	AN

STATUS: FOR APPROVAL

LEGEND
- ROCK BEACHING
- REVEGETATION
- FILL (SELECT FILL)
- ROOTBALLS

Attachment B: Technical specification

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TECHNICAL SPECIFICATION

REEF COASTAL RESTORATION PROGRAM – DAINTREE RIVER STREAMBANK REMEDIATION

25 OCTOBER 2024

Document Control

Details and distribution

	Details
Document Title	Technical Specification: Reef Coastal Restoration Program – Daintree River Streambank Remediation
Revision Number	1
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Author(s)	Jacob Dearlove
Distribution	Terrain NRM (Lana Hepburn and Charles Hammond)
Citation	Neilly Group, 2024. *Technical Specification: Reef Coastal Restoration Program – Daintree River Streambank Remediation* prepared by Neilly Group Engineering for Terrain NRM.

Revision History

Revision	Date	By	Nature of change	Checked By	Approved By
1	25 October 2024	Jacob Dearlove	Original issue	Brett Twycross	Adam Neilly

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1 Introduction

This Technical Specification sets out the requirements for the construction of works for the remediation of streambank erosion at Site DR-4 on the Daintree River. This Technical Specification sets out the requirements for the construction of the following works:

- Rock Beaching;
- Fill placement; and
- Installation of large timber (rootballs).

1.1 General requirements

This Specification is to be read in conjunction with the conditions of the contract, and all other specifications and drawings.

Where works are directed to be performed by the Contractor but are not specified in the Specification, the Contractor shall carry them out with full diligence and expedience as are expected for works of this nature under the obligations of the Contractor.

1.2 Standards and guidelines

Unless stated otherwise in this Technical Specification, the approved drawings, or elsewhere in the construction documents, work shall comply with the current and relevant Australian Standards. Any variations or ambiguity between this Technical Specification, the approved drawings, or in the other construction documents and Australian Standards shall be referred to the Neilly Group representative for direction before proceeding with the work.

1.3 Drawings

The Drawings referred to in this Technical Specification are those endorsed by Neilly Group (the Engineer). The Drawings must not be varied without the written approval of the Engineer. The Drawings are listed in Table 1.

Table 1. Drawings

Drawing Number	Revision	Drawing Title
23110-001	C1	OVERVIEW, NOTES & DRAWING SCHEDULE
23110-002	C1	PLAN VIEW & LONGITUDINAL SECTION
23110-003	C1	CROSS SECTIONS – SHEET 1
23110-004	C1	CROSS SECTIONS – SHEET 2
23110-005	C1	TYPICAL SECTIONS

1.4 Timing of works

Works shall be undertaken during the dry season to reduce the risk of flows within the river and erosion by rainfall and runoff on freshly exposed surfaces.

1.5 Sequence of works and hold points

Staging of works shall be undertaken as follows for the construction of the rootballs, rock beaching and bank reprofiling works:

1. Site preparation (including setout);
2. Placement of rock beaching (stage 1);
3. Installation of rootballs;
4. Placement of rock beaching (stage 2) and fill;
5. Topsoiling of all designated and disturbed areas; and
6. Revegetation.

Hold points that require approval by the Neilly Group Representative before proceeding are detailed in Table 2.

Table 2. Schedule of hold points

Hold Point	Details	Inspection by
Site preparation (including setout)	Site preparation in accordance with this Specification prior to: • the placement of rock beaching (stage 1). • Installation of rootballs; • placement of rock beaching (stage 2); and • placement of topsoil.	Neilly Group Representative
Placement of rock beaching (stage 1)	Placement of granular filter and rock beaching in accordance with this Specification prior to: • Installation of rootballs; • placement of rock beaching (stage 2); and • placement of topsoil.	Neilly Group Representative
Installation of rootballs	Installation of rootballs in accordance with this Specification prior to: • placement of rock beaching (stage 2); and • placement of topsoil.	Neilly Group Representative
Placement of rock beaching (stage 2) and fill	Placement of rock beaching in accordance with this Specification prior to: • the placement of topsoil.	Neilly Group Representative
Placement of topsoil	Placement of topsoil in accordance with this Specification	Neilly Group Representative

Revegetation works have not been included in this Specification. They are to be undertaken at the direction of the Neilly Group Representative in accordance with relevant specifications.

2 Site preparation

2.1 Set-out

The Contractor is responsible for setting out alignments and levels from the Drawings and shall establish sufficient set-out pegs to ensure smooth changes in both vertical and horizontal alignment. Bench marks, survey pegs, level pegs or supplementary reference marks must not be adjusted or moved without written approval of the Neilly Group Representative. The contractor must transfer any pegs affected by the earthworks to side positions clear of operations and must note the extent of the movement in distance and level.

2.2 Service location

The Contractor shall undertake a Before You Dig Australia (BYDA), or similar applicable search and obtain current underground location plans which provide an indication of the presence, location and depth of underground plant in the area of the works.

2.3 Clearing and grubbing

Clearing must be carried out in advance of any earthwork operations and is to include the removal of all foreign material and vegetation, except trees and plants required to be preserved as identified by the Neilly Group Representative, from within the boundaries of areas affected by earthworks or other areas to be cleared as designated on the Drawings.

All stumps and roots must be grubbed to a depth of at least 150mm below the finished surface level. Grub holes are to be backfilled and well compacted with approved material. All foreign material and vegetation cleared except topsoil must be removed from the site and is to be deposited at the appropriate disposal site unless otherwise specified in this Technical Specification, the approved drawings, or elsewhere in the construction documents.

2.4 Stripping and stockpiling of topsoil

All topsoil is to be stripped from areas to be excavated or filled and from other areas as shown on the Drawings. Topsoil is to be stored in approved stockpiles for use in re-instatement of the work by the Contractor. Stripping topsoil shall consist of the removal of topsoil to a depth of 150mm below ground level.

2.5 Backfill

Tunnels, holes or cavities that are found within the site shall be excavated to the full extent of the tunnelling and backfilled with materials similar to the adjacent ground, and such fill shall be compacted to a dry density similar to that of the surrounding material (**hold point**).

3 Construction of rock beaching (stage 1 and 2)

Rock beaching will be installed in two (2) stages:

- Stage 1 – installation of rock beaching to the bench level
- Stage 2 – installation of rock beaching above bench level following the installation of the rootballs.

The specification for material and install of rock beaching is the same for each stage and is detailed in the following section.

3.1 Placement of granular filter material

Granular filter material shall be placed prior to placement of rock beaching. The granular filter material shall be placed and compacted by machine bucket in accordance with this Specification and to the thicknesses and locations as shown on the Drawings. Granular filter material shall be placed and approved by the Engineer or their representative prior to the placement of rock beaching (**hold point**).

3.2 Granular filter material specification

Granular filter material shall be hard and durable gravel and shall be sized in accordance with Table 3. The granular filter material shall be approved by the Engineer or their representative prior to placement (**hold point**).

Table 3. Granular filter material size specification for rock chutes

Sieve size (mm)	Percentage finer (by weight)
50	100
25	50
7.5	10

3.3 Placement of rock beaching

Rock beaching shall be placed following placement of granular filter material. The rock beaching shall be placed in accordance with this Specification and to the thicknesses and locations as shown on the Drawings.

The Contractor shall use appropriate methods for handling and placement of rock that will avoid segregation of the rock size fractions.

The rock shall be placed to form an interlocking blanket of rock with low void spaces. Voids in the blanket of rock shall be reworked as required by the Neilly Group Representative. Rock beaching shall be placed and approved by the Neilly Group Representative prior to the placement of topsoil (**hold point**).

3.4 Rock beaching material specification

The rock used for rock beaching must be durable, resistant to weathering and angular in shape. The D_{50} is used to describe the nominal rock size required for the rock beaching works, where D_{50} represents the nominal rock diameter, of which 50% of the rocks (by weight) are smaller. No rocks should be greater in diameter than twice the D_{50} and should be proportioned such that neither the breadth nor thickness of a single rock is less than one-third its length. The rock must also be well graded so that the rock can interlock with low void spaces. Poor grading of the rock will increase the

potential for structural failure of the rock beaching works. The size specification is shown in **Error! Reference source not found.**. The rock must have a relative density greater than or equal to 2.65.

Table 4. Rock size specification for rock beaching works

Sieve size (mm)	Percentage finer (by weight)
900	100
450	50
150	10

4 Construction of large timber (rootballs)

4.1 Set-out of rootballs

The Contractor is responsible for setting out of alignments and rootball locations from the Drawings and shall establish sufficient set-out. Bench marks, survey pegs, level pegs or supplementary reference marks must not be adjusted or moved without written approval by the Engineer.

Survey pegs and/or paint shall be used by the Contractor with oversight by the Neilly Group Engineering Representative to set out the rootballs on the ground. **(hold point)**

4.2 Supply of rootballs

The required quantity of rootballs as detailed on the Drawings and Schedule of Quantities shall be delivered to designated locations adjacent to the works site, as approved by the Neilly Group Engineering Representative.

4.2.1 Location

Rootballs are to be delivered to a designated location or multiple designated locations at the works site to be determined and agreed on by the landholder/s, the Neilly Group Engineering Representative, and the Contractor(s). The timber log supplier will be informed of the most direct access to the site by the Neilly Group Engineering Representative including access through any gates and associated requirements.

4.2.2 Timber log rootball supply documentation

The timber log supplier shall document the supply of logs and make the documentation available to the Neilly Group Engineering Representative, including:

- Order number;
- Delivery number;
- Class, length, diameters and quantity of each size of timber log; and
- Log reference number if individually recorded and marked.

4.2.3 Details of rootballs

The rootballs supplied shall meet the requirements of the specification detailed in Table 5 and *Australian Standard AS 3818.3-2010 Timber – Heavy structural products – Visually graded – Piles*. Rootballs shall meet the requirements of Section 2 of the standard, *Hardwood Pile Intended for Use without Full-Length Preservative Treatment*. Refer to the Drawings for log lengths and quantities specific to each site.

Table 5. Timber log rootball specifications

Element	Requirement	Units	Value	Australian Standard	Notes
Stem length	Minimum	m	6	-	Tolerance ± 0.2m
Stem diameter	Approx.	mm	450	-	Tolerance ± 100m
Stem shape	See notes	-	-	-	Stem shall be irregularly shaped
Rootball size (diameter)	Approx.	m	1-2	-	Sphere with multiple protrusions
Material type	Equal	-	Australian Hardwood	1720.2, 5604	Green. Without preservative treatment.
Marine borer durability class	Minimum	-	NA	1720.2, 5604	
Green density	Minimum	kg/m^3	1100	1720.2	And species dry density min. 950 kg/m^3
Strength group	Minimum	-	S3	1720.1&2	

4.2.4 Defects and insects

The timber logs should be free from live insects that would cause deterioration of the timber logs (e.g., termites), short crooks, kinks, shakes of all descriptions, fractures, splits at the head, and decay pockets. Individual defects can be permitted as follows:

- grub holes, unless clustered;
- borer holes, provided the sapwood is not extensively damaged;
- termite galleries, provided that the total area at the butt does not exceed 50mm^2. Enclosed termite galleries shall not be permitted;
- bull end splits not exceeding 3% of the length, provided they extend in one direction only;
- sound knots, in the third nearest the head; and
- knot holes in the third nearest the head, less than 10 mm in diameter.

4.3 Timber log rootball installation

Following the installation of the rock beaching (Stage 1) works the rootballs shall then be installed along the bench as specified in the drawings. The rootball shall be facing outwards into the channel and extend beyond the bench.

Following the placement of the rootballs rock beaching works (Stage 2) shall occur, ensuring that a minimum of 1/3 of the rootball stem is buried within the rock beaching – additional rock beaching may need to be placed over the stem on the bench if the stem does not adequately extend into the rock beaching.

Rock shall be placed and tightly packed around the log stem to minimise voids and lock the secure stem into place. Selected larger boulders shall be placed directly on top of the rootball log. Stage 2 rock beaching shall interlock with Stage 1 rock beaching and provide a continuous interlocking mass of rock. **(hold point)**

5 Placement of fill

Filling is required, as shown on the drawings, to form the design surface. The design surface shall be formed from suitable material excavated from the site and finished to the dimensions shown on the Drawings. The fill material shall consist predominantly of clean, silty clay and shall be constructed with dimensions as shown on the Drawings.

Prior to placing fill material, the Contractor shall prepare any areas upon which the fill is to be placed to be free of organic material. The fill material shall be placed in near horizontal layers, where possible, not exceeding 150mm in loose thickness and compacted to ensure material is not loose and friable prior to placement of subsequent layers.

Safe compaction may require the overfilling prior to excavating to the design batter slope for safety and practicality of compaction reasons. Where compaction via track rolling is not safe or practical for the contractor, alternative compaction methods such as using an excavator attachment may be acceptable. Approval by both the Site Superintendent and Neilly Group RPEQ or their representative shall be sought if this is required.

Depending on the moisture content of the select fill material at the time of construction, moisture conditioning of the fill may be advisable to improve the level of compaction that can be achieved.

6 Placement of topsoil

Topsoil shall be placed following placement of fill and rock beaching. Topsoil shall be placed in accordance with this Specification and to the thicknesses and locations as shown on the Drawings. Topsoil shall be placed in loose layers of 150mm thickness, to the thickness as specified in the Drawings. The finished surface shall be left rough and free draining **(hold point)**.

7 Site reinstatement

Upon the completion of works, the Contractor shall reinstate the works site and all other areas disturbed because of the works. This shall include:

- Disposal, or re-use where approved by the Neilly Group Representative, of all waste material resulting from the works.
- Filling or grading of disturbed areas to match adjacent undisturbed surface levels to ensure areas remain free draining.
- Topsoiling all disturbed areas not already specified in the Drawings to a minimum loose thickness of 100mm, seeding with a suitable grass seed mix supplied to the contractor, left rough and free draining.
- Reinstating any access tracks to a condition similar to that prior to the commencement of works.

Attachment C: Safety in design

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SAFETY IN DESIGN ASSESSMENT

REEF COASTAL RESTORATION PROGRAM
DAINTREE RIVER STREAMBANK REMEDIATION

25 OCTOBER 2024

Document Control

Details and distribution

	Details
Document Title	Safety in Design Assessment: Reef Coastal restoration Program – Daintree River Streambank Remediation
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Author(s)	Jacob Dearlove
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Revision History

Revision	Date	By	Nature of change	Checked By	Approved By
1	25 October 2024	Jacob Dearlove	Original issue	Adam Neilly	Adam Neilly

1 Introduction

This Safety in Design Assessment has been completed using a risk assessment approach, applying the hierarchy of hazard controls. The hierarchy of hazard controls, in order of priority, are:

1. **Eliminate** the risk.
2. **Substitute** the hazard with a safer alternative
3. **Isolate** the hazard from people
4. Reduce the risks through **Engineering** controls
5. Reduce exposure to the hazard using **Administrative controls**
6. Use **Personal protective equipment.**

A combination of control measures have been applied when no single measure is enough to eliminate or minimise the risk.

This assessment considers risks for only those components and elements included in the original design. Persons using this assessment must determine if additional elements have been added to the project that may impact on, alter, or be additional to, the hazards identified and listed. While due care has been taken to review hazards in relation to the project during the design process it should be reviewed prior to any construction works commencing and updated as required. This Safety in Design assessment should not be considered exhaustive, especially with respect to having identified hazards associated with the construction. Best practice risk assessment policies and procedures should still be undertaken in addition to this Safety in Design assessment.

Where actions and comments are recorded in the far-right column of the tabulated assessment below, these points are not written with the intent of directing persons giving effect to the design (construction phase) or those with the responsibility for maintenance operations or disposal of the asset after practical completion, but rather to provide recommendations for consideration that may assist in reduction of risks where hazards or impacts that have been identified by the designer.

Project No.	23110
Project Name	DR-4 Detail Design
Assessed by	Jacob Dearlove
Assessment date	24/10/2024
Revision	1

		Consequences				
		No injury	First Aid	Injury	Serious injury	Fatality/Disable
Likelihood	**Column1**	**1**	**2**	**3**	**4**	**5**
Almost certain	1	Moderate	High	High	Extreme	Extreme
Likely	2	Moderate	Moderate	High	High	Extreme
Possible	3	Low	Moderate	Moderate	High	High
Unlikely	4	Low	Low	Moderate	Moderate	High
Rare	5	Low	Low	Low	Moderate	Moderate

ID	Project Phase	Element/Activity	Hazard Description	Risk			Control Measure Implemented/Recommended	Action By	Residual Risk			Responsibility for managing residual risk
				Consequence	Likelihood	Initial Risk Rating			Consequence	Likelihood	Residual Risk Rating	
1	Design	Large timber (Rootballs)	Handling and installation of rootballs - falling on machinery / personnel	Fatality/Disable	Possible	High	Design ensures that rootball size used is within safe size range for handling with construction machinery to be used (i.e.. design does not include any rootballs over 8m in length).	Designer	Fatality/Disable	Rare	Moderate	Civil contractor
2	Design	Interaction with underground services	Design interacts with services	Fatality/Disable	Possible	High	BYDA search undertaken - Design does not interact with services.	Designer	Fatality/Disable	Rare	Moderate	Civil contractor
3	Design / Construction	Steep grades	Machinery slip and rollover risk	Fatality/Disable	Possible	High	Design incorporates bench which acts as a platform for machinery to avoid working on steep slopes. During construction use only machinery, techniques and competent operators suitable for the work. Apply specific risk assessments and SOPs. If required, install temporary safe working platforms.	Designer/Contractor	Fatality/Disable	Rare	Moderate	Civil contractor
4	Design/Construction	Interaction with waterbodies	Design requires interaction with waterbodies - may result in drowning	Fatality/Disable	Possible	High	Design includes bench to allow for safe egress from water if fall occurs. Contractors to ensure safe working methods around deep water bodies (i.e.. Flotation devices in case of water entry.	Designer / Contractor	Fatality/Disable	Rare	Moderate	Civil contractor
5	Design	Rock Beaching	Handling and installation of rock beaching - falling on machinery/personnel	Fatality/Disable	Possible	High	Design ensures that rock size used is within safe size range for handling with typical earthmoving construction machinery.	Designer	Fatality/Disable	Rare	Moderate	Civil contractor
6	Design / Construction	Hazardous material on site	Long-term dangers to workers coming in contact with onsite contaminants	Injury (medical treatment)	Unlikely	Moderate	Site is not contaminated land.	Designer / Natural Resource Manager	Injury (medical treatment)	Rare	Low	Civil contractor
7	Construction	Storage of timber on site	Stockpiles of timber catching on fire	Fatality/Disable	Possible	High	All vegetation including grass to be removed from location of timber pile stockpiling on site. Appropriate vegetable matter clearance buffer distance to be determined via risk assessment on site at time of construction. All activities that could provide ignition are not to be conducted in close proximity to pile stockpiles.	Contractor	Fatality/Disable	Rare	Moderate	Civil contractor
8	Construction	Earthworks machinery	Design requires the use of heavy earthworks/earthmoving machinery	Fatality/Disable	Possible	High	Use only machinery, techniques and competent operators suitable for the work. Apply SOPs.	Contractor	Fatality/Disable	Rare	Moderate	Civil contractor
9	Construction	Earthworks/rootball install - interaction with underground services	Workers safety at risk	Fatality/Disable	Possible	High	Before You Dig Australia (BYDA) enquires and site risk assessment before commencement	Contractor	Fatality/Disable	Rare	Moderate	Civil contractor
10	Construction	Traffic hazards - access to site	Narrow lanes, slippery surfaces and accidents	Serious injury / LTI	Possible	High	Traffic Management Plan - clear signage and traffic management on site as required. Apply site specific risk assessment and SOPs/SWMSs.	Contractor	Serious injury / LTI	Rare	Moderate	Civil contractor
11	Construction	Public safety	Unauthorised access at site	Injury (medical treatment)	Unlikely	Moderate	Access to site is via public road with suitable signage and fencing/gates i.e.. no entry signage etc.	Contractor	Injury (medical treatment)	Rare	Low	Civil contractor
12	Construction	Site access	Steep site access track - possible roll over	Fatality/Disable	Possible	High	Use only machinery (including delivery trucks), techniques and competent operators suitable for the terrain. Apply site specific risk assessment and SOPs/SWMSs.	Contractor	Fatality/Disable	Rare	Moderate	Civil contractor
13	Construction	Working alone	Long wait for first responder to arrive	Fatality/Disable	Possible	High	When the site is occupied by personnel, at least 2 persons must be present at all times.	Contractor	Fatality/Disable	Rare	Moderate	Civil contractor
14	Operation / maintenance	Path access and vehicle access	Path too narrow for vehicle access	Injury (medical treatment)	Unlikely	Moderate	Provide safe maintenance access	Contractor	Injury (medical treatment)	Rare	Low	Natural resource manager

Attachment D: Geotechnical assessment

Douglas PARTNERS

GROUNDED EXPERTISE

Report on Geotechnical Investigation

Daintree River at McDowall Lane

McDowall Lane, Lower Daintree

Prepared for Neilly Group Pty Ltd

Project 231158.00

25 November 2024

Douglas Partners Pty Ltd
ABN 75 053 980 117
douglaspartners.com.au

Douglas PARTNERS | GROUNDED EXPERTISE

Document History

Details

Project No.	231158.00
Document Title	Report on Geotechnical Investigation
Site Address	McDowall Lane, Lower Daintree
Report Prepared For	Neilly Group Pty Ltd
Filename	231158.00.R.001.Rev1

Status and Review

Status	Prepared by	Reviewed by	Date issued
Revision 0	Dan Hanna	Bruce Stewart	23 October 2024
Revision 1	Dan Hanna	Bruce Stewart	25 November 2024

Distribution of Copies

Status	Issued to
Revision 0	Mr Jacob Dearlove, Neilly Group Pty Ltd
Revision 1	Mr Jacob Dearlove, Neilly Group Pty Ltd

The undersigned, on behalf of Douglas Partners Pty Ltd, confirm that this document and all attached drawings, logs and test results have been checked and reviewed for errors, omissions and inaccuracies.

	Signature	Date
Author		25 November 2024
Reviewer	Bruce Stewart	25 November 2024

bsi ISO 9001 Quality Management Systems CERTIFIED
FS604853

Douglas Partners acknowledges Australia's First Peoples as the Traditional Owners of the Land and Sea on which we operate. We pay our respects to Elders past and present and to all Aboriginal and Torres Strait Islander peoples across the many communities in which we live, visit and work. We recognise and respect their ongoing cultural and spiritual connection to Country.

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Appendix D: Table D.1: Summary of Acid Sulfate Soil Results

Laboratory Results

Appendix E: Agronomic Testing

Appendix F: Preliminary Slope Stability Analysis Results

Report on Geotechnical Investigation
Daintree River at McDowall Lane
McDowall Lane, Lower Daintree

1. Introduction

This report prepared by Douglas Partners Pty Ltd (Douglas) presents the results of a geotechnical investigation for proposed bank remedial works on the Daintree River, adjacent to Lots 41 to 49 McDowall Lane, Lower Daintree (the site). The investigation was commissioned by Mr Jacob Dearlove of Neilly Group Pty Ltd (Neilly) on 13 August 2024 and was undertaken in accordance with Douglas' proposal 231158.00.P.001.Rev0 dated 12 August 2024.

It is understood that an approximately 100m long section of the southern river-bank has eroded. Proposed remedial works include filling against the bank with rock benching (placed with an batter sloping at approximately 1(v):2.5(h), with the inclusion of a 2.5m wide bench to promote mangrove establishment and log rootball structures to provide animal habitat. The site is shown on Drawing 1, Appendix A.

The aim of the investigation was to assess the subsurface soil and groundwater conditions at selected test locations to provide:

- Interpreted geotechnical strength parameters based upon field data and published correlations;
- Preliminary slope stability analysis for a typical proposed remediated riverbank cross-section, including high and low tide conditions (as provided by Neilly);
- Comment on the presence or otherwise of acid sulfate soils (ASS); and
- Soil agronomic testing (to be interpreted by others).

For assessment purposes, the client provided existing topographic information which was used as a typical riverbank cross section. No bathymetric information on the submerged slopes was provided to Douglas at the time of reporting.

The investigation included three cone penetration tests (CPTs), three test pits and laboratory testing of selected samples. Details of the field and laboratory work are presented in this report, together with comments and recommendations on the items listed above.

This revised report updates comments regarding the requirement for an acid sulfate soils management plan (ASSMP).

This report must be read in conjunction with the notes About This Report, presented in Appendix B along with any other attached explanatory notes, and should be kept in its entirety without separation of individual pages or sections.

2. Site description

The site (refer to Drawing 1 in Appendix A) comprises an approximately 100 m long portion of the Daintree River southern bank, adjacent to Lots 41 – 49 McDowall Lane, Lower Daintree. The site relatively flat and is dissected by a single lane unsealed gravel road (McDowall Lane). Rural-residential lots are located to the south. The failed river-bank at this location is approximately 8m high, with a very steep to near vertical longitudinal scarp, leading down to the river.

Apart from the gravel road, the site is vegetated in short grass and scattered trees to the south. No vegetation remains on the failed river-bank.

Figures 1 to 3 below present site photographs taken during the field work.

Figure 1: Failed riverbank looking west

Figure 2: Failed riverbank looking east

Figure 3: McDowell Lane, looking east towards CPT 1

3. Published data

The following sections outlines readily available published geological information for the site.

3.1 Geology

The Mossman 1:100,000 Queensland Department of Natural Resources, Mines and Energy, Geological Compilation Series Map Sheet 7965 dated 30 August 2018 and accompanying explanatory notes indicates that the site is underlain by Quaternary alluvium. This unit is described as "sand and silt; abandoned levee, channel and outwash deposits; sandy rises in alluvial plains".

The encountered ground conditions comprised variable fill depths, overlying granular and cohesive alluvium, and are generally considered consistent with the published geological mapping.

3.2 Acid sulfate soils

National ASS risk mapping (as per Queensland Globe) indicates that the site is located within an area mapped as having a 'Low probability' of ASS occurrence. It is noted that the mapping indicates the Daintree River subtidal zones have a 'High probability' of ASS occurrence.

Figure 4 below shows the National ASS risk mapping for the site.

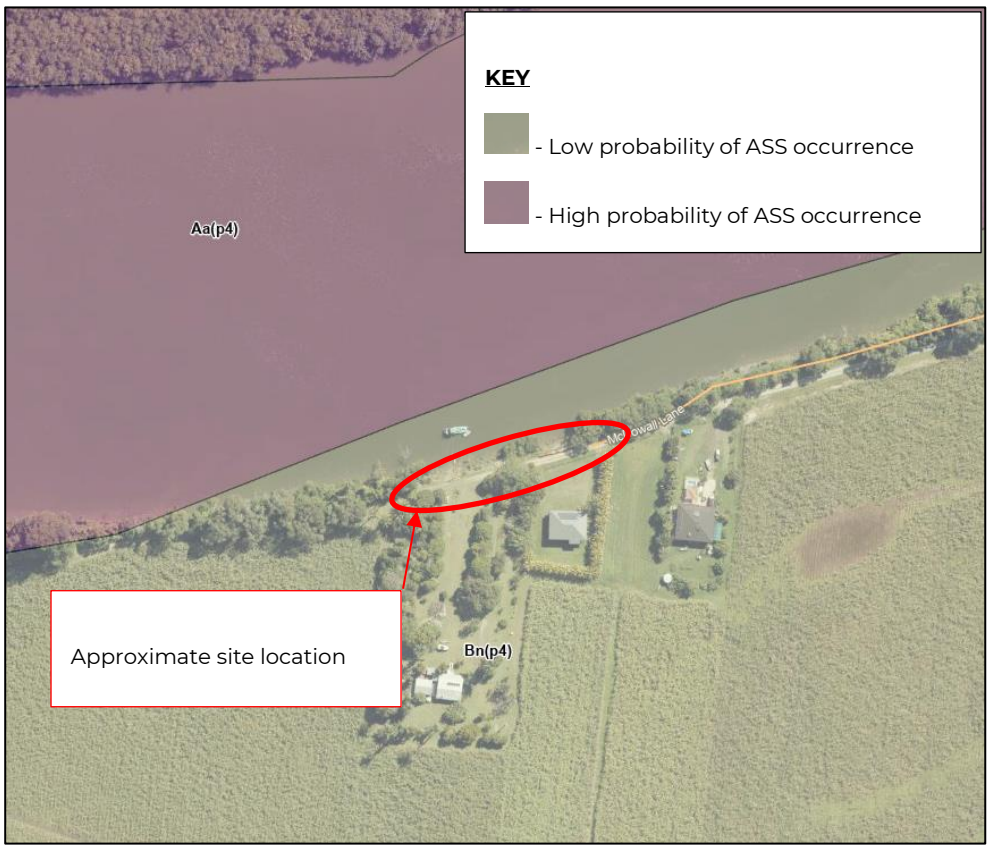

Figure 4: Published National ASS Risk Mapping for the site (as per Queensland Globe)

4. Field work methods

The field work was undertaken between 3 and 4 September 2024 and comprised three CPTs and test pits (designated CPTs/Pits 1 to 3). The CPTs and test pits were undertaken above the existing river-bank at the locations shown in Drawing 1 in Appendix A, and are summarised in Table 1.

Table 1: Test location summary

Test Location	Coordinates (MGA 2020 Zone 55)		Surface Level (m AHD)	Investigation Depth (m)
	Easting (m)	Northings (m)		
CPT 1	327883	8201304	3.8	24.62*
CPT 2	327855	8201295	3.9	25.00*
CPT 3	327827	8201285	4.0	25.60*
Pit 1	327884	8201303	3.6	4.00*
Pit 2	327856	8201291	3.7	4.00*
Pit 3	327825	8201282	4.0	4.00*

Notes to Table 1: * - Target depth

Reaction for the CPTs was provided by a purpose-built test rig, ballasted by and attached to an 10 t excavator. In the CPTs, a 35 mm diameter cone with a following 135 mm long friction sleeve is attached to rods of the same diameter and pushed into the soil by the test rig using the excavator hydraulics. Strain gauges in the cone and sleeve measure resistance to penetration. The results are displayed and stored on a computer for later plotting and interpretation.

The pits were excavated using the same excavator fitted with a 450 mm wide toothed bucket. Pocket penetrometer (pp) tests were undertaken on suitable representative undisturbed silt or clay blocks retrieved from the pits. At the completion of excavating, the pits were checked for signs of groundwater ingress, photographed, and backfilled in layers and mounded and track rolled at the surface.

A Douglas engineer operated the CPT equipment, logged the subsurface profile in the pits and collected representative samples for identification and laboratory purposes.

The UTM coordinates and surface levels were recorded using an approximately sub-decimetre accurate DGPS.

5. Field work results

The subsurface conditions inferred from the CPTs and encountered within the pits are presented in the CPT report sheets and test pit logs presented in Appendix B. These should be read in conjunction with the notes About this Report and other explanatory notes which comment on the terminology symbols and abbreviations; soil descriptions; sampling, testing and excavation methods; and cone penetration testing methods used in their preparation, as presented in Appendix A.

The ground conditions encountered/inferred at the test locations are described below.

Pavement Materials	Probably sandy gravel (inferred only) to 0.4 m and 0.6 m depth in CPTs 1 and 2 respectively.
FILL/Topsoil FILL	Sand (inferred only) to 0.45m depth in CPT 3. Low plasticity silty clay to 0.2 m depth in Pit 1
Upper Alluvial Cohesive Soils	Encountered/inferred at all test locations, comprising stiff and/or very stiff silty, occasionally firm, clay, clayey sandy silt or clayey silt. Occasionally interbedded with loose or medium dense sand or silty sands. Pits 1 to 3 were terminated within this unit at 4.0 m depth, and this unit extended to between 4.2 m and 5.0 m depth in the CPTs.
Alluvial Granular Soil	Generally loose to medium dense sand, inferred to between 14.2 m and 14.5 m depth in CPTs 1 to 3. Occasional stiff silty clay lenses in CPT 1.
Lower Alluvial Cohesive Soils	Stiff clayey silt to investigation termination depths, with some sandy silt or silty clay interbeds below about 18 m depth. It is noted that a 0.4 m thick firm band was inferred below 24.0 m depth in CPT 1.

Groundwater observations from the pits are summarised in Table 2. No observations were possible in the CPTs due to void collapse after removal of the cone and rods. It should be noted that groundwater levels are affected by climatic conditions, soil permeability and particularly tidal influences at this site, and will therefore vary with time. Furthermore, the Lower Daintree is located within the wet tropics and is particularly susceptible to 'wet' and 'dry' seasonal variations in rainfall. The pits were also only left open for a short period and it is likely that groundwater levels had not fully stabilised.

Table 2: Groundwater summary (04/09/2024)

Test Location	Surface Level (m AHD)	Observed Groundwater Depth (m)	Groundwater RL (m AHD)
Pit 1	3.59	3.80	-0.21
Pit 2	3.70	3.20	0.50
Pit 3	3.96	3.90	0.06

6. Laboratory testing

6.1 Geotechnical

Geotechnical laboratory testing comprised the following:

- Field moisture, Atterberg limits and linear shrinkage tests;
- Particle size distribution tests (sieve and hydrometer);
- pH, electrical conductivity (EC), chloride, exchangeable sodium percentage (ESP) and Emerson class testing; and
- Agronomic analysis suite on two topsoil samples.

The testing results are provided in Appendix D. The plasticity, grading and dispersion suite results are summarised in Tables 3 to 4 below.

Table 3: Classification test results summary

Pit	Depth (m)	Primary Description	FMC (%)	Atterberg Limits			LS (%)	Particle Size Distribution			
				LL (%)	PL (%)	PI (%)		Gravel (%)	Sand (%)	Silt (%)	Clay (%)
1	0.5-0.6	Clayey SILT	22.0	29	22	7	5.0	3	17	60.9	19.1
2	1.9-2.0	Clayey SILT	24.3	28	22	6	4.5	0	22	52.9	18.2
3	3.4-3.5	Clayey Sandy SILT	23.4	26	22	4	2.0	0	33	50.9	16.1

Notes to Table 3:
FMC - Field moisture content LL - Liquid Limit PL - Plastic Limit PI - Plasticity Index LS - Linear Shrinkage

Table 4: Erosion and cation exchange potential summary

Pit	Depth (m)	Primary Description	Emerson Class No	pH	Electrical Conductivity (µS/cm)	Chloride (mg/kg)	Exchangeable Sodium Percentage (%)
1	1.7-1.8	Silty CLAY	6	5.1	23	<5	6.6
1	3.2-3.3	Silty Sandy CLAY	6	4.9	28	<5	5.9
2	0.5- 0.6	Silty CLAY	6	4.5	76	10	12.8
2	3.5-3.6	Clayey SILT	6	3.4	670	7	20.0
3	1.0-1.2	Silty CLAY	6	4.6	43	<5	10.0
3	3.9-4.0	Silty Sandy CLAY	6	3.3	670	5	14.2

6.2 Acid sulfate soil

Actual acid sulfate soils (AASS) and potential acid sulfate soils (PASS) were screened with reference to the Queensland Acid Sulfate Soil Technical Manual (Dear, et al., 2024) and the National Acid Sulfate SoilS Guidelines (WQA, 2018a) and (WQA, 2018b).

48 soil samples collected from the test pits were screened undertaken by measuring pH after the addition of distilled water (pH_F)and peroxide (pH_{FOX}). The pH_F tests indicate past oxidation of sulfides and hence possible presence of AASS, while the pH_{FOX} test indicates the presence of unoxidized sulfides and therefore PASS.

More detailed chromium suite analysis was carried out by SGS Australia Pty Ltd, a NATA accredited analytical laboratory, on 24 samples. The preliminary field screening and chromium suite test results are summarised in Table D.1 in Appendix D, followed by the laboratory test certificates.

6.3 Agronomic

An agronomic test was undertaken to SESL Australia Pty Ltd, a NATA accredited analytical laboratory on a single blended 'topsoil' sample (i.e. to 0.1 m depth) from Pits 1 to 3.

The results and associated agronomist report are presented in Appendix E.

7. Proposed development

It is understood that the approximately 100m long stretch of eroded Daintree River bank, will be remediated by:

- filling against the bank with rock benching (placed with an outface batter sloping at approximately 1(v):2.5(h);
- providing a 2.5m wide bench to promote mangrove establishment;
- including a log rootball structure for animal habitat, which includes pinning of habitat logs into the rock benching;
- revegetating measures above HAT; and
- treating any unsuitable materials.

Based upon discussion with the Neilly Group, is understood that no excavation is proposed because the works comprise mostly placing rock against the existing river bank. A typical section and conceptual layout of the proposed remedial work (as provided by Neilly Group) is presented in Figures 5 and 6 below.

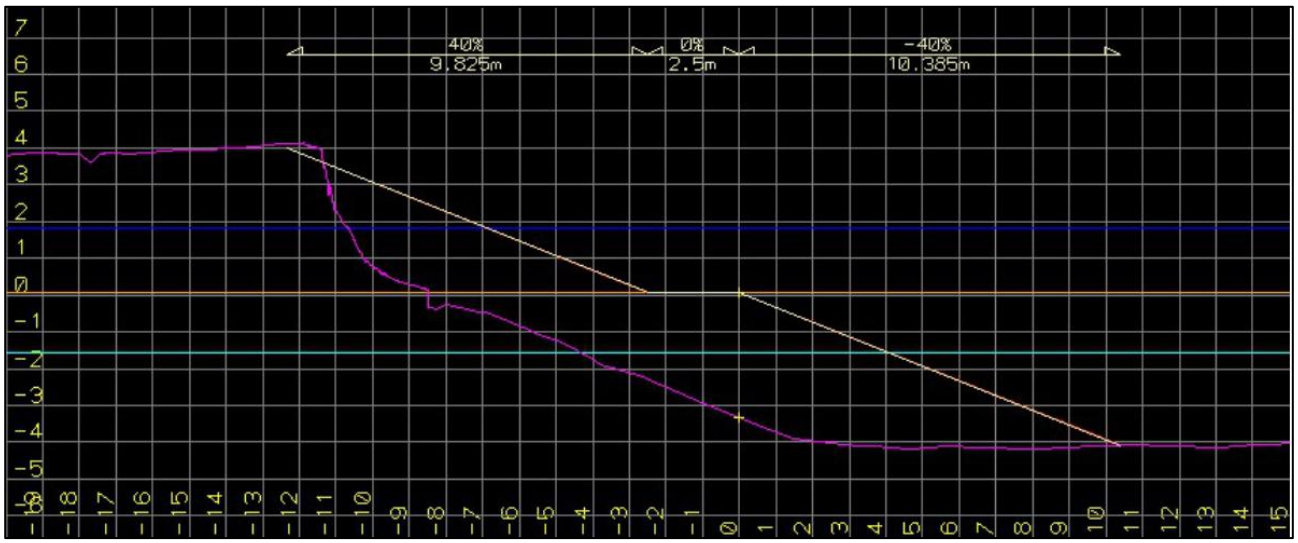

Figure 5: Typical section of the proposed remedial works (as provided by Neilly Group)

Notes on Figure 5:

Dark Blue indicates HAT (Highest Astronomical Tide) Level, Orange line indicates MSL (mean sea level) and the Aqua line indicates LAT (Lowest Astronomical Tide) Level)

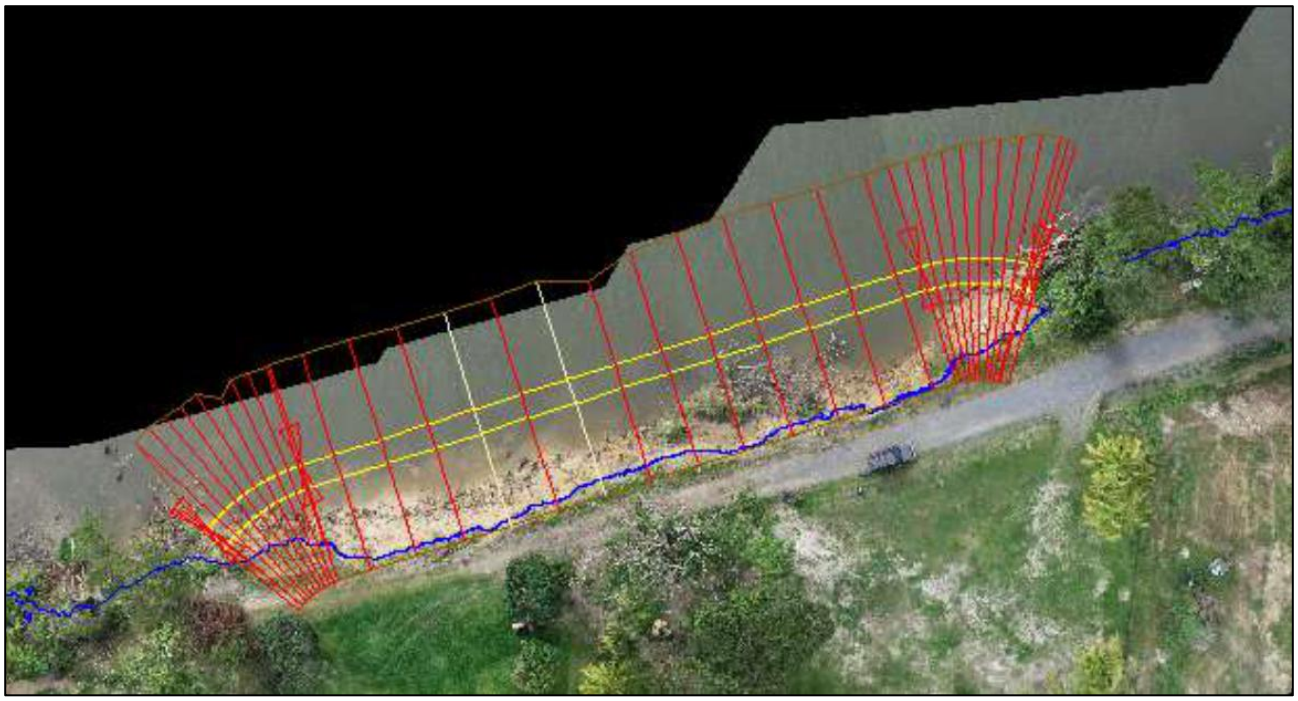

Figure 6: Conceptual layout of proposed remedial works (as provided by Neilly Group).

8. Comments

8.1 Appreciation of subsurface conditions

Ground conditions are broadly characterised by variable amounts of fill, overlying cohesive soils comprising stiff or stronger (occasionally firm) clays and silts, which were variably interbedded with loose or medium dense sands, inferred to depth s of between 4.2 m to 5.0 m. These soils were inferred to be overlying generally loose to medium dense sands to depths of between 14.2 m and 14.5 m which overlying stiff silty soils to investigation termination depth of between 24.62 m and 25.60 m,

Where groundwater was encountered, it was between at 3.2 m and 3.9 m depth.

The ground conditions inferred by, and topography provided to Douglas for this assessment, indicate the potential for continued riverbank instability, until the proposed remedial works are implemented. These assessments do not account for continued erosion by river flows and/or flood events.

Further comment on the design and c construction of the proposed remedial works area given in the following sections.

8.2 Adopted strength parameters

The drained and undrained strength parameters for the range of materials encountered/inferred during the intrusive investigation and adopted for slope stability analysis are presented in Table 5. These parameters are based on presumptive values presented in published literature, including

Appendix D of AS 45678 (2002), iterative slope stability analysis (refer to Section 8.3) and Douglas' previous experience with similar materials.

Table 5: Adopted strength parameters

Material	Strength consistency / Relative density	Bulk Unit Weight, γ (kN/m^3)	Effective Unit Weight, γ' (kN/m^3)	Undrained Shear Strength, C_u (kPa)	Effective Friction Angle, ϕ' (degrees)	Effective Cohesion, c' (kPa)
Clayey silt to silty clay	Firm	18	8	25	24	3
	Stiff	19	9	50	26	5
	Very Stiff	20	10	100	28	6
Sands and silty sands	Loose	17	7	-	30	0
	Medium Dense	18	8	-	34	0

8.3 Preliminary slope stability model

8.3.1 Methodology

Preliminary slope stability of the proposed remediated riverbank at both low and high tide was analysed to estimate the factor of safety against global stability for a representative cross section (as provided by Neilly Group). It is noted that low tide is considered the critical groundwater condition with respect to slope stability.

The preliminary stability analyses considered a circular slip, using limit equilibrium analysis in GeoStudio proprietary software Slope/W, and adopted the Morgenstern-Price method of slices analysis methodology. For the purposes of assessing global stability, as per Queensland Department of Transport and Main Roads (DTMR) Geotechnical Design Standard (GDS) (DTMR, 2020), a target Factor of Safety (FoS) of 1.5 is generally desired under conditions experienced throughout the design life of the remedial works. Furthermore, a low FoS of 1.3 can be adopted very rare, extreme short-term events. This lower extreme short-term target FoS can be adopted following a case specific risk assessment.

Following review of the CPT results, the soil profile in CPT 2 was considered to represent the worst case for global stability assessment purposes as it had thickest firm clay layer (between 3.4 m and 4.3 m depth).

8.3.2 Preliminary analysis results

The SLOPE/W analysis results for the proposed remediated riverbank typical cross section geometry is shown in Figure 7 (as provided by Neilly Group). The ground model is a simplified lithology based upon the inferred results of CPT 2 (i.e. it assumes that the subsurface profile inferred at the CPT extends uniformly into the river).

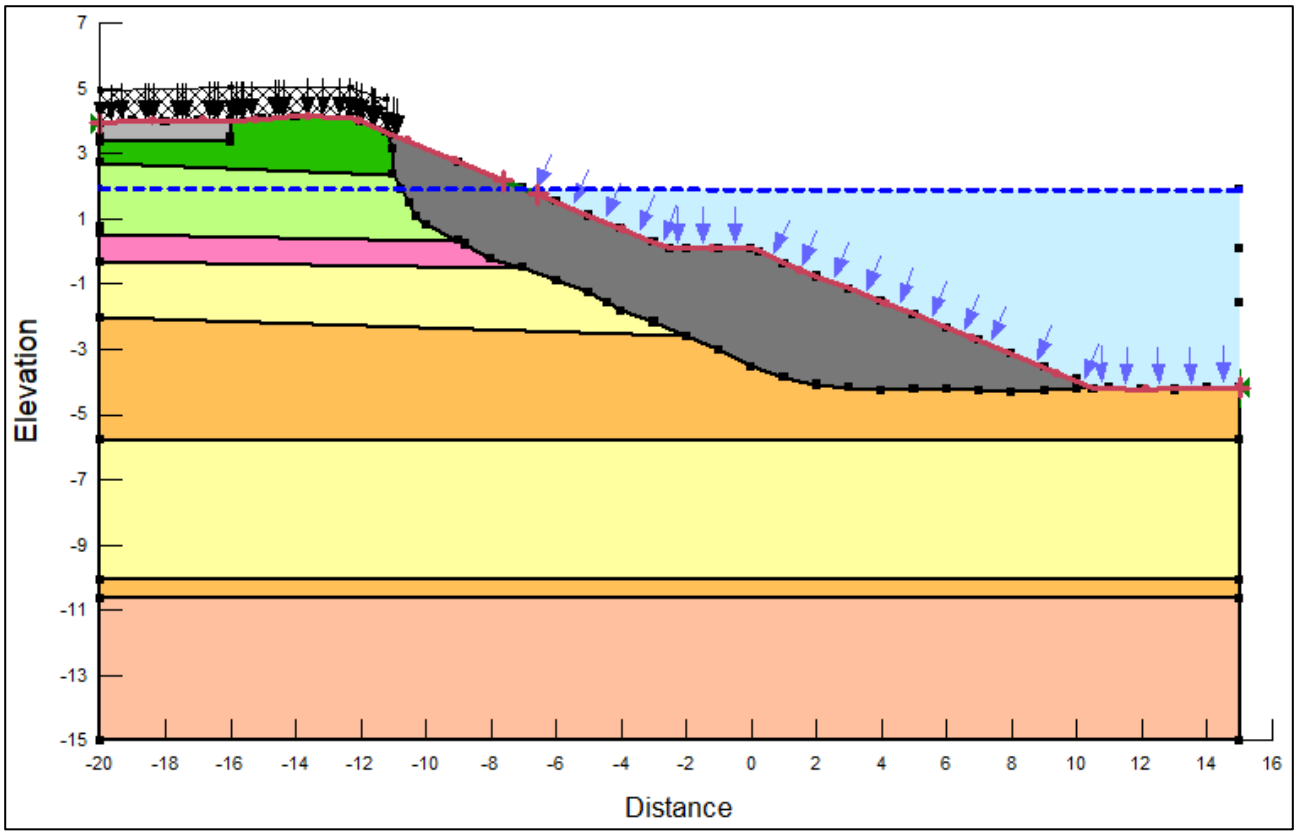

Figure 7: Slope/W model of remediated riverbank, with groundwater levels as HAT (as provided by Neilly Group).

The preliminary stability analysis has considered the remediated river bank (refer to Figure 7), with two different river/groundwater level conditions (as provided by Neilly Group (refer to Figure 5):

- Groundwater and river flows at highest astronomical tide (HAT) levels; and
- Groundwater and river flows at lowest astronomical tide (LAT) levels.

The existing river bank (as provided by Neilly Group) was initially analysed to estimate the drained strength parameters of materials encountered/inferred during the intrusive investigation. In this regard, it is noted that a Douglas engineer, who was working on a nearby site, noted that the existing bank had regressed approximately 0.3 m to 0.5 m about five weeks after the investigation. As such, the existing river bank was modelled to be unstable in current conditions, assuming both HAT and LAT groundwater/river flows (refer above). As such a typical FoS of less than or equal to 1 was used to derive the material strength parameters for this assessment (refer to Table 5).

Preliminary stability analyses of the remediated river bank, was then conservatively undertaken using drained strength parameters, as presented in Table 5 (refer to Section 8.2). The rock fill source for remediation is unknown, however the following parameters were adopted in absence of material specific information, based upon DTMR GDS (DTMR, 2020) guidance:

- Bulk unit weight = 20 kN/m^3
- Effective friction angle = 40 degrees

- Effective cohesion = 0 kPa

It is assumed that the remedial works rock fill will be placed and compacted in a controlled manner in accordance with any project specifications, which as a minimum, will comply with relevant Australian or DTMR earthworks specifications. This includes geofabric separation layers between the placed rock fill and the existing river bank, and benching/keying the rockfill into the existing river bank.

A minimum surcharge load of 20 kPa was applied to the existing surface gravel road (McDowall Lane) to simulate existing traffic loads for both the existing and remediated river-bank analysis, as per the DTMR (2020) guidance. In addition, for the remediated river-bank analysis a short-term construction load of 10 kPa was applied between McDowall Lane and the river bank crest to simulate construction traffic loads as per DTMR (2020) guidance.

The preliminary stability analysis results are presented in Table 6, with Slope/W outputs presented in Appendix F.

Table 6: Existing and Remediated Riverbank Preliminary Stability Assessment Results

Scenario	Groundwater Level	Achieved FoS	Appendix Figure Number
Remediated Riverbank	Groundwater and river flows at HAT Level	1.74	F.1
	Groundwater and river flows at LAT level	1.62	F.2

The preliminary slope stability analysis results of the existing and remediated river bank cross-sections advised by Neilly Group suggest that:

- the existing riverbank is unstable in its current condition (i.e. FoS < 1)).

  It is recommended that the site be regularly monitored until the remedial work is implemented, so that the slope failure does not infringe upon or progress into McDowall Lane. If this occurs, measures must be implemented to restrict access to the area (i.e., diverting traffic or limiting access to the area until the remedial works can be implemented).
- the proposed remedial works achieve a suitable long term FoS of greater than (>) 1.50 (refer to Table 6).

The slope stability analysis results, as presented in this report, are contingent upon the slopes within the influence zone of the flowing river effects to be adequately protected against scour and erosion, including areas outside the proposed remedial works.

It is noted that the analysis above should be considered as preliminary, and should confirmed during the detailed design phase of the project, including the assessment of suitable flood events and associated groundwater levels.

8.4 **Acid sulfate soils**

The following comments are made with reference to the summarised test results presented in Table D.1 (refer to Appendix D). The criteria used to assess the screening test results (pH_F and pH_{FOX}) as possibly indicating AASS or PASS were based on NASSG (WQA, 2018a) as follows:

- $pH_F \leq 4$ and no jarosite observed in the soil may indicate reduced inorganic sulfur (RIS) oxidation has occurred in the past and therefore AASS may be present. Of the 48 samples subject to field screening, 46 retuned a $pH_F \leq 4$ indicating that AASS may be present at the site.
- Where $pH_{FOX} < 3$, along with a strong reaction (reaction strength of 3 or 4) to peroxide, and pH_{FOX} reading at least one pH unit below pH_F, this is a strong indicator of potential acid sulfate soil (PASS) conditions.

  Of the 48 samples subject to field screening, 36 retuned a $pH_{FOX} < 3$, of which only three (3) samples had a strong reaction with peroxide. As such PASS conditions may be present at the site, subject to more rigorous testing.

Based upon the results of the field screening tests, 24 chromium suite tests were undertaken on selected samples and the calculated 'existing plus potential' acidity of each of these tests is summarised in Table D.1 (refer to Appendix D).

For less than 1000 t of soil disturbance, as is expected to be the case of the proposed riverbank remedial works, the action criteria which trigger a requirement for ASS management depends upon soil type as below:

- for clays is ≥0.1% sulfur
- for silt is ≥0.06% sulfur; and
- for sands is ≥0.03% sulfur.

If, however, greater than 1000 t of soil is to be disturbed, the action criterion triggering ASS management is ≥0.03% sulfur, no matter the soil type (further geotechnical advice must be sought in this case).

The chromium suite testing results (refer to Table D.1 in Appendix D) indicate that for 1000 t or less soil disturbance, 17 of the 24 tested samples had an 'existing plus potential' acidity that met the associated action criteria. However, because no excavations are proposed during the work, the requirement to develop an ASSMP is not triggered.

The NASSG (WQA, 2018a) indicates that ASS investigation is required for excavations greater than 100m^3. Noting that investigation has been completed, any disturbances less than 100m^3 could theoretically be completed without formal ASS management, however a general environmental duty would apply requiring appropriate neutralisation to mitigate environmental impacts. Douglas should be contacted for further advice if any excavation of the natural site soils is proposed.

9. References

AS 4678. (2002). *Earth-retaining structures*. Standards Australia.

Dear, S. E., Williams, K. M., McElnea, A. E., Ahern, C. R., Dobos, S. K., Moore, N. G., & O'Brien, L. E. (2024). *Queensland acid sulfate soil technical manual : soil management guidelines version 5.1*. Department of Environment, Science and Innovation.

DTMR. (2020). *Geotechnical Design Standard - Minimum Requirments*. Brisbane: The Queensland Government.

WQA. (2018a). *National acid sulfate soils sampling and identification methods manual*. Water Quality Australia.

WQA. (2018b). *National acid sulfate soils identification and laboratory methods manual*. Water Quality Australia.

10. Limitations

Douglas Partners Pty Ltd (Douglas) has prepared this report (or services) for this project at McDowall Lane, Lower Daintree in line with Douglas' proposal dated 12 August 2024 and acceptance received from Jacob Dearlove of Neilly Group Pty Ltd dated 13 August 2024. The work was carried out under Douglas' Engagement Terms . This report is provided for the exclusive use of Neilly Group Pty Ltd for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of Douglas, does so entirely at its own risk and without recourse to Douglas for any loss or damage. In preparing this report Douglas has necessarily relied upon information provided by the client and/or their agents.

The results provided in the report are indicative of the sub-surface conditions on the site only at the specific sampling and/or testing locations, and then only to the depths investigated and at the time the work was carried out. Sub-surface conditions can change abruptly due to variable geological processes and also as a result of human influences. Such changes may occur after Douglas' field testing has been completed.

Douglas' advice is based upon the conditions encountered during this investigation. The accuracy of the advice provided by Douglas in this report may be affected by undetected variations in ground conditions across the site between and beyond the sampling and/or testing locations. The advice may also be limited by budget constraints imposed by others or by site accessibility.

The assessment of atypical safety hazards arising from this advice is restricted to the (geotechnical / environmental / groundwater) components set out in this report and based on known project conditions and stated design advice and assumptions. While some recommendations for safe controls may be provided, detailed 'safety in design' assessment is outside the current scope of this report and requires additional project data and assessment.

This report must be read in conjunction with all of the attached and should be kept in its entirety without separation of individual pages or sections. Douglas cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion stated in this report.

This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by Douglas. This is because this report has been written as advice and opinion rather than instructions for construction.

The scope of work for this investigation/report did not include the assessment of surface or sub-surface materials or groundwater for contaminants, within or adjacent to the site. Should evidence of fill of unknown origin be noted in the report, and in particular the presence of building demolition materials, it should be recognised that there may be some risk that such fill may contain contaminants and hazardous building materials.

Appendix A

Drawing 1 – Site and Test Location Plan

LOCALITY PLAN

NOTE:
1: Basemap from MetroMaps
2: Locality Plan from StreetDirectory.com
3. Test locations are approximate only and were located using differential GPS typically accurate to ± 0.1 m depending on satellite coverage

0 20 40 60 m

Douglas PARTNERS	TITLE: **Site and Test Location Plan** **Proposed River Bank Remediation Works** **McDowall Lane, Daintree, QLD**	N	OFFICE: Cairns DRAWN BY: CM DATE: September.2024
CLIENT: Neilly Group Pty Ltd	PROJECT No: 231158.00	DRAWING No: 1	REVISION: 0

Appendix B

About this Report

Terminology, Symbols and Abbreviations

Soil Descriptions

Sampling, Testing and Excavation Methodology

Cone Penetration Testing

About this Report

October 2024

Introduction

These notes have been provided to amplify Douglas' report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

Douglas' reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

Copyright

Borehole and Test Pit Logs

The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable or possible to justify on economic grounds. In any case the boreholes and test pits represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

Groundwater

Where groundwater levels are measured in boreholes there are several potential problems, namely:

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;
- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, Douglas will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, Douglas cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, Douglas will be pleased to assist with investigations or advice to resolve the matter.

About this Report

Site Anomalies

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, Douglas requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

Information for Contractual Purposes

Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. Douglas would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.

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Terminology, Symbols and Abbreviations

November 2023

Introduction to Terminology, Symbols and Abbreviations

Douglas Partners' reports, investigation logs, and other correspondence may use terminology which has quantitative or qualitative connotations. To remove ambiguity or uncertainty surrounding the use of such terms, the following sets of notes pages may be attached Douglas Partners' reports, depending on the work performed and conditions encountered:

- Soil Descriptions;
- Rock Descriptions; and
- Sampling, insitu testing, and drilling methodologies

In addition to these pages, the following notes generally apply to most documents.

Abbreviation Codes

Site conditions may also be presented in a number of different formats, such as investigation logs, field mapping, or as a written summary. In some of these formats textual or symbolic terminology may be presented using textual abbreviation codes or graphic symbols, and, where commonly used, these are listed alongside the terminology definition. For ease of identification in these note pages, textual codes are presented in these notes in the following style XW. Code usage conforms with the following guidelines:

- Textual codes are case insensitive, although herein they are generally presented in upper case; and
- Textual codes are contextual (i.e. the same or similar combinations of characters may be used in different contexts with different meanings (for example `PL` is used for plastic limit in the context of soil moisture condition, as well as in `PL(A)` for point load test result in the testing results column)).

Data Integrity Codes

Subsurface investigation data recorded by Douglas Partners is generally managed in a highly structured database environment, where records "span" between a top and bottom depth interval. Depth interval "gaps" between records are considered to introduce ambiguity, and, where appropriate, our practice guidelines may require contiguous data sets. Recording meaningful data is not always appropriate (for example assigning a "strength" to a concrete pavement) and the following codes may be used to maintain contiguity in such circumstances.

Term	Description	Abbreviation Code
Core loss	No core recovery	KL
Unknown	Information was not available to allow classification of the property. For example, when auguring in loose, saturated sand auger cuttings may not be returned.	UK
No data	Information required to allow classification of the property was not available. For example if drilling is commenced from the base of a hole predrilled by others	ND
Not Applicable	Derivation of the properties not appropriate or beyond the scope of the investigation. For example providing a description of the strength of a concrete pavement	NA

Graphic Symbols

Douglas Partners' logs contain a "graphic" column which provides a pictorial representation of the basic composition of the material. The symbols used are directly representing the material name stated in the adjacent "Description of Strata" column, and as such no specific graphic symbology legend has been provided in these notes.

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Soil Descriptions

Terminology
Symbols
Abbreviations

March 2024

Introduction

All materials which are not considered to be "in-situ rock" are described in general accordance with the soil description model of AS 1726-2017 Part 6.1.3, and can be broken down into the following description structure:

The "classification" comprises a two character "group symbol" providing a general summary of dominant soil characteristics. The "name" summarises the particle sizes within the soil which most influence its behaviour. The detailed description presents more information about composition, condition, structure, and origin of the soil.

Classification, naming and description of soils require the relative proportion of particles of different sizes within the whole soil mixture to be considered.

Particle size designation and Behaviour Model

Solid particles within a soil are differentiated on the basis of size.

The engineering behaviour properties of a soil can subsequently be modelled to be either "fine grained" (also known as "cohesive" behaviour) or "coarse grained" ("non cohesive" behaviour), depending on the relative proportion of fine or coarse fractions in the soil mixture.

Particle Size Designation	Particle Size (mm)	Behaviour Model	
		Behaviour	Approximate Dry Mass
Boulder	>200	Excluded from particle behaviour model as "oversize"	
Cobble	63 - 200		
Gravel[1]	2.36 - 63	Coarse	>65%
Sand[1]	0.075 - 2.36		
Silt	0.002 - 0.075	Fine	>35%
Clay	<0.002		

[1] – refer grain size subdivision descriptions below

The behaviour model boundaries defined above are not precise, and the material behaviour should be assumed from the name given to the material (which considers the particle fraction which dominates the behaviour, refer "component proportions" below), rather than strict observance of the proportions of particle sizes. For example, if a material is named a "Sandy CLAY", this is indicative that the material exhibits fine grained behaviour, even if the dry mass of coarse grained material may exceed 65%.

Component proportions

The relative proportion of the dry mass of each particle size fraction is assessed to be a "primary", "secondary", or "minor" component of the soil mixture, depending on its influence over the soil behaviour.

Component Proportion Designation	Definition[1]	Relative Proportion	
		In Fine Grained Soil	In Coarse Grained Soil
Primary	The component (particle size designation, refer above) which dominates the engineering behaviour of the soil	The clay/silt component with the greater proportion	The sand/gravel component with the greater proportion
Secondary	Any component which is not the primary, but is significant to the engineering properties of the soil	Any component with greater than 30% proportion	Any granular component with greater than 30%; or Any fine component with greater than 12%
Minor[2]	Present in the soil, but not significant to its engineering properties	All other components	All other components

[1] As defined in AS1726-2017 6.1.4.4

[2] In the detailed material description, minor components are split into two further sub-categories. Refer "identification of minor components" below.

Composite Materials

In certain situations, a lithology description may describe more than one material, for example, collectively describing a layer of interbedded sand and clay. In such a scenario, the two materials would be described independently, with the names preceded or followed by a statement describing the arrangement by which the materials co-exist. For example, "INTERBEDDED Silty CLAY AND SAND".

Classification

The soil classification comprises a two character group symbol. The first character identifies the primary component. The second character identifies either the grading or presence of fines in a coarse grained soil, or the plasticity in a fine grained soil. Refer AS1726-2017 6.1.6 for further clarification.

Soil Name

For most soils, the name is derived with the primary component included as the noun (in upper case), preceded by any secondary components stated in an adjective form. In this way, the soil name also describes the general composition and indicates the dominant behaviour of the material.

Component [1]	Prominence in Soil Name
Primary	Noun (eg "CLAY")
Secondary	Adjective modifier (eg "Sandy")
Minor	No influence

[1] – for determination of component proportions, refer component proportions on previous page

For materials which cannot be disaggregated, or which are not comprised of rock or mineral fragments, the names "ORGANIC MATTER" or "ARTIFICIAL MATERIAL" may be used, in accordance with AS1726-2017 Table 14.

Commercial or colloquial names are not used for the soil name where a component derived name is possible (for example "Gravelly SAND" rather than "CRACKER DUST").

Materials of "fill" or "topsoil" origin are generally assigned a name derived from the primary/secondary component (where appropriate). In log descriptions this is preceded by uppercase "FILL" or "TOPSOIL". Origin uncertainty is indicated in the description by the characters (?), with the degree of uncertainty described (using the terms "probably" or "possibly" in the origin column, or at the end of the description).

Identification of minor components

Minor components are identified in the soil description immediately following the soil name. The minor component fraction is usually preceded with a term indicating the relative proportion of the component.

Minor Component Proportion Term	Relative Proportion	
	In Fine Grained Soil	In Coarse Grained Soil
With	All fractions: 15-30%	Clay/silt: 5-12% sand/gravel: 15-30%
Trace	All fractions: 0-15%	Clay/silt: 0-5% sand/gravel: 0-15%

The terms "with" and "trace" generally apply only to gravel or fine particle fractions. Where cobbles/boulders are encountered in minor proportions (generally less than about 12%) the term "occasional" may be used. This term describes the sporadic distribution of the material within the confines of the investigation excavation only, and there may be considerable variation in proportion over a wider area which is difficult to factually characterise due to the relative size of the particles and the investigation methods.

Soil Composition

Plasticity

Descriptive Term	Laboratory liquid limit range	
	Silt	Clay
Non-plastic materials	Not applicable	Not applicable
Low plasticity	≤50	≤35
Medium plasticity	Not applicable	>35 and ≤50
High plasticity	>50	>50

Note, Plasticity descriptions generally describe the plasticity behaviour of the whole of the fine grained soil, not individual fine grained fractions.

Grain Size

Type		Particle size (mm)
Gravel	Coarse	19 - 63
	Medium	6.7 - 19
	Fine	2.36 – 6.7
Sand	Coarse	0.6 - 2.36
	Medium	0.21 - 0.6
	Fine	0.075 - 0.21

Grading

Grading Term	Particle size (mm)
Well	A good representation of all particle sizes
Poorly	An excess or deficiency of particular sizes within the specified range
Uniformly	Essentially of one size
Gap	A deficiency of a particular size or size range within the total range

Note, AS1726-2017 provides terminology for additional attributes not listed here.

Soil Condition

Moisture

The moisture condition of soils is assessed relative to the plastic limit for fine grained soils, while for coarse grained soils it is assessed based on the appearance and feel of the material. The moisture condition of a material is considered to be independent of stratigraphy (although commonly these are related), and this data is presented in its own column on logs.

Applicability	Term	Tactile Assessment	Abbreviation code
Fine	Dry of plastic limit	Hard and friable or powdery	w<PL
	Near plastic limit	Can be moulded	w=PL
	Wet of plastic limit	Water residue remains on hands when handling	w>PL
	Near liquid limit	"oozes" when agitated	w=LL
	Wet of liquid limit	"oozes"	w>LL
Coarse	Dry	Non-cohesive and free running	D
	Moist	Feels cool, darkened in colour, particles may stick together	M
	Wet	Feels cool, darkened in colour, particles may stick together, free water forms when handling	W

The abbreviation code NDF, meaning "not-assessable due to drilling fluid use" may also be used.

Note, observations relating to free ground water or drilling fluids are provided independent of soil moisture condition.

Consistency/Density/Compaction/Cementation/Extremely Weathered Material

These concepts give an indication of how the material may respond to applied forces (when considered in conjunction with other attributes of the soil). This behaviour can vary independent of the composition of the material, and on logs these are described in an independent column and are generally mutually exclusive (i.e it is inappropriate to describe both consistency and compaction at the same time). The method by which the behaviour is described depends on the behaviour model and other characteristics of the soil as follows:

- In fine grained soils, the "consistency" describes the ease with which the soil can be remoulded, and is generally correlated against the materials undrained shear strength;
- In granular materials, the relative density describes how tightly packed the particles are, and is generally correlated against the density index;
- In anthropogenically modified materials, the compaction of the material is described qualitatively;
- In cemented soils (both natural and anthropogenic), the cemented "strength" is described qualitatively, relative to the difficulty with which the material is disaggregated; and
- In soils of extremely weathered material origin, the engineering behaviour may be governed by relic rock features, and expected behaviour needs to be assessed based the overall material description.

Quantitative engineering performance of these materials may be determined by laboratory testing or estimated by correlated field tests (for example penetration or shear vane testing). In some cases, performance may be assessed by tactile or other subjective methods, in which case investigation logs will show the estimated value enclosed in round brackets, for example (VS).

Consistency (fine grained soils)

Consistency Term	Tactile Assessment	Undrained Shear Strength (kPa)	Abbreviation Code
Very soft	Extrudes between fingers when squeezed	<12	VS
Soft	Mouldable with light finger pressure	>12 - ≤25	S
Firm	Mouldable with strong finger pressure	>25 - ≤50	F
Stiff	Cannot be moulded by fingers	>50 - ≤100	St
Very stiff	Indented by thumbnail	>100 - ≤200	VSt
Hard	Indented by thumbnail with difficulty	>200	H
Friable	Easily crumbled or broken into small pieces by hand	-	Fr

Relative Density (coarse grained soils)

Relative Density Term	Density Index	Abbreviation Code
Very loose	<15	VL
Loose	>15 - ≤35	L
Medium dense	>35 - ≤65	MD
Dense	>65 - ≤85	D
Very dense	>85	VD

Note, tactile assessment of relative density is difficult, and generally requires penetration testing, hence a tactile assessment guide is not provided.

Compaction (anthropogenically modified soil)

Compaction Term	Abbreviation Code
Well compacted	WC
Poorly compacted	PC
Moderately compacted	MC
Variably compacted	VC

Cementation (natural and anthropogenic)

Cementation Term	Abbreviation Code
Moderately cemented	MOD
Weakly cemented	WEK

Extremely Weathered Material

AS1726-2017 considers weathered material to be soil if the unconfined compressive strength is less than 0.6 MPa (i.e. less than very low strength rock). These materials may be identified as "extremely weathered material" in reports and by the abbreviation code XWM on log sheets. This identification is not correlated to any specific qualitative or quantitative behaviour, and the engineering properties of this material must therefore be assessed according to engineering principles with reference to any relic rock structure, fabric, or texture described in the description.

Soil Origin

Term	Description	Abbreviation Code
Residual	Derived from in-situ weathering of the underlying rock	RS
Extremely weathered material	Formed from in-situ weathering of geological formations. Has strength of less than 'very low' as per as1726 but retains the structure or fabric of the parent rock.	XWM
Alluvial	Deposited by streams and rivers	ALV
Fluvial	Deposited by channel fill and overbank (natural levee, crevasse splay or flood basin)	FLV
Estuarine	Deposited in coastal estuaries	EST
Marine	Deposited in a marine environment	MAR
Lacustrine	Deposited in freshwater lakes	LAC
Aeolian	Carried and deposited by wind	AEO
Colluvial	Soil and rock debris transported down slopes by gravity	COL
Slopewash	Thin layers of soil and rock debris gradually and slowly deposited by gravity and possibly water	SW
Topsoil	Mantle of surface soil, often with high levels of organic material	TOP
Fill	Any material which has been moved by man	FILL
Littoral	Deposited on the lake or seashore	LIT
Unidentifiable	Not able to be identified	UID

Cobbles and Boulders

The presence of particles considered to be "oversize" may be described using one of the following strategies:

- Oversize encountered in a minor proportion (when considered relative to the wider area) are noted in the soil description; or
- Where a significant proportion of oversize is encountered, the cobbles/boulders are described independent of the soil description, in a similar manner to composite soils (described above) but qualified with "MIXTURE OF".

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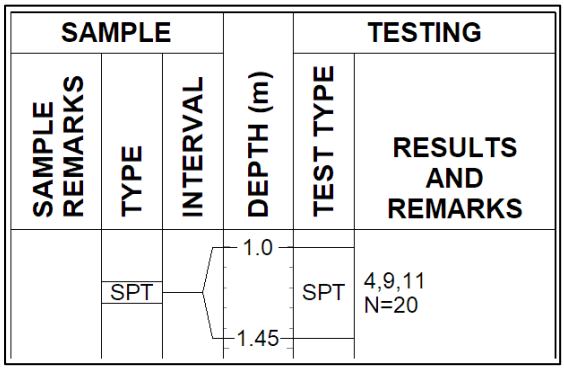
Sampling, Testing and Excavation Methodology

Terminology
Symbols
Abbreviations

October 2024

Sampling and Testing

A record of samples retained, and field testing performed is usually shown on a Douglas Partners' log with samples appearing to the left of a depth scale, and selected field and laboratory testing (including results, where relevant) appearing to the right of the scale, as illustrated below:



Sampling

The type or intended purpose for which a sample was taken is indicated by the following abbreviation codes.

Sample Type	Code
Auger sample	A
Acid Sulfate sample	ASS
Bulk sample	B
Core sample	C
Disturbed sample	D
Environmental sample	ES
Driven Tube sample	DT
Gas sample	G
Piston sample	P
Sample from SPT test	SPT
Undisturbed tube sample	U[1]
Water sample	W
Material Sample	MT
Core sample for unconfined compressive strength testing	UCS

[1] – numeric suffixes indicate tube diameter/width in mm

The above codes only indicate that a sample was retained, and not that testing was scheduled or performed.

Field and Laboratory Testing

A record that field and laboratory testing was performed is indicated by the following abbreviation codes.

Test Type	Code
Pocket penetrometer (kPa)	PP
Photo ionisation detector (ppm)	PID
Standard Penetration Test x/y =x blows for y mm penetration HB = hammer bouncing HW = fell under weight of hammer	SPT
Shear vane (kPa)	V
Unconfined compressive strength, (MPa)	UCS

Field and laboratory testing (continued)

Test Type	Code
Point load test, (MPa), axial (A), diametric (D), irregular (I)	PLT(_)
Dynamic cone penetrometer, followed by blow count penetration increment in mm (cone tip, generally in accordance with AS1289.6.3.2)	DCP9/150
Perth sand penetrometer, followed by blow count penetration increment in mm (flat tip, generally in accordance with AS1289.6.3.3)	PSP/150

Groundwater Observations

▷	seepage/inflow
▽	standing or observed water level
NFGWO	no free groundwater observed
OBS	observations obscured by drilling fluids

Drilling or Excavation Methods/Tools

The drilling/excavation methods used to perform the investigation may be shown either in a dedicated column down the left-hand edge of the log, or stated in the log footer. In some circumstances abbreviation codes may be used.

Method	Abbreviation Code
Direct Push	DP
Solid flight auger. Suffixes: /T = tungsten carbide tip, /V = v-shaped tip	AD[1]
Air Track	AT
Diatube	DT[1]
Hand auger	HA[1]
Hand tools (unspecified)	HAND
Existing exposure	X
Hollow flight auger	HSA[1]
HQ coring	HQ3
HMLC series coring	HMLC
NMLC series coring	NMLC
NQ coring	NQ3
PQ coring	PQ3
Predrilled	PD
Push tube	PT[1]
Ripping tyne/ripper	R
Rock roller	RR[1]
Rock breaker/hydraulic hammer	EH
Sonic drilling	SON[1]
Mud/blade bucket	MB[1]
Toothed bucket	TB[1]
Vibrocore	VC[1]
Vacuum excavation	VE
Wash bore (unspecified bit type)	WB[1]

[1] – numeric suffixes indicate tool diameter/width in mm

Douglas PARTNERS

Cone Penetration Testing

October 2024

Introduction

The Cone Penetration Test (CPT) is a sophisticated soil profiling test carried out in-situ. A special cone shaped probe is used which is connected to a digital data acquisition system. The cone and adjoining sleeve section contain a series of strain gauges and other transducers which continuously monitor and record various soil parameters as the cone penetrates the soils.

The soil parameters measured depend on the type of cone being used, however they always include the following basic measurements

- Cone tip resistance q_c
- Sleeve friction f_s
- Inclination (from vertical) i
- Depth below ground z

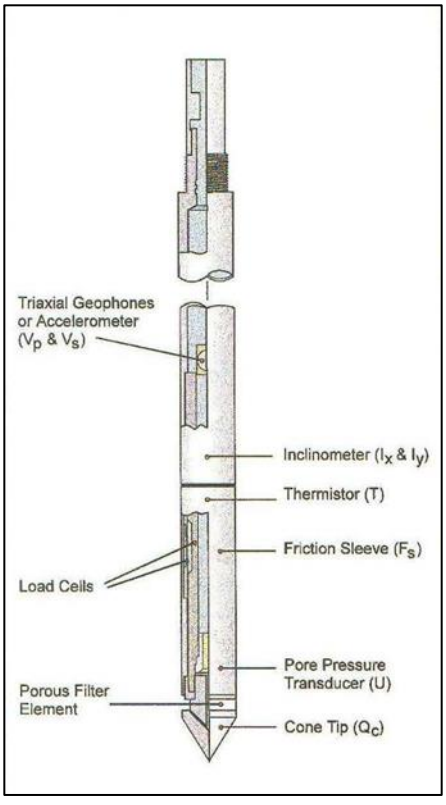


Figure 1: Cone Diagram

The inclinometer in the cone enables the verticality of the test to be confirmed and, if required, the vertical depth can be corrected.

The cone is thrust into the ground at a steady rate of about 20 mm/sec, usually using the hydraulic rams of a purpose built CPT rig, or a drilling rig. The testing is carried out in accordance with the Australian Standard AS1289 Test 6.5.1.

Figure 2: Purpose built CPT rig

The CPT can penetrate most soil types and is particularly suited to alluvial soils, being able to detect fine layering and strength variations. With sufficient thrust the cone can often penetrate a short distance into weathered rock. The cone will usually reach refusal in coarse filling, medium to coarse gravel and on very low strength or better rock. Tests have been successfully completed to more than 60 m.

Types of CPTs

Douglas Partners (and its subsidiary GroundTest) owns and operates the following types of CPT cones:

Type	Measures
Standard	Basic parameters (qc, fs, i & z)
Piezocone	Dynamic pore pressure (u) plus basic parameters. Dissipation tests estimate consolidation parameters
Conductivity	Bulk soil electrical conductivity (□) plus basic parameters
Seismic	Shear wave velocity (Vs), compression wave velocity (Vp), plus basic parameters

Strata Interpretation

The CPT parameters can be used to infer the Soil Behaviour Type (SBT), based on normalised values of cone resistance (Qt) and friction ratio (Fr). These are used in conjunction with soil classification charts, such as the one below (after Robertson 1990)

Cone Penetration testing

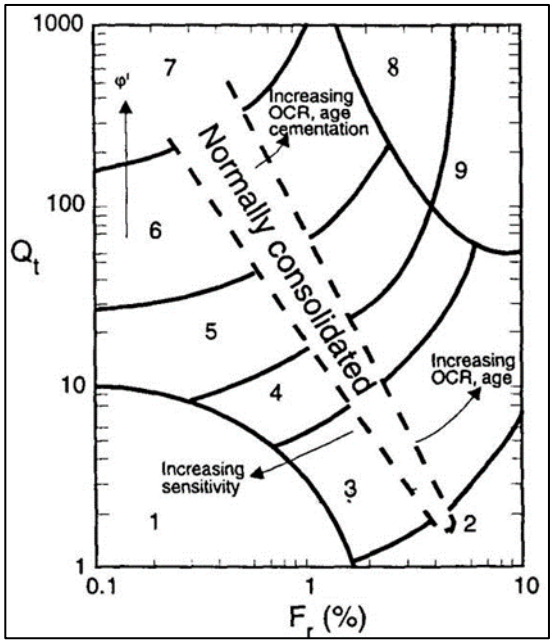


Figure 3: Soil Classification Chart

Douglas' in-house CPT software provides computer aided interpretation of soil strata, generating soil descriptions and strengths for each layer. The software can also produce plots of estimated soil parameters, including modulus, friction angle, relative density, shear strength and over consolidation ratio.

Douglas' CPT software helps our engineers quickly evaluate the critical soil layers and then focus on developing practical solutions for the client's project.

Engineering Applications

There are many uses for CPT data. The main applications are briefly introduced below:

Settlement

CPT provides a continuous profile of soil type and strength, providing an excellent basis for settlement analysis. Soil compressibility can be estimated from cone derived moduli, or known consolidation parameters for the critical layers (eg. from laboratory testing). Further, if pore pressure dissipation tests are undertaken using a piezocone, in-situ consolidation coefficients can be estimated to aid analysis.

Pile Capacity

The cone is, in effect, a small scale pile and, therefore, ideal for direct estimation of pile capacity. Douglas' in-house program ConePile can analyse most pile types and produces pile capacity versus depth plots. The analysis methods are based on proven static theory and empirical studies, taking account of scale effects, pile materials and method of installation.

The results are expressed in limit state format, consistent with the Piling Code AS2159.

Dynamic or Earthquake Analysis

CPT and, in particular, Seismic CPT are suitable for dynamic foundation studies and earthquake response analyses, by profiling the low strain shear modulus G0. Techniques have also been developed relating CPT results to the risk of soil liquefaction.

Other Applications

Other applications of CPT include ground improvement monitoring (testing before and after works), salinity and contaminant plume mapping (conductivity cone), preloading studies and verification of strength gain.

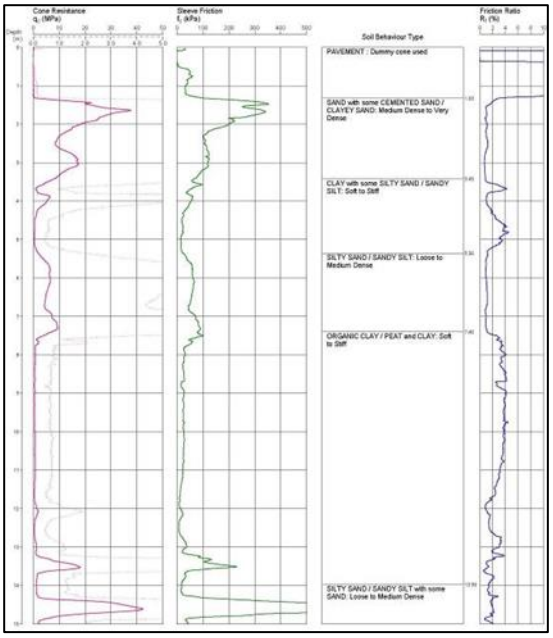


Figure 4: Sample Cone Plot

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Appendix C

Field Work Results (CPT 1 to 3 and Pits 1 to 3)

CONE PENETRATION TEST

CLIENT: Neilly Group Pty Ltd

PROJECT: Proposed River Bank Remediation Works

LOCATION: McDowall Lane, Lower Daintree

REDUCED LEVEL: 3.78

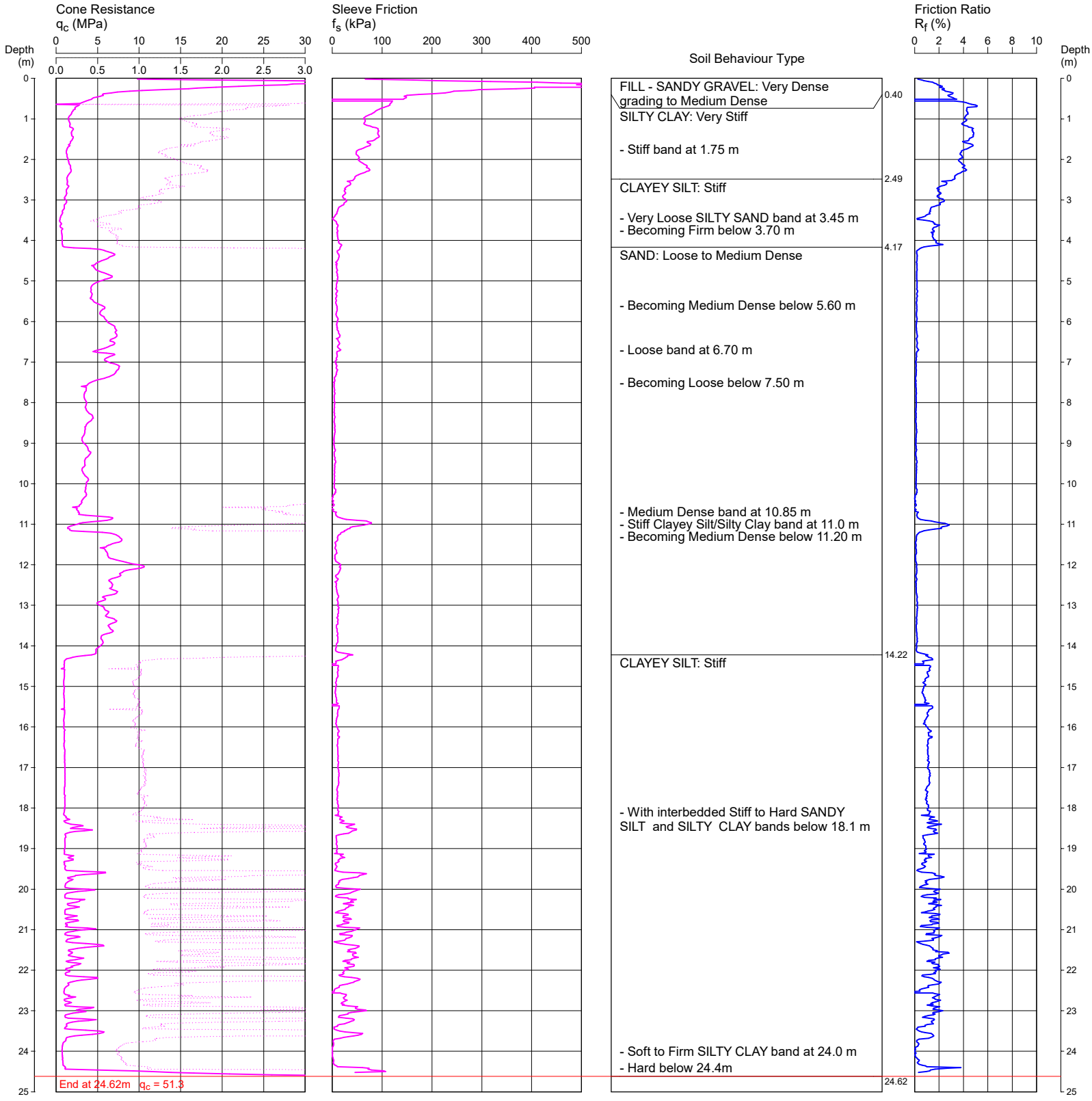
COORDINATES: 327883E 8201304N

CPT1

Page 1 of 1

DATE 04/09/2024

PROJECT No: 231158



REMARKS:

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Cone ID: 140949 **Type:** I-CFXY-10

ConePlot Version 5.9.2

Douglas Partners
Geotechnics / Environment / Groundwater

CONE PENETRATION TEST

CLIENT: Neilly Group Pty Ltd

PROJECT: Proposed River Bank Remediation Works

LOCATION: McDowall Lane, Lower Daintree

REDUCED LEVEL: 3.89

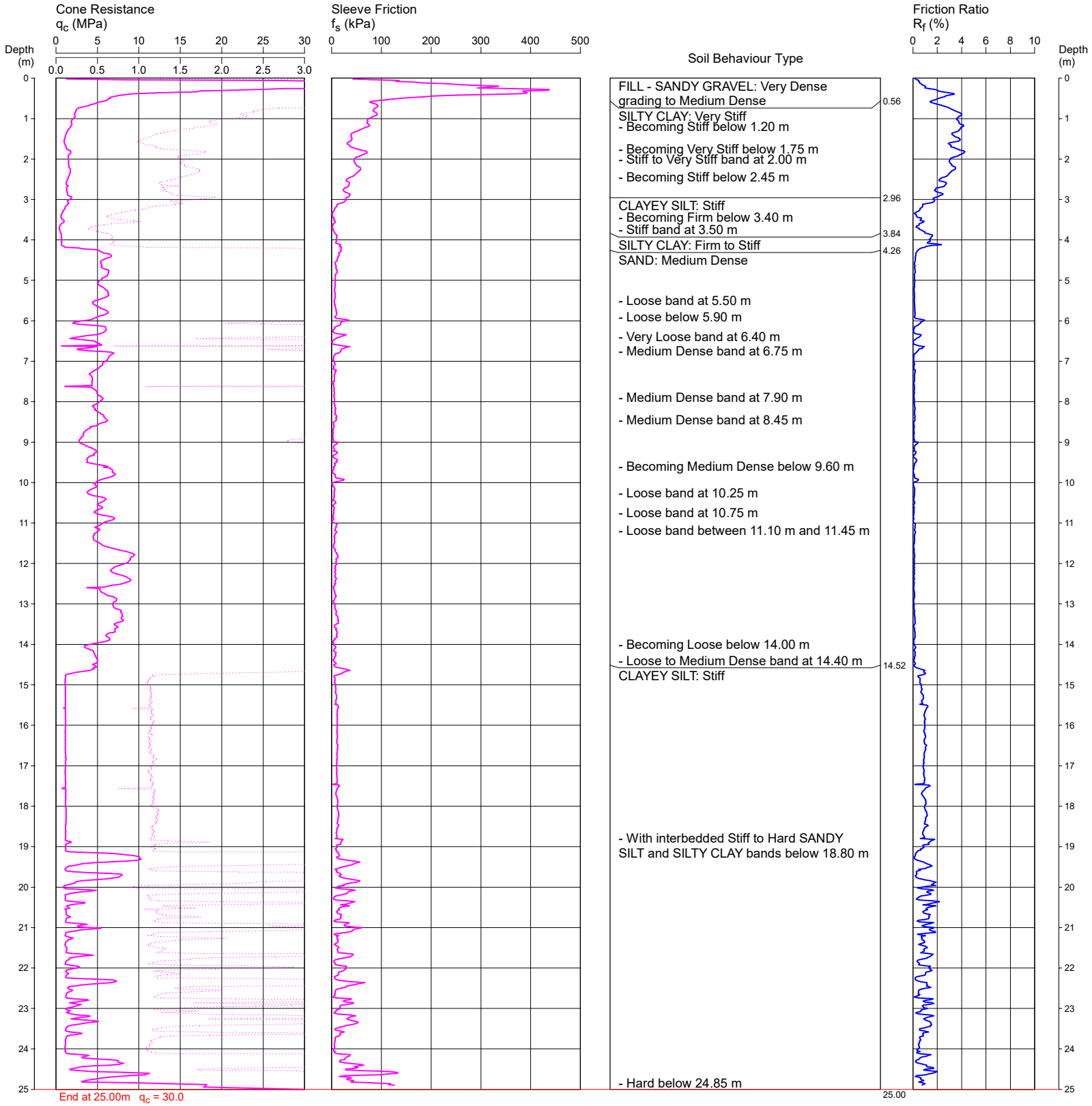
COORDINATES: 327855E 8201295N

CPT2

Page 1 of 1

DATE 03/09/2024

PROJECT No: 231158



REMARKS:

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Cone ID: 140949 **Type:** I-CFXY-10

ConePlot Version 5.9.2

Douglas Partners
Geotechnics / Environment / Groundwater

CONE PENETRATION TEST

CLIENT: Neilly Group Pty Ld

PROJECT: Proposed River Bank Remediaiton Works

LOCATION: Mcowell Lane, Lower Daintree

REDUCED LEVEL: 4.00

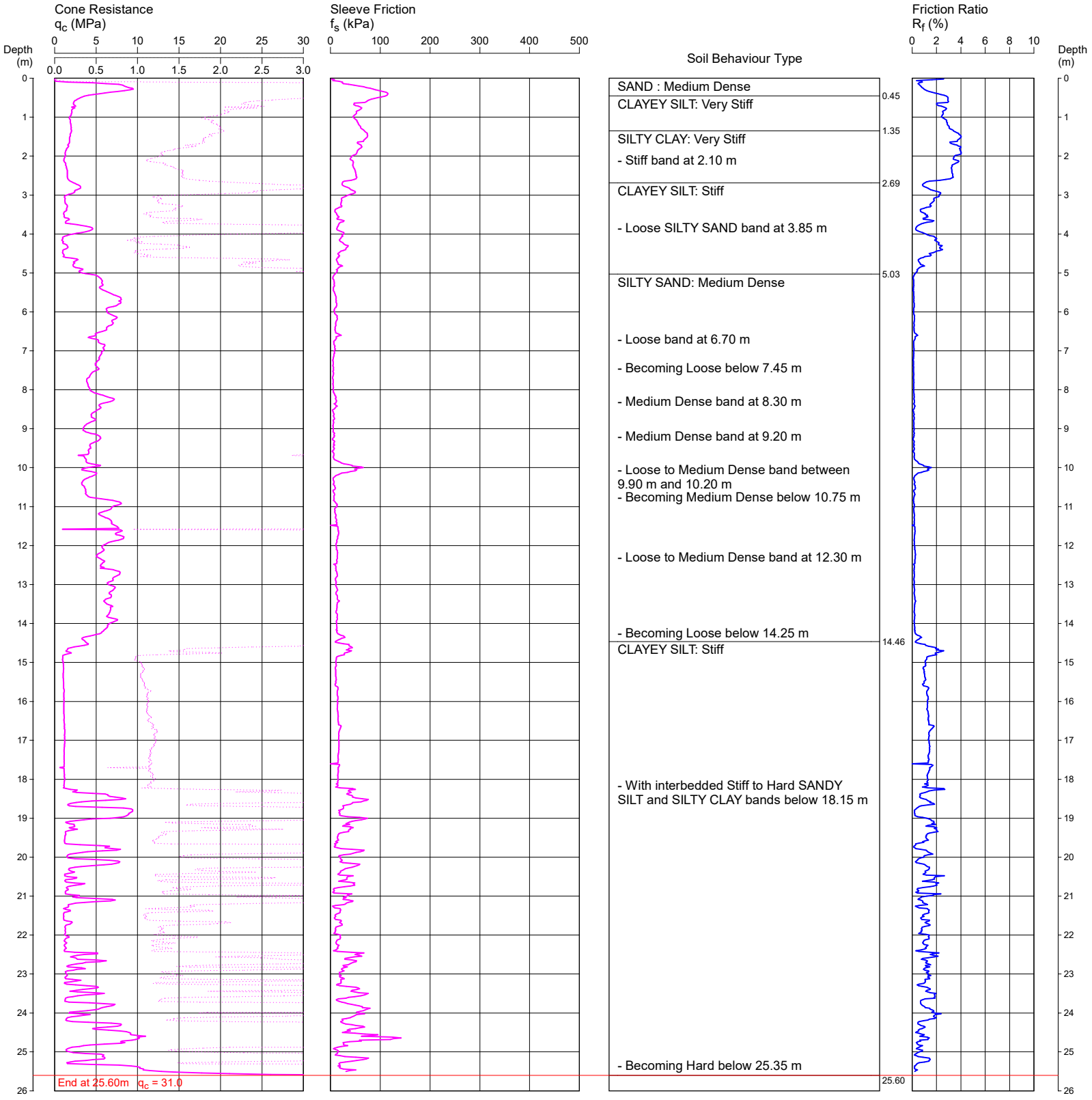
COORDINATES: 327827E 8201285N

CPT3

Page 1 of 1

DATE 03/09/2024

PROJECT No: 231158



REMARKS:

File: P:\231158.00 - LOWER DAINTREE, Stability Assessment\4.0 Field Work\CPTS\CPT3_000.CP5
Cone ID: 140949 **Type:** I-CFXY-10

ConePlot Version 5.9.2

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Neilly Group Pty Ltd
PROJECT: Proposed River Bank Remediation Works
LOCATION: McDowall Lane, Lower Daintree, QLD

SURFACE LEVEL: 3.6 AHD
COORDINATE: E:327884.2, N:8201302.7
DATUM/GRID: MGA2020 Zone 55
DIP/AZIMUTH: 90°/---°

LOCATION ID: 1
PROJECT No: 231158.00
DATE: 04/09/24
SHEET: 1 of 1

CONDITIONS ENCOUNTERED								SAMPLE			TESTING AND REMARKS	
GROUNDWATER	RL (m) / DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[^] / DENSITY.[^]	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
	0.20	TOPSOIL / Silty CLAY (CL), with gravel, trace sand: brown; low plasticity; fine to coarse, sub-angular to sub-rounded gravel; fine to coarse sand.		TOP FILL	VSt	w<PL		D		0.10		
								ASS		0.25		
		Clayey SILT (ML), trace sand: pale brown; low plasticity; fine sand.						ASS		0.50	PP	300-250kPa
								D		0.60		
								ASS		0.75	PP	200kPa
								ASS		1.00		
								D		1.10		
								ASS		1.25	PP	150kPa
								ASS		1.50		
				ALV	VSt	w<PL				1.70		
								D		1.75		
										1.80	PP	150kPa
								ASS				
								ASS		2.00		
								ASS		2.25	PP	150kPa
		2.40m: pale grey mottled brown						D		2.40		
										2.50		
								ASS				
								ASS		2.75		
								ASS		3.00	PP	100-150kPa
	3.10	Clayey Sandy SILT (ML): grey mottled brown; low plasticity; fine sand.									PP	50-100kPa
								D		3.20		
										3.25		
								ASS		3.30		
				ALV	F	w=PL		ASS		3.50		
▼ Groundwater observed below 3.8m 04/09/24		3.70m: dark grey with organics						ASS		3.75		
	4	Test Pit discontinued at 4.00m depth.						ASS		4.00		

NOTES: [#] Soil origin is "probable" unless otherwise stated. [^] Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: Yanmar 10 tonne excavator
METHOD: 450mm toothed bucket
REMARKS:

OPERATOR: Nordig
LOGGED: PJW

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

TEST PIT LOG

CLIENT: Neilly Group Pty Ltd
PROJECT: Proposed River Bank Remediation Works
LOCATION: McDowall Lane, Lower Daintree, QLD

SURFACE LEVEL: 3.7 AHD
COORDINATE: E:327855.5, N:8201291.0
DATUM/GRID: MGA2020 Zone 55
DIP/AZIMUTH: 90°/---°

LOCATION ID: 2
PROJECT No: 231158.00
DATE: 04/09/24
SHEET: 1 of 1

GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[^]	DENSITY.[^]	MOISTURE	REMARKS	SAMPLE TYPE	SAMPLE INTERVAL	DEPTH (m)	TESTING AND REMARKS: TEST TYPE	TESTING AND REMARKS: RESULTS AND REMARKS
			Clayey SILT (ML), trace sand: pale brown; low plasticity; fine sand.							D		0.10		
										ASS		0.25		
										ASS		0.50		
										D		0.60		
			0.60m: pale brown										PP	250-300kPa
										ASS		0.75		
										ASS		1.00	PP	250kPa
										D		1.10		
										ASS		1.25		
					ALV	VSt		w<PL						
										ASS		1.50		
										ASS		1.75	PP	200-250kPa
										D		1.90		
										ASS		2.00		
			2.20m: grey, no sand							ASS		2.25	PP	200kPa
			3.00m: mottled pale brown							ASS		2.50	PP	150-200kPa
		2.90								D		2.70		
												2.75		
												2.80		
										ASS				
			Clayey Sandy SILT (ML): pale grey mottled brown; low plasticity; fine sand.							ASS		3.00	PP	100kPa
▼ Groundwater observed below 3.2m 04/09/24					ALV	F		w=PL		ASS		3.25	PP	50-100kPa
			3.50m: dark grey, with organics							ASS		3.50		
										D		3.60		
										ASS		3.75		
		3.80												
			SAND (SW), with gravel, trace clay: grey and red brown; fine gravel; well graded.		ALV	L		W		D		3.90		
										ASS		4.00		
		4	Test Pit discontinued at 4.00m depth.											

NOTES: [#] Soil origin is "probable" unless otherwise stated. [^] Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: Yanmar 10 tonne excavator
METHOD: 450mm toothed bucket
REMARKS:

OPERATOR: Nordig
LOGGED: PJW

Refer to explanatory notes for symbol and abbreviation definitions

Generated with CORE-GS by Geroc - Soil Log

Douglas PARTNERS

TEST PIT LOG

CLIENT: Neilly Group Pty Ltd
PROJECT: Proposed River Bank Remediation Works
LOCATION: McDowall Lane, Lower Daintree, QLD

SURFACE LEVEL: 4.0 AHD
COORDINATE: E:327825.4, N:8201282.4
DATUM/GRID: MGA2020 Zone 55
DIP/AZIMUTH: 90°/---°

LOCATION ID: 3
PROJECT No: 231158.00
DATE: 04/09/24
SHEET: 1 of 1

CONDITIONS ENCOUNTERED								SAMPLE				TESTING AND REMARKS	
GROUNDWATER	RL (m) / DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[^] / DENSITY.[^]	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
	0	Clayey SILT (ML): brown; low plasticity.		ALV	VSt	w<PL		D		0.10		
								ASS		0.25	PP	600kPa
		0.40m: pale brown						ASS		0.50		
								D		0.60	PP	300kPa
								ASS		0.75		
	1							ASS		1.00	PP	250kPa
								D		1.10		
										1.20		
								ASS		1.25		
								ASS		1.50	PP	250kPa
								D		1.70		
										1.75		
								ASS		1.80	PP	250kPa
	2							ASS		2.00		
								ASS		2.25	PP	200kPa
	2.50	Silty SAND (SW): pale brown; fine to medium; well graded.		ALV	MD	M		D		2.40		
										2.50		
								ASS				
								ASS		2.75		
	3							ASS		3.00		
	3.10	Clayey Sandy SILT (ML): pale grey mottled brown; low plasticity; fine sand.		ALV	F	w<PL		ASS		3.25	PP	150-200kPa
								D		3.40		
								ASS		3.50		
		3.80m: dark grey						ASS		3.75		
Groundwater observed below 3.9m 04/09/24	-0							D		3.90		
	4	Test Pit discontinued at 4.00m depth.						ASS		4.00		

NOTES: [#] Soil origin is "probable" unless otherwise stated. [^] Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: Yanmar 10 tonne excavator
METHOD: 450mm toothed bucket
REMARKS:

OPERATOR: Nordig
LOGGED: PJW

Refer to explanatory notes for symbol and abbreviation definitions

Generated with CORE-GS by Geroc - Soil Log

Douglas PARTNERS

Appendix D

Table D.1: Summary of Acid Sulfate Soil Results

Laboratory Results

Acid Sulfate Soil Test Results v1.2

Table D.1: Summary of results - acid sulfate soils

Project No: 231158.00

Project Name: Proposed River Bank Remediation Works

Location: McDowall Lane, Lower Daintree

Sample Information						Screening Test Results				Laboratory Analysis Results (Acid Base Accounting)								
Location ID	Depth from (m)	Depth to (m)	Reduced level (AHD)	Sample Description	Adopted Texture	pH_F (pH units)	pH_{FOX} (pH units)	Reaction Strength	pH change (pH units)	pH_{KCl} (pH units)	S_{KCl} (%S)	S_{HCl} (%S)	Scr (%S)	TAA (%S)	S_{NAS} (%S)	ANC_{BT} (%S)	ANC Corroborated (Y/N)	Net Acidity (%S)
				Assessment Criteria (pH units)		**<4**	**<3**	-	**1.0**	Action Criteria (%S)		Coarse texture: sands to loamy sands and peats						0.03
												Medium texture: clayey sand to light clays						0.06[a]/0.03[b]
												Fine texture: light medium to heavy clays						0.1[a]/0.03[b]
Pit 1	0.25		3.34	Clayey SILT	M	6.4	2.6	1	**3.8**	5.9			<0.005	<0.01				0.012
Pit 1	0.50		3.09	Clayey SILT	M	4.2	2.3	1	**1.9**	4.7			<0.005	0.060				0.060
Pit 1	0.75		2.84	Clayey SILT	M	3.7	2.7	1	**1.0**	-			-	-				
Pit 1	1.00		2.59	Clayey SILT	M	3.8	2.9	1	0.9	-			-	-				
Pit 1	1.25		2.34	Clayey SILT	M	3.8	2.9	1	0.9	4.6			<0.005	0.060				0.060
Pit 1	1.50		2.09	Clayey SILT	M	3.6	2.8	1	0.8	-			-	-				
Pit 1	1.75		1.84	Clayey SILT	M	3.8	3	1	0.8	-			-	-				
Pit 1	2.00		1.59	Clayey SILT	M	3.7	2.9	1	0.8	4.6			<0.005	0.060				0.062
Pit 1	2.25		1.34	Clayey SILT	M	3.7	3.3	1	0.4	-			-	-				
Pit 1	2.50		1.09	Clayey SILT	M	3.6	3	1	0.6	4.8			<0.005	0.050				0.050
Pit 1	2.75		0.84	Clayey SILT	M	3.5	3.1	1	0.4	-			-	-				
Pit 1	3.00		0.59	Clayey SILT	M	3.5	3.1	1	0.4	-			-	-				
Pit 1	3.25		0.34	Clayey Sandy SILT	M	3.5	3	1	0.5	-			-	-				
Pit 1	3.50		0.09	Clayey Sandy SILT	M	3.1	1.2	1	**1.9**	4.1			1.100	0.160				1.300
Pit 1	3.75		-0.16	Clayey Sandy SILT	M	3.6	1.1	2	**2.5**	3.9			1.400	0.210				1.600
Pit 1	**4.00**		-0.41	Clayey Sandy SILT	M	3.1	1	3	**2.1**	4			1.500	0.200				1.700
Pit 2	0.25		3.45	Clayey SILT	M	3.4	1.8	1	**1.6**	4.6			<0.005	0.060				0.064
Pit 2	0.50		3.20	Clayey SILT	M	3.4	1.7	1	**1.7**	4.9			<0.005	0.060				0.060
Pit 2	0.75		2.95	Clayey SILT	M	2.9	2.3	1	0.6	-			-	-				
Pit 2	1.00		2.70	Clayey SILT	M	2.8	2.4	1	0.4	4.5			<0.005	0.070				0.072
Pit 2	1.25		2.45	Clayey SILT	M	2.9	2.6	1	0.3	-			-	-				
Pit 2	1.50		2.20	Clayey SILT	M	3.2	2.6	1	0.6	4.5			<0.005	0.060				0.066
Pit 2	1.75		1.95	Clayey SILT	M	3.3	3.2	1	0.1	-			-	-				
Pit 2	2.00		1.70	Clayey SILT	M	3.2	3.1	1	0.1	-			-	-				
Pit 2	2.25		1.45	Clayey SILT	M	3.7	3	1	0.7	-			-	-				
Pit 2	2.50		1.20	Clayey SILT	M	3.5	2.9	1	0.6	4.5			<0.005	0.050				0.056
Pit 2	2.75		0.95	Clayey SILT	M	3.5	2.9	1	0.6	-			-	-				
Pit 2	3.00		0.70	Clayey Sandy SILT	M	3.1	2.6	1	0.5	-			-	-				
Pit 2	**3.25**		0.45	Clayey Sandy SILT	M	3.1	2.4	1	0.7	-			-	-				
Pit 2	**3.50**		0.20	Clayey Sandy SILT	M	2.9	1.4	1	**1.5**	4.3			0.370	0.110				0.480
Pit 2	**3.75**		-0.05	Clayey Sandy SILT	M	3	1.1	3	**1.9**	4			1.000	0.190				1.200
Pit 2	**4.00**		-0.30	Sand	C	3	1.5	1	**1.5**	5.6			0.085	0.010				0.097
Pit 3	0.25		3.71	Clayey SILT	M	3.3	1.8	1	**1.5**	4.5			<0.005	0.080				0.078
Pit 3	0.50		3.46	Clayey SILT	M	3.2	2.5	1	0.7	4.4			<0.005	0.080				0.080
Pit 3	0.75		3.21	Clayey SILT	M	3.4	2.8	1	0.6	-			-	-				
Pit 3	1.00		2.96	Clayey SILT	M	3.1	2.8	1	0.3	4.6			-	0.060				0.058
Pit 3	1.25		2.71	Clayey SILT	M	3	2.8	1	0.2	-			-	-				
Pit 3	1.50		2.46	Clayey SILT	M	3.1	2.8	1	0.3	4.6			<0.005	0.060				0.058
Pit 3	1.75		2.21	Clayey SILT	M	3.1	3.1	1	0.0	-			-	-				
Pit 3	2.00		1.96	Clayey SILT	M	3.5	3.2	1	0.3	-			-	-				
Pit 3	2.25		1.71	Clayey SILT	M	3.4	2.7	1	0.7	-			-	-				
Pit 3	2.50		1.46	Silty Sand	C	3.5	2.7	1	0.8	4.9			<0.005	0.050				0.054
Pit 3	2.75		1.21	Silty Sand	C	3.7	2.8	1	0.9	-			-	-				
Pit 3	3.00		0.96	Silty Sand	C	3.8	3	1	0.8	-			-	-				

Acid Sulfate Soil Test Results v1.2

Sample Information						Screening Test Results				Laboratory Analysis Results (Acid Base Accounting)									
Location ID	Depth from (m)	Depth to (m)	Reduced level (AHD)	Sample Description	Adopted Texture	pH_F (pH units)	pH_{FOX} (pH units)	Reaction Strength	pH change (pH units)	pH_{KCl} (pH units)	S_{KCl} (%S)	S_{HCl} (%S)	Scr (%S)	TAA (%S)	S_{NAS} (%S)	ANC_{BT} (%S)	ANC Corroborated (Y/N)	Net Acidity (%S)
												Coarse texture: sands to loamy sands and peats							0.03
				Assessment Criteria (pH units)		**<4**	**<3**	-	**1.0**	Action Criteria (%S)		Medium texture: clayey sand to light clays							0.06[a]/0.03[b]
												Fine texture: light medium to heavy clays							0.1[a]/0.03[b]
Pit 3	3.25		0.71	Clayey Sandy SILT	M	3.6	2.9	1	0.7	4.7			<0.005	0.040				0.042
Pit 3	3.50		0.46	Clayey Sandy SILT	M	3.7	2.9	1	0.8	-			-	-				
Pit 3	3.75		0.21	Clayey Sandy SILT	M	3	1.8	3	**1.2**	4.6			0.006	0.050				0.058
Pit 3	**4.00**		-0.04	Clayey Sandy SILT	M	2.8	0.9	1	**1.9**	4.1			1.900	0.160				2.100

Notes:

Adopted texutre - C = coarse, M = medium, F = fine

pH_F - Soil pH in water

pH_{FOX} - Soil pH in peroxide

Reaction strength: L - Low , M - Medium, H - High, X - Extreme, V - Volcanic, F - Frothing (indicative of organic material)

pH change = pH_F - pH_{FOX}

pH_{KCL} - KCl extractable pH

S_{KCl} - KCl extractable sulfur

S_{HCl} - HCl extractable sulfur

S_{cr} - potential sulfidic acidity

TAA - titratable actual acidity (reported if pH_{KCL}<6.5)

S_{NAS} – retained acidity (reported if pHkCl < 4.5)

ANC_{BT} – acid neutralising capacity (reported if pH_{KCl} ≥ 6.5)

NT - Not tested

Blue depths indicate where samples have been collected at or below the groundwater table

Bold results are indicators of ASS conditions, noting:

- Assessment criteria are considered a reasonable initial screening for AASS or PASS
- pH_F<4 is indicative of the presence of Actual ASS (AASS), although it is not conclusive of ASS on its own as naturally occurring non ASS soils can have pH_F<5
- pH_{FOX}<3 or pH Change ≥1 may indicate potential ASS (PASS), although exception apply. Laboratory testing required to confirm presence of Reduced Inorganic Sulfur (RIS)
- Refer to Table 5.1, A2, A3 of Sullivan,L. et al (2018) for further details

Shaded results trigger action (i.e. equal to or exceed the action criteria). Criteria is specific for soil texture and anticpated tonnage of soil disturbed.

Net Acidity can only include the measured ANC where the ANC has been corroborated by other data (for example slab incubation data) that demonstrates the soil material does not experience acidification during complete oxidation under field conditions.

a - Action criterion for disturbance of 1-1000 tonnes of material

b - Action criterion for disturbance of more than 1000 tonnes of material

The action criteria apply only to ASS materials and not to other acidic soils such as acidic peatlands and coastal heaths.

ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS		LABORATORY DETAILS	
Contact	Patrick Wilkins	Manager	Jon Dicker
Client	DOUGLAS PARTNERS PTY LTD	Laboratory	SGS Cairns Environmental
Address	NATIONAL ACCOUNTS PAYABLE PO BOX 472 WEST RYDE NSW 2114	Address	Unit 2, 58 Comport St Portsmith QLD 4870
Telephone	07 4055 1550	Telephone	+61 07 4035 5111
Facsimile	07 4055 1774	Facsimile	+61 07 4035 5122
Email	patrick.wilkins@douglaspartners.com.au	Email	AU.Environmental.Cairns@sgs.com
Project	**231158 - Lower Daintree Aggressivity**	SGS Reference	**CE177365 R0**
Order Number	(Not specified)	Date Received	12 Sep 2024
Samples	6	Date Reported	24 Sep 2024

COMMENTS

Accredited for compliance with ISO/IEC 17025 - Testing. NATA accredited laboratory 2562(3146)

SIGNATORIES

Alyson BERGAMO
Senior Laboratory Technician

Jon DICKER
Manager Northern QLD

Maristela GANZAN
Quality Manager

Mitsuko BALDWIN
Metals Team Leader

Parameter	Units	LOR	Sample Number: CE177365.001 Sample Matrix: Soil Sample Name: pit 1 1.7-1.8	CE177365.002 Soil pit 1 3.2-3.3	CE177365.003 Soil pit 2 0.5-0.6	CE177365.004 Soil pit 2 3.5-3.6
pH in soil (1:2) Method: AN101 Tested: 18/9/2024						
pH (1:2)	pH Units	-	**5.1**	**4.9**	**4.5**	**3.4**
Conductivity (1:2) in soil Method: AN106 Tested: 18/9/2024						
Conductivity (1:2) @25 C	µS/cm	1	**23**	**28**	**76**	**670**
Resistivity (1:2)*	ohm cm	-	**43000**	**36000**	**13000**	**1500**
Resistivity (1:2)*	ohm m	1	**430**	**360**	**130**	**15**
Chloride (water extractable) Method: AN274 Tested: 19/9/2024						
Chloride (water extractable 1:2)	mg/kg	5	<5	<5	**10**	**7**
Water Soluble Metals in Soil by ICPOES From 1:2 extract Method: AN002/AN320 Tested: 18/9/2024						
Sulfur, S	mg/kg	1	**1**	**2**	**3**	**300**
Sulfur as Sulfate, SO4	mg/kg	3	**4**	**5**	**9**	**890**
Exchangeable Cations and Cation Exchange Capacity (CEC/ESP/SAR) Method: AN122 Tested: 20/9/2024						
Exchangeable Sodium, Na	mg/kg	2	**9**	**9**	**10**	**17**
Exchangeable Sodium, Na	meq/100g	0.01	**0.04**	**0.04**	**0.04**	**0.07**
Exchangeable Sodium Percentage*	%	0.1	**6.6**	**5.9**	**12.8**	**20.0**
Exchangeable Potassium, K	mg/kg	2	**44**	**65**	**46**	**64**
Exchangeable Potassium, K	meq/100g	0.01	**0.11**	**0.17**	**0.12**	**0.16**
Exchangeable Potassium Percentage*	%	0.1	**19.1**	**24.9**	**33.7**	**43.9**
Exchangeable Calcium Percentage*	%	0.1	**49.2**	**40.6**	**21.2**	**11.6**
Exchangeable Calcium, Ca	meq/100g	0.01	**0.29**	**0.27**	**0.07**	**0.04**
	mg/kg	2	**58**	**54**	**15**	**9**
Exchangeable Magnesium, Mg	mg/kg	2	**18**	**23**	**14**	**11**
Exchangeable Magnesium, Mg	meq/100g	0.02	**0.15**	**0.19**	**0.11**	**0.09**
Exchangeable Magnesium Percentage*	%	0.1	**25.1**	**28.6**	**32.2**	**24.6**
Cation Exchange Capacity	meq/100g	0.02	**0.59**	**0.67**	**0.35**	**0.37**

Parameter	Units	LOR	Sample Number: CE177365.005 Sample Matrix: Soil Sample Name: pit 3 1.1-1.2	Sample Number: CE177365.006 Sample Matrix: Soil Sample Name: pit 3 3.9-4.0
pH in soil (1:2) Method: AN101 Tested: 18/9/2024				
pH (1:2)	pH Units	-	**4.6**	**3.3**
Conductivity (1:2) in soil Method: AN106 Tested: 18/9/2024				
Conductivity (1:2) @25 C	µS/cm	1	**43**	**670**
Resistivity (1:2)*	ohm cm	-	**23000**	**1500**
Resistivity (1:2)*	ohm m	1	**230**	**15**
Chloride (water extractable) Method: AN274 Tested: 19/9/2024				
Chloride (water extractable 1:2)	mg/kg	5	<5	**5**
Water Soluble Metals in Soil by ICPOES From 1:2 extract Method: AN002/AN320 Tested: 18/9/2024				
Sulfur, S	mg/kg	1	**3**	**310**
Sulfur as Sulfate, SO4	mg/kg	3	**8**	**940**
Exchangeable Cations and Cation Exchange Capacity (CEC/ESP/SAR) Method: AN122 Tested: 20/9/2024				
Exchangeable Sodium, Na	mg/kg	2	**9**	**21**
Exchangeable Sodium, Na	meq/100g	0.01	**0.04**	**0.09**
Exchangeable Sodium Percentage*	%	0.1	**10.0**	**14.2**
Exchangeable Potassium, K	mg/kg	2	**32**	**120**
Exchangeable Potassium, K	meq/100g	0.01	**0.08**	**0.32**
Exchangeable Potassium Percentage*	%	0.1	**22.4**	**49.2**
Exchangeable Calcium Percentage*	%	0.1	**30.7**	**12.7**
Exchangeable Calcium, Ca	meq/100g	0.01	**0.11**	**0.08**
	mg/kg	2	**23**	**16**
Exchangeable Magnesium, Mg	mg/kg	2	**17**	**19**
Exchangeable Magnesium, Mg	meq/100g	0.02	**0.14**	**0.15**
Exchangeable Magnesium Percentage*	%	0.1	**37.0**	**23.9**
Cation Exchange Capacity	meq/100g	0.02	**0.37**	**0.65**

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage.* Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

Chloride (water extractable) **Method: ME-(AU)-[ENV]AN274**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Chloride (water extractable 1:2)	LB132700	mg/kg	5	<5	0%	102%

Exchangeable Cations and Cation Exchange Capacity (CEC/ESP/SAR) **Method: ME-(AU)-[ENV]AN122**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Exchangeable Sodium, Na	LB132768	mg/kg	2		1%	95%
Exchangeable Sodium, Na	LB132768	meq/100g	0.01	<0.01	1%	NA
Exchangeable Sodium Percentage*	LB132768	%	0.1		0%	NA
Exchangeable Potassium, K	LB132768	mg/kg	2		0%	104%
Exchangeable Potassium, K	LB132768	meq/100g	0.01	<0.01	0%	NA
Exchangeable Potassium Percentage*	LB132768	%	0.1		0%	NA
Exchangeable Calcium Percentage*	LB132768	%	0.1		0%	NA
Exchangeable Calcium, Ca	LB132768	meq/100g	0.01	<0.01	1%	NA
		mg/kg	2		1%	101%
Exchangeable Magnesium, Mg	LB132768	mg/kg	2		1%	101%
Exchangeable Magnesium, Mg	LB132768	meq/100g	0.02	<0.02	1%	NA
Exchangeable Magnesium Percentage*	LB132768	%	0.1		0%	NA
Cation Exchange Capacity	LB132768	meq/100g	0.02	<0.02	1%	NA

Water Soluble Metals in Soil by ICPOES From 1:2 extract **Method: ME-(AU)-[ENV]AN002/AN320**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Sulfur, S	LB132665	mg/kg	1	<1	0 - 6%	102%
Sulfur as Sulfate, SO4	LB132665	mg/kg	3	<3	0 - 6%	102%

METHOD	METHODOLOGY SUMMARY
AN002/AN320	Soil sample is extracted in deionised water (1:2 or 1:5) and metals analysed by ICP OES, method AN320/AN321, with results reported on the dried sample basis.
AN101	pH in Soil Sludge Sediment and Water: pH is measured electrometrically using a combination electrode and is calibrated against 3 buffers purchased commercially. For soils, an extract with water is made at a ratio of 1:2 and the pH determined and reported on the extract after 1 hour extraction (pH 1:2) or after 1 hour extraction and overnight aging (pH (1:2) aged). Reference APHA 4500-H+.
AN106	Conductivity : Conductivity is measured by meter with temperature compensation and is calibrated against a standard solution of potassium chloride. Conductivity is generally reported as µmhos/cm or µS/cm @ 25°C. For soils, an extract of as received sample with water is made at a ratio of 1:2 and the EC determined and reported on the extract basis after the 1 hour extraction (EC(1:2)) or after the 1 hour extraction and overnight aging (EC(1:2) aged). Reference APHA 2510 B.
AN106	Resistivity of the extract is reported on the extract basis and is the reciprocal of conductivity. Salinity and TDS can be calculated from the extract conductivity and is reported back to the soil basis.
AN122	Exchangeable Cations, CEC and ESP: Soil sample is extracted in 1 M Ammonium Acetate at pH=7 (or 1M Ammonium Chloride at pH=7) with cations (Na, K, Ca & Mg) then determined by ICP OES/ICP MS and reported as Exchangeable Cations. For saline soils, these results can be corrected for water soluble cations and reported as Exchangeable cations in meq/100g or soil can be pre-treated (aqueous ethanol/aqueous glycerol) prior to extraction. Cation Exchange Capacity (CEC) is the sum of the exchangeable cations in meq/100g.
AN122	The Exchangeable Sodium Percentage (ESP) is calculated as the exchangeable sodium divided by the CEC (all in meq/100g) times 100. ESP can be used to categorise the sodicity of the soil as below: ESP < 6% non-sodic ESP 6-15% sodic ESP >15% strongly sodic Method is referenced to Rayment and Lyons, 2011, sections 15D3 and 15N1.-
AN274	Chloride by DA following 1:5 or 1:2 DI water extraction: Chloride reacts with mercuric thiocyanate forming a mercuric chloride complex. In the presence of ferric iron, highly coloured ferric thiocyanate is formed which is proportional to the chloride concentration. Results reported on dry sample basis. Reference APHA 4500Cl-

FOOTNOTES

IS	Insufficient sample for analysis.	LOR	Limit of Reporting
LNR	Sample listed, but not received.	↑↓	Raised or Lowered Limit of Reporting
*	NATA accreditation does not cover the performance of this service.	QFH	QC result is above the upper tolerance
		QFL	QC result is below the lower tolerance
**	Indicative data, theoretical holding time exceeded.	-	The sample was not analysed for this analyte
***	Indicates that both * and ** apply.	NVL	Not Validated

Unless it is reported that sampling has been performed by SGS, the samples have been analysed as received.
Solid samples expressed on a dry weight basis.

Where "Total" analyte groups are reported (for example, Total PAHs, Total OC Pesticides) the total will be calculated as the sum of the individual analytes, with those analytes that are reported as <LOR being assumed to be zero. The summed (Total) limit of reporting is calcuated by summing the individual analyte LORs and dividing by two. For example, where 16 individual analytes are being summed and each has an LOR of 0.1 mg/kg, the "Totals" LOR will be 1.6 / 2 (0.8 mg/kg). Where only 2 analytes are being summed, the " Total" LOR will be the sum of those two LORs.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

If reported, measurement uncertainty follow the ± sign after the analytical result and is expressed as the expanded uncertainty calculated using a coverage factor of 2, providing a level of confidence of approximately 95%, unless stated otherwise in the comments section of this report.

Results reported for samples tested under test methods with codes starting with ARS-SOP, radionuclide or gross radioactivity concentrations are expressed in becquerel (Bq) per unit of mass or volume or per wipe as stated on the report. Becquerel is the SI unit for activity and equals one nuclear transformation per second.
Note that in terms of units of radioactivity:

a. 1 Bq is equivalent to 27 pCi
b. 37 MBq is equivalent to 1 mCi

For results reported for samples tested under test methods with codes starting with ARS-SOP, less than (<) values indicate the detection limit for each radionuclide or parameter for the measurement system used. The respective detection limits have been calculated in accordance with ISO 11929.

The QC and MU criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: www.sgs.com.au/en-gb/environment-health-and-safety.

ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS

Contact	Patrick Wilkins
Client	DOUGLAS PARTNERS PTY LTD
Address	NATIONAL ACCOUNTS PAYABLE PO BOX 472 WEST RYDE NSW 2114
Telephone	07 4055 1550
Facsimile	07 4055 1774
Email	patrick.wilkins@douglaspartners.com.au
Project	**231158 - Lower Daintree Chromuim Suite**
Order Number	(Not specified)
Samples	24

LABORATORY DETAILS

Manager	Jon Dicker
Laboratory	SGS Cairns Environmental
Address	Unit 2, 58 Comport St Portsmith QLD 4870
Telephone	+61 07 4035 5111
Facsimile	+61 07 4035 5122
Email	AU.Environmental.Cairns@sgs.com
SGS Reference	**CE177366 R0**
Date Received	12 Sep 2024
Date Reported	19 Sep 2024

COMMENTS

Accredited for compliance with ISO/IEC 17025 - Testing. NATA accredited laboratory 2562(3146)

SIGNATORIES

Jon DICKER
Manager Northern QLD

Maristela GANZAN
Quality Manager

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name CE177366.001 Soil 04 Sep 2024 pit 1 0.25	CE177366.002 Soil 04 Sep 2024 pit 1 0.5	CE177366.003 Soil 04 Sep 2024 pit 1 1.25	CE177366.004 Soil 04 Sep 2024 pit 1 2.0
Moisture Content Method: AN002 Tested: 12/9/2024						
% Moisture	%w/w	0.5	**7.1**	**18**	**21**	**22**
TAA (Titratable Actual Acidity) Method: AN219 Tested: 19/9/2024						
pH KCl	pH Units	-	**5.9**	**4.7**	**4.6**	**4.6**
Titratable Actual Acidity	kg H2SO4/T	0.25	<0.25	**1.7**	**1.7**	**1.8**
Titratable Actual Acidity (TAA) moles H+/tonne	moles H+/T	5	<5	**35**	**35**	**37**
Titratable Actual Acidity (TAA) S%w/w	%w/w S	0.01	<0.01	**0.06**	**0.06**	**0.06**
Sulphur (SKCl)	%w/w	0.005	-	-	-	-
Chromium Reducible Sulfur (CRS) Method: AN217 Tested: 19/9/2024						
Chromium Reducible Sulfur (Scr)	%	0.005	<0.005	<0.005	<0.005	<0.005
Chromium Reducible Sulfur (Scr)	moles H+/T	5	<5	<5	<5	<5
HCl Extractable S, Ca and Mg in Soil/Solids ICP OES Method: AN014 Tested: 19/9/2024						
Acid Soluble Sulfur (SHCl)	%w/w	0.005	-	-	-	-
Chromium Suite Net Acidity Calculations Method: AN220 Tested: 19/9/2024						
s-Net Acidity	%w/w S	0.005	**0.012**	**0.060**	**0.060**	**0.062**
s-Net Acidity without ANC	%w/w S	0.005	**0.012**	**0.060**	**0.060**	**0.062**
a-Net Acidity	moles H+/T	5	**7**	**37**	**37**	**39**
Liming Rate	kg CaCO3/T	0.1	NA	**2.8**	**2.8**	**2.9**
Verification s-Net Acidity	%w/w S	-20	**0.00**	**0.00**	**0.00**	**0.00**
a-Net Acidity without ANCBT	moles H+/T	5	**7**	**37**	**37**	**39**
Liming Rate without ANCBT	kg CaCO3/T	0.1	NA	**2.8**	**2.8**	**2.9**

Parameter	Units	LOR	Sample Number: CE177366.005 Sample Matrix: Soil Sample Date: 04 Sep 2024 Sample Name: pit 1 2.5	CE177366.006 Soil 04 Sep 2024 pit 1 3.5	CE177366.007 Soil 04 Sep 2024 pit 1 3.75	CE177366.008 Soil 04 Sep 2024 pit 1 4.0
Moisture Content Method: AN002 Tested: 12/9/2024						
% Moisture	%w/w	0.5	**21**	**35**	**36**	**36**
TAA (Titratable Actual Acidity) Method: AN219 Tested: 19/9/2024						
pH KCl	pH Units	-	**4.8**	**4.1**	**3.9**	**4.0**
Titratable Actual Acidity	kg H2SO4/T	0.25	**1.5**	**4.8**	**6.5**	**6.0**
Titratable Actual Acidity (TAA) moles H+/tonne	moles H+/T	5	**30**	**97**	**132**	**122**
Titratable Actual Acidity (TAA) S%w/w	%w/w S	0.01	**0.05**	**0.16**	**0.21**	**0.20**
Sulphur (SKCl)	%w/w	0.005	-	**0.054**	**0.077**	**0.062**
Chromium Reducible Sulfur (CRS) Method: AN217 Tested: 19/9/2024						
Chromium Reducible Sulfur (Scr)	%	0.005	<0.005	**1.1**	**1.4**	**1.5**
Chromium Reducible Sulfur (Scr)	moles H+/T	5	<5	**692**	**882**	**960**
HCl Extractable S, Ca and Mg in Soil/Solids ICP OES Method: AN014 Tested: 19/9/2024						
Acid Soluble Sulfur (SHCl)	%w/w	0.005	-	**0.11**	**0.11**	**0.097**
Chromium Suite Net Acidity Calculations Method: AN220 Tested: 19/9/2024						
s-Net Acidity	%w/w S	0.005	**0.050**	**1.3**	**1.6**	**1.7**
s-Net Acidity without ANC	%w/w S	0.005	**0.050**	**1.3**	**1.6**	**1.7**
a-Net Acidity	moles H+/T	5	**31**	**790**	**1000**	**1100**
Liming Rate	kg CaCO3/T	0.1	**2.3**	**59**	**76**	**81**
Verification s-Net Acidity	%w/w S	-20	**0.00**	**1.1**	**1.4**	**1.5**
a-Net Acidity without ANCBT	moles H+/T	5	**31**	**790**	**1000**	**1100**
Liming Rate without ANCBT	kg CaCO3/T	0.1	**2.3**	**59**	**76**	**81**

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	CE177366.009 Soil 04 Sep 2024 pit 2 0.25	CE177366.010 Soil 04 Sep 2024 pit 2 0.5	CE177366.011 Soil 04 Sep 2024 pit 2 1.0	CE177366.012 Soil 04 Sep 2024 pit 2 1.5
Moisture Content Method: AN002 Tested: 12/9/2024							
% Moisture	%w/w	0.5		**19**	**18**	**20**	**25**
TAA (Titratable Actual Acidity) Method: AN219 Tested: 19/9/2024							
pH KCl	pH Units	-		**4.6**	**4.9**	**4.5**	**4.5**
Titratable Actual Acidity	kg H2SO4/T	0.25		**2.0**	**1.8**	**2.2**	**2.0**
Titratable Actual Acidity (TAA) moles H+/tonne	moles H+/T	5		**40**	**37**	**45**	**40**
Titratable Actual Acidity (TAA) S%w/w	%w/w S	0.01		**0.06**	**0.06**	**0.07**	**0.06**
Sulphur (SKCl)	%w/w	0.005		-	-	**0.014**	**0.012**
Chromium Reducible Sulfur (CRS) Method: AN217 Tested: 19/9/2024							
Chromium Reducible Sulfur (Scr)	%	0.005		<0.005	<0.005	<0.005	<0.005
Chromium Reducible Sulfur (Scr)	moles H+/T	5		<5	<5	<5	<5
HCl Extractable S, Ca and Mg in Soil/Solids ICP OES Method: AN014 Tested: 19/9/2024							
Acid Soluble Sulfur (SHCl)	%w/w	0.005		-	-	**0.016**	**0.014**
Chromium Suite Net Acidity Calculations Method: AN220 Tested: 19/9/2024							
s-Net Acidity	%w/w S	0.005		**0.064**	**0.060**	**0.072**	**0.066**
s-Net Acidity without ANC	%w/w S	0.005		**0.064**	**0.060**	**0.072**	**0.066**
a-Net Acidity	moles H+/T	5		**40**	**37**	**45**	**41**
Liming Rate	kg CaCO3/T	0.1		**3.0**	**2.8**	**3.4**	**3.1**
Verification s-Net Acidity	%w/w S	-20		**0.00**	**0.00**	**0.00**	**0.00**
a-Net Acidity without ANCBT	moles H+/T	5		**40**	**37**	**45**	**41**
Liming Rate without ANCBT	kg CaCO3/T	0.1		**3.0**	**2.8**	**3.4**	**3.1**

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	CE177366.013 Soil 04 Sep 2024 pit 2 2.5	CE177366.014 Soil 04 Sep 2024 pit 2 3.5	CE177366.015 Soil 04 Sep 2024 pit 2 3.75	CE177366.016 Soil 04 Sep 2024 pit 2 4.0
Moisture Content Method: AN002 Tested: 12/9/2024							
% Moisture	%w/w	0.5		**20**	**27**	**35**	**20**
TAA (Titratable Actual Acidity) Method: AN219 Tested: 19/9/2024							
pH KCl	pH Units	-		**4.5**	**4.3**	**4.0**	**5.6**
Titratable Actual Acidity	kg H2SO4/T	0.25		**1.6**	**3.4**	**5.9**	**0.37**
Titratable Actual Acidity (TAA) moles H+/tonne	moles H+/T	5		**32**	**70**	**120**	**7**
Titratable Actual Acidity (TAA) S%w/w	%w/w S	0.01		**0.05**	**0.11**	**0.19**	**0.01**
Sulphur (SKCl)	%w/w	0.005		**0.007**	**0.019**	**0.053**	-
Chromium Reducible Sulfur (CRS) Method: AN217 Tested: 19/9/2024							
Chromium Reducible Sulfur (Scr)	%	0.005		<0.005	**0.37**	**1.0**	**0.085**
Chromium Reducible Sulfur (Scr)	moles H+/T	5		<5	**228**	**626**	**53**
HCl Extractable S, Ca and Mg in Soil/Solids ICP OES Method: AN014 Tested: 19/9/2024							
Acid Soluble Sulfur (SHCl)	%w/w	0.005		**0.014**	**0.058**	**0.14**	-
Chromium Suite Net Acidity Calculations Method: AN220 Tested: 19/9/2024							
s-Net Acidity	%w/w S	0.005		**0.056**	**0.48**	**1.2**	**0.097**
s-Net Acidity without ANC	%w/w S	0.005		**0.056**	**0.48**	**1.2**	**0.097**
a-Net Acidity	moles H+/T	5		**35**	**300**	**750**	**61**
Liming Rate	kg CaCO3/T	0.1		**2.6**	**22**	**56**	**4.5**
Verification s-Net Acidity	%w/w S	-20		**0.00**	**0.37**	**1.0**	**0.09**
a-Net Acidity without ANCBT	moles H+/T	5		**35**	**300**	**750**	**61**
Liming Rate without ANCBT	kg CaCO3/T	0.1		**2.6**	**22**	**56**	**4.5**

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name CE177366.017 Soil 04 Sep 2024 pit 3 0.25	CE177366.018 Soil 04 Sep 2024 pit 3 0.5	CE177366.019 Soil 04 Sep 2024 pit 3 1.0	CE177366.020 Soil 04 Sep 2024 pit 3 1.5
Moisture Content Method: AN002 Tested: 12/9/2024						
% Moisture	%w/w	0.5	**16**	**18**	**17**	**18**
TAA (Titratable Actual Acidity) Method: AN219 Tested: 19/9/2024						
pH KCl	pH Units	-	**4.5**	**4.4**	**4.6**	**4.6**
Titratable Actual Acidity	kg H2SO4/T	0.25	**2.3**	**2.3**	**1.7**	**1.7**
Titratable Actual Acidity (TAA) moles H+/tonne	moles H+/T	5	**47**	**47**	**35**	**35**
Titratable Actual Acidity (TAA) S%w/w	%w/w S	0.01	**0.08**	**0.08**	**0.06**	**0.06**
Sulphur (SKCl)	%w/w	0.005	**0.007**	**0.010**	-	-
Chromium Reducible Sulfur (CRS) Method: AN217 Tested: 19/9/2024						
Chromium Reducible Sulfur (Scr)	%	0.005	<0.005	<0.005	<0.005	<0.005
Chromium Reducible Sulfur (Scr)	moles H+/T	5	<5	<5	<5	<5
HCl Extractable S, Ca and Mg in Soil/Solids ICP OES Method: AN014 Tested: 19/9/2024						
Acid Soluble Sulfur (SHCl)	%w/w	0.005	**0.015**	**0.015**	-	-
Chromium Suite Net Acidity Calculations Method: AN220 Tested: 19/9/2024						
s-Net Acidity	%w/w S	0.005	**0.078**	**0.080**	**0.058**	**0.058**
s-Net Acidity without ANC	%w/w S	0.005	**0.078**	**0.080**	**0.058**	**0.058**
a-Net Acidity	moles H+/T	5	**49**	**50**	**36**	**36**
Liming Rate	kg CaCO3/T	0.1	**3.7**	**3.7**	**2.7**	**2.7**
Verification s-Net Acidity	%w/w S	-20	**0.00**	**0.00**	**0.00**	**0.00**
a-Net Acidity without ANCBT	moles H+/T	5	**49**	**50**	**36**	**36**
Liming Rate without ANCBT	kg CaCO3/T	0.1	**3.7**	**3.7**	**2.7**	**2.7**

Parameter	Units	LOR	Sample Number: CE177366.021 Sample Matrix: Soil Sample Date: 04 Sep 2024 Sample Name: pit 3 2.5	CE177366.022 Soil 04 Sep 2024 pit 3 3.25	CE177366.023 Soil 04 Sep 2024 pit 3 3.75	CE177366.024 Soil 04 Sep 2024 pit 3 4.0
Moisture Content Method: AN002 Tested: 12/9/2024						
% Moisture	%w/w	0.5	**17**	**20**	**27**	**32**
TAA (Titratable Actual Acidity) Method: AN219 Tested: 19/9/2024						
pH KCl	pH Units	-	**4.9**	**4.7**	**4.6**	**4.1**
Titratable Actual Acidity	kg H2SO4/T	0.25	**1.6**	**1.2**	**1.6**	**5.0**
Titratable Actual Acidity (TAA) moles H+/tonne	moles H+/T	5	**32**	**25**	**32**	**102**
Titratable Actual Acidity (TAA) S%w/w	%w/w S	0.01	**0.05**	**0.04**	**0.05**	**0.16**
Sulphur (SKCl)	%w/w	0.005	-	-	-	**0.052**
Chromium Reducible Sulfur (CRS) Method: AN217 Tested: 19/9/2024						
Chromium Reducible Sulfur (Scr)	%	0.005	<0.005	<0.005	**0.006**	**1.9**
Chromium Reducible Sulfur (Scr)	moles H+/T	5	<5	<5	<5	**1191**
HCl Extractable S, Ca and Mg in Soil/Solids ICP OES Method: AN014 Tested: 19/9/2024						
Acid Soluble Sulfur (SHCl)	%w/w	0.005	-	-	-	**0.10**
Chromium Suite Net Acidity Calculations Method: AN220 Tested: 19/9/2024						
s-Net Acidity	%w/w S	0.005	**0.054**	**0.042**	**0.058**	**2.1**
s-Net Acidity without ANC	%w/w S	0.005	**0.054**	**0.042**	**0.058**	**2.1**
a-Net Acidity	moles H+/T	5	**34**	**26**	**36**	**1300**
Liming Rate	kg CaCO3/T	0.1	**2.5**	**2.0**	**2.7**	**97**
Verification s-Net Acidity	%w/w S	-20	**0.00**	**0.00**	**0.01**	**1.9**
a-Net Acidity without ANCBT	moles H+/T	5	**34**	**26**	**36**	**1300**
Liming Rate without ANCBT	kg CaCO3/T	0.1	**2.5**	**2.0**	**2.7**	**97**

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage.* Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

Chromium Reducible Sulfur (CRS) **Method: ME-(AU)-[ENV]AN217**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Chromium Reducible Sulfur (Scr)	LB132692	%	0.005	<0.005	0%	106%
Chromium Reducible Sulfur (Scr)	LB132692	moles H+/T	5	<5		

HCl Extractable S, Ca and Mg in Soil/Solids ICP OES **Method: ME-(AU)-[ENV]AN014**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Acid Soluble Sulfur (SHCl)	LB132713	%w/w	0.005	<0.005	0 - 1%	110%

TAA (Titratable Actual Acidity) **Method: ME-(AU)-[ENV]AN219**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
pH KCl	LB132691	pH Units	-	5.8	0 - 2%	98%
Titratable Actual Acidity	LB132691	kg H2SO4/T	0.25	<0.25	0 - 7%	NA
Titratable Actual Acidity (TAA) moles H+/tonne	LB132691	moles H+/T	5	<5	0 - 7%	105%
Titratable Actual Acidity (TAA) S%w/w	LB132691	%w/w S	0.01	<0.01	0 - 7%	106%
Sulphur (SKCl)	LB132691	%w/w	0.005	<0.005	0%	89%

METHOD	METHODOLOGY SUMMARY
AN002	The test is carried out by drying (at either 40°C or 105°C) a known mass of sample in a weighed evaporating basin. After fully dry the sample is re-weighed. Samples such as sludge and sediment having high percentages of moisture will take some time in a drying oven for complete removal of water.
AN014	This method is for the determination of soluble sulfate (SO4-S) by extraction with hydrochloric acid. Sulphides should not react and would normally be expelled. Sulfate as Sulfur is determined by ICP.
AN217	Dried pulped sample is mixed with acid and chromium metal in a rapid distillation unit to produce hydrogen sulfide (H2S) which is collected and titrated with iodine (I2(aq)) to measure SCR.
AN219	Dried pulped sample is extracted for 4 hours in a 1 M KCl solution. The ratio of sample to solution is 1:40. The extract is titrated for acidity. Calcium, magnesium, and sulfur are determined by ICP-AES.
AN220	Chromium Suite: Scheme for the calculation of net acidities and liming rates using a Fineness Factor of 1.5.

FOOTNOTES

IS	Insufficient sample for analysis.	LOR	Limit of Reporting
LNR	Sample listed, but not received.	↑↓	Raised or Lowered Limit of Reporting
*	NATA accreditation does not cover the performance of this service.	QFH	QC result is above the upper tolerance
		QFL	QC result is below the lower tolerance
**	Indicative data, theoretical holding time exceeded.	-	The sample was not analysed for this analyte
***	Indicates that both * and ** apply.	NVL	Not Validated

Unless it is reported that sampling has been performed by SGS, the samples have been analysed as received.
Solid samples expressed on a dry weight basis.

Where "Total" analyte groups are reported (for example, Total PAHs, Total OC Pesticides) the total will be calculated as the sum of the individual analytes, with those analytes that are reported as <LOR being assumed to be zero. The summed (Total) limit of reporting is calcuated by summing the individual analyte LORs and dividing by two. For example, where 16 individual analytes are being summed and each has an LOR of 0.1 mg/kg, the "Totals" LOR will be 1.6 / 2 (0.8 mg/kg). Where only 2 analytes are being summed, the " Total" LOR will be the sum of those two LORs.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

If reported, measurement uncertainty follow the ± sign after the analytical result and is expressed as the expanded uncertainty calculated using a coverage factor of 2, providing a level of confidence of approximately 95%, unless stated otherwise in the comments section of this report.

Results reported for samples tested under test methods with codes starting with ARS-SOP, radionuclide or gross radioactivity concentrations are expressed in becquerel (Bq) per unit of mass or volume or per wipe as stated on the report. Becquerel is the SI unit for activity and equals one nuclear transformation per second.
Note that in terms of units of radioactivity:

a. 1 Bq is equivalent to 27 pCi
b. 37 MBq is equivalent to 1 mCi

For results reported for samples tested under test methods with codes starting with ARS-SOP, less than (<) values indicate the detection limit for each radionuclide or parameter for the measurement system used. The respective detection limits have been calculated in accordance with ISO 11929.

The QC and MU criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: www.sgs.com.au/en-gb/environment-health-and-safety.

Appendix E

Agronomic Testing

Multiple Analysis Profile

Sample Drop Off: 16 Chilvers Road
Thornleigh NSW 2120

Tel: 1300 30 40 80
Em: info@sesl.com.au
Web: www.sesl.com.au

Batch N°: 68558 **Sample N°: 1** **Date Report Generated: 4/10/2024** **Report Status: Final**

Client Name: **Douglas Partners (Cairns)**
Client Contact: **Patrick Wilkins**
Client Order N°:
Address: **13 Industrial Ave Stratford QLD 4870**

Project Name: **Agronomy Analysis**
SESL Quote N°:
Sample Name: **Pit 1,2,3/0.1m depth Combined**
Description: **Soil**
Test Type: **TN_DC_S_LV1, TC_DC_LV1, NO3_Sol, PO4_Colwell, PBI_Colwell**

Analysis	Unit	Result
Total Carbon (Dumas Combustion)	% w/w	1.09
Total Nitrogen (Dumas combustion)	% w/w	0.13
Phosphate-P (PO4) by Colwell	mg P/ kg	10.7
Phosphorous Buffer Index		212
Nitrate - N (NO3)	mg N/kg	< 2.0

This soil sample was submitted to SESL by the client for chemical analysis. SESL understands the soil in used in pasture cropping. The results indicate the N levels are very low along with low level of total carbon. The PBI is 212 and suggests a moderate to moderately high buffering capacity though P levels are low.

Recommendations

- Apply Mono Ammonium Phosphate (MAP) at 40 g/m2 to increase nitrogen and phosphorous.

Consultant: Lachlan Eager

Authorised Signatory: Peter Somerville

Multiple Analysis Profile

Sample Drop Off: 16 Chilvers Road
Thornleigh NSW 2120

Tel: 1300 30 40 80
Em: info@sesl.com.au
Web: www.sesl.com.au

Batch N°: 68558 **Sample N°: 2** **Date Report Generated: 4/10/2024** **Report Status: Final**

Client Name: **Douglas Partners (Cairns)**
Client Contact: **Patrick Wilkins**
Client Order N°:
Address: **13 Industrial Ave Stratford QLD 4870**

Project Name: **Agronomy Analysis**
SESL Quote N°:
Sample Name: **Pit, 1 / 2.4, + Pit 2 / 2.7 + Pit 3 / 2.4 Combined**
Description: **Soil**
Test Type: **TN_DC_S_LV1, TC_DC_LV1, NO3_Sol, PO4_Colwell, PBI_Colwell**

Analysis	Unit	Result
Total Carbon (Dumas Combustion)	% w/w	0.27
Total Nitrogen (Dumas combustion)	% w/w	0.05
Phosphate-P (PO4) by Colwell	mg P/ kg	<10
Phosphorous Buffer Index	-	239
Nitrate - N (NO3)	mg N/kg	< 2.0

This soil sample was submitted to SESL by the client for chemical analysis. SESL understands the soil in used in pasture cropping. The results indicate the N levels are very low along with low level of total carbon. The PBI is 239 and suggests a moderate to moderately high buffering capacity though P levels are low.

Recommendations

- Apply Mono Ammonium Phosphate (MAP) at 40 g/m2 to increase nitrogen and phosphorous.

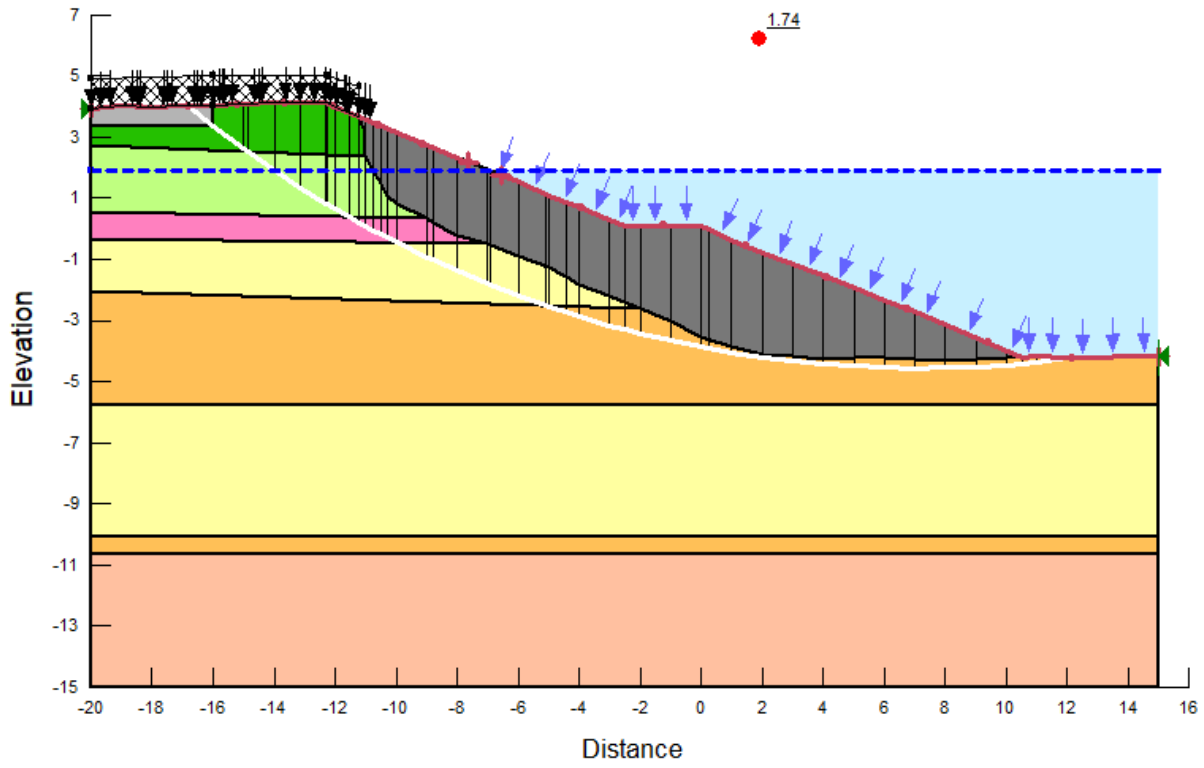
Consultant: Lachlan Eager

Authorised Signatory: Peter Somerville

Appendix F

Preliminary Slope Stability Analysis Results

Color	Name	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Piezometric Surface
	Alluvial Granular Soil - Loose	17	0	30	1
	Alluvial Granular Soil - Medium Dense	18	0	34	1
	FILL: Pavement Materials	18	0	38	1
	Lower Alluvial Cohesive Soils - Stiff	19	5	26	1
	Rock fill	20	0	40	1
	Upper Alluvial Cohesive Soils - Firm	18	3	24	1
	Upper Alluvial Cohesive Soils - Stiff	19	5	26	1
	Upper Alluvial Cohesive Soils - Very Stiff	20	6	28	1



Appendix F.1 – Remediated riverbank with groundwater at HAT

Color	Name	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Piezometric Surface
	Alluvial Granular Soil - Loose	17	0	30	1
	Alluvial Granular Soil - Medium Dense	18	0	34	1
	FILL: Pavement Materials	18	0	38	1
	Lower Alluvial Cohesive Soils - Stiff	19	5	26	1
	Rock fill	20	0	40	1
	Upper Alluvial Cohesive Soils - Firm	18	3	24	1
	Upper Alluvial Cohesive Soils - Stiff	19	5	26	1
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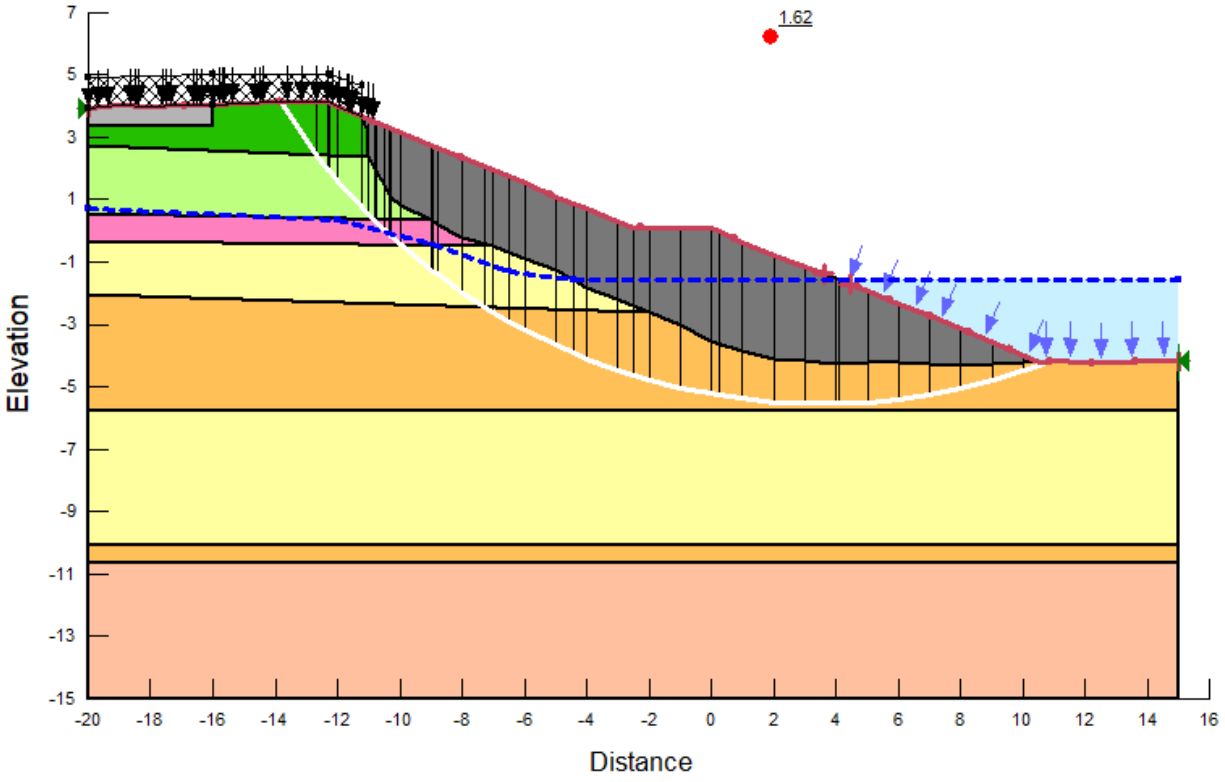

Appendix F.2 – Remediated riverbank with groundwater at LAT

NEILLY GROUP
ENGINEERING

TERRAIN NRM

REEF COASTAL RESTORATION PROGRAM DAINTREE RIVER STREAMBANK REMEDIATION

20 NOVEMBER 2023

Document Control

Details and distribution

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1	15 November 2023	Adam Neilly Jen Mackenzie Reece Fraser Kristina Ihme James Allen	Original issue	Jen Mackenzie	Adam Neilly
2	29 November 2024	Adam Neilly Jen Mackenzie Reece Fraser Kristina Ihme James Allen	Revised to include Sections 1 and 2 only	Jen Mackenzie	Adam Neilly

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1.0 Introduction

The Reef Coastal Restoration Program seeks the restoration and rehabilitation of Great Barrier Reef coastal habitats and ecosystems specifically defined as being blue carbon systems, through delivery of projects that will immediately contribute to the delivery of the Reef 2050 Long-Term Sustainability Plan and Reef Trust Outcomes. The program funding aims to upscale action with a focus on seascape-landscape scale activities.

The objectives of the program are to:

- rehabilitate and/or restore degraded or previously destroyed Reef coastal habitats/ecosystems by implementing on-ground ecosystem rehabilitation and/or restoration activities.
- encourage greater community participation and partnerships, including involvement with First Nations peoples.
- improve the health and resilience of Reef coastal habitats/ecosystems, accelerating progress towards meeting water quality targets, while aligning to the objectives of the Reef 2050 Plan, Work Area 5 (protect, rehabilitate and restore).

The intended outcomes of the program are to:

- bring immediate, tangible, and reportable benefits, outcomes and improvements for the Reef environment and catchment.
- contribute to the Reef 2050 Plan and Reef Trust Outcomes.
- accelerate action for effective on-ground rehabilitation and/or restoration, capable of being upscaled to promote large-scale improvement and recovery of Reef coastal habitats/ecosystems.

Project activities will contribute to at least one Reef Trust Outcome:

- Reef Trust Outcome 1 - Improve the quality of water entering the Great Barrier Reef from broad-scale land use to increase the health and resilience of the Great Barrier Reef.
- Reef Trust Outcome 2 - Improve the health and resilience of coastal habitats.
- Reef Trust Outcome 3 - Improve and protect marine biodiversity.

Terrain NRM (project lead) and Neilly Group are submitting a project as a partnership to pursue this grant opportunity.

2.0 Project overview

The Queensland River Rehabilitation Management (QRRM) Guideline (Department of Environment and Science, 2022) was released in June 2022. The QRRM Guideline provides a whole-of-system, values-based management framework for approaching river rehabilitation. It also provides a consistent and transparent approach to guiding the development of a well scoped Rehabilitation Plan. The approach, known as the Rehabilitation Process, and the underpinning framework has been designed to ensure that management decisions are informed by linking an understanding of the biophysical components (parts) and processes of rivers to the broader landscape, while incorporating an understanding of the ecosystem services society derives from rivers. This enables consideration of the value of these services to different beneficiaries and the threats and pressures relevant to each system.

In practical terms the QRRMG provides a rationale for selecting sites for rehabilitation, while ensuring a consistent and transparent approach is undertaken to river rehabilitation. The QRRMG theorises that river rehabilitation can be triggered by an event (recent or historical) or can be triggered through an initiative to address a responsibility or a need. It states also that natural triggers can include disasters such as cyclones, floods and fires, while societal triggers can include the need to protect at-risk infrastructure, market mechanisms, and drivers such as government policy, legislation or planning requirements.

2.1 Step 1 - Whole of system and values

2.1.1 Location

The site is located on the southern bank of the Daintree River, approximately 10km upstream from the mouth and 12km downstream from Daintree Village (Figure 1). The site is only 900m upstream from the Daintree River ferry crossing to Cape Tribulation (Figure 1).

Figure 1. Location of the project site on the Daintree River

2.1.2 Values

The Daintree catchment area is home to a rich array of wetland environments. Within this region, three wetlands are recognized as being of National Significance. Notably, the Hilda Creek headwaters, perched around 1240 meters elevation near Thornton Peak's summit, host a unique collection of rare, ancient, and endemic plants (DES, 2016). Downstream, the lower Daintree River showcases exceptional tall mangrove forests and paperbark swamps. At Alexandra Bay, the confluence of fresh and saltwater wetland communities on the high rainfall coastal plains leads to a varied spectrum of plant life along the transition zone from freshwater to saline environments (DES, 2016).

The surrounding areas of the lower Daintree valley, the Daintree Coast, and the lower Hilda Creek sub-catchment also feature diverse wetlands (DES, 2016). The prevalent high rainfall nourishes wetlands nestled within foothill regions among forests, which include specific types of rainforests with Alexandra palms or fan palms thriving on either metamorphic or granite soils. Various other wetlands, set in metamorphic foothills, are characterised by sclerophyll vegetation including turpentine trees, multiple species of tea trees, and a mix of sedges and ferns (DES, 2016).

Lowland alluvial soils support common wetland types, such as those dominated by broad-leaved paperbarks and cajuput trees, as well as swamps rich with Alexandra or fan palms (DES, 2016). Additionally, pockets of fernlands and sedgelands interspersed with emergent rainforest plants thrive in permanently wet peat swamps (DES, 2016).

2.1.3 Geomorphology

The geological landscape of the Daintree catchment is intricate, with the region's highest parts formed by Permian-era granite found in places like the Mt Carbine Tableland and north of Cape Tribulation (DES, 2016). The Daintree River initially traverses over these granitic areas before descending onto Devonian-era metamorphic rock for most of its course. Fault lines delineate the transition from granite to metamorphic regions in several key locations (DES, 2016).

Characterized by rapid flows, the Daintree River and its tributaries cascade through the granite uplands, giving way to a dynamic journey through the metamorphic rocks below 700 meters, marked by rapids and waterfalls, including the impressive Adeline Falls (DES, 2016). The river itself rises from the granite tablelands but spends the majority of its 85-kilometer length in a confined channel through the narrow valleys carved into metamorphic rock (DES, 2016).

The valleys of the lower Daintree and Stewart Creek, along with the coastal plains, are primarily composed of Quaternary alluvial deposits, which transition from coarse sand and gravel in the upper floodplains to finer silt and mud in the lower estuarine zones. The presence of paired terrace assemblages and similar geomorphic characteristics throughout the catchment suggests that stripping has occurred across the entire Daintree River floodplain multiple times (Leonard & Nott, 2015). Large flood events before the beginning of records suggest water over 9m above the channel at Barra Flats, supporting this argument (Leonard & Nott, 2015).

The process of floodplain formation in the Daintree is suggested as (Leonard & Nott, 2015):

- Rapid vertical accretion
- Growth of levees
- Stream power increases as a response to levee growth
- This causes the formation of backchannels
- Erosion thresholds are then exceeded

The above process is relatively discontinuous throughout the floodplain resulting in a mosaic of floodplain states within the Daintree Valley at any given time (Leonard & Nott, 2015). The subject site lies within an area identified as stripped by the above processes (Leonard & Nott, 2015). Overall the reach of the Daintree River described as "Daintree Village (Allanton, Luttra and Barrat Sub-Basins) in the Catchment Story has shallowed over recent time (DES, 2016). This would put additional pressure on banks, leading towards increased rates of bank erosion.

2.1.4 Vegetation and Wetlands

The tidal reaches of the Daintree River are mapped as estuarine habitat under Queensland Wetland Mapping (V4) (Figure 2). Vegetation along the riverbank is mapped as Category B 'Of Concern' vegetation (Regional Ecosystem 7.1.4) described as *Mangrove and vine closed forest of the brackish zone* (Figure 3). Vegetation along the riverbank (RE 7.1.4) is also mapped as essential habitat. Endangered regional ecosystems (7.2.23) are mapped immediately behind the bank, however examination of aerial photographs shows that much of this area is cleared paddock (Figure 3).

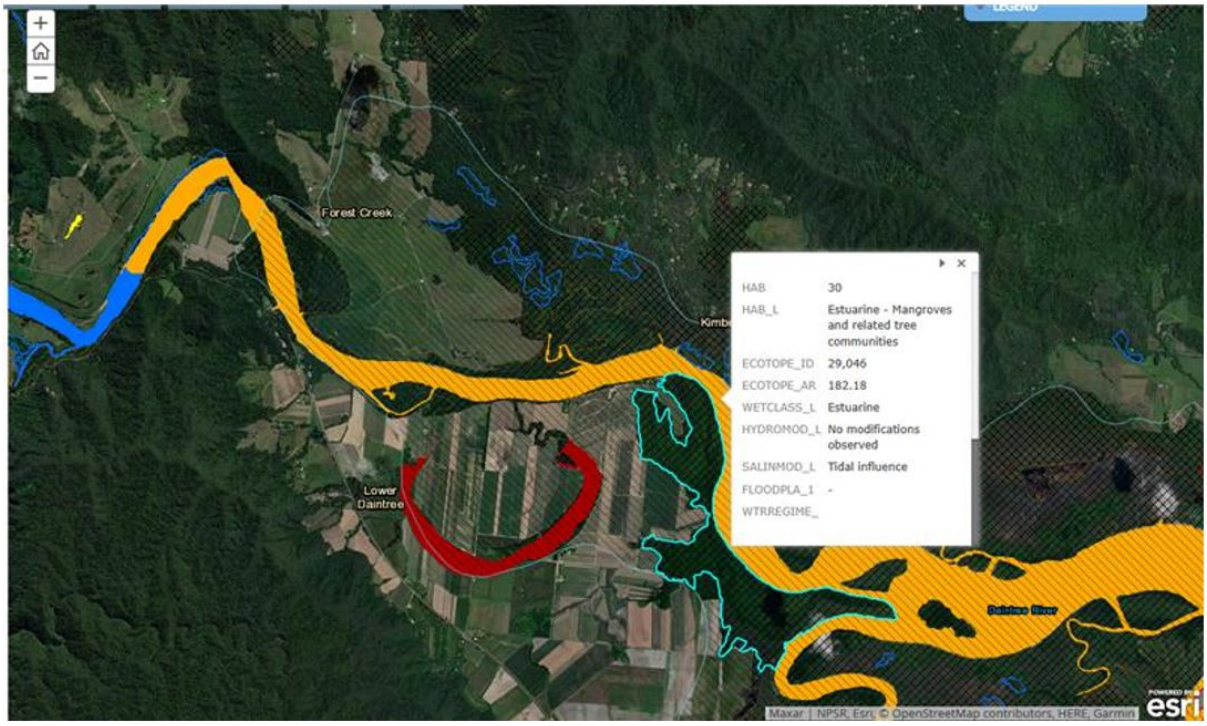

Figure 2. Wetland mapping from the Daintree Catchment Story (DES, 2016)

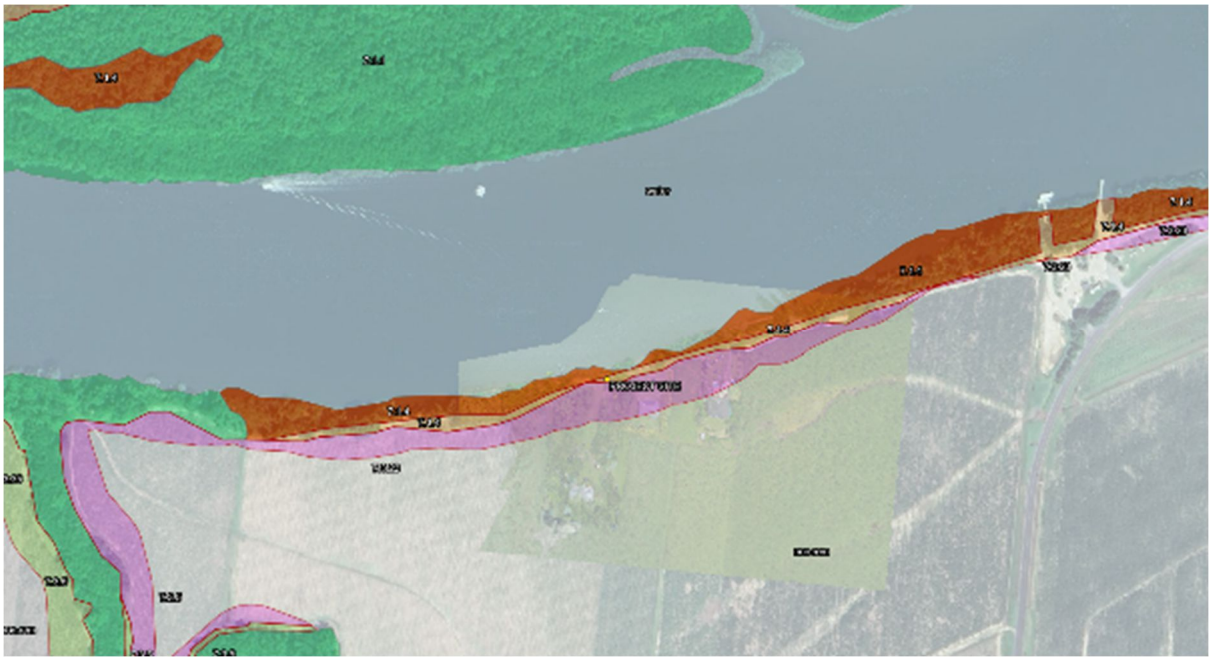

Figure 3. Regional ecosystem mapping of the project site.

2.2 Step 2 – Determine Needs and Objectives

2.2.1 Ecosystem Services

The Environmental Protection (Water and Wetland Biodiversity) Policy 2019 (EPP Water) aims to protect Queensland's water environment while allowing for ecologically sustainable development. Environmental Values (EVs) are the qualities that make water suitable for supporting aquatic ecosystem and human users. EVs and corresponding Water Quality Objectives (WQOs) are assigned to all tidal and non-tidal waters in Queensland. EVs for the Daintree Basin were determined in 2020. The site falls within waters designed "Daintree River Freshwaters" and the applicable EVs as defined by the EPP Water are provided in Table 1.

Table 1. Applicable EVs from the EPP Water to the Daintree River

Applicable Environmental Value	Definition (from EPP Water)
Aquatic Ecosystem	A community of organisms living within or adjacent to water, including riparian or foreshore area'. (EPP (Water and Wetland Biodiversity), schedule 2) The intrinsic value of aquatic ecosystems, habitat and wildlife in waterways and riparian areas, for example, biodiversity, ecological interactions, plants, animals, key species (such as turtles, platypus, seagrass and dugongs) and their habitat, food and drinking water. Waterways include perennial and intermittent surface waters, groundwaters, tidal and non-tidal waters, lakes, storages, reservoirs, dams, wetlands, swamps, marshes, lagoons, canals, natural and artificial channels and the bed and banks of waterways **Management Intent** **Moderately Disturbed (MD)** - Waters in which the biological integrity of water is adversely affected by human activity to a relatively small but measurable degree Water Type: **Middle Estuary**

Applicable Environmental Value	Definition (from EPP Water)
Farm Supply/Use	Suitability of domestic farm water supply, other than drinking water. For example, water used for laundry and produce preparation.
Stock Water (flood event)	Suitably of water supply for production of healthy livestock
Human Consumer	The suitability of the water body for producing aquatic foods for human consumption such as fish, crustaceans and shellfish from natural waterways
Visual Recreation	Means the sue that does not ordinarily involve contact with the water – for example, angling from the short, sunbathing near water
Cultural and Spiritual Values	Means scientific, social or other significance to the present generations past or future generations, including Aboriginal people or Torres Strait Islanders

Traditional Owners have aspirations to again become more involved in caring for their Country, through initiatives such as establishing their own ranger services. The Jabalbina Yalanji Rangers are now involved in managing much of the Daintree catchment and surrounding areas within the Eastern Kuku Yalanji Indigenous Protected Area (IPA).

Bank vegetation, where present, provides erosion protection to residential properties situated along The Esplanade.

2.2.2 Potential Threats and Pressures

The Water Quality Improvement Plan (WQIP) includes ranking of subcatchments according to management priorities. Four categories of management objectives were determined base don available information on threats and values, including:

1. Protect – largely unmodified and found in National Parks, Conservation Reserves or Inaccessible areas. The management objective is to ensure the values of these areas are maintained.
2. Restore – slightly disturbed waterways with repairable impacts. The management goal is to at least maintain, but preferably improve the health of the water, through early intervention or preventing new threats.
3. Maintain – moderately disturbed but vulnerable to further deterioration. The management goal is to minimise the occurrence of new threats and reduce impacts of existing threats
4. Adapt – Severely impacted and the management goal is to stabilise the environment to a minimum prevent further decline and progressively improve water quality over time.

The Lower Daintree subcatchment comprising the subject site has been listed as a “Restore” management objective (DES, 2016). The catchment is listed as having a “High” threat level

Pressures acting on the Lower Daintree include:

- Continued loss of mangroves resulting in ongoing erosion
- Climate change pressure will increase the recurrence of intense rainfall events, increasing peak flow rates. This will cause erosion at the subject site to move up and downstream, resulting in loss of more mangroves
- Further loss of fish habitat and sediment generation impacting water quality
- Potential loss of residential properties and access road
- Medium term risk to infrastructure in proximity to Daintree River ferry crossing

Poor water quality resulting from erosion can harm the health and vitality of the Great Barrier Reef ecosystem. Erosion, particularly from river systems and floodplains, can introduce sediments, pollutants, and excess nutrients into the water, leading to increased turbidity and reduced visibility.

Not all sediment eroded from a stream bank is exported to the Great Barrier Reef. Clays, consisting of sediments generally less than 2µm, will remain suspended until the runoff event stops. In larger flood events the fine sediment fraction is likely to be exported to the coast (Bartley, Henderson, Wilkinson, Whitten, & Rutherfurd, 2015). Once these clays reach the estuarine environment the sediment-laden freshwater will often float over the top of saline seawater, therefore promoting turbulence and the further transportation of clay sized particles into the marine environment (Witheridge, 2021).

This fine sediment is detrimental to the Great Barrier Reef for the following reasons (Great Barrier Reef Marine Park Authority, 2022):

- High concentrations of fine sediment can reduce coral diversity, affect reproduction, disrupt coral recruitment and increase susceptibility to disease. It can also damage gills and affect the metabolism of some fish species.
- Suspended sediment, together with nutrients and other organic particles, reduces the amount of available light for seagrass and corals to grow.

Tracing studies suggest that subsurface soils from gullies and stream bank erosion is the primary source of sediment, contributing 90% towards end of catchment loads with the fine fraction of sediment (<16µm) having the most chances of reaching the reef (Queensland Government, 2017). Therefore, stream bank and gully erosion remediation must directly address fine sediment which is delivered into the waterway and unlikely to settle as a result of erosion occurring.

Sediment load within the Daintree River is approximately 206kt/y with 78% sourced from hillslope erosion and 15.5% (32kt/y) from bank erosion (Leonard & Nott, 2015). The Daintree WQIP identifies that there are minimal anthropogenic pollutant loads. The official target for fine sediment, nitrogen and phosphorous is to maintain current loads so that there are no increases in sediment or nutrient loads.

2.2.3 Beneficiaries

Potential beneficiaries from the repair of the proposed site include:

- Commercial, recreational and indigenous fishers
- Landholders (residential and agricultural properties).
- Traditional owner groups
- Environmental values generally
- Public more broadly (ie tourism) from improved water quality in GBR.

2.3 Step 3 – Review needs and objectives

Based on the information presented above regarding the ecosystem services and the threats and pressures that the site faces, it has been determined that there is a need to intervene at site DR-4.

2.4 Step 4 – Management interventions

A number of management intervention options were considered for this site. Table 2 summarises those interventions, as well as any site-specific constraints identified which make the intervention unviable at DR-4.

Table 2. Intervention options considered for DR-4

Intervention	Description	Constraints
Bank reprofiling	Battering a bank to a less steep grade and even surface profile to allow for the construction of other streambank remediation works and revegetation of the bank.	Not effective alone without further intervention due to the potential of the soils at this site being highly erosive.
Rock armouring	Placement of angular rock against a bank to prevent erosion at the toe, or used to aid in protection of engineered infrastructure such as log jams.	Considered due to the requirement to protect infrastructure (The Esplanade) in a tidal zone.
Log jams	Divert flows away from the toe of the eroding bank, and locally increase hydraulic roughness and increase sediment deposition. May be supported by timber piles to increase longer-term stability.	Considered.
Rootballs	Timber trunks with the root ball intact, which sit in the stream and provide habitat diversity.	Erosion on this site is due to both fluvial and tidal influences, and rootballs do not have the required capacity to intervene. However they do provide habitat values for fish and can complement rock beaching works.
Timber pile field	Rows of wooden piles driven into the streambank to redirect high velocity flows to reduce erosion at the bank and encourage sediment deposition. Requires accompanied revegetation to stabilise the bank over the long term.	Bed load in system is too fine for pile field to be sufficient in settling out sediment.
Timber log fillets	When placed longitudinally onto the bank, log fillets can reduce erosion and support mangrove regeneration. Log fillets dissipate wave action and create a still zone behind them for sediment and seed deposition. Overlapping sections of the log fillet structures helps to allow for the passage of water in and out with the tide. These structures encourage the regeneration of vegetation and provide for improved habitat diversity.	Considered for this site.
Revegetation	Restores the riparian corridor with major species representative of the mapped remnant regional ecosystem or pre-clearing regional ecosystem. This will improve the longitudinal connectivity of the riparian	Not viable alone without further engineering intervention due to bank slope and site hydraulics. Will be required to complement any of the engineered options.

Intervention	Description	Constraints
	corridor provide long term resilience for the site.	

A combination of bank battering, rock toe protection (with rootballs incorporated), and active mangrove and riparian revegetation are the proposed solutions for this site. Bank battering is required for stability and vegetation establishment. Rock protection is required as a hard-engineering solution to ensure further erosion threat to The Esplanade is prevented. However, we only propose rock protection along the toe of bank, analogous to what has been done 100m further downstream. Rootballs will be incorporated into the rock protection works to provide and enhance fish habitat structure.

Hydromulching will be utilised to provide quick ground-cover protection of the battered earthworks. Active revegetation of mangrove and terrestrial riparian species will occur within the subject site. Mangrove rehabilitation will involve active collection and propagation of mangroves by licenced personnel. Revegetation with riparian species on the re-profiled bank behind the mangroves, rock protection and root-balls will increase hydraulic roughness and improve the connectivity of the riparian corridor at the site.

2.4.1 Project description

Erosion on the Daintree River, located adjacent to McDowall Road, has resulted in the loss of mangroves and riparian vegetation, sediment contribution to the Daintree River and is also threatening a 100m long section of McDowall Road and residential infrastructure, including the only access road to several homes. The site is referred to as site DR-4 and is located approximately 7.6km east-south-east of Daintree Village. The location of the site is shown below in Figure 4. Photographs of the erosion captured by drone are shown in Figure 5 and Figure 6.

In terms of environmental impact, the ongoing erosion at this site would be contributing to an estimated several hundred tonnes of sediment losses annually, thereby impacting on water quality to the Great Barrier Reef. An accurate determination of actual sediment losses using the P2R Projector Tool (SECAT) will be performed as part of the detail design process – see Step 5 Produce detail design. Neilly Group team members are very familiar with the use of P2R SECAT/GCAT tools to determine sediment losses from erosion sites. At this stage of the project, only a high-level estimate has been determined.

The ongoing loss of the mangrove and riparian vegetation zone is also contributing to the loss of critical habitat in a highly sensitive environmental location. Currently three private residences, one public access road (McDowall Road - esplanade), two privately owned sections of agricultural land and the Daintree River public access ferry infrastructure are vulnerable to loss or damage from existing and short-term potential for further site erosion at site DR-4. Additionally, this section of the Daintree River is frequented by thousands of locals and tourists annually and represents a significant environmental eyesore in the location of a Wet Tropics region World Heritage Area (Daintree area). As such, the issue is having a detrimental impact to multiple stakeholder groups; the environment, private land holders, council, tourism and business operators and tourists.

Remediation works are proposed to prevent further erosion, support mangrove regeneration, assist in protecting key community assets, while also improving visual amenity and biodiversity aspects of the site.

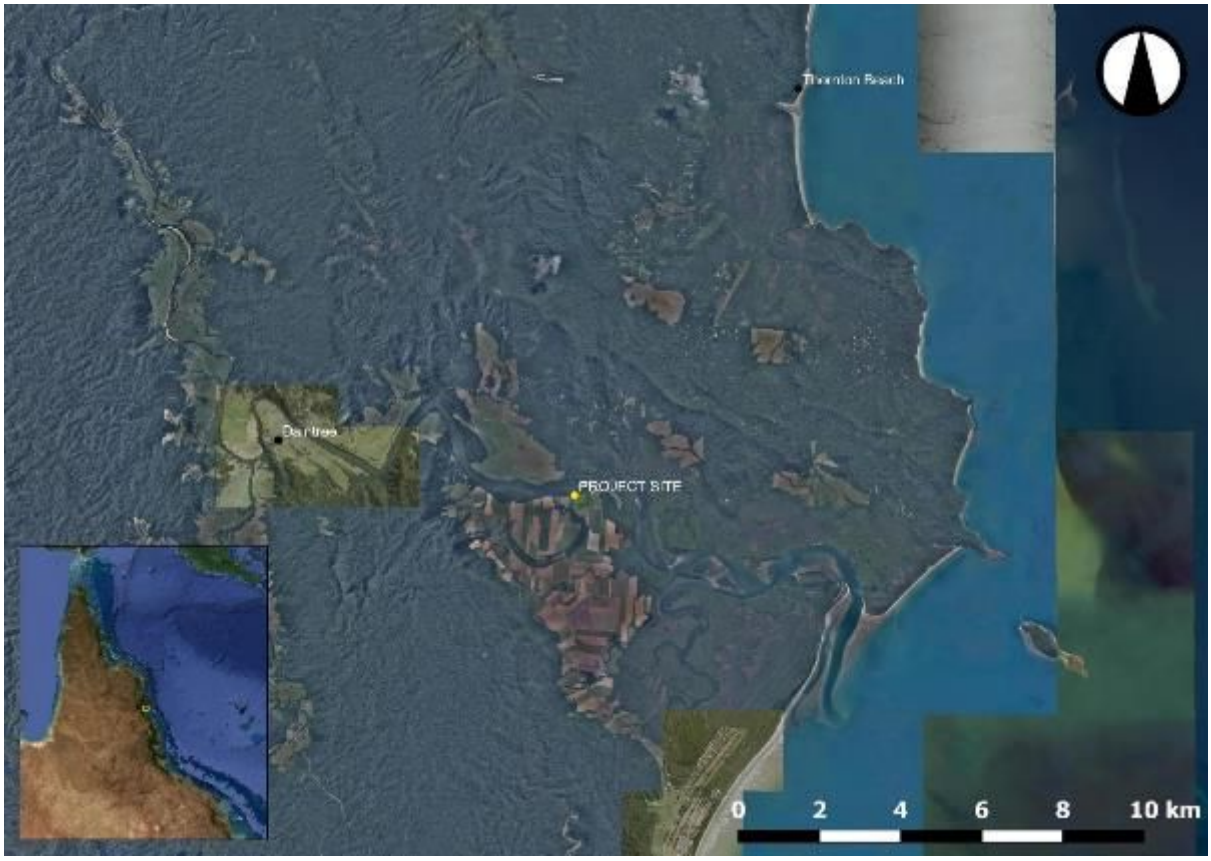

Figure 4. Location of site DR-4

Figure 5. Photograph of erosion threatening the access road/esplanade at site DR-4

Figure 6. Photograph of erosion threatening the access road/esplanade at site DR-4

A Functional Design for the site has been developed by Neilly Group and is presented below in Figure 7. The Functional Design consists of the following proposed works:

a. Bank Battering.
b. Rock toe protection
c. Installation of five log jams/large wood for fish habitat
d. Revegetation with mangroves and riparian species

A schedule of quantities has been developed for the functional design, the schedule of quantities is presented in Table 3 below.

Figure 7. Overview of proposed Functional Design

Table 3. Schedule of quantities for Functional Design of site DR-4

1	General Operational Costs	Unit	Value
1.1	Site establishment	ea	1
1.2	Survey setout	ea	1
1.3	Site facilities	ea	1
1.4	Accommodation and LAFH Costs	ea	1
1.5	Certified Machine Earth, Weed and Seed Hygiene	ea	1

2	Mobilisation/Demobilisation		
2.1	Site Mobilisation	ea	1
2.2	Site Demobilisation	ea	1
2.3	Fuel Truck	ea	1

3	Civil Construction		
3.1	Clear and grub rock chute footprint	m^2	610
3.2	Strip and stockpile topsoil (nominal 150mm thickness)	m^3	92
3.3	Excavation to foundation design profile	m^3	549
3.4	Fill to foundation design profile (including moisture conditioning where required and compaction to 95% maximum dry density at OMC)	m^3	549
3.5	Supply of granular filter (D_{50} = 25)	m^3	156
3.6	Placement of granular filter in 100mm thick layer	m^3	156
3.7	Supply of rock (D_{50} = 500mm)	m^3	1,559
3.8	Placement of rock in 1m thick layer	m^3	1,559
3.9	Placement of topsoil on upper batters (nominal 150mm thickness)	m^3	203
3.10	Supply of Large Wood	ea	3
3.11	Large Wood Installation	ea	3

4	Seeding and Cover		
4.1	Area of disturbance for seeding and cover	m^2	610
4.2	Supply Seed	kg	4.27
4.3	Supply Seed - Freight	ea	1.00
4.4	Spreading Seed on Upper Batter	kg	4.27
4.5	Supply Hay	tonnes	0.92
4.6	Supply Hay - Freight	ea	1.00
4.7	Spreading Hay on Upper Batter	tonnes	0.92

2.4.2 Approvals requirements

Environmental constraints and likely approvals that will be required are presented in the Project Plan. To support the environmental approvals process for the proposed works the following technical assessments will be required.

- **Baseline Ecology Survey and Report**: to address Matters of National Environmental Significance (MNES) and Matters of State Environmental Significance (MSES).
    - Desktop assessment of available datasets
    - Flora, fauna, vegetation, weed and pest survey
    - habitat assessments
    - habitat features and breeding places
    - Document survey findings (habitat assessments, vegetation mapping and ground - truthed REs, breeding places)
    - Likelihood of Occurrence Assessment EVNT Species, identifying species that require further assessment against EPBC SIA Guidelines and any requirements under the NC Act.
- **Marine Plant Survey and Marine Plant Clearance Report**: to address DAF triggers and clearing Marine Plants.
    - Marine Plant Survey in accordance with requirements under the *Fisheries Act 1994* and requirements under the *Planning Act 2016 as per* State code 11: Removal, destruction, or damage of marine plants (note this may require offsets)
    - Marine plant areas will be mapped and divided into survey polygons, each of
    - which will be described by species assemblage, projected cover, polygon area, impact area and condition.
- **Protected Plant Trigger area:** The protected plants flora surveys will be undertaken in accordance with the requirements noted in section 257 of the *Nature Conservation (Wildlife) Regulation 2006* (NCR) and with the methodology outlined in the *Flora Survey Guidelines – Protected Plants* (Department of Environment and Science, 2020). The guidelines require a targeted assessment of the proposed development footprint and an additional 100 m buffer around the development footprint. This survey area is referred to in the Guidelines as the 'Clearing Impact Area' (CIA).
    - Desktop Assessment
    - Targeted field survey and a protected plants population and habitat assessment (as we are in a HIGH-risk trigger area) (time covered in ecology survey)
    - Flora survey report - and the provision of an Impact Management Plan if protected plants are identified (35 hours)
    - liaise with Department of Environment and Heritage Protection (EHP) (4 hours)
    - If applicable- prepare a Clearing Permit Exemption application, or clearing permit to obtain approval from DEHP (4 hours)
- **Wetland mapping survey (HES Wetland trigger area):** The assessment will be undertaken in accordance with the Queensland Wetland Definition and Delineation Guidelines (Department of Environment and Heritage Protection, 2011), and will involve the following:
    - Review of existing data
    - Assessment of wetland hydrology
    - Assessment of wetland vegetation
    - Assessment of wetland fauna
    - ASS assessment
    - HES report as Appendix to the Ecology Report. The HES wetland assessment will inform the final wetland delineation with mapping and details presented in the Ecology Report and will allow for Schedule 14 of the Planning Regulation 2017 to be addressed.

- **Development Application Package:**
    - to address triggers identified
- **Vegetation clearing notification**: under the *Vegetation Management Act at the* Department of Natural Resources, Mines and Energy
- **Owner's consent**:
    - Part of the Development Application process.
    - public road, need owner's consent
- **ASS sampling and Geotech works (for HES trigger area considerations, as well and environmental impacts)**
    - ASS sampling and Geotech works will be undertaken by a subcontractor and supervised by Neilly Group
    - An ASS Management plan will be required
- **Revegetation Plan**
- **Environmental Management Plan (EMP)**
    - Principal document for the management of potential environmental risks identified
    - Provides information on how to meet all conditions of approvals
    - Ensure environmental risks are either mitigated or properly managed.
    - Ensures the Environmental Duty of Care, e.g. Cultural Heritage Duty of Care, obligations under various legislations and Biosecurity Obligations are met for the proposed Project works, to be compliant with legislation and any other approval conditions.

Additional Assessments (that may be required):

Depending on outcomes of the preliminary studies known to be required, several additional deliverables may be required, to obtain necessary approvals for the proposed works:

- **Targeted EVNT species surveys and migratory species surveys (MNES and MSES):**
    - Based on species specific survey guidelines (note this may have seasonal survey requirements)
    - To determine triggers under the EPBC Act 1999 and the NC Act 1992
- **EPBC Significant Impact Self-Assessment:**
    - To determine whether the Project works trigger impacts to MNES.
- **The Significant Residual impact assessment under NC Act 1992**
    - MNES
- **Species Management Program:**
    - NC Act

2.5 Step 5 – Produce detailed design

The detail design for the proposed works at site DR-4 will include the following elements:

1. Bathymetric survey of the Daintree River upstream, downstream and at the site.
2. Aerial drone survey of the Daintree River upstream, downstream and at the site to capture both orthorectified aerial imagery and LiDAR data to create a ground-controlled Digital Elevation Model for use in modelling and detail design.
3. Detail level 2D hydraulic modelling of the Daintree River at the site to inform detail design.
4. Iterative detail design of remediation measures using 2D hydraulic modelling and incorporating the findings of technical studies including Acid Sulphate Soils and Geotechnical investigations. The design is proposed to include:
    - Bank Battering
    - Rock toe protection
    - Engineered log jams
    - Revegetation with both mangroves and riparian species

5. Detail design documentation including:
    - Detail Design Report
    - For Construction Drawings
    - Technical Specifications
    - Schedule of Quantities
    - Safety in Design Report
    - Construction Schedule
    - Revegetation Plan
    - Construction Erosion and Sediment Control Plan

2.6 Step 6 – Implementation

Neilly Group will construct the proposed works that are developed throughout the detailed design and approvals process. In order to provide an accurate price estimate for construction, the Functional Design which has been completed by Neilly Group was used as the basis for our Proposed Fee. The schedule of quantities for the functional design, which forms the basis of this proposed fee, is presented in Table 3.

The Functional Design has been prepared utilising both LiDAR data captured in 2020 after the 2019 Monsoon Trough flood event and aerial drone photogrammetry data obtained in April 2022. As such there is a high degree of confidence in the design quantities.

2.7 Step 7 – Maintenance, monitoring, evaluation, adaptation and sharing

The tasks and costs associated with maintenance of the site through to the end of the funding period have been determined and presented to Terrain.

Neilly Group will be available to assist Terrain in delivering the monitoring, evaluation and lessons learned and knowledge sharing elements of the project.

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TERRAIN NRM REEF COASTAL RESTORATION PROGRAM DAINTREE RIVER STREAMBANK REMEDIATION

TECHNICAL ECOLOGY REPORT

16 SEPTEMBER 2024

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1 Introduction

Neilly Group (NG) have been commissioned by Terrain NRM to provide an engineering solution for an eroded site along the Daintree River in Far North Queensland.

The site, referred to as DR-4, is located on the southern bank of the Daintree River, approximately 10km upstream from the river mouth and 7.6km downstream from Daintree Village (Figure 1). The site is 900m upstream from the Daintree River ferry crossing to Cape Tribulation.

1.1 Project Description

Erosion on the Daintree River, located adjacent to McDowall Road, has led to the loss of mangroves and riparian vegetation, contributing sediment to the Daintree River. It also poses a threat to a 100m long section of McDowall Road and nearby residential infrastructure, including the only access road to several homes in the immediate area (Plate 1).

In terms of environmental impact, the ongoing erosion at this site would be impacting on water quality to the Great Barrier Reef through sedimentation. The ongoing loss of the mangrove and riparian vegetation zone is also contributing to the loss of critical habitat in a highly sensitive environmental location.

Currently three private residences, one public access road (McDowall Road - Esplanade), two privately owned sections of agricultural land and the Daintree River public access ferry infrastructure are vulnerable to loss or damage from existing and short-term potential for further site erosion at site DR-4.

Additionally, this section of the Daintree River is frequented by thousands of locals and tourists annually and represents a significant environmental eyesore in the location of a Wet Tropics World Heritage Area (Daintree area). As such, the issue is having a detrimental impact to multiple stakeholder groups: the environment; private land holders; council; business and tourism operators; and tourists.

Remediation works are proposed to prevent further erosion, support mangrove regeneration, assist in protecting key community assets, while also improving visual amenity and biodiversity aspects of the site.

FIGURE 1 - PROJECT LOCATION

Project:	DR-4 Streambank Remediation
Date:	10/09/2024
Drawn:	L. Marshall
Coordinate System:	GDA94

Plate 1. Photograph of erosion threatening McDowall's Road - The Esplanade at site DR-4.

1.2 Project Background

The Queensland River Rehabilitation Management (QRRM) Guideline (Department of Environment and Science, 2022) was released in June 2022. The QRRM Guideline provides a whole-of-system, values-based management framework for approaching river rehabilitation. It also provides a consistent and transparent approach to guiding the development of a well-scoped Rehabilitation Plan. The approach, known as the Rehabilitation Process, and the underpinning framework has been designed to ensure that management decisions are informed by linking an understanding of the biophysical components and processes of rivers to the broader landscape, while incorporating an understanding of the ecosystem services society derives from rivers. This enables consideration of the value of these services to different beneficiaries and the threats and pressures relevant to each system.

The QRRM Guideline theorises that river rehabilitation can be triggered by an event (recent or historical) or can be triggered through an initiative to address a responsibility or a need. It states also that natural triggers can include disasters such as cyclones, floods and fires, while societal triggers can include the need to protect at-risk infrastructure, market mechanisms, and drivers such as government policy, legislation or planning requirements.

1.2.1 Remediation Options Analysis

A number of management intervention options were considered for this site. Table 1 summarises these options, along with any site-specific constraints that render certain interventions unviable at DR-4.

Table 1. Intervention options considered for DR-4

Intervention	Description	Constraints
Bank reprofiling	Battering the bank to a flatter grade and even surface profile to allow for the construction of other streambank remediation works and revegetation of the bank.	Not effective alone without further intervention due to the potential of the soils at this site being highly erosive.
Rock armouring	Placement of angular rock against the bank to prevent erosion at the toe. Also used to aid in protection of engineered infrastructure such as log jams.	Considered due to the requirement to protect infrastructure (The Esplanade) in a tidal zone.
Log jams	Divert flows away from the toe of the eroding bank, and increase sediment deposition by locally increasing hydraulic roughness. May be supported by timber piles to increase longer-term stability.	Considered.
Rootballs	Timber trunks with the root ball intact, which sit in the stream and provide habitat diversity.	Erosion on this site is due to both fluvial and tidal influences, and the use of rootballs as a stand alone method is not a suitable solution. However, they do provide habitat values for fish and can complement rock beaching works.
Timber pile field	Rows of wooden piles driven vertically into the streambank to redirect high velocity flows to reduce bank erosion and encourage sediment deposition. Requires accompanying revegetation to stabilise the bank over the long term.	The bed load in the system is too fine for a pile field to effectively settle out sediment.
Timber log fillets	When placed longitudinally onto the bank, log fillets can reduce erosion and support mangrove regeneration. Log fillets dissipate wave action and create a still zone behind them for sediment and seed deposition. Overlapping sections of the log fillet structures helps to allow for the passage of water in and out with the tide. These structures encourage the regeneration of vegetation and provide for improved habitat diversity.	Considered for this site.
Revegetation	Restores the riparian corridor with major species representative of the mapped remnant regional ecosystem or pre-clearing regional ecosystem. This will improve the longitudinal connectivity of the riparian corridor providing long term resilience for the site.	Not viable alone without further engineering intervention due to bank slope and site hydraulics. Will be required to complement any of the engineered options.

1.2.2 Preferred Design Solution

A combination of bank battering, rock toe protection, and active mangrove and riparian revegetation are the proposed solutions for this site. Bank battering is required for stability and vegetation establishment. Rock protection is required as a hard-engineering solution to ensure further erosion threat to McDowall's Road - The Esplanade is prevented. Rock protection is proposed only along the toe of bank, analogous to what has previously been completed 100m further downstream. Five large wood rootballs will be incorporated into the rock protection works to provide and enhance fish habitat. Hydromulching will be utilised to provide rapid ground-cover protection of the battered earthworks. Active revegetation of mangrove and terrestrial riparian species will occur within the subject site. The revegetation with riparian species on the re-profiled bank behind the mangroves, rock protection, and root-balls will all increase hydraulic roughness and improve the connectivity of the riparian corridor at the site. A functional design for the site has been developed by Neilly Group and is presented below Plate 2.

Plate 2. Overview of proposed functional design

1.3 Study Aims and Objectives

The aim of the study was to undertake a terrestrial ecological assessment of the DR-4 project site to identify the flora and fauna values and assess the potential impact of the project on these values. In meeting this aim, the scope of the assessment was as follows:

- Review existing ecology data for the project site and surrounding landscape.
- Undertake a baseline flora, fauna and habitat assessment.
- Prepare and refine a Likelihood of Occurrence Assessment for threatened species, using results from the survey and habitat assessment to expand upon desktop findings and

identify any species that require further evaluation against EPBC Significant Impact Assessment Guidelines.

- In the context of relevant legislation, assess the potential impacts from the projects on ecological values.
- Clearly detail whether the project will have a significant impact to the identified flora and fauna species.
- Propose mitigation and avoidance measures for integration into this ecological assessment report to minimise potential ecological impacts.

1.4 Site Location and Description

The project is located within the Douglas Shire council area and covers a road parcel adjacent to lot 6RP888615 and lot 7RP888615 as shown in Figure 1.

1.4.1 Bioregional Context

The Daintree catchment is the northernmost catchment in the Wet Tropics region. The catchment is divided by two major waterways, the Daintree River in the south and the Bloomfield River in the north, and a number of smaller waterways that flow from the mountain ranges to the coast. The project site is located within the Daintree River Drainage Sub-basin.

The majority of the catchment is covered by mountain ranges with a narrow lowland coastal plain. The highland section is mostly reserved for conservation and is included in the Wet Tropics World Heritage Area. Agriculture and urban areas are primarily located in the lowland coastal section of the catchment (Reefplan, 2024). The Daintree catchment covers 2,107 km^2 (10% of the Wet Tropics region). Rainfall averages 2521mm a year which results in river discharges to the coast of about 2887 GL each year.

The Daintree River rises on the slopes of the Great Dividing Range within the Daintree National Park below Kalkajaka at an elevation of 1,270 metres AHD (Wikipedia, 2024). The river flows in a highly meandering course generally north, then east, south and east, through the rainforest where the water is fresh. An abundance of wildlife is known to occur in both the freshwater and tidally influenced reaches of the river, particularly fish. The river is joined by two minor tributaries before flowing through the Cairns Marine Park through thick mangrove swamps where the water is highly saline and empties into the Coral Sea, north of Wonga Beach. The mouth of the Daintree River opens onto a giant sandbar that shifts with each changing tide. The river descends 1,270 metres over its 127-kilometre course (Wikipedia, 2024).

2 Legislative Context

2.1 Commonwealth Legislation

2.1.1 Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) establishes a process for environmental assessment and approval of proposed actions that have, will have or are likely to have a significant impact on Matters of National Environmental Significance (MNES) or on Commonwealth land.

The nine MNES outlined in EPBC Act include:

- World Heritage Properties
- National Heritage Places
- Wetlands of International Importance (listed under the Ramsar Convention)
- Listed Threatened Species and Ecological Communities
- Migratory Species (listed under international agreements)
- Commonwealth Marine Areas
- Great Barrier Reef Marine Park
- Nuclear actions (including uranium mining)
- A Water Resource, in relation to coal seam gas development and large coal mining development.

Under the EPBC Act, a referral to the Department of Climate Change, Energy, the Environment and Water (DCCEEW) is required if the project has the potential to cause a 'significant impact' on MNES. The determination is made with reference to the Matters of National Environmental Significance Significant Impact Guidelines 1.1 (Department of the Environment Water Heritage and the Arts, 2013) and other EPBC Act policy statements including significant impact guidelines for individual threatened species, groups of species and threatened ecological communities.

Several MNES were identified through the desktop assessment as having potential to occur within the area. These matters were assessed through a likelihood of occurrence assessment and significant impact assessment and have been discussed further within this report (Sections 4 and 5 and Appendices B and C).

2.1.2 Threatened Ecological Communities

The EPBC Act identifies and protects Threatened Ecological Communities (TECs). Types of TECs listed under the EPBC Act include woodlands, grasslands, shrublands, forests, wetlands, marine, ground springs and cave communities. TECs are listed under the EPBC Act in the following categories:

- Extinct in the wild
- Critically endangered
- Endangered
- Vulnerable.

2.1.3 Conservation Significant Species

Conservation significant species are listed under the EPBC Act in the following categories:

- Extinct
- Extinct in the Wild
- Critically Endangered
- Endangered
- Vulnerable.

2.1.4 Migratory Shorebird Species

Australia is located within the East-Asian Australasian Flyway for migratory shorebirds. These species breed as far north as Siberia and Alaska during the northern hemisphere summer and migrate to non-breeding grounds in Australia and New Zealand to avoid the northern winter and take advantage of energy rich food sources in the southern hemisphere. Migrating shorebirds arrive in northern Australia between late August and early November. Many birds remain in the north, but others disperse southwards for the austral summer.

The EPBC Act includes a list of migratory shorebird species, comprising:

- Migratory species which are native to Australia and are included in the appendices to the Bonn Convention
- Migratory species included in annexes established under the Japan-Australia Migratory Bird Agreement (JAMBA) and the China-Australia Migratory Bird Agreement (CAMBA)
- Native, migratory species identified in a list established under an international agreement such as the Republic of Korea-Australia Migratory Bird Agreement (ROKAMBA).

There are 14 terrestrial bird species that are also listed as migratory bird species under the EPBC Act. These birds are protected because they too are included in one or more international agreements in which Australia is a party to, including JAMBA, CAMBA, ROKAMBA or the Bonn Convention.

The desktop assessment identified a number of migratory species that could potentially occur within the area. These species have been discussed further within this report (Sections 4 and 5 and Appendices B and C).

2.1.5 Weeds of National Environmental Significance

Thirty-two Weeds of National Significance (WoNS) have been identified by the Australian government using an assessment process that prioritised these weeds based on their invasiveness, potential for spread and environmental, social and economic impacts. For the 32 WoNS, customised and targeted management plans have been developed.

There are several WoNS with the potential to occur within the project site, and weeds have been discussed further within this report (Sections 4 and 5).

2.2 State Legislation

2.2.1 Nature Conservation Act 1992

The objective of the *Nature Conservation Act 1992* (NC Act) is "the conservation of nature" as outlined in section 4 of the Act. In support of the NC Act, the *Nature Conservation (Animals) Regulation 2020* lists 'protected fauna' while the *Nature Conservation (Plants) Regulation 2020* lists protected flora species, herein referred to as conservation significant species.

As per sections 88 and 89 of the NC Act, it is an offense to take or use protected wildlife, which is outside a 'protected area', unless exemptions apply, or an approval is obtained from the Department of Environment and Science (DES).

Conservation significant species are listed under the NC Act in the following categories:

- Extinct in the wild
- Endangered
- Vulnerable
- Near threatened
- Special least concern (Least Concern species of special cultural significance).

Conservation significant species listed under the NC Act with the potential to occur within the project sites are discussed within this report (Section 4 and 5 and Appendix B).

2.2.2 Vegetation Management Act 1999

The *Vegetation Management Act 1999* (VM Act) regulates the clearing of native vegetation in Queensland. The purpose of the Act is to regulate the clearing of vegetation in a way that:

a. conserves remnant vegetation
b. conserves vegetation in declared areas
c. ensures that clearing does not cause land degradation
d. prevents the loss of biodiversity
e. maintains ecological processes
f. manages the environmental effects of the clearing to achieve the matters mentioned in paragraphs (a) to (e); and
g. reduces greenhouse gas emissions (refer Section 3(1) of the VM Act).

Regulated Vegetation

The VM Act protects and regulates the clearing of native vegetation including 'remnant' and 'high value regrowth' (HVR) vegetation (shown as Category B and C on the Regulated Vegetation Management Map) (Attachment A:) on freehold land, Indigenous land and State tenures (refer to Figure 3 – Mapped Regional Ecosystems).

The VM Act also protects Category R vegetation; that is native woody vegetation on freehold land, Indigenous land or leasehold land granted for agriculture or grazing purposes, located within 50m of a watercourse in the Burdekin, Mackay, Whitsunday and Wet Tropics Great Barrier Reef catchments.

Regional Ecosystems

Regional ecosystems (REs) are vegetation communities in a bioregion that are typically associated with a particular combination of geology, landform and soil (Sattler, P., & Williams, R., 1999). The RE classification scheme is used to incorporate biodiversity into planning and management through the provisions of the VM Act.

Under the VM Act, REs are assigned a vegetation management class (VM class) and biodiversity status. The VM class is listed in the Vegetation Management Regulation and used in the regulation of clearing. Biodiversity status is used for a variety of planning and management applications and is based on an assessment of the condition of remnant vegetation in addition to the VM class determined under the VM Act.

Vegetation communities or REs are listed under the VM Act in the following categories:

- Endangered
- Of concern
- No concern at present / Least concern.

REs within the project area are discussed in Section 5.

Essential Habitat

Essential habitat, regulated under the VM Act, refers to vegetation in which threatened species listed under the NC Act have been known to occur. Clearing of essential habitat is assessed through the development assessment process under the *Planning Act 2016*. Where clearing cannot be reasonably avoided or minimised, an offset may be required under the *Environmental Offsets Act 2014*. Essential habitat within the project site is discussed in Section 5.

2.2.3 Environmental Protection Act 1994

The objective of the *Environmental Protection Act 1994* (EP Act) is to protect Queensland's environment while allowing for development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends (ecologically sustainable development). Refer to Section 3 of the EP Act.

The EP Act provides the key legislative framework for the protection of the environment in Queensland. Section 319 of the EP Act imposes a 'general environmental duty', which specifies that a person must not undertake any activity that may harm the environment without taking reasonable and practical measures to prevent or minimise the harm.

There are also several issue-specific Environmental Protection Policies (EPP's) that the project will need to comply with. These include the *Environmental Protection Regulation 2019, Environmental Protection (Air) Policy 2019, Environmental Protection (Noise) Policy 2019* and *Environmental Protection (Water and Wetland Biodiversity) Policy 2019.*

Environmentally Relevant Activities

In co-ordination with the *Planning Act 2016*, the EP Act provides for licensing and approval of Environmentally Relevant Activities (ERAs). ERAs are activities that require specific regulation because of the likelihood that they could cause environmental harm. To carry out an ERA, an environmental authority (EA) must be obtained prior to commencing the activity. A full list of all the prescribed ERAs can be found in Schedule 2 of the Environmental Protection Regulation 2019.

The project does not require approval for any ERAs.

2.2.4 Biosecurity Act 2014

The *Biosecurity Act 2014* is administered by the Department of Agriculture and Fisheries (DAF). The Act provides management measures to protect agricultural and tourism industries and the environment from pests, diseases, and contaminants. Under the Act, everyone has a 'general biosecurity obligation' to manage biosecurity risks that are under their control and that they know about or should be reasonably expected to know about. Under this obligation, individuals and organisations must take all reasonable and practical steps to prevent or minimise each risk.

Under the Act, invasive plants and animals are categorised as either a 'Prohibited Matter' or a 'Restricted Matter' and replace the 'Declared' status under the superseded *Land Protection (Pest and Stock Route Management) Act 2002*. The *Biosecurity Act 2014* also requires every local government in Queensland to develop a biosecurity plan for their area.

Biosecurity matters have been addressed in Section 5 of this report.

2.2.5 Queensland Environmental Offsets Framework

The environmental offsets framework in Queensland includes the *Environmental Offsets Act 2014* (Qld) (EO Act), the *Environmental Offsets Regulation 2014* (EO Regulation) and the Queensland Environmental Offsets Policy (EO Policy).

Matters of State Environmental Significance (MSES) are a component of the biodiversity state interest that is defined under the State Planning Policy (SPP) and defined under the EO Regulation. MSES are defined as:

- Regulated vegetation
- Connectivity areas
- Wetlands and watercourses
- Designated precincts in Strategic Environmental Areas
- Protected wildlife habitat
- Koala habitat in south-east Queensland
- Protected areas (national parks, regional parks; and nature refuges)
- Declared fish habitat areas and highly protected zones of State Marine Parks
- Waterways providing for fish passage
- Marine plants
- Legally secured offsets areas.

A self-assessment using the Queensland Significant Residual Impact Guideline is required to determine whether the project will have a significant residual impact on MSES. An environmental offset condition may be imposed under various State assessment frameworks (such as the Planning Act 2016 and EP Act for an activity prescribed under the EO Act), if the project will, or is likely to have a significant residual impact on a prescribed environmental matter that is a MSES.

2.2.6 Biodiversity Planning Assessment Mapping

Biodiversity significance is attributed by DES on a bioregional scale through a Biodiversity Planning Assessment (BPA). BPAs assign three levels of overall biodiversity significance:

1. State significance - areas assessed as being significant for biodiversity at the bioregional or state scales. They also include areas assessed by other studies/processes as being significant at national or international scales.
2. Regional significance - areas assessed as being significant for biodiversity at the subregional scale. These areas have lower significance for biodiversity than areas assessed as being of State significance.
3. Local significance and/or other values - areas assessed as not being significant for biodiversity at state or regional scales. Local values are of significance at the local government scale.

Additionally, 'State Habitat for Endangered, Vulnerable and Near Threatened (EVNT) Taxa' has been mapped, based on the presence of endangered, vulnerable and/or near threatened taxa. The criterion uses records based upon georeferencing precision of ≤2,000m and which are collected ≥1950 (flora) or ≥1975 (fauna).

3 Assessment Methodology

3.1 Desktop Assessment

The following databases and information sources were reviewed to obtain data on the biodiversity values of the project site:

- Department of Climate Change, Energy, the Environment and Water (DCCEEW) online EPBC Protected Matters Search Tool (EPBC PMST)
- Queensland Herbarium Regional Ecosystem (RE) mapping
- Species data from Wildnet (Wildlife Online) and Atlas of Living Australia
- Wetland and Watercourse Mapping (DES)
- Essential Habitat Mapping (DES)
- Flora Survey Trigger Mapping (DES)
- Aerial imagery (Google Earth, Queensland Globe)
- Department of Agriculture and Fisheries (DAF) waterways (Department of Infrastructure, Local Government and Planning Development Assessment mapping system, SARA Layers, Environment and Heritage, Fish Habitat Areas) (DEWHA, 2019)
- Queensland Government Maps of Queensland biosecurity zones.

Results of the desktop searches have been included in Appendix A.

3.2 Field Survey

3.2.1 General Survey Approach

A 2-day field assessment, undertaken by two suitably qualified ecologists on 15-16 July 2024, included the following:

- Survey of flora, fauna, vegetation communities and species listed under the *Biosecurity Act 2014*.
- Habitat assessments to identify any significant habitat features and potential breeding places for conservation significant and other least concern fauna (e.g. nests, hollows).
- Ground-truthing mapped remnant vegetation and verifying the current regional ecosystem mapping.
- Targeted surveys/habitat assessments for conservation significant species.

3.2.2 Flora Survey

The flora survey effort was focused on ground-truthing mapped REs within the project site and undertaking meandering surveys to inform species inventories, including targeted searches for threatened flora species in accordance with the Flora Survey Guidelines – Protected Plants and a survey of marine plants within the construction footprint.

As the vast majority of the site was found to be non-remnant and highly disturbed through past land uses, a total of five quaternary assessment sites were surveyed. An additional seven observations were made throughout and adjacent to the site. The quaternary sites were utilised to verify vegetation units and confirm the regional ecosystem mapping as well as the dominant characteristic species. Structural analysis included recording the height class and life form of the dominant species

within the mid and canopy strata as per (Neldner, 2022). RE classification (Sattler, P., & Williams, R., 1999) was determined based on estimated structural and floristic analysis.

Evidence of previous disturbance, fire history, incidence of exotic species and general notes on soil type and ecological integrity were compiled for each quaternary survey site. Several time-encoded digital photographs were taken at each plot as a reference.

Following the assessment at quaternary sites, the surrounding area within each project site was searched using the random meander technique (Cropper, 1993). Meander searches were employed to:

- identify additional, less abundant, species not recorded at survey plots
- identify any potential significant threatened species not identified within the survey plot
- confirm the representativeness of plot locations
- confirm boundaries and ecotone areas between vegetation communities.

RE classification of communities was determined as per Sattler and Williams (1999), and in accordance with the Regional Ecosystem Description Database (REDD) (Herbarium, 2018).

3.2.3 Specimen Identification

Where plant species were unable to be identified in the field, fruiting and/or flowering specimens were taken to assist with identification. For those species identified during the field surveys, samples were pressed, and dried, and positive identifications of plant specimens were subsequently made under laboratory conditions.

3.2.4 Nomenclature

Taxonomic nomenclature used for the description of floral species is according to (Bostock & Holland, 2018). Exotic species are signified in text by an asterisk (*).

3.2.5 Targeted Flora Surveys

The desktop assessment was used to inform a species likelihood of occurrence assessment for the presence of threatened flora species. Through this assessment, no threatened flora species were considered likely to occur within the site. Nonetheless, targeted surveys in accordance with the Flora Survey Guidelines – Protected Plants were undertaken as the area contains high risk areas on the flora trigger mapping.

3.2.6 Fauna Survey

Assessment of fauna and fauna habitat values comprised the following:

- Habitat assessments to identify any potential habitat for threatened fauna species
- Opportunistic observations and records of all faunal taxa
- Assessment of potential breeding places for fauna, including threatened species and least concern fauna.
- Ultrasonic recording of microchiropteran bat species.

3.2.7 Fauna Habitat Assessments

Fauna habitat assessments to characterise habitat values were undertaken across the project site. Habitat assessments provide an indication of potential fauna utilisation, and suitability for conservation significant fauna to occur. Habitat assessments recorded landform, vegetation characteristics, habitat condition, disturbance, microhabitat availability, fauna signs and fauna observations. Fauna habitat assessments were conducted at three sites as shown in Figure 2. Additional incidental and general observations were also undertaken across the site.

The fauna habitat assessments were also used to inform the species likelihood of occurrence assessment.

3.2.8 Animal Breeding Places

An assessment of animal breeding places was undertaken, identifying and recording any potential breeding places (e.g., nests, burrows, tunnels).

3.2.9 Opportunistic Sightings

All fauna species incidentally observed throughout the project sites were recorded.

3.2.10 Targeted Surveys

Targeted surveys were undertaken for microchiropteran bat species that were assessed as potentially occurring within the area. Anabat Swift Ultrasonic recording devices were deployed in two locations to record the echolocation calls of microchiropteran bats (Figure 2).

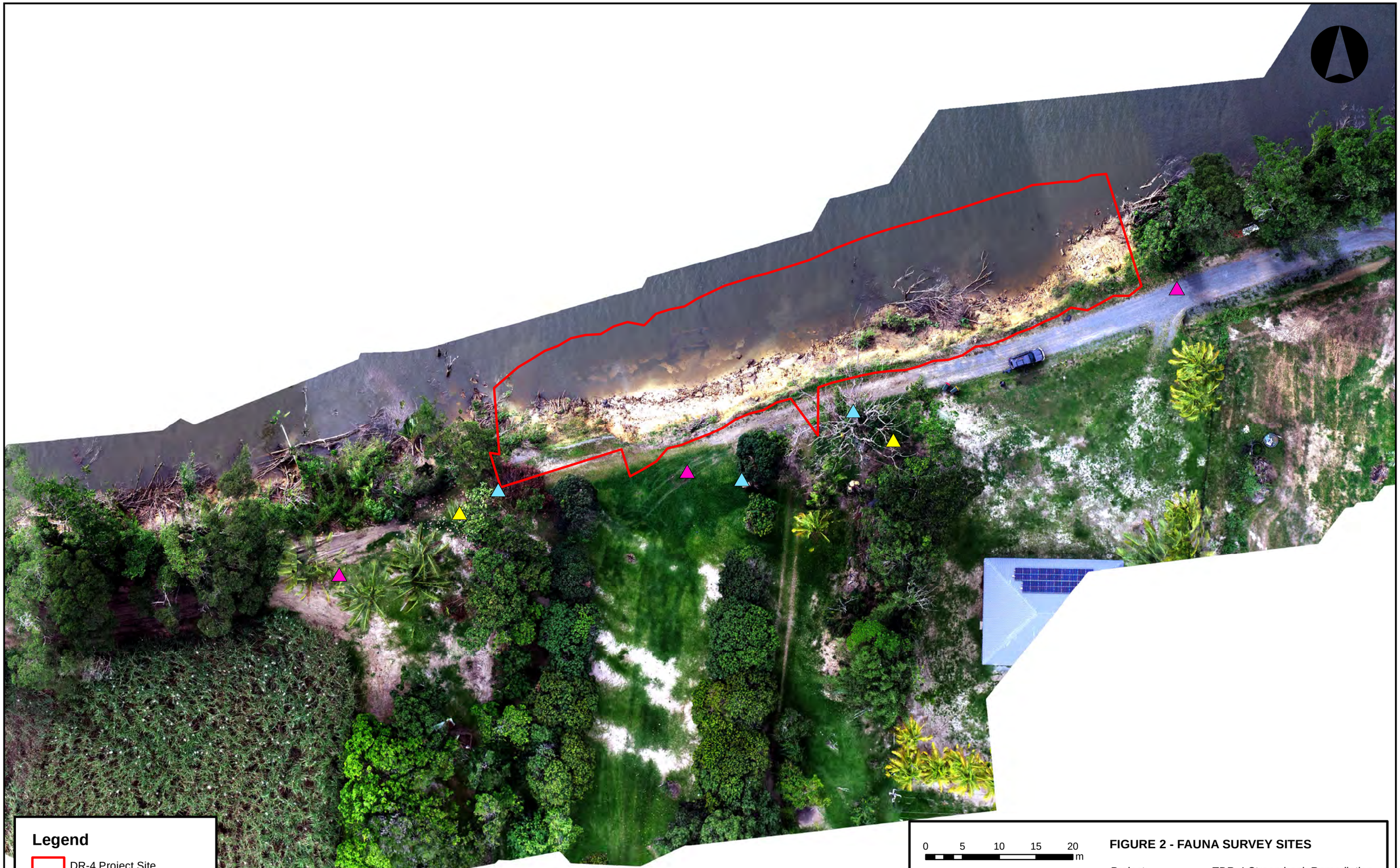
3.2.11 Limitations

The terrestrial ecology survey results are an accurate and true representation of the site at the time of survey, limited by the area surveyed, site conditions, and seasonal variation at the time of survey. The results do not guarantee the absence of conservation significant species listed under state or Commonwealth legislation.

Many fauna species are highly mobile, seasonally variable, occur at low density, or may only utilise a site intermittently. The species recorded during this survey are considered opportunistic sightings only and are not considered exhaustive.

Data acquisition during flora surveys generally has inherent limitations due to the variability of vegetation communities across a site and the changing detectability and presence of species over time. However, a high level of confidence in the survey's comprehensiveness is assumed in this study given the size and cleared state of the site, with survey sites strategically chosen to capture representative samples of all communities present. Despite this, it is acknowledged that field studies with temporal limitations cannot always account for the full range of potential floral diversity within a site.

Field survey data collection to inform mapping was conducted using a hand-held iPad unit with aerial imagery. The accuracy of the iPad is generally <6m and is not intended to be relied upon for design purposes. In accordance with (Neldner et al., 2022), RE mapping has been undertaken to a mapping scale of 1:25,000.



Legend

- DR-4 Project Site
- Habitat Observation
- Fauna Habitat Assessment
- Anabat Site

0 5 10 15 20 m

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FIGURE 2 - FAUNA SURVEY SITES

Project:	TDR-4 Streambank Remediation
Date:	10/09/2024
Drawn:	L. Marshall
Coordinate System:	GDA94

3.2.12 Likelihood of Occurrence

A likelihood of occurrence assessment was undertaken for conservation significant species identified during the desktop review (Appendix B). The assessment considered known habitat and ecological requirements of the species against the vegetation and habitat types identified through various data sources and verified during the field survey.

Each species was assessed against the categories defined below:

- **Known**: Species was positively identified and recorded at the project site during the field assessment; or previous, reliable records occur within the project site.
- **High**: Species was not recorded during the field survey or previously, however there are known records within the nearby surrounding area and suitable habitat exists at the project site.
- **Moderate**: Species was not recorded during the field survey or previously, however known records occur in the surrounding area and/or habitat in the project site is marginal or degraded.
- **Low**: Habitat in the project site might be suitable or marginal; however, species was not recorded during the field survey, and no known records of the species exist within the surrounding area.
- **None**: No suitable habitat within the project site and no records of the species in the surrounding area, or species distribution does not overlap site. This is usually applied to marine species or seabirds for terrestrial sites.

The outcome of the field assessment was then used to refine the existing Species likelihood assessment as well as inform the need for an EPBC Significant Impact Assessment and Significant Residual Impact Assessment under the NC Act 1992.

This process is to be used as a guide and is not to be used as indicating species presence or absence other than where observed presence is indicated.

3.2.13 Significant Impact Assessment

A Significant Impact Assessment was undertaken to determine impacts on any conservation significant or migratory species protected under the EPBC Act, in accordance with the EPBC Act Policy Statement 1.1 'Significant Impact Guidelines: Matters of National Environmental Significance' (Department of the Environment Water Heritage and the Arts, 2013). The Significant Impact Assessment considered those species assessed as having a Moderate or higher chance of occurrence within each site (Appendix C).

4 Desktop Assessment Results

4.1 Flora

4.1.1 Regulated Vegetation

The DRNME Vegetation Management Report identified two vegetation management categories occurring within the project site including:

- Category B Remnant vegetation, and
- Category R Regrowth vegetation.

4.1.2 Regional Ecosystems

In Queensland, remnant and regrowth vegetation is described and mapped by the Queensland Herbarium as Regional Ecosystems (REs). According to the Queensland Herbarium RE mapping, the project site is located within an area comprising remnant and regrowth vegetation and an estuary as described in Table 2 and shown in Figure 3.

Table 2. Mapped REs within the project site

RE	Short Description	VM Status	Biodiversity Status	Structure category	Area (m2) in project footprint
Estuary	Open water	NA	NA	NA	696m^2 (~0.07ha)
7.1.4a	Mesophyll vine forest/mangrove complex. Canopy species include *Heritiera littoralis, Bruguiera gymnorhiza, Sonneratia alba, Barringtonia racemosa, Archontophoenix alexandrae, Elaeocarpus grandis, Melicope elleryana, Acacia mangium* and *Syzygium tierneyanum*. Inland margins of mangroves and estuaries. Intertidal. (BVG1M: 35a).	Of concern	Endangered	Dense (Low closed forest)	705m^2 (~0.07ha)
Category R Regrowth	Great Barrier Reef Riverine Regrowth – no RE assigned.	-	-	-	173m^2 (~0.02ha)

696 m2

196 m2

173 m2

509 m2

Legend

- DR-4 Project Site

Regional Ecosystems

- 7.1.4a
- Estuary
- Cat R Regrowth
- Essential Habitat (Cassowary)
- Flora Survey Trigger Map

0 2.5 5 7.5 10 m

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FIGURE 3 - RE, ESSENTIAL HABITAT AND FLORA TRIGGER MAPPING

Project:	DR-4 Streambank Remediation
Date:	19/09/2024
Drawn:	L. Marshall
Coordinate System:	GDA94

4.1.3 Threatened Ecological Communities

The desktop assessment identified two Threatened Ecological Communities (TECs) that have the potential to occur within the project site: Lowland tropical rainforest of the Wet Tropics; and Broad leaf tea-tree (*Melaleuca viridiflora*) woodlands in high rainfall coastal north Queensland.

The lowland tropical rainforest of the Wet Tropics TEC is typically a structurally intricate, evergreen tall forest characterized by a higher species diversity compared to other Australian rainforests. It is dominated by large-leaved tree species, including mesophylls (leaves 12.5 to 25 cm in length, Walker & Hopkins 1990) and notophylls (leaves under 12.5 cm). Vines, lianas, and epiphytes are relatively abundant, as are herbaceous ground layer plants within the context of Australian rainforests. This ecological community also encompasses lowland mesophyll vine forests, which feature a distinct layer of *Archontophoenix alexandrae* (Alexandra Palm or Feather Palm) and/or *Licuala ramsayi var. ramsayi* (Fan Palm), often found on poorly drained alluvial plains.

The Broad-leaf Tea-tree (*Melaleuca viridiflora*) woodlands in the high-rainfall coastal regions of north Queensland form a TEC where *M. viridiflora* dominates the canopy, and a variety of grasses, sedges, and forbs cover the ground layer (Queensland Herbarium, 2011). This community is confined to the Wet Tropics and Central Mackay Coast bioregions of Queensland. While the community is usually a woodland, it can sometimes exhibit a forest structure in certain areas. It generally features two distinct structural layers: a canopy of broad-leaf tea-tree and a diverse ground layer of grasses, sedges, and forbs. Epiphytes are often prominent in the canopy trees. Although shrubs are typically sparse, some areas display a noticeable layer of *Xanthorrhoea spp*. (grass trees).

4.1.4 Conservation Significant Flora Species

The desktop assessment identified 26 conservation significant flora species with the potential to occur within the area. These species and their conservation status under the EPBC Act and the NC Act have been outlined in Table 3.

Table 3. Conservation significant flora with potential to occur within the project site

Scientific Name	Common Name	EPBC status	NC Act Status
Phlegmariurus squarrosus	Rock Tassel-fern, Water Tassel-fern	CE	CE
Bruguiera x hainesii	Haines's Orange Mangrove	CE	CE
Leichhardtia araujacea	-	CE	CE
Phlegmariurus filiformis	Rat's Tail Tassel-fern	E	-
Phlegmariurus dalhousieanus	BlueTassel-fern	E	CE
Carronia pedicellata	-	E	E
Vrydagzynea grayi	Tonsil Orchid	E	E
Polyphlebium endlicherianum	Middle Filmy Fern	E	V
Dendrobium mirbelianum	Dark-stemmed Antler Orchid, Mangrove Orchid	E	E
Vappodes lithocola	Dwarf Butterfly Orchid, Cooktown Orchid	E	-
Chingia australis	-	E	E
Dendrobium nindii	an orchid	E	E
Endiandra cooperana	-	E	E
Phalaenopsis rosenstromii	Native Moth Orchid	E	E
Phlegmariurus tetrastichoides	Square Tassel Fern	V	V

Scientific Name	Common Name	EPBC status	NC Act Status
Canarium acutifolium	-	V	V
Actephila foetida	-	V	V
Phaius pictus	-	V	V
Myrmecodia beccarii	Ant Plant	V	V
Arthraxon hispidus	Hairy-joint Grass	V	V
Acriopsis emarginata	Pale Chandelier Orchid	V	V
Polyscias bellendenkerensis	-	V	V
Phaleria biflora	-	V	V
Cyclophyllum costatum	a shrub	V	V
Vappodes phalaenopsis	Cooktown Orchid	V	-
Hymenasplenium wildii	-	V	V
CE= Critically endangered; E = Endangered; V = Vulnerable; NT = Near Threatened			

4.1.5 Protected Plants

According to the protected plants flora survey trigger map (Department of Environment and Science, 2024), the project site contains high-risk areas associated with mapped RE 7.1.4a (Figure 3).

4.1.6 Essential Habitat for Flora

There is no mapped essential habitat for threatened flora species within the site.

4.2 Fauna

4.2.1 Conservation Significant Fauna Species

The desktop assessment identified 31 conservation significant fauna species having the potential to occur in the area (excluding those species that are strictly marine). These species and their respective conservation status under the EPBC Act and NC Act are detailed in Table 4. Species in bold are those identified to have a moderate or higher likelihood of occurrence in the project site and were the focus of the targeted habitat assessments and surveys. Further information on each of these species has been provided in the likelihood of occurrence assessment.

Table 4. Conservation significant fauna identified through the desktop assessment as potentially occurring within the project site.

Scientific Name	Common Name	EPBC Status	NCA Status
Calidris ferruginea	Curlew Sandpiper	CE	CE
Numenius madagascariensis	Eastern Curlew, Far Eastern Curlew	CE	E
Tringa nebularia	Common Greenshank, Greenshank	CE; M	E
Limosa lapponica baueri	Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit	V	V
Erythrotriorchis radiatus	Red Goshawk	E	E
Casuarius casuarius johnsonii	**Southern Cassowary, Australian Cassowary, Double-wattled Cassowary**	**E**	**E**

Scientific Name	Common Name	EPBC Status	NCA Status
Rostratula australis	Australian Painted Snipe	E	E
Falco hypoleucos	Grey Falcon	V	V
Charadrius leschenaultii	Greater Sand Plover, Large Sand Plover	V	V
Tyto novaehollandiae kimberli	Masked Owl (northern)	V	V
Gallinago hardwickii	Latham's Snipe, Japanese Snipe	V; M; Ma	-
Calidris acuminata	Sharp-tailed Sandpiper	V; M; Ma	-
Sternula nereis nereis	Australian Fairy Tern	V	-
Calidris canutus	Red Knot, Knot	V	E
Hirundapus caudacutus	**White-throated Needletail**	**V**	**V**
Cyclopsittadiophthalma macleayana	Macleay's fig-parrot	-	V
Cairnsichthys bitaeniatus	Daintree Rainbowfish	CE	-
Stiphodon semoni	Opal Cling Goby	CE	-
Litoria dayi	Australian Lace-lid, Lace-eyed Tree Frog, Day's Big-eyed Treefrog	V	V
Dasyurus maculatus gracilis	Spotted-tailed Quoll (North Queensland), Yarri	E	E
Pteropus conspicillatus	Spectacled Flying-fox	E	E
Dasyurus hallucatus	Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu]	E	-
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)	Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory)	E	E
Mesembriomys gouldii rattoides	Black-footed Tree-rat (north Queensland), Shaggy Rabbit-rat	V	-
Rhinolophus robertsi	Large-eared Horseshoe Bat, Greater Large-eared Horseshoe Bat	V	-
Hipposideros semoni	Semon's Leaf-nosed Bat, Greater Wart-nosed Horseshoe-bat	V	E
Saccolaimus saccolaimus nudicluniatus	Bare-rumped Sheath-tailed Bat, Bare-rumped Sheathtail Bat	V	E
Xeromys myoides	Water Mouse, False Water Rat, Yirrkoo	V	V
Tachyglossus aculeatus	**Short-beaked echidna**	**-**	**SLC**
Dendrolagus bennettianus	Bennett's tree-kangaroo	-	NT
Crocodylus porosus	**Estuarine crocodile**	**M; Ma**	**V**

CE = Critically Endangered; E = Endangered; V = Vulnerable; SLC = Special Least Concern; MA= Marine under the EPBC Act; M = Migratory under the EPBC Act 1999 and / or NC Act 1992.

4.2.2 Migratory Fauna

The desktop assessment identified 16 migratory fauna species, in addition to the threatened species mentioned above that are also listed as migratory, with the potential to occur within the project site (excluding strictly marine species). These species are detailed in Table 5. Species in bold are those

identified to have a moderate or higher likelihood of occurrence and were the focus of the targeted habitat assessments. The likelihood of occurrence assessment is included in Attachment B.

Table 5. Migratory fauna with potential to occur within the DR-4 project site

Scientific Name	Common Name	EPBC Act	NCA
Apus pacificus	**Fork-tailed swift**	M	**SLC**
Cuculus optatus	Oriental cuckoo	M	SLC
Monarcha melanopsis	Black-faced monarch	M	SLC
Monarcha frater	Black-winged monarch	M	SLC
Symposiachrus trivirgatus	Spectacled monarch	M	SLC
Motacilla flava	Yellow wagtail	M	SLC
Myiagra cyanoleuca	**Satin flycatcher**	**M**	**SLC**
Rhipidura rufifrons	Rufous fantail	M	SLC
Cecropsis daurica	**Red-rumped swallow**	**M**	**SLC**
Calidris melanotos	Pectoral sandpiper	M	SLC
Fregata minor	Great Frigatebird, Greater Frigatebird	M	SLC
Fregata ariel	Lesser Frigatebird, Least Frigatebird	M	SLC
Phaethon lepturus	White-tailed Tropicbird	M	SLC
Limosa lapponica	Bar-tailed Godwit	M	SLC
Actitis hypoleucos	Common sandpiper	M	SLC
Numenius phaeopus	Whimbrel	M	SLC

M = Migratory species listed under the EPBC Act; SLC = Special Least Concern listed under the NC Act

4.2.3 Essential Habitat for Fauna

The mapped remnant polygon of 7.1.4a along the river bank is also mapped as essential habitat for the Southern Cassowary (Figure 3). Approximately 0.07 ha of mapped essential habitat falls within the project footprint.

4.3 Wetlands

No wetlands are mapped within the project site however wetlands of high ecological significance occur approximately 300m to the west and south-west of the project site.

4.4 Watercourses Defined under the Water Act

In the area of the Project Site, the Daintree River has been defined as a Stream Order 6 watercourse as per the *Water Act 2000*.

4.5 Waterway Barrier Works

In the location of the Project, the Daintree River is not mapped as a waterway for waterway barrier works.

4.6 Ecological Corridors

The mapped remnant and regrowth vegetation within the site is also mapped as a biodiversity corridor of state significance and habitat for EVNT taxa. Biodiversity corridors show areas of ecological value to be maintained and where incremental habitat loss, fragmentation and degradation should be avoided. Corridors are mapped by delineating a corridor centre line and by applying a buffer to this centre line which either captures existing remnant vegetation or identifies an area within which ecological connectivity should be maintained or improved. Mapping of biodiversity corridors is based on the assessment of:

- large tracts of vegetation;
- intact terrestrial and aquatic connectivity;
- areas of high species richness and diversity;
- unique ecosystems and representativeness; and
- climate adaptation zones and refugia.

The biodiversity corridor mapped within the project site includes very small pockets of remnant vegetation but is largely comprised of open, non-remnant areas.

5 Field Survey Results

5.1 Climatic Conditions

Weather conditions during the survey were generally fine and sunny, with warm days reaching a maximum of 29 degrees Celsius and mild nights with a minimum of 21 degrees Celsius. No rainfall occurred during the survey period.

5.2 Flora

This section documents the results of the flora and vegetation communities of the DR-4 project site and includes a summary of species diversity, vegetation communities, conservation significant flora, presence of TECs, and weeds of concern.

5.2.1 Species Diversity

The flora survey identified the presence of 74 flora species within and surrounding the project footprint, with the full species list provided in Appendix D. Of these, 41 were introduced species.

5.2.2 Regional Ecosystems

The desktop review identified approximately 705m^2 of mapped remnant RE 7.1.4a within the project footprint, 696m^2 of open water mapped as an estuary (Daintree River) and 173m^2 of non-remnant vegetation which is also mapped as high value riverine regrowth vegetation in a reef catchment area.

However, the field assessment determined that the site contains very little vegetation, with historical clearing associated with the construction of McDowall's Road – The Esplanade, and for residential lots of three dwellings in the immediate area. Most of the site comprises areas of mowed grass of mixed species, the road surface, and the highly eroded riverbank.

A total area of approximately 29m^2, consisting of one small polygon at the western end of the project site, contains native canopy and shrub species consistent with RE 7.1.4a, which has been ground-truthed (Figure 4, Plate 3). The remainder of the Project site comprises 1324m^2 of estuary (Daintree River) and 221m^2 of non-remnant vegetation along the Esplanade (Table 6).

Table 6. Ground-truthed area of each vegetation community

Ground-truthed RE Mapping	Area within project footprint
7.1.4a	29m^2
Estuary	1324m^2
Non-remnant / Regrowth	221m^2

1324m2

29m2

221m2

Legend

DR-4 Project Site

Ground-truthed Regional Ecosystems

7.1.4a

Estuary

Non-remnant

0 2.5 5 7.5 10 m

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FIGURE 4 - GROUND-TRUTHED RE MAPPING

Project:	DR-4 Streambank Remediation
Date:	10/09/2024
Drawn:	L. Marshall
Coordinate System:	GDA94

Plate 3. Photograph of site conditions showing non-remnant vegetation across the majority of the Project Site

5.2.3 Threatened Ecological Communities

Desktop assessment identified two threatened ecological communities (TECs) as potentially occurring within the project site:

- Lowland tropical rainforest of the Wet Tropics.
- Broad leaf tea-tree (*Melaleuca viridiflora*) woodlands in high rainfall coastal north Queensland.

The field assessment considered both communities, and examples of each TEC have been provided in Plates 4 and 5 below, compared with the onsite vegetation characteristics shown in Plate 6.

As outlined in Section 5.2.2 above, the site is generally devoid of remnant vegetation, with the exception of a small polygon in the western end of the site which contains some native canopy and shrub species consistent with RE 7.1.4a. While individual Alexandra palms were identified adjacent to the site (a characteristic component of the lowland tropical rainforest TEC), no characteristics of this TEC were present within the Project footprint. Similarly, no characteristics corresponding to the Broad-leaf Tea-tree (*Melaleuca viridiflora*) woodlands in the high-rainfall coastal regions of north Queensland TEC were found within the Project site.

Plate 4. Example of lowland tropical rainforest of the Wet Tropics TEC in Broadwater State Forest (Department of Agriculture, Water and the Environment, 2021)

Plate 5. Example of Broad-leaf tea-tree (*Melaleuca viridiflora*) woodlands in the high-rainfall coastal regions of north Queensland TEC (DSEWPaC, 2012)

Plate 6. Non-remnant vegetation and garden ornamentals within and adjacent to the project site.

5.2.4 Conservation Significant Species

No conservation significant flora species were identified within the project site despite thorough searching within the small project footprint. Based on the assessment of habitat and ecological conditions present within the site, conservation significant flora species are considered unlikely to occur.

5.2.5 Introduced Flora Species

A total of 41 introduced flora species were recorded within and in the vicinity of the DR-4 Project Site (Appendix D). One of these species, Olive hymenachne, is listed as a Weed of National Significance (WoNS) and a Restricted Matter under the *Biosecurity Act 2014*.

5.3 Fauna

This section documents the results of the fauna assessment within the DR-4 project site and includes an overview of fauna habitat, conservation significant species, migratory species, animal breeding places and pest animals.

5.3.1 Fauna Habitat

Two habitat types were identified within the project footprint: non-remnant grassland along the high bank of the Daintree River and adjacent to McDowall's Road – The Esplanade; and the tidally influenced aquatic habitat of the Daintree River itself. While a very small area of vegetation occurs in the far western end of the site, this patch was too small to provide significant habitat value or to be mapped as a separate habitat type for the purposes of this report.

5.3.1.1 Habitat Type 1

Within the site, the non-remnant grassland along the high bank of the Daintree River provides limited habitat value for fauna species. The few trees and shrubs are present only in the far western corner of the site, and no fallen woody debris, hollows, burrows or other significant habitat features are present (Plate 7). This habitat type comprised an area of mowed grass of mixed species and McDowall's Road – The Esplande, a gravel road along the high bank of the river which provides access to three dwellings and several sugar cane paddocks in the immediate area. Very few fauna observations were made during the survey. Within habitat type 1, only cane toads (*Rhinella marina*), a gecko (*Gehyra sp*.), and a small selection of least concern bird species were identified. Plate 8 shows the patch of disturbed remnant 7.1.4a in the western end of the site.

Plate 7. Non-remnant grassland along the high bank of the Daintree River within the site.

Plate 8. Small patch of disturbed vegetation containing species consistent with RE 7.1.4a in the far western end of the site (right hand corner of photo only within project site).

5.3.1.2 Habitat Type 2

Habitat type 2 comprised the aquatic ecosystem of the Daintree River itself, which is considered a biodiversity hot spot (DES, 2019). In the area of the project site, the river is tidally influenced, with some isolated mangroves and other marine plants present along the lower bank. The river provides habitat for a vast diversity of fish, reptiles, including the estuarine crocodile, and birds, as well as providing an important source of water and food for mammals, including microchiropteran bats and flying-foxes. During the survey, fish including the Archer fish (*Toxotes sp*.) were observed swimming and sheltering amongst woody debris along the toe of the bank.

5.3.2 Conservation Significant Fauna Species

No conservation significant fauna species were recorded during the survey. It is likely that the endangered Southern cassowary could move through the site to patches of good quality riparian habitat along the river however, given the current habitat values within the site, it is considered unlikely that the site provides important habitat or that the project will result in any significant impacts to this species.

Similarly, estuarine crocodiles are also known to occur in the immediate area even though none were observed during the survey. The project is not expected to result in a significant impact to this species based on the small scale and temporary nature of the disturbance.

White-throated needletails, listed as both vulnerable and migratory, could fly over the site. The project is not expected to result in a significant impact to this species, as no roosting habitat is present within the site, and the species does not breed in Australia.

The Short-beaked echidna, listed as Special Least Concern un the NC Act may occur from time to time, but no shelter habitat exists and food resources was minimal.

5.3.3 Migratory Species

No migratory species were recorded during the survey, however it is possible that three migratory species could occur or fly over the site at times, including the Fork-tailed swift, Red-rumped swallow and Satin flycatcher.

The Fork-tailed swift and Red-rumped swallow are both almost entirely aerial in their habit, and while it is possible that they could occur over any of the habitat types within the project site it is unlikely that they will be impacted. The Satin flycatcher may utilise the remnant 7.1.4a in the western corner of the project site. However, this habitat was assessed as potential foraging and dispersal habitat only, with no suitable nesting habitat.

5.3.4 Animal Breeding Places

No animal breeding places were identified within the project footprint.

5.3.5 Introduced Species

One introduced species, the Cane toad, was identified within the site during the survey. Dog prints were also recorded, however it is unknown whether these prints were from domestic dogs or wild dogs/dingoes. No evidence of any other pest animals was recorded.

5.4 Connectivity

The site is mapped within a state biodiversity corridor, and while the site itself provides little connectivity value at present, the revegetation proposed as part of the project will improve connectivity along the riparian zone of the Daintree River (Figure 5).

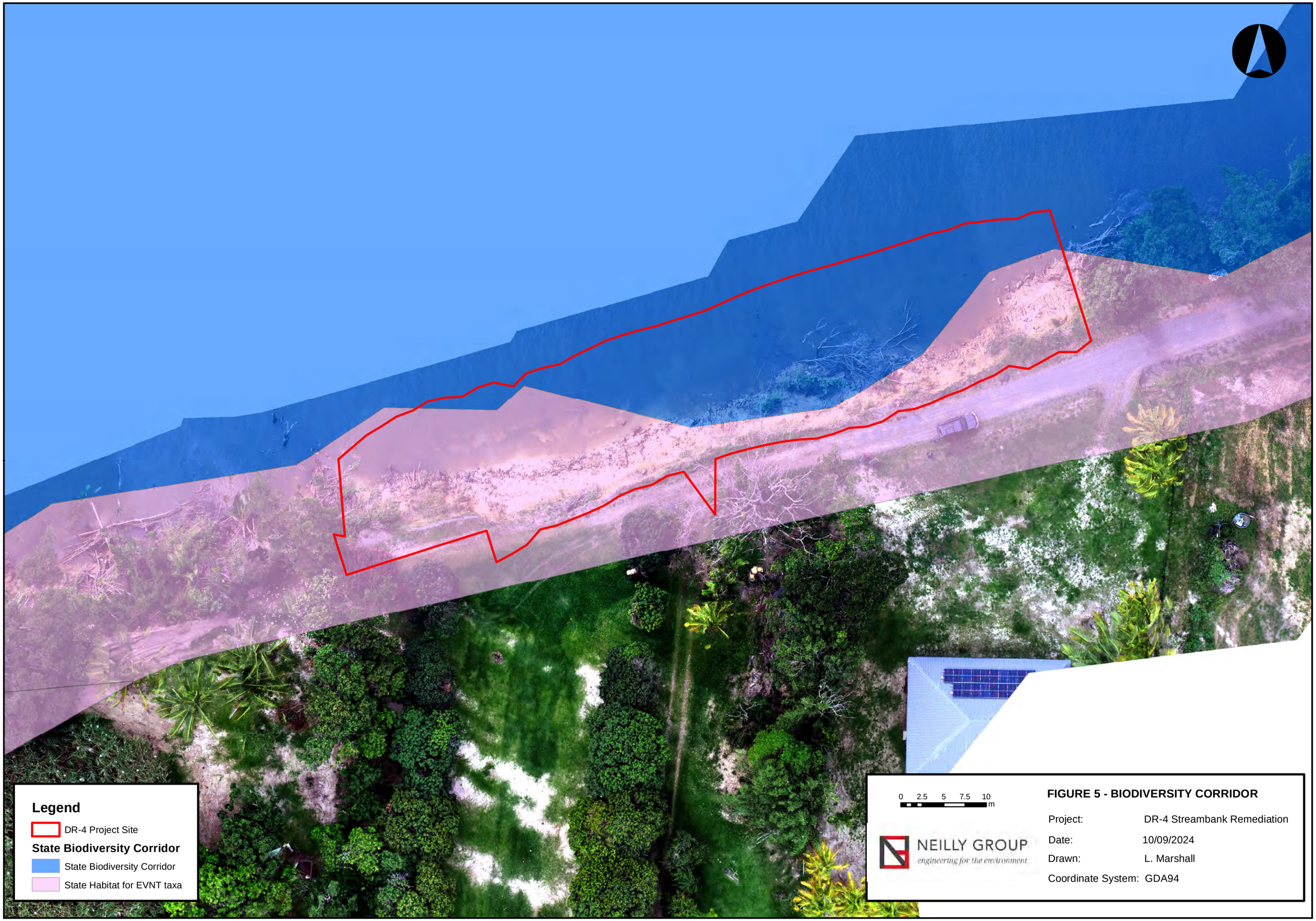
Legend
DR-4 Project Site
State Biodiversity Corridor
State Biodiversity Corridor
State Habitat for EVNT taxa
0 2.5 5 7.5 10
m
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FIGURE 5 - BIODIVERSITY CORRIDOR
Project: DR-4 Streambank Remediation
Date: 10/09/2024
Drawn: L. Marshall
Coordinate System: GDA94

6 Potential Impacts and Mitigation Measures

The most significant impacts on ecological values from the project will occur from disturbance of vegetation during construction. Further information on the potential impacts associated with the project is outlined below, as well as mitigation measures to minimise the potential impacts on flora and fauna values.

6.1 Direct Impacts

6.1.1 Vegetation Clearance

The project area contains 705m^2 of mapped remnant RE 7.1.4a, 696m^2 of open water mapped as an estuary (Daintree River) and 173m^2 of non-remnant vegetation which is also mapped as high value riverine regrowth vegetation in a reef catchment area. However, as outlined in Section 5.2.2, the field assessment determined that the site contains very little vegetation, with historical clearing associated with the construction of McDowall's Road – The Esplanade, and clearing for residential lots of three dwellings in the immediate area. Most of the site now comprises areas of mowed grass of mixed species, the road surface, and the highly eroded riverbank.

A total area of 29m^2, consisting of one small patch of disturbed vegetation at the western end of the project site contains some native canopy and shrub species consistent with RE 7.1.4a, which has been ground-truthed. The remainder of the Project site comprises 1324m^2 of estuary (Daintree River) and 221m^2 of non-remnant vegetation along McDowall's Road - The Esplanade.

The 29m^2 (0.003 ha) of RE 7.1.4a, listed as an 'Of Concern' RE under the *Vegetation Management Act 1999* is below the clearing threshold of 0.5ha for a vegetation community with a structure classification of 'Dense and mid-dense'.

There are a range of measures that should be considered by the project team to minimise the impact from clearing vegetation, including:

- Project planning should seek to avoid or minimise vegetation clearing in areas of remnant vegetation as much as practicable. It is noted that the project design has avoided areas of remnant vegetation to the greatest extent possible to achieve the desired remediation outcomes for the project.
- While it is considered unlikely in this instance, if conservation significant flora species are located during any pre-clearance surveys, efforts should be made to avoid or minimise impacts through the micro-siting process.
- The project Environmental Management Plan (EMP) will include a section on vegetation management that is to provide clear guidance on areas to be cleared and retained, methods for clearing, and other relevant environmental protection measures.
- Workers should be made aware of vegetation management requirements iduring induction training and through work instructions.
- An Erosion and Sediment Control Plan that is inclusive of construction and operation of the project should be developed and implemented prior to construction.

6.1.2 Loss and Fragmentation of Fauna Habitat

The clearance of native vegetation can adversely affect native fauna species. Potential impacts resulting from clearing native vegetation can include:

- Loss of habitat causing a reduction of biological diversity or loss of local populations and genotypes.

- Loss of leaf litter and groundcover, removing habitat for a wide variety of smaller vertebrates and invertebrates.
- Loss of food resources such as foliage, flowers, nectar, fruit and seeds.
- Fragmentation of populations, which can reduce gene flow between small, isolated populations, reduce the potential for species to adapt to environmental change and loss or severe modification of the interactions between species.
- Disturbance which can permit the establishment and spread of exotic species that may displace native species.

While the field assessment determined that the site contained limited habitat value and resources for native fauna, with only 0.003ha of disturbed vegetation present in the western end of the site, it is possible that some conservation significant fauna could utilise the site on a temporary basis or as a flyover location. Given the site is almost entirely non-remnant, the project is not expected to result in any fragmentation of either habitat or important populations of fauna species. However, the following mitigation measures have been proposed to minimise loss of habitat:

- Suitably qualified fauna spotter-catchers must be engaged to undertake pre-clearance habitat searches and be present during vegetation clearing activities to minimise fauna harm.
- A project Environmental Management Plan should be prepared to provide clear guidance on areas to be cleared and retained, methods for clearing, role of the fauna spotter-catcher and other relevant environmental protection matters.
- The project team should identify and map clear no-go zones to avoid unauthorised disturbance of areas of sensitive vegetation and habitat; such as trees that are to be retained.
- Any habitat features identified during clearing such as any felled trees and logs should be considered for relocation to other areas adjacent to the site where practical to provide microhabitat for fauna.

As the project site is largely non-remnant, the project is considered unlikely to disrupt important movement corridors or create habitat fragmentation at a regional scale.

If disruption or removal of any animal breeding place is anticipated, it will be the Contractor's responsibility to undertake activities in accordance with a Species Management Program (SMP) for tampering with animal breeding places that is being used by a protected animal to incubate or rear offspring. This may be a 'High Risk' SMP for conservation significant and/or colonial breeders, or a 'Low Risk' for Least Concern fauna.

6.1.3 Disturbance and Injury or Mortality of Fauna

Clearing of vegetation can result in injury or mortality of fauna, particularly ground dwelling fauna (e.g. reptiles), that may be crushed by machinery or struck by vehicles. Whilst a local impact on fauna may occur, the impact on fauna populations within the broader landscape is considered negligible. Nonetheless, mitigation measures to reduce the likelihood of injury or mortality to fauna include the following:

- Undertake pre-clearance surveys to identify shelters and breeding places potentially utilised by Least Concern species, colonial breeders and conservation significant fauna.
- Fauna spotter-catchers should be used to capture and relocate fauna prior to clearing.
- No unauthorised off-track driving is to occur.
- No unauthorised clearing outside of the designated project footprint is to occur.
- Any injured, sick and dead vertebrate fauna will be recorded before (by fauna spotter-catchers), during and after construction and operation. All sick or injured wildlife will be

taken to a veterinary surgeon as soon as practicably possible for assessment or handed to a licensed and experienced wildlife carer if no veterinary treatment is required.
- Appropriate procedures for managing injured wildlife should be developed and included in the project environmental management plans.
- Drive to conditions and adhere to speed limits.

6.2 Indirect Impacts

6.2.1 Potential for Weed and Pest Spread

Activities that may increase the risk of establishment of new infestations and exacerbating existing infestations include the following:

- Soil disturbance through vegetation clearance and construction activities.
- Areas of ground remaining bare for extended periods which will establish weed species where there is little competition from other species.
- Increased pedestrian and vehicular traffic through the area.
- Importation of construction materials to the site which may harbour introduced species.

The risk of these potential impacts should be mitigated and managed, with potential mitigation measures including the adoption of a Weed and Pest (Biosecurity) Management Plan. Mitigation measures should include:

- Equipping staff and contractors with information on the location of biosecurity threats, 'clean areas' and any wash-down requirements.
- Identifying known WoNS, Restricted Invasive or Regionally Declared weeds in the project area.
- Identifying the origin of high-risk construction materials, machinery and equipment to mitigate introduction of weed species.
- Undertaking management methods to control the spread of weeds considered to be Restricted Matters in accordance with industry best management practice or Queensland Department of Agriculture and Fisheries pest control guidelines.
- Promoting the awareness of weed management, by inclusion of weed issues, pictures and procedures into the project area induction program.
- Undertaking appropriate weed monitoring to identify any new incidence of weeds.
- Incorporating the vision, goals and priorities of the Australian Weeds Strategy 2017 - 2027 into the project's Weed and Pest (Biosecurity) Management Plan.

6.2.2 Impacts to Water and Air Quality

In addition to the direct impacts associated with vegetation clearance, activities associated with the construction of the project may impact water quality and the local airshed.

Construction activities may generate dust emissions. The main activities causing dust will be vegetation and soil clearing, construction, including moving, dumping and shaping material, and wheel-generated dust from unsealed access roads.

Excessive deposition of dust on leaves of plants can suppress growth and photosynthesis and result in reduced habitat quality for fauna. High levels of airborne dust particles can irritate the respiratory systems of fauna and result in ingestion of dust-coated seeds and other foods. Excessive deposition of dust on open water bodies may also degrade water quality, and overall habitat quality for fauna.

Changes to hydrology can impact run-off characteristics, intensity of flood flows and stability of waterways. Elevated levels of erosion and sediment transport across the site may lead to biodiversity loss in affected areas.

Inappropriate disposal of liquid and solid wastes, including spills and leaks (fuel, chemicals) and inadequate storage could result in point-source contamination of surrounding land. Direct adverse impacts include toxic impacts on vegetation (resulting in degradation or loss) and fauna (from contact, inhalation or ingestion) while indirect impacts include habitat loss for threatened and migratory species. Direct adverse impacts on surface and groundwater quality are also possible.

The following measures are recommended to avoid or minimise the extent and severity of impacts to water and air quality resulting from project-related activities:

- Site representatives to undertake routine visual inspections of the watercourse .
- Manage all chemicals, including hydrocarbons in accordance with standard operating procedures for transport, handling and storage.
- Do not refuel vehicles and plant at the project site.
- Transport solid waste offsite to approved facilities outside the project area.
- Develop and implement spill management procedures. Spill kits and appropriately trained staff should always be available on site.
- Avoid vegetation clearing near or within waterways or drainage features during rainfall or when rainfall is imminent to minimise the potential for sediment-laden runoff.
- Monitor the efficacy of erosion control measures such that measures can be continually improved throughout the life of the project.
- Maintain and regularly service all vehicles, plant and equipment.
- Regularly clean all vehicles, plant and machinery and avoid overloading.
- Manage project-generated dust in accordance with the Project Environmental Management Plan.
- Designate, and adhere to at all times, maximum speed limits on non-sealed roads.

6.2.3 Lighting, Activity and Noise

During the construction phase, there will be an increase in lighting, noise and activity in the project area as machinery undertakes clearing and other activities. When activity and noise is occurring in areas adjoining retained fauna habitat, potential impacts may include:

- Reduced foraging ability by auditory predators due to increased background noise.
- Increased risk of predation by visual predators due to increased background noise.
- Increased potential for collisions with vehicles.
- Human visitation causing disturbance to foraging or breeding behaviours.
- Behavioural and physiological changes due to artificial lighting.

Current research indicates that there are no government policies or other widely-accepted guidelines in respect to the noise levels which may be acceptable to wildlife. Furthermore, the levels or character of noise that may “startle” or otherwise affect the feeding or breeding pattern of birds or other wild animals are not firmly established in the technical literature either.

Sudden loud, impulsive, or impact noises can startle birds and other fauna, and if sustained over time, may disrupt feeding and breeding behaviours in some species.

Excavation, construction and earthmoving associated with the project are expected to disturb all groups of fauna, especially birds. This may result in the temporary avoidance of the area for the duration of these activities. Fauna typically move away from noise and light sources, perceiving them as threats.

Mitigation measures include:

- Focus all lighting required for the project to minimise light spillover into the wider environment.
- Use plant with efficient muffler devices.
- Regularly service and maintain vehicles, plant and equipment in accordance with manufacturer's specifications.
- Adjust reversing alarms on plant to limit the acoustic range to the immediate danger area.
- Use plant and equipment of appropriate size / capacity for the task.
- Where practicable, minimise works undertaken outside of daylight hours and, if necessary, use directional lighting that is directed away from environmentally sensitive areas.

6.3 Impacts to Conservation Significant and Migratory Species

The potential issues outlined above may impact on conservation significant and migratory species, primarily through habitat loss and degradation. The clearance of fauna habitat (0.003ha of RE 7.1.4a) may impact conservation significant fauna species and migratory species identified as a "moderate" or higher likelihood of occurrence, such as the southern cassowary.

The potential impact on these species has been quantified based on fauna habitat types in which the species occur or may potentially occur, as detailed in Table 6.

Table 7. Potential impact on conservation significant and migratory fauna habitat.

Species	Predicted Habitat Type/s	Area (ha) within the project area
Conservation significant species		
Southern cassowary	This species requires a high diversity of fruiting trees to provide a year-round supply of fleshy fruits. Although occurring primarily in rainforest, they also use woodlands, melaleuca swamps, mangroves and even beaches, both as intermittent food sources and as connecting habitat between more suitable sites. While the site provides very limited habitat value to the southern cassowary, it is probable that the species would move through the area between patches of higher quality habitat along the Daintree River riparian zone.	**0.02** (221m^2)(non-remnant grasslands – movement and dispersal habitat) **0.003** (29m^2) (disturbed RE 7.1.4a – potential foraging habitat)
White-throated needletail	This almost entirely aerial species may occur in the airspace above the Project site and utilise the site as a flyover or foraging habitat only.	**0.153** (1530m^2) (flyover and foraging habitat only)
Estuarine crocodile	This species is known to occur in the Daintree River.	**0.13 (**1324m^2**)** (estuary)
Tachyglossus aculeatus – Short-beaked echidna	This species may occur in all habitat types within the project area.	**0.025** (250m^2) (movement and dispersal habitat only)
Migratory Birds		
Fork-tailed swift	This almost exclusively aerial species may occur over all habitat types within the project area.	**0.153** (1530m^2) (flyover and foraging habitat only)
Red-rumped swallow	This almost exclusively aerial species may occur over all habitat types within the project area.	**0.153** (1530m^2) (flyover and foraging habitat only)

Species	Predicted Habitat Type/s	Area (ha) within the project area
Satin flycatcher	May occur within the riparian vegetation along Daintree River at times.	**0.003** (29m^2) (foraging and dispersal habitat within RE 7.1.4a)

An assessment was undertaken to determine whether the project is likely to significantly impact on any conservation significant or migratory species protected under the EPBC Act, in accordance with the EPBC Act Policy Statement 1.1 'Significant Impact Guidelines: Matters of National Environmental Significance' (Department of the Environment Water Heritage and the Arts, 2013). The full assessment is provided in Appendix C.

The results of the assessment determined that the project is unlikely to result in a significant impact on conservation significant fauna or migratory species.

6.4 Restoration of Disturbed Areas

The project area is highly degraded, and opportunities exist for the project to rehabilitate the Daintree River bank and vegetation communities. This will enhance the existing habitat value for flora and fauna species. Restoration of waterway and vegetation communities may be undertaken using a variety of approaches. Relevant approaches which may be applied to the project area include:

- natural regeneration of largely weed-free vegetation communities with a high regenerative potential, requiring minimal action or intervention such as fencing;
- assisting natural regeneration of vegetation communities which are largely healthy and functioning and in which natural regenerative processes are inhibited, requiring some intervention and management, including soil amelioration, targeted weed control and fencing;
- active rehabilitation including planting of tubestock and seeding with appropriate native species; and
- monitoring of the restoration activities to determine the ecological functioning habitat complexity of the areas.

Opportunities to restore areas adjacent to the project area should be considered on a case-by-case basis to determine potential restoration approaches and feasibility.

7 Conclusion and recommendations

This report documents the findings of the terrestrial ecology assessment undertaken in July 2024 for the DR-4 streambank remediation project. The impacts to flora and fauna species have been assessed based on a worst-case scenario, which involves total clearing of 0.003 ha (29 m^2) of disturbed vegetation consistent with RE 7.1.4a, 0.02 ha (221 m^2) of non-remnant grassland habitat, and approximately 0.13 ha (1324 m^2)of estuary habitat.

The key findings of the study are as follows:

- The regional ecosystems within the project footprint were found to differ from the current Queensland Herbarium RE mapping. Specifically, the project site was found to comprise almost entirely of non-remnant grassland habitat in the immediate vicinity of McDowall's Road – The Esplanade and the yards of three dwellings in the close by. One small and disturbed patch of vegetation which contained species consistent with RE 7.1.4a (0.003ha) was identified at the western end of the project site. However, as the extent of vegetation disturbance falls below the clearing threshold of 0.5 ha for a 'dense to mid-dense' regional ecosystem and given the size of the remnant patch of RE 7.1.4a is below the threshold for mapping a vegetation community as a regional ecosystem, a Property Map of Assessable Vegetation (PMAV) application is not recommended in this instance. Rather, a range of mitigation measures have been proposed (Section 6 of this report) to minimise the impacts of the Project on the ecological values of the site and surrounding landscape.
- Revegetation, comprising seeding and planting of tube stock, consistent with surrounding riparian communities and species identified within the site will be undertaken at the completion of construction to stabilise the stream banks and enhance habitat values for local flora and fauna species.
- No threatened flora or fauna species were recorded within the project area.
- Four fauna species of conservation significance have been assessed as having a moderate probability of occurring within the project area, including the Southern cassowary, White-throated needletail, Estuarine crocodile and Short-beaked echidna and three migratory bird species, including the Satin flycatcher, Red-rumped swallow and Fork-tailed swift.
- Assessment of current habitat conditions and values has determined that clearing associated with the project is unlikely to result in a significant impact to any important populations of the abovementioned species.
- The Construction footprint avoids significant habitat features and does not contain any known animal breeding places. Mitigation and on-site management measures will ensure avoidance of any fauna impacts.
- As per the EPBC Self-assessment, the proposed action is unlikely to cause a significant impact to any Matters of National Environmental Significance (MNES).
- A significant residual impact is unlikely on Matters of State Environmental Significance (MSES).
- Provided the proposed mitigation measures outlined in this report are implemented, it is unlikely that the project will result in any significant impacts to any matters of National Environmental Significance or State Environmental Significance.

8 References

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Wikipedia (2024) Daintree River, available at: https://en.wikipedia.org/wiki/Daintree_River. Viewed 6/9/24.

Appendix A: Desktop Search Results

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 17-Sep-2024

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	2
National Heritage Places:	3
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	3
Listed Threatened Species:	70
Listed Migratory Species:	40

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	82
Whales and Other Cetaceans:	2
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	10
Regional Forest Agreements:	None
Nationally Important Wetlands:	1
EPBC Act Referrals:	1
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

World Heritage Properties [Resource Information]

Name	State	Legal Status	Buffer Status
Great Barrier Reef	QLD	Declared property	In feature area
Wet Tropics of Queensland	QLD	Declared property	In buffer area only

National Heritage Places [Resource Information]

Name	State	Legal Status	Buffer Status
Indigenous			
Wet Tropics World Heritage Area (Indigenous Values)	QLD	Within listed place	In buffer area only
Natural			
Great Barrier Reef	QLD	Listed place	In feature area
Wet Tropics of Queensland	QLD	Listed place	In buffer area only

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Broad leaf tea-tree (Melaleuca viridiflora) woodlands in high rainfall coastal north Queensland	Endangered	Community likely to occur within area	In feature area
Littoral Rainforest and Coastal Vine Thickets of Eastern Australia	Critically Endangered	Community likely to occur within area	In buffer area only
Lowland tropical rainforest of the Wet Tropics	Endangered	Community likely to occur within area	In feature area

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Calidris acuminata			
Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Casuarius casuarius listed as Casuarius casuarius johnsonii Southern Cassowary [1096]	Endangered	Species or species habitat known to occur within area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area	In feature area
Erythrotriorchis radiatus Red Goshawk [942]	Endangered	Species or species habitat likely to occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat may occur within area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat known to occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
Limnodromus semipalmatus Asian Dowitcher [843]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Limosa lapponica baueri Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit [86380]	Endangered	Species or species habitat known to occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Rostratula australis](#)			
Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area	In feature area
[Sternula nereis nereis](#)			
Australian Fairy Tern [82950]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
[Tringa nebularia](#)			
Common Greenshank, Greenshank [832]	Endangered	Species or species habitat likely to occur within area	In feature area
[Tyto novaehollandiae kimberli](#)			
Masked Owl (northern) [26048]	Vulnerable	Species or species habitat likely to occur within area	In feature area
FISH			
[Cairnsichthys bitaeniatus](#)			
Daintree Rainbowfish [90721]	Critically Endangered	Species or species habitat known to occur within area	In buffer area only
[Stiphodon semoni](#)			
Opal Cling Goby [83909]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
FROG			
[Litoria dayi](#)			
Australian Lace-lid, Lace-eyed Tree Frog, Day's Big-eyed Treefrog [86707]	Vulnerable	Species or species habitat likely to occur within area	In feature area
MAMMAL			
[Dasyurus hallucatus](#)			
Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat likely to occur within area	In feature area
[Dasyurus maculatus gracilis](#)			
Spotted-tailed Quoll (North Queensland), Yarri [64475]	Endangered	Species or species habitat may occur within area	In feature area
[Hipposideros semoni](#)			
Semon's Leaf-nosed Bat, Greater Wart-nosed Horseshoe-bat [180]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Mesembriomys gouldii rattoides			
Black-footed Tree-rat (north Queensland), Shaggy Rabbit-rat [87620]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Petauroides minor			
Greater Glider (northern), Greater Glider (north-eastern Queensland) [92008]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)			
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Endangered	Species or species habitat may occur within area	In feature area
Pteropus conspicillatus			
Spectacled Flying-fox [185]	Endangered	Species or species habitat known to occur within area	In feature area
Rhinolophus robertsi			
Large-eared Horseshoe Bat, Greater Large-eared Horseshoe Bat [87639]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Saccolaimus saccolaimus nudicluniatus			
Bare-rumped Sheath-tailed Bat, Bare-rumped Sheathtail Bat [66889]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Xeromys myoides			
Water Mouse, False Water Rat, Yirrkoo [66]	Vulnerable	Species or species habitat likely to occur within area	In feature area
PLANT			
Acriopsis emarginata			
Pale Chandelier Orchid [83928]	Vulnerable	Species or species habitat known to occur within area	In feature area
Actephila foetida			
[12078]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Arthraxon hispidus			
Hairy-joint Grass [9338]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Bruguiera x hainesii			
Haines's Orange Mangrove [91351]	Critically Endangered	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Canarium acutifolium [23956]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Carronia pedicellata [24178]	Endangered	Species or species habitat likely to occur within area	In feature area
Chingia australis [24603]	Endangered	Species or species habitat known to occur within area	In feature area
Cyclophyllum costatum a shrub [82770]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Dendrobium johannis Chocolate Tea Tree Orchid [13585]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Dendrobium mirbelianum Dark-stemmed Antler Orchid, Mangrove Orchid [14310]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Dendrobium nindii an orchid [11289]	Endangered	Species or species habitat known to occur within area	In feature area
Drosera prolifera [9940]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Endiandra cooperana [52889]	Endangered	Species or species habitat may occur within area	In buffer area only
Hymenasplenium wildii listed as Asplenium wildii [92431]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Leichhardtia araujacea [91900]	Critically Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Mitrantia bilocularis [8269]	Critically Endangered	Species or species habitat may occur within area	In buffer area only
Myrmecodia beccarii Ant Plant [11852]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Phaius pictus [22564]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Phalaenopsis rosenstromii listed as Phalaenopsis amabilis subsp. rosenstromii Native Moth Orchid [15984]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Phaleria biflora [82049]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Phlegmariurus dalhousieanus BlueTassel-fern [86550]	Endangered	Species or species habitat likely to occur within area	In feature area
Phlegmariurus filiformis Rat's Tail Tassel-fern [86551]	Endangered	Species or species habitat may occur within area	In buffer area only
Phlegmariurus squarrosus Rock Tassel-fern, Water Tassel-fern [86556]	Critically Endangered	Species or species habitat may occur within area	In feature area
Phlegmariurus tetrastichoides Square Tassel Fern [86555]	Vulnerable	Species or species habitat may occur within area	In feature area
Polyphlebium endlicherianum Middle Filmy Fern [87494]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Polyscias bellendenkerensis [7237]	Vulnerable	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Ristantia gouldii [18776]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Vappodes lithocola Dwarf Butterfly Orchid, Cooktown Orchid [78893]	Endangered	Species or species habitat may occur within area	In feature area
Vappodes phalaenopsis Cooktown Orchid [78894]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Vrydagzynea grayi Tonsil Orchid [83575]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Zeuxine polygonoides Velvet Jewel Orchid [46794]	Vulnerable	Species or species habitat may occur within area	In buffer area only
REPTILE			
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Egernia rugosa Yakka Skink [1420]	Vulnerable	Species or species habitat may occur within area	In feature area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Lepidochelys olivacea			
Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Natator depressus			
Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
SHARK			
Pristis pristis			
Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat may occur within area	In feature area
Pristis zijsron			
Green Sawfish, Dindagubba, Narrowsnout Sawfish [68442]	Vulnerable	Species or species habitat known to occur within area	In feature area
Sphyrna lewini			
Scalloped Hammerhead [85267]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area

Listed Migratory Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Anous stolidus			
Common Noddy [825]		Species or species habitat known to occur within area	In feature area
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Fregata ariel			
Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat likely to occur within area	In feature area
Fregata minor			
Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat likely to occur within area	In feature area
Phaethon lepturus			
White-tailed Tropicbird [1014]		Species or species habitat may occur within area	In feature area
Migratory Marine Species			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Anoxypristis cuspidata Narrow Sawfish, Knifetooth Sawfish [68448]		Species or species habitat likely to occur within area	In feature area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Crocodylus porosus Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area	In feature area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area	In feature area
Lepidochelys olivacea Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Mobula alfredi as Manta alfredi Reef Manta Ray, Coastal Manta Ray [90033]		Species or species habitat may occur within area	In feature area
Mobula birostris as Manta birostris Giant Manta Ray [90034]		Species or species habitat may occur within area	In feature area
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Orcaella heinsohni](#) Australian Snubfin Dolphin [81322]		Species or species habitat may occur within area	In feature area
[Pristis pristis](#) Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat may occur within area	In feature area
[Pristis zijsron](#) Green Sawfish, Dindagubba, Narrowsnout Sawfish [68442]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Sousa sahulensis as Sousa chinensis](#) Australian Humpback Dolphin [87942]		Species or species habitat may occur within area	In feature area
Migratory Terrestrial Species			
[Cecropis daurica](#) Red-rumped Swallow [80610]		Species or species habitat known to occur within area	In feature area
[Cuculus optatus](#) Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat known to occur within area	In feature area
[Hirundapus caudacutus](#) White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Hirundo rustica](#) Barn Swallow [662]		Species or species habitat known to occur within area	In feature area
[Monarcha frater](#) Black-winged Monarch [607]		Species or species habitat may occur within area	In feature area
[Monarcha melanopsis](#) Black-faced Monarch [609]		Species or species habitat known to occur within area	In feature area
[Myiagra cyanoleuca](#) Satin Flycatcher [612]		Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Rhipidura rufifrons](#) Rufous Fantail [592]		Species or species habitat known to occur within area	In feature area
[Symposiachrus trivirgatus as Monarcha trivirgatus](#) Spectacled Monarch [83946]		Species or species habitat known to occur within area	In feature area
Migratory Wetlands Species			
[Actitis hypoleucos](#) Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
[Calidris acuminata](#) Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Calidris canutus](#) Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Calidris ferruginea](#) Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
[Calidris melanotos](#) Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
[Charadrius leschenaultii](#) Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Gallinago hardwickii](#) Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Limnodromus semipalmatus](#) Asian Dowitcher [843]	Vulnerable	Species or species habitat may occur within area	In buffer area only
[Limosa lapponica](#) Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Numenius madagascariensis			
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Pandion haliaetus			
Osprey [952]		Breeding known to occur within area	In feature area
Tringa nebularia			
Common Greenshank, Greenshank [832]	Endangered	Species or species habitat likely to occur within area	In feature area

Other Matters Protected by the EPBC Act

Listed Marine Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos			
Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
Anous stolidus			
Common Noddy [825]		Species or species habitat known to occur within area	In feature area
Anseranas semipalmata			
Magpie Goose [978]		Species or species habitat may occur within area overfly marine area	In feature area
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Bubulcus ibis as Ardea ibis			
Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata			
Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
Cecropis daurica as Hirundo daurica Red-rumped Swallow [80610]		Species or species habitat known to occur within area overfly marine area	In feature area
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat may occur within area overfly marine area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area	In feature area
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat likely to occur within area	In feature area
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat likely to occur within area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
Hirundo rustica Barn Swallow [662]		Species or species habitat known to occur within area overfly marine area	In feature area
Limnodromus semipalmatus Asian Dowitcher [843]	Vulnerable	Species or species habitat may occur within area overfly marine area	In buffer area only
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In feature area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
Monarcha frater Black-winged Monarch [607]		Species or species habitat may occur within area overfly marine area	In feature area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area overfly marine area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area overfly marine area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Pandion haliaetus Osprey [952]		Breeding known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Phaethon lepturus White-tailed Tropicbird [1014]		Species or species habitat may occur within area	In feature area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area overfly marine area	In feature area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area
Symposiachrus trivirgatus as Monarcha trivirgatus Spectacled Monarch [83946]		Species or species habitat known to occur within area overfly marine area	In feature area
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area
Fish			
Acentronura tentaculata Shortpouch Pygmy Pipehorse [66187]		Species or species habitat may occur within area	In feature area
Bulbonaricus davaoensis Davao Pughead Pipefish [66190]		Species or species habitat may occur within area	In feature area
Choeroichthys brachysoma Pacific Short-bodied Pipefish, Short-bodied Pipefish [66194]		Species or species habitat may occur within area	In feature area
Choeroichthys sculptus Sculptured Pipefish [66197]		Species or species habitat may occur within area	In feature area
Choeroichthys suillus Pig-snouted Pipefish [66198]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Corythoichthys amplexus Fijian Banded Pipefish, Brown-banded Pipefish [66199]		Species or species habitat may occur within area	In feature area
Corythoichthys flavofasciatus Reticulate Pipefish, Yellow-banded Pipefish, Network Pipefish [66200]		Species or species habitat may occur within area	In feature area
Corythoichthys intestinalis Australian Messmate Pipefish, Banded Pipefish [66202]		Species or species habitat may occur within area	In feature area
Corythoichthys ocellatus Orange-spotted Pipefish, Ocellated Pipefish [66203]		Species or species habitat may occur within area	In feature area
Corythoichthys paxtoni Paxton's Pipefish [66204]		Species or species habitat may occur within area	In feature area
Corythoichthys schultzi Schultz's Pipefish [66205]		Species or species habitat may occur within area	In feature area
Cosmocampus maxweberi Maxweber's Pipefish [66209]		Species or species habitat may occur within area	In feature area
Doryrhamphus dactyliophorus Banded Pipefish, Ringed Pipefish [66210]		Species or species habitat may occur within area	In feature area
Doryrhamphus excisus Bluestripe Pipefish, Indian Blue-stripe Pipefish, Pacific Blue-stripe Pipefish [66211]		Species or species habitat may occur within area	In feature area
Doryrhamphus janssi Cleaner Pipefish, Janss' Pipefish [66212]		Species or species habitat may occur within area	In feature area
Festucalex cinctus Girdled Pipefish [66214]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Festucalex gibbsi Gibbs' Pipefish [66215]		Species or species habitat may occur within area	In feature area
Halicampus dunckeri Red-hair Pipefish, Duncker's Pipefish [66220]		Species or species habitat may occur within area	In feature area
Halicampus grayi Mud Pipefish, Gray's Pipefish [66221]		Species or species habitat may occur within area	In feature area
Halicampus macrorhynchus Whiskered Pipefish, Ornate Pipefish [66222]		Species or species habitat may occur within area	In feature area
Halicampus mataafae Samoan Pipefish [66223]		Species or species habitat may occur within area	In feature area
Halicampus nitidus Glittering Pipefish [66224]		Species or species habitat may occur within area	In feature area
Halicampus spinirostris Spiny-snout Pipefish [66225]		Species or species habitat may occur within area	In feature area
Hippichthys cyanospilos Blue-speckled Pipefish, Blue-spotted Pipefish [66228]		Species or species habitat may occur within area	In feature area
Hippichthys heptagonus Madura Pipefish, Reticulated Freshwater Pipefish [66229]		Species or species habitat may occur within area	In feature area
Hippichthys penicillus Beady Pipefish, Steep-nosed Pipefish [66231]		Species or species habitat may occur within area	In feature area
Hippichthys spicifer Belly-barred Pipefish, Banded Freshwater Pipefish [66232]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Hippocampus bargibanti Pygmy Seahorse [66721]		Species or species habitat may occur within area	In feature area
Hippocampus histrix Spiny Seahorse, Thorny Seahorse [66236]		Species or species habitat may occur within area	In feature area
Hippocampus kuda Spotted Seahorse, Yellow Seahorse [66237]		Species or species habitat may occur within area	In feature area
Hippocampus planifrons Flat-face Seahorse [66238]		Species or species habitat may occur within area	In feature area
Hippocampus zebra Zebra Seahorse [66241]		Species or species habitat may occur within area	In feature area
Micrognathus andersonii Anderson's Pipefish, Shortnose Pipefish [66253]		Species or species habitat may occur within area	In feature area
Micrognathus brevirostris thorntail Pipefish, Thorn-tailed Pipefish [66254]		Species or species habitat may occur within area	In feature area
Microphis brachyurus Short-tail Pipefish, Short-tailed River Pipefish [66257]		Species or species habitat may occur within area	In feature area
Nannocampus pictus Painted Pipefish, Reef Pipefish [66263]		Species or species habitat may occur within area	In feature area
Phoxocampus diacanthus Pale-blotched Pipefish, Spined Pipefish [66266]		Species or species habitat may occur within area	In feature area
Siokunichthys breviceps Softcoral Pipefish, Soft-coral Pipefish [66270]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Solegnathus hardwickii Pallid Pipehorse, Hardwick's Pipehorse [66272]		Species or species habitat may occur within area	In feature area
Solenostomus cyanopterus Robust Ghostpipefish, Blue-finned Ghost Pipefish, [66183]		Species or species habitat may occur within area	In feature area
Solenostomus paradoxus Ornate Ghostpipefish, Harlequin Ghost Pipefish, Ornate Ghost Pipefish [66184]		Species or species habitat may occur within area	In feature area
Syngnathoides biaculeatus Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]		Species or species habitat may occur within area	In feature area
Trachyrhamphus bicoarctatus Bentstick Pipefish, Bend Stick Pipefish, Short-tailed Pipefish [66280]		Species or species habitat may occur within area	In feature area
Trachyrhamphus longirostris Straightstick Pipefish, Long-nosed Pipefish, Straight Stick Pipefish [66281]		Species or species habitat may occur within area	In feature area
Reptile			
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Crocodylus porosus Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area	In feature area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Eretmochelys imbricata			
Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area	In feature area
Lepidochelys olivacea			
Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Natator depressus			
Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area

Whales and Other Cetaceans			[Resource Information]
Current Scientific Name	Status	Type of Presence	Buffer Status
Mammal			
Orcaella heinsohni			
Australian Snubfin Dolphin [81322]		Species or species habitat may occur within area	In feature area
Sousa sahulensis			
Australian Humpback Dolphin [87942]		Species or species habitat may occur within area	In feature area

Extra Information

State and Territory Reserves			[Resource Information]
Protected Area Name	Reserve Type	State	Buffer Status
Acaciavale	Nature Refuge	QLD	In buffer area only
Daintree	National Park	QLD	In buffer area only
Daintree	National Park Aboriginal	QLD	In buffer area only
Eastern Kuku Yalanji	Indigenous Protected Area	QLD	In buffer area only
Great Barrier Reef Coast	Marine Park	QLD	In feature area
Kaba-Kada	Nature Refuge	QLD	In buffer area only
Lot 83	Nature Reserve	QLD	In buffer area only
Milky Pine	Nature Refuge	QLD	In buffer area only
Rainforest Rescue	Nature Refuge	QLD	In buffer area only

Protected Area Name	Reserve Type	State	Buffer Status
The Swamp Forest	Nature Refuge	QLD	In buffer area only

Nationally Important Wetlands [Resource Information]

Wetland Name	State	Buffer Status
Lower Daintree River	QLD	In feature area

EPBC Act Referrals [Resource Information]

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Daintree Microgrid Project	2022/09341		Completed	In buffer area only

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.

Department of Climate Change, Energy, the Environment and Water
GPO Box 3090
Canberra ACT 2601 Australia
+61 2 6274 1111

Queensland Government

WildNet species list

Search Criteria: Species List for a Specified Point
Species: All
Type: All
Queensland status: All
Records: All
Date: All
Latitude: -16.2629
Longitude: 145.3889
Distance: 5
Email: lyndall@faunalink.com.au
Date submitted: Tuesday 17 Sep 2024 11:26:41
Date extracted: Tuesday 17 Sep 2024 11:30:01

The number of records retrieved = 572

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	amphibians	Bufonidae	*Rhinella marina*	cane toad	Y			3
animals	amphibians	Hylidae	*Litoria fallax*	eastern sedgefrog		C		2
animals	amphibians	Hylidae	*Litoria gracilenta*	graceful treefrog		C		24
animals	amphibians	Hylidae	*Litoria infrafrenata*	white lipped treefrog		C		4
animals	amphibians	Hylidae	*Litoria microbelos*	javelin frog		C		5
animals	amphibians	Hylidae	*Litoria nasuta*	striped rocketfrog		C		9
animals	amphibians	Hylidae	*Litoria rheocola*	common mistfrog		E		13
animals	amphibians	Hylidae	*Litoria rubella*	ruddy treefrog		C		2
animals	amphibians	Hylidae	*Litoria serrata*	tapping green eyed frog		V		5
animals	amphibians	Hylidae	*Litoria xanthomera*	orange thighed treefrog		C		31
animals	amphibians	Limnodynastidae	*Limnodynastes convexiusculus*	marbled frog		C		10
animals	amphibians	Microhylidae	*Austrochaperina fryi*	peeping whistlefrog		C		43
animals	amphibians	Microhylidae	*Austrochaperina pluvialis*	white browed whistlefrog		C		8
animals	amphibians	Myobatrachidae	*Crinia remota*	northern froglet		C		4
animals	amphibians	Myobatrachidae	*Mixophyes coggeri*	mottled barred frog		C		4
animals	amphibians	Ranidae	*Papurana daemeli*	Australian woodfrog		C		4
animals	birds	Acanthizidae	*Gerygone magnirostris*	large-billed gerygone		C		9
animals	birds	Acanthizidae	*Gerygone mouki*	brown gerygone		C		1
animals	birds	Acanthizidae	*Gerygone palpebrosa*	fairy gerygone		C		10
animals	birds	Acanthizidae	*Sericornis magnirostra*	large-billed scrubwren		C		7
animals	birds	Accipitridae	*Accipiter fasciatus*	brown goshawk		C		1
animals	birds	Accipitridae	*Haliaeetus leucogaster*	white-bellied sea-eagle		C		1
animals	birds	Accipitridae	*Haliastur indus*	brahminy kite		C		7
animals	birds	Accipitridae	*Haliastur sphenurus*	whistling kite		C		6
animals	birds	Accipitridae	*Milvus migrans*	black kite		C		8
animals	birds	Acrocephalidae	*Acrocephalus australis*	Australian reed-warbler		C		1
animals	birds	Alcedinidae	*Ceyx azureus*	azure kingfisher		C		11
animals	birds	Alcedinidae	*Ceyx pusillus*	little kingfisher		C		7
animals	birds	Alcedinidae	*Dacelo leachii*	blue-winged kookaburra		C		1
animals	birds	Alcedinidae	*Dacelo novaeguineae*	laughing kookaburra		C		3
animals	birds	Alcedinidae	*Tanysiptera sylvia*	buff-breasted paradise-kingfisher		C		6
animals	birds	Alcedinidae	*Todiramphus macleayii*	forest kingfisher		C		7
animals	birds	Alcedinidae	*Todiramphus sanctus*	sacred kingfisher		C		5
animals	birds	Alcedinidae	*Todiramphus sordidus*	Torresian kingfisher		C		5
animals	birds	Anatidae	*Anas superciliosa*	Pacific black duck		C		1
animals	birds	Anhingidae	*Anhinga novaehollandiae*	Australasian darter		C		2
animals	birds	Anseranatidae	*Anseranas semipalmata*	magpie goose		C		3
animals	birds	Apodidae	*Aerodramus terraereginae*	Australian swiftlet		C		6
animals	birds	Apodidae	*Hirundapus caudacutus*	white-throated needletail		V	V	1
animals	birds	Ardeidae	*Ardea alba modesta*	eastern great egret		C		9
animals	birds	Ardeidae	*Ardea intermedia*	intermediate egret		C		3
animals	birds	Ardeidae	*Ardea sumatrana*	great-billed heron		C		7
animals	birds	Ardeidae	*Bubulcus ibis*	cattle egret		C		1
animals	birds	Ardeidae	*Butorides striata*	striated heron		C		4
animals	birds	Ardeidae	*Egretta garzetta*	little egret		C		3
animals	birds	Ardeidae	*Egretta novaehollandiae*	white-faced heron		C		5

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Ardeidae	*Egretta sacra*	eastern reef egret		C		1
animals	birds	Ardeidae	*Ixobrychus flavicollis*	black bittern		C		3
animals	birds	Artamidae	*Artamus leucorynchus*	white-breasted woodswallow		C		5
animals	birds	Artamidae	*Melloria quoyi*	black butcherbird		C		12
animals	birds	Artamidae	*Strepera graculina*	pied currawong		C		2
animals	birds	Burhinidae	*Burhinus grallarius*	bush stone-curlew		C		1
animals	birds	Cacatuidae	*Cacatua galerita*	sulphur-crested cockatoo		C		13
animals	birds	Campephagidae	*Coracina lineata*	barred cuckoo-shrike		C		4
animals	birds	Campephagidae	*Coracina novaehollandiae*	black-faced cuckoo-shrike		C		3
animals	birds	Campephagidae	*Coracina papuensis*	white-bellied cuckoo-shrike		C		2
animals	birds	Campephagidae	*Edolisoma tenuirostre*	common cicadabird		C		3
animals	birds	Campephagidae	*Lalage leucomela*	varied triller		C		18
animals	birds	Casuariidae	*Casuarius casuarius (southern population)*	southern cassowary (southern population)		E	E	12
animals	birds	Charadriidae	*Vanellus miles*	masked lapwing		C		3
animals	birds	Charadriidae	*Vanellus miles miles*	masked lapwing (northern subspecies)		C		4
animals	birds	Ciconiidae	*Ephippiorhynchus asiaticus*	black-necked stork		C		1
animals	birds	Cisticolidae	*Cisticola exilis*	golden-headed cisticola		C		1
animals	birds	Columbidae	*Chalcophaps longirostris*	Pacific emerald dove		C		8
animals	birds	Columbidae	*Columba leucomela*	white-headed pigeon		C		2
animals	birds	Columbidae	*Ducula bicolor*	pied imperial-pigeon		C		9
animals	birds	Columbidae	*Geopelia humeralis*	bar-shouldered dove		C		7
animals	birds	Columbidae	*Geopelia placida*	peaceful dove		C		2
animals	birds	Columbidae	*Lopholaimus antarcticus*	topknot pigeon		C		3
animals	birds	Columbidae	*Macropygia phasianella*	brown cuckoo-dove		C		4
animals	birds	Columbidae	*Ptilinopus magnificus*	wompoo fruit-dove		C		16
animals	birds	Columbidae	*Ptilinopus regina*	rose-crowned fruit-dove		C		4
animals	birds	Columbidae	*Ptilinopus superbus*	superb fruit-dove		C		9
animals	birds	Coraciidae	*Eurystomus orientalis*	dollarbird		C		1
animals	birds	Corvidae	*Corvus orru*	Torresian crow		C		1
animals	birds	Cuculidae	*Cacomantis variolosus*	brush cuckoo		C		1
animals	birds	Cuculidae	*Centropus phasianinus*	pheasant coucal		C		4
animals	birds	Cuculidae	*Chalcites minutillus*	little bronze-cuckoo		C		1
animals	birds	Cuculidae	*Chalcites minutillus barnardi*	Eastern little bronze-cuckoo		C		1
animals	birds	Cuculidae	*Chalcites minutillus russatus*	Gould's bronze-cuckoo		C		2
animals	birds	Cuculidae	*Cuculus optatus*	oriental cuckoo		SL		1
animals	birds	Cuculidae	*Eudynamys orientalis*	eastern koel		C		3
animals	birds	Dicaeidae	*Dicaeum hirundinaceum*	mistletoebird		C		15
animals	birds	Dicruridae	*Dicrurus bracteatus*	spangled drongo		C		14
animals	birds	Estrildidae	*Lonchura castaneothorax*	chestnut-breasted mannikin		C		1
animals	birds	Estrildidae	*Lonchura punctulata*	nutmeg mannikin	Y			1
animals	birds	Estrildidae	*Neochmia temporalis*	red-browed finch		C		1
animals	birds	Falconidae	*Falco cenchroides*	nankeen kestrel		C		1
animals	birds	Hirundinidae	*Cecropis daurica*	red-rumped swallow		SL		4
animals	birds	Hirundinidae	*Hirundo neoxena*	welcome swallow		C		9
animals	birds	Hirundinidae	*Petrochelidon nigricans*	tree martin		C		2

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animals	birds	Machaerirhynchidae	*Machaerirhynchus flaviventer*	yellow-breasted boatbill		C		1
animals	birds	Maluridae	*Malurus amabilis*	lovely fairy-wren		C		2
animals	birds	Megapodiidae	*Alectura lathami*	Australian brush-turkey		C		3
animals	birds	Megapodiidae	*Megapodius reinwardt*	orange-footed scrubfowl		C		15
animals	birds	Meliphagidae	*Bolemoreus frenatus*	bridled honeyeater		C		1
animals	birds	Meliphagidae	*Entomyzon cyanotis*	blue-faced honeyeater		C		1
animals	birds	Meliphagidae	*Meliphaga notata*	yellow-spotted honeyeater		C		28
animals	birds	Meliphagidae	*Melithreptus albogularis*	white-throated honeyeater		C		1
animals	birds	Meliphagidae	*Melithreptus lunatus*	white-naped honeyeater		C		1
animals	birds	Meliphagidae	*Microptilotis gracilis*	graceful honeyeater		C		15
animals	birds	Meliphagidae	*Myzomela obscura*	dusky honeyeater		C		11
animals	birds	Meliphagidae	*Myzomela sanguinolenta*	scarlet honeyeater		C		1
animals	birds	Meliphagidae	*Philemon buceroides*	helmeted friarbird		C		6
animals	birds	Meliphagidae	*Philemon corniculatus*	noisy friarbird		C		1
animals	birds	Meliphagidae	*Ramsayornis modestus*	brown-backed honeyeater		C		14
animals	birds	Meliphagidae	*Stomiopera unicolor*	white-gaped honeyeater		C		1
animals	birds	Meliphagidae	*Xanthotis macleayanus*	Macleay's honeyeater		C		13
animals	birds	Meropidae	*Merops ornatus*	rainbow bee-eater		C		5
animals	birds	Monarchidae	*Arses kaupi*	pied monarch		C		3
animals	birds	Monarchidae	*Carterornis leucotis*	white-eared monarch		C		1
animals	birds	Monarchidae	*Grallina cyanoleuca*	magpie-lark		C		1
animals	birds	Monarchidae	*Monarcha melanopsis*	black-faced monarch		SL		2
animals	birds	Monarchidae	*Myiagra alecto*	shining flycatcher		C		12
animals	birds	Monarchidae	*Myiagra rubecula*	leaden flycatcher		C		3
animals	birds	Monarchidae	*Symposiachrus trivirgatus*	spectacled monarch		SL		20
animals	birds	Nectariniidae	*Cinnyris jugularis*	olive-backed sunbird		C		24
animals	birds	Oriolidae	*Oriolus flavocinctus*	green oriole		C		15
animals	birds	Oriolidae	*Oriolus sagittatus*	olive-backed oriole		C		3
animals	birds	Oriolidae	*Sphecotheres vieilloti*	Australasian figbird		C		8
animals	birds	Orthonychidae	*Orthonyx spaldingii*	chowchilla		C		1
animals	birds	Pachycephalidae	*Colluricincla harmonica*	grey shrike-thrush		C		2
animals	birds	Pachycephalidae	*Colluricincla megarhyncha*	little shrike-thrush		C		17
animals	birds	Pachycephalidae	*Pachycephala pectoralis*	golden whistler		C		2
animals	birds	Pachycephalidae	*Pachycephala simplex peninsulae*	grey whistler		C		7
animals	birds	Paradisaeidae	*Ptiloris victoriae*	Victoria's riflebird		C		6
animals	birds	Pelecanidae	*Pelecanus conspicillatus*	Australian pelican		C		1
animals	birds	Petroicidae	*Heteromyias cinereifrons*	grey-headed robin		C		1
animals	birds	Petroicidae	*Microeca flavigaster*	lemon-bellied flycatcher		C		2
animals	birds	Petroicidae	*Tregellasia capito*	pale-yellow robin		C		4
animals	birds	Phalacrocoracidae	*Microcarbo melanoleucos*	little pied cormorant		C		3
animals	birds	Phalacrocoracidae	*Phalacrocorax varius*	pied cormorant		C		1
animals	birds	Pittidae	*Pitta versicolor*	noisy pitta		C		5
animals	birds	Podargidae	*Podargus papuensis*	Papuan frogmouth		C		4
animals	birds	Psittaculidae	*Cyclopsitta diophthalma macleayana*	Macleay's fig-parrot		V		11
animals	birds	Psittaculidae	*Trichoglossus chlorolepidotus*	scaly-breasted lorikeet		C		2
animals	birds	Psittaculidae	*Trichoglossus moluccanus*	rainbow lorikeet		C		10

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animals	birds	Ptilonorhynchidae	*Ailuroedus maculosus*	spotted catbird		C		10
animals	birds	Rallidae	*Fulica atra*	Eurasian coot		C		1
animals	birds	Rallidae	*Rallina tricolor*	red-necked crake		C		1
animals	birds	Rallidae	*Zapornia tabuensis*	spotless crake		C		1
animals	birds	Rhipiduridae	*Rhipidura albiscapa*	grey fantail		C		2
animals	birds	Rhipiduridae	*Rhipidura rufifrons*	rufous fantail		SL		10
animals	birds	Rhipiduridae	*Rhipidura rufiventris*	northern fantail		C		1
animals	birds	Scolopacidae	*Actitis hypoleucos*	common sandpiper		SL		3
animals	birds	Scolopacidae	*Numenius phaeopus*	whimbrel		SL		4
animals	birds	Strigidae	*Ninox boobook*	southern boobook		C		1
animals	birds	Strigidae	*Ninox rufa queenslandica*	rufous owl (southern subspecies)		C		1
animals	birds	Sturnidae	*Aplonis metallica*	metallic starling		C		10
animals	birds	Sturnidae	*Sturnus vulgaris*	common starling	Y			1
animals	birds	Threskiornithidae	*Platalea flavipes*	yellow-billed spoonbill		C		3
animals	birds	Threskiornithidae	*Platalea regia*	royal spoonbill		C		2
animals	birds	Threskiornithidae	*Threskiornis molucca*	Australian white ibis		C		3
animals	birds	Threskiornithidae	*Threskiornis spinicollis*	straw-necked ibis		C		2
animals	birds	Turnicidae	*Turnix maculosus*	red-backed button-quail		C		1
animals	birds	Tytonidae	*Tyto tenebricosa multipunctata*	lesser sooty owl		C		2
animals	birds	Zosteropidae	*Zosterops lateralis*	silvereye		C		4
animals	insects	Megapodagrionidae	*Austroargiolestes aureus*	tropical flatwing				1
animals	insects	Nymphalidae	*Neptis praslini staudingereana*	yellow-eyed plane				1
animals	mammals	Canidae	*Canis familiaris (dingo)*	dingo				1
animals	mammals	Macropodidae	*Dendrolagus bennettianus*	Bennett's tree-kangaroo		NT		3/2
animals	mammals	Muridae	*Hydromys chrysogaster*	water rat		C		1
animals	mammals	Muridae	*Uromys caudimaculatus*	giant white-tailed rat		C		1
animals	mammals	Peramelidae	*Isoodon macrourus*	northern brown bandicoot		C		1
animals	mammals	Suidae	*Sus scrofa*	pig	Y			1
animals	ray-finned fishes	Ambassidae	*Ambassis miops*	flagtail glassfish				2/2
animals	ray-finned fishes	Anguillidae	*Anguilla reinhardtii*	longfin eel				2/2
animals	ray-finned fishes	Apogonidae	*Glossamia aprion*	mouth almighty				1/1
animals	ray-finned fishes	Eleotridae	*Hypseleotris compressa*	empire gudgeon				5/5
animals	ray-finned fishes	Gobiidae	*Redigobius bikolanus*	speckled goby				1/1
animals	ray-finned fishes	Gobiidae	*Redigobius chrysosoma*	spotfin goby				2/2
animals	ray-finned fishes	Lutjanidae	*Lutjanus argentimaculatus*	mangrove jack				2/2
animals	ray-finned fishes	Megalopidae	*Megalops cyprinoides*	oxeye herring				1/1
animals	ray-finned fishes	Melanotaeniidae	*Melanotaenia maccullochi*	McCulloch's rainbowfish				3/3
animals	ray-finned fishes	Melanotaeniidae	*Melanotaenia splendida splendida*	eastern rainbowfish				4/4
animals	ray-finned fishes	Plotosidae	*Tandanus tropicanus*					2/2
animals	ray-finned fishes	Pseudomugilidae	*Pseudomugil signifer*	Pacific blue eye				5/5
animals	reptiles	Agamidae	*Lophosaurus boydii*	Boyd's forest dragon		C		1
animals	reptiles	Boidae	*Simalia kinghorni*	amethystine python (Australian form)		C		1
animals	reptiles	Carphodactylidae	*Saltuarius cornutus*	northern leaf-tailed gecko		C		2
animals	reptiles	Crocodylidae	*Crocodylus porosus*	estuarine crocodile		V		2
animals	reptiles	Gekkonidae	*Hemidactylus frenatus*	house gecko	Y			1
animals	reptiles	Gekkonidae	*Lepidodactylus lugubris*	mourning gecko		C		1

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animals	reptiles	Scincidae	*Bellatorias frerei*	major skink		C		1
animals	reptiles	Varanidae	*Varanus semiremex*	rusty monitor		C		1
animals	uncertain	Indeterminate	*Indeterminate*	Unknown or Code Pending				3
chromists	brown algae	Dictyotaceae	*Dictyotopsis propagulifera*			C		1/1
fungi	lecanoromycetes	Parmeliaceae	*Usnea baileyi*			C		1/1
fungi	lecanoromycetes	Parmeliaceae	*Usnea nidifica*			C		3/3
fungi	lecanoromycetes	Porinaceae	*Porina elixiana*			C		1/1
fungi	lecanoromycetes	Porinaceae	*Porina papuensis*			C		1/1
fungi	lecanoromycetes	Ramalinaceae	*Ramalina subfraxinea var. subfraxinea*			C		3/3
fungi	lecanoromycetes	Ramalinaceae	*Ramalina tropica*			C		4/4
plants	land plants	Acanthaceae	*Acanthus ilicifolius*			C		1/1
plants	land plants	Acanthaceae	*Avicennia marina subsp. australasica*			C		1/1
plants	land plants	Acanthaceae	*Strobilanthes alternata*		Y			1/1
plants	land plants	Acanthaceae	*Strobilanthes reptans*		Y			2/2
plants	land plants	Achariaceae	*Ryparosa kurrangii*			NT		1/1
plants	land plants	Amaranthaceae	*Amaranthus viridis*	green amaranth	Y			1/1
plants	land plants	Anacardiaceae	*Blepharocarya involucrigera*			C		1/1
plants	land plants	Annonaceae	*Annona glabra*	pond apple	Y			1/1
plants	land plants	Annonaceae	*Cananga odorata*	Ylang-ylang		C		2/2
plants	land plants	Annonaceae	*Polyalthia xanthocarpa*			C		1/1
plants	land plants	Apocynaceae	*Allamanda cathartica*	yellow allamanda	Y			1/1
plants	land plants	Apocynaceae	*Alstonia muelleriana*	hard milkwood		C		2/2
plants	land plants	Apocynaceae	*Alstonia scholaris*	white cheesewood		C		1/1
plants	land plants	Apocynaceae	*Alyxia spicata*			C		1/1
plants	land plants	Apocynaceae	*Dischidia nummularia*	button orchid		C		1/1
plants	land plants	Apocynaceae	*Gymnanthera oblonga*			C		1/1
plants	land plants	Apocynaceae	*Hoya australis subsp. tenuipes*			C		2/2
plants	land plants	Apocynaceae	*Hoya pottsii*			C		1/1
plants	land plants	Apocynaceae	*Kopsia arborea*			C		1/1
plants	land plants	Apocynaceae	*Melodinus acutiflorus*	bellbird vine		C		2/2
plants	land plants	Apocynaceae	*Melodinus australis*	southern melodinus		C		1/1
plants	land plants	Apocynaceae	*Parsonsia langiana*			C		1/1
plants	land plants	Apocynaceae	*Parsonsia latifolia*	green-leaved silkpod		C		1/1
plants	land plants	Aquifoliaceae	*Ilex arnhemensis subsp. ferdinandi*			C		3/3
plants	land plants	Araliaceae	*Polyscias australiana*	ivory basswood		C		2/2
plants	land plants	Araliaceae	*Polyscias nodosa*			C		1/1
plants	land plants	Arecaceae	*Calamus australis*	hairy Mary		C		1/1
plants	land plants	Arecaceae	*Licuala ramsayi var. ramsayi*			C		1/1
plants	land plants	Arecaceae	*Linospadix minor*			C		2/2
plants	land plants	Arecaceae	*Normanbya normanbyi*	black palm		C		6/6
plants	land plants	Arecaceae	*Ptychosperma elegans*	solitaire palm		C		1/1
plants	land plants	Aristolochiaceae	*Pararistolochia deltantha*			C		1/1
plants	land plants	Asteraceae	*Acanthospermum hispidum*	star burr	Y			1/1
plants	land plants	Asteraceae	*Eclipta prostrata*	white eclipta	Y			3/3
plants	land plants	Asteraceae	*Elephantopus mollis*	tobacco weed	Y			2/2
plants	land plants	Asteraceae	*Erigeron bonariensis*		Y			1/1

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plants	land plants	Asteraceae	*Parthenium hysterophorus*	parthenium weed	Y			1/1
plants	land plants	Asteraceae	*Sphagneticola trilobata*		Y			1
plants	land plants	Asteraceae	*Tridax procumbens*	tridax daisy	Y			1/1
plants	land plants	Begoniaceae	*Begonia hirtella*		Y			1/1
plants	land plants	Bignoniaceae	*Deplanchea tetraphylla*			C		1/1
plants	land plants	Bignoniaceae	*Saritaea magnifica*		Y			1/1
plants	land plants	Blechnaceae	*Blechnum cartilagineum*	gristle fern		C		1/1
plants	land plants	Blechnaceae	*Blechnum orientale*			SL		2/2
plants	land plants	Blechnaceae	*Stenochlaena palustris*	climbing swamp fern		SL		1/1
plants	land plants	Byttneriaceae	*Commersonia macrostipulata*			C		1/1
plants	land plants	Byttneriaceae	*Melochia corchorifolia*			C		1/1
plants	land plants	Calymperaceae	*Calymperes moluccense*			C		1/1
plants	land plants	Cannabaceae	*Trema tomentosa var. tomentosa*			C		1/1
plants	land plants	Cardiopteridaceae	*Citronella smythii*			C		1/1
plants	land plants	Casuarinaceae	*Allocasuarina littoralis*			C		1/1
plants	land plants	Celastraceae	*Salacia chinensis*			C		6/6
plants	land plants	Celastraceae	*Siphonodon membranaceus*			C		1/1
plants	land plants	Clusiaceae	*Garcinia warrenii*			C		1/1
plants	land plants	Combretaceae	*Lumnitzera littorea*			C		1/1
plants	land plants	Convolvulaceae	*Camonea pilosa*			C		1/1
plants	land plants	Convolvulaceae	*Decalobanthus peltatus*			C		1/1
plants	land plants	Convolvulaceae	*Ipomoea littoralis*			C		1/1
plants	land plants	Costaceae	*Cheilocostus potierae*			E		1/1
plants	land plants	Costaceae	*Costus dubius*		Y			1/1
plants	land plants	Costaceae	*Tapeinochilos ananassae*			C		1/1
plants	land plants	Crassulaceae	*Bryophyllum pinnatum*	resurrection plant	Y			1/1
plants	land plants	Cunoniaceae	*Davidsonia pruriens*			C		2/2
plants	land plants	Cunoniaceae	*Gillbeea whypallana*			C		1/1
plants	land plants	Cunoniaceae	*Pullea stutzeri*	hard alder		C		1/1
plants	land plants	Cyatheaceae	*Sphaeropteris cooperi*			C		1/1
plants	land plants	Cyperaceae	*Cyperus mindorensis*		Y			1/1
plants	land plants	Cyperaceae	*Cyperus odoratus*			C		1/1
plants	land plants	Cyperaceae	*Cyperus pilosus*			C		1/1
plants	land plants	Cyperaceae	*Cyperus sphacelatus*		Y			1/1
plants	land plants	Cyperaceae	*Fimbristylis littoralis*			C		2/2
plants	land plants	Cyperaceae	*Fimbristylis schoenoides*			C		1/1
plants	land plants	Cyperaceae	*Gahnia sieberiana*	sword grass		C		2/2
plants	land plants	Cyperaceae	*Hypolytrum compactum*			C		1/1
plants	land plants	Cyperaceae	*Hypolytrum nemorum*			C		5/5
plants	land plants	Cyperaceae	*Machaerina rubiginosa*			C		2/2
plants	land plants	Cyperaceae	*Rhynchospora brownii*	beak rush		C		1/1
plants	land plants	Cyperaceae	*Rhynchospora corymbosa*			C		4/4
plants	land plants	Cyperaceae	*Rhynchospora rubra*			C		1/1
plants	land plants	Cyperaceae	*Schoenus calostachyus*			C		2/2
plants	land plants	Cyperaceae	*Schoenus sparteus*			C		1/1
plants	land plants	Cyperaceae	*Scirpodendron ghaeri*			C		3/3

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plants	land plants	Cyperaceae	*Scleria levis*			C		1/1
plants	land plants	Cyperaceae	*Scleria polycarpa*			C		3/3
plants	land plants	Cyperaceae	*Scleria scrobiculata*			C		2/2
plants	land plants	Cyperaceae	*Scleria sumatrensis*			C		1/1
plants	land plants	Dilleniaceae	*Dillenia alata*			C		3/3
plants	land plants	Dilleniaceae	*Hibbertia scandens*			C		1/1
plants	land plants	Dilleniaceae	*Tetracera daemeliana*			C		1/1
plants	land plants	Dilleniaceae	*Tetracera nordtiana var. moluccana*			C		1/1
plants	land plants	Dilleniaceae	*Tetracera nordtiana var. nordtiana*			C		1/1
plants	land plants	Dilleniaceae	*Tetracera nordtiana var. wuthiana*			C		1/1
plants	land plants	Dracaenaceae	*Dracaena angustifolia*			C		2/2
plants	land plants	Dryopteridaceae	*Bolbitis taylorii*			SL		2/2
plants	land plants	Dryopteridaceae	*Lastreopsis wurunuran*			SL		1/1
plants	land plants	Ebenaceae	*Diospyros laurina*			C		1/1
plants	land plants	Elaeocarpaceae	*Aceratium megalospermum*			C		4/4
plants	land plants	Elaeocarpaceae	*Elaeocarpus*					1/1
plants	land plants	Elaeocarpaceae	*Elaeocarpus bancroftii*			C		5/5
plants	land plants	Elaeocarpaceae	*Elaeocarpus foveolatus*			C		2/2
plants	land plants	Elaeocarpaceae	*Elaeocarpus grahamii*			C		3/3
plants	land plants	Elaeocarpaceae	*Elaeocarpus grandis*	blue quandong		C		1/1
plants	land plants	Elaeocarpaceae	*Elaeocarpus michaelii*			C		6/5
plants	land plants	Euphorbiaceae	*Aleurites rockinghamensis*			C		1/1
plants	land plants	Euphorbiaceae	*Croton triacros*			C		2/2
plants	land plants	Euphorbiaceae	*Euphorbia hirta*		Y			1/1
plants	land plants	Euphorbiaceae	*Excoecaria agallocha*	milky mangrove		C		2/2
plants	land plants	Euphorbiaceae	*Macaranga involucrata var. mallotoides*			C		1/1
plants	land plants	Euphorbiaceae	*Macaranga polyadenia*			C		3/3
plants	land plants	Euphorbiaceae	*Macaranga subdentata*			C		1/1
plants	land plants	Euphorbiaceae	*Mallotus paniculatus*			C		1/1
plants	land plants	Flagellariaceae	*Flagellaria indica*	whip vine		C		3/3
plants	land plants	Gentianaceae	*Fagraea cambagei*			C		1/1
plants	land plants	Gesneriaceae	*Lenbrassia australiana var. australiana*			SL		1/1
plants	land plants	Gesneriaceae	*Lenbrassia australiana var. glabrescens*			SL		3/3
plants	land plants	Gleicheniaceae	*Dicranopteris linearis var. altissima*			C		1/1
plants	land plants	Gleicheniaceae	*Dicranopteris linearis var. linearis*			C		1/1
plants	land plants	Goodeniaceae	*Goodenia mystrophylla*			C		1/1
plants	land plants	Hernandiaceae	*Hernandia albiflora*			C		8/8
plants	land plants	Hymenophyllaceae	*Crepidomanes aphlebioides*			CR		2/2
plants	land plants	Hymenophyllaceae	*Vandenboschia johnstonensis*			SL		1/1
plants	land plants	Lamiaceae	*Clerodendrum floribundum*			C		1/1
plants	land plants	Lamiaceae	*Clerodendrum inerme*	coastal lolly bush		C		2/2
plants	land plants	Lamiaceae	*Clerodendrum paniculatum*		Y			2/2
plants	land plants	Lamiaceae	*Clerodendrum tracyanum*			C		1/1
plants	land plants	Lamiaceae	*Gmelina dalrympleana*			C		1/1
plants	land plants	Lamiaceae	*Gmelina fasciculiflora*			C		1/1
plants	land plants	Lamiaceae	*Hyptis capitata*		Y			2/2

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plants	land plants	Lamiaceae	*Mesosphaerum pectinatum*		Y			2/2
plants	land plants	Lamiaceae	*Vitex queenslandica*			C		2/2
plants	land plants	Lauraceae	*Beilschmiedia bancroftii*			C		2/2
plants	land plants	Lauraceae	*Beilschmiedia castrisinensis*			NT		3/3
plants	land plants	Lauraceae	*Beilschmiedia obtusifolia*	hard bolly gum		C		1/1
plants	land plants	Lauraceae	*Cryptocarya grandis*			C		3/3
plants	land plants	Lauraceae	*Cryptocarya laevigata*			C		1/1
plants	land plants	Lauraceae	*Cryptocarya mackinnoniana*			C		1/1
plants	land plants	Lauraceae	*Cryptocarya murrayi*	Murray's laurel		C		1/1
plants	land plants	Lauraceae	*Cryptocarya oblata*			C		2/2
plants	land plants	Lauraceae	*Endiandra acuminata*			C		1/1
plants	land plants	Lauraceae	*Endiandra glauca*			C		1/1
plants	land plants	Lauraceae	*Endiandra grayi*			V		4/4
plants	land plants	Lauraceae	*Endiandra hypotephra*	blue walnut		C		3/3
plants	land plants	Lauraceae	*Endiandra insignis*			C		1/1
plants	land plants	Lauraceae	*Endiandra leptodendron*			C		2/2
plants	land plants	Lauraceae	*Endiandra longipedicellata*			C		1/1
plants	land plants	Lauraceae	*Endiandra microneura*			NT		12/12
plants	land plants	Lauraceae	*Endiandra wolfei*			C		3/3
plants	land plants	Lauraceae	*Litsea bindoniana*			C		1/1
plants	land plants	Lauraceae	*Litsea leefeana*			C		2/2
plants	land plants	Lauraceae	*Neolitsea dealbata*	white bolly gum		C		1/1
plants	land plants	Laxmanniaceae	*Cordyline cannifolia*			SL		1/1
plants	land plants	Laxmanniaceae	*Eustrephus latifolius*	wombat berry		C		1/1
plants	land plants	Lecythidaceae	*Barringtonia racemosa*			C		2/2
plants	land plants	Leguminosae	*Acacia celsa*			C		1/1
plants	land plants	Leguminosae	*Acacia crassicarpa*			C		1/1
plants	land plants	Leguminosae	*Acacia mangium*			C		4/4
plants	land plants	Leguminosae	*Acacia pubirhachis*			C		1/1
plants	land plants	Leguminosae	*Arachis pintoi*		Y			1/1
plants	land plants	Leguminosae	*Austrocallerya australis*			C		1
plants	land plants	Leguminosae	*Austrosteenisia stipularis*			C		1/1
plants	land plants	Leguminosae	*Crotalaria goreensis*	gambia pea	Y			1/1
plants	land plants	Leguminosae	*Cynometra iripa*			C		3/3
plants	land plants	Leguminosae	*Dalbergia candenatensis*			C		4/4
plants	land plants	Leguminosae	*Derris trifoliata*			C		2/1
plants	land plants	Leguminosae	*Dioclea hexandra*			E		1/1
plants	land plants	Leguminosae	*Erythrina fusca*			C		1/1
plants	land plants	Leguminosae	*Glycine tomentella*	woolly glycine		C		1/1
plants	land plants	Leguminosae	*Indigofera hirsuta*	hairy indigo		C		1/1
plants	land plants	Leguminosae	*Millettia pinnata*			C		1/1
plants	land plants	Leguminosae	*Mimosa diplotricha var. diplotricha*	giant sensitive plant	Y			1/1
plants	land plants	Leguminosae	*Ormosia ormondii*			C		1/1
plants	land plants	Leguminosae	*Senna alata*		Y			1/1
plants	land plants	Leguminosae	*Senna obtusifolia*		Y			1/1
plants	land plants	Leguminosae	*Senna pendula var. glabrata*	Easter cassia	Y			1/1

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plants	land plants	Leguminosae	*Stylosanthes humilis*	Townsville stylo	Y			1/1
plants	land plants	Leguminosae	*Ticanto crista*			C		1/1
plants	land plants	Lentibulariaceae	*Utricularia uliginosa*	asian bladderwort		SL		1/1
plants	land plants	Lindsaeaceae	*Lindsaea brachypoda*			C		3/3
plants	land plants	Lindsaeaceae	*Lindsaea ensifolia subsp. agatii*			C		1/1
plants	land plants	Lindsaeaceae	*Lindsaea ensifolia subsp. ensifolia*			C		1/1
plants	land plants	Lindsaeaceae	*Lindsaea media*			C		1/1
plants	land plants	Lindsaeaceae	*Lindsaea obtusa*			C		1/1
plants	land plants	Lindsaeaceae	*Lindsaea repens var. sessilis*			C		1/1
plants	land plants	Loganiaceae	*Mitrasacme oasena*			C		1/1
plants	land plants	Loranthaceae	*Amyema conspicua subsp. conspicua*			C		1/1
plants	land plants	Loranthaceae	*Amyema quaternifolia*			C		5/5
plants	land plants	Loranthaceae	*Amylotheca dictyophleba*			C		1/1
plants	land plants	Loranthaceae	*Diplatia tomentosa*			C		1/1
plants	land plants	Lygodiaceae	*Lygodium microphyllum*	snake fern		C		1/1
plants	land plants	Lygodiaceae	*Lygodium reticulatum*			C		5/5
plants	land plants	Lythraceae	*Sonneratia alba*			C		2/1
plants	land plants	Lythraceae	*Sonneratia caseolaris*			C		2/1
plants	land plants	Maesaceae	*Maesa dependens var. pubescens*			C		1/1
plants	land plants	Malpighiaceae	*Tristellateia australasiae*			NT		1/1
plants	land plants	Malvaceae	*Thespesia*					1
plants	land plants	Malvaceae	*Thespesia populnea*			C		1/1
plants	land plants	Malvaceae	*Urena lobata*	urena weed	Y			1/1
plants	land plants	Marattiaceae	*Angiopteris evecta*	giant fern		C		1/1
plants	land plants	Melastomataceae	*Heterotis rotundifolia*		Y			1/1
plants	land plants	Melastomataceae	*Medinilla balls-headleyi*			C		1/1
plants	land plants	Melastomataceae	*Melastoma malabathricum subsp. malabathricum*			C		1/1
plants	land plants	Melastomataceae	*Memecylon pauciflorum*			C		1/1
plants	land plants	Melastomataceae	*Tristemma mauritianum var. mauritianum*		Y			1/1
plants	land plants	Meliaceae	*Aglaia ferruginea*			C		1/1
plants	land plants	Meliaceae	*Didymocheton papuanus*			C		1/1
plants	land plants	Meliaceae	*Didymocheton pettigrewianus*			C		1/1
plants	land plants	Meliaceae	*Goniocheton arborescens*			C		2/2
plants	land plants	Meliaceae	*Xylocarpus granatum*	cedar mangrove		C		2/2
plants	land plants	Menispermaceae	*Carronia protensa*			C		1/1
plants	land plants	Menispermaceae	*Hypserpa decumbens*			C		1/1
plants	land plants	Menispermaceae	*Hypserpa laurina*			C		2/2
plants	land plants	Monimiaceae	*Palmeria scandens*	anchor vine		C		1/1
plants	land plants	Monimiaceae	*Wilkiea pubescens*			C		1/1
plants	land plants	Moraceae	*Ficus congesta var. congesta*			C		1/1
plants	land plants	Moraceae	*Ficus septica*			C		1/1
plants	land plants	Moraceae	*Ficus triradiata*			C		1/1
plants	land plants	Moraceae	*Ficus variegata var. variegata*			C		1/1
plants	land plants	Musaceae	*Musa banksii*			C		1/1
plants	land plants	Myristicaceae	*Myristica globosa subsp. muelleri*	native nugmeg		C		1/1
plants	land plants	Myrsinaceae	*Aegiceras corniculatum*	river mangrove		C		1/1

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plants	land plants	Myrsinaceae	*Ardisia brevipedata*			C		1/1
plants	land plants	Myrsinaceae	*Embelia caulialata*			C		1/1
plants	land plants	Myrsinaceae	*Myrsine porosa*			C		1/1
plants	land plants	Myrtaceae	*Acmena graveolens*			C		2/2
plants	land plants	Myrtaceae	*Acmena hemilampra subsp. hemilampra*			C		4/4
plants	land plants	Myrtaceae	*Acmenosperma claviflorum*	grey satinash		C		1/1
plants	land plants	Myrtaceae	*Eucalyptus pellita*	large-fruited red mahogany		C		2/2
plants	land plants	Myrtaceae	*Gossia shepherdii*			C		1/1
plants	land plants	Myrtaceae	*Lithomyrtus obtusa*			C		1/1
plants	land plants	Myrtaceae	*Melaleuca cajuputi subsp. platyphylla*			C		6/6
plants	land plants	Myrtaceae	*Melaleuca leucadendra*	broad-leaved tea-tree		C		2/2
plants	land plants	Myrtaceae	*Melaleuca quinquenervia*	swamp paperbark		C		1/1
plants	land plants	Myrtaceae	*Melaleuca viridiflora var. viridiflora*			C		1/1
plants	land plants	Myrtaceae	*Rhodamnia sessiliflora*			E		2/2
plants	land plants	Myrtaceae	*Rhodomyrtus effusa*			E		2/2
plants	land plants	Myrtaceae	*Rhodomyrtus macrocarpa*	finger cherry		C		1/1
plants	land plants	Myrtaceae	*Syzygium angophoroides*			C		2/2
plants	land plants	Myrtaceae	*Syzygium cormiflorum*	bumpy satinash		C		4/4
plants	land plants	Myrtaceae	*Syzygium cryptophlebium*			C		2/2
plants	land plants	Myrtaceae	*Syzygium fibrosum*	fibrous satinash		C		3/3
plants	land plants	Myrtaceae	*Syzygium monospermum*			C		2/2
plants	land plants	Myrtaceae	*Syzygium sayeri*			C		2/2
plants	land plants	Neckeraceae	*Neckeropsis cyclophylla*			C		2/2
plants	land plants	Nyctaginaceae	*Pisonia umbellifera*	birdlime tree		C		1/1
plants	land plants	Oleaceae	*Jasminum didymum*			C		1/1
plants	land plants	Onagraceae	*Ludwigia hyssopifolia*		Y			1/1
plants	land plants	Ophioglossaceae	*Ophioderma pendula*			C		1/1
plants	land plants	Orchidaceae	*Demorchis queenslandica*			NT		1/1
plants	land plants	Orchidaceae	*Dendrobium canaliculatum*			SL		1/1
plants	land plants	Orchidaceae	*Dendrobium discolor*			SL		1/1
plants	land plants	Pandanaceae	*Benstonea monticola*			C		1/1
plants	land plants	Pandanaceae	*Freycinetia excelsa*	climbing pandanus		C		1/1
plants	land plants	Pandanaceae	*Freycinetia marginata*			E		3/3
plants	land plants	Pandanaceae	*Freycinetia scandens*			C		2/2
plants	land plants	Passifloraceae	*Passiflora foetida*		Y			1/1
plants	land plants	Passifloraceae	*Passiflora kuranda*			C		1/1
plants	land plants	Phyllanthaceae	*Antidesma erostre*			C		1/1
plants	land plants	Phyllanthaceae	*Breynia*					1/1
plants	land plants	Phyllanthaceae	*Breynia cernua*			C		3/3
plants	land plants	Phyllanthaceae	*Bridelia insulana*			C		1/1
plants	land plants	Phyllanthaceae	*Cleistanthus myrianthus*			C		5/5
plants	land plants	Phyllanthaceae	*Glochidion*					1/1
plants	land plants	Phyllanthaceae	*Glochidion harveyanum var. harveyanum*			C		1/1
plants	land plants	Phyllanthaceae	*Glochidion sumatranum*	umbrella cheese tree		C		1/1
plants	land plants	Phyllanthaceae	*Phyllanthus*					1/1
plants	land plants	Piperaceae	*Piper caninum*	peppervine		C		2/2

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plants	land plants	Piperaceae	*Piper hederaceum var. hederaceum*			C		1/1
plants	land plants	Piperaceae	*Piper macropiper*			C		1/1
plants	land plants	Pittosporaceae	*Pittosporum rubiginosum*			C		3/3
plants	land plants	Plantaginaceae	*Limnophila fragrans*			C		1/1
plants	land plants	Poaceae	*Centotheca lappacea*			C		1/1
plants	land plants	Poaceae	*Centotheca philippinensis*	creek grass		C		1/1
plants	land plants	Poaceae	*Cyrtococcum oxyphyllum*			C		1/1
plants	land plants	Poaceae	*Eulalia trispicata*			C		1/1
plants	land plants	Poaceae	*Garnotia stricta var. longiseta*			C		1/1
plants	land plants	Poaceae	*Hymenachne amplexicaulis 'Olive'*		Y			1/1
plants	land plants	Poaceae	*Isachne confusa*			C		1/1
plants	land plants	Poaceae	*Isachne sharpii*			E		2/2
plants	land plants	Poaceae	*Mullerochloa moreheadiana*			C		1/1
plants	land plants	Poaceae	*Oplismenus compositus*			C		1/1
plants	land plants	Poaceae	*Ottochloa nodosa*			C		1/1
plants	land plants	Poaceae	*Panicum incomtum*			C		1/1
plants	land plants	Poaceae	*Sacciolepis indica*	Indian cupscale grass		C		1/1
plants	land plants	Podocarpaceae	*Podocarpus grayae*			C		2/2
plants	land plants	Polygalaceae	*Xanthophyllum fragrans*			NT		1/1
plants	land plants	Polygonaceae	*Persicaria barbata*			C		1/1
plants	land plants	Polygonaceae	*Persicaria dichotoma*			C		1/1
plants	land plants	Polypodiaceae	*Dendroconche ampla*			SL		1/1
plants	land plants	Polypodiaceae	*Pyrrosia longifolia*			SL		4/4
plants	land plants	Proteaceae	*Austromuellera trinervia*			NT		1/1
plants	land plants	Proteaceae	*Cardwellia sublimis*			C		1/1
plants	land plants	Proteaceae	*Darlingia darlingiana*			C		1/1
plants	land plants	Proteaceae	*Grevillea baileyana*			C		1/1
plants	land plants	Proteaceae	*Helicia nortoniana*			C		2/2
plants	land plants	Psilotaceae	*Psilotum nudum*	skeleton fork fern		SL		2/2
plants	land plants	Pteridaceae	*Acrostichum aureum*	golden mangrove fern		SL		1/1
plants	land plants	Pteridaceae	*Acrostichum speciosum*	mangrove fern		SL		4/4
plants	land plants	Pteridaceae	*Taenitis pinnata*	morse fern		SL		1/1
plants	land plants	Rhizophoraceae	*Bruguiera gymnorhiza*	large-fruited orange mangrove		C		2/2
plants	land plants	Rhizophoraceae	*Bruguiera parviflora*			C		2/2
plants	land plants	Rhizophoraceae	*Carallia brachiata*	carallia		C		2/2
plants	land plants	Rhizophoraceae	*Ceriops pseudodecandra*			C		1/1
plants	land plants	Rhizophoraceae	*Ceriops tagal*	yellow mangrove		C		1/1
plants	land plants	Rhizophoraceae	*Rhizophora apiculata*			C		1/1
plants	land plants	Rosaceae	*Rubus moluccanus var. moluccanus*			C		1/1
plants	land plants	Rubiaceae	*Atractocarpus fitzalanii subsp. fitzalanii*			C		2/2
plants	land plants	Rubiaceae	*Atractocarpus hirtus*			C		1/1
plants	land plants	Rubiaceae	*Cyclophyllum brevipes*			C		1/1
plants	land plants	Rubiaceae	*Cyclophyllum costatum*			V	V	1/1
plants	land plants	Rubiaceae	*Cyclophyllum multiflorum*			C		2/2
plants	land plants	Rubiaceae	*Cyclophyllum rostellatum*			C		1/1
plants	land plants	Rubiaceae	*Exallage lapeyrousei*			C		1/1

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plants	land plants	Rubiaceae	*Exallage radicans*			C		1/1
plants	land plants	Rubiaceae	*Geophila repens*			C		1/1
plants	land plants	Rubiaceae	*Hedyotis novoguineensis*			E		3/3
plants	land plants	Rubiaceae	*Ixora biflora*			C		1/1
plants	land plants	Rubiaceae	*Lasianthus chlorocarpus*			C		1/1
plants	land plants	Rubiaceae	*Mitracarpus hirtus*		Y			1/1
plants	land plants	Rubiaceae	*Morinda citrifolia*			C		1/1
plants	land plants	Rubiaceae	*Nauclea orientalis*	Leichhardt tree		C		1/1
plants	land plants	Rubiaceae	*Neonauclea glabra*			C		2/2
plants	land plants	Rubiaceae	*Psychotria coelospermum*			C		5/5
plants	land plants	Rubiaceae	*Psychotria sp. (Mt Lewis V.K.Moriarty 2445)*			C		2/2
plants	land plants	Rubiaceae	*Randia audasii*			NT		1/1
plants	land plants	Rubiaceae	*Spermacoce prostrata*		Y			2/2
plants	land plants	Rubiaceae	*Tarenna dallachiana subsp. dallachiana*			C		1/1
plants	land plants	Rubiaceae	*Timonius timon var. timon*			C		1/1
plants	land plants	Rubiaceae	*Uncaria lanosa var. appendiculata*			C		2/2
plants	land plants	Rubiaceae	*Wendlandia inclusa*			C		3/3
plants	land plants	Rubiaceae	*Wendlandia urceolata*			C		1/1
plants	land plants	Rutaceae	*Acronychia acronychioides*			C		1/1
plants	land plants	Rutaceae	*Acronychia acuminata*			NT		3/3
plants	land plants	Rutaceae	*Brombya platynema*			C		1/1
plants	land plants	Rutaceae	*Melicope broadbentiana*			C		1/1
plants	land plants	Salicaceae	*Casearia dallachii*			C		2/2
plants	land plants	Salicaceae	*Homalium sp. (Johnstone River N.Michael 176)*			C		2/1
plants	land plants	Salicaceae	*Scolopia braunii*	flintwood		C		1/1
plants	land plants	Sapindaceae	*Allophylus cobbe*			C		8/8
plants	land plants	Sapindaceae	*Arytera pauciflora*			C		2/2
plants	land plants	Sapindaceae	*Castanospora alphandii*	brown tamarind		C		1/1
plants	land plants	Sapindaceae	*Cupaniopsis foveolata*	narrow-leaved tuckeroo		C		2/2
plants	land plants	Sapindaceae	*Diploglottis bernieana*			C		1/1
plants	land plants	Sapindaceae	*Harpullia arborea*	Cooktown tulipwood		C		2/2
plants	land plants	Sapindaceae	*Jagera madida*			C		2/2
plants	land plants	Sapindaceae	*Lepiderema sericolignis*			C		2/2
plants	land plants	Sapindaceae	*Mischocarpus albescens*			NT		3/3
plants	land plants	Sapindaceae	*Mischocarpus exangulatus*			C		4/4
plants	land plants	Sapindaceae	*Mischocarpus lachnocarpus*			C		1/1
plants	land plants	Sapindaceae	*Sarcopteryx reticulata*			C		1/1
plants	land plants	Sapindaceae	*Sarcotoechia villosa*			C		1/1
plants	land plants	Sapindaceae	*Toechima erythrocarpum*			C		1/1
plants	land plants	Sapotaceae	*Niemeyera prunifera*			C		2/2
plants	land plants	Sapotaceae	*Palaquium galactoxylon*			C		1/1
plants	land plants	Sapotaceae	*Pleioluma xerocarpa*			C		2/2
plants	land plants	Sapotaceae	*Van-royena castanosperma*			C		2/2
plants	land plants	Schizaeaceae	*Schizaea dichotoma*	branched comb fern		SL		1/1
plants	land plants	Selaginellaceae	*Selaginella australiensis*			C		1/1
plants	land plants	Selaginellaceae	*Selaginella longipinna*			C		1/1

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plants	land plants	Smilacaceae	*Smilax blumei*			C		1/1
plants	land plants	Solanaceae	*Solanum magnifolium*			C		1/1
plants	land plants	Solanaceae	*Solanum torvum*	devil's fig	Y			2/2
plants	land plants	Stemonuraceae	*Gomphandra australiana*			C		2/2
plants	land plants	Sterculiaceae	*Argyrodendron peralatum*	red tulip oak		C		1/1
plants	land plants	Sterculiaceae	*Sterculia quadrifida*	peanut tree		C		1/1
plants	land plants	Symplocaceae	*Symplocos cyanocarpa var. cyanocarpa*			C		1/1
plants	land plants	Symplocaceae	*Symplocos paucistaminea*			C		2/2
plants	land plants	Tectariaceae	*Arthropteris palisotii*			C		1/1
plants	land plants	Thelypteridaceae	*Chingia australis*			E	E	2/2
plants	land plants	Thelypteridaceae	*Christella queenslandica*			SL		2/2
plants	land plants	Thelypteridaceae	*Christella subpubescens*			SL		1/1
plants	land plants	Urticaceae	*Pouzolzia zeylanica*			C		1/1
plants	land plants	Verbenaceae	*Lantana camara*	lantana	Y			1
plants	land plants	Verbenaceae	*Stachytarpheta cayennensis*		Y			2/2
plants	land plants	Vitaceae	*Causonis australasica*			C		1/1
plants	land plants	Vitaceae	*Cayratia saponaria*			C		1/1
plants	land plants	Xyridaceae	*Xyris complanata*	yellow-eye		C		1/1
plants	land plants	Zamiaceae	*Bowenia spectabilis*			SL		1/1
plants	land plants	Zamiaceae	*Lepidozamia hopei*	Hope's cycad		SL		2/2
plants	land plants	Zingiberaceae	*Pleuranthodium racemigerum*			C		1/1

CODES

I - Y indicates that the taxon is introduced to Queensland and has naturalised.

Q - Indicates the Queensland conservation status of each taxon under the *Nature Conservation Act 1992.*
The codes are Extinct (EX), Extinct in the Wild (PE), Critically Endangered (CR), Endangered (E), Vulnerable (V), Near Threatened (NT), Special Least Concern (SL) and Least Concern (C).

A - Indicates the Australian conservation status of each taxon under the *Environment Protection and Biodiversity Conservation Act 1999.*
The values of EPBC are Extinct (EX), Extinct in the Wild (XW), Critically Endangered (CE), Endangered (E), Vulnerable (V) and Conservation Dependent (CD).

Records - The first number indicates the total number of records of the taxon (wildlife records and species listings for selected areas).
This number is output as 99999 if it equals or exceeds this value. A second number located after a / indicates the number of specimen records for the taxon.
This number is output as 999 if it equals or exceeds this value.

resources.QLD.GOV.AU

Vegetation management report

For Lot: 6 Plan: RP888615
9/6/2024

Queensland Government

This publication has been compiled by Operations Support, Department of Resources.

Recent changes

Updated mapping

Updated vegetation mapping was released on 22 November 2023 and includes the most recent Queensland Herbarium scientific updates to the Regulated Vegetation Management Map, regional ecosystems, essential habitat, wetland and high-value regrowth mapping.

The Department of Environment, Science and Innovation have also updated their koala protection mapping to align with the Queensland Herbarium scientific updates.

The latest version (v10) of the Protected Plants Flora Survey Trigger Map (trigger map) was released on 6 September 2023.

Overview

Based on the lot on plan details you have supplied, this report provides the following detailed information:
Property details - information about the specified Lot on Plan, lot size, local government area, bioregion(s), subregion(s) and catchment(s);

Vegetation management framework - an explanation of the application of the framework and contact details for the Department of Resources who administer the framework;

Vegetation management framework details for the specified Lot on Plan including:

- the vegetation management categories on the property;
- the vegetation management regional ecosystems on the property;
- vegetation management watercourses or drainage features on the property;
- vegetation management wetlands on the property;
- vegetation management essential habitat on the property;
- whether any area management plans are associated with the property;
- whether the property is coastal or non-coastal; and
- whether the property is mapped as Agricultural Land Class A or B;

Protected plant framework - an explanation of the application of the framework and contact details for the Department of Environment, Science and Innovation who administer the framework, including:

- high risk areas on the protected plant flora survey trigger map for the property;

Koala protection framework - an explanation of the application of the framework and contact details for the Department of Environment, Science and Innovation who administer the framework; and

Koala protection framework details for the specified Lot on Plan including:

- the koala district the property is located in;
- koala priority areas on the property;
- core and locally refined koala habitat areas on the property;
- whether the lot is located in an identified koala broad-hectare area; and
- koala habitat regional ecosystems on the property for core koala habitat areas.

This information will assist you to determine your options for managing vegetation under:
- the vegetation management framework, which may include:

- exempt clearing work;
- accepted development vegetation clearing code;
- an area management plan;
- a development approval;

- the protected plant framework, which may include:

- the need to undertake a flora survey;
- exempt clearing;
- a protected plant clearing permit;

- the koala protection framework, which may include:

- exempted development;
- a development approval;
- the need to undertake clearing sequentially and in the presence of a koala spotter.

Other laws

The clearing of native vegetation is regulated by both Queensland and Australian legislation, and some local governments also regulate native vegetation clearing. You may need to obtain an approval or permit under another Act, such as the Commonwealth Government's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Section 8 of this guide provides contact details of other agencies you should confirm requirements with, before commencing vegetation clearing.

Table of Contents

1. Property details

1.1 Tenure and title area

All of the lot, plan, tenure and title area information associated with property Lot: 6 Plan: RP888615 are listed in Table 1.

Table 1: Lot, plan, tenure and title area information for the property

Lot	Plan	Tenure	Property title area (sq metres)
6	RP888615	Freehold	2,192

The tenure of the land may affect whether clearing is considered exempt clearing work or may be carried out under an accepted development vegetation clearing code.

Does the property Lot: 6 Plan: RP888615 have a freehold tenure and is in the Wet Tropics of Queensland World Heritage Area?

No, this property is not located in the Wet Tropics of Queensland World Heritage Area.

1.2 Property location

Table 2 provides a summary of the locations for property Lot: 6 Plan: RP888615, in relation to natural and administrative boundaries.

Table 2: Property location details

Local Government(s)	Catchment(s)	Bioregion(s)	Subregion(s)
Douglas Shire	Daintree	Wet Tropics	Daintree - Bloomfield

2. Vegetation management framework (administered by the Department of Resources)

The *Vegetation Management Act 1999* (VMA), the Vegetation Management Regulation 2012, the *Planning Act 2016* and the Planning Regulation 2017, in conjunction with associated policies and codes, form the Vegetation Management Framework.

The VMA does not apply to all land tenures or vegetation types. State forests, national parks, forest reserves and some tenures under the *Forestry Act 1959* and *Nature Conservation Act 1992* are not regulated by the VMA. Managing or clearing vegetation on these tenures may require approvals under these laws.

The following native vegetation is not regulated under the VMA but may require permit(s) under other laws:

- grass or non-woody herbage;
- a plant within a grassland regional ecosystem identified in the Vegetation Management Regional Ecosystem Description Database (VM REDD) as having a grassland structure; and
- a mangrove.

2.1 Exempt clearing work

Exempt clearing work is an activity for which you do not need to notify the Department of Resources or obtain an approval under the vegetation management framework. Exempt clearing work was previously known as exemptions.

In areas that are mapped as Category X (white in colour) on the regulated vegetation management map (see section 4.1), and where the land tenure is freehold, indigenous land and leasehold land for agriculture and grazing purposes, the clearing of vegetation is considered exempt clearing work and does not require notification or development approval under the vegetation management framework. For all other land tenures, contact the Department of Resources before commencing clearing to ensure that the proposed activity is exempt clearing work.

A range of routine property management activities are considered exempt clearing work. A list of exempt clearing work is available at

https://www.qld.gov.au/environment/land/management/vegetation/clearing-approvals/exemptions/.

Exempt clearing work may be affected if the proposed clearing area is subject to development approval conditions, a covenant, an environmental offset, an exchange area, a restoration notice, or an area mapped as Category A. Exempt clearing work may require approval under other Commonwealth, State or Local Government laws, or local government planning schemes. Contact the Department of Resources prior to clearing in any of these areas.

2.2 Accepted development vegetation clearing codes

Some clearing activities can be undertaken under an accepted development vegetation clearing code. The codes can be downloaded at

https://www.qld.gov.au/environment/land/management/vegetation/clearing-approvals/codes/

If you intend to clear vegetation under an accepted development vegetation clearing code, you must notify the Department of Resources before commencing. The information in this report will assist you to complete the online notification form.

You can complete the online form at
https://vegetation-apps.dnrm.qld.gov.au

2.3 Area management plans

Area Management Plans (AMP) provide an alternative approval system for vegetation clearing under the vegetation management framework. They list the purposes and clearing conditions that have been approved for the areas covered by the plan. It is not necessary to use an AMP, even when an AMP applies to your property.

On 8 March 2020, AMPs ended for fodder harvesting, managing thickened vegetation and managing encroachment. New notifications cannot be made for these AMPs. You will need to consider options for fodder harvesting, managing thickened vegetation or encroachment under a relevant accepted development vegetation clearing code or apply for a development approval.

New notifications can be made for all other AMPs. These will continue to apply until their nominated end date.

If an Area Management Plan applies to your property for which you can make a new notification, it will be listed in Section 3.6 of this report. Before clearing under one of these AMPs, you must first notify the Department of Resources and then follow the conditions and requirements listed in the AMP.

https://www.qld.gov.au/environment/land/management/vegetation/clearing-approvals/area-management-plans

2.4 Development approvals

If under the vegetation management framework your proposed clearing is not exempt clearing work, or is not permitted under an accepted development vegetation clearing code, or an AMP, you may be able to apply for a development approval. Information on how to apply for a development approval is available at

https://www.qld.gov.au/environment/land/management/vegetation/clearing-approvals/development

2.5. Contact information for the Department of Resources

For further information on the vegetation management framework:

Phone 135VEG (135 834)

Email vegetation@resources.qld.gov.au

Visit https://www.resources.qld.gov.au/?contact=vegetation to submit an online enquiry.

3. Vegetation management framework for Lot: 6 Plan: RP888615

3.1 Vegetation categories

The vegetation categories on your property are shown on the regulated vegetation management map in section 4.1 of this report. A summary of vegetation categories on the subject lot are listed in Table 3. Descriptions for these categories are shown in Table 4.

Table 3: Vegetation categories for subject property

Vegetation category	Area (ha)
Category R	0.14
Category X	0.08

Table 4: Description of vegetation categories

Category	Colour on Map	Description	Requirements / options under the vegetation management framework
A	red	Compliance areas, environmental offset areas and voluntary declaration areas	Special conditions apply to Category A areas. Before clearing, contact the Department of Resources to confirm any requirements in a Category A area.
B	dark blue	Remnant vegetation areas	Exempt clearing work, or notification and compliance with accepted development vegetation clearing codes, area management plans or development approval.
C	light blue	High-value regrowth areas	Exempt clearing work, or notification and compliance with managing Category C regrowth vegetation accepted development vegetation clearing code.
R	yellow	Regrowth within 50m of a watercourse or drainage feature in the Great Barrier Reef catchment areas	Exempt clearing work, or notification and compliance with managing Category R regrowth accepted development vegetation clearing code or area management plans.
X	white	Clearing on freehold land, indigenous land and leasehold land for agriculture and grazing purposes is considered exempt clearing work under the vegetation management framework. Contact the Department of Resources to clarify whether a development approval is required for other State land tenures.	No permit or notification required on freehold land, indigenous land and leasehold land for agriculture and grazing. A development approval may be required for some State land tenures.

Property Map of Assessable Vegetation (PMAV)

There is no Property Map of Assessable Vegetation (PMAV) present on this property.

3.2 Regional ecosystems

The endangered, of concern and least concern regional ecosystems on your property are shown on the vegetation management supporting map in section 4.2 and are listed in Table 5.

A description of regional ecosystems can be accessed online at
https://www.qld.gov.au/environment/plants-animals/plants/ecosystems/descriptions/

Table 5: Regional ecosystems present on subject property

Regional Ecosystem	VMA Status	Category	Area (Ha)	Short Description	Structure Category
7.3.23	Endangered	R	0.14	Simple-complex semi-deciduous notophyll to mesophyll vine forest on lowland alluvium, predominantly riverine levees	Dense
non-rem	None	X	0.08	None	None

Please note:
1. All area and area derived figures included in this table have been calculated via reprojecting relevant spatial features to Albers equal-area conic projection (central meridian = 146, datum Geocentric Datum of Australia 1994). As a result, area figures may differ slightly if calculated for the same features using a different co-ordinate system.
2. If Table 5 contains a Category 'plant', please be aware that this refers to 'plantations' such as forestry, and these areas are considered non-remnant under the VMA.

The VMA status of the regional ecosystem (whether it is endangered, of concern or least concern) also determines if any of the following are applicable:

- exempt clearing work;
- accepted development vegetation clearing codes;
- performance outcomes in State Code 16 of the State Development Assessment Provisions (SDAP).

3.3 Watercourses

Vegetation management watercourses and drainage features for this property are shown on the vegetation management supporting map in section 4.2.

3.4 Wetlands

There are no vegetation management wetlands present on this property.

3.5 Essential habitat

Under the VMA, essential habitat for protected wildlife is native wildlife prescribed under the *Nature Conservation Act 1992* (NCA) as critically endangered, endangered, vulnerable or near-threatened wildlife.

Essential habitat for protected wildlife includes suitable habitat on the lot, or where a species has been known to occur up to 1.1 kilometres from a lot on which there is assessable vegetation. These important habitat areas are protected under the VMA.

Any essential habitat on this property will be shown as blue hatching on the vegetation supporting map in section 4.2.

If essential habitat is identified on the lot, information about the protected wildlife species is provided in Table 6 below. The numeric labels on the vegetation management supporting map can be cross referenced with Table 6 to outline the essential habitat factors for that particular species. There may be essential habitat for more than one species on each lot, and areas of Category A, Category B and Category C can be mapped as Essential Habitat.

Essential habitat is compiled from a combination of species habitat models and buffered species records. Regional ecosystem is a mandatory essential habitat factor, unless otherwise stated. Essential habitat, for protected wildlife, means an area of vegetation shown on the Regulated Vegetation Management Map -

1) that has at least 3 essential habitat factors for the protected wildlife that must include any essential habitat factors that are stated as mandatory for the protected wildlife in the essential habitat database. Essential habitat factors are

comprised of - regional ecosystem (mandatory for most species), vegetation community, altitude, soils, position in landscape; or
2) in which the protected wildlife, at any stage of its life cycle, is located.

If there is no essential habitat mapping shown on the vegetation management supporting map for this lot, and there is no table in the sections below, it confirms that there is no essential habitat on the lot.

Category A and/or Category B and/or Category C

Table 6: Essential habitat in Category A and/or Category B and/or Category C
No records

3.6 Area Management Plan(s)

Nil

3.7 Coastal or non-coastal

For the purposes of the accepted development vegetation clearing codes and State Code 16 of the State Development Assessment Provisions (SDAP), this property is regarded as*

Coastal

*See also Map 4.3

3.8 Agricultural Land Class A or B

The following can be used to identify Agricultural Land Class A or B areas under the "Managing regulated regrowth vegetation" accepted development vegetation clearing code:

Does this lot contain land that is mapped as Agricultural Land Class A or B in the State Planning Interactive Mapping System?
Class A (with urban areas masked as per SPP): 0.22 ha

No Class B

Note - This confirms Agricultural Land Classes as per the State Planning Interactive Mapping System only. This response does not include Agricultural Land Classes identified under local government planning schemes. For further information, check the Planning Scheme for your local government area.

See Map 4.4 to identify the location and extent of Class A and/or Class B Agricultural land on Lot: 6 Plan: RP888615.

4. Vegetation management framework maps

Vegetation management maps included in this report may also be requested individually at:
https://www.resources.qld.gov.au/qld/environment/land/vegetation/vegetation-map-request-form

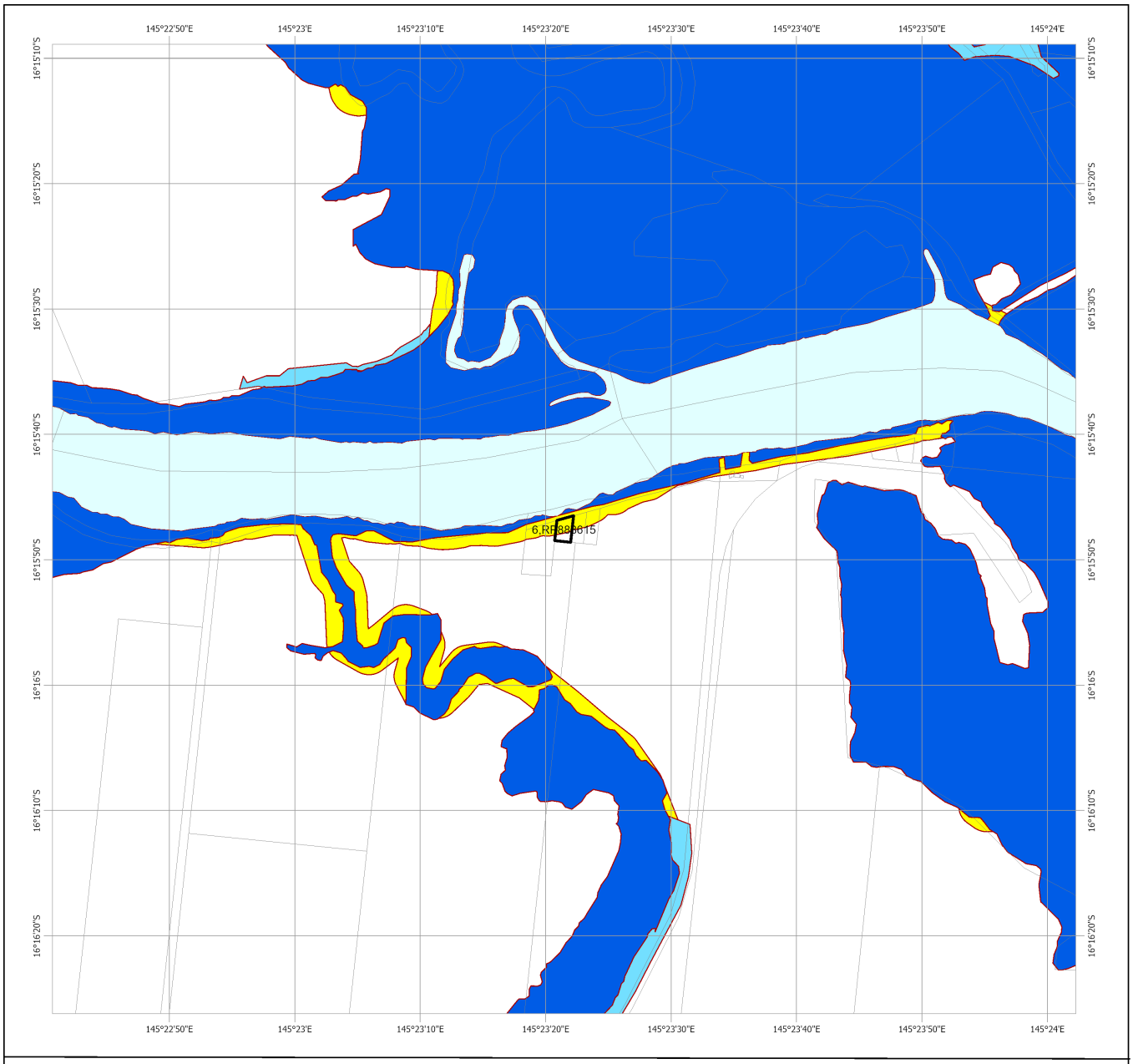
Regulated vegetation management map
The regulated vegetation management map shows vegetation categories needed to determine clearing requirements. These maps are updated monthly to show new property maps of assessable vegetation (PMAV).

Vegetation management supporting map
The vegetation management supporting map provides information on regional ecosystems, wetlands, watercourses and essential habitat.

Coastal/non-coastal map
The coastal/non-coastal map confirms whether the lot, or which parts of the lot, are considered coastal or non-coastal for the purposes of the accepted development vegetation clearing codes and State Code 16 of the State Development Assessment Provisions (SDAP).

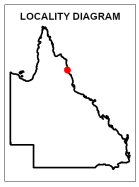
Agricultural Land Class A or B as per State Planning Policy: State Interest for Agriculture
The Agricultural Land Class map confirms the location and extent of land mapped as Agricultural Land Classes A or B as identified on the State Planning Interactive Mapping System. Please note that this map does not include areas identified as Agricultural Land Class A or B in local government planning schemes. This map can be used to identify Agricultural Land Class A or B areas under the "Managing regulated regrowth vegetation" accepted development vegetation clearing code.

4.1 Regulated vegetation management map



Regulated Vegetation Management Map

- Category A area (Vegetation offsets/compliance notices/VDecs)
- Category B area (Remnant vegetation)
- Category C area (High-value regrowth vegetation)
- Category R area (Reef regrowth watercourse vegetation)
- Category X area (Exempt clearing work on Freehold, Indigenous and Leasehold land)
- Water
- Other land parcel boundaries
- Selected Lot and Plan



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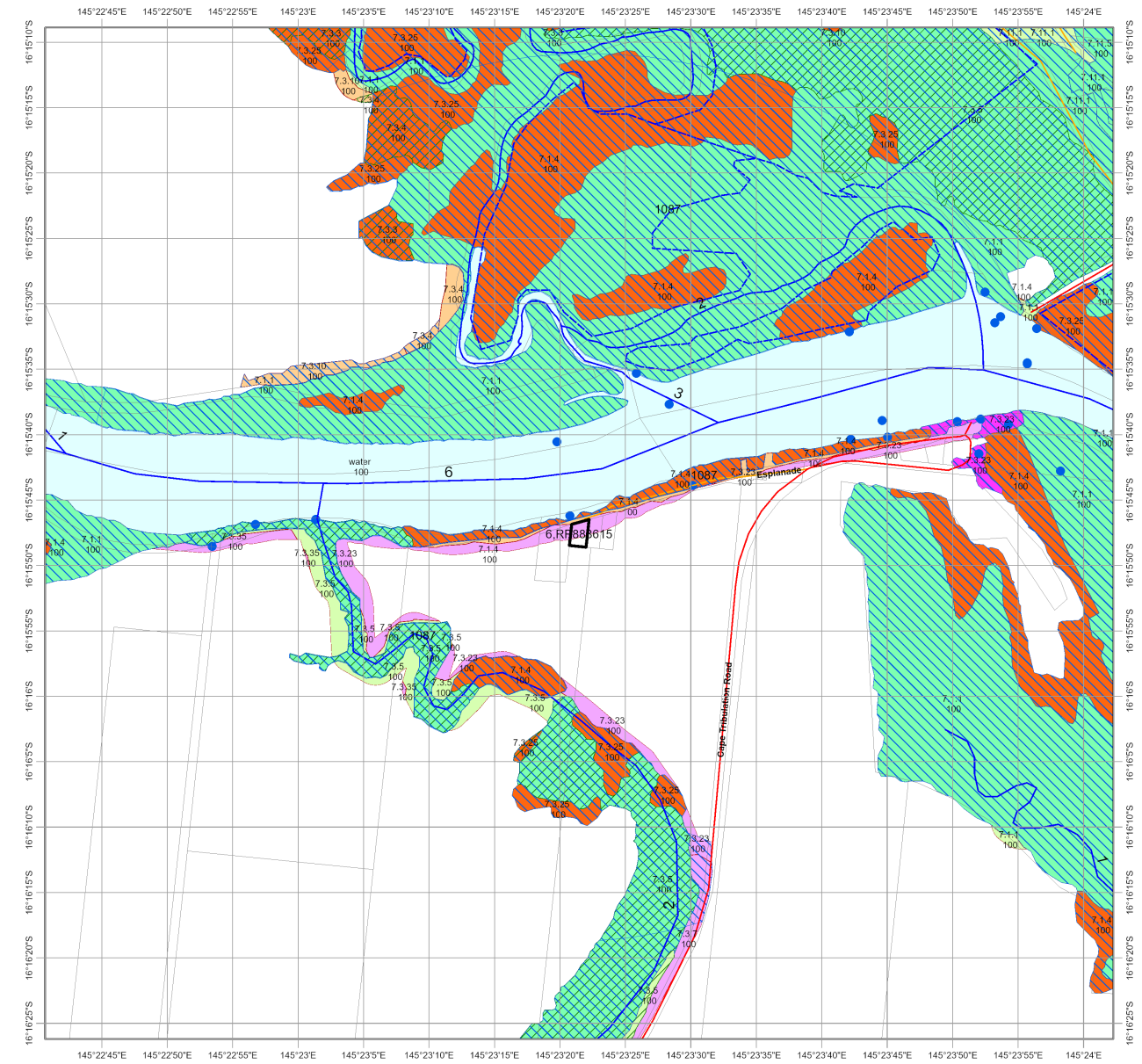
Additional information required for the assessment of vegetation values is provided in the accompanying "Vegetation Management Supporting map". For further information go to the web site: www.resources.qld.gov.au or contact the Department of Resources.

Digital data for the regulated vegetation management map is available from the Queensland Spatial Portal at http://www.information.qld.gov.au/

Land parcel boundaries are provided as locational aid only.

This map is updated on a monthly basis to ensure new PMAVs are included as they are approved.

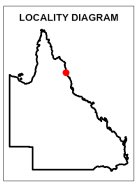
4.2 Vegetation management supporting map



Vegetation Management Supporting Map

- Category A or B area containing endangered regional ecosystems
- Category A or B area containing of concern regional ecosystems
- Category A or B area that is a least concern regional ecosystem
- Category C or R area containing endangered regional ecosystems
- Category C or R area containing of concern regional ecosystems
- Category C or R area that is a least concern regional ecosystem
- Category X area
- Water
- Wetland on the vegetation management wetlands map
- Essential habitat on the essential habitat map
- Essential habitat species record
- Watercourses and drainage features on the vegetation management watercourse and drainage features map (Stream order shown as black number against stream where available)
- Highway
- Connector
- Street/Local Road
- National Parks, State Forest and other reserves
- Other land parcel boundaries
- Selected Lot and Plan

LOCALITY DIAGRAM



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Labels for Essential Habitat are centred on the area of enquiry.

Regional ecosystem linework has been compiled at a scale of 1:100 000, except in designated areas where a compilation scale of 1:50 000 is available. Linework should be used as a guide only. The positional accuracy of RE data mapped at a scale of 1:100 000 is +/- 100 metres.

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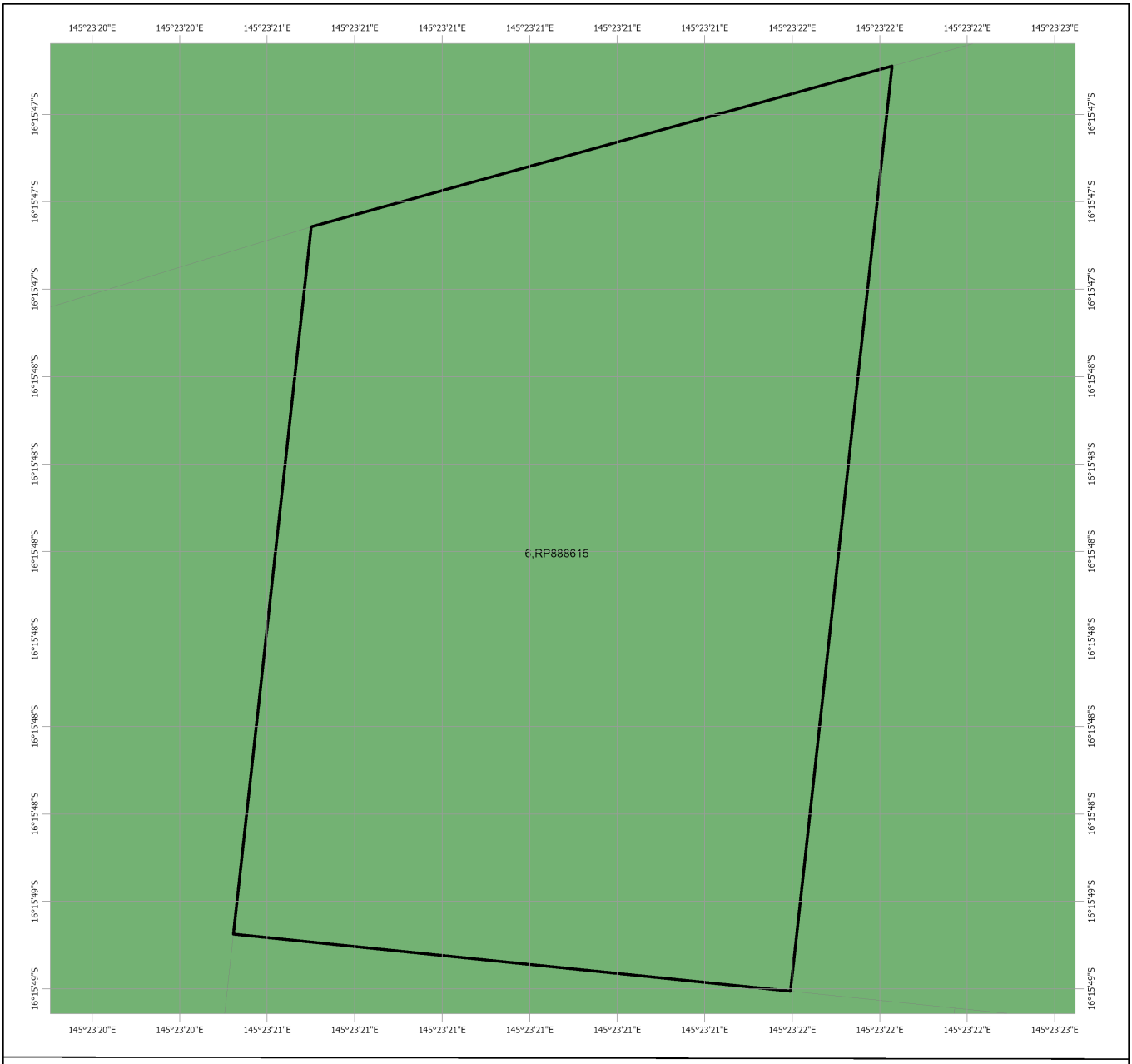
Additional information may be required for the purposes of land clearing or assessment of a regional ecosystem map or PMAV applications. For further information go to the web site: www.resources.qld.gov.au or contact the Department of Resources.

Digital data for the vegetation management watercourse and drainage feature map, vegetation management wetlands map, essential habitat map and the vegetation management remnant and regional ecosystem map are available from the Queensland Spatial Portal at http://www.information.qld.gov.au/

Land parcel boundaries are provided as locational aid only.

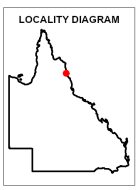
4.3 Coastal/non-coastal map



Coastal/Non Coastal Map

Coastal
Non Coastal
Other land parcel boundaries
Selected Lot and Plan

LOCALITY DIAGRAM



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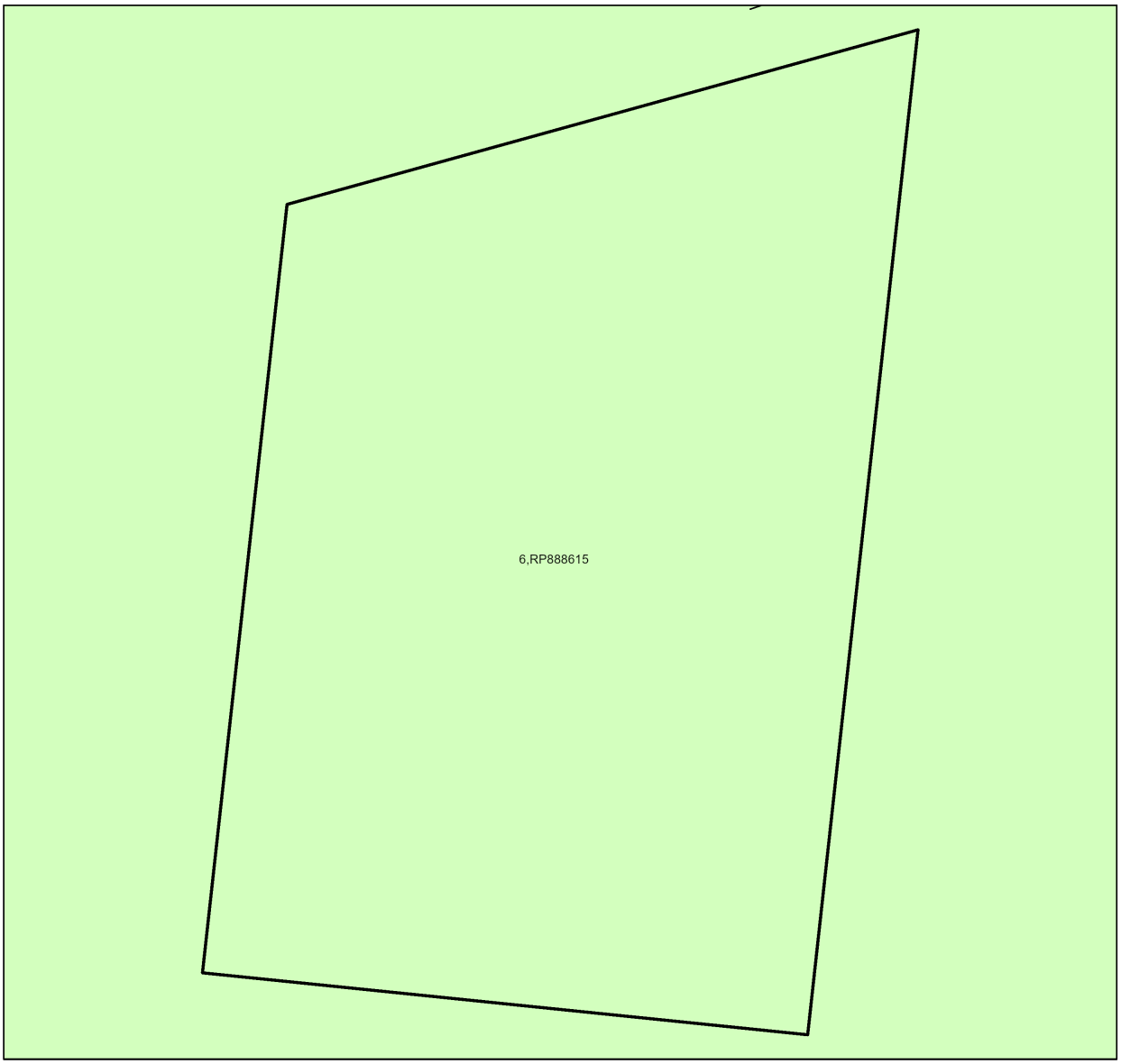
4.4 Agricultural Land Class A or B as per State Planning Policy: State Interest for Agriculture



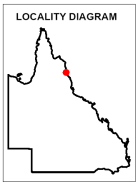
Agricultural Land Class A or B
as per State Planning Policy: State Interest for Agriculture

- Towns
- Rivers and creeks
- Freeways / motorways; Highways
- Secondary roads; Streets

Agricultural land class A or B

- A
- B
- Not class A or B
- Selected Lot and Plan

LOCALITY DIAGRAM



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0 3.9 7.8 11.7 15.6 19.5 m

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5. Protected plants framework (administered by the Department of Environment, Science and Innovation (DESI))

In Queensland, all plants that are native to Australia are protected plants under the *Nature Conservation Act 1992* (NCA). The NCA regulates the clearing of protected plants 'in the wild' (see Operational policy: When a protected plant in Queensland is considered to be 'in the wild') that are listed as critically endangered, endangered, vulnerable or near threatened under the Act.

Please note that the protected plant clearing framework applies irrespective of the classification of the vegetation under the *Vegetation Management Act 1999* and any approval or exemptions given under another Act, for example, the *Vegetation Management Act 1999* or *Planning Regulation 2017*.

5.1 Clearing in high risk areas on the flora survey trigger map

The flora survey trigger map identifies high-risk areas for threatened and near threatened plants. These are areas where threatened or near threatened plants are known to exist or are likely to exist based on the habitat present. The flora survey trigger map for this property is provided in section 5.5.

If you are proposing to clear an area shown as high risk on the flora survey trigger map, a flora survey of the clearing impact area must be undertaken by a suitably qualified person in accordance with the Flora survey guidelines. The main objective of a flora survey is to locate any threatened or near threatened plants that may be present in the clearing impact area.

If the flora survey identifies that threatened or near threatened plants are not present within the clearing impact area or clearing within 100m of EVNT plants can be avoided, the clearing activity is exempt from a permit. An exempt clearing notification form must be submitted to the Department of Environment, Science and Innovation, with a copy of the flora survey report, at least one week prior to clearing.

If the flora survey identifies that threatened or near threatened plants are present in, or within 100m of, the area to be cleared, a clearing permit is required before any clearing is undertaken. The flora survey report, as well as an impact management report, must be submitted with the clearing permit application form.

5.2 Clearing outside high risk areas on the flora survey trigger map

In an area other than a high risk area, a clearing permit is only required where a person is, or becomes aware that threatened or near threatened plantsare present in, or within 100m of, the area to be cleared. You must keep a copy of the flora survey trigger map for the area subject to clearing for five years from the day the clearing starts. If you do not clear within the 12 month period that the flora survey trigger map was printed, you need to print and check a new flora survey trigger map.

5.3 Exemptions

Many activities are 'exempt' under the protected plant clearing framework, which means that clearing of native plants that are in the wild can be undertaken for these activities with no need for a flora survey or a protected plant clearing permit. The Information sheet - General exemptions for the take of protected plants provides some of these exemptions.

Some exemptions under the NCA are the same as exempt clearing work (formerly known as exemptions) under the *Vegetation Management Act 1999* (i.e. listed in Schedule 21 of the Planning Regulations 2017) while some are different.

5.4 Contact information for DESI

For further information on the protected plants framework:
Phone 1300 130 372 (and select option four)
Email palm@des.qld.gov.au
Visit https://www.qld.gov.au/environment/plants-animals/plants/protected-plants

5.5 Protected plants flora survey trigger map

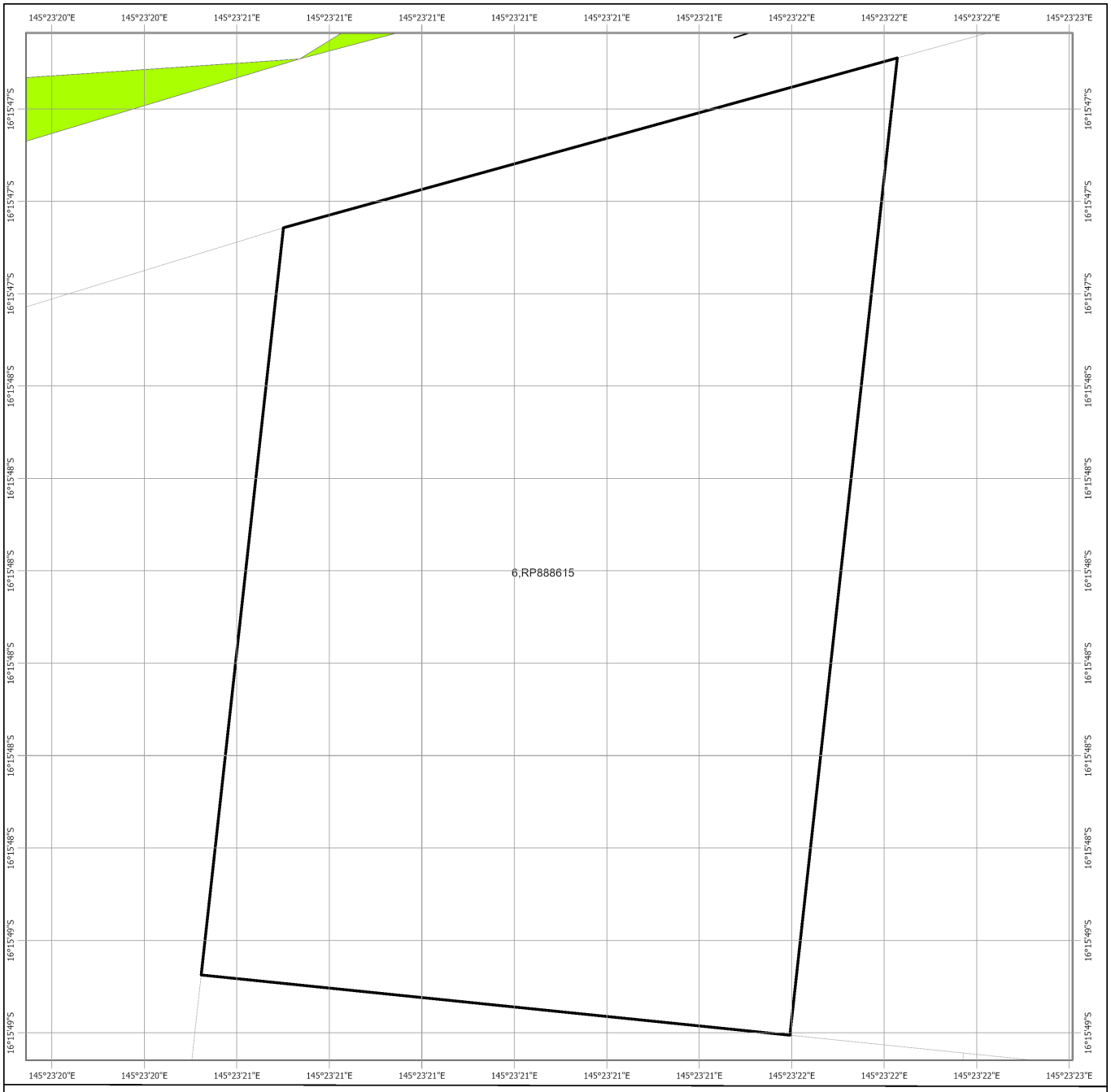
This map included may also be requested individually at: https://apps.des.qld.gov.au/map-request/flora-survey-trigger/.

Updates to the data informing the flora survey trigger map

The flora survey trigger map will be reviewed, and updated if necessary, at least every 12 months to ensure the map reflects the most up-to-date and accurate data available.

Species information

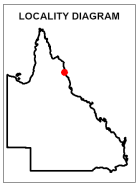
Please note that flora survey trigger maps do not identify species associated with 'high risk areas'. While some species information may be publicly available, for example via the Queensland Spatial Catalogue, the Department of Environment, Science and Innovation does not provide species information on request. Regardless of whether species information is available for a particular high risk area, clearing plants in a high risk area may require a flora survey and/or clearing permit. Please see the Department of Environment, Science and Innovation webpage on the clearing of protected plants for more information.



Protected Plants Flora Survey Trigger Map

- High risk area
- Other land parcel boundaries
- Freeways / motorways / highways
- Secondary roads / streets
- Selected Lot and Plan

LOCALITY DIAGRAM



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This product is displayed in:
GDA2020

This map shows areas where particular provisions of the Nature Conservation Act 1992 apply to the clearing of protected plants.

Land parcel boundaries are provided as locational aid only.

This map is produced at a scale relevant to the size of the area selected and should be printed as A4 size in portrait orientation.

For further information or assistance with interpretation of this product, please contact the Department of Environment, Science and Innovation at palm@des.qld.gov.au

Disclaimer: While every care is taken to ensure the accuracy of the data used to generate this product, the Queensland Government makes no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaim all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damages) and costs which might be incurred as a consequence of reliance on the data, or as a result of the data being inaccurate or incomplete in any way and for any reason.

6. Koala protection framework (administered by the Department of Environment, Science and Innovation (DESI))

The koala (*Phascolarctos cinereus*) is listed in Queensland as endangered by the Queensland Government under *Nature Conservation Act 1992* and by the Australian Government under the *Environment Protection and Biodiversity Conservation Act 1999*.

The Queensland Government's koala protection framework is comprised of the *Nature Conservation Act 1992*, the Nature Conservation (Animals) Regulation 2020, the Nature Conservation (Koala) Conservation Plan 2017, the *Planning Act 2016* and the Planning Regulation 2017.

6.1 Koala mapping

6.1.1 Koala districts

The parts of Queensland where koalas are known to occur has been divided into three koala districts - koala district A, koala district B and koala district C. Each koala district is made up of areas with comparable koala populations (e.g. density, extent and significance of threatening processes affecting the population) which require similar management regimes.

Section 7.1 identifies which koala district your property is located in.

6.1.2 Koala habitat areas

Koala habitat areas are areas of vegetation that have been determined to contain koala habitat that is essential for the conservation of a viable koala population in the wild based on the combination of habitat suitability and biophysical variables with known relationships to koala habitat (e.g. landcover, soil, terrain, climate and ground water). In order to protect this important koala habitat, clearing controls have been introduced into the Planning Regulation 2017 for development in koala habitat areas.

Please note that koala habitat areas only exist in koala district A which is the South East Queensland "Shaping SEQ" Regional Plan area. These areas include the local government areas of Brisbane, Gold Coast, Logan, Lockyer Valley, Ipswich, Moreton Bay, Noosa, Redland, Scenic Rim, Somerset, Sunshine Coast and Toowoomba (urban extent).

There are two different categories of koala habitat area (core koala habitat area and locally refined koala habitat), which have been determined using two different methodologies. These methodologies are described in the document Spatial modelling in South East Queensland.

Section 7.2 shows any koala habitat area that exists on your property.

Under the Nature Conservation (Koala) Conservation Plan 2017, an owner of land (or a person acting on the owner's behalf with written consent) can request to make, amend or revoke a koala habitat area determination if they believe, on reasonable grounds, that the existing determination for all or part of their property is incorrect.

More information on requests to make, amend or revoke a koala habitat area determination can be found in the document Guideline - Requests to make, amend or revoke a koala habitat area determination.

The koala habitat area map will be updated at least annually to include any koala habitat areas that have been made, amended or revoked.

Changes to the koala habitat area map which occur between annual updates because of a request to make, amend or revoke a koala habitat area determination can be viewed on the register of approved requests to make, amend or revoke a koala habitat area available at: https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/mapping/koalamaps. The register includes the lot on plan for the change, the date the decision was made and the map issued to the landholder that shows areas determined to be koala habitat areas.

6.1.3 Koala priority areas

Koala priority areas are large, connected areas that have been determined to have the highest likelihood of achieving conservation outcomes for koalas based on the combination of habitat suitability, biophysical variables with known relationships to koala habitat (e.g. landcover, soil, terrain, climate and ground water) and a koala conservation cost benefit analysis.

Conservation efforts will be prioritised in these areas to ensure the conservation of viable koala populations in the wild including a focus on management (e.g. habitat protection, habitat restoration and threat mitigation) and monitoring. This includes a prohibition on clearing in koala habitat areas that are in koala priority areas under the Planning Regulation 2017 (subject to some exemptions).

Please note that koala priority areas only exist in koala district A which is the South East Queensland "Shaping SEQ" Regional Plan area. These areas include the local government areas of Brisbane, Gold Coast, Logan, Lockyer Valley, Ipswich, Moreton Bay, Noosa, Redland, Scenic Rim, Somerset, Sunshine Coast and Toowoomba (urban extent).

Section 7.2 identifies if your property is in a koala priority area.

6.1.4 Identified koala broad-hectare areas

There are seven identified koala broad-hectare areas in SEQ. These are areas of koala habitat that are located in areas committed to meet development targets in the SEQ Regional Plan to accommodate SEQ's growing population including bring-forward Greenfield sites under the Queensland Housing Affordability Strategy and declared master planned areas under the repealed *Sustainable Planning Act 2009* and the repealed *Integrated Planning Act 1997*.

Specific assessment benchmarks apply to development applications for development proposed in identified koala broad-hectare areas to ensure koala conservation measures are incorporated into the proposed development.

Section 7.2 identifies if your property is in an identified koala broad-hectare area.

6.2 Koala habitat planning controls

On 7 February 2020, the Queensland Government introduced new planning controls to the Planning Regulation 2017 to strengthen the protection of koala habitat in South East Queensland (i.e. koala district A).

More information on these planning controls can be found here:
https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/mapping/legislation-policy.

As a high-level summary, the koala habitat planning controls make:

- development that involves interfering with koala habitat (defined below) in an area that is both a koala priority area and a koala habitat area, prohibited development (i.e. development for which a development application cannot be made);
- development that involves interfering with koala habitat (defined below) in an area that is a koala habitat area but is not a koala priority area, assessable development (i.e. development for which development approval is required); and
- development that is for extractive industries where the development involves interfering with koala habitat (defined below) in an area that is both a koala habitat area and a key resource area, assessable development (i.e. development for which development approval is required).

Interfering with koala habitat means:

1. Removing, cutting down, ringbarking, pushing over, poisoning or destroying in anyway, including by burning, flooding or draining native vegetation in a koala habitat area; but
2. Does not include destroying standing vegetation stock or lopping a tree.

However, these planning controls do not apply if the development is exempted development as defined in Schedule 24 of the Planning Regulation 2017. More information on exempted development can be found here:
https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/mapping/legislation-policy.

There are also assessment benchmarks that apply to development applications for:

- building works, operational works, material change of use or reconfiguration of a lot where:

  - the local government planning scheme makes the development assessable;
  - the premises includes an area that is both a koala priority area and a koala habitat area; and
  - the development does not involve interfering with koala habitat (defined above); and

- development in identified koala broad-hectare areas.

The Guideline - Assessment Benchmarks in relation to Koala Habitat in South East Queensland assessment benchmarks outlines these assessment benchmarks, the intent of these assessment benchmarks and advice on how proposed development may meet these assessment benchmarks.

6.3 Koala Conservation Plan clearing requirements

Section 10 and 11 of the Nature Conservation (Koala) Conservation Plan 2017 prescribes requirements that must be met when clearing koala habitat in koala district A and koala district B.

These clearing requirements are independent to the koala habitat planning controls introduced into the Planning Regulation 2017, which means they must be complied with irrespective of any approvals or exemptions offered under other legislation.

Unlike the clearing controls prescribed in the Planning Regulation 2017 that are to protect koala habitat, the clearing requirements prescribed in the Nature Conservation (Koala) Conservation Plan 2017 are in place to prevent the injury or death of koalas when koala habitat is being cleared.

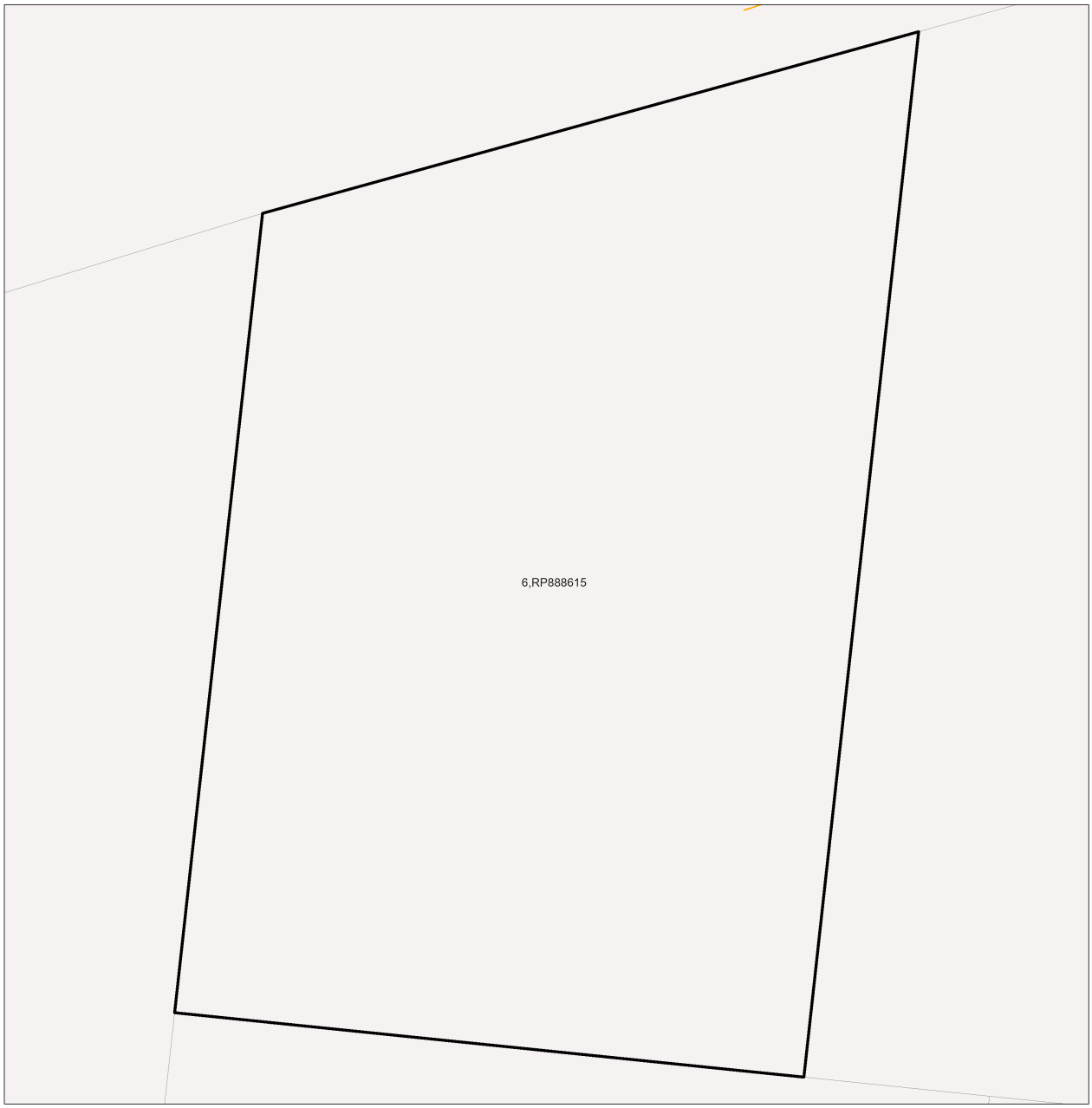
6.4 Contact information for DESI

For further information on the koala protection framework:
Phone 13 QGOV (13 74 68)
Email koala.assessment@des.qld.gov.au
Visit https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/mapping

7. Koala protection framework details for Lot: 6 Plan: RP888615

(no results)

7.2 Koala priority area, koala habitat area and identified koala broad-hectare map

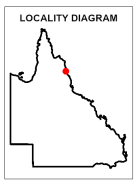


Koala priority area, koala habitat area and identified koala broad-hectare area map

- Koala habitat area (core)
- Koala habitat area (locally refined)
- Koala priority area
- Identified koala broad-hectare area
- Cadastral Boundaries
- Towns
- Major rivers/creeks
- Highway
- Connector
- Street/Local Road
- Queensland
- Selected Lot and Plan

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.

LOCALITY DIAGRAM



N

0 3.55 7.1 10.65 14.2 17.75 m

This product is displayed in GDA2020

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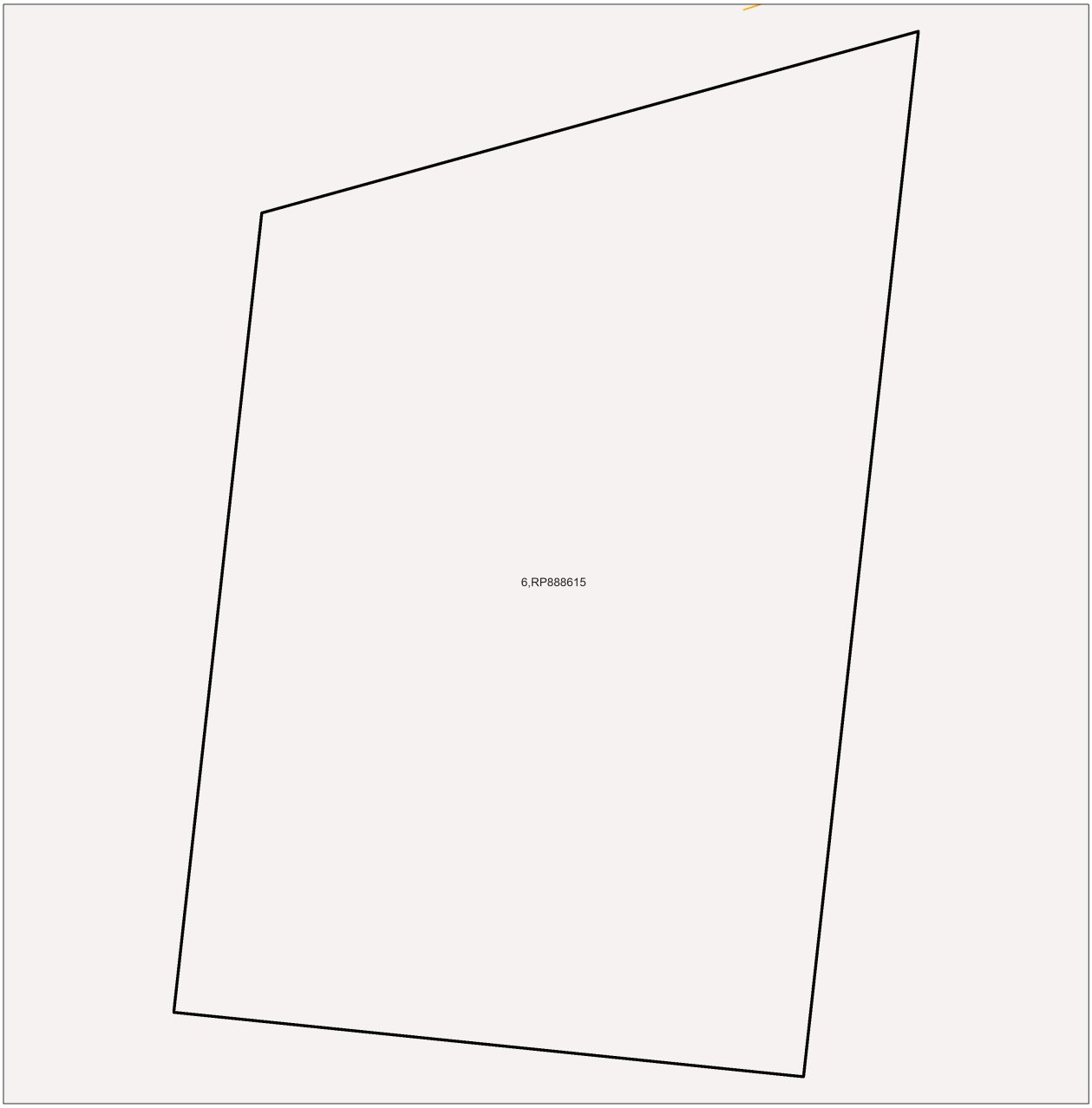
The koala conservation plan maps will be updated at least annually to include any koala habitat areas that have been made, amended or revoked.

In order to ensure that the most recent map for an area of interest can be accessed, prior to the annual update, a register of changes made to koala habitat areas as a result of the map amendment process will be available at: https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/mapping/. The register will include lot on plan for the change, the date the decision was made and the map issued to the landholder which shows areas determined to be koala habitat areas.

7.3 Koala habitat regional ecosystems for core koala habitat areas



Koala habitat regional ecosystems for core koala habitat areas

Koala habitat area (core)
Towns
Highway
Connector
Street/Local Road
Major rivers/creeks
Queensland
Selected Lot and Plan

LOCALITY DIAGRAM

N

0 3.55 7.1 10.65 14.2 17.75 m

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Due to varying sources of data, spatial locations may not coincide when overlaid.

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.

This product is displayed in GDA2020

8. Other relevant legislation contacts list

Activity	Legislation	Agency	Contact details
• Interference with overland flow • Earthworks, significant disturbance	*Water Act 2000* *Soil Conservation Act 1986*	Department of Regional Development, Manufacturing and Water (Queensland Government) Department of Resources (Queensland Government)	Ph: 13 QGOV (13 74 68) www.rdmw.qld.gov.au/ www.resources.qld.gov.au
• Indigenous Cultural Heritage	*Aboriginal Cultural Heritage Act 2003* *Torres Strait Islander Cultural Heritage Act 2003*	Department of Seniors, Disability Services and Aboriginal and Torres Strait Islander Partnerships	Ph: 13 QGOV (13 74 68) www.datsip.qld.gov.au
• Mining and environmentally relevant activities • Infrastructure development (coastal) • Heritage issues	*Environmental Protection Act 1994* *Coastal Protection and Management Act 1995* *Queensland Heritage Act 1992*	Department of Environment, Science and Innovation (Queensland Government)	Ph: 13 QGOV (13 74 68) www.des.qld.gov.au
• Protected plants and protected areas	*Nature Conservation Act 1992*	Department of Environment, Science and Innovation (Queensland Government)	Ph: 1300 130 372 (option 4) palm@des.qld.gov.au www.des.qld.gov.au
• Koala mapping and regulations	*Nature Conservation Act 1992*	Department of Environment, Science and Innovation (Queensland Government)	Ph: 13 QGOV (13 74 68) Koala.assessment@des.qld.gov.au
• Interference with fish passage in a watercourse, mangroves • Forestry activities on State land tenures	*Fisheries Act 1994* *Forestry Act 1959*	Department of Agriculture and Fisheries (Queensland Government)	Ph: 13 QGOV (13 74 68) www.daf.qld.gov.au
• Matters of National Environmental Significance including listed threatened species and ecological communities	*Environment Protection and Biodiversity Conservation Act 1999*	Department of Agriculture, Water and the Environment (Australian Government)	Ph: 1800 803 772 www.environment.gov.au
• Development and planning processes	*Planning Act 2016* *State Development and Public Works Organisation Act 1971*	Department of State Development, Infrastructure, Local Government and Planning (Queensland Government)	Ph: 13 QGOV (13 74 68) www.dsdmip.qld.gov.au
• Local government requirements	*Local Government Act 2009* *Planning Act 2016*	Department of State Development, Infrastructure, Local Government and Planning (Queensland Government)	Ph: 13 QGOV (13 74 68) Your relevant local government office
• Harvesting timber in the Wet Tropics of Qld World Heritage area	*Wet Tropics World Heritage Protection and Management Act 1993*	Wet Tropics Management Authority	Ph: (07) 4241 0500 https://www.wettropics.gov.au/

Appendix B: Likelihood of Occurrence Assessment

Species Name	Common Name	Conservation Status		Habitat	Likelihood of Occurrence
		EPBC Act	NC Act		
Threatened Flora Species					
Phlegmariurus squarrosus	Rock Tassel-fern, Water Tassel-fern	CE	CE	*Phlegmariurus squarrosus* occurs on rocks, particularly around waterfalls, or on tree trunks in lowland swamps and low to mid-altitude rainforest (DCCEEW, 2024).	Low – the site does not contain the preferred habitat of this species.
Bruguiera x hainesii	Haines's Orange Mangrove	CE	CE	*Bruguiera x hainesii* occurs in the landward mangrove zone where it is inundated by only very high tides. It co-occurs with *Aegiceras corniculatum, B. cylindrica, B. gymnorhiza* and *Xylocarpus granatum* (DCCEEW, 2024). Globally, the species is found in the intermediate estuarine zone in the high intertidal region.	Low – this species was searched for during the survey and was not identified within the site.
Leichhardtia araujacea	-	CE	CE	This species, thought to be extinct until recently re-discovered near Cooktown in Far North Queensland, occurs in lowland rainforest (DCCEEW, 2024).	Low – the site does not contain the preferred habitat of this species. Further, it was searched for during the surveys and was not found within the site.
Phlegmariurus filiformis	Rat's Tail Tassel-fern	E	-	The Rat's Tail Tassel-fern is an epiphyte on canopy trees in complex vine forest (DCCEEW, 2024). It occurs in canopy trees in the Mt Hypipamee crater area on the Atherton Tableland and possibly on the coastal ranges between Hinchinbrook Island and Cairns and between Mossman and Cooktown.	Low – the site does not contain the preferred complex vine forest habitat of this species.
Phlegmariurus dalhousieanus	BlueTassel-fern	E	CE	The Blue Tassel-fern is known from only two collections in Queensland, both of which are in lowland swamp forest near Cairns, one of which has been lost to urban development (DCCEEW, 2024). It is an epiphyte on trees or rocks and has been recorded growing in clumps of Platycerium (staghorn).	Low – the site does not contain the preferred habitat, lacking trees and rocks on which it grows. It was not identified during the survey.
Carronia pedicellata	-	E	E	*Carronia pedicellata* grows in complex mesophyll or notophyll vine forest of deep soils derived from basalt, granite or metamorphic substrates at altitudes from near sea level to 520 m (DCCEEW, 2024)	Low – the site does not contain the preferred complex vine forest habitat of this species.
Vrydagzynea grayi	Tonsil Orchid	E	E	*Vrydagzynea paludosa* has only been collected once in Australia, in 1983 from Stewart Creek in the Daintree area in dense lowland rainforest that was cleared prior to world heritage listing (DCCEEW, 2024). It is possible that the species is still present in the nearby national park.	Low – the site does not contain the preferred lowland rainforest habitat of this species.

Species Name	Common Name	Conservation Status		Habitat	Likelihood of Occurrence
		EPBC Act	NC Act		
Polyphlebium endlicherianum	Middle Filmy Fern	E	V	The Middle Filmy Fern grows on damp rocks and tree trunks, in tropical rainforest, often near streams or beside waterfalls (DCCEEW, 2024).	Low – the site does not contain the preferred tropical rainforest habitat of this species.
Dendrobium mirbelianum	Dark-stemmed Antler Orchid, Mangrove Orchid	E	E	*Dendrobium mirbelianum* grows mainly on trees in mangroves and coastal swamps in humid locations (DCCEEW, 2024) and has also been recorded growing on rocks.	Low – This species was targeted during the survey and no individuals were found.
Vappodes lithocola	Dwarf Butterfly Orchid, Cooktown Orchid	E	-	*Vappodes lithocola* grows in rainforest areas on rocks, boulders and cliff faces on ridges and slopes at altitudes of 300–800 m above sea level. Plants are often exposed to the sun and can withstand long periods of hot, dry conditions (DCCEEW, 2024).	Low – the site does not contain the tropical rainforest habitat with rocks, cliffs and boulders preferred by this species.
Chingia australis	-	E	E	*Chingia australis* occurs in rainforest on steep creek banks and slopes of ridges. This species is reliant upon exposure of mineral soil (that lacks organic matter) and is an early pioneer of canopy gaps and substrate disturbance (DCCEEW, 2024).	Low – the site does not contain the preferred habitat of this species.
Dendrobium nindii	an orchid	E	E	*Dendrobium nindii* occurs up to 400 m above sea level, growing on trees (including mangroves and palms) in near-coastal swamps, coastal rainforest, mangroves, and low altitude gorges and streams (DCCEEW, 2024).	Low – the site does not contain the preferred habitat of this species and it was not identified during surveys.
Endiandra cooperana	-	E	E	This species grown in well developed lowland rainforest and is restricted to an area between Cape Tribulation and the Daintree River.	Low – the site does not contain the preferred habitat of this species and it was not identified during surveys.
Phalaenopsis rosenstromii	Native Moth Orchid	E	E	This species is known to grow in trees, rarely on rocks, in humid airy situations on sheltered slopes and in gullies, in deep gorges and close to streams in rainforests, at altitudes from 200–500 m (DCCEEW, 2024).	Low – the site does not contain the preferred habitat of this species and it was not identified during surveys.
Phlegmariurus tetrastichoides	Square Tassel Fern	V	V	The Square Tassel-fern occurs in upland notophyll vineforest (DCCEEW, 2024). It is an epiphyte on rainforest trees, occurring in north-eastern Queensland, from the Daintree, south to Hinchinbrook Island, and west of Mackay, from sea level to 1100 m altitude.	Low – the site does not contain the preferred habitat of this species and it was not identified during surveys.

Species Name	Common Name	Conservation Status		Habitat	Likelihood of Occurrence
		EPBC Act	NC Act		
Canarium acutifolium	-	V	V	This species occurs in mesophyll vine forest along rivers and creeks at altitudes of 5 to 200 m (DCCEEW, 2024).	Low – the site does not contain the preferred habitat of this species and it was not identified during surveys.
Actephila foetida	-	V	V	*Actephila foetida* grows in lowland rainforest (evergreen, complex mesophyll vineforest) on alluvium overlying granite substrates at altitudes from near sea level to 100 m (DCCEEW, 2024).	Low – the site does not contain the preferred lowland rainforest habitat of this species and it was not identified during surveys.
Phaius pictus	-	V	V	*Phaius pictus* occurs sporadically from the McIlwraith Range, Bloomfield River to Kirrama Range (DCCEEW, 2024). It is highly localised, restricted to rainforests from 0–600 m altitude, and usually occurs in sheltered humid sites close to streams and seepage among forest litter on boulders.	Low – the site does not contain the preferred lowland rainforest habitat of this species and it was not identified during surveys.
Myrmecodia beccarii	Ant Plant	V	V	*Myrmecodia beccarii* is known from the coastal woodlands between Cooktown and Ingham in Queensland. This species occurs in open woodland dominated by Melaleuca viridiflora or mangroves (DCCEEW, 2024).	Low – the site does not contain the preferred coastal woodland and *Melaleuca viridiflora* rainforest habitat of this species and it was not identified during surveys.
Arthraxon hispidus	Hairy-joint Grass	V	V	Hairy-joint grass is found in or on the edges of rainforest and in wet eucalypt forest, often near creeks or swamps (DCCEEW, 2024), as well as woodland.	Low – the site does not contain the preferred lowland rainforest or wet eucalypt habitat of this species and it was not identified during surveys.
Acriopsis emarginata	Pale Chandelier Orchid	V	V	*Acriopsis javanica* grows on trees in hot, humid, lowland rainforest, rainforest margins, and in swamps (DCCEEW, 2024). This species is found in near-coastal swamps in the most southerly parts of its range where it can be found growing on paperbarks, palms, and Pandanus spp. (DCCEEW, 2024).	Low – the site does not contain the preferred lowland rainforest or swamp habitat of this species and it was not identified during surveys.
Polyscias bellendenkerensis	-	V	V	This species occurs in mountain rainforest. It has been recorded as growing in microphyll vine/fern thickets, notophyll vine forest and stunted shrublands on granite substrates (DCCEEW, 2024).	Low – the site does not contain the preferred rainforest, vine forest or shrubland habitat of this species and it was not identified during surveys.

Species Name	Common Name	Conservation Status		Habitat	Likelihood of Occurrence
		EPBC Act	NC Act		
Phaleria biflora	-	V	V	*Phaleria biflora* is known from north Queensland, where it occurs in rainforest. It has been recorded in notophyll-microphyll forest and stunted scrub on granite at altitudes of 1140–1350 m(DCCEEW, 2024).	Low – the site does not contain the preferred rainforest, vine forest or shrubland habitat of this species and it was not identified during surveys.
Cyclophyllum costatum	a shrub	V	V	This species grows in rainforest and complex notophyll vineforest along creeks and rivers on stony clay soil with shallow surface of loam from altitudes of 960–1095 m (DCCEEW, 2024).	Low – the site does not contain the preferred rainforest or vine forest habitat of this species and it was not identified during surveys.
Vappodes phalaenopsis	Cooktown Orchid	V	-	*Dendrobium (Vappodes) phalaenopsis* grows on trees and rocks in coastal scrub, littoral rainforest, riverine vegetation, monsoon thickets, swamps and gullies in open forests at altitudes of up to 400 m above sea level (DCCEEW, 2024).	Low – the site does not contain the preferred habitat of this species and it was not identified during surveys.
Hymenasplenium wildii	-	V	V	*Hymenasplenium wildii* is generally found on mossy boulders in accumulated soil within lowland rainforest, occasionally on the banks of streams (DCCEEW, 2024).	Low – the site does not contain the preferred habitat of this species and it was not identified during surveys.
Threatened Fauna Species					
Calidris ferruginea	Curlew Sandpiper	CE; M	E	Curlew Sandpipers mainly occur on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. They are also recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand. They occur in both fresh and brackish waters. Occasionally they are recorded around floodwaters. They do not breed in Australia.	Low - the habitat at the site is not suitable as it does not contain coastal/intertidal habitat. There are also no records within 20km of site, therefore no impact is expected.
Numenius madagascariensis	Eastern Curlew, Far Eastern Curlew	CE; M	E	Most commonly associated with sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sandflats, often with beds of seagrass (Zosteraceae). Occasionally, the species occurs on ocean beaches (often near estuaries), and coral reefs, rock platforms, or rocky islets.	Low – the site does not contain the preferred habitat of this species.

Species Name	Common Name	Conservation Status		Habitat	Likelihood of Occurrence
		EPBC Act	NC Act		
Tringa nebularia	Common Greenshank, Greenshank	E; M; Ma	-	The Common Greenshank is found in a wide variety of inland wetlands and sheltered coastal habitats of varying salinity. It occurs in sheltered coastal habitats, typically with large mudflats and saltmarsh, mangroves or seagrass. Habitats include embayments, harbours, river estuaries, deltas and lagoons and are recorded less often in round tidal pools, rock-flats and rock platforms (DCCEEW, 2024).	Low - the site, particularly in its current state with steeply eroded banks, does not contain suitable roosting or foraging habitat of this species.
Limosa lapponica baueri	Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit	E	V	Bar-tailed godwits usually forage near the edge of water or in shallow water within tidal estuaries and harbours. Most feeding takes place on exposed sandy or soft mud substrates on intertidal flats and beaches. Roosting tends to occur on large intertidal sandflats, spits, and banks. Less frequently, roosting occurs within mudflats, estuaries, coastal lagoons, and bays (DCCEEW, 2024).	Low - the site, particularly in its current state with steeply eroded banks, does not contain suitable roosting or foraging habitat of this species.
Erythrotriorchis radiatus	Red Goshawk	V	E	The Red goshawk inhabits tropical grassy woodlands mostly in undulating stony lands. The types of woodland favoured in the Northern Territory are better known than in Queensland. It nests in large trees, frequently the tallest and most massive in a tall stand, and nest trees are invariably within 1km of permanent water. They typically utilise emergent trees along major watercourses for nesting.	Low - the project area is within the predicted distribution for the species, and there is some potential for it to fly over and utilise the site for foraging from time to time, however no nesting sites were located during the survey and no suitable nesting habitat was identified, and as such it is considered likely that the site would only be used transiently.
Casuarius casuarius johnsonii	**Southern Cassowary, Australian Cassowary, Double-wattled Cassowary**	E	E	This species lives in tropical rainforests, Melaleuca (paperbark) swamps, mangrove forests woodlands and can even be found foraging along beaches. They require this diverse range of habitats to ensure availability of fleshy fruits year round.	**Moderate –** while the site does not currenty contain any foraging plants and affords no shelter, Southern cassowary is known from the area and may move through the site at times to nearby patches of good quality habitat along the Daintree River.
Rostratula australis	Australian Painted Snipe	E	E	The Australian Painted Snipe generally inhabits shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and	Low – the site does not contain the preferred habitat of this species.

Species Name	Common Name	Conservation Status		Habitat	Likelihood of Occurrence
		EPBC Act	NC Act		
				permanent lakes, swamps and claypans. They also use inundated or waterlogged grassland or saltmarsh, dams, rice crops, sewage farms and bore drains. Typical sites include those with rank emergent tussocks of grass, sedges, rushes or reeds, or samphire (DCCEEW, 2024).	
Falco hypoleucos	Grey falcon	V	V	This species inhabits open woodlands and grasslands and the lightly timbered plains over tropical and temperate Australia. It nests in tall trees near or beside major watercourses. A highly nomadic species.	Low – This species is typically considered to be absent from areas east of the Great Dividing Range in Queensland and occurs typically in areas with less than 500mm of annual rainfall. Further, no nesting sites were located during the survey and no suitable nesting habitat was identified
Charadrius leschenaultii	Greater Sand Plover, Large Sand Plover	V: M; Ma	V	In the non-breeding grounds in Australasia, the species is almost entirely coastal, inhabiting littoral and estuarine habitats. They mainly occur on sheltered sandy, shelly or muddy beaches with large intertidal mudflats or sandbanks, as well as sandy estuarine lagoons (DCCEEW, 2024).	Low – the site does not contain the preferred habitat of this species.
Tyto novaehollandiae kimberli	Masked Owl (northern)	V	V	In northern Australia, the Masked owl has been recorded from riparian forest, rainforest, open forest, Melaleuca swamps and the edges of mangroves, as well as along the margins of sugar cane fields (DCCEEW, 2024). The Masked owl (northern) requires a large home range and an abundance of large trees with large hollows in patches of closed forest for nesting.	Low – the site is lacking the necessary roosting and breeding habitat of this species, with no hollow-bearing trees present. The site does not contain closed forest habitat.
Gallinago hardwickii	Latham's Snipe, Japanese Snipe	V; M	V	Open, freshwater wetlands with low, dense vegetation e.g. swamps, flooded grasslands or heathlands, around bogs and other water bodies.	Low – the site does not contain the preferred habitat of this species.
Calidris acuminata	Sharp-tailed Sandpiper	V; M; Ma	SLC	Fresh or salt wetlands, muddy edges of swamps, lagoons, lakes, dams, temporary floodwaters.	Low – the site does not contain the preferred habitat of this species.
Sternula nereis nereis	Australian Fairy Tern	V	-	The Fairy tern (Australian) nests on sheltered sandy beaches, spits and banks above the high tide line and below vegetation. The subspecies has been found in embayments of a variety of habitats including offshore, estuarine or lacustrine (lake) islands, wetlands and mainland coastline (DCCEEW, 2024).	Low – the site does not contain the preferred habitat of this species.

Species Name	Common Name	Conservation Status		Habitat	Likelihood of Occurrence
		EPBC Act	NC Act		
Calidris canutus	Red Knot, Knot	V, M, Ma	E	In Australasia the Red knot mainly inhabit intertidal mudflats, sandflats and sandy beaches of sheltered coasts, in estuaries, bays, inlets, lagoons and harbours; sometimes on sandy ocean beaches or shallow pools on exposed wave-cut rock platforms or coral reefs (DCCEEW, 2024).	Low - the site, particularly in its current state with steeply eroded banks, does not contain the preferred habitat of this species.
Hirundapus caudacutus	**White-throated Needletail**	V, M; Ma	V	In Australia, the White-throated Needletail is mostly aerial, from heights of less than 1 m up to more than 1000 m above the ground (DCCEEW, 2024). Although they occur over most types of habitat, they are recorded most often above wooded areas, including open forest and rainforest, and may also fly below the canopy between trees or in clearings (Higgins 1999).	**Moderate –** this almost entirely aerial species may occur in the airspace over the project site, however no project impacts are expected. There are no important populations recognised in the area, and no breeding occurs in Australia.
Cyclopsittadiophthalma macleayana	Macleay's fig-parrot	-	V	Macleay's fig parrot is a rainforest specialist, feeding on figs, berries, seeds, nectar and the larvae of instecs that bore into wood.	Low – the site does not contain the rainforest habitat required by this species.
Cairnsichthys bitaeniatus	Daintree Rainbowfish	CE	-	The Daintree rainbowfish occurs in small, clear, springfed, rainforest tributaries of Cooper Creek and Hutchinson Creek. It is most common in shaded stream reaches without instream vegetation, situated close to the foothills/plains interface, with water flowing over rock, sand, gravel and log debris (DCCEEW, 2024).	Low – the site is located in the lower, tidally influenced reach of the Daintree River and does not provide suitable habitat for this species.
Stiphodon semoni	Opal Cling Goby	CE	-	In Australia, the Opal cling goby is confined to a limited number of pristine rainforest streams in far north-east Queensland that have significant flow and direct access to marine habitats (DCCEEW, 2024). Locations where the species has been found include Cooper Creek north of the Daintree River, Pauls Pocket Creek north of the Mulgrave and Russell Rivers, and Harvey Creek that drains into the Mulgrave River and Russell River estuary.	Low **–** the site does not contain the pristine rainforest streams required by this species.It is possible it may move through the site to marine habitats.
Litoria dayi	Australian Lace-lid, Lace-eyed Tree Frog, Day's Big-eyed Treefrog	V	V	This species occurs throughout the Wet Tropics Bioregion from Paluma to Cooktown (DCCEEW, 2024). It is associated with rainforests and rainforest margins. In montane areas the species prefers fast-flowing rocky streams although they also frequent slower watercourses where ample vegetation exists along the margins. At low elevations, it favours rock soaks, narrow ephemeral streams and rock outcrops in larger watercourses. It may also	Low **–** the site does not contain the preferred habitat of this species.

Species Name	Common Name	Conservation Status		Habitat	Likelihood of Occurrence
		EPBC Act	NC Act		
				be found on rocks, boulders and vegetation in or adjacent to streams (DCCEEW, 2024).	
Dasyurus maculatus gracilis	Spotted-tailed Quoll (North Queensland), Yarri	E	E	The north Queensland subspecies is thought to be confined to two extant populations: one on the Windsor and Carbine Tablelands, Thornton Peak, Mount Finnegan and associated smaller ranges; the other centered on the Atherton Tablelands and associated mountain ranges (DCCEEW, 2024). It is mostly confined to relatively cool, wet and climatically equable upland closed-forests (mostly above 900 m altitude) that occur in the upper catchments of rivers. Vegetation types typical of this habitat are simple and complex notophyll vine forest, simple microphyll vine-fern forest and simple microphyll vine-fern thicket. It uses dens in tree hollows, logs and rock crevices for resting and for raising young.	Low – the site does not contain the preferred tall, closed forest or vine forest preferred by this species. There is a lack of suitable denning sites, with no hollow-bearing trees or hollow logs within the site.
Pteropus conspicillatus	Spectacled Flying-fox	E	E	The Spectacled flying-fox occurs in north-eastern Queensland. It is restricted to tropical rainforest areas (DCCEEW, 2024). The species was long assumed to feed primarily on rainforest species but individuals regularly feed on a wide variety of non-rainforest species, including eucalypts (Eucalyptus spp., Corymbia spp.) in tall open forests adjoining rainforest communities and in tropical woodland and savanna ecosystems .	Low – No roosts have been identified within or close to the site and the site does not contain the preferred roosting or feeding habitat for this species.
Dasyurus hallucatus	Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu]	E	-	This species is most abundant in rocky eucalypt woodlands but occurs in a variety of habitats. The most successful breeding occurs near creeklines, and dens are usually in hollow tree trunks (DCCEEW, 2024).	Low – there is no suitable denning habitat within the site to support this species. It may move through the site between patches of suitable habitat.
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)	Koala (combined populations of Queensland, New South Wales and	E	E	The Koala is restricted to Eucalypt forests and woodlands and in the northern and western extents of its range, leaf moisture is likely a limiting factor, therefore, it is most likely to be confined to riparian areas in the northern and western parts of its range, particularly during the dry season.	Low – The site does not contain any Koala food or shelter trees. There is no suitable Koala habitat present.

Species Name	Common Name	Conservation Status		Habitat	Likelihood of Occurrence
		EPBC Act	NC Act		
	the Australian Capital Territory)				
Mesembriomys gouldii rattoides	Black-footed tree-rat (north Queensland), Shaggy Rabbit-rat	E	-	This species mostly occurs in eucalypt forests and woodlands, especially where hollows are relatively plentiful. It is a nocturnal rodent that dens mostly in tree hollows, but occasionally in dense foliage (notably of Pandanus), and occasionally in buildings (DCCEEW, 2024).	Low – the site is lacking any suitable denning habitat (ie. a lack of hollow-bearing trees) and foraging species, such as Pandanus.
Rhinolophus robertsi	Large-eared horseshoe bat, Greater large-eared horseshoe bat	V	V	The Large-eared horseshoe bat occurs only in northern Queensland, from the Iron Range southwards to Townsville and west to the karst regions of Chillagoe and Mitchell-Palmer. It is found in lowland rainforest, along gallery forest-lined creeks within open eucalypt forest, Melaleuca forest with rainforest understorey, open savannah woodland and tall riparian woodland of Melaleuca, Forest Red Gum (*E. tereticornis*) and Moreton Bay Ash (*E. tesselaris*) (Churchill 2008).	Low – It is possible that this species could fly and forage over the site. However there is no suitable roosting habitat present to support this species.
Hipposideros semoni	Semon's Leaf-nosed bat, Greater wart-nosed horseshoe-bat	V	E	Semon's leaf-nosed bats roost in caves, old mines, cracks in rocks and under rock overhangs and in trees. They prefer very dark places. They do not appear to roost together in colonies. They mainly occur in rainforests, but have also been recorded from streams and rivers adjacent to rainforest (DCCEEW, 2024).	Low – the site does not contain the preferred habitat for this species. No roosting habitat is present.
Saccolaimus saccolaimus nudicluniatus	Bare-rumped Sheath-tailed Bat, Bare-rumped Sheathtail Bat	V	E	The Bare-rumped Sheathtail Bat occurs mostly in lowland areas, typically in a range of woodland, forest and open environments (DCCEEW, 2024). The Bare-rumped Sheathtail Bat has been suggested to forage over habitat edges such as the edge of rainforest and in forest clearings (Churchill 2008). The small number of confirmed roosts located in Australia have all been in tree hollows (DCCEEW, 2024).	Low – the site does not contain the preferred roosting tree species, and lacks any hollow-bearing trees for roosting purposes.
Xeromys myoides	Water Mouse, False Water Rat, Yirrkoo	V	V	The Water mouse inhabits mangroves and the associated saltmarsh, sedgelands, clay pans, heathlands and freshwater wetlands. It constructs five types of nests: free-standing, termitarium-like mound nests or mounds at the base of mangrove trees (e.g. *Avicennia marina*), mound nests on small elevated 'islands' within the tidal zone, mound nests or	Low - the site does not contain the preferred nesting or foraging habitat for this species. No evidence of Water mouse was identified during the surveys.

Species Name	Common Name	Conservation Status		Habitat	Likelihood of Occurrence
		EPBC Act	NC Act		
				holes in supralittoral banks; nests inside hollow tree trunks, and nests in spoil heaps created as a result of human activity (DCCEEW, 2024).	
Tachyglossus aculeatus	**Short-beaked echidna**	-	SLC	Short-beaked echidnas are Australia's most widespread native mammal, being found in almost all habitats, from snow-covered mountains to deserts. They are also common in urban areas. Echidnas are usually found among rocks, in hollow logs and in holes among tree roots	**Moderate** – The echidna occupies a very broad range of habitat types and may move through the site at times. The site is unlikely to provide important habitat for this species, with no sheltering sites and a lack of food (termites and ants).
Dendrolagus bennettianus	Bennett's tree-kangaroo	-	NT	Bennett's tree kangaroo primarily inhabits northern Queensland's dense rainforests and montane forests, particularly in regions like the Daintree Rainforest and the surrounding areas.	Low – the site does not contain the rainforest or montane forest required by this species.
Crocodylus porosus	**Estuarine crocodile**	M	V	Saltwater crocodiles inhabit coastal rivers and swamps extending well inland via major rivers and billabongs. They are a tropical species, extending south to Rockhampton.	Known – Estuarine crocodiles are known to opccur in the Daintree River.
Migratory Species					
Apus pacificus	**Fork-tailed swift**	M	SLC	Low to very high airspace over varied habitat, rainforest to semi-desert.	**Moderate** – this almost exclusively aerial species occurs over a broad range of habitat types.
Cuculus optatus	Oriental cuckoo	M	SLC	Non-breeding habitat only in Australia. Prefers monsoonal rainforest, vine thickets, wet sclerophyll forest or open Casuarina, Acacia or Eucalyptus woodlands. Frequently at edges or ecotones between habitat types.	Low – the site does not contain the preferred habitat of this species.
Monarcha melanopsis	Black-faced monarch	M	SLC	The Black-faced Monarch mainly occurs in rainforest ecosystems, including semi-deciduous vine-thickets, complex notophyll vine-forest, tropical (mesophyll) rainforest, subtropical (notophyll) rainforest, mesophyll (broadleaf) thicket/shrubland, warm temperate rainforest, dry (monsoon) rainforest and (occasionally) cool temperate rainforest (Blakers et al. 1984). Other areas in which the Black-faced Monarch may be found include gullies in mountain areas or coastal foothills.	Low – the site does not contain the preferred rainforest / vine thicket habitat of this species.

Species Name	Common Name	Conservation Status		Habitat	Likelihood of Occurrence
		EPBC Act	NC Act		
Monarcha frater	Black-winged monarch	M	SLC	The Black-winged monarch is a summer breeding migrant to Australia with a migration route between the north-east coast of Australia (between Cooktown and Cape York Peninsula) and New Guinea, where it is assumed to overwinter. It is a rainforest species, but will use mixed tropical open eucalypt forests and woodlands that are adjacent to areas of rainforest. These woodlands contain understorey elements similar to those found in rainforest habitats (DCCEEW, 2024).	Low – the site does not contain the preferred rainforest habitat, or any tropical open eucalypt forests and woodlands adjacent to areas of rainforest.
Motacilla flava	Yellow Wagtail	M	SLC	This species occupies a range of damp or wet habitats with low vegetation, from damp meadows, marshes, waterside pastures, sewage farms and bogs and grassy tundra. In the north of its range it is also found in large forest clearings.	Low – the site does not contain the preferred habitat of this species.
Myiagra cyanoleuca	**Satin flycatcher**	M	SLC	Ethis species inhabits Eucalypt forest and woodlands, at high elevations when breeding. They are particularly common in tall wet sclerophyll forest, often in gullies or along water courses. In woodlands they prefer open, grassy woodland types. During migration, habitat preferences expand, with the species recorded in most wooded habitats except rainforests. Wintering birds in northern Qld will use rainforest - gallery forest interfaces (DCCEEW, 2024).	**Moderate** – the species may occur along the riparian corridor of Daintree River at times.
Rhipidura rufifrons	Rufous fantail	M	SLC	The Rufous Fantail mainly inhabits wet sclerophyll forests, often in gullies dominated by eucalypts such as Tallow-wood (*Eucalyptus microcorys*), Mountain Grey Gum (*E. cypellocarpa*), Narrow-leaved Peppermint (*E. radiata*), Mountain Ash (*E. regnans*), Alpine Ash (*E. delegatensis*), Blackbutt (*E. pilularis*) or Red Mahogany (*E. resinifera*); usually with a dense shrubby understorey often including ferns. They also occur in subtropical and temperate rainforests (Higgins et al.2007).	Low – while it is possible the species could occur within the narrow riparian habitat associated with minor drainage lines and dams in the site, it's preferred habitat and species with which it is commonly associated are lacking.
Cecropsis daurica	**Red-rumped swallow**	M; MA	SLC	This species predominately forages over wetlands, including swamps, rivers, dams etc. or open areas such as golf courses or cane fields, where insects are taken on the wing. They have been recorded feeding in mixed flocks with other aerial insectivores. As with most swallows and martins,	**Moderate** – this largely aerial species may forage over open areas, such as the non-remnant grassland and ovwer the river.

Species Name	Common Name	Conservation Status		Habitat	Likelihood of Occurrence
		EPBC Act	NC Act		
				Red-rumped Swallows often perch on bare branches or wires. Non-breeding habitat only in Australia.	
Symposiachrus trivirgatus as Monarcha trivirgatus	Spectacled monarch	M	SLC	This species occupies dense vegetation, mainly in rainforest but also in moist or wet sclerophyll forest and occasionally in other densely vegetated habitats such as mangroves, drier forest, woodlands, parks and gardens.	Low – the site does not contain the preferred rainforest habitat of this species.
Calidris melanotos	Pectoral sandpiper	M; Ma	SLC	The Pectoral Sandpiper prefers shallow fresh to saline wetlands. The species is found at coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands. The species is usually found in coastal or near coastal habitat but occasionally found further inland. It prefers wetlands that have open fringing mudflats and low, emergent or fringing vegetation.	Low – The habitat within the site is not the preferred habitat of this species.
Fregata minor	Great frigatebird, Greater frigatebird	M; Ma	SLC	Great frigatebirds are found throughout the tropical and subtropical Indian, Pacific, and south Altantic Oceans. They are vagrant to the south Pacific.	Low – the site does not provide the preferred habitat for this oceanic species.
Fregata ariel	Lesser frigatebird, Least frigatebird	M, Ma	SLC	The Lesser frigatebird occurs over tropical and subtropical waters across the Indian and Pacific Oceans as well as off the Atlantic coast of Brazil.	Low – the site does not provide the preferred habitat for this oceanic species.
Phaethon lepturus	White-tailed tropicbird	M; Ma	SLC	This species is primarily oceanic in tropical waters, rarely inshore, and only near land when breeding. Nests are located on islands and atolls utilising a variety of habitats from closed canopy rainforest to bare sandy ground and rugged rocky terrain (DCCEEW, 2024).	Low – the site does not provide the preferred habitat for this oceanic species.
Limosa lapponica	Bar-tailed Godwit	M; Ma	SLC	The Bar-tailed Godwit is found mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. It is found often around beds of seagrass and, sometimes, in nearby saltmarsh (DCCEEW, 2024).	Low – the site does not contain the preferred habitat of this species.
Actitis hypoleucos	Common sandpiper	M; Ma	SLC	The Common sandpiper is found along all coastlines of Australia and in many areas inland, it is widespread in small numbers. It utilises a wide range of coastal wetlands and some inland wetlands, with varying levels of salinity, and is mostly found around muddy margins or rocky shores	Low – The site does not contain the preferred habitat of this species, and lack foraging habitat.

Species Name	Common Name	Conservation Status		Habitat	Likelihood of Occurrence
		EPBC Act	NC Act		
				and rarely on mudflats. The species is often associated with mangroves, and sometimes found in areas of mud littered with rocks or snags.	
Numenius phaeopus	Whimbrel	M; Ma	SLC	The Whimbrel is often found on the intertidal mudflats of sheltered coasts. It is also found in harbours, lagoons, estuaries and river deltas, often those with mangroves, but also open, unvegetated mudflats. It is occasionally found on sandy or rocky beaches, on coral or rocky islets, or on intertidal reefs and platforms (DCCEEW, 2024).	Low – in it's current state, with steeply eroded banks, the site does not provide the preferred habitat for this species.

Appendix C: Significant Impact Assessment

This section provides detailed profiles for Matters of National Environmental Significance outlining the specific potential impacts and mitigation measures to avoid or reduce the impact to MNES from project activities. Impacts specific to threatened and migratory species are discussed in relation to guidance within the policy statement on those subject areas, and species-specific mitigation measures are also provided (additional to those discussed in Section 6.0 of the terrestrial ecology report).

MNES identified in the terrestrial ecology report and as having a likelihood of occurrence of 'moderate' or higher are addressed in this section.

Significant Impact Criteria

The EPBC Act Policy Statement 1.1 states that the following measures should be considered to determine whether an action is likely to have a significant impact on a MNES:

1. Whether there are any MNES located in the area of the proposed action (noting that 'the area of the proposed action' is broader than the immediate location where the action is undertaken; consider also whether there are any MNES adjacent to or downstream from the immediate location that may potentially be impacted)?
2. Consider the proposed action at its broadest scope (that is, considering all stages and components of the action, and all related activities and infrastructure), whether there is potential for impacts, including indirect impacts, on MNES?
3. Whether there are any proposed measures to avoid or reduce impacts on MNES (and if so, is the effectiveness of these measures certain enough to reduce the level of impact below the 'significant impact' threshold)?
4. Whether any impacts of the proposed action on MNES are likely to be significant impacts (important, notable, or of consequence, having regard to their context or intensity)?

Habitat critical to the survival of a species

'Habitat critical to the survival of a species' refers to areas that are necessary:

- For activities such as foraging, breeding, roosting, or dispersal
- For the long-term maintenance of the species (including the maintenance of species essential to the survival of the species, such as pollinators)
- To maintain genetic diversity and long-term evolutionary development, or
- For the reintroduction of populations or recovery of the species.

Vulnerable Species Criteria

An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:

- Lead to a long-term decrease in the size of an important population of a species
- Reduce the area of occupancy of an important population
- Fragment an existing important population into two or more populations
- Adversely affect habitat critical to the survival of a species
- Disrupt the breeding cycle of an important population
- Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline

- Result in invasive species that are harmful to a Vulnerable species becoming established in the Vulnerable species' habitat
- Introduce disease that may cause the species to decline; or
- Interfere substantially with the recovery of the species.

An 'important population' is a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are:

- Key source populations either for breeding or dispersal
- Populations that are necessary for maintaining genetic diversity, and/or
- Populations that are near the limit of the species range.

Critically Endangered or Endangered Species Criteria

An action is likely to have a significant impact on a Critically Endangered or Endangered species if there is a real chance or possibility that it will:

- Lead to a long-term decrease in the size of a population
- Reduce the area of occupancy of the species
- Fragment an existing population into two or more populations
- Adversely affect habitat critical to the survival of a species
- Disrupt the breeding cycle of a population
- Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline
- Result in invasive species that are harmful to a Critically Endangered or Endangered species becoming established in the Endangered or Critically Endangered species' habitat
- Introduce disease that may cause the species to decline; or
- Interfere with the recovery of the species.

Migratory Species Criteria

An action is likely to have a significant impact on a migratory species if there is a real chance or possibility that it will:

- Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species;
- Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species; or
- Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.

An area of 'important habitat' for a migratory species is:

a) Habitat utilised by a migratory species occasionally or periodically within a region that supports an ecologically significant proportion of the population of the species, and/or
b) Habitat that is of critical importance to the species at particular life-cycle stages, and/or
c) Habitat utilised by a migratory species which is at the limit of the species range, and/or
d) Habitat within an area where the species is declining.

What is an ecologically significant proportion?

Listed migratory species cover a broad range of species with different life cycles and population sizes. Therefore, what is an 'ecologically significant proportion' of the population varies with the species (each circumstance will need to be evaluated). Some factors that should be considered include the species' population status, genetic distinctiveness, and species-specific behavioural patterns (for example, site fidelity and dispersal rates).

What is the population of a migratory species?

'Population', in relation to migratory species, means the entire population or any geographically separate part of the population of any species or lower taxon of wild animals, a significant proportion of whose members cyclically and predictably cross one or more national jurisdictional boundaries including Australia.

Vulnerable Species

White-throated needletail (*Hirundapus caudacutus*)

Description

The White-throated needletail (*Hirundapus caudacutus*) is a large swift with a thickset, cigar-shaped body, stubby tail and long pointed wings (20cm in length and approximately 115–120g in weight). Sexes are alike, with no seasonal variation in plumage. The adults have a dark-olive head and neck, with an iridescent gloss on the crown. The mantle and the back are paler, greyish in colour and the upperwings are blackish, sometimes with a greenish gloss, with a contrasting white patch at the base of the trailing edge. The uppertail is black with a greenish gloss. The face is dark-olive with a narrow, white band across the forehead and lores with a white patch on the chin and throat.

The underparts are generally dark-olive except for a U-shaped band across the rear flanks, the vent and the undertail coverts, and the undertail is black with a greenish gloss. The underwing is blackish-brown with glossy grey-brown flight feathers. The bill is black, the eyes black-brown and the legs and feet are dark grey, sometimes with a pinkish tinge.

Juveniles have a similar appearance to the adults, but can be separated by duller plumage, with little gloss. The pale saddle is duller, contrasting less with the head, neck and uppertail, and the white band across the forehead and white patches on the upperwings and the vent and undertail coverts are all less prominent and duller (DCCEEW, 2024).

The White-throated needletail is generally gregarious when in Australia, sometimes occurring in large flocks, though they are occasionally seen singly. Occasionally the species occurs in mixed flocks with other aerial insectivores, including Fork-tailed swifts (Apus pacificus) and Fairy martins (*Hirundo ariel*) (DCCEEW, 2024).

Distribution

There are two recognised subspecies of the White-throated needletail:

- subspecies caudacutus occurs in central and eastern Siberia, northern Mongolia, northern China and the Korean Peninsula, Sakhalin and Japan, and migrates to spend the non-breeding season in Australasia.
- subspecies nudipes, which breeds in the Himalayas from northern Pakistan to Assam and south-western China and is largely resident and does not occur in Australasia (DCCEEW,2024).

Subspecies caudacutus is widespread in eastern and south-eastern Australia. In eastern Australia, the species is recorded in all coastal regions of Queensland and NSW, extending inland to the western slopes of the Great Dividing Range and occasionally onto the adjacent inland plains. Further south on the mainland, it is widespread in Victoria, though more so on and south of the Great Dividing Range, and there are few records in western Victoria. The species occurs in adjacent areas of south-eastern South Australia, where it extends west to the Yorke Peninsula and the Mount Lofty Ranges. It is widespread in Tasmania.

The species is also a vagrant to the Northern Territory as well as various outlying islands, including Norfolk, Lord Howe, Macquarie, Christmas and Cocos-Keeling Islands.

The breeding distribution of the White-throated needletail is fragmented, with subspecies caudacutus breeding from northern Japan west to central and eastern Siberia.

General Habitat

This species is mostly aerial, from heights of less than 1m up to more than 1000m above the ground. Although they occur over most types of habitat, they are recorded most often above wooded areas, including open forest and rainforest, and may also fly below the canopy between trees or in clearings (Higgins 1999).

Roosting Habitat

This species roosts in trees amongst dense foliage in the canopy or in hollows (Corben et al. 1982; Tarburton 1993, 2015).

Recognised Threats

In Australia there is evidence of collision with wind turbines (Hull 2013), overhead wires, windows and lighthouses (Stokes 1983) but the scale of impact at the population level requires further investigation.

Tarburton (2014) identified the use of insecticides, particularly organochlorines, as another possible cause of decline of White-throated needletails, either through a decrease in the abundance of invertebrates from wide use of insecticides or from secondary poisoning by insecticides accumulated as sublethal doses in the prey.

As noted in Tarburton (2014), the loss of roosting sites in Australia may also be contributing to the decline of the species. Loss of forest and woodland habitats may have also resulted in the reduction of invertebrate prey.

It is thought that logging of taiga forests in Siberia, where most of the population breeds, poses the greatest risk by removing old trees and stumps that contain hollows which this species uses to breed (Crowley 2005).

On the species' breeding grounds it was formerly hunted with nets placed near their breeding sites.

Important population

There are no important populations of this species known in Australia (or elsewhere), and the species total population is unknown.

Significant impact assessment

An assessment against the Significant Impact Guidelines 1.1 is provided in Table 7. The outcome of this assessment was that the project is considered unlikely to result in a significant impact to the species, due to the absence of an important population in the project area and the occurrence of potential foraging and roosting habitat only. The assessment has been based on total clearing of approximately 33ha 1530 m^2 of remnant vegetation, although this entire area may not require clearing for the project.

Table 8. Significant impact assessment for the White-throated needletail

EPBC Act Criteria – is there a real possibility that the project will:	Assessment of significance
Lead to a long-term decrease in the size of an important population of a species?	**No.** This species is almost entirely aerial in its habits and does not breed in Australia. It was not detected within the project area during the surveys. There is no roosting habitat present within the site. No important population of the White-throated needletail has been identified within or near the project area (or elsewhere in Australia). It is therefore considered highly unlikely that the project will result in a long-term decrease in the size of an important population of this species.
Reduce the area of occupancy of an important population?	**No.** The area of occupancy of the White-throated needletail in Australia has been estimated at 126,200 km² (DCCEEW, 2024a). As a worst-case scenario, the project will result in the loss of approximately 0.0015km² (0.153 ha) of disturbed riparian vegetation, grassland habitat and estuary over which it may forage, which is negligible in terms of the total estimated area of occupancy for the species. No white-throated needletails were identified within the project area. Further, no important populations are known from within Australia. As such, it is considered unlikely that the project will result in a reduction in the area of occupancy of an important population.
Fragment an existing important population into two or more populations?	**No.** The species is highly mobile and aerial in habit, and the project will result in limited vegetation clearing, while vast tracts of contiguous remnant vegetation surround the project site, maintaining extensive connectivity throughout the landscape. No important populations are known within Australia or expected to occur within the project area and project activities would not result in dispersal challenges for any population that may exist. Therefore, it is considered unlikely that the project will result in the fragmentation of an existing important population into two or more subpopulations.
Adversely affect habitat critical to the survival of a species?	**No.** Important habitat for this widespread and aerial species in Australia is restricted to non-breeding foraging and roosting habitat, and habitat critical the survival of the species has not been defined in Australia. As such, it is considered unlikely that the project will result in adverse impacts to habitat classified as critical to the survival of this species.
Disrupt the breeding cycle of an important population?	**No.** This species does not breed in Australia and the project will not disrupt the breeding cycle of any important populations.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?	**No.** From examining the extent and connectivity of habitat in the surrounding landscape and considering relevant aspects of their biology, the proposed action would not have the capacity to isolate populations or destroy enough habitat that could be considered significant in the broader context. It is not anticipated that the proposed action will decrease the availability or quality of habitat to the extent that the species is likely to decline. Therefore, considering the broader landscape characteristics and connectivity as well as the species' ability to move across large areas, it is concluded that the proposed action is unlikely to decrease habitat availability to the extent that the species is likely to decline.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat?	**No.** Detailed weed and pest management measures will be developed and incorporated into the Project EMP to mitigate and manage the potential spread of pest flora and fauna species. Species-specific management will be undertaken for identified key weed and pest species at risk of spread through project activities. Control efforts will be increased in areas particularly sensitive to invasion. Further, invasive species have not been identified as a threat to the White-throated needletail.
Introduce disease that may cause the species to decline?	**No.** Disease has not been identified as a threat to the White-throated needletail.
Interfere with the recovery of the species?	**No.** Due to the limited nature of any threats to this species and its mobility, there are no threat abatement or recovery actions either underway or proposed (DCCEEW, 2024). It is therefore unlikely that the project will interfere with the recovery of the species.

Endangered species

Southern cassowary (*Casuarius casuarius johnsonii*)

Description

Cassowaries belong to the ratite group of large flightless land birds. Of the three extant species, only the southern cassowary, *Casuarius casuarius johnsonii*, is found in Australia (DCCEEW, 2024). It is the largest native vertebrate in Australian rainforests. Adults grow to two metres tall with males up to 55kg and females, usually larger, up to 76kg.

Newly hatched chicks are striped dark brown and creamy white. After three to six months the stripes fade and the plumage changes to brown. As the young mature the plumage darkens, the wattles and casque develop and the skin colour on the neck and wattles brighten (DCCEEW, 2024).

Adults have shiny black plumage and a distinctive neck and head: brilliant blue and purple with long, drooping red wattles and amber eye. The tall helmet or casque on maturing birds grows with age. Each leg has three toes, with the inside toe bearing a large dagger-shaped claw. The sexes are fairly similar though females are slightly larger. Cassowaries mature at about three years of age.

Distribution

Cassowaries in the Wet Tropics were historically distributed between Cooktown in the north, south to Townsville and west to the extent of rainforest including the entire rainforest portion of the Atherton Tableland (Marchant and Higgins 1990). Present distribution remains similar but greatly reduced and fragmented by vegetation clearance. Areas in which cassowaries are thought to be extinct include large parts of the Atherton Tablelands, the lower Goldsborough Valley, the floor of the Whyanbeel valley, the Clohesy River region and the Cassowary Range (DCCEEW, 2024).

Core habitat remains in the rainforest and associated habitats of the coastal lowlands between Ingham and Mossman, and the upland areas incorporating Seaview and Kirrama Range, the southern Atherton and Evelyn Tablelands, the Lamb Range and the Carbine, Finnegan and Thornton uplands (DCCEEW, 2024).

Foraging and breeding habitat

Although occurring primarily in rainforest and associated vegetation mosaics, the cassowary also uses woodland, swamp and disturbed habitats as intermittent food sources and as connecting habitat between more suitable sites (DCCEEW, 2024). It requires a high diversity of fruiting trees to provide a year-round supply of fleshy fruits. While some habitats may be important only briefly in the annual cycle of food production, they may be crucial to the survival of cassowaries whose home range encompasses them. Their diet includes fleshy fruits of up to 238 plant species (DCCEEW, 2024). While fallen fruit is the primary food source, cassowaries also eat small vertebrates, invertebrates, fungi, plants and carrion (Marchant and Higgins 1990).

The cassowary is territorial and solitary, with contact between mature individuals generally only tolerated during mating. Sexes will maintain independent but overlapping home ranges with female home ranges encompassing those of one to several males (DCCEEW, 2024).

Habitat Critical to the Survival of the Species

As a significant amount of cassowary habitat has been lost through clearing, all remaining habitat utilised by cassowaries is considered important. Three categories of habitat utilised by cassowaries

have been identified and mapped in the Wet Tropics and are based on the Regional Ecosystem (RE) mapping. While three categories have been defined it is the category of 'essential habitat', defined as being necessary for the persistence of cassowary populations in perpetuity, that is deemed to be the best estimate of habitat critical to the survival of the species. Essential cassowary habitat has been afforded protection under the VM Act as discussed in Section 4 and 5 of the Technical Ecology Report.

More than 800,000ha of essential cassowary habitat has been mapped in the Wet Tropics of which 84 per cent falls within the Wet Tropics World Heritage Area (WHA). While the majority of habitat lies within protected tenures (DCCEEW, 2024).

Important population

Areas of high cassowary activity or 'hotspots' around Mission Beach, Coquette Point (Moresby Range), Graham Range, Woopen/Badgery Creeks (upper Russell and North Johnstone River valleys), and the Wallaman Falls/Mt Fox areas have been identified (Crome and Moore, 1990 in DCCEEW, 2024). It has been further suggested that the Black Mountain corridor (Macalister Range), the Lamb Range to Davies Creek and the slopes on the north and east shores of Lake Tinaroo, appeared to be important for cassowary populations. Six priority Regional Cassowary Management Areas are identified as having extreme current/potential threats to their cassowary populations. They are the Daintree lowlands, Kuranda and Black Mountain Road, sections of the Cairns foothills, Innisfail, Mission Beach and Paluma/Mt Spec.

Given their spatial and probable long-term temporal isolation from one another, the Wet Tropics and Cape York populations might well represent distinct genetic populations, but no population genetics data exists to confirm this (DCCEEW, 2024). There appear to be at least ten subpopulations that have become isolated by clearing in the Wet Tropics (Garnett and Crowley 2000).

Significant impact assessment

An assessment against the Significant Impact Guidelines 1.1 is provided in Table 8. The outcome of this assessment was that the project is considered unlikely to result in a significant impact to the species, due to the lack of suitable foraging, sheltering and breeding habitat, and the presence of dispersal and movement habitat only within the site. The assessment has been based on total worst-case scenario of clearing or disturbance of approximately 0.003 ha of disturbed remnant riparian vegetation and 0.02 ha of non-remnant grassland, and taking into consideration that the project aims to remediate the site, including revegetation with local native species that will enhance habitat for this species.

Table 9. Significant impact assessment for the Southern cassowary

EPBC Act Criteria – is there a real possibility that the project will:	Assessment of significance
Lead to a long-term decrease in the size of an important population of a species?	**No.** It is possible that Southern cassowaries could move through the site between patches of higher quality habitat at times, but no cassowaries or evidence of cassowary was identified during the surveys. It is therefore considered unlikely that the project will result in a long-term decrease in the size of an important population of this species.
Reduce the area of occupancy of	**No.** While it is possible that the project area could provide movement and dispersal habitat for the Southern cassowary, no individuals were recorded during the surveys, and the habitat present was

EPBC Act Criteria – is there a real possibility that the project will:	Assessment of significance
an important population?	assessed as marginal for this species. There is no foraging, breeding and shelter habitat present within the site. The project therefore is not expected to reduce the area of occupancy of an important population of the Southern cassowary.
Fragment an existing important population into two or more populations?	**No.** While it is possible that the project area could provide movement and dispersal habitat for the Southern cassowary, no individuals were recorded during the surveys, and the habitat present was assessed as marginal for this species. There is no foraging, breeding and shelter habitat present within the site. Further, considering the project site in the broader landscape context, it is surrounded by vast tracts of remnant vegetation maintaining extensive connectivity throughout the landscape. It is therefore considered unlikely that the project would result in the fragmentation of an important population into two or more populations.
Adversely affect habitat critical to the survival of a species?	**No.** The site contains approximately 0.07 ha of mapped essential habitat for the Southern cassowary. However, the field surveys determined that most of the site is in fact non-remnant grassland with no foraging, breeding or shelter habitat present. Approximately 0.003 ha of disturbed riparian vegetation consistent with RE 7.1.4a occurs in the far western end of the site and will be cleared to construct the project. However, considering the vast extent of suitable cassowary habitat in the broader landscape surrounding the project site, and the proposed revegetation of the site which will enhance habitat values for the Southern cassowary, the project was assessed as unlikely to result in a significant impact to habitat critical to the survival of the species.
Disrupt the breeding cycle of an important population?	**No.** The site is almost entirely non-remnant and does not contain any suitable breeding habitat for this species. It is therefore considered unlikely that the project will result in the disruption of the breeding cycle of this species.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?	**No.** The site contains approximately 0.07 ha of mapped essential habitat for the Southern cassowary. However, the field surveys determined that most of the site is in fact non-remnant grassland with no foraging, breeding or shelter habitat present. Approximately 0.003 ha of disturbed riparian vegetation consistent with RE 7.1.4a occurs in the far western end of the site and will be cleared to construct the project. However, considering the vast extent of suitable cassowary habitat in the broader landscape surrounding the project site, and the proposed revegetation of the site which will enhance habitat values for the Southern cassowary, the project was assessed as unlikely to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat?	**No.** Detailed weed and pest management measures will be developed and incorporated into the Project EMP to mitigate and manage the potential spread of pest flora and fauna species, particularly those restricted species listed under the *Biosecurity Act 2014* which pose the greatest threat to the Southern cassowary and other threatened species.
Introduce disease that may cause the species to decline?	**No.** Two diseases have been recognised as a threat to the Southern cassowary: Avian TB, which is a ubiquitous disease with the organism found in the environment including soil and water; and Aspergillosis, the most common mycotic infection of the respiratory tract in birds is possibly a secondary disease of debilitated cassowaries causing respiratory symptoms and ultimately mortality (DCCEEW, 2024). However, it is not expected that the proposed action will introduce known of new diseases that may cause the species to decline.
Interfere with the recovery of the species?	**No.** A new draft National recovery plan for this species is currently under development. However, the existing National Recovery Plan (Latch, 2007) identified 8 key objectives for the conservation and recovery of the Southern cassowary. The project is not expected to interfere with these objectives.

Migratory Species

Estuarine Crocodile (*Crocodylus porosus*)

The saltwater or estuarine crocodile, *Crocodylus porosus*, is the largest of all living reptiles. Young saltwater crocodiles are pale yellow in colour with black stripes and spots on their bodies and tails. This colouration lasts for several years until the crocodiles mature into adults. The colour as an adult is much darker greenish drab, with a few lighter tan or grey areas sometimes apparent.

Despite their relative lethargy, saltwater crocodiles are agile predators and display surprising agility and speed when necessary, usually during strikes at prey. They can also swim at 24 to 29 km/h (15 to 18 mph) in short bursts, around three times as fast as the fastest human swimmers, but when cruising, they usually travel at 3 to 5 km/h (2 to 3 mph).

Males reach sexual maturity around 3.3 m (10 ft 10 in) at around 16 years of age, while females reach sexual maturity at 2.1 m (6 ft 11 in) and 12–14 years of age.[12] Saltwater crocodiles mate in the wet season, when water levels are at their highest. The female selects the nesting site, and both parents will defend the nesting territory, which is typically a stretch of shore along tidal rivers or freshwater areas, especially swamps. Nests are often in a surprisingly exposed location, often in mud with little to no vegetation around, and thus limited protection from the sun and wind. The nest is a mound of mud and vegetation, usually measuring 175 cm (5 ft 9 in) long and 53 cm (1 ft 9 in) high, with an entrance averaging 160 cm (5 ft 3 in) in diameter. The female typically lays from 40 to 60 eggs, but some clutches have included up to 90.

Distribution

In northern Australia, Western Australia, and Queensland, the Saltwater crocodile is thriving, particularly in the multiple river systems near Darwin such as the Adelaide, Mary, and Daly Rivers, along with their adjacent billabongs and estuaries. The saltwater crocodile population in Australia is estimated at 100,000 to 200,000 adults (DCCEEW, 2024).

In Queensland the Saltwater crocodile inhabits reef, coastal and inland waterways from Gladstone on the east coast, throughout the Cape York Peninsula and west to the Queensland-Northern Territory border.

Habitat

It is found in suitable habitats in the Indo-Pacific coast. Including freshwater swamps and rivers, moving downstream to estuaries in the dry season, and sometimes traveling far out to sea. There is no Recovery Plan or conservation advice present for this species and no important habitat has been identified.

Significant Impact Assessment

An assessment against the Significant Impact Guidelines 1.1 is provided in Table 9. The outcome of this assessment was that the project is considered unlikely to result in a significant impact to the species, due to the small scale of temporary impact within the river, and the lack of suitable nesting, shelter or basking habitat within the terrestrial sections of the project site. The assessment has been based on total clearing of the project area (0.023 ha of non-remnant and disturbed riparian vegetation which does not provide suitable nesting, shelter or basking habitat), although it is unlikely that this entire area will be required to be cleared for the project.

Table 10. Significant impact assessment for the Estuarine crocodile.

EPBC Act Criteria- is there a real possibility that the Project will:	Assessment of Significance
Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species?	**No.** The project will result in temporary disturbance within a small area of the riverbank / channel (0.13 ha) and clearing of 0.02 ha of non-remnant grassland and 0.003 ha of disturbed riparian vegetation. The terrestrial habitats within the site were assessed as unsuitable for nesting, shelter or basking. The site will be remediated and revegetated, enhancing habitat values within the site on completion. It is therefore concluded that the proposed project will not substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for the Estuarine crocodile.
Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species?	**No.** Detailed weed and pest management measures will be developed and incorporated into the Project EMP to mitigate and manage the potential spread of pest flora and fauna species, particularly those restricted species listed under the *Biosecurity Act 2014* which pose the greatest threat to threatened and migratory species.
Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species?	**No.** The project site does not contain any habitat suitable for nesting and it is not expected that this short-term project will seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the Estuarine crocodile population.

Satin Flycatcher (*Myiagra cyanoleuca*)

Description

The Satin flycatcher is a small blue-black and white bird with a small crest. The sexes are dimorphic (have two forms). Males are glossy blue-black above, with a blue-black chest and white below, while females are duskier blue-black above, with an orange-red chin, throat and breast, and white underparts and pale-edged wing and tail feathers (Birds in Backyards, 2024). Young birds are dark brown-grey above, with pale streaks and buff edges to the wing feathers, and a mottled brown-orange throat and chest. It is an active, mobile species.

Distribution

The Satin flycatcher is found along the east coast of Australia from far northern Queensland to Tasmania, including south-eastern South Australia. It is also found in New Guinea. It is not a commonly seen species, especially in the far south of its range, where it is a summer breeding migrant.

Habitat

The satin flycatcher inhabits eucalypt woodlands with open understorey and grassy ground cover and is generally absent from rainforest. While the diversity of occupied habitats expands during migration, this species is recorded in most wooded habitats. Wintering birds in northern Queensland will use the rainforest - gallery forests interfaces, and birds have been recorded wintering in mangroves and paperbark swamps (DCCEEW, 2024).

This species migrates to northern Australia and Papua New Guinea in autumn and returns to southeastern Australia in spring. Their migration route appears to follow the Great Dividing Range but reported sightings have occurred in coastal New South Wales. Departure times vary dependant on location, but it is generally between February and early May. Timing for returning south to breed also varies dependant on location but ranges between August to November.

The satin flycatcher has not previously been recorded within the project area; however scattered records occur from the surrounding area. Foraging habitat for this species is found within the project area, with approximately 0.003 ha of disturbed riparian vegetation occurring in the western end of the project site. This species is primarily insectivorous, preying on arthropods, mostly insects, although very occasionally they will also eat seeds. They are arboreal foragers, feeding high in the canopy and subcanopy of trees, usually sallying for prey in the air or picking prey from foliage and branches of trees, flitting from one perch to another (DCCEEW, 2024).

The Satin flycatcher typically breeds in *Eucalyptus* forest and woodland at high elevations (in southern Australia) which is not present within the project site, and as such, no impacts to breeding are anticipated.

Potential impacts of the project on this species include temporary habitat loss followed by a net gain of habitat due to revegetation.

Important Habitat

According to Department of the Environment (2015), important habitat for the Satin flycatcher has been identified as the following:

- Eucalypt forest and woodlands, at high elevations when breeding. They are particularly common in tall wet sclerophyll forest, often in gullies or along water courses. In woodlands they prefer open, grassy woodland types.
- During migration, habitat preferences expand, with the species recorded in most wooded habitats except rainforests.
- Wintering birds in northern Queensland will use rainforest - gallery forests interfaces, and birds have been recorded wintering in mangroves and paperbark swamps.

The vegetation within the project area does not meet the definition of important habitat.

Significant Impact Assessment

An assessment against the *Significant Impact Guidelines 1.1* is provided in Table 10. The outcome of this assessment was that the project is considered unlikely to result in a significant impact to the species. The project is not expected to create barriers to movement, substantially modify important habitat, result in invasive species becoming established or disrupt the lifecycle of an ecologically significant proportion of the population. The assessment has been based on total clearing of the project area (0.003 ha of potential habitat), although it is unlikely that this entire area will be required to be cleared for the project.

Table 11. Significant impact assessment for the Satin flycatcher

EPBC Act Criteria- is there a real possibility that the Project will:	Assessment of Significance
Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species?	**No.** The project is not considered likely to result in the creation of barriers to movement to, between, or within habitat, nor will it alter the fire regimes, nutrient cycles or hydrological cycles. Substantial loss or modification of important habitat has been identified as a loss of 4,400 ha (1%) and 440 ha (0.1%). Approximately 0.003 ha of dispersal and foraging habitat for this species occurs within the project area, although it is unlikely that this entire area will be required to be cleared for the project. The project will result in minimal impacts to suitable foraging habitat for the Satin flycatcher; and the area to be cleared does not reach the area threshold for this species. Therefore, the project is unlikely to substantially modify, destroy or isolate an area of important habitat for the Satin flycatcher.
Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species?	**No.** Black rat (*Rattus rattus*) and invasive vines of riparian habitat have been identified as a key threat to the species. Black rat was not identified during the survey but given the limited extent of clearing and the ability of the species to persist in highly diverse habitats, it is unlikely that project activities will exacerbate impacts to any population beyond current levels. A detailed Weed and Pest Management Plan will be developed to mitigate and manage the potential spread of pest flora and fauna species. Species-specific management will be undertaken for identified key weed and pest species at risk of spread through project activities. Control efforts will be increased in areas particularly sensitive to invasion.
Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species?	**No.** The global population size has not been quantified, but the species is reported to be commonest in the south of its range in Australia (especially Tasmania) and scarce in the north. The range of the population and the extent of the habitat used suggest that the population is at least tens of thousands. An ecologically significant proportion of the Satin flycatcher population is estimated at 17,000 individuals (1%, lower threshold) and 1,700 individuals (0.1%, upper threshold) (Department of the Environment, 2015). Further, this species is likely to be an infrequent visitor to the project area. Approximately 0.003 ha of foraging and dispersal habitat for this species occurs within the project area, which is not considered large enough to support an ecologically significant proportion of the Satin flycatcher population. Given the limited amount of clearing required and with the implementation of mitigation measures in place, the project is unlikely to seriously disrupt the lifecycle of an ecologically significant proportion of the population.

Fork-tailed swift (*Apus pacificus*)

Description

The Fork-tailed swift is a medium to large member of the Apodidae Family. It has a length of 18–21cm, a wingspan of 40–42cm and weighs around 30–40g. It is a medium-sized swift, with a slim body with long scythe-shaped wings that taper to finely pointed tips. It is characterized by a long and deeply forked tail. It is smaller and slimmer than the White-throated Needletail, *Hirundapus caudacutus*, with much narrower wings and a longer, more deeply forked tail. It is much bigger than swiftlets with much longer wings and a lower forked tail (DCCEEW, 2024).

The Fork-tailed swift is mainly blackish with a white band across the rump. There is also a white patch on the chin and throat. The body, tail and upperwings are black-brown and they have a faint pale scaling to the saddle and white scalloping to the underbody. The sexes are alike with no seasonal variation, juveniles are also indistinguishable in the field (Higgins 1999).

Potential impacts of the project on this species include habitat loss.

Distribution

This species breeds in eastern Asia. It is strongly migratory, spending the northern hemisphere's winter in Southeast Asia and Australia (Inaturalist, 2024). The Fork-tailed swift is a non-breeding visitor to all states and territories of Australia (Higgins 1999). In Queensland, there are scattered records of the Fork-tailed swift in the Gulf Country, and a few records on Cape York Peninsula. In the north-east region there are many records east of the Great Divide from near Cooktown and south to Townsville. They are also widespread but scattered in coastal areas from 20° south (approximately Bowen), south to Brisbane and in much of the south south-eastern region of Australia. They are more widespread west of the Great Divide and are commonly found west of the line joining Chinchilla and Hughenden. They are found to the west between Richmond and Winton, Longreach, Gowan Range, Maraila National Park and Dirranbandi. They are rarely found further west to Windorah and Thargomindah (Higgins 1999).

Important Habitat

The Fork-tailed Swift is almost exclusively aerial, flying from less than 1m to at least 300m above ground and probably much higher.

In Australia, they mostly occur over inland plains but sometimes above foothills or in coastal areas. They often occur over cliffs and beaches and also over islands and sometimes well out to sea. They also occur over settled areas, including towns, urban areas and cities. They mostly occur over dry or open habitats, including riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh. They are also found at treeless grassland and sandplains covered with spinifex, open farmland and inland and coastal sand-dunes. The sometimes occur above rainforests, wet sclerophyll forest or open forest or plantations of pines (Higgins 1999).

They forage aerially, up to hundreds of metres above ground, but also less than 1m above open areas or over water. They often occur in areas of updraughts, especially around cliffs. They are said to search along edges of low-pressure systems, which assist flight. Low-flying Swifts are said to be precursors of unsettled weather, possibly because insect prey fly at a lower altitude when the air is humid and when the air density is low (Cameron 1952). They sometimes feed aerially among tree-tops in open forest (Higgins 1999). They probably roost aerially but are occasionally observed to land (Higgins 1999). They were once recorded roosting in trees, using a bare exposed branch emergent above the foliage. Sometimes they loaf in the air, by allowing strong winds to support them.

Significant Impact Assessment

An assessment against the Significant Impact Guidelines 1.1 is provided in Table 11. The outcome of this assessment was that the project is considered unlikely to result in a significant impact to the

species. The project is not expected to create barriers to movement, substantially modify important habitat, result in invasive species becoming established or disrupt the lifecycle of an ecologically significant proportion of the population. The assessment has been based on total clearing of 0.153 ha of disturbed riparian vegetation, non-remnant grassland and estuary habitat, over which this almost exclusively aerial species may fly and forage.

Table 12. Significant impact assessment for the Fork-tailed swift

EPBC Act Criteria- is there a real possibility that the Project will:	Assessment of Significance
Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species?	**No.** The project is not considered likely to result in the creation of barriers to movement to, between or within habitat, nor will it alter the fire regimes, nutrient cycles or hydrological cycles. Clearing will be restricted to 0.153 ha of disturbed riparian vegetation, non-remnant grassland and open estuary habitat which is not considered core habitat for this almost exclusively aerial species. The project will result in minimal impacts to potential foraging or flyover habitat for the Fork-tailed swift. Therefore, the project is unlikely to substantially modify, destroy or isolate an area of important habitat for the fork-tailed swift.
Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species?	**No.** Predation by feral animals is identified as a key threat to the species. However, it is unlikely that project activities will exacerbate any feral predator population beyond current levels. A detailed Weed and Pest Management Plan will be developed to mitigate and manage the potential spread of pest flora and fauna species. Species-specific management will be undertaken for identified key weed and pest species at risk of spread through project activities. Control efforts will be increased in areas particularly sensitive to invasion.
Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species?	**No.** The global population size of this species has not been quantified. The range of the population and the extent of the habitat used suggest that the population is at least tens of thousands. Approximately 0.153 ha of potential flyover habitat will be temporarily impacted during construction of the project. This is not considered large enough to support an ecologically significant proportion of the Fork-tailed swift population. Given the limited amount of clearing required and with the implementation of mitigation measures in place, the project is unlikely to seriously disrupt the lifecycle of an ecologically significant proportion of the population.

Red-rumped swallow (*Cecropis daurica*)

Description

The red-rumped swallow (*Cecropis daurica*) is a small passerine bird in the swallow family. It breeds in open hilly country of temperate southern Europe and Asia from Portugal and Spain to Japan, India, Sri Lanka and tropical Africa. The Indian and African birds are resident, but European and other Asian birds are migratory. They winter in Africa or India and are vagrants to Christmas Island and northern Australia.

Red-rumped swallows are somewhat similar in habits and appearance to the other aerial insectivores, such as the related swallows and the unrelated swifts. They have blue upperparts and dusky underparts. They resemble barn swallows but are darker below and have pale or reddish rumps, face and neck collar. They lack a breast band but have black undertails. They are fast fliers and they swoop on insects while airborne. They have broad but pointed wings.

Distribution

The red-rumped swallow breeds across southern Europe and Asia east to southern Siberia and Japan. These populations are migratory, wintering in sub-Saharan Africa or south Asia. This species is a regular vagrant outside its breeding range.

Breeding

Red-rumped swallows build quarter-sphere nests with a tunnel entrance lined with mud collected in their beaks and lay 3 to 6 eggs. They normally nest under cliff overhangs in their mountain homes but will readily adapt to buildings such as mosques and bridges. They do not normally form large breeding colonies but are gregarious outside the breeding season. Many hundreds can be seen at a time on the plains of India.

Important Habitat

The Red-rumped swallow is a non-breeding visitor to all states and territories of Australia (Higgins 1999). It is almost exclusively aerial, and important habitat is predominately areas where it forages over wetlands and open well-watered grasslands.

Significant Impact Assessment

An assessment against the Significant Impact Guidelines 1.1 for Red-rumped swallow is provided in Table 12. The outcome of this assessment was that the project is considered unlikely to result in a significant impact to the species. The project is not expected to create barriers to movement, substantially modify important habitat, result in invasive species becoming established or disrupt the lifecycle of an ecologically significant proportion of the population. The assessment has been based on total clearing of 0.153 ha of disturbed riparian vegetation, non-remnant grassland and estuary habitat, over which this almost exclusively aerial species may fly and forage.

Table 13. Significant impact assessment for the Red-rumped swallow

EPBC Act Criteria- is there a real possibility that the Project will:	Assessment of Significance
Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species?	**No.** The project is not considered likely to result in the creation of barriers to movement to, between or within habitat, nor will it alter the fire regimes, nutrient cycles or hydrological cycles. Clearing will be restricted to 0.153 ha of disturbed riparian vegetation, non-remnant grassland and open estuary habitat which is not considered core habitat for this almost exclusively aerial species. The project will result in minimal impacts to potential foraging or flyover habitat for the Red-rumped swallow. Therefore, the project is unlikely to substantially modify, destroy or isolate an area of important habitat for the Red-rumped swallow.

EPBC Act Criteria- is there a real possibility that the Project will:	Assessment of Significance
Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species?	**No.** Predation by feral animals is identified as a key threat to the species. However, it is unlikely that project activities will exacerbate any feral predator population beyond current levels. A detailed Weed and Pest Management Plan will be developed to mitigate and manage the potential spread of pest flora and fauna species. Species-specific management will be undertaken for identified key weed and pest species at risk of spread through project activities. Control efforts will be increased in areas particularly sensitive to invasion.
Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species?	**No.** The global population size of this species has not been quantified. The range of the population and the extent of the habitat used suggest that the population is at least tens of thousands. Approximately 0.153 ha of potential flyover habitat will be temporarily impacted during construction of the project. This is not considered large enough to support an ecologically significant proportion of the Red-rumped swallow population. Given the limited amount of clearing required and with the implementation of mitigation measures in place, the project is unlikely to seriously disrupt the lifecycle of an ecologically significant proportion of the population.

Appendix D: Project Site Species List

Common Name	Species Name
Alexandra palm	*Archontophoenix alexandrae*
Asthma plant*	*Euphorbia hirta*
Bamboo*	*Bamboo nigra*
Bastard summergrass*	*Digitaria violascens*
Blackbean	*Castanospermum australe*
Black wattle	*Acacia crassicarpa*
Blue billygoat weed*	*Ageratum houstonianum*
Blue quandong	*Elaeocarpus angustifolius*
Bothriochloa pertusa*	*Indian bluegrass*
Brown macaranga	*Macaranga involucrata*
Butterfly pea*	*Clitoria ternatea*
Button grass*	*Dactyloctenium radulans*
Calopo, Wild ground nut*	*Calopogonium mucunoides*
Canna lily*	*Canna sp.*
Climbing maidenhair fern	*Lygodium microphyllum*
Cockspur grass*	*Echinochloa crus-galli*
Coconut palm	*Cocos nucifera*
Cottonwood tree	*Hibiscus tiliaceus*
Elephant ears, Taro*	*Colocasia esculenta*
Elephant grass*	*Cenchrus purpureum*
False daisy*	*Eclipta prostrata*
Flax lily	*Lomandra hystrix*
Golden beaksedge	*Rhynchospora corymbosa*
Green couch*	*Cynodon dactylon*
Guava*	*psidium guineense*
Guinea grass*	*Megathyrsus maximus*
Heliconia*	*Heliconia rauliniana*
Heliconia*	*Heliconia rostrata*
Hickory wattle	*Acacia mangium*
Indigofera	*Indigofera sp.*
Jaggery palm	*Caryota urens*
Lawyer cane	*Calamas australis*
Lawyer vine	*Smilax australis*
Leichhardt tree	*Nauclea orientalis*
Licorice weed	*Scoparia dulcis*
Lilly pilly	*Syzygium sp.*
Lovegrass	*Eragrostis sororia*
Mango	*Mangifera indica*
Mangrove fern	*Acrostichum speciosum*
Mexican clover*	*Richardia brasiliensis*

Common Name	Species Name
Milkweed*	*Euphorbia heterophylla*
Milkwort*	*Polygala paniculata*
Narrow-leaved tuckeroo	*Cupaniopsis foveolata*
Navua sedge*	*Cyperus aromatuicus*
Northern white beech	*Gmelina fasciculiflora*
Nutgrass*	*Cyperus sphacelatus*
Nutrush	*Scleria levis*
Olive hymenachne*	*Hymenachne amplexicaulis*
Philodendron	*Philodendron sp.*
Purple joyweed*	*Alternanthera brasiliana*
Red ash	*Alphitonia whitei*
Red Natal grass*	*Melinis repens*
Sandpaper fig	*Ficus coronata*
Scarlet morning glory*	*Ipomoea hederifolia*
Sedge	*Cyperus sp.*
Sedge	*Fimbristylis sp.*
Sensitive pea*	*Chamaechrista rotundifolia*
Sensitive plant*	*Mimosa pudica*
Silver lady fern	*Blechnum sp.*
Singapore daisy*	*Sphagneticola trilobata*
Siratro*	*Macroptilium atropurpureum*
South African pigeon grass*	*Setaria sphacelata*
Spider lily*	*Hymenocallis littoralis*
Stag horn	*Platycerium bifurcatum*
Stiff-leafed spermacoce	*Spermacoce brachystema*
Stinking passion vine*	*Passiflora foetida*
Streaky rattlepod*	*Crotalaria pallida*
Stylo*	*Stylosanthes scabra*
Tobacco weed*	*Elephantopus mollis*
Tridax daisy*	*Tridax procumbens*
Umbrella sedge*	*Cyperus involucratus*
Umbrella tree	*Schefflera actinophylla*
Urena burr*	*Urena lobata*
White eye*	*Mitracarpus hirtus*

LEGEND

- Rootball
- Revegetation
- Rock

NOTES

1. LOCATIONS OF ALL ANCILLARY INFRSTRUCTURE ARE INDICATIVE ONLY AND TO
2. WHEREVER POSSIBLE DISTURBANCE TO EXISTING VEGETATION SHOULD BE AVOIDED OR MINIMISED
3. LOCATION OF ESC MEASURES ARE INDICATIVE ONLY. LOCATION TO BE JUDGED ON-GROUND BY CONTRACTOR
4. SITE IS LOW RISK ASSUMING A 5-6 WEEK CONSTRUCTION WINDOW DURING THE DRY SEASON
5. THE CONSTRUCTION PROGRAM WILL NOT RESULT IN A NET-INCREASE IN SEDIMENT AS THE WORKS WILL REDUCE EROSION WITHIN THE RIVER
6. TO THE MAXIMUM DEGREE POSSIBLE CONSTRUCTION EQUIPMENT AND MACHINERY MUST NOT OPERATE IN OPEN FLOWING WATERS
7. ENSURE CLEARING OF ACCESS PATHS AND TRACKS ARE KEPT TO MINIMUM REQUIRED
8. ALL SITE DISTURBANCE IS TO BE AMELIORATED BY COVERING WITH HYDROMULCH, STRAW MULCH
   OR APPROPRIATELY SEEDING. A GROUND-COVER TARGET OF 70% OF ALREADY
   VEGETATED AREAS WHICH HAVE BEEN DISTURBED MUST BE ACHIEVED FOR
9. ENSURE ROCK FILL IS CLEAN OF DEBRIS AND SEDIMENT PRIOR TO PLACEMENT BELOW THE WATER

MATERIAL STOCKPILES

10. DIVERT UP-SLOPE WATER AROUND THE STOCKPILE AREA
11. INSTALL SEDIMENT FEWNCE, SMALL EARTHEN BUND OR MULCH BUND AROUND DOWN-SLOPE AREAS OF STOCKPILES, MAINTINING 1M SEPARATION FROM TOE OF STOCKPILE

SEDIMENT FENCES

12. SEDIMENT FENCES ARE TO BE INSTALLED IN ACCORDANCE WITH STANDARD DRAWING SF-01 BY CATCHMENTS AND CREEKS.
13. ALL SEDIMENT FENCES ARE TO HAVE 500MM SEPARATION FROM NEARBY STOCKPILES OR DISTURBED AREAS

ACCESS TRACKS

14. ALL ACCESS TRACKS ARE TO BE KEPT IN A TIDY MANNER WHICH MINIMISES SEDIMENT RUNOFF IN THE EVENT OF RAINFALL

SITE REHABILITATION AND LANDSCAPING

15. REFER TO THE REVEGETATION PLAN FOR THE SITE

SITE:
DAINTREE RIVER WORKS
TITLE
EROSION AND SEDIMENT CONTROL PLAN

NEILLY GROUP
engineering for the environment

terrain
NATURAL RESOURCE MANAGEMENT

REV	DESCRIPTION	DATE	APPRVD
A	CONCEPTUAL FOR CONSTRUCTION	17/06/2021	RF

SCALE @ A3	DRAWN DATE: 26/11/2024	DESIGNED RF	APPRVD RF	APPRVD DATE	26/11/2024
PROJECT NO: 23110	DWG NO. 001	REVISION A1	SHEET NO 001	FILE NAME	

NEILLY GROUP

engineering for the environment

TERRAIN NRM REEF COASTAL RESTORATION PROGRAM
DAINTREE RIVER STREAMBANK REMEDIATION

MARINE PLANT CLEARANCE REPORT

2 SEPTEMBER 2024

Document Control

Details and distribution

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Revision History

Revision	Date	By	Nature of change	Checked By	Approved By
1	2 September 2024	Kristina Ihme	Original Issue	Monica Pollock	Brett Twycross

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1 Introduction

Neilly Group Engineering (NGE) have been commissioned by Terrain NRM as part of the Reef Coastal Restoration Program to undertake restoration and stabilisation works at the Daintree River (the Project). The following report documents a marine plant assessment undertaken for the Project to support a Development Application for a Development Permit under the *Planning Act 2016*.

This Marine Plant Survey Report supports the Development Permit for Operational Works under the *Planning Act 2016* and documents the presence of marine plants and extent of impact (removal/damage) from the Project.

2 Background

2.1 Project Location

The site is located on the southern bank of the Daintree River, approximately 10km upstream from the mouth and 12km downstream from Daintree Village (Figure 1). The site is 900m upstream from the Daintree River ferry crossing to Cape Tribulation (Figure 1).

As per Detailed Design Report (Neilly Group, 2024a), site visits were completed in July and August 2024, to undertake:

  - topographic survey of the site using GNSS equipment
  - flora and fauna ecological baseline surveys
  - acid sulfate soil sampling
  - geotechnical investigations
- investigate the erosion features and likely causes of erosion
- obtain UAV photographs of the erosion features.

Erosion at the site consists of a 100m long section of bank scour, leading to vegetation loss and putting a local government road that provides access to Esplanade Road residents at risk (Figure 2).

Figure 1. Location of the project site on the Daintree River

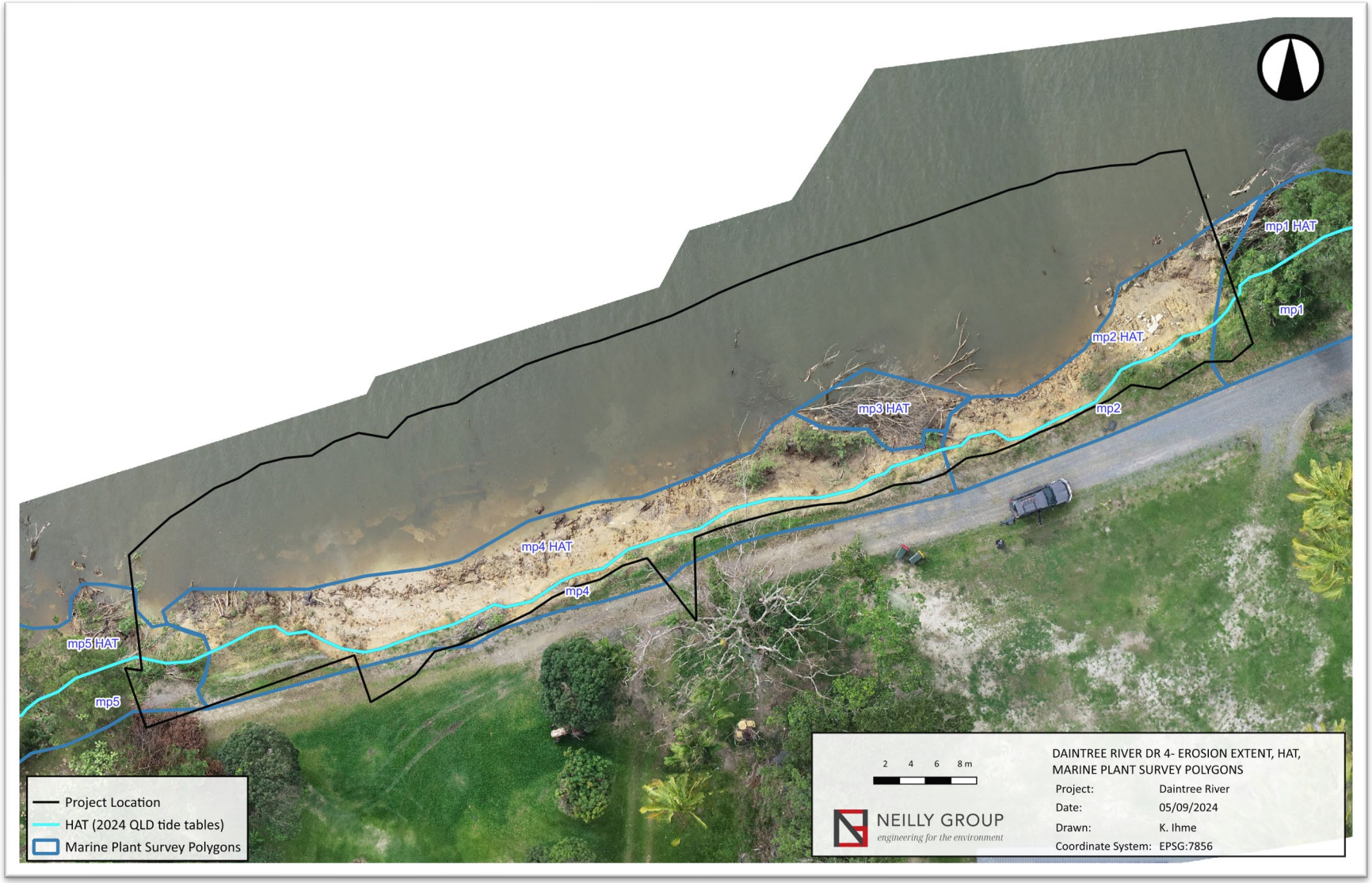

Figure 2. Aerial image of the site erosion overview, Highest Astronomical Tide (HAT) and marine plant survey polygons ID.

2.2 Proposed Works

The proposed Project works are described in the Detailed Design Report (Neilly Group, 2024a). The report addresses possible alternative design solutions and associated impact scenarios, and how Project impacts on marine plants have been minimised in due course. The remaining proposed clearing works have been minimised as much as possible and are considered essential to improve the actively eroding site.

Proposed works include erosion stabilisation measures with a combination of:

- Rock protection as a hard-engineering solution to ensure further erosion threat to Esplanade Road is prevented. However, we only propose rock protection along the toe of bank, analogous to what has been undertaken 100m further downstream;
- Rootballs incorporated into the rock protection works to provide and enhance fish habitat structure; and
- Active mangrove and riparian revegetation.

Cover will be utilised to provide quick ground-cover protection after the earthworks. Revegetation of mangrove and terrestrial riparian species will occur within the subject site. Revegetation with riparian species on the re-profiled bank behind the mangroves, rock protection and root-balls will increase hydraulic roughness and improve the connectivity of the riparian corridor at the site.

Revegetation efforts will aim to restore healthy marine plant communities that will eventually re-connect with the remnant communities, resulting in an overall net gain of marine plants at the site. These restored communities will re-connect crucial connectivity pathways for terrestrial biota and protect the streambanks from further erosion with cross over vegetation (existing revegetation site), then riparian revegetation occurring above Highest Astronomical Tide (HAT) on the upper and top of bank region. Reducing further erosion will also prevent sediment export to the Great Barrier Reef (GBR) and protect economically and environmentally important fish habitat located downstream from the site.

3 Methodology

The marine plant survey was undertaken by two qualified Principal Ecologists on the 15th and 16th of July 2024. The objective of the survey was to identify marine plants along the proposed Project area. Marine plant areas were mapped and divided into survey polygons (Figure 2), each of which was described by species assemblage, projected cover, polygon area, impact area and condition (disturbance factors such as presence of weeds, rubbish, erosion and fire).

3.1 Plant Identification and Nomenclature

Plant identification and nomenclature was based on the following field guides:

- D. Reid, 2004, *Common Saltmarsh Plants of the Townsville Coastal Plains*. Ross Island Volunteers Estuarine Research (Reid, D., 2004).
- L. Meddigan, R. Allan and D. Reid, 2008, *Coastal Plants of the Burdekin Dry Tropics*, Burdekin Solutions Ltd and Coastal Dry Tropics NRM, 2008 (L. Meddigan, R. Allan and D. Reid, 2008).
- C. Lovelock, 1993, *Field Guide to the Mangroves of Queensland*, Australian Institute of Marine Science (L. Johns, 2010).
- N. Smith, 2011, *Weeds of Northern Australia A Field Guide*, Environmental Centre NT (N. Smith, 2011).

Scientific names for terrestrial flora are consistent with those used in the Census of the Queensland Flora (Bostock & Holland, 2018) and botanical binomials presently accepted by the Queensland Herbarium. An asterisk (*) preceding a flora or fauna species name indicates a non-native species.

3.2 Survey Limitations

Data acquisition during flora surveys generally has inherent limitations associated with variability of vegetation communities across a site, and changes to the detectability and presence of species with time. A high level of confidence in comprehensiveness is implicit in this study as survey sites were strategically located to capture representative samples of all communities. Access was an issue due to safety reasons (i.e. crocodile danger) so a safe distance had to be kept from the Daintree River. Given the above, it is recognised that field studies with a temporal limitation cannot always account for 100% of potential floral diversity present within a site. Section 4 summarises survey results for the Project area.

4 Results

4.1 Desktop Results

The Ecology Report (Neilly Group, 2024b) documents desktop findings and environmental values present within the Project area. The findings are from a terrestrial ecological baseline assessment undertaken in July 2024. The impacts to habitat and fauna species have been assessed based on a worst-case scenario, which involves the total clearing of the Construction Footprint (Figure 2).

Key findings of the study include:

- The Project is located next to infrastructure (a council road and houses), with high degrees of disturbance present to original vegetation. Habitat that has been removed for land use and part of the riparian vegetation has been disturbed due to active erosion of the riverbank.
- Habitat features identified within the Project area include small shrubs without the potential for hollows to be present. Moreover, the Daintree River serves as a habitat corridor but is disconnected within the Project area due to active erosion and lack of vegetation.
- The Project area is considered unsuitable to support conservation significant fauna species, but some birds may occur, when overflying the area.
- No conservation significant fauna species were recorded within the Project area during the field survey. The likelihood of occurrence assessment is detailed in Appendix A of the Ecology report (Neilly Group, 2024b).
- No conservation significant flora has been identified within the Project area.
- One introduced fauna species (Cane Toad) was recorded within the Project area during the field survey and can be viewed in Appendix A, *Likelihood of Occurrence Assessment* (Neilly Group, 2024b).
- Rats tail grass, Singapore daisy and Olive hymenachne are classified as category 3 restricted invasive plants under the *Biosecurity Act 2014*. Vehicle washdowns when departing the site would minimise the risk of spreading seeds from this species.
- The Project is unlikely to result in a significant impact on conservation significant fauna or migratory species and their habitat.
- Mitigation and management measures are recommended to ensure the potential impact on ecological values are minimised or avoided and will be documented in an Environmental Management Plan (EMP).

4.2 Survey Results

Figure 3 identifies survey polygons of the Project area, as well as HAT, with polygon 1 starting at the eastern end and polygon 5 ending at the western section of the Project area. Plate 1-5 show marine plant survey polygons and associated plant assemblages.

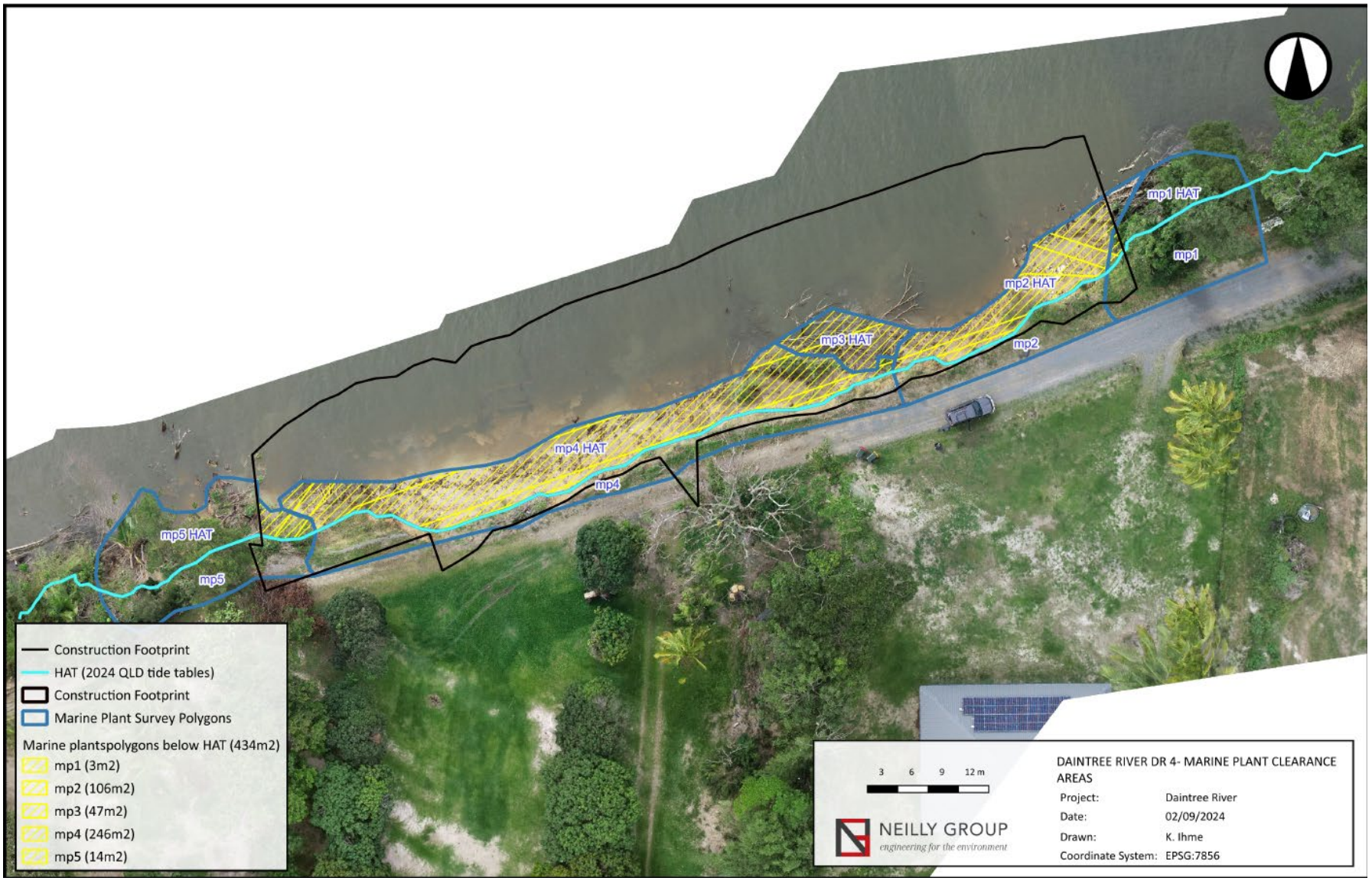

Figure 3. Marine plant polygons/clearance areas below HAT

Plate 1. Polygon 1 at the eastern end of the Project area

Plate 2. Polygon 2 eastern end of the Project area bordering polygon 1.

Plate 3. Polygon 3 in the middle of the Project area, dead trees and bare ground

Plate 4. Polygon 4 in the middle of the Project area

Plate 5. Polygon 5 at the western end of the Project area

4.3 Marine Plant Diversity

The average species diversity within the survey polygons in the project area was 3, which indicates a very low species diversity within the survey polygons compared to regional ecosystems bordering the Project area, which had a species diversity of 10 (Figure 4), which is typical for species diversity in the estuarine communities around the Daintree region. Present species were mostly very small (0.3m) seedlings trees (mangrove), and some shrubs (not typically considered marine species), with a total lack of marine succulent plants, grasses, sedges (Appendix A).

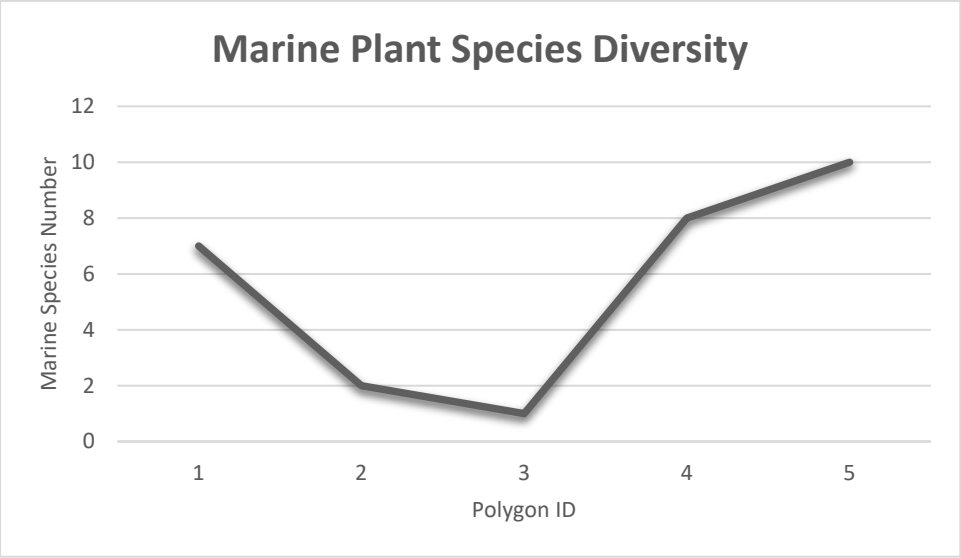

Figure 4. Marine species diversity within survey polygons

Figure 4 shows the lack of species diversity in survey polygons 2-4. This reflects the active erosion on site and its lack of vegetation as well as the impact on species diversity in general.

4.4 Marine Plant Clearance

Table 1 identifies the marine plant clearance area, including height and cover information within the Project area. Since habitat condition differs within each of the surveyed polygons, the condition of the vegetation, including weeds present, is described in detail in Appendix A. The marine plant clearance area was calculated based on projected cover for each polygon within the Project area, in which the nominated species was present (refer to Appendix A). The total area of marine plants within the Construction footprint is approximately 1574m^2 (Figure 2).

Table 1. Area of marine plants within the project area.

Polygon ID	Common Name	Scientific Name	Height (m)	Projected Cover (%)	Total Impact Area (m2)
1					
	Umbrella tree	*Schefflera actinophylla*	8	25	0.750
	Acacia	*Acacia mangium*	2	8	0.240
	Acacia spp.	*Acacia spp. NA*	4	8	0.240
	narrow-leaved tuckeroo	*Cupaniopsis foveolata*	2.4	4	0.120
	Alexandria palm	*Archontophoenix alexandrae*	4	25	0.750
	Vine	*Ipomiea hederifolia**	0.2	0.5	0.015
	Dead tree	*NA*	2.2	2.5	0.075
	Bare ground	*NA*	0	0.5	0.015
	Other (Weeds)				0.795
2					
	Climbing fern	*Lygodium microphyllum*	0.3	0.2	0.212
	Calopo	*Calopogonium mucunoides**	0.1	1	1.060
	Acacia	*Acacia mangium*	0.3	1	1.060
	Heartleaved shrub	*NA*	1	2	2.120
	Dead trees	*NA*	1	6	6.360
	Bare ground	*NA*	1.8	70	74.200
	Other (Weeds)				20.900
3					
	Cotton tree	*Hibiscus tiliaceus*	0.1	1	0.470
	Bare ground	*NA*	0	10	4.700
	Dead trees	*NA*	3	60	28.20
	Water	*NA*	0	29	13.63
4					
	Fimbrystylus spp.	*Fimbristylis spp,*	0.2	0.1	0.264
	Psydium	*Psidium guineense*	0.3	0.1	0.264
	Spider Lilly	*Hymenocallis littoralis*	0.4	0.1	0.264
	4 mangrove seedlings	Spp. NA	0.3	0.1	0.264
	Acacia spp.	NA	0.5	0.1	0.264

Polygon ID	Common Name	Scientific Name	Height (m)	Projected Cover (%)	Total Impact Area (m2)
	Acacia spp 1	*Acacia mangium*	0.2	0.1	0.264
	Climbing fern	*Lygodium microphyllum*	0.3	0.1	0.264
	Dead wood	*NA*	3	0.1	0.264
	Bare ground	*NA*		60	158.400
	Water	NA	0	25	66.000
	Other (Weeds)				37.488
5					
	Silver Lady fern	Blechnum	1	2	0.280
	Acacia	*Acacia mangium*	1	4	0.560
	Lawyer vine	*Smilax australis*	0.1	1	0.140
	Vine	*Macaranga involucrata*	1.5	1	0.140
	Mangrove fern	*Acrostichum speciosum*	1	2	0.280
	Acacia	*Acacia crassicarpa*	6	25	3.500
	Climbing fern	*Lygodium microphyllum*	0.7	1	0.140
	Heliconia rauliniana	*Heliconia rauliniana*	0.1	1	0.140
	Psydium	*Psidium guineense*	0.5	0.1	0.014
	Bothriochloa spp	*Bothriochloa spp.*	0.1	1	0.140
	Bare ground	NA	0	7	0.980
	Water	NA	0	7	0.980
	Dead wood	NA	0	15	2.100
	Other (Weeds)				4.536
Total impact marine plants					**14.219**

4.5 Site Condition

The Project area is classified as non-remnant, RE 7.1.4, and water. The project area has been heavily modified in the past due to erosion, land use (bordering cane farms and residential areas), road (mowing and slashing) and is represented by a bare area with almost non-existing tree and shrub cover. Instead, the area is dominated by weeds and other introduced species.

The Project area shows active erosion that is progressing and causing the loss of marine plants (Plate 6). Riparian vegetation does not provide a continuous corridor for species movement within the Project area. There is a presence of several introduced species as well as species classed under *the Biosecurity Act 2015* (Table 2).

Table 2. Invasive species

Common Name	Scientific name	Comments
Guinea grass*	Panicum maximum*	invasive (a general biosecurity obligation (GBO))
Blue billigoat weed	*Ageratum houstonianum**	invasive (GBO)
Purple joyweed	*Alternanthera brasiliana**	invasive (GBO)
Sensitive pea	*Chamaecrista rotundifolia**	invasive (GBO)
Butterfly pea	*Clitoria ternatea**	invasive (GBO)
Coconut palm	*Cocos nucifera**	invasive (GBO)
Streaky rattlepod	*Crotalaria pallida**	invasive (GBO)
Green couch	*Cynodon dactylon**	invasive (GBO)
Navua sedge	*Cyperus aromaticus**	invasive (GBO)
Nutgrass	*Cyperus rotundus**	invasive (GBO)
White eclipta	Eclipta prostrata*	invasive (GBO)
Tabacco weed	*Elephantopus mollis**	invasive (GBO)
Milkweed	Euphorbia heterophylla*	invasive (GBO)
Heliconia	*Heliconia rostrata**	invasive (GBO)
Olive hymenachne	*Hymenachne amplexicaulis**	Category 3
Siratro	*Macroptilium atropurpureum**	invasive (GBO)
NA	*Matricarpus hurtus**	invasive (GBO)
Red natal grass	*Melinis repens**	invasive (GBO)
Sedge 2	*NA*	invasive (GBO)
Guine grass	*Panicum maximum**	invasive (GBO)
Bamboo	*Bambu nigra**	invasive (GBO)
Milkwort	*Polygala paniculata**	invasive (GBO)
Mexican clover	Richardia brasiliensis*	invasive (GBO)
goatweed	Scoparia dulcis*	invasive (GBO)
pigeon grass	Setaria sphacelata*	invasive (GBO)
Singapore daisy	*Sphagneticola trilobata**	Category 3
Rats tail grass	*Sporobolus natalensis**	Category 3
Urena burr	*Urena lobata**	invasive (GBO)

This disturbance is reflected in the low marine species diversity found in the Project area, whilst areas bordering the Project site display a higher tree species diversity (Neilly Group, 2024b). Areas

bordering the Project area are characterised by remnant vegetation and an existing riparian zone and would likely contain habitat for a range of conservation significant fauna and flora.

Plate 6. Showing mangrove tree die off due to active erosion and the access road being unstable.

5 Discussion and Conclusion

5.1 Project Benefit

The Project is a Riverbank restoration and stabilisation initiative, which will not have a permanent impact to the environment but, instead, rehabilitate existing conditions. If left unmanaged, current active erosion sites will create further soil loss, loss of marine plants, and continued disconnection of the riparian corridor.

The design aims to restore the actively eroding streambank by deflecting wave action away from the eroding streambanks and back into the centre of the waterway. The design will provide areas of low flow and velocity along the streambank. These low flow/velocity areas will create suitable conditions to facilitate the re-colonisation of marine plants at the site. The structures will also encourage the deposition of suspended sediment flowing from the catchment upstream. This deposition occurs on the downstream side of the log structures, providing ideal substrate for the colonisation of marine plant communities in the regions below the bank.

The restored healthy marine plant communities established due to the Project works will re-connect with the remnant marine plant communities, resulting in an overall net gain of marine plants at the site. These restored communities will also re-connect crucial connectivity pathways for terrestrial biota and protect the streambanks from further erosion with cross over vegetation (existing revegetation site).

Reducing further erosion will also prevent sediment export to the GBR and protect economically and environmentally important habitat. The streambank stabilisation works and restoration of marine plant communities along this bank will further enhance the resilience of coastal communities to coastal hazards such as cyclones, floods, tidal and wave action together with sea level rises. This is achieved through the establishment of marine plant communities, cross over species and riparian communities, which in combination with the root balls, shall hold the streambank together sufficiently to allow marine plant restoration.

A summary of Project benefits include:

- erosion control resulting in reduced suspended sediment loads to the Daintree River and the Great Barrier Reef.
- revegetation of the Project area's riparian vegetation (that is currently absent) to integrate the riparian corridor with surrounding naturally vegetated areas, once established there will be a net gain of marine plant communities.
- increased connectivity for species movement in the Daintree River riparian area.
- reduction of weeds and species listed under the *Biosecurity Act 2015.*
- long term socio environmental benefits, such as local jobs during establishment, and ongoing maintenance, of the access road to the residential areas.
- maintenance access for local residence to their properties.
- protection of broad scale values of the Daintree River Marine Parks area.

5.2 Total Area of Marine Plant Clearance

As per Section 2 the construction footprint has been minimised to prevent excess marine plant clearance. The total area of marine plants proposed to be cleared within the construction footprint is ~14.22 m^2 which is based on a worst-case impact scenario and considered unavoidable.

Note though that typical marine species such as mangroves, saltwater couch and succulents were mostly absent. Marine species have been defined as per the definition that anything below HAT that is not a classified weed.

Revegetation efforts will include recruitment of mangrove species. Once the works are finished and conditions are suitable for the recolonisation of marine plants, the banks will quickly be established with marine plants and re-connect with upstream and downstream marine plant communities.

An Environmental Management Plan (EMP) will be in place that includes strict avoidance, management and protection mechanisms for existing vegetation and site environmental values. Vegetation clearing will be avoided wherever possible.

It is anticipated that the Project will have achieved a net gain of marine plants communities at the site within five years. The restored marine plant communities at this site are anticipated to hold the streambanks together, reduce erosion and provide important fish habitat into the future.

5.3 Revegetation

A Revegetation Plan has been delivered to specify proposed revegetation within the Project area ((Neilly Group, 2024) Appendix A).

The revegetation efforts will consist of the following:

1.) Marine Revegetation below HAT:
Revegetation will consist of marine species and will be sourced via seed collection within the Project area, retaining any propagules within the Project footprint and replanting those, as well as natural regeneration.
2.) Mixed (terrestrial and marine) revegetation area:
Neilly Group propose ongoing engagement with Douglas shire council to select appropriate riparian species between the road and the marine revegetation area (below HAT). There will be grass cover, to protect the soil from further erosion, but tree species selection (locally present native species) will need to be coordinated with council.

Details on species composition and revegetation specifications can be viewed in the Revegetation Plan ((Neilly Group, 2024) Appendix A).

5.4 Conclusion

This Marine Plant Survey Report identifies the area of marine plants to be cleared as well as species, assemblage, projected cover, polygon area, impact area and condition (disturbance factors such as presence of weeds, garden waste and rubbish). The proposed works and associate construction footprint have been reduced significantly by adapting the design solution to avoid marine plant clearance. The remaining impact footprint is considered essential to prevent further erosion. Once the design has been installed as well as rehabilitation, revegetation, and ongoing management efforts applied, the Project will have achieved a net gain of marine plants after about 5 years, as well as reconnected the riparian corridor along the Daintree River.

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Appendix A Supporting Data and Reports

Table 1 Marine plant survey data

Polygon ID	Common Name	Scientific Name	Height (m)	Projected Cover (%)	Total Survey Polygon Area (m^2)	Survey Polygon Area (m^2) below HAT in Construction Footprint	Total Impact Area (m2)
1					181	3	3
	Umbrella tree	*Schefflera actinophylla*	8	25			0.75
	Acacia	*Acacia mangium*	2	8			0.24
	Acacia spp.	*Acacia spp. NA*	4	8			0.24
	Cupaniopsis foveolata	*narrow-leaved tuckeroo*	2.4	4			0.12
	Alexandria palm	*Archontophoenix alexandrae*	4	25			0.75
	Vine	*Ipomiea hederifolia**	0.2	0.5			0.015
	Dead tree	*NA*	2.2	2.5			0.075
	Bare ground	*NA*	0	0.5			0.015
	Weeds and grasses combined						0.795
	Sensitive weed	*Mimosa pudica**	0.1	1			0.03
	Singapore daisy	*Sphagneticola trilobata**	0.2	8			0.24
	Navua sedge	*Cyperus aromaticus**	0.3	1			0.03
	Sedge 2	*NA*	0.3	1			0.03
	Nutgrass	*Cyperus rotundus**	0.2	1			0.03
	Green couch	*Cynodon dactylon**	0.1	0.5			0.015
	Guinea grass	*Panicum maximum**	0.3	0.5			0.015
	Bamboo	*Phyllostachys spp.*, Bambusa spp.**	0.7	13			0.39
	Coconut palm	*Cocos nucifera**	0.3	0.5			0.015
2					194	106	
	Climbing fern	*Lygodium microphyllum*	0.3	0.2			0.212
	Calopo	*Calopogonium mucunoides**	0.1	1			1.06
	Acacia	*Acacia mangium*	0.3	1			1.06
	Heart leaved shrub	*NA*	1	2			2.12
	Dead trees	*NA*	1	6			6.36

Polygon ID	Common Name	Scientific Name	Height (m)	Projected Cover (%)	Total Survey Polygon Area (m^2)	Survey Polygon Area (m^2) below HAT in Construction Footprint	Total Impact Area (m2)
	Bare ground	*NA*	1.8	70			74.2
	Weeds and grasses combined						20.868
	Streaky rattlepod	*Crotalaria pallida**	0.1	0.3			0.318
	Blue billigoat weed	*Ageratum houstonianum**	0.5	2			2.12
	NA	*Matricarpus hurtus**	0.1	1			2.06
	Purple joyweed	*Alternanthera brasiliana**	0.1	1			2.06
	Olive hymenachne	*Hymenachne amplexicaulis**	0.75	1			1.06
	Sensitive pea	*Chamaecrista rotundifolia**	0.2	1			1.06
	Sensitive weed	*Mimosa pudica**	0.2	2			2.12
	Singapore daisy	*Sphagneticola trilobata**	0.1	6.5			6.89
	Urena burr	*Urena lobata**	0.2	1			1.06
	Tabacco weed	*Elephantopus mollis**	0.5	1			1.06
	Milkwort	*Polygala paniculata**	0.1	1			1.06
3					47	47	
	Cotton tree	*Hibiscus tiliaceus*	0.1	1			0.47
	Bare ground	*NA*	0	10			4.7
	Dead trees	*NA*	3	60			28.2
	Water	*NA*	0	29			13.63
4					422		264
	Fimbrystylus spp.	*Fimbristylis spp,.*	0.2	0.1			0.264
	Psydium	*Psidium guineense*	0.3	0.1			0.264
	Spider lilly	*Hymenocallis littoralis*	0.4	0.1			0.264
	4 mangrove seedlings	Spp. NA	0.3	0.1			0.264
	Acacia spp	NA	0.5	0.1			0.264
	Acacia spp 1	*Acacia mangium*	0.2	0.1			0.264
	Climbing fern	*Lygodium microphyllum*	0.3	0.1			0.264
	Dead wood	*NA*	3	0.1			0.264
	Bare ground	*NA*		60			158.4

Polygon ID	Common Name	Scientific Name	Height (m)	Projected Cover (%)	Total Survey Polygon Area (m^2)	Survey Polygon Area (m^2) below HAT in Construction Footprint	Total Impact Area (m2)
	Water	NA	0	25			66
	Weeds combined						37.488
	Mexican clover	Richardia brasiliensis*	0.2	0.1			0.264
	Goatweed	Scoparia dulcis*	0.3	0.1			0.264
	Olive hymenachne	*Hymenachne amplexicaulis**	0.2	0.1			0.264
	Green couch	*Cynodon dactylon**	0.1	2			5.28
	Heliconia	*Heliconia rostrata**	0.1	1			2.64
	White eclipta	Eclipta prostrata*	0.5	1			2.64
	Rats tail grass	*Sporobolus natalensis**	0.3	1			2.64
	Sensitive weed	*Mimosa pudica**	0.1	2			5.28
	Siratro	*Macroptilium atropurpureum**	0.1	0.1			0.264
	Blue billigoat weed	*Ageratum houstonianum**	0.1	4			10.56
	NA	*Matricarpus hurtus**	0.1	0.1			0.264
	Milkweed	Euphorbia heterophylla*	0.1	0.1			0.264
	Navua sedge	*Cyperus aromaticus**	0.2	2.1			5.544
	Coconut palm	*Cocos nucifera**	0.2	0.1			0.264
	Butterfly pea	*Clitoria ternatea**	0.1	0.1			0.264
	Red natal grass	*Melinis repens**	0.2	0.1			0.264
	Bamboo	*Phyllostachys spp.*, Bambusa spp.**	2.2	0.1			0.264
	Pigeon gras	Setaria sphacelata*	0.5	0.1			0.264
5					203		14
	Silver Lady fern	Blechnum	1	2			0.28
	Acacia spp 1	*Acacia mangium*	1	4			0.56
	Lawyer vine	*Smilax australis*	0.1	1			0.14
	Vine	*Macaranga involucrata*	1.5	1			0.14
	Mangrove fern	*Acrostichum speciosum*	1	2			0.28
	Acacia crassicarpa	*Acacia crassicarpa*	6	25			3.5

Polygon ID	Common Name	Scientific Name	Height (m)	Projected Cover (%)	Total Survey Polygon Area (m^2)	Survey Polygon Area (m^2) below HAT in Construction Footprint	Total Impact Area (m2)
	Climbing fern	*Lygodium microphyllum*	0.7	1			0.14
	Heliconia rauliniana	Heliconia rauliniana	0.1	1			0.14
	Psydium	*Psidium guineense*	0.5	0.1			0.014
	Biotchryocloa spp	*Bothriochloa*	0.1	1			0.14
	Bare ground	NA	0	7			0.98
	Water	NA	0	7			0.98
	Dead wood	NA	0	15			2.1
	Weeds combined						4.536
	Pigeon grass	Setaria sphacelata*	0.1	0.5			0.07
	Goatweed	Scoparia dulcis*	0.1	0.5			0.07
	Green couch	*Cynodon dactylon**	0.1	10			1.4
	Blue billigoat weed	*Ageratum houstonianum**	0.1	1.3			0.182
	Bamboo	*Phyllostachys spp.*, Bambusa spp.**	1.2	10			1.4
	Guinea grass*	(Panicum maximum*	0.4	10			1.4
	Sensitive weed	*Mimosa pudica**	0.1	0.1			0.014
Total impact marine plants							**14.219**

NEILLY GROUP

engineering for the environment

TERRAIN NRM REEF COASTAL RESTORATION PROGRAM DAINTREE RIVER STREAMBANK REMEDIATION

REVEGETATION PLAN AND REPORT

26 SEPTEMBER 2024

Document Control

Details and distribution

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1	02/09/2024	Kristina Ihme	Original issue	Brett Twycross	Adam Neilly

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1 Introduction

This Revegetation Plan outlines the requirements for implementing revegetation works as part of the Riverbank Restoration and Stabilisation project at the Daintree River.

The proposed works will involve remediating 100m of riverbank along the Daintree River (the proposed works) that have been impacted by erosion. The proposed works are located on the southern bank of the Daintree River, along the Esplanade – in the Road Reserve adjacent 41 and 49 McDowall Lane – in Lower Daintree, Douglas Shire (the project area).

The nominated species have been selected using the following criteria:

- Native (as per preclear and surrounding REs)
- Compatible with the local area (surrounding REs)
- Able to survive tidal inundation (below HAT)
- Successful recruiters (erosion control)
- Resilient.

This Revegetation Plan sets out the requirements for the following works:

1. Weed control
2. Clearing and topsoil stripping
3. Preparation of batters and ground surfaces
4. Mulch spreading
5. Hydromulching, hydroseeding & Bonded Fibre Matrix (BFM)
6. Direct seeding
7. Planting
8. Establishment of vegetation
9. Monitoring
10. As built handover
11. Final completion.

This Revegetation Plan should be read in conjunction with the project Technical Specification, For Construction Drawings and the Schedule of Quantities.

2 General Requirements

This Revegetation Plan was developed in conjunction with the Erosion and Sediment Control Plan (ESCP) (Neilly Group, 2024c) and the Environmental Management Plan (EMP) (Neilly Group, 2024d).

The ESCP provides details on:

- Soil management measures to facilitate proposed construction activities.
- The appropriate control measures to construct the remediation works.
- Site stabilisation and maintenance requirements following completion of works.

The ESCP also identifies that the project area needs to have suitable groundcover of at least 70% prior to the onset of the wet season. Refer to the International Erosion Control Association Best Practice Erosion and Sediment Control 2008 document for additional construction phase erosion information (BPESC).

The EMP has been prepared for the proposed works (Neilly Group, 2024d). The EMP addresses key activities likely to have environmental impacts and includes environmental management processes and implementation strategies to protect and manage water quality, waste, flora and fauna, soils (including erosion and sedimentation), air quality, noise, and cultural heritage.

Where works are directed to be performed by the Contractor but are not specified in this Revegetation Plan, the Contractor shall carry them out with full diligence and expedience as are expected for works of this nature under the obligations of the Contractor.

2.1 Standards and Guidelines

Unless stated otherwise in this Revegetation Plan, the approved drawings, or elsewhere in the construction documents, work shall comply with the current and relevant Australian Standards. Any variations or ambiguity between this Revegetation Plan, other construction documents and Australian Standards shall be referred to the Neilly Group Engineering RPEQ or their representative for direction before proceeding with the work.

2.2 Approved Clearance Areas and Revegetation Areas

As per State Code 11 requirements for marine plant clearing, the following areas are acceptable to be cleared to construct the proposed works:

- Construction Footprint: 1574.00 m^2
- Marine Plant Clearance areas (below HAT): 14.22m^2.

As per Figure 1 and Table 1 below, the following revegetation areas are being proposed.

Table 1. Clearance and Revegetation Zone IDs

Description	Total area (m^2)	ID
Rocks (below HAT)	314	1
Upper bank and local road (above HAT)	184	2
Total area of Revegetation	**498**	

2.3 Timing of Works

Given the small scale of the works and the approximate 5 weeks construction program, a late dry season/early wet season commencement for revegetation works is considered acceptable, providing adequate risk management measures are in place including daily weather forecast checks, an emergency response plan and with the ESCP in place.

Figure 1. Revegetation Areas

3 Revegetation Rationale

The proposed revegetation of the 498m^2 of project construction footprint aims to establish the same composition and structure as the regional ecosystems within the approved clearing footprint. The revegetation rationale is based on field assessments of vegetation structure and composition present within the proposed clearing footprint.

One distinct revegetation zone, Revegetation Zone ID 1 as shown in Table 1 and Figure 1, is required, with the same species composition.

The native plants will be sourced from the DSC nursery or other local supplier.

Individuals will be planted between rocks into soils mixed with absorbent material and fertiliser compatible for use near aquatic habitats. Personnel will hand dig in tube stock, placing plants approximately one metre apart where possible. Initially, the soil will be restricted to crevices between rocks, so that sediment run off to the Daintree River will not occur during applied watering and rainfall events.

Over time, as the vegetation stabilises the soils, organic material and plants will build up and cover the exposed rocks. At this time the ground coverage will have become stabilised and the risk of sediment run off will be reduced.

4 Sequence of Works

Staging of revegetation works on an area-by-area basis shall be undertaken as listed below. Full details of all project works including surface treatments (amelioration), fertiliser application, seeding and hay cover are detailed in the Technical Specifications, on the For Construction Drawings and/or in the Schedule of Quantities.

4.1 Weed Control

a) The Contractor must implement an approved weed control program and, as necessary, control all weed species prior to undertaking any other works.
b) Any changes to the timing and sequence of weed control operations must be confirmed with the Site supervisor.
c) Existing plants to be retained and new planting areas must be protected during any herbicide spraying, if necessary, by fitting guards onto spray units or around existing plants.
d) For spot spraying a non-toxic, water-soluble, biodegradable coloured dye must be added to the herbicide spray mix that will be clearly visible for at least 48 hours after the herbicide application.
e) Treated areas must remain undisturbed for two weeks or as recommended by the herbicide manufacturer.

4.2 Clearing and Topsoil Stripping

a) Existing vegetation and topsoil must be removed where nominated in the Drawings. All clearing, stockpiling and treatment of cleared vegetation must be undertaken in accordance with design instructions.
b) Where nominated in the Drawings or as specified, the Contractor must undertake the lifting, transport and storage of selected vegetation using accepted industry practices. The replanting

of this vegetation must be in accordance with this Specification at the locations as shown in the Drawings (if any).

c) The Contractor must remove tree trunks nominated for salvage (if any) as specified in the Drawings and ensure that the tree trunks are not broken by equipment during removal, transport or placement.
d) Where possible, marine plants will be transplanted by the appointed contractor to areas adjacent to the timber structures.

4.3 Cover Spreading

a) The Contractor must manually spread straw (as specified, back from HAT) as soon as is practical after surface preparation, topsoiling, soil improvements, and the placement of weed control or erosion control matting.
b) If a rainfall event occurs before the mulch can be spread, creating soil erosion, the Contractor must replace the eroded material and prepare the soil surface before spreading the mulch.
c) Straw must be uniformly spread over the ground surface to an even depth by hand or machine and if required the surface raked to present an even surface.
d) The Contractor must avoid spreading straw on plants, and paths, and grassed areas and leave the site in a neat, clean condition.
e) Straw must not be placed closer than 150 mm from the stem of any existing vegetation or new plantings. Existing vegetation or new plants accidentally covered by mulch must be uncovered as soon as possible
f) Unless otherwise detailed, the thickness of the straw must be a minimum of 3 mm and no more than 5 mm.
g) Areas subject to concentrated surface runoff flows must be treated with thicker applications of hydromulch, or higher concentration of binder as specified.
h) Hydromulch must not be applied in heavy rain or when the wind speed exceeds 25 km per hour except by direct handheld hose application.
i) Continue inspections until vegetation is suitably established or erosion control is no longer required.

4.4 Planting

a) Timing- Planting is to occur between September and December 2025, just before the wet season, to promote rapid establishment and reduce the need to irrigate or water.
b) Plant Supply:
    a. All plants, propagules and seeds to be supplied by the Contractor.
    b. The Contractor must ensure all supplied plants, propagules and seeds are in good condition and:
        i. The root system must be fibrous and firmly established but not root bound and with no large roots growing out of the container.
        ii. The root mass must retain its shape and hold 90% of the root ball material when removed from the container.
        iii. Leaves must be of normal size, colour and texture for the specified species.
        iv. No substitutions can be made without written approval from the Superintendent. Any proposed substitutions must include details of the species, size, number and be forwarded to the Superintendent. If the Superintendent considers the substitutions unsuitable then the originally specified plants must be grown and planted in the following planting season. (HOLD POINT).
c) Ready to Plant:

a. Not less than 5 working days prior to commencing any planting operations on site, the Contractor must certify that:
    i. The nominated areas for planting are correctly defined.
    ii. No obstructions, obstacles, hazards or factors likely to cause delays or failures of the operations have been identified.
    iii. The soil surfaces are ready for the planting operation.
    iv. Adequate soil moisture content is present for planting.
    v. All staff are competent, experienced, and skilled in planting operations.

d) Setting out Plants:
    a. If the placement of transplanted materials or advanced plants is not nominated in the Drawings, the Contractor must request the Superintendent for direction on Site prior to setting out and planting.

e) Planting Out:
    a. Prior to any planting into erosion or weed control matting, each individual planting hole must be prepared by first slitting open and laying back the matting to allow for each planting hole to be excavated and prepared for planting.
    b. Prior to planting any mature plants into mulch, each individual planting hole must be prepared by first moving clear sufficient mulch to allow for each planting hole to be excavated and prepared for planting and space for the excavated soil.
    c. For each planting hole, any substandard excavated material or excess soil must be spread evenly around the planting hole and used to create a watering well around the plant or disposed of as specified.
    d. The planting hole must be excavated vertically to accommodate the root ball of the plant, such that the top of the plant root ball finishes below the existing ground surface and creates a watering depression suitable for the size of the plant.
    e. If necessary, the base of the hole must be broken up to a minimum depth of 100mm and the sides of the planting hole loosened.
    f. Individual plants must be removed from containers to minimise damage to leaves, stem and root ball.
    g. The root ball of plants must not be left exposed or allowed to dry out and planted without delay.
    h. Plants must not be planted into standing water within an individual planting hole.
    i. Individual plants must be placed in the centre of the planting hole and set plumb. The backfill must be firmed progressively after placing to eliminate air pockets and minimise settlement. After firming and settlement, the top of the root ball must be covered with soil and sit below the finished lowest level of the surrounding watering saucer shaped during planting.
    j. The outside lip of the watering saucer must be approximately three times the diameter of the plant container and capable of holding a sufficient volume of water necessary for any follow-up watering for the plant container size. When planting on batter slopes a raised horizontal terrace must be formed as a watering saucer, down slope and equal to the diameter of the planting hole.
    k. Frayed or broken roots of bare rooted plants must be cut cleanly before planting.
    l. Fertiliser must be blended through each planting hole in accordance with good horticultural practice.
    m. Mulch must be respread so that the mulch tapers down to soil level 25 mm from the stem of the plant.
    n. Plants must be watered in immediately after planting, sufficient to thoroughly saturate the soil to twice the area of the root ball.

f) Completion of Works

a. Prior to completion of the works the Contractor must remove all rubbish and surplus materials accumulated during construction and the Site must be left in a neat and tidy condition.

4.5 Vegetation Establishment

a) The Contractor must establish and monitor the condition and development of the Works during the Establishment Period.
b) Prior to commencing the Establishment Period, the Contractor must provide to the Superintendent, for approval, a detailed program of all activities including timing to be undertaken by the Contractor to establish the vegetation in accordance with this Specification.
c) The approved Vegetation Establishment Program must include at least one fortnightly inspection of the Works, and the Contractor must notify the Superintendent of any vandalism of the Works, any faults or defects to irrigation, or any other damage within 5 days of detection.
d) The Contractor must be responsible for the operation, inspection and maintenance of any irrigation system until the end of the Establishment Period for the Works. The Contractor must adjust the height of all sprinkler heads, valve boxes and any other associated plant and equipment as directed by the Superintendent during the irrigation period.
e) The designated activities to establish the works must include but not be limited to:
    a. Progressive weed control.
    b. Inspections.
    c. Repair and replace any erosion rills in soil surfaces.
    d. Repairs and replacement of damaged or failed areas of seeding or cover spreading.
    e. Watering of all plantings as necessary.
    f. Maintenance of trees and groundcovers.
f) Water must be applied to all plants as often and in sufficient amount as conditions may require keeping the plants in a healthy and growing condition until the end of the Vegetation Establishment Period.

4.6 Monitoring

a) The Contractor must undertake monitoring via transect line photo plots to describe species richness, composition, community structure, seedling/sapling density and planting success and undertake fortnightly reporting on the condition and development of the works during the Establishment Period.
b) Prior to commencing the Establishment Period, the Contractor must provide to the Superintendent, a detailed program of all the monitoring and reporting activities including timing to be undertaken by the Contractor.
c) Each monitoring report must:
    a. Outline the works undertaken during the reporting period.
    b. Compare development of revegetation with the relevant outcome-based completion criteria.
    c. Identify any follow up remedial works to be undertaken.
    d. Set out a program for the remedial works.
    e. Include photos from agreed photo monitoring points.
d) Electronic copies of each report must be supplied to the Superintendent within 14 days of the end of the reporting period.
e) The final monitoring report at the end of the Vegetation Establishment Period must be included in the Hand-over report submitted at Final Completion.

4.7 Handover

The hand-over report must include:

a) The Final Monitoring Report.
b) Record any outstanding defects for correction and the proposed timing.
c) Provide a summary of activities undertaken during the Establishment Period and detail the recommended ongoing maintenance activities for the Contract area.

5 Planting Schedule

Table 2 shows the revegetation schedule and species composition based on species present within the project area that will lead to a similar grassland ground cover to what is currently present, with additional select species included for their value in providing ground stability and preventing future erosion. Seeds will be subject to availability.

Table 2. Species schedule and species composition

	Revegetation schedule (subject to availability)				
	Plant symbol	***Botanical name***	**Common name**	**Type**	**CCS**
Revegetation ID 1 (Marine Plant below HAT)					
Trees/ shrubs	HERlit	*Heritiera littoralis*	Glass mangrove	propagule	0.3-2m
	BRUgym	*Bruguiera gymnorhiza*	Oriental mangrove	propagule	0.3-2m
	SONalb	*Sonneratia alba*	Pornupan Mangrove	propagule	0.3-2m
	HIBtil	*Hibiscus tiliaceus*	Hibiscus	propagule	0.3-2m
	AVImar	*Avicennia marina*	Grey mangrove	propagule	0.3-2m
	ACAili	*Acanthus ilicifolius*	Holly mangrove	propagule	0.3-2m
	RHYsty	*Rhyzophora stylosa*	Red mangrove	propagule	0.3-2m
No ground cover (rocks)					
Revegetation ID 2 (Mixed, marine and terrestrial)					
Trees/ shrubs	ELAgran	*Elaeocarpus grandis*	Blue quandong	propagule	0.3-2m
	MELelle	*Melicope elleryana*	Pink flowered doughwood	propagule	0.3-2m
	ACAman	*Acacia mangium*	Black wattle	propagule	0.3-2m
	SYZtie	*Syzygium tierneyanum*	River Cherry	propagule	0.3-2m
	HIBtil	*Hibiscus tiliaceus*	Sea hibiscus	propagule	0.3-2m
	LIVdru	*Livistona drudei*	Halifax Fan Palm	propagule	0.3-2m
	NAUori	*Nauclea orientalis*	Bur tree	propagule	0.3-2m
	CRYhyp	*Cryptocarya hypospodia*	Northern laurel	propagule	0.3-2m
	CASaus	*Castanospermum australe*	Moreton Bay Chestnut	propagule	0.3-2m
	BARrac	*Barringtonia racemosa*	Powder-puff tree	propagule	0.3-2m
	ARCHale	*Archontophoenix alexandrae*	Alexander Palm	propagule	0.3-2m
Ground cover	ECHesc	*Echinochloa esculenta* NAT gra *NA*	Japanese millet	seed	20kg/ha
	NA	*Other grasses*	e.g. Rhodes grass, windmill grass etc.		15kg/ha
	NA	Native grass species	NA	seed	15kg/ha

Queensland Government

SARA reference: 2406-41077 SPL
Applicant reference: 23110

8 July 2024

Terrain NRM C/- Neilly Group Engineering
228 Riverside Blvd
DOUGLAS QLD 4817
kristina@neillygroup.com.au

Attention: Kristina Ihme

Dear Sir/Madam

SARA Pre-lodgement advice – Daintree River bank restoration works

I refer to your pre-lodgement request received on 25 June 2024 in which you sought pre-lodgement advice from the State Assessment and Referral Agency (SARA) regarding the proposed development at the above address. This notice provides advice on aspects of the proposal that are of relevance to SARA.

SARA's understanding of the project

The applicant is proposing to undertake remediation works along the Daintree River in an area impacted by erosion. The works aim to prevent further erosion and mitigate the risk to adjacent properties and infrastructure.

The works will improve the visual amenity and biodiversity values by preventing further loss of mangroves and riparian vegetation, allowing for mangrove regeneration and reducing sediment transportation to the Great Barrier Reef.

The remediation works are understood to comprise the following:

- bank battering
- rock toe protection
- installation of five log jams/large wood for fish habitat
- revegetation with mangroves and riparian species.

Supporting information

The advice in this letter is based on the following documentation that was submitted with the pre-lodgement request.

Drawing/report title	Prepared by	Date

Far North Queensland regional office
Ground Floor, Cnr Grafton and Hartley Street, Cairns
PO Box 2358, Cairns QLD 4870

Reef Coastal Restoration Program: Daintree River Streambank Remediation	Neilly Group Engineering	20 November 2023

Pre-lodgement advice

The following advice outlines the aspects of the proposal that are of relevance to SARA.

SARA's jurisdiction and fees	
1.	The application will require referral to SARA under the following provisions of the Planning Regulation 2017: • Schedule 10, Part 6, Division 3, Subdivision 3, Table 1, Item 1 – Operational work that includes the removal, destruction or damage of marine plants (refer Item 2 below). o This will require a fee of between $3,636 and $14,538 to be paid in accordance with Schedule 10, Part 6, Division 3, Subdivision 2, Table 1, Item 5(a) - (c), depending on the total area of marine plants to be removed, destroyed or damaged (yet to be determined). • Schedule 10, Part 17, Division 3, Table 1, Item 1 – Tidal works (refer Item 3 below). o This will require a fee of $3,636 to be paid in accordance with Schedule 10, Part 17, Division 2, Table 1, Item 5(e). • Schedule 10, Part 17, Division 3, Table 2, Item 1 – Tidal works in tidal waters (refer Item 4 below). o This will require a fee of $7,271 to be paid in accordance with Schedule 10, Part 17, Division 3, Table 2, Item 8(c). The application may also require referral to SARA under the following provisions of the Planning Regulation 2017: • Schedule 10, Part 20, Division 4, Table 1, Item 1 - Operational work in wetland protection area (refer Item 5 below). o This will require a fee of $3,636 to be paid in accordance Schedule 10, Part 20, Division 3, Table 1, Item 5. SARA would be a referral agency for the proposed application. Douglas Shire Council would be the assessment manger, as the development constitutes prescribed tidal works.
Key matters and action items	
Marine plant removal, destruction or damage	
2.	The proposed works are likely to involve the removal, destruction or damage of marine plants. Marine plants include: • *any plant (a tidal plant, including marine algae) that usually grows on or adjacent to tidal lands whether it is living, dead, standing or fallen; or* • *any plant material on tidal land (up to the level of Highest Astronomical Tide (HAT)).* • *plants such as mangroves, mangrove fern, salt couch or samphire species are considered marine plants regardless of whether or not they are above or below the level of HAT.* Marine plants do not include:

- *a plant that is prohibited matter or restricted matter under the Biosecurity Act 2014; or*
- *a plant that is controlled biosecurity matter or regulated biosecurity matter under the Biosecurity Act 2014.*

Marine plant protection applies irrespective of the tenure of the land on which the plant occurs (e.g. unallocated state land and all state tenured lands, including private freehold and leasehold lands), the time the plant has been growing at the location, or the degree of or purpose of the disturbance.

The proposed works cannot comply with the accepted development requirements (ADR) as the removal, damage, or destruction of marine plants for the purpose of erosion control does not constitute any of the prescribed work types. A development approval will therefore be required for assessable development that is the removal, destruction or damage of marine plants.

State code 11: Removal, destruction or damage of marine plants

SARA will assess whether the development application complies with SDAP State code 11: Removal, destruction or damage of marine plants. Particular attention should be paid to the following performance outcomes (POs): PO1, PO2, PO3, PO7, PO8, PO10, PO11, PO20, PO24 and PO25.

PO2 – Detail how the design, location, construction methods, setbacks and/or environmental buffers aims to avoid and minimise impacts to marine plants and will result in the smallest impact possible. Demonstrate that the proposed development will avoid or minimise impacts to adjacent marine plants, for example through changes to tidal inundation, erosion or sedimentation.

PO3 - Marine plants are a Matter of State Environmental Significance (MSES) under the *Environmental Offsets Act 2014.* The application must demonstrate how impacts to marine plants have been mitigated. Despite mitigation measures, the works may still result in a Significant Residual Impact (SRI), in which case an environmental offset may be required. Any rehabilitation of marine plants on site may help to reduce the scale of the SRI. Options to mitigate the SRI to marine plants must be pursued before an offset can be considered. The DSDILGP Significant Residual Impact Guideline (see Section 3.9) is useful in determining the likelihood of the proposed development resulting in a SRI.

PO7 - To demonstrate that the works encourage fish habitats and fisheries resource values to naturally regenerate:

- submit application material demonstrating that degrading processes are avoided and mitigated to provide conditions in which natural regeneration of tidal fish habitats will occur; and
- provide a post-works monitoring and maintenance program appropriate for the scale of the restoration works. The plan should identify potential risks from degrading processes and include management actions to be undertaken should these occur.

PO8 - To demonstrate that the works prevent the release of contaminants from the disturbance of acid sulfate soils:

- identify whether the proposal will disturb or drain acid sulfate soils; and
- provide an acid sulfate soil management plan, including measures to avoid and minimise impacts of acid sulfate soils on fisheries resources and fish habitats.

	PO10 - Detail how the development will maintain or improve natural coastal processes, with specific reference to erosion and accretion. **PO11** - To demonstrate that the development is designed, constructed and maintained so that it does not increase the risk of scour or erosion of waterway bed or banks: • provide discussion of the natural processes that affect the proposed development area, including erosion, accretion, vegetation and biota colonisation. Reference of historical imagery may assist in demonstrating changes that have occurred in the area over time; and • detail how these natural processes were considered to inform design, construction and maintenance of the proposed development so as not to increase the risk of scour or erosion of the waterway bed or banks, ensuring that erosive forces are not transferred onto adjacent areas. **PO24** – To demonstrate restoration works do not result in substitution of fish habitats or adverse impacts to the condition of fish habitats or fisheries productivity, submit details of proposed restoration works, usually in the form of a restoration plan, that includes: • background, including detailed information describing the existing fisheries resources and fish habitat values of the restoration site; • information on the degrading factors affecting the site that will be managed to ensure successful restoration; • objectives and milestones; • specific restoration activities, including plans and drawings; • details of the species and number of marine plants for revegetation and identification of collection sites; • monitoring and evaluation appropriate to the scale and risk of the restoration project; • reporting; • alert to action plan that details measures to address issues that may arise, that impact on the proposed restoration; • an evaluation and discussion of the impacts to the marine plant collection site; and • measures to be undertaken to minimise and mitigate impacts to tidal fish habitats and fisheries resources. **PO25** - To demonstrate that marine plants to be used for revegetation purposes have local provenance, provide location details and impact areas for the marine plant collection site or evidence of where the seed stock is to be obtained from an authorised nursery.
Tidal works	
3.	**State code 8: Coastal development and tidal works** The proposed development will require assessment against SDAP State code 8: Coastal development and tidal works in its entirety, identifying how the proposed development meets each PO. Please refer to the Guideline: State Development Assessment Provisions, State Code 8: Coastal development and tidal works for information on how to respond to POs and specific information requirements.

	The guideline contains information on how to respond to particular POs and outlines specific information requirements. It should be noted that if the PO has no relevance to the proposed development a response of "not applicable" and a statement as to why it is not relevant is required. For this application, a particularly detailed response is required for the following POs: PO3, PO4, PO10, PO12, PO14 and PO17. **Matters of State environmental significance (MSES)** Following a preliminary investigation, it appears that the proposed development may have an impact on the following MSES which are present on the site or in the adjacent area: • conservation areas (marine park (highly protected areas)) • Great barrier reef wetland protection areas (wetland in a wetland protection area and wetland protection area – trigger area) • wetlands (high ecological significance wetlands) • wildlife habitat (endangered and vulnerable wildlife and special least concern animal) • regulated vegetation (category b, category r, essential habitat, defined watercourse) To address PO17 of State code 8 it will be required to determine if there are any MSES on or adjacent to the proposed development site. Queensland Globe (https://qldglobe.information.qld.gov.au/) can be used to conduct a desktop analysis to identify any mapped MSES that exist on and near the proposed site/s. Where MSES are identified: • provide a targeted assessment to ground truth any MSES identified; • demonstrate how the development avoids adverse impacts on each MSES to the greatest extent practicable; • where avoidance is not reasonably possible, demonstrate how impacts on MSES have, or will be, minimised and mitigated to the greatest extent practicable; • determine whether there will be a Significant Residual Impact on any MSES using the DSDILGP Significant Residual Impact Guideline: Significant Residual Impact Guideline (windows.net). An assessment will need to be undertaken for each MSES; and • identify the delivery of any potential offset as per PO17 (3).
Tidal works in tidal waters	
4.	The proposed works may constitute tidal works that are occurring within tidal waters which will require referral to SARA for assessment for potential impacts to maritime safety. A development application should provide an adequate response to the latest version of SDAP State code 7: Maritime safety, identifying how the proposed development meets each of the relevant POs. The Department of Transport and Main Roads' Guideline may assist the applicant in responding to State code 7.
Wetland protection area	
5.	The development site is mapped as being within a wetland protection area trigger area, with the development site located approximately 196m from the wetland itself. However,

	the development may not trigger assessment under Schedule 10, Part 20 of the Planning Regulation 2019 as the works may not constitute high impact earthworks. It is ultimately the responsibility of the applicant/entity undertaking the works to ensure that the activities are undertaken lawfully. The applicant should determine whether the works constitute high impact earthworks. Consideration should be given to laydown areas and other areas which may be disturbed as a result of the development which may be outside of the immediate development footprint. **High impact earthworks** is defined in the Planning Regulation 2017 as: *(a) operational work that changes the form of land, or involves placing a structure on land, in a way that diverts water to or from a wetland in a wetland protection area and involves excavating or filling—* *(i) if the work is carried out in the wetland or within 200m of the wetland—more than 100m^3; or* *(ii) otherwise—more than 1,000m^3; but* *(b) does not include operational work—* *(i) that is excavating to establish underground infrastructure, other than infrastructure for drainage or stormwater flows, if the excavated land is to be restored, as far as practicable, to its original contours after the infrastructure is established; or* *(ii) to maintain dams, fences, helipads, roads, stockyards, vehicular tracks or watering facilities; or* *(iii) to alter, maintain, repair, replace, rehabilitate, remove or service government supported transport infrastructure; or* *(iv) to take preventative or remedial action in relation to government supported transport infrastructure; or* *(vi) in tidal water; or* *(ix) to restore or conserve the ecological processes or hydrological functions of a wetland protection area; or* *(xv) that is completely or partly in a declared fish habitat area, if the work is prescribed assessable development; or* *(xvi) that is constructing or raising waterway barrier works, if the work is accepted development under schedule 7, part 3, section 6.* Note: There are several additional exclusions, only the most commonly relevant are listed above.
Native vegetation clearing	
6.	The development site is mapped as containing Category B of concern regional ecosystem and Category R regulated regrowth vegetation. However, the application is unlikely to trigger assessment for native vegetation clearing under Schedule 10, Part 3 of the Planning Regulation 2017. Clearing associated with the development is likely to constitute exempt clearing work or accepted development, as follows: • Category B regional ecosystem 7.1.4 comprises mangroves and vine forest. In accordance with Section 8(c) of the *Vegetation Management Act 1999* (VMA). The VMA does not apply to the clearing of marine plants. • Clearing associated with the development is likely to constitute necessary environmental clearing under the Department of Resources Accepted Development Vegetation Clearing Code (ADVCC). Necessary environmental clearing is defined as: *Clearing of vegetation that is necessary to:*

	a) *restore the ecological and environmental condition of land; or Example— stabilising banks of watercourses, works to rehabilitate eroded areas, works to prevent erosion of land or for ecological fire management* b) *divert existing natural channels in a way that replicates the existing form of the natural channels; or* c) *prepare for the likelihood of a natural disaster; or Example— removal of silt to mitigate flooding* d) *remove contaminants from land.* In the case that the works cannot be carried out under an exemption or an ADVCC, the proposed development will require referral to SARA. A development application would need to address and meet the requirements of SDAP State code 16: Native vegetation clearing.
Marine parks (outside SARA's jurisdiction)	
7.	As the development is located in a State marine park, a permit to undertake the activity may be required from DES Statewide Marine Works. Please see the following link for more information: https://www.qld.gov.au/environment/coasts-waterways/marine-parks/works. If you wish to enquire about obtaining a marine park permit please contact marineparksworks@des.qld.gov.au.
Landowner's consent	
8.	To lodge a properly made development application, landowner's consent will be required under s51 of the *Planning Act 2016* where the applicant is not the landowner. To undertake works below the high-water mark on land owned or managed by the State (e.g. for works on State coastal land), written consent is required from the Department of Resources (Resources) as the owner of the land administers the allocation and use of the land under the *Land Act 1994*. Please contact Resources Land and Surveying Services regarding tenure and owner's consent at SLAMlodgement@resources.qld.gov.au.
Lodgement material	
9.	It is recommended that the following information is submitted when referring the application to SARA: • DA form 1 • a full response to the relevant sections of SDAP: o State code 7: Maritime safety o State code 8: Coastal development and tidal works o State code 11: Marine plant, removal, destruction or damage of marine plants o State code 9: Great barrier reef wetland protection areas (if triggered) • landowner's consent • relevant plans as per the DA forms guide, including: o description of the land intended to be developed, including the property address, tenure and real property description of the land o description of the development methodology, including: - any operational works occurring on site and expected timeframes. - staging of the development if applicable. - measures employed to minimise impacts to the local receiving

	environment. o detailed and appropriately scaled drawings and/or plans which clearly identify the location of proposed development, including: - location of all built structures, or structures to be modified or demolished, as a result of the proposed development. - adjacent riverbanks, walls, sandbanks, structures, the limit of vegetation, and/or other principal features of the immediate area. - relevant tidal planes (e.g. highest astronomical tide, mean high water springs); - the location and setting out details for cross-sections; and - any other information required to accurately define the area and to allow the site to be readily identified from the plan. For the marine plant trigger, provide the following: • the total amount of marine plants that will be disturbed, identifying portion of permanent and/or temporary disturbance (in m^2 or hectares); • the location of the marine plants to be disturbed in relation to the development works; • location and extent of fish habitat within the development area, including creeks; • sand and/or yabby banks, drainage lines, lagoons and marshes; • results of a marine plant survey undertaken by a suitably qualified and experienced person(s). This should include all species found in the proposed impact footprint; • information of the source of marine plants for revegetation purposes, including plans showing the location and area in m^2 of marine plants to be removed if required; • a restoration plan; • a marine plant revegetation and monitoring plan that includes an alert to action component to address issues that may affect recruitment success; and • an acid sulfate soil management plan. *Note: All plans/drawings should include title, date and numbering suitable to identify the plan and should be mapped to GDA2020 projection.*

This advice outlines aspects of the proposed development that are relevant from the jurisdiction of SARA. This advice is provided in good faith and is:

- based on the material and information provided to SARA
- current at the time of issue
- not applicable if the proposal is changed from that which formed the basis of this advice.

This advice does not constitute an approval or an endorsement that SARA supports the development proposal. Additional information may be required to allow SARA to properly assess the development proposal when a formal application has been lodged.

If you require further information please contact Isley Peacey, Senior Planning Officer, on 4037 3202 or via email CairnsSARA@dsdilgp.qld.gov.au who will be pleased to assist.

Yours sincerely

Leanne Simpson
Principal Planning Officer

Development details	
Proposal:	Operational work – Prescribed tidal works, tidal works in tidal waters and marine plant removal, destruction or damage
Street address:	Daintree River, adjacent to 41 & 49 Mcdowall Lane, Lower Daintree
Real property description:	Adjacent to Lot 6 on RP888615 and Lot 7 on RP888615
SARA role:	Referral agency
Assessment Manager:	Douglas Shire Council
Assessment criteria:	State Development Assessment Provisions (SDAP): State code 7: Maritime safety State code 8 - Coastal development and tidal works State code 11: Marine plant, removal, destruction or damage of marine plants State code 9: Great Barrier Reef wetland protection areas (if triggered)

From: Jenny Elphinstone
To: Monica Pollock
Subject: Douglas Shire Council Planning Advice Proposed works - Daintree River RE: Development Permit - Charity Fee Enquiry
Date: Thursday, 21 November 2024 3:36:33 PM
Attachments: image005.png
image001.png

Hi Monica,
In reference to your enquiry below please see the following advice.

Firstly, the fee schedule states that the required fee is 2.5% of the cost of the work. Where this value falls below $1,875.00, the minimum fee of 1,875.00 is required fee.
Secondly, Council accepts Terrain NRM as a not -for-profit organisation and agrees to a 50% reduction in the required development application fee.

Please forward the application to enquiries@douglas.qld.gov.au . Once allocated to planning an invoice for the fee will be created and issued out.

Kind Regards

Jenny Elphinstone
Senior Planning Officer

Douglas Shire Council
P: +61 7 4099 9482 | **F:** 07 4098 2902
E Jenny.Elphinstone@douglas.qld.gov.au | **W** douglas.qld.gov.au
Mail: PO Box 723, Mossman Q 4873 | **Office:** 64-66 Front St, Mossman Q 4873
Facebook /douglasshirecouncil | **Instagram** @douglasshirecouncil

From: Monica Pollock <monica@neillygroup.com.au>
Sent: Wednesday, 20 November 2024 10:31 AM
To: Enquiries <enquiries@douglas.qld.gov.au>
Subject: Development Permit - Charity Fee Enquiry

Good morning

Could this request please be forwarded to council's Town Planning section?

Neilly Group has been engaged on behalf of Terrain NRM, to prepare a Development application for Operational Works for Prescribed Tidal work and the Removal, destruction or damage of marine plants (associated with the Daintree River Streambank Erosion Remediation).

The proposed works are located on the southern bank of the Daintree River and Road Reserve adjacent 41 and 49 McDowall Lane – Esplanade, Lower Daintree, Douglas Shire, more formally described as the Daintree River and Road Reserve adjacent to Lot 6 on RP888615 and Lot 7 on RP888615.

I would like to please confirm the associated application fees for the project?

In reference to the Douglas Shire Council Fees & Charges Schedule 2024 / 2025 (Building, Planning & Plumbing), **is the fee $1,875.00 or 2.5% of the estimated cost of the work**? An extract for prescribed tidal works fees is provided below.

Prescribed Tidal Works								
2.5% of estimated cost of the work (minimum fee)	**Application**	**1,875.00**	**0.00**	**1,875.00**	**0.00**	**Y**	**SPA 2009; Planning Act 2016; Planning Reg 2017; BCCM 1997**	**97(2)(a)**

Not For Profit Organisations
Any not for profit, volunteer, charitable, community, sporting, religious organisation not in possession of a liquor licence may request up to a 50% reduction in fees. Request for reduction in application fees must be made in writing prior to application be submitted. The request must demonstrate the eligibility of the applicant as a community, sporting or religious organisation etc.

Also, our client Terrain NRM is a registered charity, so we would like to request a 50% reduction in fees upon lodgement of the development application. However, I note the Fees & Charges schedule advises that requests for reduction in fees must be made in writing prior to the application being submitted and must demonstrate the eligibility of the applicant (as per the extract above).

In this regard, can council please confirm if providing the Terrain NRM ABN (53 106 385 899) is sufficient? Council can then search the Australian Government's Australian Business Register and identify that Terrain NRM's "entity name" is FNQ NRM LTD and confirm they are registered as a charity. Council can also follow the ACNC link from the ABN page to the Australian Government's Australian Charities and Non-for-profits Commission website and also confirm that FNQ NRM LTD is registered as a charity there. **Will this method satisfy eligibility? If not, could council please advise what evidence would be required?**

Please get in touch should any further information be required.

Monica Pollock – Principal Planner
NOTE: My workdays are Mon-Fri (9am-2.30pm)
M 0408 987 346
E monica@neillygroup.com.au
W www.neillygroup.com.au

NEILLY GROUP
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