

Appendix A. Environmental Management Plan



Rockhampton Ring Road

Environmental Management Plan

1167108-DJV-0EN10-PLN-100001 | 02

21 January 2022

Department of Transport and Main Roads





Rockhampton Ring Road

Project No:	1167108
Document Title:	Environmental Management Plan
Document No.:	1167108-DJV-0EN10-PLN-100001
Revision:	03
Date:	21 January 2022
Client Name:	Department of Transport and Main Roads
Client No:	
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File Name:	1167108-DJV-0EN10-PLN-100001.docx

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Document history and status

Revision	Date	Description	Author	Checked	Reviewed	Approved
01	1 November 2021	Issue 01	J Diflo	K McPherson	M Zulpo	E Van Dyk
02	13 November 2021	Issue 02	M Zulpo	E Van Dyk	E Van Dyk	E Van Dyk
03	21 January 2022	Issue 03	M Zulpo	K McPherson	E Van Dyk	E Van Dyk



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Glossary of Terms and Acronyms

Term	Glossary
Administering Authority	An Authority with legislative jurisdiction
Appropriately Qualified Person (AQP)	Appropriately qualified person(s) is as defined by the administering authority of the <i>Environmental Protection Act 1994</i>
	The definition relevant to temporary sediment and erosion control is:
	A person or persons who has professional qualifications, training, skills or experience relevant to the nominated subject matter and can give authoritative assessment, advice and analysis to performance relative to the subject matter using the relevant protocols, standards, methods or literature.
	The appropriately qualified person(s) should have, or collectively have, all the following capabilities:
	a) A detailed understanding of relevant sections of the following guidelines and legislation:
	i. Environmental Protection Act and Environmental Protection Regulation
	ii. Environmental Protection (Water) Policy
	iii. Environment and Heritage Protection Urban Stormwater Planning Guidelines
	iv. Queensland Urban Drainage Manual
	v. IECA Best Practice Erosion and Sediment Control Manual.
	 b) An understanding of hydrology and hydraulics, including the ability to size and determine stabilisation requirements of drainage structures and treatment devices
	 c) An understanding of soil as it relates to revegetation and erosion. Specifically, the ability to conduct an effective soil sampling program, interpret results and design management strategies to address problem soils (pH, sodic, dispersive, and saline)
	 An understanding of appropriate use of the revised universal soil loss equation (RUSLE) to estimate soil loss
	 e) An understanding of the erosion, drainage and sediment controls considered best practice in Australia, and knowledge on the correct installation, operation and maintenance of these controls
	 Ability to prepare erosion and sediment control plans of a standard that is suitable for construction
	 g) Has experience in erosion and sediment control and a suitable environmental or engineering degree from a recognised institution
Approval	For the purpose of this EMP, approval means approval under the <i>Environment Protection and Biodiversity Conservation Act</i> 1992



ASS	Acid Sulfate Soils
Biosecurity Matter	Biosecurity matters as defined in the <i>Biosecurity Act 2014</i> including Biosecurity Matters listed by Local, State and Commonwealth Governments. Biosecurity matters include but are not limited to prohibited and restricted invasive plants (weeds) and animals
Complaint	A verbal or written complaint from a member of the pubic regarding the Works under the Contract and the impact upon their person or property
Construction Contractor/Contractor	The organisation engaged by the Principal to construct the works as detailed in the design
CPESC	Certified Professional in Erosion and Sediment Control
Cultural Heritage	Cultural Heritage includes artefacts, Sites, items, areas or places of known or potential Cultural Heritage significance (both indigenous and non-indigenous).
DAF	Department of Agriculture and Fisheries
DAWE	Commonwealth Department of Agriculture, Water and the Environment
DES	Department of Environment and Science
Discharge	The movement of Site stormwater:
	a) into a Waterway within the Site
	b) into a Waterway adjacent to the Site, and
	 beyond the boundary of the Site where it could reasonably enter a Waterway
DO	Dissolved Oxygen
EC	Electrical Conductivity
Elevated likelihood of occurrence	Assessed as having a 'high' or 'moderate' likelihood of occurrence in the previous flora and fauna reporting undertaken for the Project
Environment Incident	An environment incident is the occurrence of a reportable breach of legislation, an event that causes or has the potential to cause material or serious Environmental Harm
Environmental Harm	As defined by the Environmental Protection Act 1994, Section 14
Environmental Nuisance	As defined by the Environmental Protection Act 1994, Section 15
EMP	Environmental Management Plan
EMP (C)	Environmental Management Plan (Construction)



EPBC Act	The Commonwealth Environment Protection and Biodiversity Conservation Act 1999
ESC	Erosion and sediment control
ESCP	Erosion and Sediment Control Plan
IECA	International Erosion Control Association Australasia
JSDJV	Jacobs SMEC Design Joint Venture
Limits of Clearing	The Limits of Clearing are defined as the outside boundary of areas specified within the Contract for clearing and ground disturbance
Management Measure(s)	A Management Measure is purpose-built structure or strategy employed by the Contractor and documented in the EMPC to prevent or minimise Environmental Harm or provide an environmental benefit
MNES	Matters of National Environmental Significance
MRTS03	Transport and Main Roads Specifications MRTS03 Drainage, Retaining Structures and Protective Treatments
MRTS04	Technical Specification Transport and Main Roads Specifications MRTS04 General Earthworks
MRTS14	Technical Specification Transport and Main Roads Specifications MRTS14 Road Furniture
MRTS15	Technical Specification Transport and Main Roads Specifications MRTS15 Noise Fences
MRTS16	Transport and Main Roads Specifications MRTS16 Landscape and Revegetation Works
MRTS27	Transport and Main Roads Specifications MRTS27 Geotextiles
MRTS51	Technical Specification Transport and Main Roads Specifications MRTS51 Environmental Management
MRTS52	Technical Specification Transport and Main Roads Specifications MRTS52 Erosion and Sediment Control
No-go zones	An area not to be entered by a person or machine for the duration of the Contract or otherwise designated period of time or restricted access for authorised persons
The Principal	Department of Transport and Main Roads
The Proponent	Department of Transport and Main Roads are the person proposing to take the action, designated proponent and approval holder with regard to EPBC Reference: 2020/8628.



PASS	Potential Acid Sulfate Soils
Project Area	The Project Area aligns with the gazetted road corridor. It is the area proposed to be disturbed, altered, or used for the construction or operation of the Rockhampton Ring Road. Relocation of Public Utility Services may occur outside of the Project Area as well as other flood mitigation works
Project Footprint	The Project Footprint is located within the Project Area. It is the area proposed to be used for the operation of the Rockhampton Ring Road
RUSLE	Revised Universal Soil Loss Equation (RUSLE) Predictor of erosion risk based on the estimated annual soil loss.
	A = R x K x LS x C x P
	A = annual soil loss due to erosion (t/ha/year)
	R = rainfall erosivity factor
	K = soil erodibility factor
	LS = topographic factor based on slope length and gradient
	C = cover and management factor
	P = erosion control practice factor
	Refer to IECA Manual, Appendix E for further information.
Significant Vegetation	Significant Vegetation is an individual plant or vegetation community, which are protected under Commonwealth legislation, or have been identified under the Clause 9 of Annexure MRTS51.1 as being of significance
Site	Refer to description of Project Area.
Suitably Qualified and Experienced Fauna Spotter/Catcher	A person with formal qualifications and/or experience in identification of native animals and wildlife ecology. A person is considered to be suitably qualified and experienced if they meet one or more of the following criteria:
	 An ecological consultant with experience in conducting surveys for native animal breeding places
	A person who possesses a degree in natural science or similar with experience in conducting surveys for native animal breeding places, or
	3. A person who is authorised as a Spotter Catcher under a rehabilitation permit issued under the Queensland <i>Nature Conservation Act 1992</i>
TEC	Threatened Ecological Community under the EPBC Act
TMR	Queensland Department of Transport and Main Roads
TSS	Total Suspended Solids
The Project	The preliminary and detailed design and construction of the Rockhampton Ring Road



Vegetation Treatment	Turfing, Seeding or Planting.
Water Quality Investigation Criteria	The Water Quality Investigation Criteria sets the criteria for impacts to water quality. Non-conformance with Water Quality Investigation Criteria trigger investigations as to the cause of the non-conformance and whether the non-conformance represents an Environmental Incident
Waterway	As defined as a watercourse under the Environmental Protection Regulation 2008 and including naturally occurring surface waters as defined in the Environmental Protection Regulation 2008
Weekly Site Inspections	Weekly Site Inspections undertaken by the Contractor's Environmental Representative or other person deemed suitable by the Principal, and are documented visual inspections of environmental Management Measures to assess presence, functionality and adequacy of measures prescribed in the Environmental Management Plan (Construction)
Work under the Contract	The work which the Contractor is or may be required to execute under the Contract and includes variations, remedial work, Construction Plant and Temporary Works



1. Introduction

1.1 Background

The Rockhampton Ring Road Project (the Project) is the key piece of road infrastructure recommended in the Fitzroy River Floodplain and Road Planning Study (AECOM, 2011), which investigated long-term solutions for flooding impacts on freight, road and rail transport in and around the city of Rockhampton.

The Project will provide a western road link off the Bruce Highway to the west of Rockhampton, with key linkages into the city at the Capricorn Highway, West Rockhampton, Alexandra Street and Yaamba Road (Rockhampton – Yeppoon Road). The alignment will integrate with major infrastructure projects already completed in the area, including Yeppen Floodplain Project (south) and Yeppen Floodplain Project (north), as well as current works in development including the Rockhampton Northern Access Upgrade and Capricorn Highway Duplication (Rockhampton – Gracemere).

The Project Area and Project Footprint are shown in Figure **2-1**. The Project Area generally aligns with the gazetted road corridor for the Rockhampton Ring Road. It is the area proposed to be disturbed, altered, or used for the construction or operation of the Rockhampton Ring Road. The Project Footprint is the area within the Project Area that will be used for the operation of the Rockhampton Ring Road. Works associated with the construction and operation of the Project will generally be undertaken within the Project Area.

1.2 Purpose and Scope of this EMP

This Environmental Management Plan (EMP) has been developed during the preliminary design phase of the Project to:

- Provide an environmental management framework outlining roles and responsibilities and governance arrangements
- Identify performance outcomes and management measures to minimise potential impacts on Matters
 of National Environmental Significance (MNES) associated with the construction and operation of the
 Project
- Inform the development of an Environmental Management Plan (Construction) (EMP(C)) by the Construction Contractor. It is expected that the Construction Contractor will review this document and produce their own EMP specific to the construction methodology and which generally complies with the requirements outlined.
- Support the Preliminary Documentation prepared in direct response to additional information requested by the Department of Agriculture Water and the Environment (DAWE) as part of the "Controlled Action: Preliminary Documentation" determination for the Rockhampton Ring Road made on 16 June 2020 (EPBC Reference: 2020/8628)

The EMP provides a consolidated management plan to mitigate potential impacts to MNES flora and fauna assessed as present, or as having an elevated likelihood of occurrence (i.e. have a 'high' or 'moderate' likelihood of occurrence) within the Project Area. The assessment of relevant MNES is based on desktop and field surveys undertaken to characterise the existing environmental values of the Project Area, as outlined in the Preliminary Documentation report (Jacobs SMEC Design Joint Venture, 2021b).

The EMP provides sub plans that aim to:

- Detail potential impacts to MNES and their habitat
- Detail objectives and targets for managing potential impacts to MNES and their habitat
- Detail mitigation and management approach to minimise the potential negative direct and indirect impacts of the Project on the identified MNES and their habitat



- Monitoring, reporting and training requirements to determine the effectiveness of the mitigation measures
- Details of the roles and responsible parties relevant to implementing this EMP.

This EMP is intended to be a stand-alone document specific to MNES flora and fauna; however, can be read in conjunction with the Preliminary Documentation report (Jacobs SMEC Design Joint Venture, 2021b). The Preliminary Documentation contains a description of the Project, the existing environment values, potential impacts, mitigation measures and the significant impact assessment for each relevant MNES.

1.3 Structure of the EMP

This document has been structured as follows:

Section 2: Project Description – Outlines the project description, construction and ancillary activities, operational phase activities and project delivery.

Section 3: Environmental Management Framework– the required procedures in the event of complaints or incidents and the required monitoring, auditing and reporting.

Section 4: Summary of MNES- this section provides a summary of the MNES identified in the Preliminary Documentation for the Project (Jacobs SMEC Design Joint Venture, 2021b).

Section 5: Construction Sub Plans - outlines environmental management requirements to address key potential impacts to MNES during construction.

Section 6: Sub Plans – Operation - Separate sub plans have been developed for the construction and operation phases.

The Sub Plans conform to the following structure:

- Objective(s) The performance requirements for the element
- Performance Criteria Demonstration of implementation of indicators, management strategies and/or monitoring
- Management Strategies The strategies that will be implemented to achieve the objectives.
- Training Training conducted to ensure personnel adhere to and understand the Performance Criteria and Management Strategies
- Monitoring The monitoring requirements that will measure the actual performance indicators
- Reporting The format, timing and responsibility for reporting and auditing of the results of monitoring
- Responsibility Who is responsible for implementing and monitoring the Management Strategies and implementing corrective actions
- Timing The stage of the Project the Management Strategies relates to
- Corrective Action The action to be implemented if the performance criteria and objective is not reached, and identification of the person/organisation responsible for the non-conformance.

1.4 Period of effect

This EMP will be in effect during the construction phase of the Project and is deemed to be complete once the Project has reached practical completion. Operational requirements of this EMP will be implemented and managed via TMR's standard operating procedures and policies.



2. **Project Description**

2.1 Project Description

The Project will provide a western road link of the Bruce Highway to the west of Rockhampton, with key linkages into the city at the Capricorn Highway, West Rockhampton, Alexandra Street and Yaamba Road (Rockhampton – Yeppoon Road). The alignment will integrate with major infrastructure projects already completed, Yeppen Floodplain Project (south) and Yeppen Floodplain Project (north), as well as current works in development including the Rockhampton Northern Access Upgrade and Capricorn Highway Duplication (Rockhampton – Gracemere).

The Project commences on the Capricorn Highway approximately 2 km west of the intersection of the Bruce Highway and Capricorn Highway at the Yeppen Roundabout and its alignment traverses north through the Western Yeppen Floodplain, sweeping around the Rockhampton Airport at Pink Lily lagoon and connecting to West Rockhampton near Ridgelands Road before crossing the Fitzroy River. After crossing the Fitzroy River, the alignment intersects Alexandra Street in Parkhurst and connects with the Bruce Highway at the Bruce Highway and Rockhampton – Yeppoon Road intersection.

The Project proposes to deliver the following, which will provide a highway standard ring road:

- A nominal 80 m wide road corridor for the Rockhampton Ring Road sufficient to provide a footprint for the road, temporary access tracks for construction and clearance to the corridor boundary to allow maintenance during the operational phase of the road
- Construction of roads including a two lane section from Capricorn Highway to Rockhampton Connector Road and a four-lane section from Rockhampton Connector Road to Yeppoon Road
- 18 new bridge structures, including a new four lane crossing of the Fitzroy River
- Construction of a new intersection at the Capricorn Highway, approximately 2 km west of the Yeppen Roundabout
- Construction of a new connection (Rockhampton Connector Road) to West Rockhampton at Pink Lily
- Construction of a new connection to Parkhurst at Alexandra Street by means of a grade separated interchange
- Reconfiguration of existing roads and streets to implement improved access at West Rockhampton and Alexandra Street
- Intersection upgrade for the connection to the intersection of the Bruce Highway and Rockhampton Yeppoon Road
- 1% AEP flood immunity of the Rockhampton Ring Road and Rockhampton Connector Road
- Relocation and reconfiguration of affected Public Utility Plant
- Intelligent transport systems including CCTV (closed-circuit television) cameras, bluetooth detection and electronic message signing
- Road lighting at intersections, ramps and the bridge over the Fitzroy River
- Widening of the drainage channel outside of the road corridor and at the southern end of the Rockhampton Airport
- Landscaping and revegetation of disturbed areas.

The total combined length of the Project is approximately 17 km (including the Rockhampton Connector Road). The length of the Project from the Capricorn Highway intersection to the Yeppoon Road intersection is approximately 14.7 km (excluding the Rockhampton Connector Road). The Project Area and Project Footprint are shown in Figure 2-1.







2.2 Construction and Ancillary Activities

The general construction sequence is anticipated to include the following:

- Site establishment and survey set out
- Clearing vegetation
- Temporary erosion and sediment controls (as vegetation is cleared)
- Temporary construction access tracks
- Earth drainage lines and preparation of existing ground surface
- Drainage (culverts) and construction of deep foundations (piles) / bridge substructures
- Bulk earthworks and retaining walls
- Road pavements and bridge superstructures
- Road surfacing and environmental protection treatments
- Road furniture, intersection lighting, traffic signals, Intelligent Transport Systems and active transport infrastructure
- Landscaping and disturbed area rehabilitation
- Site disestablishment and finalisation of construction defects.

It is anticipated orthodox construction equipment will be used during construction with specialist pile driving equipment used on site for bridge construction. Materials for construction are expected to be sourced from quarries in the Rockhampton region. Project activities are not expected to involve quarrying activities to supply construction material.

During construction, temporary access tracks and haul roads will be required. The temporary haul roads are anticipated to have an approximately 10 m wide road surface, plus batters, which will likely equate to an average width of approximately 15 m.

Temporary bridges or barges are expected to be used to facilitate construction of the Fitzroy River bridge. At other bridge locations, approximately 23 m wide temporary crane pads and approximately 12 m wide temporary pile laydown areas will be required.

The total bridging equates to approximately 7 km, with the construction of the bridges to be sequenced throughout the Project duration. Construction timeframes will vary for each bridge, with the longest timeframe of 14 months anticipated. The Construction Contractor would be required to construct temporary access tracks and working pads to facilitate the bridge works.

The Construction Contractor will be encouraged to use non-potable water for construction works where feasible. No raw water or treated effluent lines are located near the Project Area.

Temporary site offices, stockpiles and laydown areas will generally be located within the Project Area or other suitable land (e.g. TMR acquired properties or road reserve).

Highway traffic will be able to continue to use the existing road network during construction.

2.3 Operational Phase Activities

Once operational, the road will be maintained in accordance with TMR standards which is anticipated to include the following:

- Vegetation maintenance works including weed control
- Culvert and bridge maintenance works
- Maintenance of bioretention basins and spill containment devices
- General road maintenance works.



2.4 Project Delivery

The Project design is anticipated to be delivered as a Transport Infrastructure Contract – Construct Only. The Project is anticipated to commence construction in 2022, with the overall construction program for the Project expected to be approximately three years.



3. Environmental Management Framework

The following section provides information on the environmental management framework to be adopted during Project delivery in relation to management of MNES flora and fauna, including:

- Key roles and responsibilities of TMR and the Construction Contractor
- Monitoring and reporting requirements
- Environmental training such as site inductions and regular toolbox talks
- Emergency contacts and procedures
- Management review meetings.

This EMP and broader environmental management framework, including other inputs and the implementation process, are shown in Figure 3-1.



Figure 3-1 The Project Environmental Management Framework



3.1 Roles and Responsibilities

3.1.1 Department of Transport and Main Roads

TMR are the Proponent and asset manager of the Project. With respect to this EMP, TMR have the responsibility to ensure that:

- Appropriate flora and fauna management and mitigation measures are included in the design
- The requirements of this EMP are included in the tender documents for construction
- The nominated Construction Contractor is made aware of the need to comply with the requirements of this EMP
- All activities associated with the Project are verified and reported to the relevant statutory authorities as required
- Incidents relating to flora and fauna are reported to relevant government agencies, where necessary
- Reporting and monitoring of any non-compliance is undertaken, and management procedures reviewed where necessary
- Manage corrective actions undertaken by the Construction Contractor to address non-conformance.

The construction project will be split in to two separate contracts for the delivery of the southern and northern sections of the Rockhampton Ring Roads.

Separate from this, the Collaborative Project Agreement (Construction Only) or CPA(CO) will be the instrument for the management of the project and environmental controls. The CPA (CO) references:

- The Scope of Works and Technical Criteria document (plans and reports and construction constraints)
- The Queensland Transport and Main Roads Technical Specifications (MRTS) and Addenda framework whereby environmental and other technical requirements are set out for adherence by the Contractor and surveillance by the Contract Administrator (acting on behalf of TMR) to enforce those requirements of the contract and
- The engagement of an environmental auditor and surveillance resources nominated in the abovementioned structures to manage the environmental requirements including EPBC.

The CPA (CO) incorporates a project structure where TMR and the Contractor(s) have membership of the project management team, where monthly reporting of multiple components of the projects will be reported and decisions made. This includes receipt of all necessary environmental health and safety controls and measures implemented on the project.

In addition the project, as noted above, will include the engagement of environmental auditors and surveillance resources to oversight environmental compliance (Figure 3-2).





Figure 3-2 Key Personnel and Project Management Framework for the Project



3.1.2 Construction Contractor

The key responsibilities of the Construction Contractor in relation to this EMP include:

- Prepare and implement an Environmental Management Plan (Construction) (EMP(C)) and Erosion and Sediment Control Plan (ESCP)
- Undertake the works in accordance with this EMP and ensure the implementation of the EMP requirements
- Undertake the works in accordance with the conditions of the contract including the Transport and Main Roads Specifications MRTS51 Environmental Management and Transport and Main Roads Specifications MRTS52 Erosion and Sediment Control and the EMP(C)
- Inform all staff and sub-contractors of their environmental obligations
- Report, monitor and act on any non-compliance and review management procedures where necessary
- Adhere to relevant requirements of state and federal legislation.

3.2 Monitoring and Reporting

Specific monitoring and reporting requirements for potential impacts to MNES flora and fauna are specified in the Sub Plans included in this EMP. During construction, the effectiveness of management measures detailed in this EMP will be monitored through the compilation of incidental, weekly and monthly reporting in accordance with TMR's contractual documentation and the EMP(C). Requirements for incident reporting applies during construction and operation.

3.2.1 Construction Monthly Reporting

The Construction Contractor shall complete and submit exception reporting to the Principal in the form of a monthly environmental report. The monthly environmental report shall be submitted to the Principal within five business days of the end of each month. The monthly environmental report shall include exception reporting and statements actively addressing¹ but not limited to the following that occurred during the reporting month:

- a) Contractor's updates to EMP(C)
- b) Weekly Site Inspections number of inspections completed, and summary of corrective actions undertaken
- c) Monitoring Reporting summary of Monitoring and whether non-conforming results were obtained, including:
 - Clearing records
 - Pre-clearing survey reporting
 - Groundwater and surface water monitoring results
 - · Acid sulphate soil testing and management
 - Weed inspections and management
 - Landscaping and rehabilitation activities
- d) Register of current and completed non-conformance reports, environment-related complaints and Environmental and Cultural Heritage Incidents raised by the Construction Contractor as part of their Quality System in relation to MRTS51 and a record of the current status
- e) Positive environmental outcomes achieved, and opportunities identified by the Contractor.

¹ Actively addressing means that where there is nothing to report, the Contractor shall report "nil" rather than omission of any response.



Where exception reporting demonstrates repeated or multiple (three or more) non-conformances of the same issue, the Principal may instruct the Construction Contractor to undertake a review of the adequacy of Management Measures outlined in the EMP(C) and provide response back to the Principal within five business days either confirming and justifying the suitability of the existing EMP(C) or notifying of updates to the EMP(C) and the justification.

3.2.2 Construction and Operation Incident Reporting

Incident reporting is the investigation of an incident post the immediate response to an incident, which includes immediate notification, management and remediation. An Environment Incident Report must be prepared within 40 business days of the Environmental Incident detailing:

- a) The nature of the incident
- b) What Management Measures were in place to prevent an incident occurring
- c) Probable cause of the incident; and
- d) What corrective actions have been undertaken to prevent incidents reoccurring.

TMR and the Construction Contractor have a responsibility to report any non-compliance with the conditions of approval for the Project under the EPBC Act to the Minister for Environment within two (2) business days of becoming aware of the non-compliance. TMR and the Construction Contractor also have a responsibility to report all major environmental incidents that risk causing environmental harm to the Queensland Department of Environment and Science under the Queensland *Environmental Protection Act 1994*.

3.3 Training and Awareness

To achieve environmental compliance all site personnel (including subcontractors) must be made aware of their obligations and also TMR's commitment to meet these obligations. As such, the following environmental training is to be undertaken:

- Induction in accordance with TMR's Health, Safety, Environment requirements
- Induction training, including roles and responsibilities
- Environmental, social awareness and cultural heritage training as required in relation to areas of specific concern
- Issue specific 'Tool-box' training.

All training will be undertaken by a suitably qualified person and records will be maintained detailing the training undertaken and attendees at training.

3.3.1 Induction Training

Prior to the commencement of Project activities, all site personnel (including subcontractors) will attend a site induction.

The site induction is to include:

- Responsibilities and accountabilities of all site personnel
- The key environmental aspects and values and associated high risk activities
- Controls and procedures to prevent impacts
- General Environment Duty and Duty to Notify responsibilities as per the *Queensland Environmental Protection Act 1994.*



3.3.2 Construction Environmental Training

During construction, site staff will be required to undergo environmental training prior to commencing work on site as relevant to their work. This is to include a briefing on the following (at a minimum):

- The requirements of this EMP
- MNES flora and fauna confirmed present and with the potential to be present
- Fauna habitat types and areas
- Potential impacts of construction
- Corrective action requirements
- Reporting requirements throughout the Construction phase.

3.3.3 'Toolbox' Training

Regular 'Toolbox' training will help to ensure that relevant information arising from issues is communicated and that feedback can be provided on issues of interest or concern. 'Toolbox' training topics of relevance to MNES may include but not be limited to:

- MNES flora and fauna species and required management procedures
- No-go Zones
- Protecting waterways, riparian zones and wetlands
- Management of works near waterways
- Soil erosion and sediment control
- Working in flood zones
- Waste management, minimisation, and recycling
- Noise and vibration minimisation
- Dust control
- Wastewater control
- Management of acid sulphate soils and potentially contaminated soil if encountered.

3.4 Community Consultation and Complaints

3.4.1 Community Consultation

Proactive consultation with the local community regarding the Project will be undertaken by TMR or delegated representative.

3.4.2 Complaint Management

The process for complaint/dispute management is as follows:

- 1. Record the complaint in the Complaint Register
- 2. Report all complaints to TMR
- 3. Establish corrective action associated with the complaint
- 4. Report corrective action back to TMR who will then communicate to the complainant; and



5. If acceptable to the complainant close out the complaint, if not start dispute resolution process.

3.4.3 Complaint Register

Complaints received by the Construction Contractor will be comprehensively recorded noting the following:

- Date
- Time
- Type of communication (telephone, letter, meeting etc.)
- Name, address, contact number of complainant
- Nature of complaint
- Details
- The name of the person who received the complaint
- Action taken in response including who the complaint was referred to (if not resolved immediately)
- Details of any monitoring undertaken to confirm that the complaint has been satisfactorily resolved; and
- Any other information received or given during a verbal complaint such as timeframes for response.

3.5 Emergency Contacts and Procedures

Any instances of an animal emergency (e.g. serious injury requiring care or hospitalisation or animal death) will be followed up with an incident report submitted to TMR. If an animal emergency occurs, the fauna spotter/catcher will remove the affected animal to a wildlife carer/vet/animal hospital. Incident reporting will be undertaken as outlined in Section 3.2.2.

Contingency measures and adjustments to the management strategies outlined in this EMP are to be subject to continual review for improvement and may need to be considered in the event MNES flora or fauna are negatively impacted, or the mitigation measures cannot be complied with, or are deemed to be ineffective. In this event, the current mitigation strategies will be reviewed in conjunction with a Suitably Qualified and Experienced Person (Fauna)² and any recommended changes implemented.

If, during construction, a threatened species or community, other than that identified in this document, is identified, works will stop in the area until suitable mitigation measures have been developed and/or the required permits/approvals have been obtained. However, if a threatened species with the same habitat requirements as the species covered by this EMP is identified (e.g. other MNES mammals, birds and/or reptiles), the management measures identified in this EMP shall be applied and considered sufficient. TMR will notify the relevant departments including Commonwealth Department of Agriculture, Water and the Environment (DAWE) of the inclusion of the additional threatened species or community in this EMP.

If MNES fauna are injured as a result of construction or operational activities, the following actions will be implemented:

- Injured fauna will be inspected by the fauna spotter/catcher to assess the extent of the injury or sickness.
- Where the fauna spotter/catcher considers the injury to be minor (e.g. minor abrasion) and the animal is otherwise alert and active, the animal may be released into suitable habitat outside the Project area to reduce stress on the animal.
- Where the fauna spotter/catcher considers the injury to be more than minor, the fauna spotter/catcher will immediately take the species to a wildlife carer/vet/animal hospital.

² Suitably qualified and experienced (fauna) is defined TMR Technical Specification, MRTS51 Environmental Management



3.6 Document Management

The Construction Contractor and TMR will ensure that an adequate document control system is in place to ensure that only current documentation is in use.

Records collected as part of environmental management activities will be retained by the Construction Contractor and TMR for the legally required period of time. Environmental records include but may not be limited to:

- Site inspection checklists
- Environmental audit reports
- Training records
- Monitoring data
- Complaints and associated records of communication
- Meeting minutes.

During construction, the Contractor will make these records available to the TMR or any relevant authorities and their representatives on request.

During the operational phase, the Proponent (TMR) will make these records available to any relevant authorities and their representatives on request and where justified and in accordance with legislation.

3.7 Audit

During construction activities, the Construction Contractor will be responsible for complying with the relevant provisions as set out in this EMP and sub-plans.

Internal audits will take place monthly and be informed by weekly inspections and monthly reporting. External environmental audits of erosion and sediment control measures will be undertaken by a suitably qualified and independent environmental auditor in accordance with MRTS52, which requires a minimum of three independent audits for each stage of the project (e.g. one audit immediately following clearing and grubbing and one audit during cut and fill and one audit at end of major earthworks).

All inspection and compliance reports of environmental performance will be stored in an electronic database that is used to enable corrective actions identified during the inspection/auditing process be recorded, tracked and closed out. The information will be made available to the relevant regulatory authorities and TMR as required.

During the operational phase, monitoring and maintenance activities will be managed in accordance with TMR policies and procedures.

3.8 Review

During construction, management review meetings will be held every six months to examine the effectiveness of the implementation of the EMP. The six-monthly management review will address the following matters:

- Performance against objectives and performance targets
- Results of inspections, environmental monitoring and incidents and internal and external (where applicable) environmental audits, including any trends
- Identification of requirement for further mitigation measures
- Review of mitigation measures in response to monitoring results
- Review of the progressive assessment of the predicted impacts and design of mitigation measures prior to the relevant stages of construction works



- Outcomes of community consultation
- Setting new objectives and targets to promote continual improvement, where required.

Meeting attendees will include (as a minimum) the General Superintendent, Environmental Manager, Environmental Officer, Construction Manager and TMR representatives. Other attendees such as Site Engineer/s, or their nominated representatives may be invited from time to time to discuss specific issues. The meeting would be chaired by the Environment Manager, and records of such reviews will be documented as minutes and maintained.

This EMP will not be amended in such a way that would result in a contravention of any condition of any environmental obligation (e.g. approval conditions, legislative requirements, etc).

During the operational phase, monitoring and maintenance activities will be managed in accordance with TMR policies and procedures.



4. Summary of Matters of National Environmental Significance

This EMP addresses potential impacts to the following species known, or that have an elevated likelihood of occurring (i.e. have a 'high' or 'moderate' likelihood of occurrence), in the Project Area:

Flora:

- Black ironbox (Eucalyptus raveretiana) Vulnerable
- Brigalow (Acacia harpophylla dominant and co-dominant) Threatened Ecological Community (TEC) Endangered

Aquatic fauna:

- Estuarine crocodile (Crocodylus porosus) Migratory, Marine
- Fitzroy River turtle (Rheodytes leukops) Vulnerable
- White-throated snapping turtle (*Elseya albagula*) Critically Endangered

Terrestrial fauna:

- Australian painted snipe (Rostratus australis) Endangered, Marine
- Grey-headed flying-fox (Pteropus poliocephalus) Vulnerable
- Koala (Phascolarctos cinereus) (combined populations of Qld, NSW and the ACT) Vulnerable
- Ornamental snake (Denisonia maculata) Vulnerable
- Squatter pigeon (Geophaps scripta scripta) Vulnerable

Migratory birds

- Black-tailed godwit (Limosa limosa) Migratory, Marine
- Caspian tern (Hydroprogne caspia) Migratory, Marine
- Common greenshank (Tringa nebularia) Migratory, Marine
- Common sandpiper (Actitis hypoleucos) Migratory, Marine
- Curlew sandpiper (Calidris ferruginea) Critically Endangered, Migratory, Marine
- Eastern osprey (Pandion haliaetus) Migratory, Marine
- Glossy ibis (Plegadis falcinellus) Migratory, Marine
- Latham's snipe (Gallinago hardwickii) Migratory, Marine
- Little curlew (Numenius minutus) Migratory, Marine
- Marsh sandpiper (Tringa stagnatilis) Migratory, Marine
- Pectoral sandpiper (Calidris melanotos) Migratory, Marine
- Red-necked stint (Calidris ruficollis) Migratory, Marine
- Sharp-tailed sandpiper (Calidris acuminata) Migratory, Marine
- White-winged black tern (Chlidonias leucopterus) Migratory, Marine
- Wood sandpiper (*Tringa glareola*) Migratory, Marine

4.1 Flora

There are 63 black ironbox (*Eucalyptus raveretiana*) individuals and approximately 8.8 Ha of suitable habitat for this species along Limestone Creek with additional suitable habitat anticipated to be present outside of



the surveyed area (Jacobs SMEC Design Joint Venture, 2021c). Within the Project Area, there is approximately 1.0 Ha of potentially suitable habitat along Limestone Creek (Figure 4-1)

A 1.9 ha patch of the brigalow (*Acacia harpophylla* dominant and co-dominant) TEC was identified within the Project Area (Ecosure, 2021b), with only a small portion of the habitat inside the Project Footprint (0.3 Ha).

Habitat in the Project Area to be retained will be demarcated as a no-go zone and protected during construction (Figure 4-2).

4.2 Fauna

This section provides an overview of MNES fauna of relevance to the Project and their habitat within the Project Area.

MNES fauna of relevance were identified in the Preliminary Documentation as confirmed as present during the field surveys (AECOM, 2020f; AECOM, 2020b; AECOM, 2020d; AECOM, 2020e; Jacobs SMEC Design Joint Venture, 2021a; Ecosure, 2021a) or considered to have a 'high' or 'moderate' likelihood of occurrence within the Project Area (Table 4-1).

Likelihood	Description
Known/Recorded	Known/Recorded Species observed or recorded during the survey program. Species recorded previously within Project Area and known to persist via ongoing monitoring programs.
High	 Species considered to have a high likelihood of occurrence include species that: have been recorded in the Project Area or surrounding area on a regular basis
	 are dependent on or associated with habitat types that are present in the Project Area in good or unmodified condition
	 are known to persist as resident sedentary populations in areas surrounding and contiguous with the Project Area
	 are unlikely to persist in the Project Area, however, may use habitat within the Project Area on a seasonal, transient or opportunistic basis.
Moderate	 Species considered to have a moderate likelihood of occurrence include species that: have been recorded in the Project Area or surrounding area on a rare or intermittent basis
	 are dependent on or associated with specific types of habitat that are present in the Project Area in poor or modified condition
	 are unlikely to persist in the Project Area, however, may seasonally use resources within the Project Area on a transient or opportunistic basis.
Low	 Species considered to have a low likelihood of occurrence include species that: have not been recorded previously in the Project Area and surrounding area
	 are well outside their known or documented distribution range
	 are dependent or associated with specific types of habitat that are absent from the Project Area
	 are considered locally or regionally extinct.

Table 4-1 Likelihood of Occurrence Criteria



MNES fauna and their habitat associations are provided in Table 4-2.

The following habitat types were identified within the Project Area during field surveys for the Project:

- Lacustrine wetland
- Palustrine wetland
- Riverine wetland
- Fringing riparian woodland
- Open woodland to low open woodland on alluvial floodplain
- Eucalyptus crebra and Corymbia dallachiana woodland
- Brigalow low forest
- Modified grasslands.

The fauna habitat types within the Project Area are shown in Figure 4-3.



Figure 4-1: Black ironbox (Eucalyptus raveretiana) habitat within the Project Area and potential habitat in the broader area



Legend



Field-verified habitat for species within the Project Area

Fringing riparian woodland with Eucalyptus raveretiana (11.3.25a)

Fringing riparian woodland (11.3.25)

Potential habitat based on Regional Ecosystem mapping

Semi evergreen vine thicket (11.3.11)



Project Area

Project Footprint





Rockhampton Ring Road

Source: Queensland Department of Resources: Roads (2020); AECOM: Ironbox Habitat (2021); Metromap: Imagery (2020)

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Legend

Field-verified habitat for Brigalow Threatened Ecological Community within the Project Area

🔆 Potential habitat based on Regional Ecosystem mapping

Project Area
Project Footprint





Rockhampton Ring Road

Source: Queensland Department of Resources: Roads (2020); AECOM: Brigalow Habitat (2021); ESRI: Imagery (2020)

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Figure 4-3: Habitat Types









Table 4-2 MNES Fauna and their Habitat Associations

Species	Description ³	Habitat Utilisation	Habitat Type/s	Approx. Area of Habitat
Likelihood of Occurrence				(Ha) in Project Area
Aquatic fauna				
Estuarine crocodile High	Usually restricted to coastal waterways and floodplain wetlands, preferring to nest on elevated, isolated freshwater swamps that do not experience tidal influence. Rockhampton is the southern extent of the species range and abundance is comparatively low. Feed primarily on crustaceans and insects but are also known to consume a variety of prey including birds, fishes, flying foxes, cats, dogs, pigs, cattle, horses and infrequently humans.	Breeding/ nesting, foraging and dispersal	Lacustrine or palustrine wetlands Riverine waterbodies	12.9
Fitzroy River turtle High	Endemic to the Fitzroy Basin. Undercut banks, root tangles, woody debris, riparian vegetation and macrophytes are preferred sheltering and foraging habitat features, and it shows preference for clear water and riffles but will retreat to non-flowing, potentially isolated pools during the dry season, however is not known to occur in deep water areas or off-stream habitats. Nests have all been located on river sandbanks 1 – 4 m above the water level.	Foraging and dispersal	Riverine waterbodies	6.4
White-throated snapping turtle High	Endemic to the combined Fitzroy-Burnett-Mary basins and generally found in pools >6 m deep with clear, flowing, highly oxygenated water including riffle habitat or adjacent pools and waterways characterised by steep sides, sand-gravel substrate and underwater refuge. Does not generally occur within farm dams, ephemeral swamplands or brackish waters. Nesting is primarily restricted to sand and loam alluvial deposits anywhere from 1 - 86 m from and >8 m above the water line.	Foraging and dispersal	Riverine waterbodies	6.4
Terrestrial fauna				
Australian painted snipe	Breeds on small exposed islands within freshwater wetlands with a combination of exposed muddy areas and dense vegetative cover. Foraging habitat includes palustrine and lacustrine wetlands with shallow waters and muddy margins.	Foraging, roosting and dispersal	Lacustrine or palustrine wetlands	9.5

³ Species Profile and Threats Database (Australian Government Department of Agriculture, Water and the Environment, 2021)



Species Likelihood of Occurrence	Description ³	Habitat Utilisation	Habitat Type/s	Approx. Area of Habitat (Ha) in Project Area
High	Based on the specific habitat requirements of the species, shallow wetlands in eastern Australia are considered habitat critical to the survival of the species.			
Grey-headed flying- fox High	Canopy-feeding frugivore and nectarivore, which utilises vegetation communities including rainforests, open forests, closed and open woodlands, melaleuca swamps and banksia woodlands. Requires foraging resources and roosting sites. The primary food source is blossom from <i>Eucalyptus</i> spp. and related genera.	Foraging, opportunistic roosting and dispersal	Eucalyptus woodland on metamorphics or granitic Brigalow woodland	32.5
			Eucalyptus populnea woodland on alluvial floodplains	
			Fringing riparian woodland	
			Fringing riparian woodland with <i>Eucalyptus raveretiana</i>	
			Eucalyptus woodland on alluvial floodplains	
			Eucalyptus woodland on alluvial floodplains with <i>Eucalyptus tereticornis</i>	
Koala Moderate	Inhabits a range of temperate, sub-tropical and tropical forests, woodlands and semi-arid communities. Diet is restricted mainly to foliage of <i>Eucalyptus</i> spp. however, it may also consume foliage of related genera, including <i>Corymbia</i>	Breeding, foraging and dispersal	Eucalyptus woodland on metamorphics or granitic	33.9
	spp., Angophora spp. and Lopnostemon spp, and may, at times, supplement its diet with other species, including Leptospermum spp. and Melaleuca spp		Eucalyptus populnea woodland on alluvial floodplains	



Species Likelihood of Occurrence	Description ³	Habitat Utilisation	Habitat Type/s	Approx. Area of Habitat (Ha) in Project Area
Ornamental snake Moderate	Known only from the Brigalow Belt north and parts of the Brigalow Belt south biogeographical regions, with core distribution within the Fitzroy and Dawson sub-basins. Prefer woodlands and open forests associated with moist areas, particularly gilgai mounds and depressions Queensland RE Land Zone 4 (Tertiary-early Quaternary clay plains), but also lake margins and wetlands.	Breeding, foraging and dispersal	Fringing riparian woodland Fringing riparian woodland with <i>Eucalyptus raveretiana</i> Eucalyptus woodland on alluvial floodplains Eucalyptus woodland on alluvial floodplains with <i>Eucalyptus tereticornis</i> Lacustrine or palustrine wetlands Brigalow woodland Eucalyptus populnea woodland on alluvial floodplains Fringing riparian woodland Fringing riparian woodland with <i>Eucalyptus raveretiana</i> Riverine waterbody	42.1



Onesia			Habitat Tumala	A
Species Likelihood of Occurrence	Description	Habitat Utilisation	Habitat Type/S	of Habitat (Ha) in Project Area
Squatter pigeon (southern) Present	Ground-dwelling bird that inhabits dry grassy woodland and open forest, mostly in sandy areas close to permanent water. Known to persist in areas of active grazing and substantial habitat degradation. Forages for seeds among sparse and low grass, including improved pastures and disturbed habitats such as road reserves, with suitable waterbodies required daily to drink.	Breeding, foraging, roosting and dispersal	Eucalyptus woodland on alluvial floodplains Eucalyptus woodland on alluvial floodplains with <i>Eucalyptus tereticornis</i> Semi-evergreen vine thicket Lacustrine or palustrine wetlands <i>Eucalyptus populnea</i> woodland on alluvial floodplains Eucalyptus woodland on alluvial floodplains Eucalyptus woodland on alluvial floodplains with <i>Eucalyptus tereticornis</i> Modified grasslands	196.7
Migratory birds				
Black-tailed godwit Present	Can be found in a variety of coastal and inland wetlands throughout Australia. During the Austral spring/summer period, this species is widespread in coastal Queensland in response to large-scale flood events, inhabiting permanent or ephemeral wetlands of varying salinity, including swamps, lagoons, billabongs, saltpans, saltmarshes, estuaries, pools on inundated floodplains, and intertidal mudflats and also sewage farms and saltworks. Forages on wide intertidal	Foraging, roosting and dispersal	Lacustrine or palustrine wetlands	9.5



Species Likelihood of Occurrence	Description ³	Habitat Utilisation	Habitat Type/s	Approx. Area of Habitat (Ha) in Project Area
	mudflats or sandflats, and soft sediment habitats on shores of inland lakes and other wetlands.			
Caspian tern Present	Mostly found in sheltered coastal embayments, preferring sandy or muddy margins, and also on near-coastal and inland wetlands and large river systems that are either fresh or saline, especially lakes (including ephemeral lakes), waterholes, reservoirs, rivers and creeks, and use artificial wetlands such as reservoirs, sewage ponds and saltworks. Forage on the wing by plunge-diving in open waterbodies to capture a variety of fish species.	Foraging, roosting and dispersal	Lacustrine or palustrine wetlands Riverine waterbodies	12.9
Common greenshank High	In Queensland, this species is widespread in the Gulf country and eastern Gulf of Carpentaria, and also found in a wide variety of inland wetlands and sheltered coastal habitats of varying salinity. 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 around tidal pools, rock-flats and rock platforms.	Foraging, roosting and dispersal	Lacustrine or palustrine wetlands	9.5
Common sandpiper Moderate	Known to occur in a range of wetland environments across Australia, both coastal and inland. Primary habitat is rocky shorelines and narrow muddy margins of billabongs, lakes, estuaries and mangroves. The muddy margins utilised by the species are often narrow and may be steep. Often associated with mangroves, and sometimes found in areas of mud littered with rocks or snags.	Foraging, roosting and dispersal	Lacustrine or palustrine wetlands	9.5
Curlew sandpiper High	Occur around the Australian coast and are quite widespread inland. In Queensland, widespread records along the coast south of Cairns, mainly on intertidal mudflats in sheltered coastal areas. 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. Forage on mudflats and nearby shallow water and at the edges of shallow pools and drains of intertidal mudflats and sandy shores.	Foraging, roosting and dispersal	Lacustrine or palustrine wetlands	9.5



Species Likelihood of Occurrence	Description ³	Habitat Utilisation	Habitat Type/s	Approx. Area of Habitat (Ha) in Project Area
Eastern osprey Present	Occurs in littoral and coastal habitats and terrestrial wetlands of tropical and temperate Australia, mostly in coastal areas but occasionally inland along major rivers. Require extensive areas of open fresh, brackish or saline water for foraging with nests constructed in a variety of natural features and manmade structures including dead or partly dead trees, on cliffs and rocks and lighthouses and telecommunication towers.	Breeding/nesting, foraging, roosting and dispersal	Lacustrine or palustrine wetlands Riverine waterbodies	12.9
Glossy ibis Present	Forages and breeds in freshwater marshes at the edges of lakes and rivers, lagoons, floodplains, wet meadows, swamps, reservoirs, sewage ponds and cultivated areas under irrigation. Occasionally found in coastal habitats. Within Australia, this species moves in response to good rainfall, however the core breeding areas are within the Murray-Darling Basin region of New South Wales and Victoria, the Macquarie Marshes in New South Wales, and in southern Queensland. Often moves north in autumn, then returns south to the main breeding areas in spring and summer.	Foraging, roosting and dispersal	Lacustrine or palustrine wetlands Riverine waterbodies	12.9
Latham's snipe Present	A non-breeding visitor to eastern Australia with the Queensland range extending along the east coast from Cape York Peninsula south and inland over the eastern tablelands to south-eastern Queensland. Inhabits both permanent and ephemeral wetlands up to 2000 m above sea-level, ranging from open freshwater wetlands with low, dense vegetation to saline or brackish water in modified or artificial habitats. Forage in areas of mud, typically with some form of low, dense vegetation cover. Tolerant of disturbance and can be found in human-modified landscapes and in habitats located close to humans or human activity.	Foraging, roosting and dispersal	Lacustrine or palustrine wetlands	9.5
Little curlew Moderate	Generally found in northern Australia with many inland records and widespread but scattered records on the east coast. Most often found feeding in short, dry grassland and sedgeland, including dry floodplains and blacksoil plains, which have scattered, shallow freshwater pools or areas that are seasonally inundated, but also uses open woodlands with a grassy or burnt understorey, dry saltmarshes, coastal swamps, mudflats or sandflats of estuaries or beaches	Foraging, roosting and dispersal	Lacustrine or palustrine wetlands	9.5



Species Likelihood of Occurrence	Description ³	Habitat Utilisation	Habitat Type/s	Approx. Area of Habitat (Ha) in Project Area
	on sheltered coasts, mown lawns, gardens, recreational areas, ovals, racecourses and verges of roads and airstrips.			
Marsh sandpiper Present	Found on coastal and inland wetlands throughout Australia, and widespread in coastal Queensland south of Cooktown. Lives in permanent or ephemeral wetlands of varying salinity, including swamps, lagoons, billabongs, saltpans, saltmarshes, estuaries, pools on inundated floodplains, and intertidal mudflats and also sewage farms and saltworks, often associated with other waders. Forages in tight co-ordinated groups, and sometimes with other shorebird species.	Foraging, roosting and dispersal	Lacustrine or palustrine wetlands	9.5
Pectoral sandpiper Moderate	One of the largest flyway populations of any of the 37 regular migrant shorebird species which routinely visit Australia. Usually recorded as single birds or in very low numbers, in association with larger groups of sharp-tailed sandpipers. In Queensland, mostly occur around Cairns with scattered records elsewhere, mainly from east of the Great Divide between Townsville and Yeppoon. Usually found in coastal or near coastal habitat but very occasionally found further inland. Prefer wetlands that have open fringing mudflats and low, emergent or fringing vegetation, such as grass or samphire.	Foraging, roosting and dispersal	Lacustrine or palustrine wetlands	9.5
Red-necked stint High	Most common in south eastern Australia but occur across all states, mostly in protected coastal areas. Occasionally recorded on exposed or ocean beaches, stony or rocky shores, reefs or shoals, in saltworks, sewage farms, saltmarsh, ephemeral or permanent shallow wetlands, riverbanks, waterholes, bore drains, dams, soaks, pools on salt flats, flooded paddocks or damp grasslands. Mostly forages on bare wet mud on intertidal mudflats or sandflats, or in very shallow water. During high tides they sometimes forage in non-tidal wetlands and will readily take advantage of flooded inland wetlands and inundated floodplains and are considered to be a habitat generalist.	Foraging, roosting and dispersal	Lacustrine or palustrine wetlands	9.5
Sharp-tailed sandpiper	Recorded in all states and territories, and considered a habitat generalist that uses freshwater, estuarine, brackish and coastal or marine habitats (including hypersaline) depending on food resource availability. Prefer muddy edges of shallow or brackish wetlands with inundated saltmarsh or low-lying vegetation.	Foraging, roosting and dispersal	Lacustrine or palustrine wetlands	9.5



Species Likelihood of Occurrence	Description ³	Habitat Utilisation	Habitat Type/s	Approx. Area of Habitat (Ha) in Project Area
Present	Forage on seeds, worms, crustaceans, molluscs and insects at the edge of wetlands or intertidal mudflats, either on bare wet mud or sand, or in shallow water, and also among inundated vegetation of saltmarsh, grass or sedges, and sewage ponds. After rain, they may forage in paddocks of short grass, well away from water.			
White-winged black tern Present	Mostly inhabits fresh, brackish or saline, and coastal or subcoastal wetlands, including harbours, bays, estuaries and lagoons, and their associated tidal sandflats, mudflats, swamps, lakes, billabongs, rivers, floodplains, reservoirs, saltworks, sewage ponds and outfalls. Wetlands may be open, or with floating emergent or marginal vegetation. Mainly forages aerially, over water or over muddy or sandy edges of wetlands, and also forages over land adjacent to wetlands, especially if inundated, including rice paddies and dry paddocks and grassland.	Foraging, roosting and dispersal	Lacustrine or palustrine wetlands	9.5
Wood sandpiper Moderate	Largely solitary species, that uses well-vegetated, shallow, freshwater wetlands, such as swamps, billabongs, lakes, pools and waterholes, typically associated with emergent, aquatic plants or grass, and dominated by taller fringing vegetation and often with fallen timber. Also, frequent inundated grasslands, short herbage or wooded floodplains, where floodwaters are temporary or receding, and irrigated crops, and artificial wetlands, including open sewage ponds, reservoirs, large farm dams, and bore drains.	Foraging, roosting and dispersal	Lacustrine or palustrine wetlands	9.5



5. Construction Environmental Management Sub-plans

Sub Plans have been developed to include information on management, avoidance, minimisation and mitigation strategies associated with potential impacts on MNES during construction.

5.1 Matters of National Environmental Significance Flora and Fauna

Management measures for MNES flora and fauna during construction are outlined in Table 5-1.

Table 5-1 Sub Plan 1 – MNES Flora a	and Fauna
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Sub Plan 1	MNES Flora and Fauna
Objective(s)	 To comply with the regulatory requirements detailed under the EPBC Act
	 To comply with requirements detailed in the Transport and Main Roads Specifications MRTS51 Environmental Management and annexure
	 Avoid, where possible, impacts on MNES flora and fauna and their habitat, including minimising the amount of vegetation clearing to the extent necessary to construct the works.
Performance	 No mortality or injury of MNES fauna as a result of construction activities
Criteria	 No unauthorised clearing of MNES flora or fauna habitat
	 Clearing is minimised to the extent necessary to construct the works and complies with clearing limits specified.
	 No works within Black Duck Lagoon
	 No removal or damage to retained areas of Black ironbox and Brigalow TEC as a result of site activities (Figure 4-1 and Figure 4-2)
	 Further investigation will occur where performance criteria area not achieved
	 Corrective actions will be implemented where construction related impacts have been found to occur.
Management	Terrestrial Fauna
Strategies	 All clearing activities are to be carried out under the supervision and direction of suitably qualified, appropriately experienced and licensed fauna spotter/catchers
	 No more than two weeks prior (or at a time deemed suitable by the fauna spotter/catcher) to clearing in any area, the fauna spotter/catcher is to undertake a pre- clearing survey of the area to be cleared to identify fauna habitat and breeding places, focusing on MNES species known, or that have an elevated likelihood of occurring within the Project Area. During the pre-clearing survey the following is required, as a minimum:
	 All areas of potential habitat/breeding places are to be surveyed to determine the presence of fauna and/or their eggs/young
	 All areas of potential habitat/breeding places and habitat trees (hollow bearing trees) are to be visually marked with temporary no go zone flagging
	 Each fauna breeding place shall be GPS recorded.
	 Clearly identify potential or known fauna habitat by identification markers that are visibly different to the limits of clearing markers
	 Following the pre-clearing survey, the fauna spotter/catcher may make recommendations to incorporate temporary fauna exclusion fencing in areas identified



Sub Plan 1	MNES Flora and Fauna
	by the fauna spotter/catcher as providing suitable habitat to fauna species and migratory birds and having an elevated potential for fauna to enter into the Project Area
	 Prior to initial vegetation clearing/bulk earthworks within 150 m of a wetland, the fauna spotter/catcher is to undertake flushing transects to clear the wetlands of migratory birds. The timing of the flushing transects is to be determined by the fauna spotter/catcher and should be undertaken such that migratory birds do not have time to re-enter the works area. As an example, the fauna spotter/catcher may walk a safe distance in front of the machinery or undertake the flushing surveys the morning of clearing.
	 Immediately prior to vegetation clearing, the fauna spotter/catcher is to re-inspect all potential habitat/breeding places identified during the pre-clearing surveys
	 Should any nesting or roosting fauna be located on the sites, work must be excluded from the area being utilised by the animal and the area inspected by a suitably qualified fauna spotter/catcher
	Where fauna/eggs/young are encountered by the fauna spotter/catcher, the fauna spotter/catcher is required to manage the fauna/eggs/young appropriately and decide the most appropriate course of action to take. For example, if a healthy adult fauna species is encountered, the fauna spotter/catcher may decide to release the fauna into suitable habitat outside the Project Area. The suitable habitat outside the Project Area is to be identified by the fauna spotter/catcher. There should be sufficient suitable habitat outside the Project Area available to the fauna to minimise the potential of the fauna species returning into the Project Area
	Where eggs and/or young are identified, the fauna spotter/catcher is to manage the eggs/young appropriately and at their discretion in accordance with conditions of their Damage mitigation permit (removal and relocation of wildlife). This is likely to involve the eggs/young being transported immediately to a wildlife carer/vet/animal hospital or relocating the eggs/young into suitable habitat outside the Project Area. Where the fauna spotter/catcher is required to leave site to relocate fauna/eggs, clearing works are not allowed until the fauna spotter/catcher has returned to site (or another suitably qualified and appropriately experienced fauna spotter/catcher is present)
	 Following the removal of all identified fauna from within the clearing area, a two-stage clearing process, as directed in conjunction with the fauna spotter/catcher, is to be adopted as follows:
	 The first stage of clearing will involve the removal of all vegetation NOT identified as suitable fauna habitat, or breeding habitat, or habitat trees. The retained fauna habitat and breeding habitat/places and habitat/trees are to be left standing for 24hrs to allow fauna to leave the clearing area on their own accord
	 After leaving the identified fauna habitat and breeding habitat/places and/or habitat trees for 24hrs, the fauna spotter/catcher is to undertake an inspection of the identified fauna habitat and breeding habitat/places and/or habitat trees. Where fauna have not moved on of their own accord, the fauna spotter/catcher is to relocate fauna (except koalas) into suitable habitat or, if eggs/young are identified, to a wildlife carer/vet/animal hospital
	 Where the inspection of breeding places (e.g. hollows) is not practical, habitat trees are to be soft-felled to reduce the disturbance and risk of injury to any inhabiting fauna as follows:
	 A vertical tree grab attachment on an excavator is to be used to remove the entire tree and lay the tree down in a slow and steady controlled fashion. The tree is then to be inspected by the fauna spotter-catcher



Sub Plan 1	MNES Flora and Fauna
	 Where trees are too large for a vertical tree grab or may deteriorate from machine handling (e.g. brittle snags), an elevated work platform may be used to allow the fauna spotter/catcher to inspect hollows in the trees.
	 If a koala is found prior to or during clearing activities, it must not be forcibly relocated. Any tree that has a koala present, as well as any tree with its crown overlapping that tree, must not be removed. The trees must remain in place until the koala vacates the tree of its own accord
	 All fauna is to only be handled by the fauna spotter/catcher. Where fauna is injured the fauna spotter/catcher is to use their discretion/expertise to determine if the fauna is required to be taken to a wildlife carer, a veterinarian, or released into suitable habitat outside the Project Area
	If fauna is injured during site works the following strategies are to be implemented:
	 Cease works immediately in the vicinity of the injured animal
	 Notify the Site Manager or Environmental Representative immediately
	 The Environmental Representative must contact the nearest office of the Wildlife Management section of DES, a wildlife carer, veterinarian or the RSPCA (ph 1300 ANIMAL) immediately and proceed based on advice received
	 Remove any actual or potential threats to the injured animal. The animal should be moved as little as possible and only by a qualified and experienced fauna spotter/catcher or wildlife carer. Only if the animal is in threat of further danger and if the welfare of people is not compromised, carefully move the animal to a safe and quiet place
	 If movement of the animal is required, minimise stress to the animal by placing in a soft towel or cloth, then gently placing in a box. The box must be stored in a warm, quiet and dark place and not disturbed until a fauna spotter/catcher or wildlife carer arrives at the site
	 The incident must be reported in accordance with the site audit and inspection requirements.
	 The fauna spotter/catcher is to take all reasonable and practical measures to minimise the potential for fauna to re-enter the construction site
	 All onsite staff will be made aware of No-Go Zones and habitat through Site Induction, environmental training and toolbox talks prior to vegetation clearing or grubbing commencing
	 Where works are being undertaken adjacent to retained habitat, temporary exclusion fencing is to be erected after the clearing has been undertaken. The temporary exclusion fencing requirements and locations will be at the discretion of the fauna spotter/catcher
	 All trenches will be inspected in the morning and afternoon. The fauna spotter/catch will release any trapped fauna to suitable habitat outside the Project Area
	 Site personnel are not to feed fauna under any circumstances
	 Waste bins are to be properly sealed (as per waste management procedures) to secure food wastes etc. and keep them inaccessible to fauna.
	Aquatic Fauna
	 The construction and maintenance of in-stream structures may require the use of temporary bunds to allow dry work conditions. If this is required, salvage of fish and turtles will be undertaken in accordance with the Guidelines for Fish Salvage (Queensland Government Department of Agriculture and Fisheries, 2018)



Sub Plan 1	MNES Flora and Fauna				
	 If aquatic fauna is injured during site works, the following strategies are to be implemented: 				
	 Cease works immediately in the vicinity of the injured animal 				
	 Notify the Site Manager or Environmental Representative immediately 				
	 The Environmental Representative must contact the nearest office of the Wildlife Management section of DES, a wildlife carer, veterinarian or the RSPCA (ph 1300 ANIMAL) immediately and proceed based on advice received 				
	 Remove any actual or potential threats to the injured animal. The animal should be moved as little as possible and only by a qualified and experienced fauna spotter/catcher or wildlife carer. Only if the animal is in threat of further danger and if the welfare of people is not compromised, carefully move the animal to a safe and quiet place 				
	 The incident must be reported in accordance with the site audit and inspection requirements. 				
	Flora				
	 Avoid disturbance to vegetation or ground surface outside of the Limits of Clearing 				
	 Minimise disturbance areas within the Limits of Clearing to that necessary to construct the works 				
	 The approved clearing limits are to be included in the EMP(C) and signed and fenced on ground to prevent access during construction. Identification markers shall be maintained for the duration of the Contract or at least until Works are complete in the adjacent area 				
	 All onsite staff will be made aware of No-Go Zones and areas of Significant Vegetation through Site Induction, environmental training and tool box talks prior to vegetation clearing or grubbing commencing 				
	 Where works encroach on individual trees or vegetation to be retained, ground disturbance or other works, including material stockpiling, shall not encroach within the dripline of the tree (below canopy of tree) unless otherwise deemed suitable by the Principal 				
	 Trees are to be felled away from areas of vegetation to be retained to prevent damage in these areas 				
	 If present, vines are to be cut prior to felling trees to avoid damage to adjoining vegetation 				
	 All tree roots of retained vegetation that are damaged during excavations and related activities are to be saw cut to a clean surface and are to be treated with a fungicidal solution prior to backfilling or within 24 hours of the damage to the root occurring 				
	 All construction traffic will be confined to designated access roadways to prevent soil compaction 				
	 Pruning of overhanging tree branches is to be carried out in accordance with Australian Standard AS4373-2007: Pruning of Amenity Trees 				
	 No burning of any vegetation is permitted. 				
Training	The induction and environmental training for all onsite personnel is to include awareness of the procedures for flora and fauna protection and management during the works. 'Toolboxes' will be held prior to the commencement of tasks to identify potential risks to MNES flora and fauna and controls will be identified.				



Sub Plan 1	MNES Flora and Fauna		
Monitoring	Weekly Site Inspections		
	The Contractor's Environmental Representative shall undertake and document Weekly Site Inspections for the purpose of:		
	 Verifying the Management Strategies prescribed in this Sub Plan are present, functional and adequate4 		
	 Observe the Project Area for actual or potential impacts to MNES flora and fauna, including wildlife injuries or deaths associated with the project activities 		
	 Inspect and verify the adherence to the Limits of Clearing 		
	 Identify maintenance requirements for implemented Management Measures 		
	 The Contractor shall undertake corrective actions to rectify issues identified by the Weekly Site Inspections. 		
	The procedure for Weekly Site Inspections shall be documented within the EMP(C). The Weekly Site Inspection records shall be made available to the Principal within 48 hours of a request for a specific Weekly Site Inspection Report.		
Reporting	Clearing Records		
	 A record must be maintained of the dates over which clearing has occurred 		
	 A record must be maintained of the clearing methodology and how vegetation was disposed of destroyed or re-used. 		
	Fauna Reporting		
	Following the completion of the pre-clearing survey, a Pre-clearing Survey Report is to be submitted to the Principal. The following information is to be recorded:		
	 The areas of potential habitat/breeding places surveyed to determine the presence of fauna and/or their eggs/young 		
	 Details of all areas of potential habitat/breeding places and habitat trees (hollow bearing trees) identified 		
	 GPS records of each fauna breeding place identified. 		
	Weekly inspection reports are to be developed by the Contractor. When fauna species relevant to the EMP are relocated, the following information is to be recorded for each capture and release event:		
	 The date and time of capture 		
	 The location is to be GPS recorded (capture and relocation) 		
	 The vegetation community where the fauna was identified 		
	 The vegetation community into which the fauna is released 		
	 The number of individual(s) released 		
	 The date and time of release 		
	 Record and maintain a log of native road / kill injury during construction and follow up with information from receiving veterinary surgeon. 		
Responsibility	The Contractor shall be responsible for managing potential Environmental Harm to MNES flora and fauna, their breeding places and their habitat within the site and adjacent to the site.		

⁴ Adequate refers to whether the Management Measures employed on Site are reasonable and practicable to manage the risk of Environmental Harm occurring as a result of the Works under the Contract.



Sub Plan 1	MNES Flora and Fauna			
Timing	At all times during construction of the Project.			
Corrective Action	 If fauna is identified on site, stop works and arrange for the fauna to be removed or protected by fencing or relocating machinery etc. 			
	 Temporary stop works for activities related to injury/mortality of MNES fauna, injured fauna taken to wildlife carer/vet/animal hospital 			
	 The Contractor shall undertake immediate remedial actions to mitigate actual impacts or further impacts to MNES flora and fauna. Immediate response actions shall not be delayed by the need for notification to the Principal or Administrating Authority 			
	 Once the immediate risk from the Environmental Incident or non-conformance with this Sub Plan is alleviated, the Contractor shall investigate the cause of the breach and/or potential Environmental Harm, identify, and implement corrective actions as soon as practicable 			
	 Where Monitoring identifies a non-conforming result with this Sub Plan, the legislative or Contractual criteria or objective, this non-conformance shall be reported in the Contractor's monthly environmental reporting. 			

5.2 Erosion and Sediment Control

Erosion and sediment control management measures during construction are outlined in Table 5-2.

Sub Plan 2	Erosion and Sediment Control
Objective(s)	To implement best-practice erosion and sediment control measures in accordance:
	 Department of Transport and Main Roads Technical Specification MRTS52 Erosion and Sediment Control and annexure
	 International Erosion Control Association (IECA) Best Practice Erosion and Sediment Control Manual (2008).
Performance Criteria	 The approved Erosion and Sediment Control Plan (ESCP) is to be implemented, monitored, maintained, and updated for the duration of the construction activities
	 Erosion and sediment controls are installed prior to the commencement of works and are maintained throughout construction
	 Releases from site must not cause scour at the area of discharge
	 Releases from site must direct flows away from wetlands
	 Water must only be released at the discharge point nominated within the ESCP and as deemed acceptable by the Principal. Any modification to discharge point must be agreed by the Principal
	 No tracking of soil or sediment onto adjacent roads
	 Further investigation will occur where performance criteria area not achieved.
	 Corrective actions will be implemented where construction related impacts have been found to occur.
Management Strategies	 Prepare and implement an ESCP as an annexure to the EMP(C) prior to construction. The ESCP is to be prepared in accordance with MRTS52 and as a minimum contains the following:
	 Potentially affected wetlands, waterways, tributaries and drainage lines

Table 5-2 Sub Plan 2 – Erosion and Sediment Control



Sub Plan 2	Erosion and Sediment Control
	 Water quality performance criteria to be achieved, as per this Sub Plan
	 Plans detailing type and location of erosion and sediment control devices to be installed
	 Catchment and sediment basin sizing calculations.
	 The ESCP is to be approved by the Principal prior to commencement of work and updated plans are to be provided on a monthly basis during construction
	 The ESCP is to be signed off by a Certified Professional in Erosion and Sediment Control (CPESC)
	 Design, install and maintain sediment and erosion controls in accordance with the IECA Manual (particularly Book 4 - Design Fact Sheets and Book 6 - Standard Drawings) and manufacturers specifications
	 Erosion and sediment control shall be designed, installed, maintained and decommissioned in accordance with the following Principles:
	 Erosion and sediment controls are integrated with construction planning
	 Effective and flexible erosion and sediment control plans are developed based on soil, weather, construction conditions and the receiving environment
	 The extent and duration of soil exposure is minimised
	 Water movement through the Site is controlled and clean water is diverted around the Site
	 Soil erosion is minimised
	 Disturbed areas are promptly stabilised
	 Sediment retention on Site is maximised
	 Controls are maintained in proper working order at all times
	 The Site is monitored, and erosion and sediment control practices adjusted to maintain the required performance standard.
	 Maintain all erosion and sediment controls in effective working order including reconfiguring drainage lines as required during the construction process to ensure dirty water is always directed into sediment controls
	 Operate and maintain sediment basins and other sediment controls in a manner that minimises the risk of environmental harm.
	 The sediment storage zone shall be maintained at all times, with the accumulated sediment removed in a manner that does not allow the sediment to be conveyed into a watercourse or offsite
	 Minimise the duration of works within drainage lines and tributaries to that necessary to conduct the works
	 Minimise vegetation clearing to that necessary to conduct the works
	 Stage works to minimise the area of exposed earth
	 Divert clean flows around disturbed areas
	 Outlets from sediment basins must be designed to direct discharge away from wetlands. No direct discharge to wetlands is permitted
	 Cleared vegetation, not infested by weeds, may be mulched and re-used on site as a surface cover to reduce erosion and growth of weeds or during landscaping and



Sub Plan 2	Erosion and Sediment Control				
	rehabilitation works. The ESCP and EMP(C) will include management of sediment and tannin that may be released from the mulch				
	 The Contractor shall remove temporary controls when permanent measures are in place and/or Site stabilisation has occurred 				
	 Any areas used for erosion and sediment control shall be rehabilitated to the satisfaction of the Principal. 				
Training	 All personnel are to attend a site induction, environmental training and 'toolbox' meetings that include the requirements for adherence to the Erosion and Sediment Control Plan 				
	 Personnel responsible for installing and maintaining erosion and sediment controls (ESC) are to be experienced and knowledgeable in installing and maintaining ESC in accordance with the ESCP, MRTS52 and the IECA Best Practice Erosion and Sediment Control Manual (2008). 				
Monitoring	Weekly Site Inspections				
	 The Contractor's Environmental Representative shall undertake and document Weekly Site Inspections for the purpose of: 				
	 Verifying the Management Strategies prescribed in this Sub Plan are present, functional and adequate 				
	 Verifying Management Measures prescribed in the EMP(C) are present, functional and adequate 				
	 Identifying maintenance requirements for implemented Management Measures. 				
	 The Contractor shall undertake corrective actions to rectify issues identified by the Weekly Site Inspections 				
	 The procedure for Weekly Site Inspections shall be documented within the EMP(C). The Weekly Site Inspection records shall be made available to the Principal within 48 hours of a request for a specific Weekly Site Inspection Report. 				
	Following a rainfall event				
	 A full inspection of erosion and sediment controls will be undertaken following a heavy rainfall event (>25mm in 24 hours) to identify and undertake any necessary rectification works. 				
Reporting	 The Contractor will prepare a monthly report for TMR detailing any incidents of environmental nuisance and non-conformances. 				
	 TMR and the Contractor have a responsibility to report all major environmental incidents that risk causing environmental harm to the Queensland Department of Environment and Science under the Queensland Environment Protection Act 1994. 				
Responsibility	 The Contractor is responsible for temporary erosion and sediment control and for ensuring that controls are adequately designed, installed, adapted, maintained and decommissioned. 				
	 The ESCP is to be prepared by an Appropriately Qualified Person/s (see definitions) with experience in major road projects 				
	 Drawings and design for any items that are Prescribed Engineering Service (PES) shall be certified by a Registered Professional Engineer, Queensland (RPEQ) 				
	 The ESCP is to be reviewed and deemed suitable by an independent verifier who is an Appropriately Qualified Person. 				

Sub Plan 2	Erosion and Sediment Control
Timing	 The ESCP shall be prepared prior to commencement of construction, with erosion and sediment controls installed prior to ground disturbance and maintained throughout the construction period.
Corrective Action	 Following a heavy rainfall event, any necessary rectification works will be undertaken Further investigation will occur where performance criteria area not achieved. Corrective actions will be implemented where construction related impacts have been found to occur.

5.3 Groundwater and Surface Water

Groundwater and surface water management measures during construction are outlined in Table 5-3.

Table 5-3 Sub	Plan 3 –	Groundwater	and	Surface	Water

Sub Plan 3	Groundwater and Surface Water			
Objective(s)	 To comply with regulatory requirements detailed under the Queensland Environmental Protection Act 1994 and the Environmental Protection (Water and Wetland Biodiversity) Policy 2019 			
	 To comply with requirements detailed in the Transport and Main Roads Specifications MRTS51 Environmental Management and annexure 			
	 Avoid Environmental Harm or Environmental Nuisance within the site and to waterways, wetlands and groundwater 			
	 Water quality within wetlands and waterways is maintained during construction to avoid potential impacts to MNES flora and fauna 			
	 Groundwater water levels are not substantially altered by construction. 			
Performance Criteria	 No construction related impacts to water quality and levels that results in Environmental Harm or Environmental Nuisance to MNES. 			
	Surface water quality management measures shall be designed to achieve discharge from site compliant with the Water Quality Investigation Criteria (Discharge). Further investigation will be undertaken where the Water Quality Investigation Criteria is exceeded. Where a parameter is not listed, reference should be made to the relevant water quality objectives defined in the <i>Environmental Protection (Water and Wetland Biodiversity) Policy 2019</i> (EPP). Further investigation is required where a parameter exceeds the values outlined in the EPP AND there is 10% increase from upstream values			
	Groundwater levels will be further investigated when monitoring shows a rapid change compared to expected levels based on rainfall, data from other bores and baseline data			
	Corrective actions will be implemented where construction related impacts have been found to occur.			



Sub Plan 3	Groundwater and Surface Water					
	Table 5-3.1 Surface water quality investigation criteria					
	Parametre	Discharge ¹	Dewatering	Waterway and Wetland ³		
			to Land ²	Level	Change (Upstream- Downstream)	
	Suspended Solids	Discharges shall be < 50 mg/L TSS or equivalent turbidity as determined by laboratory analysis by correlating turbidity with the suspended solids limit.	NA	< 50 mg/L TSS or equivalent turbidity as determined by laboratory analysis by correlating turbidity with the suspended solids limit	5 mg/L or 10% increase (whichever is greatest)	
	рН	Stable pH reading; and General Sites: 6.5 – 8.5, or Wallum/Acidic Ecosystems: 5.0 – 7.0	Stable pH reading, and General Sites: 6.5 – 8.5, or Wallum/ Acidic Ecosystem: 5.0 – 7.0	General Sites: 6.5 - 8.5	1.0 pH unit change	
	Hydrocarbons tannins, paint	No visible trace	No visible trace	No visible change from upstream	-	
	Dissolved Oxygen	90% Saturation (lower limit)	N/A	> 85% saturation or flowing waters DO > 5 mg/L	10% decrease	
	 Discharge criteria - criteria applicable to stormwater flows moving into Waterways within the Site, Waterways adjacent to the Site and beyond the boundary of the Site where it could reasonably enter a Waterway such as in defined drainage lines (Discharges). Discharges criteria also applies to Discharges from sediment basin(s) prior to dewatering. Discharge criteria does not extend to overland flows. 					
	 Land criteria – the land criteria applies where sediment basins or other impoundment of wa purposefully dewatered over areas of land for the purpose of evaporation and infiltration (does not to overland flow). 				ooundment of water is Itration (does not apply	
	 Waterway Waterway Waterway the Works m upstrea 	(s) criteria – criteria for W s adjacent to Site. Purpos upstream of the Site to dov under the Contract. The Co m and 100 m downstream o	aterway(s) are applic the of the criteria is the vnstream of the Site the antractor shall nomina of the works on all we	cable to Waterways wi to compare water qua to identify potential wat te representative locati tland and waterways.	thin a Site or receiving ality parameters of the er quality impacts from ons, not more than 100	
Management	Groundwater an	d Surface Water				
Strategies	 Develop and implement an EMP(C) that includes a Water Quality Monitoring Plan (Groundwater and Surface Water) and an Erosion and Sediment Control Plan. 					
	 No constructi waterways du 	on material or debris i Iring construction	s to fall or be dep	oosited into draina	ge lines or	



Sub Plan 3	Groundwater and Surface Water					
	 No construction waste or litter is to fall or be deposited into drainage lines or waterways 					
	 Pump out sediment basins and/or flocculating turbid water in basins prior to periods of heavy or prolonged rainfall 					
	 Where coagulants or flocculants are used to treat stormwater, they must not cause harm to the receiving waters or environment. A jar test or streaming current detector must be undertaken to estimate volumes of the coagulant or flocculant required and to reduce the risk of overdosing. 					
	 Develop appropriate spill prevention and response plans to cover Project activities and the types and quantities of fuel, oil and chemicals held on site 					
	 Move potential contaminants to higher ground prior to periods of heavy or prolonged rainfall 					
	 Water for construction activities is not to be sourced from wetlands. 					
	Dewatering					
	 Limit dewatering to that necessary to construct the works 					
	 Dewatering may be undertaken in association with bridge construction if there is heavy rainfall during installation, or if groundwater or surface water is encountered in the area of excavation. 					
	 For works in the Fitzroy River, surface water abstracted to facilitate pier installation will be returned to the river where Waterway and Wetland Change Criteria are achieved. Water quality of abstracted water will be compared to the receiving environment to confirm if the change is within acceptable limits. 					
	 For works outside of the Fitzroy River, abstracted water will by captured in sediment basins and released to the receiving environment where within the nominated Water Quality Discharge Criteria or released to land where within the nominated Dewatering to Land Criteria is achieved. 					
Training	All personnel are to attend a site induction, environmental training and 'toolbox' meetings that include the requirements for adherence to this Sub Plan.					
	Personnel responsible for undertaking water quality monitoring are to be experienced and knowledgeable in the task.					
Monitoring	 Develop and implement a Surface Water and Groundwater Monitoring Plan to verify the effective management of water quality risks from the site during construction. 					
	 The surface water and groundwater monitoring program shall be developed in accordance with the Monitoring and Sampling Manual (Queensland Government Department of Environment and Science, 2018), and take into consideration the following documents: 					
	 Australian and New Zealand guidelines for fresh and marine water quality (Water Quality Australia, 2018) 					
	 Australian/New Zealand Standard 5667.1:1998 Water Quality Sampling: Guidance on the design of sampling programs, sampling techniques and preservation and handling of samples (Standards Australia, 1998) 					
	 Groundwater sampling and analysis field guide (Sundaram, et al., 2009) 					
	 The surface water and groundwater monitoring program shall include Lion Creek, Limestone Creek, Fitzroy River, wetlands adjacent to the project and installed groundwater bores. Locations, parametres and frequency of monitoring will be as per the baseline (surface) Water Quality Sampling Plan (Doc. No. 1167108) (Jacobs SMEC 					

Sub Plan 3	Groundwater and Surface Water			
	Design Joint Venture, 2021d) and Groundwater Monitoring Plan (Doc. No. 1167108- DJV-0EN10-RPT-000005) (Jacobs SMEC Design Joint Venture, 2021e).			
	 Groundwater quality and levels will be monitored at six bore locations on a quarterly basis. The following parametres will be monitored: 			
	 total and dissolved metals and metalloids (arsenic, cadmium, chromium (total), copper, mercury, nickel, lead and zinc) 			
	 polycyclic aromatic hydrocarbons (PAH) (ultratrace analysis required*) 			
	 total recoverably hydrocarbons (TRH) 			
	 BTEXN compounds (benzene, toluene, ethylbenzene, xylenes, naphthalene) 			
	 organochlorine and organophosphorus (OC/OP) pesticides (ultratrace analysis required*). 			
	 Surface water monitoring will be undertaken monthly at: 			
	– Lion Creek			
	 Limestone Creek 			
	– Fitzroy River			
	 Capricorn Highway Lagoon 			
	 Pink Lily Lagoon 			
	 Dunganweate Lagoon 			
	 Black Duck Lagoon 			
	– Lotus Lagoon			
	– Murray Lagoon.			
	 The following physio-chemical parameters will be measured in situ at each surface water monitoring site: 			
	– pH			
	 dissolved oxygen. 			
	 electrical conductivity 			
	– temperature			
	– Turbidity.			
	 Visible observations of hydrocarbons, tannins, paint or other chemicals. 			
	 The following parametres will be analysed by a NATA accredited laboratory: 			
	 total recoverable hydrocarbons (TRP) 			
	 total suspended solids (TSS) 			
	– total nitrogen (TN)			
	 total phosphorus (TP). 			
	 Groundwater and Surface water monitoring will be undertaken for the duration of construction. 			
Reporting	The Contractor shall complete and submit exception reporting to the Principal in the form of a monthly environmental report, which will include details of water quality monitoring and results.			

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Sub Plan 3	Groundwater and Surface Water
Responsibility	The Contractor shall be responsible for the management of water quality to meet Contractual and legislative requirements, and not cause Environmental Harm or Environmental Nuisance to waterways, wetlands and groundwater.
Timing	 Construction ESC should be in place prior to works commencing and then maintained throughout works, in accordance with Construction Sub Plan 2 Erosion and Sediment Control
	 Water quality monitoring should occur at the timeframes specified above
	 Controls shall be in place until the site is stabilised.
Corrective Action	 For surface waters, where the performance criteria are not achieved, the Contractor shall: a) Report the non-conformance to the Principal including the size of the rainfall event ARI⁵, duration of the rainfall event (where applicable), the water quality parameter that exceeded the criteria and level that was recorded from within the site and downstream of the site
	b) Undertake an investigation generally in accordance with the processes outlined in the Department of Environment and Science 'Procedural Guide, Releases to waters from land development/construction sites 2500m ² and greater'
	Where groundwater and surface water monitoring shows that construction related impacts have occurred, the Contractor Shall:
	a) Develop and implement corrective actions such as improved work procedures or Management Measures and prevent re-occurrence of Monitoring non-conformances
	b) Implement corrective actions within 24 hours.

5.4 Acid Sulfate Soils

Acid sulfate soil management measures during construction are outlined in Table 5-4.

Table 5-4 Sub Plan 4 – Acid Sulfate Soils

Sub Plan 4	Acid Sulfate Soils
Objective(s)	 To comply with regulatory requirements detailed under the Queensland Environmental Protection Act 1994
	 To comply with requirements detailed in the Transport and Main Roads Specifications MRTS51 Environmental Management and annexure
	To avoid Environmental Harm resulting from the disturbance of Acid Sulfate Soils (ASS)
	 To manage ASS stored for verification testing.
Performance Criteria	 No on-site or off-site effects to MNES as a result of ASS disturbance
	• To minimise the impacts of ASS treatment on MNES flora and fauna in the Project Area
	 Further investigation will occur where performance criteria area not achieved
	 Corrective actions will be implemented where construction related impacts have been found to occur.

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⁵ The Contractor shall use the most recently available IFD (Intensity – Frequency- Duration) data available through the Bureau of Meteorology (www.bom.gov.au). Alternatively the Contractor may utilise data from a calibrated Site based rainfall intensity gauge and Bureau of Meteorology data. The rainfall event shall be expressed as Annual Recurrence Interval (ARI).



Sub Plan 4	Acid Sulfate Soils
Management Strategies	 The potential for ASS to be present within the Project Area should be determined by utilising the Atlas of Australian Acid Sulfate Soils mapping, accessed via the Australian Soil Resource Information System
	 If the Australian Acid Sulfate Soils mapping identifies the potential for ASS to be present within the Project Area, the presence of ASS should be field-verified. Field testing and sampling shall be undertaken in high risk areas generally in accordance with the Queensland Acid Sulfate Soil Technical Manual (QASST Manual) (Ahern, et al., 2014)
	 If the field-verification confirms the presence of ASS within the Project Area, the Contractor is to prepare an ASS Management Plan in accordance with QASST Manual (Ahern, et al., 2014) that, as a minimum, addresses the following:
	 Liming rates for treatment of ASS
	 The location of treatment of ASS
	 Measures to contain material stockpiled for treatment
	 Measures to collect and treat acidic runoff from stockpiled material
	 Verification testing requirements
	 Location of disposal of treated material
	 If ASS or Potential Acid Sulfate Soils (PASS) are observed during construction, and an ASS Management Plan has not been developed, the Contractor is to develop an ASS Management Plan
	 All material used in the works must be free of ASS/PASS
	 ASS/PASS material must not be used in the construction of bunds and other diversion devices
	 ASS/PASS treatment and management must be undertaken by a suitably qualified professional
	 Stockpiled areas for ASS/PASS treatment must be clearly marked on drawings and signed to avoid dumping in incorrect areas
	 Any treatment undertaken will be carried out on prepared pads, not in situ and interactions with groundwater and surface waters avoided
	All stockpiled areas for ASS treatment are to be bunded and drained to collection ponds
	 Runoff from stockpiled material will only be discharged upon meeting acceptable water quality criteria (as per Construction Sub Plan 3: Groundwater and Surface).
Training	Staff induction to include awareness training about indicators of ASS/PASS and measures to be implemented in the event that ASS/PASS are encountered during construction.
Monitoring	<u>Weekly Site Inspections</u> The Contractor's Environmental Representative shall undertake and document Weekly Site Inspections for the purpose of:
	 Verifying the Management Strategies prescribed in this Sub Plan are present, functional and adequate
	 Verifying Management Measures prescribed in the EMP(C) are present, functional and adequate
	 Observe the Project Area for any visual signs of ASS/PASS
	 ASS testing in areas of cut or excavation where desktop or field investigations indicate a high likelihood of ASS/PASS



Sub Plan 4	Acid Sulfate Soils
	 pH testing as part of the Water Quality Monitoring Plan should consider possible impacts from ASS if pH changes are identified Monitor for potential pest occurrences (and treatment if required) of equipment, vehicles, machinery and materials (including soil, mulch, fill) entering the site
	 Identify maintenance requirements for implemented Management Measures, and
	 The Contractor shall undertake corrective actions to rectify issues identified by the Weekly Site Inspections.
	 The procedure for Weekly Site Inspections shall be documented within the EMP(C). The Weekly Site Inspection records shall be made available to the Principal within 48 hours of a request for a specific Weekly Site Inspection Report.
Reporting	The Contractor shall complete and submit exception reporting to the Principal in the form of a monthly environmental report, which is to include ASS testing and management.
Responsibility	The Contractor shall be responsible for the management of actual or potential acid sulfate soils within the site.
Timing	At all times during construction.
Corrective Action	Non-conformances with this EMP or the ASS Management Plan (if required during construction) should be investigated immediately and corrective actions implemented within 24 hours of becoming aware of the non-conformance.

5.5 Weed and Pest

Weed and pest management measures during construction are outlined in Table 5-5.

Table 5-5 Sub Plan 5 – Weed and Pest

Sub Plan 5	Weed and Pest
Objective(s)	 Minimise the introduction or spread of restricted invasive plants into the Project Area and control existing restricted invasive plants, prior to and during construction
	 Protect adjacent areas of native vegetation from weed incursion
	 Prevent impacts to native fauna from pest species.
Performance Criteria	 Compliance with the Biosecurity Act 2014 and the Lands Protection (Pest & Stock Route Management) Act 2002
	 The Contractor shall fulfil their General Biosecurity Obligations to mitigate Biosecurity risk from prohibited and restricted Biosecurity Matters (including but not limited to invasive animals and plants) within the site by preventing their spread into the site, within the site and out of the site.
Management Strategies	Construction:
	 A pre-clearing survey will be carried out by a suitably qualified person to locate restricted invasive plants within the Project Area
	 To minimise the spread of weeds throughout the Project Area, the following weed management measures will be implemented:
	 All vehicles arriving to the site from areas with known Biosecurity Matters must be in a clean state
	 All machinery and vehicles from areas with known Biosecurity Matters which are required to travel outside the site and around the road network shall be regularly cleaned down to avoid the spread of Biosecurity Matters. Clean down should be conducted in accordance with the Queensland Department of Agriculture and



Sub Plan 5	Weed and Pest
	Fisheries' Vehicle and Machinery Cleandown Procedures, which can be downloaded from <u>Vehicle and machinery cleandown procedures (daf.qld.gov.au)</u>
	 All machinery and vehicles that travel off dedicated haul roads/site access roads and amongst vegetation where Biosecurity Matters are known to occur, shall be cleaned down to avoid spreading Biosecurity matters
	 Weed growth within the site will be controlled by hand or mechanical removal prior to commencement of clearing
	 Spraying of herbicides is only to be undertaken by an appropriately qualified and licensed operator registered under the <i>Agricultural Chemicals Distribution Control</i> <i>Act 1966</i>
	 Any restricted invasive plants removed from the site will be disposed of at an approved off-site disposal facility that accepts green waste
	 Ongoing monitoring of the Project Area to identify any new incidence of weed infestation
	 Where suitable, cleared vegetation not infested by weeds will be mulched and re-used on site as a surface cover to reduce erosion and growth of weeds. The Erosion and Sediment Control Plan and EMP(C) will include management of sediment and tannin that may be released from the mulch
	 Putrescible waste generated during construction will be stored in covered bins to limit access by scavenger animals, and will be transported off site for disposal
	 All restricted invasive species are to be controlled in accordance with the Queensland Department of Agriculture and Fisheries Biosecurity Queensland Invasive Species Guidelines (Queensland Government Department of Agriculture and Fisheries, 2016) (unless more up-to-date information is available)
	 Where hand or mechanical removal is impractical, selective chemical treatment may be undertaken to control weed infestations, in accordance with the Biosecurity Queensland Invasive Species Guidelines (Queensland Government Department of Agriculture and Fisheries, 2016). If chemical treatment is proposed weeds must be sprayed at least 24 hours prior to clearing and earthworks activities
	 Herbicide application is not to be progressed in the following areas:
	 Within 50m of the mapped extent of wetlands or waterways
	 Within the mapped extent of wetlands or waterways
	 Within drainage lines that drain to wetland habitat or waterways
	 Management measures to reduce the risk of spreading Cinnamon fungus (<i>Phytophthora cinnamomi</i>) and other water-borne pathogens or diseases will be included in the EMP(C). This should detail and raise awareness of, and compliance with, pathogen management and spoil management to regulate the movement of spoil and so reduce the risk of infected soil leaving or entering the site.
Training	The induction and environmental training for all onsite personnel is to include awareness of the procedures for weed and pest management during the works. 'Toolboxes' will be held prior to the commencement of tasks to identify potential risks from weed and pests and controls will be identified.
Monitoring	 <u>Weekly Site Inspections</u> The Contractor's Environmental Representative shall undertake and document Weekly Site Inspections for the purpose of: Verifying the Management Strategies prescribed in this Sub Plan are present, functional and adequate



Sub Plan 5	Weed and Pest
	 Verifying Management Measures prescribed in the EMP(C) are present, functional and adequate
	 Observe the Project Area for actual or potential impacts from weeds and/or pests
	 Monitor for potential pest occurrences (and treatment if required) of equipment, vehicles, machinery and materials (including soil, mulch, fill) entering the site
	 Identify maintenance requirements for implemented Management Measures, and
	 The Contractor shall undertake corrective actions to rectify issues identified by the Weekly Site Inspections.
	The procedure for Weekly Site Inspections shall be documented within the EMP(C). The Weekly Site Inspection records shall be made available to the Principal within 48 hours of a request for a specific Weekly Site Inspection Report.
Reporting	 If herbicides are used, the Contractor is to keep an herbicide application record sheet, in accordance with the Agricultural Chemicals Distribution Control Act 1966
	 The Contractor shall notify the Administrator as soon as practicable upon identification of a new Biosecurity prohibited matter or restricted matter (Category 1 or 2) within the Project Area or breach of a condition of a biosecurity zone
	 The Contractor shall complete and submit exception reporting to the Principal in the form of a monthly environmental report, which is to include weed and pest monitoring and management.
Responsibility	The Contractor shall be responsible for managing Work under the Contract in order to mitigate the spread of Biosecurity Matters.
Timing	At all times during construction.
Corrective Action	 If weekly inspections identify inconsistencies with weed and pest management requirements, conduct the following: Additional weed treatments where required; Additional staff training; and
	 Changed protocols for weed hygiene
	 Non-conformances should be investigated immediately and corrective actions
	implemented within 24 hours of becoming aware of the non-conformance.

5.6 Landscape and Revegetation

Landscape and revegetation control management measures during construction, operation and rehabilitation are outlined in Table 5-6.

Table 5-6 Sub Plan 6 – Landscape and Revegetation

Sub Plan 6	Landscape and Revegetation
Objective(s)	 Rehabilitate Project Area in accordance with the Landscape and Rehabilitation Plan
	 Comply with the requirements of Transport and Main Roads Specifications MRTS16 Landscape and Revegetation Works (MRTS16) and annexure.
Performance Criteria	 All areas temporarily disturbed during construction will be stabilised following completion of the works in accordance with the Landscape and Rehabilitation Plan
	 Prevent and manage the introduction of weed species to areas being rehabilitated



Sub Plan 6	Landscape and Revegetation
Management Strategies	 Pre-construction: Prior to the commencement of ground preparation operations (i.e. subsoil operations and topsoil operations), the area shall be in a weed free condition. All prohibited and restricted Biosecurity Matters shall be addressed as per Construction Sub Plan 5 Weed and Pest, MRTS51 Environmental Management and the EMP(C)
	 The Contractor will conduct subsoil and topsoil sampling and testing in accordance with MRTS16 and results will be used to develop the Soil Management Plan – Construction
	The Contractor will conduct non-potable water (dam, creek, river and bore water) sampling and testing in accordance with MRTS16 and results will be used to develop the Non-Potable Water Management Plan.
	Rehabilitation:
	 Rehabilitation will be conducted in accordance with MRTS16 and annexure
	 The rehabilitation works will be undertaken progressively, if appropriate
	 Active rehabilitation will be undertaken within the riparian zone of Fitzroy River, Lion Creek and Limestone Creek, wetlands and the area of retained brigalow (<i>Acacia</i> <i>harpophylla</i> dominant and co-dominant) vegetation community near Alexandra Street. At these locations, rehabilitation works will aim to reinstate temporarily disturbed areas to the pre-disturbance vegetation community and minimise weed intrusion
	 Reinstate native vegetation communities at key locations by using endemic native species appropriate to their position in the landscape. This will assist in maintaining the vegetation structure/composition to minimise the potential for invasive species becoming established
	 Where suitable cleared vegetation not infested by weeds, will be mulched and re-used on site as a surface cover to reduce erosion and growth of weeds. The Erosion and Sediment Control Plan and EMP(C) will include management of sediment and tannin that may be released from the mulch
	Establishment Period
	 The Contractor shall be subjected to an Establishment Period in adherence with MRTS16 when the installation of vegetation treatments (turfing, seeding or planting) is deemed compliant and a Certificate of Commencement of the Establishment Period has been issued by the Principal
	 The Contractor shall care for the installed vegetation treatments to ensure their long term sustainability and to meet the completion criteria of Clause 9.2.2 of the Annexure MRTS16.1
	 Establishment Period operations include:
	a) Watering
	b) Fertilising
	c) Weed control
	d) Pest and disease control
	e) Protection of vegetation works
	f) Interim evaluation
	g) Repair or re-installation of treatments
	h) Mowing, slashing and brush cutting
	i) Pruning



Sub Plan 6	Landscape and Revegetation
	j) Selective removal of non-complying plants
	k) Topping up of mulch, and
	I) Monthly program and inspection reporting
	Monitoring supplementary requirements of MRTS16 Landscape and Revegetation Works shall be specified in Clause 4.4 of the Annexure MRTS16.1.
	Monitoring Period
	 The Monitoring Period shall commence with the issuing of the Certificate of Commencement of the Monitoring Period by the Principal, following the completion of the Establishment Period
	 The Contractor shall care for the installed vegetation treatments to ensure their long- term sustainability
	 Monitoring Period operations include:
	a) Watering
	b) Fertilising
	c) Weed Control
	d) Pest And Disease Control
	e) Repair Or Re-Installation Of Failed Treatments
	f) Mowing, Slashing And Brush Cutting
	g) Pruning
	h) Selective Removal Of Non-Complying Plants
	i) Topping Up Of Mulch, And
	j) Monthly Program And Inspection Reporting
Training	All relevant personnel are to attend a site induction, environmental training and 'toolbox' meetings that include the requirements for adherence to this Sub Plan.
Monitoring	Weekly Site Inspections
	The Contractor's Environmental Representative shall undertake and document Weekly Site Inspections for the purpose of:
	 Verifying the Management Strategies prescribed in this Sub Plan are present, functional and adequate
	 Identify maintenance requirements for implemented Management Measures
	 The Contractor shall undertake corrective actions to rectify issues identified by the Weekly Site Inspections.
	The procedure for Weekly Site Inspections shall be documented within the EMP(C). The Weekly Site Inspection records shall be made available to the Principal within 48 hours of a request for a specific Weekly Site Inspection Report.
Reporting	The Contractor will develop a Soil Assessment Report that shall be:
	a) Prepared for each sample
	 b) Prepared by a soil scientist with accreditations in accordance with clause 6.2 of MRTS16
	c) In accordance with form B of MRTS16 appendix
	d) Used to develop the Soil Management Plan – Construction; and



Sub Plan 6	Landscape and Revegetation
	e) Incorporated as an Appendix to the Soil Management Plan – Construction.
	 The Contractor will develop a Non-Potable Water Testing and Assessment Report that shall be:
	a) Prepared for each sample tested
	b) In accordance with Form I of MRTS16 Appendix
	c) Used to develop the Non-potable Water Management Plan; and
	d) Incorporated as an Appendix to the Non-potable Water Management Plan.
	During the Establishment Period and Monitoring Period, a report shall be submitted to the Principal every month, within seven days of the inspection. The report shall include:
	a) monthly program of maintenance works
	b) dates of maintenance visits and inspections
	c) maintenance works undertaken
	d) maintenance works in progress
	e) watering application dates and volumes
	failed or failing vegetation treatments, their general locations on marked up plans, and suspected cause of failure
	g) repair or re-installation of failed treatments
	h) weeds identified and method of treatment
	i) issues identified during inspections and actions required to remedy these; and
	j) damage to vegetation caused by vandalism or theft of vegetation.
Responsibility	All rehabilitation actions will be commenced within the major works contract by the Contractor at the completion of construction activities.
Timing	Establishment Period
	The Establishment Period shall commence when the installation of vegetation treatments is deemed compliant and a Certificate of Commencement of the Establishment Period has been issued by the Principal.
	The Establishment Period shall:
	 a) be evaluated at four weeks (interim evaluation) to determine if it is on track for meeting the completion criteria
	 be a minimum duration of ninety days from the date of Certificate of Commencement of the Establishment Works
	 where completion criteria have not been achieved, continue beyond the minimum ninety day until vegetation treatments meet the completion criteria.
	Monitoring Period
	The Monitoring Period shall:
	 a) be a minimum duration of 90 days from the date of Certificate of the Commencement of the Monitoring Period
	b) continue until all vegetation treatments meet the completion criteria.
Corrective Action	Landscape and revegetation will be subject to the conditions of the Establishment Period and Monitoring Period.



6. Operational Environmental Management Sub-plans

Operational requirements to mitigate impacts to MNES will primarily involve management of weeds and pests and water quality. The following sub-plans contain key measures that will be incorporated into the Operations and Maintenance plan to be developed by TMR for the Project in conjunction with TMR's Routine Maintenance Guidelines (2017).

6.1 Weed and Pest

Weed and pest management measures during operation are outlined in Table 6-1

Table 6-1 Sub Plan 1 – Weed and Pest

Sub Plan 5	Weed and Pest
Objective(s)	 Minimise the introduction or spread of restricted invasive plants into the Project Area and control existing restricted invasive plants, prior to and during construction and operation
	 Protect adjacent areas of native vegetation from weed incursion
	 Prevent impacts to native fauna from pest species.
Performance Criteria	 The Contractor shall fulfil their General Biosecurity Obligations to mitigate Biosecurity risk from prohibited and restricted Biosecurity Matters (including but not limited to invasive animals and plants) within the site by preventing their spread into the site, within the site and out of the site
	 Compliance with the Biosecurity Act 2014 and the Lands Protection (Pest & Stock Route Management) Act 2002
Management Strategies	 To minimise the spread of weeds throughout the Project Area, the following weed management measures will be implemented:
	 All vehicles arriving to the site from areas with known Biosecurity Matters must be in a clean state
	 All machinery and vehicles from areas with known Biosecurity Matters which are required to travel outside the site and around the road network shall be regularly cleaned down to avoid the spread of Biosecurity Matters. Clean down should be conducted in accordance with the Queensland Department of Agriculture and Fisheries' Vehicle and Machinery Cleandown Procedures, which can be downloaded from Vehicle and machinery cleandown procedures (daf.qld.gov.au)
	 All machinery and vehicles that travel off dedicated haul roads/site access roads and amongst vegetation where Biosecurity Matters are known to occur, shall be cleaned down to avoid spreading Biosecurity matters
	 Weed growth within the site will be controlled by hand or mechanical removal prior to commencement of clearing
	 Spraying of herbicides is only to be undertaken by an appropriately qualified and licensed operator registered under the Agricultural Chemicals Distribution Control Act 1966
	 Any restricted invasive plants removed from the site will be disposed of at an approved off-site disposal facility that accepts green waste
	 Ongoing monitoring of the Project Area to identify any new incidence of weed infestation
	 Where suitable cleared vegetation not infested by weeds, will be mulched and re-used on site as a surface cover to reduce erosion and growth of weeds. All restricted invasive species are to be controlled in accordance with the Queensland Department of Agriculture and Fisheries Biosecurity Queensland Invasive Species



Sub Plan 5	Weed and Pest
	 Guidelines (Queensland Government Department of Agriculture and Fisheries, 2016) (unless more up-to-date information is available) Where hand or mechanical removal is impractical, selective chemical treatment may be undertaken to control weed infestations, in accordance with the Biosecurity Queensland Invasive Species Guidelines (Queensland Government Department of Agriculture and Fisheries, 2016). If chemical treatment is proposed weeds must be sprayed at least 24 hours prior to clearing and earthworks activities Herbicide application is not to be progressed in the following areas: Within 50m of the mapped extent of wetlands or waterways Within the mapped extent of wetlands or waterways
	 Within drainage lines that drain to wetland habitat or waterways.
Training	The induction and environmental training for all onsite personnel is to include awareness of the procedures for weed and pest management. 'Toolboxes' will be held prior to the commencement of tasks to identify potential risks from weed and pests and controls will be identified.
Monitoring	Monitoring of the site for new infestations of Biosecurity Matters will be undertaken in accordance with TMR's Routine Maintenance Guidelines (2017).
Reporting	 If herbicides are used, the Contractor is to keep an herbicide application record sheet, in accordance with the Agricultural Chemicals Distribution Control Act 1966
	 The Contractor shall notify TMR as soon as practicable upon identification of a new Biosecurity prohibited matter or restricted matter (Category 1 or 2) or breach of a condition of a biosecurity zone
Responsibility	The Contractor shall be responsible for managing Work under the Contract in order to mitigate the spread of Biosecurity Matters.
Timing	At all times during operation.
Corrective Action	 If routine inspections identify inconsistencies with weed and pest management requirements, conduct the following:
	 Additional weed treatments where required
	 Additional staff training
	 Changed protocols for weed hygiene.
	 Non-conformances with this EMP should be investigated immediately and corrective actions implemented within 24 hours of becoming aware of the non-conformance.

6.2 Surface Water

Surface water management measures during operation are outlined in Table 6-2

Table 6-2	Sub F	Plan	2 –Surface	Water
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Sub Plan 3	Groundwater and Surface Water
Objective(s)	 To comply with regulatory requirements detailed under the Queensland Environmental Protection Act 1994 and the Environmental Protection (Water and Wetland Biodiversity) Policy 2019
	 Avoid Environmental Harm or Environmental Nuisance within the site and to waterways wetlands and groundwater

Sub Plan 3	Groundwater and Surface Water
	 Water quality within wetlands and waterways is maintained to avoid potential impacts to MNES flora and fauna
Performance Criteria	 Spill containment devices and bioretention basins are maintained and in good working condition
Management Strategies	 Implement the requirements of this Sub Plan into the Operations and Maintenance plan to be developed by TMR for the Project
	 Undertake maintenance in a timely manner based on the level of risk presented
Training	 All personnel are to attend a site induction, environmental training and 'toolbox' meetings that include the requirements for adherence to this Sub Plan.
	 Personnel responsible for undertaking water quality monitoring are to be experienced and knowledgeable in the task.
Monitoring	 Inspection of bioretention basins will be undertaken following a major flood event causing inundation of the basins.
	 Spill containment devices will be inspected in the event of a spill.
Reporting	Maintenance activities shall be recorded in accordance with TMRs maintenance defects register (defect name, image, description and possible cause).
	The following will be recorded:
	 the specific Maintenance Activities required
	 the defects and appropriate priorities for works
	 approximate quantities required
	 any necessary Routine Maintenance Minor Works.
Responsibility	The Contractor shall be responsible for the management of water quality to meet Contractual and legislative requirements, and not cause Environmental Harm or Environmental Nuisance to waterways, wetlands and groundwater.
Timing	At all times during operation.
Corrective Action	Corrective actions will be developed and implemented where monitoring and inspection identifies defects. Maintenance and rectification works will be undertaken to ensure that water quality treatment devices and function and maintained.

Jacobs

Member of the Surbana Jurong Group