Construction Environmental Management Plan (Draft)

White Patch Esplanade, Bribie Island

Client:	Moreton Bay Regional Council
Reference:	J210

BASE/

Document Control

Title:	Construction Environmental Management Plan
Address:	White Patch Esplanade, Bribie Island
Job Number:	J210
Client:	Moreton Bay Regional Council

Document Issue

Issue	Date	Prepared By
DRAFT	28/10/2022	JB / MD

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1.0 Introduction

This Construction Environmental Management Plan (CEMP) has been developed specifically to manage environmental requirements for the project. This draft document shall be updated to incorporate the regulatory approvals received by the project in the coming months prior to the onboarding of the construction contractor. This CEMP shall then guide the development of the construction contractor's project specific CEMP that will be generated under their management systems and approved by the Client prior to the commencement of construction activities.

1.1 Project Description

The project is located on western side of Bribie Island at White Patch Esplanade, approximately four kilometres north of the Bribie Island bridge. A road crossing over Wrights Creek acts as the solitary link between the community of White Patch to the north, and the remainder Bribie Island to the south. Bribie Island National Park adjoins the road to the north-east of the crossing. Pumicestone Passage is located to the west of the project and forms part of the greater Moreton Bay area (refer to Figure 1).

The project is being undertaken by Moreton Bay Regional Council following the destruction of the crossing over Wrights Creek during a flood event in February 2022 and involves the construction of a new crossing.

Prior to the flood event in February 2022, the crossing consisted of a causeway with a series of steel pipes which allowed continuous tidal flow through to Wrights Creek. The flood event saw the washout of these pipes under the road along with the surrounding rock material and public utility services. A temporary road crossing was established in the same location with pipes and a combination of concrete and rock fill. The temporary crossing is currently in operation and open to traffic until the permanent structure is built. The project consists of construction of a bridge structure on an alignment immediately to the west of the existing road, and removal of the current temporary crossing.

The Project is being undertaken through the Queensland Reconstruction Authority's Disaster Recovery Funding Arrangements.

1.2 Environment Management for the Project

This CEMP has been prepared to support the construction phase of the project and provides a framework for management of identified impacts and implementation of management and mitigation measures. Environmental management for the project will operate within an Environmental Management System (EMS) framework, in accordance with the ISO14001:2015 EMS Standard.

In relation to site and project specific requirements, this EMS will apply on a site-specific and project-specific basis and is managed by the Environment function on site and overseen by the site manager.

For projects, the EMS requires:

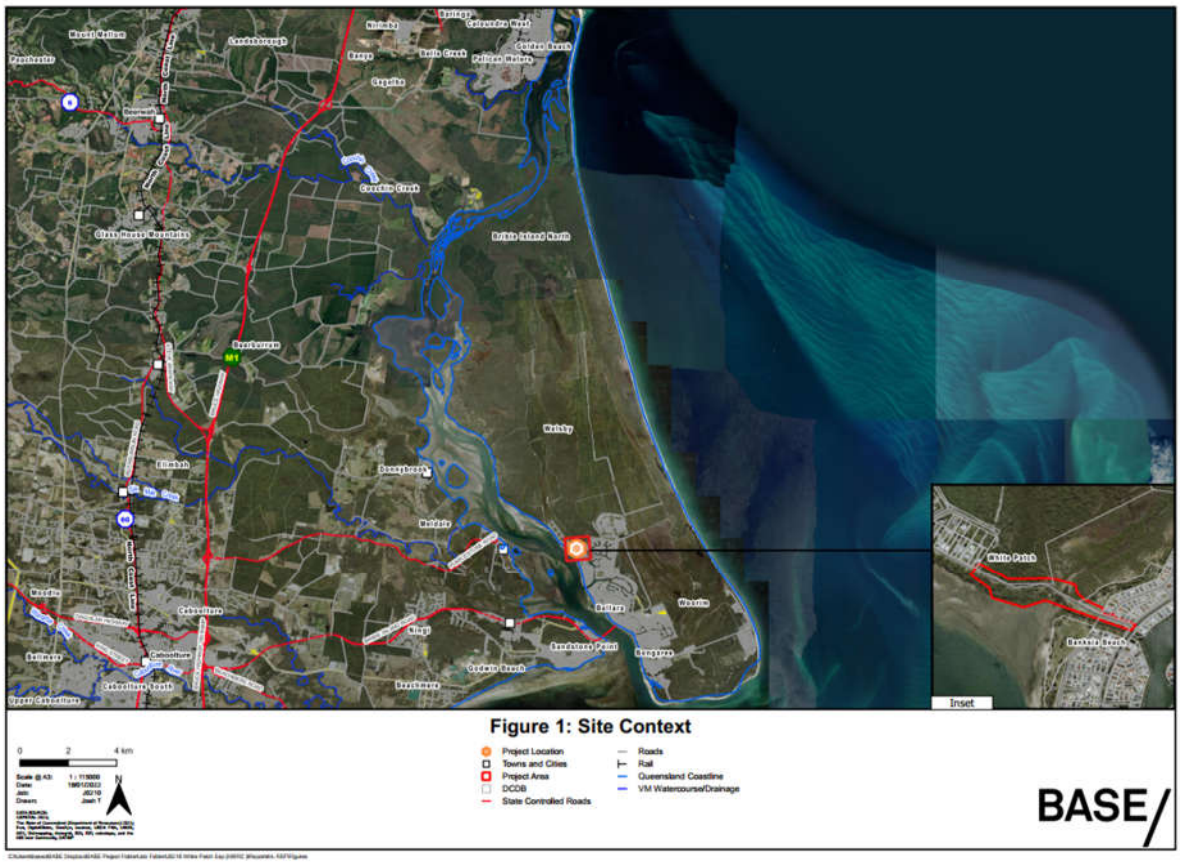
- The establishment of systems and arrangements to ensure compliance with the EMS Management Standards
- Utilising EMS Compliance Guidelines for the development and implementation of procedures
- Contributing to the implementation and on-going operation of the EMS.

2.0 Project Description

2.1 General

The project to which this Construction Environmental Management Plan (CEMP) applies is the construction of a road crossing on White Patch Esplanade. The project is located on western side of Bribie Island at White Patch Esplanade, approximately four kilometres north of the Bribie Island bridge. White Patch Esplanade crosses Wrights Creek and acts as the solitary link between the community of White Patch to the north, to the remainder Bribie Island to the south. Bribie Island National Park adjoins the road to the north east of the crossing. Pumicestone Passage is located to the west of the project and forms part of the greater Moreton Bay area. Refer to Figure 1 below.

Figure 1: Site Location



The Project Area includes the surrounding road, bushland, open space and tidal waterway areas. Refer to Figure 2.

Figure 2: Site Plan

0 20 40 60 80 m

Scale @ A3: 1 : 1500
Date: 17/11/2022
Job: J0210
Drawn: Oliver OCallaghan

N

DATA SOURCE:
QSPATIAL 2022;
The State of Queensland (Department of Resources) 2022;
Esri, DigitalGlobe, GeoEye, i-cubed, USDA FSA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community, DATSIP

- DCDB
- Roads
- Rail
- Protected areas of Queensland
- Nature Refuges
- Waterways
- Mountains
- Development Layout

BASE/

Project File - C:\Users\ctayl\BASE Dropbox\BASE Project Folder\Job Folder\J0210 White Patch Esp (MBRC)\GIS CAD Files\J0210_White Patch Esp_DA_OP Works Application.qgz, Figures - C:\Users\ctayl\BASE Dropbox\BASE Project Folder\Job Folder\J0210 White Patch Esp (MBRC)\Reports\5. Approvals\DA WWBW Tidal works\Figures

White Patch Esplanade consists of road reserve parcels either side of the waterway which also include adjoining land that is currently vegetated. To the northeast is the Bribie Island National Park on Lot105 AP22462. On the southern side the area is open space parkland on both sides of White Patch Esplanade (Lot2 SP177807, 3SP 177807 and Lot201 RP209320) with residential dwellings further to the south on Flamingo Drive and Solander Esplanade. The remaining tidal and waterway area outside of the land parcels which is below the Highest Astronomical Tide (HAT) line is unallocated State Land.

2.2 Environment Assessment

A Review of Environmental Factors (REF) was undertaken by BASE Consulting Group on behalf of Red Fox Advisory for the design of the White Patch Esplanade crossing structure. The REF included:

- Desktop review of environmental information.
- Ecological field investigations conducted onsite and associated reporting.
- Review of Environmental Planning Approvals; and
- Identification of potential environmental impacts through the delivery of the project.

The review encompassed information for both potential crossing options (i.e., culverts or bridge) and was used to inform the decision-making process for the design of the crossing structure.

2.3 Key Environmental Impacts

Key environmental impacts are detailed in the following Appendices to this CEMP:

Appendix A – Air Quality Subplan

Appendix B – Biosecurity Subplan

Appendix C – Cultural Heritage Subplan

Appendix D – Erosion and Sediment Control Subplan *(concept plan included as separate document)*

Appendix E – Flora and Fauna Subplan

Appendix F – Hazardous Substances Subplan

Appendix G – Land and Soil Management Subplan

Appendix H – Noise and Vibration Subplan

Appendix I – Water Quality Subplan

Appendix J – Waste and Recycling Subplan

Appendix K – Visual Amenity Subplan.

Refer to the relevant subplans for the noted impacts and nominated management and mitigation measures to be implemented during the construction phase of the project.

3.0 Legislation, Standards and Guidelines

3.1 Federal Legislation – Environment Protection and Biodiversity Conservation Act

The *Environment Protection and Biodiversity Conservation (EPBC) Act 1999* is the Australian Government's central piece of legislation. It provides the legal framework to protect and manage nationally and internationally important flora and fauna, ecological communities, and heritage places (Matters of National Environmental Significance).

A protected matters search is conducted over the subject property and surrounding 5 km radius (to identify the potential for MNES. Following this an EPBC Self-Assessment Checklist shall be completed. Depending on the outcome of the self-assessment referral to Department of Agriculture, Water and Environment (DAWE) may be required. DAWE shall assess the project to determine it if is to be categorised as a 'controlled action' which then requires a full assessment.

3.2 State Legislation

A range of State environmental legislation is applicable to development within Queensland. The applicability of this legislation is largely guided by a series of mapping layers and scheduled flora and fauna species. The following section outlines the relevance of this legislation to the Project Area.

3.2.1 *Nature Conservation Act 1992*

The *Nature Conservation Act 1992* (NCA) classifies and protects significant areas (Protected Areas) and protects Threatened plant and animal species. The *Nature Conservation (Wildlife) Regulation 1994* (NCWR) lists plant and animal species presumed extinct, endangered, vulnerable, near threatened, least concern, international or prohibited. The schedules of this regulation were considered in this report using a Wildlife Online Database Search with a five (5) kilometre radius from the site.

3.2.2 *Vegetation Management Act 1999*

The *Vegetation Management Act 1999* (Qld) (VM Act) regulates the clearing of native vegetation in Queensland and is administered by the Department of Resources (DoR). The VM Act also protects and regulates areas designated for offsets or compliance (Category A). The VM Act categorises the status of native vegetation as:

- remnant (Category B).
- high value regrowth (HVR) (Category C).
- reef regrowth watercourse vegetation (Category R); and
- non-remnant (Category X).

Remnant, HVR or reef regrowth vegetation can be further classified into regional ecosystems (REs) based on bioregion, landform and dominant canopy species.

In addition, within the VM Act Regulations all RE are assigned to a Vegetation Management Class (VM Class). This is based on the current extent remaining compared to its pre-clearing extent, as gazetted under the VM Act and listed in the Regional Ecosystem Description Database (REDD) maintained by the Queensland Herbarium, Department of Environment and Science (DES).

3.2.3 *Fisheries Act 1994*

Waterway Barriers

Development of new, or raising of existing waterway barriers, must provide adequate fish passage. In many cases fish are unable to move into waters upstream or downstream of these barriers. This loss of access to habitat has caused a decline in distribution of native fish populations, including species of commercial, recreational and traditional importance.

Examples of waterway barriers may include:

- Bridges
- Culverts
- Partial Bunds
- Bed Level Crossings
- Causeways
- Sediment curtains

Certain waterway barrier works are able to be constructed depending on the structure design, duration in place and type of waterway, as per the Accepted Development Requirements for Waterway Barrier Works and not require full assessment.

Marine Plants

All marine plants in Queensland (including mangroves, seagrass, marine algae, salt couch and samphires) are protected. The protection applies over all tenures, including privately owned land. The removal, damage or destruction of marine plants requires authorisation through a development approval or through demonstrated compliance with accepted development requirements.

Some property maintenance or minor impacts works requiring the removal, damage or destruction of marine plants may be undertaken in compliance with accepted development requirements. Accepted development requirements for operational work that is the removal, destruction or damage of marine plants

3.2.4 *Coastal Protection and Management Act 1995*

Tidal Works

Tidal works are any works carried in, on or over tidal land and includes the construction or demolition of structures such as jetties, pontoons, seawalls, navigation channels, marina basins. Prescribed tidal works, a subset of tidal works, are assessed by local government under the development assessment system. The Department of Environment and Science (DES) provides assistance to local government in this role by providing the Code for assessable development that is prescribed tidal works in Schedule 3 of the *Coastal Protection and Management Regulation 2017*.

Quarry Material

A quarry material allocation is needed under the *Coastal Protection and Management Act* where dredging activity results in the removal of material from land under tidal waters owned by the State and where the material is disposed of above the high-water mark.

Two circumstances are considered a reasonable excuse for removing quarry material without an allocation notice:

- Material is removed as a necessary part of the construction of an approved tidal work and has no commercial value, and not required for maintaining coastal processes and adjacent areas and cannot be returned to tidal water.
- Material is removed as part of investigative process and is less than 10m3, will analysed for chemical. Physical or stratigraphic properties, and pre work notification occurs.

3.2.5 *Environmental Protection Act 1994*

The *Environmental Protection Act 1994* lists obligations and duties to prevent environmental harm, nuisances, and contamination. All persons have a general environmental duty which means they must not carry out any activity that causes or is likely to cause environmental harm unless all reasonable and practicable measures are taken to prevent or minimise the harm. Demonstrating compliance with general environmental duty can be used as a defence for offences relating to causing unlawful environmental harm.

Environmental Protection (Water and Wetland Biodiversity) Policy 2019

The purpose of the EPP (Water and Wetland Biodiversity) is to achieve the object of the *Environmental Protection Act 1994* (EP Act) in relation to waters and wetlands. Environmental values (EVs) and water quality objectives (WQOs) are being progressively determined for Queensland waters. EVs define the uses of the water by aquatic

ecosystems and for human uses (e.g., drinking water, irrigation, aquaculture, recreation). WQOs define objectives for the physical, chemical and biological characteristics of the water (e.g., nitrogen content, dissolved oxygen, turbidity, toxicants, fish).

Environmental Protection (Noise) Policy 2019 (EPP (Noise))

In relation to noise, the EP Act is supported by the Environmental Protection (Noise) Policy 2019 (EPP(Noise)). The key environmental values for the acoustic environment are outlined within Section 7 of the EPP(Noise) as below. The environmental values to be enhanced or protected under this policy are:

(a) the qualities of the acoustic environment that are conducive to protecting the health and biodiversity of ecosystems; and

(b) the qualities of the acoustic environment that are conducive to human health and wellbeing, including by ensuring a suitable acoustic environment for individuals to do any of the following:

(i) sleep.

(ii) study or learn.

(iii) be involved in recreation, including relaxation and conversation; and

(c) the qualities of the acoustic environment that are conducive to protecting the amenity of the community.

Environmental Protection (Air) Policy 2019 (EPP (Air))

Under the Environmental Protection Act 1994 (EP Act), activities are assessed to ensure they will not adversely affect environmental values including air quality, public amenity, and safety. This means ensuring the Project is not likely to cause environmental nuisance or environmental harm. The Environmental Protection (Air) Policy 2019 (EPP (Air)) under the EP Act establishes air environment values to be protected or enhanced. These values are conducive to:

- Protecting the health and biodiversity of ecosystems.
- Human health and wellbeing.
- Protecting the aesthetics of the environment, including the appearance of buildings structures and other property; and
- Protecting agricultural use of the environment.

The EPP (Air) provides long-term goals for sulphur dioxide, nitrogen dioxide, ozone, carbon monoxide, particles, lead and a number of air toxics in line with the objectives above. These long-term goals generally apply to stationary sources of air pollution.

Environmentally Relevant Activity (ERA) 16 – Extraction and Screening Activities

Dredging is defined as the removal of material from the bed of any naturally occurring waterway. Where the removal involves greater than 1000 tonnes or more of material the need for an Environmentally Relevant Activity is triggered.

An exemption exists within the Act with respect to extracting material from a road if the use of material extracted is for constructing or maintaining a road.

3.2.6 *Marine Parks Act 2004*

The Moreton Bay Marine Park is managed under the Marine Park Act. The area is split into four different zones that allow certain uses to occur in each:

- General Use Zone.
- Habitat Protection Zone.
- Conservation Zone; and
- Marine National Park Zone.

The zoning plan states activities that can occur without specific permission and those that require a permit. Marine Park permits are an important tool for managing Moreton Bay Marine Park. QPWS can place conditions on certain

activities, separate conflicting activities, limit the impacts on high-use and/or sensitive areas, collect data and encourage responsible behaviour by marine park users. Marine park permits are required for most commercial or high impact activities, including:

- commercial tourism programs.
- collecting restricted marine plants or animals.
- works considered consistent with the object of the zone.
- constructing or installing a jetty, boat ramp or revetment wall.
- dredging, material extraction and disposal.
- aquaculture operations (not including the addition of feed).
- non-accredited research and educational activities.
- vessel charter operations; or
- operating a hovercraft.

Marine Parks (Moreton Bay) Zoning Plan 2019

Major works as listed under the Plan are those that:

(a) are inconsistent with the objects to be achieved for the zone in which the works are being, or are proposed to be, carried out; and

(b) are likely to have a significant adverse impact on an area of the marine park by:

(i) destroying or disturbing the natural hydrology of the area, including, for example, by altering tidal or natural currents or drainage patterns; or

(ii) changing the composition of natural species or productivity of aquatic communities in the area; or

(iii) causing alienation of part of the marine park; or

(iv) removing or destroying the substrate, animals or plants.

Examples of major works:

- port and harbour works, including construction of a breakwater or berthing and terminal facility.
- airport works, including construction of a runway or terminal.
- reclamation works.
- developmental dredging of a navigation channel or boat harbour; and
- building works including a sand loading facility, marina, wharf or submarine pipeline.

3.2.7 *Environmental Offsets Act 2014*

The *Environmental Offsets Act 2014* (the Offsets Act) outlines the framework for environmental offsets. It supports assessment legislation by coordinating the delivery of environmental offsets across jurisdictions and placing limits on when an environmental offset condition may be imposed. It also provides for the subsequent assessment, delivery, and compliance with offset conditions once imposed. The Offsets Act is supported by the *Environmental Offsets Regulation 2014* (the Offsets Regulation) and the Queensland Environmental Offsets Policy (the Offsets Policy). Conditions for environmental offsets are applied under the assessment legislation. The *Environmental Protection Act 1994, Planning Act 2016, Nature Conservation Act 1992, Fisheries Act 1994* or the *Marine Parks Act 2004* regulate whether an environmental offset is required as a condition of an authority.

3.2.8 *Transport Operations (Marine Safety) Act 1994*

Maritime Safety Queensland provide technical advice to SARA regarding the impacts of development applications on maritime safety interests as part of the development process. The State Development Assessment Provisions (SDAP) support SARA to assess an application. The SDAP establishes development requirements for proposals that may impact on maritime safety. Development applications that achieve the performance outcomes and acceptable outcomes for the maritime safety state code (State Code 7).

3.2.9 *Biosecurity Act 2014*

All people have a general biosecurity obligation (GBO) under the Biosecurity Act to ensure you do not spread a pest, disease or a contaminant. Under the GBO, individuals and organisations whose activities pose a biosecurity risk must:

- take all reasonable and practical steps to prevent or minimise each biosecurity risk.
- minimise the likelihood of causing a biosecurity event and limit the consequences if such an event is caused.
- prevent or minimise the harmful effects a risk could have, and not do anything that might make any harmful effects worse.

This act covers all invasive plants and animals.

3.3 Local Government Legislation

The Project Area is located within the Moreton Bay Regional Council which has a planning scheme that covers the local government area. This scheme has a number of codes and overlays to protect people, property and the environment.

Mapping under the Moreton Bay Regional Council (MBRC) planning scheme identifies the study area contains the following constraints regarding water quality:

- Area is within the coastal hazard erosion prone area.
- Area is mapped as a high-risk storm tide inundation area.
- Area is partially mapped as high probability of acid sulfate soils (ASS).

The Moreton Bay Regional Council Biodiversity mapping covers the project site with the following triggered:

Environmental Areas

- MSES – Matters of State Environmental Significance
- MLES – Matters of Local Environmental Significance
- MLES – Wetlands
- MLES – Waterway Buffer
- MLES – Wetland Buffer

Waterways

W3 – Waterway

Road works that are government supported and undertaken for and on behalf of the Council is not assessable under the Moreton Bay Regional Council planning scheme in accordance with the *Planning Regulations 2017* schedule 6, Part 5, 26 (2) (c) and (3) (c), as follows:

Planning Regulations 2017 schedule 6, Part 5, 26

(2) Development for the construction of the following infrastructure, if the infrastructure is a government-supported transport infrastructure—

(c) Road transport infrastructure

(3) Development that is the use of, or for the maintenance, repair or upgrading of—

(c) Road transport infrastructure.

4.0 Permits and Approvals

A summary of the permits and approvals applicable to the permanent bridge structure and temporary construction activities is presented in the sections below.

4.1 Permanent Crossing Structure Permits and Approvals

Table 2 below outlines the list of Approvals applicable to the permanent crossing structure works. The removal of the existing causeway structure is included in the scope of these approvals as required.

Table 1: Permanent Crossing Works Approvals

Approval Name	Legislation	Assessment Manager	Advice / Referral Agency	Notes
MNES Self-Assessment and or Referral	*Environmental Protection and Biodiversity Conservation Act 1999*	DCCEEW	-	EPBC Self-assessment is to be conducted on threatened species including RAMSAR wetland shorebirds.
Conservation Significant Species (Species Management Program)	*Nature Conservation Act 1992*	DES	N/A	A Species Management Program is required for the tampering of breeding places for endangered, vulnerable or near threatened species.
Operational Works – Waterway Barrier Works (Permanent)	*Fisheries Act 1994*	SARA	DAF	The new structure, depending on design, within the tidal waterway is likely to be a waterway barrier and will require assessment against State Code 18
Marine Plant Disturbance	*Fisheries Act 1994*	SARA	DAF	The proposed structure is likely to require the disturbance of marine plants and will require assessment against State Code 11. Offsets are required under the *Environmental Offsets Act 2014*.
Tidal Works / Quarry Material Allocation	*Coastal Management Act 1995*	SARA	DES	The proposed structure involves tidal works and requires assessment against State Code 8. As part of this approval owners' consent is required through the Department of

Approval Name	Legislation	Assessment Manager	Advice / Referral Agency	Notes
				Resources' State Land Asset Management (SLAM) for works under the high-water mark. The associated quarry material allocation under the Coastal Act is not required as the structure is an approved tidal work.
Moreton Bay Marine Parks Permit	*Marine Park Act 2004*	DES	NA	The development footprint is within the Moreton Bay Marine Park and requires a marine park permit
Maritime Safety (Harbour Master)	*Transport (Marine Safety) Act 1994*	SARA	DTMR	Depending on design option for the structure approval may be required with respect to navigation
ERA 16 - Dredging	*Environmental Protection Act 1994*	SARA	DES	Depending on the design option for the structure this may be required and will require assessment against State Code 23

4.2 Construction

Approvals that may be triggered during the construction phase of the Project depending on contractor methodology are shown in Table 2 below.

Table 2: Construction Contractor Approvals

Approval Name	Legislation	Assessment Manager	Advice / Referral Agency	Notes
Operational Works – Waterway Barrier Works (Temporary)	*Fisheries Act 1994*	SARA	DAF	The construction methodology may require the placement of temporary (<6mths) structures (e.g., rock platform, sediment curtain) within the tidal waterway is likely to be a waterway barrier that may require notification as per the ADR for WWBW. If the barrier is planned to be in place for >6mths, it will require assessment against State Code 18.
Moreton Bay Marine Parks Permit	*Marine Park Act 2004*	DES	NA	Depending on the design option and construction methodology for the structure, a permit may be required. Permission is required to anchor a vessel in the zone for more than 14 consecutive days.
Maritime Safety (Harbour Master)	*Transport (Marine Safety) Act 1994*	SARA	DTMR	Depending on the design option and construction methodology for the structure, this approval may be required with respect to navigation e.g., temporary barges in waterway.

5.0 Client Documents

Section 5 to be updated prior to commencement of construction.

5.1 Specifications

TBA

6.0 Roles and Responsibilities

Roles, responsibilities and authorities for construction of the project are presented in Section 6 and the Environmental Sub Plans.

6.1 Project Manager

- Ensure compliance with all legal requirements including requirements of all environment and planning approvals.
- Ensure that adequate resources are available within the construction team to meet all compliance requirements and implement the requirements of this CEMP.
- Monitor close-out of corrective actions.
- Review outcomes of incident investigations.
- Demonstrate a visible and pro-active commitment to environmental issues.
- Ensuring that the environmental policy and environmental objectives are established and are compatible with the strategic direction and the context of the organisation.
- Ensuring the integration of the environmental management system requirements into the organisation's business processes.
- Directing and supporting personnel to contribute to the effectiveness of the environmental management.

6.2 Environmental Representative

- Assist and support managers, supervisors and workers in implementing the CEMP and achieving environmental compliance.
- Conduct monitoring, auditing and reporting activities required in this CEMP.
- Assist with incident response and investigation where required to manage and address environmental impacts of incidents.
- Conduct induction training and tool box talks on environmental topics.
- Compile monthly and quarterly environmental reports.

6.3 Project Engineering

- Manage environmental performance requirements in contracts, including penalties in the event of non-compliance.
- Demonstrate a visible and pro-active commitment to environmental issues.
- Comply with all relevant requirements of this CEMP.

6.4 Project Field Supervision

- Implement all relevant requirements of this CEMP.
- Integrate environmental management requirements into work procedures and practices.
- Provide initial responses to emergencies involving potential environmental impacts.
- Participate in incident investigations.

6.5 All Project Staff

- Comply with all relevant requirements of this CEMP.

7.0 Risk Management

7.1 Risk Process

7.1.1 Identification

Risks are systematically identified, taking into consideration the full range of project activities in relation to individual aspects of the existing environment.

All risks are recorded on the Project Risk Register and qualitatively scored. This involves an assessment of the risk against likelihood and consequence criteria to provide a qualitative evaluation. This then provides a common means to assess the severity and prioritise risk mitigation activity.

In order to assess each risk, qualitative criteria have been used to ensure clear and consistent evaluation. This provides the scores against likelihood and consequence as detailed in the risk matrix between one and five, used in evaluating the risk.

All risks are evaluated for the consequence areas and assessed for impacts against:

- Health, safety and security
- Social performance
- Environment and Cultural Heritage
- Economic (cost and schedule)

Project Wide Risks are to be developed and managed through an in-house platform to be confirmed by the contractor.

7.1.2 Mitigation

In treating risks, the hierarchy of control principal applies, as shown in Figure 3 below.

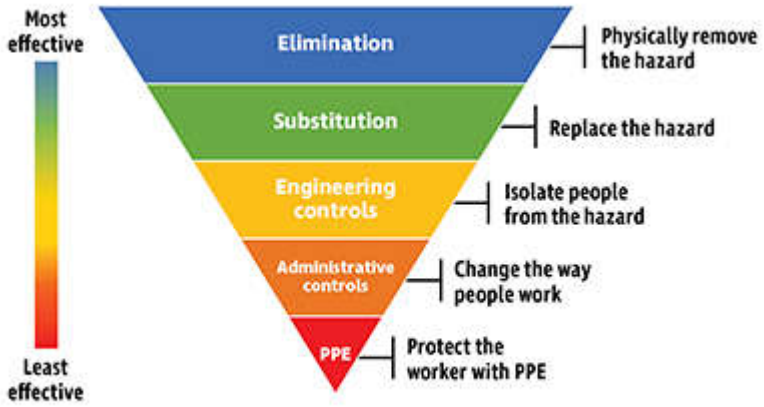


Figure 3: Hierarchy of controls

Environmental Impacts and Aspects including associated management measures are captured within the Environmental Sub Plans within this CEMP for the relevant Environmental Aspect.

7.1.3 Checking and Review

Environmental risks are managed through the implementation of mitigation measures noted in each relevant appendix of this CEMP. The Monitoring, Reporting and Review section of each appendix describes the appropriate measures and potential corrective actions for each management action.

7.2 Risk Documents

High level Project Environmental Risks are captured and tracked in the Project Environmental Risk Register. Environmental Impacts and Aspects including associated management measures are captured within the Environmental Sub Plans within this CEMP for the relevant Environmental Aspect.

Further Risk Management documentation will be prepared and provided by the contractor prior to commencement of construction. Examples of potential documents include Work Method Statements, task specific risk assessments for high-risk works, Job Safety and Environment Assessments et cetera.

8.0 Incident Management

An environmental incident is an action or omission that has – or may have – the potential to breach legal and other requirements. Environmental incidents can therefore be considered to trigger a "non-conformance".

Environmental incidents and non-conformances can include breaching or not meeting legal and other requirements, such as conditions included within environmental, or planning approvals granted under the various acts or potential or actual environmental harm under the *Environmental Protection Act 1994* (EP Act).

8.1 Reporting

Environmental incidents and non-conformances as defined in section 8.0 must be reported. Under project approvals and legislation there are some incidents that require notification to various regulatory bodies, based on the level of severity. Under the EP Act, where an incident occurs and cleanup costs total over $5,000, the Department of Environment and Science (DES) must be notified. Any offsite impact must be reported immediately to the Principal's representative.

Contractors are to report all incidents to their Principal representative within 24 hours, who will then undertake further notification in accordance with this procedure.

Where an environmental incident and/or non-conformance is identified, the environmental incident and/or non-conformance is to be recorded in the Environmental Incident, Non-conformance and Environmental Emergency Corrective Actions Register associated with this procedure.

The following details must be included:

- Details of the person reporting the environmental incidents and/or non-conformance
- Description of the environmental incidents and/or non-conformance including time, date and location
- Summary of the environmental incidents and/or non-conformance including personnel involved, cause and environmental impact
- Summary of actions taken to remediate the situation and mitigate further environmental impact; and
- Further action required and personnel involved to correct or prevent future environmental incidents and/or non-conformances.

Contractors will develop a procedure to be used when reporting, classifying and investigation incidents.

8.2 Investigation

Serious and/or material environmental incidents, non-conformances or environmental emergencies must be investigated to determine the contributing and causal factors; this process may include root cause analysis. This should occur as soon as possible after the incident occurs, but no later than one week.

The depth of investigation shall be appropriate to the actual or potential seriousness of the environmental incident, non-conformance event or emergency.

The investigation shall be recorded on an Environmental Reporting and Investigation Form prepared by the Contractor. Corrective action/s should also be recorded on the form.

9.0 Communication

9.1 Internal Communication

Internal Reporting is required in response to relevant project and legislative requirements. Internal project reporting is set out in Table 3.

Table 3: Project Internal Reporting

Reporting Trigger	Report Content	Responsibility	Recipient	Timeframe
Monthly Post Clearing Reports	Vegetation Cleared by type	Contractor	Client's Representative	As per contract reporting requirements
Monthly Fauna Signings / Mortality	All MNES Fauna sited Fauna Mortalities	Contractor	Client's Representative	As per contract reporting requirements
Out of Hours Works	Monthly Summary of Out of Hours works including any noise monitoring undertaken	Contractor	Client's Representative	As per contract reporting requirements
Incidents causing actual or potential environmental harm	Incident investigation and corrective actions	Contractor	Client's Representative	
Contractor Monitoring and Reporting Requirements	Refer Sec 5 and Environmental Sub Plans of this document	Contractor	Client's Representative	

Within the Project, communications regarding environmental matters will include:

- Environmental compliance, incidents, initiatives and corrective actions as agenda items in all management meetings
- Regular toolbox talks on environmental matters
- Environmental inductions and other training as described in Section 10
- Incorporation of environmental risk assessment and management into all risk assessment activities
- Posting of information on environmental issues, impacts and performance on noticeboards
- Inclusion of environmental performance and issues in weekly, monthly and annual reports.

9.2 External Communication

External reporting is expected to be required in response to legislative requirements. Initial reporting requirements are set out in Table 4 below and this will be updated based on conditions of approval.

Table 4: External Environmental Reporting Requirements

Reporting Trigger	Report Content	Report Recipient	Responsibility	Timeframe
Incidents causing actual or potential environmental harm	Incident investigation and corrective actions	DES	Client	Within 24hrs of becoming aware
EPBC Approval	EPBC Approval Compliance with Conditions	DCCEEW	Client	TBA
DA Reporting Conditions	As detailed in project DA Conditions	DES/DAF	Client	TBA

10.0 Training

10.1 Induction

All employees and contractors other than short term visitors will receive environmental induction training on commencement, and then annual environmental awareness training, covering:

- An overview of environmental values of the site
- Key environmental impacts and risks associated with construction
- Legislative and other responsibilities, including the general environmental duty
- How to conduct task-based environmental risk assessment
- Waste management and minimisation, including segregation and storage of wastes
- Erosion and sediment control and protection of watercourses
- Fauna interactions
- Weed hygiene requirements
- Aboriginal cultural heritage awareness
- Storage and handling of environmentally hazardous materials
- Spill prevention and response
- Fire prevention and response
- Energy and water conservation
- Incident notification and reporting requirements.

A visitor induction will be given to visitors and short-term contractors not undertaking work onsite as determined by the contractor Training Matrix

Further requirements will be defined based on the construction contractor's strategy.

11.0 Inspection

Environmental monitoring requirements are set out in each sub-plan within this Table 5 provides a contextual summary of the required monitoring programs across the various project.

Table 5: Summary of Monitoring Requirements

Element	Construction
Meteorology	✓
Air quality	✓
Noise and vibration	✓
Surface water	✓
General and hazardous waste	✓
Terrestrial ecology	✓
Aquatic ecology	✓
Scenic amenity	✓
Erosion and sediment control	✓
Contaminated land	✓
Topsoil management	✓
Cultural heritage	✓
Weed Management	✓

11.1 Checks and Inspections

A formal site inspection will be conducted weekly by the environmental team during active works. Inspections will be carried out to assess project activities against compliance requirements set out in the environment and planning approvals and this CEMP.

Inspections will be documented on a checklist that will record whether the performance requirement for each item was achieved and corrective actions required to achieve the performance requirement. Where the non-conformance does not present a significant risk of environmental harm, and can be corrected promptly, the corrective action will be closed out on the checklist. Where the risk of environmental harm is more significant and/or the corrective action cannot be undertaken promptly, the action will be recorded in the corrective action register. Table 6 details the inspection regime for the project.

Table 6: Environmental Inspection Regime

Inspection	Frequency	Responsible	Output	Tracking
Environmental Inspection	Weekly	Client's Representative	Weekly Inspection Report	Corrective Action Register
Pre-Wet Weather Inspection	Forecast 80% chance of 10mm or more in 24 hr. period	Contractor	Pre-Wet Weather Inspection Report	Corrective Action Register
Post-Wet Weather Inspection	Next day after 10 mm or more of rain in 24hr period	Contractor	Post-Wet Weather Inspection Report	Corrective Action Register
Environmental Observation	Ad Hoc	Construction Supervision Team	Environmental Observation Report	Corrective Action Register
Environmental Inspection	As per Contractor CCEMP (weekly minimum)	Contractor	As per Contractor CCEMP	Corrective Action Register

Where an incident or near miss is observed during inspections, the incident or near miss will be recorded and followed up.

12.0 Auditing

Audits are required under the relevant project approvals and the Environmental Management System. The following standards may be relevant to auditing activities:

- AS/NZS ISO 14015-2001 Environmental Management – Environmental Assessment of Sites and Organizations
- AS/NZS ISO/IEC 17021:2011 Conformity assessment - Requirements for bodies providing audit and certification of management systems
- AS/NZS ISO 19011-2011 Guidelines for Quality and/or Environmental Management Systems Auditing
- ISO 19011:2011 Guidelines for auditing management systems.
- Draft audit reports will be reviewed by the Environmental and Approvals Manager. Once an audit report is finalised:
    - Audit reports will be circulated to the Project Manager
    - Recommendations will be entered into the corrective action register
    - Findings will be discussed at management meetings
    - Where relevant, findings will be presented as tool box talks
    - Reports and findings will be tabled at management reviews
    - Any non-compliances that are required to be reported under legislation or conditions of approval will be reported.

12.1 Internal

Auditing during construction will depend on the contracting strategy which is currently being finalised.

For contractors/subcontractors, the Client's Representative will conduct audits on a six-monthly basis, or for shorter duration contracts, at least once during the contract duration. These audits will cover:

- Contractor's compliance with legal and other obligations
- Whether contractor's management plans have appropriately identified environmental impacts and risks
- Whether roles, responsibilities and training and competency requirements have been identified and followed
- Whether adequate management and control strategies are in place to achieve compliance with legal requirements and performance requirements documented in this CEMP
- Whether management and control strategies are being implemented
- Monitoring approaches and outcomes, and identification and implementation of corrective actions
- Adequacy of record keeping and reporting.

It would also be expected that contractors will have internal and external audit programs.

12.2 External

TBA - To be updated based on project approvals and conditions.

13.0 Environmental Management Plan Review

The CEMP will be reviewed at least annually and updated to reflect:

- Changes in legislative requirements (including conditions of approvals)
- Environmental performance
- Outcomes of audits
- Outcomes of incident investigations
- Changes in external and internal policies, standards and guidelines
- Changes in requirements of the environmental management system
- Any organisation changes such as changes in organisational structure
- Major Change in Scope or Process.

The review will ensure the continuing suitability, adequacy and effectiveness of the CEMP and the Environmental Management System. The review will include assessing opportunities for improvement of environmental performance, recuing environmental impacts and where possible increasing beneficial impacts.

Intermediate updates may also be undertaken in response to corrective actions or other changes that need to be addressed urgently.

Amendments to the CEMP will be communicated to all staff through management meetings and tool box talks.

Appendix A

Air Quality Subplan

1.0 Air Quality Subplan

1.1 Legislation and Guidelines

Air quality is managed through a framework established under the *Environmental Protection Act 1994* (EP Act):

- The EP Act includes general objectives in relation to preserving environmental values in relation to air quality
- Under the EP Act, the *Environmental Protection (Air) Policy 2008* (EPP Air) is established and sets out objectives in relation to air quality.
- Under the EP Act, an environmental authority is required to undertake environmentally relevant activities, including a range of activities that may cause emissions to the air. In issuing an environmental authority, the regulator must have regard to the extent to which the activity meets the objectives established under the EPP Air. The environmental authority will then contain conditions in relation to air quality.

Occupational exposure to air contaminants is managed through the *Work Health and Safety Act 2011* and is not discussed further in this CEMP.

This Air Quality Management Sub Plan details the management and mitigation measures for Air Quality Management during project construction.

The Commonwealth government has also established non-statutory air quality standards in the *National Environmental Protection Measure (Ambient Air Quality)*.

The national pollutant inventory is established through a national environmental protection measure under the Federal *National Environment Protection Council Act 1994*. The Project is not likely to trigger reporting under this scheme.

1.2 Potential Impacts

1.2.1 Existing Environmental Values

Broad environmental values in relation to air quality are established in the EPP Air:

(a) the qualities of the air environment that are conducive to protecting the health and biodiversity of ecosystems.

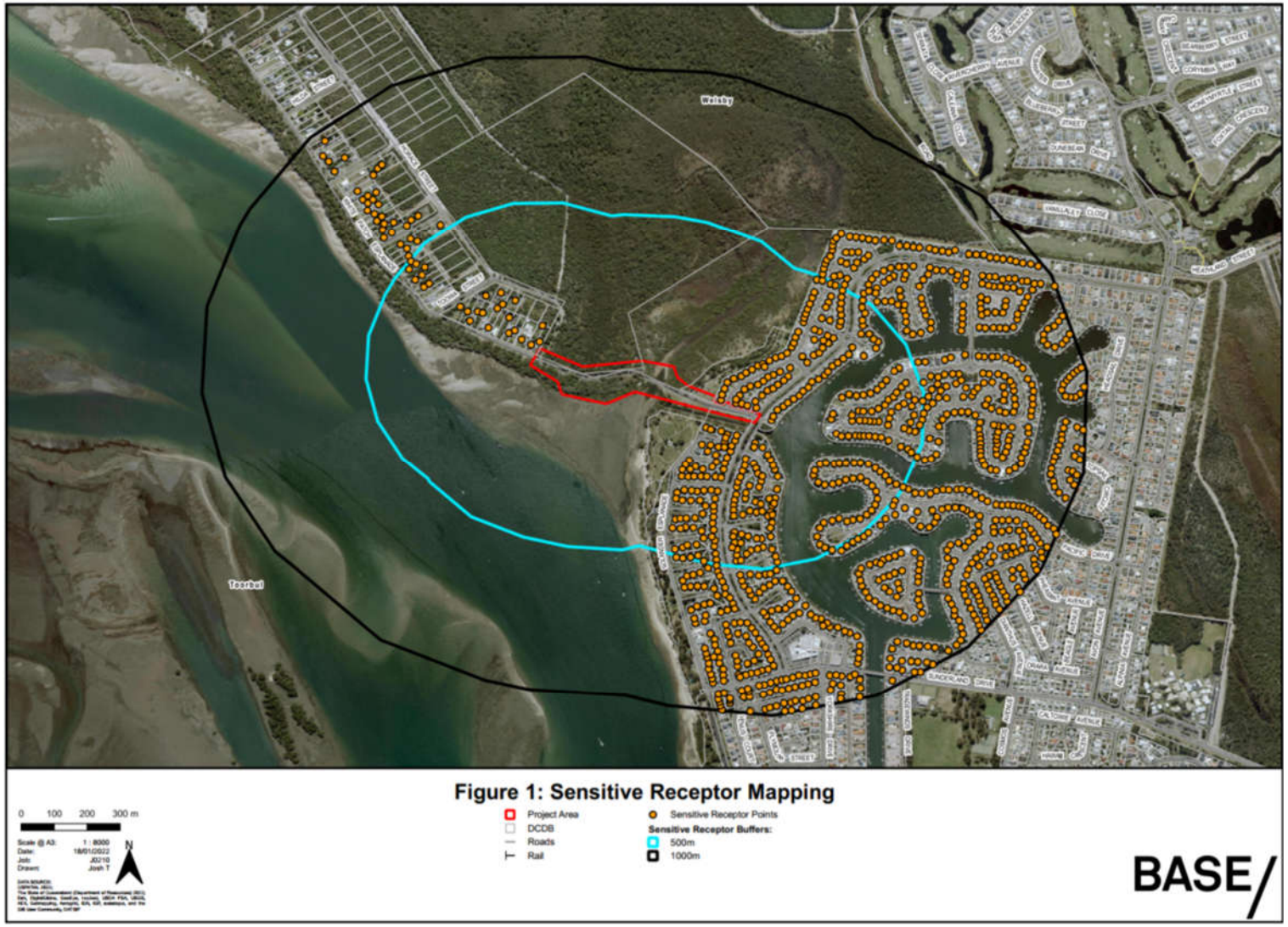
(b) the qualities of the air environment that are conducive to human health and wellbeing.

(c) the qualities of the air environment that are conducive to protecting the aesthetics of the environment, including the appearance of buildings, structures and other property; and

(d) the qualities of the air environment that are conducive to protecting agricultural use of the environment.

Sensitive receptors within a distance of 500m and 1km of the Project area are shown in Figure 1.

Figure 1 – Sensitive receptors



The key contaminant of concern is particulate matter, and relevant air quality objectives in relation to particulate matter at sensitive receptors are shown in Table 1 below.

Table 1: Ambient Air Quality Objectives [(1)] and Criterion for Dust Deposition

Pollutant	Objective	Averaging period
Total suspended particulates	90 µg/m^3	Annual
Particulate matter <10 µm (PM_{10})	50 µg/m^3	24 hours
Dust deposition	120 mg/m^2/day	Monthly

(1) From EPP Air

1.2.2 Construction Impacts

Emissions to the atmosphere during construction works that could result in adverse impacts to air quality are typically divided into two categories - dust and particulates, and emissions. These are listed in Table 2 below.

Table 2: Potential Construction Impacts

Activity	Potential Environmental Impact
Construction Activities and vehicle movements	Increased movement of vehicles and machinery with construction activities may increase dust levels. Plant and vehicle movement over unsealed construction areas may generate additional dust affecting neighbouring properties
Vegetation Clearing	Vegetation clearing and soil disturbance has the potential to generate dust and impact on neighbouring vegetation
Exposed soil area and stockpiles	Exposed soil areas onsite have the potential to create wind-blown dust which may impact neighbouring sensitive receptors
Vehicle Emissions	Use of plant and equipment may impact the local air quality with exhaust emissions from the combustion of fuel

1.3 Performance Outcome

The following performance outcomes apply to the project:

- Prevent or minimise any air quality impacts at the location of sensitive receptors during construction of the Project.
- No non-compliance with approval conditions.
- No air quality complaints received from nearby sensitive receptors.
- No environmental nuisance infringements as a result of construction.
- Meet EPP Air objectives for dust emission at sensitive receptors.
- Not cause nuisance from dust deposition at sensitive receptors.

1.4 Management Actions

Table 3: Management and Mitigation Actions

Action Number	Mitigation / Management Action	Timing	Responsibility
AQ1	Training will be provided to all project personnel, including relevant sub-contractors on sound air quality control practices and the requirements from this plan through inductions, toolboxes and targeted training.	Prior to works and ongoing	Contractor
AQ2	Air quality control measures from this plan will be included in relevant Work Method Statements (WMS) and/or Erosion and Sediment Control Plans (ESCP).	Prior to works commencing	Contractor
AQ3	Vegetation clearing will be staged where possible to minimise the area and time that surfaces are exposed.	At all times	Contractor
AQ4	Exposed surfaces with no scheduled work for two weeks will be treated to minimise dust generation. Exposed surfaces will be stabilised progressively using the most practical site-specific methods, examples including watering and geo-fabrics for short term exposure and emulation spray, spray grass, soil compaction and revegetation for longer term exposed areas or final finishes.	As required	Contractor
AQ5	Construction activities will be modified, reduced or controlled during high or unfavourable wind conditions if they have a potential to increase off-site dust generation.	As required	Contractor
AQ6	Control measures including water carts, sprinklers, sprays, dust screens or the application of geo-binding agents will be utilised where applicable to control dust emissions. The frequency of use will be modified accommodate prevailing conditions.	As required	Contractor
AQ7	Erosion control structures will be checked regularly for buildup of silt and other materials to ensure deposits do not become a dust source.	As prescribed under ESC Plan	Contractor
AQ8	Waste will be segregated and collected on a regular basis to ensure odours associated with waste do not become an issue.	As required	Contractor

Action Number	Mitigation / Management Action	Timing	Responsibility
AQ9	Stockpiles will be located in accordance with Erosion and Sediment Control Plans. Stabilise topsoil stockpiles if left in place for longer than four weeks. Methods may include covering and planting of native grasses or sterile grasses.	At all Times	Contractor
AQ10	There will be no burning off of waste or vegetation.	At all Times	Contractor
AQ11	Areas of disturbed material and access roads will be stabilised by methods such as compaction and ground cover/surface treatment. Compounds, ancillary facilities, administration access roads and standing areas will be managed to minimize dust.	At all Times	Contractor
AQ12	Measures implemented to minimise dust, soil or mud from being deposited vehicles on public roads. This will be achieved by implementing mitigation measures such as rumble grids and large aggregate at entry/exit points. Manual cleaning will also be carried out where appropriate. In the event of any spillage or tracking, the spilt material will be removed as soon as practicable.	End of Shift / As required	Contractor
AQ13	All loaded haulage trucks will be covered where there is a risk of release of dust or other materials and at all times on public roads.	At all times	Contractor
AQ14	Regularly service vehicles, plant and equipment such that exhaust systems and fuel consumption comply with manufacturers' specifications.	As required	Contractor
AQ15	Engines of plant parked next to sensitive receptors will be switched off when not in operation.	At all times	Contractor
AQ16	Refuelling will only occur in designated areas. Fuel and oil storage areas will be maintained and operated to minimise emissions to the atmosphere via leaks or spills.	As required	Contractor
AQ17	Dust monitoring gauges will be established, and ambient dust monitoring will be measured at sensitive receptors as prescribed in table 7-1. Monitoring shall be undertaken in accordance with AS/NZS 3580.	As required	Contractor
AQ18	Weather forecast will be reviewed on a daily basis and appropriate measures implemented where unfavorable weather conditions (dry weather, strong winds) are anticipated.	Daily	Contractor

Action Number	Mitigation / Management Action	Timing	Responsibility
AQ19	An onsite weather station will be established to record weather data. Rainfall at the premises will be measured and recorded in millimetres per 24-hour period at the same time each day from the time that the site office is established.	At all times	Contractor
AQ20	Dust control and procedures will be reviewed and modified if results exceed the air quality criteria and are attributable to construction activities.	At all times	Contractor
AQ21	All complaints relating to air quality (including dust emissions) will be recorded and managed in accordance with the complaints management protocol. Corrective action will be undertaken in accordance with the environmental management plan if the complaint is validated.	At all times	Contractor

1.5 Monitoring, Reporting and Review

Table 5: Monitoring, Reporting and Review Actions

Monitoring Action	Responsibility	Frequency	Performance Requirement	Potential Corrective Action
Weather Conditions	Contractor, Construction Manager	Daily	Planned activities suit prevailing weather conditions not causing excessive windblown dust	Review and planning of activities to suit prevailing weather conditions
Visual monitor for dust lift off	Contractor Workforce	Ongoing	Dust lift off is not travelling beyond boundary Suppressants or sealants are regularly applied	Increase application of suppressants or sealants Reduce vehicle speeds
Air Quality Monitoring	Contractor Environmental Team	Monthly at selected locations or in response to a complaint	Dust Deposition at Sensitive Place not exceeding 120mg/sqm/day (monthly avg) PM10 concentrations not exceeding daily 24-hour average of 50µg/m3 (max 5 days per year) PM2.5 concentrations not exceeding daily 24-hour average of 25µg/m3	Review methodology including dust management measures

Appendix B

Biosecurity Subplan

1.0 Biosecurity Subplan

1.1 Legislation and Guidelines

Requirements in relation to biosecurity include federal, state and local legislation, as detailed in the following sections.

1.1.1 Commonwealth Legislation

***Environment Protection and Biodiversity Protection Act 1999* (EPBC Act)**

Under the *EPBC Act*, the Commonwealth can, among other things, list key threatening processes, develop and implement threat abatement plans (TAPs) and outline recovery plans to manage and reduce the impact of invasive species. As defined by Department of Climate Change, Energy, the Environment and Water (DCCEEW), invasive species include diseases, fungi and parasites, feral animals, insects and other invertebrates, introduced marine pests and weeds.

Weeds

The Australian Weeds Strategy 2017–2027 (DAWR, 2017) outlines a coordinated strategy for weed management across Australia. It provides consistent guidance on weed management and identifies Weeds of National Significance (WoNS), which are nationally agreed priority plants for control and management. Thirty-two WoNS are outlined in the Australian Weeds Strategy 2017–2027 (DAWR, 2017). The strategy also addresses roles and responsibilities for weed management, outlining the various roles of government (national, state and local), industry and individuals in weed management.

Pest animals

The Australian Pest Animal Strategy 2017-2027 (DAWR, 2017) outlines a national strategy for the management of vertebrate animals in Australia. This strategy outlines that it is the landholder's responsibility to detect and report new occurrences of pest animals and manage pest animals on their own land. Landholders also have a responsibility to management pest animal problems on their own land and where relevant, plan pest animal management activities jointly with neighbours.

Biosecurity Act 2015

The federal *Biosecurity Act 2015* commenced on 16 June 2016. The *Biosecurity Act 2015* establishes a strong biosecurity system, which protect our way of life from the threat of exotic pests and diseases to our unique environment, the economy, our health and our agricultural industries.

The *Biosecurity Act 2015* has been designed to be flexible and responsive to changes in technology and biosecurity challenges. Being able to adapt quickly is important as international passenger travel and trade are growing and evolving every year.

1.1.2 *State Legislation*

Biosecurity Act 2014

The *Biosecurity Act 2014* commenced on 1 July 2016. It ensures a consistent, modern, risk-based and less prescriptive approach to biosecurity in Queensland.

The Act provides comprehensive biosecurity measures to safeguard our economy, agricultural and tourism industries, environment and way of life, from:

- diseases, viruses or parasites
- invasive animals or plants (e.g., pest animals or weeds)
- noxious fish
- insect pests.

Restricted matter is biosecurity matter found in Queensland and has a significant impact on human health, social amenity, the economy or the environment. Specific actions are required to limit the spread and impact of this matter by reducing, controlling or containing it. There are 7 categories or restricted matter. Category 1 and 2 restricted matter must be reported.

Category 1 restricted matter must be reported to an inspector within 24 hours.

Category 2 restricted matter must be reported to an inspector or authorised person within 24 hours.

1.2 Potential Impacts

1.2.1 Existing Environmental Values

Two introduced fauna species were observed during field surveys, with neither species considered a restricted matter under the *Biosecurity Act 2014*. Introduced species observed within the Survey Area include:

- Feral pigeon (*Columba livia*)
- Spotted dove (*Spilopelia chinensis*).

Other introduced fauna species likely to occur within the project area include cane toad (*Rhinella marina*), black rat (*Rattus rattus*), and house mouse (*Mus musculus*).

The Project site is not located within the SEQ Red Imported Fire Ant (RIFA) Biosecurity Zones. The nearest the Biosecurity Zone to the Project is the area surrounding the Brisbane Airport which is approximately 35km away.

A total of 24 out of the 90 flora species identified during the recent site survey were introduced species. Of this number, five were identified as Category 3 restricted invasive plants under the Queensland *Biosecurity Act 2014* and three of these are also recognised as WoNS. The Category 3 and WoNS plants are outlined below in Table 1.

Table 1: Restricted Invasive Flora Observed within the Survey Area

Introduced Flora Species	Category 3 *Biosecurity Act 2014*	WoNS
Asparagus aethiopicus	✓	✓
Lantana camara	✓	✓
Opuntia stricta	✓	✓
Senecio madagascariensis	✓	
Sphagneticola trilobata	✓	

1.2.2 Construction Impacts

Table 2: Construction Impacts

Activity	Potential Environmental Impact
Vehicle movements	Increased movement of people, vehicles, machinery, vegetation waste and soil may facilitate the spread of weeds at and near the Project Area.
	Increasing the prevalence of weeds at the Project Area (and potentially beyond to the surrounding landscape), may reduce the quality of habitats for some flora and fauna species, particularly by replacing native plants.
Construction activities	Vegetation clearing and soil disturbance allows seeds present in soil to germinate. Germination and plant growth for weeds is typically faster than for native species and this can lead to increased weed levels in disturbed areas and affect the ability for native vegetation to re-establish.
	There is also significant potential for weeds, either as seeds or other plant propagules, to be introduced to sites attached to dirty vehicles and equipment or to be contained in soil or seed mixes brought to the site. This can lead to increased levels of weeds already present on the site, or infestation by new weeds.

1.3 Performance Outcome

Performance outcomes for the project include:

- No marked increase or spread of weeds beyond pre-development conditions as a result of project activities.
- No unapproved biosecurity management activities.

1.4 Management Actions

Table 3: Mitigation and Management Actions

Action Number	Mitigation / Management Action	Timing	Responsibility
BY1	Site inductions for all staff are to include education sessions regarding the local weed and pests that may be present on the site and protocols required to be undertaken.	Prior to and during works	Contractor
BY2	Weed control will be undertaken in areas that are very heavily infested or where WONS or biosecurity matter declared under the *Biosecurity Act 2014* are present prior to disturbance.	Prior to and during works	Contractor
BY3	Vehicles and equipment are to be cleaned before being brought to site and inspected on entry to site. *Queensland Government Checklist for Clean down Procedures* (2000) to be followed for clean down and inspection.	Whenever vehicles or equipment are brought to site	Contractor
BY4	Soil stripped and stockpiled from areas containing known weed infestations, particularly of declared weeds, are to be stored separately and are not to be moved to areas free of weeds.	Ongoing	Contractor
BY5	All soil and materials of plant origin to be certified as weed free by the supplier and a biosecurity certification supplied	Whenever soil or plant materials are brought to site	Contractor
BY6	Disturbed topsoil and vegetative material will be returned as close as possible to the original sites in order to limit the potential spread of weeds and pathogens.	During rehabilitation	Contractor
BY7	Minimise vehicle movements on vegetated areas that may contain weed material, i.e., stay on established tracks/roadways.	During construction	Contractor
BY8	Conduct regular visual inspections of identified weeds and pest species. Pest and weed species identified shall be managed in accordance with DAF requirements to prevent their growth and proliferation.	During construction	Contractor

Action Number	Mitigation / Management Action	Timing	Responsibility
BY9	Weed control will be conducted as required.	Every 3 months during construction	Contractor
BY10	Prior to collecting topsoil from the stockpile, any weeds will be carefully scalped off the topsoil. If weeds are present, then the top 5cm deep weed-infected layer will be removed and to prevent its transfer to the rehabilitated areas.	During rehabilitation (includes temp works)	Contractor
BY11	Waste management measures should include containment of food scraps in securely sealed containers to prevent attracting pest species.	Prior to works and ongoing	Contractor

1.5 Monitoring, Reporting and Review

Table 4: Monitoring Actions

Monitoring Action	Responsibility	Frequency	Performance Requirement	Potential Corrective Action
Include weed and pest species in the pre-clearance survey and monitor weed species during construction	Contractor Environmental Team	Weekly	Weed levels in disturbed areas are similar to pre-clearing	Conduct a weed control program
Monitor pest animal numbers	Contractor Environmental Team	Weekly	No increase in pest animal occurrence	Conduct a pest animal control program. Sighting Register

Appendix C

Cultural Heritage Subplan

1.0 Cultural Heritage Subplan

1.1 Legislation and Guidelines

Protection of Aboriginal cultural heritage is largely achieved through the Queensland *Aboriginal Cultural Heritage Act 2003* which establishes a duty of care in relation to managing impacts on items and places of Aboriginal cultural heritage significance.

Legislation protecting non-Indigenous cultural heritage is as follows:

- The EPBC Act, administered by the Department of Climate Change, Energy, the Environment and Water (DCCEEW) protects listed national heritage places.
- The *Queensland Heritage Act 1992* (QH Act), administered by the DES identifies and protects places of state heritage significance. It applies to discovery and protection of any previously unidentified archaeological artefacts or archaeological places.

The Charter for the Conservation of Places of Cultural Significance (The Burra Charter) 1977 is used to define cultural significance in Queensland and derives its philosophical principles from the International Council on Monuments and Sites (ICOMOS).

1.2 Potential Impacts

1.2.1 Existing Environmental Values

The Project is located within the Kabi Kabi First Nation Traditional Owners Native Title Claim Group (QC13/03 – QUD280/2013) (Kabi Kabi People). A cultural heritage assessment report has been prepared by Converge Heritage consultants on behalf of Moreton Bay Regional Council. One DATSIP registered shell midden site was found in the vicinity of the project area on the southern side of Wrights Creek to the west of the tidal drainage line in front of the parkland. Refer to Figure 1 below.

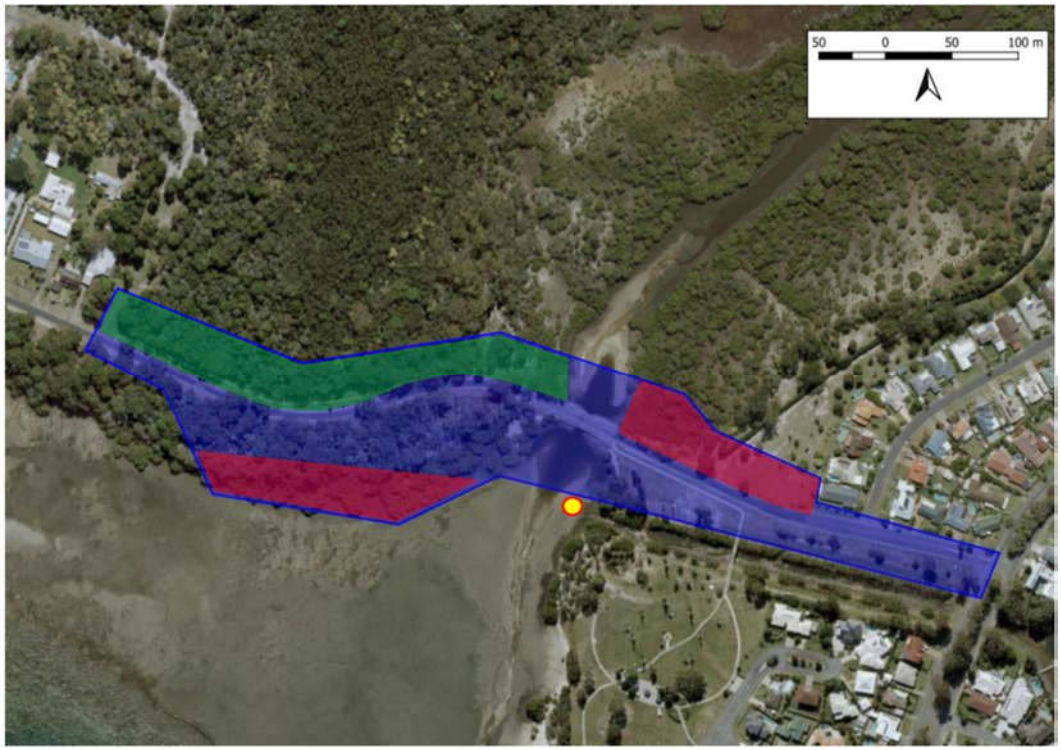


Figure 1: Location of DATSIP registered site (Source: White Patch Esplanade Causeway Upgrade – Aboriginal Cultural Heritage Assessment, Converge Heritage and Community, May 2022)

1.2.2 Construction Impacts

It is not anticipated based on the current design that the DATSIP registered site located on the southern bank of Wrights Creek will be disturbed by the project. However, there is potential for the disturbance of previously unknown cultural heritage items during construction such as the discovery of surface materials and sub-surface material in the form of shell middens, isolates, and low-density artefact scatters. Table 1 outlines the construction activities and subsequent impact.

Table 1: Potential Cultural Heritage Impacts

Activity	Potential Cultural Heritage Impact
Vegetation clearing and ground disturbance	Vegetation clearing and ground disturbance will disturb and potentially destroy artefacts The contextual setting of artefacts will also be effectively destroyed by ground disturbance
Disturbance and erosion of streams and drainage lines	Erosion may expose artefacts on stream banks and drainage lines, with subsequent loss to downstream environments

1.3 Performance Outcomes

Performance outcomes for the project include:

- Protection of aboriginal items of significance
- Previously unknown sites of indigenous and non-indigenous cultural heritage significance are identified, reported and protected.

1.4 Mitigation and Management Actions

Table 2: Mitigation and Management Actions

Action Number	Mitigation / Management Action	Timing	Responsibility
CH1	Site inductions for all staff are to include education sessions regarding Cultural Heritage. Undertake Unexpected Finds awareness training sessions with personnel	Prior to and during works	Contractor
CH2	In the event that an inadvertent find of potentially significant cultural heritage material is made cease work and notify Supervisor / Environmental Team – Refer Unexpected Finds Procedure. Moreton Bay Regional Council Cultural Heritage Officer shall be notified as soon as practicable to inform the Kabi Kabi Traditional Owner Group representatives.	As required	Contractor
CH3	Manage unexpected cultural heritage finds in accordance with the Unexpected Finds Procedure: • Stop work arrangements in the vicinity of suspected finds – establishment of buffer zones etc. • Notification to the relevant Aboriginal party and Aboriginal party assessment of the find With regard to the discovery of human remains, referrer to DATSIMA's guidelines, *The Discovery, Handling and Management of Human Remains under the Provisions of The Aboriginal Cultural Heritage Act 2003 And Torres Strait Islander Cultural Heritage Act 2003*.	As required	Contractor
CH4	Where required by agreements with Traditional Owner groups, monitors may be required for ground disturbance works including clearing and grubbing, topsoil stripping, earthworks and works within and adjacent to waterways.	As required	Contractor

1.5 Monitoring, Reporting and Review

In the event that a significant non-indigenous cultural heritage place or item is identified, monitoring requirements shall be developed in consultation with relevant stakeholders.

Table 3: Monitoring, Reporting and Review Actions

Monitoring Action	Responsibility	Frequency	Performance Requirement	Potential Corrective Action
CH Monitors to be present onsite during ground disturbance activities	Contractor Environmental Team	As required	Representatives of TO Group onsite	Coordinate with MBRC CH Officer
Previously unknown CH items observations	Contractor Environmental Team	During construction	Reporting of previously unknown items	Coordinate with MBRC CH Officer

Appendix D

Erosion and Sediment Control Subplan

Appendix E

Flora and Fauna Sub Plan

1.0 Flora and Fauna Subplan

1.1 Legislation and Guidelines

Terrestrial and aquatic ecosystem values are protected by Federal and State legislation. The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) provides protection for matters of national environmental significance including listed threatened species, listed migratory species and threatened ecological communities.

The *Vegetation Management Act 1999* (VM Act) protects remnant native vegetation and approval is required to clear this. Endangered and of concern vegetation must be offset under this Act.

In Queensland, the *Nature Conservation Act 1992* (NC Act) also provides a framework for protecting all native plants and animals including threatened species, breeding places and habitat.

Queensland *Biosecurity Act 2014* (Biosecurity Act) identifies declared pest plant and animal species and provides for their control. The Biosecurity Act imposes a legal responsibility on all landowners to control declared species on their land (subject to certain conditions).

The *Fisheries Act 1994* (Fisheries Act) protects fish and fish habitat. Matters regulated by the Fisheries Act include maintaining fish passage and creating a waterway barrier, and an approval is required for raising a waterway barrier unless codes can be complied with. Additionally, the act protects marine vegetation such as mangroves. There may be an offsets requirement under this Act which must be complied with regarding clearing of marine vegetation.

1.2 Potential Impacts

1.2.1 Existing Environmental Values

The Project Area incorporates four (4) distinct vegetation communities including:

- Eucalypt and Corymbia dominated open forest or woodland on sandy soils (0.18 ha)
- Grey mangrove low closed forest to shrubland (<0.1 ha)
- Intertidal mudflats (0.12 ha)
- Non-remnant regrowth vegetation and mown park (0.93 ha)

Field surveys were undertaken to confirm the presence of prescribed Matters of National Environmental Significance (MNES) and Matters of State Environmental Significance (MSES) and are presented in Tables 1 and 2 respectively.

MNES potentially occurring within the project area include the RAMSAR Wetlands of International Significance (RAMSAR), threatened flora and fauna, and threatened migratory species which may utilise the area.

Three of the four listed threatened species deemed likely to occur are shorebirds including the Beach Stone-Curlew, White-Throated Needletail and Eastern Curlew. These species are birds that utilise the mudflat / sandbank tidal zones in Pumicestone Passage for foraging. Whilst the design options do not extend significantly further to the west into the large areas of sandbanks, the population is likely to come close to the project site intermittently when foraging. The long-term loss of foraging area is likely to be minor, however there may be some disturbance of migratory birds depending on the time of year.

The other listed threatened species that has been assessed as likely to occur is the grey headed flying fox. Although no roosting sites are present in the area, the vegetation on the northern side of the crossing may be used as foraging occasionally so there is potential for minor impacts if these trees are removed.

Table 1: Summary of MNES

Prescribed MNES	Presence in Survey Area
Wetlands of International Importance (Ramsar)	Moreton Bay Wetland occurs within the project Area
Listed Threatened Species	Field surveys identified four (4) species likely to occur: • *Esacus magnirostris* (Beach Stone-Curlew) • *Hirundapus caudacutus* (White-Throated Needletail) • *Numenius madagascariensis* (Eastern Curlew) • *Pteropus poliocephalus* (Grey-headed Flying-fox) A further ten (10) species may occur within the project Area
Listed Migratory Species	Field surveys of the vegetation communities and habitat types identified nine (9) species likely to occur within the project area and sixteen (16) species that may occur within the project area.

Table 2: Summary of MSES

Prescribed MSES	Presence in Project Area
Regulated Vegetation – Regional Ecosystems	Present either side of Wrights Creek within the project area.
	Areas of prescribed regional ecosystems that are also considered essential habitat for threatened species occur within the project area.
Marine Plants	Marine plants species below the Highest Astronomical Tide (HAT) are present within the project area
Wetlands and watercourses - Wetland protection area - Wetlands of high ecological significance	Estuarine - Mangroves and related tree communities Estuarine – water Coastal/ Sub-Coastal non-floodplain tree swamps (Melaleuca and Eucalypt) Artificial/ highly modified wetlands (dams, ring tanks, irrigation channel
	Present either side of Wright Creek to the north of White Patch Esplanade.
Protected Areas – National Park	Bribie Island National Park is present to north of White Patch Esplanade within the Survey Area
Fish habitat areas and highly protected zones of state marine parks	Moreton Bay Marine Park (Pumicestone Channel-Godwin Beach) occurs within the Project area
Waterways proving for fish passage	Wrights Creek and Pumicestone Passage are both classed as tidal waterways that provide for fish passage.

Prescribed MSES	Presence in Project Area
Protected wildlife habitat	Protected wildlife habitat occurs within the project area for multiple species including: • Water mouse (*Xeromys myoides*) • Regent honeyeater (*Anthochaera Phrygia*) • Eastern curlew (*Numenius madagascariensis*) • Great knot (*Calidris tenuirostris*) • Western Alaskan bar-tailed godwit (*Limosa lapponica*) • Red knot (*Calidris canutus*) • Curlew sandpiper (*Calidris ferruginea*) • Lesser sand plover (*Charadrius mongolus*) • Greater sand piper (*Charadrius leschenaultia*)

1.2.2 Construction Impacts

Table 3: Potential Construction Impacts

Activity	Potential Environmental Impact
Vegetation clearing and earthworks	• Loss of native plants and vegetation communities • Loss of low-grade habitat for native animals, including some threatened species • Injury or mortality to native animals • Proliferation of weeds and pests • Sedimentation of waterways • Landscape fragmentation, reduction in connectivity and reduced capacity for fauna dispersal • Degradation of adjacent habitat due to dust deposition, changes in overland flow regimes, exposure of edges to sunlight and increased predation
Construction within the waterway	• Loss of aquatic habitat for aquatic flora and fauna • Degradation of aquatic habitat and riparian zones • Aquatic fauna mortality • Reduced local availability of habitats associated with natural and artificial water bodies • Sedimentation of waterways • Temporary waterway barriers for fauna movement • Disturbance of marine vegetation
General site activities	Intermittent noise and light impacts on local fauna

1.3 Performance Outcomes

Performance outcomes with respect to flora and fauna include:

- No unapproved loss in biodiversity values over and above those impacts permitted through project approvals.
- No vegetation clearing outside the specified, pre-approved boundaries where practicable and in allowance for safe construction working.
- Minimise injury or death of wildlife.
- No increase in level of weed and pest infestation as a result of construction activities for the Project.
- Waterway habitats are not degraded by sediment deposition, scouring or water quality degradation.

- Waterway flow changes remain within natural fluctuations.

1.4 Mitigation and Management Actions

Table 4: Mitigation and Management Actions

Action Number	Mitigation / Management Action	Timing	Responsibility
FF1	Site inductions for all staff are to include information regarding the local fauna and flora that may be present on the site and protocols to be undertaken if fauna are encountered. The Site induction must cover relevant vegetation protection as well as fauna interaction rules including information on protection species listed under the EPBC Act.	Prior to and during works	Contractor
FF2	Pre-clearance surveys will be undertaken in areas identified as potential habitat for threatened species, prior to commencement of clearing. During pre-clearance surveys, habitat features that may be used by fauna for nesting or shelter will be marked (e.g., hollow-bearing trees, log piles) and thoroughly checked by a fauna spotter-catcher prior to vegetation clearing commencing.	Prior to Clearing	Contractor
FF3	Vegetation clearing will be undertaken in a sequential manner to allow mobile fauna to disperse away from clearing areas. Prior to clearing, all demarcated habitat features will be checked for fauna by a fauna spotter-catcher and at-risk species will be relocated. A licensed spotter/catcher must be onsite at all times during clearing.	Prior to and during works	Contractor
FF4	Vegetation clearing activities will, where possible, seek to avoid alteration to waterways such that the impacts to water quality and downstream flows are minimised to the greatest extent possible. Dust suppression activities to be undertaken where appropriate.	Prior to and during works	Contractor
FF5	Design and layout of the temporary and permanent structures and infrastructure within the construction footprint (including construction areas, such as site offices, construction stockpile locations, machinery/equipment laydown areas and storages) will as far as possible avoid areas of remnant vegetation (in particular endangered, of concern and threatened REs) and make use of previously cleared, non-remnant land.	Prior to works	Contractor
FF6	In the event that native animals are injured a local wildlife carer or vet shall be contacted to assist with animal welfare.	/ During Construction	Contractor

Action Number	Mitigation / Management Action	Timing	Responsibility
FF7	Locate lighting systems to minimise light spill into fauna sensitive areas of native vegetation and the Pumicestone Passage sandflats including: • Directional lighting and shields e.g., upward glow • Sensitive placement and specification of lighting • Minimise security lighting	During Construction	Contractor
FF8	The boundary of the project clearing footprint will be clearly marked on site. Any areas outside of this boundary will be designated as 'no go' zones. All personnel involved shall be made aware of the clearing limits.	Prior to and during works	Contractor
FF9	Work areas are to be checked regularly for fauna that may have entered the work area or become trapped and fauna are to be relocated. Management of work areas should seek to avoid attracting fauna. All vehicles and plant will adhere to designated tracks/roads to avoid unnecessary habitat impacts and will adhere to site rules relating to speed limits to minimise potential for roadkill.	During Works	Contractor
FF10	Undertake progressive rehabilitation of disturbed areas. Rehabilitation shall be conducted as per the project revegetation plans. Species to be used shall be compatible with the ecological communities within the project site. E.g., marine plants, remnant open forest to woodland vegetation dominated by *Corymbia intermedia, Lophostemon confertus* and locally dominant *Callitris columellaris*	During Works and Ongoing	Contractor
FF11	All injured animals are to be reported to the Project Environmental Manager / Officers immediately.	During Construction	Contractor
FF12	No pet animals will be allowed to be brought to the construction site.	During Construction	Contractor
FF13	Where salvage of fish and aquatic fauna is required, it shall be undertaken in accordance with the DAF Fish Salvage Guidelines.	During Construction	Contractor
FF14	No Construction employee on the project shall intentionally damage or injure native flora or fauna respectively.	During and Post Construction	Contractor
FF15	Fauna are not to be fed by project construction employees.	During and Post Construction	Contractor

Action Number	Mitigation / Management Action	Timing	Responsibility
FF16	Cleared material will be mulched for rehabilitation and revegetation works on-site. Larger vegetation materials like hollow logs and hollow bearing trees will be reused in rehabilitation activities where possible or in adjoining bushland to provide habitat for fauna	During and Post Construction	Contractor

1.5 Monitoring, Reporting and Review

Table 5: Monitoring, Reporting and Review Actions

Monitoring Action	Responsibility	Frequency	Performance Requirement	Potential Corrective Action
Undertake Fauna Pre-Clearing Surveys	Contractor	Pre-Construction	Preclearing survey by spotter / catcher prior to clearing	
Monitoring during clearing	Contractor	During clearing	Spotter / catcher onsite during clearing activities	
Monitor fauna death/injury statistics.	Contractor Environmental Team	Ongoing	No particularly high occurrences of animal death/injury	Provide fauna crossing or other control to protect animals from harm.

Appendix F

Hazardous Substances Subplan

1.0 Hazardous Substances Subplan

1.1 Legislation and Guidelines

1.2 Potential Impacts

Hazardous materials to be transported, stored and handled during construction of the Project are to be properly managed both to minimise risk to health and to avoid environmental impact on the land and to the surrounding communities.

1.2.1 Construction Impacts

The impacts that may arise during construction consist primarily of:

- Ground or water contamination due to accidental spills or leaks
- Health impact due to long-term exposure of chemicals; and
- Fire or explosion involving the use and storage of hazardous substances.

Prior to the commencement of construction, the Contractor will prepare a Spill Response Procedure which will be utilised on site for all activities.

1.3 Performance Outcome

Performance outcomes for the project with respect to hazardous chemicals include:

- Prevent release of contaminants into soil, groundwater or surface water as a result of construction activities.
- No incident resulting from inappropriate storage and handling of hazardous substances, including no release of hazardous substances to land, water or air.

1.4 Management Actions

Table 1: Mitigation and Management Actions

Action Number	Mitigation / Management Action	Timing	Responsibility
HS1	Site inductions for all staff are to include education sessions regarding the storage and handling of hazardous substances.	Prior to and during works	Contractor Project Manager
HS2	Design all fuel storages (including tanks and bunds) to meet the requirements of *AS 1940: The Storage and Handling of Flammable and Combustible Liquids.*	Temporary Works Design	Contractor Construction Manager
HS3	Activities involving oils will be undertaken on a hard stand area, and drip trays will be provided during transfer operations. Controls and management procedures will be adopted for servicing of machinery.	Prior to and during works	Contractor Construction Manager
HS4	A Spill Response Plan will be prepared and incorporated into an incident response plan, including requirements for spills to be reported, contained and cleaned. The plan will include actions to be taken for both land based and water-based spill scenarios. All staff shall be trained in spill response procedures.	Prior to Construction	Contractor Environmental Team
HS5	Major routine servicing of plant and equipment will not be undertaken onsite. Minor servicing that is required will be conducted 50m from the waterway. In certain circumstances where this is not possible a temporary bund shall be used on the ground to capture spills.	At all times	Contractor
HS6	Refuelling of plant and equipment will be conducted 50m from the waterway. In certain circumstances where this is not possible a temporary bund shall be used on the ground to capture spills.	At all times	Contractor
HS7	A floating boom shall be established around the temporary works areas in the waterway. This shall be placed around the outside of the work zone on each bank. The floating boom shall not extend across the entire waterway. The boom may be incorporated as part of a sediment curtain.	Prior to and during all works in waterways	Contractor

Action Number	Mitigation / Management Action	Timing	Responsibility
HS8	As part of the spill response plan, spillages will be prevented from entering drains or water courses and absorbent material will be placed on spillages which will be collected for disposal and any contaminated soil removed for treatment and disposal. A licensed contractor will be used for disposal of spilled waste oil and clean-up material.	Ongoing	Contractor Environmental Team
HS9	• If contamination occurs as a result of the Project, including the potential for the disturbance of a previously contaminated site, then management will be carried out in accordance with the contaminated land provisions of the EP Act, National Environment Protection (Assessment of Site Contamination) Measure 1999 (NEPM, 1999) and the Land and Soil Subplan (Appendix G of this CEMP). Advice shall be sought from a Suitably Qualified Person (SQP) as recognized by the QLD Department of Environment and Science (DES)	Ongoing	Contractor Project Manager
HS10	In the event of a small to medium spill (up to 100 L) • Don appropriate PPE (for diesel and oil spills, this shall include long sleeved shirts and trousers made of cotton, plastic or rubber gloves, boots) • If safe to do so, shut off source of spill • If safe to do so, use spill kit materials to contain the spill and place absorbents over the spilt material • If spill kit is not available, use available materials to contain the spill from flowing across the ground • Contact the supervisor for further assistance • Place all contaminated material in plastic bags and clearly label as hydrocarbon contaminated material • Environmental manager/officer to advise if soils are to be bio remediated or disposed of • Place all hydrocarbon contaminated material awaiting disposal in designated waste storage area and clearly label • Environmental manager/officer to arrange for disposal permits if required Complete incident investigation and report as per EMS requirements.	Ongoing	Contractor Superintendent
HS11	In the event of a large spill: • Don appropriate PPE (for diesel and oil spills, this shall include long sleeved shirts and trousers made of cotton, plastic or rubber gloves, boots) • If safe to do so, shut off source of spill • If safe to do so, use available spill kit or other material to contain material to stop overland flow. For very large spills, if earthmoving equipment is available this may be used to raise a bund downslope of the spill area. • Remove all potential ignition sources and prevent traffic from entering the area • Contact the environmental officer and/or supervisor for further assistance. • Environmental manager to determine further clean up requirements and methods • Environmental officer to discuss with Environmental Manager whether notification under EP Act is required. • Place all hydrocarbon contaminated material awaiting disposal in designated waste storage area and clearly label	Ongoing	Contractor Superintendent

Action Number	Mitigation / Management Action	Timing	Responsibility
	• Environmental officer to arrange for disposal permits if required Complete incident investigation and report as per EMS requirements.		
HS12	Conduct a risk assessment and approval process along with an SDS register for all chemicals and substances proposed to be utilized on the project prior to use.	As required	Contractor HSE Team

1.5 Monitoring, Reporting and Review

Table 2: Monitoring, Reporting and Review Actions

Monitoring Action	Responsibility	Frequency	Performance Requirement	Potential Corrective Action
Soil and water testing as required to follow up a particular incident of contamination	Contractor Environmental Team	As required	Soil and groundwater contamination levels are within current guidelines	Further remediation as required until guideline levels are met
Regular inspection of site for spills	Contractor Environmental Team	Refer to inspection requirements	As per checklist	As required to achieve performance requirements in checklists
Inspection of appropriate practices of Handling, Storage and Dispensing of Substances	Contractor Construction Manager	As required	Performance Requirement contained in this CEMP	Identification of non-compliance, modify practice

Appendix G

Land and Soil Management Subplan

1.0 Land and Soil Management Subplan

1.1 Legislation and Guidelines

Legislation and policies that apply to acid sulfate soils (ASS) in Queensland include the *Environmental Protection Act 1994*, *Planning Act 2016* (including the *State Planning Policy 2017*), *Fisheries Act 1994* and the *State Development and Public Works Organisation Act 1971*. The Queensland Acid Sulphate Soils Technical Manual provides guidance on the investigation, management and treatment of acid sulphate soils.

The legislative requirements covering contamination of land in Queensland are primarily contained in the EP Act and subordinate legislation. The EP Act is administered by DES.

The EP Act contains a number of provisions in relation to the investigation, management and remediation of contaminated land. If notices are received from DES in regard to contaminated land, these notices must be complied with.

In Queensland, acceptable and unacceptable contaminant levels are set in:

- *National Environment Protection (Assessment of Site Contamination) Measure 1999*
- *Queensland Auditor Handbook for Contaminated Land Module 5: Auditor's functions*
- *Queensland Auditor Handbook for Contaminated Land Module 6: Content requirements for contaminated land investigation documents, certifications and audit reports*

It is an offence under the EP Act to remove soils from a site listed on the CLR or EMR without a permit.

1.2 Potential Impacts

1.2.1 Existing Environmental Values

Bribie Island is a large sand island separated from the mainland by Pumicestone Passage. Across the project there is negligible change in elevation along the length of the area. At the most western point the elevation is 5 mAHD, lowering to 1.8 mAHD at the most eastern extent of the project area, which measures approximately 710m from west to east.

The project area is within a unit mapped as low-lying coastal plain consisting of freshwater swampland behind the modern beach dunes, mud flats and saline marshes. The chief soils are acid peats of the swamplands, with subsoil consisting of coarse sands and leached sands. The project waterway area is surrounded by tidal sand and mudflats.

Investigations recently undertaken by Unity Water indicated that the project area consists of sand in the form of alluvium or coffee rock down to 15m (Geotechnical & Acid Sulfate Soils Investigation Report – Watermain Replacement White Patch Esplanade, Bribie Island, Core Consultants, May 2022).

The presence of acid sulfate soils was confirmed through recent testing undertaken on behalf Unity Water in the vicinity of the project. Three boreholes were located along the White Patch Esplanade corridor either side of the crossing but not within Wrights Creek. Testing indicated that either existing acidity or potential acid sulfate soils were consistently present below 2-3m in all locations down to 15m. (Geotechnical & Acid Sulfate Soils Investigation Report – Watermain Replacement White Patch Esplanade, Bribie Island, Core Consultants, May 2022).

Contamination of soil affects the viability of the soil resource. Disturbance of contaminated soil, or contamination of soil also has potential to impact on a surface water quality, groundwater resources and aquatic ecosystem values.

1.2.2 Construction Impacts

Topsoil will be stripped during construction and stockpiled for reuse during revegetation and landscaping of areas temporarily disturbed by construction activities. A number of activities during construction have potential to increase the risk of erosion, including:

- Clearing of vegetation
- Topsoil stripping and stockpiling
- Earthworks
- Construction during high rainfall events

Some chemical and physical properties of soils will restrict plant growth and may impact success of progressive rehabilitation. Such limiting properties include elevated sodicity, salinity, acidity and high alkalinity. Compaction of soils during construction works may affect physical and chemical properties of the soil resource. Compaction increases soil density, reduces hydraulic conductivity and surface water infiltration. Incidental compaction and settlement of soils within the Project Area may occur during construction due to the movement of vehicles and machinery.

Due to the location of the Project Area, it is likely that Potential or Actual Acid Sulfate Soils will be encountered during the construction of the Project. The sampling conducted by Core Consultants for Unity Water confirmed the presence of actual acidity and potential acid sulfate soils for alluvium sands in the vicinity of the project. It would be reasonable to assume that this would be consistent with the final alignment of the crossing structure. Further sampling and assessment of the soil and substrate onsite shall be undertaken as part of the geotechnical investigations during the design phase.

If the results determine that presence of these soils and they are to be disturbed, further management shall be undertaken as per the Queensland Acid Sulphate Soils Technical Manual (v4.0 2014). Where possible these soils should be avoided through design of the structure. Where disturbance is unavoidable the preferred management strategies are:

- Minimisation of disturbance
- Neutralisation
- Hydraulic separation of sulfides
- Strategic reburial

The potential impacts of land contamination may arise in two ways. First, construction activities may increase human exposure to pre-existing contaminants, or mobilise contaminants to surface water or groundwater. Second, construction activities may release contaminants into soils, causing soil contamination.

Soil contamination then has a number of flow on effects, including:

- Acute or chronic toxicity effects on humans and animals that come into contact with the soil, including where contaminated soil becomes windblown. Contaminated soil guidelines generally focus on whether or not levels of particular contaminants might be high enough to cause toxic effects.
- Inhibition of plant growth, and death of existing plants in contaminated areas.
- Mobilisation of contaminants by overland flows to surface watercourses. This in turn may lead to acute or chronic toxicity effects to aquatic organisms and to contamination of water supplies.
- Contaminants in watercourses may be deposited in sediment on the bed of the watercourse, resulting in sediment contamination. Subsequent flow events may re-mobilise sediments into the water columns, and contaminated sediments may also inhibit aquatic plant growth.
- Mobilisation of contaminants to groundwater, which in turn may lead to contamination of groundwater supplies. In high permeability aquifers, contaminant plumes may be conveyed over considerable distances.

The following activities may risk spillage and consequent contamination of soil, groundwater or surface water during construction:

- Storage, handling, transportation and disposal of substances, bulk fuels and oils
- Refuelling by mobile fuel trucks
- Storage and handling of fertilisers and soil ameliorants

- Storage and handling of other chemicals and hazardous materials such as chemicals for water treatment, cleaning products, solvents and degreasers
- Operation of equipment such as breakage of hydraulic hoses

It is not intended that the Project will lead to land contamination requiring registration in the CLR or EMR. Any Notifiable Activities under Schedule 3 of the EP Act, such as the storage of hazardous material associated with the Project will be reported to DES.

1.3 Performance Outcomes

The performance outcomes relating to land and soil management include:

- Topsoil and subsoil resources are adequately recovered, stockpiled and biological and physical viability maintained to support the remediation of temporarily disturbed areas.
- Minimise soil loss occurring due to construction practices, through implementation of appropriate erosion control practices.
- Prevent release of contaminants into soil as a result of construction activities. Avoid the disturbance of acid sulphate soils

1.4 Management Actions

Table 1: Mitigation and Management Actions

Action Number	Mitigation / Management Action	Timing	Responsibility
SL1	Site inductions for all staff are to include education sessions regarding soils, erosion and sediment control	Prior to and during works	Contractor Project Manager
SL2	Identify a suitable location or locations for infrastructure placement and topsoil stockpiling. The area should not be subject to significant overland flow, or flow should be diverted around the area. Risk of accidental disturbance should be minimised. Infrastructure placement should: • Design and implement appropriate ESC measures. • Minimise the amount of vegetation removed. • Restrict vehicle movement to designated tracks. • Protect exposed areas as soon as possible following disturbance by re-establishing vegetation, applying a protective mulch to the surface on level to gently sloping areas, covering smaller areas and steeply sloping areas with geo-fabric or sprayed with a polymer to bind the soil.	Prior to and during works	Contractor Project Manager
SL3	Prepare an Erosion and Sediment Control Plan (ESCP) in accordance with the *Best Practice Erosion and Sediment Control Manual* (IECA, 2008) and implemented for the Project area prior to the commencement of site works Design of all drainage around proposed structures and permanent landforms should consider the presence of erodible and dispersive soils and apply suitable erosion reduction methods. Minimise the area to be disturbed. All disturbed areas should be revegetated, or protected from erosion using suitable erosion control measures;	Prior to and during works	Contractor Construction Manager / Environmental Team
SL4	Depth of topsoil placement should be the same as the depth stripped	Prior to and ongoing	Contractor Environmental Team
SL5	Cleary identify, mark out areas and communicate depths for stripping to machinery operators. Delineate no-go areas	Prior to and ongoing	Contractor Construction Manager

Action Number	Mitigation / Management Action	Timing	Responsibility
SL6	Place topsoil in stockpiles no more than 1.5m in height and with side slope steepness depending on the nature of the topsoil such that stockpiles do not fail.	Prior to and ongoing	Contractor Construction Manager
SL7	If stockpiles are to remain in place for more than 1 month, stabilise in accordance with the Erosion and Sediment Control Plan.	Prior to and ongoing	Contractor Construction Manager
SL8	Replace topsoil in any disturbed areas that are not required after construction and seed with grass or other species as determined through rehabilitation trials.	Prior to and ongoing	Contractor Construction Manager
SL9	Temporarily disturbed areas will be stabilised as soon as practical by reinstating topsoil and subsoil and compacting replaced soils.	Ongoing	Contractor Construction Manager
SL10	Implement Erosion and Sediment Control measures consistent with the practices described in the International Erosion Control Association (IECA), *Best Practice Erosion and Sediment Control Guideline*, 2008. Erosion and Sediment Control Plans must be certified by a certified Soil Conservationist (Certified Practicing Erosion and Sediment Control Specialist).	Prior to and ongoing	Contractor Construction Manager
SL11	Potential runoff and sediment loading of water courses. Erosion and runoff during construction will be minimised by • Implement appropriate measures, as designed for the site. • Minimise the amount of vegetation clearing, clear progressively if possible. Site rehabilitation to be carried out progressively following disturbance and as soon as possible following disturbance.	Prior to works and ongoing	Contractor Superintendent
SL12	Acid Sulfate Soils Prepare an acid sulfate soils management plan aligned to the Queensland Acid Sulfate Soils Technical Manual and manage any ASS/PASS in line with this plan.	Prior to works and ongoing	Contractor Construction Manager
SL13	If contamination occurs as a result of the Project, including the potential for the disturbance of a previously contaminated site, then management will be carried out in accordance with the contaminated land provisions of the EP Act, National Environment Protection (Assessment of Site Contamination) Measure 1999 (NEPM, 1999) Broadly, the management measures will include: • A site contamination assessment (SCA) will be undertaken in accordance with the National Environment Protection (Assessment of Site Contamination) Measure 1999 (NEPM, 1999)	Ongoing	Contractor Project Manager

Action Number	Mitigation / Management Action	Timing	Responsibility
	• Management and remediation will adhere to a Site Management Plan or Remediation Action Plan as prepared and certified by a specialist consultant and third-party auditor as prescribed under Chapter 7 of the EP Act. • Validation sampling will be conducted to verify that remediation is successful		

1.5 Monitoring, Reporting and Review

Table 2: Monitoring, Reporting and Review Actions

Monitoring Action	Responsibility	Frequency	Performance Requirement	Potential Corrective Action
Visual inspection of topsoil stockpile areas	Environmental Manager	In high wind conditions	Minimal dust lift off	Rectify existing and re-design/re-apply control measures if necessary Apply water Seed stockpiles if necessary
Visual inspection of topsoil stockpile areas	Environmental Manager	Monthly and after rainfall (>10mm)	Stockpiles are intact and not slumping Management requirements in topsoil register have been implemented Stockpiles greater than 6 months have been seeded Vegetation cover is healthy (where required) No sign of erosion	Reshape stockpiles Apply seed to stockpiles Apply water
Visual inspection for erosion and signs of sediment mobilisation off site	Environmental Manager	Monthly and after rainfall (>10mm)	Sediment loads and dirty water runoff from construction a site is being adequately captured and attenuated by control measures as designed	Correct, fix and re-design ESC measures if required
Visual inspection of progressively rehabilitated areas	Environmental Manager	Weekly	Erosion and sediment controls are functioning as designed, no visible signs of soil loss form rehabilitated areas	Correct, fix and re-design ESC measures if required

Monitoring Action	Responsibility	Frequency	Performance Requirement	Potential Corrective Action
			Planted vegetation is successfully established and providing the required level of cover as outline within the Rehabilitation Management Plan Works in accordance with Appendix F	Re-apply fertiliser and other ameliorants and re-seed areas of poor germination. Hydro mulch on steeper slopes Irrigate re-seeded areas if necessary
Visual inspection for signs of contamination or acid sulphate soils	Contractor	During excavation	Unusual material to be reported to Client Representative	Manage as per State regulatory requirements and SQP advice

Appendix H

Noise and Vibration Subplan

1.0 Noise and Vibration Subplan

1.1 Legislation and Guidelines

Ambient and environmental noise is managed through a framework established under the EP Act:

- The EP Act includes general objectives in relation to preserving environmental values in relation to air quality
- Under the EP Act, the Environmental Protection (Noise) Policy (EPP Noise) is established and sets out objectives in relation to ambient noise levels and the acoustic environment
- Under the EP Act, an environmental authority is required to undertake environmentally relevant activities, including a range of activities that may cause noise emissions. In issuing an environmental authority, the regulator must have regard to the extent to which the activity meets the objectives established under the EPP Noise. The environmental authority will then contain conditions in relation to noise.
- The EP Act also contains some requirements in relation to noise nuisance.

Occupational exposure to noise is managed through the Work Health and Safety Act 2011 and is not discussed further in this CEMP.

1.2 Potential Impacts

1.2.1 Existing Environmental Values

The project area is primarily bordered by natural areas such as Pumicestone Passage to the west and moderate to dense vegetation to the north. Residential development areas are located to the southeast of the project, as shown in Figure 1. White Patch Esplanade traverses through the project area which connects the suburbs of White Patch to Banksia Beach.

There are no significant point sources of noise and vibration in the vicinity of the project site with background levels generally being considered low. Existing noise at the study area consists primarily of:

- vehicle traffic movements on White Patch Esplanade.
- fauna.
- recreational activities in Pumicestone Passage such as boating; and
- other intermittent urban sources from residential and parkland areas (e.g., lawn mowing).

Environmental values for the acoustic environment that are to be protected or enhanced are established in the EPP Noise as follows:

a. the qualities of the acoustic environment that are conducive to protecting the health and biodiversity of ecosystems; and
b. the qualities of the acoustic environment that are conducive to human health and wellbeing, including by ensuring a suitable acoustic environment for individuals to do any of the following—
    i. sleep.
    ii. study or learn.
    iii. be involved in recreation, including relaxation and conversation; and
c. the qualities of the acoustic environment that are conducive to protecting the amenity of the community.

Protected areas identified under the *Nature Conservation Act 1992* are classed as sensitive receptors; the closest protected area under the NC Act to the Project is Bribie Island National Park, which is immediately adjacent to the project area.

The existing noise environment is consistent with the quiet residential setting.

Figure 1: Sensitive Receptors

1.2.2 Construction Impacts

Table 1: Noise and Vibration Potential Environmental Impacts

Activity	Potential Environmental Impact
Civil works during construction	Disturbance (noise) to sleep, social activities, work activities Disturbance (noise) of native fauna
Heavy equipment operation	Disturbance (noise) to sleep, social activities, work activities Damage to infrastructure (vibration) Discomfort to human beings (vibration) Disturbance (noise) of native fauna
Pile driving, rock breaking	Disturbance (noise) to sleep, social activities, work activities Damage to infrastructure (vibration) Discomfort to human beings (vibration) Disturbance (noise) of native fauna

Table 2 details the construction noise criteria, as prescribed in the Transport Noise Management Code of Practice: Volume 2 – Construction Noise and Vibration (Department of Transport and Main Roads, 2016).

Table 2: Construction Noise Criteria

Work Period		External Noise level $L_{Aeq,adj,15\ minute}$ [4, 5], dB(A)	
		Lower Limit	Upper Limit [6]
Standard hours		RBL + 10 [1][2][3]	75 Where: RBL > 55
			70 Where: 40 < RBL ≤ 55
			65 Where: RBL ≤ 40
Non Standard hours	Evening	RBL + 5 [3]	RBL + 5
	Night time		

Notes:

[1] RBL + 5 dB(A) should be considered where a facility, equipment and long-term earthworks are required in an area for greater than six months.

[2] Where the lower limit value exceeds the upper limit value, the lower limit is taken to equal the upper limit value.

[3] Minimum lower limit is 50 dB(A) for Standard hours and 45 dB(A) for Non-Standard hours. A maximum lower limit of 75 dB(A) applies to Non-Standard hours.

[4] Noise contribution from construction activity determined as the component level.

[5] The noise level from construction includes adjustment factors in Table 2.1.2.1(b) (for example, low frequency noise, impulsivity, tonality, intermittency and modulation).

[6] For a single short event in a 24-hour period, the upper limit may be increased by:

- for Standard hours
  - 2 dB(A) for event of 6 minutes to 15 minutes
  - 10 dB(A) for event of 1.5 minutes to 6 minutes
  - 15 dB(A) for event of less than 1.5 minutes.
- for Non-Standard hours
  - 5 dB(A) for event of less than 1.5 minutes.

This single short event adjustment is designed to account for unusual and one-off events, and does not apply to regular high-noise levels that occur more frequently than once per day.

1.3 Performance Outcome

Performance outcomes relating to noise and vibration include:

- No adverse noise impacts on sensitive receptors attributable to the construction of the Project.
- No damage to buildings or community infrastructure from vibration
- No valid complaints regarding excessive noise or vibration.
- Any noise and vibration complaint is addressed within specified time frames.
- No exceedance of noise criteria described in Section 1.2.2.

1.4 Management Actions

Table 3: Mitigation and Management Actions

Action Number	Mitigation / Management Action	Timing	Responsibility
NV1	Training will be provided to all project personnel, including relevant sub-contractors on noise and vibration requirements from this plan through inductions, toolboxes and targeted awareness training.	Prior to works and ongoing	Contractor
NV2	Locate mobile and fixed plant (e.g., compressors, generators) as far as practicable away from the nearest potential sensitive receptors.	Prior to works	Contractor
NV3	Undertake pre-construction building and infrastructure surveys on properties / infrastructure potentially susceptible to vibration damage from construction.	Prior to works	Contractor,
NV4	Construction activities will, wherever possible and practicable, be confined to standard work hours of 6:30 am – 6:30 pm Monday to Saturday. No work is to occur on Sundays or Public Holidays.	Ongoing	Construction
NV5	Where it is necessary for such activities (noise and vibration generating) to be carried out outside standard working hours, potentially impacted receptors will be notified at least one week in advance of the activities. The notification will include: • The schedule of construction activities (the proposed times) • The reasons for construction being carried out outside standard daytime working hours • Likely timeframes of construction activities (the proposed dates) • Access routes for workers and equipment • Nature of construction activities.	One week prior to works outside of standard hours	Stakeholder Manager / Contractor
NV6	Regularly service vehicles, plant and equipment such that noise emissions comply with manufacturers' specifications.	Ongoing	Construction Manager and Supervisors

Action Number	Mitigation / Management Action	Timing	Responsibility
NV7	Use of audible warning devices will be within operational health and safety constraints. Broadband / tonal alarms (squawkers) must be utilized.	Ongoing	Construction
NV8	Co-ordination of loading/unloading of material activities will be within standard daytime working hours wherever practicably possible.	Ongoing	Construction
NV9	Trafficked areas are to be kept in good condition to minimise noise from vehicle movement.	Ongoing	Construction
NV10	Minimise the drop heights of materials into trucks when loading.	Ongoing	Construction
NV11	Plant and equipment will be switched off when not required. Machines that might have intermittent use will be shut down between work periods or will be throttled down to a minimum.	Ongoing	Construction
NV12	Appropriately sized equipment would be selected in order to minimise vibration impacts, where required.	As required	Contractor
NV13	Noise and vibration monitoring will be undertaken in accordance with DES's Noise Measurement Manual.	Ongoing	Contractor
NV14	Respond to complaints relating to construction in accordance with complaints management procedures. Corrective action will be undertaken in accordance with the environmental management plan if the complaint is validated.	Ongoing	Stakeholder Manager, Contractor
NV15	Undertake precondition surveys / dilapidation reports of buildings or community infrastructure that are within the zone of influence for vibration.	Prior to and following construction	Contractor

1.5 Monitoring, Reporting and Review

Table 4: Monitoring, Reporting and Review Actions

Monitoring Action	Responsibility	Frequency	Performance Requirement	Potential Corrective Action
Monitor vibration levels at sensitive receptors and structures in close proximity to construction activities.	Contractor	Ongoing	No sustainable vibration levels causing loading	Assess any verified damage in consultation with the landholder.
Dilapidation reports	Contractor	Prior to and following construction activities	No further structural damage compared to dilapidation survey report	Assess any verified damage in consultation with the landholder.
All noise complaints will be recorded, acknowledged, considered and responded to as soon as is practicable.	Contractor	Ongoing in response to a complaint	An initial response is provided to the complainant within 24 hours.	Noise complaints will be managed in accordance with the complaints management protocol
Undertake noise or vibration monitoring in response to a complaint.	Contractor	In response to a complaint	Noise & vibration levels do not exceed objectives as prescribed in the project approvals	Implement noise attenuation or mitigation measures. Measures may include those in AS2436:2010 *Guide to noise and vibration control on construction, demolition and maintenance sites.* Measures may also be taken at the sensitive receptor with agreement from the complainant.

Appendix I

Water Quality

1.0 Water Quality Subplan

1.1 Legislation and Guidelines

. The EP Act establishes the frameworks for managing water quality such that environmental values in relation to water quality are protected. This includes:

- *Environmental Protection (Water & Wetland Biodiversity) Policy 2019* which:
  - Identifies environmental values and management goals for Queensland waters (surface water and groundwater)
  - Establishes water quality goals and guidelines for waters
  - Provides guidance on making consistent, equitable and informed decisions about waters
  - Includes requirements for monitoring of ambient water quality.
- Requirements for assessment and approval of activities (environmentally relevant activities) that might result in a discharge to surface waters or other impact on surface waters.
- Provisions in relation to compliance with approval conditions in relation to impacts of activities on surface water resources.
- Specific offences relating to contamination of surface waters.

1.2 Potential Impacts

1.2.1 Existing Environmental Values

Under the *Environmental Protection (Water and Wetlands Biodiversity) Policy 2019*, environmental values and water quality objectives for Pumicestone Passage include waters on Bribie Island, including both fresh (non-tidal) waters and tidal waters. The study area intersects Wrights Creek, which is mapped as enclosed coastal/lower estuary at the mouth and middle estuary upstream. Both ecological and human use environmental values are nominated as applicable to the waters in the study area, including:

- Aquatic ecosystems – moderately disturbed
- Seagrass
- Aquaculture
- Human consumer
- Oystering
- Primary recreation
- Secondary recreation
- Visual recreation; and
- Cultural and spiritual values.

1.2.2 Construction Impacts

The potential for impacts on surface water will depend on a number of factors. Primarily impacts will be dependent on the nature, extent and magnitude of construction activities and their interaction with the natural environment. Potential impacts attributable to construction activities are discussed in Table 1 below.

The main construction phase surface water effects on these values relate to the potential disturbance of watercourses for the crossings, which manifest as:

- Change and / or interruption to flows
- Degradation of water quality
- Barriers to movement of aquatic fauna.

Table 1: Potential Surface Water Impacts

Activity	Potential Environmental Impact
Vegetation clearing, ground compaction / minor disturbance	Erosion and subsequent degradation of water quality. Release of sediments to water through erosive processes.
Storage, handling and use of environmentally hazardous substances	Spills and leaks and subsequent degradation of water quality.
Storage and handling of hydrocarbons and other environmentally hazardous materials	Contamination of surface water resources.
Dewatering of excavations	Drawdown of groundwater may occur. Disposal of water from dewatering has the potential to cause surface water degradation, particularly where salinity and sedimentation is high.

The project waters are mapped as enclosed coastal/lower estuary, therefore the water quality objectives prescribed in Table 2 below apply for all construction activities, including localised dewatering. The Contractor will develop and implement a dewatering procedure that ensures the criteria noted in Table 2 are not exceeded as a result of dewatering activities.

Table 2: Water Quality Criteria (Source: Pumicestone Passage environmental values and water quality objectives, EPP 2019)

Water area/type (refer Plan WQ1413)	Management intent (level of protection)	Water quality objectives to protect aquatic ecosystem EV [1-11]
Enclosed coastal waters/lower estuary	Aquatic ecosystem – moderately disturbed	▪ turbidity: <6 NTU ▪ suspended solids: <16 mg/L ▪ chlorophyll a: <2.5 µg/L ▪ total nitrogen: <220 µg/L ▪ oxidised N: <3 µg/L ▪ ammonia N: <6 µg/L ▪ organic N: <210 µg/L ▪ total phosphorus: <25 µg/L ▪ filterable reactive phosphorus (FRP): <7 µg/L ▪ dissolved oxygen: 90 – 105% saturation ▪ pH: 8.0 – 8.3 ▪ secchi depth: >1.4m

1.3 Performance Outcomes

Environmental values relating to aquatic ecosystems, biodiversity and cultural and spiritual values are maintained.

Water quality of the receiving waters (Wrights Creek) meets the following requirements:

— No degradation of water quality downstream relative to upstream values.

1.4 Management Actions

Table 3: Mitigation and Management Actions

Action Number	Mitigation / Management Action	Timing	Responsibility
WQ1	Training will be provided to all project personnel, including relevant sub-contractors on sound water quality management measures from this plan through inductions, toolboxes and targeted training.	Prior to works	Contractor
WQ2	Schedule construction works as far as practical such that major vegetation clearing and earthworks activities do not take place in wet conditions	Prior to works	Contractor
WQ3	Design access roads and tracks with drainage systems to minimise concentration of flow and erosion risk.	Prior to works	Contractor
WQ4	Locate infrastructure and facilities away from drainage lines and steep slopes where practicable.	Site Establishment and Planning	Contractor
WQ5	The construction of instream bridge structures will be programmed during the months of low rainfall where possible. Activities such as works in the waterway under HAT with the potential to mobilise sediment will be conducted in the lower half of the tide wherever possible. Examples include: - Clearing of marine vegetation - Placement of rock for either temporary or permanent structures - Removal of the existing causeway structure	Site Establishment and Planning	Contractor
WQ6	Where works are undertaken within waterways, works will comply with the DoR and DAF Guidelines	During works in the waterway	Contractor
WQ7	Develop and implement a site-specific erosion and sediment control plan (ESCP) for the project work areas prior to construction commencing. General principles for erosion and sediment control will be drawn from industry guidelines in place at the time of construction (International Erosion Control Association (Australasia), Best Practice Erosion and Sediment Control (2008)). Erosion and sediment control measures are to be based on an erosion risk assessment and are to include:	Site Establishment and Planning / Ongoing	Contractor

Action Number	Mitigation / Management Action	Timing	Responsibility
	• Requirement to construct across watercourses during dry periods (as far as possible) to limit localised erosion at construction areas • Requirement to clearly identify areas for land clearing and earthworks on construction plans and on the ground to avoid unnecessary disturbance to areas outside the construction area • Installation and maintenances standards for erosion and sediment control devices, in particular for areas near earthworks, watercourses and key stormwater flow paths • Locating any soil or mulch stockpiles away from watercourses and key stormwater flow paths to limit potential for transport of these substances into the watercourses via runoff • Rehabilitation and / or requirements to protect / stabilise exposed earth from water and wind erosion • Stabilisation of creek banks disturbed during construction • Monitoring requirements for the purposes of detecting changes in water quality in Wrights Creek Treatment and management requirements for sodic, dispersive and aggressive soils • Inspection requirements to maintain the effectiveness of installed control mechanisms, including frequency and corrective actions to be undertaken in the event that erosion control mechanisms are not operating appropriately.		
WQ8	Install perimeter controls around temporary construction laydown areas to prevent offsite upslope clean water from entering the site and controls downslope to confine dirty water within the site and out on the low flow channel. Design and management of the installation of such controls will be in accordance with IECA guidelines (IECA 2008).	Site Establishment and Planning / Ongoing	Contractor
WQ9	Existing riparian vegetation will be retained as far as is practicable. Where possible, marine vegetation shall be cut off at ground level to maintain bank stability.	Site Establishment and Planning / Ongoing	Contractor
WQ10	Rehabilitation of any disturbed ground due to temporary construction infrastructure will be conducted progressively as soon as construction activities are complete in any area.	Ongoing	Contractor r
WQ11	Stripped topsoil will be set aside for use in reinstatement. Topsoil stockpiles will be managed to maintain soil fertility and other soil properties.	Ongoing	Contractor
WQ12	Protection measures for exposed slopes, banks and batters will be installed as required	Ongoing	Contractor

Action Number	Mitigation / Management Action	Timing	Responsibility
WQ13	Refuelling or servicing of vehicles and plant will only occur in designated areas away from waterways and watercourses. Refer to Haz Sub Plan	Ongoing	Contractor
WQ14	Chemicals and hazardous substances will be appropriately stored in containment bunding in accordance with AS1940:2017 – The storage and handling of flammable and combustible liquids. Refer to Haz Sub Plan	Ongoing	Contractor
WQ15	Visual inspections shall be carried out during significant rainfall events in order to identify any visible signs of contaminated stormwater or contaminated runoff leaving the site.	Ongoing	Contractor
WQ16	Washout of trucks shall only occur within the designated area only away from the waterway and stormwater drains.	Ongoing	Contractor
WQ17	As part of the spill response plan, spillages will be prevented from entering drains or water courses and absorbent material will be placed on spillages which will be collected for disposal and any contaminated soil removed for treatment and disposal.	Site Establishment and Planning / Ongoing	Contractor
WQ18	Concreting activities will be conducted to prevent concrete material or cement laden water (alkaline) from entering the waterway. Concrete washout area shall be established away from the waterway.	Ongoing	Contractor
WQ19	Instream barriers such as sediment curtains / floating hydrocarbon booms shall be established around the temporary work zones on each bank. However, these are not to extend as a continuous barrier across the creek with an area allowing tidal flow to be open at all times.	During work in the waterway	Contractor
WQ20	Where construction activities require the establishment of 'dry' work areas within the waterway e.g., sheet piling, water from within the area must meet the water quality requirements for discharge. Water shall be treated and tested to meet the performance requirements.	During work in the waterway	Contractor
WQ21	A specific procedure for the demolition of the existing causeway shall be developed by the contractor prior to this phase of works and approved by the Client Representative. This procedure shall detail management and mitigation measures to minimise the impact on water quality in Wrights Creek. Management actions are to include but not limited to: - Staging of removal of existing pipes to maintain waterway connectivity; - Timing of removal of pipes and causeway material during low tide / incoming tides; - Installation of instream controls such as silt curtains; - Temporary erosion controls on exposed banks or areas of material eg geofabric / rock - No unnecessary debris or waste materials are deposited in the waterway.;	Prior to and during works in the waterway	Contractor

Action Number	Mitigation / Management Action	Timing	Responsibility
	- Timing of work to occur when no rain events are forecast; and - Additional monitoring requirements.		

1.5 Monitoring, Reporting and Review

Table 4: Monitoring, Reporting and Review Actions

Monitoring Action	Responsibility	Frequency	Performance Requirement	Potential Corrective Action
Monitor the potential for flooding in accordance with the BOM flood warning system	Contractor Construction Manager	Daily following heavy rain events	Appropriate notice of floods / significant rainfall events is provided	Staff notified and equipment and materials removed from flood prone areas if required
Visual inspection of waterway in the vicinity of construction site for signs of contamination	Contractor Construction Manager and Supervisors	Weekly or during rainfall events	Free from signs of contamination e.g., oily sheen, discolouration	Investigate source of contamination
Inspect erosion and sediment control devices	Contractor Environmental Team and Supervisors	Weekly (Checklist) or pre/post rainfall events	See weekly checklist	Undertake repairs or replace devices. Review controls
Surface Water Monitoring Program	Contractor Environmental Tram	As per Contractor Plan	As per Contractor Plan	As per Contractor Plan

Appendix J

Waste and Recycling Subplan

1.0 Waste and Recycling Subplan

1.1 Legislation and Guidelines

The key legislation in relation to waste management is the *Environmental Protection Act 1994* (EP Act), which identifies effective waste management strategies as part of an integrated management approach to environment protection and ecologically sustainable development. The EP Act also sets up requirements for minimisation, handling, transport, storage and disposal of wastes. Under the EP Act and *Environmental Protection Regulation 2000* (EP Regulation), activities associated with waste management, including transport, treatment, storage and disposal of wastes are environmentally relevant activities and an authorisation is required to carry out these activities. Schedule 7 of the EP Regulation also defines regulated waste, being wastes that are particularly hazardous to the environment if not managed appropriately.

The EP Regulation establishes procedures for tracking of certain regulated wastes. Trackable wastes are defined in Schedule 1 of the regulation and a docket system is in place to track these wastes from the point of origin to disposal.

Waste Reduction and Recycling (Waste Levy Act) Act and the *Waste Reduction and Recycling (Waste Levy) Amendment Regulation 2019* provides a framework for statewide waste management strategy and establishment of levies and other mechanisms to promote waste minimisation. The strategy identifies waste tyres from commercial and industrial activities as a high priority for waste minimisation and management.

1.2 Potential Impacts

Wastes represent lost or degraded material and energy resources.

Improper waste management can impact on a range of environmental values including land, air quality, surface water and groundwater. Improper waste management can also cause a range of public health hazards.

1.2.1 Construction Impacts

Types of wastes likely to be produced during construction of the Project are listed in Table 2, along with potential environmental or public health impacts that may arise if wastes are not properly managed.

Table 2: Waste Generation Potential Environmental Impacts

Activity	Potential Waste	Classification	Management Option
Clearing and grubbing	Green waste	Construction and demolition waste	Mulched and reused onsite
	Rubbish and debris	Construction and demolition waste	Landfill
Topsoil stripping	Topsoil	Construction and demolition waste	Onsite reuse
Earthworks (land and waterway)	Unsuitable Spoil (includes PASS and dredge material)	Construction and demolition waste	Landfill
	Waste concrete	Construction and demolition waste	Recycled
Bridge construction	Waste concrete	Construction and demolition waste	Recycled

Activity	Potential Waste	Classification	Management Option
	Waste metal	Construction and demolition waste	Recycled
Construction office	Wastepaper/cardboard/ plastic	Commercial and industrial waste	Recycled
	Electrical waste	Commercial and industrial waste	Recycled
	Food waste	Commercial and industrial waste	Landfill
	Sewage	Regulated Waste Trackable Waste (K130)	Liquid Waste Facility
Road Construction	Asphalt	Commercial and industrial waste	Recycled
Removal of Existing Crossing Structure	Asphalt and Concrete	Commercial and industrial waste	Recycled
	Rock	Commercial and industrial waste	Reused
	General fill material / spoil	Commercial and industrial waste	Landfill
Plant and equipment operation	Maintenance fluids	Regulated Waste Trackable Waste (G150)	Liquid Waste Facility
	Hydrocarbons and water mixtures or emulsions,	Regulated Waste Trackable Waste (J120)	Liquid Waste Facility
	Tyres	Regulated Waste Trackable Waste (T140)	Recycled
	Batteries	Regulated Waste Trackable Waste (B100)	Recycled

1.3 Performance Outcomes

Minimise generation of waste in accordance with the waste management hierarchy:

— AVOID unnecessary resource consumption.

— REDUCE waste generation and disposal.

— RE-USE waste resources without further manufacturing.

— RECYCLE waste resources to make the same or different products.

— RECOVER waste resources, including the recovery of energy.

— TREAT waste before disposal, including reducing the hazardous nature of waste.

— DISPOSE of waste only if there is no viable alternative.

Avoid adverse impacts of waste on land contamination, surface and groundwater quality and visual amenity.

1.3.1 Waste Management Inventory

Table 3 presents waste storage and handling requirements and indicative waste management methods, in order of preference. Final waste management methods will depend on the availability of waste management contractors to provide a cost-effective service to this location.

Table 3: General and Hazardous Waste Management

Waste type	Waste storage and handling requirements	Indicative waste management methods
Vegetation waste	Store so as to minimise fire hazard Separate logs and hollow trees Avoid mixing native vegetation with introduced vegetation where possible Store away from trafficked areas Mulch Management	Place logs and hollow trees in rehabilitated areas or areas of retained habitat. Mulch or otherwise treat native vegetation for reuse in revegetation areas (trials to be undertaken to determine best methods for reuse).
Packaging waste	Segregate plastic, wood and cardboard Contain plastics so that these do not blow away	Return packaging to source wherever possible. Plastics and cardboard removed from site for recycling where viable.
Waste concrete and concrete wash out waste	Concrete wash out in designated and contained areas away from watercourses	Recycle at offsite facility Disposal at a licensed waste facility
Scrap metal	Segregate from other wastes	Off-site recycling if feasible Disposal at a licensed waste facility
Other building and demolition wastes	Segregate from other wastes	Disposal at a licensed waste facility Reuse material e.g., rock on site where feasible.
Waste oil and oil contaminated wastes	Store in sealed containers in a designated bunded area, away from sources of fire and watercourses	Removal by authorised oil recovery contractor
Office wastes	Segregate paper, cartridges, computer wastes Store paper in a closed container to avoid litter	If feasible, remove wastes for recycling Disposal at a licensed waste facility
Food wastes	Dispose of in lidded bins	Disposal at a licensed waste facility
Other general wastes	Dispose of in lidded bins	Disposal at a licensed waste facility
Sewage	Store in fully contained receptacles in a designated area away from watercourses	Transfer using licensed transporter for disposal at a licensed waste facility

Waste type	Waste storage and handling requirements	Indicative waste management methods
Batteries	Store in contained areas	Removal by authorised contractor for material recovery or disposal at an authorised disposal facility

1.4 Management Actions

Table 4: Mitigation and Management Actions

Action Number	Mitigation / Management Action	Timing	Responsibility
WT1	Training will be provided to all project personnel, including relevant sub-contractors on waste management practices and the requirements from this plan through inductions, toolboxes and targeted training.	Prior to works and ongoing	Contractor
WT2	Ensure waste contracts are in place for all wastes that require removal from the site for reuse, recycling, treatment and/or disposal. Utilise contractors that can offer reuse and recycling services in preference to those that cannot and ensure that all contractors hold appropriate authorisations to transport, receive, store, reprocess, treat and/or dispose of wastes expected to be generated.	Prior to works	Contractor
WT3	Maintain a waste register, including the following information: • Waste type and waste code • Waste source • Potential contaminants and other environmental hazards • Quantity generated • Storage locations and requirements • Whether the waste is regulated and trackable • Waste avoidance or reduction measures in place • Management method (reuse, recycling, on-site disposal, off-site disposal) • Quantities removed for reuse/recycling/disposal • Relevant waste contractor.	Ongoing	Contractor

Action Number	Mitigation / Management Action	Timing	Responsibility
WT4	Engage with both waste transporters and waste disposal operators to ensure adequate waste capacity planning, particularly for waste streams such as concrete, metals and waste oils which are in relatively large volumes.	Ongoing	Contractor
WT5	For trackable wastes, waste register will include: • Consignment number for the load. • Transport provider's details (including license number). • Date and time trackable waste removed from the project site. • Quantity removed. Receiver's details (including license number).	Ongoing	Contractor
WT6	Any transfers of waste will take place in accordance with tracking systems that ensure waste reaches the appropriate destination. Only licensed contractors and drivers will be utilised. Any transporters will be expected to meet legislative requirements for spill control and be equipped with emergency equipment	Ongoing	Contractor
WT7	A waste storage area will be established at the construction site. The waste storage area will include: • Segregation of wastes for wood, steel, glass, other recyclables and general waste • Secure, contained storages for hazardous and putrescible wastes. • Food scraps and other wastes that may potentially attract animals will be stored in waste containers with lids Waste storage areas will be clearly signed and located so as to be at low risk of interaction with vehicle and equipment. Bins will be regularly collected and disposed of in the nearest registered landfill or transported to recycling facilities, where possible.	Ongoing	Contractor
WT8	Materials will be reused or recycled where possible. This may include: • Timber will be reused on site where possible, or recycled on or offsite • Waste concrete will be crushed and recycled where possible • Suitable steel off cuts or scrap metal will be recycled	Ongoing	Contractor

Action Number	Mitigation / Management Action	Timing	Responsibility
	• Cabling will be recycled • Packaging material to be recycled where possible		
WT9	Where practicable, tyres will be repaired and reused; otherwise, tyres will be stored in a designated area free of flammable material awaiting disposal.	Ongoing	Contractor
WT10	Other miscellaneous oil/hydrocarbon wastes will be stored in designated bins for collection by a licensed contractor for recycling and/or disposal.	Ongoing	Contractor
WT11	Cleared vegetation that is weed free will be mulched for rehabilitation and revegetation works on-site.	Ongoing	Contractor
WT12	Wastes from administrative and office facilities will be managed to reduce excess or inappropriate office materials. Examples include recycling office stationery, cartridges and computer waste.	Ongoing	Contractor
WT13	No burning of wastes will be permitted on or off site.	Ongoing	Contractor
WT14	The demolition and removal of the existing causeway shall be undertaken to ensure no unnecessary debris or waste materials are deposited of in the waterway.	During demolition works	Contractor

1.5 Monitoring, Reporting and Review

Table 5: Monitoring, Reporting and Review Actions

Monitoring Action	Responsibility	Frequency	Performance Requirement	Potential Corrective Action
Review waste register for waste avoidance, reuse, recycling, or other minimisation opportunities. Identify trends in waste generation and check that appropriate storage, handling, and management measures are in place for each waste type	Contractor	Annually	Waste avoidance and minimisation opportunities are maximised	Review on-site procedures and incorporate waste avoidance and minimisation measures Amend waste contracts to maximise reuse and recycling in preference to disposal
Review waste contractors	Contractor	Prior to engagement	Waste contractors are properly authorised to transport, recycle and/or dispose of waste	Utilise only contractors with proper authorisations for waste management services
Monitor project construction and laydown areas and surrounding park, bushland and waterway areas for litter	Contractor	Ongoing / Weekly		
Storage areas will be regularly inspected to assess condition and appropriateness of storage	Contractor	Weekly		Any inappropriately stored substances will be removed immediately and moved to an appropriate storage area

Appendix K

Visual Amenity Subplan

1.0 Visual Amenity Subplan

1.1 Legislation and Guidelines

While the EP Act includes aesthetic dimensions in its definition of environment, there are no specific provisions in relation to scenic amenity.

1.2 Potential Impacts

1.2.1 Existing Environmental Values

Under the Moreton Bay Regional Council (MBRC) Planning scheme overlay mapping, the project area is not mapped as being locally important or regionally significant in terms of scenic amenity. The project site area contains remnant terrestrial vegetation to the north and marine vegetation within the site, which does provide some minor local amenity value. The large trees either side of White Patch Esplanade to the north of the crossing form part of a continuous line of natural areas and vegetation on the foreshore of the western side of Bribie Island. These areas extend from the parkland to the south through to the locality of White Patch to the north, and acts as a line-of-sight buffer between views from the mainland and Pumicestone Passage towards residential areas.

1.2.2 Construction Impacts

Potential impacts to the scenic amenity within the vicinity of the Project area are outlined in Table 1 below:

Table 1: Potential Impacts

Activity	Potential Environmental Impact
Vegetation clearing	Increased visual permeability Change in landscape from native vegetation to cleared land.
Lighting	During construction periods, localised and temporary light pollution caused by lighting for night works and vehicles travelling at night.

1.3 Performance Outcome

Performance outcomes with respect to visual amenity include:

- Minimal change to visual amenity from residential viewpoints and sensitive receptors.
- The site is not over-lit unnecessarily and light spillage into adjacent areas is minimised.

1.4 Management Actions

Table 2: Mitigation and Management Actions

Action Number	Mitigation / Management Action	Timing	Responsibility
SV1	Site inductions for all staff are to include education sessions regarding Visual Amenity. Induction and training sessions should also include information / discussion on waste management behavior such as roadside littering from vehicles.	Prior to and during works	Contractor
SV2	Design lighting systems to minimise light spillage and upward "glow": • Directional lighting and shields • Sensitive placement and specification of construction lighting – i.e., towards neighbouring houses or towards Pumicestone Passage migratory bird areas • Minimise security lighting	Temporary Works	Contractor
SV3	Temporary hoardings, barriers, traffic management and signage will be removed when no longer required.	Temporary Works	Contractor
SV4	All construction areas will be operated in a neat and tidy manner to minimise visual impact on neighboring landholders.	At all times	Contractor
SV5	Ensure outdoor lighting is in accordance with AS4282:1997 Control of obtrusive effects of outdoor lighting.	At all times	Contractor

1.5 Monitoring, Reporting and Review

Monitoring requirements for Visual Amenity shall be captured in the Environmental Inspection and Monitoring Process.