

Appendix G

Construction Environmental Management Framework



Transport
for NSW

Parramatta Light Rail Stage 2

Construction Environmental Management Framework

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Glossary and Definitions

Acronym / Term	Description
ACHMP	Aboriginal cultural heritage management plan
AQMP	Air quality management plan
BMP	Biodiversity management plan
CBD	Central business district
CEMF	Construction environmental management framework (this document)
CEMP	Construction environmental management plan
CMP	Construction monitoring program
Construction	Includes work required to construct the CSSI as defined in the Project Description in Appendix A of the Amendment Report including commissioning trials of equipment and temporary use of any part of the CSSI, but excluding Low Impact Work which is carried out or completed prior to approval of the CEMP.
CSSI	Critical state significant infrastructure
DEC	Department of Environment and Conservation
DECC	Department of Environment and Climate Change
DECCW	Department of Environment, Climate Change and Water
DPE	Department of Planning and Environment
DPI Fisheries	Department of Primary Industries (Fisheries)
ECM	Environmental control map
EH Group	Department of Planning and Environment (Environment and Heritage Group)
EIS	Environmental impact statement
EP&A Act	<i>Environmental Planning and Assessment Act 1979 (NSW)</i>
EPA	Environment Protection Authority (NSW)
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999 (Cth)</i>
ER	Environmental Representative

Acronym / Term	Description
GGBFMP	Green and golden bell frog management plan
GPOP	Greater Parramatta and the Olympic Peninsula
HMP	Heritage management plan
ICNG	<i>Interim Construction Noise Guideline</i>
Low Impact Works	<p>Includes:</p> <ul style="list-style-type: none"> (a) survey work including carrying out general alignment survey, installing survey controls (including installation of global positioning systems (GPS)), installing repeater stations, carrying out surveys of existing and future utilities and building and road dilapidation surveys (b) investigations including investigative drilling, contamination investigations and excavation (c) site establishment work approved under a Site Establishment Management Plan (d) use of minor ancillary facilities if the Environmental Representative has determined the operational activities will have a minor impact on the environment and the community (e) minor clearing and relocation of native vegetation, as identified in the Planning Approval (f) installation of mitigation measures including erosion and sediment controls, temporary exclusion fencing for sensitive areas and at-property treatments (g) property acquisition adjustment work including installation of property fencing (h) relocation and connection of utilities where the relocation or connection has been determined by the Environmental Representative to have a minor impact to the environment and the community; (i) archaeological testing under the <i>Code of practice for archaeological investigation of Aboriginal objects in NSW</i> (Department of Environment, Climate Change and Water (DECCW), 2010) or archaeological monitoring undertaken in association with (a) – (h) above to ensure that there is no impact on heritage items (j) maintenance of existing buildings and structures required to facilitate the carrying out of the CSSI (k) other activities determined by the Environmental Representative to have minor impact on the environment and the community, which may include but not be limited to construction of minor access roads, temporary relocation of pedestrian and cycle paths and the provision of property access. <p>Notwithstanding the following works are not Low Impact Work:</p> <ul style="list-style-type: none"> (a) where heritage items (excluding those impacted by activities (f), (h), (i) and (j) above), or threatened species or threatened ecological communities (within the meaning of the <i>Biodiversity Conservation Act 2016</i> or <i>Environment Protection and Biodiversity Conservation Act 1999</i>) are affected or potentially affected by any low impact work, that work is construction, unless otherwise determined by the Planning Secretary, following consultation by the Proponent with Heritage NSW, EH Group or DPI Fisheries (in the case of impact upon fish, aquatic invertebrates or marine vegetation); and

Acronym / Term	Description
	<p>(b) any night-time hours (as defined by the <i>Interim Construction Noise Guideline</i> (ICNG) (Department of Environment and Climate Change (DECC), 2009)) work that exceeds the following noise management and vibration levels:</p> <p>Works that cause $L_{Aeq(15\text{ minute})}$ noise levels:</p> <ul style="list-style-type: none"> • No more than 5 dB(A) above the rating background level at any residence in accordance with the ICNG, and • No more than the 'Noise affected' Noise Management Levels (NML) specified in Table 3 of the ICNG at other sensitive land use(s) <p>Works that cause:</p> <ul style="list-style-type: none"> • Continuous or impulsive vibration values, measured at the most affected residence are no more than the preferred values for human exposure to vibration, specified in Table 2.2 of <i>Assessing Vibration: a technical guideline</i> (Department of Environment and Conservation (DEC), 2006), or • Intermittent vibration values measured at the most affected residence are no more than the preferred values for human exposure to vibration, specified in Table 2.4 of <i>Assessing Vibration: a technical guideline</i> (DEC, 2006).
MNMP	Marine works and navigation management plan
NML	Noise Management Level
NVMP	Noise and vibration management plan
OOHW	Out-of-hours work
Planning approval	Collective term for the Parramatta Light Rail Stage 2 Environmental Impact Statement, Response to Submissions, Amendment Report and Infrastructure Approval (should the project be approved)
PMF	Probable maximum flood
ROL	Road occupancy licence
SEPP	State Environmental Planning Policy
SMART Principles	Specific, Measurable, Achievable, Realistic and Timely
SOPA	Sydney Olympic Park Authority
SSI	State significant infrastructure
SWMP	Soil and water management plan
TAMP	Traffic and access management plan
The project	Parramatta Light Rail Stage 2

Acronym / Term	Description
Transport	Transport for NSW (the proponent)
WRMP	Waste and resource management plan

1 Introduction

1.1 Background and project description

Parramatta Light Rail will deliver an integrated light rail service that supports population and employment growth expected throughout the Greater Parramatta and the Olympic Peninsula (GPOP). It will integrate with existing and future modes of transport, including buses, trains, ferries and active transport, as well as Sydney Metro West services and the existing road network.

The Parramatta Light Rail project will be delivered in stages to ensure the infrastructure needed to support growth and development is in place:

- Stage 1 will connect Westmead to Carlingford via the Parramatta central business district (CBD) and Camellia. The construction and operation of Parramatta Light Rail Stage 1 was approved by the NSW Minister for Planning in May 2018. Major construction is underway, with the track installation complete and light rail stop construction in progress. Stage 1 is expected to start operating in 2024. Further information on Stage 1 is available at Parramatta Light Rail.
- Stage 2 (the project) will connect the Parramatta CBD and Stage 1 to Camellia, Rydalmere, Ermington, Melrose Park, Wentworth Point, Sydney Olympic Park and the Carter Street precinct in Lidcombe, adjacent to Sydney Olympic Park.

Figure 1-1 provides an overview of Parramatta Light Rail showing both stages.

This Construction Environmental Management Framework (CEMF) applies to Parramatta Light Rail Stage 2 (the project) which comprises two main elements:

- Construction of about 10 kilometres of light rail infrastructure, between Camellia and the Carter Street precinct adjacent to Sydney Olympic Park
- Operation of about 13 kilometres of light rail alignment between the Parramatta CBD and the Carter Street precinct, including a section of infrastructure constructed by Parramatta Light Rail Stage 1 between Camellia and the Parramatta CBD.

1.2 Statutory planning context

The project is declared State significant infrastructure and is classified as a Critical State significant infrastructure (CSSI) project. As State significant infrastructure the project is subject to approval by the NSW Minister for Planning and Public Spaces under Part 5, Division 5.2 of the *Environmental Planning and Assessment Act 1979* (NSW) (EP&A Act).

The project has also been determined to be a controlled action under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) and requires approval from the Australian Minister for the Environment and Water.

This CEMF identifies how Transport for NSW (Transport), and its delivery partners will prepare and seek approval for construction environmental management plans (CEMPs), sub-plans and monitoring programs detailed within the environmental impact statement (EIS).

1.3 Purpose

This CEMF has been prepared to facilitate the preparation and approval of CEMPs, sub-plans and monitoring plans prior to and during the construction phase of the project. It includes a guide to the general environmental, stakeholder and community management requirements which will be implemented during construction and provides a road map for environmental management documentation.

In particular, the CEMF will:

- Identify the CEMPs, CEMP sub-plans and construction monitoring programs (CMPs) required for each stage of construction
- Document the proposed structure of the aforementioned documents
- Provide a risk assessment of the predicted level of environmental and social risk posed by each construction stage
- Nominate the consultation and endorsement level for the listed plans for each construction stage.

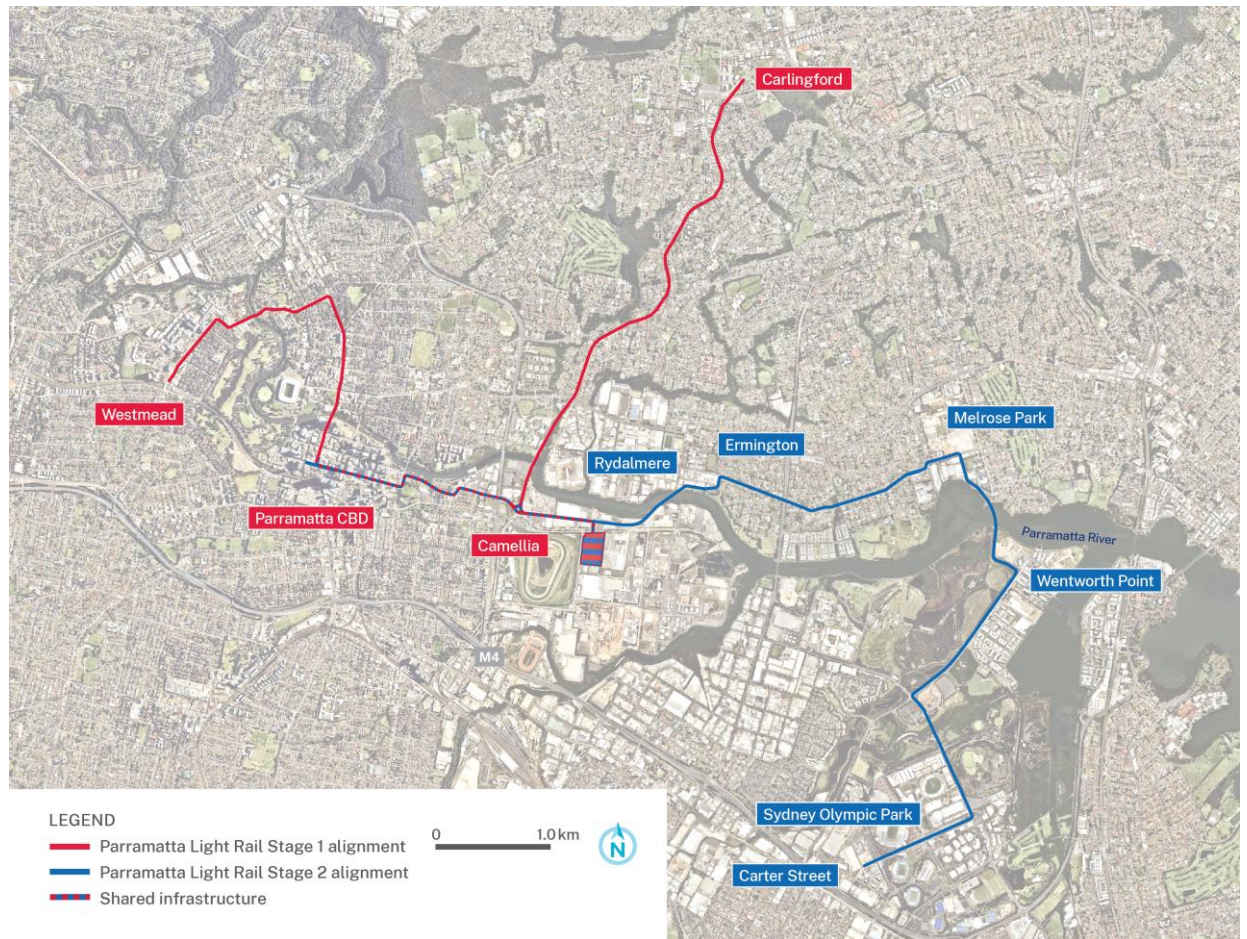


Figure 1-1: Parramatta Light Rail network

2 Legislative and other requirements

2.1 Conditions of approval

This document has been developed in accordance with the *State Significant Infrastructure Template Conditions of Approval (Linear Infrastructure)* (Department of Planning and Environment (DPE), 2022), conditions A14 to A17 (refer to Table 2-1). Should the project be approved, this document will be updated to alignment with relevant conditions of the Infrastructure Approval.

Table 2-1: Conditions of approval from the *State Significant Infrastructure Template Conditions of Approval (Linear Infrastructure)* relevant to the CEMF

ID	Condition	Document Reference	How addressed
A14	Should a Construction Environmental Management Framework (CEMF) be submitted for approval under Condition A15, the Staging Report must be submitted with the CEMF, i.e., no later than one (1) month before the lodgement of any CEMP, CEMP sub plan or CMP to the Planning Secretary for approval.	N/A	A Staging Report has been prepared for the construction of the project. It was submitted to the Department of Planning and Environment as part of the Response to Submissions (Appendix F), prior to determination of the project.
A15	A Construction Environmental Management Framework (CEMF) may be prepared to facilitate the preparation and approval of construction environmental management and monitoring plans required under Part C of this approval. The CEMF must:	This document	This document has been prepared to facilitate the preparation and approval of the construction environmental management and monitoring plans. It was submitted to the Department of Planning and Environment as part of the Response to Submissions (Appendix G).
A15(a)	identify the Construction Environmental Management Plans (CEMPs), CEMP Sub-plans and Construction Monitoring Programs (CMP) required for each stage of construction consistent with the Staging Report prepared under Condition A9;	Section 5.1	Section 5.1 identifies the CEMP, sub-plans and monitoring programs which will be implemented for each stage of construction. The staging in this section is consistent with that in Appendix F of the Response to Submissions (Staging Report).
A15(b)	document the proposed structure of the CEMPs, CEMP Sub-plans and CMPs for the relevant stage of construction;	Sections 6 and 7	Section 6 provides an outline of the structure of the CEMP and sub-plans, with section 7 providing a guide to the general construction management measures which will be considered in each sub-plan.

ID	Condition	Document Reference	How addressed
A15(c)	provide, by way of a Risk Matrix, an assessment of the predicted level of environmental and social risk, including the potential level of community concerns posed by each construction stage. This must use a process consistent with <i>AS/NZS ISO 31000: 2018; Risk Management – Guidelines</i> ; and	Section 4 and Appendix C	A risk assessment of the construction stages is provided in Appendix C and Section 4 outlines the framework used to complete this assessment.
A15(d)	<p>nominate the consultation and endorsement level for the CEMPs, CEMP Sub-plans and CMPs required for each construction stage. The endorsement level being one of the following:</p> <ul style="list-style-type: none"> (i) Low Risk Stage – to be self-endorsed and consultation with agency and council stakeholders is not mandatory, (ii) Medium Risk Stage – to be endorsed by the ER and consultation with agency and council stakeholders required, and (iii) High Risk Stage – to be endorsed by the Planning Secretary and consultation with agency and council stakeholders required. <p>For a Low-Risk Stage(s) the requirements of Part C of this approval do not apply. In these circumstances, a CEMP, CEMP sub-plan and CMP, may be substituted with an alternate process such as a Construction Method Statement or the like.</p>	Section 5.2	Section 5.2 nominates the consultation and endorsement level of each CEMP, sub-plan and monitoring program, in accordance with the endorsement levels in this condition.
A15	<p>The CEMF must be endorsed by the ER and then submitted no later than one (1) month before the lodgement of any CEMP, CEMP sub plan or CMP to the Planning Secretary for approval.</p> <p><i>Note: The Planning Secretary may vary the CEMF in relation to the endorsement authority for the CEMPs, CEMP Sub-plans and CMPs.</i></p>	This document	This document was submitted to the Department of Planning and Environment as part of the Response to Submissions (refer to Appendix G), prior to determination of the project.

ID	Condition	Document Reference	How addressed
A16	The approved CEMF must be implemented for the duration of construction.	This document	The CEMF will be implemented prior to and during construction of the project, should the project be approved.
A17	Where changes are proposed to the staging of construction, a revised CEMF must be prepared, endorsed by the ER and submitted to the Planning Secretary for approval no later than one (1) month prior to the proposed change in the staging.	Section 8	Should Transport decide to amend staging of the construction of the project at a later date, the Staging Report and CEMF would be revised, endorsed by the Environmental Representative and submitted to the Department of Planning and Environment prior to the commencement of the proposed change in the staging.

2.2 Other key legislative requirements

Table 2-2 identifies key NSW environmental legislative requirements and their applicability to construction of the project. These legislative requirements will be regularly reviewed and updated by Transport and its contractor(s) (refer to section 8).

Table 2-2: NSW Legislative Requirements

Legislation and Administering Authority	Requirements	Application to the project
<i>Environmental Planning and Assessment Act 1979</i> (EP&A Act) Department of Planning and Environment (DPE)	Encourages proper environmental impact assessment and management of development areas for the purpose of promoting the social and economic welfare of the community and a better environment.	Transport must adhere to requirements of the Parramatta Light Rail Stage 2 environmental impact statement, Response to Submissions, Amendment Report and Infrastructure Approval (collectively referred to as the Planning Approval). Transport and its contractors will endeavour to deliver the project in a consistent manner across the project stages, within the scope of works.

Legislation and Administering Authority	Requirements	Application to the project
<p><i>Protection of the Environment Operations Act 1997</i> NSW Environment Protection Authority (EPA)</p>	<p>The relevant objective of the Act is to prevent environmental pollution and harm to the environment.</p>	<p>Contractors must implement strategies to prevent pollution of the environment. An Environment Protection License, approved by the EPA under this Act, will be obtained for each package of work that meets the threshold for scheduled activities.</p>
<p><i>Contaminated Land Management Act 1997</i> EPA</p>	<p>The Act provides a process for the investigation and remediation of land where contamination presents a significant risk of harm to human health or some other aspect of the environment.</p>	<p>Transport must follow this process where contaminated land is identified.</p>
<p><i>Heritage Act 1977</i> DPE (Environment and Heritage Group)</p>	<p>The Act aims to encourage the conservation of the State's heritage and provides for the identification and registration of items of State heritage significance.</p>	<p>Transport projects assessed under Part 5.2 of the EP&A Act are exempt from approvals required under Part 4 and permits required under section 139 of this Act.</p>
<p><i>Biodiversity and Conservation Act 2016</i> DPE (Environment and Heritage Group)</p>	<p>The Act provides for the listing of threatened species and communities, establishes a framework to avoid, minimise and offset the impacts of proposed development and establishes a scientific method for assessing the likely impacts on biodiversity values and calculating measures to offset those impacts.</p>	<p>Transport will mitigate and offset the biodiversity impacts of the project as required by the Act.</p>
<p><i>Fisheries Management Act 1994</i> Department of Primary Industries (Fisheries) (DPI Fisheries)</p>	<p>The Act seeks to conserve, develop and share the fishery resources of the State for the benefit of present and future generation</p>	<p>The Act has been considered in the identification of suitable impact mitigation and environmental management measures for aquatic habitats, including for impacts on mangroves and works within the riparian zone.</p>
<p><i>Water Management Act 2000</i> DPE (Water)</p>	<p>Provides for the sustainable and integrated management of the water sources of the State for the benefit of both present and future generations</p>	<p>Details requirements for activities that involve the taking or use of water and defines waterfront land a protected area.</p>

Legislation and Administering Authority	Requirements	Application to the project
<i>Dangerous Goods (Roads and Rail Transport) Act 2008</i> EPA / SafeWork NSW	A licence is required for the storage (SafeWork NSW) and transport (EPA) of prescribed quantities of dangerous goods.	Contractors must obtain a licence where storage of dangerous goods exceeds licensable quantities.
<i>Roads Act 1993</i> Transport for NSW	The relevant objective of the Act is to regulate the carrying out of various activities on public roads	As Transport is a public authority, approval from the relevant roads' authority (City of Parramatta and Ryde Council's) is not required, however ongoing consultation will occur. Road occupancy licenses (ROLs) will be obtained for relevant road closures required.
<i>Marine Safety Act 1998</i> Transport for NSW	This Act sets out broad legal policy relating to marine safety and other matters.	The project will comply with the requirements of this policy where works require the use of marine vessels or may impact upon the safety of non-project vessels.
<i>Waste Avoidance and Resource Recovery Act 2001</i> EPA	The objectives of the Act are to reduce environmental harm and provide for the reduction in waste generation.	Contractors must implement strategies to reduce waste volumes and report on waste generated.

3 Project staging

Construction will be staged to align with the procurement and delivery strategy for the project, and achieve project completion in the minimum, practically reasonable time, while effectively managing community and environmental impacts. All works will be undertaken using suitably qualified and experienced contractors for specialised components. To achieve this, the project will be constructed in two stages:

- Stage A – Bridge between Melrose Park and Wentworth Point
- Stage B – Main alignment construction works and supply, operate and maintain system works.

This CEMF only applies to Stage A of the project and will be revised at a later date to include Stage B following further design development and construction planning, as referenced in section 8 of this document. Further detail on the staging of the project is provided in Appendix F of the Response to Submissions (Staging Report).

3.1 Stage A – Bridge between Melrose Park and Wentworth Point

Stage A of the project includes construction of the bridge between Melrose Park and Wentworth Point. By building the bridge over the Parramatta River and its approaches first, Transport will be able to align the construction of the broader project with market capacity.

Stage A has been broken into four substages of work:

- Substage A1 – Pre-construction and site establishment, including heritage investigations
- Substage A2 – Utilities relocation
- Substage A3 – Temporary works
- Substage A4 – Main construction works and testing and commissioning.

The general extent of the work area is shown in Figure 3-2 below.

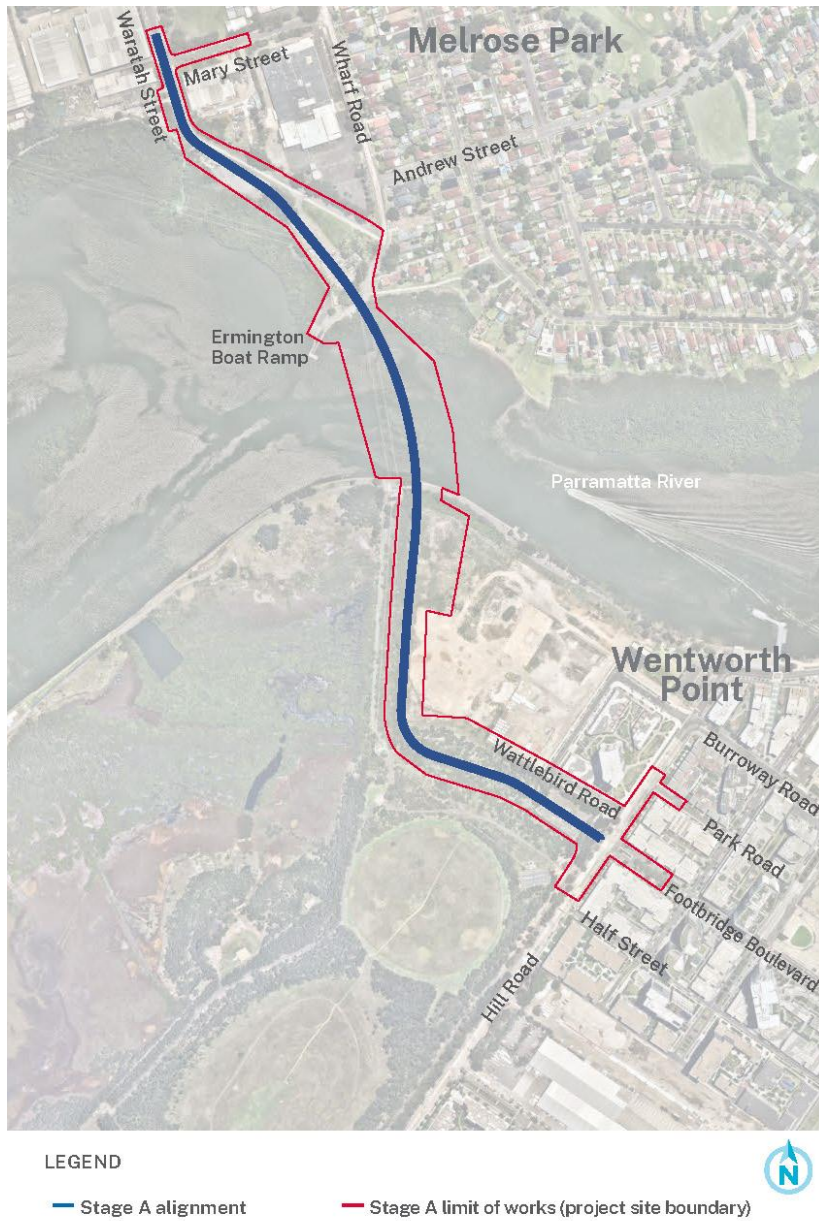


Figure 3-2: Extent of works for Stage A – Bridge between Melrose Park and Wentworth Point

3.1.1 Substage A1 – Pre-construction and site establishment

Works undertaken in Substage A1 are required to provide additional design information; inform heritage, contamination and other environmental investigations; and enable the area for construction. The pre-construction and site establishment substage activities meet the “low impact work” definition within the *State Significant Infrastructure Template Conditions of Approval (Linear Infrastructure)* and therefore are not classified as “construction”. This CEMF does not apply to “low impact works” and therefore a CEMP is not required to be prepared for this substage.

This substage includes:

- a) Survey works
- b) Investigations including investigative drilling, contamination investigations and excavation, heritage investigations, utility investigations and dilapidation surveys
- c) Site clearing and establishment work approved by the Department of Planning and Environment under a Site Establishment Management Plan, including the demolition of structures and establishment of fencing and internal haulage roads

- d) Use of ancillary facilities if the Environmental Representative has determined the operational activities would have minimal impact on the environment and community
- e) Minor clearing and relocation of native vegetation, as identified in the EIS, Response to Submissions and Amendment Report
- f) Installation of mitigation measures including heritage salvage, erosion and sediment control, temporary exclusion fencing for sensitive areas and at-property treatments
- g) Property acquisition adjustment works including installation of property fencing
- h) Relocation and connection of utilities where the relocation or connection has been determined with the Environmental Representative to have a minor impact to the environment and the community
- i) Archaeological testing under the *Code of practice for archaeological investigation of Aboriginal objects in NSW* (DECCW, 2010), archaeological investigations to inform design or archaeological monitoring undertaken in association with (a)-(h) above to ensure that there is no impact to heritage items
- j) Maintenance of existing buildings and structures required to facilitate the carrying out of the project
- k) Other activities determined by the Environmental Representative to have minor impact on the environment and the community, which may include but not be limited to construction of minor access roads, temporary relocation of pedestrian and cycle paths and the provision of property access.

Where particular heritage items or threatened species, populations or ecological communities are affected or potentially affected by the work, approval by the Planning Secretary, following consultation with Heritage NSW, Environment and Heritage Group and DPI Fisheries will need to be sought. Additionally, any night-time hours work that exceeds the standard Noise Management Levels (NMLs) as defined by the *Interim Construction Noise Guideline* will not be undertaken at this stage.

The pre-construction and site establishment activities stage will commence before other works in Stage A however they may continue concurrently with and be completed during the main construction works.

3.1.2 Substage A2 – Utilities relocation

Part of the utility relocation works may be undertaken during Substage A1 where the Environmental Representative deems the utility protection, relocation and connection to have a minor impact to the environment and the community – this is further detailed in the risk assessment in section 4. All other utility work will be completed in Substage A2 and is required to remove clashes between existing utilities and the project. Substage A2 works will include:

- At the intersection of Waratah Street and Mary Street:
 - Works during the night-time period of 10pm – 7am for the relocation of Sydney Water potable water utilities
 - Works during the night-time period of 10pm – 7am for the relocation of Jemena gas utility
 - Works during the night-time period of 10pm – 7am for the relocation of telecommunication utilities
- At Wharf Road, south of Waratah Street:
 - Works during the night-time period of 10pm – 7am for the relocation of Sydney Water potable water and wastewater utilities
 - Works during the night-time period of 10pm – 7am for the relocation of Ausgrid electricity utilities

- At the intersection of Hill Road and Footbridge Boulevard:
 - Relocation of Sydney Olympic Park Authority communications utility
 - Works during the night-time period of 10pm – 7am for the relocation of Sydney Water recycled water and wastewater utilities
 - Works during the night-time period of 10pm – 7am for the relocation of Jemena gas utility
 - Works during the night-time period of 10pm – 7am for the relocation of Ausgrid electricity utilities
- Works during the night-time period of 10pm – 7am for the relocation of the VIVA petroleum utility between the intersection of Mary and Waratah streets and Wharf Road
- Works during the night-time period of 10pm – 7am for the relocation of the Ausgrid 132kV overhead electricity utility spanning the Parramatta River between Melrose Park and Wentworth Point, including installation of new transmission poles at Melrose Park, removal of the existing pylon at Melrose Park and tie-in to existing pylons.

Works in Substage A2 are “construction” under the *State Significant Infrastructure Template Conditions of Approval (Linear Infrastructure)* and will commence before other works in Stage A however they may continue concurrently with and be completed during Substages A3 and A4.

3.1.3 Substage A3 – Temporary works

The temporary works stage of the project includes the construction of temporary structures, including temporary working platforms, and infrastructure to enable construction of the bridge and other permanent works. The includes:

- Transfer of construction equipment via barge
- Installation of new navigation aid piles and marine site delineation
- Construction of a new crew transfer / safety evacuation pontoon
- Installation of temporary mooring piles (if required)
- Installation of temporary working platforms including, piling, installation of prefabricated steel headstock and pile bracing, installation of primary beams and decking and fitting of handrails.

The works in Substage A3 are “construction” under the *State Significant Infrastructure Template Conditions of Approval (Linear Infrastructure)* and will commence before Substage A4, however they may be completed during the main construction works.

3.1.4 Substage A4 – Main construction works and testing and commissioning

Substage A4 will include the remainder of the works required to complete the construction, testing and commissioning of the bridge between Melrose Park and Wentworth Point, excluding system operations works (these will be completed as part of Stage B).

In summary the works in Substage A4 include:

- Removal of remaining trees and vegetation and offset planting
- Remaining earthworks and retaining structures
- Road works including connections to the existing road network:
 - Removing existing kerb, gutters, median strips and redundant infrastructure
 - Milling and excavation to the level required for the installation of the track slab
 - Placing and compacting road base and road pavement works
 - Integration with existing road pavements (where required)
 - Constructing new kerbs, gutters and other drainage
 - Erection of directional, wayfinding, regulatory and other signage

- Erection of roadside furniture
- Road paving and pavement marking
- Constructing tie-ins to existing roads
- Installing / modifying traffic lights, induction loops and signage
- Drainage works
- Light rail civil infrastructure and track and stop slabs, including installation of services conduits, placing steel reinforcement and concrete formwork and pouring concrete
- New bridge between Melrose Park and Wentworth Point:
 - Excavation works at approaches and supports
 - Construction of bridge abutments on the approaches to the bridge
 - Piling and construction of pile caps
 - Construction of bridge piers
 - Constructing bridge superstructure, which may include:
 - Lifting and installing concrete girders and/or precast concrete bridge segments using cranes
 - On and off-site assembly of structural elements and lifting into place
 - In-situ concrete pouring of bridge superstructure elements
 - Concrete pouring the bridge deck
 - Other bridge fit-out works, including installing handrails and other safety and operational infrastructure
- Provision of active transport links for pedestrians and cyclists
- Urban and architectural design and finishes of the corridor and public domain, including replacement public car parking and construction of a new amenities building (if required)
- Landscaping
- Testing and commissioning of the infrastructure works.

The works in Substage A4 are “construction” under the *State Significant Infrastructure Template Conditions of Approval (Linear Infrastructure)*.

3.2 Project timing

The proposed timing for Stage A of the project is outlined in Table 3-1: Indicative timing of Stage A . Further detail on additional stages will be included in future revisions of this document.

Table 3-1: Indicative timing of Stage A

Substage	Indicative Commencement Date	Indicative Completion Date
Substage A1 – Pre-construction and site establishment, including heritage investigations	Q4 2024	Q2 2025
Substage A2 – Utilities relocation	Q1 2025	Q1 2027
Substage A3 – Temporary works	Q1 2024	Q1 2026
Substage A4 – Main construction works and testing and commissioning	Q2 2025	Q2 2030

4 Risk assessment

A risk-based approach has been used to determine the level of management tool which will be used on the project and to guide the implementation of environmental risks and mitigation measures. Through this approach the CEMF will streamline the CEMP and CEMP sub-plans prepared to manage environmental impacts (refer to section 5.1). This approach considers the following:

- Identification of activities to be undertaken during each construction substage
- Assessment of project-specific environmental risks and hazards associated with each construction substage
- Determination of suitable mitigation measures proportionate to the extent of the risk identified in order to minimise the risk
- Allocation of defined responsibility for managing the risks and opportunities.

4.1 Risk framework

Parramatta Light Rail Stage 2 has established a proactive risk management approach to enhance performance outcomes and assist in constructive decision making. This supports the objectives of the project as well as decreases the potential for harm. By using a standardised risk management framework the project will implement structured and integrated management systems that focus on desired outcomes. Consistently implemented, this will allow for risks to be identified, analysed, evaluated and appropriately managed.

The purpose of the project risk management standard is to define and communicate the project's approach, process and procedure in relation to risk management. The standard is applicable to all functions, operations and activities undertaken by the project.

The project risk assessment process includes:

- Step 1: Establish Context
- Step 2: Risk Identification
- Step 3: Risk Analysis
- Step 4: Risk Evaluation
- Step 5: Risk Treatment
- Step 6: Monitoring, Review and Reporting

This framework is aligned with *AS/NZS ISO 31000: 2018; Risk Management – Principles and Guidelines*. Refer to Appendix A for the risk matrix and consequence table that forms part of the Risk Standard.

4.2 Risk levels

As per the condition A14 of the *State Significant Infrastructure Template Conditions of Approval (Linear Infrastructure)*, the consultation and endorsement level for the CEMP, sub-plans and monitoring programs will be nominated based on the risk assessment. The endorsement level for the CEMP, sub-plans and monitoring programs will be one of the following:

- (i) **Low Risk** – to be self-endorsed and consultation with agency and council stakeholders is not mandatory
- (ii) **Medium Risk** – to be endorsed by the Environmental Representative and consultation with agency and council stakeholders is required

- (iii) **High Risk** – to be endorsed by the Planning Secretary and consultation with agency and council stakeholders is required.

4.3 Risk analysis

The works during Substage A1 meet the “low impact work” definition and is therefore not classified as “construction” as per the *State Significant Infrastructure Template Conditions of Approval (Linear Infrastructure)*. The risk assessment confirmed these works will have a low residual risk.

Substage A2 has been assessed as having a medium risk due to the need to undertake some works out of hours. The works will be completed under a CEMP and noise and vibration management plan, developed in consultation with agency and council stakeholders and endorsed by the Environmental Representative prior the commencement of the substage. An out of hours protocol will also be prepared and implemented.

Substage A3 has been assessed as having a medium risk due to the increased exposure of working within and around waterways and the increased risk in biodiversity management. The CEMP, sub-plans and procedures will be developed in consultation with agency and council stakeholders and endorsed by the ER prior to the commencement of the substage.

Substage A4 is considered high risk work primarily due to the cumulative impact of these complex works within the proximity of a major waterway. All works are to be undertaken under a CEMP and sub-plans, developed in consultation with agency and council stakeholders and endorsed by the Planning Secretary prior to the commencement of the substage.

Table 4-1 provides a summary of the overall risk level for each substage based on the risk assessment (refer to Appendix C) and the risk levels defined in section 4.2.

Table 4-1: Summary of risk levels for substages of Stage A construction

Substage	Risk Level
Substage A1 – Pre-construction and site establishment, including heritage investigations	Not Applicable
Substage A2 – Utilities relocation	Medium
Substage A3 – Temporary works	Medium
Substage A4 – Main construction works and testing and commissioning	High

5 Environmental management framework

5.1 Streamlining CEMP and sub-plans

The project is employing a streamlined process for the development of CEMPs, sub-plans and monitoring programs, based on the environmental and social risks for each construction substage. Depending on the scope and scale of works for each stage and substage, the risk assessment will determine environmental management documentation requirements, for example whether a sub-plan is needed to manage a risk or if a procedure as part of the CEMP is sufficient.

Table 5-1 summarises the environmental management documentation requirements for each substage. This assessment considered each substage's scope of work, environmental and social risk (refer to Appendix B), relevant mitigation measures and whether additional environmental management documentation will be required to ensure their effective implementation. The assessment concluded:

- Whether risks are not applicable to the substage ('N/A')
- Residual risk levels of 'low' will be addressed in a CEMP (if the substage has an over risk of medium) or work method statement (or similar) (if the substage has an over risk of low)
- Residual risk levels of 'medium' will be addressed in the CEMP document in the form of a procedure ('CEMP-P')
- Residual risk levels of 'high' or 'very high' will be addressed in a stand-alone 'CEMP sub-plan'.

A summary of the documentation applicable for each substage of construction can be found in Table 5-1 below.

Table 5-1: Applicable documentation for environmental management for each substage

Potential risk	Substage A2 Utilities relocation	Substage A3 Temporary works	Substage A4 Main construction Works
Transport and access	N/A	TAMP	TAMP
Maritime and navigation	N/A	MNMP	MNMP
Noise and vibration	NVMP	NVMP	NVMP
Aboriginal heritage	CEMP-P	CEMP-P	ACHMP
Non-Aboriginal heritage	CEMP-P	CEMP-P	HMP
Biodiversity	CEMP	BMP and fauna monitoring program	BMP and fauna monitoring program
Green and golden bell frog	CEMP	GGBFMP	GGBFMP
Flooding, hydrology and water quality	CEMP	SWMP and water quality monitoring program	SWMP and water quality monitoring program

Potential risk	Substage A2 Utilities relocation	Substage A3 Temporary works	Substage A4 Main construction Works
Groundwater and geology	N/A	N/A	N/A
Soils and contamination	CEMP-P	SWMP and water quality monitoring program	SWMP and water quality monitoring program
Resource management	N/A	N/A	WRMP
Land use and property	N/A	CEMP	CEMP
Visual impact	CEMP	N/A	CEMP
Social and economic	CEMP	CEMP	CEMP
Air quality	CEMP	N/A	AQMP and air quality, odour and landfill gas monitoring program
Hazard and risk	CEMP	CEMP	CEMP
Cumulative impacts	N/A	N/A	N/A

Notes: TAMP – Traffic and access management plan
 NVMP – Noise and vibration management plan
 HMP – Heritage management plan
 GGBFMP – Green and golden bell frog management plan
 AQMP – Air quality management plan
 MNMP – Marine works and navigation management plan
 ACHMP – Aboriginal cultural heritage management plan
 BMP – Biodiversity management plan
 SWMP – Soil and water management plan
 WRMP – Waste and resource management plan

5.2 Consultation and endorsement

Where the residual risk of a substage is ‘medium’, the CEMP must be developed in consultation with relevant agency and council stakeholders and with the Environmental Representative’s endorsement prior to the commencement of the substage. Where the residual risk of the substage is ‘high’ or ‘very high’, the environmental management documentation must be developed in consultation with relevant agency and council stakeholders, and endorsement will be sought from the Planning Secretary prior to the commencement of the substage (refer to section 4.2).

All contractors are required to implement this CEMF, as appropriate to their scope of works. Consistently implemented, the potential impacts of each substage of construction will be effectively and efficiently managed from an environmental and social perspective. This CEMF only applies to Stage A of the project and will be revised at a later date to include Stage B following further design development and construction planning (as per section 8 of this document).

Table 5-2 to Table 5-4 below summarise the endorsement requirements for each construction substage of Stage A based on the residual risk rating for each environmental risk category (as per the risk analysis in section 4.2 and Appendix C).

Table 5-2: Reviews, endorsements and approvals for Substage A2 – Utilities Relocation

Plan	Contractor internal review and approval	Transport review	Government agency / stakeholder consultation	ER review and endorsement	Planning Secretary review and approval
CEMP	✓	✓	N/A	N/A	N/A
Sub-plans					
Traffic and access	N/A	N/A	N/A	N/A	N/A
Maritime works and navigation	N/A	N/A	N/A	N/A	N/A
Noise and vibration	✓	✓	✓	✓	N/A
Aboriginal cultural heritage	N/A	N/A	N/A	N/A	N/A
Heritage	N/A	N/A	N/A	N/A	N/A
Biodiversity	N/A	N/A	N/A	N/A	N/A
Soil and water	N/A	N/A	N/A	N/A	N/A
Air quality	N/A	N/A	N/A	N/A	N/A
Waste and resource	N/A	N/A	N/A	N/A	N/A
Monitoring programs					
Fauna	N/A	N/A	N/A	N/A	N/A
Water quality	N/A	N/A	N/A	N/A	N/A
Air quality, odour and landfill gas	N/A	N/A	N/A	N/A	N/A
Procedures (included in CEMP)					
Out of hours works Protocol	✓	✓	N/A	✓	N/A
Unexpected heritage items	✓	✓	✓	✓	N/A
Unexpected contamination finds	✓	✓	N/A	✓	N/A

Plan	Contractor internal review and approval	Transport review	Government agency / stakeholder consultation	ER review and endorsement	Planning Secretary review and approval
Acid sulfate soils management plan	✓	✓	N/A	✓	N/A

Table 5-3: Reviews, endorsements and approvals for Substage A3 – Temporary Works

Plan	Contractor internal review and approval	Transport review	Government agency / stakeholder consultation	ER review and endorsement	Planning Secretary review and approval
CEMP	✓	✓	✓	✓	N/A
Sub-plans					
Traffic and access	✓	✓	✓	✓	N/A
Maritime works and navigation	✓	✓	✓	✓	N/A
Noise and vibration	✓	✓	✓	✓	N/A
Aboriginal cultural heritage	N/A	N/A	N/A	N/A	N/A
Heritage	N/A	N/A	N/A	N/A	N/A
Biodiversity	✓	✓	✓	✓	N/A
Soil and water	✓	✓	N/A	✓	N/A
Air quality	N/A	N/A	N/A	N/A	N/A
Waste and resource	N/A	N/A	N/A	N/A	N/A
Monitoring programs					
Fauna	✓	✓	✓	✓	N/A
Water quality	✓	✓	N/A	✓	N/A

Plan	Contractor internal review and approval	Transport review	Government agency / stakeholder consultation	ER review and endorsement	Planning Secretary review and approval
Air quality, odour and landfill gas	N/A	N/A	N/A	N/A	N/A
Procedures (included in CEMP)					
Out of hours works Protocol	✓	✓	N/A	✓	N/A
Unexpected heritage items	✓	✓	ü	✓	N/A
Unexpected contamination finds	✓	✓	N/A	✓	N/A
Acid sulfate soils management plan	✓	✓	N/A	✓	N/A

Table 5-4: Reviews, endorsements and approvals for Substage A4 – Main Construction Works

Plan	Contractor internal review and approval	Transport review	Government agency / stakeholder consultation	ER review and endorsement	Planning Secretary review and approval
CEMP	✓	✓	✓	✓	✓
Sub-plans					
Traffic and access	✓	✓	✓	✓	✓
Maritime works and navigation	✓	✓	✓	✓	✓
Noise and vibration	✓	✓	✓	✓	✓
Aboriginal cultural heritage	✓	✓	✓	✓	✓
Heritage	✓	✓	✓	✓	✓
Biodiversity	✓	✓	✓	✓	✓

Plan	Contractor internal review and approval	Transport review	Government agency / stakeholder consultation	ER review and endorsement	Planning Secretary review and approval
Soil and water	✓	✓	N/A	✓	✓
Air quality	✓	✓	N/A	✓	✓
Waste and resource	✓	✓	N/A	✓	✓
Monitoring programs					
Fauna	✓	✓	✓	✓	✓
Water quality	✓	✓	N/A	✓	✓
Odour management strategy	✓	✓	N/A	✓	✓
Procedures (included in CEMP)					
Out of hours works Protocol	✓	✓	N/A	ü	ü
Unexpected heritage items	✓	✓	ü	ü	ü
Unexpected contamination finds	✓	✓	N/A	ü	ü
Acid sulfate soils management plan	✓	✓	N/A	ü	ü

6 CEMP and sub-plan structure

6.1 Construction environmental management plan

The project CEMP will provide a centralised mechanism through which construction-related environmental impacts and management measures are documented. It will comprise a main CEMP document, issue-specific sub-plans and procedures. The CEMP will be prepared in accordance with *Environmental Management Plan Guideline for Infrastructure Projects* (Department of Planning, Industry and Environment (DPIE), 2020c) and *Independent Audit Post Approval Requirements* (DPIE, 2020d).

The CEMP will provide the system and procedures to ensure that environmental impacts are minimised, and that legislative and approval requirements are fulfilled. As a minimum, it will include:

- The environmental policy, objectives, and performance targets for construction
- Description of activities to be undertaken during construction
- Reference to relevant statutory and other obligations, including consents, licences, approvals, permits and voluntary agreements required
- Issue-specific sub plans that detail how construction activities will be managed and monitored to avoid or minimise impacts, including the type, location and timing of environmental controls (described below)
- Processes for managing non-conformances, including identifying and implementing corrective and preventative actions to rectify the non-conformance and prevent recurrence (described below)
- Processes for demonstrating compliance with the commitments made in the EIS and relevant consents, licences, approvals, permits and voluntary agreements
- Responsibilities for planning, implementing, maintaining and monitoring environmental controls including the responsibilities of sub-contractors
- Procedures for the control of environmental records
- A compliance tracking and auditing program.

6.1.1 CEMP sub-plans

The requirement for CEMP sub-plans is specified by the mitigation measures (refer to Appendix B (Updated mitigation measures) of the Response to Submissions) and Appendix J (Outline Construction Environmental Management Plan) of the EIS. Sub-plans will detail how:

- Environmental performance outcomes will be achieved
- Mitigation measures will be implemented
- Issues requiring management during construction (including cumulative impacts), as identified through ongoing environmental risk analysis, will be managed through Specific, Measurable, Achievable, Realistic and Timely (SMART) principles.

The sub-plans include:

- Traffic and access
- Maritime works and navigation
- Noise and vibration

- Aboriginal cultural heritage
- Heritage
- Biodiversity
- Green and Golden Bell Frog
- Soil and water
- Air quality
- Waste and resources.

Should the project be approved, it is noted that the conditions of approval may require different and/or additional matters to be addressed in the CEMP or sub-plans. An outline of the indicative make-up of the construction sub-plans, and a guide to the general construction management measures required in each, is provided in Section 7.

6.1.2 Additional strategies, plans and procedures

In addition to the CEMP, and its sub-plans, a number of other strategies, plans and procedures will be developed and implemented during construction to manage environmental and community impacts in accordance with the mitigation measures. These include:

- Site establishment management plan
- Parking management strategy
- Out-of-hours work protocol
- Dewatering management strategy
- Erosion and sediment control plan
- Acid sulfate soils management plan
- Unexpected contaminated finds procedure
- Odour management strategy
- Flood and emergency response plan
- Remediation action plan
- Unexpected heritage items procedure
- Environmental work method statement
- Incident and emergency response plan
- Community communication strategy
- Social impact management plan
- Business management and activation plan.

6.2 Environmental control maps

Environmental control maps (ECMs) are detailed illustrative maps that outline the controls for managing environmental risks within an area of the project.

ECMs will be prepared in accordance with *Guide to Environmental Control Map (DMS-SD015)* (Transport for NSW, 2021a) and at a minimum will:

- Reflect the current and proposed work areas
- Indicate which environmental procedures or environmental approvals are applicable

- Illustrate work areas showing significant structures, work areas and boundaries including the project site boundary
- Illustrate environmental control measures and environmentally sensitive receivers
- Be endorsed by the contractor's Environmental Manager or delegate
- Be included in relevant training programs to ensure the requirements are understood.

ECMs will be revised to reflect changes within the relevant area as needed, including where changes to the physical site introduce new potential environmental risks requiring additional and/or refined controls. Revised ECMs will be adequately communicated to project personnel such as through project induction, pre-work briefings, toolbox talks and training and awareness sessions.

ECMs and revised ECMs will be reviewed and endorsed by the Transport Senior Environment and Sustainability Manager.

6.3 Construction monitoring programs

Construction monitoring programs (CMP) are issue-specific such as for monitoring biodiversity, air quality and water quality. The CMP also comprises hold and observance points to facilitate decision making and maintain compliance during construction.

Each CMP will have consideration of SMART principles and provide:

- Details of baseline data available
- Details of baseline data to be obtained and when
- Details of monitoring to be undertaken
- The parameters of the project to be monitored
- The frequency of monitoring to be undertaken
- The location of monitoring
- The reporting of monitoring and analysis of results against relevant criteria
- Details of the methods that will be used to analyse the monitoring data
- Procedures to identify and implement additional mitigation measures where the results of the monitoring indicate unacceptable project impacts
- Any consultation to be undertaken in relation to the monitoring programs.

7 Environmental aspects

A CEMP will be developed for the project to provide a centralised mechanism through which all potential construction-related environmental impacts will be managed. The CEMP will be comprised of a main CEMP document, issue-specific sub-plans and procedures and strategies.

An outline of the required sub-plans, and a guide to the general construction management measures to be considered in each, is provided in the sections below.

7.1 Traffic and access management

7.1.1 Performance outcomes

The following performance outcomes for traffic and access management will apply throughout construction of the project:

- Ensure appropriate controls and procedures are implemented to minimise potential traffic, transport and access impacts
- Maintain safe and efficient operation of the road network, public transport services and active transport, including during special events
- Ensure access to properties is maintained.

7.1.2 Sub-plan requirements

Traffic and access will be managed as outlined in Table 7-1 below.

Table 7-1: Transport, traffic and access

Management Plan / Requirement	Detail
Purpose and requirements	<p>The plan will detail processes and responsibilities to minimise traffic and access delays and disruptions, and identify and respond to changes to road access and on-street parking arrangements.</p> <p>The plan will be prepared in consultation with Transport for NSW; City of Parramatta and City of Ryde councils; Sydney Olympic Park Authority (SOPA); emergency services; the Sydney Coordination Office; and bus and ferry operators.</p> <p>The plan will include measures to:</p> <ul style="list-style-type: none"> • Manage staging of construction works to ensure that satisfactory capacity and minimum levels of service are maintained for all users • Maintain access to individual residences, services and businesses • Communicate changes in traffic conditions and access arrangements • Provide safe routes for pedestrians and cyclists during construction • Minimise the number of changes to road users' travel paths • Manage the movements of construction-related traffic to minimise traffic and access disruptions in the public road network • Manage temporary access arrangements where required

Management Plan / Requirement	Detail
	<ul style="list-style-type: none"> Provide a mechanism for the monitoring, review and amendment of the plan. <p>Heavy vehicle routes will be identified to manage the movements of construction-related traffic to minimise traffic and access disruptions in the public road network.</p>
Relevant guidelines and standards	<p>The plan will be prepared in accordance with relevant legislation, guidelines and standards, including:</p> <ul style="list-style-type: none"> <i>Roads Act 1993</i> <i>Traffic Signal Design</i> (Roads and Maritime Services, 2008) <i>Traffic control at work sites version 6.1</i> (Transport for NSW, 2021d) <i>Specification TS101 Traffic Signals – New installation and Reconstruction</i> (Transport for NSW, 2021c) <i>AS 1742.3–2009: Manual of uniform traffic control devices</i> (Standards Australia, 2009) <i>Guide to Road Safety Party 6: Road Safety Audit</i> (Austroads, 2022) <i>Guide to Road Safety Audit Practices</i> (Roads and Maritime Services, 2011).
Related strategies, plans or requirements	<ul style="list-style-type: none"> Road safety audits Site-specific traffic management plans Road occupancy licenses Speed zone change authorisations Parking management strategy Community communications strategy and engagement plans

7.1.3 Example management measures

Mitigation measures which could be included in the plan and implemented during construction include:

- Adequate road signage will be provided to inform the public of the works, timing and alternative access arrangements
- Heavy vehicle movements will be minimised during peak traffic times
- The provision of measures to manage traffic flows in the vicinity of the area affected by construction, including required regulatory and directional signposting, line marking, variable message signs, and other traffic control devices
- Designated queuing and idling areas for construction heavy vehicles will be determined near work areas to minimise disruption to the local community
- The establishment of appropriate controls where vehicles are required to cross footpaths or cycle paths to access construction sites. This may include manual supervision, physical barriers or temporary traffic signals
- Construction vehicles will park within the construction compound where practicable and space permits
- The timing of deliveries accessing the site will be programmed to ensure there is sufficient space within the project site to accommodate deliveries.

7.2 Maritime works and navigation management

7.2.1 Performance outcomes

The following performance outcomes for maritime works and navigation management will apply throughout construction of the project:

- Ensure appropriate controls and procedures are implemented to minimise potential impacts on navigation and access along the Parramatta River
- Ensure appropriate controls are implemented to minimise potential impacts on marine recreational assets
- Ensure safe access along the Parramatta River is maintained
- Provide alternative transport measures, as required.

7.2.2 Sub-plan requirements

Maritime works and navigation will be managed as outlined in Table 7-2 below.

Table 7-2: Maritime works and navigation

Management Plan / Requirement	Detail
Purpose and requirements	<p>The plan will detail processes and responsibilities to manage marine construction vessels and impacts on navigation during construction of the bridges over the Parramatta River.</p> <p>The plan will be prepared in consultation with Transport for NSW, Maritime; City of Parramatta and City of Ryde councils; ferry operators; and affected business and recreation groups.</p> <p>The plan will include:</p> <ul style="list-style-type: none"> • Requirements for works within and over the river • Notification and approval processes establishment of exclusion zones (where required) • Restrictions on speed limits or specific activities • Any changes to navigational channels or markers • Measures to manage impacts on marine recreational assets, including alternative boat ramp locations, community advertising campaigns and signage to advise of closures.
Relevant guidelines and standards	<p>The plan will be prepared in accordance with relevant legislation, guidelines and standards, including:</p> <ul style="list-style-type: none"> • <i>Navigation Act 2012</i> • <i>Marine Safety Act 1998</i> • <i>NSW Boating Handbook</i> (Transport for NSW, 2021b).
Related strategies, plans or requirements	<ul style="list-style-type: none"> • Traffic and access management plan • Community communications strategy and engagement plans

7.2.3 Example management measures

Mitigation measures which could be included in the plan and implemented during construction include:

- Construction marine traffic will be scheduled to avoid times and locations of high marine traffic where feasible and reasonable

- Construction vessel crews will be appropriately trained
- Indicator lines will be rigged with lights and flags to mark the area of reduced clearance for construction vessels.

7.3 Noise and vibration management

7.3.1 Performance outcomes

The following performance outcomes for noise and vibration management will apply throughout construction of the project:

- Minimise potential adverse noise and vibration impacts on the environment and community
- Minimise unreasonable noise and vibration impacts on receivers
- Avoid structural damage to buildings or heritage items as a result of construction vibration.

7.3.2 Sub-plan requirements

Noise and vibration will be managed as outlined in Table 7-3 below.

Table 7-3: Noise and vibration

Management Plan / Requirement	Detail
Purpose and requirements	<p>The plan will detail processes, responsibilities and measures to manage noise and vibration and minimise the potential for impacts during construction, aligned with the results of community consultation and consistent with the management approach and mitigation measures in the <i>Construction Noise and Vibration Strategy</i> (Transport for NSW, 2019). It will provide the framework and mechanisms for the feasible and reasonable management and mitigation of potential noise and vibration impacts.</p> <p>The plan will be prepared in consultation with the EPA, where relevant.</p> <p>It will:</p> <ul style="list-style-type: none"> • Identify noise and vibration performance criteria • Confirm sensitive receivers, ecological receivers and features in the vicinity of the project site • Include relevant standard and additional mitigation measures from the <i>Construction Noise and Vibration Strategy</i> (Transport for NSW, 2019a) and <i>Interim Construction Noise Guideline</i> (DECC, 2009) • Include protocols that will be adopted to manage works required outside standard construction hours, in accordance with relevant guidelines including for management of respite periods • Include the preparation of activity-specific construction noise and vibration impact statements which will detail standard and additional mitigation measures to be implemented based on predicted noise levels • Include details for ongoing consultation with sensitive affected receivers • Include measures to manage vehicle movements outside standard construction working hours • Provide a mechanism for the monitoring, review and amendment of this plan.

Management Plan / Requirement	Detail
Relevant guidelines and standards	<p>The plan will be prepared in accordance with relevant legislation, guidelines and standards, including:</p> <ul style="list-style-type: none"> • <i>Construction Noise and Vibration Strategy</i> (Transport for NSW, 2019a) • <i>Interim Construction Noise Guideline</i> (DECC, 2009) • <i>Generic Vibration Criteria for Vibration-Sensitive Equipment</i> (Gordon, 1999) • <i>AS 2436-2010 Guide to noise and vibration control on construction, demolition and maintenance sites</i> (Australian Standards, 2010).
Related strategies, plans or requirements	<ul style="list-style-type: none"> • Construction noise and vibration impact statements • Out-of-hours work protocol • Dilapidation surveys • Community communications strategy and engagement plans

7.3.3 Example management measures

Mitigation measures which could be included in the plan and implemented during construction include:

- The noise levels of plant and equipment will be monitored to confirm the operating sound power or sound pressure levels comply with the required criteria
- All site workers will be informed of the feasible and reasonable measures they are required to implement to minimise noise and vibration impacts on sensitive receivers and ecological receivers
- Highly noise intensive activities and equipment will be limited to the recommended standard working hours as far as practicable
- Quieter and less vibration emitting construction methods will be used where reasonable and feasible
- Silencer attachments on rock breakers and exhaust silencers on mobile plant will be used where possible near residences and ecological receivers
- Loading and unloading of materials/deliveries will occur as far as possible from sensitive receivers and ecological receivers, and preferably during standard construction hours
- Dropping of materials from heights into or out of trucks will be minimised
- No plant or equipment will be left idling when operating near sensitive receivers and ecological receivers
- Structures and site sheds will be used as screening where reasonable and feasible
- Lower vibration generating items will be used for excavation plant and equipment where minimum working distances cannot be met
- The community will be consulted on their preference for respite from noise and vibration impacts
- The scheduling of construction works will consider major events at Rosehill Gardens Racecourse and at Sydney Olympic Park.

7.4 Aboriginal cultural heritage management

7.4.1 Performance outcomes

The following performance outcomes for Aboriginal heritage management will apply throughout construction of the project:

- Ensure appropriate controls and procedures are implemented during construction to avoid or minimise potential adverse impacts on items of heritage value
- Ensure workers are aware of Aboriginal heritage.

7.4.2 Sub-plan requirements

Aboriginal cultural heritage will be managed as outlined in Table 7-4 below.

Table 7-4: Aboriginal cultural heritage

Management Plan / Requirement	Detail
Purpose and requirements	<p>The plan will include measures to minimise the potential for impacts and manage Aboriginal heritage.</p> <p>The plan will be prepared in consultation with registered Aboriginal parties and the Department of Planning and Environment. The outcomes of further investigations will be incorporated into the plan.</p> <p>It will:</p> <ul style="list-style-type: none"> • Identify Aboriginal heritage items in the vicinity of the project site • Include a salvage methodology • Include appropriate controls and procedures to avoid or minimise potential adverse impacts to Aboriginal heritage • Define the requirements for an induction and cultural heritage awareness training for construction workers and supervisors • Describe the procedures to manage unexpected items of potential heritage significance or human remains • Provide a mechanism for the monitoring, review and amendment of this plan.
Relevant guidelines and standards	<p>The plan will be prepared in accordance with relevant legislation, guidelines and standards, including:</p> <ul style="list-style-type: none"> • <i>National Parks and Wildlife Act 1974</i> • <i>Procedure for Aboriginal Cultural Heritage Consultation and Investigation</i> (Roads and Maritime Services, 2012) • <i>Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010</i> (DECCW, 2010a) • <i>Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW</i> (DECCW, 2010b) • <i>Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW</i> (Office of Environment and Heritage (OEH), 2011) • <i>Unexpected Heritage Items Procedure</i> (Transport for NSW, 2022) • <i>Skeletal Remains: Guidelines for Management of Human Skeletal Remains</i> (NSW Heritage Office, 1998).

Management Plan / Requirement	Detail
Related strategies, plans or requirements	<ul style="list-style-type: none"> • Unexpected heritage items procedure • Heritage interpretation strategy

7.4.3 Example management measures

Mitigation measures which could be included in the plan and implemented during construction include:

- All identified items within and in the immediate vicinity of the project site will be marked on the environmental control maps, fenced off where appropriate, and avoided
- Works will not destroy, modify or otherwise physically affect any heritage items, including human remains, outside of the project site boundary through demarcation, identification and training
- Identified Aboriginal objects will be avoided, where possible, and protective measures implemented, including delineating and marking areas as no-go zones for earthworks, excavations and stockpile sites
- A safe keeping place for any artefacts recovered during construction will be identified in consultation with the Registered Aboriginal Parties
- Any works outside the project site will be subject to further review of Aboriginal significance.

7.5 Heritage management

7.5.1 Performance outcomes

The following performance outcomes for non-Aboriginal heritage management will apply throughout construction of the project:

- Ensure appropriate controls and procedures are implemented during construction to avoid or minimise potential adverse impacts on items of heritage value
- Ensure workers are aware of non-Aboriginal heritage.

7.5.2 Sub-plan requirements

Heritage will be managed as outlined in Table 7-5 below.

Table 7-5: Non-Aboriginal heritage

Management Plan / Requirement	Detail
Purpose and requirements	<p>The plan will include measures to manage non-Aboriginal heritage and minimise the potential for impacts during construction. It will provide the framework and mechanisms for the management and feasible and reasonable mitigation of potential non-Aboriginal heritage impacts.</p> <p>The plan will be prepared in consultation with the relevant heritage agencies (such as Heritage NSW), relevant agencies (such as Sydney Olympic Park Authority), City of Parramatta Council and City of Ryde Council. It will:</p> <ul style="list-style-type: none"> • Identify non-Aboriginal heritage items within/in the vicinity of the project site • Include outcomes of further surveys, including test excavations and the Research Design and Excavation Methodology • Include appropriate controls and procedures to avoid or minimise potential adverse impacts to non-Aboriginal heritage • Define the requirements for non-Aboriginal historical heritage awareness site workers prior to the commencement of construction works • Provide details regarding the conservation and curation of any historical artefacts recovered during works • Describe the procedures for the reinstatement of areas of heritage value that will be temporarily impacted by construction • Describe the procedures to manage unexpected items of potential heritage significance, including maritime archaeological resources, or human remains • Provide a mechanism for the monitoring, review and amendment of this plan.
Relevant guidelines and standards	<p>The plan will be prepared in accordance with relevant legislation, guidelines and standards, including:</p> <ul style="list-style-type: none"> • <i>Heritage Act 1977</i> • <i>Unexpected Heritage Items Procedure</i> (Transport for NSW, 2022) • <i>Skeletal Remains: Guidelines for Management of Human Skeletal Remains</i> (NSW Heritage Office, 1998) • <i>Construction Noise and Vibration Strategy</i> (Transport for NSW, 2019a) • <i>Interpreting Heritage Places and Items</i> (Heritage Office, 2005).
Related strategies, plans or requirements	<ul style="list-style-type: none"> • Research Design and Excavation Methodology • Unexpected finds procedure • Heritage interpretation strategy

7.5.3 Example management measures

Mitigation measures which could be included in the plan and implemented during construction include:

- All identified items within and in the immediate vicinity of the project site will be marked on the environmental control maps, fenced off where appropriate, and avoided
- Exclusion zones will be established for maritime archaeological items, which will be marked on environmental control maps
- Works will not destroy, modify or otherwise physically affect any heritage items outside of the project site boundary through demarcation, identification and training
- Any heritage items not impacted by the works will be retained and protected throughout construction by demarcation, identification and training
- Construction activities will be conducted in a manner to minimise the potential for vibration impacts.

7.6 Biodiversity management

7.6.1 Performance outcomes

The following performance outcomes for biodiversity management will apply throughout construction of the project:

- Ensure controls and procedures are implemented during construction to avoid, minimise or manage potential adverse impacts on biodiversity within and adjacent to the proposal site
- Appropriately manage the spread of weeds and plant pathogens.

7.6.2 Sub-plan requirements

Biodiversity will be managed as outlined in Table 7-6 below.

Table 7-6: Biodiversity

Management Plan / Requirement	Detail
Purpose and requirements	<p>The plan will include measures to protect biodiversity and minimise the potential for impacts during construction. It will detail how construction impacts on terrestrial and aquatic and flora and fauna will be mitigated, managed and monitored.</p> <p>Management measures for works within Sydney Olympic Park and the Millennium Parklands will be developed in consultation with Sydney Olympic Park Authority.</p> <p>The plan will include:</p> <ul style="list-style-type: none"> • Measures to manage potential impacts on the Green and Golden Bell Frog • Measures to manage biosecurity risks (including pathogens and weeds) in accordance with the <i>Biosecurity Act 2015</i> • Induction requirements for all workers • Locations and requirements for pre-clearing surveys, including where clearing is required within Sydney Olympic Park and areas of mangrove, saltmarsh or other riparian vegetation

Management Plan / Requirement	Detail
Relevant guidelines and standards	<ul style="list-style-type: none"> • An unexpected finds procedure in accordance with the <i>Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects</i> (RTA, 2011) • Hygiene controls in relation to chytrid fungus, cinnamon fungus (<i>Phytophthora cinnamomic</i>) and myrtle rust (<i>Pucciniales fungi</i>) • Locations and procedures for monitoring of flora, such as mangroves, saltmarsh, the Narrow-leafed <i>Wilsonia</i> (<i>Wilsonia backhousei</i>), and fauna populations during and following construction <p>The plan will be prepared in accordance with relevant legislation, guidelines and standards, including:</p> <ul style="list-style-type: none"> • <i>Biodiversity Conservation Act 2016</i> • <i>Biodiversity Conservation Regulation 2017</i> • <i>Biosecurity Act 2015</i> • <i>National Parks and Wildlife Act 1974</i> • <i>Fisheries Management Act 1994</i> • <i>Environmental Protection and Biodiversity Conservation Act 1999</i> • <i>Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects</i> (Roads and Traffic Authority, 2011) • <i>Biodiversity Assessment Method</i> (DPIE, 2020b) • <i>Policy and guidelines for fish habitat conservation and management Update 2013</i> (DPI, 2013) • <i>National Light Pollution Guidelines for Wildlife Including Marine Turtles, Seabirds and Migratory Shorebirds</i> (Department of the Environment and Energy, 2020) • <i>Hygiene guidelines</i> (DPIE, 2020a) • <i>Management of Phytophthora cinnamomi for Biodiversity Conservation in Australia: Part 2 – National Best Practice Guidelines</i> (O’Gara et al., 2005) • <i>Myrtle Rust factsheet</i> (DPI, 2015).
Related strategies, plans or requirements	<ul style="list-style-type: none"> • Tree offset strategy • Rehabilitation strategy • Green and Golden Bell Frog management plan • Fauna monitoring program

7.6.3 Example management measures

Mitigation measures which could be included in the plan and implemented during construction include:

- Timing of construction, quieter construction methods, appropriate siting of lighting and/or the use of temporary noise barriers will be implemented close to breeding habitat at the Holker Busway (to minimise impacts on the breeding of the Southern Myotis during October to April), Hill Road (to minimise impacts on the breeding of the White-bellied Sea-eagle during July to January) and Hill Road adjacent to Narawang Wetland, Newington Nature Reserve Wetland and Kronos Hill (to minimise impacts on migratory waders and the Green and Golden Bell Frog during spring and summer)

- Impacts on estuarine mangrove vegetation at Haslams Creek will to be avoided or minimised as far as practicable
- Works on the Holker Busway bridge will be undertaken via scaffolding attached to the bridge as far as practicable, rather than from the ground, to minimise impacts on estuarine mangrove vegetation
- Exclusion zones will be established and maintained around native vegetation to be retained, particularly areas of biodiversity value adjoining the project site that are located in close proximity to work areas
- Vegetation removal will be undertaken in accordance with Guide 4 (Clearing of vegetation and removal of bushrock) of the *Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (Roads and Traffic Authority, 2011) and *Sydney Olympic Park Biodiversity Strategy and Management Plan* (SOPA, 2022)
- Habitat will be replaced or reinstated in accordance with Guide 5 (Re-use of woody debris and bushrock) and Guide 8 (Nest boxes) of the *Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (Roads and Traffic Authority, 2011)
- All plant/machinery and vehicles entering ecologically sensitive areas of the project site will be appropriately washed down and disinfected prior to working in these areas to prevent the potential spread of weeds, Cinnamon Fungus (*Phytophthora cinnamomi*) and Myrtle Rust (*Pucciniales fungi*) in accordance with the national best practice guidelines for Phytophthora (O'Gara et al., 2005), the *Myrtle Rust factsheet* (DPI, 2015) for hygiene control and the *NSW hygiene guidelines for wildlife* (DPIE, 2020a)
- All plant/machinery and vehicles will be subject to the same controls while moving about between ecologically sensitive parts of the project site, with wash-down to occur before working in different parts of Sydney Olympic Park, as determined in consultation with Sydney Olympic Park Authority ecologists
- Weed species will be managed in accordance with Guide 6 (Weed management) of the *Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (Roads and Traffic Authority, 2011), the *Hygiene guidelines* (DPIE, 2020a), and in consultation with the Sydney Olympic Park Authority for works within Sydney Olympic Park and the Millennium Parklands
- Fauna will be managed in accordance with Guide 9 (Fauna handling) of the *Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (Roads and Traffic Authority, 2011)
- Aquatic habitat will be protected in accordance with Guide 10 (Aquatic habitats and riparian zones) of the *Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (Roads and Traffic Authority, 2011) and section 3.3.2 (Standard precautions and mitigation measures) of the *Policy and guidelines for fish habitat conservation and management Update 2013* (DPI Fisheries, 2013).

7.7 Soil and water management

7.7.1 Performance outcomes

The following performance outcomes for soil and water management will apply throughout construction of the project:

- Ensure appropriate controls and procedures are implemented during construction to avoid or minimise potential soil and water impacts, including to threatened aquatic fauna habitats
- Minimise the potential for pollutants to enter surface water and groundwater.

7.7.2 Soil and Water Management Implementation

Soil and water will be managed as outlined in Table 7-7 below.

Table 7-7: Soil and water management

Management Plan / Requirement	Detail
Purpose and requirement	<p>The plan will detail processes, responsibilities and measures to manage potential soil and water quality impacts during construction, including measures to minimise the potential for pollutants to enter surface water and groundwater.</p> <p>The plan will include a detailed list of measures that will be implemented during construction to minimise the potential for soil and water impacts, including:</p> <ul style="list-style-type: none"> • Minimising the extent and duration of exposed surfaces • Development of adequate water quality control measures prior to carrying out of significant earthworks or bridge construction activities • Implementation of erosion and sediment control measures during earthwork activities across the project site, and other activities adjacent to waterways • Identification of areas of potential contamination concern • Development of procedures for the assessment, handling and stockpiling of potentially contaminated materials • Spill management procedures • Management of soils excavated or exposed in potential acid sulfate soils areas. <p>An unexpected finds protocol will be prepared as part of the plan and outline the activities to be undertaken in the event that previously undetected contamination is identified, which will include making the site safe, carrying out an assessment of the finds, and managing the finds based on the results of the assessment.</p>
Relevant guidelines and standards	<p>The plan will be prepared in accordance with relevant legislation, guidelines and standards, including:</p> <ul style="list-style-type: none"> • <i>Water Management Act 2000</i> • <i>Water Act 1912</i> • <i>Protection of the Environment Operations Act 1997</i> • <i>National Environment Protection (Assessment of Site Contamination) Measure 1999</i> • <i>Contaminated Land Management Act 1997</i> • State Environmental Planning Policy (Resilience and Hazards) 2021 • <i>Managing Urban Stormwater – Soils and Construction - Volume 1</i> (Landcom, 2004), <i>Volume 2B Waste landfills</i> (DECC, 2008a), and <i>Volume 2D Main Road Construction</i> (DECC, 2008b) (the Blue Book) • <i>Best Practice Erosion & Sediment Control</i> (International Erosion Control Association (Australasia), 2008) (IECA Manual) • <i>Australian and New Zealand Guidelines for Fresh and Marine Water Quality</i> (Australian and New Zealand Governments, 2018) • <i>Discharge and Reuse Guideline DMS-SD-024</i> (Transport for NSW, 2019b)

Management Plan / Requirement	Detail
	<ul style="list-style-type: none"> • <i>Guidelines for watercourse crossings on waterfront land</i> (DPI, 2012) • <i>Guidelines for controlled activities on waterfront land – Riparian corridors</i> (Natural Resources Access Regulator, 2018) • <i>Acid Sulfate Soils Assessment Guidelines</i> (Acid Sulfate Soils Management Advisory Committee, 1998) • <i>Waste Classification Guidelines -Part 4: Acid Sulfate Soils</i> (NSW EPA, 2014b).
Related strategies, plans or requirements	<ul style="list-style-type: none"> • Water quality monitoring program • Dewatering management strategy • Existing long term environmental management plans • Acid sulfate soils management plan • Unexpected contaminated finds procedure • Flood and emergency response plan

7.7.3 Example management measures

Mitigation measures which could be included in the plan and implemented during construction include:

- Sediment and erosion control devices will be installed to minimise mobilisation and transport of sediment in accordance with the Blue Book and IECA Manual
- Stockpiles of materials and fuel and chemical storage will not be located within high/medium flood risk areas or flow paths, without appropriate mitigation
- Maintenance and checking of the erosion and sedimentation controls will be undertaken on a regular basis, to ensure controls work effectively at all times. This includes clearing sediment from behind barriers/sandbags as required
- Work will cease where practicable during heavy rainfall events where the works contribute to sediment loss off site
- Stockpile topsoil separately, where of suitable quality and space permits, for potential reuse in landscaping and rehabilitation works
- Protect stockpiles to prevent erosion during rainfall
- The storage of hazardous materials and maintenance of construction plant and equipment will be undertaken in clearly marked designated areas that are designed to contain spills and leaks
- Vehicle washdowns and/or concrete truck washouts will be undertaken within a designated area or at a suitable location off site
- Site facilities will be located outside flood hazard areas or be elevated above the ground, where possible
- Awareness training will be provided for all onsite staff in the identification of potentially contaminated material
- In the event that indicators of contamination are encountered during construction (such as odours or visually contaminated materials), work in the affected area will cease immediately, and the unexpected finds protocol will be implemented

- The unexpected finds protocol will include the following general approach:
 - Site workers will make the area safe, stop work, and notify the construction supervisor, who will quarantine/fence the area, notify staff on-site and the project manager
 - The project manager or their representative will notify an appropriately qualified environmental consultant who will carry out an assessment of the nature and extent of the unexpected contamination
 - Remediation will be undertaken as required and as advised by the environmental consultant
 - Works may only recommence at the fenced off area after approval has been obtained from the environmental consultant and the project manager
 - Validation of the remediation will be carried out to assess the success of the remediation works
- Spill containment kits will be present and maintained on site during all activities where potential spills could occur
- Develop site shutdown procedures and implement them before forecasted inclement weather and before planned site shutdowns of more than 48 hours. Update the procedures as the project site develops and changes.

7.8 Air quality management

7.8.1 Performance outcomes

The following performance outcomes for air quality management will apply throughout construction of the project:

- Ensure appropriate controls and processes are implemented to manage air quality, odour and landfill gas and minimise the potential for impacts during construction
- Identify and control potential dust and air pollutant sources.

7.8.2 Sub-plan requirements

Air quality will be managed as outlined in Table 7-8 below.

Table 7-8: Air quality management

Management Plan / Requirement	Detail
Purpose and requirements	<p>The plan will detail processes, responsibilities and measures to manage air quality and minimise the potential for impacts during construction.</p> <p>The plan will be prepared in consultation with relevant government agencies and will include management and mitigation related to:</p> <ul style="list-style-type: none"> • Spoil handling • Stockpile management • Dust suppression • Monitoring.

Management Plan / Requirement	Detail
Relevant guidelines and standards	<p>The plan will be prepared in accordance with relevant legislation, guidelines and standards, including:</p> <ul style="list-style-type: none"> • <i>Protection of the Environment Operations Act 1997</i> • <i>Protection of the Environment Operations (Clean Air) Regulation 2010</i> • <i>Air Quality Management Guideline</i> (Transport for NSW, 2015) • <i>NSW Government Resource Efficiency Policy</i> (OEH, 2014) • <i>Guidance on the assessment of dust from demolition and construction</i> (Institute of Air Quality Management (IAQM), 2014) • <i>Determination of odorants in ambient air by field inspection</i> (German Standards, 1993).
Related strategies, plans or requirements	<ul style="list-style-type: none"> • Odour management strategy • Energy and greenhouse gas strategy • Air quality, odour and landfill gas monitoring program

7.8.3 Example management measures

Mitigation measures which could be included in the plan and implemented during construction include:

- Materials transported to and from the site will be covered to reduce dust generation in transit
- Vehicles, plant or equipment will comply with appropriate standards. Where vehicles, plant or equipment produce excessive (visual assessment) emissions they will be disused until service/maintenance can be undertaken to return them to normal working order
- Where visible dust is generated from excavation or stockpiling activities or vehicle movements on site, watering and/or other stabilising approaches will be implemented
- Any manufacturer specified exhausts and/or baffles will be installed and operated as per specifications
- Machinery will be turned off when not in use and not left to idle for prolonged periods
- Low sulfur content diesel fuel/oil will be utilised where available
- Odour eliminating sprays or foams will be used in the short term where potential odours are identified.

7.9 Waste and resource management

7.9.1 Performance outcomes

The following performance outcomes for waste and resource management will apply throughout construction of the project:

- Implement the waste management hierarchy of avoidance, minimisation, reuse, recycling and disposal
- Minimise waste generation and maximise reuse as far as practicable
- Maximise awareness of waste and resource use management issues.

7.9.2 Sub-plan requirements

Waste and resources will be managed as outlined in Table 7-9 below.

Table 7-9: Waste

Management Plan / Requirement	Detail
Purpose and requirements	<p>The plan will detail processes, responsibilities and measures to minimise waste generation and conserve energy during construction. It will adopt the circular economic principles and the waste hierarchy contains in the <i>Waste Avoidance and Resource Recovery Act 2001</i> and the <i>Infrastructure Sustainability Rating Scheme Technical Manual</i> (Infrastructure Sustainability Council, 2021).</p> <p>The plan will include:</p> <ul style="list-style-type: none"> • Measures to minimise resource and material, water and energy use • Classification of waste generated by the project in accordance with the <i>Waste Classification Guidelines</i> (NSW EPA, 2014b) and appropriate management options in accordance with the waste hierarchy principles and resource recovery orders and exemptions • Strategies to manage spoil, including reuse options • Procedure for waste storage, transport (including tracking where relevant), reuse and disposal • Identification of any approvals required for managing on and off-site waste, including application of any relevant resource recovery exemptions • Monitoring, record keeping and reporting, including any documentation management obligations arising from resource recovery exemptions.
Relevant guidelines and standards	<p>The plan will be prepared in accordance with relevant legislation, guidelines and standards, including:</p> <ul style="list-style-type: none"> • <i>Protection of the Environment Operations Act 1997</i> • Protection of the Environment Operations (Waste) Regulation 2005 • <i>Waste Avoidance and Resource Recovery Act 2001</i> • Work Health and Safety Regulation 2011 • <i>Waste Classification Guidelines</i> (NSW EPA, 2014b) • <i>NSW Waste and Sustainable Materials Strategy</i> (DPIE, 2021)
Related strategies, plans or requirements	Nil

7.9.3 Example management measures

Mitigation measures which could be included in the plan and implemented during construction include:

- Waste management strategies will be implemented in accordance with the *Waste Avoidance and Resource Recovery Act 2001* management hierarchy
- Waste segregation bins with signage will be located at key construction compounds to facilitate segregation and prevent cross contamination

- Resource management hierarchy principles will be followed:
 - Avoid unnecessary resource consumption as a priority
 - Avoidance is followed by resource recovery (including reuse of materials, reprocessing, recycling and energy recovery)
 - Disposal is undertaken as a last resort
- Trees and weed free plant material will be mulched or chipped on site and used in landscaping where practicable to stabilise disturbed soils
- Identify recycled materials (such as recycled aggregates in road pavement and surfacing; steel with recycled content) for use in construction or operation of the project where they are cost, quality and performance competitive.

8 Review

This CEMF details the environmental and social risks associated with Stage A of construction for the project and speaks to project staging outlined with the project Appendix F of the Response to Submissions (Staging Report). To appropriately manage each aspect of risk, and to allow for changes to project design and / or the introduction of new stages or substages of work, it is essential that consistent and frequent monitoring and review of this management framework is undertaken. Should the delivery strategy change as the project progresses, or when additional stages or substages of construction are identified in the Staging Report, changes will be reflected in this document.

This document will be reviewed on an annual basis at minimum. Where changes are made to this document, endorsement will be sought from the Environmental Representative and it will be submitted to the Department of Planning and Environment prior to the commencement of any changes or the stage of construction.

The CEMP and sub plans are to be reviewed and updated as required, including in response to audit findings, compliance monitoring results, and incidents and inspections that identify corrective and preventative actions. This will include an annual review conducted by the contractor(s) as part of the continual improvement process.

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Appendix A Risk matrix

Likelihood criteria and risk matrix

				Consequence									
				One off event How likely?	Repeated How often?	Likelihood		Insignificant	Minor	Moderate	Major	Severe	Catastrophic/ Transformational
								C6	C5	C4	C3	C2	C1
Probability	Frequency	Expected to occur frequently during time of activity or project. Greater than a 90% chance of occurring.	10 times or more every year	Almost Certain	L1	Medium	High	High	Very High	Very High	Very High		
		Expected to occur occasionally during time of activity or project. A 75-90% chance of occurring.	1-10 times every year	Very Likely	L2	Medium	Medium	High	High	Very High	Very High		
		More likely to occur than not occur during time of activity or project A 50-75% chance of occurring.	Once each year	Likely	L3	Low	Medium	Medium	High	High	Very High		
		More likely not to occur than occur during time of activity or project. A 25-50% chance of occurring.	Once every 1 to 10 years	Unlikely	L4	Low	Low	Medium	Medium	High	High		
		Not expected to occur during the time of activity or project. A 10-25% chance of occurring.	Once every 10 to 100 years	Very Unlikely	L5	Low	Low	Low	Medium	Medium	High		
		Not expected to ever occur during time of activity or project. Less than 10% chance of occurring.	Less than once every 100 years	Almost Unprecedented	L6	Low	Low	Low	Low	Medium	Medium		

Consequence criteria

Consequence						
	Insignificant	Minor	Moderate	Major	Severe	Catastrophic/ Transformational
	C6	C5	C4	C3	C2	C1
Environment	No appreciable changes to environment and/or highly localised event.	Change from normal conditions within environmental regulatory limits and environmental effects are within site boundaries.	Short-term and/or well-contained environmental effects. Minor remedial actions probably required.	Impacts external ecosystem and considerable remediation is required.	Long-term environmental impairment in neighbouring or valued ecosystems. Extensive remediation required.	Irreversible large-scale environmental impact with loss of valued ecosystems.
Regulatory or legal Breach	Low-level non-compliance with legal and/or regulatory requirement or duty by individuals or Transport.	Minor non-compliance with legal and/or regulatory requirement or duty. Investigation and/or report to authority.	Moderate non-compliance. Subject to comment and monitoring from applicable regulator. Small fine and no disruption to services.	Systemic non-compliance/Major breach resulting in enforcement action and/or prohibition notices. Substantial fine and no disruption to services.	Substantial breach resulting in prosecution, fines and/or litigation. Licence or accreditation restricted or conditional affecting ability to operate.	Prosecution leading to imprisonment of Transport executive. Loss of operating licence.
Customer Experience and Satisfaction	Infrequent or unrelated written complaints.	A stream of written complaints for more than 3 months.	A stream of written complaints for more than a year.	A substantial and sustained uplift in the rate of complaints.	A deluge of complaints for up to 6 months with normal background rates increasing by a factor of 3 or more.	A prolonged deluge of complaints for more than 6 months, with some normal background rates increasing by a factor of 10 or more.

Appendix B Risk context

Applicable to all substages

Potential Risks	Risk Context
Transport - construction	<p>The project activities have a high potential to cause temporary traffic, transport and parking impacts on the surrounding community without controls due to the requirements for lane closures, use of heavy vehicles, alterations to access and removal of parking.</p> <p>Traffic risks will be managed in accordance with a standalone traffic and access management plan and traffic mitigation measures as outlined in Appendix B (Updated mitigation measures) of the Response to Submissions.</p>
Maritime and Navigation	<p>The project involves the construction of two new bridges over Paramatta River. These works have a high potential to interfere with maritime vessels and disrupt navigation channels due to temporary working platforms in the river, boat ramp closures, barge operations, and piling and pier construction in and over waterways.</p> <p>Maritime and navigation risks will be managed in accordance with a standalone maritime works and navigation management plan and mitigation measures a outlined Appendix B of the Response to Submissions.</p>
Noise and vibration - construction	<p>The project activities have a high potential to cause noise and vibration impacts on the surrounding community and ecological receivers without controls due to the proximity of plant and equipment to residential areas, and the potential for out of hours work. Public domain works and the bridge works are predicted to have higher noise impacts during construction, with a mix of intermittent and impulsive noise that will occur over a longer period of time.</p> <p>Noise and vibration risks will be managed in accordance with a standalone noise and vibration management plan and mitigation measures in Appendix B of the Response to Submissions.</p>
Aboriginal heritage - construction	<p>Two Aboriginal heritage sites are located partially within the Parramatta CBD section of the project site and eight areas have been identified as having potential for sub-surface archaeological deposits, one of which is relevant to Stage A of the project: PAD1 – Ermington Boat ramp, Melrose Park. This location is considered to have a high potential for archaeological deposits.</p> <p>Relics will be managed through further survey and investigation and the Unexpected Heritage Finds Procedure. Items and locations that have potential heritage value will be managed in accordance with the Aboriginal cultural heritage management plan and mitigation measures in Appendix B of the Response to Submissions.</p>
Non-Aboriginal heritage - construction	<p>The project has the potential to impact historical sites on land as well as maritime archaeology in the Parramatta River. While there are not globally, nationally or state listed heritage items within the project site boundary, there are five items listed on local environmental plans and State Environmental Planning Policies: the tram alignment, wetlands, Bulla Cream Dairy (Willowmere), Ermington Wharf and the State Abattoir locality. The project site also crosses two heritage conservation listed areas, the Millennium Parklands Heritage Precinct and the state Abattoirs heritage conservation area.</p>

Potential Risks	Risk Context
Biodiversity – construction	<p>The heritage management plan and mitigation measures in Appendix B of the Response to Submissions will be implemented for all works associated with the project.</p> <p>Clearing of minor riparian vegetation (estuarine mangrove forest) and very small areas of saltmarsh is proposed during Stage A, along with clearing of some planted vegetation. At Wentworth Point there will also be some clearing of Grey Ironbark open forest. The southern side of the bridge also encompasses a small area of Green and Golden Bell Frog habitat as well as providing refuge for migratory species.</p> <p>Five species of priority weeds are also commonly found throughout the project site.</p> <p>Biodiversity risks will be managed in accordance with a standalone biodiversity management plan and mitigation measures outlined in Appendix B of the Response to Submissions.</p>
Flooding, Hydrology and Water Quality – construction	<p>Some of the project worksites will be within areas affected by the probable maximum flood (PMF). Temporary water quality impacts may be caused due to construction in and around Parramatta River. Trenching works for utility relocation will progressively expose and backfill soil along the route, limiting the exposed area and reducing the risk of erosion and sediment impacts.</p>
Groundwater and Geology - construction	<p>Not relevant to the Stage A scope, to be included in Stage B</p>
Soils and contamination - construction	<p>Utility works will progressively expose and backfill soil along the route, limiting the risk of water quality impacts. While soil is exposed, rainfall has the potential to cause sedimentation to enter into adjacent stormwater systems.</p> <p>Several areas of contamination have been identified at Sydney Olympic Park.</p> <p>Contamination risks will be managed in accordance with a standalone soil and water management plan and contamination mitigation measures outlined in Appendix B of the Response to Submissions.</p>
Resource Management - construction	<p>A lack of mitigation measures and management systems in relation to waste management leads to excessive waste generation, and inappropriate waste classification and disposal.</p>
Land use and property - construction	<p>Minimal acquisitions and some minor fencing works, however there are anticipated to be no additional property impacts associated with the Stage A. Access to properties will be maintained. Key changes to land-use include the temporary closure of Ermington Boat Ramp</p>
Visual Impact - construction	<p>Minor temporary visual impacts will occur with respect to construction sites and the visibility of plant and equipment in residential areas and along Parramatta River. Minor vegetation clearance is proposed in the riparian zone.</p>
Social and economic - construction	<p>While construction activities will be temporary and limited to one area for Stage A, there will be localised amenity impacts on residential receivers and social infrastructure such as the temporary closure of Ermington Boast Ramp and loss of parking.</p>

Potential Risks	Risk Context
Air Quality - construction	Ground disturbing works and the use of plant and light vehicles could mobilise dust in work areas, and due to the proximity of these works to residential receivers it is likely dust impacts will occur without controls.
Hazard and risk - construction	Transport and storage of hazardous substances and dangerous goods will be limited for the project works and potential risks will be managed in accordance with NSW guidelines including the <i>Managing risks of hazardous chemicals in the workplace</i> (SafeWork NSW, 2022) and applying State Environmental Planning Policy (Resilience and Hazards) 2021 as required.
Cumulative impacts - construction	Cumulative impacts are expected to be minimal given the limited and temporary nature of the works for Stage A however this will be reassessed for Stage B where interaction with the Parramatta Light Rail Stage 1 and other external projects may occur.

Appendix C Risk assessments

Risk assessment for Substage A1 – Pre-construction and site establishment

Risk Area	Risk Statements	C	L	Initial Risk Rating	Controls	C	L	Residual Risk Rating
Transport and Access	A lack of mitigation measures and management systems in relation to traffic and access leads to frequent non-compliance with the project requirements.	C3	L3	Medium	<ul style="list-style-type: none"> • Consultation with stakeholders, agencies and community • Road Safety audits where changes to road network are proposed • SEMP • Mitigation measures (MM) TT7, TT11-TT16, T18, TT19 	C4	L5	Low
Maritime and Navigation	Not relevant to Substage A1 scope	N/A	N/A	N/A	<ul style="list-style-type: none"> • N/A 	N/A	N/A	N/A
Noise and vibration	A lack of mitigation measures and management systems in relation to noise and vibration leads to unreasonable impacts on residents and businesses, and structural damage to buildings or heritage items.	C4	L5	Low	<ul style="list-style-type: none"> • Works to take place during standard construction hours only • Standard and project specific mitigation measures • 2.4m minimum high solid hoarding to be installed around compounds on Wharf Road and Wentworth Point north • SEMP • MM NV4, NV6-NV10, NV13-NV15. 	C5	L5	Low

Risk Area	Risk Statements	C	L	Initial Risk Rating	Controls	C	L	Residual Risk Rating
Aboriginal heritage	A lack of mitigation measures and management systems in relation to Aboriginal heritage leads to poor integration of heritage values in design and impacts on heritage items outside of what has been approved.	C3	L4	Medium	<ul style="list-style-type: none"> • Unexpected Finds Procedure • Salvage works to be undertaken in accordance with MM AH6 • Design refinements to avoid direct impact where possible • Continued consultation with registered Aboriginal parties • SEMP • MM AH2, AH5-AH6, AH9 	C4	L5	Low
Non-Aboriginal heritage	A lack of mitigation measures and management systems in relation to non-Aboriginal heritage leads to poor integration of heritage values in design and impacts on heritage items outside of what has been approved.	C3	L4	Medium	<ul style="list-style-type: none"> • Unexpected Finds Procedure • Design refinements to avoid direct impact where possible • Archaeological research and excavation framework to be implemented • SEMP • MM NAH2-NAH3, NAH9, NAH11 	C4	L5	Low
Biodiversity	A lack of mitigation measures and management systems in relation to biodiversity leads to unreasonable impacts to flora and fauna, spread of weeds and pathogens, and unintended vegetation clearance.	C2	L1	High	<ul style="list-style-type: none"> • Hygiene controls, vegetation clearing and fauna handling management procedures • Clear delineation of clearing works and retained vegetation • Biodiversity offsets initiated • Pre-clearance surveys • MM BD1, BD13, BD16 	C5	L4	Low

Risk Area	Risk Statements	C	L	Initial Risk Rating	Controls	C	L	Residual Risk Rating
Flooding, Hydrology and Water Quality	A lack of mitigation measures and management systems in relation to soil and water leads to unexpected pollution events, water quality impacts on adjacent water bodies, and soil erosion.	C4	C4	Medium	<ul style="list-style-type: none"> SEMP Flood management strategy and emergency response plan Erosion and sediment control plans MM W6-W8, W10, W14 	C5	L4	Low
Groundwater and Geology	Not relevant to the Substage A1 scope	N/A	N/A	N/A	<ul style="list-style-type: none"> N/A 	N/A	N/A	N/A
Soils and contamination	A lack of mitigation measures and management systems in relation to soil and water leads to unexpected pollution events, water quality impacts on adjacent water bodies and aquatic ecology, and soil erosion.	C3	L3	High	<ul style="list-style-type: none"> Unexpected contaminated land procedure Detailed site investigations Independent site auditor to review the scope and results of investigations Erosion and sediment controls Appropriate storage of hazardous chemicals as required, refuelling to occur offsite SEMP MM CS1, CS3-CS6, CS9-CS13, AQ3 	C4	L5	Low
Resource Management	Not relevant to the Substage A1 scope	N/A	N/A	N/A	<ul style="list-style-type: none"> N/A 	N/A	N/A	N/A

Risk Area	Risk Statements	C	L	Initial Risk Rating	Controls	C	L	Residual Risk Rating
Land use and property	A lack of mitigation measures and management systems in relation to land use and property lead to impacts outside of project approval.	C4	L5	Low	<ul style="list-style-type: none"> Ongoing consultation with landowners and key stakeholders Personal Relationship Manager to be available for residential landowners and/or tenants affected by land acquisition Vegetation clearing minimised to the greatest extents practical MM LP5-LP9 	C5	L5	Low
Visual Impact	A lack of mitigation measures and management systems in relation to visual amenity leads to unreasonable visual impacts on the surrounding community, landscape features and poor landscape design outcomes.	C4	L5	Low	<ul style="list-style-type: none"> Design refinements to avoid and minimise impact on trees Tree register to be kept for all potentially impacted trees and a tree offset strategy developed to offset the loss of any trees Lighting designed to minimise light spill and glare Construction site hoarding to be installed at compounds on Wharf Road and Wentworth Point north MM LV4, LV7, LV8, LV9-LV10, LV15 	C5	L5	Low
Social and economic	<p>Amenity impacts not appropriately mitigated or managed lead to unreasonable impacts on the community.</p> <p>A lack of mitigation measures and management systems in relation to community management results in community concern.</p>	C3	L3	Medium	<ul style="list-style-type: none"> Community communication strategy Enquiries and complaint management systems Social impact management plan MM SE1-SE12 	C5	L4	Low

Risk Area	Risk Statements	C	L	Initial Risk Rating	Controls	C	L	Residual Risk Rating
Air Quality	Not relevant to the Substage A1 scope	N/A	N/A	N/A	<ul style="list-style-type: none"> N/A 	N/A	N/A	N/A
Hazard and risk	A lack of management systems in relation to hazards and risks leads to breaches of legislation and environmental standards	C4	L3	Medium	<ul style="list-style-type: none"> Implementation of NSW guidelines To be included in preparatory CEMP risk assessment MM HR8 	C5	L4	Low
Cumulative impacts	Not relevant to the Substage A1 scope	N/A	N/A	N/A	<ul style="list-style-type: none"> N/A 	N/A	N/A	N/A

Risk assessment for Substage A2 – Utility relocation

Risk Area	Risk Statements	C	L	Initial Risk Rating	Controls	C	L	Residual Risk Rating
Transport and Access	A lack of mitigation measures and management systems in relation to traffic and access leads to frequent non-compliance with the project requirements.	C4	L3	Medium	<ul style="list-style-type: none"> • Consultation with stakeholders, agencies and community • Road Safety audits where changes to road network are proposed • MM TT7, TT12-TT16, TT18-TT19 	C5	L4	Low
Maritime and Navigation	Not relevant to the Substage A2 scope	N/A	N/A	N/A	<ul style="list-style-type: none"> • N/A 	N/A	N/A	N/A
Noise and vibration	A lack of mitigation measures and management systems in relation to noise and vibration leads to unreasonable impacts on residents and businesses, and structural damage to buildings or heritage items.	C3	L2	High	<ul style="list-style-type: none"> • NVMP • OOHW protocol • Standard and project specific mitigation measures • Minimise high noise intensity works during OOHW. • Ensure adequate respite provided to nearby residential receivers • MM NV4-NV15 	C5	L2	Medium
Aboriginal heritage	A lack of mitigation measures and management systems in relation to Aboriginal heritage leads to poor integration of heritage values in design and impacts on heritage items outside of what has been approved.	C3	L4	Medium	<ul style="list-style-type: none"> • Unexpected Finds Procedure • Design refinements to avoid direct impact where possible • Continued consultation with registered Aboriginal parties • Inductions and training prior to works starting for awareness and artefact recognition • MM AH2, AH5-AH6, AH8-AH9 	C5	L4	Low

Risk Area	Risk Statements	C	L	Initial Risk Rating	Controls	C	L	Residual Risk Rating
Non-Aboriginal heritage	A lack of mitigation measures and management systems in relation to non-Aboriginal heritage leads to poor integration of heritage values in design and impacts on heritage items outside of what has been approved.	C3	L4	Medium	<ul style="list-style-type: none"> • Unexpected Finds Procedure • Design refinements to avoid direct impact where possible • Archaeological research and excavation framework to be implemented • MM NAH2-NAH3, NAH9, NAH11 	C5	L4	Low
Biodiversity	A lack of mitigation measures and management systems in relation to biodiversity leads to unreasonable impacts to flora and fauna, spread of weeds and pathogens, and unintended vegetation clearance.	C3	L4	Medium	<ul style="list-style-type: none"> • Hygiene controls, vegetation clearing and fauna handling management procedures • Clear delineation of clearing works and retained vegetation • Minimise retained tree root damage during non-destructive digging works • Pre-clearance surveys • MM BD1, BD13, BD16 	C5	L4	Low
Flooding, Hydrology and Water Quality	A lack of mitigation measures and management systems in relation to soil and water leads to unexpected pollution events, water quality impacts on adjacent water bodies, and soil erosion.	C4	L4	Medium	<ul style="list-style-type: none"> • Flood management strategy and emergency response plan • Erosion and sediment control plans • Water discharge and reuse guidelines • MM W7-W8, W10, W14 	C5	L4	Low
Groundwater and Geology	Not relevant to the Substage A2 scope	N/A	N/A	N/A	<ul style="list-style-type: none"> • N/A 	N/A	N/A	N/A

Risk Area	Risk Statements	C	L	Initial Risk Rating	Controls	C	L	Residual Risk Rating
Soils and contamination	A lack of mitigation measures and management systems in relation to soil and water leads to unexpected pollution events, water quality impacts on adjacent water bodies and aquatic ecology, and soil erosion.	C4	L3	Medium	<ul style="list-style-type: none"> • Unexpected contaminated land and Asbestos Finds procedure • Detailed site investigations • Independent site auditor to review the scope and results of investigations • Erosion and sediment controls • Appropriate storage of hazardous chemicals as required • Refuelling to occur offsite. • MM CS1, CS5-CS6, CS9-CS13, AQ3 	C5	L4	Low
Resource Management	Not relevant to the Substage A2 scope	N/A	N/A	N/A	<ul style="list-style-type: none"> • N/A 	N/A	N/A	N/A
Land use and property	A lack of mitigation measures and management systems in relation to land use and property lead impacts outside of project approval.	C5	L4	Low	<ul style="list-style-type: none"> • Ongoing consultation with landowners and key stakeholders • Personal relationship Manager to be available for residential landowners and/or tenants affected by land acquisition • Vegetation clearing minimised to the greatest extents practical. • MM LP5-LP9 	C5	L5	Low

Risk Area	Risk Statements	C	L	Initial Risk Rating	Controls	C	L	Residual Risk Rating
Visual Impact	A lack of mitigation measures and management systems in relation to visual amenity leads to unreasonable visual impacts on the surrounding community, landscape features and poor landscape design outcomes.	C4	L5	Low	<ul style="list-style-type: none"> Design refinements to avoid and minimise impact on trees Tree register to be kept for all potentially impacted trees and a tree offset strategy developed to offset the loss of any trees Lighting designed to minimise light spill and glare Construction site hoarding to be installed at compounds on Wharf Road and Wentworth Point north MM LV4, LV7-LV11 	C5	L4	Low
Social and economic	Amenity impacts not appropriately mitigated or managed lead to unreasonable impacts on the community. A lack of mitigation measures and management systems in relation to community management results in community concern.	C4	L3	Medium	<ul style="list-style-type: none"> Community communication strategy Enquiries and complaint management systems Social impact management plan MM SE1-SE12 	C5	L4	Low
Air Quality	Not relevant to the Substage A2 scope	N/A	N/A	N/A	<ul style="list-style-type: none"> N/A 	N/A	N/A	N/A

Risk Area	Risk Statements	C	L	Initial Risk Rating	Controls	C	L	Residual Risk Rating
Hazard and risk	A lack of management systems in relation to hazards and risks leads to breaches of legislation and environmental standards	C3	L3	High	<ul style="list-style-type: none"> • Safe work method statement for relocation of 132V overhead electricity utility • Dial before you dig permits • Incident and emergency response plan prepared in the event of an incident involving critical utilities • To be included in preparatory CEMP risk assessment • MM HR3, HR7-HR8 	C3	L4	Medium
Cumulative impacts	Not relevant to the Substage A2 scope	N/A	N/A	N/A	<ul style="list-style-type: none"> • N/A 	N/A	N/A	N/A

Risk assessment for Substage A3 – Temporary works

Risk Area	Risk Statements	C	L	Initial Risk Rating	Controls	C	L	Residual Risk Rating
Transport and Access	A lack of mitigation measures and management systems in relation to traffic leads to frequent non-compliance with the project requirements.	C3	L2	High	<ul style="list-style-type: none"> TAMP Consultation with stakeholders, agencies and community Road Safety audits where changes to road network are proposed / implemented Parking management strategy Detailed site planning including haul roads and heavy and light vehicle separation MM TT7-9, TT11-TT16, TT18-TT19 	C4	L4	Medium
Maritime and Navigation	A lack of mitigation measures and management systems results in unplanned closure of the navigation channel. Impacts from construction mobilise river-bed sediments which impact the water quality of the Parramatta River	C2	L2	Very High	<ul style="list-style-type: none"> MNMP Clear delineation of marine work areas Site specific environmental work method statement which includes a range of mitigation measures to manage marine impacts and interactions with the navigation channel Consultation with relevant stakeholders MM TT10 	C4	L4	Medium

Risk Area	Risk Statements	C	L	Initial Risk Rating	Controls	C	L	Residual Risk Rating
Noise and vibration	A lack of mitigation measures and management systems in relation to noise and vibration leads to unreasonable impacts on residents and businesses, and structural damage to buildings or heritage items.	C3	L1	Very High	<ul style="list-style-type: none"> NVMP OOHW protocol Standard and project specific mitigation measures 2.4m minimum high solid hoarding to be installed around compounds on Wharf Road and Wentworth Point north Noise and vibration monitoring Minimise high noise intensity works during OOHW Use low noise piling techniques where feasible Ensure adequate respite provided to nearby residential receivers MM NV4-NV15 	C4	L4	Medium
Aboriginal heritage	A lack of mitigation measures and management systems in relation to Aboriginal heritage leads to poor integration of heritage values in design and impacts on heritage items outside of what has been approved.	C3	L3	High	<ul style="list-style-type: none"> Unexpected Finds Procedure Continued consultation with registered Aboriginal parties Inductions and training prior to works starting for awareness and artifact recognition MM AH2, AH5-AH6, AH8-AH9 	C5	L4	Low

Risk Area	Risk Statements	C	L	Initial Risk Rating	Controls	C	L	Residual Risk Rating
Non-Aboriginal heritage	A lack of mitigation measures and management systems in relation to non-Aboriginal heritage leads to poor integration of heritage values in design and impacts on heritage items outside of what has been approved.	C3	L3	High	<ul style="list-style-type: none"> • Unexpected Finds Procedure • Design refinements to avoid direct impact where possible • Archaeological research and excavation framework to be implemented • Settlement and vibration monitoring • MM NAH2-NAH3, NAH9, NAH11 	C5	L4	Low
Biodiversity	A lack of mitigation measures and management systems in relation to biodiversity leads to unreasonable impacts to flora and fauna, spread of weeds and pathogens, and unintended vegetation clearance.	C2	L3	High	<ul style="list-style-type: none"> • BMP • Hygiene controls, vegetation clearing and fauna handling management procedures • Maintain clear delineation of clearing works and retained vegetation • Fauna monitoring program implemented • MM BD1, BD11-BD13, BD15-BD16 	C3	L4	Medium

Risk Area	Risk Statements	C	L	Initial Risk Rating	Controls	C	L	Residual Risk Rating
Flooding, Hydrology and Water Quality	A lack of mitigation measures and management systems in relation to soil and water leads to unexpected pollution events, water quality impacts on adjacent water bodies, and soil erosion.	C2	L3	High	<ul style="list-style-type: none"> • SWMP • Stockpile management away from waterways and outside of flood prone areas • Flood management strategy and emergency response plan • Ongoing consultation with NSW State Emergency Service • Water discharge and reuse guidelines • Erosion and sediment control plans • Water quality monitoring implemented • MM W7-W11, W13-W14 	C4	L3	Medium
Groundwater and Geology	Not relevant to the Substage A3 scope	N/A	N/A	N/A	<ul style="list-style-type: none"> • Nil 	N/A	N/A	N/A
Soils and contamination	A lack of mitigation measures and management systems in relation to soil and water leads to unexpected pollution events, water quality impacts on adjacent water bodies and aquatic ecology, and soil erosion.	C3	L3	High	<ul style="list-style-type: none"> • SWMP • Unexpected contaminated land and Asbestos Finds procedure • Acid Sulphate soils management plan • Detailed site investigations and remediation action plans • Independent site auditor to review the scope and results of investigations • Erosion and sediment controls • MM CS1, CS3-CS5, CS7-CS13 	C3	L4	Medium

Risk Area	Risk Statements	C	L	Initial Risk Rating	Controls	C	L	Residual Risk Rating
Resource Management	A lack of mitigation measures and management systems in relation to waste management leads to excessive waste generation, and inappropriate waste classification and disposal.	C4	L3	Medium	<ul style="list-style-type: none"> EPA Waste Classification guidelines and procedures Material procurement and resource use to be in accordance with Sustainable Design Guidelines MM WR2, WR4-WR6 	C5	L4	Low
Land use and property	A lack of mitigation measures and management systems in relation to land use and property lead to impacts outside of project approval.	C4	L3	Medium	<ul style="list-style-type: none"> Ongoing consultation with landowners and key stakeholders Personal Relationship Manager to be available for residential landowners and/or tenants affected by land acquisition Vegetation clearing minimised to the greatest extents practical MM LP5-LP8 	C3	L4	Medium
Visual Impact	A lack of mitigation measures and management systems in relation to visual amenity leads to unreasonable visual impacts on the surrounding community, landscape features and poor landscape design outcomes.	C4	L3	Medium	<ul style="list-style-type: none"> Design refinements to avoid and minimise impact on trees Tree register to be kept for all potentially impacted trees and a tree offset strategy developed to offset the loss of any trees Lighting designed to minimise light spill and glare Construction site hoarding to be installed at compounds on Wharf Road and Wentworth Point north MM LV4, LV7-LV11 	C5	L4	Low

Risk Area	Risk Statements	C	L	Initial Risk Rating	Controls	C	L	Residual Risk Rating
Social and economic	Amenity impacts not appropriately mitigated or managed lead to unreasonable impacts on the community. A lack of mitigation measures and management systems in relation to community management results in community concern.	C4	L2	High	<ul style="list-style-type: none"> Community communication strategy Enquiries and complaint management systems Social impact management plan MM SE1-SE12 	C5	L3	Medium
Air Quality	A lack of mitigation measures and management systems in relation to air quality management leads to unreasonable particulate pollutant emissions from construction activities.	C4	L3	Medium	<ul style="list-style-type: none"> Air quality monitoring MM AQ3 	C5	L4	Low
Hazard and risk	A lack of management systems in relation to hazards and risks leads to breaches of legislation and environmental standards	C3	L2	High	<ul style="list-style-type: none"> CEMP NSW guidelines Spill response procedures To be included in CEMP risk assessment MM HR3-HR4, HR8 	C3	L4	Medium
Cumulative impacts	A lack of management systems in relation to cumulative impacts leads to excessive impacts on local community	C4	L5	Low	<ul style="list-style-type: none"> Cumulative construction transport and traffic impacts to be reviewed and coordinated with other projects To be included in CEMP Risk Assessment 	C5	L5	Low

Risk assessment for Substage A4 – Main construction works, testing and commissioning

Risk Area	Risk Statements	C	L	Initial Risk Rating	Controls	C	L	Residual Risk Rating
General Environmental Management	A lack of environmental management systems leads to non-compliance with the project requirements	C2	L3	High	<ul style="list-style-type: none"> Final CEMP Sub-plans and monitoring programs Environmental inspections Environmental monitoring Reporting, auditing and review 	C3	L4	Medium
Transport and Access	A lack of mitigation measures and management systems in relation to traffic leads to frequent non-compliance with the project requirements	C3	L3	High	<ul style="list-style-type: none"> TAMP Consultation with stakeholders, agencies and community Road safety audits where changes to road network are proposed / implemented Parking management strategy Implementation of new stops and services for public transport Detailed site planning including haul roads and heavy and light vehicle separation MM TT7-TT9, TT11-TT16, TT18-TT19 	C3	L4	Medium

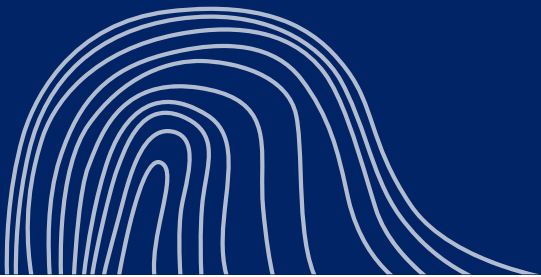
Risk Area	Risk Statements	C	L	Initial Risk Rating	Controls	C	L	Residual Risk Rating
Maritime and Navigation	A lack of mitigation measures and management systems results in unplanned closure of the navigation channel. Impact from construction mobilise river-bed sediments which impact the water quality of the Parramatta River	C2	L2	Very High	<ul style="list-style-type: none"> MNMP Clear delineation of marine work areas Site specific environmental work method statement which includes a range of mitigation measures to manage marine impacts and interactions with the navigation channel Consultation with relevant stakeholders MM TT10 	C2	L4	High
Noise and vibration	A lack of mitigation measures and management systems in relation to noise and vibration leads to unreasonable impacts on residents and businesses, and structural damage to buildings or heritage items.	C3	L2	High	<ul style="list-style-type: none"> NVMP OOHW protocol Standard and project specific mitigation measures 2.4m minimum high solid hoarding to be installed around compounds on Wharf Road and Wentworth Point north Noise and vibration monitoring Minimise high noise intensity works during OOHW Ensure adequate respite provided to nearby residential receivers MM NV4-NV15 	C4	L3	Medium

Risk Area	Risk Statements	C	L	Initial Risk Rating	Controls	C	L	Residual Risk Rating
Aboriginal heritage	A lack of mitigation measures and management systems in relation to Aboriginal heritage leads to poor integration of heritage values in design and impacts on heritage items outside of what has been approved.	C3	L3	High	<ul style="list-style-type: none"> ACHMP Unexpected Finds Procedure Continued consultation with registered Aboriginal parties Inductions and training prior to works starting for awareness and artefact recognition MM AH2, AH5-AH9 	C4	L4	Medium
Non-Aboriginal heritage	A lack of mitigation measures and management systems in relation to non-Aboriginal heritage leads to poor integration of heritage values in design and impacts on heritage items outside of what has been approved.	C3	L3	High	<ul style="list-style-type: none"> HMP Unexpected Finds Procedure Design refinements to avoid direct impact where possible Archaeological research and excavation framework to be implemented Settlement and vibration monitoring MM NAH2-NAH3, NAH8-NAH9, NAH11 	C4	L4	Medium
Biodiversity	A lack of mitigation measures and management systems in relation to biodiversity leads to unreasonable impacts to flora and fauna, spread of weeds and pathogens, and unintended vegetation clearance.	C2	L2	Very High	<ul style="list-style-type: none"> BMP Hygiene controls, vegetation clearing and fauna handling management procedures Maintain clear delineation of clearing works and retained vegetation Removal of remaining trees and vegetation Biodiversity offsets finalised Fauna monitoring program MM BD1, BD11-BD16 	C3	L3	High

Risk Area	Risk Statements	C	L	Initial Risk Rating	Controls	C	L	Residual Risk Rating
Flooding, Hydrology and Water Quality	A lack of mitigation measures and management systems in relation to soil and water leads to unexpected pollution events, water quality impacts on adjacent water bodies, and soil erosion.	C2	L1	Very High	<ul style="list-style-type: none"> SWMP Stockpile management away from waterways and outside of flood prone areas Flood management strategy and emergency response plan Ongoing consultation with NSW State Emergency Service Water discharge and reuse guidelines Erosion and sediment control plans Water quality monitoring MM W6-W14, W16 	C3	L3	High
Groundwater and Geology	Not relevant to the Substage A4 Scope	N/A	N/A	N/A	<ul style="list-style-type: none"> N/A 	N/A	N/A	N/A
Soils and contamination	A lack of mitigation measures and management systems in relation to soil and water leads to unexpected pollution events, water quality impacts on adjacent water bodies and aquatic ecology, and soil erosion.	C2	L2	Very High	<ul style="list-style-type: none"> SWMP Unexpected contaminated land and Asbestos Finds procedure Acid Sulphate soils management plan Detailed site investigations and remediation action plans Independent site auditor to review the scope and results of investigations Erosion and sediment controls MM CS1, CS3-CS5, CS7-CS13 	C4	L4	Medium

Risk Area	Risk Statements	C	L	Initial Risk Rating	Controls	C	L	Residual Risk Rating
Resource Management	A lack of mitigation measures and management systems in relation to waste management leads to excessive waste generation, and inappropriate waste classification and disposal.	C4	L2	High	<ul style="list-style-type: none"> WRMP Waste Classification procedures Material procurement and resource use to be in accordance with Sustainable Design Guidelines MM WR1-WR6 	C4	L4	Medium
Land use and property	A lack of mitigation measures and management systems in relation to land use and property lead to impacts outside of project approval.	C4	L4	Medium	<ul style="list-style-type: none"> Ongoing consultation with landowners and key stakeholders Personal Relationship Manager to be available for residential landowners and/or tenants affected by land acquisition Vegetation clearing minimised to the greatest extents practical MM LP5-LP11 	C5	L4	Low
Visual Impact	A lack of mitigation measures and management systems in relation to visual amenity leads to unreasonable visual impacts on the surrounding community, landscape features and poor landscape design outcomes.	C3	L3	High	<ul style="list-style-type: none"> Design refinements to avoid and minimise impact on trees Tree register to be kept for all potentially impacted trees and a tree offset strategy developed to offset the loss of any trees Lighting designed to minimise light spill and glare Construction site hoarding to be installed at compounds on Wharf Road and Wentworth Point north MM LV4, LV7-LV14 	C3	L4	Medium

Risk Area	Risk Statements	C	L	Initial Risk Rating	Controls	C	L	Residual Risk Rating
Social and economic	Amenity impacts not appropriately mitigated or managed lead to unreasonable impacts on the community. A lack of mitigation measures and management systems in relation to community management results in community concern.	C3	L2	High	<ul style="list-style-type: none"> Community communication strategy Enquiries and complaint management systems Social impact management plan MM SE1-SE12 	C5	L3	Medium
Air Quality	A lack of mitigation measures and management systems in relation to air quality leads to unreasonable particulate pollutant emissions from construction activities.	C3	L3	High	<ul style="list-style-type: none"> AQMP Air quality monitoring Energy and greenhouse gas strategy Odour management strategy and odour surveys MM AQ1-AQ3 	C4	L4	Medium
Hazard and risk	A lack of management systems in relation to hazards and risks leads to breaches of legislation and environmental standards	C2	L2	Very High	<ul style="list-style-type: none"> CEMP Implementation of NSW guidelines Spill response procedures To be included in CEMP risk assessment MM HR3-HR4, NH7-NH8 	C2	L4	High
Cumulative impacts	A lack of management systems in relation to cumulative impacts leads to excessive impacts on local community	C2	L3	High	<ul style="list-style-type: none"> Cumulative construction transport and traffic impacts to be reviewed and coordinated with other projects To be included in CEMP Risk Assessment 	C3	L4	Medium



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