



Staging Report

Western Harbour Tunnel and Warringah Freeway
Upgrade (SSI 8863)

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6.2	21 March 2023	Final	Revision to address DPE comments	TfNSW Environment Team

Glossary / Abbreviations

Abbreviation	Expanded Text
AA	Acoustic Advisor
BL	Beaches Link (proposed project)
CEMF	Construction Environmental Management Framework
CEMP	Construction Environmental Management Plan
CGC	Cammeray Golf Course adjustment works, Stage 1B of the Western Harbour Tunnel and Warringah Freeway Upgrade
CoA	Conditions of approval
CNVIS	Construction Noise and Vibration Impact Statement
COVID-19	Coronavirus disease
CUT	Critical utility installation, relocation and protection, Stage 1A of the Western Harbour Tunnel and Warringah Freeway Upgrade
DPE	NSW Department of Planning and Environment
EIS	Western Harbour Tunnel and Warringah Freeway Upgrade Environmental Impact Statement (January 2020)
EPA	NSW Environment Protection Authority
ER	Environmental Representative
ITS	Intelligent Transport System
Low Impact Work	Low impact work as defined in the Conditions of Approval includes: (a) site establishment work approved under a Site Establishment Management Plan; (b) operation of ancillary facilities if the ER has determined the operational activities will have minimal impact on the environment and community; (c) minor clearing and relocation of native vegetation, as identified in the documents listed in Condition of Approval A1; (d) installation of mitigation measures including erosion and sediment controls, temporary exclusion fencing for sensitive areas and at-property treatments (including the implementation of the NIP);

Abbreviation	Expanded Text
	(e) property acquisition adjustment work including installation of property fencing, and relocation and adjustments of utilities to property including water supply and electricity; (f) relocation and connection of utilities where the relocation or connection has a minor impact to the environment as determined by the ER; (g) archaeological testing under the Code of practice for archaeological investigation of Aboriginal objects in NSW (DECCW, 2010) or archaeological monitoring undertaken in association with (a) – (f) above to ensure that there is no impact on heritage items; (h) the relocation of Cape Don and Baragoola historic vessels as permitted subject to Condition of Approval E53; (i) adjustment of Cammeray Golf Course as identified in Condition of Approval E101 and relocation of the Cammeray Golf Club dam / harvesting scheme subject to Condition of Approval E209; (j) noise barrier / wall between Massey and Amherst Street, Cammeray as identified in Condition of Approval E183 and Appendix C; (k) maintenance of existing buildings and structures required to facilitate the carrying out of the CSSI; and (l) other activities determined by the ER to have minimal environmental impact 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. Notwithstanding the following works are not Low Impact Work: (a) where heritage items (excluding those impacted by activities (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 in consultation with Heritage NSW, EESG or DPI Fisheries (in the case of impact upon fish,

Abbreviation	Expanded Text
	aquatic invertebrates or marine vegetation); and (b) any night time (hours as defined by the ICNG) work that exceeds noise management levels as identified in Condition of Approval E68(b)(i) The low impact work described in this definition becomes construction with the approval of a Construction Environmental Management Plan.
MH	Maritime Heritage – relocation of historic vessels <i>M.V. Cape Don and Baragoola</i> , Stage 1E of the Western Harbour Tunnel and Warringah Freeway Upgrade
Minister, the	Minister for Planning and Public Space (or delegate)
M2A	Massey to Amherst noise barrier, Stage 1C of the Western Harbour Tunnel and Warringah Freeway Upgrade
NSW	New South Wales
OOHW	Out of Hours Works
Project, the	Western Harbour Tunnel and Warringah Freeway Upgrade Project
REMM	Revised Environmental Management Measure as outlined in the project RtS documentation.
ROL	Road Occupancy Licence
RtS	Western Harbour Tunnel and Warringah Freeway Upgrade Response to Submissions (September 2020)
SCO	Sydney Coordination Office
SSI	State Significant Infrastructure
TfNSW	Transport for New South Wales
TMC	Transport Management Centre
WFU	Warringah Freeway Upgrade, Stage 2 of the Western Harbour Tunnel and Warringah Freeway Upgrade
WHT	Western Harbour Tunnel project, Stage 3 of the Western Harbour Tunnel and Warringah Freeway Upgrade

Abbreviation	Expanded Text
WHTCP	Western Harbour Tunnel construction power, Stage 1D of the Western Harbour Tunnel and Warringah Freeway Upgrade
WHTWFU	Western Harbour Tunnel and Warringah Freeway Upgrade (SSI 8863)

1 Introduction

1.1 Purpose of this Staging Report

This Staging Report has been prepared and structured to address the requirements of Conditions of Approval (CoA) A10 to A14 of the Western Harbour Tunnel and Warringah Freeway Upgrade (SSI 8863) (WHTWUFU/ the project) planning approval. Table 1 cross-references sections in this report that address each applicable planning approval requirement relating to the Staging Report.

The Department of Planning and Environment (DPE) has been advised of the status of the project prior to the commencement of each stage.

Updates to this Staging Report will be made as required, particularly following the determination of any project modifications or changes to the delivery strategy (refer to Sections 2.2). Where amendments to the proposed staging occur, a revised Staging Report will be prepared in consultation with DPE and will be submitted in accordance with CoA A14.

Table 1: Staging Report Planning Approval condition cross references

CoA	Condition requirement(s)	Staging Report Section
A1	The Proponent must carry out the CSSI in accordance with the terms of this approval and generally in accordance with the: a) Western Harbour Tunnel and Warringah Freeway Upgrade Environmental Impact Statement – Volumes 1A-B and 2A-J (dated January 2020) (the EIS); and b) Western Harbour Tunnel and Warringah Freeway Upgrade Response to Submissions Report (dated September 2020) (the RtS).	This document
A2	The CSSI must only be carried out in accordance with all procedures, commitments, preventative actions, performance criteria and mitigation measures set out in the documents listed in Condition A1 unless otherwise specified in, or required under, this approval.	This document.
A10	The CSSI may be constructed and operated in stages. Where staged construction or operation is proposed, a Staging Report (for either or both construction and operation as the case may be) must be prepared and submitted to the Planning Secretary for information. The Staging Report must be Endorsed by the ER and then submitted to the Planning Secretary no later than one month before the commencement of construction of the first of the proposed stages of construction (or if only staged operation is proposed, one month before the commencement of operation of the first of the proposed stages of operation).	This report must be submitted to the Planning Secretary for information one month prior to the commencement of the first stage.
A11	The Staging Report must: (a) if staged construction is proposed, set out how the construction of the whole of the CSSI will be staged, including details of work and other activities to be carried out in each stage and the general timing of when construction of each stage will commence and finish;	Sections 2.2 and 2.4 outline the activities which will occur within each construction stage and an indicative program for the works.

CoA	Condition requirement(s)	Staging Report Section
	(b) if staged operation is proposed, set out how the operation of the whole of the CSSI will be staged, including details of work and other activities to be carried out in each stage and the general timing of when operation of each stage will commence and finish (if relevant);	Sections 2.3 and 2.4 outline the activities which will occur within each operational stage and an indicative program for the works.
	(c) specify how compliance with conditions will be achieved across and between each of the stages of the CSSI; and	Section 3 discusses the environmental management system which would be implemented on the project to manage compliance across the stages of the Project.
	(d) set out mechanisms for managing any cumulative impacts arising from the proposed staging.	Section 2.6 includes details on how cumulative impacts will be managed.
A 12	The CSSI must be staged in accordance with the Staging Report, as approved by the Planning Secretary.	The project will be staged in accordance with this report which will be submitted for information to the Planning Secretary prior to the commencement of the stage.
A13	Where staging is proposed, the terms of this approval that apply or are relevant to the works or activities to be carried out in a specific stage must be complied with at the relevant time for that stage.	Appendix A and Appendix B allocate the applicability of each CoA and Revised Environmental Mitigation Measures (REMMs) to each stage of the project.
A14	Where changes are proposed to the staging of construction or operation, a revised Staging Report must be prepared and submitted to the Planning Secretary for approval no later than one month prior to the proposed change in the staging.	This report will be revised, endorsed by the ER and submitted to the Planning Secretary no later than one month prior to the proposed change in the staging.

1.2 Background

The Western Harbour Tunnel and Warringah Freeway Upgrade (WHTWUFU) project comprises a new tolled motorway tunnel connection across Sydney Harbour, and an upgrade of the Warringah Freeway to integrate the new motorway infrastructure with the existing road network and to connect to the future proposed Beaches Link and Gore Hill Freeway Connection project.

Due to its importance, the WHTWUFU was declared to be critical state significant infrastructure (CSSI) by the Minister for Planning and Public Spaces on 9 November 2020.

On 21 January 2021, the Department of Planning and Environment (DPE), formerly the Department of Planning, Industry and Environment (DPIE) approved the construction and operation of the WHTWUFU.

1.3 Project Description

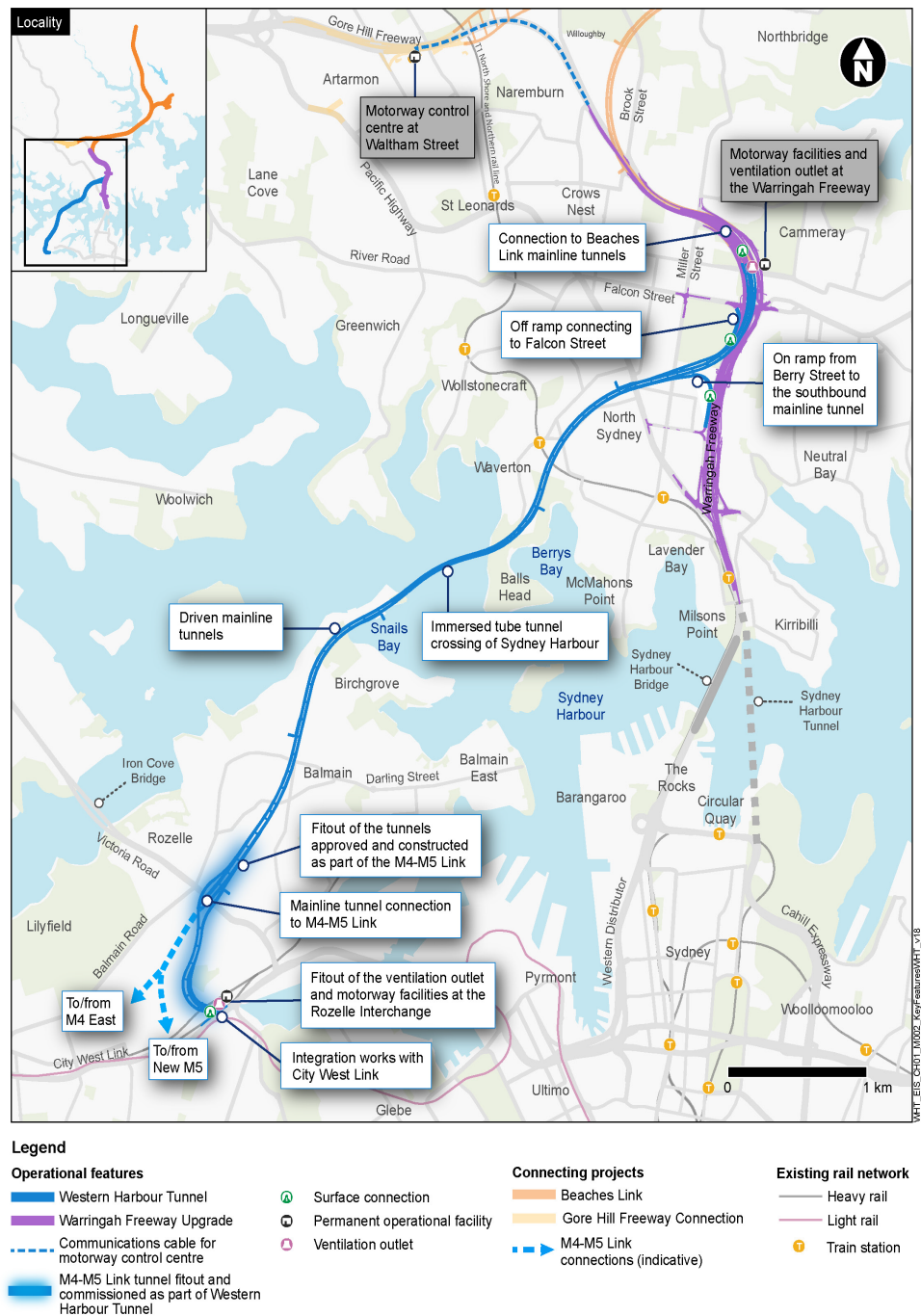
The WHTWUFU project comprises of two main components:

- A new crossing of Sydney Harbour involving twin tolled motorway tunnels connecting the M4-M5 Link at Rozelle and the existing Warringah Freeway at North Sydney (the Western Harbour Tunnel (WHT)) (refer to Figure 1)
- Upgrade and integration works along the existing Warringah Freeway, including infrastructure required for connections to the future proposed Beaches Link and

Gore Hill Freeway Connection project (the Warringah Freeway Upgrade (WFU)) (refer to Figure 2).

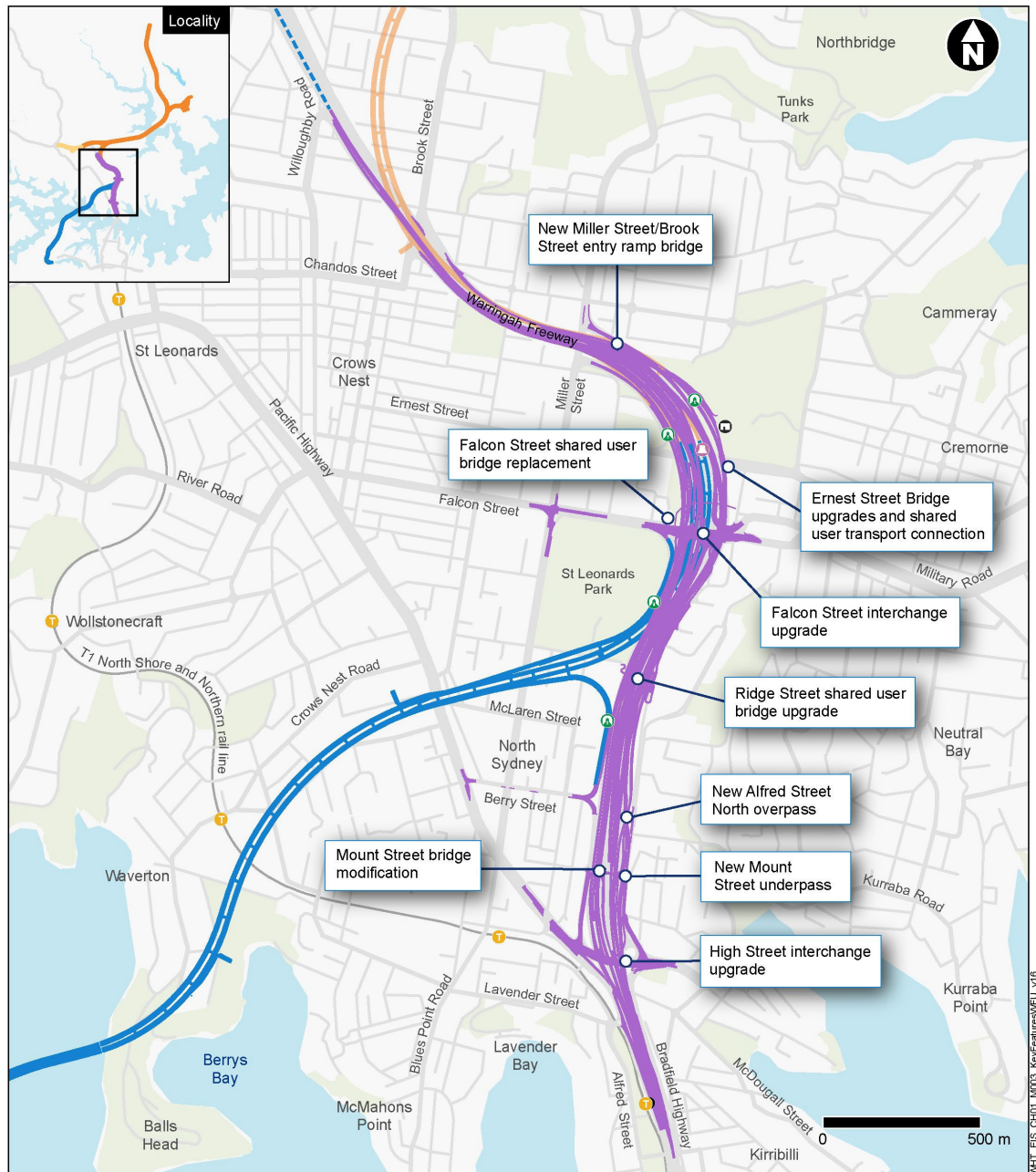
The WHTWU project has been split into two separate projects, which will be delivered by TfNSW.

A detailed description of the Project is provided in Chapter 5 of the Western Harbour Tunnel and Warringah Freeway Upgrade Environmental Impact Statement (EIS).



(Reference: Western Harbour Tunnel and Warringah Freeway Upgrade Environmental Impact Statement, Figure 1-2)

Figure 1: Key features of the Western Harbour Tunnel component of the project



Legend

Operational features

- Warringah Freeway Upgrade
- Western Harbour Tunnel
- Communications cable for motorway control centre
- Surface connection
- Permanent operational facility
- Ventilation outlet

Connecting projects

- Beaches Link

Existing rail network

- Heavy rail
- Train station

(Reference: Western Harbour Tunnel and Warringah Freeway Upgrade Environmental Impact Statement, Figure 1-3)

Figure 2: Key features of the Warringah Freeway Upgrade component of the project

2 Project Staging

2.1 Overview

TfNSW has elected to stage portions of the project in response to further planning and feedback received from stakeholders and industry consultation.

The staging strategy for the project focuses on balancing the need for construction to occur in a safe and efficient manner, while managing constructability constraints, reducing the cumulative impacts and minimising impacts on local communities, the environment, and users of the surrounding road and other transport networks.

The duration of construction is significantly influenced by the complexity and magnitude of the interfaces between the various scopes of work. The staging strategy seeks to minimise the risk to delivery timing and impacts on nearby communities, including cumulative impacts from construction (refer to Section 2.6).

The stages of the project comprise of:

Stage 1 - Early and enabling works:

- Stage 1A – Critical utility installation, relocation and protection (CUT)
(commencement of construction 19 May 2021)
- Stage 1B – Cammeray Golf Course adjustment works (CGC)
(commencement of construction 15 August 2022)
- Stage 1C – Massey to Amherst noise wall (M2A)
(commencement of construction 9 December 2021)
- Stage 1D – WHT construction power and utilities (WHTCP)
(commencement of works 25 June 2021) – Works on hold December 2022 subject to methodology changes for WHT Stage 3B
- Stage 1E – Berry's Bay – Berry's Bay archaeological investigation (BB)

Stage 2 - Warringah Freeway Upgrade project:

- Stage 2 – Warringah Freeway Upgrade (WFU) (commencement of construction 23 May 2022)

Stage 3 - Western Harbour Tunnel project (WHT).

- Stage 3A – WHT Southern Tunnel Works (commencement of construction 30 January 2023)
- Stage 3B - Northern Tunnelling and Integration works, which include:
 - Integration with the WHT Southern Tunnels Works near Birchgrove (Chainage 2750) on the southern zone, aka the Stage 3A.
 - integration with the Warringah Freeway Upgrade works in the north near Cammeray, incorporating a north bound off-ramp at Falcon Street, southbound on-ramp at Berry Street, aka the northern approach and integration.
- Stage 3C – Sydney Harbour Crossing between Birchgrove and Balls Head, Waverton.

Further information on the works comprising each stage is contained in Section 2.2.

2.1.1 The Staging Rationale

The rationale for the staged construction and operation of the project is based on the following considerations:

- Making the scope of the project more manageable by dividing the works into numerous construction contracts
- Ensure the following pre-construction activities are carried out ahead of main construction activities, to ensure they can continue unhindered:
 - Critical utility installation, relocation and protection.
 - Cammeray Golf Course adjustment works.
 - Installation of the Massey to Amherst noise wall.
 - Installation of construction power and utilities for tunnelling support sites, and
 - Archaeological investigations.
- Minimising impacts on key stakeholders by relocating utilities and golf course facilities prior to the main works
- Limit as far as possible concurrent activities at any one time, minimising cumulative impacts within the construction footprint
- Action and satisfy proposed REMMs as detailed in the project EIS/RtS. This approach is intended to mitigate impacts on the community and environment, ahead of expected construction impacts
- Keeping with Government advice on staggering activities to limit the potential spread of COVID 19
- Result in a shorter construction program overall, as well as earlier completion of the asset.

The project will be operated in two stages, with the operation of the WFU and WHT projects commencing in accordance with the staged construction strategy.

2.2 Construction Stages

2.2.1 Early and enabling works

The early and enabling works comprise the following stages:

- Critical utility installation, relocation and protection (CUT).
- Cammeray Golf Course adjustment works (CGC).
- Massey to Amherst noise wall (M2A).
- Construction power and utilities for WHT (WHTCP), and
- Berry's Bay archaeological investigation works (BB).

2.2.1.1 Critical utility installation, relocation and protection (CUT)

The critical utility installation, relocation and protection stage of the project will include the following works:

- Alfred Street North, Neutral Bay
 - Relocation of existing in-ground Sydney Water sewer mains
 - Relocation and undergrounding of existing Ausgrid overhead and in-ground assets
 - Relocation of existing communication provider assets, including Telstra (in-ground), Optus (including overhead and in-ground assets), TPG (in-ground assets) and NBN (in-ground assets)
- Arthur Street/High Street, North Sydney
 - Relocation of existing in-ground Ausgrid assets
 - Relocation of various in-ground communication provider assets, including Vocus, Optus, Verizon, TPG, UeComm and Telstra
 - Relocation of two existing Sydney Harbour Tunnel fire hydrant booster stations on Arthur Street and Mount Street
 - Relocation of existing in-ground 415V feed to Sydney Harbour Tunnel control room
 - Installation of enabling infrastructure and equipment for Sydney Harbour Tunnel ITS Gantry
- Cammeray Avenue / Ernest Street / Cammeray Golf Course
 - Relocation of existing in-ground Ausgrid assets
 - Removal of existing disused in-ground 132kV and 33kV Ausgrid assets
 - Relocation of existing in-ground Sydney Water sewer and potable water mains
 - Relocation of existing in-ground UeComm communication provider assets
 - Installation of new permanent Intelligent Transport System (ITS) node and temporary connections
 - Installation of temporary construction power supply along Ernest Street from Ben Boyd Road to the Cammeray Golf Course site (WHT10).
- Sydney Harbour Bridge*
 - Installation of enabling infrastructure and equipment on the existing ITS Gantry 9
 - Gantry leg reinforcement
 - Installation of power and communications infrastructure

*These works are the subject to a Heritage Impact Assessment and consistency assessment to demonstrate an improved outcome for the heritage impacts on the Sydney Harbour Bridge

2.2.1.2 Cammeray Golf Course adjustment works (CGC)

The Cammeray Golf Course adjustment works include works required under REMMs WQ8 and LP7, and CoA E101, E197 and E209, including:

- Installation of a new permanent replacement stormwater harvesting dam (and associated infrastructure) within Cammeray Golf Course prior to decommissioning of the existing dam
- An active transport link through Cammeray Golf Course between Ernest Street and Warringah Road / Bells Avenue, Cammeray must be provided prior to the removal of the existing path, and
- Adjustments to the golf course to maintain its viability, including:
 - Demolition and removal of redundant paths
 - Installation of a temporary Active Transport Link*
*note: these works are proposed to be undertaken as low-impact works, prior to works under the CEMP, subject to the assessment outlined in section 3.3.1
 - Vegetation trimming and removal
 - Utility protection and adjustment works
 - Earthworks and construction of retaining walls
 - Installation of irrigation and drainage infrastructure for the 9 hole golf course
 - Landscaping and plantings for 9 hole golf course

2.2.1.3 Massey to Amherst Street noise barrier

The existing Massey to Amherst Street noise barrier is impacted by the widening of the Warringah Freeway and the installation of the new noise barrier is programmed to occur before the start of the construction of the Warringah Freeway Upgrade. The works will include:

- Vegetation trimming and removal
- The demolition and removal of the existing noise wall section
- Excavation and civil works
- Construction of pile foundations and footings
- Construction and installation of new noise barrier
- Reinstatement works including backfilling, installation of rock face, fencing, and landscape paving
- Road reinstatement works including mill and re-sheet, and line marking

2.2.1.4 Construction power and utilities for WHT

The construction power and utility installation for Western Harbour Tunnel is on hold and is subject to further design development associated with the change in methodology for Stage 3B.

2.2.1.5 Berrys Bay archaeological investigation works (BB)

Prior to the establishment of the WHT7 Berry's Bay ancillary facility, TfNSW will undertake archaeological investigation works at the BP Site, Waverton.

The archaeological investigation works will include;

- Undertaking archaeological salvage excavations.
- Record results and undertake artefact processing from the archaeological excavation, and
- Reinstate site in original condition.

2.2.2 Warringah Freeway Upgrade project

The Warringah Freeway Upgrade works will include:

- Assessment and installation of at-property treatments and noise walls to mitigate construction noise from the project
- Site preparation works including clearing of vegetation, installation of temporary fencing and hoarding, installation of environmental controls including erosion and sedimentation controls
- Establishment of ancillary facilities at High Street south (WFU2), High Street north (WFU3), Arthur Street east (WFU4), Berry Street east (WFU5), Ridge Street east (WFU6), Merlin Street (WFU7), Cammeray Golf Course (WFU8) and Rosalind Street (WFU9) and Northern Hub (NH1)
- Operation of ancillary facilities at High Street south (WFU2), High Street north (WFU3), Arthur Street east (WFU4), Berry Street east (WFU5), Ridge Street east (WFU6), Ridge Street North (WHT9), Merlin Street (WFU7), Cammeray Golf Course (WFU8), Rosalind Street (WFU9) and Northern Hub (NH1)
- Preparation of the Cammeray Golf Course construction support site for the benefit of the WHT works and proposed BL works
- Utility installation, relocation and protection (in addition to the CUT stage works), including new and relocated drainage and installation of Intelligent Transport System (ITS):
 - Underbore and service relocation from Ernest Street through Cammeray Avenue to Rosalind Street
 - ITS node construction (move from Ernest Street to Rosalind)
 - Northbound verge ITS trenching works (between Ch2800- Ch3050)
- CCTV and cleaning of existing drainage structure

- Construction of retaining walls, including excavation, piling, installation of concrete footings, provision of structural support (i.e., rock anchors or soil nails), shotcreting, drainage structures, installation of panels and backfilling of retaining wall structure
- Construction of the new Ridge Street Pedestrian Bridge, including localised excavation, piling, concrete works, roadworks, installation of bridge spans, stairs and ramp and demolition works
- Bridge modifications and widening works to the Mount Street bridge and Falcon Street bridge and entry and exit ramps including installation of traffic barriers, concrete works, installation of structural steel, installation of drainage, asphaltting and line marking
- Realignment of traffic including demolition of existing barriers, rock walls, drainage, lighting and signage, asphaltting works
- Construction of the bridge over Alfred Street exit ramp including excavation and concrete works
- High Street bridge widening and ramps including piling and concrete works
- Bulk earthworks for the widening of the Warringah Freeway into the Cammeray Golf Course, including the micro tunnel for the Green Park drainage pipe (1500mm diameter) from the (proposed) Beaches Link compound
- Construction of Warringah Freeway southbound bus lanes including piling and concrete works
- Construction of the Mount Street (North Street) and Ernest Street (Cammeray) underpasses including excavation, piling and concrete works.
- Construction of the inner carriage way:
 - Directional sign removal and relocation to Ernest Street
 - Rock excavation and piling for the WHT cut and cover structure
- Demolition and construction of footpaths at the Falcon and Miller Street intersection
- Installation of stormwater drainage
- Upgrade or capacity improvements of other cross drainage structures which cross underneath the Warringah Freeway
- Upgrade and capacity improvements to the drainage pipelines along the on and off ramps connecting the Warringah Freeway with the existing culvert crossing near Brook Street at Cammeray/Crows Nest
- Upgrading local and arterial roads connecting to the Warringah Freeway Upgrade
- Road pavement works
- Installation of shared user paths and cycleways
- Surface finishing works such as linemarking and the installation of directional signage and other roadside furniture

- Final landscape treatments and rehabilitation works
- Testing and commission works
- Site clean-up and demobilisation including the reinstatement of construction support sites, post construction condition surveys, removal of construction-related signage, and the removal of construction-related environmental controls and traffic management infrastructure

2.2.3 Western Harbour Tunnel Project (WHT)

The Western Harbour Tunnel project includes:

- Twin mainline tunnels about 6.5 kilometres long connecting the M4-M5 Link at Rozelle to the Warringah Freeway, near Cammeray
- A crossing of Sydney Harbour between Birchgrove and Balls Head – the methodology of the Harbour crossing is currently being revised and will be subject to a Modification to the approval.
- Underground connections to the M4-M5 Link project beneath Rozelle
- Tunnelled ramps and surface connections at Rozelle, North Sydney and Cammeray, including direct connections to and from the Warringah Freeway (including integration with the Warringah Freeway Upgrade), an off ramp to Falcon Street and an on ramp from Berry Street at North Sydney
- Tunnelled stubs for future underground connections to the future proposed Beaches Link and Gore Hill Freeway Connection project under the Warringah Freeway near Cammeray
- Fitout and commissioning of a ventilation outlet and motorway facilities at the Rozelle Interchange
- Construction of a ventilation outlet and motorway facilities at the Warringah Freeway in Cammeray
- Operational facilities including a motorway control centre at Waltham Street, in the Artarmon industrial area, and tunnel support facilities at the Warringah Freeway in Cammeray
- Other operational infrastructure including groundwater and tunnel drainage management and treatment systems, signage, tolling infrastructure, fire and life safety systems, lighting, emergency evacuation and emergency smoke extraction infrastructure, CCTV and other traffic management systems.

2.2.3.1 Stage 3A – WHT Southern Tunnels Package

The WHT Southern Tunnels Package includes:

- Twin mainline tunnels about 2 kilometres long and each accommodating three lanes of traffic in each direction, connecting with the stub tunnels from the M4-M5 Link at Rozelle.

- Connections to the stub tunnels at the M4-M5 Link project in Rozelle.
- Ventilation cavern and tunnel excavation in Rozelle and Balmain.
- Limited in tunnel operational infrastructure including road pavement and drainage to enable Stage 3B works.

2.2.3.2 Stage 3B – WHT Northern Tunnelling and Integration works

The WHT Northern Tunnels work includes:

- Excavation of twin mainline tunnels about 2.5 kilometres long and each accommodating three lanes of traffic in each direction, connecting portals adjacent to the Cammeray Golf Course to the Harbour Crossing section of the tunnel at Berrys Bay.
- Excavation of Falcon Street off-ramp tunnel.
- Excavation of Berry Street on-ramp tunnel.
- Cut and cover infrastructure surface construction at the Ridge Street North construction support site (WHT9), Berry Street and the Warringah Freeway portals.
- Integration works including Mechanical and Electrical (M&E) fit out for the Southern and Northern tunnelling sections, paving, surface connections, ventilation cavern fitout, integration and fitout of the Motorway Operation Centre (MOC) and Motorway Control Centre (MCC)
- Establishment and operation of White Bay (WHT3 – southern portion. The northern portion of WHT3 as described in the EIS will not be used); Ridge Street North (WHT9), and Cammeray Golf Course (WHT10) construction support sites.
- Operation of the City West Link Portal tunnelling support site (WHT12) after the completion of Stage 3A.

2.2.3.3 Stage 3C – WHT Sydney Harbour Crossing

Details of Stage 3C including applicable MCoA and REMMS, will be confirmed following finalisation of the project modification.

2.3 Operation Stages

Operation of the project would be staged as per construction staging, with the WFU stage to commence operation (2025) prior to the WHT stage (2028).

The staging report is focussed on construction and any further proposed staging of operation will be addressed by revising the report as per CoA A14 (refer Section 2.5).

2.4 Indicative timing

Construction of the WHTWFU project commenced in 2021, with completion of construction in 2028. Early and enabling works as well as site establishment works,

were programmed to be carried out first on the project, substantial construction starting in 2022.

An indicative construction and operational program is shown in Table 2 for each stage. The timing specific to each stage will be subject to review as the procurement processes evolve.

2.5 Changes to the Staging

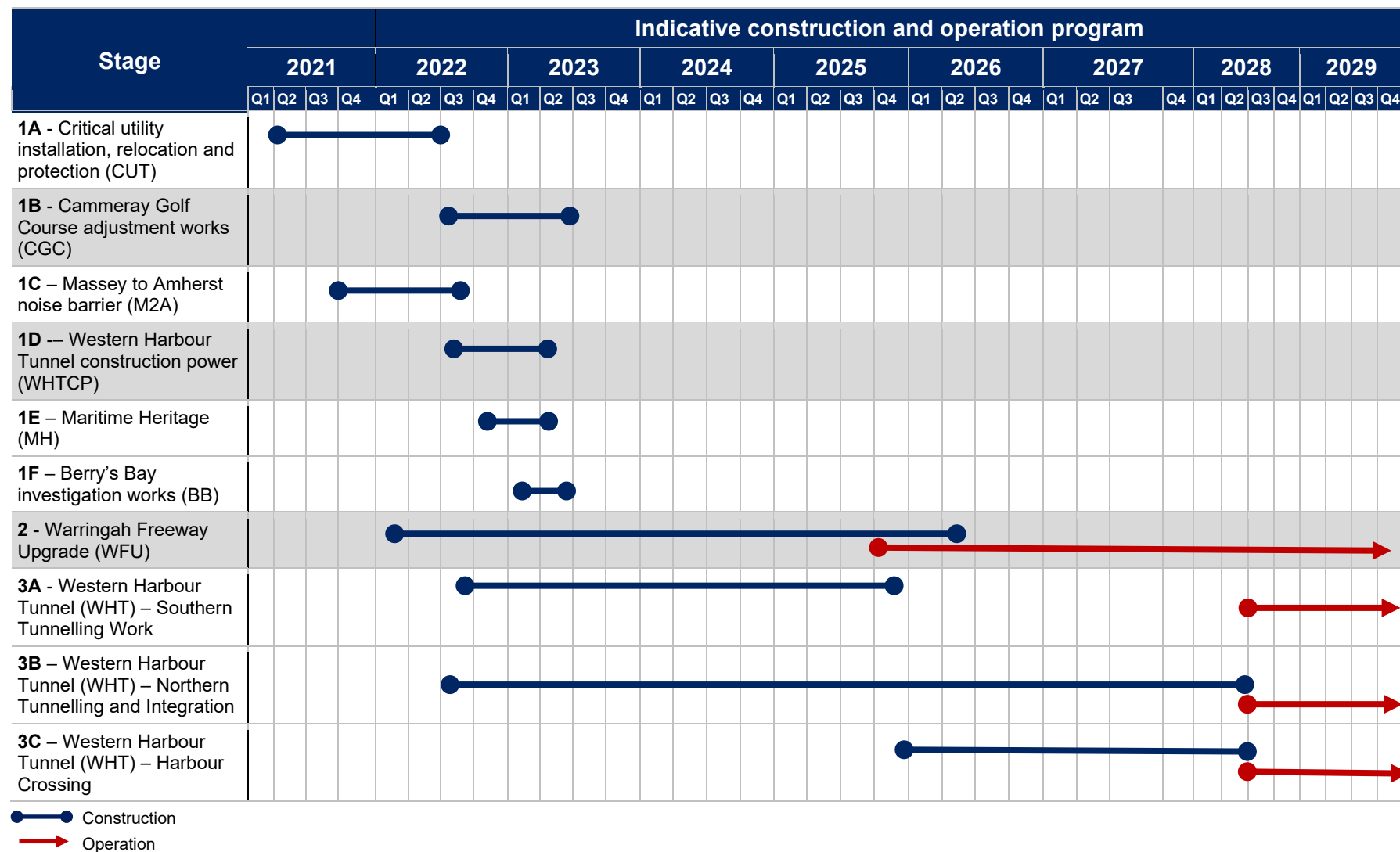
Where changes are proposed to the staging of construction or operation, a revised Staging Report will be prepared, endorsed by the ER and submitted to the Planning Secretary for information no later than one month prior to the proposed change in the staging.

2.6 Revisions to the CEMP and Sub-plans

Condition of Approval C10 states that *“Where construction of the CSSI is staged, construction of a stage must not commence until the CEMP and sub-plans for that stage have been endorsed by the ER and approved by the Planning Secretary”*.

Where updates to the CEMP or Sub-plans are required for phases of the main construction stages, and these changes are minor; do not increase impacts to nearby receivers; or administrative in nature, the ER can approve these changes in accordance with CoA A27(i).

Table 2: Indicative construction and operation stage timeframes



2.7 Cumulative impacts

Cumulative impacts may occur as a result of the project stages being constructed concurrently, or consecutively, with other stages of the project and/ or other approved CSSI or SSI projects in the area, including Stage 1 Early and enabling works, Stage 2 Warringah Freeway Upgrade, Stage 3 Western Harbour Tunnel, WestConnex M4-M5 Link and Rozelle Interchange, Sydney Metro West and the proposed Beaches Link and Gore Hill Freeway Connection project (subject to approval).

TfNSW has elected to stage the Project in an effort to reduce cumulative impacts from the Project overall. This will result in a shorter construction program, reducing the impact and duration in any one work area, as well as an earlier completion of the asset.

Cumulative impacts during construction of the project stages will be managed through compliance with the relevant CoAs, coordination meetings between TfNSW, its contractors, external agencies and stakeholders, and environmental management measures related to key environmental impacts including traffic and access, noise and vibration and construction fatigue.

Key CoAs established to manage cumulative impacts during construction of the project stages include but are not limited to:

- E69 (Out-Of-Hours Work Protocol) to facilitate the coordination of out-of-hours work to ensure appropriate respite is provided to the community
- E82 (Utility Coordination and Respite) to coordinate and ensure respite periods are provided for all work undertaken for the delivery of the CSSI, including those undertaken by third parties (such as utility relocations)
- E83 (Out-of-Hours Works – Community Consultation on Respite) to ensure appropriate respite periods for out-of-hours work are implemented in consultation with the community at each affected location on a regular basis
- E139 (Construction Parking Management) to manage light and heavy vehicle use associated with the CSSI and impacts to the community
- E140 (Construction Parking and Access Strategy) to manage impacts resulting from on- and off-street parking changes during construction of the CSSI
- E154 (Utility Coordination Manager) to manage and coordinate all utility work associated with the delivery of the CSSI and to ensure respite is provided to the community

Further details of how compliance with these requirements will be achieved, monitored and reported during construction are provided in section 3.

Other mechanisms to mitigate cumulative impacts from the CSSI and its multiple stages are provided in sections 2.6.1 to 2.6.5.

2.7.1 Traffic management

Coordination meetings between TfNSW, Contractors and Transport Management Centre (TMC)/ Sydney Coordination Office (SCO) will occur on a regular basis throughout the delivery of the CSSI and its multiple stages. Key issues for discussion at the traffic coordination meetings will include ROLs and any other traffic changes or impacts as a result from the CSSI.

2.7.2 Noise mitigation

OOHW coordination meetings chaired by TfNSW, with representatives from other Contractors (and other projects stages and CSSI projects), including Utility Authorities, working in the vicinity of the project will occur on a weekly basis. The purpose of these meetings is to coordinate out of hours works, to minimise cumulative noise and vibration impacts and maximise respite for affected sensitive receivers as required by the Planning Approval.

TfNSW has also taken the proactive approach and has started to implement a project specific Noise Insulation Program for at property treatment to minimise noise impacts as a result of the CSSI. For further information on noise mitigation and the Noise Insulation Program, refer to <https://v2.communityanalytics.com.au/rms/wht/noise>.

2.7.3 Interface management

The project has multiple interfaces that will be managed, and specific interface agreements will be required for the purpose of facilitating and promoting coordination with relevant third parties such as utility providers and other CSSI/SSI projects.

TfNSW contractor's will be required to enter into an Interface Deed with Contractors and Utility Providers in which they interact with i.e., WFU Contractor will be required to enter into an Interface Deed with the WHT Contractor and the BL Contractor, to coordinate works and minimise cumulative impacts.

2.7.4 Visual amenity and landscape mitigation

The WHTWFU project elements at Cammeray will be constructed in close proximity to elements for the proposed BL project. When preparing the Beaches Link and Gore Hill Freeway Connection environmental impact statement operational landscape and visual amenity impacts were assessed cumulatively with the WFU project. The urban and landscape designs for both projects in this area will be developed to be sympathetic with and consistent with each other, thus minimising cumulative impacts from the projects.

2.7.5 Other measures to minimise cumulative impacts

In order to minimise cumulative impacts TfNSW will have oversight of projects' construction programs and the ability to identify potential cumulative impacts as to the duration and nature (visual, noise, traffic, business disruptions). Once the potential impacts are identified, TfNSW and its principal contractors will trigger appropriate management measures including; for example, hours of operation, respite and other noise mitigation measures (screening, community consultation as to alternate work programs etc.).

The suite of management measures best adapted to the impacted zone will be determined through community consultation. The steps to managing cumulative impacts are:

- Community Consultation Managers' and Environment Managers' to identify suite of REMMs to address cumulative impact via liaison with Sydney Coordinating Office, Councils and other stakeholders or sensitive receivers
- Develop suitable suite of management measures applicable to the area
- Separation of time and place, staging/phasing works to minimise cumulative impacts

- Progressively build cumulative management measures into the respective CEMP/ Sub plans, for example CNVIS, and Traffic Management Plans for specific areas
- Monitor complaints to identify unexpected/emerging cumulative impacts
- Up-date approach and revised CEMP and specific sub-plan updates, as needed.

3 Compliance

3.1 CoA and REMMs

The applicability of the CoA and REMMs to each stage of the project has been assessed, allocated and confirmed. These allocations to each stage of the project are tabled in Appendix A and Appendix B respectively:

- Where a CoA or REMM has been determined to be relevant to a stage, it is defined as **Applicable** to that stage. This indicates that the CoA or REMM will be fully complied with during the stage
- Where a CoA or REMM does not relate to the stage, it is defined as **Not Applicable**. This indicates that the CoA or REMM may not be complied with during the stage
- Where only part of a CoA or REMM relates to the stage, it is defined as **Partial**. This indicates that the CoA or REMM will be at least partially complied with during the stage to the degree explained in Appendix A or Appendix B.

In the event where there is a refinement in design or construction methodology, the change will be considered in the context of consistency with the Minister's approval for the Project. The applicability to the CoA and REMMs to that stage shall also be reviewed as part of the consistency assessment.

Should a project modification be undertaken that requires a change to the MCoAs or REMMs, the staging report will be revised, following approval of the modification, to reflect any changes to the condition allocations.

3.2 Construction Environmental Management Framework

Consistency in environmental management across each stage of the project will be achieved through the implementation of the *WHTWUFU Construction Environmental Management Framework* (CEMF). The CEMF formed part of the Western Harbour Tunnel and Warringah Freeway Upgrade Response to Submissions Report (RtS) and provides a linking document to the Construction Environmental Management Plans (produced by the Proponent and contractors). A link to the CEMF contained in the RtS is provided in Appendix C.

The CEMF provides a whole-of-construction life-cycle approach to construction environmental management and sets the environmental and community engagement requirements for construction. More specifically, it details:

- The Construction Environmental Management Plans (CEMPs), sub-plans and other supporting documentation for each environmental management category (i.e. noise and vibration, visual amenity, etc.)
- Key issues that each sub plan would address, along with the relevant guidelines or requirements each plan would be prepared in accordance with.

The requirements of the CEMF have been allocated to each stage of the project by indicating the applicability of each section of the CEMF to each stage. These allocations are provided in Appendix C.

Compliance with the CEMF will help achieve the environmental performance outcomes for the project. These performance outcomes outline the broader objectives to be achieved by TfNSW in the design, construction and operation of the project.

3.3 Environmental management approach

The project contractors are required to adhere to and implement the requirements of the CEMF to a degree that is appropriate to the applicable stage of construction / operation. The applicability of the CEMF to each stage allows for effective and efficient management of environmental issues that is commensurate to the impacts of each project stage on each environmental management category. Table 3 indicates the applicability of the requirements relating to each CEMF environmental management category to each stage of the project. This includes for each environmental management category:

- Whether a stand-alone sub-plan will be prepared ('Sub-plan')
- Whether the category risks will be addressed in the main CEMP document in the form of a procedure ('P'), or
- Whether the risk is not relevant to the scope of work and is not addressed within the CEMP (Not Applicable).

This assessment was based on each project stage's scope of work, relevant CoA and REMMs requirements. The corresponding CoA for each management plan or monitoring program are identified within the table. Additional plans and programs identified in the CoA, not specifically referenced in the CEMF have also been included. Table 3 also outlines the tool (i.e., CEMP or low impact works), which would be used to manage environmental requirements during the stage of the project.

3.3.1 Low impact works

Each stage of the project would include some "low impact work" (refer to definitions section and CoA), which would become "construction" following approval of the CEMP for that applicable stage. In some instances, "low impact work" for a later stage may occur following approval of a CEMP for an earlier, separate stage, e.g., "low impact work" undertaken as part of the Warringah Freeway Upgrade (Stage 2) may occur following approval of the CEMP for the Critical utility installation, relocation and protection stage in Stage 1A.

In some instances, the CSSI planning approval defines a stage or an activity as low impact works i.e., Stage 1E Marine Heritage. All activities regarded as 'Low Impact Works' will not be defined as 'Construction' in accordance with the definition of 'Construction' provided in the CSSI planning approval.

Low Impact Works will only occur after the following activities have been undertaken:

- Consideration of relevant regulatory requirements
- Identification of relevant Conditions of Approval (CoA), Environmental Performance Outcomes (EPOs) and Revised Environmental Mitigation Measures (REMMs)
- Preparation of a Low Impact Works Approval Form by the relevant contractor and approval by TfNSW to confirm that the works do not represent 'Construction' in accordance with the applicable planning approval. This application must include (as a minimum):
 - Detailed description of the proposed works

- Environmental risk assessment (including identification of actual and potential environmental impacts)
- Identification of mitigation measures to be implemented to address any actual or potential environmental risks and/or impacts (including details on community consultation relevant to the works)
- Environmental Control Map, and
- Endorsement by the Environmental Representative as necessary in accordance with the nature of the Low Impact Works and/or the definition of 'Construction' in the CSSI planning approval.

Table 3: CEMF and Construction Environmental Management Tool Applicable to each Stage.

(No.) CEMF (relevant CoA)	STAGE	1A	1B	1C	1D	1E	2	3A	3B	3C
		CUT	CGC	M2A	WHTCP	BB	WFU	WHT Southern Tunnel Works	WHT – Northern Tunnelling and Integration Works	WHT – Harbour Crossing
Construction Environmental Management Tool		CEMP	CEMP	CEMP	Low Impact Works Approval	Low Impact Works Approval	CEMP	CEMP	CEMP	CEMP
Traffic, Transport and Access (CoA C4(a))		Sub-plan	Sub-plan	Sub-plan	Low-impact Assessment	Low-impact Assessment	Sub-plan	Sub-plan	Sub-plan	Sub-plan
Noise and vibration (CoA C4(b))		Sub-plan	Sub-plan	Sub-plan	Low-impact Assessment	Low-impact Assessment	Sub-plan	Sub-plan	Sub-plan	Sub-plan
Flora and Fauna (CoA C4(c))		P	Sub-plan	P	Low-impact Assessment	Low-impact Assessment	Sub-plan	P	Sub-plan	Sub-plan
Air Quality and Odour (CoA C4(d))		P	P	P	Low-impact Assessment	Low-impact Assessment	Sub-plan	Sub-plan	Sub-plan	Sub-plan
Soil and Surface Water (CoA C4(e))		P	Sub-plan	P	Low-impact Assessment	Low-impact Assessment	Sub-plan	Sub-plan	Sub-plan	Sub-plan
Groundwater (CoA C4(f))		N/A	N/A	N/A	N/A	N/A	P	Sub-plan	Sub-plan	Sub-plan
Maritime Heritage (CoA C4(g))		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	TBC
Non-Aboriginal Heritage (CoA C4(h))		P	P	P	Low-impact Assessment	Low-impact Assessment	Sub-plan	P	Sub-plan	Sub-plan
Aboriginal Cultural Heritage (CoA C4(i))		P	P	P	Low-impact Assessment	Low-impact Assessment	P	P	N/A	Sub-plan
Dredging and Disposal (CoA C4(j))		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	TBC
Noise and vibration monitoring program (CoA C11(a))		Included in sub-plan	Included in sub-plan	Included in sub-plan	Low-impact Assessment	Low-impact Assessment	Included in sub-plan	Included in sub-plan	Included in sub-plan	Included in sub-plan
Air Quality (including Odour) Monitoring Program (CoA C11(b))		P	P	P	Low-impact Assessment	Low-impact Assessment	Included in sub-plan	Included in sub-plan	Included in sub-plan	Included in sub-plan
Surface Water Monitoring Program (CoA C11(c))		P	P	P	Low-impact Assessment	Low-impact Assessment	Included in sub-plan	Included in sub plan	Included in sub-plan	Included in sub-plan
Groundwater Monitoring Program (CoA C11(d))		N/A	N/A	N/A	N/A	N/A	P	Included in sub plan	Included in sub-plan	Included in sub-plan
Marine Monitoring Program (CoA C11(e))		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	TBC
Dredging Monitoring Program (CoA C11(f))		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	TBC

Note: Should a project modification be undertaken that requires a change to the MCoAs or REMMs, Table 3 will be revised and amended to illustrate CEMF approaches, following approval of the modification, to reflect any changes to the condition allocations.

3.4 Compliance Monitoring

Several layers of compliance checking will be applied during the construction of the CSSI. Contractors will maintain their own internal audit program to ensure they meet the requirements set out in the CoA and contract. TfNSW will conduct an additional auditing program across all stages with a specific focus on compliance with the conditions of approval. TfNSW will monitor compliance with the Planning Approval across all stages through surveillance, environmental inspections, record-keeping and contractor compliance reporting.

TfNSW has engaged an independent ER and Acoustic Advisor (AA) for the early and enabling works relating to WFU (Stage 1A through to Stage 1C) and WFU (Stage 2). TfNSW has engaged a separate ER and AA for WHT Stage 3A, Stage 3B and Stage 3C, WHT Stage 1D and WHT Stage 1E. The ERs will:

- Undertake regular site inspections with the Contractor's environmental managers and TfNSW representatives
- Review compliance with the approvals on a periodic basis
- Review management plans and provide advice in relation to the level of risk associated with construction works
- Provide independent advice on matters relating to compliance to the Contractors, TfNSW and DPE if requested.

3.5 Independent Environmental Auditing

Independent Audits of the CSSI will be conducted and carried out in accordance with the *Independent Audit Post Approval Requirements (DPIE, 2020)*.

The purpose of an Independent Audit is to obtain an independent and objective assessment of the environmental performance and compliance status of a project. Independent Audits differ from other compliance reporting requirements that may apply as they are undertaken and reported by an independent auditor, rather than an Authorised Reporting Officer. Proposed independent auditors will be agreed to in writing by the Planning Secretary prior to the commencement of an Independent Audit.

Appendix A Applicability of Conditions of Approval to each stage

Table 4 has been based on the WHTWUFU conditions of approval as issued by DPE on 21 January 2021. This document is attached at the end of this table.

Items listed as “Not Applicable” have been identified as CoAs that will not be triggered under the scope of the relevant project stage. As identified in Section 3.1, should a project modification be undertaken that requires a change to the MCoAs or REMMs, the following table will be updated, following approval of the modification, to reflect any changes to the condition allocations.

Table 4: Applicability of Conditions of Approval to each stage

CoA Topic	CoA	CUT	CGC	M2A	WHTCP	BB	WUFU	WHT Stage 3A	WHT Stage 3B	WHT Stage 3C
General	A1	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	A2	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	A3	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	A4	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	A5	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	A6	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	A7	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	A8	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
Noise Insulation Program	A9	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable	Applicable
Staging	A10	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	A11	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	A12	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	A13	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	A14	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	A15	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
Ancillary Facilities	A16	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
Site Establishment Works	A17	Not Applicable – construction ancillary facilities would be established and operated in accordance with the CEMP	Not Applicable – construction ancillary facilities would be established and operated in accordance with the CEMP	Not Applicable – construction ancillary facilities would be established and operated in accordance with the CEMP	Not Applicable – minor construction ancillary facilities would be established and operated in accordance with the low impact works approval	Not Applicable – minor construction ancillary facilities would be established and operated in accordance with the low impact works approval	Applicable	Not Applicable	Not Applicable – construction ancillary facilities would be established and operated in accordance with the CEMP	Not Applicable – construction ancillary facilities would be established and operated in accordance with the CEMP
	A18	Applicable	Applicable	Applicable	Applicable	Not Applicable – the works are defined as Low Impact Works and so the requirements of the CEMP do not apply	Applicable	Applicable	Applicable	Applicable
	A19	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	A20	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	A21	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
Independent Appointment	A22	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	A23	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	A24	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
Environmental Representative	A25	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	A26	Applicable – the Proponent will engage two Environmental Representatives – one	Applicable – the Proponent will engage two Environmental Representatives – one	Applicable – the Proponent will engage two Environmental Representatives – one	Applicable – the Proponent will engage two Environmental Representatives – one	Applicable – the Proponent will engage two Environmental Representatives – one	Applicable – the Proponent will engage two Environmental Representatives – one	Applicable – the Proponent will engage two Environmental Representatives – one	Applicable – the Proponent will engage two Environmental Representatives – one	Applicable – the Proponent will engage two Environmental Representatives – one

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CoA Topic	CoA	CUT	CGC	M2A	WHTCP	BB	WFU	WHT Stage 3A	WHT Stage 3B	WHT Stage 3C
	B4	Applicable – WHTWFO Overarching Community Communication Strategy for all works in this stage	Applicable – WHTWFO Overarching Community Communication Strategy for all works in this stage	Applicable – WHTWFO Overarching Community Communication Strategy for all works in this stage	Applicable – WHTWFO Overarching Community Communication Strategy for all works in this stage	Applicable – WHTWFO Overarching Community Communication Strategy for all works in this stage	Applicable – WHTWFO Overarching Community Communication Strategy for all works in this stage	Applicable – WHTWFO Overarching Community Communication Strategy for all works in this stage	Applicable – WHTWFO Overarching Community Communication Strategy for all works in this stage	Applicable – WHTWFO Overarching Community Communication Strategy for all works in this stage
	B5	Applicable – WHTWFO Overarching Community Communication Strategy for all works in this stage	Applicable – WHTWFO Overarching Community Communication Strategy for all works in this stage	Applicable – WHTWFO Overarching Community Communication Strategy for all works in this stage	Applicable – WHTWFO Overarching Community Communication Strategy for all works in this stage	Applicable – WHTWFO Overarching Community Communication Strategy for all works in this stage	Applicable – WHTWFO Overarching Community Communication Strategy for all works in this stage	Applicable – WHTWFO Overarching Community Communication Strategy for all works in this stage	Applicable – WHTWFO Overarching Community Communication Strategy for all works in this stage	Applicable – WHTWFO Overarching Community Communication Strategy for all works in this stage
Public Liaison Officer	B6	Applicable	Applicable	Applicable	Applicable	Not Applicable	Applicable	Applicable	Applicable	Applicable
Complaints Management System	B7	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	B8	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	B9	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	B10	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	B11	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	B12	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	B13	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	B14	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
Provision of Electronic Information	B15	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
Construction Environmental Management Plan	C1	Applicable – Refer to Appendix C for applicable CEMF requirements for each stage	Applicable – Refer to Appendix C for applicable CEMF requirements for each stage	Applicable – Refer to Appendix C for applicable CEMF requirements for each stage	Not Applicable – the WHTCP are defined as 'low impact works' and are not construction; environmental risks associated with the works will be addressed in accordance with Table 3.	Not Applicable – the BB works are defined as 'low impact works' and are not construction; environmental risks associated with the works will be addressed in accordance with Table 3.	Applicable – Refer to Appendix C for applicable CEMF requirements for each stage	Applicable – Refer to Appendix C for applicable CEMF requirements for each stage	Applicable – Refer to Appendix C for applicable CEMF requirements for each stage	Applicable – Refer to Appendix C for applicable CEMF requirements for each stage
	C2	Applicable	Applicable	Applicable	Not Applicable – refer to Table 3	Not Applicable — refer to Table 3	Applicable	Applicable	Applicable	Applicable
	C3	Applicable	Applicable	Applicable	Not Applicable — refer to Table 3	Not Applicable — refer to Table 3	Applicable	Applicable	Applicable	Applicable
	C4	Partial – refer to Table 3	Partial – refer to Table 3	Partial – refer to Table 3	Not Applicable – refer to Table 3	Not Applicable — refer to Table 3	Partial – refer to Table 3	Partial – refer to Table 3	Partial – refer to Table 3	Partial – refer to Table 3
	C5	Applicable	Applicable	Applicable	Not Applicable	Not Applicable — refer to Table 3	Applicable	Applicable	Applicable	Applicable
	C6	Partial – refer to Table 3	Applicable	Partial – refer to Table 3	Not Applicable – refer to Table 3	Not Applicable — refer to Table 3	Applicable	Not Applicable	Not Applicable – refer to Table 3	Not Applicable – refer to Table 3
	C7	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable — refer to Table 3	Not Applicable	Not Applicable	Not Applicable — refer to Table 3	Applicable
	C8	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable — refer to Table 3	Not Applicable	Not Applicable	Not Applicable — refer to Table 3	Applicable
	C9	Applicable	Applicable	Applicable	Not Applicable	Not Applicable — refer to Table 3	Applicable	Applicable	Applicable	Applicable
	C10	Applicable	Applicable	Applicable	Not Applicable	Not Applicable — refer to Table 3	Applicable	Applicable	Applicable	Applicable
	C11	Partial – refer to Table 3	Partial – refer to Table 3	Partial – refer to Table 3	Not Applicable – refer to Table 3	Not Applicable — refer to Table 3	Partial – refer to Table 3	Partial – refer to Table 3	Partial – refer to Table 3	Partial – refer to Table 3

CoA Topic	CoA	CUT	CGC	M2A	WHTCP	BB	WFU	WHT Stage 3A	WHT Stage 3B	WHT Stage 3C
Construction Monitoring Programs	C12	Applicable	Applicable	Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable	Applicable
	C13	Applicable	Applicable	Applicable	Not Applicable – refer to Table 3	Not Applicable – refer to Table 3	Applicable	Applicable	Applicable	Applicable
	C14	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable
	C15	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable
	C16	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable
	C17	Applicable	Applicable	Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable	Applicable
	C18	Applicable	Applicable	Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable	Applicable
	C19	Applicable	Applicable	Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable	Applicable
	C20	Applicable	Applicable	Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable	Applicable
	C21	Applicable	Applicable	Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable	Applicable
Operational Environmental Management	D1	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Applicable	Applicable
	D2	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Applicable	Applicable
	D3	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Applicable	Applicable
	D4	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Applicable	Applicable
Operational Monitoring Program	D5	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable
	D6	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable
	D7	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable
	D8	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable
	D9	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable
	D10	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable
	D11	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable
	D12	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable
	D13	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable
Air Quality and Odour	E1	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	E2	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable
	E3	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable
	E4	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable
Air Quality Goals	E5	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable for design and construction elements of this condition.	Applicable for design and construction elements of this condition.
	E6	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable for design and construction elements of this condition.	Applicable for design and construction elements of this condition.
	E7	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable for design and construction elements of this condition.	Applicable for design and construction elements of this condition.
	E8	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable – Operational condition	Not Applicable – Operational condition
	E9	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable – Operational condition	Not Applicable – Operational condition
	E10	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable – Operational condition	Not Applicable – Operational condition

[illegible]

CoA Topic	CoA	CUT	CGC	M2A	WHTCP	BB	WFU	WHT Stage 3A	WHT Stage 3B	WHT Stage 3C
	E30	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable – Operational condition	Not Applicable – Operational condition
	E31	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable – Operational condition	Not Applicable – Operational condition
	E32	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable – Operational condition	Not Applicable – Operational condition
	E33	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable for design and construction elements of this condition.	Applicable for design and construction elements of this condition.
	E34	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable for design and construction elements of this condition.	Applicable for design and construction elements of this condition.
	E35	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable – Operational condition	Not Applicable – Operational condition
	E36	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable – Operational condition	Not Applicable – Operational condition
	E37	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable – Operational condition	Not Applicable – Operational condition
Biodiversity	E38	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Not Applicable	Not Applicable
	E39	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Not Applicable	Not Applicable
	E40	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Not Applicable	Not Applicable
	E41	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Microbat Management Plan will be developed if it is determined that microbats will be impacted by the work in this stage.	Microbat Management Plan will be developed if it is determined that microbats will be impacted by the work in this stage.
	E42	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not triggered unless E41 is triggered.	Not triggered unless E41 is triggered.
	E43	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not triggered unless E41 is triggered.	Not triggered unless E41 is triggered.
	E44	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not triggered unless E41 is triggered.	Not triggered unless E41 is triggered.
	E45	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not applicable	Applicable if impacts are expected.
	E46	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not applicable	Applicable if impacts are expected.
	E47	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not applicable	Applicable if impacts are expected.
	E48	Applicable	Applicable	Applicable	Applicable	Not Applicable	Applicable	Not Applicable	Applicable if impacts are expected.	Applicable if impacts are expected.
Flooding	E49	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable	Applicable
Aboriginal Cultural Heritage	E50	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
Non-Aboriginal Heritage	E51	Applicable – the tolling equipment is being installed on an exisiting gantry on the Sydney Harbour Bridge in consultation with Heritage NSW		Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not applicable	Not applicable

CoA Topic	CoA	CUT	CGC	M2A	WHTCP	BB	WFU	WHT Stage 3A	WHT Stage 3B	WHT Stage 3C
Noise and Vibration	E52	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	To be confirmed*	To be confirmed*
	E53	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	To be confirmed*	To be confirmed*
	E54	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not applicable	Applicable
	E55	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	To be confirmed*	To be confirmed*
	E56	Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable	Not Applicable	Partial – CoA only to apply to locations impacted by this stage	Partial – CoA only to apply to locations impacted by this stage
	E57	Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable	Not Applicable	Applicable	Applicable
	E58	Applicable	Applicable	Applicable	Not Applicable	Applicable	Applicable	Not Applicable	Applicable	Applicable
	E59	Applicable	Applicable	Applicable	Not Applicable	Applicable	Applicable	Not Applicable	Applicable – if triggered by E58	Applicable – if triggered by E58
	E60	Applicable	Applicable	Applicable	Not Applicable	Applicable	Applicable	Not Applicable	Applicable – if triggered by E58	Applicable – if triggered by E58
	E61	Applicable	Applicable	Applicable	Not Applicable	Applicable	Applicable	Not Applicable	Applicable – if triggered by E58	Applicable – if triggered by E58
	E62	Applicable	Applicable	Applicable	Not Applicable	Applicable	Applicable	Not Applicable	Applicable – if triggered by E58	Applicable – if triggered by E58
	E63	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	E64	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	E65	Applicable	Applicable	Applicable	Applicable – survey will be included in the Noise and Vibration Procedure	Not Applicable	Applicable	Applicable	Applicable	Applicable
	E66	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	E67	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	E68	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	E69	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	E70	Applicable	Applicable	Applicable	Applicable – works exceeding noise management levels and / vibration criteria would be managed in accordance with low impact works approval	Applicable – works exceeding noise management levels and / vibration criteria would be managed in accordance with low impact works approval	Applicable	Applicable	Applicable	Applicable
	E71	Applicable	Applicable	Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable	Applicable
	E72	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	E73	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	E74	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	E75	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	E76	Applicable	Applicable	Applicable	Applicable – properties would be identified in the low impact works approval	Applicable – properties would be identified in the low impact works approval	Applicable	Applicable	Applicable	Applicable
	E77	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable
	E78	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable
	E79	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	E80	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	E81	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Not Applicable	Applicable	Applicable
	E82	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable

CoA Topic	CoA	CUT	CGC	M2A	WHTCP	BB	WFU	WHT Stage 3A	WHT Stage 3B	WHT Stage 3C
	E83	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	E84	Applicable	Applicable	Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Not applicable	Not applicable
	E85	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Not applicable	Not applicable
	E86	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Not applicable	Not applicable
	E87	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Applicable	Applicable
	E88	Applicable	Not Applicable	Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Applicable	Applicable
	E89	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Applicable	Applicable
	E90	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Applicable	Applicable
	E91	Applicable	Applicable	Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Not applicable	Not applicable
	E92	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Applicable	Applicable
	E93	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Applicable	Applicable
	E94	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Not applicable	Not applicable
	E95	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable
	E96	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable
	E97	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable
	E98	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable
	E99	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable
Socio-Economic, Land Use and Property	E100	Applicable	Not Applicable	Applicable	Applicable	Not Applicable	Applicable	Applicable	Applicable	Applicable
Cammeray Golf Course	E101	Not Applicable	Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not applicable	Not applicable
Settlement	E102	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable	Applicable
	E103	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable	Applicable
	E104	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable	Applicable
	E105	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable	Applicable
	E106	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable	Applicable
Condition Survey	E107	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	E108	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	E109	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	E110	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	E111	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	E112	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	E113	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
Soils	E114	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
Contaminated sites	E115	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Not Applicable	Applicable	Applicable
	E116	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Not Applicable	Applicable	Applicable
	E117	Partial – all requirements will be complied with fully, with the exception of (i) where the parcel of land is being handed over to another stage of the Project	Applicable	Applicable	Partial – all requirements will be complied with fully, with the exception of (i) where the parcel of land is being handed over to another stage of the Project	Applicable	Applicable	Not Applicable	Applicable	Applicable

CoA Topic	CoA	CUT	CGC	M2A	WHTCP	BB	WFU	WHT Stage 3A	WHT Stage 3B	WHT Stage 3C
	E118	Applicable	Applicable	Applicable	Not Applicable	Applicable	Applicable	Not Applicable	Applicable if triggered	Applicable if triggered
	E119	Applicable	Applicable	Applicable	Not Applicable	Applicable	Applicable	Not Applicable	Applicable if triggered	Applicable if triggered
	E120	Applicable	Applicable	Applicable	Not Applicable	Applicable	Applicable	Not Applicable	Applicable if triggered	Applicable if triggered
	E121	Applicable	Applicable	Applicable	Not Applicable	Applicable	Applicable	Not Applicable	Applicable if triggered	Applicable if triggered
	E122	Applicable	Applicable	Applicable	Not Applicable	Applicable	Applicable	Not Applicable	Applicable if triggered	Applicable if triggered
	E123	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	E124	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
Sustainability	E125	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable	Applicable
	E126	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable - partial	Applicable	Applicable
	E127	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable - partial	Applicable	Applicable
Traffic and Transport	E128	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	E129	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	E130	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable
	E131	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable
	E132	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	E133	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	E134	Not Applicable – spoil is generated during excavation of the tunnel and large bulk earthworks; this stage does not include tunnel exavation or large bulk earthworks	Not Applicable – spoil is generated during excavation of the tunnel and large bulk earthworks; this stage does not include tunnel exavation or large bulk earthworks	Not Applicable – spoil is generated during excavation of the tunnel and large bulk earthworks; this stage does not include tunnel exavation or large bulk earthworks	Not Applicable – spoil is generated during excavation of the tunnel and large bulk earthworks; this stage does not include tunnel exavation or large bulk earthworks	Not Applicable – spoil is generated during excavation of the tunnel and large bulk earthworks; this stage does not include tunnel exavation or large bulk earthworks	Not Applicable – spoil is generated during excavation of the tunnel and large bulk earthworks; this stage does not include tunnel exavation or large bulk earthworks	Not Applicable	Applicable	Applicable
	E135	Not Applicable – spoil is generated during excavation of the tunnel and large bulk earthworks; this stage does not include tunnel exavation or large bulk earthworks.	Not Applicable – spoil is generated during excavation of the tunnel and large bulk earthworks; this stage does not include tunnel exavation or large bulk earthworks.	Not Applicable – spoil is generated during excavation of the tunnel and large bulk earthworks; this stage does not include tunnel exavation or large bulk earthworks.	Not Applicable – spoil is generated during excavation of the tunnel and large bulk earthworks; this stage does not include tunnel exavation or large bulk earthworks.	Not Applicable – spoil is generated during excavation of the tunnel and large bulk earthworks; this stage does not include tunnel exavation or large bulk earthworks	Not Applicable – spoil is generated during excavation of the tunnel and large bulk earthworks; this stage does not include tunnel exavation or large bulk earthworks	Applicable	Applicable	Applicable
	E136	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	E137	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	E138	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	E139	Applicable	Applicable	Applicable	Applicable – mitigation measures would be implemented through the low impact works approval	Applicable – mitigation measures would be implemented through the low impact works approval	Applicable	Applicable	Applicable	Applicable
	E140	Applicable	Applicable	Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable	Applicable
	E141	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	E142	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Not applicable	Not applicable
	E143	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Not applicable	Not applicable
	E144	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable	Applicable
	E145	Applicable	Applicable	Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable	Applicable
	E146	Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Applicable	Applicable

[illegible]

CoA Topic	CoA	CUT	CGC	M2A	WHTCP	BB	WFU	WHT Stage 3A	WHT Stage 3B	WHT Stage 3C
	E184	Applicable	Applicable	Applicable	Applicable	Not Applicable	Applicable	Not Applicable	Applicable	Applicable
	E185	Applicable	Applicable	Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Applicable	Applicable
	E186	Applicable	Applicable	Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Applicable	Applicable
	E187	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Applicable	Applicable
	E188	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	To be confirmed*	To be confirmed*
	E189	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	To be confirmed*	To be confirmed*
	E190	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	To be confirmed*	To be confirmed*
	E191	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	To be confirmed*	To be confirmed*
	E192	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Applicable	Applicable
	E193	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Applicable	Applicable
	E194	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Applicable	Applicable
	E195	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Not Applicable	Not Applicable
	E196	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Not Applicable	Not Applicable
	E197	Not Applicable	Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Not Applicable	Not Applicable
	E198	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Not Applicable	Not Applicable
	E199	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Not Applicable	Not Applicable
	E200	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Not Applicable	Not Applicable
Waste	E201	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	E202	Applicable	Applicable	Applicable	Applicable	Not Applicable – no importation of waste is required for the Works	Applicable	Applicable	Applicable	Applicable
	E203	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	E204	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable
	E205	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
Water	E206	Applicable	Applicable	Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable	Applicable
	E207	Applicable	Applicable	Applicable	Applicable	Not Applicable – there will be no Works on riparian corridors	Applicable	Applicable	Not Applicable – there will be no Works on riparian corridors	Not Applicable – there will be no Works on riparian corridors
	E208	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable	Applicable
	E209	Not Applicable	Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
	E210	Applicable	Applicable	Applicable	Not Applicable - The Works are defined as Low Impact Works with no planned stormwater discharges	Not Applicable - The Works are defined as Low Impact Works with no planned stormwater discharges	Applicable	Applicable	Applicable	Applicable
	E211	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable
	E212	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable
	E213	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable
	E214	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable
	E215	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable
	E216	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable
	E217	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable
	E218	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable
	E219	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable

CoA Topic	CoA	CUT	CGC	M2A	WHTCP	BB	WFU	WHT Stage 3A	WHT Stage 3B	WHT Stage 3C
	E220	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable
	E221	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable
	E222	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable	Applicable
	E223	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable	Applicable
	E224	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable	Applicable

* *N.B. Subject to a planned Project Modification*

Appendix B Applicability of REMMs to each stage

Table 5 has been based on the latest version of the Revised Environmental Management Measures taken from Part D of the RtS. This document can be found here:

<https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=EXH-2682%2120200914T005951.156%20GMT>

Items listed as “Not Applicable” have been identified as REMMs that will not be triggered under the scope of the relevant project stage. As identified in Section 3.1, should a project modification be undertaken that requires a change to the REMMs, the following table will be updated, following approval of the modification, to reflect any changes to the allocations.

Table 5: Applicability of REMMs to each stage

REMM Topic	REMM	CUT	CGC	M2A	WHTCP	BB	WFU	WHT Stage 3A	WHT Stage 3B	WHT Stage 3C
Traffic and Transport – Construction	CTT1	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	CTT2	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable
	CTT3	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable
	CTT4	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	CTT5	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	CTT6	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	CTT7	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	CTT8	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	CTT9	Applicable	Applicable	Applicable	Applicable	Not Applicable – parking imoacts will be minimal from the Works	Applicable	Applicable	Applicable	Applicable
	CTT10	Applicable	Not Applicable	Applicable	Not Applicable – no impact to bus stops proposed as part of the Works	Not Applicable – parking impacts will be minimal from the Works	Applicable	Not Applicable	Applicable	Not Applicable
	CTT11	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable	Applicable
	CTT12	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	CTT13	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Not Applicable	Not Applicable
	CTT14	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable
	CTT15	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable
	CTT16	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable
	CTT17	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable
	CTT18	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable
	CTT19	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
Traffic and Transport – Operation	OT1	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Not Applicable	Not Applicable
	OT2	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Not Applicable	Not Applicable
	OT3	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Not Applicable	Not Applicable
	OT4	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Not Applicable	Not Applicable
Noise And Vibration	CNV1	Applicable	Applicable	Applicable	Not Applicable – construction noise and vibration impacts will be managed through the low impacts works approval as per Table 3	Not Applicable – construction noise and vibration impacts will be managed through the low impacts works approval as per Table 3	Applicable	Applicable	Applicable	Applicable
	CNV2	Applicable	Not Applicable	Applicable	Applicable	Not Applicable	Applicable	Applicable	Applicable	Applicable

REMM Topic	REMM	CUT	CGC	M2A	WHTCP	BB	WFU	WHT Stage 3A	WHT Stage 3B	WHT Stage 3C
	CNV3	Applicable	Not Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	CNV4	Applicable	Not Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	CNV5	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	CNV6	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	CNV7	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	CNV8	Applicable	Not Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	CNV9	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable
	CNV10	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	ONV1	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Not Applicable – Operational condition	Not Applicable – Operational condition
	ONV2	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Not Applicable – Operational condition	Not Applicable – Operational condition
	ONV3	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Not Applicable – Operational condition	Not Applicable – Operational condition
Air Quality	AQ1	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	AQ2	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
Human Health	HH1	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable
	HH2	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable
Non Aboriginal Heitage	NAH1	Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
	NAH2	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Applicable	Applicable
	NAH3	Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Not Applicable	Not Applicable
	NAH4	Applicable	Not Applicable	Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Applicable	Applicable
	NAH5	Applicable	Applicable	Not Applicable	Applicable	Applicable	Applicable	Not Applicable	Partial	Partial
	NAH6	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable
	NAH7	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable
	NAH8	Not Applicable	Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
	NAH9	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable
	NAH10	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	NAH11	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	NAH12	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	NAH13	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	To be confirmed*	To be confirmed*
	NAH14	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Not Applicable	Not Applicable
	NAH15	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable
	NAH16	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable
	NAH17	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable
	NAH18	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable
	NAH19	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable
	NAH20	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	To be confirmed*	To be confirmed*
	NAH21	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable
	NAH22	Applicable	Applicable	Not Applicable	Applicable	Applicable	Applicable	Not Applicable	Not Applicable	Applicable
	NAH23	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable

REMM Topic	REMM	CUT	CGC	M2A	WHTCP	BB	WFU	WHT Stage 3A	WHT Stage 3B	WHT Stage 3C
Aboriginal Cultural Heritage	NAH24	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable
	NAH25	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable
	AH1									
	AH2	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Applicable	Applicable
	AH3	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Applicable	Applicable
	AH4	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Applicable	Applicable
	AH5	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	AH6	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	AH7	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable
	AH8	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable
Geology Soils and Groundwater	AH9	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable
	AH10	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable
	SG1	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable
	SG2	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable
	SG3	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable	Applicable
	SG4	Applicable	Applicable	Applicable	Applicable	Not Applicable	Applicable	Applicable	Applicable	Applicable
	SG5	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	SG6	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Not Applicable	Partial	Partial
	SG7	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	SG8	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	SG9	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Not Applicable	Not Applicable
	SG10	Not Applicable – waste mitigation measures to be implemented during this activity will be managed through a procedure as identified in Table 3.	Not Applicable – waste mitigation measures to be implemented during this activity will be managed through a procedure as identified in Table 3.	Not Applicable – waste mitigation measures to be implemented during this activity will be managed through a procedure as identified in Table 3.	Not Applicable – waste mitigation measures to be implemented during this activity will be managed through a procedure as identified in Table 3.	Not Applicable – waste mitigation measures to be implemented during this activity will be managed through a procedure as identified in Table 3.	Applicable	Applicable	Applicable	Applicable
	SG11	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	SG12	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Applicable	Applicable	Applicable
	SG13	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Partial	Not Applicable
	SG14	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable
	SG15	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable
	SG16	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable
	SG17	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Not Applicable	Applicable
	SG18	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable	Applicable
	SG19	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable	Applicable
	SG20	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable
	SG21	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable
	SG22	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable
	SG23	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	WQ1	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable

REMM Topic	REMM	CUT	CGC	M2A	WHTCP	BB	WFU	WHT Stage 3A	WHT Stage 3B	WHT Stage 3C
Hydrodynamics and Water Quality	WQ2	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	WQ3	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable
	WQ4	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable	Applicable
	WQ5	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable
	WQ6	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable
	WQ7	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Applicable	Applicable
	WQ8	Not Applicable	Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
	WQ9	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable
	WQ10	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable
	WQ11	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable
	WQ12	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Applicable	Applicable
	WQ13	Not Applicable	Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Applicable	Applicable
Flooding	F1	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable	Applicable
	F2	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Applicable	Not Applicable
	F3	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable	Applicable
	F4	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable	Applicable
	F5	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Not Applicable	Applicable	Applicable
	F6	Applicable	Applicable	Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Applicable	Applicable
	F7	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable	Applicable
	F8	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable	Applicable
	F9	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Applicable	Applicable
Biodiversity	B1	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Not Applicable	Applicable	Applicable
	B2	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Not Applicable	Applicable	Applicable
	B3	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	B4	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Applicable	Applicable
	B5	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Not Applicable	Applicable	Applicable
	B6	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable – The Works would not be carried out during the microbat roosting period of March to Septmeber	Not Applicable	Not Applicable	Applicable	Applicable
	B7									
	B8	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable
	B9	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable
	B10	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	B11	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Not Applicable	Applicable	Applicable
	B12	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable
	B13	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable
	B14	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Not Applicable	Applicable	Applicable
	B15	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Not Applicable	Applicable	Applicable
	B16	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable

[illegible]

REMM Topic	REMM	CUT	CGC	M2A	WHTCP	BB	WFU	WHT Stage 3A	WHT Stage 3B	WHT Stage 3C
Hazards and Risks	V11	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Applicable	Applicable
	V12	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Applicable	Applicable
	HR1	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	HR2	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	HR3	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable
	HR4	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable
	HR5	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable
	HR6	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Applicable	Applicable
	HR7	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Not Applicable – operational condition	Not Applicable – operational condition
	HR8	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Not Applicable – operational condition	Not Applicable – operational condition
Resource and Waste Management	HR9	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable – operational condition	Not Applicable – operational condition
	WM1	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	WM2	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	WM3	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	WM4	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	WM5	Applicable	Applicable	Applicable	Not Applicable – wastewater will not be generated by the Works	Not Applicable – wastewater will not be generated by the Works	Applicable	Applicable	Applicable	Applicable
	WM6	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Applicable	Applicable
	WM7	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Not Applicable	Applicable	Applicable
Sustainability	WM8	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable
	SU1	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable	Applicable
Climate change Risks	SU2	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable	Applicable
	CC1	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Applicable	Applicable
Greenhouse Gas Assessment	GHG1	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Applicable	Applicable
	GHG2	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable	Applicable
Cumulative impacts	CI1	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	CI2	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	CI3	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	CI4	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable

* N.B. Subject to a planned Project Modification

Appendix C Applicability of CEMF to each stage

Table 6 has been based on the latest version of the Construction Environmental Management Framework that was included in Part D of the RtS. This document can be found here:

<https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=EXH-2682%2120200914T005951.156%20GMT>

Table 6: Applicability of CEMF to each stage

CEMF Topic	Key issue	CUT	CGC	M2A	WHTCP	BB	WFU	WHT Stage 3A	WHT Stage 3B	WHT Stage 3C
Traffic management plan	Construction traffic and access management objectives	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	Construction traffic and access management implementation including:								Applicable	Applicable
	• Traffic staging plans	Applicable	Not Applicable	Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable	Applicable
	• Traffic control plans and identification of truck marshalling areas	Applicable – traffic control plans Not applicable – truck marshalling areas	Applicable – traffic control plans Not applicable – truck marshalling areas	Applicable – traffic control plans Not applicable – truck marshalling areas	Not Applicable	Not Applicable	Applicable	Applicable	Applicable	Applicable
	• Pedestrian management plans	Applicable	Not Applicable	Applicable	Not Applicable	Applicable	Applicable	Not Applicable	Applicable	Applicable
	• Parking management plans	Applicable	Not Applicable	Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable	Applicable
	• Heavy vehicle hauling routes	Applicable	Not Applicable	Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable	Applicable
	• Construction traffic and access mitigation including: • Monitoring and inspection requirements • Compliance records • Driver certification requirements	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable	Applicable
Marine works and marine traffic management plans	Marine works and marine traffic management objectives	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable
	Marine works and marine traffic implementation including: • Works approval requirements • Exclusion zones • Temporary mooring locations	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable
	Marine works and marine traffic mitigation including requirements for vessel movements and navigational restrictions	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable
Noise and vibration management plan	Hours of construction	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	Construction noise and vibration management objectives	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	Construction noise and vibration management implementation including the requirements of environmental management measure CNV1 (refer to Table D2-1 of this submissions report)	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	Construction noise and vibration impact statements for all construction support sites and major construction works required for the project as required by environmental management measure CNV2	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable

CEMF Topic	Key issue	CUT	CGC	M2A	WHTCP	BB	WFU	WHT Stage 3A	WHT Stage 3B	WHT Stage 3C
	Out of hours works protocol as required by environmental management measure CNV3 including: - Details of works required outside standard construction hours, including acceptable justifications for works outside of standard construction hours, what types of works are allowed to take place outside of construction hours, and justifications of why the activities are required outside standard construction hours - Details of the assessment and approval process (internal and external) for works proposed outside standard construction hours - Noise and vibration mitigation and management measures that are to be considered and implemented where appropriate to manage potential impacts associated with works outside standard construction hours - The noise and vibration impact assessment processes that will be followed to identify potentially affected receivers, clarify potential impacts and determine appropriate mitigation and management measures	Applicable	Applicable	Applicable	Applicable	Not Applicable	Applicable	Applicable	Applicable	Applicable
	Construction noise and vibration mitigation including: - Monitoring and inspection requirements - Compliance records	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable

CEMF Topic	Key issue	CUT	CGC	M2A	WHTCP	BB	WFU	WHT Stage 3A	WHT Stage 3B	WHT Stage 3C
	Blast Management Strategy as required by environmental management measure CNV9 which will: - Detail the blasting to be performed including location, method and justification of the need to blast - Identify any potentially affected noise and vibration sensitive sites including heritage buildings and utilities - Establish appropriate criteria for blast overpressure and ground vibration levels at each category of noise sensitive site - Detail storage and handling arrangements for explosive materials and the proposed transport of those materials to the construction support site - Identify hazardous situations that may arise from the storage and handling of explosives, the blasting process and recovery of the blast site after detonation of the explosives - Determine potential noise and vibration and risk impacts from blasting and appropriate best management practices - Detail community consultation procedures. - Note – the Blasting Management Strategy may not form part of the CNVMP and may be a separate plan	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable
	Air Quality Objectives	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
Air quality management plan	Air quality management implementation including: - Details of standard construction air quality mitigation and management measures required by environmental management measure AQ1 (refer to Table D2-1 of this submissions report - Odour management measures for odour from sediments and acid sulfate soils (if confirmed)	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	- Air quality mitigation including: - Compliance records - Monitoring and inspection requirements	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	Waste and spoil management objectives	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
Waste and resource use	Waste and spoil management implementation including procedures for handling and storing potentially contaminated substances	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	Waste and spoil mitigation including: - Monitoring and inspection requirements - Compliance records	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
Soil and water management plan	Soil, surface water and contamination management objectives	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	Soil, surface water and contamination management implementation including:								Applicable	Applicable

CEMF Topic	Key issue	CUT	CGC	M2A	WHTCP	BB	WFU	WHT Stage 3A	WHT Stage 3B	WHT Stage 3C
	Erosion and sediment control plans	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	Management responses to contaminated sediments (if confirmed), including remediation action plans (in accordance with environmental management measure SG2).	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Not Applicable	Applicable	Applicable
	Acid sulfate soil management plans	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Not Applicable	Applicable	Applicable
	Emergency spill procedures	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	Dewatering plans (including aquatic fauna relocation requirements)	Applicable – excluding aquatic fauna relocation requirements	Applicable	Applicable – excluding aquatic fauna relocation requirements	Applicable – excluding aquatic fauna relocation requirements	Not Applicable	Applicable	Applicable – excluding aquatic fauna relocation requirements	Applicable	Applicable
	Water quality monitoring and management	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable	Applicable
	Soil, surface water and contamination mitigation including: - Monitoring and inspection - Compliance records	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	Construction flood emergency management measures including requirements for construction support sites to manage risks to adjoining properties.	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable	Applicable
	Groundwater management objectives	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable	Applicable
Groundwater management plan	Groundwater management implementation including: - Additional modelling requirements - Acceptable groundwater inflow levels - Ground movement management and minimisation requirements	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable
	Groundwater mitigation including: - Monitoring and inspection requirements - Compliance records	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Applicable	Applicable
Dredging management plan	Dredging management objectives	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable
	Dredging management implementation including contamination management and contingency measures	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable
	Dredging mitigation including: Backhoe dredging operations would be completed within a floating silt curtain, as described in Appendix P (Technical working paper: Hydrodynamics and dredge plume modelling)							Not Applicable		
	- No overflow would be permitted from transport barges taking material not suitable for offshore disposal to White Bay for unloading and land disposal - Additional silt curtains would be located around sensitive foreshore areas eg seagrass areas - Works would be completed under a full time supervision and inspection regime	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable		Not Applicable	Applicable

CEMF Topic	Key issue	CUT	CGC	M2A	WHTCP	BB	WFU	WHT Stage 3A	WHT Stage 3B	WHT Stage 3C
Flora and fauna management plan	Flora and fauna management objectives	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	Flora and fauna management implementation including:									
	• Seagrass monitoring and management	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable
	• Intertidal and rocky reef management	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable
	• Marine mammals and reptile management	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable
	• Unexpected flora and fauna finds procedure	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	• Stop works procedure	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	• Weed management measures	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Not Applicable	Applicable	Applicable
	• Dewatering management	Applicable	Applicable	Applicable	Applicable	Not Applicable	Applicable	Applicable	Applicable	Applicable
	• Large Bent-winged Bat management	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable
Heritage management plan	Flora and fauna mitigation including: • Monitoring and inspection requirements • Compliance records	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	Heritage management objectives	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	Heritage management implementation including Aboriginal and non-Aboriginal heritage unexpected finds procedures	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
	Maritime heritage management detailing the objectives and methodologies to conserve maritime heritage and mitigate impacts. As required by environmental management measure NAH15 (refer to Table D2-1 of this submissions report).	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable
	Heritage mitigation including: • Monitoring and inspection requirements • Compliance records	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable

Appendix D Aspect and impact registers

- Stage 1A – Critical utility installation, relocation and protection (CUT)
- Stage 1B – Cammeray Golf Course adjustment works (CGC)
- Stage 1C – Massey to Amherst noise wall (M2A)
- Stage 1D – Western Harbour Tunnel Construction Power and Utilities
- Stage 2 – Warringah Freeway Upgrade (WFU)
- Stage 3A – Western Harbour Tunnel Southern Tunnel Works (WHT Stage 3A)
- Stage 3B – Western Harbour Tunnel Northern Tunnelling and Integration works (WHT Stage 3B)
- Stage 3C – Western Harbour Tunnel Crossing (WHT Stage 3C)*

*registers for future stages will be included once prepared and finalise

An environmental risk assessment for the various construction stages has been completed to assist in determining applicability of each CEMF environmental management category to each stage of the project. The tables identifies the stage of the project, the associated potential environmental impacts and a risk rating for that impact. The risk rating (refer to Table 3) is based on the likelihood of the event occurring (refer to Table 1) and the consequence (refer to Table 2); the classification system used is based on the *Environmental Management Plan Guideline – Guideline for Infrastructure Projects* (DPIE April 2020). Where a risk is assessed as negligible or minor it will be managed with a procedure; medium, major and substantial risks will be managed with a sub-plan.

Table 1: Likelihood criteria

Probability (likelihood)	Description
<i>Highly likely (5)</i>	<i>Is expected to occur in most circumstances</i>
<i>Likely (4)</i>	<i>Will probably occur during the life of the project</i>
<i>Possible (3)</i>	<i>Might occur during the life of the project</i>
<i>Unlikely (2)</i>	<i>Could occur but considered unlikely or doubtful</i>
<i>Rare (1)</i>	<i>May occur in exceptional circumstances</i>

Table 2: Consequence criteria

Consequence (impact)	Description
<i>Minor (1)</i>	<i>Minor incident of environmental damage that can be reversed</i>
<i>Medium (2)</i>	<i>Isolated but substantial instances of environmental damage that could be reversed with intensive efforts</i>
<i>High (3)</i>	<i>Substantial instances of environmental damage that could be reversed with intensive efforts</i>
<i>Major (4)</i>	<i>Major loss of environmental amenity and real danger of continuing</i>
<i>Critical (5)</i>	<i>Severe widespread loss of environmental amenity and irrecoverable environmental damage</i>

Table 3: Risk rating

		Consequence				
		Minor (1)	Medium (2)	High (3)	Major (4)	Critical (5)
Likelihood	Almost certain (5)	Medium (5)	High (10)	High (18)	Severe (23)	Severe (25)
	Likely (4)	Low (4)	Medium (9)	High (17)	High (20)	Severe (24)
	Possible (3)	Low (3)	Medium (8)	Medium (13)	High (19)	Severe (22)
	Unlikely (2)	Low (2)	Low (7)	Medium (12)	High (15)	High (21)
	Rare (1)	Low (1)	Low (6)	Low (11)	Medium (14)	High (16)

Table 4: Aspect and impact register – Stage 1A (Critical utility installation, relocation and protection)

Issue	Construction activity/aspect	Potential impact	Risk level prior to mitigation	Indicative Mitigation Measures	Risk level following mitigation	Management Documents / Training Required
Air Quality	- General construction activities (no major earthworks or excavation anticipated) - Utility works and relocation	- Generation of dust due to cutting/grinding/sawing equipment, material /waste/spoil handling; and generation of exhaust emissions due to inappropriate plant maintenance - Generation and mobilisation of dust impacting receivers including residents, businesses, vegetation and habitats	8 (minor)	Direct: - Construction activities with the potential to generate dust will be modified or ceased during unfavourable weather conditions to reduce the potential for dust generation - Access roads within Project sites will be maintained and managed to reduce dust generation - Storage of materials that have the potential to result in dust generation will be minimised within Project sites at all times - During high wind and/or dry conditions, programming of dust generating activities is to be considered in order to reduce nuisance to neighbouring properties - Demolition activities will be planned and carried out to minimise the potential for dust generation - Adequate dust suppression will be applied during all demolition works required to facilitate the Project Indirect: - Other measures outlined in the Air Quality Management Procedure (AQP)	6 (minor)	Air Quality Management Procedure (AQP)
Biodiversity	Vegetation clearance	Clearing outside of an approved area, including: - Accidental clearing outside of the project boundaries - Accidental clearing beyond the requirements of the Project Approval - Accidental lopping of trees and/or damage to tree roots - Accidental clearing of threatened species or threatened ecological communities outside of the project boundary	8 (minor)	Direct: - Toolbox talks regarding clearing limits - Clearly delineate the Project footprint prior to clearing Indirect: - Engage an arborist to supervise works where impact or damage to tree roots is probable - Provide tree protection where required at the direction of the arborist - Other measures outlined in the Flora and Fauna Management Procedure (FFP)	6 (minor)	Flora and Fauna Management Procedure (FFP)
	- General construction activities - Utility works and relocation	Spreading of weeds in stockpiled material	8 (minor)	Direct: - Implement a weed management procedure. Indirect: - Other measures outlined in the FFP	6 (minor)	Weed Management Procedure (within FFP)
Contamination	- General construction activities - Utility works and relocation	Contamination of soil or water from spill or leak of dangerous or hazardous materials from plant / equipment	10 (moderate)	Direct: - The use of any hazardous substance that could result in a spill will be undertaken away from drainage or stormwater lines and, wherever possible, within defined bunds - Any refuelling undertaken on site shall be undertaken in designated areas only, outside of riparian areas and well away from stormwater system inlets - All spills or leakages will be immediately contained and absorbed - Spill containment kits will be placed at locations where there is direct discharge of stormwater to receiving waterways - All sites are hardstand - Inspection regime of bulk storage facility	3 (minor)	Soil and Water Management Procedure (SWP)

Issue	Construction activity/aspect	Potential impact	Risk level prior to mitigation	Indicative Mitigation Measures	Risk level following mitigation	Management Documents / Training Required
				- Undertake Detailed Site Investigations at any locations identified as having moderate or high risks of contamination in accordance with CoA E115 Indirect: - Other measures outlined in the Soil and Water Management Procedure (SWP)		
		Exposure to unidentified contaminated materials during works, causing program delays and injuries and health concerns	10 (moderate)	Direct: - Induct construction personnel in the identification and management of previously unidentified contaminated sites. - The discovery of previously unidentified contaminated material will be managed in accordance with an unexpected contaminated lands finds procedure. The procedure will include: - Cease work in the vicinity - Initial assessment by an appropriately qualified environmental consultant - Further assessment and management of contamination, if confirmed, in accordance with Section 105 of the CLM Act Indirect: - Other measures outlined in the Unexpected Contaminated Land Finds Procedure	8 (minor)	Unexpected Contaminated Land Finds Procedure (within SWP)
Heritage	Utility works and relocation	Disturbance or damage of unidentified Aboriginal heritage artefact	4 (minor)	Direct: - All on site personnel will be provided with site training in regard to Aboriginal cultural heritage site awareness, key mitigation and management requirements and their responsibilities pertaining to the Aboriginal Heritage provisions of the NPW Act 1974 (NSW) prior to construction commencing. Training will include unexpected heritage finds procedures for heritage items, objects and human remains. - Implement Unexpected Heritage Finds and Human Remains Procedure Indirect: - Other measures outlined in the Heritage Management Procedure (HP)	3 (minor)	Heritage Management Procedure (HP) Unexpected Heritage Finds and Human Remains Procedure (within HP)
		Disturbance or damage of non-Aboriginal heritage items including: - St Leonards Park - Cammeray Park (including air raid trenches) - Sydney Harbour Bridge	9 (moderate)	Direct: - Any excavations, intrusive works or other operations that have the potential to impact areas of known heritage, cultural or archaeological items must ensure works are performed in accordance with a heritage assessment and regulatory requirements (which may include a dilapidation survey and/or supervision of works by a competent person and/or vibration monitoring) - Any such areas should be signposted and segregated by the erection of physical barriers to prevent authorised entry Indirect: - Archival recording in accordance with CoA E56 and REMM NAH5 - Integrated design assessment by heritage specialists of potential air raid trench impacts - Prepare a Heritage Impact Assessment (HIA) and implement recommendations for any works that may cause impact to the heritage significance of the Sydney Harbour Bridge - Other measures outlined in the Heritage Management Procedure	6 (minor)	Heritage Management Procedure (HP)
Noise and Vibration	- General construction activities - Utility works and relocation	Noise and vibration impacts on nearby receivers, including out of hours impacts resulting in structural damage or community complaints	15 (significant)	Direct: All on site personnel will undergo a site induction and ongoing toolbox talks that will detail noise and vibration requirements from this plan through inductions, toolboxes and targeted training	9 (moderate)	Noise and Vibration Management Plan (NVMP) Construction Noise and Vibration Monitoring Program

Issue	Construction activity/aspect	Potential impact	Risk level prior to mitigation	Indicative Mitigation Measures	Risk level following mitigation	Management Documents / Training Required
				- Noise and vibration monitoring undertaken in accordance with the Project's Construction Noise and Vibration Monitoring Program - The safe working distances for vibration intensive plant would be complied with where feasible and reasonable. This would include the consideration of smaller equipment when working in close proximity to existing structures - Erection of temporary noise walls - Community liaison and notification - Provision of respite and alternative accommodation where required - Programming the works to minimise the duration of noisy works in any one particular location Indirect: - Other measures outlined in the NVMP and Construction Noise and Vibration Monitoring Program		
		Noise disturbance due to works undertaken out of standard construction hours	15 (significant)	- Out of Hours Works are to be carried out in accordance with the Project's Out-of-Hours-Works Protocol and EPL - Ensure OOHW are appropriately justified – safety or community requirement. - Implement noise mitigation strategies for out of standard hours work as per OOHW Protocol. - Monitor noise for compliance to project goals. - Community notifications distributed.	9 (moderate)	NVMP OOHW Protocol
Soil and Water	- General construction activities - Utility works and relocation	Serious incidents, e.g. uncontrolled release of washout water, water treatment plant, major fuel spill, that cause or threaten material harm to the environment	12 (moderate)	Direct: - Any washout areas will be adequately sized, regularly maintained, and located in designated covered areas. They will be outside of riparian areas and well away from stormwater system inlets in a position where wastewater will not enter any drainage lines or waterways - The use of any hazardous substance that could result in a spill will be undertaken away from drainage or stormwater lines and, wherever possible, within defined bunds - Any refuelling undertaken on site shall be undertaken in designated areas only, outside of riparian areas and well away from stormwater system inlets - Spill containment kits will be placed at locations where there is direct discharge of stormwater to receiving waterways Indirect: - Other measures outlined in the SWP	8 (minor)	SWP
		Erosion and sedimentation impacts on downstream waterways due to exposed land, inadequate controls or failure of controls	12 (moderate)	Direct: - ESCPs will be prepared for all work and implemented in advance of site disturbance - All on site personnel will undergo a site induction and ongoing toolbox talks that will detail erosion and sediment control management measures - Further targeted training to key on site personnel - EWMS will be prepared for high risk activities - An experienced soil conservation specialist (CPESC) will be engaged to provide advice regarding erosion and sediment control - Hardstand areas and surrounding public roads will be cleaned as required using methods such as brooms, bobcat attachments or street sweepers Indirect:	6 (minor)	SWP ESCP

Issue	Construction activity/aspect	Potential impact	Risk level prior to mitigation	Indicative Mitigation Measures	Risk level following mitigation	Management Documents / Training Required
				Other measures outlined in the SWP		
Traffic	- General construction activities - Utility works and relocation	Traffic and parking impacts due to increased number of construction vehicles, site access arrangements and vehicle movements	12 (significant)	Direct: - Designated haul routes for heavy vehicles - Use of the virtual superintendent system - Deployment of surveillance officers - Utilisation of the traffic control centre - Staff log-in at designated parking stations - Limiting vehicle movements to designated entries and exits and haulage routes - All on site personnel will undergo a site induction and ongoing toolbox talks that will detail traffic, transport and access management measures - Communication and adherence to a Worker Code of Conduct - Minimise construction vehicle parking on public roads - Queuing and idling of construction vehicles in residential streets will be minimised - Measures identified in the TMP will be implemented for each ancillary facility/construction compound which requires direct access/egress onto the local/arterial road network Indirect: - Other measures outlined in the TMP	9 (moderate)	Traffic, Transport and Access Management Plan (TTAMP)
Utilities	- General construction activities - Utility works and relocation	Damage to existing utility services	20 (significant)	Direct: - Ensuring appropriate precautionary measures are undertaken or in place prior to works such as completing Dial Before You Dig searches - Positive utility identification such as through potholing or non-destructive digging - Utilisation of utility spotters - Ensuring Ground Penetration Permits are obtained - Appointment of a Project Utility Coordination Manager - Liaison with the relevant utility agencies Indirect: - Other measures outlined in the Utilities Management Strategy (UMS)	12 (moderate)	CEMP and Sub-plans
Visual	General construction activities	Visual impacts on nearby receivers due to light spill, construction works, overshadowing	10 (moderate)	Direct: - Site establishment works will be conducted to minimise visual impacts. Where there is no noise wall or hoarding in place, boundary fencing will be installed to minimise visual, noise and air quality impacts on adjacent sensitive receivers - Retention of existing vegetation or treatment of key temporary structures - Minimise light spill from the project by directing construction lighting into the construction areas and ensuring the site is not over-lit Indirect: - Other measures outlined in the Site Establishment Management Plan (SEMP)	8 (minor)	CEMP and Sub-plans
Waste	- General construction activities - Utility works and relocation	Inappropriate disposal of waste (including demolition, vegetation and hazardous / special waste) or disposal at an unlicensed waste facility	12 (moderate)	Direct: - All on site personnel will undergo a site induction and ongoing toolbox talks that will detail waste and resource management measures - Vegetation disposal in accordance with the FFMP and Weed Management Protocol	6 (minor)	Waste and Resource Use Management Procedure (WP) FFP SWP

Issue	Construction activity/aspect	Potential impact	Risk level prior to mitigation	Indicative Mitigation Measures	Risk level following mitigation	Management Documents / Training Required
				- HAZMAT surveys and removal of asbestos prior to demolition activities - Waste classification in accordance with EPA guidelines - Suitably licensed waste contractors will be used for the collection and transport of all non-domestic, retail and commercial wastes for either offsite processing and/or disposal to an appropriately licensed facility. - Receipts for waste transfer and disposal will be checked to ensure all details are correct and retained for audit purposes - Waste tracking register Indirect: - Other measures outlined in the Waste and Resource Use Management Procedure (WP), SWP and FFP		
		Litter, inappropriate use of co-mingling and waste receptacles	4 (minor)	Direct: - All staff and subcontractors will undergo a site induction and ongoing toolbox talks that will detail waste and resource management measures (including the waste management hierarchy) and energy consumption - All recyclable solid wastes (paper/ cardboard/ plastic/ glass/ timber/ metals/ fluorescent lighting/ printer cartridges/ICT equipment) will be segregated for recycling purposes and volumes reported. Wherever possible, packaging should be avoided or minimised to prevent waste products being unnecessarily brought onto an operation Indirect: - Other measures outlined in the Sustainability Management Plan and WMP	2 (negligible)	WP

Table 5: Aspect and impact register - Stage 1B (Cammeray Golf Course Reconfiguration)

Construction activity/aspect	Issue	Potential impact	Risk level prior to mitigation	Indicative Mitigation Measures	Risk level following mitigation	Management Documents / Training Required
Cammeray Golf Course Adjustment						
Adjustment of the remaining portion of the Golf Course lands into a 9 hole golf course. Activities required to undertake the adjustment works include: 1. Excavation and commissioning of the new water harvesting dam. 2. Earthworks and construction of re-alignment of fairways, bunkers and tees. 3. Earthworks and installation of a new irrigation system. 4. Construction of new maintenance facilities and associated supporting infrastructure. 5. Tree clearing. 6. Landscaping including concrete footpaths, plantings and new trees. 7. Utility relocations within the Golf Course.	Air quality	Complaints from neighbours, including loss of amenity, dust in living areas, swimming pools	High (10)	• Induct personnel on air quality issues and safeguards. • Use water suppression during dust generating activities. • Use street sweepers to reduce dust in areas of dust build up. • Modify or cease operations during high winds. • All trucks on public roads to cover loads. • Vehicles, equipment, machinery used and all facilities – designed, operated and maintained to control the emission of smoke, dust, odours and fumes. • All disturbed areas stabilised, rehabilitated as soon as practicable. • Minimise tracked mud/dust on public roads. • No burning or incineration of any material at any time. • Areas of disturbance will be minimised and managed with an Erosion and Sediment Control Plan developed by the Project Soil Conservationist and approved by the TfNSW Soil Conservationist.	Low (4)	Air Quality Procedure Induction Erosion & Sediment Control Plan (ESCP) G38 Specification
		Potential adverse health effects	Low (11)		Low (6)	
		Generation of exhaust emissions due to inappropriate plant maintenance	Medium (9)		Low (3)	
	Biodiversity	Clearing / disturbance outside of approved area	Medium (8)	• Induct personnel on biodiversity issues and safeguards. • The location of any threatened species or other important flora, fauna and habitat features identified during pre-clearing surveys will be identified on the Sensitive Area Plans. • Establish clearing boundary prior to commencing works, including no-go zones. • The clearing of vegetation will be minimised with the objective of reducing impacts to all flora and fauna, to the greatest extent practicable. • Identify trees to be retained within clearing boundary. • Prior to the commencement of clearing, pre-clearing surveys will be undertaken to determine the presence and on-site location of any habitat features, threatened species and any weed infestations in vegetation to be cleared. • A Clearing and Grubbing Plan is to be prepared. • Prior to the commencement of clearing an ecologist or experienced fauna handler will conduct a search for any wildlife that may need to be removed and relocated. • Undertake tree removal using a suitably qualified arborist in accordance with AS 4373-2007 Pruning of Amenity Trees and NSW WorkCover Code of Practice for the Amenity Tree Industry (1998). • Arborist to be contacted and be present onsite if excavation works are within the critical root zone. • Disturbed area landscaped as part of future construction works. • Stockpiling/storage of cleared timber, mulch and other equipment is to be in areas designated and outside the critical root zone of remaining trees. • Declared noxious weeds are to be managed according to requirements under the <i>Biosecurity Act 2015</i> and Guide 6 (Weed Management) of the Roads and Maritime Services Biodiversity Guidelines 2011.	Medium (8)	Flora and Fauna Management Plan Induction TfNSW Specification G36 TfNSW Specification G40 TfNSW Biodiversity Guidelines
		Impacts on unexpected threatened species	Medium (12)		Low (6)	
		Displacement of, or injury to fauna	Medium (9)		Low (1)	
		Spread of noxious weeds via personnel, plant / equipment, topsoil/mulch	Medium (8)		Low (3)	
		Incorrect handling and translocation of fauna species from the existing dam to the new dam.	High (10)		Medium (8)	

Construction activity/aspect	Issue	Potential impact	Risk level prior to mitigation	Indicative Mitigation Measures	Risk level following mitigation	Management Documents / Training Required
	Non-Aboriginal heritage	Commencement without undertaking archival recording of the existing Cammeray Golf Course.	High (17)	- Induct personnel on heritage issues and safeguards. - Prior to commencement of work in a specific area, heritage items adjacent to the project footprint will be fenced / flagged and sign posted as No-go zones. Preserved heritage items will be shown on relevant site plans and communicated to the relevant workforce. - If any previously unidentified heritage objects, archaeological relics, and/or Aboriginal objects are discovered, work must cease immediately and the TfNSW's Standard Management Procedure: – Unexpected Heritage Items shall be followed. - The proponent shall not destroy, modify or otherwise physically affect any heritage items outside the SSI footprint. - Prior to the commencement of works the construction methodology will be reviewed to confirm if works are required within the minimum working distance for known heritage items. If the works are within the minimum working distance the construction method will be reviewed to identify additional mitigation measures to be implemented, e.g. use of smaller plant. Where works cannot be avoided within the minimum working distance attended vibration monitoring will be completed at the commencement of the vibration generating activity, with additional mitigation implemented as required.	Low (7)	Heritage Procedure Induction TfNSW Unexpected Heritage Items procedure Archival Recording
		Impacts to heritage items (Cammeray Golf Course I0024, Cammeray Conservation Area CA01)	Medium (12)		Low (6)	
		Disturbance or damage to unidentified non-Aboriginal heritage item	Low (11)		Low (1)	
		Commencement without completion of the requirements associated with the Thematic study of the Cammeray Golf Course.	Medium (12)		Low (6)	
	Aboriginal heritage	Disturbance or damage to unidentified Aboriginal heritage item	Low (11)	- Induct personnel on heritage issues and safeguards. - If any previously unidentified heritage objects, archaeological relics, and/or Aboriginal objects are discovered, work must cease immediately and the TfNSW's Standard Management Procedure: – Unexpected Heritage Items shall be followed. - If human remains are discovered during construction, the find will be managed in accordance with the TfNSW's Standard Management Procedure: – Unexpected Heritage Items. - The proponent shall not destroy, modify or otherwise physically affect any heritage items, including human remains, outside the SSI footprint.	Low (1)	Heritage Procedure Induction TfNSW Unexpected Heritage Items procedure
	Surface water quality	Erosion and sedimentation impacts on downstream waterways due to exposed land, inadequate controls or failure of controls	High (10)	- Induct personnel on soil and water issues and safeguards. - Erosion and Sediment Control Plans (ESCP) are to be prepared in accordance with the Blue Book. - Manage surface water and soils to minimise potential erosion and sedimentation of drains and watercourses in accordance with the requirements of the Blue Book. - Minimise areas of exposed soil surfaces to reduce erosion. - Install sediment control measures prior to commencing excavation or vegetation clearing works. - Stabilise disturbed areas at the completion of works. - Store oils and fuels in a suitably bunded, covered and secure area with sufficient capacity to contain at least 110 percent of the volume of the largest container. - In the event of a spill follow the Spill Management Procedure. - Any concrete washout undertaken on site shall be undertaken in designated areas only, well away from stormwater system inlets. - All vehicles leaving site will be required to ensure tyres, guards and drawbars are clear of excess sediment. - Use street sweepers and broom trucks as required.	Low (3)	Soil and Water Procedure Induction Spill Management Procedure G38 Specification Detailed Site Investigation (DSI)
		Contamination of soil or water from spill or leak of dangerous or hazardous materials from plant / equipment	High (10)		Low (1)	
		Contamination of soil or water from spill or leak of dangerous or hazardous materials from bulk storage	Medium (9)		Low (1)	
		Tracking of mud from work area	High (10)		Medium (8)	
		Incorrect storage and disposal of contaminated soils (incl. asbestos) resulting in contamination of soil or water	Medium (9)		Low (1)	

Construction activity/aspect	Issue	Potential impact	Risk level prior to mitigation	Indicative Mitigation Measures	Risk level following mitigation	Management Documents / Training Required
				- Cover loads prior to exiting site. - Consolidated material stockpiles will only occur within an ancillary facility. - Temporary storage of materials adjacent to works will not be restricted to ancillary facilities. - Any refuelling undertaken on site shall be undertaken in designated areas only, well away from stormwater system inlets.		
		Exposure to unidentified contaminated materials during works	Medium (9)	- Induct construction personnel in the identification and management of previously unidentified contaminated sites. - The discovery of previously unidentified contaminated material will be managed in accordance with an unexpected contaminated land finds procedure. The procedure will include: - Cease work in the vicinity - Initial assessment by an appropriately qualified environmental consultant Further assessment and management of contamination, if confirmed, in accordance with Section 105 of the CLM Act.	Medium (9)	
		Management of known areas of contamination during adjustment works.	Medium (9)	- Undertake Detailed Site Investigations (DSI) on the subject area prior to commencing disturbance of ground. - Prepare a DSI report detailing the extent of contamination and further measures to mitigate risk (as required). - Induct construction personnel in the identification and management of previously identified contaminated sites. - Further assessment and management of contamination, if confirmed, in accordance with Section 105 of the CLM Act.	Medium (9)	
	Noise	Noise nuisance to sensitive receivers from works in standard hours	High (10)	- Induct personnel on noise issues and safeguards. - Works shall generally be undertaken during standard working hours (Monday to Saturday). - High noise intensive works are restricted to occurring between 8am and 6pm (Monday to Friday) and 8am to 1pm (Saturday), unless required by an ROL. Respite will be implemented for these works in the form of works in continuous blocks that do not exceed three hours with a minimum one-hour respite in between each block. - Where feasible, hand tools will replace excavator mounted rock breakers to minimise the noise levels associated with removing rock (if encountered). Where hand held jackhammers are used, noise blankets will be used to reduce impacts on sensitive receivers. - Where feasible, noise sources will be shielded using acoustic noise blankets while ensuring that the occupational health and safety of workers is maintained. - For work outside of standard working hours the following additional management measures will apply: - Works to be undertaken in accordance with the OOH Work Protocol - Noise monitoring will be undertaken by the Contractor during works outside standard working hours to confirm that noise levels are within those modelled for the works - Notification to sensitive receivers detailing work activities, dates and hours, impacts and mitigation measures and contact telephone number. Notification will be undertaken in accordance with the OOH Work Protocol and the Community Strategy.	Low (4)	Noise and Vibration Management Sub-Plan Out of Hours Works Protocol Community Strategy Induction
		Noise nuisance to sensitive receivers from works in conducted out of hours	High (18)		Medium (8)	

Construction activity/aspect	Issue	Potential impact	Risk level prior to mitigation	Indicative Mitigation Measures	Risk level following mitigation	Management Documents / Training Required
	Vibration	Vibration nuisance to sensitive receivers	High (10)	- Induct personnel on vibration issues and safeguards. - Maintain minimum working distances between vibration intensive works and sensitive building structures for human response criteria where reasonable and feasible in accordance with RMS CNVG. - Complete pre and post-construction condition assessments for residential properties where vibration generating activities will be undertaken within the minimum working distance for cosmetic damage as defined in Table 2 RMS CNVG 2016.	Low (4)	Noise and Vibration Management Sub-Plan
		Damage to property from vibration impacts	Medium (8)		Low (7)	Induction
	Visual and amenity impacts	Visual impacts on nearby receivers due to light spill, construction works	High (10)	- Induct personnel on community nuisance issues and safeguards. - Minimise the extent of work areas and maintain worksites in a clean and tidy manner. - During out of hours works temporary lighting locations will be reviewed at the commencement of the shift to confirm the light is not towards residential properties, whilst providing the necessary light to complete the works safely.	Low (3)	Noise and Vibration Management Sub-Plan Induction
	Traffic	Amenity and noise impacts on sensitive receivers due to increased number of construction vehicles, site access arrangements and vehicle movements	High (10)	- Induct personnel on traffic issues and safeguards. - Develop temporary works that minimise conflicts with the existing road network and maximises spatial separation between work areas and travel lanes. - Complete a pre and post condition assessment of local roads used during CGC adjustment works. - Isolate work areas from general traffic through the implementation of appropriate traffic and access controls. - Notify affected communities about temporary traffic and access disruptions. - Minimise on-street parking removal to extent required for each work week. - Construction workers utilise designated off-street car parking areas where available. - Minimise periods of time during which roads and footpaths would be closed. - Property access is to be maintained in consultation with property owners. - Access to be maintained for public pedestrian pathways and cycleways. - Install signage to advise road users of any closures and alternative arrangements. - Pedestrian access will be maintained. Diversions around work areas will be minimised. - For any utility works on main arterial roads, a Road Occupancy Licence (ROL) and coordination with the Sydney Coordination Office (SCO)/Traffic Management Centre (TMC) would be required. - Undertake assessments for use of local roads in accordance with the E132 Ministers Conditions of Approval.	Medium (8)	Traffic, Transport and Access Management Sub-Plan Construction Parking Access Strategy Induction
		Complaints from sensitive receivers due to changes in parking	High (10)		Medium (8)	E133 Local Roads Approval
		Complaints from sensitive receivers due to changes in traffic arrangement	High (10)		Medium (8)	
		Complaints from sensitive receivers due to changes in traffic arrangements in local roads	High (10)		Medium (8)	
	Cumulative impacts (noise, vibration, air quality, traffic)	Complaints from sensitive receivers due to cumulative noise, vibration, air quality and traffic impacts from the works	High (10)	Utilities Coordination Manager would coordinate contestable and non-contestable utilities to ensure out of hours respite is provided (for utilities in the CUT Scope as well as the CGC adjustment scope).	Medium (8)	Noise and Vibration Management Sub-Plan Traffic, Transport and Access Management Sub-Plan

Construction activity/aspect	Issue	Potential impact	Risk level prior to mitigation	Indicative Mitigation Measures	Risk level following mitigation	Management Documents / Training Required
				- Adjustment works would be coordinated with other construction projects and other Early Works packages (as well as Stage 2 Main Works) to avoid cumulative noise impacts where possible. - Where it is not practical to avoid cumulative impacts additional noise mitigation at the source would be investigated including a review of the construction methodology.		Air Quality Procedure Induction
	Waste	Inappropriate disposal of waste including, vegetation and asbestos or disposal at an unlicensed waste facility	Medium (9)	- Induct personnel on traffic issues and safeguards. - Wastes will be managed in accordance with relevant NSW legislation and government policies including using the waste hierarchy principles.	Low (1)	Waste Procedure
		Litter, inappropriate use of co-mingling and waste receptacles	Low (4)	- Characterise and manage waste in accordance with the NSW EPA's Waste Classification Guidelines. - Where feasible, recyclable material is to be segregated from spoil to maximise recycling opportunities. - Appropriate signage for waste receptacles.	Low (3)	

Table 6: Aspect and impact register - Stage 1C (Massey to Amherst noise barrier)

Issue	Construction activity/aspect	Potential impact	Risk level prior to mitigation	Indicative Mitigation Measures	Risk level following mitigation	Management Documents / Training Required
Air Quality	- General construction activities - Cutting of rock face to create slots (recess) for piles - Removal of existing noise barrier - Installation of new noise barrier - Landscaping/rehabilitation work	- Generation of dust due to cutting/grinding/sawing equipment, material /waste/spoil handling; and generation of exhaust emissions due to inappropriate plant maintenance - Generation and mobilisation of dust impacting receivers including residents, businesses, and vegetation	8 (minor)	Direct: - Construction activities with the potential to generate dust will be modified or ceased during unfavourable weather conditions to reduce the potential for dust generation - Access roads within Project sites will be maintained and managed to reduce dust generation (including the use of a street sweeper where appropriate) - Storage of materials that have the potential to result in dust generation will be minimised within Project sites at all times - During high wind and/or dry conditions, programming of dust generating activities is to be considered in order to reduce nuisance to neighbouring properties - Demolition activities will be planned and carried out to minimise the potential for dust generation - Adequate dust suppression will be applied during all demolition/rock cutting and excavation works required to facilitate the Project Indirect: - Other measures outlined in the Air Quality and Odour Management Procedure (AQOMP)	6 (minor)	Air Quality and Odour Management Procedure (AQOMP)
Biodiversity	- General construction activities - Excavation and civil works, including backfilling, temporary and permanent reinstatement works - Removal of existing noise barrier - Installation of new noise barrier - Vegetation clearance	Clearing outside of an approved area, including: - Accidental clearing outside of the project boundaries - Accidental clearing beyond the requirements of the Project Approval - Accidental lopping of trees and/or damage to tree roots - Accidental clearing of threatened species or threatened ecological communities outside of the project boundary	8 (minor)	Direct: - Toolbox talks regarding clearing limits - Clearly delineate the Project footprint prior to clearing Indirect: - Engage an arborist to supervise works where impact or damage to tree roots is probable - Provide tree protection where required at the direction of the arborist - Other measures outlined in the Flora and Fauna Management Procedure (FFMP)	6 (minor)	Flora and Fauna Management Procedure (FFMP)
		Spreading of weeds in stockpiled material	8 (minor)	Direct: - Implement a weed management procedure. Indirect: - Other measures outlined in the FFMP	6 (minor)	Weed Management Procedure (within FFMP)
Contamination	- General construction activities - Excavation and civil works, including backfilling, temporary and permanent reinstatement works	Contamination of soil or water from spill or leak of dangerous or hazardous materials from plant / equipment	10 (moderate)	Direct: - The use of any hazardous substance that could result in a spill will be undertaken away from drainage or stormwater lines and, wherever possible, within defined bunds - Any refuelling undertaken on site shall be undertaken in designated areas only, and well away from stormwater system inlets - All spills or leakages will be immediately contained and absorbed	3 (minor)	Soil and Water Management Procedure (SWMP)

Issue	Construction activity/aspect	Potential impact	Risk level prior to mitigation	Indicative Mitigation Measures	Risk level following mitigation	Management Documents / Training Required
	- Removal of existing noise barrier - Installation of new noise barrier			- Spill containment kits will be placed at locations where there is direct discharge of stormwater to receiving waterways Indirect: - Other measures outlined in the Soil and Water Management Procedure (SWMP)		
		Exposure to unidentified contaminated materials during works, causing program delays and injuries and health concerns	10 (moderate)	Direct: - Induct construction personnel in the identification and management of previously unidentified contaminated sites. - The discovery of previously unidentified contaminated material will be managed in accordance with an unexpected contaminated lands finds procedure. The procedure will include: - Cease work in the vicinity - Initial assessment by an appropriately qualified environmental consultant - Further assessment and management of contamination, if confirmed, in accordance with Section 105 of the CLM Act Indirect: - Other measures outlined in the Unexpected Contaminated Land Finds Procedure	8 (minor)	Unexpected Contaminated Land Finds Procedure (within SWMP)
Heritage	- General construction activities - Excavation and civil works, including backfilling, temporary and permanent reinstatement works - Removal of existing noise barrier - Installation of new noise barrier	Disturbance or damage of unidentified Aboriginal heritage artefact	4 (minor)	Direct: - All on site personnel will be provided with site training in regard to Aboriginal cultural heritage site awareness, key mitigation and management requirements and their responsibilities pertaining to the Aboriginal Heritage provisions of the NPW Act 1974 (NSW) prior to construction commencing. Training will include unexpected heritage finds procedures for heritage items, objects and human remains. - Implement Unexpected Heritage Finds and Human Remains Procedure Indirect: - Other measures outlined in the Heritage Management Procedure (HMP)	3 (minor)	Heritage Management Procedure (HMP) Unexpected Heritage Finds and Human Remains Procedure (within HMP)
		Disturbance or damage of non-Aboriginal heritage items including: - Cammeray Conservation Area at Cammeray - Heritage House (I0002) at 11 Armstrong Street, Cammeray - Heritage House (I0023) at 280 West Street, Cammeray - Tarella, Cammeray	9 (moderate)	Direct: - Any excavations, intrusive works or other operations that have the potential to impact areas of known heritage, cultural or archaeological items must ensure works are performed in accordance with a heritage assessment and regulatory requirements (which may include a dilapidation survey and/or supervision of works by a competent person and/or vibration monitoring) - Any such areas should be signposted and segregated by the erection of physical barriers to prevent authorised entry - Implementation of Noise and Vibration Management Plan to minimise the risk of structural damage to any heritage item (note – all heritage items are outside the buffer zone for vibration impacts) Indirect: - Other measures outlined in the HMP and the CNVMP	6 (minor)	HMP CNVMP
Noise and Vibration	General construction activities	Noise and vibration impacts on nearby receivers, including out of hours impacts resulting in	15 (significant)	Direct:	9 (moderate)	Noise and Vibration Management Plan (NVMP)

Issue	Construction activity/aspect	Potential impact	Risk level prior to mitigation	Indicative Mitigation Measures	Risk level following mitigation	Management Documents / Training Required
	- Excavation and civil works, including backfilling, temporary and permanent reinstatement works - Removal of existing noise barrier - Installation of noise barrier	structural damage or community complaints		- All on site personnel will undergo a site induction and ongoing toolbox talks that will detail noise and vibration requirements from this plan through inductions, toolboxes and targeted training - Noise and vibration monitoring undertaken in accordance with the Project's Construction Noise and Vibration Monitoring Program - The safe working distances for vibration intensive plant would be complied with where feasible and reasonable. This would include the consideration of smaller equipment when working in close proximity to existing structures - Erection of temporary noise walls - Community liaison and notification - Provision of respite and alternative accommodation where required - Programming the works to minimise the duration of noisy works in any one particular location Indirect: - Other measures outlined in the NVMP and Construction Noise and Vibration Monitoring Program (NVMoP)		Construction Noise and Vibration Monitoring Program (NVMoP)
		Noise disturbance due to works undertaken out of standard construction hours	15 (significant)	- Out of Hours Works are to be carried out in accordance with the Project's Out-of-Hours-Works Protocol and EPL - Ensure OOHW are appropriately justified – safety or community requirement. - Implement noise mitigation strategies for out of standard hours work as per OOHW Protocol. - Monitor noise for compliance to project goals. - Community notifications distributed.	9 (moderate)	NVMP OOHW Protocol
Soil and Water	- General construction activities - Excavation and civil works, including backfilling, temporary and permanent reinstatement works - Augering of piles - Removal of existing noise barrier - Installation of noise barrier	Serious incidents, e.g., uncontrolled release of contaminated water, major fuel spill, that cause or threaten material harm to the environment	12 (moderate)	Direct: - Any washout areas will be adequately sized, regularly maintained, and located in designated covered areas. They will be outside of riparian areas and well away from stormwater system inlets in a position where wastewater will not enter any drainage lines or waterways - The use of any hazardous substance that could result in a spill will be undertaken away from drainage or stormwater lines and, wherever possible, within defined bunds - Any refuelling undertaken on site shall be undertaken in designated areas only, outside of riparian areas and well away from stormwater system inlets - Spill containment kits will be placed at locations where there is direct discharge of stormwater to receiving waterways Indirect: - Other measures outlined in the SWP	8 (minor)	SWMP
		Erosion and sedimentation impacts on downstream waterways due to exposed land, inadequate controls or failure of controls	12 (moderate)	Direct: - ESCPs will be prepared for all work and implemented in advance of site disturbance - All on site personnel will undergo a site induction and ongoing toolbox talks that will detail erosion and sediment control management measures	6 (minor)	SWMP ESCP

Issue	Construction activity/aspect	Potential impact	Risk level prior to mitigation	Indicative Mitigation Measures	Risk level following mitigation	Management Documents / Training Required
				- Further targeted training to key on site personnel - EWMS will be prepared for high risk activities - An experienced soil conservation specialist (CPESC) will be engaged to provide advice regarding erosion and sediment control - Hardstand areas and surrounding public roads will be cleaned as required using methods such as brooms, bobcat attachments or street sweepers Indirect: - Other measures outlined in the SWP		
Traffic	- General construction activities - Excavation and civil works, including backfilling, temporary and permanent reinstatement works - Removal of existing noise barrier - Installation of noise barrier	Traffic and parking impacts due to increased number of construction vehicles, site access arrangements and vehicle movements	12 (significant)	Direct: - Designated haul routes for heavy vehicles - Use of the virtual superintendent system - Deployment of surveillance officers - Utilisation of the traffic control centre - Staff log-in at designated parking stations - Limiting vehicle movements to designated entries and exits and haulage routes - All on site personnel will undergo a site induction and ongoing toolbox talks that will detail traffic, transport and access management measures - Communication and adherence to a Worker Code of Conduct - Minimise construction vehicle parking on public roads - Queuing and idling of construction vehicles in residential streets will be minimised - Measures identified in the TTAMP will be implemented for each ancillary facility/construction compound which requires direct access/egress onto the local/arterial road network Indirect: - Other measures outlined in the TTAMP - Local Roads Approval - Construction Parking and Access Strategy (CPAS)	9 (moderate)	Traffic, Transport and Access Management Plan (TTAMP)
Visual	- General construction activities - Excavation and civil works, including backfilling, temporary and permanent reinstatement works - Removal of existing noise barrier - Installation of noise barrier	Visual impacts on nearby receivers due to light spill, construction works, overshadowing	10 (moderate)	Direct: - Site establishment works will be conducted to minimise visual impacts. Where there is no noise wall or hoarding in place, boundary fencing will be installed to minimise visual, noise and air quality impacts on adjacent sensitive receivers - Retention of existing vegetation or treatment of key temporary structures - Minimise light spill from the project by directing construction lighting into the construction areas and ensuring the site is not over-lit	8 (minor)	CEMP and Sub-plans
Waste	General construction activities	Inappropriate disposal of waste (including demolition, vegetation and hazardous / special waste) or disposal at an unlicensed waste facility	12 (moderate)	Direct: All on site personnel will undergo a site induction and ongoing toolbox talks that will detail waste and resource management measures	6 (minor)	Waste and Resource Use Management Procedure (WRUMP) FFMP SWMP

Issue	Construction activity/aspect	Potential impact	Risk level prior to mitigation	Indicative Mitigation Measures	Risk level following mitigation	Management Documents / Training Required
	- Excavation and civil works, including backfilling, temporary and permanent reinstatement works - Removal of existing noise barrier - Installation of noise barrier			- Vegetation disposal in accordance with the FFMP and Weed Management Protocol - HAZMAT surveys and removal of asbestos prior to demolition activities - Waste classification in accordance with EPA guidelines - Suitably licensed waste contractors will be used for the collection and transport of all non-domestic, retail and commercial wastes for either offsite processing and/or disposal to an appropriately licensed facility. - Receipts for waste transfer and disposal will be checked to ensure all details are correct and retained for audit purposes - Waste tracking register Indirect: - Other measures outlined in the Waste and Resource Use Management Procedure (WRUMP), SWMP and FFMP		
		Litter, inappropriate use of co-mingling and waste receptacles	4 (minor)	Direct: - All staff and subcontractors will undergo a site induction and ongoing toolbox talks that will detail waste and resource management measures (including the waste management hierarchy) and energy consumption - All recyclable solid wastes (paper/ cardboard/ plastic/ glass/ timber/ metals/ fluorescent lighting/ printer cartridges/ICT equipment) will be segregated for recycling purposes and volumes reported. Wherever possible, packaging should be avoided or minimised to prevent waste products being unnecessarily brought onto an operation Indirect: - Other measures outlined in the Sustainability Management Plan and WRUMP	2 (negligible)	WRUMP

Table 7: Aspect and impact register - Stage 2 (Warringah Freeway Upgrade)

Issue	Construction activity/aspect	Potential impact	Risk level prior to mitigation	Indicative Mitigation Measures	Risk level following mitigation	Management Documents / Training Required
Air quality	- General earthworks - Vegetation clearing - Open excavation works - Spoil handling - Stockpiling - Vehicular movements on unsealed roads - Material haulage - Vehicle emissions - Handling of chemicals, waste and hazardous goods.	Complaints from neighbours, including loss of amenity, dust in living areas, swimming pools	Likelihood – 5 Consequence – 2 Risk – 10 (Moderate)	- Induct personnel on air quality issues and safeguards - Use water carts on unsealed surfaces and stockpiles - Utilise safe dust suppressants to reduce dust generation - Use street sweepers to reduce dust in areas of dust build up - Modify or cease operations during high winds - All trucks on public roads to cover loads - Vehicles, equipment, machinery used and all facilities – designed, operated and maintained to control the emission of smoke, dust, odours and fumes - All disturbed areas stabilised, revegetated and/or landscaped as soon as practicable - Minimise tracked mud/dust on public roads - No burning or incineration of any material at any time - Dust monitoring - Avoid “hot-work” during total fire bans and obtain any necessary permits/exemptions from the Rural Fire Service - WorkCover licensing requirements will be complied with for the storage of hazardous substances and dangerous goods - Appropriately stocked spill kits will be readily available at all chemical storage locations and during chemical use - Material Safety Data Sheets (MSDSs) will be obtained, complied with and retained on site for all required chemicals - Pesticide use will be in accordance with the Pesticides Act, 1999	Likelihood – 3 Consequence – 1 Risk – 3 (Low)	Air Quality Management Sub Plan (AQMP) Environmental Work Method Statements (EWMS) Soil and Water Management Sub Plan (SWMP) Complaints Procedure Project induction
		Potential adverse health effects	Likelihood – 3 Consequence – 2 Risk – 8 (Moderate)		Likelihood – 2 Consequence – 2 Risk – 7 (Low)	
		Degradation of water quality and other aspects of the natural environment	Likelihood – 3 Consequence – 2 Risk – 8 (Moderate)		Likelihood – 2 Consequence – 2 Risk – 7 (Low)	
		Health risks to neighbours and members of the public from release of gases and/or smoke	Likelihood – 3 Consequence – 2 Risk – 8 (Moderate)		Likelihood – 1 Consequence – 2 Risk – 6 (Low)	
Biodiversity	- Clearing of native vegetation. - Stockpile / haul road construction near vegetation. - General earthworks near vegetation. - Vehicular movements. - Open excavation works. - Bushfires	Loss of habitat for threatened species beyond minimum clearing footprint.	Likelihood – 3 Consequence – 2 Risk – 8 (Moderate)	- Induct personnel on biodiversity issues and mitigation measures. - Verify vegetation clearing boundaries prior to clearing - Ensure vegetation clearing boundaries clearly marked and visible as per FFMP - Prior to construction – identify and fence all flora and fauna habitat areas required to be protected as identified in the FFMP. - Minimise clearing of all vegetation and undertake progressive revegetation. - Pre-clearing inspections by Project Ecologist to review weeds and other threatened species - Implement ongoing weed monitoring and management programs. - Disturbed areas will be monitored for effective soil stabilisation and restoration / rehabilitation. - Implement a staged clearing process and undertake fauna rescue during clearing as required. - Project Arborist to provide advice on habitat tree health and provide ongoing advice. - Undertake threatened species management as required under the FFMP and detailed design documentation / Approval. - Undertake monitoring as required. - Spark arresters on plant prevent fires. - Obtain permits from Fire authorities during high risk fire season.	Likelihood – 2 Consequence – 2 Risk – 7 (Low)	Flora and Fauna Management Plan (FFMP) EWMS Vegetation Clearing procedure Fauna handling procedure Project induction
		Weed infestation	Likelihood – 5 Consequence – 2 Risk – 10 (Moderate)		Likelihood – 3 Consequence – 1 Risk – 3 (Low)	
		Potential longer term impacts associated with increased habitat fragmentation.	Likelihood – 2 Consequence – 2 Risk – 7 (Low)		Likelihood – 1 Consequence – 2 Risk – 6 (Low)	
		Direct impact to flora or fauna during construction.	Likelihood – 2 Consequence – 2 Risk – 7 (Low)		Likelihood – 1 Consequence – 2 Risk – 6 (Low)	

Issue	Construction activity/aspect	Potential impact	Risk level prior to mitigation	Indicative Mitigation Measures	Risk level following mitigation	Management Documents / Training Required
Aboriginal heritage	- Initial clearing and/or grubbing of vegetation. - Initial removal of topsoil. - Construction of site compounds and material or equipment stockpile areas. - Temporary access roads	Impact to undiscovered or undocumented heritage sites	Likelihood – 2 Consequence – 3 Risk – 12 (High)	- Induct personnel on heritage issues and mitigation measures. - For ancillary sites, identify and assess Aboriginal heritage items and predict potential impacts. - Implement unexpected find procedures as required.	Likelihood – 1 Consequence – 2 Risk – 6 (Low)	Heritage Management Sub Plan (HMP) Unexpected Heritage Items Procedure Project induction
		Finding / disturbing burials or human remains	Likelihood – 2 Consequence – 2 Risk – 7 (Low)		Likelihood – 1 Consequence – 2 Risk – 6 (Low)	
Non-Aboriginal heritage	- Initial clearing and/or grubbing of vegetation. - Initial removal of topsoil. - Construction of site compounds and spoil / mulch and / or equipment stockpile areas. - Temporary access roads during construction - Excavations and earthworks. - Pile driving causing vibration. - Use of other vibratory equipment such as rollers.	Impact to identified heritage items.	Likelihood – 3 Consequence – 3 Risk – 13 (High)	- Pre-construction surveys to identify and assess non- Aboriginal heritage items. - Induct personnel on heritage issues and safeguards. - Protect identified heritage items with protective fencing or flagging from being disturbed during construction. - Undertake archival recording as required - Implement unexpected find procedures - Landholder consultation.	Likelihood – 2 Consequence – 2 Risk – 7 (Low)	Heritage Management Sub Plan (HMP) Noise and Vibration Management Sub Plan (NVMP) Unexpected Heritage Items Procedure Project induction
		Vibration damage during the construction period to identified sites.	Likelihood – 3 Consequence – 2 Risk – 8 (Moderate)		Likelihood – 2 Consequence – 2 Risk – 7 (Low)	
		Impact to undiscovered or undocumented heritage sites.	Likelihood – 3 Consequence – 3 Risk – 13 (High)		Likelihood – 2 Consequence – 2 Risk – 7 (Low)	
		Change in visual integrity of heritage sites.	Likelihood – 2 Consequence – 2 Risk – 7 (Low)		Likelihood – 2 Consequence – 1 Risk – 2 (Low)	
Noise and vibration	- Potentially noisy and vibration impact generating works: - Site establishment. - Earthworks - Piling - Paving - Saw cutting	Noise impacts on sensitive receivers during construction.	Likelihood – 5 Consequence – 3 Risk – 18 (Very High)	- Consult with local communities and affected residents. - Adherence to working hours in NVMP unless otherwise approved. - Respite periods for particularly noisy/ short duration activities (in accordance with NVMP). - Construction equipment selected, operated and maintained to minimise noise impacts and where necessary fitted with non-tonal reversing alarms. - Minimise impacts from saw cutting/ use effective shielding. - Regular noise monitoring to monitor predicted verses actual levels. - Implementing management measures where regenerated noise is found to be excessive and agreements are not in place. - Managing construction vehicle routes and speed of vehicles. - Modelling vibration impacts and monitoring where impacts are predicted. - Establish and maintain complaints management system. - Building condition reports on potentially impacted buildings and structures as required by Project approval. - review monitoring results and implement corrective actions as appropriate, such as for example revising mitigation measures, revising predictions. - Implement any additional feasible and reasonable mitigation measures, identified from the review of monitoring results, for minimising noise and vibration impacts - Discuss noise and vibration monitoring results at each ERG.	Likelihood – 4 Consequence – 2 Risk – 9 (Moderate)	NVMP EWMS Out of hours works (OOHW) protocol Negotiated agreements Complaints procedure Project induction
		Vibration impacts on nearby receptors, including heritage.	Likelihood – 4 Consequence – 2 Risk – 9 (Moderate)		Likelihood – 3 Consequence – 2 Risk – 8 (Moderate)	

Issue	Construction activity/aspect	Potential impact	Risk level prior to mitigation	Indicative Mitigation Measures	Risk level following mitigation	Management Documents / Training Required
Soil and water quality	- Clearing and grubbing. - Earthworks and stockpile management. - Storage of fuels and chemicals - Maintenance of plant and equipment, including servicing and refuelling - Sediment basin management - Drainage works - Concrete works - Temp access road construction - Bridge construction. - Landscaping - Landscaping maintenance	Erosion and movement of soils.	Likelihood – 5 Consequence – 3 Risk – 18 (Very High)	- Appropriately designed erosion control structures (e.g. rock checks, sedimentation basins, silt fences and sand bags) will be installed, maintained and cleaned regularly. - Locate spoil stockpiles, plant and equipment away from drainage lines, watercourses or stormwater drains in accordance with established criteria. - Install clean water diversions to ensure clean and dirty water are not mixed on site. - Storage, compound access and parking areas sealed, as early during works as practicable. - Chemical storage meets bunding requirements. - Wheel mud reduction/ cleaning measures at exit of all sites where required. - Buffer zones of vegetation will be maintained adjacent to waterways for as long as practical. - Rehabilitation and landscaping works of disturbed areas undertaken as soon as the works are completed and/or progressively where possible. - Implement concrete washout process within bunded areas. - Provide and maintain spill kits. - Establish clean water catch drains/ diversion early in Project before topsoil stripping. - Design drainage to maximise dirty water to sediment basins. - Establish dedicated ERSed crews for the Project. - Install signage at discharge points to assist workers to understand implications of dirty water release in sensitive areas. - Meet TfNSW Dewatering guidelines.	Likelihood – 3 Consequence – 2 Risk – 8 (Moderate)	SWMP EWMS Basin management procedure Project induction Targeted ERSed training
		Captured dirty water discharge from basins.	Likelihood – 4 Consequence – 3 Risk – 17 (Very High)		Likelihood – 3 Consequence – 2 Risk – 8 (Moderate)	
		Dirty water not captured and leaves site without controls.	Likelihood – 4 Consequence – 3 Risk – 17 (Very High)		Likelihood – 3 Consequence – 2 Risk – 8 (Moderate)	
		Haul road washout from flood event.	Likelihood – 3 Consequence – 2 Risk – 8 (Moderate)		Likelihood – 2 Consequence – 2 Risk – 7 (Low)	
Flooding	- Transverse drainage. - Haul roads and Freeway.	Restriction to flow paths causing localised flooding.	Likelihood – 4 Consequence – 3 Risk – 17 (Very High)	- Design drainage structures to cope with design flood events and Environmental Assessment commitments. - Locate compounds / plant / storage above 1 in 20 years flood level events. - Design and build temporary crossings to be stabilised and minimise scour / erosion during flood events. - Install scour protection as early as possible. - Look at predicting flood events from gauges or rainfall predictions. - Design and construct Project in accordance with CoA .	Likelihood – 3 Consequence – 2 Risk – 8 (Moderate)	SWMP EWMS
		Changes to flood levels – increased impact to receivers.	Likelihood – 3 Consequence – 4 Risk – 19 (Very High)		Likelihood – 2 Consequence – 2 Risk – 7 (Low)	
		Stormwater inflow to site – clean stormwater getting mixed with dirty site water.	Likelihood – 5 Consequence – 3 Risk – 18 (Very High)		Likelihood – 3 Consequence – 2 Risk – 8 (Moderate)	
		Flood damage to plant / equipment / satellite compounds.	Likelihood – 3 Consequence – 3 Risk – 13 (High)		Likelihood – 2 Consequence – 2 Risk – 7 (Low)	
		Erosion of haul/ access road during large flood events.	Likelihood – 3 Consequence – 2 Risk – 8 (Moderate)		Likelihood – 2 Consequence – 2 Risk – 7 (Low)	
Spoil and Fill	- Cuts - Fill areas	Demand on local resources – local quarries / suppliers.	Likelihood – 4 Consequence – 1 Risk – 4 (Low)	- Design for balanced earthworks. - Offsite spoil movements to be monitored and tracked on the site waste disposal register to ensure spoil movements meet EPA guidelines,	Likelihood – 3 Consequence – 1 Risk – 3 (Low)	SWMP EWMS and Work Packs AQMP

Issue	Construction activity/aspect	Potential impact	Risk level prior to mitigation	Indicative Mitigation Measures	Risk level following mitigation	Management Documents / Training Required
	- Haulage of spoil and fill - Stockpiling - Spoil areas - Site establishment utility - Service relocations - Earthworks - Drainage works	ERSED issues from cuts / batters / stockpiles. Sensitive area damage from stockpiling. Contaminated land.	Likelihood – 4 Consequence – 2 Risk – 9 (Moderate) Likelihood – 3 Consequence – 2 Risk – 8 (Moderate) Likelihood – 3 Consequence – 3 Risk – 13 (High)	including characterisation of the spoil to determine correct disposal locations and volumes. - Spoil to be beneficially reused, on or off site, where applicable and meeting environmental requirements. Includes reuse of excavated material, either as fill, or as earth mounds for noise control, or beautification, shielding or revegetation mounds on site. - All loads accessing public roads to be covered to prevent any loss of material, which may cause driver safety issues. - Only locate stockpiles in accordance with criteria in CEMP/SWMP - Classify and dispose of any contaminated land in accordance with EPA guidelines.	Likelihood – 3 Consequence – 2 Risk – 8 (Moderate) Likelihood – 2 Consequence – 2 Risk – 7 (Low) Likelihood – 2 Consequence – 2 Risk – 7 (Low)	CEMP Contaminated Land Management Procedure
Waste Management	Generation of waste during construction activities including building materials, excess unsuitable spoil material, vegetation material.	Excessive waste being directed to landfill. Incorrect disposal of contaminated waste. Meeting POEO Act requirements for VENM, ENM, Recovered Aggregate, Reclaimed Asphalt pavement and mulch	Likelihood – 3 Consequence – 1 Risk – 3 (Low) Likelihood – 3 Consequence – 4 Risk – 19 Very High Likelihood – 3 Consequence – 3 Risk – 13 (High)	- Apply waste hierarchy principles – avoid-reduce-reuse-recycle. - Waste materials contained in waste bins or other suitable containers, and collected for recycling, reuse or disposal by the licensed waste contractor. - Separate, contain, manage and dispose contaminated waste to prevent migration and further contamination whilst maintaining compliance with EPA requirements. - Label and store all liquid waste containers in a bunded area prior to removal off-site. - Undertake inspections of the worksite and waste storage areas to ensure litter / debris is regularly cleaned up and contained on site. - Establish recycling system early on in Project. - Establish good segregation areas for concrete and waste concrete is not to be transported off site for land disposal. - Section 143 Notices Under the POEO Act and provision of a letter to landholder highlighting the need for a “s.143 Notice”, the Contractor’s role and the respective roles of the TfNSW and the landholder in ensuring that the waste is appropriately managed. - Consider types of waste, how each waste type will be used as a beneficial use and address in the approvals that no other type of waste will be used.	Likelihood – 2 Consequence – 1 Risk – 2 (Low) Likelihood – 2 Consequence – 2 Risk – 7 (Low) Likelihood – 2 Consequence – 2 Risk – 7 (Low)	Waste and Energy Management Plan (WEMP) EWMS Waste register
Traffic and transport	- Haulage of material. - Import of material / plant / equipment. - Travel to / from site.	Accidents - Safety of commuters, pedestrians, cyclists, contractors and subcontractors. Delays Noise Vibrations and Dust nuisance to residents on haul routes Unapproved use of local roads	Likelihood – 4 Consequence – 4 Risk – 20 (Very High)	- Develop and update Traffic Control Plans for all stages of work. - Identify and assess roads likely to be affected by Project construction and develop methods to minimise traffic increases. - Undertake before and after dilapidation surveys on local roads - Traffic controllers and / or signage for both egress and ingress off the work sites. - All vehicles carrying materials to be adequately covered to prevent any loss of material, which may cause driver safety issues. - Toolbox workforce on approved access routes	Likelihood – 3 Consequence – 3 Risk – 13 (High)	Traffic Management Plan (TMP) EWMS AQMP WEMP Project induction Toolbox talks
Visual Impact, Landscaping and Rehabilitation	- Cuttings and cut finishes. - Bridge design Revegetation / landscaping. - Removal of visually prominent native vegetation. - Evening / night works.	General public aesthetic impacts Heritage related visual	Likelihood – 3 Consequence – 1 Risk – 3 (Low) Likelihood – 2 Consequence – 2 Risk – 7 (Low)	- Landscape and rehabilitation plan including extensive seeding planting in required areas will be developed and implemented. - Landscape treatments will incorporate the surrounding landscape types and vegetation patterns and address view scapes. - Embankments and cuttings will be stabilised by the use of appropriate landscape treatments. - The use of night-lighting will be minimised where possible during the construction phase and directed away from residential areas.	Likelihood – 2 Consequence – 1 Risk – 2 (Low) Likelihood – 1 Consequence – 2 Risk – 6 (Low)	Urban Design and Landscape Management Plan (UDLMP) FFMP

Issue	Construction activity/aspect	Potential impact	Risk level prior to mitigation	Indicative Mitigation Measures	Risk level following mitigation	Management Documents / Training Required
				- Site compounds and areas surrounding them will be kept tidy and be regularly cleaned and maintained. - Undertake landscaping and revegetation works in accordance with the approved Urban Design and Landscape Management Plan.		
Contamination	Discovery of contaminated soils/ asbestos	Contamination of land and /or waterways from spills/ asbestos/ land contamination.	Likelihood – 4 Consequence – 3 Risk – 17 (Very High)	Implement unexpected finds contamination management measures	Likelihood – 2 Consequence – 2 Risk – 7 (Low)	Contaminated Land Management Procedure EPA guidelines
General Environmental Management	- Environmental management / supervision - Incident response	Poor environmental culture leading to poor environment outcomes.	Likelihood – 4 Consequence – 2 Risk – 9 (Moderate)	- Ensure all environmental personnel are trained in the CEMP and all associated documents. - Environment team diligence in including requirements from CEMP and procedures into EWMS and training. - Regular review of environmental management documents. - Regular environment team and ERG meetings. - Environmental Manager to be involved in design and construction meetings. - Training in environmental emergency response. - Ensure NCR process is followed. - Early consultation with regards to proposed upcoming works and approvals to be sought. - Implementation of high operating standards & in accordance with accepted industry standards.	Likelihood – 2 Consequence – 2 Risk – 7 (Low)	CEMP Procedures (in CEMP and sub-plans) TfNSW Incident Management procedures EWMS Compliance Tracking Program Internal / external audits ERG
		Non-compliance with CEMP, EPL, MCoA and legislative requirements.	Likelihood – 4 Consequence – 2 Risk – 9 (Moderate)		Likelihood – 2 Consequence – 2 Risk – 7 (Low)	
		Failure to follow requirements of strategies / procedures.	Likelihood – 4 Consequence – 2 Risk – 9 (Moderate)		Likelihood – 2 Consequence – 2 Risk – 7 (Low)	
		Failure to report environmental issues and incidents.	Likelihood – 4 Consequence – 2 Risk – 9 (Moderate)		Likelihood – 2 Consequence – 2 Risk – 7 (Low)	
		Inconsistent advice to construction personnel.	Likelihood – 4 Consequence – 2 Risk – 9 (Moderate)		Likelihood – 2 Consequence – 2 Risk – 7 (Low)	
		Inadequate response to environmental incident/ emergency.	Likelihood – 3 Consequence – 2 Risk – 8 (Moderate)		Likelihood – 2 Consequence – 2 Risk – 7 (Low)	
Planning Approvals	Approvals/ Legislative Compliance	Lost opportunities to implement innovations leading to better environmental outcomes	Likelihood – 4 Consequence – 2 Risk – 9 (Moderate)	- Early consultation in preparing approvals and CEMP. - Ensure all environmental personnel are trained in the CEMP and all associated documents. - Environment team diligence in including requirements from CEMP and procedures into EWMS and training. - Regular review of environmental management documents. - Regular review of compliance with environmental management documents, MCoA etc. - Regular environment team and ERG meetings. - Early consultation with regards to proposed upcoming works and approvals to be sought.	Likelihood – 2 Consequence – 2 Risk – 7 (Low)	CEMP Compliance Tracking Program Internal / external audits ERG
		Poor working relationships with regulators	Likelihood – 3 Consequence – 2 Risk – 8 (Moderate)		Likelihood – 2 Consequence – 2 Risk – 7 (Low)	
		Delays due to receipt of approvals (e.g. CEMP, Planning Modifications, Environment Assessments for Ancillary Facilities)	Likelihood – 4 Consequence – 2 Risk – 9 (Moderate)		Likelihood – 1 Consequence – 2 Risk – 6 (Low)	

Table 8: Aspect and impact register – Stage 3A (WHT Southern Tunnel Works)

Issue	Construction activity/aspect	Potential impact	Risk level prior to mitigation	Indicative Mitigation Measures	Risk level following mitigation	Management Documents / Training Required
Air quality	Construction works for this stage are to be undertaken predominantly underground with limited surface-based activities. Stage 3A involves tunnel excavation and support, both of which will occur from the WHT cut and cover structure or underground. Accordingly, predicted air quality impacts are low and can be mitigated through the measures outlined below.					
	- Spoil handling underground - Stockpiling underground - Material haulage - Vehicle emissions - Handling of chemicals, waste and hazardous goods underground.	Generation of dust as a nuisance to the community, including complaints made to the Project	Likelihood – 3 Consequence – 2 Risk – 8 (Moderate)	- REMM AQ1: Standard construction air quality mitigation and management measures will be detailed in construction management documentation and implemented during construction, such as: a) Reasonable and feasible dust suppression and/or management measures, including the use of water carts, dust sweepers, sprinklers, dust screens, site exit controls (eg wheel washing systems and rumble grids), stabilisation of exposed areas or stockpiles, and surface treatments b) Selection of construction equipment and/or materials handling techniques that minimise the potential for dust generation c) Management measures to minimise dust generation during the transfer, handling and on site storage of spoil and construction materials (such as sand, aggregates or fine materials) (eg the covering of vehicle loads) d) Adjustment or management of dust generating activities during unfavourable weather conditions, where possible e) Minimisation of exposed areas during construction f) Management measures for managing unexpected odour generation likely to result in odour impacts at sensitive receivers in the vicinity during the disturbance, handling and storage of potentially odorous materials, including any contingency measures g) Internal project communication protocols to ensure dust-generating activities in the same area are coordinated and mitigated to manage cumulative dust impacts of the project h) Site inspections will be carried out to monitor compliance with implemented measures. - REMM AQ2: Dust and air quality complaints will be managed in accordance with the overarching complaints handling process for the project. Appropriate corrective actions; if required, will be taken to reduce emissions in a timely manner. - CoA E1: Measures must be implemented to minimise and manage the emission of dust, odour and other air pollutants during construction and operation - Other specific measures as outlined in the Project Environmental Protection Licence (EPL)	Likelihood – 2 Consequence – 2 Risk – 7 (Low)	Construction Environmental Management Plan (CEMP) Air Quality Management Plan and Air Quality Monitoring Program (AQMP + AQMtGP) Activity Method Statement (AMS) Soil and Surface Water Management Sub Plan and Surface Water Monitoring Program (SSWMP+SWMP) Environmental Protection Licence (EPL)
		Impacts on ambient air quality and human health from dust and plant emissions.	Likelihood – 3 Consequence – 2 Risk – 8 (Moderate)		Likelihood – 2 Consequence – 2 Risk – 7 (Low)	
		Health risks to neighbours and members of the public from release of gases and/or smoke	Likelihood – 1 Consequence – 2 Risk – 6 (Low)		Likelihood – 1 Consequence – 2 Risk – 6 (Low)	
		Odour from hydrocarbons/acid sulphates/unknown contaminants	Likelihood – 1 Consequence – 1 Risk – 1 (Low)		Likelihood – 1 Consequence – 1 Risk – 1 (Low)	
Biodiversity	Construction works for this stage are to be undertaken predominantly underground with limited surface-based activities. Stage 3A involves tunnel excavation and support, both of which will occur from the WHT cut and cover structure or underground. Accordingly, flora and fauna impacts are not likely to occur given vegetation clearing is not anticipated; treated water discharge into Rozelle Bay will be in accordance with the EPL and planning approval requirements; there are no predicted Groundwater Dependent Ecosystem impacts in the Project area; no biodiversity impacts from wastewater treatment plant discharges are predicted.					

Issue	Construction activity/aspect	Potential impact	Risk level prior to mitigation	Indicative Mitigation Measures	Risk level following mitigation	Management Documents / Training Required
	• Vehicular movements • Operation of tunnel support ancillary facility underground • Tunnel excavation • Unforeseen vegetation clearing	Impact on native vegetation and threatened ecological communities.	Likelihood – 1 Consequence – 1 Risk – 1 (Low)	Where unexpected impacts to flora or fauna are encountered, the following measures will be generally implemented: • Treated water will be discharged in accordance with the requirements from the Project EPL and planning approval • REMM B1: Vegetation removal including the clearing of native vegetation and fauna habitat will be further minimised, where feasible and reasonable. • REMM B2: Vegetation removal will be carried out in accordance with Guide 4: Clearing of vegetation and removal of bushrock of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA, 2011). • REMM B3: The unexpected species find procedure included in Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA, 2011) will be followed if threatened ecological communities, flora or fauna species, not assessed in the biodiversity assessment, are identified in the construction footprint. • REMM B4: Vegetation will be re-established within the project footprint where feasible, in accordance with Guide 3: Re-establishment of native vegetation of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA, 2011). Where replacement trees cannot be accommodated within the project footprint, locations outside the project footprint will be identified for compensatory plantings. The replacement trees will consist of local native provenance species from the vegetation community that once occurred in the locality (rather than plant exotic or non-local native trees) where available and subject to the urban design and landscape plan. • REMM B5: Pre-clearing surveys for threatened flora species will be carried out in accordance with Guide 1: Pre-clearing process of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA, 2011). • REMM B10: Fauna will be managed in accordance with Guide 9: Fauna handling of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA, 2011). • REMM B11: Pre-clearing surveys will be undertaken in accordance with Guide 1: Preclearing process of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA, 2011). • REMM B14: Weed species will be managed in accordance with Guide 6: Weed management of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA, 2011). • REMM B15: Pathogens will be managed in accordance with Guide 2: Exclusion zones of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA, 2011). • REMM B18: The velocity of wastewater treatment plant discharge will be minimised to avoid scour impacts on the marine environment.	Likelihood – 1 Consequence – 1 Risk – 1 (Low)	Flora and Fauna Management Procedure CEMP EPL
		Impacts to fauna habitat, including aquatic and marine habitats	Likelihood – 1 Consequence – 2 Risk – 6 (Low)		Likelihood – 1 Consequence – 2 Risk – 6 (Low)	
		Impacts on threatened fauna species and endangered populations.	Likelihood – 2 Consequence – 1 Risk – 6 (Low)		Likelihood – 1 Consequence – 1 Risk – 1 (Low)	
Aboriginal heritage	There are no registered AHIMS sites within 50 metres of the construction footprint for this stage of the WHT.					

Issue	Construction activity/aspect	Potential impact	Risk level prior to mitigation	Indicative Mitigation Measures	Risk level following mitigation	Management Documents / Training Required
	Unregistered aboriginal heritage site is discovered above or in close proximity to the tunnel alignment	Direct impacts to terrestrial Aboriginal heritage sites.	Likelihood – 1 Consequence – 2 Risk – 6 (Low)	- REMM AH5: If at any time during construction of the project, any items of potential Aboriginal archaeological or cultural heritage conservation significance or human remains are discovered they will be managed in accordance with the Standard Management Procedure: Unexpected Heritage Items (Roads and Maritime, 2015). - REMM AH6: Cultural and historic heritage awareness training will be carried out for personnel engaged in work that may impact heritage items before commencing works for the project. - CoA E63: An Unexpected Heritage Finds and Human Remains Procedure must be prepared to manage unexpected heritage finds (including maritime discoveries) in accordance with any guidelines and standards prepared by Heritage NSW and submitted to the Planning Secretary for information before the commencement of construction. - CoA E64: The Unexpected Heritage Finds and Human Remains Procedure, as submitted to the Planning Secretary, must be implemented for the duration of construction. In the event that an unregistered aboriginal heritage site is discovered in close proximity to the tunnel alignment the following mitigations will be implemented: - REMM AH2: The following process will be carried out to confirm where vibration monitoring at terrestrial AHIMS sites will be required: - Terrestrial Aboriginal site condition surveys will be completed using photogrammetry and 3D-capture techniques to determine which AHIMS sites are considered to be structurally unsound construction footprint) - Where this determination cannot be made, the AHIMS site will be considered to be structurally unsound - A screening of vibration intensive activities within 50 metres of structurally unsound sites will be carried out to identify activities that have the potential to exceed vibration levels of 2.5 millimetres per second Sites identified as being both structurally unsound and having potential for exceedance in vibration levels of 2.5 millimetres per second will be identified as requiring vibration monitoring. - REMM AH3: Vibration monitoring will be carried out at AHIMS sites that have been identified as requiring monitoring in accordance with the process outlined in mitigation measure AH2. Where possible, works will be conducted in a manner to minimise vibration levels, to less than 2.5 millimetres per second at all structurally unsound AHIMS sites. - REMM AH4: If vibration monitoring identifies that vibration levels exceed 2.5 millimetres per second at AHIMS sites that have been identified as requiring monitoring, a site visit will be organised with a representative from Metro LALC to record any changes to the integrity of the site that may have resulted from construction vibration, and updated site cards must be prepared accordingly.	Likelihood – 1 Consequence – 2 Risk – 6 (Low)	CEMP Noise and Vibration Management Sub Plan and Noise and Vibration Monitoring Program (NVMP + NVMtgP) Construction Noise and Vibration Impact Statements (CNVIS) Heritage Management Procedure – this procedure includes Aboriginal and non-Aboriginal heritage Unexpected Heritage Finds and Human Remains Procedure – this procedure is incorporated into the Heritage Management Procedure
		Indirect impacts to terrestrial Aboriginal heritage sites due to vibration and settlement.	Likelihood – 2 Consequence – 2 Risk – 7 (Low)		Likelihood – 1 Consequence – 2 Risk – 6 (Low)	

Issue	Construction activity/aspect	Potential impact	Risk level prior to mitigation	Indicative Mitigation Measures	Risk level following mitigation	Management Documents / Training Required
				Condition surveys may include further photogrammetry and 3D-capture techniques. CoA E65: A detailed land use survey must be undertaken to confirm sensitive land user(s) (including critical working areas such as operating theatres and precision laboratories) potentially exposed to construction noise and vibration, construction ground-borne noise and operational noise. The survey may be undertaken on a progressive basis but must be undertaken in any one area before the commencement of work which generates construction or operational noise, vibration or ground-borne noise in that area. The results of the survey must be included in the Noise and Vibration CEMP Sub-plan required by Condition C4.		
Non-Aboriginal heritage	This stage of the WHT involves no surface-based excavation within or nearby heritage areas or listed items. There are listed heritage items above sections of the tunnel alignment, however, due to the depth of tunnel excavation and implementation of the measures below impacts are not anticipated.					
	- Tunnelling works - Use of other vibratory equipment.	Direct impacts to terrestrial heritage items, archaeology or heritage conservation areas	Likelihood – 1 Consequence – 3 Risk – 11 (Moderate)	- REMM NAH5: Archival recording will be carried out in accordance with the <i>Photographic Recording of Heritage Items Using Film or Digital Capture</i> guideline for areas/items subject to change within the following terrestrial items, in accordance with Appendix J (Technical working Paper: Non-Aboriginal heritage): A) Item 2: The Valley Heritage Conservation Area, Rozelle and Balmain Archival recording will be completed prior to any works that have the potential to impact upon the items and deposited with appropriate stakeholders as determined during detailed design (eg local councils). - REMM NAH10: If at any time during construction of the project, historical heritage materials, features and/or deposits are encountered during construction, the Roads and Maritime Services <i>Standard Management Procedure: Unexpected Heritage Items</i> (Roads and Maritime, 2015) will be followed. - REMM NAH11: In the event that construction of the project reveals possible human skeletal material (remains), Standard Management Procedures – Unexpected Heritage Items (Roads and Maritime, 2015) will be implemented. - REMM NAH12: Non-Aboriginal historical heritage awareness training will be provided for contractors prior to commencement of construction works to ensure understanding of potential heritage items that may be impacted during the project, and the procedure required to be carried out in the event of discovery of historical heritage materials, features or deposits, or the discovery of human remains. - REMM SG4: Pre-construction building/structure condition surveys will be offered and prepared for properties (and heritage assets) within the zone of influence of tunnel settlement (for example within the 5 millimetre predicted surface settlement contour and within 50 metres of surface works) and within the minimum working distances for cosmetic and structural damage due to vibration. The surveys will be carried out by a suitably qualified person prior to the commencement of the tunnelling and vibration-intensive activities in the vicinity with the potential to affect the building/structure. Within three (3) months of the completion of construction activities that have the potential	Likelihood – 1 Consequence – 2 Risk – 6 (Low)	Heritage Management Procedure NVMP + NVMtgP Unexpected Heritage Finds and Human Remains Procedure
		Potential direct impacts to terrestrial heritage items due to the proximity of construction vehicles and equipment.	Likelihood – 1 Consequence – 3 Risk – 11 (Moderate)		Likelihood – 1 Consequence – 2 Risk – 6 (Low)	
		Impact to undiscovered or undocumented heritage sites.	Likelihood – 1 Consequence – 2 Risk – 6 (Low)		Likelihood – 1 Consequence – 2 Risk – 6 (Low)	
		Indirect impacts to terrestrial heritage items due to temporary visual, aesthetic and social impacts, or permanent settlement and vibration impacts	Likelihood – 2 Consequence – 3 Risk – 12 (High)		Likelihood – 1 Consequence – 2 Risk – 6 (Low)	

Issue	Construction activity/aspect	Potential impact	Risk level prior to mitigation	Indicative Mitigation Measures	Risk level following mitigation	Management Documents / Training Required
				to impact on the subject surface/subsurface structure, all property owners of buildings for which a preconstruction building condition survey was carried out will be offered a second building condition survey. Where an offer is accepted, post- construction building condition surveys will be carried out by a suitably qualified person. The results of the surveys will be documented in a post-construction building condition survey report for each building surveyed. Copies of building condition survey reports will be provided to the owners of the buildings surveyed within one (1) month of the survey being completed. Any property damage caused by the project will be rectified. • CoA E63: An Unexpected Heritage Finds and Human Remains Procedure must be prepared to manage unexpected heritage finds (including maritime discoveries) in accordance with any guidelines and standards prepared by Heritage NSW and submitted to the Planning Secretary for information before the commencement of construction. • CoA E64: The Unexpected Heritage Finds and Human Remains Procedure, as submitted to the Planning Secretary, must be implemented for the duration of construction. • CoA E65: A detailed land use survey must be undertaken to confirm sensitive land user(s) (including critical working areas such as operating theatres and precision laboratories) potentially exposed to construction noise and vibration, construction ground-borne noise and operational noise. The survey may be undertaken on a progressive basis but must be undertaken in any one area before the commencement of work which generates construction or operational noise, vibration or ground-borne noise in that area. The results of the survey must be included in the Noise and Vibration CEMP Sub-plan required by Condition C4. • CoA E79: The Proponent must conduct vibration testing during vibration generating activities that have the potential to impact on heritage items to identify minimum working distances to prevent cosmetic damage. In the event that the vibration testing and attended monitoring shows that the preferred values for vibration are likely to be exceeded, the Proponent must review the construction methodology and, if necessary, implement additional mitigation measures. • CoA E80: Advice from a heritage specialist must be sought on methods and locations for installing equipment used for vibration, movement and noise monitoring at heritage-listed structures. • CoA E102: A geotechnical model of representative geological and groundwater conditions must be prepared prior to excavation (that may pose a settlement risk) and tunnelling to identify geological structures and groundwater features. The model must include details of proposed excavations and tunnels, construction staging, and identify surface and sub-surface structures, including any specific attributes, which may be impacted by the CSSI. The Proponent must use this model to assess the cumulative predicted settlement, ground movement, stress redistribution and horizontal strain profiles caused by excavation and tunnelling, including groundwater		

Issue	Construction activity/aspect	Potential impact	Risk level prior to mitigation	Indicative Mitigation Measures	Risk level following mitigation	Management Documents / Training Required
				drawdown and associated impacts, on adjacent surface and sub-surface structures. - CoA E103: The Proponent must undertake a review of surface and sub-surface structures at risk from damage to determine appropriate criteria to prevent damage, prior to excavation and tunnelling works that may pose a settlement risk. Criteria for surface and sub-surface structures which are not included in Condition E104 (Table 9) must be determined in consultation with the owner(s) of the surface and sub-surface structures prior to commencement of any excavation or tunnelling works potentially affecting the surface and sub-surface structures. - CoA E104: In the case of buildings, roads, parking areas and parks, the appropriate criteria which govern the greatest risk of damage are to be selected from Table 9 unless the Proponent has determined more stringent criteria as a result of Condition E103. - CoA E105: Should the geotechnical model in Condition E102 identify exceedances of the relevant criteria established by Conditions E103 and E104, the Proponent must implement an instrumentation and monitoring program to measure settlement, distortion or strain as required. The Proponent must also identify and implement appropriate mitigation measures in consultation with the owner(s) of the relevant surface and sub-surface structures prior to excavation and tunnelling works to ensure where possible that the surface and sub-surface structures will not experience exceedances of the relevant criteria. The adopted criteria do not remove any responsibility from the Proponent for the protection of existing surface and sub-surface structures or for rectifying any damage to surface and subsurface structures resulting from the CSSI. - CoA E106: Where monitoring indicates groundwater drawdown or settlement is substantially different to predictions or in excess of the limits specified in this approval, the requirements of Conditions E102 to E105 inclusive must be undertaken again within three months. Model input parameters must be adjusted to calibrate the model so that predictions are better aligned with actual observations - CoA C14: The Groundwater Monitoring Program must include: (a) results from existing monitoring bores and from additional monitoring bores required following a review of the monitoring bore network, with the review based on actual results of existing monitoring and groundwater modelling findings in relation to the final tunnel detailed design; (b) daily measurement of the amount of water discharged from the water treatment plants; (c) water quality testing of the water discharged from treatment plants; (d) monitoring of groundwater levels in aquifers adjacent to the tunnel alignment; (e) monitoring of groundwater levels, electrical conductivity and temperature in key locations between saline water		

Issue	Construction activity/aspect	Potential impact	Risk level prior to mitigation	Indicative Mitigation Measures	Risk level following mitigation	Management Documents / Training Required
				bodies and the tunnel (including beneath high risk sites for contamination); (f) measures to record or otherwise estimate and report groundwater inflows into the tunnels during their construction; (g) methods for providing the data collected under (a) and (b) to Sydney Water where discharges are directed to their assets; and (h) a method for providing the groundwater monitoring data to DPIE Water every three months during construction of the tunnels and portals.		
Noise and vibration	- General construction activities - Operation of ancillary facilities - Spoil transport, deliveries, general plant operation on public roads - Tunnel excavation	Ground-borne noise impacts during tunnelling	Likelihood – 5 Consequence – 2 Risk – 10 (Moderate)	- REMM CNV2: Detailed Construction Noise and Vibration Impact Statements will be carried out for all construction support sites and major construction works required for the project prior to the commencement of construction. The Statements will consider the proposed site layouts and noise and vibration generating activities that will take place during all major stages of the construction support site, assess predicted noise and vibration levels against the relevant management levels, and incorporate feasible and reasonable mitigation and management measures in accordance with the requirements of the Interim Construction Noise Guideline (DECC, 2009) and the Construction Noise and Vibration Guideline (Roads and Maritime, 2016a). - REMM CNV3: An out of hours works protocol will be developed for the construction of the Project. The protocol will include: a) Details of works required outside standard construction hours, including acceptable justifications for works outside of standard construction hours, what types of works are allowed to take place outside of construction hours, and justifications of why the activities are required outside standard construction hours b) Details of the assessment and approval process (internal and external) for works proposed outside standard construction hours c) Noise and vibration mitigation and management measures that are to be considered and implemented where appropriate to manage potential impacts associated with works outside standard construction hours d) The noise and vibration impact assessment processes that will be followed to identify potentially affected	Likelihood – 4 Consequence – 1 Risk – 4 (Low)	NVMP + NVMtgP CNVIS AMS Out of hours works (OOHW) protocol Negotiated agreements EPL Community Communications Strategy (CCS)
		Noise impacts on sensitive receivers during construction activities and operation of the ancillary facility	Likelihood – 5 Consequence – 2 Risk – 10 (Moderate)		Likelihood – 4 Consequence – 1 Risk – 4 (Low)	
		Construction road traffic noise impacts	Likelihood – 4 Consequence – 2 Risk – 9 (Moderate)		Likelihood – 2 Consequence – 2 Risk – 7 (Low)	

Issue	Construction activity/aspect	Potential impact	Risk level prior to mitigation	Indicative Mitigation Measures	Risk level following mitigation	Management Documents / Training Required
				receivers, clarify potential impacts and determine appropriate mitigation and management measures. The protocol will be prepared in consultation with the Department of Planning, Industry and Environment and the NSW Environment Protection Authority, and independently endorsed. The project protocol will be implemented during the duration of the construction of the project. • REMM CNV4: Construction noise and vibration impacts will be monitored periodically throughout all stages of the construction support sites to ensure that: a) Impacts are consistent with the noise and vibration levels detailed in the relevant Construction Noise and Vibration Impact Statements b) Noise and vibration impacts are being appropriately managed c) Mitigation measures are effective. • REMM CNV5: Where feasible and reasonable, unless compliance with the relevant traffic noise criteria can be achieved, or alternative arrangements have been agreed with affected receivers, construction vehicle movements will not occur on local roads beyond those required for direct access to construction sites. • REMM CNV6: Vibration generating activities will be managed through the establishment of minimum buffer distances to achieve screening levels. Where vibration levels are predicted to exceed the screening levels, a more detailed assessment of the impacted structure and attended vibration monitoring will be carried out to ensure vibration levels remain below appropriate limits for that structure. For heritage items, the more detailed assessment will specifically consider the heritage values of the structure in consultation with a heritage specialist to ensure sensitive heritage fabric is adequately monitored and managed. Any damage caused by the project will be rectified. • REMM CNV7: Feasible and reasonable measures will be implemented to minimise ground-borne noise where exceedances are predicted. • REMM CNV10: Construction noise from concurrent and consecutive construction works will be managed to minimise cumulative construction noise impacts. Where feasible and reasonable the approaches that will be used include: a) Coordinating work between project construction sites and construction works to avoid cumulative noise impacts b) Consideration of additional at source or near source mitigation where construction noise levels may result in cumulative construction noise impacts, where programming is not practical to avoid cumulative noise impacts c) Community consultation throughout the project to gauge construction key noise impacts and issues and any unknown impacts from concurrent or consecutive sets of constructions works d) Incorporating additional noise mitigation and management measures with consideration of cumulative		

Issue	Construction activity/aspect	Potential impact	Risk level prior to mitigation	Indicative Mitigation Measures	Risk level following mitigation	Management Documents / Training Required
				and consecutive construction noise impacts based upon coordination between projects. - CoA E65: A detailed land use survey must be undertaken to confirm sensitive land user(s) (including critical working areas such as operating theatres and precision laboratories) potentially exposed to construction noise and vibration, construction ground-borne noise and operational noise. The survey may be undertaken on a progressive basis but must be undertaken in any one area before the commencement of work which generates construction or operational noise, vibration or ground-borne noise in that area. The results of the survey must be included in the Noise and Vibration CEMP Sub-plan required by Condition C4. - Construction hours as outlined in CoA E66, CoA E67 and CoA E68. - CoA E69: An Out-of-Hours Work Protocol must be prepared to identify a process for the consideration, management and approval of work which is outside the hours defined in Conditions E66, and that are not subject to an EPL. The Protocol must be approved by the Planning Secretary before commencement of the Out-of-Hours Work. The Protocol must be prepared in consultation with the ER, AA and EPA. - CoA E70: Mitigation measures must be implemented with the aim of achieving the following construction noise management levels and vibration objectives: (a) construction 'Noise affected' NML established using the Interim Construction Noise Guideline (DECC, 2009); (b) vibration criteria established using the Assessing vibration: a technical guideline (DEC, 2006) (for human exposure); (c) Australian Standard AS 2187.2 - 2006 "Explosives - Storage and Use - Use of Explosives"; (d) BS 7385 Part 2-1993 "Evaluation and measurement for vibration in buildings Part 2" as they are "applicable to Australian conditions"; and (e) the vibration limits set out in the German Standard DIN 4150-3: Structural Vibration- effects of vibration on structures (for structural damage). Any work identified as exceeding the noise management levels and/or vibration criteria must be managed in accordance with the Noise and Vibration CEMP Sub-plan. - CoA E71: Mitigation measures must be applied when the following residential ground-borne noise levels are exceeded: (a) evening (6:00 pm to 10:00 pm) — internal LAeq(15 minute): 40 dB(A); and (b) night (10:00 pm to 7:00 am) — internal LAeq(15 minute): 35 dB(A). The mitigation measures must be outlined in the Noise and Vibration CEMP Sub-plan, including in any Out-of-Hours Work Protocol, required by Condition E69. - CoA E72: Noise generating work in the vicinity of potentially-affected community, religious, educational institutions, noise and vibration-sensitive businesses and critical working areas (such as theatres, laboratories and operating theatres) resulting in noise levels above the		

Issue	Construction activity/aspect	Potential impact	Risk level prior to mitigation	Indicative Mitigation Measures	Risk level following mitigation	Management Documents / Training Required
				NMLs must not be timetabled within sensitive periods, unless other reasonable arrangements with the affected institutions are made at no cost to the affected institution. - CoA E73: At no time can noise generated by construction exceed the National Standard for exposure to noise in the occupational environment of an eight-hour (8hr) equivalent continuous A-weighted sound pressure level of LAeq,8h of 85 dB(A) for any employee working at a location near the CSSI. - CoA E74: Industry best practice construction methods must be implemented where reasonably practicable to ensure that noise levels are minimised. Practices must include, but are not limited to: (a) use of regularly serviced low sound power equipment; (b) early occupation and later release of road carriageways and construction sites; (c) scheduling of noisiest works before 11.00 pm Sunday to Thursday and before 12 midnight Friday and Saturday; (d) temporary noise barriers (including the arrangement of plant and equipment) around noisy equipment and activities such as rockhammering and concrete cutting; and (e) use of alternative construction and demolition techniques. - CoA E75: Construction Noise and Vibration Impact Statements (CNVIS) must be prepared for any work that may exceed the noise management levels, vibration criteria and/or ground-borne noise levels specified in Condition E70 and Condition E71 at any residence outside construction hours identified in Condition E66, or where receivers will be highly noise affected. The CNVIS must include specific mitigation measures identified through consultation with affected sensitive land user(s) and the mitigation measures must be implemented for the duration of the works. A copy of the CNVIS must be provided to the AA and ER prior to the commencement of the associated works. The Planning Secretary may request a copy/ies of CNVIS. - CoA E76: Owners and occupiers of properties at risk of exceeding the screening criteria for cosmetic damage must be notified before work that generates vibration commences in the vicinity of those properties. If the potential exceedance is to occur more than once or extend over a period of 24 hours, owners and occupiers are to be provided a schedule of potential exceedances on a monthly basis for the duration of the potential exceedances, unless otherwise agreed by the owner and occupier. These properties must be identified and considered in the Noise and Vibration CEMP Sub-plan required by Condition C4 and the Community Communication Strategy required by Condition B1. - CoA E77: All surface-based tunnelling support activities that generate noise levels above the noise management levels in Condition E70 must occur within an acoustic shed. - CoA E78: All acoustic sheds must be designed and used so that activities carried out within them do not result in the exceedance of the NMLs.		

Issue	Construction activity/aspect	Potential impact	Risk level prior to mitigation	Indicative Mitigation Measures	Risk level following mitigation	Management Documents / Training Required
				- CoA E79: The Proponent must conduct vibration testing during vibration generating activities that have the potential to impact on heritage items to identify minimum working distances to prevent cosmetic damage. In the event that the vibration testing and attended monitoring shows that the preferred values for vibration are likely to be exceeded, the Proponent must review the construction methodology and, if necessary, implement additional mitigation measures. - CoA E83: In order to undertake out-of-hours work outside the hours specified under Condition E66, the Proponent must identify appropriate respite periods for the out-of-hours work in consultation with the community at each affected location on a regular basis. This consultation must include (but not be limited to) providing the community with: (a) a progressive schedule for periods no less than three months, of likely out-of-hours work; (b) a description of the potential work, location and duration of the out-of-hours work; (c) the noise characteristics and likely noise levels of the work; and (d) likely mitigation and management measures which aim to achieve the relevant noise management levels under Condition E70 (including the circumstances of when respite or relocation offers will be available and details about how the affected community can access these offers). The outcomes of the community consultation, the identified respite periods and the scheduling of the likely out-of-hour work must be provided to the AA, ER, EPA and the Planning Secretary. - Other specific measures as outlined in the Project Environmental Protection Licence (EPL)		

Issue	Construction activity/aspect	Potential impact	Risk level prior to mitigation	Indicative Mitigation Measures	Risk level following mitigation	Management Documents / Training Required
Hydrodynamics and water quality	- Storage of fuels and chemicals - Maintenance of plant and equipment, including servicing and refuelling - Ancillary facility operation (spoil haulage, WTP discharge)	Surface water quality impacts due to discharge of treated tunnel water.	Likelihood – 3 Consequence – 3 Risk – 13 (High)	- REMM WQ1: Erosion and sediment measures will be implemented at all work sites and surface road upgrades in accordance with the principles and requirements in Managing Urban Stormwater – Soils and Construction, Volume 1 (Landcom, 2004), Managing Urban Stormwater: Volume 2D Main Road Construction (NSW Department of Environment, Climate Change and Water, 2008) and relevant guidelines, procedures and specifications of Transport for NSW. A soil conservation specialist will be engaged by both Transport for NSW and the Contractor for the duration of construction of the project to provide advice regarding erosion and sediment control including review of Erosion and Sediment Control Plans (ESCPs). - REMM WQ2: Emergency spill procedures will be developed to avoid and manage accidental spillages of fuels, chemicals or fluids during construction. - REMM WQ3: Discharges from wastewater treatment plants during the construction phase will be required to meet the following discharge criteria: - The relevant physical and chemical stressors set out in of the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC/ARMCANZ, 2000), and - The ANZG (2018) 90 per cent species protection levels for toxicants generally, with the exception of those toxicants known to bioaccumulate, which will be treated to meet the ANZG (2018) 95 per cent species protection levels, and - The draft ANZG default guideline values for iron (in fresh and marine water) and zinc (in marine water) which are likely to be finalised in October 2020. [Or an EPL is in place as permitted by CoA E208]. - REMM WQ7: The potential for scour and erosion of watercourse bed and banks will be considered during the design of new and augmented discharge outlets. Construction work activities within or next to the watercourses and drainage lines will be minimised as much as reasonably practicable to minimise disturbance of sediments in or near the waterway. - CoA E206: The CSSI must be designed, constructed and operated so as to maintain the NSW Water Quality Objectives where they are being achieved as at the date of this approval, and contribute towards achievement of the NSW Water Quality Objectives over time where they are not being achieved as at the date of this approval, unless an EPL in force in respect of the CSSI contains different requirements in relation to the NSW Water Quality Objectives, in which case those requirements must be complied with. - CoA E207: The Proponent must consider the Guidelines for controlled activities on waterfront land Riparian corridors (Department of Industry 2018) when carrying out work within 40 metres of a watercourse, including its bed. - CoA E208: Unless an EPL is in force in respect to the CSSI and that licence specifies alternative criteria, discharges from construction water treatment plants to surface waters must not exceed: (a) the Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2018 (ANZG 2018) default	Likelihood – 2 Consequence – 2 Risk – 7(Low)	SSWMP + SWMP EPL
		Impacts on geomorphology, water availability and flows.	Likelihood – 1 Consequence – 3 Risk – 11 (Moderate)		Likelihood – 1 Consequence – 2 Risk – 6 (Low)	

Issue	Construction activity/aspect	Potential impact	Risk level prior to mitigation	Indicative Mitigation Measures	Risk level following mitigation	Management Documents / Training Required
				guideline values for toxicants at the 90 per cent species protection level; (b) for physical and chemical stressors, the guideline values set out in Tables 3.3.2 and 3.3.3 of the Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000; and (c) for bioaccumulative and persistent toxicants, the ANZG 2018 values at a minimum of 95 per cent species protection level. Where the ANZG 2018 does not provide a default guideline value for a particular pollutant, the approaches set out in the ANZG 2018 for deriving guideline values, using interim guideline values and/or using other lines of evidence such as international scientific literature or water quality guidelines from other countries, must be used CoA E210: If construction stage stormwater discharges are proposed, a water pollution impact assessment will be required to inform licensing consistent with section 45 of the POEO Act. Any such assessment must be prepared in consultation with the EPA and be consistent with the National Water Quality Guidelines, with a level of detail commensurate with the potential water pollution risk.		
Geology, soils and groundwater	- Tunnel excavation - General construction activities	Soil erosion and offsite sedimentation during construction	Likelihood – 1 Consequence – 3 Risk – 11 (Moderate)	- REMM SG1: Detailed predictive settlement models will be developed for areas of concern to guide tunnel design and construction methodology, including the selection of options to minimise settlement where required. - REMM SG3: An Independent Property Impact Assessment Panel, comprising geotechnical and engineering experts, will be established prior to the commencement of works to independently verify building condition survey reports, resolve any property damage disputes and establish ongoing settlement and vibration monitoring requirements. - REMM SG4: Pre-construction building/structure condition surveys will be offered and prepared for properties (and heritage assets) within the zone of influence of tunnel settlement (for example within the 5 millimetre predicted surface settlement contour and within 50 metres of surface works) and within the minimum working distances for cosmetic and structural damage due to vibration. The surveys will be carried out by a suitably qualified person prior to the commencement of the tunnelling and vibration-intensive activities in the vicinity with the potential to affect the building/structure. Within three (3) months of the completion of construction activities that have the potential to impact on the subject surface/subsurface structure, all property owners of buildings for which a preconstruction building condition survey was carried out will be offered a second building condition survey. Where an offer is accepted, post- construction building condition surveys will be carried out by a suitably qualified person. The results of the surveys will be documented in a post-construction building condition survey report for each building surveyed. Copies of building condition survey reports will be provided to the owners of the buildings surveyed within one (1) month of the survey being completed. Any property damage caused by the project will be rectified.	Likelihood – 1 Consequence – 2 Risk – 7 (Low)	SSWMP + SWMP Groundwater Management Plan and Groundwater Monitoring Program (GMP + GWMP) EPL
		Exposure of acid sulfate solid or soil salinity during construction	Likelihood – 1 Consequence – 2 Risk – 6 (Low)		Likelihood – 1 Consequence – 1 Risk – 2 (Low)	
		Disturbance of contaminated land or groundwater contamination during construction works	Likelihood – 2 Consequence – 3 Risk – 11 (Moderate)		Likelihood – 1 Consequence – 2 Risk – 6 (Low)	
		Groundwater drawdown impacts and tunnel inflows during construction	Likelihood – 4 Consequence – 3 Risk – 17 (Very High)		Likelihood – 3 Consequence – 2 Risk – 8 (Moderate)	
		Impacts to groundwater quality due to saltwater intrusion, mobilisation of contaminants or acidification during construction.	Likelihood – 2 Consequence – 3 Risk – 12 (High)		Likelihood – 1 Consequence – 2 Risk – 6 (Low)	

Issue	Construction activity/aspect	Potential impact	Risk level prior to mitigation	Indicative Mitigation Measures	Risk level following mitigation	Management Documents / Training Required
				• REMM SG5: Erosion and Sediment measures will be implemented at all work sites in accordance with the principles and requirements in 'Managing Urban Stormwater – Soils and Construction, Volume 1 (Landcom, 2004) and Volume 2D (NSW Department of Environment, Climate Change, 2008), commonly referred to as the 'Blue Book'. • REMM SG6: Potentially contaminated areas directly affected by the project will be investigated and managed in accordance with the requirements of guidance endorsed under section 105 of the Contaminated Land Management Act 2008. • REMM SG7: Any soil/fill materials surplus to construction will be classified in accordance with the NSW EPA (2014a) Waste Classification Guidelines. • REMM SG8: Asbestos handling and management will be carried out in accordance with relevant legislation, codes of practice and Australian standards. • REMM SG11: The discovery of previously unidentified contaminated material will be managed in accordance with an unexpected contaminated lands discovery procedure, as outlined in the Guideline for the Management of Contamination (Roads and Maritime, 2013). • REMM SG14: Where groundwater inflows exceed 1L/sec/km during construction, feasible and reasonable measures to manage inflow will be applied. • REMM SG17: Outcomes of updated groundwater modelling will identify any requirements for further groundwater monitoring, and management of groundwater drawdown and associated impacts. • REMM SG18: As more information becomes available through ongoing groundwater monitoring, groundwater modelling will be updated. Construction and operational inflow predictions will be updated prior to construction, and operational inflow and impact predictions will be updated at the end of the construction period. • REMM SG19: Additional groundwater baseline monitoring will be carried out during the pre-construction period and will be considered in the development of the groundwater quality monitoring program described in management measure SG20 • REMM SG20: A groundwater quality monitoring program will be developed and implemented, taking into consideration the location of areas subject to medium and high risk of groundwater contamination during construction (and operation). Where relevant, modelling/mass balance analysis will be carried out to assess potential impacts on beneficial aquifer use and the likely quality of groundwater inflows. The groundwater monitoring program will be developed in consultation with the Department of Planning, Industry and Environment (Water). • REMM SG21: If the groundwater quality monitoring and associated analysis identifies potential impacts to beneficial aquifer use from the migration of contaminated groundwater, or the quality of groundwater tunnel inflows, feasible and reasonable management measures will be identified and implemented.		

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				• REMM SG22: As more information becomes available through ongoing groundwater monitoring, groundwater modelling will be updated to refine the predictions documented in Appendix N (Technical working paper: Groundwater). Inflow predictions will be updated during further design development and operational inflow and impacts predictions will be updated at the end of the construction period. If refined predictions indicate that groundwater inflows and water table drawdown will be greater than the impacts documented in Appendix N (Technical working paper: Groundwater) feasible and reasonable measures will be implemented. • REMM SG23: Emergency Spill measures procedures will be developed to avoid and manage accidental spillages of fuels, chemicals, and fluids to minimise the risk of human health impacts and contamination of groundwater. • CoA E102: A geotechnical model of representative geological and groundwater conditions must be prepared prior to excavation (that may pose a settlement risk) and tunnelling to identify geological structures and groundwater features. The model must include details of proposed excavations and tunnels, construction staging, and identify surface and sub-surface structures, including any specific attributes, which may be impacted by the CSSI. The Proponent must use this model to assess the cumulative predicted settlement, ground movement, stress redistribution and horizontal strain profiles caused by excavation and tunnelling, including groundwater drawdown and associated impacts, on adjacent surface and sub-surface structures. • CoA E103: The Proponent must undertake a review of surface and sub-surface structures at risk from damage to determine appropriate criteria to prevent damage, prior to excavation and tunnelling works that may pose a settlement risk. Criteria for surface and sub-surface structures which are not included in Condition E104 (Table 9) must be determined in consultation with the owner(s) of the surface and sub-surface structures prior to commencement of any excavation or tunnelling works potentially affecting the surface and sub-surface structures. • CoA E105: Should the geotechnical model in Condition E102 identify exceedances of the relevant criteria established by Conditions E103 and E104, the Proponent must implement an instrumentation and monitoring program to measure settlement, distortion or strain as required. The Proponent must also identify and implement appropriate mitigation measures in consultation with the owner(s) of the relevant surface and sub-surface structures prior to excavation and tunnelling works to ensure where possible that the surface and sub-surface structures will not experience exceedances of the relevant criteria. The adopted criteria do not remove any responsibility from the Proponent for the protection of existing surface and sub-surface structures or for rectifying any damage to surface and subsurface structures resulting from the CSSI. • CoA E106: Where monitoring indicates groundwater drawdown or settlement is substantially different to predictions or in excess of the limits specified in this approval, the requirements of Conditions E102 to E105		

Issue	Construction activity/aspect	Potential impact	Risk level prior to mitigation	Indicative Mitigation Measures	Risk level following mitigation	Management Documents / Training Required
				inclusive must be undertaken again within three months. Model input parameters must be adjusted to calibrate the model so that predictions are better aligned with actual observations - CoA E107: The Proponent must offer pre-construction surveys and must undertake and prepare Preconstruction Condition Survey Reports where the offer is accepted, on the current condition of surface and sub-surface structures identified as at risk from settlement or vibration by the geotechnical model described in Condition E102 and the CNVIS required by Condition E75 or as directed by the Independent Property Impact Assessment Panel (IPIAP) established under Condition E111. The Pre-construction Condition Survey Reports must be prepared by a suitably qualified and experienced person(s) and must be provided to the owners of the surface and sub-surface structures for review prior to the commencement of potentially impacting works. - CoA E110: Where damage has been determined to occur as a result of the project, the Proponent must carry out rectification at its expense and to the reasonable requirements of the surface and sub-surface structure owner(s) within 12 months of completion of construction unless another timeframe is agreed with the owner of the affected surface or sub-surface structure. - CoA E114: Prior to the commencement of any work, erosion and sediment controls must be installed and maintained, as a minimum, in accordance with the publication Managing Urban Stormwater: Soils & Construction (4th edition, Landcom 2004) commonly referred to as the 'Blue Book'. - CoA E115: Prior to the commencement of any work that would result in the disturbance of moderate to high risk contaminated sites as identified in the documented listed in Condition A1, a Detailed Site Investigations must be undertaken by a Contaminated Land Consultant certified under either the Environment Institute of Australia or New Zealand's "Certified Environmental Practitioner" (Site Contamination) scheme (CEnvP(SC)) or the Soil Science Australia "Certified Professional Soil Scientist Contaminated Site Assessment and Management (CPSS CSAM) scheme. - CoA E123: An Unexpected Finds Procedure for Contamination must be prepared before the commencement of work and must be followed should unexpected contamination or asbestos (or suspected contamination) be excavated or otherwise discovered. The procedure must include details of who will be responsible for implementing the unexpected finds procedure and the roles and responsibilities of all parties involved. The procedure must be submitted to the Planning Secretary for information. - CoA E216: The Proponent must take measures to limit operational groundwater inflows into each tunnel to no greater than one litre per second across any given kilometre (1L/s/km). Compliance with this condition cannot be determined by averaging groundwater inflows across the length of the tunnel(s). - CoA E217: Make good provisions for groundwater users must be provided in the event of a material decline in water supply levels, quality or quantity from registered		

Issue	Construction activity/aspect	Potential impact	Risk level prior to mitigation	Indicative Mitigation Measures	Risk level following mitigation	Management Documents / Training Required
				existing bores associated with groundwater changes from either construction and/or ongoing operational dewatering caused by the CSSI. - CoA E218: Further modelling must be undertaken of groundwater drawdown, tunnel inflows and saline water migration (using particle tracking) prior to finalising the detailed design of the tunnels and undertaking any works that would impact on groundwater flows or levels. The modelling must be undertaken in consultation with DPIE Water and include the results and hydrogeological analyses of at least 12 continuous months of current baseline groundwater monitoring data. - CoA E219: The results of the modelling required by Condition E218 must be documented in a Groundwater Modelling Report. - CoA E220: The groundwater model must be updated once 24 months of groundwater monitoring data are available and the results of the updated modelling (assessed against all predicted outcomes of the Groundwater Modelling Report that accompanied the final detailed design of the tunnels) be provided to the Planning Secretary and DPIE Water in an updated Groundwater Modelling Report.		
Flooding	Flooding impacts are not anticipated due to the site configuration and upgrade works completed as part of the M4-M5 Link Rozelle Interchange project. Construction works and operation of ancillary sites predominantly occurs underground.					
	Tunnel excavation	Impacts on construction activities due to flooding.	Likelihood – 1 Consequence – 3 Risk – 11 (Moderate)	REMM F3: Entries to tunnel excavations, including cut and cover sections of tunnel, will be protected against frequent flooding by locating openings outside flood prone areas, and/or the provision of local bunding and flood protection barriers.	Likelihood – 1 Consequence – 2 Risk – 6 (Low)	SSWMP + SWMP
		Impacts on flood-prone areas and properties.	Likelihood – 1 Consequence – 4 Risk – 14 (High)	- REMM F4: The flood standard adopted at each tunnel entry during construction will be WHT developed taking into consideration the duration of construction, the magnitude of inflows and the potential risks to personal safety and the project works. - REMM F5: Spoil stockpiles will be located in areas which are not subject to frequent inundation by floodwater, ideally outside the 10% AEP flood extent. The exact level of flood risk accepted at stockpile sites will depend on the duration of stockpiling operations, the type of material stored, the nature of the receiving drainage lines and also the extent to which that would impact flooding conditions in adjacent development. - REMM F7: Flood emergency management measures for construction and operation of the project will be incorporated into relevant environmental and/or safety management documentation. - REMM F8: Detailed construction planning will consider flood risk at construction sites and construction support sites. This will include: - A review of site layout and staging of construction activities to avoid or minimise obstruction of overland flow paths and limit the extent of flow diversion required - Identification of measures to not worsen flood impacts on the community and on other property and infrastructure during construction up to and including the 1% AEP flood event where reasonable and feasible	Likelihood – 1 Consequence – 2 Risk – 6 (Low)	

Issue	Construction activity/aspect	Potential impact	Risk level prior to mitigation	Indicative Mitigation Measures	Risk level following mitigation	Management Documents / Training Required
				- Measures to mitigate alterations to local runoff conditions due to construction activities. - CoA E49: The CSSI must be designed and implemented to limit flooding characteristics to the following levels: (a) a maximum increase in inundation time of one hour in a 1 % AEP flood event; (b) a maximum increase of 10 mm in inundation at properties where floor levels are currently exceeded in a 1 % AEP flood event; (c) a maximum increase of 50 mm in inundation at properties where floor levels would not be exceeded in a 1 % AEP flood event; and (d) no inundation of floor levels which are currently not inundated in a 1% AEP flood event. - Measures identified in the documents listed in Condition A1 to not worsen flood characteristics or other measures that achieve the same outcomes, must be incorporated into the detailed design of the CSSI. The incorporation of these measures must be reviewed and endorsed by a suitably qualified and experienced person in consultation with directly affected landowners, EESG, NSW State Emergency Service (SES) and relevant councils.		
Resource use and waste management	- Generation of waste during construction activities - General construction activities - Ancillary site operation - Haulage of waste and spoil	Impacts associated with unexpected waste volume or types.	Likelihood – 2 Consequence – 3 Risk – 12 (High)	- REMM WM1: Construction materials will be sourced in accordance with the project's Sustainability Framework and with a preference for Australian materials and prefabricated products with low embodied energy, where feasible and reasonable. - REMM WM2: The resource management hierarchy principles established under the Waste Avoidance and Recovery Act 2001 of avoid/reduce/reuse/ recycle/dispose will be applied. - REMM WM3: Wastes for land disposal will be classified in accordance with the NSW Environment Protection Authority Waste Classification Guidelines: Part 1 Classifying Waste. - REMM WM4: Wastes will be appropriately transported, stored and handled according to their waste classification and in a manner than prevents pollution of the surrounding environment. - REMM WM5: Opportunities for wastewater reuse and recycling, including recirculating water during tunnel excavation to use for dust suppression and offsite reuse, will be investigated and implemented where feasible and reasonable. - CoA E201: Waste generated during construction and operation must be dealt with in accordance with the following priorities: (a) waste generation must be avoided and where avoidance is not reasonably practicable, waste generation must be reduced; (b) where avoiding or reducing waste is not possible, waste must be re-used, recycled, or recovered; and (c) where re-using, recycling or recovering waste is not possible, waste must be treated or disposed of. - CoA E202: The importation of waste and the storage, treatment, processing, reprocessing or disposal of such	Likelihood – 2 Consequence – 2 Risk – 7 (Low)	EPL Water Reuse Strategy

Issue	Construction activity/aspect	Potential impact	Risk level prior to mitigation	Indicative Mitigation Measures	Risk level following mitigation	Management Documents / Training Required
				waste must comply with the conditions of the current EPL for the CSSI, or be done in accordance with a Resource Recovery Exemption or Order issued under the Protection of the Environment Operations (Waste) Regulation 2014, as the case may be. - CoA E203: Waste must only be exported to a site licensed by the EPA for the storage, treatment, processing, reprocessing or disposal of the subject waste, or in accordance with a Resource Recovery Exemption or Order issued under the Protection of the Environment Operations (Waste) Regulation 2014, or to any other place that can lawfully accept such waste. - CoA E205: All waste must be classified in accordance with the EPA's Waste Classification Guidelines, with appropriate records and disposal dockets retained for audit purposes		
		Increased demand on electricity and water supply	Likelihood – 4 Consequence – 1 Risk – 4 (Low)	Utilities connections for electricity and water that have been installed in the area for previous projects	Likelihood – 2 Consequence – 1 Risk – 2 (Low)	
		Impacts associated with poor waste management during construction	Likelihood – 3 Consequence – 3 Risk – 13 (High)	- REMM WM2: The resource management hierarchy principles established under the <i>Waste Avoidance and Recovery Act 2001</i> of avoid/reduce/reuse/recycle/dispose will be applied - REMM WM3: Wastes for land disposal will be classified in accordance with the NSW Environmental Protection Authority <i>Waste Classification Guidelines: part 1 Classifying Waste</i> - REMM WM4: Wastes will be appropriately transported, stored and handled according to their waste classification and in a manner that prevents pollution of the surrounding environment. - CoA E123: An Unexpected Finds Procedure for Contamination must be prepared before the commencement of work and must be followed should unexpected contamination or asbestos (or suspected contamination) be excavated or otherwise discovered. The procedure must include details of who will be responsible for implementing the unexpected finds procedure and the roles and responsibilities of all parties involved. The procedure must be submitted to the Planning Secretary for information. - CoA E124: The Unexpected Finds Procedure for Contamination must be implemented throughout construction. - CoA E201: Waste generated during construction and operation must be dealt with in accordance with the following priorities: (a) waste generation must be avoided and where avoidance is not reasonably practicable, waste generation must be reduced; (b) where avoiding or reducing waste is not possible, waste must be re-used, recycled, or recovered; and	Likelihood – 2 Consequence – 2 Risk – 7 (Low)	Unexpected Finds Procedure for Contamination CEMP AMS EPL

Issue	Construction activity/aspect	Potential impact	Risk level prior to mitigation	Indicative Mitigation Measures	Risk level following mitigation	Management Documents / Training Required
				(c) where re-using, recycling or recovering waste is not possible, waste must be treated or disposed of. - CoA E202: The importation of waste and the storage, treatment, processing, reprocessing or disposal of such waste must comply with the conditions of the current EPL for the CSSI, or be done in accordance with a Resource Recovery Exemption or Order issued under the Protection of the Environment Operations (Waste) Regulation 2014, as the case may be. - CoA E203: Waste must only be exported to a site licensed by the EPA for the storage, treatment, processing, reprocessing or disposal of the subject waste, or in accordance with a Resource Recovery Exemption or Order issued under the Protection of the Environment Operations (Waste) Regulation 2014, or to any other place that can lawfully accept such waste. - CoA E206: All waste must be classified in accordance with the EPA's Waste Classification Guidelines, with appropriate records and disposal dockets retained for audit purposes.		
Traffic and transport	- Haulage of material. - Import of material / plant / equipment. - Travel to / from site.	Local road, pedestrian and cyclist, and parking impacts	Likelihood – 3 Consequence – 3 Risk – 13 (High)	- REMM CTT1: A road dilapidation report will be prepared, in consultation with relevant councils and road owners, identifying existing conditions of local roads and mechanisms to repair damage to the road network caused by heavy vehicle movements associated with the project. - REMM CTT4: Ongoing consultation will be carried out with (as relevant to the location) Transport Coordination within Transport for NSW, the Port Authority of NSW, local councils, emergency services and bus operators to minimise traffic and transport impacts during construction. - REMM CTT5: The community will be notified in advance of proposed transport network changes, and maritime restrictions through appropriate media and other appropriate forms of community liaison. - REMM CTT9: Where provision of construction on-site parking cannot accommodate the full construction workforce, feasible and reasonable management measures that minimise impacts on parking on local roads will be identified and implemented. Depending on the location, management measures may include workforce shuttle buses and the use of public transport. E128: Access to all utilities and properties must be maintained during construction, where practicable, unless otherwise agreed with the relevant utility owner, landowner or occupier. - CoA E129: Any property access physically affected by the CSSI must be reinstated to at least an equivalent standard, unless otherwise agreed by the landowner or occupier. - CoA E130: Access to the ancillary facility WHT3 construction support site at White Bay by construction vehicles (including light vehicles) must only be via The Crescent/City West Link and James Craig Road. No vehicle associated with the CSSI is permitted to access the site via Robert Street, Rozelle, unless required in the event of an emergency. - CoA E132: Local roads proposed to be used by heavy vehicles to directly access the construction boundary and ancillary facilities that are not shown in Figure 5-7 to 5-22	Likelihood – 2 Consequence – 2 Risk – 7 (Low)	Traffic, Transport and Access Management Plan (TTAMP) Construction Parking and Access Strategy (CPAS) Traffic Management Plan (TMP)

Issue	Construction activity/aspect	Potential impact	Risk level prior to mitigation	Indicative Mitigation Measures	Risk level following mitigation	Management Documents / Training Required
				inclusive of Appendix F of the EIS must be approved by the Planning Secretary and included in the Traffic, Transport and Access Management CEMP Sub-plan. - CoA E135: The locations of all heavy vehicles used for spoil haulage must be monitored in real time and the records of monitoring be made available electronically to the Planning Secretary and the EPA upon request for a period of no less than one year following the completion of construction. - CoA E136: Before any local road is used by a heavy vehicle for the purposes of the CSSI, a Road Dilapidation Report must be prepared for the road. A copy of the Road Dilapidation Report must be provided to the relevant council within three weeks of completion of the survey and no later than one month prior to the road being used by heavy vehicles associated with the CSSI. - CoA E138: Safe pedestrian and cyclist access must be maintained around work sites during construction. In circumstances where pedestrian and cyclist access is restricted or removed due to construction activities, a proximate alternative route which complies with relevant standards, unless otherwise endorsed by an independent, appropriately qualified and experienced person, must be provided (including signposting) prior to the restriction or removal of the impacted access. - CoA E139: Vehicles (including light and heavy vehicles) associated with the CSSI must be managed to: (a) minimise parking on public roads; (b) minimise idling and queueing on state and regional roads; (c) not carry out marshalling of construction vehicles near sensitive land user(s); (d) not block or disrupt access across pedestrian or shared user paths at any time; and (e) ensure spoil haulage vehicles adhere to the nominated haulage routes identified in the Traffic, Transport and Access Management CEMP Sub-plan. - CoA E140 A Construction Parking and Access Strategy must be prepared to identify and mitigate impacts resulting from on- and off-street parking changes during construction of the CSSI. The Strategy must include, but not necessarily be limited to: (a) achieving the requirements of Condition E139; (b) confirmation and timing of the removal of on- and off-street parking associated with construction of the CSSI; (c) parking surveys of all parking spaces to be removed or occupied by the CSSI workforce to determine current demand during peak, off-peak, school drop off and pickup, weekend periods and during special events; (d) consultation with affected stakeholders utilising existing on- and off-street parking stock which will be impacted as a result of construction; (e) assessment of the impacts to on- and off-street parking stock taking into consideration, occupation by the CSSI workforce, outcomes of consultation with affected stakeholders and considering the impacts of special events; (f) identification of mitigation measures to manage impacts to stakeholders as a result of on and off-street parking changes including, but not necessarily limited to, staged removal and replacement of parking, provision of alternative parking arrangements, managed staff		

Issue	Construction activity/aspect	Potential impact	Risk level prior to mitigation	Indicative Mitigation Measures	Risk level following mitigation	Management Documents / Training Required
				parking arrangements and working with relevant council(s) to introduce parking restrictions adjacent to work sites and compounds or appropriate residential parking schemes; (g) where residential parking schemes already exist, off-road parking facilities must be provided for the CSSI workforce; (h) mechanisms for monitoring, over appropriate intervals, to determine the effectiveness of implemented mitigation measures; (i) details of shuttle bus service(s) to transport the CSSI workforce to construction sites from public transport hubs and off-site car parking facilities (where these are provided) and between construction sites; (j) provision of contingency measures should the results of mitigation or monitoring indicate implemented measures are ineffective; and (k) provision of reporting of monitoring results to the Planning Secretary and relevant council(s) at three monthly intervals.		
	- Operation of ancillary facilities - Spoil transport, deliveries, general plant operation on public roads	Construction traffic impacts on road network	Likelihood – 4 Consequence – 3 Risk – 17 (Very High)	- REMM CTT1: A road dilapidation report will be prepared, in consultation with relevant councils and road owners, identifying existing conditions of local roads and mechanisms to repair damage to the road network caused by heavy vehicle movements associated with the project. - REMM CTT4: Ongoing consultation will be carried out with (as relevant to the location) Transport Coordination within Transport for NSW, the Port Authority of NSW, local councils, emergency services and bus operators to minimise traffic and transport impacts during construction. - REMM CTT5: The community will be notified in advance of proposed transport network changes, and maritime restrictions through appropriate media and other appropriate forms of community liaison. - REMM CTT6: Construction road traffic will be managed to minimise movements during peak periods. - CoA E130: Access to the ancillary facility WHT3 construction support site at White Bay by construction vehicles (including light vehicles) must only be via The Crescent/City West Link and James Craig Road. No vehicle associated with the CSSI is permitted to access the site via Robert Street, Rozelle, unless required in the event of an emergency. - CoA E132: Local roads proposed to be used by heavy vehicles to directly access the construction boundary and ancillary facilities that are not shown in Figure 5-7 to 5-22 inclusive of Appendix F of the EIS must be approved by the Planning Secretary and included in the Traffic, Transport and Access Management CEMP Sub-plan. - CoA E135: The locations of all heavy vehicles used for spoil haulage must be monitored in real time and the records of monitoring be made available electronically to the Planning Secretary and the EPA upon request for a period of no less than one year following the completion of construction. - CoA E136: Before any local road is used by a heavy vehicle for the purposes of the CSSI, a Road Dilapidation Report must be prepared for the road. A copy of the Road Dilapidation Report must be provided to the relevant council within three weeks of completion of the survey and	Likelihood – 3 Consequence – 2 Risk – 8 (Moderate)	

Issue	Construction activity/aspect	Potential impact	Risk level prior to mitigation	Indicative Mitigation Measures	Risk level following mitigation	Management Documents / Training Required
				no later than one month prior to the road being used by heavy vehicles associated with the CSSI. CoA E139: Vehicles (including light and heavy vehicles) associated with the CSSI must be managed to: (a) minimise parking on public roads; (b) minimise idling and queueing on state and regional roads; (c) not carry out marshallng of construction vehicles near sensitive land user(s); (d) not block or disrupt access across pedestrian or shared user paths at any time; and (e) ensure spoil haulage vehicles adhere to the nominated haulage routes identified in the Traffic, Transport and Access Management CEMP Sub-plan.		
Visual Amenity	Operation of ancillary facilities	Landscape character and visual impacts from construction activities and construction support sites.	Likelihood – 3 Consequence – 1 Risk – 3 (Low)	- REMM V1: Construction support sites will be developed to minimise visual impacts for adjacent receivers where feasible and reasonable. - REMM V3: Site hoardings will be in neutral colours and designs, in proximity to open space, to help blend them into the surrounding environment. - REMM V4: Site hoarding and perimeter site areas will be maintained regularly to include the prompt removal of graffiti. - REMM V5: Site lighting will be designed to minimise glare issues and light spillage into adjoining properties and be generally consistent with the requirements of Australian Standards and Guidelines 4282 – 1997 2019 Control of the obtrusive effects of outdoor lighting. - REMM V6: Hoardings and temporary noise walls will be erected as early as possible within the site establishment phase to provide visual screening. - CoA E155: The CSSI must be constructed in a manner that minimises visual impacts of construction sites, including providing temporary landscaping and vegetative screening of the construction sites, minimising light spill, and incorporating architectural treatment and finishes within key elements of temporary structures that reflect the context within which the construction sites are located. - CoA E163: The Proponent must construct and operate the CSSI with the objective of minimising light spillage to surrounding properties. All lighting associated with the construction and operation of the CSSI must be consistent with the requirements of AS/NZS 4282:2019 Control of the obtrusive effects of outdoor lighting and relevant Australian Standards in the series AS/NZ 1158 – Lighting for Roads and Public Spaces. Additionally, the Proponent must provide mitigation measures to manage any residual night lighting impacts to protect properties adjoining or adjacent to the CSSI, in consultation with affected landowners.	Likelihood – 2 Consequence – 1 Risk – 2 (Low)	CEMP
Hazards and Risks	- Operation of ancillary facilities - General Construction activities - Haulage of spoil	Transport and storage of hazardous substances and dangerous goods during construction.	Likelihood – 2 Consequence – 4 Risk – 15 (High)	- REMM HR1: Dangerous goods and hazardous materials will be stored in accordance with supplier's instructions and relevant legislation, Australian Standards, and applicable guidelines and may include bulk storage tanks, chemical storage cabinets/containers or impervious bunds. - REMM HR2: Dangerous goods and hazardous substances will be transported in accordance with relevant legislation and codes, including the Dangerous Goods (Road and Rail Transport) Act 2008, Road and Rail Transport (Dangerous Goods)(road) Regulation 1998 and the Australian Code for	Likelihood – 2 Consequence – 2 Risk – 7 (Low)	SSWMP + SWMP

Issue	Construction activity/aspect	Potential impact	Risk level prior to mitigation	Indicative Mitigation Measures	Risk level following mitigation	Management Documents / Training Required
				the Transport of Dangerous Goods by Road and Rail (national Transport Commission, 2008).		
Human Health	- Operation of ancillary facilities - General construction activities	Human health impacts associated with air quality.	Likelihood – 3 Consequence – 2 Risk – 8 (Moderate)	- Air quality mitigation measures as identified above - Noise and vibration measures to manage construction impacts outlined above - Social impact mitigation measures as outlined under the 'socioeconomic' section below.	Likelihood – 2 Consequence – 2 Risk – 7 (Low)	CEMP Procedures (in CEMP and sub-plans)
		Human health impacts associated with noise and vibration from construction activities.	Likelihood – 3 Consequence – 2 Risk – 8 (Moderate)		Likelihood – 2 Consequence – 2 Risk – 7 (Low)	
		Human health impacts associated with social impacts.	Likelihood – 3 Consequence – 2 Risk – 8 (Moderate)		Likelihood – 2 Consequence – 2 Risk – 7 (Low)	
Land use and property	- Operation of ancillary facilities - Tunnel excavation	Discontent with substratum acquisition	Likelihood – 5 Consequence – 2 Risk – 10 (Moderate)	- REMM LP1: Land acquisition for the project will be carried out in accordance with the Land Acquisition (Just Terms Compensation) Act 1991 (NSW), the Roads and Maritime Services Land Acquisition Information Guide (Roads and Maritime, 2014) and Fact sheet: Property acquisition of subsurface lands (Roads and Maritime, 2015) and in accordance with the land acquisition reforms announced by the NSW Government in 2016. Transport for NSW will appoint a Personal Manager - Acquisition to help land owners and residents who may be affected by acquisition for the project. The Personal Manager -Acquisition will be in regular contact with these individuals to provide updates on the project and respond to questions and queries. Should acquisition for the project be confirmed for a particular property, the Personal Manager - Acquisition will work with the affected land owners and residents to offer assistance and support throughout the acquisition and relocation process. - REMM LP3: Where impacts to private property access is unavoidable during construction, property owners will be consulted in advance to develop appropriate alternative access arrangements.	Likelihood – 4 Consequence – 2 Risk – 6 (Low)	CEMP CCS
Socioeconomics	- Operation of ancillary facilities - General construction activities	Temporary impacts on social infrastructure and community values during construction	Likelihood – 3 Consequence – 2 Risk – 8 (Moderate)	- REMM SE3: Ongoing engagement will be carried out with managers of social infrastructure located near to surface construction works/construction support sites and sensitive social infrastructure above the tunnel alignment (for example, schools, places of worship, aged care, child care, health and medical facilities) about the timing and duration of construction works and management of potential impacts. - REMM SE4: Consultation for the project will be carried out in accordance with the Community Consultation	Likelihood – 2 Consequence – 2 Risk – 7 (Low)	CEMP Procedures (in CEMP and sub-plans)
		Impacts to businesses during construction (passing trade, access, parking etc)	Likelihood – 2 Consequence – 2 Risk – 7 (Low)		Likelihood – 1 Consequence – 2 Risk – 6 (Low)	
		Access and connectivity impacts during construction.	Likelihood – 2 Consequence – 2		Likelihood – 1 Consequence – 2	

Issue	Construction activity/aspect	Potential impact	Risk level prior to mitigation	Indicative Mitigation Measures	Risk level following mitigation	Management Documents / Training Required
			Risk – 7 (Low)	Framework provided as Appendix E of the environmental impact statement. - REMM BU2: Specific consultation will be carried out with businesses potentially impacted during construction. Consultation will aim to identify specific potential construction impacts for individual businesses. - REMM BU3: Based on consultation with businesses, specific feasible and reasonable measures to maintain business access, visibility and parking and address other potential impacts as they arise through the construction process will be identified and implemented. A phone hotline that enables businesses to find out about the project or register any issues will be maintained. - CoA E100: The Proponent must identify the utilities and services (hereafter “services”) potentially affected by construction to determine requirements for diversion, protection and/or support. Alterations to services must be determined by negotiation between the Proponent and the service providers. The Proponent in consultation with service providers must ensure that disruption to services resulting from the Activity are avoided where practical and advised to customers.	Risk – 6 (Low)	
Cumulative impacts	- Operation of ancillary facilities - General construction activities	Construction noise and traffic associated with developments in proximity to construction sites including the Beaches Link and Gore Hill Freeway Connection project (if approved), the Western Sydney Metro project, the M4-M5 Link project and other developments.	Likelihood – 5 Consequence – 2 Risk – 21 (Very High)	- REMM CI1: Considered and tailored multi-party engagement and cooperation will be established prior to construction to ensure all contributors to impacts are working together to minimise adverse impacts or enhance benefits of multiple projects occurring concurrently or consecutively. Haulage routes and road occupancy will be coordinated with other major transport projects via Transport Coordination within Transport for NSW. - REMM CI2: Multi-party engagement and cooperation will be established prior to construction to coordinate with the following projects to manage fatigue impacts where possible: a) M4-M5 Link b) Beaches Link and Gore Hill Freeway Connection c) Sydney Metro City & Southwest. - REMM CI3: Communication strategies for the project will be managed consistently across the NSW Government transport portfolio and in accordance with the Community Consultation Framework for the project, particularly with the Beaches Link and Gore Hill Freeway Connection project. - REMM CI4: Cumulative complaints fatigue will be managed as outlined in Chapter 7 (Stakeholder and community engagement). Complaint management tools for the project are outlined in Appendix E (Community consultation framework). - CoA E82: All work undertaken for the delivery of the CSSI, including those undertaken by third parties (such as utility relocations), must be coordinated to ensure respite periods are provided. The Proponent must: (a) reschedule any work to provide respite to impacted noise sensitive land user(s) so that the respite is achieved in accordance with Condition E83; or	Likelihood – 3 Consequence – 1 Risk – 11 (Moderate)	CEMP Procedures (in CEMP and sub-plans) EPL

Issue	Construction activity/aspect	Potential impact	Risk level prior to mitigation	Indicative Mitigation Measures	Risk level following mitigation	Management Documents / Training Required
				(b) consider the provision of alternative respite or mitigation to impacted noise sensitive land user(s); and (c) provide documentary evidence to the AA in support of any decision made by the Proponent in relation to respite or mitigation. The consideration of respite must also include all other CSSI, SSI and SSD projects which may cause cumulative and/or consecutive impacts at receivers affected by the delivery of the CSSI.		

Table 9: Aspect and Impact Register - Stage 1D (Western Harbour Tunnel Construction Power and Utilities)

Issue	Activity/aspect	Potential impact	Risk level prior to mitigation	Indicative Mitigation Measures	Risk level following mitigation	Management Documents / Training Required
Air Quality	- General activities including: - Trenching - Installation of conduit and cable - Kiosk activity	- Generation of dust due to material /waste/spoil handling; earthworks equipment, and generation of exhaust emissions due to inappropriate plant maintenance - Generation and mobilisation of dust impacting receivers including residents, businesses, vegetation and habitats	9 (moderate)	Direct: - Activities with the potential to generate dust will be modified or ceased during unfavourable weather conditions to reduce the potential for dust generation - Access roadways within Project sites will be maintained and managed to reduce dust generation - Storage of materials that have the potential to result in dust generation will be minimised within Project sites at all times - During high wind and/or dry conditions, programming of dust generating activities is to be considered in order to reduce nuisance to neighbouring properties - Earthwork activities will be planned and carried out to minimise the potential for dust generation - Adequate dust suppression will be applied during all activities required to facilitate the Project - Trenching activities undertaken in sequential manner with areas stabilised on completion Indirect: - Other measures outlined in the Contractors Environmental Management Plan (EMP)	6 (minor)	Contractors Environmental Management Plan (EMP)
Biodiversity	- General activities including: - Trenching - Installation of conduit and cable - Kiosk activity	Clearing outside of an approved area, including: - Accidental clearing outside of the project boundaries - Accidental lopping of trees and/or damage to tree roots - Accidental clearing of threatened species or threatened ecological communities outside of the project boundary	12 (moderate)	Direct: - Toolbox talks regarding clearing process and limits - Clearly delineate the Project footprint prior to clearing - Implementation of the clearing permit process for all clearing and trimming activity on the Project - The unexpected species find procedure included in Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA, 2011) will be followed if threatened ecological communities, flora or fauna species, not assessed in the biodiversity assessment, are identified in the footprint. - Pre-clearing surveys for threatened flora species will be carried out in accordance with Guide 1: Pre-clearing process of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA, 2011). - No disturbance of native vegetation unless all of the following apply: - works are for the purpose of vegetation maintenance - works are undertaken in accordance with ISSC3 Guide for the Management of Vegetation in the Vicinity of Electricity Assets (November 2016), NS179 Vegetation Management and Ausgrid's Tree Safety Management Plan - clearing is to the minimum extent necessary to maintain existing and regularly maintained clearances (ie no new clearance envelopes) Indirect: - Engage an arborist to supervise works where impact or damage to tree roots is probable - Provide tree protection where required at the direction of the arborist - Other measures outlined in the Contractors Environmental Management Plan (EMP), Vegetation Management Plan (VMP) and Tree Protection Plan (TPP)	9 (moderate)	Contractors Environmental Management Plan (EMP) Vegetation Management Plan (VMP) Tree Protection Plan (TPP)

Issue	Activity/aspect	Potential impact	Risk level prior to mitigation	Indicative Mitigation Measures	Risk level following mitigation	Management Documents / Training Required
		Spreading of weeds in stockpiled material or machinery tracking	8 (minor)	Direct: Implement a weed management procedure. Indirect: Other measures outlined in the Contractors Environmental Management Plan (EMP), Vegetation Management Plan (VMP) and Tree Protection Plan (TPP)	3 (minor)	Contractors Environmental Management Plan (EMP) Vegetation Management Plan (VMP) Tree Protection Plan (TPP)
Contamination	- General activities including: - Trenching - Installation of conduit and cable - Kiosk activity	Contamination of soil or water from spill or leak of dangerous or hazardous materials (e.g. hydraulic fluid) from plant / equipment	6 (minor)	Direct: - The use of any hazardous substance that could result in a spill will be undertaken away from drainage or stormwater lines and, wherever possible, within defined bunds - Any refuelling undertaken on site shall be undertaken in designated areas only, outside of vegetated areas and away from stormwater systems - All spills or leakages will be immediately contained and absorbed - Spill containment kits will be placed at active working locations - All plant and equipment on site will be maintained and serviced in accordance with manufacturing specifications - No fuels and chemicals will be stored within compounds on site Project Indirect: - Other measures outlined in the Contractors Environmental Management Plan (EMP)	3 (minor)	Contractors Environmental Management Plan (EMP)
		Exposure to unidentified contaminated materials (including acid sulfate soil) during works, causing program delays and injuries and health concerns	6 (minor)	Direct: - Induct personnel in the identification and management of previously unidentified contaminated sites. - A detailed site investigation (DSI) will be undertaken for all areas within the WHT Project boundary identified to be a moderate to high risk of contamination (per the EIS Appendix M) - Should potential acid sulfate soil be identified, works are to cease and appropriate testing is to be undertaken to determine management requirements, including neutralisation rate and disposal options. - The discovery of previously unidentified contaminated material will be managed in accordance with the Unexpected Contaminated Lands finds procedure. The procedure will include: - Cease work in the vicinity - Initial assessment by an appropriately qualified environmental consultant - Further assessment and management of contamination, if confirmed, in accordance with Section 105 of the CLM Act Indirect: - Other measures outlined in the Unexpected Contamination and Asbestos Procedure	3 (minor)	Unexpected Contamination and Asbestos Procedure (EMP Appendix A7))
Heritage	- General activities including: - Trenching - Installation of conduit and cable - Kiosk activity	Disturbance or damage of unidentified Aboriginal heritage artefact	4 (minor)	Direct: - All on site personnel will be inducted including awareness of Aboriginal cultural heritage site relating to the Project, key mitigation and management requirements and their responsibilities pertaining to the Aboriginal Heritage provisions of the NPW Act 1974 (NSW) prior to commencing. The induction will include unexpected heritage finds procedures for heritage items, objects and human remains. - If at any time during of the project, any items of potential Aboriginal archaeological or cultural heritage conservation significance or human remains	3 (minor)	Contractors Environmental Management Plan (EMP) EMP Appendix A8 – Heritage Unexpected Finds Procedure

Issue	Activity/aspect	Potential impact	Risk level prior to mitigation	Indicative Mitigation Measures	Risk level following mitigation	Management Documents / Training Required
				are discovered they will be managed in accordance with the Standard Management Procedure: Unexpected Heritage Items (Roads and Maritime, 2015) - Cultural and historic heritage awareness training will be carried out for personnel engaged in work that may impact heritage items before commencing works for the project Indirect: - Other measures outlined in the Contractors Environmental Management Plan (EMP)		
		Disturbance or damage of non-Aboriginal heritage items including: - Berrys Bay precinct - BP Site - Former Coal Loader - Woodleys shipyard - Balls Head Reserve - Yurulbin Point precinct - Sandstone gutters project wide	12 (moderate)	Direct: - Any excavations, intrusive works or other operations that have the potential to impact areas of known heritage, cultural or archaeological items must ensure works are performed in accordance with the Statement of Heritage Impact (SoHI) prepared for the Project and regulatory requirements (which may include a dilapidation survey and/or supervision of works by a competent person and/or vibration monitoring) - Any such areas should be signposted and segregated by the erection of physical barriers to prevent authorised entry where potential for impact may occur - A condition survey will be completed prior to works commencing within safe working distances to heritage structures. - If at any time during of the project, historical heritage materials, features and/or deposits are encountered, the Roads and Maritime Services Standard Management Procedure: Unexpected Heritage Items (Roads and Maritime, 2015) will be followed. - All works to stop immediately and restrict access if potential heritage is discovered. Notify the Supervisor and Ausgrid's Environmental Services (9394 6659). - Non-Aboriginal historical heritage awareness training will be provided for contractors prior to commencement of works to ensure understanding of potential heritage items that may be impacted during the project, and the procedure required to be carried out in the event of discovery of historical heritage materials, features or deposits, or the discovery of human remains Indirect: - The location of known non-Aboriginal heritage items and conservation areas in the vicinity of the works are shown on the sensitive area plans (Appendix A2 of the EMP). Their location will be communicated to all site personnel prior to the commencement of works. - Other measures outlined in the Contractors Environmental Management Plan (EMP)	6 (minor)	Contractors Environmental Management Plan (EMP) Statement of Heritage Impact (SoHI)
Noise and Vibration	- General activities including: - Trenching - Installation of conduit and cable - Kiosk activity	Noise and vibration impacts on nearby receivers, including works resulting in structural damage or community complaints	9 (moderate)	Direct: - All on site personnel will undergo a site induction and ongoing toolbox talks that will detail noise and vibration requirements from this plan through inductions, toolboxes and targeted training - Noise and vibration monitoring undertaken in accordance with the Project's Construction Noise and Vibration Impact Statement (CNVIS) - Activities will be undertaken in standard working hours wherever possible - The safe working distances for vibration intensive plant would be complied with where feasible and reasonable. This would include the consideration of smaller equipment when working in close proximity to existing structures	4 (minor)	Construction Noise and Vibration Impact Statement (CNVIS)Community Communication Strategy (CCS).

Issue	Activity/aspect	Potential impact	Risk level prior to mitigation	Indicative Mitigation Measures	Risk level following mitigation	Management Documents / Training Required
				- Erection of temporary noise curtains/hoarding for noisy equipment (i.e. hammering and road sawing) and where stationary plant (i.e. generators) are used and the control will be effective in reducing noise impacts at the receiver. - Community liaison and notification (including management of vibration perception) - Provision of respite and alternative accommodation where required - Undertaking of the activities in a transient nature with completion (including stabilisation) at one work location prior to progression. - Building condition survey for all structures within safe working distances - Attended measurements for vibration during initial activity for verification Indirect: - Other measures outlined in the Construction Noise and Vibration Impact Statement (CNVIS)		
		Noise disturbance due to works undertaken out of standard hours	12 (moderate)	- Out of Hours Works are to be carried out in accordance with the Project's Out-of-Hours-Works Protocol and Construction Noise and Vibration Impact Statement (CNVIS) - Ensure OOHW are appropriately justified – safety or community requirement. - Implement noise mitigation strategies for out of standard hours work as per OOHW Protocol and Construction Noise and Vibration Impact Statement (CNVIS). - Monitor noise for compliance to project predictions as per Construction Noise and Vibration Impact Statement (CNVIS). - Community notifications distributed for all works activities in accordance with the Project Community Communication Strategy (CCS).	9 (moderate)	Construction Noise and Vibration Impact Statement (CNVIS) Community Communication Strategy (CCS). OOHW Protocol
Soil and Water	- General activities including: - Trenching - Installation of conduit and cable - Kiosk activity	Serious incidents, e.g. uncontrolled release of water or concrete washout water, major failure erosion and sediment controls, major fuel spill, that cause or threaten material harm to the environment	12 (moderate)	Direct: - Erosion and Sediment measures will be implemented at all work sites in accordance with the principles and requirements in 'Managing Urban Stormwater – Soils and Construction, Volume 1 (Landcom, 2004) and Volume 2D (NSW Department of Environment, Climate Change, 2008), commonly referred to as the 'Blue Book' - Any concrete washout areas will be adequately sized, regularly maintained, and located in designated areas. They will be away from stormwater system inlets in a position where wastewater will not enter any drainage lines or waterways - Reuse of site water in dust suppression and compaction activities. - The use of any hazardous substance that could result in a spill will be undertaken away from drainage or stormwater lines, creeks/waterways, and wherever possible, within defined bunds - Any refuelling undertaken on site shall be undertaken in designated areas only, and away from stormwater system inlets/waterways. - Workers will be made aware of the locations of drains, drainage lines, grates , inlets and waterways and the requirements to protect these area and prevent impacts from oils, fuels and spills - Spill containment kits will be placed at active work locations - Works areas will be backfilled and stabilised on completion of each section (including verge) to reinstate cover. This will include polymer or turfing as required. - Precast units are to be used where reasonable and feasible to minimise concrete use and management on the Project Indirect:	9 (moderate)	Contractors Environmental Management Plan (EMP)

Issue	Activity/aspect	Potential impact	Risk level prior to mitigation	Indicative Mitigation Measures	Risk level following mitigation	Management Documents / Training Required
				Other measures outlined in the Contractors Environmental Management Plan (EMP)		
Traffic	- General activities including: - Trenching - Installation of conduit and cable - Kiosk activity	Traffic and parking impacts due to increased number of vehicles, site access arrangements and vehicle movements	12 (significant)	Direct: - Designated haul routes for heavy vehicles accessing the Project to be communicated during induction - Use of surveillance officers for routine verification and management - Limiting vehicle movements to designated entries and exits and haulage routes as communicated during the Project induction - All on site personnel will undergo a site induction and ongoing toolbox talks that will detail traffic, transport and access management measures - Communication and adherence to approval and behavioural requirements - Workers are to utilise designated off-street car parking areas where available . Parking for site personnel will be provided in the minor ancillary facility located at Berrys Bay. Queuing and idling of vehicles in residential streets will be minimised - Measures identified in the MAFA will be implemented for each ancillary facility/ compound which requires direct access/egress onto the local road network - Notifications to be implemented (i.e. parking signage an routine communication) for disruption to roadway and parkin areas. - Vehicle movements to and from sites will be managed to ensure pedestrian, cyclist and motorist safety. - A road dilapidation report will be prepared, in consultation with relevant councils and road owners, identifying existing conditions of local roads and mechanisms to repair damage to the road network caused by heavy vehicle movements associated with the project. Indirect: - Other measures outlined in the Contractors Environmental Management Plan (EMP) and Traffic Guidance Scheme (TGS)	9 (moderate)	Contractors Environmental Management Plan (EMP) Traffic Guidance Scheme (TGS)
Visual	- General activities including: - Trenching - Installation of conduit and cable - Kiosk activity	Visual impacts on nearby receivers, shared-pathway users, due to light spill and works.	9 (moderate)	Direct: - Site establishment works will be conducted to minimise visual impacts. Boundary fencing and/or shade cloth will be installed to minimise visual, noise and air quality impacts on sensitive receivers adjacent to the compound. - Retention of existing vegetation (where possible) or treatment of key temporary structures immediately following completion of trenching activity - Where possible, trees will be trimmed rather than removed. Works will be carried out by a qualified arborist - Minimise light spill (where undertaking work OOH) from the project by directing lighting into the work areas and ensuring the site is not over-lit. - Reinstatement of roadway and verge areas immediately following completion of activity in each section. Indirect: - Other measures outlined in the Contractors Environmental Management Plan (EMP)	6 (minor)	Contractors Environmental Management Plan (EMP)
Waste	- General activities including: - Trenching - Installation of conduit and cable - Kiosk activity	Inappropriate disposal of waste (including road asphalt, vegetation and special waste) or disposal at an unlicensed waste facility	4 (minor)	Direct: - All on site personnel will undergo a site induction and ongoing toolbox talks that will detail waste and resource management measures - Vegetation disposal in accordance with the EMP - Waste classification in accordance with EPA guidelines (undertaken during investigation activity wherever possible)	2 (negligible)	Contractors Environmental Management Plan (EMP)

Issue	Activity/aspect	Potential impact	Risk level prior to mitigation	Indicative Mitigation Measures	Risk level following mitigation	Management Documents / Training Required
				- Suitably licensed waste contractors will be used for the collection and transport of all non-domestic, retail and commercial wastes for either offsite processing and/or disposal to an appropriately licensed facility. - Receipts for waste transfer and disposal will be checked to ensure all details are correct and retained for audit purposes - Waste tracking register for all waste disposal - In situ classification of material would be undertaken where reasonable and feasible. - No storage of spoil material on site Indirect: - Other measures outlined in the Contractors Environmental Management Plan (EMP)		
		Litter, inappropriate use of comingling and waste receptacles	4 (minor)	Direct: - All staff and subcontractors will undergo a site induction and ongoing toolbox talks that will detail waste and resource management measures (including the waste management hierarchy) and energy consumption - All recyclable solid wastes (paper/ cardboard/ plastic/ glass/ timber/ metals/ fluorescent lighting/ printer cartridges/ICT equipment) will be managed through offsite comingled recycling contractors for recycling purposes and volumes reported where reasonable and feasible. - Wherever possible, packaging should be avoided or minimised to prevent waste products being unnecessarily brought onto an operation Indirect: - Other measures outlined in the Contractors Environmental Management Process Plan (EMP)	2 (negligible)	Contractors Environmental Management Plan (EMP)
Ancillary Facility	Office use, amenities, storage	Litter, inappropriate use of facility, inappropriate storage of material, spills, dust	9 (moderate)	- The generator will be maintained properly so that it does not generate any smoke or odour. If the generator does start to emit smoke or an odour it will be replaced or repaired. - The generator will be internally banded to mitigate spills as a result of malfunctioning. - Refuelling of the generator will be undertaken using a drip tray while refuelling and having an appropriate spill kit stored in the project area. - Refuelling of plant and machinery to be undertaken away from site wherever possible - The generator will be turned off when the facility is not in use. - An appropriately sized spill kit is to be kept on site and will be used to manage potential spills in the area of the facility. - Spilled material will be collected and disposed of appropriately and the area cleaned. - Suitable waste management is to be provided to manage the construction waste. This includes construction waste bins, general waste bins, comingled recycling bins and paper/cardboard bins. - Waste will be managed to prevent odour through regular emptying of the garbage bins and cleaning of the area. - Blinds will be fitted to the office and lunchrooms and lights will be switched off when the facility is not in use. - The facility will be secured through ATF covered with screening / mesh to restrict access. The access gate will be locked when the facility is not in use.	4 (minor)	Contractors Environmental Management Plan (EMP) Minor Ancillary Facility Assessment Report

Issue	Activity/aspect	Potential impact	Risk level prior to mitigation	Indicative Mitigation Measures	Risk level following mitigation	Management Documents / Training Required
		Traffic congestion / disturbance	9 (moderate)	- Vehicles to enter and exit in forward motion - Reversing to be minimised on site wherever possible - No beeper reverse alarms allowed to operate on the site. Vehicles to be fitted with non-tonal reverse alarms where required - Behavioural measures (i.e. minimising horn use, obeying road rules) to be implemented on site. - Workers to consider carpooling to minimise number of vehicles on site wherever possible - Schedule deliveries so that vehicles are not parked on local streets waiting entry into the site - Standard site operation to be up to 10 persons	4 (minor)	Contractors Environmental Management Plan (EMP) Minor Ancillary Facility Assessment Report
		Noise and vibration impacts to heritage items and structures	12 (moderate)	- Use of the facility will be limited to portable site sheds and amenities with no ground disturbance, no impact to structures and no modification of the existing environment. - A heritage specific induction will be included for all site personnel related to the Balls Head heritage values and protection measures required (i.e. fencing, exclusion areas and limitations of use) - No vibration intensive activity is to occur at the facility - No noisy works (i.e. operation of construction equipment) will occur at the facility. - Standard behavioural management measures will be applied to site activity (i.e., no yelling, appropriate language etc)	4 (minor)	Contractors Environmental Management Plan (EMP) Minor Ancillary Facility Assessment Report
		Loss of vegetation and biodiversity	9 (moderate)	- No trimming or removal of vegetation will occur at the facility. - Should any fauna / animal be identified, it will in the first instance be left alone to relocate. Should the fauna / animal be injured or not relocate of its own will, a suitably qualified wildlife handler will be engaged to remove / assist the fauna / animal. - All waste receptacles to have lids and be emptied regularly - Minimise storage of consumables and putrescible material on site	4 (minor)	Contractors Environmental Management Plan (EMP) Minor Ancillary Facility Assessment Report

Environmental Aspects and Impacts Register

This Environmental Aspects and Impacts Register has been prepared by ACCIONA , to supplement the Environmental Risk Analysis conducted as part of the Environmental Impact Statement (EIS). For more detail on the EIS and Project assessment and approval process, please refer to the Construction Environmental Management Plan.

The identification of potential environmental impacts that could eventuate during construction of the Project is central to the selection of appropriate environmental safeguards.

The risk management process involved an assessment of all specific project activities/aspects in or near environmentally sensitive areas and resulted in the development of a list of environmental risks (effects and impacts) and a corresponding risk mitigation strategy and risk ranking. Each environmental risk was categorised, based on the following:

- The environmental aspect
- Relative scale of the potential impact
- Type of potential impact
- Likelihood of occurrence.

The identification of risks included a review of the proposed works, the CoA, REMM, and review of the environmental risks identified by the EA and subsequent Submissions Report.

A risk consideration workshop, highlighting the construction processes and locations and reviewing the potential risk resulting from Project construction, based on risks highlighted in the EIS, updated construction methodologies and past experience, was held on 18 January 2023 and included attendees from:

- Transport for New South Wales,
- North Sydney Council and
- Inner West Council.
- The Acoustic Advisor
- The Environmental Representative

Following this, the risk assessment process has been implemented as described below.

Risk Assessment Process

The following tables outline the risk assessment process using 3 steps to identify the appropriate management measures required.

- Table 1 is used to determine the likelihood that the aspect will have an impact on the environment.
- Table 2 is used to determine the potential consequence rating of the risk identified

From these two tables, a risk rating can then be assigned by using Table 3 to determine how severe the potential impact may be and what level of management each type of risk will require

Table 1: Likelihood criteria

Score	Description	Percentage	Expected frequency
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5	Almost Certain	Common / Frequent Occurrence	Can be expected to occur 75% - 99%	More than 1 event per month
4	Likely	Is known to occur or "It has happened regularly"	Can quite commonly occur 50% - 75%	More than 1 event per year
3	Possible	Could occur or "I've heard of it happening"	May occasionally occur 25% - 50%	1 event per 1 to 10 years
2	Unlikely	Not likely to occur very often	May infrequently occur 10% - 25%	1 event per 10 to 100years
1	Rare	Conceivable but only in exceptional circumstances	May occur in exceptional circumstances 0% – 10%	Less than 1 event per100 years

Table 2: Consequence criteria

Consequence Rating	1	2	3	4	5
	Negligible	Minor	Moderate	Major	Substantial
Safety and Health	First Aid Treatment (or No treatment)	Medical Treatment Injury	Lost Time Injury	Permanent Injury (Paraplegia, Amputation)	Fatality (Single or multiple)
Environment and Heritage	Small, contained localised impact / Low level repairable damage	Short lived, well contained environmental impact / Minor remedial action required	Medium term, contained impact / Significant remedial action required	Impacts extend off-site / external ecosystem. Considerable remediation required	Long Term irreversible damage / Long Term Remediation required
Plant Damage	Little or No Damage	Damage less than \$15,000	Damage between \$15,000 and \$50,000	Damage between \$50,000 and \$100, 000	Damage greater than \$100, 000
Reputation	Brief local negative media coverage.	Local negative media coverage. Site or project problem.	Regional/short negative media coverage. Loss of Client / project.	Sustained national negative media coverage. Loss of long term key client.	International negative media coverage. Loss of business from key sector.
Time	Delay / Business interruption <1% of program days	Delay / Business interruption between 1%-3% of program days	Delay / Business interruption between 4%-6% of program days	Delay / Business interruption between 7%-10% of program days	Delay / Business interruption >10% of program days
Cost	Additional cost to the business / project <1% revenue	Additional cost to the business / project between 1%-3% revenue	Additional cost to the business / project between 4%-6% of revenue	Additional cost to the business / project between 7%-10% of revenue	Additional cost to the business / project >10% of revenue

Table 3: Risk severity

	Consequence	Negligible	Minor	Moderate	Major	Substantial
Likelihood	Rating	1	2	3	4	5
Almost Certain	5	5 (Low)	10 (Moderate)	18 (Very High)	23 (Extreme)	25 (Extreme)
Likely	4	4 (Low)	9 (Moderate)	17 (Very High)	20 (Very High)	24 (Extreme)
Possible	3	3 (Low)	8 (Moderate)	13 (High)	19 (Very High)	22 (Very High)
Unlikely	2	2 (Low)	7 (Low)	12 (High)	15 (High)	21 (Very High)
Rare	1	1 (Low)	6 (Low)	11 (Moderate)	14 (High)	16 (High)

Table 10: Aspect and Impact Register - Stage 3B (Northern Tunnelling and Integration works)

Issue	Construction activity/aspect	Potential Impact	Risk (prior to mitigation)	Indicative mitigation measures	Risk (following mitigation)	Management Documents / Training Required
Air Quality	- General earthworks - Vegetation clearing - Open excavation works - Spoil handling - Stockpiling - Vehicular movements on unsealed roads - Material haulage - Vehicle emissions - Handling of chemicals, waste and hazardous goods.	Complaints from neighbours, including loss of amenity, dust in living areas, swimming pools	Likelihood – 5 Consequence – 2 Risk – 10 (Moderate)	- Induct personnel on air quality issues and safeguards - Use water carts on unsealed surfaces and stockpiles - Utilise safe dust suppressants to reduce dust generation - Use street sweepers to reduce dust in areas of dust build up - Modify or cease operations during high winds - Installation of acoustic sheds/ramp covers as early as possible - All trucks carrying dispersible material must be covered when on public roads - Vehicles, equipment, machinery must be designed, operated and maintained to control the emission of smoke, dust, odours and fumes - All disturbed areas stabilised, revegetated and/or landscaped as soon as practicable - Minimise tracked mud/dust on public roads with wheel wash or rumble grids - No burning or incineration of any material at any time - Air quality monitoring in accordance with Project Air Quality and Odour Monitoring Program. - Pesticide use will be in accordance with the Pesticides Act, 1999 - Selection of appropriate plant / equipment for use, and minimise idling - Minimise exhaust fumes – vehicle shut down procedures, maintenance, education of operators. - Underground safety equipment including gas monitoring and plant discharge limits to be undertaken in accordance with safety requirements - scrubbers used as part of tunnel ventilation system to be regularly maintained and operated in accordance with standards and safety guidelines. - Investigate use of surface miner as a more efficient means of surface excavation (vs rock hammering) - where possible.	Likelihood – 3 Consequence – 1 Risk – 3 (Low)	Air Quality and Odour Management Sub Plan (AQOMP) including the Air Quality and Odour Monitoring Program. Environmental Work Method Statements (EWMS) Soil and Surface Water Management Sub Plan (SSWMP) Community Consultation Strategy (CCS) / Complaints Procedure Project induction Environmental Protection License (EPL)
		Potential adverse health effects	Likelihood – 3 Consequence – 2 Risk – 8 (Moderate)		Likelihood – 2 Consequence – 2 Risk – 7 (Low)	
		Degradation of air quality and other aspects of the natural environment	Likelihood – 3 Consequence – 2 Risk – 8 (Moderate)		Likelihood – 2 Consequence – 2 Risk – 7 (Low)	
		Health risks to neighbours and members of the public from release of gases and/or smoke, or unexpected odour	Likelihood – 3 Consequence – 2 Risk – 8 (Moderate)		Likelihood – 1 Consequence – 2 Risk – 6 (Low)	
Biodiversity	- Clearing of native vegetation. - Tree / vegetation removal - Stockpile / haul road construction near vegetation. - General earthworks near vegetation. - Vehicular movements. - Open excavation works. - Bushfires	Loss of habitat for threatened species beyond minimum clearing footprint.	Likelihood – 3 Consequence – 2 Risk – 8 (Moderate)	- Induct personnel on biodiversity issues and mitigation measures. - Ensure vegetation clearing boundaries clearly marked, maintained and visible and are include in the Sensitive Area Maps. - Prior to disturbance, identify and fence all flora and fauna habitat areas required to be protected (in accordance with the pre-clearing inspection requirements) and ensure protected areas are included in the Sensitive Area Maps. - Minimise clearing of all vegetation and undertake progressive revegetation. - Pre-clearing inspections by Project Ecologist to review weeds and other threatened species - Implement ongoing weed monitoring and management programs (in accordance with the Weed Management Protocol). - Disturbed areas will be monitored for effective soil stabilisation and restoration / rehabilitation. - Implement a staged clearing process and undertake fauna rescue during clearing as required. - Project Arborist to provide advice on habitat tree health and provide ongoing advice. - Undertake threatened species management as required under the FFMP - Undertake species monitoring as required - Maintain data on all removed trees, to inform replacement strategy	Likelihood – 2 Consequence – 2 Risk – 7 (Low)	Flora and Fauna Management Plan (FFMP) including: - Pre-clearing inspection requirements - Weed Management Protocol EWMS Project induction Safety Management Plan (re: procedures for hot works activities) Clearing and Grubbing Plan (refer to Specification G40) Tree Register Sensitive Area Maps (SAMs).
		Weed /pathogen infestation	Likelihood – 5 Consequence – 2 Risk – 10 (Moderate)		Likelihood – 3 Consequence – 1 Risk – 3 (Low)	
		Potential longer-term impacts associated with increased habitat fragmentation.	Likelihood – 2 Consequence – 2 Risk – 7 (Low)		Likelihood – 1 Consequence – 2 Risk – 6 (Low)	
		Direct impact to flora or fauna during construction.	Likelihood – 2 Consequence – 2 Risk – 7 (Low)		Likelihood – 1 Consequence – 2 Risk – 6 (Low)	
Aboriginal heritage	- Initial clearing and/or grubbing of vegetation. - Initial removal of topsoil. - Construction of site	Impact to undiscovered or undocumented heritage sites	Likelihood – 2 Consequence – 3 Risk – 12 (High)	- Induct personnel on heritage issues and mitigation measures. - For ancillary sites, identify and assess Aboriginal heritage items and predict potential impacts. - Implement unexpected find procedures as required.	Likelihood – 1 Consequence – 2 Risk – 6 (Low)	Aboriginal Cultural Heritage Management Plan (ACHMP) Unexpected Heritage Finds

Issue	Construction activity/aspect	Potential Impact	Risk (prior to mitigation)	Indicative mitigation measures	Risk (following mitigation)	Management Documents / Training Required
	compounds and material or equipment stockpile areas. • Temporary access roads	Finding / disturbing burials or human remains Vibration or settlement damage during the construction period to identified sites.	Likelihood – 2 Consequence – 2 Risk – 7 (Low) Likelihood – 3 Consequence – 2 Risk – 8 (Moderate)	• Where sensitive items need to be protected on site or adjacent to the Project, these are to be included in the SAMs • Undertake an extensive Instrumentation and Monitoring (I&M) program to monitor for settlement • undertaken vibration assessments prior to impact, and additional monitoring as required.	Likelihood – 1 Consequence – 2 Risk – 6 (Low) Likelihood – 2 Consequence – 2 Risk – 7 (Low)	Procedure Project induction SAMs Noise and Vibration Management Sub Plan (NVMP) and Monitoring Program I&M Program
Non Aboriginal heritage	• Initial clearing and/or grubbing of vegetation. • Initial removal of topsoil. • Construction of site compounds and spoil / mulch and / or equipment stockpile areas. • Temporary access roads during construction • Excavations and earthworks. • Pile driving causing vibration. • Use of other vibratory equipment such as rollers and roadheaders.	Impact to identified heritage items. Vibration or settlement damage during the construction period to identified sites. Impact to undiscovered or undocumented heritage sites. Change in visual integrity of heritage sites.	Likelihood – 3 Consequence – 3 Risk – 13 (High) Likelihood – 3 Consequence – 2 Risk – 8 (Moderate) Likelihood – 3 Consequence – 3 Risk – 13 (High) Likelihood – 2 Consequence – 2 Risk – 7 (Low)	• Pre-construction surveys to assess potentially impacted non-Aboriginal heritage items. • Induct personnel on heritage issues and safeguards. • Delineate identified heritage items with protective fencing or flagging prior to disturbance. • Undertake archival recording as required. • Implement unexpected find procedures. • undertaken landholder consultation as required, in locations of known items/artefact areas. • undertaken vibration assessments prior to impact, and additional monitoring as required. • Where sensitive items need to be protected on site or adjacent to the Project, these are to be included in the SAMs • Undertake an extensive Instrumentation and Monitoring (I&M) program to monitor for settlement	Likelihood – 2 Consequence – 2 Risk – 7 (Low) Likelihood – 2 Consequence – 2 Risk – 7 (Low) Likelihood – 2 Consequence – 2 Risk – 7 (Low) Likelihood – 2 Consequence – 1 Risk – 2 (Low)	Non-Aboriginal Heritage Management Sub Plan (NAHMP) Noise and Vibration Management NVMP and Monitoring Program Unexpected Heritage Finds Procedure Project induction SAMs I&M Program
Noise and vibration	• Regular out of hour works (OOHW) • Potentially noisy and vibration impact generating works including (but not limited to): o Site establishment. o Earthworks o Piling o Paving o Saw cutting o Tunnelling activities o Spoil transport, vehicle movements/deliveries on public roads o Operation of ancillary facilities	Noise impacts on sensitive receivers during construction. Vibration impacts on nearby receptors, including heritage	Likelihood – 3 Consequence – 3 Risk – 13 (High) Likelihood – 4 Consequence – 2 Risk – 9 (Moderate)	• Consult with local communities and affected residents. • Adherence to working hours in NVMP unless otherwise approved. Implement OOHW Permit process, including the OOHW Protocol. Where OOHW are unavoidable, program noisy works outside night-time periods. • Construction Noise and Vibration Impact Statements (CNVIS) to be prepared to determine impact, appropriate mitigation and consultation requirements • Respite periods for highly noise intensive works. • Construction equipment selected, operated and maintained to minimise noise impacts and fitted with non-tonal reversing alarms. • Minimise impacts from saw cutting/ use effective shielding. • Regular noise monitoring to monitor predicted verses actual levels. • Managing construction vehicle routes and speed of vehicles. • Modelling vibration impacts and monitoring where impacts are predicted. • Building condition reports on potentially impacted buildings and structures. • review monitoring results and implement corrective actions as appropriate, such as for example revising mitigation measures, revising predictions. • Implement any additional feasible and reasonable mitigation measures, identified from the review of monitoring results, for minimising noise and vibration impacts • Implement on site controls (listed in the NVMP) • Land Use Survey to confirm surrounding land uses, prior to construction impacting receivers. • be considerate of changes in work from home as result of COVID; will result in an increase in noise experience.	Likelihood – 3 Consequence – 2 Risk – 8 (Moderate) Likelihood – 3 Consequence – 2 Risk – 8 (Moderate)	NVMP including the Noise and Vibration Monitoring Program EWMS Construction Noise and Vibration Impact Statement (CNVIS) Out of hours works (OOHW) protocol Negotiated agreements Complaints procedure Project induction EPL
Soil and water quality	• Clearing and grubbing. • Earthworks and stockpile management.	Erosion and movement of soils.	Likelihood – 5 Consequence – 3 Risk – 18 (Very High)	• Appropriately designed erosion control structures (e.g. rock checks, sedimentation basins, silt fences and sand bags) will be installed, maintained and cleaned regularly to maintain capacity.	Likelihood – 3 Consequence – 2 Risk – 8 (Moderate)	SWMP and Monitoring Program EWMS

Issue	Construction activity/aspect	Potential Impact	Risk (prior to mitigation)	Indicative mitigation measures	Risk (following mitigation)	Management Documents / Training Required
	- Storage of fuels and chemicals - Maintenance of plant and equipment, including servicing and refuelling - Sediment basin management - Drainage works - Concrete works - Temp access road construction - Bridge construction. - Landscaping - Landscaping maintenance	Captured dirty water discharge from basins.	Likelihood – 4 Consequence – 3 Risk – 17 (Very High)	- Locate spoil stockpiles, plant and equipment away from drainage lines, watercourses or stormwater drains - Install clean water diversions to ensure clean and dirty water are not mixed on site. - Storage, compound access and parking areas sealed, as early during works as practicable. - Chemical storage meets bunding requirements. - Wheel mud reduction/ cleaning measures at exit of all sites where required. - Rehabilitation and landscaping works of disturbed areas undertaken as soon as the works are completed and/or progressively where possible. - Use of temporary ground covers such as hydraulic soil stabilisers or geotextile fabric will be used as much as possible to stabilise batters, stockpiles and large surface areas. - Implement concrete washout process within bunded areas. - Provide and maintain spill kits. - Implement SSWMP and Surface Water Monitoring Program - Implement Dewatering Permit process – testing and confirming criteria is complied with prior to dewatering - Investigate potential use of temporary Water Treatment Plants (pending EPA approval) for the management of surface water - Communicate discharge requirements to project team - Consider interface with other projects prior to discharging water into neighbouring areas - Maximise reuse of construction water - Treat construction water for reuse with water treatment plant - Monitoring/measuring potable water use - Include Flood Prone Areas on the SAMs to prioritise not storing materials inside these locations. - Location of stockpiles (outside spoil / acoustic sheds) outside flood risk areas - Set up sites to reduce flood impacts - avoid blocking drainage lines or pits or provide alternative drainage pathway - Reduce groundwater change through the preparation of Groundwater Model and undertaken Groundwater Monitoring.	Likelihood – 3 Consequence – 2 Risk – 8 (Moderate)	Project induction Targeted ERSED training Dewatering Permit EPL SAMs Sustainability Management Plan Groundwater Management Plan and Groundwater Monitoring Program.
		Dirty water not captured and leaves site without controls.	Likelihood – 4 Consequence – 3 Risk – 17 (Very High)		Likelihood – 3 Consequence – 2 Risk – 8 (Moderate)	
		Materials (including hazardous materials or unconsolidated construction materials) washout from flood event.	Likelihood – 3 Consequence – 2 Risk – 8 (Moderate)		Likelihood – 2 Consequence – 2 Risk – 7 (Low)	
		Excessive potable water usage	Likelihood – 4 Consequence – 3 Risk – 17 (very high)		Likelihood – 2 Consequence – 2 Risk – 7 (Low)	
		Mobilization of Acid Sulfate Soils	Likelihood – 2 Consequence – 3 Risk – 12 (High)		Likelihood – 2 Consequence – 2 Risk – 7 (Low)	
Spoil and Fill	- Cuts - Fill areas - Haulage of spoil and fill - Stockpiling - Spoil areas - Site establishment utility - Service relocations - Earthworks - Drainage works	ERSED issues from cuts / batters / stockpiles.	Likelihood – 3 Consequence – 2 Risk – 8 (Moderate)	- Offsite spoil movements to be monitored and tracked on the site waste disposal register to ensure spoil movements meet EPA guidelines, including characterisation of the spoil to determine correct disposal locations and volumes. - Spoil to be beneficially reused, on or off site, where applicable and meeting environmental requirements. Includes reuse of excavated material, either as fill, or as earth mounds for noise control, or beautification, shielding or revegetation mounds on site. - All loads accessing public roads to be covered to prevent any loss of material, which may cause driver safety issues. - Only locate stockpiles in accordance with criteria in CEMP/SWMP - Classify and dispose of any contaminated land in accordance with EPA guidelines. - The locations of all heavy vehicles used for spoil haulage must be monitored in real time and the records of monitoring be made available electronically to the Planning Secretary and the EPA upon request for a period of no less than one year following the completion of construction	Likelihood – 3 Consequence – 1 Risk – 3 (Low)	SWMP EWMS and Work Packs AQMP CEMP Contaminated Land Management Procedure
		Sensitive area damage from stockpiling.	Likelihood – 3 Consequence – 1 Risk – 3 (Low)		Likelihood – 2 Consequence – 1 Risk – 2 (Low)	
		Contaminated land.	Likelihood – 3 Consequence – 3 Risk – 13 (High)		Likelihood – 2 Consequence – 2 Risk – 7 (Low)	
Waste Management	Generation of all waste during construction activities including office	Excessive waste being directed to landfill.	Likelihood – 3 Consequence – 1 Risk – 3 (Low)	- Apply waste hierarchy principles – avoid-reduce-reuse-recycle. - Waste materials contained in waste bins or other suitable containers, and collected for recycling, reuse or disposal by the licensed waste contractor.	Likelihood – 2 Consequence – 1 Risk – 2 (Low)	Waste and Resource Management Plan (WRMP) Sustainability Management Plan

Issue	Construction activity/aspect	Potential Impact	Risk (prior to mitigation)	Indicative mitigation measures	Risk (following mitigation)	Management Documents / Training Required
	waste, building materials, excess unsuitable spoil material, vegetation material.	Incorrect disposal of contaminated waste.	Likelihood – 3 Consequence – 4 Risk – 19 Very High	- Separate, contain, manage and dispose contaminated waste to prevent migration and further contamination whilst maintaining compliance with EPA requirements. - Label and store all liquid waste containers in a bunded area prior to removal off-site. - Undertake inspections of the worksite and waste storage areas to ensure litter / debris is regularly cleaned up and contained on site. - Establish recycling system early on in Project. - Establish good segregation areas for concrete and waste concrete is not to be transported off site for land disposal. - Section 143 Notices Under the POEO Act and provision of a letter to landholder highlighting the need for a “s.143 Notice”, the Contractor’s role and the respective roles of the TfNSW and the landholder in ensuring that the waste is appropriately managed. - Consider types of waste, how each waste type will be used as a beneficial use and address in the approvals that no other type of waste will be used. - Waste disposal tracking and/or permit system - Undertake waste audits	Likelihood – 2 Consequence – 2 Risk – 7 (Low)	(SMP) Waste Register EPL
		Meeting POEO Act requirements for VENM, ENM, Recovered Aggregate, Reclaimed Asphalt pavement and mulch	Likelihood – 3 Consequence – 3 Risk – 13 (High)		Likelihood – 2 Consequence – 2 Risk – 7 (Low)	
Traffic and transport	- Haulage of material. - Import of material / plant / equipment. - Travel to / from site. - Loss of street parking	Accidents - Safety of commuters, pedestrians, cyclists, contractors and subcontractors.	Likelihood – 4 Consequence – 4 Risk – 20 (Very High)	- Include bicycle groups and bicycle delivery companies into consultation strategy - Technical and safety management via Traffic Management documentation: -Traffic Staging Drawings -Road Occupancy Licenses/applications -Vehicle Movement Plans -Traffic Guidance Schemes (TGS) (previously known as Traffic Control Plans) - Where additional access routes are required, these will aim to: - Avoid sensitive areas including schools, aged care facilities and child care facilities - Minimise impacts on residents - Return construction vehicles to major arterial roads as quickly as possible. - Any additional local road access will require DPE approval (reference E132) - Undertake before and after dilapidation surveys on local roads - All vehicles carrying materials are to be covered or otherwise adequately secured to prevent any loss of material, which may cause driver safety issues. - Toolbox workforce and driver education on communication of approved access routes and requirements - Implement Chain of Responsibility requirements (legislation)	Likelihood – 3 Consequence – 3 Risk – 13 (High)	Traffic Management Plan (TMP) Traffic Transport and Access Management Plan (TTAMP) EWMS Project induction Toolbox talks CPAS
		Noise Vibrations and Dust nuisance to residents on haul routes	Likelihood – 4 Consequence – 4 Risk – 20 (Very High)		Likelihood – 3 Consequence – 3 Risk – 13 (High)	
		Unapproved use of local roads	Likelihood – 4 Consequence – 4 Risk – 20 (Very High)		Likelihood – 3 Consequence – 3 Risk – 13 (High)	

Issue	Construction activity/aspect	Potential Impact	Risk (prior to mitigation)	Indicative mitigation measures	Risk (following mitigation)	Management Documents / Training Required
		Closures or detours of roads, cycleways and footpaths/active transport causing disruption and delay	Likelihood – 4 Consequence – 3 Risk – 17 (Very High)	• Utilise Traffic Control Devices (TCD) to promote orderly traffic flow, regulate traffic (assign right of way, and indicate regulations in force), warn road users of hazards or regulatory controls ahead and guide traffic (e.g. guide signs to inform road users of directions to destinations, identify routes, and pavement markings to guide the travel path of vehicles) • Stage works to limit road occupancy and minimise potential impacts, and obtain all approvals with concurrence of the relevant road authority • maintain pedestrian and cyclist connectivity, utilising detours where all other options are exhausted design sites to improve the safety or amenity of pedestrians including where heavy vehicles are entering and exiting construction support sites • changes to pedestrian and bicycle connectivity will be signposted on location and communicated to local stakeholders prior to implementation • incorporate the following measures as part of the TMPs, to minimise impacts on mobility impaired pedestrians: - Clearly define temporary footpath or bicycle lane/path arrangements by using appropriate signage - Maintain sufficient space for wheelchair access - Maintain a smooth, even surface on all temporary footpaths and crossings - Conduct regular inspections to maintain footpaths free of trip hazards - When changing footpath access, minimise grades for wheelchair use • Adopt Disability Discrimination Act 1992 requirements for kerb ramps and bus stop locations. • notifications and consultation with road users. Communicate changes with groups such as cycling groups and delivery rider companies about the changes • Implement measures described in the Construction Parking and Access Strategy (CPAS) for minimising construction worker parking impacts.	Likelihood – 3 Consequence – 3 Risk – 13 (High)	
		Property access impacts	Likelihood – 4 Consequence – 3 Risk – 17 (Very High)	• Access to all utilities and properties will be maintained during construction, where practicable, unless otherwise agreed with the relevant utility owner, landowner or occupier • Where disruption cannot be minimised, alternative pedestrian and vehicular access, and parking arrangements must be developed in consultation with affected businesses, landowners and / or occupiers and implemented prior to the disruption • Adequate signage and directions to businesses must be provided prior to, and for the duration of, any disruption • Any property or utility access physically affected by the Project must be reinstated to at least an equivalent standard, unless otherwise agreed by the landowner or occupier	Likelihood – 3 Consequence – 3 Risk – 13 (High)	
		Public transport disruptions	Likelihood – 4 Consequence – 3 Risk – 17 (Very High)	• Where adjustments to bus stops within the construction works area are required, disruption to bus customers will be minimised by relocating the bus stops to a location within 400 metres walking distance of the existing stop • Advance notification will be provided to affected bus customers of the changes to stopping sequences and location of bus stops • Wayfinding signage must be provided directing commuters to adjacent or relocated bus stops. • Footpaths and (where required) road crossing facilities must be provided to any relocated bus stops such that accessibility and safety standards are achieved • Relocated bus stops will be functioning before affected bus stops are temporarily closed	Likelihood – 3 Consequence – 3 Risk – 13 (High)	

Issue	Construction activity/aspect	Potential Impact	Risk (prior to mitigation)	Indicative mitigation measures	Risk (following mitigation)	Management Documents / Training Required
Visual Impact, Landscaping, and Rehabilitation	- Cuttings and cut finishes. - Bridge design - Revegetation / landscaping. - Removal of visually prominent native vegetation. - Evening / night works. - Operation of ancillary facilities	General public aesthetic impacts	Likelihood – 3 Consequence – 1 Risk – 3 (Low)	- Landscape and rehabilitation plan including extensive seeding planting in required areas will be developed and implemented. - Landscape treatments will incorporate the surrounding landscape types and vegetation patterns and address view scapes. - Embankments and cuttings will be stabilised using appropriate landscape treatments. - The use of night-lighting will be minimised where possible during the construction phase and directed away from residential areas. - Site compounds and areas surrounding them will be kept tidy and be regularly cleaned and maintained. - Undertake landscaping and revegetation works in accordance with the approved Place Design and Landscape Plan.	Likelihood – 2 Consequence – 1 Risk – 2 (Low)	Place Design and Landscape Plan (PDMP) FFMP
		Heritage related visual	Likelihood – 2 Consequence – 2 Risk – 7 (Low)		Likelihood – 1 Consequence – 2 Risk – 6 (Low)	
Contamination	- Discovery of contaminated soils/ asbestos - Management of known contamination	Contamination of land and /or waterways from spills/ asbestos/ land contamination/ discharges	Likelihood – 4 Consequence – 3 Risk – 17 (Very High)	- Implement unexpected finds contamination management measures - Undertake Detailed Site Investigations to determine location and extent of contamination - manage contamination as per Contaminated Land MP - remediate sites if required following specialist advice - EPL licensed water discharge locations and water quality criteria for WTPs - Prepare and implement a Spill Response Procedure - Appropriate storage of potentially hazardous materials away from water courses, in bunded areas of appropriate site to contain all stored - Minimise stockpiling and storage of potentially hazardous materials in flood prone areas. Flood prone areas to be identified in the Project's sensitive area plans - Ensure separation of different stockpile materials (e.g., contaminated vs non-contaminated)	Likelihood – 2 Consequence – 2 Risk – 7 (Low)	Contaminated Land Management Plan SSWMP EPA guidelines Detailed Site Investigations Remediation Action Plans Spill Response Procedure
Groundwater	Excavation (including tunnelling) below groundwater table.	Reduced groundwater recharge. Groundwater level changes and potential settlement Decrease in the groundwater baseflow to surface water features (creek or river gaining systems).	Likelihood – 3 Consequence – 4 Risk – 19 Very High	- Geotechnical model of representative geological and groundwater conditions to assess the cumulative predicted settlement, ground movement, stress redistribution, horizontal strain profiles and groundwater drawdown - Modelling of groundwater drawdown, tunnel inflows and saline water migration (using particle tracking) and preparation of an independently reviewed Groundwater Modelling Report - Monitoring of groundwater levels and quality during construction - Offer and carry out pre and post construction Condition Surveys at properties that take up the offer. - A geotechnical model of representative geological and groundwater conditions will be prepared to guide tunnel design and construction methodology - Implement GWMP & GMP - Implement an instrumentation and monitoring program to identify areas of ground movement/change.	Likelihood – 3 Consequence – 3 Risk – 13 (High)	Groundwater Management Plan (GWMP) Groundwater Monitoring Program (GMP). SSWMP EPL
	Surface construction activities	Change in groundwater quality due to the following: * Oil and fuel spills or leaks * Contaminant migration * Groundwater quality deterioration (blending of water types). * Saltwater intrusion. * Activation of acid sulfate soils.	Likelihood – 3 Consequence – 4 Risk – 19 Very High	- EPL licensed water discharge locations and water quality criteria for WTPs - Monitoring of groundwater levels and quality during construction - Site-specific trigger values for electrical conductivity (EC) will need to be developed using the pre-construction baseline data. - Spill response procedure to be implemented - correct storage of hazardous materials - Implement GWMP & GMP - Implement SSWMP	Likelihood – 3 Consequence – 3 Risk – 13 (High)	

Issue	Construction activity/aspect	Potential Impact	Risk (prior to mitigation)	Indicative mitigation measures	Risk (following mitigation)	Management Documents / Training Required
General Environmental Management	- Environmental management / supervision - Incident response	Poor environmental culture leading to poor environment outcomes. Non-compliance with CEMP, EPL, MCoA and legislative requirements.	Likelihood – 4 Consequence – 2 Risk – 9 (Moderate)	- Ensure all environmental personnel are trained in the CEMP and all associated documents. - Environment team diligence in including requirements from CEMP and procedures into EWMS and training. - Regular review of environmental management documents. - Regular environment team and ERG meetings. - Environmental Manager to be involved in design and construction meetings. - Training in environmental emergency response. - Ensure NCR process is followed. - Early consultation with regards to proposed upcoming works and approvals to be sought. - Implementation of high operating standards & in accordance with accepted industry standards.	Likelihood – 2 Consequence – 2 Risk – 7 (Low)	CEMP Procedures (in CEMP and sub-plans) TfNSW Incident Management procedures EWMS Compliance Tracking Program Internal / external audits ERG EPL
		Failure to follow requirements of strategies / procedures.	Likelihood – 4 Consequence – 2 Risk – 9 (Moderate)		Likelihood – 2 Consequence – 2 Risk – 7 (Low)	
		Failure to report environmental issues and incidents.	Likelihood – 4 Consequence – 2 Risk – 9 (Moderate)		Likelihood – 2 Consequence – 2 Risk – 7 (Low)	
		Inconsistent advice to construction personnel.	Likelihood – 4 Consequence – 2 Risk – 9 (Moderate)		Likelihood – 2 Consequence – 2 Risk – 7 (Low)	
		Inadequate response to environmental incident/emergency.	Likelihood – 3 Consequence – 2 Risk – 8 (Moderate)		Likelihood – 2 Consequence – 2 Risk – 7 (Low)	
Planning Approvals	Approvals/ Legislative Compliance	Lost opportunities to implement innovations leading to better environmental outcomes	Likelihood – 4 Consequence – 2 Risk – 9 (Moderate)	- Early consultation in preparing approvals and CEMP. - Ensure all environmental personnel are trained in the CEMP and all associated documents. - Environment team diligence in including requirements from CEMP and procedures into EWMS and training. - Regular review of environmental management documents. - Regular review of compliance with environmental management documents, MCoA etc. - Regular environment team and ERG meetings. - Early consultation with regards to proposed upcoming works and approvals to be sought.	Likelihood – 2 Consequence – 2 Risk – 7 (Low)	CEMP Compliance Tracking Program Internal / external audits ERG EPL
		Poor working relationships with regulators	Likelihood – 4 Consequence – 2 Risk – 9 (Moderate)		Likelihood – 2 Consequence – 2 Risk – 7 (Low)	
		Delays due to receipt of approvals (e.g. CEMP, Planning Modifications, Environment Assessments for Ancillary Facilities)	Likelihood – 4 Consequence – 2 Risk – 9 (Moderate)		Likelihood – 1 Consequence – 2 Risk – 6 (Low)	