

SITE ESTABLISHMENT MANAGEMENT PLAN

Rosehill Early Works

Sydney Metro West – Western Tunnelling Package

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The current document version number and date of revision are shown in the document footer. All changes made to the Management Plan during its implementation on a live project are to be recorded in the amendment tables below.

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A	21/12/2021	Early Works Submission	Approvals Manager	Project Director
B	20/05/2022	Revised draft for stakeholder consultation	Approvals Manager	Project Director
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Terms and Definitions

Term	Definition
AA	Acoustic Advisor
CEMF	Construction Environmental Management Framework
CSSI	Critical State Significant Infrastructure
DPE	Department of Planning and Environment (NSW)
EA	Environmental Advisor
ECM	Environmental Control Measures
EIS	Environmental Impact Statement
EM	Environmental Manager
EMS	Environmental Management System (Integrated Management System)
EPA	Environmental Protection Authority
EPL	Environmental Protection Licence
ER	Environmental Representative
ESR	Environmental Site Representative
EWMS	Environmental Work Method Statement
GLC	Gamuda Australia and Laing O'Rourke Consortium
MCoA	Minister's Conditions of Approval
MSF	Maintenance and Stabling Facility
SEMP	Site Establishment Management Plan
OOHW	Out Of Hours Work
PM	Project Manager
POEO	<i>Protection of the Environment Operations Act 1997 (NSW)</i>
REMMs	Revised Environmental Mitigation Measures
SM	Sydney Metro
WTP	Sydney Metro West Western Tunnelling Package Works

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1 INTRODUCTION

1.1 Context

This Site Establishment Management Plan (SEMP) has been developed for the Rosehill site, which forms part of the Clyde Maintenance and Stabling Facility (MSF). The SEMP has been developed as part of the delivery of the Sydney Metro West Western Tunnelling Package (WTP). It will be delivered by Gamuda Australia Laing O'Rourke Consortium (GLC).

Sydney Metro West – Westmead to the Bays Concept and Stage 1 received planning approval on 11 March 2021 (SSI 10038). The Project comprises of the western portion of Stage 1 of SSI 10038, from Sydney Olympic Park to Westmead. Following that approval, Sydney Metro submitted a request to modify Condition A39.1 under section 5.25 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The modification was approved by delegated authority of the former Minister for Planning and Public Spaces on 28 July 2021.

This SEMP has been developed to address the requirements of the Minister's Conditions of Approval (MCoA) (as modified), Revised Environmental Mitigation Measures (REMMs), Performance Outcomes (POs) and Construction Environmental Management Framework (CEMF) listed in the *Sydney Metro West – Concept and Stage 1 (major civil construction between Westmead and the Bays) Environmental Impact Statement* (the EIS) and the *Sydney Metro West Westmead to the Bays and Sydney CBD Submissions Report Concept and Stage 1* (Submissions Report) as amended by the *Sydney Metro West Westmead to the Bays and Sydney CBD Amendment Report Concept and Stage 1* (Amendment Report).

1.2 Background

Sydney Metro is Australia's biggest public transport program. Services between Rouse Hill and Chatswood started in May 2019 on this new stand-alone metro railway system, which is revolutionising the way Sydney travels. Sydney Metro's program of work includes the Metro North West Line, Sydney Metro City & Southwest, Sydney Metro West and Sydney Metro – Western Sydney Airport. Potential future extensions to Schofields / Tallawong in Rouse Hill in the north and to Macarthur in the south are under consideration and are being safeguarded.

The key components of the Sydney Metro West Project are expected to include:

- About 24 kilometres of twin tunnels between Westmead and the Sydney CBD
- New metro stations at Westmead, Parramatta, Sydney Olympic Park, North Strathfield, Burwood North, Five Dock, The Bays, Pyrmont and Hunter Street in the Sydney CBD
- A turn-up-and-go metro service operating from early morning to late at night, between Westmead and the Sydney CBD
- Pedestrian links and connections to other modes of transport (such as the existing suburban rail network and other parts of the metro network) and surrounding land uses
- Modifications to existing suburban stations and associated rail infrastructure (including overhead wiring, signalling, access tracks/paths and rail corridor fencing) at Westmead and North Strathfield
- Services within each of the metro stations, including mechanical and fresh air ventilation equipment and electrical power substations to supply power for operation
- A stabling and maintenance facility at Clyde, and associated aboveground and belowground tracks to connect to the mainline tunnels and other operational ancillary infrastructure

- Services facilities at Rosehill (within the Clyde Maintenance and Stabling Facility (MSF) construction site) and between Five Dock and The Bays for fresh air ventilation and emergency evacuation
- Alterations to pedestrian and traffic arrangements, and cycling and public transport (e.g. bus) infrastructure around the metro stations
- Subdivision of station sites to support integrated station and precinct developments, and ancillary facilities
- Ancillary facilities to support construction.

1.3 Project Description

1.3.1 Sydney Metro West – Stage 1

Stage 1 would involve major civil construction work between Westmead and The Bays including:

- Enabling works, such as demolition, utility supply to construction sites, utility adjustments and modifications to the existing transport network
- Tunnel excavation, including tunnel support activities
- Station excavation for new metro stations at Westmead, Parramatta, Sydney Olympic Park, North Strathfield, Burwood North, Five Dock and The Bays
- Shaft excavation for services facilities at Rosehill (within the Clyde MSF construction site) and at a location between Five Dock and The Bays (to be determined)
- Civil works for the stabling and maintenance facility at Clyde including earthworks and structures for crossings at A'Becketts Creek and Duck Creek
- A precast concrete segment manufacturing facility at Eastern Creek (subject to a separate SEMP)
- Excavation of a tunnel dive structure and associated tunnels at Rosehill to support a connection between the Clyde stabling and maintenance facility and the mainline metro tunnels.

1.3.2 Western Tunnelling Package

The WTP comprises the civil construction works between Westmead and Sydney Olympic Park including station excavation and tunnelling. It involves nine kilometres of twin railway tunnels between as well as:

- Westmead Station box excavation, including temporary support, stub tunnels, partially mined station cavern and crossover cavern including permanent lining and support
- Parramatta Station, including excavation of station box and associated support
- Clyde Maintenance and Stabling Facility (MSF), including permanent dive structure, portal, spur running tunnels, spur tunnel junction cavern, bulk earthworks, civil structures, utilities corridor, road crossing and creek diversion
- Rosehill Services Facility, including shaft excavation, permanent lining and lateral support
- A precast segment manufacturing facility at Eastern Creek
- Demolition and site clearance works
- Tunnelling between Sydney Olympic Park (SOP) and Westmead. Tunnelling will be undertaken by placing the tunnel boring machines (TBMs) at the Rosehill Services Facility box and retrieved out at the SOP Station Box and then placed back at the Rosehill Services Facility and

retrieved at the Westmead Station Box. No surface works are proposed at SOP except for the retrieval of the TBM.

1.3.3 Clyde Maintenance and Stabling Facility

The Clyde MSF construction site incorporates about 380,000m² of land between the M4 Motorway, James Ruse Drive and Rosehill Gardens Racecourse. This site would be used to:

- Construct the land formation for the maintenance and stabling facility
- Construct structures over A'Becketts Creek and Duck Creek, including creek realignment works
- Excavate the Rosehill services facility
- Excavate and construct the Rosehill dive structure and tunnel portal.

For the purposes of project delivery, the Clyde MSF has been split into four smaller sites including Clyde dive, Rosehill, MSF West and MSF East.

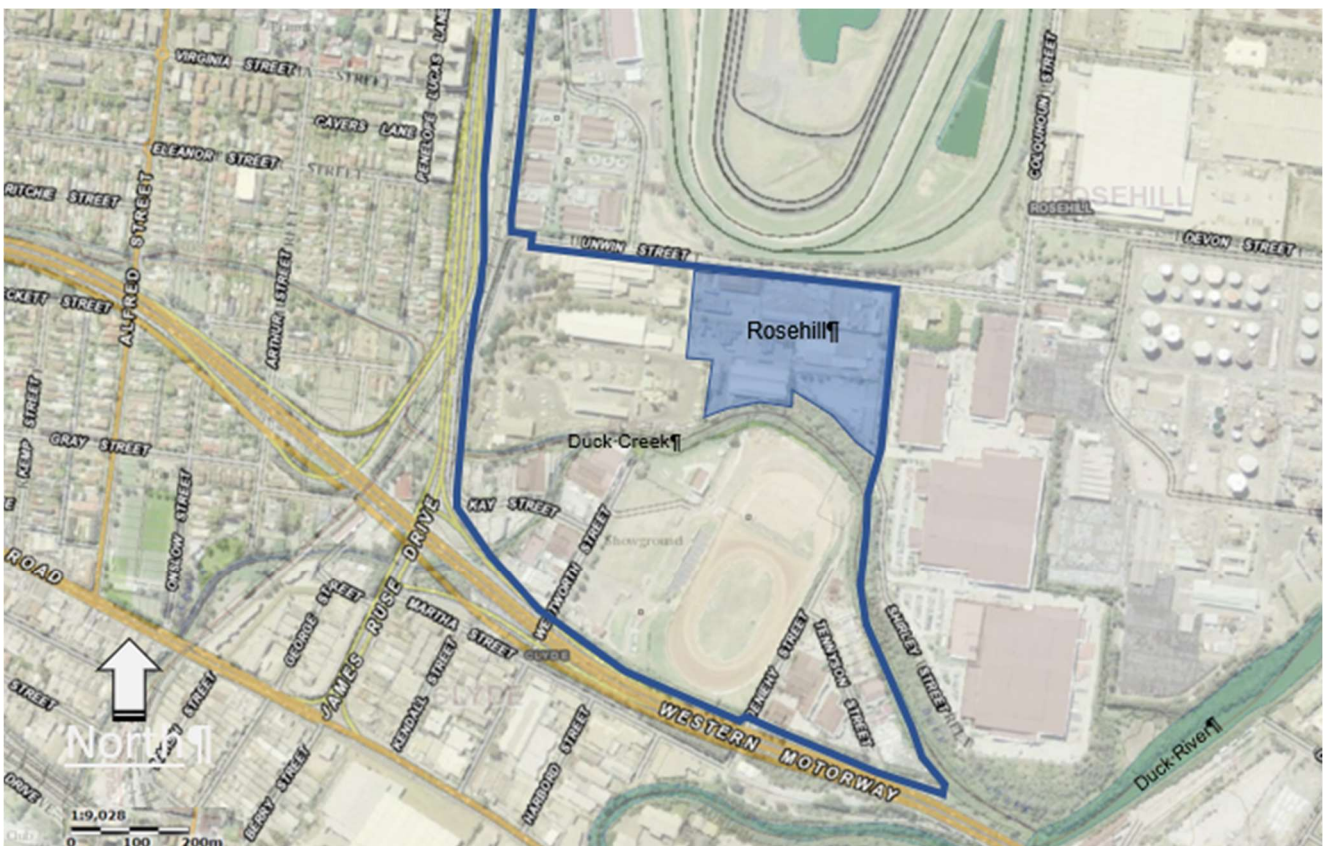


Figure 1: The Rosehill Site within the wider Clyde Maintenance and Stabling Facility construction site

1.3.4 Rosehill Site

The following scope is to be delivered in the Rosehill site within the Clyde MSF construction site:

- Shaft excavation for services facilities
- Lowering of the Tunnel Boring Machines for tunnelling to commence in either direction.

The scope of works for the Rosehill site, including ancillary facilities, is referred to as 'the Site' from this point forward in the document. This SEMP relates specifically to site establishment work at the Site.

The indicative construction layout for the Site is illustrated on Figure 2. Figure 2 outlines the work sought under this SEMP (Water treatment plant and bentonite farm construction).

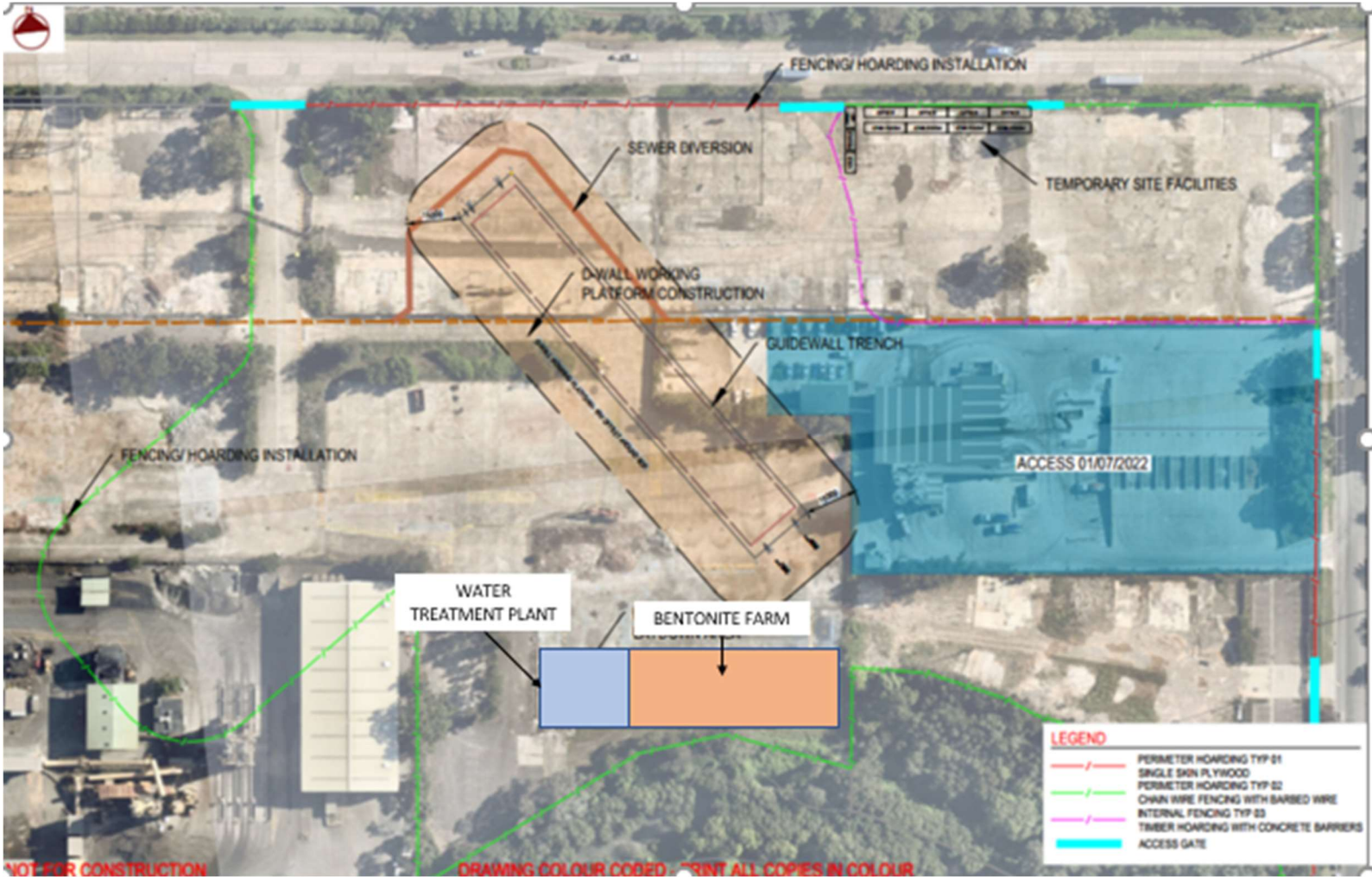


Figure 2: Rosehill Site

2 PURPOSE AND OBJECTIVES

2.1 Scope

This SEMP outlines the environmental mitigation and management measures that will be implemented during key activities required in establishment of the Site and its ancillary facilities. The key ancillary facilities to be established under this Plan include the:

- Water treatment plant (WTP) and
- Bentonite Farm

This SEMP is applicable to all activities required to establish the above facilities. All GLC staff and subcontractors are required to operate under the requirements of this SEMP, over the duration of the establishment works.

Unless specified, operation of the above ancillary facilities and operation of the Site during construction does not fall within the scope of this SEMP and is therefore not included within this SEMP. This will be managed under the project Construction Environmental Management Plan (CEMP). Any site establishment work detailed in this SEMP, which is underway at the time of CEMP approval, will then be undertaken in accordance with the CEMP.

2.2 Purpose

The purpose of this SEMP is to outline the environmental management practices and procedures to be followed during establishment of ancillary facilities. This SEMP meets the requirements of Conditions of Approval (CoA) A17 to prepare a Site Establishment Management Plan, to be determined by the Environment Representative (ER). Attachment 1 details how this SEMP meets the requirements of the CoA.

Details of site establishment works are summarised in Section 4. Potential environmental impacts and mitigation measures are summarised in Section 5 and Section 6.2.

2.3 Objectives

The objective of this plan is to ensure that the proposed activities will:

- Be delivered in accordance with the environmental requirements for the Project, as outlined in the relevant planning approvals, including the MCoA, REMMs and CEMF (Attachment 1)
- Meet the environmental performance outcomes of the Project (Table 2.2)
- Manage the risks identified in the risk assessment (Attachment 3).

These objectives, targets and key performance indicators for the Site are presented in Table 2.1.

Table 2.1: Objectives and Targets for the Site

Objective	Target	Key Performance Indicators
Compliance with the Minister for Planning's MCoA, as well as REMMs and conditions in the CEMF, as it applies to the Site	Full compliance	Compliance Reporting
Compliance – permits/licences	Full compliance	Compliance Reporting

Objective	Target	Key Performance Indicators
Implementation of performance outcomes (refer to Section 2.4), commitments and mitigation measures specified in planning approval documents.	Full compliance	Compliance Reporting
Engage with the community, minimise complaints and respond to complaints within defined timeframes	Provide timely and relevant information. Record and respond to complaints within the specified timeframe.	Audits Complaints records
Minimise environmental risk and respond to emerging environmental hazards throughout project delivery	All actions raised during inspections and audits are closed out within proposed timeframes	Inspection and audit reports
Effective site environmental controls	Set-up prior to starting work in the affected area. Maintain effective controls.	Weekly inspection checklists and daily environmental surveillance (informal inspection)
Promote a culture of innovation and continuous improvement of environmental management.	Training program implemented and learnings shared amongst the team	Toolbox talks Lessons Learned Inspection / audit reports Training logs
Demonstrate commitment to environmental objectives	80% leadership attendance rate at environmental inspections 80% actual vs. planned attendance at environmental awareness training (excluding toolbox talks / inductions)	Inspection Reports Training logs

2.4 Environmental Performance Outcomes

Table 2.2 outlines the Environmental Performance Outcomes (EPOs) which would be relevant to the activities covered by this SEMP. These EPOs have been derived from the EPOs detailed in Chapter 8 of the EIS.

Table 2.2: Environmental Performance Outcomes relevant this SEMP.

No.	Performance Outcome	Reference	How addressed
1	<p>Transport and Traffic</p> <ul style="list-style-type: none"> ● Safe access and egress is provided to and from construction sites. ● The use of local roads by heavy vehicles is minimised ● Loss of on-street parking and loading zones is minimised ● Construction traffic and transport impacts on special events are minimised ● Safe access to properties is maintained 	Attachment 2	Implement the environmental mitigation and management measures MMTT1 – MMTT2 as applicable to the site establishment works

No.	Performance Outcome	Reference	How addressed
	<ul style="list-style-type: none"> • Safer routes for pedestrians and cyclists are provided around construction sites. 		
2	<p>Noise and vibration</p> <ul style="list-style-type: none"> • Impacts on local communities are minimised by controlling noise and vibration at the source, on the source to receiver path and at the receiver • Structural damage to buildings and heritage items from construction vibration is avoided 	Attachment 2	Implement the environmental mitigation and management measures MMNV1 – MMNV9 as applicable to the site establishment works
3	<p>Non-Aboriginal heritage</p> <ul style="list-style-type: none"> • Impacts to non-Aboriginal heritage items and archaeology are avoided or minimised where feasible and reasonable • Accidental impacts to heritage items are avoided 	Attachment 2	Implement the environmental mitigation and management measures MMAH1 – MMNV3 as applicable to the site establishment works
4	<p>Aboriginal heritage</p> <ul style="list-style-type: none"> • Impacts on areas of moderate or higher archaeological potential and significance are avoided or minimised, where feasible and reasonable • Accidental impacts to heritage items are avoided 	Attachment 2	Implement the environmental mitigation and management measures MMAH1 – MMNV3 as applicable to the site establishment works
6	<p>Landscape character and visual amenity</p> <ul style="list-style-type: none"> • No net loss of tree numbers and tree canopy • Establish and operate ancillary facilities to minimise adverse impacts on the visual amenity of the local community 	Attachment 2	Implement the environmental mitigation and management measures MMLC1 – MMLC5 as applicable to the site establishment works
7	<p>Business</p> <ul style="list-style-type: none"> • Affected businesses are communicated with in a clear and timely manner to reduce disruption and address concerns • Access to businesses for employees and customers is maintained • Potential impacts to businesses are minimised. 	Attachment 2	Implement the environmental mitigation and management measures MMSB1 – MMSB2 as applicable to the site establishment works
8	<p>Social</p> <ul style="list-style-type: none"> • Negative impacts on customers and the community (including transport services, amenity, noise and vibration, water management and air quality) are minimised • Affected communities are communicated with in a clear and timely manner to enhance community benefits, reduce disruption and address community concerns. 	Attachment 2	Implement the environmental mitigation and management measures MMSB1 – MMSB2 as applicable to the site establishment works

No.	Performance Outcome	Reference	How addressed
10	Soil and water quality <ul style="list-style-type: none"> • Pollution of surface water is minimised through the implementation of appropriate erosion and sediment controls • Existing water quality of receiving surface watercourses is maintained • Impacts on aquatic environments from the disturbance of acid sulfate soils are avoided. • The discharge water quality requirements outlined in applicable environment protection licence(s) are met 	Attachment 2	Implement the environmental mitigation and management measures MMSW1 – MMSW6 as applicable to the site establishment works
11	Contamination <ul style="list-style-type: none"> • Contamination risks to human health and ecological receivers are minimised through effective management of existing contaminated land 	Attachment 2	Implement the environmental mitigation and management measures MMC1– MMC3 as applicable to the site establishment works
12	Hydrology and flooding <ul style="list-style-type: none"> • Dedicated evacuation routes are not impacted in flood events up to and including the probable maximum flood 	Attachment 2	Implement the environmental mitigation and management measures MMHF1 – MMHF2 as applicable to the site establishment works
13	Biodiversity <ul style="list-style-type: none"> • Impacts on biodiversity are avoided (where possible) and minimised • Biodiversity impacts are offset in accordance with the Biodiversity Conservation Act 2016 	Attachment 2	Implement the environmental mitigation and management measures MMB1 – MMB8 as applicable to the site establishment works
14	Air quality <ul style="list-style-type: none"> • Minimise air quality impacts during site establishment works 	Attachment 2	Implement the environmental mitigation and management measures MMAQ1 – MMAQ13 as applicable to the site establishment works
15	Spoil, waste management and resource use <ul style="list-style-type: none"> • 100 per cent of useable spoil is reused in accordance with the spoil reuse Hierarchy • Products made from recycled content are prioritised • A minimum 95 per cent recycling target is achieved for construction and demolition waste • The use of potable water for non-potable purposes is avoided if non-potable water is available 	Attachment 2	Implement the environmental mitigation and management measures MMSR1 – MMSR8 as applicable to the site establishment works

No.	Performance Outcome	Reference	How addressed
	<ul style="list-style-type: none">The reuse of water is maximised, either on site or off site.		
16	Hazards <ul style="list-style-type: none">Dangerous goods are to be transported, stored and used so as to not cause a hazardous event	Attachment 2	Implement the environmental mitigation and management measures MMH1 – MMH4 as applicable to the site establishment works

3 ENVIRONMENTAL REQUIREMENTS

3.1 Relevant Legislation

Legislation relevant to the management of the Site includes:

- *Aboriginal and Torres Strait Islander Heritage Protection Act 1984*
- *Biodiversity Conservation Act 2016*
- *Biosecurity Act 2015 (general duty to prevent, eliminate or minimise any biosecurity risk posed)*
- *Biosecurity Regulation 2017*
- *Contaminated Land Management Act 1997* (duty to notify the NSW Environment Protection Authority (EPA) in relation to the contamination of land (if contaminated material is found), the EIS also notes that the Clyde stabling, and maintenance facility site has a moderate potential contamination risk).
- *Construction Work Code of Practice 2012*
- *Dangerous Goods (Road and Rail Transport) Act 2008*
- *Environmentally Hazardous Chemicals Act 1985*
- *Environmental Planning and Assessment Act 1979*
- *Environment Protection Biodiversity Conservation Act 1999 (Cth)*
- *Fisheries Management Act 1994*
- *Heritage Act 1977* (notification of discovery of relic under s146)
- *Marine Pollution Act 2012*
- *National Greenhouse and Energy Reporting Act 2007 (Cth)*
- *National Parks and Wildlife Act 1974* (Unexpected finds of Aboriginal heritage items)
- *Pesticides Act 1999*
- *Protection of the Environment Operations Act 1997 (POEO Act)*
- *Protection of the Environment Operations (Clean Air) Regulation 2021*
- *Protection of the Environment Operations (Waste) Regulation 2014*
- *Roads Act 1993*
- *Sydney Water Act 1994*
- *Sydney Water Regulation 1994*
- *Waste Avoidance and Resource Recovery Act 1997*
- *Water Management Act 2000*
- *Work Health and Safety Act 2011*

3.2 Guidelines and Standards

Guidelines and standards relevant to the Site includes:

- *Assessing Vibration: A Technical Guideline (DEC 2006)*
- *Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997 (NSW EPA, 2015)*
- *ISO14001 Environmental Management System – Requirements with Guidelines for Use (2004)*
- *NSW Industrial Noise Policy (INP) (EPA 2000)*
- *NSW Interim Construction Noise Guideline (ICNG), (Department of Environment and Climate Change 2009)*
- *Managing Urban Stormwater: Soils and Construction. Volume 1: 'Blue Book', (Landcom 2004)*

- Sydney Metro Construction Noise and Vibration Standard (Sydney Metro 2020)
- Sydney Metro Construction Traffic Management Framework
- Transport for NSW's Air Quality Management Guidelines (9TP-SD-107/3.0) (TfNSW 2016)
- Transport for NSW's Chemical Storage and Spill Response Guidelines (9TP-SD-066) (TfNSW 2015)
- Transport for NSW's Construction Noise and Vibration Strategy (7TP-ST-157) (TfNSW 2018)
- Transport for NSW's Guide to Environmental Control Map (3TP-SD-015/8.0).
- Transport for NSW's Unexpected Heritage Items (Heritage Procedure 02) (TfNSW 2015)
- Transport for NSW's Environmental Incident Classification and Reporting Procedure (TfNSW 2016).

3.3 Conditions of Approval

A comprehensive list of MCoAs and REMMs that apply to the activities covered by this SEMP are included at Attachment 1.

3.4 Additional Approvals, Licenses, Permits and Requirements

An Environmental Protection License (EPL) will be obtained for the Project as the works will trigger a scheduled activity listed in Schedule 1 of the POEO Act. This licence will include premise boundaries that will incorporate ancillary facilities, including the site establishment works at the sites as required. Other requirements for site establishment works may include the following:

- Road Occupancy Licenses and associated Traffic Control Plans (TCPs)/Vehicle Movement Plans (VMPs). Out of hours deliveries have been addressed within LIW application 7 & 8 and will continue for the duration of the low impact work
- Utilities agreements. Utility relocations, have been addressed within LIW application 7 & 8.

4 SITE ESTABLISHMENT WORKS

4.1 Ancillary Facilities

The proposed ancillary facilities at Rosehill would primarily be required to facilitate, water treatment and management, and the operation of drilling equipment which require bentonite.

Temporary site facilities will incorporate:

- Energy efficient lighting schemes and light emitting diode (LED) light fittings with effective lighting control to eliminate the energy consumption from lighting during inactive periods; [SM-W-WTP-PS-505]
- Plug-in electrical equipment which complies with the requirements of the Equipment Energy Efficiency Program (E3) “Minimum Energy Performance Standards” and has at least a five star Energy Rating Label; [SM-W-WTP-PS-506]
- High performance thermal insulation in all walls (R2.0), ceilings (R3.0) and floors that optimise thermal performance; [SM-W-WTP-PS-507]
- Natural daylighting; [SM-W-WTP-PS-508]
- Natural ventilation; [SM-W-WTP-PS-509]
- Rainwater harvesting; [SM-W-WTP-PS-510]
- Water efficient fixtures, fittings and controls; [SM-W-WTP-PS-511]
- Air conditioning refrigerants with low or zero global warming potential; and [SM-W-WTP-PS-512]
- Crime prevention through environmental design principles. [SM-W-WTP-PS-513]
- Occupancy based controls for air-conditioning units to eliminate operation when the facility is not occupied; [SM-W-WTP-PS-2989]
- Low volatile organic compounds (VOC) paints, adhesives, sealants and carpets where applicable; [SM-W-WTP-PS-2990]
- The use of Forest Stewardship Council (FSC) or Programme for the Endorsement of Forest Certification (PEFC) certified timber; [SM-W-WTP-PS-2991]
- The use of door-closers on all external doors as well as weather seals at all doors and windows (to air-conditioned spaces).

4.2 Site Establishment Activities

The site establishment works for the Site are detailed in Table 4.1, which outlines the activities included in this SEMP, as well as activities approved under a Low Impact Works application.

Table 4.1: Site Establishment Works

Activity	Site Establishment Works	Approval Pathway
Low impact works	<ul style="list-style-type: none"> • Initial investigation works • Vegetation clearing and grubbing • Protecting and/or relocating utilities • Sewer relocation • High voltage work • Establishment of site facilities and equipment store • Guide wall preparation • D-wall working platform construction 	Low Impact Work Approval (LIW02, LIW07 & LIW08)

Activity	Site Establishment Works	Approval Pathway
	<ul style="list-style-type: none"> Environmental controls, including establishment of truck wheel wash or rumble grid 	
Site establishment works	<ul style="list-style-type: none"> Establish water treatment plant Establish bentonite farm 	This SEMP

Proposed activities which would be undertaken as part of this SEMP are detailed within Table 4.3. Activities are proposed to commence from late May 2022. The indicative schedule for these activities is illustrated in Table 4.2.

Table 4.2: Indicative schedule

Activity	Start	Finish
Establishing WTP	13/06/22	24/06/22
Establish Bentonite Farm	6/06/22	15/07/22

Installation of ancillary facilities will be undertaken in accordance with this SEMP. The SEMP will be submitted to the Environment Representative (ER) for endorsement at least one month prior to the proposed establishment activities in accordance with MCoA A19.

Additional activities to be undertaken prior to the commencement of construction at the Site may include activities defined as 'Low Impact Work' and approved to commence under a Low Impact Works Approval. These activities may include but not be limited to:

- Dilapidation survey
- Detailed site investigations
- Potholing for services and utilities
- Minor clearing and grubbing
- Installation of environmental controls
- Additional property adjustments required to make the site safe and secure upon handover to GLC, the Principal Contractor.
- Utility relocations determined as having minor impact by the ER
- Establishing site compound and ancillary facilities such as offices, amenities, and workshops
- Site security measures and initial site office and ablution facilities, to be utilised for initial establishment works.

Alterations to any utilities and services will be determined by negotiation with the affected service providers. Disruption to services resulting from site establishment will be avoided, wherever possible, and advised to customers where it is not possible.

Table 4.3: Site Establishment Activities

Activity	Description	Indicative Plant	Approximate Duration
Establishing Water Treatment Plant	<ul style="list-style-type: none"> Footprint of the Water Treatment Plant will be around 475m² pending final vendor sizing The Water Treatment Plant structure will be constructed on the existing hardstand. Work will include the addition of a concrete bund around the footprint of the WTP The WTP would not be operated until construction has commenced with approval of the Project CEMP, and in accordance with the Project Environmental Protection Licence 	<ul style="list-style-type: none"> 20T franna crane 20T excavator with hammer and bucket Concrete pump Electric hand tools Concrete agitator truck Concrete pencil vibrator Delivery trucks 	2 weeks
Establishing Bentonite Farm	<ul style="list-style-type: none"> Footprint of the bentonite farm will be approximately 1200m² The bentonite farm will be constructed on an existing hardstand. Preparation of the existing hardstand will include excavation and construction of a sump within the footprint of the bentonite farm This bentonite farm would not be operated until construction has commenced with approval of the Project CEMP 	<ul style="list-style-type: none"> 20T franna crane 20T excavator with hammer and bucket Concrete pump Concrete saw Electric hand tools Concrete agitator truck Concrete pencil vibrator 80 t crawler crane (assembly) Delivery trucks 	6 weeks

4.3 Construction Hours

Standard construction hours for site establishment works as set in MCoA D35 and D36 are as follows:

- 7:00am to 6:00pm Mondays to Fridays, inclusive
- 8:00am to 6:00pm Saturdays
- At no time on Sundays or public holidays.

Activities that result in high noise impacts will be subject to respite periods as outlined in MCoA D36, which states:

Except as permitted by an EPL, highly noise intensive works that results in an exceedance of the applicable NML at the same receiver must only be undertaken:

(a) between the hours of 8:00 am to 6:00 pm Monday to Friday;

(b) between the hours of 8:00 am to 1:00 pm Saturday; and

(c) if continuously, then not exceeding three (3) hours, with a minimum cessation of work of not less than one (1) hour.

For the purposes of this condition, ‘continuously’ includes any period during which there is less than one (1) hour between ceasing and recommencing any of the work.

Out of hours deliveries have been addressed within LIW 7 & 8. Out of hours deliveries will continue under LIW 7 & 8 and do not form part of this SEMP.

5 ENVIRONMENTAL ASPECTS AND POTENTIAL IMPACTS

5.1 Traffic and Transport

Chapter 10 of the EIS assessed potential traffic and transport impacts, which are discussed in the sections below.

Potential traffic and transport impacts will be managed in accordance with MCoA A21, A47, D83, D90, D94, D95, D98, D103, REMMs TT1 – TT4, TT6, TT7, TT10, TT18, CEMF requirements 3.7a, 3.8b, 5.3a, as well as the mitigation and management measures listed in Attachment 2.

5.1.1 Existing Traffic Conditions

The Site is located in an industrial area of western Sydney and is bounded by the Duck Creek to the south, Unwin Street to the north and Shirley Street/ Deniehy Street to the east. Key roads to be used during site establishment works include Wentworth Street, Kay Street, Unwin Street and Shirley Street.

Wentworth Street is a local road under the care and control of the City of Parramatta Council. Traffic signals are located at the intersection of Wentworth Street and Parramatta Road. These signals allow for all movements. Signalised pedestrian crossings are provided across Wentworth Street and on the northern approach on Parramatta Road. A left turn arrow hold is provided for east to north movements providing protection for the Wentworth Street signalised crossing. Parking is typically unrestricted along Wentworth Street with a small section of No Parking provided on the eastern side of Wentworth Street leading towards the signals on Parramatta Road

Kay Street is a local road under the care and control of the City of Parramatta Council. It starts at Wentworth Street and ceases at Unwin Street. Kay Street runs in an east west direction. The speed limit is 50km/hr. There is no public transport operating along Kay Street. Parking is typically unrestricted. Footpaths are provided on both sides of the street.

Unwin Street is a local road under the care and control of the City of Parramatta council. The existing speed limit is 50km/hr. No public transport operates along Unwin Street. Parking is restricted on the western side of Unwin Street between Kay Street and Unwin Street between the hours of 630AM-430PM Monday to Friday. There is a small section of 30-minute parking on the southern side of Unwin Street opposite the Rosehill Gardens entry to the stables. Outside of these two locations, parking is generally unrestricted.

Shirley Street is a local road under the care and control of the City of Parramatta Council. The speed limit is 50km/hr. Parking is generally unrestricted; however, No Stopping is installed south of the Hytec gate, approximately 65m south of the Unwin Street kerb on the western side

5.1.2 Site Access and Parking

In accordance with MCoA D88, a road dilapidation report will be prepared by a suitably qualified person for local roads (and associated infrastructure within the road reserve) which would be used by heavy vehicles prior to works commencing.

Vehicle access to and from the construction site will be managed to maintain pedestrian, cyclists, and motorist safety. At the Site, where existing footpaths are in place, pedestrian management will be established to safely facilitate heavy vehicle movements. The Site will be accessed via existing

driveways. The Unwin Street driveway is located approximately 60m west of Shirley Street intersection.

Access to the Site will be split across two dates, one in May 2022 and July 2022. This SEMP only covers the works needed to enable the site setup within the first stage of handover, which is in late May 2022.

To minimise any impacts to on-street parking by workers, designated onsite worker parking will be available at the Site. Impacts will be minimised through construction traffic management measures until specific parking facilities are established.

5.1.3 Haulage Routes

Generally, the heavy vehicle routes will be via arterial roads, freeways and tollways. Where possible, the routes have considered the requirements of the EIS. The EIS identified Wentworth Street as the access route for the Site. The EIS does not identify heavy vehicle routes north of the M4 Motorway overpass, refer to Figure 3.

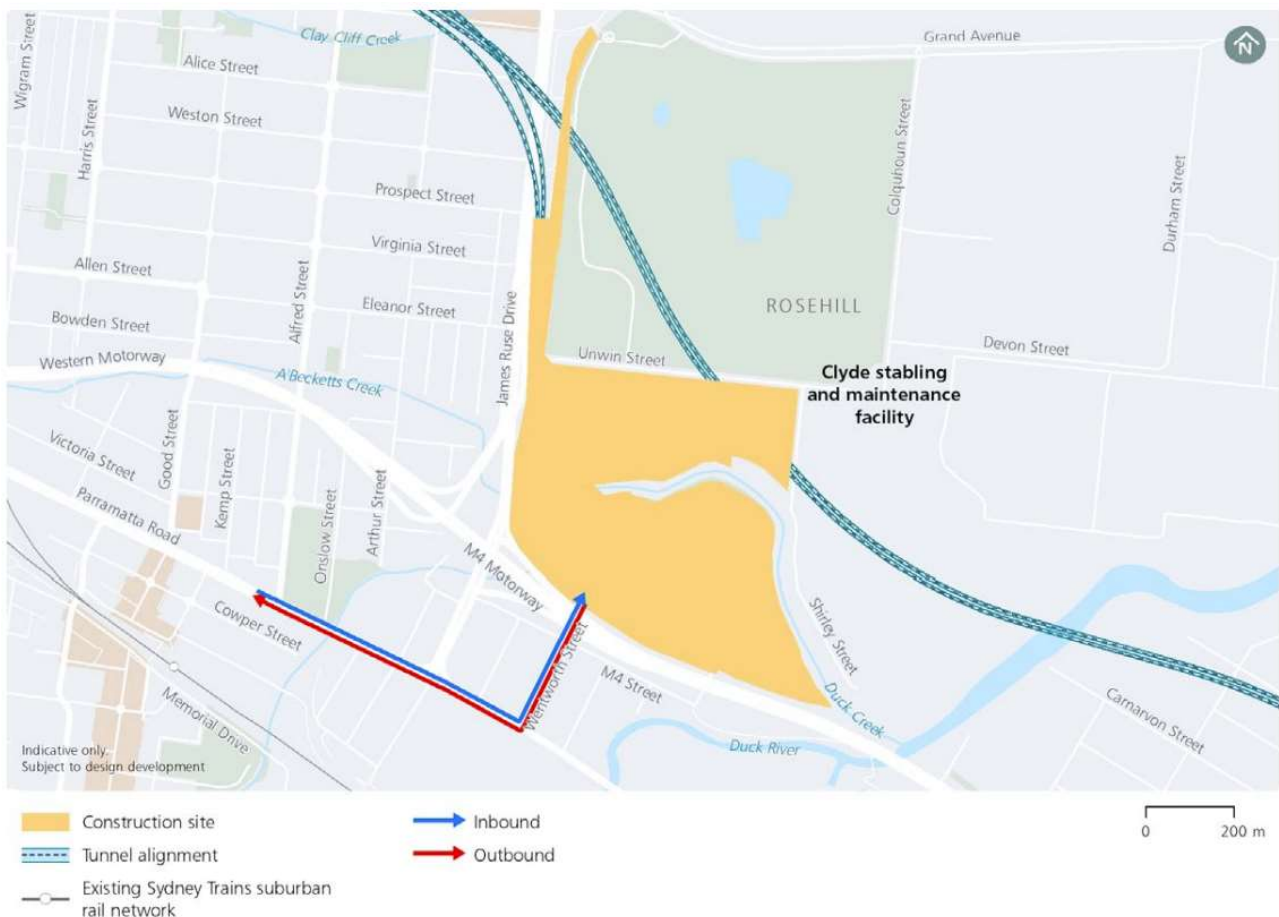


Figure 3: EIS nominated heavy vehicle routes

The roads to be used to access the Rosehill Site, not captured in the EIS have been identified in the Clyde Rosehill Site Establishment Construction Traffic Management Plan, as per .

Table 5.1 below. All streets have appropriate two-way traffic flow with a speed limit of 50km/hr.

Table 5.1: Other roads to be used (not in the EIS) (see Figure 1 for road locations)

Road name	between	Classification
Wentworth Street	M4 overpass - Kay Street	Local
Wentworth Street	Kay Street – Duck Creek	Local (to be subsumed within the Clyde MSF site)
Kay Street	Wentworth Street – Unwin Street	Local
Unwin Street	Kay Street – Shirley Street	Local
Shirley Street	Unwin Street - Duck Creek	Local
Martha Street	Wentworth Street – Deniehy Street	Local
Deniehy Street	Martha Street – end of road	Local (to be subsumed within the Clyde MSF site)
Tennyson Street	Deniehy Street – end of road	Local (to be subsumed within the Clyde MSF site)

Materials will be removed from the Site using spoil haulage vehicles and light vehicles, where applicable, and taken to authorised disposal sites around Sydney.

5.1.4 Vehicle Movements

The EIS noted that the site establishment works would have distinct peak travel periods for light vehicles. These peak travel periods would typically occur prior to, and post, the standard

construction hours, as detailed in Figure 4. Light vehicle numbers would be fairly constant over the work day.

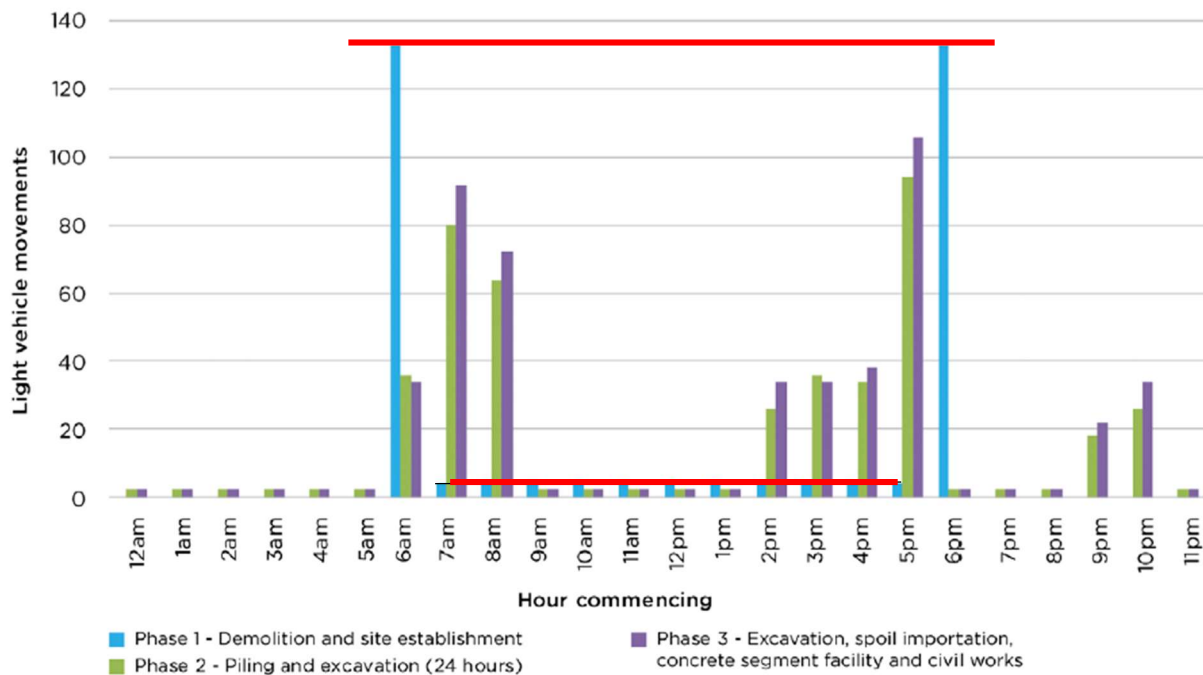


Figure 10-13: Hourly light vehicle movements at the Clyde stabling and maintenance facility construction site
 Note: Movement means a one way movement. A truck entering and then leaving a work site represents 2 movements.

Figure 4: EIS Hourly light vehicle movements (source: EIS Chapter 10 page 10-13)

For heavy vehicle movements, the EIS predicted movements were evenly spread over the course of the work day, refer to Figure 5.

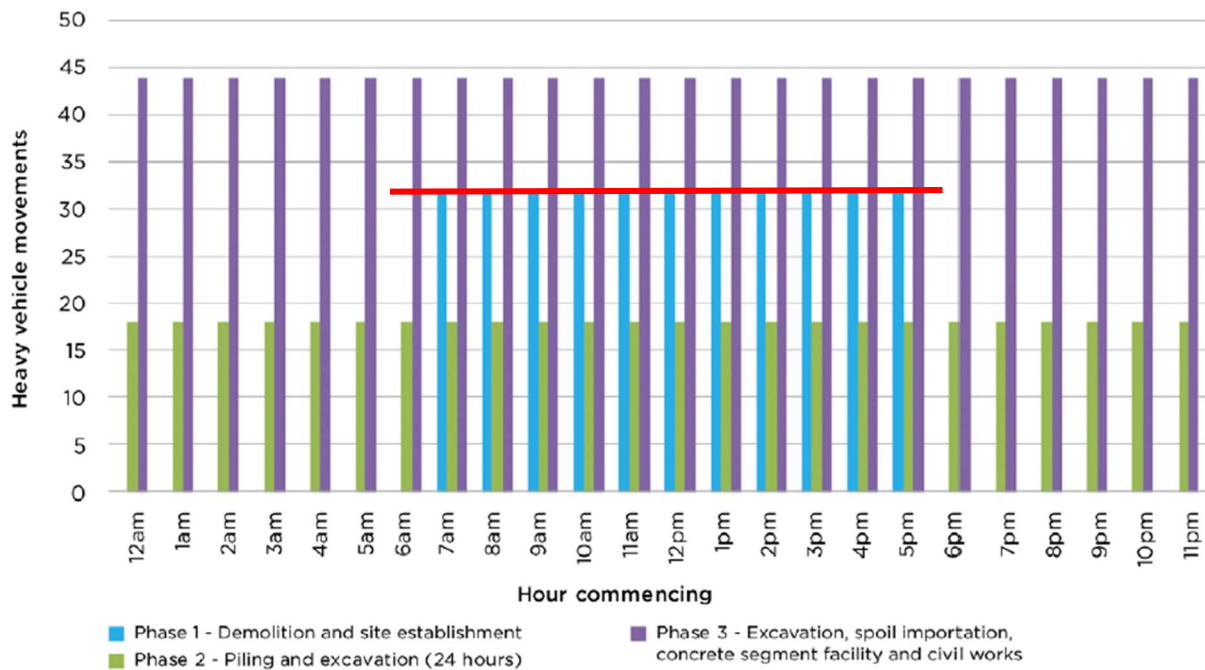


Figure 10-14: Hourly heavy vehicle movements at the Clyde stabling and maintenance facility construction site

Note: Movement means a one way movement. A truck entering and then leaving a work site represents 2 movements.

Figure 5: EIS Hourly heavy vehicle movements (source: EIS Chapter 10 page 10-13)

A comparison of traffic volumes during the site establishment works is provided in Table 5.2.

Table 5.2: Comparison of EIS and GLC Site Establishment vehicle movements (numbers)

Time	EIS Light	GLC Light	EIS Heavy	GLC Heavy
0600-0700	132 (66)	80 (40)	0	0
0700-1700	4 (2)	4 (2)	32 (16)	20 (10)
1700-1800	132 (66)	80 (40)	0	0

Traffic volumes were provided in the EIS, as detailed in Table 5.3.

Table 5.3: 2019 traffic volumes (source: EIS Chapter 10 Table 10-16 page 10-13)

Road	Direction	Morning peak hour vehicles per hour	Evening peak hour vehicles per hour
Unwin Street, west of Colquhoun Street	Eastbound	220	190
	Westbound	280	130
Kay Street west of Wentworth Street	Eastbound	150	170
	Westbound	270	90
Wentworth Street, north of Parramatta Road	Northbound	260	120
	Southbound	150	180

The data shows that the vehicle numbers predicted in the EIS across the Project, as well as those predicted for the Site, are both substantially lower than the volumes previously provided for this

area when all businesses were operational. It is noted that a number of businesses that previously operated in the area are no longer present, as the demolition works for the Site has been completed.

5.1.5 Public Transport and Taxis

No public transport or taxi parking is anticipated to be impacted by the site establishment works.

5.1.6 Active Transport

GLC will not block or disrupt access across pedestrian or shared user paths at any time unless alternate access is provided which complies with the applicable standard.

5.1.7 Special Events

During major special events classified as ‘Class One’ in the *Guide to Traffic and Transport Management for Special Events* (NSW Government, 2018), which includes events that have major impacts on the transport and traffic network, GLC will review options to limit impact by:

- Minimising the level of site establishment activity and, if necessary, ceasing all site establishment works
- Maintaining appropriate access to all areas within the event precinct
- Erection of hoardings, site fencing and gates at key locations with the Site boundary, to permit pedestrian movements adjacent to the construction site and separate pedestrians from site establishments vehicles
- Scheduling deliveries to the Site outside of special event periods
- Consultation with relevant stakeholders including the Australian Turf Club.

5.2 Noise and Vibration

A noise and vibration impact assessment (NVIA) was prepared to assess the potential noise and vibration impacts associated with site establishment works and recommend mitigation and management measures, refer Attachment 4. A summary of the NVIA is presented in the sections below.

Potential noise and vibration impacts will be managed in accordance with MCoA’s A21, A22, D14, D36, D37, D38, D41, D42, D43, D44, D46, D47, D49, D50, D51, REMMs NV1, NV3, NV4, NV6, NV9, NV15 and NV18, CEMF requirements 3.7a, 5.1b, 5.3a, as well as the mitigation and management measures listed in Attachment 2.

5.2.1 Work Hours

Site establishment works will occur during approved construction hours where possible. Approved construction hours for site establishment works as set in MCoA D35 are as follows:

- 7:00am to 6:00pm Mondays to Fridays, inclusive
- 8:00am to 6:00pm Saturdays
- at no time on Sundays or public holidays.

Notwithstanding, the approved hours above, MCoA D37 allows out of hours work to be undertaken in the following circumstances:

- a. Safety and Emergencies, including:

- i. for the delivery of materials required by the NSW Police Force or other authority for safety reasons; or
- ii. where it is required in an emergency to avoid injury or the loss of life, to avoid damage or loss of property or to prevent environmental harm.

On becoming aware of the need for emergency work in accordance with (a)(ii) above, the AA, the ER, the Planning Secretary and the EPA must be notified of the reasons for such work. The Proponent must use best endeavours to notify as soon as practicable all noise and/or vibration affected sensitive land user(s) of the likely impact and duration of those work.

- b. Low impact, including:
 - i. construction that causes $L_{Aeq(15\text{ minute})}$ noise levels:
 - o no more than 5 dB(A) above the rating background level at any residence in accordance with the ICNG, and
 - o no more than the 'Noise affected' NMLs specified in Table 3 of the ICNG at other sensitive land user(s); and
 - ii. construction that causes $L_{AFmax(15\text{ minute})}$ noise levels no more than 15 dB(A) above the rating background level at any residence; or
 - iii. construction that causes:
 - o continuous or impulsive vibration values, measured at the most affected residence are no more than the preferred values for human exposure to vibration, specified in Table 2.2 of Assessing Vibration: a technical guideline (DEC, 2006), or
 - o intermittent vibration values measured at the most affected residence are no more than the preferred values for human exposure to vibration, specified in Table 2.4 of Assessing Vibration: a technical guideline (DEC, 2006).
- c. By Approval, including:
 - i. where different construction hours are permitted or required under an EPL in force in respect of the CSSI; or
 - ii. works which are not subject to an EPL that are approved under an Out-of-Hours Work Protocol as required by Condition D38 of this schedule; or
 - iii. negotiated agreements with directly affected residents and sensitive land user(s).
- d. By Prescribed Activity, including:
 - i. tunnelling (excluding cut and cover tunnelling and surface works) are permitted 24 hours a day, seven days a week; or
 - ii. concrete batching at the Clyde construction site is permitted 24 hours a day, seven days a week; or
 - iii. delivery of material that is required to be delivered outside of standard construction hours in Condition D35 of this schedule to directly support tunnelling activities, except between the hours 10:00 pm and 7:00 am to / from the Five Dock and Westmead construction sites and to / from Burwood North construction site using any roads / streets other than directly from Parramatta Road; or
 - iv. haulage of spoil except between the hours of 10:00 pm and 7:00 am to / from the Five Dock and Westmead construction sites and to / from Burwood North construction site using any roads / streets other than directly from Parramatta Road; or
 - v. work within an acoustic shed where there is no exceedance of noise levels under Low impact circumstances identified in (b) above, unless otherwise agreed by the Planning Secretary.

5.2.2 Airborne Noise

For site establishment works, noise levels are predicted to remain below noise management levels (NMLs) throughout all work scenarios (refer to Table 5.4).

Site establishment works will be undertaken during approved hours to minimise impacts on nearby receivers. Delivery of equipment during out-of-hours periods has been addressed as part of LIW 07&08 and noise levels were predicted to remain below NMLs and sleep disturbance screening levels.

Table 5.4: Summary of NML Exceedances – All Receiver Types

Activity	Site Establishment Works	Predicted Noise Exceedance at Sensitive Receivers (dB)		Potential Impact
		Residential	Other	
Site establishment works	Establishment of Bentonite slabs and plant (equivalent to work activity W008 in Attachment 4 NVIA)	-	-	Negligible impact to residential and other sensitive receivers
	Establishing water treatment plant (see work activity W008 in Attachment 4 NVIA)	-	-	Negligible impact to residential and other sensitive receivers

5.2.3 Road Traffic Noise

The site establishment works are not anticipated to increase road traffic noise by more than 0.1 dBA. Differences in noise levels of less than approximately 2 dBA (whether an increase or a decrease) is generally considered to be imperceptible in practice. As such, no recommendations for road traffic noise mitigation and management measures are considered necessary in this assessment.

5.2.4 Ground-borne Noise

Ground-borne noise impacts from site establishment works are not anticipated, as there is no proposed vibration intensive work with the potential to generate perceptible ground-borne noise. Vibration intensive work will be completed outdoors, therefore airborne noise levels at the nearest receivers would likely be higher than the corresponding internal ground-borne noise levels. Where airborne noise levels are higher than ground-borne noise levels, it is not necessary to evaluate potential ground-borne noise impacts. As such, they have not been considered further for this assessment.

5.2.5 Vibration

Vibration intensive items of equipment are not anticipated for site establishment.

Vibration impacts are not anticipated at the nearest receivers, as all receivers are beyond the minimum working distances to vibration intensive work.

Nearby heritage listed buildings/structures are considered structurally sound, therefore the cosmetic damage criteria should apply. All heritage structures are also beyond the minimum distance for sensitive heritage buildings identified in Table 5.5. Vibration impacts from site establishment works are predicted to remain below the sensitive heritage building screening criteria.

Table 5.5: Recommended minimum working distances from vibration intensive equipment (NVMP 2022)

Plant Item	Rating/Description	Minimum Distance		
		Cosmetic Damage		Human Response (AVTG)
		Residential and Light Commercial (BS 7385)	Heritage Items (DIN 4150, Group 3)	
Vibratory Roller	<50 kN (1–2 tonne)	5 m	11 m	15 m to 20 m
	<100 kN (2–4 tonne)	6 m	13 m	20 m
	<200 kN (4–6 tonne)	12 m	25 m	40 m
	<300 kN (7–13 tonne)	15 m	31 m	100 m
	>300 kN (13–18 tonne)	20 m	40 m	100 m
	>300 kN (>18 tonne)	25 m	50 m	100 m
Small Hydraulic Hammer	300 kg (5 to 12 t excavator)	2 m	5 m	7 m
Medium Hydraulic Hammer	900 kg (12 to 18 t excavator)	7 m	15 m	23 m
Large Hydraulic Hammer	1,600 kg (18 to 34 t excavator)	22 m	44 m	73 m
Vibratory Pile Driver	Sheet piles	2 m to 20 m	5 m to 40 m	20 m
Piling Rig – Bored	≤ 800 mm	2 m (nominal)	5 m	4 m
Jackhammer	Hand held	1 m (nominal)	3 m	2 m

5.2.6 Mitigation and Management Measures

Mitigation and management measures will be applied for site establishment works, where feasible and reasonable, to control and minimise the noise and vibration impacts (refer Attachment 2 and Attachment 4). Reference to relevant MCoA, REMMs CEMF requirements are provided for each of these measures.

5.2.7 Outcomes

Based on the predicted noise and vibration levels, as well as mitigation and management measures presented in Attachment 2 and Attachment 4, site establishment works associated with the Site are considered have low impact for noise and vibration.

5.3 Non-Aboriginal Heritage

The broader Clyde MSF is a heavily modified industrial landscape, with surrounding land being used primarily for industrial purposes. Chapter 12 and Technical Paper 3 of the EIS identified that the non-Aboriginal heritage items within, and immediately adjacent to, the Site are:

- Wetlands (I1) – *Parramatta Local Environmental Plan 2011*. This heritage item is made up of the remnant wetland vegetation including mangrove and saltmarsh complexes along the foreshores of the Parramatta and Duck Rivers, and their tributaries. This item is located within the boundary of the Site.

- RTA Depot (1576) – *Parramatta Local Environmental Plan 2011*. This heritage item includes a main multi-storey framed industrial workshop as well as a number of other workshops, structures and remnants of a rail siding. This item is located within the boundary of the Site.
- Capral Aluminium (1575) – *Parramatta Local Environmental Plan 2011*. This heritage item includes a multi-storey office building which was developed in late 1930. This item is located adjacent to the Site.

The EIS concluded that the overall impact of that extent of vegetation removal would have a minor direct impact. The removal of small shrubbery across the Site may be required, however it is anticipated that the Site will be cleared of all vegetation prior to site establishment works. As the extent of potential vegetation removal for site establishment works will be less than the overall extent required as part of the wider Project, site establishment works will result in a minor direct and indirect impact to the Wetlands.

In relation to the RTA Depot, the EIS concludes that impacts would be minor and would arise because of the partial demolition/removal of structures within the heritage curtilage, as well as through potentially vibration-intensive works. Demolition works will be undertaken prior to site establishment works commencing. Accordingly, the site establishment works detailed in this SEMP would not impact the RTA Depot through the demolition or removal of structures. Notwithstanding, some site establishment works such as concrete hammering (which is not proposed) are considered to be vibration-intensive works. The NVIA concludes that all heritage structures are beyond the minimum distance for sensitive heritage buildings (refer to Table 5.5). Project vibration is predicted to remain below the sensitive heritage building screening criteria. Prior to establishing noise barriers, hoarding and equipment used for vibration and noise monitoring, the advice of a suitably qualified and experienced built heritage expert will be obtained and implemented as per McoA D14.

The EIS notes that the introduction of structures over Duck Creek would cause a minor indirect visual impact to the Capral Aluminium heritage item. As the site establishment works would not involve the introduction of a structure over Duck Creek, site establishment works are not anticipated to affect the heritage significance of Capral Aluminium.

Chapter 12 and Technical Paper 3 of the EIS identified that significant archaeological remains are not predicted within the Clyde MSF construction boundary, and therefore the Site. The extent of ground disturbance required for the site establishment works would not likely result in impacts to significant archaeological remains.

Potential impacts to non-Aboriginal heritage will be managed in accordance with McoA A21, D14, D31, D46, D47, D49, REMM NAH1, as well as CEMF requirement 3.7a.

Mitigation and management measures to control the extent of potential impacts to non-Aboriginal heritage values at the Rosehill site are listed in Attachment 2.

5.4 Aboriginal Heritage

Chapter 13 and Technical Paper 4 of the EIS did not identify any recorded Aboriginal heritage sites within the Site. With the exception of an area within the Sydney Speedway, the Clyde MSF was assessed as being substantially disturbed with a low archaeological potential. It is therefore unlikely that the site establishment works at the Site would impact on Aboriginal heritage.

Notwithstanding, Technical Paper 4 of the EIS states that there is a correlation of the predominance of archaeological evidence relating to Aboriginal land use activities adjacent to watercourses. As works would be carried out nearby Duck Creek, there is a possibility that previously unidentified Aboriginal heritage items could be present beneath the surface.

Potential impacts to Aboriginal heritage will be managed in accordance with McoA A21, D19, D31, REMMs AH3, AH4, as well as CEMF requirement 3.7a.

Mitigation and management measures to avoid, minimise and mitigate potential impacts to unidentified Aboriginal heritage items are listed in Attachment 2.

5.5 Property and Land Use

The Site is subject to the *Parramatta Local Environmental Plan (LEP) 2011*. The land use zoning for the Site is defined as IN3 Heavy Industrial.

Land uses surrounding the Site include the Rosehill Gardens Racecourse, Duck Creek, large warehouses and industrial uses, as well as the Viva Energy site that was formerly used as part of Clyde oil refinery. The M4 Western Motorway is located south of the Site, beyond which the Clyde industrial area continues. To the west of the Site is a corridor containing James Ruse Drive and the now closed T6 Carlingford Line. Further west are low density residential areas in Rosehill and Granville.

As detailed in the EIS, as a result of Stage 1 there would be a change from industrial land uses to a transport infrastructure construction site. This land use change would be minor considering the scale of surrounding industrial land in Clyde, Camellia and Rosehill. Aside from the change of land use, there are no direct property acquisition impacts for the Site.

Potential property and land use impacts will be managed in accordance with McoA A21, D58, D81, REMM LU1, as well as CEMF requirement 3.7a.

Any ongoing potential land use and property impacts during site establishment works would be managed in accordance with the mitigation and management measures listed in Attachment 2.

5.6 Landscape Character and Visual Amenity

Chapter 15 of the EIS assessed potential landscape character and visual amenity impacts. Potential visual impacts identified within the EIS would be related to the following items:

- Presence and use of heavy machinery and equipment, such as mobile cranes, excavators, concrete pumps and piling rigs
- Establishment of site ancillary facilities
- Hoardings and/or fencing surrounding the Site, about three metres high.

Site establishment works are consistent with the existing and former heavy industrial character of the wider Clyde area and general overall landscape character impacts would be negligible to minor. Removal of the majority of vegetation within the Site would be undertaken prior to site establishment works commencing, which would open up views from James Ruse Drive to the Site.

Lighting visible at night will consist of security lighting and lighting from headlights of heavy vehicles, which will be readily absorbed into the existing moderately lit setting of adjacent industrial facilities. Overall, night lighting impacts at the Site would be low.

Potential landscape character and visual amenity impacts will be managed in accordance with McoA A21, A23, D103, D109, D110, REMMs LV1, LV2, LV5, LV6, LV11, LV12 and the mitigation and management measures listed in Attachment 2.

5.7 Business Impacts

The Site is located across the Rosehill and Clyde business areas, both of which are primarily industrial comprising a range of businesses, such as manufacturing, warehousing, urban services, and industrial or speciality retail outlets.

Chapter 16 of the EIS assessed potential business impacts. Potential impacts identified within the EIS will be related to:

- Potential traffic congestion and increased travel time associated with construction traffic. Workers and businesses in this area already experience a congested road network during some periods of the day and the addition of construction traffic is expected to result in a relatively minor impact.
- Loss of goods and services associated with the delivery delays due to congestion. Businesses within the construction site generally provide goods and services to a wider catchment and do not provide local business-to-business services. As such, there are unlikely to be flow on effects to other nearby businesses.
- Reduced local amenity due to noise, vibration, dust and visual impacts. Surrounding businesses are primarily industrial and would already experience lower local amenity than other businesses (e.g. retail outlets, hospitality venues and urban services). The Rosehill Gardens Racecourse may be impacted by changes to local amenity, including noise and dust during site establishment. This potential impact will be temporary and is considered minor in nature, as the surrounding landscape is heavily industrialised.
- Safety and security of neighbouring businesses. The industrial parts of the precinct already have relatively low levels of street activity and surveillance. Reduced business activity around the construction site is unlikely to result in any reduction in customer safety and security.
- Temporary power and utility disruptions to neighbouring businesses. Unplanned power and utility interruptions is considered to be unlikely, however it could result in temporary impacts during interruptions.
- The Stage 1 project is expected to provide a stimulus for the local economy (local cafes, restaurants, and shops) due to the influx of the project workforce.

Potential business impacts will be largely related to traffic and transport. Potential impacts will be managed in accordance with McoA A21, D59, D60, D61, D80, D101, REMMs B12, B13, CEMF requirement 3.7a, 3.8a, as well as the mitigation and management measures listed in Attachment 2.

5.8 Social Impacts

Chapter 17 of the EIS assessed the potential social impacts of site establishment works, which include:

- Potential changes to community character and sense of place due to loss of established industrial businesses, the natural environment centred around Duck Creek and A' Becketts Creek as well as major local and regional destinations
- Impacts to the operations of Rosehill Gardens Racecourse, including:
 - potential changes to vehicular travel routes of attendees
 - minor noise impacts at the stables
- Potential changes to community connection to place and shared histories associated with the relocation of Sydney Speedway
- Potential temporary impacts of site establishment works on health and wellbeing

- Potential impacts to personal and property rights through property acquisitions and construction processes
- Air quality impacts to surrounding sensitive receivers including residential receivers in the suburb of Rosehill, the Fun2Learn Early Learning Centre and attendees at Rosehill Gardens Racecourse. The overall air quality impacts will be significantly reduced through the implementation of mitigation and management measures
- Perceived temporary safety impacts associated with changed sightlines, changed vehicle routes and establishment of hoardings.

Potential social impacts will be managed in accordance with McoA A21, REMM S1, as well as the CEMF requirements 3.7a and 3.8a.

Mitigation and management measure to avoid, minimise and mitigate potential social impacts are listed in Attachment 2.

5.9 Groundwater and Ground Movement

Site establishment works are generally aboveground with only minor potential to intercept groundwater. Jacobs (2020) reports groundwater levels in the vicinity of the Clyde MSF (which incorporates the Site) of 3-5 metres below ground level (mbgl).

Subsequent investigations, including within this high rainfall period, have shown higher groundwater levels. Groundwater depths recently measured (Golders/Douglas 2022) are shown in Table 5.6.

Table 5.6: Groundwater depths within the Rosehill Box area

Borehole	Standing water level (mbgl)	Well depth (mbgl)
ENV801	1.45	7.5
ENV801_s	0.86	1.5
WTP_BH14	1.46	8.0
WTP_BH15A	2.96	16.1
ENV808	0.90	8.0
ENV809	1.54	8.0
WTP_BH16	1.99	16.0
ENV806	1.91	7.2
ENV811	1.60	6.0

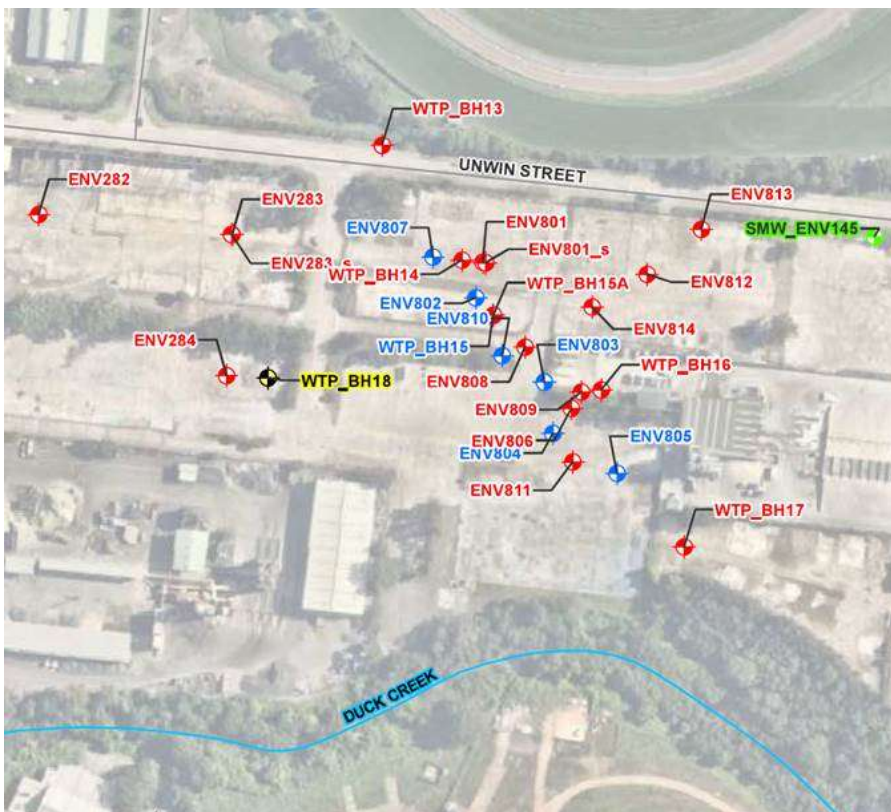


Figure 6: Borehole locations – groundwater monitoring

Should groundwater be encountered during minor excavation a vacuum truck will be used for dewatering and any groundwater will be taken off site and disposed of in accordance with Waste Classification Guidelines (EPA 2021).

It is considered unlikely that ground movement will be a risk as a result of the works proposed within this SEMP. The works do not include significant interaction with, or drawdown of, groundwater.

Potential groundwater and ground movement impacts will be managed in accordance with MCoA A21, REMMs GW2 – GW4, CEMF requirement 3.7a and the mitigation and management measure listed in Attachment 2.

Potential groundwater contamination and any remediation activities will be managed in accordance with Section 5.11 and the mitigation and management measures provided Attachment 2.

5.10 Soils and Surface Water Quality

The EIS identified the potential for erosion of exposed soils, sedimentation of waterways and exposure of contaminated soils and groundwater during Stage 1 works, including site establishment. There is potential that exposed soils and other unconsolidated materials, such as spoil and construction materials, could be transported from the Site into surrounding waterways via stormwater runoff. This would be managed through mitigation and management measures, including stabilising disturbed ground and exposed soils, using water to suppress dust and implementing appropriate bunding (as required).

The EIS states that the majority of the construction sites for the Stage 1 project are located in areas having “no known occurrence” of acid sulfate soils. However, the Site is located in an area

designated as “disturbed terrain”. These areas are often reclaimed land and can be associated with the potential presence of acid sulfate soils. The exposure of acid sulfate soils could potentially release acid sulfates into the environment, which would result in harm to nearby vegetation, aquatic environments and potentially drainage lines.

Testing for acid sulfate soils is currently being carried out as part of the contamination detailed site investigation to determine the presence of actual and/or potential acid sulfate soils. If acid sulfate soils are encountered, they would be managed in accordance with the Acid Sulfate Soil Manual (ASSMAC, 1998) which includes procedures for the investigation, handling, treatment and management of such soils. An acid sulfate soils management plan would be prepared in the event of ASS at the site.

Management of soils with regards to contamination is detailed within Section 5.11 and with regards to waste in Section 5.15.

Mitigation and management measures are detailed within Attachment 2.

Potential soils and surface water quality impacts will be managed in accordance with MCoA A21, D116, REMMs SSWQ1, SSWQ2, SSWQ4, SSWQ5, SSWQ7, CEMF requirements 3.7a, 3.9a, as well as the mitigation and management measure listed in Attachment 2.

5.11 Contamination

As described within Section 20 and Technical Paper 8 of the EIS, there is potential for contamination to be encountered in the areas within the Site. If not managed appropriately, there is the potential to:

- Mobilise contaminants that may affect soils, surface water and groundwater
- Promote the migration of contaminants into surrounding areas including receiving environments such as Duck Creek
- Increase the risk of exposure to site workers
- Accumulation of vapour containing volatile organic compounds (VOC), which may enter excavation voids.

The tasks most likely to pose a risk to the above include the following, and generally relate to excavation and subsequent management of potentially contaminated materials:

- Minor excavation works to support WTP and bentonite farm establishment

Section 20 of the EIS details the areas of environmental interest (AEI), where the potential for contamination is to be encountered during the proposed works at the Site. The two identified AEIs are designated as moderate contamination risk potential (which includes the whole site). These are summarised in Table 5.7 below.

Table 5.7: Overview of AEIs with the footprint of the Site

AEI	Description / Source	Media / Contaminants of Concern	Activities Potentially Intersecting Contamination	Risk Ranking
AEI13	Former and existing structures – Hazardous building materials within or	Surface soil Heavy metals, hydrocarbons (TRH/PAH),	Excavation Clearing	Moderate

AEI	Description / Source	Media / Contaminants of Concern	Activities Potentially Intersecting Contamination	Risk Ranking
	from on-site buildings / structures, demolition wastes	pesticides and asbestos		
AEI15	Current commercial / industrial use within locality – Inappropriate chemical storage and use, industrial operations, waste disposal and management (e.g. James Hardie asbestos disposal sites) and existing EPL adjacent Downer EDI Works	Surface soil Heavy metals, hydrocarbons (TRH/PAH/BTEX), pesticides and asbestos Groundwater Heavy metals, hydrocarbons (TRH/PAH), pesticides and VOC	Excavation Clearing	Moderate

GLC has recently received a significant dataset from site investigations conducted in September 2021. A review of the data that relates to the Site has been completed. The majority of the data focuses on the proposed shaft, however, there are some boreholes that are relevant to the whole Site. It is noted that due to the positioning of the gantry crane, the data from around the shaft is directly relevant to the material that will be excavated during this activity and the associated groundwater. A summary of relevant data is provided herein, however, it is noted that a report has not been provided or reviewed for this dataset. The interpretation below has been conducted based on raw data only and does not include consideration of quality assurance and control parameters.

Based on the information provided by Sydney Metro, there are 11 soil bore locations that are from within, or adjacent to, the Site shaft footprint. Contaminants of concern that have been reported include: TPH, BTEX, heavy metals, PFAS, VOC/SVOC, PAHs, phenols, OCPs/OPPs. Samples were collected from sampling intervals to a depth of approximately 15 mbgs and over 250 samples were reported to have been analysed. A review of the data indicates that the risk posed by the management of these materials is very low. Through the entire data set there are only a small number of individuals results with concentrations above nominated management limits and criteria (human health / ecological / waste classification). There is no evidence of gross contamination or data that suggests there will be issues with the management of these materials once excavated. The materials are considered likely to be classified as General Solid Waste per the Waste Classification Guidelines Part 1: Classifying Waste (NSW EPA, 2021). Any material will be assessed for potential reuse as backfill, through resource recovery or removed from the site.

Groundwater has also been assessed in this area. Similar to the soil results, the reported concentrations indicate that the risk posed by the management of groundwater in the proposed excavations is low. Whilst some dissolved heavy metals were identified above the adopted trigger values these appear to be consistent with site-wide background concentrations. The standing water levels are discussed above in Section 5.9.

There are three other locations that are relevant to the Site but cannot be necessarily associated with specific planned infrastructure. These locations are to the east of the shaft. A total of 35 samples were collected and analysed for the CoPCs listed above. Of these samples, one near surface sample reported concentrations of petroleum hydrocarbons above the documented

management limits and criteria. It is noted that the samples below this reported concentration are below the limit of reporting hence this appears to be a minor surface impact, though this hasn't been delineated horizontally.

Groundwater has also been assessed at these three locations. Similar to the soil results, the reported concentrations indicate that the risk posed by the management of groundwater in the proposed excavations is low. Whilst some dissolved heavy metals were identified above the adopted trigger values these appear to be consistent with site-wide background concentrations.

Based on this review, excavations required for site establishment are considered minor and can be managed through the mitigations provided within this Plan. It is noted that any minor spoil generated from the excavations for the Site will be managed through standard waste classification and waste tracking procedures (refer to Section 5.15). The material will be assessed either in-situ or upon stockpiling and then reused through resource recovery or removed from the site. The material that cannot be recovered will then be disposed of in accordance with waste guidance. In addition, any groundwater encountered within an excavated area will be treated as contaminated and removed from site via a vacuum truck. Disposal will be in accordance with Waste Classification Guidelines (EPA 2021)

The mitigation measures in this Plan will be updated, as required, upon receipt of the results of the detailed site investigations. Potential contamination impacts will be managed in accordance with MCoA A21, REMMs C1, C2, as well as CEMF requirements 3.7a and 3.9a.

Whilst an Unexpected Contaminated Land and Asbestos Finds Procedure is not required until the commencement of construction work, in order to manage potential environmental risk associated with these works, this will be in place prior to commencing the site establishment works (refer to Attachment 5).

Potential environmental impacts which could occur as a result of contamination, will be managed by the mitigation and management measures listed in Attachment 2.

5.12 Hydrology and Flooding

Chapter 21 and Technical Paper 9 of the EIS assessed potential flooding and drainage impacts of the Stage 1 project. The Site is located on generally flat to undulating terrain and has been highly modified from previous land uses. It is located on the Duck Creek and A'Becketts Creek floodplain, with drainage on the Site generally flowing towards these creeks, although there is local ponding of runoff from undulations on the current site surface, which reduces free surface drainage of flows to the creeks.

Characterisation of flooding and hydrology condition within the EIS was based on the flood extent for the one per cent annual exceedance probability (AEP) event (a flood event with a one in a hundred per cent chance of occurring in any one year) and probable maximum flood (PMF) event (the largest flood that could conceivably occur at a particular location).

The potential flooding impacts as highlighted in the EIS include:

- Potential increase in peak flood levels in and adjacent to Duck Creek and Duck River of up to 0.08 metres during the five per cent and one per cent AEP events, downstream of site
- Potential increase in peak flood levels in the PMF event of up to 0.15 metres in the Duck Creek floodplain upstream of the culvert crossing
- Potential minimal increases in the flood extent for all events up to the PMF
- Potential minor increases in high flood hazard extent in the five per cent and one per cent AEP and PMF events

- Potential increases in flood levels of 0.08 metres at commercial and industrial properties near the Duck Creek and Duck River confluence in the five per cent and one per cent AEP events.

Overall, the potential flooding risks are considered to be minor in all flooding events. Potential flooding and drainage impacts will be managed in accordance with MCoA A21, REMMs HF1, HF3, HF4, HF7, as well as CEMF requirement 3.7a.

Flooding and drainage will also be managed in accordance with the flooding and drainage mitigation and management measures identified in Attachment 2 of this SEMP.

5.13 Biodiversity

The Clyde MSF is predominantly comprised of commercial and industrial development with no existing natural vegetation, with the exception of the riparian zones of A'Becketts Creek and Duck Creek as per Chapter 22 and Technical Paper 10 of the EIS. More specifically, the Site contains a section of the Duck Creek riparian zone within its boundary. The vegetation surveyed along Duck Creek is dominated by weeds, with some native species present on the banks. Mangrove vegetation found within the Duck Creek riparian zone corresponds to the plant community type: Mangrove Forests in estuaries of the Sydney Basin Bioregion and South East Corner Bioregion (Plant Community Type (PCT) 920). This vegetation has been assessed as being in a poor condition and is not classified as a threatened ecological community, however it is considered to be protected marine vegetation under the *Fisheries Management Act 1994*.

Several threatened fauna species have the potential to forage in and around mangrove vegetation, including:

- Little Bent-winged Bat (*Miniopterus australis*)
- Large Bent-winged Bat (*Miniopterus orianae oceanensis*)
- Eastern Coastal Free-tailed Bat (*Micronomus norfolkensis*)
- Grey-headed Flying-fox (*Pteropus poliocephalus*)

In addition, the following migratory species are considered moderately likely to occur in mangrove habitats:

- Migratory marine birds: Fork-tailed Swift
- Migratory terrestrial species: White-throated Needletail
- Migratory wetland species: Common Sandpiper, Ruddy Turnstone, Sharp-tailed Sandpiper, Curlew Sandpiper, Pectoral Sandpiper, Red-necked Stint, Great Knot, Double-banded Plover, Greater Sand Plover, Lesser Sand Plover, Latham's Snipe, Bar-tailed Godwit, Eastern Curlew, Whimbrel, Osprey, Ruff, Pacific Golden Plover, Grey-tailed Tattler, Common Greenshank and March Sandpiper.

Although migratory bird species may be evident within mangrove vegetation, the overall Stage 1 construction footprint is not classed as 'important habitat', as a result nor is the vegetation within the Site.

Site establishment works with the potential to impact biodiversity includes:

- Minor excavation works

As part of the overall works at the Clyde MSF, Technical Paper 10 of the EIS estimates that 0.15 hectares of native vegetation classified as PCT 920 would be removed. Vegetation removal works associated with site establishment is not covered in this SEMP and has been assessed under a Low Impact Works application.

Chapter 22 of the EIS concludes that the removal of vegetation associated with the overall Stage 1 Project would not detrimentally affect threatened fauna, however it has the potential to disrupt foraging habitat connectivity for flying fauna species, while the removal of mangrove vegetation will result in the direct loss of a small amount of mangrove habitat for aquatic species.

Potential biodiversity impacts will be managed in accordance with MCoA A21, D2, D3, D9, as well as CEMF requirements 3.7a and 3.9a.

Any ongoing potential biodiversity impacts during site establishment works would be managed in accordance with the mitigation and management listed in Attachment 2.

5.14 Air Quality

There is potential for dust emissions at the Site during establishment works, as a result of the following:

- Tracking of dust and dirt from the site onto the public road network from construction vehicles
- Emissions due to the use of plant, machinery and vehicles
- Storage and stockpiling of materials.

Mitigation and management measures have been recommended to mitigate the effects of establishment works on local air quality, including carrying out inspections and using water to suppress dust. With these mitigation and management measures in place, air quality is anticipated to have a minimal impact.

Potential air impacts would be managed in accordance with MCoA A21, D1, REMMs AQ1 and AQ2 and the mitigation and management measures listed in Attachment 2.

5.15 Spoil, Waste Management and Resource Use

Chapter 24 of the EIS assessed spoil and waste generation and resource. Resource use as a result of site establishment works at the Site would largely be made up of construction materials (concrete, asphalt, steel, fuel etc.), water and power. Waste generated on site as a result of site establishment works comprise of concrete and minor unsuitable fill.

Concrete waste produced as part of the site establishment works will be reused where possible as hardstand surfaces. Any waste to be removed will be taken offsite in accordance with the procedures in the sections below, as well as the mitigation and management measures in Attachment 2.

5.15.1 Waste reuse measures

Every effort will be made to ensure that waste material is seen as a resource and is used, either on-site for site establishment works or off-site either on other projects or by other persons. The Waste Reuse Principles adopted are:

- Identifying materials for a reuse purpose
- Segregating materials at the source of generation to facilitate reuse, and store or reuse those items, either on-site or off-site
- Re-useable formwork will be used where practicable
- Compostable erosion and sediment control measures will be used where possible
- Recycled and recyclable materials will be used where possible, without compromise to the structural integrity, longevity and visual quality of materials and structure.

5.15.2 Waste Recycling measures

Recycling is a process involving the collection and separation of waste materials, which are transformed into useable products. The principles adopted for this SEMP are:

- Erect signage to encourage the reuse and recycling of recovered waste material
- Identify materials for a recycling purpose
- Where practical, construction recycling facilities will be provided within the Site
- Sort materials into components/material streams to facilitate recycling. Separation of materials may occur off-site by specialised licensed waste handling contractors
- A waste contractor with access to a sophisticated materials reclamation facility will be contracted to sort and recycle and manage construction waste to be removed from the Site
- Implement packaging take-back initiatives with sub-contractors and suppliers.

5.15.3 Waste Disposal/Removal measures

Waste removal requires the transport and disposal of waste material off-site that cannot be reused or recycled. The following waste removal principles have been adopted:

- The site establishment works will seek to limit the wastes which it sends directly to landfill. A waste contractor with a sophisticated recycling facility will be contracted to achieve the highest recycling rates achievable for the waste streams generated. Residual waste will be landfilled after the reclamation process is carried out at that facility
- Various types and sizes of waste receptacles will be provided to promote separation of materials for ease of reuse/recycling
- Hazardous and liquid wastes will be securely stored within appropriate receptacles within a bunded area prior to removal by licensed contractors
- A regular collection/removal or emptying of bins or skips will be implemented
- Waste will be classified and disposed of in accordance with the guidelines.

5.15.4 Waste Hierarchy

The SEMP has planned to take actions to address waste management and recycling risks and opportunities, its compliance obligations, and its objectives. The SEMP has determined what will be done, what resources will be required, who will be responsible, when it will be completed and how the results will be evaluated.

When planning action, the SEMP has and will apply the waste hierarchy detailed below, focusing on the waste streams with the most significant lifecycle impacts first, by prioritising (in order of preference):

1. Waste elimination
2. Waste reduction
3. Waste reuse onsite
4. Waste reuse offsite
5. Waste recycling
6. Waste to landfill

5.15.5 Waste Management

5.15.5.1 Classification of waste streams

Where waste cannot be avoided, reused or recycled, it will be classified and appropriate disposal will then occur. The classification of waste is undertaken in accordance with the EPA's Waste Classification Guidelines Part 1: Classifying Waste (NSW EPA, 2014). This document identifies six classes of waste as defined in clause 49 of Schedule 1 of the POEO Act:

- Special waste
- Liquid waste
- Hazardous waste
- Restricted solid waste
- General solid waste (putrescible)
- General solid waste (non-putrescible).

The steps below will be implemented to determine which of the above classifications applies to the Project's waste. Once a classification has been established under a particular step, the waste will be taken to have that classification and will be managed accordingly.

Step 1: Is it 'special waste'?

Establish if the waste should be classified as special waste. Special wastes are: clinical and related, asbestos, waste tyres. Definitions are provided in the guidelines.

Note: Asbestos and clinical wastes must be managed in accordance with the requirements of Clauses 42 and 43 of the Protection of the Environment Operations (Waste) Regulation 2005.

Step 2: If not special, is it 'liquid waste'?

If it is established that the waste is not special waste, it must be decided whether it is 'liquid waste'. Liquid waste is defined in Section 5.15.5.3. Liquid wastes are sub-classified into:

- Sewer and stormwater effluent
- Trackable liquid waste according to the Protection of the Environment Operations (Waste) Regulation 2005 Schedule 1 Waste to which waste tracking requirements apply
- Non-trackable liquid waste.

Step 3: Has the waste already been pre-classified by the NSW EPA?

The EPA has pre-classified several commonly generated wastes in the categories of hazardous, general solid waste (putrescible) and general solid waste (non-putrescible). If a waste is listed as 'pre-classified', no further assessment is required. Details are provided in the guidelines.

Step 4: If not pre-classified, is the waste hazardous?

If the waste is not special waste, liquid waste or pre-classified, establish if it has certain hazardous characteristics and can therefore be classified as hazardous under the classes or divisions of the Transport of Dangerous Goods Code which include explosives, flammable solids, substances liable to spontaneous combustion, oxidizing agents, toxic substances and corrosive substances.

Step 5: Chemical assessment to determine classification?

If the waste does not possess hazardous characteristics, it needs to be chemically assessed to determine whether it is hazardous, restricted solid or general solid waste (putrescible and non-

putrescible). If the waste is not chemically assessed, it must be classified and treated as hazardous.

Waste is assessed by comparing Specific Contaminant Concentrations (SCC) of each chemical contaminant, and where required the leachable concentration using the Toxicity Characteristics Leaching Procedure (TCLP), against Contaminant Thresholds (CT).

Step 6: Is the general solid waste putrescible or non-putrescible?

If the waste is chemically assessed as general solid waste, a further assessment is available to determine whether the waste is putrescible or non-putrescible. The assessment determines whether the waste is capable of significant biological transformation. If this assessment is not undertaken, the waste must be managed as general solid waste (putrescible).

5.15.5.2 Contaminated Spoil

Spoil not classified as either virgin excavated natural material (VENM) or excavated natural material (ENM) due to contamination from either construction material or other sources will be characterised in accordance with the Waste Classification Guidelines: Part 1 Classifying Waste (EPA 2014). This may include classification as General Solid Waste (Non-putrescible), Hazardous Waste, Special Waste or Restricted Waste. Spoil may also be assessed for retention and reuse on site as appropriate. Spoil waste types will be segregated as far as possible to prevent cross-contamination.

5.15.5.3 Liquid Waste

In accordance with the waste classification guidelines, liquid waste means any waste (other than special waste) that:

- Has an angle of repose of less than 5 degrees above horizontal
- Becomes free-flowing at or below 60 degrees Celsius or when it is transported
- Is generally not capable of being picked up by a spade or shovel
- Is classified as liquid waste under an EPA gazettal notice.

If the waste meets the criteria outlined above, it is classified as liquid waste, and no further assessment for classification is required, noting that some liquid waste needs to be tracked.

Liquid wastes (e.g. waste oil) are to be stored in appropriate containers in bunded areas until it can be transported off-site for disposal at a licenced facility. Bunded areas must have the capacity to hold 110% of the liquid waste volume for bulk storage.

Sediment laden water would be managed in accordance with the Soil and Water Management Plan. Where evidence of contamination is present (oil, grease) further testing would be carried out, and appropriate treatment or disposal if required.

Concrete washout water would be contained within the washout area and allowed to either evaporate or harden. In the event that capacity is reached, it would be removed by vacuum truck or pumped to an appropriately bunded container.

Waste from non-destructive digging would be taken offsite for disposal. Where there are significant quantities of waste, a bunded area would be established to allow the waste to be dried out and then reused on site where applicable.

Sanitary wastes from temporary site amenities would be removed by a licenced contractor and taken to an appropriately licenced liquid waste facility for treatment or disposal.

5.15.5.4 Waste Exemptions

Under the *Protection of the Environment Operations (Waste) Regulation 2005*, the EPA has issued general exemptions that allow for reuse of a range of common waste materials. They specify ways in which the waste can be reused, chemical concentrations or other attributes to be met as well as other requirements such as record keeping. Where the criteria specified in the exemption and/or order is met, the following public exemptions and orders may be applied to the works:

- The excavated natural material exemption and order, 2014
- The reclaimed asphalt pavement exemption and order, 2014
- The recovered aggregate order, 2014
- The treated drilling mud exemption and order, 2014
- The mulch exemption and order, 2016

Additionally, the site establishment works may seek specific resource recovery exemptions from the EPA as required.

5.15.6 On-site Handling, Transportation and Disposal

5.15.6.1 On-site handling

Materials segregation and recycling facilities will be provided on site. This will include:

- Reusable materials will be stored separately, in secure facilities
- Recyclable waste will be stored separately from other waste and recycling bins will be stored adjacent to general waste bins
- Sufficient storage areas which will be secured and materials will be collected on a regular basis
- Work sites will be kept free of litter and good housekeeping will be maintained
- Vermin proof bins will be used on site
- Specialist bins for specialist waste streams (including electrical and electronic waste, and equipment waste)
- Waste oil, other liquid wastes and spillages will be collected and stored in bunded areas.

5.15.6.2 Transportation

Where waste cannot be reused on site, it will be transported off site using an appropriately licensed waste management contractor. All transport vehicles will be covered, and tailgates secured prior to trucks leaving the work site. All vehicles will be appropriate for transport of the waste as classified.

Transporters will hold an EPL if transporting higher risk wastes ('controlled' or 'trackable' waste). High risk waste will be tracked using EPA's online waste tracking system or the project-specific tracking system.

5.15.6.3 Receiving Facilities

Facilities used for the receiving of waste will be appropriately licensed to accept the classified waste type. The Environmental Manager will review the licence of the receiving facility before any waste is transported.

5.15.6.4 Material tracking

Waste and material tracking data will aim to track waste from ‘cradle to grave’, capturing:

- Types and quantity of waste sent to landfill
- Types and quantity of waste reused or recycled
- Types and quantity of waste treated
- Types and quantity of hazardous/regulated waste generated and its method of treatment and disposal
- Location of treatment and disposal
- Percentage of waste reused or recycled
- Quantity of spoil generated
- Reduction in disposal to landfill achieved
- Records of legal transport, treatment and disposal, including license reference of receiving and transportation as required.

The quantity of waste in each solid waste stream is measured by weight and liquid waste stream by volume, with records provided by the waste transport contractor in the form of Waste Dockets.

A Waste Tracking Register will be kept detailing the information listed above. The information will be collated, and register maintained by the Environment Manager (or delegate).

5.15.6.5 Record keeping

The following records will be retained electronically on the GLC document management system:

- Records of inspections in relation to waste management and recycling activities, including weekly inspections of waste storage facilities
- Records detailing the beneficial re-use or recycling of material either within the project or at off-site locations.

The following records will be retained on site in a designated folder:

- Waste tracking forms and dockets.

5.15.7 Spoil Handling

GLC will adopt the objectives of the NSW Waste Avoidance and Recovery Strategy to minimise waste disposal. As a priority, the preferred method will be to ‘Avoid and Reduce’ waste. This will be regularly assessed throughout the site establishment works.

Additionally, GLC will continue to examine opportunities to reuse spoil during the site establishment works. Firstly, onsite within the Site. Secondly, offsite through the pursuit of new Resource Recovery Orders and/or Exemptions, notably for tunnel spoil.

While not all potentially contaminated spoil will be suitable for retention, the lower and upper general fill zones are the most likely locations where reuse of spoil addressed by the RAP can be achieved. Subject to Sydney Metro’s approval, GLC considers that the existing MCoA (D111& D112) and standard EPL conditions provide the opportunity to pursue this strategy.

Development projects provide a great opportunity for maximising the reuse of spoil at receipt sites. GLC will take advantage of existing Waste Recovery Orders and Exemptions/Orders to

further avoid otherwise unsuitable spoil from being disposed of at landfill sites. Some examples of existing Resource Recovery Orders (RROs) are:

- ENM
- Excavated public road material (EPRM)
- Reclaimed asphalt pavement.

In instances where spoil cannot be beneficially reused either onsite or offsite it will be disposed at licensed facilities. Material types disposed would generally include General Solid Waste (Putrescible and Non-Putrescible), Restricted Solid Waste (RSW), Hazardous Solid Waste (HSW), and Special Waste.

Potential impacts from spoil, waste management and resource use will be managed in accordance with MCoA A21, A47, D83, D111, D112, D113, D114, REMMs WR1, WR4, as well as CEMF requirement 3.7a.

Mitigation and management measures for resource use and waste minimalization are listed in Attachment 2.

5.16 Hazards

Chapter 25 of the EIS assessed the potential hazards that could arise from construction works for the Stage 1 project, including the Site. Potential hazards would include accidental spills of fuels and/or chemicals causing contamination of soils and/or waterways as well as utility strikes which could result in the release of untreated sewage, natural gas, large electrical currents or high pressure petroleum.

Potential hazards will be managed in accordance with MCoA A21, REMMs HA2, HA3, as well as CEMF requirement 3.7a.

These hazards would also be managed by implementing the hazard and risk mitigation and management measures listed in Attachment 2.

5.17 Sustainability and Climate Change

Chapter 26 of the EIS assesses several issues that relate to sustainability and climate change as detailed in Table 5.8.

Table 5.8: Sustainability and climate change issues

Issues	Reference
Air quality	Section 5.14
Greenhouse gas and energy	This section
Climate change adaptation	This section
Waste management and resource use	Section 5.15
Hazard and risk	Section 5.16

As climate change is strongly linked to greenhouse gas emissions and energy usage, they will be minimised through appropriate mitigation and management measures. An iterative process of greenhouse gas assessments and design refinements would be carried out during site establishment works to identify opportunities to minimise greenhouse gas emissions, with performance measured in terms of percentage reduction in greenhouse gas emissions from a baseline inventory calculated at the detailed design stage for the WTP. Additionally, at least 25 percent of the greenhouse gas emissions associated with consumption of electricity during construction would be offset.

Chapter 26.3.2 of the EIS evaluated the potential impact of climate change and greenhouse gas emissions. Potential climate change risk related to the site establishment works largely relate to flooding as a result of the site being located in low lying areas. Refer to Section 5.12 for detail on flooding.

These mitigation and management measures may be refined and updated further once the Sydney Metro West Sustainability Plan has been developed.

Besides the above, the Infrastructure Sustainability Council (ISC) Infrastructure Sustainability (IS) Rating v1.2 has been adopted as the WTP sustainability assurance framework with a proposed target rating of 85. The following credits has been identified along with GLC’s respective targets to be relevant to the Site.

Credit	IS Rating Tool Requirement	Document Reference
Dis-4 ‘Air Quality’ L1	<ul style="list-style-type: none"> Measures to minimise adverse impacts to local air quality during construction and operation have been identified and implemented. Monitoring of air emissions and/or air quality is undertaken at appropriate intervals and in response to complaints during construction 	Section 5.14 Construction Monitoring Program
Dis-4 ‘Air Quality’ L2	<ul style="list-style-type: none"> Requirements for L1 are achieved. Monitoring and modelling demonstrates no recurring or major exceedances of air emission or air quality goals 	Section 5.14 Construction Monitoring Program
Dis-4 ‘Air Quality’ L3	<ul style="list-style-type: none"> Requirements for L2 are achieved. Monitoring and modelling demonstrates no exceedances of air emission or air quality goals 	Section 5.14 Construction Monitoring Program
Ene-1 ‘Energy and carbon monitoring and reduction’ L1	<ul style="list-style-type: none"> Monitoring and modelling of energy use and greenhouse gas (GHG) emissions, and actions taken to reduce them, is undertaken, covering at least Scope 1, Scope 2 and land clearing across the infrastructure lifecycle. 	Sustainability Management Plan
Ene-1 ‘Energy and carbon monitoring and reduction’ L2.67	<ul style="list-style-type: none"> Requirements for L1 are achieved. Monitoring and modelling demonstrates a reduction of 25% in GHG emissions compared to a base case footprint. 	Sustainability Management Plan
Ene-2 ‘Use of Renewable Energy’ L1	<ul style="list-style-type: none"> Opportunities for use of renewable energy fully investigated. 	This section

Credit	IS Rating Tool Requirement	Document Reference
Ene-2 'Use of Renewable Energy' L3	<ul style="list-style-type: none"> Requirements for L1 are achieved. Substitution of energy from renewable sources of 40% 	This section
Cli-1 'Climate change risk assessment' L1	<ul style="list-style-type: none"> A readily available climate change projection is identified and adopted for the asset region over the forecast useful life of the asset. Direct climate change risks to the asset over the forecast useful life are identified and assessed. 	This section
Cli-1 'Climate change risk assessment' L2	<ul style="list-style-type: none"> Requirements for L1 are achieved. A number of readily available climate change projections are identified and adopted for the asset region over the forecast useful life of the asset. The climate change risk assessment also considered indirect climate change risks to the asset. A multi-disciplinary team participated in identifying climate change risks and issues. 	This section
Cli-2 'Adaptation measures' L1	<ul style="list-style-type: none"> Adaptation options to treat all extreme and high priority climate change risks are identified, assessed and appropriate measures implemented. After treatment there are no extreme priority residual climate change risks. 	This section
Cli-2 'Adaptation measures' L2	<ul style="list-style-type: none"> Requirements for L1 are achieved. Adaptation options to treat 25-50% of all medium priority climate change risks are identified, assessed and appropriate measures implemented. 	This section
Cli-2 'Adaptation measures' L3	<ul style="list-style-type: none"> Requirements for L2 are achieved. The optimal scale and timing of options is addressed (which may be triggered by when a specific climate threshold is likely to be achieved). Adaptation options to treat at least 50% of all medium priority climate change risks are identified, assessed and appropriate measures implemented. After treatment there are no high priority residual climate change risks. 	This section
Was-1 L1	<ul style="list-style-type: none"> Predictions for waste quantities and types have been developed for construction and operation Measures to minimise waste during construction and operation have been identified and implemented Monitoring of all wastes is undertaken during construction 	Section 5.15.5
Was-1 L2	<ul style="list-style-type: none"> Requirements for L1 are achieved. Waste monitoring and management has been managed, reviewed or audited by a suitably qualified professional. 	Section 5.15.5

Credit	IS Rating Tool Requirement	Document Reference
	<ul style="list-style-type: none"> Waste handling and disposal/recycling all the way to final destination has been audited at appropriate intervals 	
Was-2 L1	<ul style="list-style-type: none"> 70 to <80% of spoil volume diverted 25 to <50% of volume of inert and non-hazardous waste diverted 25 to <40% by volume of office waste material diverted 	Section 5.15.5 Section 5.15.7
Was-2 L2	<ul style="list-style-type: none"> 80 to <100% of spoil volume diverted 50 to 90% of by volume of inert and non-hazardous waste diverted 40 to 60% by volume of office waste material diverted 	Section 5.15.5 Section 5.15.7
Was-2 L3	<ul style="list-style-type: none"> 100% by volume of spoil diverted >90% by volume of inert and non-hazardous waste diverted >60% by volume of office waste material diverted 	Section 5.15.5 Section 5.15.7
Mat-1 L1	<ul style="list-style-type: none"> Monitoring and modelling of materials lifecycle impacts is undertaken using the Materials Calculator (or other suitable Lifecycle Assessment technique) across the infrastructure lifecycle. 	Sustainability Management Plan
Mat-1 L2	<ul style="list-style-type: none"> Requirements for L1 have been achieved. Monitoring and modelling demonstrates a reduction in materials lifecycle impacts compared to a base case footprint up to 15%. 	Sustainability Management Plan

6 RESPONSIBILITIES AND AUTHORITIES

6.1 Key Personnel

The key responsibilities of the GLC environmental personnel and other personnel involved in site establishment works are detailed in Table 6.1.

Table 6.1: Roles and Responsibilities

Role	Key Responsibilities and Authorities
Environmental personnel	
Environment and Sustainability Lead	<ul style="list-style-type: none"> • Reports to Deputy Project Director • Authorised to stop work in the event of potential environmental harm • Provide adequate resources to meet environmental objectives • Primary contact on environmental and sustainability matters to Sydney Metro, the Acoustic Advisor, and Environmental Representative • Provide environmental support to the project team • Coordinate internal audits • Report to management on environmental performance and breaches
Environmental Manager	<ul style="list-style-type: none"> • Reports to the Environment and Sustainability Lead • Ensures that the SEMP is effectively established, implemented and maintained at the project level • Ensures relevant licences, approvals and permits are obtained • Ensures compliance with all relevant statutes, regulations, rules, procedures, standards and policies • Ensures that all personnel on site receive appropriate environmental induction and training and are aware of their environmental responsibilities under relevant legislation and the contract • Ensures that environmental records and files are collected and maintained • Conducts regular compliance checking as required by this SEMP • Ensures that non-conformances and environmental incidents are recorded and written reports are provided to the Client's Representative and Environmental Manager within 24 hours. Liaises with the required stakeholders to confirm the nature of the corrective action required and comply with the timeframe within which corrective actions must occur • Ensures environmental controls, materials and equipment are maintained • Maintains an ongoing relationship with the Environmental Representative and Acoustics Advisor by coordinating site inspections and maintaining open communication regarding on-site activities and environmental activities.
Senior Environmental Advisor	<ul style="list-style-type: none"> • Reports to the Environmental Manager • Ensures that the SEMP and EPL are effectively implemented and maintained at the project level • Ensures compliance with all relevant statutes, regulations, rules, procedures, standards and policies

Role	Key Responsibilities and Authorities
	<ul style="list-style-type: none"> ● Delivers environmental induction and training and ensures all staff are aware of environmental responsibilities under legislation and the contract ● Ensures that environmental records and files are collected and maintained ● Conducts regular compliance checking as required by this SEMP ● Ensures that non-conformances and environmental incidents are recorded and written reports are provided to the Senior Environmental Manager for submission to the Client’s Representative and Environmental Manager within 24 hours. Liaises with the required stakeholders to confirm the nature of the corrective action required and comply with the timeframe within which corrective actions must occur ● Ensures environmental controls, materials and equipment are maintained ● Maintains an ongoing relationship with the Environmental Representative by participating in site inspections and maintaining open communication regarding on-site activities and environmental activities.
Environmental Advisor	<ul style="list-style-type: none"> ● Reports to the Senior Environmental Advisor ● Undertake site inspections to ensure compliance with the SEMP and environmental impacts are minimised ● Inspection of environmental controls and implementation of mitigation and management measures ● Ensures compliance with all relevant statutes, regulations, rules, procedures, standards and policies ● Ensures that environmental records and files are collected and maintained ● Record any identified environmental non-conformances and raise them with the Site Supervisor / Senior Environmental Advisor.
Heritage Specialist	<ul style="list-style-type: none"> ● Provide advice for the use of equipment and installation of hoarding near built heritage items to ensure any such work does not have an adverse impact on the heritage significance of the item ● Conduct site inspections, where necessary, to ensure any works near built heritage items are not impacting the heritage significance of the item ● Review any proposed scope or methodology changes which may impact on heritage items.
Other key personnel	
Project Director	<ul style="list-style-type: none"> ● Project Director reports to the Steering Committee ● Ensures project responsibilities/authorities are defined/communicated ● Accountable for implementation of the SEMP ● Provides adequate resources to meet environmental objectives ● Appoints/nominates and provides support for the Environment and Sustainability Lead ● Approves the SEMP ● Reports to Steering Committee on the performance of the system and environmental breaches ● Reports environmental incidents to the client / authorities as required ● Authorise expenditure on environmental issues within limits of authority

Role	Key Responsibilities and Authorities
	<ul style="list-style-type: none"> Resolve major issues which cannot be resolved by the Deputy Project Director Must complete corporate and project induction covering environmental responsibilities and Gamuda's environmental management system.
Deputy Project Director	<ul style="list-style-type: none"> The Deputy Project Director reports to the Project Director Ensures that the SEMP is effectively implemented and maintained Takes action to resolve environmental non-conformances and incidents Ensure that internal audits of the system are conducted Review audit corrective actions and take action as necessary to ensure timely close out of issues Reports to senior management on the performance of the system and environmental breaches Ensures suppliers and subcontractors comply with requirements Resolve major issues which cannot be resolved by the Environment and Sustainability Lead Must complete corporate and project induction covering environmental responsibilities and Gamuda's environmental management system.
Construction Manager	<ul style="list-style-type: none"> Construction Manager reports to the Project Director Manage site establishment works in accordance with the Planning Approval and obligations Ensures compliance with this plan, procedures and ECMs Support and integrate sustainability initiatives and tracking Work collaboratively with environment teams to resolve incidents safely
Site Supervisor / Site Foreman	<ul style="list-style-type: none"> Site Supervisor / Site Foreman reports to the Construction Manager Responsible for site inductions and toolbox training with all personnel and sub-contractors regarding site-specific environmental issues and compliance with the SEMP Regular monitoring of the Site to ensure compliance with the SEMP and identify any potential environmental risks that require management Record and action identified environmental non-conformances Regular inspections of site establishment plant, equipment and vehicles Identify resources required for implementation of the SEMP Responsible implementing the actions required in an event of an emergency, including the shut down of site establishment works.
Building Surveyor	<ul style="list-style-type: none"> Undertake initial condition surveys of all buildings, structures and utilities identified in the SEMP as being at risk of damage prior to site establishment works. Document the results of the surveys in a Pre-construction Condition Survey Report for each item surveyed Undertake post site establishment condition surveys of all buildings identified in the Pre-construction Condition Survey Report. Document the results of the surveys in a Post-construction Condition Survey Report for each item surveyed
Utility Coordination Manager	<ul style="list-style-type: none"> Responsible for the management and coordination of all utility work associated with the delivery of the Site, to ensure respite is provided to the community

Role	Key Responsibilities and Authorities
	<ul style="list-style-type: none"> Provide advice to Sydney Metro regarding upcoming utility work, including the scope of the work and the responsibility for the work Investigate complaints received for the site establishment works relating to utility work and providing a response as required.
All site personnel and subcontractors	<ul style="list-style-type: none"> Ensure all site establishment works are compliant with the SEMP Follow all procedures outlined in the site induction / toolbox talks Review the ECMs for the SEMP to be informed of environmentally sensitive areas Responsible for personal duty of care when carrying out an activity, ensuring it is performed in a way that minimises risk of environmental impact.

6.2 Sydney Metro

Sydney Metro is the Proponent under the EP&A Act for these works being carried out under the approval of the Stage 1 for major civil construction work between Westmead and The Bays Precinct (SSI 10038). Sydney Metro has ultimate responsibility for compliance with the Planning Approval.

The Sydney Metro Delivery Environment and Sustainability team will ensure compliance with the Project Planning Approval obligations.

6.3 Regulatory and Other Key Stakeholders

6.3.1 Environmental Representative

The ER is approved by the Planning Secretary and engaged by Sydney Metro. The ER was not involved in development of the Planning Approval documents (including the EIS) and is independent of the design and construction personnel.

The role of the ER is to oversee compliance with the Planning Approval. They are the principle point of advice for the environmental management of the delivery of the site establishment. The ER's role is further outlined through MCoAs A27 to A31 of the Planning Approval. GLC will:

- Immediately notify the ER of all environmental incidents and non-compliances
- Provide relevant information and documents as requested by the ER to perform their functions
- Provide access to the site as reasonably required to allow the ER to perform its functions under the Planning Approval
- Update this Plan to address any relevant requirements and recommendations of the ER.

6.3.2 Acoustics Advisor

The AA is approved by the Planning Secretary and engaged by Sydney Metro. The AA is independent of the design and construction personnel.

The role of the AA is to oversee compliance and provide independent noise and vibration advice in accordance with the Planning Approval. The AA's role is further outlined through MCoAs A32 to A36 of the Planning Approval. GLC will:

- Provide access to noise and vibration monitoring activity as they take place
- Submit noise and vibration plans, assessments, monitoring reports and data analyses undertaken for review
- Consider any recommendations to improve practices and demonstrate why any recommendation is not adopted.

Further information about the role of the AA is included in the Noise and Vibration Management Sub-plan for the WTP CEMP.

6.3.3 Environmental Protection Authority

The EPA has powers under a range of legislation and is the agency primarily responsible for administering the POEO Act. The Site will require an EPL as the site establishment works are consistent with those defined by Schedule 1 of the POEO Act as "Railway Activities – Railway Infrastructure Construction". GLC will:

- Work closely with the EPA to obtain and hold an EPL for the works
- Notify the EPA in the event of an incident in accordance with relevant legislation and this plan
- Report to the EPA as required by the EPL
- Provide access to the site as reasonably required.

7 ENVIRONMENTAL RISK IDENTIFICATION AND MANAGEMENT

7.1 Risk Assessment Approach

A site-specific Environmental Risk Assessment is presented in Attachment 3 outlining site specific aspects and impacts of site establishment works. The assessment outlines:

- Key establishment activities and associated environmental aspects
- Potential impacts
- Indicative mitigation and management measures
- Risk level for each environmental aspect prior to and following mitigation measures.

The identification of risks included a review of the proposed works and review of the environmental risks identified by the EIS and subsequent Amendment Report.

To quantify the potential for an impact to cause harm, the qualitative environmental risk assessment was undertaken using the *ISO 31000:2009 Risk Management – Guidelines* and the Gamuda Australia Integrated Management System, namely GA-MSP-005 Risk Management.

The risk assessment criteria, consequence of the potential impact and likelihood of the potential impact as identified in Table 7.1, Table 7.2 and Table 7.3 has been used to undertake the risk assessment located in Attachment 3.

The activity-specific site mitigation and management measures outlined have been developed to comply with the requirements from the Sydney Metro CEMF, MCoA and REMMs. Management measures may include physical controls, procedures, forms, checklists, monitoring requirements, permits, etc.

An environmental risk assessment workshop was held on 9 December 2021 for the wider WTP project to refine this risk assessment.

An ongoing program for analysis of environmental risks will be documented through the following:

- Environmental risk register (reviewed every six months and following incidents and non-compliances)
- Environmental inspections.

Table 7.1: Risk Rating

Likelihood	Consequence				
	Extreme 5	Major 4	Moderate 3	Minor 2	Insignificant 1
Almost Certain 5	Extreme (25)	Extreme (20)	Extreme (15)	High (10)	Moderate (5)
Likely 4	Extreme (20)	Extreme (16)	High (12)	Moderate (8)	Low (4)
Possible 3	Extreme (15)	High (12)	Moderate (9)	Moderate (6)	Low (3)
Unlikely	High (10)	Moderate (8)	Moderate (6)	Low (4)	Low (2)

Likelihood	Consequence				
	Extreme 5	Major 4	Moderate 3	Minor 2	Insignificant 1
2					
Rare 1	Moderate (5)	Low (4)	Low (3)	Low (2)	Very low (1)

Table 7.2: Likelihood Scale

Level	Descriptor	Definition
1	Rare	Unlikely to occur during a lifetime or very unlikely to occur
2	Unlikely	Could occur about once during a lifetime or more likely not to occur than to occur
3	Possible	Could occur more than once during Project lifetime or more likely not to occur than to occur
4	Likely	Will probably occur in most circumstances
5	Almost Certain	Is expected to occur in most circumstances

Table 7.3: Consequence Scale

Level	Descriptor	Definition
1	Insignificant	<ul style="list-style-type: none"> Very low environmental and health impacts confined to a small area within the Project area; Prompt (typically within a shift) clean-up; Negligible loss of human, social, financial or built capital/wellbeing; Negligible media coverage; First aid injury.
2	Minor	<ul style="list-style-type: none"> Low environmental and health impacts confined within the Project area; Short-term (typically within a week) clean-up; Small but noticeable loss of human, social, financial or built capital/wellbeing, can be easily rehabilitated; Regulation breaches without fine or litigation; Negative local media coverage; Complaint from community; Medical treatment injury/ occupational health effects/ Restricted Work Injury.
3	Moderate	<ul style="list-style-type: none"> Reversible offsite environmental health impacts, requiring short-term clean-up (weeks); Onsite medium term (months) clean-up; Moderate, noticeable loss of financial or built capital/wellbeing; Regulation breaches resulting in fine or prosecution;

Level	Descriptor	Definition
		<ul style="list-style-type: none"> Negative media coverage at local/regional level over more than one day; Lost time/disabling injury/ occupational health effects/multiple medical treatments.
4	Major	<ul style="list-style-type: none"> Major, offsite, environmental and health impacts requiring medium-term clean-up (months); Onsite impact requiring significant clean-up effort (years); Substantial loss of financial or built capital/wellbeing, will attract public concern; Major litigation at operation level; Negative national media cover age; Fatality or permanent incapacity/health effects.
5	Extreme	<ul style="list-style-type: none"> Prolonged or severe, offsite or regional environmental and health impacts requiring long-term clean-up (years) with irreversible residual damage; Extreme permanent loss of, financial or built capital/ wellbeing, with anticipated major public outrage; Major litigation or prosecution at parent company level; Loss of environmental licence; Fatalities or permanent injuries from single incident.

8 TRAINING, AWARENESS AND COMPETENCE

8.1 Training Needs Analysis

An Environmental Training Needs Analysis has been undertaken by the Senior Environmental Lead and the Workforce Development Manager during the SEMP planning phase. The analysis included an assessment of training skill level required and the potential for any gaps between required knowledge and actual knowledge levels. The analysis will inform the Training Management Plan, which will be developed as part of the broader WTP CEMP. It will be particularly useful in identifying the need for target environmental awareness training across the Project.

For each key environmental risk, relevant training requirements have been identified. A matrix was prepared listing all roles that hold environmental responsibility as detailed in this SEMP, against training requirements based on the environmental aspect that that role would encounter as part of its activities on this project (refer to Table 8.1). As a result, the matrix specifies the minimum training requirements for each role. It outlines all training courses or events and the frequency of that training.

The Workforce Development team along with the Environmental team will schedule and coordinate the training to be delivered to the identified team members as outlined in the training matrix. The project induction and SEMP onboarding (where identified) will be provided as minimum training for new starters to the site.

The above teams will co-manage the matrix and update completion against the identified workforce participants. Participants will be sent calendar invites to notify them of the training, and attendance will be recorded within the Workforce Development records keeping system. Upon attendance, the matrix will be updated to reflect the training has been completed. The matrix will be reviewed on an ongoing basis to ensure people who were unable to attend and any new starters are captured and invited to the next session.

Personnel performing tasks that can cause significant environmental impacts will be selected on competency based on education, training and experience. All employees will receive suitable environmental induction/training to ensure that they are aware of their responsibilities and are competent to carry out the work. Environmental requirements will be explained to employees during site induction and on-going training via toolbox meetings, briefings, notifications and the like.

Table 8.1: Training Needs Matrix

Training Topic / Course	Completed by	Personnel															
		Project Director	Senior Managers	Superintendents	Engineers	Safety	Traffic Engineers	Quality, Systems and Digital	Environmental	Sustainability	Community Stakeholder and	Site Foreman / Supervisor	Leading Hands	Labourers	Subcontractors	Design	Administration
Project induction	Prior to commencing work on the project																
Project approvals, licences, obligations and requirements																	
Out of hours works approvals and permit processes and requirements																	
Environmental incident identification, response and management																	
Unexpected finds procedure and asbestos awareness																	
SEMP onboarding	Prior to SEMP activities																
Environmental management																	

Training Topic / Course	Completed by	Personnel															
		Project Director	Senior Managers	Superintendents	Engineers	Safety	Traffic Engineers	Quality, Systems and Digital	Environmental	Sustainability	Community Stakeholder and	Site Foreman / Supervisor	Leading Hands	Labourers	Subcontractors	Design	Administration
obligations and due diligence																	
Erosion and sediment control techniques and practices	Prior to commencing work on the project																
Environmental noise and vibration monitoring	Prior to commencing work on the project																
Practical erosion and sediment control for the workforce	Prior to commencing work on the project																
Selecting and installing erosion and sediment control measures	Prior to commencing work on the project																

8.2 Environmental Induction

All employees (including subcontractors) will attend a compulsory induction prior to works commencing on site. The environmental component of the induction will include the following:

- Training purpose and objectives
- Environmental Policy
- SEMP environmental objectives, targets and key performance indicators
- Individual authorities and responsibilities
- Potential consequences of departures from rules and responsibilities
- Approval conditions and licences and permit requirements
- Environmental emergency procedure and response
- Due diligence and duty of care requirements
- High risk activities and associated mitigation and management measure
- Location of sensitive receivers
- Incident response and reporting requirements
- Unexpected Finds Procedure: Heritage and Contamination Management
- Key environmental issues, mitigation and management measure and working in or near environmentally sensitive areas
- Site specific issues including ECMs, their purpose, scope and use
- Protocols for interaction with the community and stakeholders.

All staff involved with site establishment works will be provided with training in environmental requirements. Initial training in the SEMP for key personnel will be undertaken prior to site establishment starting. SEMP training for new staff members will be completed as required prior to their commencement. A brief, short-term induction will be used for visitors who will be accompanied by an inducted site personnel.

8.3 Daily Pre-start Meetings

The Site Supervisor will deliver a daily pre-start meeting with the site workforce before the commencement of work each day. It will target new information beyond that included in the induction, high risk issues specific to the day's activities and emerging/recurring issues. It will cover environmental protection practices, no-go zones, environmental risks and hazards specific to the day's activities. Typically, the daily pre-start meetings would take around 10-15 minutes to deliver.

8.4 Targeted Environmental Awareness Training

Targeted training will be delivered to ensure environmental awareness continues throughout site establishment. It will be tailored to specific issues identified from training needs analysis or as part of ongoing continual improvement. Training in aspects outlined in Table 8.2 will be undertaken as the site establishment progresses. It will be scheduled to reflect the program for critical activities.

Table 8.2: Targeted Training

Aspect	Training Inclusion	Personnel Required	Timing/Frequency/ Means
Emergency Spill Response	<ul style="list-style-type: none"> • Use/location of spill kits • Spill control • Emergency response procedures • identify hydraulic hose fatigue 	Site Establishment Personnel	Project Toolbox Talks
Noise and Vibration Management	<ul style="list-style-type: none"> • The management of noise impacts 	Project engineers responsible for the implementation of noise and vibration mitigation measures	Prior to the commencement of activities with the potential for high noise impacts on sensitive receivers
Blue Book Training	<ul style="list-style-type: none"> • Erosion and sediment control training 	Project engineers managing excavation works	Prior to commencement of excavation works

9 CONSULTATION AND COMMUNICATION

9.1 Internal Communication

Internal stakeholders include GLC employees/staff and subcontractors. General internal communication methods will depend on the urgency and nature of the information and include:

- Toolbox talks, employee inductions, and subject specific training
- Management reports
- Site inspection reports, audit reports and incident reports
- Noticeboards, notifications and alerts
- Site meetings and briefings.

9.2 External Communication

The stakeholders relevant to these works include Government agencies such as DPE, EPA and Councils, as well as members of the public (community), public interest groups, affected businesses and other relevant third-party agencies, authorities and organisations.

General external communication methods will include:

- The GLC Environmental Manager, environment staff involved in managing compliance with the Planning Approvals, SMEs as requested, and the Community and Stakeholder Engagement Manager, will attend weekly environment and approvals meetings with Sydney Metro, the ER, the AA and other attendees as required
- All significant incidents notified to the client and ER/Approving Authority
- Monthly reporting to Sydney Metro
- Meetings and correspondence with interested parties (local councils and EPA) as necessary
- Discussions with adjoining landowners/neighbours and the community who may be affected by the site establishment works in accordance with the Sydney Metro West Overarching Community Communications Strategy (OCCS); and the Community Communications Strategy and Business Management Plan
- Provide documented evidence to the Principal's Representative, or any independent party appointed through the MCoA, as required upon request.

Consultation with stable owners and workers will be conducted through the Australian Turf Club (ATC). Regular meetings will be held with the ATC and weekly email construction updates are being provided to the ATC about construction progress and upcoming works.

In accordance with the requirements for consultation specified in the CEMF, the following consultation approach will be undertaken:

1. Provide agencies with a copy of the final draft SEMP for review and seek feedback
2. Present the proposed approach with regards to management measures specific to the activities relevant to the agencies
3. Update document in response to feedback received
4. Provide feedback to agencies demonstrating how comments have been closed out.

Evidence of consultation will be submitted to the Planning Secretary as required by the Planning Approval and attached as Attachment 7 of this SEMP. This evidence will include the following:

- Documentation of engagement with relevant stakeholders, including dates of consultation (or dates of attempted consultation if unable to reach a stakeholder)
- Evidence of follow-up consultation if feedback has not been provided by a stakeholder
- Key issues raised during consultation and how they have been addressed, including justification for not addressing any outstanding issues.

The approved ER will manage communications from the Planning Secretary in relation to the environmental performance for the Site. The ER will consider and inform the Planning Secretary on matters specified in the MCoA outlined in Attachment 1.

If requested by the Planning Secretary, the approved ER may assist in the resolution of community complaints received directly by the Department.

9.2.1 Noise Disturbances

Out-of-hours deliveries have been addressed in LIW 7 & 8 and are discussed for completeness in Section 4.3.

The AA will manage communications from the Planning Secretary in relation to the noise and vibration for the Site. The AA will consider and inform the Planning Secretary on noise and vibration matters specified in the MCoA outlined in Attachment 1.

In the event that conflict arises between the GLC and the community in relation to the noise and vibration performance of site establishment works, the AA will follow the procedure in the Overarching Community Communication Strategy referenced in MCoA B1 of the Planning Approval to attempt to resolve the conflict, and if it cannot be resolved, notify the Planning Secretary.

9.2.2 Traffic and Transport

The general community will be notified at least seven (7) days in advance of proposed road and pedestrian network changes through appropriate forms of community liaison, which may include doorknocks, letterbox drops, emails, newspaper advertisements and social media updates.

In the event of a traffic related incident, coordination will be carried out with Transport for NSW, including Transport Coordination and/or the Transport Management Centre's Operations Manager.

9.2.3 Impact to Buildings, Utilities, Services and Other Infrastructure

9.2.3.1 Condition Surveys

A Building Surveyor will undertake condition surveys prior to site establishment works, as well as post site establishment, which includes all buildings, structures and utilities identified in the SEMP as being at risk of damage.

Copies of Pre-construction Condition Survey Reports will be provided to the relevant owners of the items surveyed in the vicinity of the proposed work, and no later than one (1) month before the commencement of the work that could impact on the subject surface / subsurface structure.

Copies of Post-construction Condition Survey Reports will be provided to the landowners of the items surveyed, and no later than three (3) months following the completion of the work that could impact on the subject surface / subsurface structure unless otherwise agreed by the Planning Secretary.

9.2.3.2 Utilities and Services

Utilities, services and other infrastructure potentially affected by site establishment works will be identified before the commencement of works affecting the item, in order to determine requirements for access to, diversion protection, and / or support.

The relevant owner(s) and / or provider(s) of services will be consulted to make suitable arrangements for access to diversion, protection, and / or support of the affected infrastructure as required.

GLC will ensure that disruption to any service is minimised and is responsible for advising local residents and businesses affected before any planned disruption of service.

10 MONITORING AND INSPECTION

In order to validate the predicted impacts of site establishment works and to measure the effectiveness of environmental controls, environmental monitoring will be undertaken.

10.1 Monitoring

Regular monitoring of compliance with the relevant conditions of approval for the SEMP (including the MCoAs, performance outcomes REMMs and CEMF requirements in Attachment 1) during site establishment works will be undertaken by the Environmental Manager. In addition, the Environmental Manager will monitor the implementation of mitigation and management measures in Attachment 2 and how they meet the EPOs identified in Section 2.4.

The approved ER will regularly monitor the implementation of the SEMP to ensure implementation is being carried out in accordance with the relevant MCoA in Attachment 1.

The results of any monitoring undertaken as a requirement of a licence or permit that is required to be published will be published on the Sydney Metro, or a project specific, website within 14 days of obtaining the results.

10.1.1 Noise and Vibration Monitoring Program

During site establishment, monitoring of noise levels will be undertaken by personnel suitably qualified and experienced in undertaking acoustic measurements will be undertaken as follows:

- Monitoring will be carried out at the commencement of activities to confirm that actual noise and vibration levels are consistent with noise and vibration impact predictions and that the management measures that have been implemented are appropriate
- Where a change in methodology, plant or equipment is anticipated to result in a significant increase in noise impact
- In response to a noise related complaint
- As otherwise required by the NVIA.

Noise monitoring will be targeted to select locations that have been identified as sensitive (e.g. The Rosehill Gardens Racecourse Stables) refer Attachment 4.

The following information shall be recorded within the noise monitoring record template:

- Date and time of measurements
- Type and model number of instrumentation
- Results of field calibration checks before and after measurements
- Description of the time aspects of each measurement (i.e. sample times, measurement time intervals and time of day)
- Monitoring will be undertaken at the nearest sensitive receiver
- Sketch map of area
- Background noise/noise due to other sources (e.g. traffic, trains, dogs barking, insects etc.)
- Weather conditions during measurements.

Vibrational monitoring will be undertaken when required (i.e. during vibration generating activities). Periodic monitoring of vibrational levels will be undertaken at heritage items within proximity to the site establishment works (identified in Section 5.3), to ensure it does not exceed the relevant criteria.

The approved AA will regularly monitor the implementation of all noise and vibration documents, including the noise and vibration monitoring program and Attachment 4, required to be prepared under the MCoA in Attachment 1 to ensure implementation is in accordance with what is stated in the SEMP and Attachment 1.

10.2 Inspections

GLC's Environmental Inspection Report Form (Attachment 8) will be used to monitor environmental issues on site and issued to the Project Director. The report will be completed by the Environment Coordinator on a weekly basis.

At a minimum, fortnightly site inspections will be completed by the GLC Environmental Advisor or equivalent. Inspections may be more frequent where there is increased activity on site or as outlined in Table 10.1 below.

Table 10.1: Inspection Requirements

Item	Scope	Frequency	Responsibility
Weather	<ul style="list-style-type: none"> ● Monitoring of weather forecasts when adverse weather conditions are predicted. Specific notifications will be made if: <ul style="list-style-type: none"> – Winds exceed 25km/h – Temperature exceeds 40 degrees Celsius – High rainfall events (>20mm a day or a 5-day rainfall event) ● Monitoring of the Site following high wind, temperature and rainfall events to manage any impact to surrounding environmental receivers. 	Weekly forecast	Environmental Advisor
Inspection of environmental controls and implementation	<ul style="list-style-type: none"> ● Hoardings and boundary fencing ● Erosion and sediment controls ● Traffic control plan measures ● Waste storage and collection practices ● Chemical and fuel storage ● Operation of plant and equipment 	Weekly	Environmental Advisor and Site Supervisor
Inspection of work sites	<ul style="list-style-type: none"> ● The ER, AA and Sydney Metro staff will undertake inspections of works sites, and in particular, critical activities throughout construction of the Project. Inspections timing dependant on complexity and anticipated risks associated with the work 	Fortnightly/weekly (as required depending on construction activities)	ER, Sydney Metro (SM) and AA

Item	Scope	Frequency	Responsibility
	occurring at the time. ER will undertake inspections and produce an ER Inspection Report		
AA monthly noise and vibration report	<ul style="list-style-type: none"> Monthly review of the noise impacts of minor ancillary facilities Only required if requested by the ER 	Monthly	AA
Dust monitoring	<ul style="list-style-type: none"> No visible dust emissions 	Continual	Site personnel
General noise and vibration monitoring	<ul style="list-style-type: none"> Noise and vibration generating activities Designated areas for construction vehicles and site offices Operating plant and equipment 	Continual	Site personnel
Building condition survey	<ul style="list-style-type: none"> Condition surveys of all items assessed as part of the initial surveys (refer to Section 4.2) upon completion of site establishment works. The results of the surveys will be documented in a Post-construction Condition Survey Report for each item surveyed. 	End of site establishment works	Building Surveyor

11 REVIEW AND IMPROVEMENT

11.1 Continuous Improvement

Continuous improvement of this SEMP to ensure its effectiveness will be achieved through ongoing monitoring and evaluation of environmental management performance against environmental policies and objectives.

The objective of the continuous improvement process is to:

- Identify areas of opportunity for improvement of environmental management and performance
- Determine the cause(s) of any non-compliances and deficiencies
- Develop and implement a plan of corrective and preventative action to address any non-compliances and deficiencies
- Verify the effectiveness of the corrective and preventative actions
- Document any changes in procedures resulting from process improvement.

Environmental controls will be inspected regularly to ensure their ongoing suitability and effectiveness. Monitoring is carried out to establish pre-construction benchmarks, confirm compliance with the conditions of environmental approvals, licences and laws and to provide early indication of potential adverse impacts to the environment or community.

Improvements recommended by the ER, which may be made to work practices to avoid or minimise adverse impact to the environment and community, will be taken into consideration (which may result in an amendment to the SEMP). Additionally, improvements recommended by the AA, which may be made to work practices to avoid or minimise adverse noise and vibration impacts, will be taken into consideration.

11.2 Document Approval

This SEMP has been prepared in accordance with MCoA A17. It has been prepared with the review of Sydney Metro and the GLC Project Director and Environment and Sustainability Lead prior to submission to the ER for endorsement.

The SEMP will be submitted to the Planning Secretary for approval one (1) month before the establishment of any ancillary facilities, unless the ER is expressly nominated by the Planning Secretary to endorse the SEMP. In this case, the SEMP is to be submitted to the ER at least one (1) month prior to establishment works. It is intended that this SEMP will be endorsed by the ER.

The approved ER will endorse the SEMP, as well as any other documents identified by the Planning Secretary, prior to being submitted to the Planning Secretary for approval. Once endorsed, the documents will be submitted as soon as practicable to the Planning Secretary, unless otherwise agreed by the Planning Secretary. If these documents do not require approval from the Planning Secretary, the ER will endorse the documents before the implementation of such documents.

Approval of changes to the SEMP will be managed as per Section 11.7 on a case-by-case basis in consultation with the Planning Secretary / ER and, where required, will be endorsed by the ER.

The approved AA will review all noise and vibration documents required to be prepared under the MCoA in Attachment 1 and, should they be consistent with the MCoA, endorse them before submission to the Planning Secretary (if required to be submitted to the Planning Secretary) or before implementation (if not required to be submitted to the Planning Secretary).

11.3 Auditing

11.3.1 Independent Environmental Audits

The WTP project EMS will be audited by an Independent External Auditor engaged by Sydney Metro. The proposed Independent External Auditor will be approved by the Planning Secretary before the commencement of the Independent Audit.

The Independent Audit Program will be undertaken in accordance with MCoA A39 to A42 and managed by Sydney Metro. The Independent Audits will be undertaken in accordance with the *Independent Audit Post Approval Requirements* (IAPAR) (DPE, 2020). However, the Planning Secretary may require the Independent Audits to be undertaken at different times to those specified in the IAPAR, which would be notified to GLC at least four (4) weeks prior to the proposed audit date.

Independent Audit Reports and GLC's response to audit findings will be submitted to the Planning Secretary within two (2) months of undertaking the independent audit site inspection as outlined in the IAPAR, unless otherwise agreed by the Planning Secretary.

11.3.2 Internal Audits

GLC will undertake an internal audit within the first three months from commencement of site establishment works for the SEMP.

The scope of the audit will include but not be limited to:

- Compliance with the Planning Approval and any additional permits or licenses
- Compliance with the EMS and the SEMP
- Environmental training records
- Environmental monitoring and inspection results.

An internal audit schedule will be developed by GLC to align with Integrated Management System requirements. It will allow for flexibility where necessary i.e. internal audits will not coincide with external audits.

Auditing of the project environmental requirements will be carried out in accordance with Gamuda Australia Integrated Management System, AS/NZS ISO 14001:2016 Environmental management systems - Requirements with guidance for use and AS/NZS ISO 19011:2019– Guidelines for Auditing Management Systems. Audits will be undertaken by suitably qualified personnel within the Project team or as engaged by GLC.

Actions arising from the audit will be developed in consultation with the personnel involved in the audit and implementation overseen by the Environment and Sustainability Lead.

If requested by the Planning Secretary, the approved ER and AA may help plan or attend audits, including scoping audits, programming audits, briefings and site visits, but not independent environmental audits required under MCoA A39.

GLC has developed an audit schedule which includes internal and external audits. Facilitation of environmental audits will be led by the Environment and Sustainability Lead.

11.4 Non-Conformance

Non-conformance arising out of monitoring, inspections and audit outcomes will be recorded and addressed by raising a GLC Health, Safety, Environment and Quality Non-Conformance Report and managed in accordance with the Sydney Metro Environmental Incident and Non-Compliance Reporting Procedure. All actions will be centrally recorded and monitored within Velocity EHS, Gamuda’s assurance software.

All non-conformances will be reviewed to evaluate the need for action to prevent reoccurrence. Actions to review the non-conformance will include:

- Understand the nature of the nonconformity and the requirement it relates to
- Determining the causes of the nonconformity
- Determining if similar nonconformities exist, or could potentially occur
- Identify the need for corrective actions to ensure the compliance requirement is understood by the relevant project personnel and that the requirement is clearly documented. Corrective actions may include team communication such as alerts or toolbox talks, training, or review of this plan
- Review the effectiveness of any corrective action taken.

Sydney Metro or the ER may also raise non-conformances against environmental requirements. In this event, form GA-FRM-HSEQ-015 Health, Safety, Environment Quality Non-Conformance Report will be raised and managed in accordance with the Sydney Metro Environmental Incident and Non-Compliance Reporting Procedure.

Sydney Metro will be advised of non-conformances in a timely manner. Non-conformances and their corrective actions will also be outlined in the Monthly Report (refer Section 11.5).

11.4.1 Notification of Non-compliance

The Planning Secretary will be notified in writing via the Major Projects website within seven (7) days after GLC becomes aware of any non-compliances with the MCoA in Attachment 1.

A non-compliance notification will identify the CSSI (including the application number for it), set out the MCoA that the site establishment works are non-compliant with, the way in which it does not comply and the reasons for the non-compliance (if known) and what actions have been, or will be undertaken to address the non-compliance.

11.5 Corrective Actions

Corrective Actions arising from audits, inspections, non-conformances or incidents will be captured in a Corrective Actions Register to prevent recurrence or manage ongoing environmental risk. This register will track the action, when and how it was raised, who is responsible and timeframe for implementation. Corrective actions are differentiated by risk ranking. The nominated timeframes to resolve items on the register are as follows:

Table 11.1: Corrective Action Requests

CAR Risk Ranking	Timeframe for resolution
1	Action needs to be commenced immediately to resolve the issue.
2	Action needs to be resolved within one week.
3	Action needs to be resolved within one month.

Actions will be resolved within the required timeframe and closed in accordance with the Sydney Metro Environmental Incident and Non-Compliance Reporting Procedure.

The Environment Manager is responsible for the investigation, tracking and ensuring appropriate closeout of non-compliances, corrective, and preventative actions in accordance with GA-MSP-HSEQ-005 Audits, Inspection and Correction Action.

11.6 Compliance Tracking

Compliance with all relevant laws and approvals will be monitored throughout construction through the auditing program, monitoring and inspections. A compliance tracking report will be provided to Sydney Metro on a regular basis and will be in the form of a compliance table detailing all MCoAs, REMMs, CEMF requirements and other requirements as relevant.

GLC will provide Sydney Metro and the ER documented evidence that all MCoA and REMMs which have a pre-construction requirement, have been met and are compliant two weeks prior to the anticipated date for commencement of construction.

Compliance with the EPL will be tracked and recorded to ensure all license conditions are met. As may be required by the EPL, an annual report will be prepared which will include details of compliance and any non-conformance and corrective actions.

GLC will provide Sydney Metro and the ER with all documented evidence demonstrating compliance for each MCoA and REMMs prior to the completion of works. Documented evidence will be submitted via the Project Document Control System in a format specified by Sydney Metro.

11.7 Document Update and Amendment

A review of the SEMP will be undertaken six months after commencement, after which the review timeframes of the CEMP will be followed and within one month of the following events:

- Reportable environmental incidents
- Identification of new risks, including risks identified during risk register updates
- Non-compliances
- Environmental audit outcomes
- Material project changes
- Changes in legislative requirements and external/internal policies and guidelines
- Submission of an incident report.

All revisions to the SEMP are to be approved by the ER prior to implementation and distributed to the appropriate staff. A register is to be maintained detailing the new version number and the date of issue.

If requested by the ER, the approved AA may consider relevant minor amendments made to the SEMP and noise and vibration monitoring program that require updating, or are of an administrative nature, and are consistent with the MCoA and monitoring programs approved by the Planning Secretary and, if satisfied such amendment is necessary, endorse the amendment.

11.8 Records and Reporting

The Site Supervisor and Construction Manager will maintain appropriate records of the following:

- Site inspections, audits, monitoring, reviews or remedial actions

- Documentation as required by performance conditions, approvals, licences and legislation
- Modifications to site environmental documentation (eg CEMP, sub-plans and procedures)
- Other records as required by the conditions of approval in Attachment 1 (including MCoA, REMMs and CEMF requirements).

Records will be accessible onsite for the duration of works.

Additionally, records will be retained by GLC for a period of no less than 7 years. Records will be made available in a timely manner to Sydney Metro (or their representative) upon request.

12 EMERGENCIES AND INCIDENTS

12.1 Emergency Preparedness and Response

In the event of an emergency, processes will be followed for responding to minimise potential for environmental damage. The procedure is attached to this SEMP as Attachment 1. It will aim to:

- Plan actions which prevent or mitigate environmental harm in response to potential emergency situations, relevant to the consequence and magnitude of the emergency
- Respond to emergency situations including a list of resources and contact details available
- Reporting and reviewing requirements following an environmental emergency
- Test the emergency response throughout construction, including environmental response drills
- Review procedure effectiveness after emergency with actual/potential environmental hazard
- Need for training of the emergency environmental response.

An Emergency Response Plan will be developed for all potential high risk environmental emergencies. Emergency response procedures and plans will be updated in response to any changes in approval, permits and licenses. A Pollution Incident Response Management Plan (PIRMP) will be developed, as part of the Emergency Response Plan, in accordance with the EPA Guidelines. The PIRMP will be kept on site.

Emergency Services contact numbers are to be displayed in the main site office. Initial Project Emergency contact numbers are included in Table 12.1.

Table 12.1: Emergency Contact Details

Contact	Phone Number	Address
EPA Pollution Line	131 555 or (02) 9995 5555 (if calling from outside NSW).	City of Parramatta, 10 Valentine Ave, Parramatta NSW 2150

12.2 Incident Classification and Notification

All Incidents will be classified by the Environment and Sustainability Lead in consultation with the Deputy Project Director in accordance **GA-MSP-HSEQ-006 Incident Management and Reporting** and the classifications outlined in Table 12.2 below.

All incidents will be reported in accordance with the Sydney Metro Environmental Incident and Non-compliance Reporting Procedure Version 5.1 (SM-17-00000096) (refer to Table 12.2), relevant licenses and legislation.

The Project Director, Deputy Project Director, Construction Manager and relevant Project Manager will be made aware of the incident as soon as possible.

In the event an actual or potential incident is reported through the Community Complaints line, the Environment Manager will be contacted immediately to respond and investigate.

The approved ER and AA will review all relevant notifications of incidents, in accordance with MCoA A43.

Table 12.2: Environmental Incident Classification

Environmental Incident Classification		
GLC Incident Classification		
Class 3	Class 2	Class 1
<u>Class Three Environmental</u> Incidents typically cause short term or nuisance damage. The damage is easily rectified usually within one day. Class 3 incidents do not cause medium or long term damage.	<u>Class Two Environmental</u> Incidents create short to medium term damage to the environment. This damage will result in the environment taking up to 12 months to return to pre-existing conditions. Potential for prosecution or infringement notice.	<u>Class One Environmental</u> Incidents create permanent or long term damage to the environment. This damage will result in the environment taking 12 months or more to return to pre-existing conditions. Major environmental investigation and potential for large prosecution.
Corresponding Sydney Metro Incident Classification		
C6 C5 C4	C3 C2	C1
Notification Requirements		
<u>Report only</u> <ul style="list-style-type: none"> Verbally notify Sydney Metro of incidents immediately, followed by written notification to Sydney Metro and the ER within 24 hours of the incident If required, GLC will notify the EPA and relevant authorities immediately. 	<u>Notifiable</u> <ul style="list-style-type: none"> Verbally notify Sydney Metro of incidents immediately, followed by written notification to Sydney Metro and the ER within 24 hours of the incident Notify the EPA and relevant authorities immediately Prepare an incident notification / non-conformance report and submit to Sydney Metro and the ER within 48 hours Prepare an investigation report and submit to Sydney Metro and the ER within 7 days. 	

12.2.1 Sydney Metro and DPE

The Project Director will immediately verbally notify Sydney Metro, followed by written notification within 24 hours of the incident occurring. In accordance with MCoA A43 and in order for Sydney Metro to comply with its incident notification requirements under the Planning Approval, the incident notification will include the location and general nature of the incident, any non-conformance with the Planning Approval and any corrective actions in relation to that non-conformance where relevant.

The Environmental Incident and Non-compliance Notification Report (SM ES-FT-403) or a similar and consistent form approved by Sydney Metro will be completed for all actual and potential Class

1 and 2 environmental incidents within 48 hours and forwarded to the Project Director to submit to Sydney Metro.

GLC will provide notification of the incident to Sydney Metro's Representative in accordance with Table 12.2.

12.2.2 Planning Secretary

The Planning Secretary will be notified by Sydney Metro via phone or in writing via the Major Projects website immediately after GLC and Sydney Metro become aware of an incident, in accordance with MCoA A43. Any notification via phone will be followed up by a notification in writing via the Major Projects website within 24 hours of the initial phone call. The written notification will include the following information, which will be provided by GLC in a suitable timeframe for Sydney Metro to submit to the Planning Secretary:

- The CSSI and application number
- Details of the incident (date, time, location, a brief description of what occurred and why it is classified as an incident)
- How the incident was detected
- When GLC became aware of the incident
- Any actual or potential non-compliance with the conditions of approval
- What immediate steps were taken in relation to the incident
- Further action(s) that will be taken in relation to the incident
- A project contact for further communication regarding the incident.

An Incident Report will be submitted to the Planning Secretary within 30 days of the incident, and in accordance with the requirements set out in MCoA A44. This report will include:

- A summary of the incident
- Outcomes of an incident investigation, including identification of the cause of the incident
- Details of the corrective and preventative actions that have been, or will be, implemented to address the incident and prevent recurrence
- Details of any communication with other stakeholders regarding the incident.

12.2.3 EPA and Other Agencies

If a potential environmental pollution event occurs (as specified by the POEO Act), the Environment and Sustainability Lead will immediately notify the EPA and other agencies as nominated by the PIRMP. Information to be provided to the EPA will be in accordance with Section 150 of the POEO Act.

For notifiable events as detailed in the PIRMP, in addition to notifying the EPA of pollution incidents other authorities as outlined below must also be notified immediately:

- The Ministry of Health (via the local Public Health Unit – 02 9391 9000)
- SafeWork NSW (13 10 50)
- Depending on the LGA where the incident occurred: Cumberland City Council (02) 8757 9000, (Westmead) City of Parramatta (02) 9806 5000 (Parramatta, Clyde and Sydney Olympic Park sites)
- Fire and Rescue NSW on 000.

Regardless of the actual or potential impact, these authorities must be notified under the amended legislation for all notifiable pollution incidents. Further information in relation to the incident must be provided immediately it becomes available after the initial notification. Records of contact with and details of the information provided to external authorities must be maintained in the project records.

Environmental incidents relating to the Environment Protection and Biodiversity Conservation Act 1999 must be notified to the Secretary of the Department within seven days of the event.

These types of incidents include the death or injury to migratory bird species, listed marine species, threatened species or ecological communities (death or includes taking or removal).

Incidents requiring notification to the EPA must also be immediately notified to the Gamuda Australia Head of Health, Safety, Environment and Quality, LOR Environmental Leader, LOR HSE General Manager and the Head of Legal for both Gamuda Australia and Laing O'Rourke.

As per MCoA A43, The Planning Secretary will also be notified via phone or in writing (in accordance with the requirements of Appendix A of SSI 10038) via the Major Projects website immediately after the Proponent becomes aware of an incident. Notification via phone will be followed up by a notification in writing via the Major Projects website within 24 hours of the initial phone call.

12.3 Incident Response

Priority response to an incident is to make the area safe and prevent environmental harm. If an incident presents an immediate threat to human health or property, 000 is to be called in accordance with the procedures outlined in the Construction Health and Safety Management Plan.

All incidents will be logged in Velocity EHS, Gamuda's Incident Reporting Database within 48 hours. All Class 1 and 2 Incidents must be investigated according to the GLC Incident Management and Reporting Procedure (GA-MSP-HSEQ-006). The investigation will result in specific and detailed corrective and preventative actions to be identified, actioned and closed out. Actions may include reviewing and improving existing environmental controls and job safety analyses / work method statements, site rehabilitation, increasing site inspections and monitoring, modifying construction or installation methods, and increasing environmental awareness including retraining and tool-box meetings.

Class 1 and Class 2 reportable incidents will be reviewed by the Gamuda Australia Head of Health, Safety, Environment and Quality, Laing O'Rourke Environmental Leader, Laing O'Rourke HSE General Manager and Head of Legal from both Gamuda Australia and Laing O'Rourke prior to the issue of formal correspondence to external parties or regulatory authorities.

Specific procedures relating to heritage finds are outlined in Attachment 6.

Access to site and assistance will be provided to regulatory inspectors as appropriate.

12.3.1 Senior Leaders' Environmental Incident Review

For all Class 1 and Class 2 incidents, within three (3) days the Project Director will convene a briefing with the GLC Senior Leadership team to provide an update on the incident investigation and to allow the Area/Operations Manager to be actively involved in the investigation process. The briefing will include discussion on the progress of the investigation and any specific initial findings. A status report on any rectification work or maintenance activities to the relevant environmental controls will also be provided.

Information relating to the incident investigation will be forwarded to the Senior Business Leader/ Area/Construction Manager and Regional HSE Manager, including condition of the environment and the status of any rectification or remediation works, the completed incident investigation report, including appropriate causal analysis and corrective actions, program for the implementation of the corrective actions and any maintenance activities, any other relevant information.

ATTACHMENT 1 – RELEVANT CONDITIONS OF APPROVAL

This annexure contains the Conditions of Approval relevant to this SEMP.

The following table contains the MCoA relevant to this SEMP.

MCoA No.	Requirement	Reference
MCoA C-A2	The Proponent must carry out the CSSI Concept in accordance with the conditions of this approval and the documents listed in Condition C-A1 of this schedule unless otherwise specified in, or required under, the conditions of this approval.	Section 1.1
MCoA A2	Stage 1 of 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 of this schedule unless otherwise specified in, or required under, this approval.	Section 1.1
MCoA A6	Where the conditions of this approval require a document or monitoring program to be prepared, or a review to be undertaken, in consultation with identified parties, evidence of the consultation undertaken must be submitted to the Planning Secretary with the document. The evidence must include:	Attachment 7 and Section 9.2
MCoA A6 (a)	documentation of the engagement with the party identified in the condition of approval that has occurred before submitting the document for approval;	Attachment 7 and Section 9.2
MCoA A6 (b)	a log of the dates of engagement or attempted engagement with the identified party and a summary of the issues raised by them;	Attachment 7 and Section 9.2
MCoA A6 (c)	documentation of the follow-up with the identified party(s) where feedback has not been provided to confirm that the party(s) has none or has failed to provide feedback after repeated requests;	Attachment 7 and Section 9.2
MCoA A6 (d)	outline of the issues raised by the identified party(s) and how they have been addressed; and	Attachment 7 and Section 9.2
MCoA A6 (e)	a description of the outstanding issues raised by the identified party(s) and the reasons why they have not been addressed.	Attachment 7 and Section 9.2
MCoA A17	Before establishment of any ancillary facility (excluding exempt or complying development, minor ancillary facilities determined by the ER to have minimal environmental impact and those established under Condition A21 of this schedule, and those considered in an approved CEMP), the Proponent must prepare a Site Establishment	This document

MCoA No.	Requirement	Reference
	Management Plan which outlines the environmental management practices and procedures to be implemented for the establishment of the ancillary facilities. The Site Establishment Management Plan must be prepared in consultation with the Relevant Council(s) and relevant government agencies. The Site Establishment Management Plan must include:	
MCoA A17 (a)	a description of activities to be undertaken during establishment of the ancillary facility (including scheduling and duration of work to be undertaken at the site)	Section 4.2
MCoA A17 (b)	figures illustrating the proposed operational site layout and the location of the closest sensitive land user(s)	Section Sensitive receivers are marked on the ECM (Attachment 10) and also within the Noise Impact Assessment (Attachment 4)
MCoA A17 (c)	a program for ongoing analysis of the key environmental risks arising from the site establishment activities described in subsection (a) of this condition, including an initial risk assessment undertaken before the commencement of site establishment work	Section 6.2 and Attachment 3 – Environmental Risk Assessment
MCoA A17 (d)	details of how the site establishment activities described in subsection (a) of this condition will be carried out to: (i) meet the performance outcomes stated in the documents listed in Condition A1 of this schedule, and (ii) manage the risks identified in the risk analysis undertaken in subsection (c) of this condition;	Section 2.4, Section 8 and Attachment 2
MCoA A17 (e)	a program for monitoring the performance outcomes, including a program for construction noise monitoring, where appropriate or required	Section 10.1
MCoA A18	With the exception of a Site Establishment Management Plan relating to the Silverwater ancillary facility referred to in Condition A19 below and any other Site Establishment Management Plan expressly nominated by the Planning	Section 11.2

MCoA No.	Requirement	Reference
	Secretary to be endorsed by the ER, all Site Establishment Management Plans must be submitted to the Planning Secretary for approval one (1) month before the establishment of any ancillary facilities	
MCoA A19	A Site Establishment Management Plan relating to the Silverwater ancillary facility and any other Site Establishment Management Plan expressly nominated by the Planning Secretary must be submitted to the ER for endorsement one (1) month before the establishment of that ancillary facility or as otherwise agreed with the ER.	Section 11.2
MCoA A20	The use of an ancillary facility for construction must not commence until the CEMP required by Condition C1 of this schedule, relevant CEMP Sub-plans required by Condition C5 of this schedule and relevant Construction Monitoring Programs required by Condition C14 of this schedule have been approved by the Planning Secretary or endorsed by the ER (whichever is applicable). Note: This condition does not apply to Condition A21 of this schedule or where the use of an ancillary facility is Low Impact Work or for Low Impact Work.	WTP Construction Environmental Management Plan
MCoA A22	Boundary screening must be erected around ancillary facilities that are adjacent to sensitive land user(s) for the duration that the ancillary facility is in use unless otherwise agreed with relevant affected residents, business operators or landowners.	Section 1.3.4
MCoA A23	Boundary screening required under Condition A22 of this schedule must minimise visual impacts on adjacent sensitive land user(s).	Section 1.3.4
MCoA A30	For the duration of the work or as agreed with the Planning Secretary, the approved ER must:	Section 1.3.4
MCoA A30 (a)	receive and respond to communication from the Planning Secretary in relation to the environmental performance of Stage 1 of the CSSI;	Section 9.2
MCoA A30 (b)	consider and inform the Planning Secretary on matters specified in the conditions of this approval;	Section 9.2
MCoA A30 (c)	consider and recommend to the Proponent any improvements that may be made to work practices to avoid or minimise adverse impact to the environment and to the community;	Section 11.1

MCoA No.	Requirement	Reference
MCoA A30 (d)	review documents identified in Conditions A10, A17, A19, C1, C5 and C14 of this schedule and any other documents that are identified by the Planning Secretary, to ensure they are consistent with requirements in or under this approval and if so: (i) endorse the documents before submission of such documents to the Planning Secretary (if those documents are required to be approved by the Planning Secretary); or (ii) endorse the documents before the implementation of such documents (if those documents are only required to be submitted to the Planning Secretary / Department for information or are not required to be submitted to the Planning Secretary / Department);	Section 11.2
MCoA A30 (e)	for documents that are required to be submitted to the Planning Secretary / Department for information under (d)(ii) above, the documents must be submitted as soon as practicable to the Planning Secretary / Department after endorsement by the ER, unless otherwise agreed by the Planning Secretary;	Section 11.2
MCoA A30 (f)	regularly monitor the implementation of the documents listed in Conditions A10, A17, A19, C1, C5 and C14 of this schedule to ensure implementation is being carried out in accordance with the document and the conditions of this approval;	Section 10.1
MCoA A30 (g)	as may be requested by the Planning Secretary, help plan or attend audits of the development commissioned by the Department including scoping audits, programming audits, briefings and site visits, but not independent environmental audits required under Condition A39 of this schedule;	Section 11.3
MCoA A30 (h)	as may be requested by the Planning Secretary, assist in the resolution of community complaints received directly by the Department;	Section 9.2
MCoA A30 (i)	consider or assess the impacts of minor ancillary facilities comprising lunch sheds, office sheds and portable toilet facilities as required by Condition A21 of this schedule; and	Section 5
MCoA A30 (j)	consider any minor amendments to be made to the Site Establishment Management Plan, CEMP, CEMP Sub-plans and construction monitoring programs without increasing impacts to nearby sensitive receivers, and are consistent with the conditions of this approval and the Site Establishment Management Plan, CEMP, CEMP Sub-plans and construction monitoring programs approved by the Planning Secretary and, if satisfied such amendment is necessary, approve the amendment. This does not include any modifications to the conditions of this approval;	Section 11.2 and Section 11.7

MCoA No.	Requirement	Reference
MCoA A30 (k)	prepare and submit to the Planning Secretary and other relevant regulatory agencies, for information, an Environmental Representative Monthly Report providing the information set out in the Environmental Representative Protocol under the heading “Environmental Representative Monthly Reports”. The Environmental Representative Monthly Report must be submitted within seven (7) days following the end of each month for the duration of the ER’s engagement for Stage 1 of the CSSI, or as otherwise agreed by the Planning Secretary; and	Section 10.2
MCoA A30 (l)	assess the impacts of activities as required by the Low Impact Work definition.	Section 4.2 and Section 5
MCoA A36	The approved AA must:	
MCoA A36 (a)	receive and respond to communication from the Planning Secretary in relation to the performance of Stage 1 of the CSSI in relation to noise and vibration;	Section 9.2
MCoA A36 (b)	consider and inform the Planning Secretary on matters specified in the conditions of this approval relating to noise and vibration;	Section 9.2
MCoA A36 (c)	consider and recommend, to the Proponent, improvements that may be made to avoid or minimise adverse noise and vibration impacts;	Section 11.1
MCoA A36 (d)	review all proposed night-time works (with the exception of low risk activities) to determine if sleep disturbance would occur and recommend measures to avoid sleep disturbance or appropriate additional alternative mitigation measures;	Section 4.3
MCoA A36 (e)	review all noise and vibration documents required to be prepared under the conditions of this approval and, should they be consistent with the conditions of this approval, endorse them before submission to the Planning Secretary (if required to be submitted to the Planning Secretary) or before implementation (if not required to be submitted to the Planning Secretary);	Section 5.2, Section 11.2 and Attachment 4

MCoA Requirement No.	Requirement	Reference
MCoA A36 (f)	regularly monitor the implementation of all noise and vibration documents required to be prepared under the conditions of this approval to ensure implementation is in accordance with what is stated in the document and the conditions of this approval;	Section 10.1.1
MCoA A36 (g)	review the Proponent's notification of incidents in accordance with Condition A43 of this schedule;	Section 12.2
MCoA A36 (h)	<p>in conjunction with the ER (where required), the AA must:</p> <ul style="list-style-type: none"> (i) as may be requested by the Planning Secretary or Community Complaints Mediator (required by Condition B8 of this schedule), help plan, attend or undertake audits of noise and vibration management of Stage 1 of the CSSI including briefings, and site visits, (ii) in the event that conflict arises between the Proponent and the community in relation to the noise and vibration performance of Stage 1 of the CSSI, follow the procedure in the Overarching Community Communication Strategy referenced in Condition B1 of this schedule to attempt to resolve the conflict, and if it cannot be resolved, notify the Planning Secretary, (iii) if requested by the ER, consider relevant minor amendments made to the Site Establishment Management Plan, CEMP, relevant sub-plans and noise and vibration monitoring programs that require updating or are of an administrative nature, and are consistent with the conditions of this approval and the management plans and monitoring programs approved by the Planning Secretary and, if satisfied such amendment is necessary, endorse the amendment, (this does not include any modifications to the conditions of this approval), (iv) if requested by the ER, review the noise impacts of minor ancillary facilities, and prepare and submit to the Planning Secretary and other relevant regulatory agencies, for information, a Monthly Noise and Vibration Report detailing the AA's actions and decisions on matters for which the AA was responsible in the preceding month. The Monthly Noise and Vibration Report must be submitted within seven (7) days following the end of each month for the duration of the AA's engagement for Stage 1 of the CSSI, or as otherwise agreed by the Planning Secretary. 	Section 9, Section 10 and Section 11
MCoA A39	Independent Audits of Stage 1 of the CSSI must be conducted and carried out in accordance with the <i>Independent Audit Post Approval Requirements</i> (DPIE, 2020).	Section 11.3.1
MCoA A40	Proposed independent auditors must be approved by the Planning Secretary before the commencement of an Independent Audit.	Section 11.3.1

MCoA No.	Requirement	Reference
MCoA A41	The Planning Secretary may require the initial and subsequent Independent Audits to be undertaken at different times to those specified in the Independent Audit Post Approval Requirements (DPIE, 2020), upon giving at least four (4) weeks' notice (or timing as stipulated by the Planning Secretary) to the Proponent of the date upon which the audit must be commenced.	Section 11.3.1
MCoA A42	Independent Audit Reports and the Proponent's response to audit findings must be submitted to the Planning Secretary within two (2) months of undertaking the independent audit site inspection as outlined in the <i>Independent Audit Post Approval Requirements</i> (DPIE, 2020), unless otherwise agreed by the Planning Secretary.	Section 11.3.1
MCoA A43	The Planning Secretary must be notified via phone or in writing via the Major Projects website immediately after the Proponent becomes aware of an incident. Any notification via phone must be followed up by a notification in writing via the Major Projects website within 24 hours of the initial phone call. The written notification must identify the CSSI (including the application number and the name of the CSSI if it has one) and set out the location and general nature of the incident.	Section 12.2
MCoA A44	Subsequent notification must be given and reports submitted in accordance with the requirements set out in Attachment 1.	Section 12.2
MCoA A45	The Planning Secretary must be notified in writing via the Major Projects website within seven (7) days after the Proponent becomes aware of any non-compliance with the conditions of this approval.	Section 11.4.1
MCoA A46	A non-compliance notification must identify the CSSI (including the application number for it), set out the condition of approval that the development is non-compliant with, the way in which it does not comply and the reasons for the non-compliance (if known) and what actions have been, or will be undertaken to address the non-compliance.	Section 11.4.1
<i>Note: A non-compliance which has been notified as an incident does not need to also be notified as a non-compliance.</i>		
MCoA A47	All Heavy Vehicles used for spoil haulage must be clearly marked on the sides and rear with the project name and application number to enable immediate identification by a person viewing the Heavy Vehicle standing 20 metres away.	Attachment 2
MCoA A48	The CSSI name, application number, telephone number, postal address and email address required under Condition B3 of this schedule must be available on site boundary fencing / hoarding at each ancillary facility before the commencement of construction. This information must also be provided on the website required under Condition B11 of this schedule.	Attachment 2

MCoA No.	Requirement	Reference
MCoA D1	All reasonably practicable measures must be implemented to minimise the emission of dust and other air pollutants during construction.	Attachment 2
MCoA D2	The clearing of native vegetation must be minimised to the greatest extent practicable with the objective of reducing impacts to threatened ecological communities and threatened species habitat.	Attachment 2
MCoA D3	Impacts to plant community types must not exceed those identified in the documents listed in Condition A1 of this schedule, unless otherwise approved by the Planning Secretary. In requesting the Planning Secretary's approval, an assessment of the additional impact(s) to plant community types and an updated ecosystem and / or species credit requirement under Condition D4 below, if required, must be provided.	Attachment 2
MCoA D9	As many mature trees and as much urban canopy as practicable must be retained during construction. Canopy trimming should be considered where practicable prior to any mature tree removal.	Attachment 2
MCoA D14	Before installing protective site boundary hoarding or equipment used for vibration and noise monitoring at any Heritage item identified in the documents listed in Condition A1 of this schedule, the advice of a suitably qualified and experienced built heritage expert must be obtained and implemented to ensure any such work does not have an adverse impact on the heritage significance of the item. The installation must also consider and avoid impacts to potential historical archaeology and seek advice from the Excavation Director approved under Condition D27 below.	Section 5.3, Section 6.1 and Attachment 2
MCoA D19	All reasonable steps must be taken not to harm, modify or otherwise impact Aboriginal objects except as authorised by this approval.	Section 5.4 and Attachment 2
MCoA D24	Where previously unidentified Aboriginal objects are discovered, all work must immediately stop in the vicinity of the affected area and a suitably qualified and experienced Aboriginal heritage expert must be contacted to provide specialist heritage advice, before construction recommences. The measures to consider and manage this process must be specified in the Heritage CEMP Sub-plan required by Condition C5 of this schedule and, where relevant, include registration in the Aboriginal Heritage Information Management System (AHIMS).	Attachment 6
MCoA D31	An Unexpected Heritage Finds and Human Remains Procedure must be prepared to manage unexpected heritage finds (heritage items and values) in accordance with any guidelines and standards prepared by the Heritage Council of NSW or Heritage NSW.	Attachment 6
MCoA D34	A detailed land use survey must be undertaken to confirm sensitive receivers (including critical working areas such as operating theatres and precision laboratories) potentially exposed to construction noise and vibration and construction ground-borne 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 noise, vibration or ground-borne noise in that area.	Attachment 2

MCoA No.	Requirement	Reference
	The results of the survey must be included in the Noise and Vibration CEMP Sub-plan required under Condition C5 of this schedule.	
MCoA D35	Work must only be undertaken during the following hours: (a) 7:00am to 6:00pm Mondays to Fridays, inclusive; (b) 8:00am to 6:00pm Saturdays; and (c) at no time on Sundays or public holidays	Section 4.3 and Attachment 2
MCoA D36	Except as permitted by an EPL, highly noise intensive work that results in an exceedance of the applicable NML at the same receiver must only be undertaken: (a) between the hours of 8:00 am to 6:00 pm Monday to Friday; (b) between the hours of 8:00 am to 1:00 pm Saturday; and (c) if continuously, then not exceeding three (3) hours, with a minimum cessation of work of not less than one (1) hour. For the purposes of this condition, 'continuously' includes any period during which there is less than one (1) hour between ceasing and recommencing any of the work.	Section 4.3 and Attachment 2
MCoA D37	Notwithstanding Conditions D35 and D36 of this schedule work may be undertaken outside the hours specified in the following circumstances: (a) Safety and Emergencies, including: (i) for the delivery of materials required by the NSW Police Force or other authority for safety reasons; or (ii) where it is required in an emergency to avoid injury or the loss of life, to avoid damage or loss of property or to prevent environmental harm. On becoming aware of the need for emergency work in accordance with (a)(ii) above, the AA, the ER, the Planning Secretary and the EPA must be notified of the reasons for such work. The Proponent must use best endeavours to notify as soon as practicable all noise and/or vibration affected sensitive land user(s) of the likely impact and duration of those work. (b) Low impact, including: (i) construction that causes Laeq(15 minute) noise levels: no more than 5 Db(A) above the rating background level at any residence in accordance with the ICNG, and no more than the 'Noise affected' NMLs specified in Table 3 of the ICNG at other sensitive land user(s); and	Section 5.2 and Attachment 2

MCoA No.	Requirement	Reference
	<p>(ii) construction that causes LAFmax(15 minute) noise levels no more than 15 Db(A) above the rating background level at any residence; or</p> <p>(iii) construction that causes:</p> <ul style="list-style-type: none"> · continuous or impulsive vibration values, measured at the most affected residence are no more than the preferred values for human exposure to vibration, specified in Table 2.2 of Assessing Vibration: a technical guideline (DEC, 2006), or · intermittent vibration values measured at the most affected residence are no more than the preferred values for human exposure to vibration, specified in Table 2.4 of Assessing Vibration: a technical guideline (DEC, 2006). <p>(c) By Approval, including:</p> <ul style="list-style-type: none"> (i) where different construction hours are permitted or required under an EPL in force in respect of the CSSI; or (ii) works which are not subject to an EPL that are approved under an Out-of-Hours Work Protocol as required by Condition D38 of this schedule; or (iii) negotiated agreements with directly affected residents and sensitive land user(s). <p>(d) By Prescribed Activity, including:</p> <ul style="list-style-type: none"> (i) tunnelling (excluding cut and cover tunnelling and surface works) are permitted 24 hours a day, seven days a week; or (ii) concrete batching at the Clyde construction site is permitted 24 hours a day, seven days a week; or (iii) delivery of material that is required to be delivered outside of standard construction hours in Condition D35 of this schedule to directly support tunnelling activities, except between the hours 10:00 pm and 7:00 am to / from the Five Dock and Westmead construction sites and to / from Burwood North construction site using any roads / streets other than directly from Parramatta Road; or (iv) haulage of spoil except between the hours of 10:00 pm and 7:00 am to / from the Five Dock and Westmead construction sites and to / from Burwood North construction site using any roads / streets other than directly from Parramatta Road; or (v) work within an acoustic shed where there is no exceedance of noise levels under Low impact circumstances identified in (b) above, unless otherwise agreed by the Planning Secretary. <p>Note: Tunnelling does not include station box excavation.</p>	
MCoA D38	An Out-of-Hours Work Protocol must be prepared to identify a process for the consideration, management and approval of work which are outside the hours defined in Conditions D35 and D36 of this schedule. The Protocol must	Section 4.3 and Attachment 2

MCoA No.	Requirement	Reference
	<p>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. The Protocol must provide:</p> <ul style="list-style-type: none"> (a) identification of low and high-risk activities and an approval process that considers the risk of activities, proposed mitigation, management, and coordination, including where: <ul style="list-style-type: none"> (i) the ER and AA review all proposed out-of-hours activities and confirm their risk levels; (ii) low risk activities can be approved by the ER in consultation with the AA; and (iii) high risk activities that are approved by the Planning Secretary; (b) a process for the consideration of out-of-hours work against the relevant NML and vibration criteria; (c) a process for selecting and implementing mitigation measures for residual impacts in consultation with the community at each affected location, including respite periods consistent with the requirements of Condition D50 of this schedule. The measures must take into account the predicted noise levels and the likely frequency and duration of the out-of-hours works that sensitive land user(s) would be exposed to, including the number of noise awakening events; (d) procedures to facilitate the coordination of out-of-hours work including those approved by an EPL or undertaken by a third party, to ensure appropriate respite is provided; and (c) notification arrangements for affected receivers for all approved out-of-hours works and notification to the Planning Secretary of approved low risk out-of-hours works. <p>This condition does not apply if the requirements of Condition D37(b) of this schedule are met. Note: Out-of-hours work is any work that occurs outside the construction hours identified in Condition D35 and D36 of this schedule.</p>	
MCoA D41	<p>Noise generating work in the vicinity of potentially-affected community, religious, educational institutions and noise and vibration-sensitive businesses and critical working areas (such as theatres, laboratories and operating theatres) resulting in noise levels above the 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.</p>	Attachment 4
MCoA D42	<p>Industry best practice construction methods must be implemented where reasonably practicable to ensure that noise levels are minimised around sensitive land user(s). Practices must include, but are not limited to:</p> <ul style="list-style-type: none"> (a) use of regularly serviced low sound power equipment; (b) temporary noise barriers (including the arrangement of plant and equipment) around noisy equipment and 	Attachment 2, Attachment 3 and Attachment 4

MCoA No.	Requirement	Reference
	activities such as rock hammering and concrete cutting; and (c) use of alternative construction and demolition techniques.	
MCoA D46	Vibration testing must be conducted 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. Such measures must include, but not be limited to, review or modification of excavation techniques.	Section 5.2 and Attachment 2
MCoA D47	The Proponent must seek the advice of a heritage specialist on methods and locations for installing equipment used for vibration, movement and noise monitoring at Heritage items.	Section 5.3 and Attachment 2
MCoA D49	If a Heritage item is found to be structurally unsound (following inspection) a more conservative cosmetic damage criterion of 2.5 mm/s peak component particle velocity (from DIN 4150) must be applied.	Attachment 2
MCoA D50	All work undertaken for the delivery of Stage 1 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 receivers so that the respite is achieved in accordance with Condition D51 of this schedule; or (b) consider the provision of alternative respite or mitigation to impacted noise sensitive receivers; 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 approved Critical SSI, SSI and SSD projects which may cause cumulative and / or consecutive impacts at receivers affected by the delivery of Stage 1 of the CSSI.	Section 6.1 and Attachment 2
MCoA D51	In order to undertake out-of-hours work outside the work hours specified under Condition D35 of this schedule, appropriate respite periods for the out-of-hours work must be identified 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 (3) 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	Section 9.2

MCoA No.	Requirement	Reference
	<p>(d) likely mitigation and management measures which aim to achieve the relevant NMLs under Condition D39 (including the circumstances of when respite or relocation offers will be available and details about how the affected community can access these offers).</p> <p>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, EPA and the Planning Secretary.</p> <p>Note: Respite periods can be any combination of days or hours where out-of-hours work would not be more than 5 dB(A) above the RBL at any residence.</p>	
MCoA D58	Stage 1 of the CSSI must be designed and constructed with the objective of minimising impacts to, and interference with, third party property and infrastructure, and that such infrastructure and property is protected during construction.	Section 4.2 and Attachment 2
MCoA D59	The utilities and services (hereafter “services”) potentially affected by construction must be identified to determine requirements for diversion, protection and / or support. Alterations to services must be determined by negotiation between the Proponent and the service providers. Disruption to services resulting from construction must be avoided, wherever possible, and advised to customers where it is not possible.	Section 4.2 and Section 9.2.3
MCoA D60	A suitably qualified and experienced person must undertake condition surveys of all buildings, structures, utilities and the like identified in the documents listed in Condition A1 of this schedule as being at risk of damage before commencement of any work that could impact on the subject surface / subsurface structure. The results of the surveys must be documented in a Pre-construction Condition Survey Report for each item surveyed. Copies of Pre-construction Condition Survey Reports must be provided to the relevant owners of the items surveyed in the vicinity of the proposed work, and no later than one (1) month before the commencement of the work that could impact on the subject surface / subsurface structure.	Section 4.2, Section 6.1, Section 10.2 and Attachment 2
MCoA D61	Condition surveys of all items for which condition surveys were undertaken in accordance with Condition D60 of this schedule must be undertaken by a suitably qualified and experienced person after completion of the work identified in Condition D60 of this schedule. The results of the surveys must be documented in a Post-construction Condition Survey Report for each item surveyed. Copies of Post-construction Condition Survey Reports must be provided to the landowners of the items surveyed, and no later than three (3) months following the completion of the work that could impact on the subject surface / subsurface structure unless otherwise agreed by the Planning Secretary.	Section 4.2, Section 5.7, Section 6.1, Section 10.2 and Attachment 2
MCoA D71	Before commencement of any construction that would result in the disturbance of moderate to high risk contaminated sites as identified in the documents identified in Condition A1 of this schedule, Detailed Site Investigations (for contamination) must be conducted to determine the full nature and extent of the contamination. The Detailed Site	Section 5.11 and Attachment 3

MCoA No.	Requirement	Reference
	Investigation Report(s) and the subsequent report(s), must be prepared, or reviewed and approved, by consultants certified under either the Environment Institute of Australia and 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. The Detailed Site Investigations must be undertaken in accordance with guidelines made or approved under section 105 of Contaminated Land Management Act 1997 (NSW). The Detailed Site Investigation for Sydney Olympic Park metro construction site must be prepared in consultation with SOPA.	
MCoA D77	An Unexpected Contaminated Land and Asbestos Finds Procedure must be prepared before the commencement of construction and must be followed should unexpected contaminated land or asbestos (or suspected contaminated land or asbestos) be excavated or otherwise discovered during construction.	Attachment 5
MCoA D78	An Unexpected Contaminated Land and Asbestos Finds Procedure must be prepared before the commencement of construction and must be followed should unexpected contaminated land or asbestos (or suspected contaminated land or asbestos) be excavated or otherwise discovered during construction.	Attachment 5
MCoA D80	Access to all utilities and properties must be maintained during works, unless otherwise agreed with the relevant utility owner, landowner or occupier.	Attachment 2 and Section 9.2.3
MCoA D81	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. Property access must be reinstated within one (1) month of the work that physically affected the access is completed or in any other timeframe agreed with the landowner or occupier.	Attachment 2
MCoA D83	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 (1) year following the completion of construction.	Attachment 2
MCoA D88	Before any local road is used by a Heavy Vehicle for the purposes of construction of Stage 1 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 Road Authority(s) within three (3) weeks of completion of the survey and at no later than one (1) month before the road being used by Heavy Vehicles associated with the construction of Stage 1 of the CSSI.	Section 5.1 and Attachment 2
MCoA D90	Vehicles associated with the project workforce (including light vehicles and Heavy Vehicles) must be managed to: <ul style="list-style-type: none"> (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); 	Section 5.1 , Attachment 2 and CTMP Site

MCoA No.	Requirement	Reference
	<ul style="list-style-type: none"> (d) not block or disrupt access across pedestrian or shared user paths at any time unless alternate access is provided; and (e) ensure spoil haulage vehicles adhere to the nominated haulage routes identified in the CTMPs. 	Establishment Clyde and Rosehill
MCoA D98	Safe pedestrian and cyclist access must be maintained around construction sites during construction. In circumstances where pedestrian and cyclist access is restricted or removed due to construction activities, a proximate alternate route which complies with the relevant standards, must be provided and signposted before the restriction or removal of the impacted access.	CTMP and Attachment 2
MCoA D101	Utilities, services and other infrastructure potentially affected by construction must be identified before works affecting the item, to determine requirements for access to, diversion protection, and / or support. The relevant owner(s) and / or provider(s) of services must be consulted to make suitable arrangements for access to diversion, protection, and / or support of the affected infrastructure as required. The Proponent must ensure that disruption to any service is minimised and be responsible for advising local residents and businesses affected before any planned disruption of service.	Section 9.2.3
MCoA D102	<p>A Utility Coordination Manager must be appointed for the duration of work associated with Stage 1 of the CSSI. The role of the Utility Coordination Manager must include, but not be limited to:</p> <ul style="list-style-type: none"> (a) the management and coordination of all utility work associated with the delivery of Stage 1 of the CSSI, to ensure respite is provided to the community; (b) providing advice to the Sydney Metro Place Manager regarding upcoming utility work, including the scope of the work and the responsibility for the work; and (c) investigating complaints received from the Community Complaints Mediator or the Project communication team relating to utility work and providing a response as required. 	Section 6.1
MCoA D103	Wayfinding information must be incorporated on temporary hoardings to guide pedestrians around ancillary facilities and enhance their understanding and experience of the locality and space.	Section 4.2 and Attachment 2
MCoA D104	Nothing in this approval permits advertising on any element of Stage 1 of the CSSI.	Attachment 2
MCoA D111	<p>Waste generated during construction and operation must be dealt with in accordance with the following priorities:</p> <ul style="list-style-type: none"> (a) waste generation must be avoided and where avoidance is not reasonably practicable, waste generation must be reduced; 	Section 5.15 and Attachment 2

MCoA No.	Requirement	Reference
	<p>(b) where avoiding or reducing waste is not possible, waste must be re-used, recycled, or recovered; and</p> <p>(c) where re-using, recycling or recovering waste is not possible, waste must be treated or disposed of.</p>	
MCoA D112	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 Stage 1 of 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.	Section 5.15 and Attachment 2
MCoA D113	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.	Section 5.15 and Attachment 2
MCoA D114	All waste must be classified in accordance with the EPA’s Waste Classification Guidelines, with appropriate records and disposal dockets retained for audit purposes.	Section 5.15 and Attachment 2
MCoA D116	Before undertaking any works and during maintenance or construction activities, erosion and sediment controls must be implemented and maintained to prevent water pollution consistent with LandCom’s Managing Urban Stormwater series (The Blue Book).	Attachment 2
MCoA D118	<p>Unless an EPL is in force in respect to Stage 1 of the CSSI and that licence specifies alternative criteria, discharges from wastewater treatment plants to surface waters must not exceed:</p> <ul style="list-style-type: none"> a) the Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2018 (ANZG (2018)) default guideline values for toxicants at the 95 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 (ANZECC/ARMCANZ); and c) for bioaccumulative and persistent toxicants, the ANZG (2018) guidelines values at a minimum of 99 per cent species protection level. <p>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.</p>	Attachment 2

The following table contains the REMMs relevant to the SEMP.

REMM No.	Requirement	Document Reference
TT1	The community would be notified in advance of proposed road and pedestrian network changes through appropriate forms of community liaison.	Section 9.2.2
TT2	In the event of a traffic related incident, coordination would be carried out with Transport for NSW, including Transport Coordination and/or the Transport Management Centre's Operations Manager.	Section 9.2.2 and Attachment 2
TT3	Access to properties for emergency vehicles would be provided at all times.	Attachment 2
TT4	Vehicle access to and from construction sites would be managed to maintain pedestrian, cyclist and motorist safety. Depending on the location, this may require manual supervision, physical barriers, temporary traffic signals and modifications to existing signals or, on occasions, police presence.	Attachment 2
TT6	All trucks would enter and exit construction sites in a forward direction, where feasible and reasonable.	Attachment 2
TT7	Construction site traffic would be managed to minimise movements during peak periods.	Attachment 2
TT10	Where existing parking is removed to facilitate construction activities, consultation would occur with the relevant local council to investigate opportunities to provide alternative parking facilities.	Section 9.2.2 and Attachment 2
TT18	Access to existing properties and buildings would be maintained in consultation with property owners.	Attachment 2
NV01	<p>Further engagement and consultation would be carried out with:</p> <ul style="list-style-type: none"> The affected communities to understand their preferences for mitigation and management measures. 'Other sensitive' receivers such as schools, medical facilities or places of worship to understand periods in which they are more sensitive to impacts. <p>Based on this consultation, appropriate mitigation and management options would be considered and implemented where feasible and reasonable to minimise the impacts.</p>	Section 9.2.1
NV03	<p>Appropriate respite would be provided to affected receivers in accordance with the Sydney Metro Construction Noise and Vibration Standard. This would include consideration of impacts from Stage 1 utility and power supply works when determining appropriate respite periods for affected receivers.</p> <p>When determining appropriate respite, the need to efficiently undertake construction would be balanced against the communities' preferred noise and vibration management approach.</p>	Attachment 2

REMM No.	Requirement	Document Reference
NV04	The use of noise intensive equipment at construction sites with ‘moderate’ and ‘high’ out-of-hours noise management level exceedances would be scheduled for standard construction hours, where feasible and reasonable. Where this is not feasible and reasonable, the works would be undertaken as early as possible in each work shift.	Section 4.3 and Attachment 2
NV06	Perimeter site hoarding would be designed with consideration of on-site heavy vehicle movements with the aim of minimising sleep disturbance impacts.	Attachment 2
NV09	Feasible and reasonable measures would be implemented to minimise ground-borne noise where exceedances are predicted. This may require implementation of less ground-borne noise and less vibration intensive alternative construction methodologies.	Attachment 2
NV15	Consultation with the owners and operators of the horse stables near the Clyde stabling and maintenance facility construction site would be carried out so that potential impacts to horses are appropriately managed.	Section 9.2.1
NV17	Condition surveys of buildings and structures near to the tunnel and excavations would be undertaken prior to the commencement of excavation at each site, where appropriate. For heritage buildings and structures the surveys would consider the heritage values of the structure in consultation with a heritage specialist.	Section 10.2 and Attachment 2
NV18	The likelihood of cumulative construction noise impacts would be reviewed during detailed design when detailed construction schedules are available. Co-ordination would occur between potentially interacting projects to minimise concurrent or consecutive works in the same areas, where possible. Specific mitigation strategies would be developed to manage impacts. Depending on the nature of the impact, this could involve adjustments to construction program or activities of Sydney Metro West or of other construction projects.	Attachment 2
NAH1	<p>Archival recording and reporting of the following heritage items would be carried out in accordance with the NSW Heritage Office’s How to Prepare Archival Records of Heritage Items (1998), and Photographic Recording of Heritage Items Using Film or Digital Capture (2006):</p> <ul style="list-style-type: none"> ● Shops (and potential archaeological site) (Parramatta LEP Item No. I703) ● Kia Ora (and potential archaeological site) (Parramatta LEP Item No. I716) ● RTA Depot (Parramatta LEP Item No. I576) ● State Abattoirs (SEPP Listing No. A) ● White Bay Power Station (SHR Listing No. 01015) 	Attachment 2

REMM No.	Requirement	Document Reference
AH3	If Aboriginal archaeological remains are recovered during Stage 1, results would be incorporated into Aboriginal heritage interpretation for the Concept in consultation with registered Aboriginal parties.	Attachment 2
AH4	In the event that a potential burial site or potential human skeletal material is exposed during construction, the Sydney Metro Exhumation Management Plan would be implemented.	Attachment 2
LU1	Except where required for subsequent construction activities associated with future stages of the Concept, temporary use areas for construction purposes would be stabilised and appropriately rehabilitated as soon as feasible and reasonable following completion of construction. This would be carried out in consultation with the relevant landowner.	Attachment 2
LV1	Where feasible and reasonable, the elements within construction sites would be located to minimise visual impacts (for example storing materials and machinery behind fencing).	Attachment 2
LV2	The design and maintenance of construction site hoardings would aim to minimise visual amenity and landscape character impact.	Attachment 2
LV5	Lighting of construction sites would be orientated to minimise glare and light spill impacts on adjacent receivers.	Attachment 2
LV6	Construction site hoardings would be designed in accordance with Sydney Metro Brand Design Guidelines and opportunities for public art on hoardings would be considered in high pedestrian locations.	Attachment 2
LV11	Opportunities for the retention and protection of existing street trees and trees within the site would be identified during detailed construction planning.	Attachment 2
LV12	Existing trees to be retained would be protected prior to the commencement of construction in accordance with Australian Standard AS4970 the Australian Standard for Protection of Trees on Development Sites and Adjoining Properties.	Attachment 2
BI2	Planned power and utility interruptions would be scheduled to before or after typical business hours where feasible and reasonable. Prior notice would be provided to all affected business owners of the interruptions.	Attachment 2
BI3	Hoarding and screening impacting the visibility of business would be minimised where feasible and reasonable, without compromising public safety or the effective management of construction airborne noise. Clear pathways and signage would be implemented around construction sites to maximise visibility of retained businesses, including sufficient lighting along pedestrian footpaths during night-time where relevant.	Attachment 2

REMM No.	Requirement	Document Reference
S1	Consultation would be carried out with managers of social infrastructure located near construction sites about the timing and duration of construction works and management of potential impacts, with the aim of minimising potential disruptions to the use of the social infrastructure from construction activity.	Section 9.2.1 and Attachment 2
GW2	A review of additional geotechnical and hydrogeology data would be undertaken to confirm the geological and groundwater conditions and determine, based on these local conditions, whether predicted groundwater drawdown from Stage 1 is likely to occur in the vicinity of these creeks. Where the additional data review shows local conditions and predicted groundwater drawdown are likely to cause surface water/groundwater interaction, then additional site investigations (in accordance with GW3) would be undertaken for those creeks or surface water bodies.	Attachment 2
GW3	Additional site investigations would be carried out at creeks or surface water bodies where the additional data review in GW2 shows there is a likely surface water/groundwater interaction. This would involve baseline monitoring of creek flows (streamflow gauging) prior to construction, and baseflow streamflow analysis to confirm the existing groundwater baseflow contribution to streamflow for each creek. Where a significant reduction in baseflow is predicted due to Stage 1, design responses would be implemented at station and shaft excavations to reduce potential baseflow loss.	Attachment 2
GW4	Monitoring of groundwater levels and quality at the site area would occur before, during and after construction. This would also include monitoring of potential contaminants of concern. Groundwater level data would be regularly reviewed during and after construction by a qualified hydrogeologist. Groundwater monitoring data would be provided to the NSW Environment Protection Authority and Department of Planning, Industry, Environment, Water and the Natural Resources Access Regulator for information prior to commencement of construction.	Attachment 2
SSWQ1	Prior to ground disturbance in areas of potential acid sulfate soil occurrence, testing would be carried out to determine the presence of actual and/or potential acid sulfate soils. If acid sulfate soils are encountered, they would be managed in accordance with the Acid Sulfate Soil Manual (ASSMAC, 1998)	Attachment 2
SSWQ2	Prior to ground disturbance in high probability salinity areas, testing would be carried out to determine the presence of saline soils. If salinity is encountered, excavated soils would not be reused or it would be managed in accordance with Book 4 Dryland Salinity: Productive Use of Saline Land and Water (NSW DECC 2008). Erosion controls would be implemented in accordance with Blue Book (Landcom, 2004).	Attachment 2

REMM No.	Requirement	Document Reference
SSWQ3	Erosion and sediment measures would be implemented at all construction 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 and Water 2008), commonly referred to as the 'Blue Book'. Additionally, any water collected from construction sites would be appropriately treated and discharged to avoid any potential contamination or local stormwater impacts. Temporary sediment basins would be designed in accordance with Managing Urban Stormwater: Soils and Construction and Managing Urban Stormwater, Volume 2D: Main Road Construction (DECC, 2008).	Attachment 2
SSWQ4	Works in waterways and surrounding low lying areas would be carried out in accordance with progressive erosion and sediment control plans.	Attachment 2
SSWQ5	The water treatment plants would be designed so that wastewater is treated to a level that is compliant with the ANZECC/ARMCANZ (2000) and ANZG (2018) and draft ANZG (2020) default guidelines for 95 per cent species protection and 99 per cent species protection and 99 per cent species protection for toxicants that bioaccumulate unless other discharge criteria are agreed with relevant authorities.	Attachment 2
SSWQ7	Further design development would confirm the local stormwater system capacity to receive construction water treatment plant inflows. In the event there is a stormwater infrastructure capacity issue with existing infrastructure, mitigation measures such as storage detention to control water outflow during wet weather events would be implemented.	Attachment 2
C1	For sites where potential contamination risk is moderate, high or very high, a further review of data would be performed. Where the additional data review provides sufficient information to confirm that contamination is likely to have a very low or low risk, the site would then be managed in accordance with the Soil and Water Management Plan. This would typically occur where there is minor, isolated contamination that can be readily remediated through standard construction practices such as excavation and off-site disposal.	Attachment 2
C2	Where data from the additional data review (mitigation measure C1) is insufficient to understand the risk of contamination, a Detailed Site Investigation would be carried out in accordance with the National Environment Protection Measure (2013) and other guidelines made or endorsed by the NSW EPA. The sites requiring a Detailed Site Investigation would be confirmed following the additional data review (mitigation measure C1), however on the basis of the Stage 1 assessment, it is anticipated that Detailed Site Investigations would be required at the specified application locations.	Attachment 2

REMM No.	Requirement	Document Reference
HF1	<p>Detailed construction planning would consider flood risk at construction sites. This would include:</p> <ul style="list-style-type: none"> ● Identification of measures to not worsen flood impacts on the community and on other property and infrastructure during construction up to and including the one per cent AEP flood event ● Provide flood-proofing to excavations at risk of flooding or coastal inundation during construction, where feasible and reasonable, such as raised entry into shafts and/or pump-out facilities to minimise ingress of floodwaters into shafts and the dive structure ● Review of site layout and staging of construction works to avoid or minimise obstruction of overland flow paths and limit the extent of flow diversion required. This includes design of site hoardings to minimise disruption to flow paths (if possible). <p>Not worsen is defined as:</p> <ul style="list-style-type: none"> ● A maximum increase in flood levels of 50mm in a one per cent AEP flood event ● A maximum increase in time of inundation on one hour in a one per cent AEP flood event ● No increase in potential soil erosion and scouring from any increase in flow velocity in a one per cent AEP flood event. 	Attachment 2
HF3	<p>Further design refinement at the Clyde stabling and maintenance facility construction site would occur during detailed design to mitigate the identified potential impacts including:</p> <ul style="list-style-type: none"> ● The increases in flood levels of up to 0.03 metres in Duck Creek and adjacent properties in the one per cent AEP flood event ● Increases in flow velocities and the potential increased risk of scour at the proposed creek crossings and in the downstream channels ● The potential flooding impacts from filled features 	Attachment 2
HF4	<p>Drainage at construction sites would be designed, where feasible and reasonable, to mitigate potential alterations to local runoff conditions due to construction sites.</p>	Attachment 2
HF7	<p>Construction planning regarding flooding matters would be carried out in consultation with the NSW State Emergency Service and the relevant local council.</p>	Attachment 2

REMM No.	Requirement	Document Reference
AQ1	<p>The following best-practice dust management measures would be implemented during all construction works:</p> <ul style="list-style-type: none"> ● Regularly wet-down exposed and disturbed areas including stockpiles, especially during dry weather ● Adjust the intensity of activities based on measured and observed dust levels and weather forecasts ● Minimise the amount of materials stockpiled and position stockpiles away from surrounding receivers ● Regularly inspect dust emissions and apply additional controls as required ● Consider all relevant measures listed in the UK IAQM corresponding to the highest level of risk determined around each Stage 1 construction site. 	Attachment 2
AQ2	Plant and equipment would be maintained in a proper and efficient manner. Visual inspections of emissions from plant would be carried out as part of preacceptance checks.	Attachment 2
WR1	All waste would be assessed, classified, managed, transported and disposed of in accordance with the Waste Classification Guidelines and the Protection of the Environment Operations (Waste) Regulation 2014.	Attachment 2
WR3	Construction waste would be minimised by accurately calculating materials brought to the site and limiting materials packaging.	Attachment 2
WR4	Waste streams would be segregated to avoid cross-contamination of materials and maximise reuse and recycling opportunities.	Attachment 2
HA2	Dial before you dig searches and non-destructive digging would be carried out to identify the presence of underground utilities.	Section 4.2, Attachment 2
HA3	Ongoing consultation would be carried out with utility providers for high pressure gas or petroleum pipelines to identify appropriate construction methodologies to be implemented. Any interaction with high pressure gas or petroleum pipelines would comply with the relevant standards, including AS 2885 Pipelines – Gas and Liquid Petroleum.	Attachment 2

The following table contains the CEMF requirements relevant to the SEMP.

CEMF Section	Requirement	Document Reference
1.3	<p>Principal Contractors are required to undertake their works in accordance with this policy. The Policy reflects a commitment in the delivery of the project to:</p> <ul style="list-style-type: none"> ● Optimise sustainability outcomes, transport service quality and cost effectiveness. ● Develop effective and appropriate responses to the challenges of climate change, carbon management, resource and waste management, land use integration, customer and community expectation, and heritage and biodiversity conservation. ● Be environmentally responsible, by avoiding pollution, enhancing the natural environment and reducing the project ecological footprint, while complying with all applicable environmental laws, regulations and statutory obligations. ● Be socially responsible by delivering a workforce legacy which benefits individuals, communities, the project and industry, and is achieved through collaboration and partnerships. 	This document
2	Compliance with Commonwealth and NSW legislative requirements. Sydney Metro and its Contractors should regularly review their legislative requirements	Section 3.1
2.1	The requirements of the relevant approval are required to be complied with by Sydney Metro. Responsibility for implementing mitigation measures and conditions of approval will be allocated between Sydney Metro and Principal Contractors as appropriate. Typically where there are multiple packages of works, Sydney Metro will produce a Staging Report which sets out the applicability and allocation of approval requirements within the project's program of works.	Attachment 1
2.2	<p>Contractors need to review the applicability of Scheduled Activities and assess the need to obtain and Environment Protection Licence (EPL). In other circumstances work may be undertaken using the existing EPL held by Sydney Trains.</p> <p>Where required, Sydney Metro Principal Contractors will:</p> <ul style="list-style-type: none"> ● Apply for and be granted an EPL from the EPA. ● Hold an EPL which covers their scope of works as necessary under the POEO Act. ● Undertake their scope of works in accordance with the conditions of the applicable EPLs as issued by the EPA. ● Work under the existing Sydney Trains EPL. 	Section 3.4

CEMF Section	Requirement	Document Reference
2.3	Numerous environmental publications, standards, codes of practice and guidelines are relevant to Sydney Metro construction and are referenced throughout this Construction Environmental Management Framework.	Section 3
3.1a	Principal Contractors are required to have a corporate Environmental Management System certified under AS/NZS ISO 14001:2015	Gamuda Australia Branch Environmental Management System
3.1b	Principal Contractors are required to develop a project based Environment and Sustainability Management System (E&SMS). The E&SMS will: <ul style="list-style-type: none"> i. Be consistent with the Principal Contractors corporate Environmental Management System and AS/NZS ISO 14001:2015 ii. Be supported by a process for identifying and responding to changing legislative or other requirements iii. Include processes for assessing design or construction methodology changes for consistency against the planning approvals iv. Include processes for tracking and reporting performance against sustainability and compliance targets v. Include a procedure for the identification and management of project specific environmental risks and appropriate control measures; and vi. Be consistent with the SM C&SW Sustainability Strategy and Sydney Metro Environment and Sustainability Policy 	Gamuda Australia Branch Environmental Management System
3.1c	All sub-contractors engaged by the Principal Contractor will be required to work under the Principal Contractor's Environment and Sustainability Management System.	Gamuda Australia Branch Environmental Management System

CEMF Section	Requirement	Document Reference
3.4a	Principal Contractors are required to prepare and implement a Construction Environmental Management Plan (CEMP) relevant to the scale and nature of their scope of works. The CEMP shall comprise of a main CEMP document, issue specific sub-plans, activity specific procedures and site based control maps. The CEMP shall illustrate the relationship between other plans required by the contract, in particular those that relate to design management.	As these works are not Construction, this requirement does not apply to the activities covered by this SEMP.
3.4e	The CEMP and associated sub-plans will be reviewed by Sydney Metro and/or an independent environmental representative prior to any construction works commencing. Depending on the Conditions of Approval, the CEMP and certain sub-plans may also require the approval of the Department of Planning, Industry and Environment (DPIE).	As these works are not Construction, this requirement does not apply to the activities covered by this SEMP.
3.6a	The Principal Contractor will prepare and implement activity specific environmental procedures. These procedures should supplement environmental management sub plans, but may substitute for sub plans in agreement with Sydney Metro if a reasonable risk based justification can be made and the sub plan is not a requirement of any approval.	Attachment 2
3.6b	The procedures will include: <ul style="list-style-type: none"> i. a breakdown of the work tasks relevant to the specific activity and indicate responsibility for each task, ii. potential impacts associated with each task, iii. a risk rating for each of the identified potential impacts, iv. mitigation measures relevant to each of the work tasks, and v. responsibility to ensure the implementation of the mitigation measures. 	Section 4.2, Section 5 and Attachment 2

CEMF Section	Requirement	Document Reference
3.6c	<p>The Principal Contractor will prepare and implement site based progressive Environmental Control Maps (ECM's) which as a minimum:</p> <ol style="list-style-type: none"> i. Depicts the current representation of the site; ii. Indicate which environmental procedures, environmental approvals, or licences are applicable iii. Illustrate the site, showing significant structures, work areas and boundaries; iv. Illustrate the environmental control measures and environmentally sensitive receivers; v. Is endorsed by the Principal Contractors Environmental Manager or delegate; vi. Include all the training and competency requirements for relevant workers; and vii. Be communicated to relevant workers, including sign-off for the appropriate procedures prior to commencing works on the specific site and / or activity. 	Attachment 10
3.7a	<p>Where the requirement for an additional environmental assessment is identified, this will be undertaken prior to undertaking any construction activities. The environmental assessment will include:</p> <ol style="list-style-type: none"> i. A description of the existing surrounding environment; ii. Details of the ancillary works and construction activities required to be carried out including the hours of works; iii. An assessment of the environmental impacts of the works, including, but not necessarily limited to, traffic, noise and vibration, air quality, soil and water, ecology and heritage iv. Details of mitigation measures and monitoring specific to the works that would be implemented to minimise environmental impacts; and v. Identification of the timing for completion of the construction works, and how the sites would be reinstated (including any necessary rehabilitation). 	N/A to SEMP as activities not defined as construction
3.8a	<p>Prior to the commencement of construction the Principal Contractors are to offer Pre-construction Building Condition Surveys, in writing, to the owners of buildings where there is a potential for construction activities to cause damage regardless of severity. If accepted, the Principal Contractor will produce a comprehensive written and photographic condition report produced by an appropriate professional prior to relevant works commencing.</p>	Section 9.2.3, Section 10.2 and Attachment 2
3.8b	<p>Prior to the commencement of construction the Principal Contractor will prepare a Road Dilapidation Report for all local public roads proposed to be used by heavy vehicles. Dilapidation reports are to include other road infrastructure such as signs, curbs, applicable driveways and pedestrian paths.</p>	Attachment 2

CEMF Section	Requirement	Document Reference
3.9a	Principal Contractors will identify hold points, beyond which approval is required to proceed with a certain activity. These hold points will be documented in the CEMP or relevant sub-plans. Example activities include vegetation removal and water discharge.	N/A to SEMP as activities not defined as construction
3.9b	Table 6 provides the structure for these hold points to be included in the CEMP as well as an initial list of hold points which will be implemented.	N/A to SEMP as activities not defined as construction
3.10a	<p>Principal Contractors are responsible for determining the training needs of their personnel. As a minimum this will include site induction, regular toolbox talks and topic specific environmental training as follows:</p> <ul style="list-style-type: none"> i. The site induction will be provided to all site personnel and will include, as a minimum: <ul style="list-style-type: none"> a. Training purpose, objectives and key issues, Contractor’s environmental and sustainability policy(s) and key performance indicators, b. Due diligence, duty of care and responsibilities, c. Relevant conditions of any environmental licence and/or relevant conditions of approval, d. Site specific issues and controls including those described in the environmental procedures, e. Reporting procedure(s) for environmental hazards and incidents, and f. Communication and protocols for interactions with community and stakeholders ii. Toolbox talks will be held on a regular basis in order to provide a project or site wide update, including any key or recurring environmental issues; and iii. Topic specific environmental training should be based upon, but is not limited to, Issue specific sub-plans required under Section 3.5 (a) (i-xi). 	Section 8

CEMF Section	Requirement	Document Reference
3.10b	<p>Principal Contractors will conduct a Training Needs Analysis which:</p> <ul style="list-style-type: none"> i. Identifies that all staff are to receive environmental training; ii. Identifies the competency requirements of staff that hold environmental roles and responsibilities documented within the Construction Environmental Management Plan and sub-plans; iii. Identifies appropriate training courses/events and the frequency of training to achieve and/or maintain these competency requirements; and iv. Implements and documents as part of the CEMP a training schedule that plans attendance at environmental training events, provides mechanisms to notify staff of their training requirements, and identifies staff who do not attend scheduled training events or who have overdue training requirements 	Section 8.1
3.11a	<p>Principal Contractors undertaking work in accordance with an EPL must develop and implement a Pollution Incident Response Management Plan, in accordance with the requirements of the POEO Act. Contractors' emergency and incident response procedures will also be consistent with any relevant Sydney Metro procedures and will include:</p> <ul style="list-style-type: none"> i. Categories for environmental emergencies and incidents; ii. Notification protocols for each category of environmental emergency or incident, including notification to Sydney Metro and notification to owners / occupiers in the vicinity of the incident. This is to include relevant contact details; iii. Identification of personnel who have the authority to take immediate action to shut down any activity, or to affect any environmental control measure (including as directed by an authorised officer of any regulator or government department); iv. A process for undertaking appropriate levels of investigation for all incidents and the identification, implementation and assessment of corrective and preventative actions; and v. Notification protocols of incidents to relevant regulators and stakeholders including (but not limited to) the EPA or DPIE that are made by the Contractor or Sydney Metro. 	Section 12
3.11b	The Contractor will make all personnel aware of the plan and their responsibilities	Section 8

CEMF Section	Requirement	Document Reference
3.12a	<p>Sydney Metro will engage Independent Environmental Representatives (ERs) as required under the CSSI approval to undertake the following, along with any additional roles as required:</p> <ol style="list-style-type: none"> i. Review, provide comment on and endorse (where required) any relevant environmental documentation to verify it is prepared in accordance with relevant environmental legislation, planning approval conditions, Environment Protection Licences, relevant standards and this CEMF; ii. Monitor and report on the implementation and performance of the above mentioned documentation and other relevant documentation; iii. Provide independent guidance and advice to Sydney Metro and the Contractors in relation to environmental compliance issues and the interpretation of planning approval conditions; iv. Be the principal point of advice for the DP&E in relation to all questions and complaints concerning the environmental performance of the project; v. Ensure that environmental auditing is undertaken in accordance with all relevant project requirements; and vi. Recommend reasonable steps, including 'stop works', to be taken to avoid or minimise adverse environmental impacts 	Section 6.3.1
3.13a	<p>In relation to Roles and Responsibilities the CEMP will:</p> <ol style="list-style-type: none"> i. Describe the relationship between the Principal Contractor, Sydney Metro, key regulatory stakeholders, the independent environmental representative and the independent certifier; ii. For each role that has environmental accountabilities or responsibilities, including key personnel, provide a tabulated description of the authority and roles of key personnel, lines of responsibility and communication, minimum skill level requirements and their interface with the overall project organisation structure; iii. Provide details of each specialist environment, sustainability or planning consultant who is employed by the Principal Contractor including the scope of their work; and iv. Provide an overview of the role and responsibilities of the Independent Environmental Representative, the Independent Certifier and other regulatory stakeholders. 	Section 6
3.13b	All sub-contractors engaged by the Principal Contractor will be required to operate within the EMS documentation of that Principal Contractor.	Section 6

CEMF Section	Requirement	Document Reference
3.14a	Issue specific environmental monitoring will be undertaken as required or as additionally required by any approval, permit or licence conditions.	Section 10
3.14b	The results of any monitoring undertaken as a requirement of a licence or permit that is required to be published will be published on the Principal Contractor's, or a project specific, website within 14 days of obtaining the results.	Section 10.1
3.14c	Environmental inspections will include: <ul style="list-style-type: none"> i. Surveillance of environmental mitigation measures by the Site Foreman; and ii. Periodic inspections by the Principal Contractor's Environmental Manager (or delegate) to verify the adequacy of all environmental mitigation measures. This will be documented in a formal inspection record. 	Section 10.2
3.14d	Regular site inspections by the ERs and Sydney Metro representatives at a frequency to be agreed with the Principal Contractor.	Section 10.2
3.14e	Principal Contractors must undertake internal environmental audits. The scope will include: <ul style="list-style-type: none"> i. Compliance with any approval, permit or licence conditions; ii. Compliance with the E&SMS, CEMP, SMP, sub-plans and procedures; iii. Community consultation and complaint response; iv. Environmental training records; and v. Environmental monitoring and inspection results. 	Section 11.3
3.15a	Principal Contractors will document and detail any non-compliances with the requirements of any legislative or other requirements. Sydney Metro will be made aware of all non-compliances in a timely manner.	Section 11.4
3.15b	Principal Contractors will develop and implement corrective actions to rectify the non-compliances in order to prevent a re-occurrence of the non-compliance. Contractors will also maintain a register of non-compliances and associated corrective actions.	Section 11.5
3.15c	Sydney Metro or the Environmental Representative may raise non-compliances against environmental requirements. In these circumstances the Principal Contractor must abide by any requirements of Sydney Metro's procedure for managing non-compliances.	Section 11.4

CEMF Section	Requirement	Document Reference
3.16a	Principal Contractors will maintain appropriate records of the following: <ul style="list-style-type: none"> i. Site inspections, audits, monitoring, reviews or remedial actions; ii. Documentation as required by performance conditions, approvals, licences and legislation; iii. Modifications to site environmental documentation (eg CEMP, sub-plans and procedures); and iv. Other records as required by this Construction Environmental Management Framework 	Section 11.8
3.16b	Records must be accessible onsite for the duration of works.	Section 11.8
3.16c	Additionally, records will be retained by the Principal Contractor for a period of no less than 7 years. Records will be made available in a timely manner to Sydney Metro (or their representative) upon request	Section 11.8
3.16d	Compliance reports detailing the outcome of any environmental surveillance activity including internal and external audits (refer to Section 3.14) will be produced by the Principal Contractors Environmental Manager or delegate. These reports will be submitted to Sydney Metro at an agreed frequency	Section 11.4.1
3.17a	Principal Contractors will ensure the continual review and improvement of the management systems. This will generally occur in response to: <ul style="list-style-type: none"> i. Issues raised during environmental surveillance and monitoring; ii. Expanded scope of works; iii. Environmental incidents; and iv. Environmental non-conformances. 	Section 11.1
5.1a	Standard working hours are between 7am – 6pm on weekdays and 8am – 1pm on Saturdays.	Section 4.3

CEMF Section	Requirement	Document Reference
5.1b	<p>Works which can be undertaken outside of Standard construction hours without any further approval include:</p> <ul style="list-style-type: none"> i. Those which have been described in respective environmental assessments as being required to take place 24/7. For example, tunnelling and underground excavations and supporting activities will be required 24/7 ii. Works which are determined to comply with the relevant Noise Management Level at sensitive receivers; iii. The delivery of materials outside of approved hours as required by the Police or other authorities (including Sydney Roads) for safety reasons; iv. Where it is required to avoid the loss of lives, property and / or to prevent environmental harm in an emergency; and v. Where written agreement is reached with all affected receivers. 	Section 4.3
5.1c	Principal Contractors may apply for EPA approval to undertake works outside of normal working hours under their respective Environment Protection Licenses	Section 4.3
5.3a	<p>Principal Contractors will consider the following in the layout of construction sites:</p> <ul style="list-style-type: none"> i. The location of noise intensive works and 24 hour activities in relation to noise sensitive receivers; ii. The location of site access and egress points in relation to noise and light sensitive receivers, especially for sites proposed to be utilised 24 hours per day; iii. The use of site buildings to shield noisy activities from receivers; iv. The use of noise barriers and / or acoustic sheds where feasible and reasonable for sites proposed to be regularly used outside of daytime hours; v. Aim to minimise the requirement for reversing, especially of heavy vehicles; and vi. Any applicable requirements of the Construction Traffic Management Framework (CTMF). 	Attachment 2

ATTACHMENT 2 – MITIGATION AND MANAGEMENT MEASURES

This annexure contains requirements that will be applied to the works completed under this SEMP. Mitigation and management measures will be included within the various work packs and also the work method statements. Site personnel will be required to undertake all works in accordance with the mitigation and management measures identified in the relevant documents.

No.	Mitigation and Management Measures	Responsibility	Timing	Reference
SEA – Senior Environmental Advisor, CM – Construction Manager, EA – Environmental Advisor, SS- Site Supervisor, TM – Traffic Manager, CSEM– Community and Stakeholder Engagement Manager, PM – Project Manager				
Transport and Traffic				
MMTT1	Construction site traffic will be managed to schedule vehicle movement and haulage outside of peak periods, where practicable	CM/TM	During establishment	REMM TT7
MMTT2	Construction related vehicles are to park onsite in designated site parking areas	SS/CM	During establishment	CoA D90
MMTT3	A Traffic Control Plan (TCP) will be developed and implemented	TM/CM/PM	Prior to site establishment / site establishment	CoA D94
MMTT4	Vehicle movements will follow site signage and traffic management plan, which will be communicated during site inductions	SS/CM/TM	During establishment	Best practice
MMTT5	Vehicles associated with the site establishment workforce (including light vehicles and Heavy Vehicles) will be managed to: <ul style="list-style-type: none"> a) minimise parking on public roads; b) minimise idling and queueing on state and regional roads; c) enter and exit construction sites in a forward direction, where feasible and reasonable; 	SS/CM/TM	During establishment	CoA D42, D90, REMM TT6

No.	Mitigation and Management Measures	Responsibility	Timing	Reference
SEA – Senior Environmental Advisor, CM – Construction Manager, EA – Environmental Advisor, SS- Site Supervisor, TM – Traffic Manager, CSEM– Community and Stakeholder Engagement Manager, PM – Project Manager				
	<ul style="list-style-type: none"> d) not carry out marshalling of construction vehicles near sensitive land user(s); e) not block or disrupt access across pedestrian or shared user paths at any time unless alternate access is provided; and f) ensure spoil haulage vehicles adhere to the nominated haulage routes identified in the SEMP. 			
MMTT6	Access to properties for emergency vehicles will be provided at all times.	SS/CM/TM	Prior to site establishment / site establishment	REMM TT3
MMTT7	Access to all utilities and properties will be maintained during works, unless otherwise consulted and agreed with the relevant utility owner, landowner or occupier.	SS/CM/TM	Prior to site establishment / site establishment	CoA D80, REMM TT18
MMTT8	<p>Safe pedestrian and cyclist access will be maintained around the Site during site establishment activities. This may require manual supervision, physical barriers, temporary traffic signals and modifications to existing signals or, on occasions, police presence.</p> <p>In circumstances where pedestrian and cyclist access is restricted or removed due to site establishment activities, a proximate alternate route which complies with the relevant standards, will be provided and signposted before the restriction or removal of the impacted access.</p>	SS/CM/TM	Prior to site establishment / site establishment	CoA D98, REMM TT4
MMTT9	During special events, consideration would be given to minimising the level of construction activity, or ceasing all construction activity.	SS/CM/TM	Prior to site establishment / site establishment	Best practice

No.	Mitigation and Management Measures	Responsibility	Timing	Reference
SEA – Senior Environmental Advisor, CM – Construction Manager, EA – Environmental Advisor, SS- Site Supervisor, TM – Traffic Manager, CSEM– Community and Stakeholder Engagement Manager, PM – Project Manager				
MMTT10	Schedule deliveries to the construction site outside of special event periods, where possible	SS/CM	Prior to site establishment / site establishment	Best practice
MMTT11	In the event of a traffic related incident, coordination would be carried out with Transport for NSW, including Transport Coordination and/or the Transport Management Centre's Operations Manager.	SEA	During site establishment	REMM TT2
MMTT12	Before any local road is used by a Heavy Vehicle for the purposes of site establishment, a Road Dilapidation Report will be prepared for the road. A copy of the Road Dilapidation Report will be provided to the Relevant Road Authority(s) within three (3) weeks of completion of the survey and at no later than one (1) month before the road being used by Heavy Vehicles.	SEA/TM	Prior to site establishment	CoA D88
Noise and Vibration				
MMNV1	The CSSI name, application number, telephone number, postal address and email address to be available onsite boundary fencing / hoarding at each ancillary facility before the commencement of site establishment works.	CM	Prior to site establishment	CoA A48
MMNV2	Works to only be undertaken during the following hours: <ul style="list-style-type: none"> ● 7:00am to 6:00pm Monday to Friday ● 8:00am to 6:00pm Saturdays ● At no time on Sundays or public holidays Where 'highly noise intensive' works exceed the applicable noise management level (NML) at the same receiver, works are to only be undertaken during the following hours: <ul style="list-style-type: none"> ● 8:00am to 6:00pm Monday to Friday 	CM/SEA	During establishment	CoA D35, D36, NV4

No.	Mitigation and Management Measures	Responsibility	Timing	Reference
SEA – Senior Environmental Advisor, CM – Construction Manager, EA – Environmental Advisor, SS- Site Supervisor, TM – Traffic Manager, CSEM– Community and Stakeholder Engagement Manager, PM – Project Manager				
	<ul style="list-style-type: none"> 8:00am to 1:00pm Saturdays and if continuously, then not exceeding three (3) hours, with a minimum cessation of work of not less than one (1) hour. 			
MMNV3	Noise and vibration monitoring will be conducted periodically at the commencement of site establishment works.	EA/SEA	During establishment	CoA D39, C16
MMNV4	Additional portable noise barriers may also be used around particularly noisy equipment such as concrete saws, where necessary	CM/SS	During establishment	CoA D42 REMM NV2
MMNV5	Plant and machinery will be fitted with manufacturer supplied noise suppression devices and maintained where required	CM/SS	During establishment	CoA D42 REMM NV2
MMNV6	Reasonable and feasible noise mitigation measures for heavy vehicles listed within the NVIA will be implemented, including: <ul style="list-style-type: none"> Delivery vehicles fitted with straps instead of chains Avoid compression braking in heavy vehicles, where possible 	EA/CM/SS	Prior to site establishment / During establishment	CoA D42
MMNV7	Any equipment not in use for extended periods shall be switched off	CM/SS	During establishment	CoA D42, Best practice
MMNV8	Less intensive noise and vibration construction techniques will be used, where possible, to break rock and saw concrete	CM/SS	During establishment	CoA D42 REMM NV02, NV09
MMNV9	Implementation of respite periods during high noise impact activities, as per the Sydney Metro CNVS (e.g. one hour of respite for every three hours of noise intensive work).	CM/SS	During establishment	CoA D50 REMM NV3
MMNV10	Co-ordination will occur between potentially interacting projects and other site teams within the same project to	SEA	Prior to establishment	CoA D50, REMM NV18

No.	Mitigation and Management Measures	Responsibility	Timing	Reference
SEA – Senior Environmental Advisor, CM – Construction Manager, EA – Environmental Advisor, SS- Site Supervisor, TM – Traffic Manager, CSEM– Community and Stakeholder Engagement Manager, PM – Project Manager				
	minimise concurrent or consecutive works in the same areas, where possible.			
MMNV11	Noise levels for plant and machinery will be mitigated through the following: <ul style="list-style-type: none"> • Have operating Sound Power Levels (LW) compliant with the Sydney Metro CNVS • Fitted with manufacturer supplied noise suppression devices and maintained where required. 	SS/CM	During establishment	CoA D42, REMM NV02
Non-Aboriginal heritage and Aboriginal heritage				
MMAH1	In the event that unexpected Aboriginal/non-Aboriginal heritage items are exposed during construction, the Sydney Metro Exhumation Management Plan and the Unexpected Heritage Finds and Human Remains Procedure would be implemented.	All personnel	Prior to site establishment / During establishment	CoA D13, CoA D31 and AH4
MMAH2	Protective measures for heritage items to be established at the earliest phase of site establishment (undertaken under LIW 7/8).	SEA/CM	Prior to site establishment / During establishment	CoA D19
MMAH3	Archaeological test excavation (and salvage when required) would be carried out where intact natural profiles with the potential to contain significant archaeological deposits are encountered. Excavations would be conducted in accordance with the methodology outlined in the Aboriginal cultural heritage assessment report	SEA/EA/CM	During establishment	CoA C13
MMAH4	If Aboriginal archaeological remains are identified during Stage 1, results would be incorporated into Aboriginal heritage interpretation for the Concept in consultation with registered Aboriginal parties	SEA/EA	During establishment	CoA C13, C-B6 and REMM AH3

No.	Mitigation and Management Measures	Responsibility	Timing	Reference
SEA – Senior Environmental Advisor, CM – Construction Manager, EA – Environmental Advisor, SS- Site Supervisor, TM – Traffic Manager, CSEM– Community and Stakeholder Engagement Manager, PM – Project Manager				
MMAH5	In the event that a potential burial site or potential human skeletal material is exposed during construction, the Sydney Metro Exhumation Management Plan would be implemented.	SEA/EA	During establishment	
Landscape character and visual amenity				
MMLC1	Graffiti on site hoarding and construction litter around site perimeters will be removed throughout site establishment	CM/SS	Prior to site establishment / During establishment	REMM LV3
MMLC2	Ensure worksites are kept in an organised, tidy fashion at the end of every work day	CM/SS	During establishment	Best Practice
MMLC3	There will be no advertising on any element of the Site.	SS/CM/SEA	Prior to site establishment / During establishment	CoA D104
Social and Business				
MMSB1	Access to all utilities and properties will be maintained during site establishment	SEA/CM/SS	Prior to site establishment / During establishment	CoA D80
MMSB2	Dial Before You Dig (DBYD) searches will be undertaken prior to any ground penetration work to locate any existing underground services, utilities and infrastructure that may be impacted by that work. The relevant owner(s) will be consulted prior to and during any diversion, protection or support works that are required to protect the service, utility or infrastructure.	SEA/CM/SS	Prior to site establishment / During establishment	CoA D101, REMM HA2
MMSB3	The site establishment works would be undertaken with the objective of minimising impacts to, and interference with, third party property and infrastructure, and that such infrastructure and property is protected during site establishment.	SEA/CM/SS	Prior to site establishment / During establishment	CoA D58

No.	Mitigation and Management Measures	Responsibility	Timing	Reference
SEA – Senior Environmental Advisor, CM – Construction Manager, EA – Environmental Advisor, SS- Site Supervisor, TM – Traffic Manager, CSEM– Community and Stakeholder Engagement Manager, PM – Project Manager				
MMSB4	A suitably qualified and experienced person will undertake condition surveys of all buildings, structures, utilities and the like as being at risk of damage as identified in the Detailed Noise and Vibration Impact Statement before commencement of any work that could impact on the subject surface / subsurface structure. The results of the surveys will be documented in a Pre-construction Condition Survey Report for each item surveyed. Copies of Pre-construction Condition Survey Reports will be provided to the relevant owners of the items surveyed in the vicinity of the proposed work, and no later than one (1) month before the commencement of the work that could impact on the subject surface / subsurface structure.	SEA	Prior to site establishment	CoA D60 and REMM NV17
MMSB5	Condition surveys will be undertaken by a suitably qualified and experienced person after completion of the work. The results of the surveys will be documented in a Post-construction Condition Survey Report for each item surveyed. Copies of Post-construction Condition Survey Reports will be provided to the landowners of the items surveyed, and no later than three (3) months following the completion of the work that could impact on the subject surface / subsurface structure unless otherwise agreed by the Planning Secretary.	SEA	Post site establishment	CoA D61
Soils, Groundwater and Surface Water Quality				
MMSW1	Soil and water management measures consistent with Managing Urban Stormwater - Soils and Construction Vols 1 and 2, 4th Edition (Landcom, 2004), including those listed in this table will be designed, installed and managed during the construction of the project to minimise soil erosion and the	SS/EA	During establishment	CoA D116 SSWQ3

No.	Mitigation and Management Measures	Responsibility	Timing	Reference
SEA – Senior Environmental Advisor, CM – Construction Manager, EA – Environmental Advisor, SS- Site Supervisor, TM – Traffic Manager, CSEM– Community and Stakeholder Engagement Manager, PM – Project Manager				
	discharge of sediment and other pollutants to land and/or waters.			
MMSW2	Prevent soil erosion through minimising ground disturbance and sealing ground surfaces as soon as is practicable.	SS/EA	Prior to site establishment / site establishment	CoA D116 SSWQ3
MMSW3	An Erosion and Sediment Control Plan (ESCP) will be developed and implemented for all sites. The ESCPs will be updated where changes to site use, storage and conditions change.	SS/EA	Prior to site establishment / site establishment	CoA D116, SSWQ3, SSWQ4
MMSW4	A soil conservation specialist will be engaged if relevant, to provide advice regarding erosion and sediment control and review the initial ESCPs.	SS/EA	Prior to site establishment / site establishment	Best practice
MMSW5	If acid sulfate soils are identified, they will be managed in accordance with the Acid Sulfate Soil Manual (Acid Sulfate Soil Management Advisory Committee 1998) which includes procedures for the investigation, handling, treatment and management of such soils.	SS/EA	Prior to site establishment / site establishment	SSWQ1
MMSW6	Monitoring of groundwater levels and quality at the site area will occur before, during and after construction. This will also include monitoring of potential contaminants of concern.	SS/EA	Prior to site establishment / site establishment	REMM GW4
MMSW7	Further design development will confirm the local stormwater system capacity to receive construction water treatment plant inflows. In the event there is a stormwater infrastructure capacity issue with existing infrastructure, mitigation measures such as storage detention to control water outflow during wet weather events will be implemented.	SS/EA	Prior to site establishment / site establishment	SSWQ7

No.	Mitigation and Management Measures	Responsibility	Timing	Reference
SEA – Senior Environmental Advisor, CM – Construction Manager, EA – Environmental Advisor, SS- Site Supervisor, TM – Traffic Manager, CSEM– Community and Stakeholder Engagement Manager, PM – Project Manager				
MMSW8	<p>Unless an EPL is in force in respect to the site establishment works and that licence specifies alternative criteria, discharges from wastewater treatment plants to surface waters will not exceed:</p> <ul style="list-style-type: none"> a) The Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2018 (ANZG (2018)) default guideline values for toxicants at the 95 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 (ANZECC/ARMCANZ); and c) For bioaccumulative and persistent toxicants, the ANZG (2018) guidelines values at a minimum of 99 per cent species protection level. <p>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, will be used.</p>	EA	Prior to site establishment / site establishment	CoA D118
Contamination				
MMC1	<p>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 1997 (NSW) (CLM Act). This includes further investigations in areas of potential contamination identified in the project footprint. If</p>	SEA/CM	Prior to construction	CoA D71 REMM C1



No.	Mitigation and Management Measures	Responsibility	Timing	Reference
SEA – Senior Environmental Advisor, CM – Construction Manager, EA – Environmental Advisor, SS- Site Supervisor, TM – Traffic Manager, CSEM– Community and Stakeholder Engagement Manager, PM – Project Manager				
	contamination posing a risk to human or ecological receptors is identified, a Remediation Action Plan will be prepared and implemented and subsequent phases of work may be required.			
MMC2	An Unexpected Contaminated Land and Asbestos Finds Procedure will be implemented to manage any potentially contaminated materials that may be encountered during site establishment works.	SEA/CM	Prior to site establishment / site establishment	CoA D77
MMC3	Use of solvents containing VOCs will be minimised, where possible, and not permitted in belowground excavation.	SEA/CM	Prior to site establishment / site establishment	Best practice
Hydrology and Flooding				
MMHF1	Provide flood-proofing to excavations at risk of flooding or coastal inundation during construction, where feasible and reasonable	SEA/CM/SS	Prior to site establishment / site establishment	Best Practice
Biodiversity				
MMB1	General hygiene controls including the cleaning of plant and equipment to be undertaken before and after works	CM/SS	Site establishment	Best practice
MMB2	An arborist will be present onsite if works are within the critical root zone of native vegetation to confirm if an arborist is required.	EA/SS	During establishment	CoA: C11 and D9
Air Quality				
MMAQ1	Exposed areas will be watered to prevent offsite dust migration	CM/SS	Site establishment	CoA D1 REMM AQ1
MMAQ2	Regular site inspections will be conducted to monitor for potential dust issues	CM/SS/SEA	Site establishment	CoA D1 REMM AQ1

No.	Mitigation and Management Measures	Responsibility	Timing	Reference
SEA – Senior Environmental Advisor, CM – Construction Manager, EA – Environmental Advisor, SS- Site Supervisor, TM – Traffic Manager, CSEM– Community and Stakeholder Engagement Manager, PM – Project Manager				
MMAQ3	Control measures including water carts, sprinklers, sprays/suppressants will be utilised where applicable to control dust emissions	CM/SS	Site establishment	CoA D1 REMM AQ1
MMAQ4	Access roads within Project sites will be maintained and managed to reduce dust generation	CM/SS	Site establishment	CoA D1 REMM AQ1
MMAQ5	Sawing of concrete or bricks will be undertaken in a manner that minimises the generation of dust, such as the wetting of the sawing face	CM/SS	Site establishment	CoA D1 REMM AQ1
MMAQ6	Works that would generate dust, will have a modified set up method or will be ceased during high dust generating weather	CM/SS	Site establishment	CoA D1 REMM AQ1
MMAQ7	Adequate dust suppression to be applied during the installation of environmental controls	CM/SS	Site establishment	CoA D1 REMM AQ1
MMAQ8	Construction activities will be modified, reduced or controlled during high or unfavourable wind conditions if they have a potential to increase the generation or emission of dust	CM/SS	Site establishment	CoA D1 REMM AQ1
MMAQ9	All stockpiles will be managed in accordance with Managing Urban Stormwater: Soils and construction (Landcom, 2004; “the Blue Book”)	CM/SS	Site establishment	CoA D1 REMM AQ1
MMAQ10	All trucks entering or leaving the site with loads will have their loads covered	CM/SS	Site establishment	CoA D1 REMM AQ1
MMAQ11	Plant and equipment to be maintained and operated in an efficient manner to reduce emissions	CM/SS	Site establishment	CoA D1 REMM AQ2
MMAQ12	Machinery will be turned off when not in use (ie avoid idling) to reduce emissions	CM/SS	Site establishment	CoA D1
Spoil Waste Management and Resource Use				

No.	Mitigation and Management Measures	Responsibility	Timing	Reference
SEA – Senior Environmental Advisor, CM – Construction Manager, EA – Environmental Advisor, SS- Site Supervisor, TM – Traffic Manager, CSEM– Community and Stakeholder Engagement Manager, PM – Project Manager				
MMSR1	Waste generated during site establishment will be dealt with in accordance with the following priorities: <ul style="list-style-type: none"> a) waste generation will be avoided and where avoidance is not reasonably practicable, waste generation will be reduced; b) where avoiding or reducing waste is not possible, waste will be re-used, recycled, or recovered; and c) where re-using, recycling or recovering waste is not possible, waste will be treated or disposed of. 	SS/CM/EA	Site establishment	CoA D111, REMM WR3
MMSR2	Construction waste would be minimised by accurately calculating materials brought to the site and limiting materials packaging	SS/CM/EA	Site establishment	CoA D111, REMM WR3
MMSR3	Waste streams would be segregated to avoid cross-contamination of materials	SS/CM/EA	Site establishment	REMM WR4
MMSR4	Recyclable materials will be collected and transported for offsite recycling wherever possible	SS/CM	Site establishment	CoA D111
MMSR5	All waste will be collected by an appropriately suitably licensed waste contractors to facilities licensed by the EPA for the storage, treatment, processing, reprocessing or disposal of the subject waste.	EA/SS/SEA	Site establishment	CoA D112, D113 REMM WR1
MMSR6	All waste will be classified in accordance with the EPA's Waste Classification Guidelines, with appropriate records and disposal dockets retained for audit purposes.	EA/SS/SEA	Site establishment	CoA D112, D113, D114 REMM WR1
MMSR7	Standard signage will be posted in all waste storage / collection areas to inform and educate users of waste storage	EA/SS	Site establishment	Best practice

No.	Mitigation and Management Measures	Responsibility	Timing	Reference
SEA – Senior Environmental Advisor, CM – Construction Manager, EA – Environmental Advisor, SS- Site Supervisor, TM – Traffic Manager, CSEM– Community and Stakeholder Engagement Manager, PM – Project Manager				
	/ collection areas while promoting waste minimisation and resource recovery			
MMSR8	Signs approved by the NSW EPA for labelling of waste materials are available online and will be used where applicable	EA/SS	Site establishment	Best practice
Hazards				
MMH1	Fuel and chemicals to be stored in approved containers within a bunded area	CM	Site establishment	Best practice
MMH2	Fuel storage to be inspected daily for damage, leaks or tampering	SS	Site establishment	Best practice
MMH3	Emergency spill kits to be made readily available on-site	SS	Site establishment	Best practice
MMH4	Refuelling of machinery shall conform to the following requirements: Designated refuelling area within close proximity to spill response equipment <ul style="list-style-type: none"> • No fuelling within 30 metres of the upper banks of the watercourse and drainage lines • Fuelling activity to be supervised at all times 	CM/SS	Site establishment	Best practice
MMH5	Ongoing consultation will be carried out with utility providers for high pressure gas or petroleum pipelines to identify appropriate construction methodologies to be implemented. Any interaction with high pressure gas or petroleum pipelines will comply with the relevant standards, including AS 2885 Pipelines – Gas and Liquid Petroleum.	SEA	Prior to site establishment	REMM HA3

ATTACHMENT 3 – ENVIRONMENTAL RISK ASSESSMENT

Key establishment Activities (note: items may not occur in sequence order)	Environmental Aspect	Potential Impacts	Likelihood	Consequence	Risk Rating	Mitigation Measures	Residual Impacts following mitigation	Likelihood	Consequence	Residual Risk Rating	Overall Residual rating of activity
Movement of vehicles into the site	Traffic and transport	<ul style="list-style-type: none"> Changes to localised traffic flows as a result of increased vehicle movements 	Possible	Insignificant	Low (3)	<ul style="list-style-type: none"> Minimise queuing and idling of construction vehicles Measures identified in the Traffic and Transport Management Sub-plan to be implemented 	<ul style="list-style-type: none"> Occasional queuing and idling of site vehicles outside site compound 	Unlikely	Insignificant	Low (2)	Low (4)
	Landscape character and visual amenity	<ul style="list-style-type: none"> Negative visual impact of the construction site 	Likely	Minor	Moderate (8)	<ul style="list-style-type: none"> Hoardings to be designed with appropriate colours/material that minimises visual prominence Graffiti on site hoarding and construction litter around site perimeters will be removed throughout site establishment Ensure worksites are kept in an organised, tidy fashion at the end of every work day All external lighting will be mounted, screened, and directed in such a manner so as not to create a nuisance to surrounding land users A clearly visible sign will be installed at the site access. Relevant contact details, including a phone number for community enquiries, will be included on site signage 	<ul style="list-style-type: none"> Degradation of hoarding 	Possible	Low	Low (3)	Low (4)
Establishment of facilities including: <ul style="list-style-type: none"> Water Treatment Plant Bentonite farm 	Noise and Vibration	<ul style="list-style-type: none"> Noise nuisance to sensitive receivers Vibration nuisance to sensitive receptors 	Possible	Moderate	Moderate (9)	<ul style="list-style-type: none"> Acoustic hoarding around the site perimeter to be erected to control the dispersion of noise offsite. Additional portable noise barriers may also be used around particularly noisy equipment such as concrete saws, where necessary. Plant and machinery will be fitted with manufacturer supplied noise suppression devices and maintained where required Community updates will be provided throughout the site establishment works Any equipment not in use for extended periods shall be switched off Implementation of respite periods during high noise impact activities Less intensive noise and vibration construction techniques will be used, where possible, to break rock and saw concrete Works to only be undertaken during the following hours: <ul style="list-style-type: none"> 7:00am to 6:00pm Monday to Friday 8:00am to 6:00pm Saturdays 	<ul style="list-style-type: none"> No residual impacts are anticipated should all mitigation measures be implemented and adhered to accordingly 	Unlikely	Minor	Low (4)	Low

Key establishment Activities (note: items may not occur in sequence order)	Environmental Aspect	Potential Impacts	Likelihood	Consequence	Risk Rating	Mitigation Measures	Residual Impacts following mitigation	Likelihood	Consequence	Residual Risk Rating	Overall Residual rating of activity
						<ul style="list-style-type: none"> - At no time on Sundays or public holidays • Where 'highly noise intensive' works exceed the applicable noise management level (NML) at the same receiver, works are to only be undertaken during the following hours: <ul style="list-style-type: none"> - 8:00am to 6:00pm Monday to Friday - 8:00am to 1:00pm Saturdays - Respite periods of one hour for every three hours to be applied. • Conduct noise and/or vibration monitoring in response to any formal complaints received • Sydney Metro CNVS Additional Mitigation Measures to be implemented. 					
	Non-Aboriginal heritage	<ul style="list-style-type: none"> • Discovery of an unexpected non-Aboriginal heritage item or relic • Partial or complete destruction of an unexpected non-Aboriginal heritage item or relic • Accidental destruction or damage of existing heritage items as a result of vehicle strike and movement of plant and equipment • Damage to structural elements of heritage buildings, i.e. footings • Insufficient distance between construction facilities and heritage buildings resulting in additional impacts. 	Possible	Moderate	Moderate (9)	<ul style="list-style-type: none"> • In the event that unexpected non-Aboriginal heritage items are exposed during construction, the Sydney Metro Exhumation Management Plan and the Unexpected Heritage Finds and Human Remains Procedure would be implemented. • In the event historical archaeological remains are encountered, a program of test excavation (and salvage if required) would be required to be undertaken in accordance with an Archaeological Research Design prepared by a suitably qualified Excavation Director. This may require consultation with Heritage NSW (to be determined on the level of significance of the relics) • Protective measures for heritage items to be established at the earliest phase of site establishment • Vehicle movements to follow site signage and traffic management plan • Site specific heritage induction for all personnel (project staff and contractors), induction to include no-go zones and protocols for protecting heritage from accidental and intentional damage • Planning of construction facility locations should be undertaken in consultation with a suitably qualified heritage advisor and acoustics/vibration specialist. Protective measures should be established in line with the advice of heritage advisor or acoustics/vibration specialist if the site facilities are unable to be relocated. 	<ul style="list-style-type: none"> • Unexpected non-Aboriginal heritage items are exposed 	Unlikely	Minor	Low (4)	Low

Key establishment Activities (note: items may not occur in sequence order)	Environmental Aspect	Potential Impacts	Likelihood	Consequence	Risk Rating	Mitigation Measures	Residual Impacts following mitigation	Likelihood	Consequence	Residual Risk Rating	Overall Residual rating of activity
	Aboriginal heritage	<ul style="list-style-type: none"> Discovery of an unexpected Aboriginal heritage object Partial or complete destruction of an unexpected Aboriginal heritage object 	Unlikely	Moderate	Moderate (8)	<ul style="list-style-type: none"> In the event that unexpected Aboriginal heritage items are exposed during construction, the Sydney Metro Exhumation Management Plan and the Unexpected Heritage Finds and Human Remains Procedure would be implemented. Aboriginal archaeological test excavation (and salvage when required) will be carried out where intact natural profiles with the potential to contain significant archaeological deposits are encountered. Any excavations should be undertaken in accordance with an Archaeological Research Design prepared in consultation with the Aboriginal community in accordance with the Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010 Site specific heritage induction for all personnel (project staff and contractors), induction to include no-go zones and protocols for protecting heritage from accidental and intentional damage 	<ul style="list-style-type: none"> Unexpected Aboriginal heritage items are exposed 	Unlikely	Minor	Low (4)	Low
	Landscape character and visual amenity	<ul style="list-style-type: none"> Negative visual impact of the construction site 	Possible	Minor	Moderate (6)	<ul style="list-style-type: none"> Hoardings to be designed with appropriate colours/material that minimises visual prominence Graffiti on site hoarding and construction litter around site perimeters will be removed throughout site establishment Ensure worksites are kept in an organised, tidy fashion at the end of every work day All external lighting will be mounted, screened, and directed in such a manner so as not to create a nuisance to surrounding land users A clearly visible sign will be installed at the site access. Relevant contact details, including a phone number for community enquiries, will be included on site signage 	<ul style="list-style-type: none"> Degradation of hoarding Potential to unintentionally overlook graffiti on hoardings 	Unlikely	Insignificant	Low (2)	Low
	Soils and surface water quality	<ul style="list-style-type: none"> Sediment tracking onto roads Stockpiled soils migrating offsite Migration of sediment into nearby stormwater system and/or waterways 	Likely	Moderate	High (12)	<ul style="list-style-type: none"> Site access and egress points to be fitted with wheel wash facilities and rumble grids Streetsweepers to be used to management sediment tracking on roads Erosion and sediment control plans to be prepared for all work and implemented prior to any ground disturbance works 	<ul style="list-style-type: none"> Localised sediment release offsite during high volume or prolonged rain events Water ponding around wheel wash 	Unlikely	Minor	Low (4)	Low

Key establishment Activities (note: items may not occur in sequence order)	Environmental Aspect	Potential Impacts	Likelihood	Consequence	Risk Rating	Mitigation Measures	Residual Impacts following mitigation	Likelihood	Consequence	Residual Risk Rating	Overall Residual rating of activity
						<ul style="list-style-type: none"> Sediment and erosion controls to be inspected regularly for damage. Where damage or potential failures are observed, faults are to be rectified immediately Workers will undergo a site induction and ongoing toolbox talks regarding erosion and sediment control mitigation Hardstand areas will be cleaned as soon as practically possible 	<ul style="list-style-type: none"> Offsite migration of sediment as a result of failures to sediment and erosion controls 				
	Contamination	<ul style="list-style-type: none"> Spills or leaks of chemicals or fuels from plant and equipment resulting in contamination of soils Exposing unexpected contaminated material 	Possible	Moderate	Moderate (9)	<ul style="list-style-type: none"> Vehicles and machinery to be properly maintained and routinely inspected to minimise the risk of fuel/oil leaks. Construction plant, vehicles and equipment to also be refuelled offsite, or in a designated refuelling area The Unexpected Contaminated Land and Asbestos Finds procedure to be implemented throughout site establishment works A Detailed Site Investigation will be carried out in accordance with the National Environment Protection Measure (2013) Where the Detailed Site Investigation confirms that contamination would have a moderate, high or very high risk, a Remediation Action Plan would be developed for the area of the construction footprint Site Auditor would review and approve the Remediation Action Plan and would develop a Site Audit Statement and Site Audit Report upon completion of remediation Ongoing management and monitoring measures would be documented in an appropriate form and implemented for any areas where minor, residual contamination remains following construction 	<ul style="list-style-type: none"> Unexpected contaminated material finds resulting in human health or ecological impacts 	Unlikely	Minor	Low (4)	Low
	Air quality	<ul style="list-style-type: none"> Generation of odours as a result of excavation into contaminated soil Generation of dust 	Possible	Minor	Moderate (6)	<ul style="list-style-type: none"> Works that would generate dust, will have a modified set up method or will be ceased during high dust generating weather Adequate dust suppression to be applied during the installation of environmental controls If contaminated material is identified works would cease immediately, the contaminated material would be 	<ul style="list-style-type: none"> Potential for minor dust generation within the boundaries of the Rosehill site. 	Unlikely	Minor	Low (4)	Low

Key establishment Activities (note: items may not occur in sequence order)	Environmental Aspect	Potential Impacts	Likelihood	Consequence	Risk Rating	Mitigation Measures	Residual Impacts following mitigation	Likelihood	Consequence	Residual Risk Rating	Overall Residual rating of activity
						assessed, excavated and disposed of off-site to a licensed waste disposal					
Minor earthworks including: <ul style="list-style-type: none"> minor excavation for sump and minor concrete work Preparation of existing hardstands 	Noise and Vibration	<ul style="list-style-type: none"> Noise nuisance to sensitive receivers Vibration nuisance to sensitive receptors 	Likely	Moderate	High (12)	<ul style="list-style-type: none"> Water and/or odour suppressants to be applied as required Acoustic hoarding around the site perimeter to be erected to control the dispersion of noise offsite. Additional portable noise barriers may also be used around particularly noisy equipment such as concrete saws, where necessary. Any equipment not in use for extended periods shall be switched off Plant and machinery will be fitted with manufacturer supplied noise suppression devices and maintained where required Community updates will be provided throughout the site establishment works Implementation of respite periods during high noise impact activities Less intensive noise and vibration construction techniques will be used, where possible, to break rock and saw concrete Works to only be undertaken during the following hours: <ul style="list-style-type: none"> 7:00am to 6:00pm Monday to Friday 8:00am to 6:00pm Saturdays At no time on Sundays or public holidays Where 'highly noise intensive' works exceed the applicable noise management level (NML) at the same receiver, works are to only be undertaken during the following hours: <ul style="list-style-type: none"> 8:00am to 6:00pm Monday to Friday 8:00am to 1:00pm Saturdays Respite periods of one hour for every three hours to be applied. Conduct noise and/or vibration monitoring in response to any formal complaints received. Sydney Metro CNVS Additional Mitigation Measures to be implemented. 	<ul style="list-style-type: none"> No residual impacts are anticipated should all mitigation measures be implemented and adhered to accordingly 	Unlikely	Minor	Low (4)	Low
	Non-Aboriginal heritage	<ul style="list-style-type: none"> Discovery of an unexpected non-Aboriginal heritage item or relic Partial or complete destruction of an unexpected non- 	Possible	Moderate	Moderate (9)	<ul style="list-style-type: none"> In the event that unexpected non-Aboriginal heritage items are exposed during construction, the Sydney Metro Exhumation Management Plan and the Unexpected Heritage Finds and Human Remains Procedure would be implemented. 	<ul style="list-style-type: none"> Unexpected non-Aboriginal heritage items are exposed 	Unlikely	Minor	Low (4)	Low

Key establishment Activities (note: items may not occur in sequence order)	Environmental Aspect	Potential Impacts	Likelihood	Consequence	Risk Rating	Mitigation Measures	Residual Impacts following mitigation	Likelihood	Consequence	Residual Risk Rating	Overall Residual rating of activity
		<ul style="list-style-type: none"> Aboriginal heritage item or relic Accidental destruction or damage of existing heritage items as a result of vehicle strike and movement of plant and equipment Damage to structural elements of heritage buildings, i.e. footings. 				<ul style="list-style-type: none"> In the event historical archaeological remains are encountered, a program of test excavation (and salvage if required) would be required to be undertaken in accordance with an Archaeological Research Design prepared by a suitably qualified Excavation Director. This may require consultation with Heritage NSW (to be determined on the level of significance of the relics) Protective measures for heritage items to be established at the earliest phase of site establishment Vehicle movements to follow site signage and traffic management plan Site specific heritage induction for all personnel (project staff and contractors), induction to include no-go zones and protocols for protecting heritage from accidental and intentional damage 					
	Aboriginal heritage	<ul style="list-style-type: none"> Discovery of an unexpected Aboriginal heritage object Partial or complete destruction of an unexpected Aboriginal heritage object 	Unlikely	Moderate	Moderate (8)	<ul style="list-style-type: none"> In the event that unexpected Aboriginal heritage items are exposed during construction, the Sydney Metro Exhumation Management Plan and the Unexpected Heritage Finds and Human Remains Procedure would be implemented. Aboriginal archaeological test excavation (and salvage when required) will be carried out where intact natural profiles with the potential to contain significant archaeological deposits are encountered. Any excavations should be undertaken in accordance with an Archaeological Research Design prepared in consultation with the Aboriginal community in accordance with the Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010 Site specific heritage induction for all personnel (project staff and contractors), induction to include no-go zones and protocols for protecting heritage from accidental and intentional damage 	<ul style="list-style-type: none"> Unexpected Aboriginal heritage items are exposed 	Unlikely	Minor	Low (4)	Low
	Soils and surface water quality	<ul style="list-style-type: none"> Sediment tracking onto roads Stockpiled soils migrating offsite Migration of sediment into nearby 	Likely	Moderate	High (12)	<ul style="list-style-type: none"> Site access and egress points to be fitted with wheel wash facilities and rumble grids Streetsweepers to be used to management sediment tracking on roads 	<ul style="list-style-type: none"> Localised sediment release offsite during high volume or prolonged rain events 	Unlikely	Minor	Low (4)	Low

Key establishment Activities (note: items may not occur in sequence order)	Environmental Aspect	Potential Impacts	Likelihood	Consequence	Risk Rating	Mitigation Measures	Residual Impacts following mitigation	Likelihood	Consequence	Residual Risk Rating	Overall Residual rating of activity
		stormwater system and/or waterways				<ul style="list-style-type: none"> Erosion and sediment control plans to be prepared for all work and implemented prior to any ground disturbance works Sediment and erosion controls to be inspected regularly for damage. Where damage or potential failures are observed, faults are to be rectified immediately Workers will undergo a site induction and ongoing toolbox talks regarding erosion and sediment control mitigation Hardstand areas will be cleaned as soon as practically possible 	<ul style="list-style-type: none"> Water ponding around wheel wash Offsite migration of sediment as a result of failures to sediment and erosion controls 				
	Contamination	<ul style="list-style-type: none"> Spills or leaks of chemicals or fuels from plant and equipment resulting in contamination of soils Exposing unexpected contaminated material 	Possible	Moderate	Moderate (9)	<ul style="list-style-type: none"> Vehicles and machinery to be properly maintained and routinely inspected to minimise the risk of fuel/oil leaks. Construction plant, vehicles and equipment to also be refuelled offsite, or in a designated refuelling area The Unexpected Contaminated Land and Asbestos Finds procedure to be implemented throughout site establishment works A Detailed Site Investigation will be carried out in accordance with the National Environment Protection Measure (2013) Where the Detailed Site Investigation confirms that contamination would have a moderate, high or very high risk, a Remediation Action Plan would be developed for the area of the construction footprint Site Auditor would review and approve the Remediation Action Plan and would develop a Site Audit Statement and Site Audit Report upon completion of remediation Ongoing management and monitoring measures would be documented in an appropriate form and implemented for any areas where minor, residual contamination remains following construction 	<ul style="list-style-type: none"> Unexpected contaminated material finds resulting in human health or ecological impacts 	Unlikely	Minor	Low (4)	Low
	Air Quality	<ul style="list-style-type: none"> Wind Erosion of material from unsealed areas/open excavations 	Possible	Minor	Moderate (6)	<ul style="list-style-type: none"> Construction activities will be modified, reduced or controlled during high or unfavourable wind conditions if they have a potential to increase the generation or emission of dust 	<ul style="list-style-type: none"> Potential for minor dust generation within the boundaries of the Rosehill site. 	Unlikely	Insignificant	Low (2)	Low
Stockpiling, material loading and haulage	Non-Aboriginal heritage	<ul style="list-style-type: none"> Damage to heritage items as a result of 	Possible	Moderate	Moderate (9)	<ul style="list-style-type: none"> Stockpiles are not to be located adjacent to heritage buildings 	<ul style="list-style-type: none"> Uncovering of unexpected non- 	Unlikely	Minor	Low (4)	Low

Key establishment Activities (note: items may not occur in sequence order)	Environmental Aspect	Potential Impacts	Likelihood	Consequence	Risk Rating	Mitigation Measures	Residual Impacts following mitigation	Likelihood	Consequence	Residual Risk Rating	Overall Residual rating of activity
		stockpiling of material adjacent to structure					Aboriginal heritage items				
	Soils and surface water quality	<ul style="list-style-type: none"> Sediment tracking onto roads Stockpiled soils migrating offsite Migration of sediment into nearby stormwater system and/or waterways 	Likely	Moderate	High (12)	<ul style="list-style-type: none"> Site access and egress points to be fitted with wheel wash facilities and rumble grids Streetsweepers to be used to manage sediment tracking on roads Erosion and sediment control plans to be prepared for all work and implemented prior to any ground disturbance works Sediment and erosion controls to be inspected regularly for damage. Where damage or potential failures are observed, faults are to be rectified immediately Workers will undergo a site induction and ongoing toolbox talks regarding erosion and sediment control mitigation Hardstand areas will be cleaned as soon as practically possible 	<ul style="list-style-type: none"> Localised sediment release offsite during high volume or prolonged rain events Water ponding around wheel wash Offsite migration of sediment as a result of failures to sediment and erosion controls 	Unlikely	Minor	Low (4)	Low
	Contamination	<ul style="list-style-type: none"> Spills or leaks of chemicals or fuels from plant and equipment resulting in contamination of soils 	Possible	Moderate	Moderate (9)	<ul style="list-style-type: none"> Vehicles and machinery to be properly maintained and routinely inspected to minimise the risk of fuel/oil leaks. Construction plant, vehicles and equipment to also be refuelled offsite, or in a designated refuelling area The Unexpected Contaminated Land and Asbestos Finds procedure to be implemented throughout site establishment works A Detailed Site Investigation will be carried out in accordance with the National Environment Protection Measure (2013) Where the Detailed Site Investigation confirms that contamination would have a moderate, high or very high risk, a Remediation Action Plan would be developed for the area of the construction footprint Site Auditor would review and approve the Remediation Action Plan and would develop a Site Audit Statement and Site Audit Report upon completion of remediation Ongoing management and monitoring measures would be documented in an appropriate form and implemented for any areas where minor, residual contamination remains following construction 	<ul style="list-style-type: none"> Unexpected contaminated material finds resulting in human health or ecological impacts 	Unlikely	Minor	Low (4)	Low

Key establishment Activities (note: items may not occur in sequence order)	Environmental Aspect	Potential Impacts	Likelihood	Consequence	Risk Rating	Mitigation Measures	Residual Impacts following mitigation	Likelihood	Consequence	Residual Risk Rating	Overall Residual rating of activity
	Air Quality	<ul style="list-style-type: none"> Wind Erosion of material 	Possible	Moderate	Moderate (9)	<ul style="list-style-type: none"> All stockpiles will be covered, seeded or fenced to prevent wind erosion All trucks entering or leaving the site with loads will have their loads covered Ceasing or reducing processing operations and the loading/unloading of stockpiles during strong wind conditions 	<ul style="list-style-type: none"> Potential for minor dust generation within the boundaries of the Rosehill site. 	Unlikely	Insignificant	Low (2)	Low
	Spoil, waste management and resource use	<ul style="list-style-type: none"> Cross-contamination of stockpiles Inappropriate disposal of waste or disposal at an unlicensed waste facility 	Possible	Major	High (12)	<ul style="list-style-type: none"> All waste must be collected by an appropriately suitably licensed waste contractors <ul style="list-style-type: none"> Receipts for waste transfer and disposal will be checked to ensure all details are correct and retained for audit purposes Signs approved by the NSW EPA for labelling of waste materials are available online and will be used where applicable Wastes will be stored appropriately to prevent cross-contamination and/or mixing of different waste types Standard signage will be posted in all waste storage / collection areas to inform and educate users of waste storage / collection areas while promoting waste minimisation and resource recovery Standard waste classification and waste tracking procedures to be followed 	<ul style="list-style-type: none"> Miscommunication leading to accidental mixing of spoil stockpiles 	Rare	Moderate	Low	Low
Work to existing slabs will involve: <ul style="list-style-type: none"> Concrete cutting Minor excavation 	Noise and Vibration	<ul style="list-style-type: none"> Noise nuisance to sensitive receivers Vibration nuisance to sensitive receptors 	Likely	Moderate	High (12)	<ul style="list-style-type: none"> Acoustic hoarding around the site perimeter to be erected to control the dispersion of noise offsite. Additional portable noise barriers may also be used around particularly noisy equipment such as concrete saws, where necessary. Plant and machinery will be fitted with manufacturer supplied noise suppression devices and maintained where required Community updates will be provided throughout the site establishment works Implementation of respite periods during high noise impact activities Any equipment not in use for extended periods shall be switched off Less intensive noise and vibration construction techniques will be used, where possible, to break rock and saw concrete Works to only be undertaken during the following hours: <ul style="list-style-type: none"> 7:00am to 6:00pm Monday to Friday 	<ul style="list-style-type: none"> No residual impacts are anticipated should all mitigation measures be implemented and adhered to accordingly 	Unlikely	Insignificant	Low (4)	Low

Key establishment Activities (note: items may not occur in sequence order)	Environmental Aspect	Potential Impacts	Likelihood	Consequence	Risk Rating	Mitigation Measures	Residual Impacts following mitigation	Likelihood	Consequence	Residual Risk Rating	Overall Residual rating of activity
						<ul style="list-style-type: none"> - 8:00am to 6:00pm Saturdays - At no time on Sundays or public holidays • Where 'highly noise intensive' works exceed the applicable noise management level (NML) at the same receiver, works are to only be undertaken during the following hours: <ul style="list-style-type: none"> - 8:00am to 6:00pm Monday to Friday - 8:00am to 1:00pm Saturdays - Respite periods of one hour for every three hours to be applied. • Conduct noise and/or vibration monitoring in response to any formal complaints received • Sydney Metro CNVS Additional Mitigation Measures to be implemented. 					
	Non-Aboriginal heritage	<ul style="list-style-type: none"> • Discovery of an unexpected non-Aboriginal heritage item or relic • Partial or complete destruction of an unexpected non-Aboriginal heritage item or relic • Accidental destruction or damage of existing heritage items as a result of vehicle strike and movement of plant and equipment • Damage to structural elements of heritage buildings as a result of vibration and or accidental undermining of structures 	Possible	Moderate	Moderate (9)	<ul style="list-style-type: none"> • In the event that unexpected non-Aboriginal heritage items are exposed during construction, the Sydney Metro Exhumation Management Plan and the Unexpected Heritage Finds and Human Remains Procedure would be implemented. • In the event historical archaeological remains are encountered, a program of test excavation (and salvage if required) would be required to be undertaken in accordance with an Archaeological Research Design prepared by a suitably qualified Excavation Director. This may require consultation with Heritage NSW (to be determined on the level of significance of the relics) • Protective measures for heritage items to be established at the earliest phase of site establishment • Vehicle movements to follow site signage and traffic management plan • Site specific heritage induction for all personnel (project staff and contractors), induction to include no-go zones and protocols for protecting heritage from accidental and intentional damage • Vibration testing must be conducted 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 	<ul style="list-style-type: none"> • Unexpected non-Aboriginal heritage items are exposed 	Unlikely	Minor	Low (4)	Low

Key establishment Activities (note: items may not occur in sequence order)	Environmental Aspect	Potential Impacts	Likelihood	Consequence	Risk Rating	Mitigation Measures	Residual Impacts following mitigation	Likelihood	Consequence	Residual Risk Rating	Overall Residual rating of activity
						<p>be exceeded, the construction methodology must be reviewed and, if necessary, implement additional mitigation measures. Such measures must include, but not be limited to, review or modification of excavation techniques</p> <ul style="list-style-type: none"> The advice of a heritage specialist must be sought on methods and locations for installing equipment used for vibration, movement and noise monitoring at heritage items. 					
Aboriginal heritage		<ul style="list-style-type: none"> Discovery of an unexpected Aboriginal heritage object Partial or complete destruction of an unexpected Aboriginal heritage object 	Unlikely	Moderate	Moderate (8)	<ul style="list-style-type: none"> In the event that unexpected Aboriginal heritage items are exposed during construction, the Sydney Metro Exhumation Management Plan and the Unexpected Heritage Finds and Human Remains Procedure would be implemented. Aboriginal archaeological test excavation (and salvage when required) will be carried out where intact natural profiles with the potential to contain significant archaeological deposits are encountered. Any excavations should be undertaken in accordance with an Archaeological Research Design prepared in consultation with the Aboriginal community in accordance with the Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010 Site specific heritage induction for all personnel (project staff and contractors), induction to include no-go zones and protocols for protecting heritage from accidental and intentional damage 	<ul style="list-style-type: none"> Unexpected Aboriginal heritage items are exposed 	Unlikely	Minor	Low (4)	Low
Soils and surface water quality		<ul style="list-style-type: none"> Sediment tracking onto roads Stockpiled soils migrating offsite Migration of sediment into nearby stormwater system and/or waterways 	Likely	Moderate	High (12)	<ul style="list-style-type: none"> Site access and egress points to be fitted with wheel wash facilities and rumble grids Streetsweepers to be used to management sediment tracking on roads Erosion and sediment control plans to be prepared for all work and implemented prior to any ground disturbance works Sediment and erosion controls to be inspected regularly for damage. Where damage or potential failures are observed, faults are to be rectified immediately 	<ul style="list-style-type: none"> Localised sediment release offsite during high volume or prolonged rain events Water ponding around wheel wash Offsite migration of sediment as a result of failures to sediment and erosion controls 	Unlikely	Minor	Low (4)	Low

Key establishment Activities (note: items may not occur in sequence order)	Environmental Aspect	Potential Impacts	Likelihood	Consequence	Risk Rating	Mitigation Measures	Residual Impacts following mitigation	Likelihood	Consequence	Residual Risk Rating	Overall Residual rating of activity
						<ul style="list-style-type: none"> Workers will undergo a site induction and ongoing toolbox talks regarding erosion and sediment control mitigation Hardstand areas will be cleaned as soon as practically possible 					
	Contamination	<ul style="list-style-type: none"> Spills or leaks of chemicals or fuels from plant and equipment resulting in contamination of soils Exposing unexpected contaminated material 	Possible	Moderate	Moderate (9)	<ul style="list-style-type: none"> Vehicles and machinery to be properly maintained and routinely inspected to minimise the risk of fuel/oil leaks. Construction plant, vehicles and equipment to also be refuelled offsite, or in a designated refuelling area The Unexpected Contaminated Land and Asbestos Finds procedure to be implemented throughout site establishment works A Detailed Site Investigation will be carried out in accordance with the National Environment Protection Measure (2013) Where the Detailed Site Investigation confirms that contamination would have a moderate, high or very high risk, a Remediation Action Plan would be developed for the area of the construction footprint Site Auditor would review and approve the Remediation Action Plan and would develop a Site Audit Statement and Site Audit Report upon completion of remediation Ongoing management and monitoring measures would be documented in an appropriate form and implemented for any areas where minor, residual contamination remains following construction 	<ul style="list-style-type: none"> Unexpected contaminated material finds resulting in human health or ecological impacts 	Unlikely	Minor	Low (4)	Low
	Biodiversity	<ul style="list-style-type: none"> Works disrupting foraging behaviour of microbats, grey-headed flying-fox and birds 	Possible	Moderate	Moderate (9)	<ul style="list-style-type: none"> Relevant noise mitigation measures including working hour restrictions to be complied with 	<ul style="list-style-type: none"> No residual impacts are anticipated should the mitigation measure be implemented and adhered to accordingly 	Unlikely	Minor	Low (4)	Low
	Air Quality	<ul style="list-style-type: none"> Off-site release of dust Release of odours 	Possible	Moderate	Moderate (9)	<ul style="list-style-type: none"> Works that would generate dust, will have a modified set up method or will be ceased during high dust generating weather Regular site inspections will be conducted to monitor for potential dust issues 	<ul style="list-style-type: none"> Potential for minor dust generation within the boundaries of the Rosehill site. 	Unlikely	Insignificant	Low (4)	Low

Key establishment Activities (note: items may not occur in sequence order)	Environmental Aspect	Potential Impacts	Likelihood	Consequence	Risk Rating	Mitigation Measures	Residual Impacts following mitigation	Likelihood	Consequence	Residual Risk Rating	Overall Residual rating of activity
						<ul style="list-style-type: none"> Control measures including water carts, sprinklers, sprays/suppressants will be utilised where applicable to control dust emissions Access roads within Project sites will be maintained and managed to reduce dust generation All sealed surfaces within sites and site accesses will be managed to reduce dust generation and sediment tracking onto roads Sawing of concrete or bricks will be undertaken in a manner that minimises the generation of dust, such as the wetting of the sawing face Water and/or odour suppressants to be applied as required 					
Spoil, waste management and resource use		<ul style="list-style-type: none"> Inappropriate storage/insufficient storage of construction spoil Inappropriate disposal of waste Missed spoil reuse opportunity 	Possible	Moderate	Moderate (9)	<ul style="list-style-type: none"> All waste must be collected by an appropriately suitably licensed waste contractors <ul style="list-style-type: none"> Receipts for waste transfer and disposal will be checked to ensure all details are correct and retained for audit purposes Construction waste would be minimised by accurately calculating materials brought to the site and limiting materials packaging Waste streams would be segregated to avoid cross-contamination of materials Resource recovery will be applied to the management of construction spoil and will include the recovery of resources for reuse-reusable materials generated by the Project will be segregated for reuse on site, or off site where possible Recyclable materials will be collected and transported for offsite recycling wherever possible Standard waste classification and waste tracking procedures to be followed 	<ul style="list-style-type: none"> Miscommunication leading to mixing of spoil stockpiles Potential mishandling of waste tracking documentation 	Unlikely	Insignificant	Low (4)	Low
Use of fuel stores, mobile plant and vehicles	Hazards	<ul style="list-style-type: none"> Leak or spill causing land and water contamination caused by the release of hydrocarbons 	Possible	Minor	Moderate (6)	<ul style="list-style-type: none"> Fuel and chemicals to be stored in approved containers within a bunded area Fuel storage to be inspected daily for damage, leaks or tampering Hydrocarbon spill kits to be made readily available on-site Refuelling of machinery shall conform to the following requirements: 	<ul style="list-style-type: none"> Failure of site personnel to conform to refuelling requirements Spill kits are not restocked and up to date 	Unlikely	Minor	Low (4)	Low

Key establishment Activities (note: items may not occur in sequence order)	Environmental Aspect	Potential Impacts	Likelihood	Consequence	Risk Rating	Mitigation Measures	Residual Impacts following mitigation	Likelihood	Consequence	Residual Risk Rating	Overall Residual rating of activity
						<ul style="list-style-type: none"> - Designated refuelling area within close proximity to spill response equipment - No fuelling within 30 metres of the upper banks of the watercourse and drainage lines - Fuelling activity to be supervised at all times 					
Disposal of putrescible waste,	Spoil, waste management and resource use	<ul style="list-style-type: none"> • Littering of waste around site compound causing a reduction in visual amenity and fauna impacts from ingestion of litter • Proliferation of pest species 	Likely	Minor	Moderate (8)	<ul style="list-style-type: none"> • Sufficient number of rubbish bins are to be located on-site, each labelled for their purpose • Bin lids will be closed at all times • Food waste will be bagged prior to disposal. • All bins will be in good condition 	<ul style="list-style-type: none"> • Overfilling of rubbish bins 	Unlikely	Insignificant	Low (2)	Low
Operation of site and heavy vehicles on access routes	Transport and Traffic	<ul style="list-style-type: none"> • Potential traffic congestion and increased travel times • Complaints from sensitive receivers • Temporary loss of parking 	Possible	Minor	Moderate (6)	<ul style="list-style-type: none"> • Implementation of Traffic Control Plans • Minimise parking or queuing on public roads • Ensure sufficient designated on site parking for site vehicles • Scheduled road movements will be minimised where possible • Deliveries of plant and materials will be undertaken outside of peak periods where possible 	<ul style="list-style-type: none"> • Insufficient space onsite • Occasional queuing and idling of site vehicles outside site compound • Insufficient onsite parking leading to occasional offsite parking 	Unlikely	Insignificant	Low (2)	Low
Use of packaged materials	Spoil, waste management and resource use	<ul style="list-style-type: none"> • Overing ordering material resulting in wastage • Degradation of materials through weathering and moisture damage 	Likely	Minor	Moderate (8)	<ul style="list-style-type: none"> • Materials will be delivered on an 'as needed' basis • Accurate forecasting 	<ul style="list-style-type: none"> • Potential material shortage on site 	Unlikely	Insignificant	Low (2)	Low

ATTACHMENT 4 – NOISE AND VIBRATION IMPACT ASSESSMENT

SYDNEY METRO WEST

Western Tunnelling Package (WTP) Noise and Vibration Impact Assessment (NVIA) Rosehill Site

Prepared for:

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Suite 26.01, 100 Miller Street, North Sydney, NSW 2060, Australia

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BASIS OF REPORT

This report has been prepared by SLR Consulting Australia Pty Ltd (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Gamuda Australia Laing O'Rourke Consortium (GALC) (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of the Client. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

DOCUMENT CONTROL

Reference	Date	Prepared	Checked	Authorised
610.30644-R01-v1.0	7 February 2022	Steven Luzuriaga	David Lindsey	David Lindsey
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Appendix B	Construction Scenarios and Equipment
Appendix C	Noise Impact Maps

Glossary and Abbreviations

Item	Description / Definition
AVTG	Assessing Vibration: a technical guideline (DEC, 2006)
dBA	Decibel, A-weighted
DEC	Department of Environment and Conservation (now EPA)
DECC	Department of Environment and Climate Change (now EPA)
DECCW	Department of Environment, Climate Change and Water (now EPA)
DP&E	Department of Planning and Environment (now Department of Planning, Industry and Environment)
EPA	Environment Protection Authority
GALC	Gamuda Australia Laing O'Rourke Consortium
HNA	Highly Noise Affected. Relates to construction noise levels of ≥ 75 dBA and is the point above which there may be strong community reaction to construction noise levels
ICNG	<i>Interim Construction Noise Guideline</i> (DECC, 2009)
LAeq	The average noise level during a measurement period, such as the daytime or night-time
LAFmax	The maximum noise level measured during a monitoring period, using 'fast' weighting (also known as the L1 level)
L90	The noise level exceeded for 90% of the sample period. This noise level is described as the average minimum background sound level (in the absence of the source under consideration), or simply the background level.
NCA	Noise Catchment Area
NML	Noise Management Level
Noise intensive equipment	Construction equipment that is particularly noisy and causes annoyance. Includes items such as rockbreakers and concrete saws
NPfl	Noise Policy for Industry
NSW	New South Wales
NVIA	Noise and Vibration Impact Assessment
OOH	Out of Hours
OOHW	Out-of-Hours Work
Other sensitive receivers	Non-residential sensitive receivers, including hospitals, educational facilities, place of worship, child care centres, outdoor recreation areas, etc
Project	Sydney Metro West - Rosehill site
RBL	Rating Background Level. This is the background noise level measured at a particular location. The method for calculating the RBL is defined in the NSW <i>Noise Policy for Industry</i>
Realistic worst-case scenarios	Realistic worst-case construction scenarios have been developed to assess the potential impacts from the project. These scenarios are based on the noisiest items of equipment which would likely be required to complete the works
RMS	Root Mean Square
RNP	Road Noise Policy

Item	Description / Definition
SLR	SLR Consulting Australia Pty Ltd
SWL / Lw	Sound Power Level
Sydney Metro CNVS	Sydney Metro Construction Noise and Vibration Standard (Sydney Metro, 2020)
TfNSW	Transport for New South Wales
TfNSW CNVS	TfNSW Construction Noise and Vibration Strategy (TfNSW, 2019)
The Bays	A proposed station located between Glebe Island and White Bay Power Station
VC	Vibration Criterion
VDV	Vibration Dose Value
Worst-case impacts and noise levels	The worst-case (ie highest) impacts or noise levels predicted in this report
WTP	Sydney Metro West – Western Tunnelling Package

1 Introduction

SLR Consulting Australia Pty Ltd (SLR) has been engaged by Gamuda Australia Laing O'Rourke Consortium (GALC) to undertake a noise and vibration impact assessment (NVIA) of the site establishment and low impact work associated with the Sydney Metro West - Rosehill site (the Project). The Rosehill site forms part of the Clyde maintenance and stabling facility (MSF) site. This assessment has been prepared to accompany the Site Establishment Management Plan (SEMP) and low impact works approval for the Project. The SEMP was developed as part of the delivery of the Sydney Metro West Western Tunnelling Package (WTP).

This report assesses the potential noise and vibration impacts associated with the Project (ie site establishment and low impact work). An explanation of the specialist acoustic terminology used in this report is provided in **Appendix A**.

1.1 Project Description

Sydney Metro West – Westmead to the Bays Concept and Stage 1 received planning approval on 11 March 2021 (SSI 10038). The WTP comprises the western portion of Stage 1 of SSI 10038, from Sydney Olympic Park to Westmead. A summary of the key components of the Sydney Metro West project are outlined below:

Sydney Metro West – Stage 1

Stage 1 would involve major civil construction work between Westmead and The Bays including:

- Enabling works, such as demolition of existing buildings, utility supply to construction sites, utility adjustments and modifications to the existing transport network
- Tunnel excavation, including tunnel support activities
- Station excavation for new metro stations at Westmead, Parramatta, Sydney Olympic Park, North Strathfield, Burwood North, Five Dock and The Bays
- Shaft excavation for services facilities at Rosehill (within the Clyde MSF construction site), Silverwater and at a location between Five Dock and The Bays (to be determined)
- Civil works for the stabling and maintenance facility at Clyde including earthworks and structures for crossings at A'Becketts Creek and Duck Creek
- A concrete segment facility for use during construction located at the Clyde MSF construction site
- Excavation of a tunnel dive structure and associated tunnels at Rosehill to support a connection between the Clyde MSF and the mainline metro tunnels

Clyde Maintenance and Stabling Facility

The Clyde MSF construction site incorporates about 380,000 square metres of land between the M4 Motorway, James Ruse Drive and Rosehill Gardens Racecourse. This site would be used to:

- Construct the land formation for the stabling and maintenance facility
- Construct structures over A'Becketts Creek and Duck creek, including creek realignment works
- Construct and operate a temporary precast concrete segment production facility
- Excavate the Rosehill services facility

- Excavate and construct the Rosehill dive structure and tunnel portal.

For the purposes of project delivery, the Clyde maintenance and stabling facility (MSF) facility has been split into four smaller sites including Clyde dive, Rosehill, MSF West and MSF East.

Rosehill site

The following scope is to be delivered in the Rosehill site within the Clyde MSF construction site:

- Shaft excavation for services facilities
- Lowering of the Tunnel Boring Machines (TBM) for tunnelling to commence in either direction.

Construction work for the services facilities would involve:

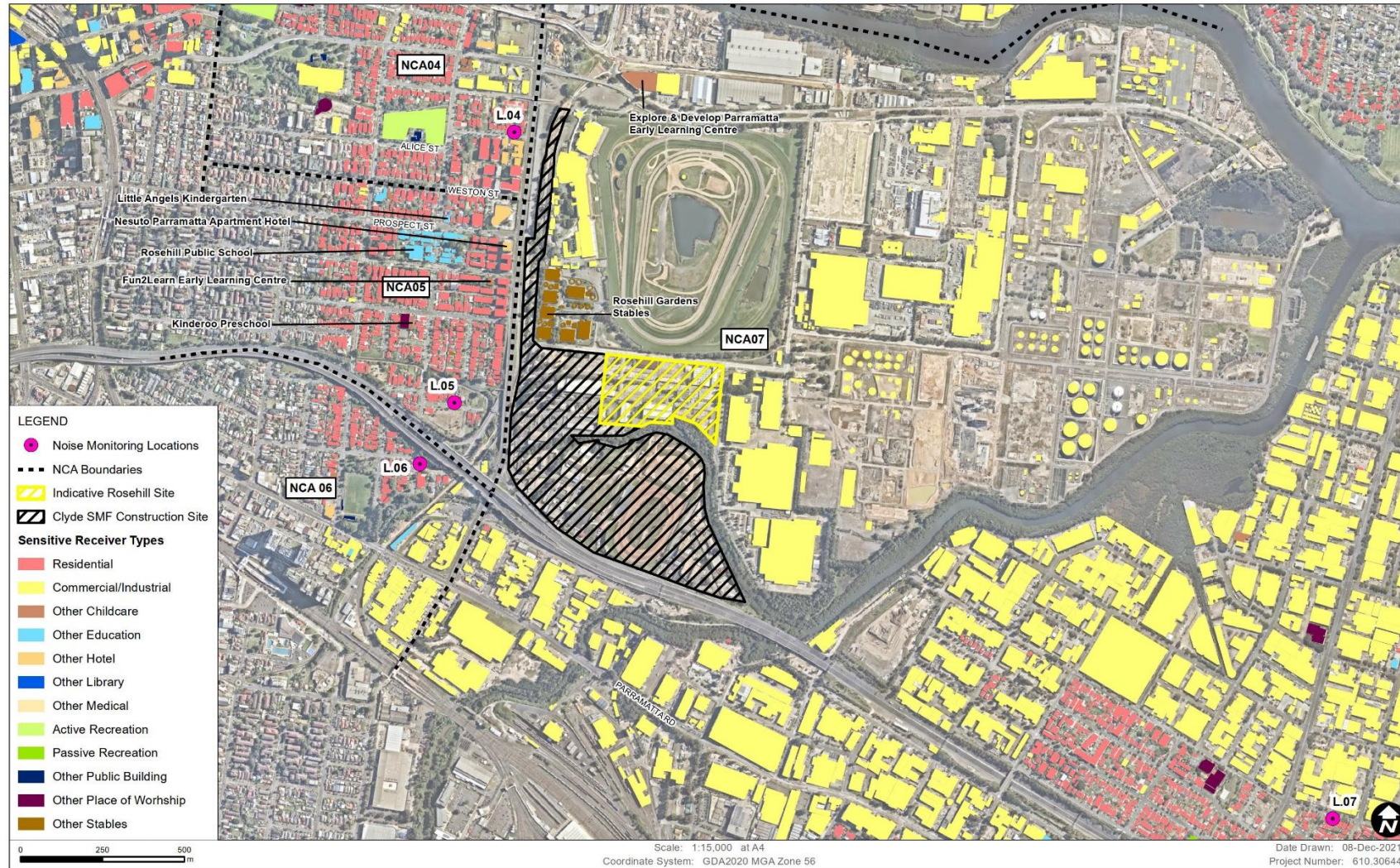
- Enabling works including protection or diversion of utilities and establishment of site access points
- Vegetation removal (where required)
- Excavation of a vertical shaft to the tunnels below
- Temporary lining and reinforcement of the shaft.

The focus of this NVIA is the establishment of the Rosehill Site located at 2 Unwin St, Rosehill NSW. The site is adjacent to Rosehill Gardens Racecourse, with James Ruse Drive located to the west.

The scope of work for the SEMP will be limited to the establishment of the Rosehill Site. Work scenarios for these site establishment and low impact activities are outlined in **Section 4.1**

The site location, surrounding receivers and noise monitoring locations are shown in **Figure 1**.

Figure 1 Site Location, Surrounding Receivers and Noise Monitoring Locations



1.1.2 Hours of Work

As outlined in the Minister's Conditions of Approval (CoA) D35, Project work should only be undertaken during the following approved hours:

- 7:00 am to 6:00 pm Mondays to Fridays, inclusive
- 8:00 am to 6:00 pm Saturdays, and
- at no time on Sundays or public holidays.

Out-of-Hours Work (OOHW)

Notwithstanding, the approved hours above, CoA D37 allows out of hours work to be undertaken in the following circumstances:

- Safety and Emergencies, including:
 - for the delivery of materials required by the NSW Police Force or other authority for safety reasons; or
 - where it is required in an emergency to avoid injury or the loss of life, to avoid damage or loss of property or to prevent environmental harm.
- Construction that causes LAeq(15 minute) noise levels no more than Noise Management Levels (NMLs).
- Construction that causes vibration levels no more than vibration criteria.
- Approved by an EPL or out-of-hours work protocol.
- A prescribed activity within the CoA.

Project work periods are outlined in **Table 1** below:

Table 1 Hours of Work

Work Period	Description
Approved Hours	Monday -Friday (7am – 6pm)
	Saturday (8am – 6pm)
	Sunday / Public Holidays (Nil)
OOHW (Evening)	Monday -Friday (6pm – 10pm)
	Saturday (6pm – 10pm)
	Sunday / Public Holidays (8am -6pm)
OOHW (Night)	Monday -Friday (10pm – 7am)
	Saturday (10pm – 8am)
	Sunday / Public Holidays (6pm -7am)

Note 1: Adapted from the Sydney Metro Construction Noise and Vibration Standard, incorporating CoA D35 (approved work hours).

2 Existing Noise Environment

2.1 Unattended Noise Monitoring

Unattended noise monitoring was completed for the Sydney Metro West Project between March and July 2019 as part of the EIS. The measured 2019 baseline noise levels surrounding the Clyde MSF have been used to determine the existing noise environment and to set the criteria used to assess the potential impacts from the Project.

The monitoring equipment was positioned to measure existing noise levels that are representative of receivers potentially most affected by the Project.

The noise monitoring equipment continuously measured existing noise levels in 15-minute periods during the daytime, evening and night-time.

The noise monitoring locations are shown in **Figure 1** and the results are summarised in **Table 2**. Further information regarding the monitoring, including methodology and detailed data, is provided in the EIS (Technical Paper 2 - Noise and Vibration).

Table 2 Summary of Ambient and Background Noise Levels

ID	NCA	Address	Measured Noise Levels (dBA)					
			Background Noise (RBL)			Average Noise (LAeq)		
			Day	Evening	Night	Day	Evening	Night
B.04	NCA04	5 Hope Street, Rosehill	51	48	41	61	58	57
B.05	NCA05	9 A'Beckett Street, Granville	50	49	45	56	55	53
B.06	NCA06	4B Gray Street, Granville	52	51	44	58	57	55
B.07	NCA07	10 Carnarvon Street, Silverwater	46	44	41	60	57	55

Note 1: The assessment periods are the daytime which is 7 am to 6 pm Monday to Saturday and 8 am to 6 pm on Sundays and public holidays, the evening which is 6 pm to 10 pm, and the night-time which is 10 pm to 7 am on Monday to Saturday and 10 pm to 8 am on Sunday and public holidays. See the NSW EPA *Noise Policy for Industry*.

2.2 Noise Catchment Areas

The Project study area has been divided into four Noise Catchment Areas (NCAs) as defined in the Sydney Metro West – Westmead to the Bays Concept and Stage 1 - Environmental Impact Statement (EIS). These NCAs reflect the ambient noise environment of that area, as well as the noise and vibration sensitivity of the surrounding land uses. These four NCA are described in **Table 3** below and presented in **Figure 1**.

Table 3 Noise Catchment Areas

NCA	Description
NCA04	South of the Parramatta River and west of James Ruse Drive. The catchment is mainly residential with small areas of commercial receivers.
NCA05	North of the M4 Motorway and west of James Ruse Drive. The catchment is mainly residential. 'Other sensitive' receivers include Rosehill Public School and a number of hotels and child care centres.
NCA06	South of the M4 Motorway in Granville. The catchment is mostly residential adjacent to the motorway, with some commercial use in the south-east.
NCA07	East of James Ruse Drive, this catchment is mostly commercial and covers Rosehill Gardens racecourse, the Clyde commercial/industrial area, and Silverwater and Newington. Residential receivers and Newington Public School are in the south-east. This catchment is included in both the Clyde and Silverwater precincts.

2.3 Sensitive Receivers

Receivers potentially sensitive to noise and vibration have been categorised as residential buildings, commercial/industrial buildings, or 'other sensitive' land uses which includes educational institutions, child care centres, medical facilities, places of worship, outdoor recreation areas, etc.

This assessment identifies the likely maximum impacts for each receiver in the vicinity of the Project. Some buildings may contain more than one use, for example residential apartments with commercial uses on ground floor. Where this occurs, the building is categorised using the most stringent criteria.

Receiver types and locations are shown in **Figure 1**.

3 Assessment Criteria

3.1 Construction Noise and Vibration Guidelines

The standards and guidelines relevant to the Project are listed in **Table 4**. These guidelines aim to protect the community and environment from excessive noise and vibration impacts during construction of projects.

Table 4 Construction Noise and Vibration Standards and Guidelines

Guideline/Policy Name	Where Guideline Used
<i>Interim Construction Noise Guideline (ICNG)</i> (DECC, 2009)	Assessment of airborne noise impacts on sensitive receivers
<i>Construction Noise and Vibration Strategy (TfNSW CNVS)</i> (TfNSW, 2019)	Assessment and management protocols for airborne noise, ground-borne noise and vibration impacts for construction of rail infrastructure projects
<i>Sydney Metro Construction Noise and Vibration Standard</i> (Sydney Metro CNVS) (Sydney Metro, 2020)	Assessment and management protocols for construction of Sydney Metro projects. This Sydney Metro standard is based on the requirements of the ICNG and Transport for NSW CNVS, as appropriate to Sydney Metro and is the guiding strategy for assessing and managing the potential impacts during construction of Sydney Metro West
<i>Road Noise Policy (RNP)</i> (DECCW, 2011)	Assessment of construction traffic impacts
<i>BS 7385 Part 2-1993 Evaluation and measurement for vibration in buildings Part 2</i> , BSI, 1993	Assessment of vibration impacts (structural damage) to non-heritage sensitive structures
<i>DIN 4150:Part 3-2016 Structural vibration – Effects of vibration on structures</i> , Deutsches Institute fur Normung, 1999	Screening assessment of vibration impacts (structural damage) to heritage sensitive structures, where the structure is found to be unsound
<i>Assessing Vibration: a technical guideline (AVTG)</i> (DEC, 2006)	Assessment of vibration impacts on sensitive receivers

3.2 Interim Construction Noise Guideline

The NSW *Interim Construction Noise Guideline (ICNG)* is used to assess and manage impacts from construction noise on residences and other sensitive land uses in NSW.

The ICNG contains procedures for determining project specific Noise Management Levels (NMLs) for sensitive receivers based on the existing background noise in the area. The 'worst-case' noise levels from construction of a project are predicted and then compared to the NMLs in a 15-minute assessment period to determine the likely impact of the project.

The NMLs are not mandatory limits, however, where construction noise levels are predicted or measured to be above the NMLs, feasible and reasonable work practices to minimise noise emissions are to be investigated.

Residential Receivers

The ICNG approach for determining NMLs at residential receivers is shown in **Table 5**.

Table 5 ICNG NMLs for Residential Receivers

Time of Day	NML LAeq(15minute)	How to Apply
Standard Construction Hours Monday to Friday 7:00 am to 6:00 pm Saturday 8:00 am to 1:00 pm No work on Sundays or public holidays	Noise affected RBL ¹ + 10 dB	The noise affected level represents the point above which there may be some community reaction to noise Where the predicted or measured LAeq(15minute) is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.
	Highly Noise Affected 75 dBA	The Highly Noise Affected (HNA) level represents the point above which there may be strong community reaction to noise Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restructuring the hours that the very noisy activities can occur, taking into account: Times identified by the community when they are less sensitive to noise (such as before and after school for works near schools or mid-morning or mid-afternoon for works near residences) If the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.
Outside Standard Construction Hours	Noise affected RBL + 5 dB	A strong justification would typically be required for works outside the recommended standard hours The proponent should apply all feasible and reasonable work practices to meet the noise affected level Where all feasible and reasonable practises have been applied and noise is more than 5 dB above the noise affected level, the proponent should negotiate with the community.

Note 1: The RBL is the Rating Background Level and the ICNG refers to the calculation procedures in the NSW *Industrial Noise Policy (INP)*. The INP has been superseded by the NSW EPA *Noise Policy for Industry (NPfi)*.

Sleep Disturbance

The Sydney Metro CNVS has adopted the NPfi method for assessing sleep disturbance. Although the NPfi sleep disturbance criteria relates to industrial noise, it is also considered relevant for reviewing potential impacts from construction noise as a screening criteria to identify the need for further assessment. The NPfi notes that a detailed maximum noise level assessment should be undertaken where a project results in night-time noise levels which exceed 52 dBA LA_{Fmax} or the prevailing background level plus 15 dB, whichever is the greater.

Project Residential NMLs

Residential NMLs for the Project have been determined in accordance with the requirements of the ICNG and the Sydney Metro CNVS as described above and are shown in **Table 6**.

Table 6 Project Residential NMLs

NCA	Receiver Type	Representative Logger Location	Noise Management Level ($L_{Aeq}(15\text{minute})$ – dBA)				Sleep Disturbance Screening Level (52 dBA or RBL +15 dB whichever is higher) (L_{Amax} dBA)
			Approved Construction Hours (RBL+10dB)	Out of Hours (RBL+5dB)			
			Daytime	Daytime ¹	Evening	Night-time	
NCA04	Residential	B.05	61	56	53	46	56
NCA05	Residential	B.05	60	55	54	50	60
NCA06	Residential	B.06	62	57	56	49	59
NCA07	Residential	B.07	56	51	49	46	56

Note 1: Daytime out of hours is 7 am to 8 am on Saturday, and 8 am to 6 pm on Sunday and public holidays

'Other Sensitive' Land Uses and Commercial Receivers

The NMLs for 'other sensitive' non-residential land uses are shown in **Table 7** and **Table 9**. These have been adopted from the ICNG, Sydney Metro CNVS, *AS2107:2016 Acoustics – Recommended design sound levels and reverberation times for building interiors*, and previous assessments undertaken for the Sydney Metro West Project (eg EIS and modification reports).

Table 7 NMLs for 'Other Sensitive' Receivers - ICNG

Land Use	Assessment Period	Noise Management Level $L_{Aeq}(15\text{minute})$ (dBA)	
		Internal	External
ICNG 'Other Sensitive' Receivers			
Classrooms at schools and other educational institutions	When in use	45	55 ¹
Hospital wards and operating theatres	When in use	45	65 ²
Places of worship	When in use	45	55 ¹
Active recreation areas (characterised by sporting activities and activities which generate noise)	When in use	-	65
Passive recreation areas (characterised by contemplative activities that generate little noise)	When in use	-	60
Commercial	When in use	-	70
Industrial	When in use	-	75

Note 1: It is assumed that these receivers have windows partially open for ventilation which results in internal noise levels being around 10 dB lower than the external noise level.

Note 2: It is assumed that these receivers have fixed windows which conservatively results in internal noise levels being around 20 dB lower than the external noise level.

Table 8 NMLs for 'Other Sensitive' Receivers – Additional

Land Use	Assessment Period	Noise Management Level L _{Aeq} (15minute) (dBA)	
		Internal	External
Non-ICNG 'Other Sensitive' Receivers			
Hotel ³	Day / Evening	50	70 ²
	Night-time	40	60 ²
Café / Bar / Restaurant ³	When in use	50	70 ²
Child Care Centres – Sleeping areas ⁴	When in use	40	50 ¹
Public Building	When in use	50	60 ¹
Recording Studio	When in use	25	45 ²
Theatre/Auditorium	When in use	30	50 ²
Rosehill Gardens Racecourse Stables ⁵	When in use	-	60

Note 1: It is assumed that these receivers have windows partially open for ventilation which results in internal noise levels being around 10 dB lower than the external noise level.

Note 2: It is assumed that these receivers have fixed windows which conservatively results in internal noise levels being around 20 dB lower than the external noise level.

Note 3: Adopted from AS2107.

Note 4: Adopted from *Association of Australian Acoustical Consultants Guideline for Child Care Centre Acoustic Assessment*.

Note 5: Adopted from the ICNG – passive recreation.

3.3 Construction Road Traffic Noise Guidelines

The potential impacts from construction traffic on public roads are assessed under the NSW EPA *Road Noise Policy* (RNP) and the Sydney Metro CNVS.

An initial screening test is first applied to evaluate if existing road traffic noise levels are expected to increase by more than 2.0 dB as a result of construction traffic. Where this is considered likely, further assessment is required using the RNP base criteria shown in **Table 9**.

Table 9 RNP Criteria for Assessing Construction Vehicles on Public Roads

Road Category	Type of Project/Land Use	Assessment Criteria (dBA)	
		Daytime (7 am – 10 pm)	Night-time (10 pm – 7 am)
Freeway/ arterial/ sub-arterial roads	Existing residences affected by additional traffic on existing freeways/arterial/sub-arterial roads generated by land use developments	L _{Aeq} (15hour) 60 (external)	L _{Aeq} (9hour) 55 (external)
Local roads	Existing residences affected by additional traffic on existing local roads generated by land use developments	L _{Aeq} (1hour) 55 (external)	L _{Aeq} (1hour) 50 (external)

3.4 Ground-borne Noise

Construction work can cause ground-borne (structure-borne or regenerated) noise impacts in nearby buildings when vibration intensive equipment is in use, such as during tunnelling or excavation work using tunnel boring machines, roadheaders or rockbreakers. Vibration can be transmitted through the ground and into nearby buildings, which can then create audible noise impacts inside the building.

Ground-borne noise NMLs are applicable where ground-borne noise levels are likely to be higher than airborne noise levels, which can occur where work is underground or where surface work is shielded by noise barriers or other structures.

Residential and Commercial Receivers

The internal ground-borne noise criteria for residential and commercial receivers are shown in **Table 10**.

Table 10 Ground-borne Noise Criteria

Receiver Type	Noise Management Level (L _{Aeq(15minute)} – dBA)		
	Daytime ¹	Evening ²	Night-time ²
Residential	45	40	35
Commercial	50	n/a	n/a

Note 1: Daytime ground-borne noise NMLs taken from preceding Sydney Metro planning applications for consistency. Daytime ground-borne noise NMLs are not specified in the ICNG or Sydney Metro CNVS.

Note 2: Specified in the Sydney Metro CNVS and ICNG.

Vibration Guidelines

The effects of vibration from construction work can be divided into three categories:

- Those in which the occupants of buildings are disturbed (**human comfort**). People can sometimes perceive vibration impacts when vibration generating construction work is located close to occupied buildings. Vibration from construction work tends to be intermittent in nature and the AVTG (DEC, 2006) provides criteria for intermittent vibration based on the Vibration Dose Value (VDV), as shown in **Table 11**.
- Those where the integrity of the building may be compromised (**structural/cosmetic damage**). If vibration from construction work is sufficiently high, it can cause cosmetic damage to elements of affected buildings. Industry standard cosmetic damage vibration limits are specified in British Standard BS 7385 and German Standard DIN 4150. The limits are shown in **Table 12** and **Table 13**.
- Those where building contents may be affected (**building contents**). People perceive vibration at levels well below those likely to cause damage to building contents. For most receivers, the human comfort vibration criteria are the most stringent and it is generally not necessary to set separate criteria for vibration effects on typical building contents. Exceptions to this can occur when vibration sensitive equipment, such as electron microscopes or medical imaging equipment, are in buildings near to construction work, refer **Section 3.4.3**. No such equipment has been identified in the study area.

Table 11 Human Comfort Vibration – Vibration Dose Values for Intermittent Vibration

Building Type	Assessment Period	Vibration Dose Value ¹ (m/s ^{1.75})	
		Preferred	Maximum
Critical Working Areas (eg operating theatres or laboratories)	Day or night-time	0.10	0.20
Residential	Daytime	0.20	0.40
	Night-time	0.13	0.26
Offices, schools, educational institutions and places of worship	Day or night-time	0.40	0.80
Workshops	Day or night-time	0.80	1.60

Note 1: The VDV accumulates vibration energy over the daytime and night-time assessment periods, and is dependent on the level of vibration as well as the duration.

Table 12 Cosmetic Damage – BS 7385 Transient Vibration Values for Minimal Risk of Damage

Group	Type of Building	Peak Component Particle Velocity in Frequency Range of Predominant Pulse	
		4 Hz to 15 Hz	15 Hz and Above
1	Reinforced or framed structures. Industrial and heavy commercial buildings	50 mm/s at 4 Hz and above	
2	Unreinforced or light framed structures. Residential or light commercial type buildings	15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz	20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above

Note 1: Where the dynamic loading caused by continuous vibration may give rise to dynamic magnification due to resonance, especially at the lower frequencies where lower guide values apply, then the guide values may need to be reduced by up to 50%.

Table 13 Cosmetic Damage – DIN 4150 Guideline Values for Short-term Vibration on Structures

Group	Type of Structure	Guideline Values Vibration Velocity (mm/s)				
		Foundation, All Directions at a Frequency of			Topmost Floor, Horizontal	Floor Slabs, Vertical
		1 to 10 Hz	10 to 50 Hz	50 to 100 Hz	All frequencies	All frequencies
1	Buildings used for commercial purposes, industrial buildings and buildings of similar design	20	20 to 40	40 to 50	40	20
2	Residential buildings and buildings of similar design and/or occupancy	5	5 to 15	15 to 20	15	20
3	Structures that, because of their particular sensitivity to vibration, cannot be classified as Group 1 or 2 and are of great intrinsic value (eg heritage listed buildings)	3	3 to 8	8 to 10	8	20 ¹

Note 1: It may be necessary to lower the relevant guideline value markedly to prevent minor damage.

3.4.2 Heritage Buildings or Structures

Heritage listed buildings and structures should be considered on a case-by-case basis but as noted in the Sydney Metro CNVS, should not be assumed to be more sensitive to vibration, unless structurally unsound. Where a heritage building is deemed to be sensitive, the more stringent DIN 4150 Group 3 guideline values in **Table 13** can be applied. The broader Clyde MSF that the Rosehill site is located within, is a heavily modified industrial landscape, with land uses surrounding this location being used primarily for industrial purposes. Chapter 12 and Tech Paper 3 of the EIS identified that the heritage structures within and nearby the Rosehill site are:

- RTA Depot (I576) – *Parramatta Local Environmental Plan 2011*. This heritage item includes a main multi-storey framed industrial workshop as well as a number of other workshops, structures and remnants of a rail siding. This item is located within the boundary of the Rosehill site.
- Capral Aluminium (I575) – *Parramatta Local Environmental Plan 2011*. This heritage item includes a multi-storey office building which was developed in late 1930. This item is located adjacent to the Rosehill site.

Both heritage structures are classified with 'Good' physical condition on the state heritage inventory and are therefore not deemed structurally unsound, or more sensitive to vibration.

3.4.3 Sensitive Scientific Equipment

Some scientific equipment, such as electron microscopes and microelectronics manufacturing equipment, can require more stringent vibration objectives. Other sensitive equipment used for various business requirements, such as medical equipment, may also have specific vibration goals. Vibration sensitive equipment is, however, often housed in buildings/rooms specifically designed and constructed for that purpose, which can help mitigate any potential impacts.

Vibration limits for the operation of sensitive scientific and medical equipment should be taken from manufacturer's data. Where this is not available the Vibration Criterion (VC) curves outlined in the Sydney Metro CNVS shown in **Table 14** can be used. Where the criteria are exceeded all appropriate feasible and reasonable mitigation and management measures would be considered to minimise the impacts.

Table 14 VC Curves for Vibration Sensitive Equipment

Criterion Curve	Max Level ($\mu\text{m/s, RMS}$) ¹	Detail Size (microns) ²	Description of Use
VC-A	50	8	Adequate in most instances for optical microscopes to 400X, microbalances, optical balances, proximity and projection aligners, etc.
VC-B	25	3	An appropriate standard for optical microscopes to 1000X, inspection and lithography equipment (including steppers) to 3 micron line widths.
VC-C	12.5	1	A good standard for most lithography and inspection equipment to 1 micron detail size.
VC-D	6	0.3	Suitable in most instances for the most demanding equipment including electron microscopes (TEMs and SEMs) and E-Beam systems, operating to the limits of their capability.
VC-E	3	0.1	A difficult criterion to achieve in most instances. Assumed to be adequate for the most demanding of sensitive systems including long path, laser-based, small target systems and other systems requiring extraordinary dynamic stability.

Note 1: As measured in one-third octave bands of frequency over the frequency range 8 to 100 Hz.

Note 2: The detail size refers to the line widths for microelectronics fabrication, the particle (cell) size for medical and pharmaceutical research, etc. The values given take into account the observation requirements of many items depend upon the detail size of the process.

3.4.4 Minimum Working Distances for Vibration Intensive Works

Minimum working distances for typical vibration intensive construction equipment are provided in the TfNSW CNVS and are shown in **Table 15**. The minimum working distances are for both cosmetic damage (from BS 7385 and DIN 4150) and human comfort (from AVTG). They are calculated from empirical data which suggests that where work is further from receivers than the quoted minimum distances then impacts are not considered likely.

Table 15 Recommended Minimum Working Distances from Vibration Intensive Equipment

Plant Item	Rating/Description	Minimum Distance		
		Cosmetic Damage		Human Response (NSW EPA Guideline)
		Residential and Light Commercial (BS 7385)	Heritage Items (DIN 4150, Group 3)	
Vibratory Roller	<50 kN (1–2 tonne)	5 m	11 m	15 m to 20 m
	<100 kN (2–4 tonne)	6 m	13 m	20 m
	<200 kN (4–6 tonne)	12 m	25 m	40 m
	<300 kN (7–13 tonne)	15 m	31 m	100 m
	>300 kN (13–18 tonne)	20 m	40 m	100 m
	>300 kN (>18 tonne)	25 m	50 m	100 m
Small Hydraulic Hammer	300 kg (5 to 12 t excavator)	2 m	5 m	7 m
Medium Hydraulic Hammer	900 kg (12 to 18 t excavator)	7 m	15 m	23 m
Large Hydraulic Hammer	1,600 kg (18 to 34 t excavator)	22 m	44 m	73 m
Vibratory Pile Driver	Sheet piles	2 m to 20 m	5 m to 40 m	20 m
Piling Rig – Bored	≤ 800 mm	2 m (nominal)	5 m	4 m
Jackhammer	Hand held	1 m (nominal)	3 m	2 m

The minimum working distances are indicative and will vary depending on the particular item of equipment and local geotechnical conditions. The distances apply under typical geotechnical conditions.

4 Impact Assessment

A noise model of the study area has been used to predict noise levels from the proposed construction work to all surrounding receivers. The model uses ISO 9613 algorithms in SoundPLAN software. The local terrain profile, receiver buildings and structures were digitised in the noise model to develop a three-dimensional representation of the construction sites and surrounding areas.

4.1 Work Scenarios

The representative work scenarios developed to assess potential impacts during the Project are described in **Table 16**. Equipment lists for each scenario and sound power level data is provided in **Appendix B**. Refer to the SEMP for further detail on construction methodology.

Table 16 Site Establishment Activities

Work ID	Scenario	Description	Approximate Schedule
W.001	Site preparation work	<ul style="list-style-type: none"> Establishing site security measures: <ul style="list-style-type: none"> Noise barriers Hoarding around the perimeter of the site Signage with site specific contact details (ie site supervisor) Establishing initial temporary facilities such as: <ul style="list-style-type: none"> Crib room Training room Ablution facilities including toilets, change room and locker room Security room. 	12 weeks
W.002	Initial investigation work	<ul style="list-style-type: none"> Heritage investigations, protection, and archival recordings Additional geotechnical, contamination and utility investigations Building condition surveys Road dilapidation survey. 	5 weeks
W.003	Vegetation removal and grubbing	<ul style="list-style-type: none"> Following on from the Sydney Metro early works. Any localised vegetation removal will be conducted within the first 2 weeks of site access (if not already undertaken by the Sydney Metro). 	2 weeks
W.004	Protecting and/or relocating utilities	<ul style="list-style-type: none"> The Rosehill site will utilise and connect into the existing services. This includes: <ul style="list-style-type: none"> Existing Low Voltage (LV) feed on Shirley Street Connection into the existing sewer on Shirley Street Water connection on Unwin Street All temporary services will be reticulated around site Initial site setup will require a temporary site office and amenities. The facilities will run off a diesel generator and tanks requiring suck out every several days 	9 weeks

Work ID	Scenario	Description	Approximate Schedule
W.005	Sewer relocation	<ul style="list-style-type: none"> An existing nominal diameter (DN) 200 cast iron cement lined pipe (CICL) rising sewer main runs through the Rosehill site box in an East – West direction The sewer mains connect to an existing pumping station located across Shirley Street to the East of the Rosehill Site The sewer is to be decommissioned and removed in a staged sequence, with the first stage being to relocate it around the Northwest corner of the service facility box to facilitate piling and excavation of the Service Facility Total sewer relocation works would involve 180 metres of sewer to be relocated with an excavation depth of approximately 2 metres. 	9 weeks
W.006	High Voltage (HV) work	<ul style="list-style-type: none"> For initial site setup and establishment, the site will be powered by a combination of a small LV feed and diesel generators until the main HV connection is completed Connection of the HV power consists of underground connection from the Rosehill Zone substation on Unwin St to the Project site. 	2 weeks
W.007	Establishing site amenities	<ul style="list-style-type: none"> Establishing site compound and ancillary facilities such as offices, amenities, and workshops Erection of boundary screening around ancillary facilities near sensitive land users for the duration of site establishment. 	12 weeks
W.008	Establishing Water Treatment Plant (WTP)	<ul style="list-style-type: none"> Footprint of the Water Treatment Plant will be around 475 m² (25 x 19 m pending final vendor sizing) The water treatment plant structure will be constructed on the existing hardstand. 100 m² of the water treatment plant will consist of an above ground sedimentation pond to treat the initial waste water and remove solids Existing concrete hardstand will be removed via saw cut and grab Concrete will be removed off site via concrete waste. 	8 weeks
W.009	Establishing vehicle access and egress points	<ul style="list-style-type: none"> Establishing vehicle access and egress points including: <ul style="list-style-type: none"> Site access gates (two located on Shirley Street and three located on Unwin Street) Traffic signage Temporary parking. 	3 weeks
W.010	Establishing concrete slabs or piling platforms	<ul style="list-style-type: none"> The GALC team intends to re-use all existing concrete slabs and hardstands except for heavy-duty structures such as but not limited to the spoil shed, heavy lifting crane platforms and the overhead crane within the segment shed As the Rosehill Service Facility site is in an industrial area it is assumed that all existing concrete slabs will be suitable for haul roads and general site works not involving heavy lifting or subjected to high vertical loading. The GALC team will seek geotechnical advice and conduct verification to confirm these assumptions upon access into site. 	14 weeks
W.011	Establishing spoil shed (slab)	<ul style="list-style-type: none"> Footprint of the spoil shed will be approximately 3,500 m² Existing concrete hardstand will be removed via saw cut and grab Concrete will be removed off site via concrete waste. 	14 weeks
W.012	Establishing spoil shed (structure)	<ul style="list-style-type: none"> The spoil shed steel works construction will commence following the slab and footings No piles are to be constructed for the spoil shed. 	

Work ID	Scenario	Description	Approximate Schedule
W.013	Establishing segment shed (slab)	<ul style="list-style-type: none"> Footprint of the segment shed will be approximately 1,800 m² Bored piles of 900mm diameter and 15m depth are to be constructed for the gantry crane loadings. Existing concrete hardstand will be removed via saw cut and grab Concrete will be removed off site via concrete waste. 	17 weeks
W.014	Establishing segment shed (structure)	<ul style="list-style-type: none"> The segment shed steel works construction will commence following the slab and footings. 	
W.015	Establishing truck wheel wash or rumble grid	<ul style="list-style-type: none"> Existing concrete hardstand will be removed via saw cut and grab Concrete will be removed off site via concrete waste Install wheel wash and connect to temporary LV power. 	3 weeks
W.016a	Diaphragm wall (D-wall) construction (within approved hours)	<ul style="list-style-type: none"> Saw cut box footprint through concrete slab. 2,900 m² (D wall MCO 130 m x 20 m at 1 m thick) Remove concrete within the footprint. Existing concrete will be removed via saw cut and grab All concrete removed off site via concrete waste Local excavation for D-wall and capping beam construction. 	8 weeks
W.016b	Diaphragm wall (D-wall) construction (out-of-hours work)	<ul style="list-style-type: none"> Local excavation for D-wall and capping beam construction. Note: no saw cutting during out-of-hours work (OOHW). 	8 weeks
W.019	FRP (form reo pour - concrete works)	<ul style="list-style-type: none"> Form reo pour for permanent concrete base slab laydown, capping beams and in-situ stitch pours Construction of internal reinforced concrete struts and walers 	17 weeks
W.020	Delivery of Equipment (out-of-hours work)	<ul style="list-style-type: none"> Delivery of equipment to the site will occur as out-of-hours work. 	Ongoing

Note 1: Equipment lists for each scenario and sound power level data is provided in **Appendix B**.

4.2 Airborne Noise

The following overview is based on the predicted impacts at the most affected receivers and is representative of the worst-case noise levels that are likely to occur during Project work.

The assessment shows the predicted impacts based on the exceedance of the management levels, as per the categories in **Table 17**.

Table 17 Exceedance Bands and Impact Colouring

Exceedance of Management Level	Subjective Classification	Impact Colouring
No exceedance	Negligible	
1 to 10 dB	Low impact	
11 dB to 20 dB	Moderate impact	
>20 dB	High impact	

Note 1: This subjective classification is indicative and follows the approach outlined in the Sydney Metro CNVS for reporting of construction impacts in Detailed Noise and Vibration Impact Statements. The subjective response would vary and depends on the period in which the impacts occur (ie people are generally more sensitive to impacts during the evening and night-time).

A summary of the number of buildings where NML exceedances were predicted for the various work activities is shown in **Table 18**. Maps of the predicted (worst-case) noise impacts are presented in **Appendix C**. Maps are not produced for work scenarios where all predicted noise levels are below the NMLs. For most work activities, it is expected that the noise levels would frequently be lower than predicted, as the noise levels presented in this report are based on each scenario occurring at the work zone boundary which is the closest point to each receiver.

The assessment is generally considered conservative as the calculations assume all items of construction equipment are in use at the same time within individual scenarios. In reality, there would frequently be periods when construction noise levels are much lower than the worst-case levels predicted as well as times when no equipment is in use and no noise impacts occur.

The potential for these work activities to overlap and at times occur concurrently has also been considered (refer **Table 16**). Due to the dominant influence of the work conducted closest to the most affected receiver, the influence of other work occurring on the site (at greater distances) would likely be masked. When evaluating potential effects of concurrent work it is also important to consider how noise levels add together. For example:

- If two separate activities are occurring on site and the noise level from each is 55 dBA at the receiver, then the resultant noise level is 58 dBA. A 3 dBA increase in noise level will be just perceptible and a significant change in impact is considered unlikely.
- If two separate activities are occurring and the noise level from one is 55 dBA and the other is 53 dBA, then the resultant noise level is 57 dBA. A 2 dBA increase in noise will be hardly perceptible in practice and a significant change in impact is highly unlikely.

Table 18 Overview of NML Exceedances – All Receiver Types

Receiver Category	NCA	Total	Number of Receivers																				
			Exceedance Category ¹	With NML Exceedance ²																			
				W.001 AH ³	W.002 AH ³	W.003 AH ³	W.004 AH ³	W.005 AH ³	W.006 AH ³	W.007 AH ³	W.008 AH ³	W.009 AH ³	W.010 AH ³	W.011 AH ³	W.012 AH ³	W.013 AH ³	W.014 AH ³	W.015 AH ³	W.016a AH ³	W.016b OOHW ³	W.019 AH ³	W.020 OOHW ³	
Residential	NCA04	16	1-10 dB	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
			11-20 dB	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
			>20 dB	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			HNA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Sleep Disturbance	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	NCA05	184	1-10 dB	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
			11-20 dB	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			>20 dB	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			HNA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Sleep Disturbance	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	NCA06	30	1-10 dB	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
			11-20 dB	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			>20 dB	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			HNA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Sleep Disturbance	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	NCA07	-	1-10 dB	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
			11-20 dB	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			>20 dB	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			HNA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Sleep Disturbance	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other Sensitive	All NCAs	28	1-10 dB	-	-	-	-	1	4	2	-	3	3	-	-	1	-	2	1	-	-	-	
			11-20 dB	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			>20 dB	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Note 1: HNA = Highly Noise Affected, based on ICNG definition (ie predicted LAeq(15minute) noise at residential receiver is 75 dBA or greater).

Note 2: Based on worst-case predicted noise levels.

Note 3: AH = Approved Hours, OOHW = Out-of-hours work.

The assessment of the predicted worst-case noise levels shows:

- The highest impacts are expected to occur where highly noise intensive activities are being undertaken (ie concrete sawing, rock hammering and vibratory rolling). These activities will be limited to the approved project work hours to avoid noise impacts during more sensitive out-of-hours periods (refer **Section 6**).
- During scenarios W.005, W.006, W.007, W.009, W.010, W.013, W.015 and W.016a, noise levels at the nearby receivers are predicted to exceed the NML, with a low impact rating (ie <10 dBA above the NML) (refer **Appendix C**).
- All predicted noise levels are below the Highly Noise Affected (HNA) NML of 75 dBA.
- The majority of work scenarios will occur during the approved project hours. Two work scenarios are anticipated to occur during out-of-hours periods. These scenarios are W.016b and W.020.
- Predicted noise levels for W.016b and W.020 are below the NML during the most sensitive night-time period.
- Predicted LAF_{max} noise levels for W.016b and W.020 are below the sleep disturbance screening level at all residential receivers.
- During site establishment activities there is a risk of startling horses at the Rosehill Gardens Racecourse Stables with sudden loud noises (e.g. metal on metal impacts, or highly noise intensive activities). Given the limited guidance on assessing noise impact on horses, it is recommended that consultation with the Rosehill Gardens Racecourse and an equine veterinary expert is undertaken to help inform noise and vibration objectives for this sensitive receiver prior to construction (refer **Table 21**, NV27). In addition, activities with the potential for sudden loud noises will be scheduled during less sensitive periods (refer **Section 6**).

Recommended noise mitigation and management measures are discussed in **Section 6**.

4.3 Road Traffic Noise

The Roads & Maritime Services (RMS) *Construction Road Traffic Noise Estimator* was used to calculate the change in road traffic noise levels with the introduction of Project traffic.

The Project is expected to generate a total of 268 light vehicle movements and 32 heavy vehicle movements per day. That would be a total of 300 vehicle movements (in and out) per day. The proposed construction traffic route to and from the site passes residential receivers (and the Rosehill Gardens Racecourse Stables) along James Ruse Drive. A summary of the vehicle data for the assessment and predicted increase in traffic noise levels are shown in **Table 19**.

Table 19 Vehicle Traffic Data

Road Name	Vehicle type	Existing Traffic Volumes ¹		Project Traffic Volumes		Change in Noise Level (dBA)	
		Day (7 am – 10 pm)	Night (10 pm – 7 am)	Day (7 am – 10 pm)	Night (10 pm – 7 am)	Day (7 am – 10 pm)	Night (10 pm – 7 am)
James Ruse Drive	Light Vehicles	57,671 ¹	13,011 ¹	136	132	<0.1	<0.1
	Heavy Vehicles	6,408 ²	1,446 ²	32	0		

Note 1: Existing traffic volumes adopted from most recent data on TfNSW *Traffic Volume Viewer* (Station 72013, dated 2018).

Note 2: Existing light vehicle volumes assumed at 90% of total traffic

Note 3: Existing heavy vehicle volumes assumed at 10% of total traffic

The Project is not anticipated to increase road traffic noise during operation of the project by more than 0.1 dBA. Differences in noise levels of less than approximately 2 dBA (whether an increase or a decrease) is generally considered to be imperceptible in practice. As such, no recommendations for road traffic noise mitigation and management measures are considered necessary in this assessment.

4.4 Ground-borne Noise

Ground-borne construction noise impacts from the Project are not anticipated as vibration intensive work with the potential to generate perceptible ground-borne noise, does not form part of the site establishment work. Vibration intensive work for the Project will be completed outdoors meaning airborne noise levels at the nearest receivers would likely be higher than the corresponding internal ground-borne noise levels.

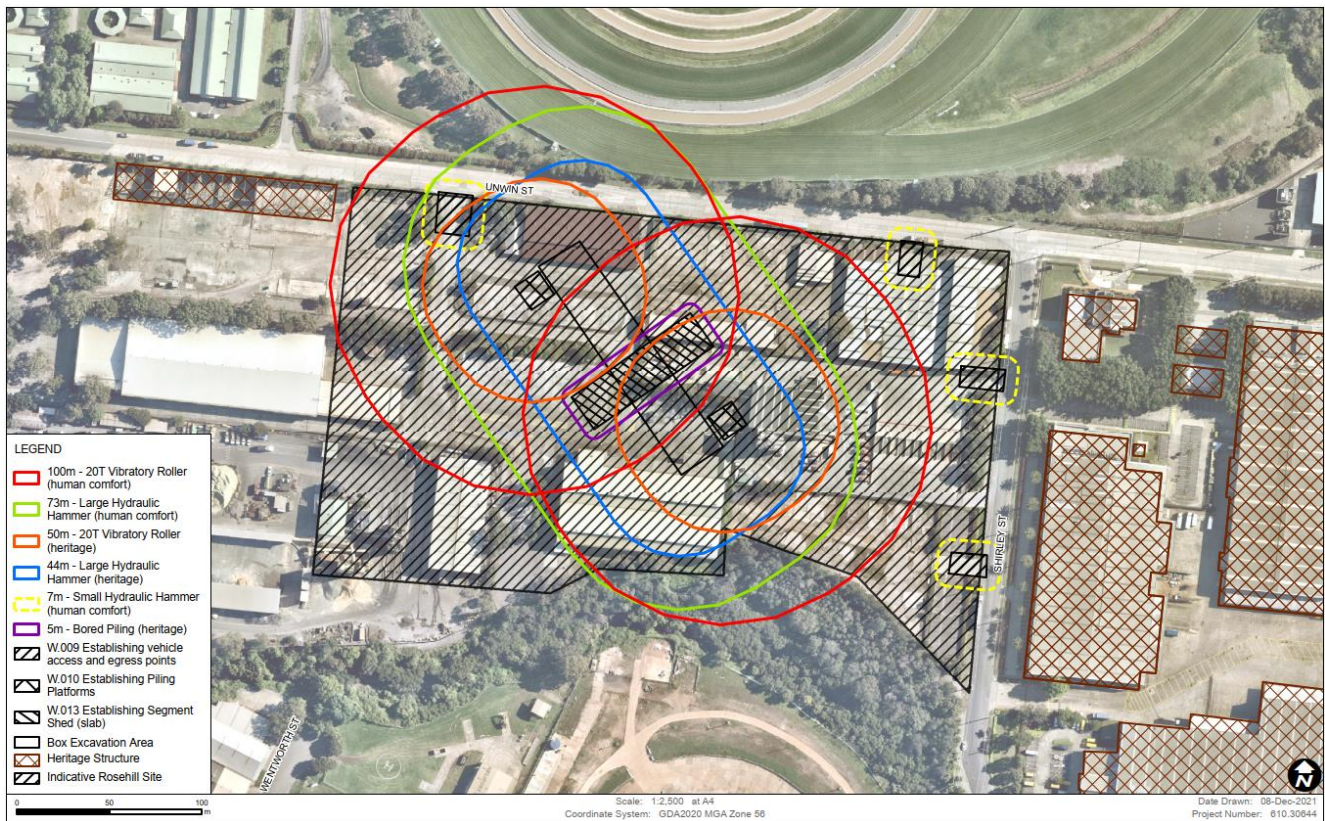
Where airborne noise levels are higher than ground-borne noise levels it is not necessary to evaluate potential ground-borne noise impacts and as such, they have not been considered further for this assessment.

4.5 Vibration

Vibration intensive items of equipment that would be required during the Project include Vibratory roller (20t), Large hydraulic hammer, Small hydraulic hammer and Bored piling rig. These items of equipment are required during *W.009 – Establishing vehicle access and egress points*, *W.010 – Establishing concrete slabs or piling platforms*, and *W.013 – Establishing segment shed (slab)*.

The minimum working distances for vibration intensive work associated with the Project are shown in **Figure 2**. Where vibration intensive work is undertaken at greater distances, impacts are not considered likely.

Figure 2 Vibration Assessment



The assessment of the vibration intensive work shows:

- Vibration impacts are not anticipated at the nearest receivers. All receivers are beyond the minimum working distances to vibration intensive work.
- All receivers are beyond the minimum distance for cosmetic damage (ie 25 m for vibratory roller, 22 m for large hydraulic hammer, and 2 m for small hydraulic hammer / bored piling). Project vibration is predicted to remain below the cosmetic damage screening criteria.
- All receivers are beyond the minimum distance for human comfort (ie 100 m for vibratory roller, 73 m large hydraulic hammer, 7 m for small hydraulic hammer and 4 m for bored piling). Project vibration is predicted to remain below the human comfort screening criteria.
- Nearby heritage listed buildings/structures are considered structurally sound, therefore the cosmetic damage criteria should apply. However, all heritage structures are beyond the minimum distance for sensitive heritage buildings (ie 50 m for vibratory roller, 44 m for large hydraulic hammer, and 5 m for small hydraulic hammer / bored piling). Project vibration is predicted to remain below the sensitive heritage building screening criteria.
- Vibration impacts are not anticipated at the Rosehill Gardens Racecourse Stables as vibration intensive works are well beyond the minimum distances for human comfort. Project vibration is unlikely to be perceptible at the Rosehill Gardens Racecourse Stables (refer **Table 21**, NV27).

5 Cumulative Construction Impacts

Cumulative construction impacts can occur where multiple construction projects are being completed in the same area at the same time. The potential cumulative impacts from other major projects are discussed in the EIS. Other major projects relevant to this assessment are summarised below.

Table 20 Nearby Major Developments

Project	Details
Parramatta Light Rail Stage 1	Parramatta Light Rail involves the construction of a new light rail network. Stage 1 of the project is between Westmead and Carlingford, via Parramatta CBD and Camellia, and is currently under construction. Enabling works for Stage 1 began in late-2018 and construction is expected to be complete by early 2023.
Camellia Town Centre	A strategy for renewal of Camellia is being developed. It would provide for a new riverside town centre positioned on the Parramatta Light Rail, as well as a proposed new primary school, 13 hectares of new open space and affordable housing. The project is in the planning stages and construction timeframes are not currently known.
Clyde Terminal Conversion Project	Viva Energy Australia is converting what was an operating refinery into a more efficient fuel import and storage terminal. The project includes demolition and removal of redundant refining infrastructure as well as works to improve the environmental and operational performance of the facility. Construction is expected to last for five to 10 years from project approval (which was in 2015).

Based on review of the nearby major projects, the following conclusions were made:

- The Parramatta light rail alignment passes through the north of Rosehill along Tramway Avenue and to the north of Grand Avenue. A stabling and maintenance facility is also located to the east of Rosehill Gardens Racecourse. The projects are separated by around 850 m therefore cumulative impacts are unlikely.
- Cumulative noise impacts with the Camellia Town Centre project are not considered a risk as it is currently in the planning stages and construction timeframes are not known.
- Conversion work at the Clyde Terminal are located to the east of the Project and cumulative noise impacts may affect receivers in Clyde area between both projects. These receivers are largely commercial with relatively low sensitivity to construction noise, therefore cumulative impacts would be considered low.

6 Mitigation and Management Measures

Noise impacts may be apparent at the nearest receivers at certain times during the Project. The Project should apply all feasible and reasonable mitigation measures to minimise the impacts, particularly during highly noise intensive work, such as concrete sawing, rock hammering and vibratory rolling.

The following best-practice measures shown in **Table 21** should be implemented in accordance with CoA D39 to minimise the potential impacts from the works. Reference to applicable CoA and Revised Environmental Mitigation Measures (REMMs) are provided for each of these measures.

Table 21 Recommended Mitigation and Management Measures

ID	Project stage	Measure	Reference / Notes
NV01	Scheduling	Where feasible and reasonable, construction should be carried out during the approved Project working hours. Work generating high noise and/or vibration levels should be scheduled during less sensitive time periods.	CoA D35
NV02		Highly noise intensive works (ie concrete sawing, rock hammering and vibratory rolling) should only be undertaken during the following approved hours, unless otherwise assessed and justified: 7am to 6 pm Mondays to Fridays, inclusive; and 8am to 1 pm Saturdays; and at no time on Sundays or public holidays.	CoA D36 REMM NV04
NV03		Provide appropriate respite periods as per the Sydney Metro CNVS when highly noise intensive works are undertaken or during periods of high noise impacts (eg one hour of respite for every three hours of noise intensive work).	CoA D36 REMM NV02, NV03
NV04		Carry out community consultation to determine the need and frequency of respite periods, as required by the CoA. This should include consultation with the Rosehill Gardens Racecourse.	CoA D38, D41, D51 REMM NV01, NV15
NV05		Co-ordination should occur between potentially interacting projects to minimise concurrent or consecutive works in the same areas, where possible.	CoA D50, REMM NV18
NV06	Site Layout	Compounds and work areas should be one-way to minimise the need for vehicles to reverse.	CoA D42, Best Practice
NV07		Stationary sources of noise, such as generators, should be located away from sensitive receivers.	CoA D42, Best Practice
NV08	Contractor management	Training should be provided to project personnel, including relevant sub-contractors, on noise and vibration requirements and the location of sensitive receivers during inductions and toolbox talks.	CoA D42, Best Practice
NV09	Heavy Vehicles	Delivery vehicles should be fitted with straps rather than chains for unloading, wherever possible.	CoA D42, Best Practice
NV10		Truck drivers should avoid compression braking as far as practicable.	CoA D42, Best Practice

ID	Project stage	Measure	Reference / Notes
NV11		Trucks should not idle near to residential receivers or the Rosehill Gardens Racecourse Stables.	CoA D42, Best Practice
NV12		Air brake silencers would be used on heavy vehicles that access the construction sites multiple times per night or over multiple nights.	CoA D42, REMM NV05
NV13	Path Control	Acoustic hoarding around the site perimeter should be erected to control the dispersion of noise offsite.	CoA D42, REMM NV02, NV06 Best Practice
NV14		Additional portable noise barriers may also be used around particularly noisy equipment such as concrete saws, where necessary.	CoA D42, REMM NV02 Best Practice
NV15		Use onsite structures to shield sensitive receivers from noise such as site shed placement; hoarding; erection of operational stage noise barriers (where practicable) and consideration of site topography when situating plant.	CoA D42, Best Practice
NV16		Implement acoustic treatment of the Spoil shed and Segment shed during establishment of structure, to control the dispersion of noise offsite.	CoA D42, REMM NV08
NV17	Noise source mitigation	Noise levels of plant and equipment must have operating Sound Power Levels (Lw) compliant with the Sydney Metro CNVS and presented in Appendix B .	CoA D42, Best Practice
NV18		Use the minimum sized equipment necessary to complete the work and where possible, use alternative, low-impact construction techniques (eg excavator grab instead of hydraulic hammer, bored piling instead of impact piling etc)	CoA D42, REMM NV02, NV09 Best Practice
NV19		Plant and machinery should be fitted with manufacturer supplied noise suppression devices and maintained where required.	CoA D42 REMM NV02
NV20		Power tools should use mains power where possible rather than generators.	CoA D42, Best Practice
NV21		Shut down machinery, including generators, when not in operation.	CoA D42, Best Practice
NV22		Avoid dropping materials from a height and dampen or line metal trays, as necessary.	CoA D42, Best Practice
NV23		Ensure equipment is operated in the correct manner.	CoA D42, Best Practice
NV24		All equipment should be appropriately maintained and fitted with noise control devices, where practicable (eg attenuated generators).	CoA D42, Best Practice
NV25		Where night-time works are required, equipment/trucks should use broadband reversing alarms.	CoA D42, Best Practice
NV26		Community consultation	Engagement and consultation should be carried out with the affected communities to understand their preferences for mitigation and management measures (eg Rosehill Gardens Racecourse).

ID	Project stage	Measure	Reference / Notes
NV27		Undertake consultation with the Rosehill Gardens Racecourse and an equine veterinary expert to help inform noise and vibration objectives for this sensitive receiver prior to construction.	Clyde MSF Mod NV20
NV28		Provide appropriate notice to the affected sensitive receivers prior to starting works and before any noisy periods of works.	CoA D38, D51
NV29		Provide signage with a 24 hour contact number.	CoA A48
MV30		Where there are complaints regarding noise, review and implement additional control measures, where feasible and reasonable.	CoA B4, D42, Best Practice
NV31	Monitoring	Noise monitoring should be undertaken within the first month of work and periodically throughout the construction period and cover the range of activities being undertaken at the site during day, evening and night-time periods	CoA C16
NV32		Conduct noise and/or vibration monitoring in response to any formal complaints received.	CoA B4, D42, Best Practice
NV33		Conduct vibration monitoring if vibration intensive works are to be undertaken within the minimum working distances of sensitive receivers or structures.	CoA D42, D46 Best Practice
NV34	Building Surveys	Condition surveys of buildings and structures near to the tunnel and excavations would be undertaken prior to the commencement of excavation at each site, where appropriate. For heritage buildings and structures the surveys would consider the heritage values of the structure in consultation with a heritage specialist.	CoA D60, REMM NV17

6.1 Additional Mitigation Measures

Where the predicted 'mitigated' construction noise levels are above the project specific noise management levels (NMLs), the Additional Mitigation Measures (AMM) identified in the Sydney Metro CNVS are to be implemented. The AMM for ground-borne noise and construction vibration are also applicable where predictions are above the relevant management levels. The approach, guided by the AMM, is primarily aimed at pro-active engagement with affected sensitive receptors rather than additional noise reducing mitigation. The AMM applies to all receptor types where these receptors are in-use.

The types of additional mitigation measures are listed in **Table 22** and described in the Sydney Metro CNVS. The AMM for construction noise are identified in **Table 23**. The AMMM for ground-borne noise and vibration are identified in **Table 24** and **Table 25**.

Table 22 Additional Mitigation Measures

Mitigation / Management Measure	Abbreviation
Alternative accommodation	AA
Monitoring	M
Individual briefings	IB
Letter box drops	LB
Project-specific respite offer	RO
Phone calls and emails	PC
Specific notification	SN

Table 23 Additional Mitigation Measures Matrix - Construction Noise

Time Period		Mitigation Measures			
		Predicted LAeq(15minute) noise level above NML			
		0 to 10 dBA	10 to 20 dBA	20 to 30 dBA	> 30 dBA
Approved Hours	Mon-Fri (7am – 6pm)	-	LB	LB, M, SN	LB, M, SN
	Sat (8am – 6pm)				
	Sun/Pub Hol (Nil)				
OOHW (Evening)	Mon-Fri (6pm – 10pm)	LB	LB, M	LB, M, SN, RO	LB, M, SN, IB, PC, RO
	Sat (6pm – 10pm)				
	Sun/Pub Hol (8am -6pm)				
OOHW (Night)	Mon-Fri (10pm – 7am)	LB	LB, M, SN, RO	LB, M, SN, IB, PC, RO, AA	LB, M, SN, IB, PC, RO, AA
	Sat (10pm – 8am)				
	Sun/Pub Hol (6pm -7am)				

Table 24 Additional Mitigation Measures – Ground-borne Construction Noise

Time Period		Mitigation Measures		
		Predicted LAeq(15minute) noise level above NML		
		0 to 10 dBA	10 to 20 dBA	20 to 30 dBA
Approved Hours	Mon-Fri (7am – 6pm)	-		
	Sat (8am – 6pm)			
	Sun/Pub Hol (Nil)			
OOHW (Evening)	Mon-Fri (6pm – 10pm)	LB	LB, M, SN	LB, M, SN, IB, PC, RO
	Sat (6pm – 10pm)			
	Sun/Pub Hol (8am -6pm)			
OOHW (Night)	Mon-Fri (10pm – 7am)	LB, N, SN	LB, M, SN, IB, PC, RO, AA	LB, M, SN, IB, PC, RO, AA
	Sat (10pm – 8am)			
	Sun/Pub Hol (6pm -7am)			

Table 25 Additional Mitigation Measures – Ground-borne Construction Noise

Time Period		Mitigation Measures Predicted vibration level above maximum level (human comfort)
Approved Hours	Mon-Fri (7am – 6pm)	LB, M, RO
	Sat (8am – 6pm)	
	Sun/Pub Hol (Nil)	
OOHW (Evening)	Mon-Fri (6pm – 10pm)	LB, M, IB, PC, RO, SN
	Sat (6pm – 10pm)	
	Sun/Pub Hol (8am -6pm)	
OOHW (Night)	Mon-Fri (10pm – 7am)	LB, M, IB, PC, RO, SN, AA
	Sat (10pm – 8am)	
	Sun/Pub Hol (6pm -7am)	

A summary of additional mitigation measures is outlined below:

- Where highly noise intensive works are scheduled (ie concrete sawing, rock hammering and vibratory rolling) noise levels at the closest receivers are predicted to exceed the NML, in the category of '0 to 10 dBA' above the NML. This work will be limited to less sensitive periods (refer **Table 21, NV02**) and does not trigger any AMM from the Sydney Metro CNVS.
- The majority of Project work will be undertaken during approved hours to minimise impacts on nearby receivers. Two work scenarios are anticipated to occur during out-of-hours periods. These scenarios are W.016b and W.020.
- Predicted noise levels for W.016b and W.020 are below the NML during the most sensitive night-time period (refer **Table 18**).
- Predicted LAF_{max} noise levels for W.016b and W.020 are below the sleep disturbance screening level at all residential receivers (refer **Table 18**).
- AMM have not been triggered for ground-borne noise or vibration as no impacts are anticipated for site establishment work.

7 Conclusion

SLR has been engaged to assess the potential noise and vibration impact from the establishment of the Sydney Metro West - Rosehill site and low impact work. The Rosehill site forms part of the Clyde maintenance and stabling facility site. This assessment has been prepared to accompany the Site Establishment Management Plan (SEMP) and low impact works approval for the Project. The SEMP was developed as part of the delivery of the Sydney Metro West Western Tunnelling Package (WTP).

Noise emissions from the Project have been predicted to the surrounding receivers and noise levels are expected to remain below noise management levels (NMLs) for most receivers throughout all work scenarios. Where highly noise intensive works are scheduled, the closest receivers are predicted to exceed the NML, with a low impact category (ie <10 dBA above the NML). Highly noise intensive works will be limited to less sensitive periods to avoid noise impacts during more sensitive out-of-hours periods.

The majority of Project work will be undertaken during approved hours to minimise impacts on nearby receivers. Two work scenarios are anticipated to occur during out-of-hours periods. These scenarios are W.016b and W.020. Where out-of-hours are required, noise levels are predicted to remain below NMLs and sleep disturbance screening levels.

Vibration impacts are not anticipated at the nearest receivers, as all receivers are beyond the minimum working distances to vibration intensive work.

A number of best-practice mitigation and management measures have been recommended to be applied, where feasible and reasonable, to control and minimise the impacts during construction as far as practicable. Reference to the Minister's Conditions of Approval (CoA) and Revised Environmental Mitigation Measures (REMMs) are provided for each of these measures.

Based on the predicted noise and vibration levels and assuming the recommended mitigation and management measures are applied, work associated with the establishment of the Rosehill site (ie the Project) is considered to result in an overall category of low impact.

APPENDIX A

Acoustic Terminology

1. Sound Level or Noise Level

The terms ‘sound’ and ‘noise’ are almost interchangeable, except that ‘noise’ often refers to unwanted sound.

Sound (or noise) consists of minute fluctuations in atmospheric pressure. The human ear responds to changes in sound pressure over a very wide range with the loudest sound pressure to which the human ear can respond being ten million times greater than the softest. The decibel (abbreviated as dB) scale reduces this ratio to a more manageable size by the use of logarithms.

The symbols SPL, L or LP are commonly used to represent Sound Pressure Level. The symbol LA represents A-weighted Sound Pressure Level. The standard reference unit for Sound Pressure Levels expressed in decibels is 2×10^{-5} Pa.

2. ‘A’ Weighted Sound Pressure Level

The overall level of a sound is usually expressed in terms of dBA, which is measured using a sound level meter with an ‘A-weighting’ filter. This is an electronic filter having a frequency response corresponding approximately to that of human hearing.

People’s hearing is most sensitive to sounds at mid frequencies (500 Hz to 4,000 Hz), and less sensitive at lower and higher frequencies. Different sources having the same dBA level generally sound about equally loud.

A change of 1 dB or 2 dB in the level of a sound is difficult for most people to detect, whilst a 3 dB to 5 dB change corresponds to a small but noticeable change in loudness. A 10 dB change corresponds to an approximate doubling or halving in loudness. The table below lists examples of typical noise levels.

Sound Pressure Level (dBA)	Typical Source	Subjective Evaluation
130	Threshold of pain	Intolerable
120	Heavy rock concert	Extremely noisy
110	Grinding on steel	
100	Loud car horn at 3 m	Very noisy
90	Construction site with pneumatic hammering	
80	Kerbside of busy street	Loud
70	Loud radio or television	
60	Department store	Moderate to quiet
50	General Office	
40	Inside private office	Quiet to very quiet
30	Inside bedroom	
20	Recording studio	Almost silent

Other weightings (eg B, C and D) are less commonly used than A-weighting. Sound Levels measured without any weighting are referred to as ‘linear’, and the units are expressed as dB(lin) or dB.

3. Sound Power Level

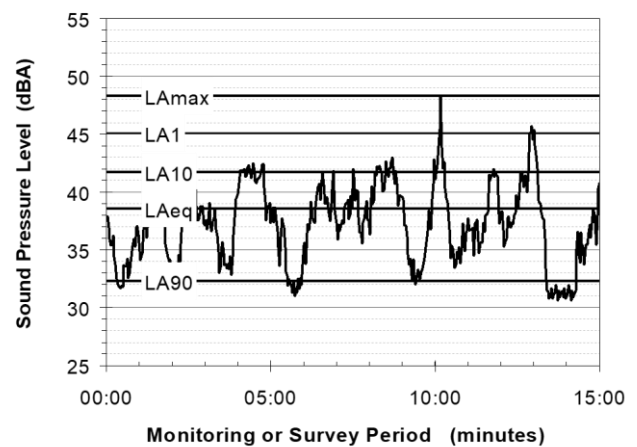
The Sound Power of a source is the rate at which it emits acoustic energy. As with Sound Pressure Levels, Sound Power Levels are expressed in decibel units (dB or dBA), but may be identified by the symbols SWL or LW, or by the reference unit 10^{-12} W.

The relationship between Sound Power and Sound Pressure is similar to the effect of an electric radiator, which is characterised by a power rating but has an effect on the surrounding environment that can be measured in terms of a different parameter, temperature.

4. Statistical Noise Levels

Sounds that vary in level over time, such as road traffic noise and most community noise, are commonly described in terms of the statistical exceedance levels LAN, where LAN is the A-weighted sound pressure level exceeded for N% of a given measurement period. For example, the LA1 is the noise level exceeded for 1% of the time, LA10 the noise exceeded for 10% of the time, and so on.

The following figure presents a hypothetical 15 minute noise survey, illustrating various common statistical indices of interest.



Of particular relevance, are:

- LA1 The noise level exceeded for 1% of the 15 minute interval.
- LA10 The noise level exceeded for 10% of the 15 minute interval. This is commonly referred to as the average maximum noise level.
- LA90 The noise level exceeded for 90% of the sample period. This noise level is described as the average minimum background sound level (in the absence of the source under consideration), or simply the background level.
- LAeq The A-weighted equivalent noise level (basically, the average noise level). It is defined as the steady sound level that contains the same amount of acoustical energy as the corresponding time-varying sound.
- LAmax The A-weighted maximum sound pressure level of an event measured with a sound level meter.

5. Frequency Analysis

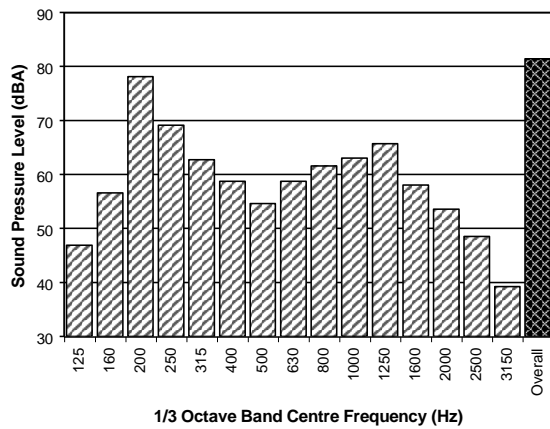
Frequency analysis is the process used to examine the tones (or frequency components) which make up the overall noise or vibration signal.

The units for frequency are Hertz (Hz), which represent the number of cycles per second.

Frequency analysis can be in:

- Octave bands (where the centre frequency and width of each band is double the previous band)
- 1/3 octave bands (three bands in each octave band)
- Narrow band (where the spectrum is divided into 400 or more bands of equal width)

The following figure shows a 1/3 octave band frequency analysis where the noise is dominated by the 200 Hz band. Note that the indicated level of each individual band is less than the overall level, which is the logarithmic sum of the bands.



6. Annoying Noise (Special Audible Characteristics)

A louder noise will generally be more annoying to nearby receivers than a quieter one. However, noise is often also found to be more annoying and result in larger impacts where the following characteristics are apparent:

- **Tonality** - tonal noise contains one or more prominent tones (ie differences in distinct frequency components between adjoining octave or 1/3 octave bands), and is normally regarded as more annoying than 'broad band' noise.
- **Impulsiveness** - an impulsive noise is characterised by one or more short sharp peaks in the time domain, such as occurs during hammering.
- **Intermittency** - intermittent noise varies in level with the change in level being clearly audible. An example would include mechanical plant cycling on and off.
- **Low Frequency Noise** - low frequency noise contains significant energy in the lower frequency bands, which are typically taken to be in the 10 to 160 Hz region.

7. Vibration

Vibration may be defined as cyclic or transient motion. This motion can be measured in terms of its displacement, velocity or acceleration. Most assessments of human response to vibration or the risk of damage to buildings use measurements of vibration velocity. These may be expressed in terms of 'peak' velocity or 'rms' velocity.

The former is the maximum instantaneous velocity, without any averaging, and is sometimes referred to as 'peak particle velocity', or PPV. The latter incorporates 'root mean squared' averaging over some defined time period.

Vibration measurements may be carried out in a single axis or alternatively as triaxial measurements (ie vertical, longitudinal and transverse).

The common units for velocity are millimetres per second (mm/s). As with noise, decibel units can also be used, in which case the reference level should always be stated. A vibration level V , expressed in mm/s can be converted to decibels by the formula $20 \log (V/V_0)$, where V_0 is the reference level (10^{-9} m/s). Care is required in this regard, as other reference levels may be used.

8. Human Perception of Vibration

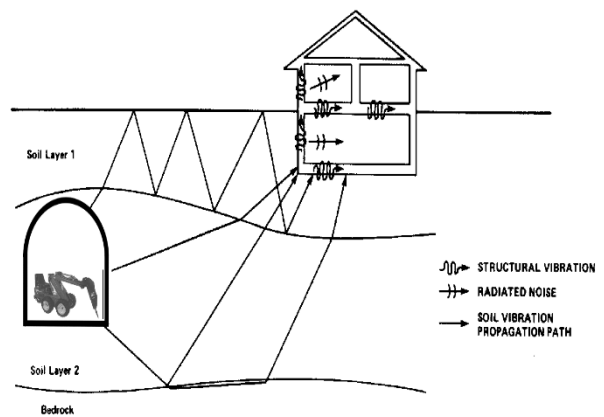
People are able to 'feel' vibration at levels lower than those required to cause even superficial damage to the most susceptible classes of building (even though they may not be disturbed by the motion). An individual's perception of motion or response to vibration depends very strongly on previous experience and expectations, and on other connotations associated with the perceived source of the vibration. For example, the vibration that a person responds to as 'normal' in a car, bus or train is considerably higher than what is perceived as 'normal' in a shop, office or dwelling.

9. Ground-borne Noise, Structure-borne Noise and Regenerated Noise

Noise that propagates through a structure as vibration and is radiated by vibrating wall and floor surfaces is termed 'structure-borne noise', 'ground-borne noise' or 'regenerated noise'. This noise originates as vibration and propagates between the source and receiver through the ground and/or building structural elements, rather than through the air.

Typical sources of ground-borne or structure-borne noise include tunnelling works, underground railways, excavation plant (eg rockbreakers), and building services plant (eg fans, compressors and generators).

The following figure presents an example of the various paths by which vibration and ground-borne noise may be transmitted between a source and receiver for construction activities occurring within a tunnel.



The term 'regenerated noise' is also used in other instances where energy is converted to noise away from the primary source. One example would be a fan blowing air through a discharge grill. The fan is the energy source and primary noise source. Additional noise may be created by the aerodynamic effect of the discharge grill in the airstream. This secondary noise is referred to as regenerated noise.

APPENDIX B

Construction Scenarios and Equipment

Table B1 Construction Scenarios and Equipment

Equipment		TOTAL LW (dBA)	Crane Franna (20 tonne)	Elevated Work Platform	Excavator 3-6T + hydraulic Hammer	Excavator - Tracked (20 tonne)	Generator - attenuated	Light Vehicle - 4WD	Pavement Laying Machine	Piling Rig - Bored	Pump - Concrete	Roller - Vibratory	Saw - Concrete	Truck - Dump	Truck - Medium Rigid (20 tonne)	Truck - road truck/ truck & dog (30 tonne)	Truck - Vacuum (non-destructive digger)	Tub Grinder/Mulcher (40-50hp)	Wrench - Impact	Tracked Hydraulic Drilling Rig	Hand tools (electric)	Concrete agitator truck	Concrete pencil vibrator	Slurry Plant	D-Wall Grab	Trench Cutter	Asphalt Milling Machine	Crane (mobile)	Truck mounted EWP
Sound Power Level (LW)			98	97	115	105	92	103	114	112	109	109	118	110	103	108	109	116	111	114	102	109	103	98	113	113	111	104	103
Estimated utilisation in assessment period (%)			30	25	30	100	100	25	50	30	100	100	30	25	25	25	100	30	30	50	50	100	100	100	50	50	50	30	30
ID	Construction Scenario																												
W.001	Site preparation work	109	1			1	1	4							2						2								
W.002	Initial investigation works	116					1	4												1	2								
W.003	Vegetation removal and grubbing	112				1									1	1		1											
W.004	Protecting and/or relocating utilities	118				1	1	4					1																1
W.005	Sewer relocation	118				1	1	4					1																1
W.006	High Voltage (HV) work	116				1	1	4	1				1		1												1		1
W.007	Establishing site amenities	118	1										1		1						2								
W.008	Establishing Water Treatment Plant (WTP)	119	1			1					1		1								2	1	2						
W.009	Establishing vehicle access and egress points	116	1		1			4									1				2								
W.010	Establishing concrete slabs or piling platforms	121	1			1					1	1	1			2					2	1	2						
W.011	Establishing spoil shed (slab)	119	1			1					1		1		1						2	1	2						
W.012	Establishing spoil shed (structure)	109	1	4											1				2										
W.013	Establishing segment shed (slab)	120				1				1	1		1		1						2	1	2					1	
W.014	Establishing segment shed (structure)	109	1	4											1				2										
W.015	Establishing truck wheel wash or rumble grid	119	1			1					1		1								1	1	2						
W.016a	D-Wall construction (Approved Hours)	119				1							1			2								1	1	1		2	
W.016b	D-Wall construction (OOHW)	115				1										2								1	1	1		2	
W.019	FRP (form reo pour - concrete works)	113	1								1										1	1	2						
W.020	Delivery of Equipment (OOHW)	110	2												4	4												2	

Note 1: Equipment classed as ‘annoying’ in the ICNG and requires a 5 dB correction.

Note 2: Sound power level data is taken from the DEFRA Noise Database, AS2436, TfNSW Construction Noise and Vibration Strategy and Sydney Metro Construction Noise and Vibration Standard.

APPENDIX C

Noise Impact Maps



LEGEND

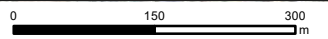
- Acoustic Hoarding
- NCA Boundaries
- Rosehill Site - Indicative Boundary
- Clyde MSF Construction Site

Sensitive Receivers

- Residential/Commercial
- Other Sensitive
- Other Stables

Predicted Noise Impact (Level above NML)

- Low (1 to 10 dBA)
- Moderate (11 to 20 dBA)
- High (>20 dBA)



Scale: 1:8,043 at A4
 Coordinate System: GDA2020 MGA Zone 56

Date Drawn: 08-Dec-2021
 Project Number: 610.30644



Data Source:
 Nearmap Imagery Oct 2021

**W.005 Sewer Relocation
 Worst-Case Noise Impacts**

FIGURE C1



LEGEND

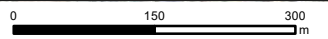
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- Clyde MSF Construction Site

Sensitive Receivers

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- Other Sensitive
- Other Stables

Predicted Noise Impact (Level above NML)

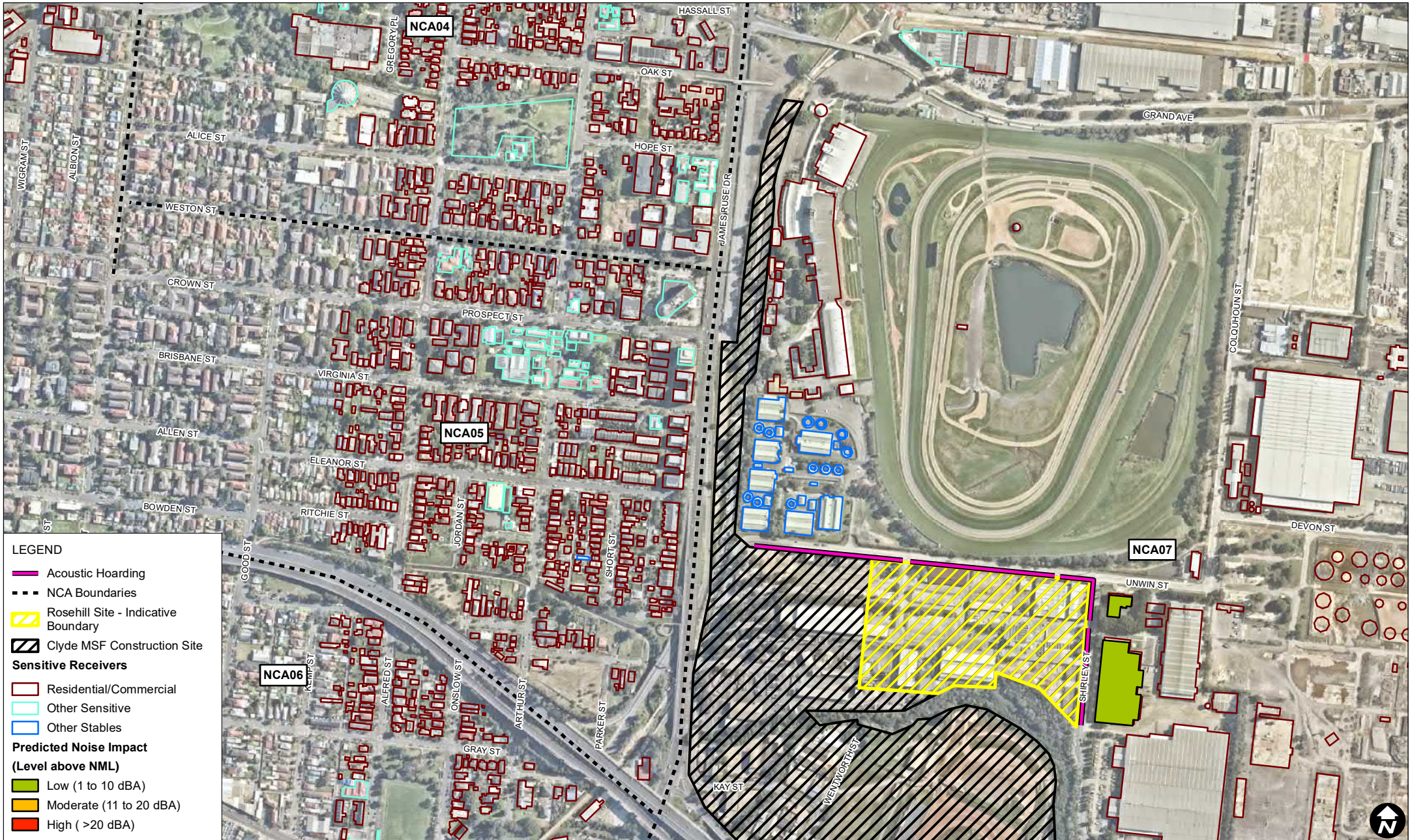
- Low (1 to 10 dBA)
- Moderate (11 to 20 dBA)
- High (>20 dBA)



Scale: 1:8,043 at A4
 Coordinate System: GDA2020 MGA Zone 56

Date Drawn: 08-Dec-2021
 Project Number: 610.30644

H:\Projects-SLR\610-SrvSYD\610-SYD\610.30644.00000 Sydney Metro West Western Tunnelling Pl06 SLR Data\01 CADGIS\GIS\SLR61030644_C02_W006_High_Voltage_Work_01.mxd



LEGEND

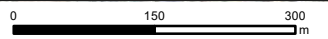
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- Rosehill Site - Indicative Boundary
- Clyde MSF Construction Site

Sensitive Receivers

- Residential/Commercial
- Other Sensitive
- Other Stables

Predicted Noise Impact (Level above NML)

- Low (1 to 10 dBA)
- Moderate (11 to 20 dBA)
- High (>20 dBA)



Scale: 1:8,043 at A4
 Coordinate System: GDA2020 MGA Zone 56

Date Drawn: 08-Dec-2021
 Project Number: 610.30644



LEGEND

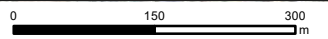
- Acoustic Hoarding
- NCA Boundaries
- Rosehill Site - Indicative Boundary
- Clyde MSF Construction Site

Sensitive Receivers

- Residential/Commercial
- Other Sensitive
- Other Stables

Predicted Noise Impact (Level above NML)

- Low (1 to 10 dBA)
- Moderate (11 to 20 dBA)
- High (>20 dBA)



Scale: 1:8,043 at A4
 Coordinate System: GDA2020 MGA Zone 56

Date Drawn: 08-Dec-2021
 Project Number: 610.30644



Data Source:
 Nearmap Imagery Oct 2021

W.009 Establishing Vehicle Access & Egress Points
Worst-Case Noise Impacts

FIGURE C4



LEGEND

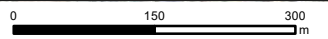
- Acoustic Hoarding
- NCA Boundaries
- Rosehill Site - Indicative Boundary
- Clyde MSF Construction Site

Sensitive Receivers

- Residential/Commercial
- Other Sensitive
- Other Stables

Predicted Noise Impact (Level above NML)

- Low (1 to 10 dBA)
- Moderate (11 to 20 dBA)
- High (>20 dBA)



Scale: 1:8,043 at A4
 Coordinate System: GDA2020 MGA Zone 56

Date Drawn: 08-Dec-2021
 Project Number: 610.30644



Data Source:
 Nearmap Imagery Oct 2021



**W.010 Establishing Concrete Slabs or Piling Platforms
 Worst-Case Noise Impacts**

FIGURE C5



LEGEND

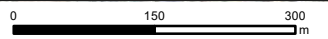
- Acoustic Hoarding
- NCA Boundaries
- Rosehill Site - Indicative Boundary
- Clyde MSF Construction Site

Sensitive Receivers

- Residential/Commercial
- Other Sensitive
- Other Stables

Predicted Noise Impact (Level above NML)

- Low (1 to 10 dBA)
- Moderate (11 to 20 dBA)
- High (>20 dBA)



Scale: 1:8,043 at A4
 Coordinate System: GDA2020 MGA Zone 56

Date Drawn: 08-Dec-2021
 Project Number: 610.30644



Data Source:
 Nearmap Imagery Oct 2021

W.013 Establishing Segment Shed (Slab)
Worst-Case Noise Impacts

FIGURE C6



LEGEND

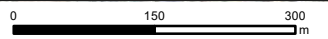
- Acoustic Hoarding
- NCA Boundaries
- Rosehill Site - Indicative Boundary
- Clyde MSF Construction Site

Sensitive Receivers

- Residential/Commercial
- Other Sensitive
- Other Stables

Predicted Noise Impact (Level above NML)

- Low (1 to 10 dBA)
- Moderate (11 to 20 dBA)
- High (>20 dBA)



Scale: 1:8,043 at A4
 Coordinate System: GDA2020 MGA Zone 56

Date Drawn: 08-Dec-2021
 Project Number: 610.30644



Data Source:
 Nearmap Imagery Oct 2021

**W.015 Establishing Truck Wheel Wash
 or Rumble Grid
 Worst-Case Noise Impacts**

FIGURE C7



LEGEND

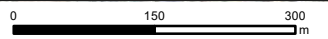
- Acoustic Hoarding
- NCA Boundaries
- Rosehill Site - Indicative Boundary
- Clyde MSF Construction Site

Sensitive Receivers

- Residential/Commercial
- Other Sensitive
- Other Stables

Predicted Noise Impact (Level above NML)

- Low (1 to 10 dBA)
- Moderate (11 to 20 dBA)
- High (>20 dBA)



Scale: 1:8,043 at A4
 Coordinate System: GDA2020 MGA Zone 56

Date Drawn: 08-Dec-2021
 Project Number: 610.30644



Data Source:
 Nearmap Imagery Oct 2021

**W.016a D-Wall Construction
 (Approved Hours)
 Worst-Case Noise Impacts**

FIGURE C8

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F: +61 2 9427 8200

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F: +61 3 9249 9499

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F: +61 2 4037 3201

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F: +61 8 9422 5901

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ATTACHMENT 5 – UNEXPECTED CONTAMINATED LAND AND ASBESTOS FINDS PROCEDURE

UNEXPECTED CONTAMINATED LAND AND ASBESTOS FINDS PROCEDURE

Unexpected Finds Procedure

PROTOCOL



INTERNAL HOLD POINT : Evidence of Contamination Observed

If observations indicate presence of potential contamination, then STOP all work in the immediate area and prevent further activity in the area.

- Do not touch or disturb the item/ materials.
- If material is suspected to be asbestos, cover with geofabric and secure.
- Set up appropriate barricades to prevent access to the area.
- Notify the Site Supervisor, Environmental Advisor, Safety Advisor and Construction Manager

Workforce

- Record the following details of the unexpected contamination find:
- Location of the potential contamination
 - Visual appearance
 - Odour (if any)
 - Depth
 - Surrounding material and works being undertaken at the time of discovering the material

Project Engineer
Supervisor

As soon as reasonably practicable, GLC Environmental and Sustainability Manager is to notify the Sydney Metro representative of unexpected find. Incident Report to be submitted via InEight.

Environmental and
Sustainability Manager

- If required, Environmental and Sustainability Manager is to obtain assistance from a suitably qualified and experienced contaminated land consultant in identifying the potential hazard to human health or environment.
- Sampling and laboratory analysis of materials may be undertaken in accordance with relevant guidelines.
- Implement procedures from SWQMP for contaminated land management

Environmental and
Sustainability Manager
Suitably Qualified
Contamination Specialist
Site Auditor
Project Engineer

EXTERNAL HOLD POINT: Environmental Protection

Activities within the vicinity of actual or suspected contaminated land require assessment in accordance with the SWMP

Environmental and
Sustainability Manager

EXTERNAL HOLD POINT RELEASE: Environmental Protection

Sydney Metro Representative

- Contaminated land management procedures to be implemented in accordance with the CLM strategy
- If contaminated material requires offsite disposal, refer to Waste and Spoil Management Sub-plans for guidance on management, handling, classification, disposal and tracking requirements.
- Unexpected finds to be recorded in the Contamination Register

Construction Manager
Supervisor
Project Engineer
Environmental and
Sustainability Manager

- Construction activities to recommence once CLM procedures have been implemented and completed (investigation/remediation/validation)

Environmental and
Sustainability Manager
Supervisor
Construction Manager

This Unexpected Contaminated Land and Asbestos Finds Procedure must be followed should unexpected contamination or asbestos (or suspected contamination) be excavated or otherwise discovered. This procedure has been developed for compliance with CoA D77 and will be implemented as per requirements of CoA D78.

Likelihood of contamination

The presence of potentially contaminated material can be detected where material is uncovered which displays some or all of these characteristics:

- Unusual odour from soils that are not detected in other similar areas
- Discolouration or staining of soil or rock
- Seepage of unusual liquids from soil or rock
- Unusual odours, sheen or colour on groundwater and/or surface water
- Unusual metal objects
- Unexpected underground storage tanks, buried drums or machinery etc.
- Presence of waste or rubbish above or below ground
- Potential asbestos containing material

Where these factors are identified, the material is considered to be possibly contaminated and the flowchart is to be followed.

Asbestos

An unexpected asbestos find occurs when Asbestos Containing Materials (ACM), not identified in the Asbestos Register, are found on site. In the event of an unexpected asbestos find, the below steps are to be followed along with the flowchart.

- The area is to be delineated, works in the immediate vicinity to cease.
- Notify the Environmental Advisor, Safety Advisor and Site Supervisor. Site Supervisor to notify workers in the vicinity of find.
- Ensure the soil and potential asbestos remain damp with dust suppression or securely covered where water cannot be accessed. If material is to be left over night, exposed area is to be securely covered.
- Project Engineer must arrange for testing of the suspected ACM and arrange for a occupational hygienist to undertake monitoring of the area (if required).
- A licenced asbestos removalist is to be engaged to provide recommendations to treat the area, as required.
- A clearance certificate is required from the asbestos removalist to confirm that the area is to be made safe. If assessed to be present through soil:
- Notify the contaminated land management team for inclusion on the Contamination Register
- Implement procedures in accordance with the contaminated land framework

Acid Sulfate Soils

It is possible tha Acid Sulfate Soils will be encountered within the Project footprint. If detailed investigations determine high-risk ASS, then it will be identified on relevant sensitive area plans.

If ASS is encountered management strategies include:

- Modifying the work to avoid the area of ASS.
- Undertaking in situ testing including SPOCAS or CRS testing to determine liming rate required to neutralise material
- Onsite treatment to neutralise the ASS in designated stockpile area in accordance with testing results.
- Management of material in accordance with the Spoil Management Plan including consideration of potential for reuse
- Delineation, treatment and removal of material to a suitably licenced facility, if required
- Any material to be removed off-site will be classified in accordance with the NSW EPA Waste Classification requirements.

ATTACHMENT 6 – UNEXPECTED HERITAGE FINDS PROCEDURE



Unexpected Heritage Finds Procedure

SM-20-00099497

Metro Body of Knowledge (MBoK)

Applicable to:	Sydney Metro
Document Owner:	Senior Heritage Advisor
System Owner:	Director, Environment, Sustainability and Planning
Status:	Final
Version:	4.0
Date of issue:	16 August 2021
Review date:	16 August 2022
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1. Introduction

1.1. Purpose

This Procedure has been prepared to provide a consistent approach to the management of unexpected Aboriginal and non-Aboriginal heritage uncovered during Sydney Metro activities. It applies to all Sydney Metro activities, both the pre-construction (prior to the Construction Heritage Management Plan approval) and construction phase (post Construction Heritage Management Plan approval) and pre or post-approval activities that are subject to the NSW *Heritage Act (1977)* (Heritage Act) and the *National Parks and Wildlife Act 1974* (NPW Act).

In NSW, there are strict laws to protect and manage both Aboriginal and non-Aboriginal heritage. As a result, appropriate management measures need to be implemented to avoid or minimise impacts, ensure compliance with statutory requirements, and to minimise the risk of penalties to individuals, Sydney Metro and its contractors. This Procedure includes Sydney Metro's heritage notification obligations under the Heritage Act, NPW Act and the *Coroner's Act 2009* and the requirements of the conditions of approval (CoA) issued by NSW Department of Planning, Industry and Environment.

Note that a Contractor must not amend this Procedure or use a different procedure without the prior approval of Sydney Metro.

This Procedure must be read in conjunction with the relevant approval conditions, contract documents and other plans and procedures including [SM-20-00099495 Exhumation Management Procedure](#), in addition to any other relevant documents as developed by the contractor for the delivery of Sydney Metro activities.

1.2. Scope

This Procedure applies to the discovery of any unexpected heritage item, where the find is not anticipated in an approved Archaeological Research Design (ARD) or Archaeological Method Statement (AMS) or other project specific document related to heritage. It applies to all Sydney Metro activities.

This Procedure must be followed by all Sydney Metro staff, contractors, subcontractors or any person undertaking work for Sydney Metro. It includes references to some of the relevant legislative and regulatory requirements, but is not intended to replace them.

This Procedure *does not apply* to the discovery and disturbance of a heritage items:

- As a result of investigations being undertaken in accordance with the *Code of Practice for Archaeological Investigations of Aboriginal Objects in NSW 4376 2010*; an Aboriginal Heritage Impact Permit (AHIP) issued under the NPW Act; or a permit approval issued under the Heritage Act; or
- As a result of construction related activities, where the disturbance is permissible in accordance with an AHIP or an approval issued under the Heritage Act or State Significant Infrastructure (SSI)/State Significant Development (SSD) planning approval; or
- Of local significance, where the find is identified and anticipated to occur in an AMS or ARD.

Construction Environment Management Plans (CEMP) should reference or include this Procedure. Where there is an approved CEMP, it must be followed in the first instance. Where there is a difference between approved CEMPs and this Procedure, the approved CEMP must be followed. Where an approved CEMP does not provide sufficient detail on particular issues, this Procedure should be used as a reference.

1.3. Definitions and abbreviations

1.3.1. What is an unexpected heritage find?

An 'unexpected heritage find' can be defined as a:

- Unanticipated discovery of an Aboriginal object or archaeological work or relic, which Sydney Metro does not have approval to disturb and/or is not covered under an existing management process or plan
- Find that has not been identified or assessed in a project assessment or document related to heritage
- Find that is not referenced in an archaeological research design (ARD) or archaeological method statement (AMS)
- Find that is not covered by an existing approval under the NPW Act or Heritage Act.

1.3.2. Abbreviations

All terminology in this Procedure is taken to mean the generally accepted or dictionary definition. Acronyms and terms specific to this document are listed below.

Other terms and jargon are defined within the [SM-17-0000203 Sydney Metro Glossary](#).

Table 1: Terms/acronyms and definitions

	Definitions
Aboriginal object	An Aboriginal object is any deposit, object or material evidence (not being a handcraft made for sale) relating to the Aboriginal habitation of the area, being habitation before or concurrent with (or both) the occupation of that area by persons of non-Aboriginal extraction, and includes Aboriginal remains. An Aboriginal object may include a shell midden, stone tools, bones, rock art, Aboriginal-built fences and stockyards, scarred trees and the remains of fringe camps.
AHIP	Aboriginal Heritage Impact Permit.
AMS	Archaeological Method Statement.
ARD	Archaeological Research Design.
CEMP	Construction Environmental Management Plan.
CoA	Conditions of Approval.
CSSI	Critical State Significant Infrastructure.
Disturbance	Disturbance is considered to be any physical interference to an item that results in it being destroyed, defaced, damaged, harmed, impacted or altered in any way (this includes archaeological investigation activities).
EP&A Act	NSW <i>Environmental Planning and Assessment Act 1979</i> .

	Definitions
Excavation Director	A person that has been determined by the Heritage Council of NSW or delegate to meet the Criteria for Assessment of Excavation Directors (4 September 2019 and as updated) and can therefore competently archaeologically investigate a site of either local and/or state significance.
Heritage Act	NSW <i>Heritage Act 1977</i> .
Heritage NSW	Formerly Office of Environment and Heritage (OEH). Now Heritage NSW as part of the Department of Premier and Cabinet NSW.
NPW Act	NSW <i>National Parks and Wildlife Act 1974</i> .
Relic (non-Aboriginal heritage)	A relic means any deposit, artefact, object or material evidence that: <ol style="list-style-type: none"> Relates to the settlement of the area that comprises NSW, not being Aboriginal settlement; and Is of State or local significance.
SSD	State Significant Development.
SSI	State Significant Infrastructure.
Work (non-Aboriginal heritage)	Archaeological features such as historic utilities or buried infrastructure that provide evidence of prior occupations such as former rail or tram track, timber sleepers, kerbing, road pavement, fences, culverts, historic pavement, buried retaining walls, cisterns, conduits, sheds or building foundations, but are also subject to assessment by the Excavation Director to determine its classification.

1.4. Accountabilities

The Director, Environment, Sustainability & Planning is accountable for this Procedure including approving the document, monitoring its effectiveness and performing a formal document review.

Direct Reports to the Chief Executive are accountable for ensuring the requirements of this Procedure are implemented within their area of responsibility.

Direct Reports to the Chief Executive who are accountable for specific projects/programs are accountable for ensuring associated contractors comply with the requirements of this Procedure.

2. Types of unexpected heritage finds and their statutory protections

Project, field and environmental personnel (including construction contractors) are critical to the early identification and protection of unexpected heritage finds.

[Appendix A: Examples of unexpected heritage finds](#) illustrates the wide range of heritage items uncovered to date during Transport for NSW projects and provides an understanding of what unexpected finds may look like.

Unexpected heritage finds are categorised as either:

- Aboriginal objects;
- Historic (non-Aboriginal) heritage items; or
- Human skeletal remains.

The relevant legislation that applies to each of these categories is described below.

2.1. Aboriginal objects

The NPW Act provides the basis for the care, protection and management of Aboriginal objects and places in NSW.

An Aboriginal object is defined as: *any deposit, object or material evidence (not being a handicraft made for sale) relating to the Aboriginal habitation of the area that comprises New South Wales, being habitation before or concurrent with (or both) the occupation of that area by persons of non-Aboriginal extraction, and includes Aboriginal remains.*

An 'Aboriginal place' is an area declared by the Minister administering the Act to be of special significance with respect to Aboriginal culture. An Aboriginal place does not have to contain physical evidence of occupation (such as Aboriginal objects).

Under section 87 of the Act, it is an offence to harm or desecrate an Aboriginal object or place. There are strict liability offences. An offence cannot be upheld where the harm or desecration was authorised by an AHIP and the permit's conditions were not contravened. Defences and exemptions to the offence of harming an Aboriginal object or Aboriginal place are provided in section 87, 87A and 87B of the Act. A person must notify Heritage NSW if a person is aware of the location of an Aboriginal object.

Penalties for some of the offences can include two years imprisonment and/or up to \$550,000 (for individuals), and a maximum penalty of \$1.1 million (for corporations).

Examples of Aboriginal objects include stone artefacts, shell middens, axe grinding grooves, pigment or engraved rock art, burials and scarred trees.

IMPORTANT!

All Aboriginal objects, regardless of significance, are protected under law.

If any impact is expected to an Aboriginal object, an AHIP is usually required from Heritage NSW. When a person becomes aware of an Aboriginal object they must notify the Director-General of Heritage NSW about its location. Assistance on how to do this is provided in section 4 (Step 5).

2.2. Historic (non-Aboriginal) heritage items

The Heritage Act provides for the care, protection and management of heritage items in NSW. Historic (non-Aboriginal) heritage items include:

- Archaeological 'relics' as defined under the Heritage Act; and
- Other items such as works, buildings or movable objects, which are not considered 'relics' under the Act.

2.2.1. Archaeological relics

Under section 139, it is an offence to disturb or excavate any land knowing or having reasonable cause to suspect that the disturbance or excavation will or is likely to result in a relic being discovered, exposed, moved, damaged or destroyed, unless the disturbance or

excavation is carried out in accordance with an excavation permit issued by Heritage NSW under the Act.

A relic is defined as: *'any deposit, artefact, object or material evidence that: (a) relates to the settlement of the area that comprises New South Wales, not being Aboriginal settlement, and (b) is of State or local heritage significance.'*

A person must notify Heritage NSW, if a person is aware or believes that they have discovered or located a relic (section 146). Penalties for offences under the Heritage Act can include six months imprisonment and/or a fine of up to \$1.1million.

IMPORTANT!

All relics are subject to statutory controls and protection.

If a relic is likely to be disturbed, an approval is usually required from the Heritage Council of NSW. When a person discovers a relic, they must notify the Heritage Council of NSW of its location.

2.2.2. Other items

Some historic heritage items are not considered to be 'relics', but are instead referred to as works, buildings, structures or movable objects. Examples of these items that may be encountered include culverts, historic pavements, retaining walls, tramlines, rail tracks, turn tables, timber sleepers, cisterns, fences, sheds, buildings and conduits.

Usually archaeological relics are uncovered via a process of excavation or soil removal. When an unexpected find is uncovered, an archaeological excavation permit under section 140 or section 60 of the Heritage Act may be required to further investigate or remove it if investigation is not covered by an existing approval. In contrast, 'other historic items' either exist above the ground surface (for example a shed), or they are designed to operate and exist beneath the ground surface (for example a culvert). They may also need a permit to alter, disturb or remove them if there is not an approval already in place.

2.3. Human skeletal remains

[SM-20-00099495 Exhumation Management Procedure](#) provides a more detailed explanation of the approval processes related to human skeletal remains.

Human skeletal remains can be classified as:

- Reportable deaths;
- Aboriginal objects; or
- Relics

Where it is suspected that less than 100 years has elapsed since death, human skeletal remains come under the jurisdiction of the State Coroner and the *Coroners Act 2009* (NSW). Under s35(2) of the Act, a person must report a death to a police officer, a coroner or an assistant coroner as soon as possible. This applies to all human remains less than 100 years old regardless of ancestry. Public health controls may also apply.

Where the remains are suspected of being more than 100 years old, they are considered to be either Aboriginal objects or non-Aboriginal relics, depending on the ancestry of the

individual. Aboriginal human remains are protected under the NPW Act, while non-Aboriginal heritage remains are protected under the Heritage Act.

The discovery of Aboriginal human remains also triggers notification requirements to the Commonwealth Minister for the Environment under s20 (1) of the *Aboriginal and Torres Strait Islander Heritage Protection Act 1984*.

IMPORTANT!

All human skeletal remains are subject to statutory controls and protections.

All bones must be treated as potential human skeletal remains and work around them must stop while they are appropriately protected and investigated, the relevant authorities notified and approvals received.

3. Unexpected heritage finds procedure

In the event that an unexpected find is encountered on a Sydney Metro project, the steps summarised in Figure 1 and detailed in Table 2 must be followed. There are seven steps in the procedure.

IMPORTANT!

Sydney Metro may have approval to impact certain heritage items during construction. If you think that you may have discovered a heritage item and you are unsure whether an approval is in place or not, **STOP** work and follow this Procedure.

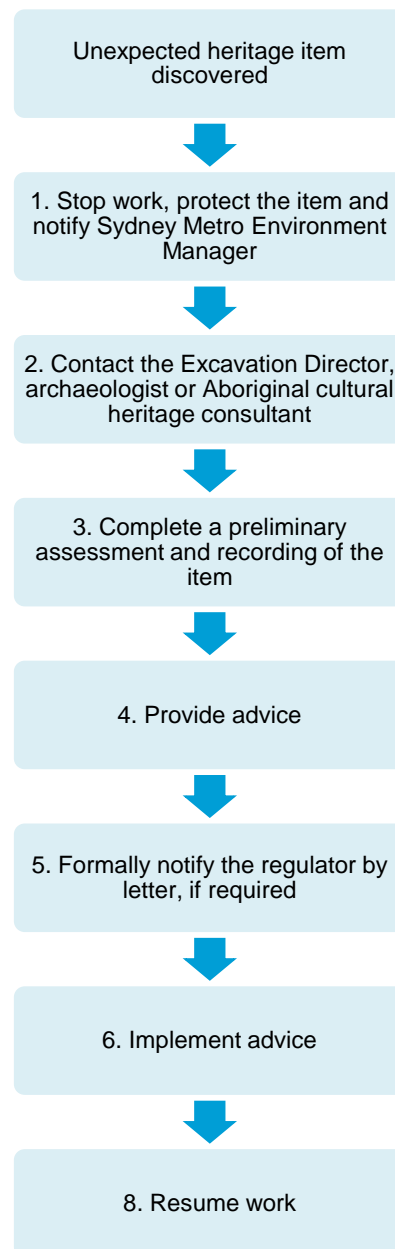


Figure 1: Summary of steps to be taken on the discovery of an unexpected heritage item

Table 2: Specific tasks to be implemented following the discovery of an unexpected heritage item

Step	Task	Responsibility	Guidance and tools
1	Stop work and protect the item		
1.1	Stop all work in the immediate area of the item and notify the Project Manager	Contractor/ Supervisor	Appendix A: Examples of unexpected heritage finds
1.2	Establish a 'no-go zone' around the item. Use high visibility fencing, where practical. No ground disturbing work is to be undertaken within this zone until further archaeological investigations are completed, and if required, appropriate approvals are obtained. Inform all on-site personnel about the no-go zone.	Contractor's Project Manager or Supervisor	
2	Engage an archaeologist		
2.1	Contact the nominated Excavation Director, archaeologist or Aboriginal cultural heritage consultant to discuss the location and nature of the item and arrange an inspection. The project CEMP should contain the contact details of the archaeologist. Provide as much information as possible to the Excavation Director, archaeologist or Aboriginal cultural heritage consultant, including photographs of the item. Inform the Sydney Metro Environment Manager, and keep them involved in the process. The Environment Manager will inform the Sydney Metro Senior Heritage Advisor.	Contractor's Project Manager	
2.2	Where there is no project Excavation Director, archaeologist or Aboriginal cultural heritage consultant engaged for the work, engage a suitably qualified consultant to assess the find. If the find is likely to be an Aboriginal object, engage a suitably qualified and experienced Aboriginal cultural heritage consultant. If the find is a non-Aboriginal heritage item, engage a suitably qualified and experienced historical archaeological consultant.	Contractor's Project Manager	
3	Preliminary assessment and recording		
3.1	Occasionally, the Excavation Director, archaeologist or Aboriginal cultural heritage consultant may determine from the photographs provided at Step 2.1 that it is not necessary to inspect the item because no heritage constraint exists for the project (for example the item is not an Aboriginal object or archaeological relic). This advice should be provided in writing (for example via email or letter with the consultant's name and company clearly identifiable) to the Sydney Metro Project Manager, Environment Manager and Senior Heritage Advisor.	Excavation Director, archaeologist or Aboriginal cultural heritage consultant	Proceed to Step 7
3.2	Arrange access for the Excavation Director, archaeologist or Aboriginal cultural heritage consultant to inspect the item as soon as practicable. In most cases, a site inspection is required to conduct a preliminary assessment.	Contractor's Project Manager/ Excavation Director	

Step	Task	Responsibility	Guidance and tools
3.3	<p>Subject to the Excavation Director, archaeologist or Aboriginal cultural heritage consultant's assessment, work may recommence at a set distance from the item.</p> <p>This is to protect any other archaeological evidence that may exist in the vicinity, which may have not yet been uncovered.</p> <p>The 'no-go zone' established in Step 1.2 may need to be adjusted to reflect the area of archaeological potential, as determined by the Excavation Director, archaeologist or Aboriginal cultural heritage consultant.</p>	Excavation Director, archaeologist or Aboriginal cultural heritage consultant/ Contractor's Project Manager	
3.4	<p>Has the item been damaged or harmed?</p> <p>If yes, record the incident in the Incident Management System. Implement any additional reporting requirements related to the planning approval and CEMP where relevant</p>	Contractor's Project Manager/ Excavation Director, archaeologist or Aboriginal cultural heritage consultant	
3.5	<p>Can the work avoid further impact to the item?</p> <p>Project Manager to confirm with Sydney Metro Environment Manager.</p>	Contractor's Project Manager	
3.6	<p>Record the item and complete the Unexpected Heritage Item Recording Form.</p>	Excavation Director, archaeologist or Aboriginal cultural heritage consultant	<p>Appendix B: Unexpected heritage find recording form</p> <p>Appendix C: Photographing unexpected heritage items</p>
3.7	<p>Is the item likely to be bone?</p> <p>If yes, follow the steps in Appendix D 'Uncovering bones'.</p> <p>Where it is obvious that the bones are human remains, you must notify the local police by telephone immediately.</p> <p>They may take command of all or part of the site.</p> <p>Also refer to SM-20-00099495 Exhumation Management Procedure.</p> <p>If no, proceed to the next step.</p>	Excavation Director, archaeologist or Aboriginal cultural heritage consultant	
3.8	<p>The Excavation Director, archaeologist or Aboriginal cultural heritage consultant may provide advice after the inspection and preliminary assessment that no heritage constraint exists for the project (for example the item is not an Aboriginal object or relic).</p> <p>This advice should be provided in writing (for example via email or letter with the consultant's name and company clearly identifiable) to the Sydney Metro Project Manager, Environment Manager and Senior Heritage Advisor.</p>	Excavation Director, archaeologist or Aboriginal cultural heritage consultant	Proceed to Step 7
3.9	<p>Where required, seek additional specialist technical advice (such as a forensic or physical anthropologist to identify skeletal remains).</p> <p>The Excavation Director, archaeologist or Aboriginal cultural heritage consultant can provide contacts for such specialist consultants.</p>	Excavation Director, archaeologist or Aboriginal cultural heritage consultant	

Step	Task	Responsibility	Guidance and tools
4	Provide advice		
4.1	The Excavation Director, archaeologist or Aboriginal cultural heritage consultant should provide written advice with input from Registered Aboriginal Parties where appropriate. The plan should include as a minimum a) a description of the item, b) an assessment of the significance of the item, c) approval or statutory notification requirements, d) reporting requirements, e) consultation requirements, and f) relevance to other project approvals or management plans.	Excavation Director, archaeologist or Aboriginal cultural heritage consultant	Appendix D: Archaeological/heritage advice checklist Other references DECCW 2010, Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010 DECCW 2010, Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW Heritage Branch 2009, Assessing Significance for Historical Archaeological Sites and 'Relics'
4.2	In preparing the advice, the Excavation Director, archaeologist or Aboriginal cultural heritage consultant must review the CEMP, heritage sub-plans, conditions of project approval and associated heritage assessment documentation (for example an Environmental Impact Statement Technical Paper). The Excavation Director, archaeologist or Aboriginal cultural heritage consultant must determine if the item is consistent with previous heritage or project approvals or management plans. The Project Manager must provide all relevant documents to the Excavation Director to assist with this.	Excavation Director, archaeologist or Aboriginal cultural heritage consultant/ Contractor's Project Manager	
4.3	The Excavation Director, archaeologist or Aboriginal cultural heritage consultant must submit this advice as a report, letter or email to the Project Manager as soon as practicable.	Excavation Director, archaeologist or Aboriginal cultural heritage consultant	
4.4	The Project Manager, Sydney Metro Environment Manager and Sydney Metro Senior Heritage Advisor should review the advice to ensure that all requirements are addressed and can be reasonably implemented.	Consultant's Project Manager/ Sydney Metro Environment Manager/ Sydney Metro Senior Heritage Advisor	
5	Notify the regulator, if required		
5.1	Based on the advice and any statutory requirements, is notification to Heritage NSW and the Secretary required? If no, proceed directly to Step 6. If yes, proceed to next step.	Sydney Metro Environment Manager/ Sydney Metro Senior Heritage Advisor	

Step	Task	Responsibility	Guidance and tools
5.2	If notification is required, complete the template notification letter and forward with supporting documentation (including advice obtained at Step 4) to the Sydney Metro Environment Manager. The Environment Manager will seek the approval of the Sydney Metro Senior Heritage Advisor and the signature of the Director Project Environment, Sustainability & Planning or Director Environment, Sustainability & Planning	Sydney Metro Environment Manager	Appendix E: Template notification letter
5.3	Forward the signed notification letter to Heritage NSW once approved and cc Sydney Metro. Informal notification (via a phone call or email) to Heritage NSW prior to sending the letter is appropriate. The advice and completed Unexpected Heritage Item Recording Form (Appendix B) must be submitted with the notification letter (for both Aboriginal objects and non-Aboriginal relics). If the item is an archaeological relic as defined under the Act, a section 146 notification form must also be completed and sent to Heritage NSW as part of the notification.	Sydney Metro Environment Manager	Appendix B: Unexpected heritage find recording form Appendix E: Template notification letter
5.4	A copy of the final signed notification letter, archaeological or heritage management plan and the Unexpected Heritage Item Recording Form is to be kept on file and a copy sent to the Sydney Metro Project Manager	Sydney Metro Environment Manager/ Contractor's Project Manager	
6	Implement advice		
6.1	The advice should be modified to take into account any additional advice resulting from notification and discussions with the regulator if required.	Excavation Director, archaeologist or Aboriginal cultural heritage consultant/ Contractor's Project Manager	
6.2	Implement advice. Where impact cannot be avoided, this could include a formal assessment of heritage significance and impact assessment, preparation of excavation or recording methodologies, consultation with Registered Aboriginal Parties and obtaining heritage approvals if required.	Excavation Director, archaeologist or Aboriginal cultural heritage consultant/ Contractor's Project Manager	DECCW 2010, Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010 DECCW 2010, Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW
6.3	Where heritage approvals are required, contact the Sydney Metro Environment Manager for further advice and support. Please note there are time constraints associated with heritage approval preparation and processing.	Excavation Director, archaeologist or Aboriginal cultural heritage consultant/ Contractor's Project Manager	

Step	Task	Responsibility	Guidance and tools
6.4	For SSI or SSD projects, or projects approved under Part 5 of the EP&A Act, assess whether the heritage impact is consistent with the project approval or if project approval modification is required from the Department of Planning, Industry and Environment or the relevant consent authority.	Excavation Director, archaeologist or Aboriginal cultural heritage consultant/ Contractor's Project Manager	
6.5	Where statutory approvals (or project modifications) are required, impact upon Aboriginal objects or relics must not occur until heritage and planning approvals have been issued by the appropriate regulator.	Excavation Director, archaeologist or Aboriginal cultural heritage consultant/ Contractor's Project Manager	
6.6	Where statutory approval is not required but where recording is recommended by the Excavation Director, archaeologist or Aboriginal cultural heritage consultant, sufficient time and resources must be allowed for this to occur.	Excavation Director, archaeologist or Aboriginal cultural heritage consultant/ Contractor's Project Manager	
6.7	Ensure short term and permanent storage locations are identified for archaeological material or other heritage material recovered from site, where required. Interested third parties (for example local Aboriginal land councils, local councils or museums) should be consulted on this issue. Contact the Excavation Director, archaeologist or Aboriginal cultural heritage consultant for advice on this issue.	Excavation Director, archaeologist or Aboriginal cultural heritage consultant/ Contractor's Project Manager	
7	Resume work		
7.1	Seek written clearance to resume project work from the Excavation Director, archaeologist or Aboriginal cultural heritage consultant. Clearance would only be given once all archaeological excavation or heritage recommendations and approvals (where required) are complete. Resumption of project work must be in accordance with all the relevant project and heritage approvals/determinations.	Contractor's Project Manager	
7.2	If required, ensure archaeological excavation/heritage reporting and other heritage approval conditions are completed in the required timeframes. This includes artefact retention repositories, conservation and/or disposal strategies.	Excavation Director, archaeologist or Aboriginal cultural heritage consultant/ Contractor's Project Manager	
7.3	If additional unexpected heritage items are discovered, this procedure must begin again from Step 1.	All	

4. Responsibilities

Table 3: Roles and responsibilities

Role	Responsibility
Contractor/Supervisor	<ul style="list-style-type: none"> Stop work immediately when an unexpected heritage item is encountered. Cordon off area until Contractor Environmental Manager/Excavation Director, archaeologist or Aboriginal cultural heritage consultant advises that work can recommence. Manage the process of the identification, protection and mitigation of impacts on the heritage item. Liaise with the Sydney Metro Project Manager, Environment Manager and Senior Heritage Advisor. Assist the Excavation Director, archaeologist or Aboriginal cultural heritage consultant with mitigation and statutory requirements. Complete Incident Report and review CEMP for any changes that may be required. Proposed amendments to the CEMP if any changes are required.
Contractor's Project Manager	Ensure all aspects of this Procedure are implemented. Advise the Contractor/Supervisor to recommence work if all applicable requirements have been satisfied and the Contractor Environmental Manager/ Excavation Director, archaeologist or aboriginal cultural heritage consultant has approved commencement of work.
Contractor's Excavation Director/ archaeologist or Aboriginal cultural heritage consultant	Provide expert advice to the Contractor and Sydney Metro Environment Manager on find identification, significance, mitigation, legislative procedures and requirements.
Environmental Representative	Ensure compliance with relevant approvals (new and existing) and the Construction Environment Management Plan.
Sydney Metro Environment Manager	Notify the Director Project Environment, Sustainability & Planning of find and help support Contractor with managing Incident Reporting.
Sydney Metro Senior Heritage Advisor	Provide expert advice to Sydney Metro Environment Manager and project as required.

5. Seeking advice

Advice on this Procedure should be sought from the Sydney Metro Environment Manager in the first instance. Contractors and delivery partners should ensure their own project environment managers are aware of and understand this Procedure.

Technical archaeological or heritage advice regarding an unexpected heritage item should be sought from a suitably qualified and experienced archaeologist/Aboriginal heritage consultant.

6. Related documents and references

Related documents and references

- [SM-20-00099495 Exhumation Management Procedure](#)
- [SM-17-00000096 Environmental Incident Classification and Reporting Procedure](#)
- [SM-21-00280658 Unexpected Heritage Find Recording Form](#)
- [SM-21-00280680 Archaeological Heritage Advice Checklist](#)
- [SM-21-00280708 Unexpected Heritage Discovery Notification Letter Template](#)
- 3TP-SD-015/7.0 Transport for NSW Guide to Environmental Control Map
- Roads and Maritime Services, November 2015, Unexpected Heritage Items Heritage Procedure 02
- [SM-17-00000203 Sydney Metro Glossary](#)
- Department of Environment, Climate Change and Water 2010, Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010
- Department of Environment, Climate Change and Water 2010, Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW
- Heritage Branch Department of Planning 2009, Assessing Significance for Historical Archaeological Sites and 'Relics'

7. Superseded documents

Superseded documents

There are no documents superseded as a result of this document.

8. Document history

Version	Date of approval	Notes
1.1	June 2017	Incorporates Environmental Representative comments
1.2	-	Amends p13 step 8 reference to s146
1.3	-	Incorporates Planning Mods 1-4 including amended CoA E20
1.4	March 2018	Incorporates Environmental Representative comments
2.0	-	Removes SSI 15-7400 COA reference
3.0	-	Revises definitions
3.1	-	Revises procedure
3.2	-	Revises roles and responsibilities
3.3	-	Minor edits and corrections
4.0	16 August 2021	Revises definitions and procedure; references the Sydney Metro Exhumation Management Procedure v5 with amendments throughout for consistency with that document. Updates to related documents and references.

Appendix A: Examples of unexpected heritage finds



Figure 2: Aboriginal stone artefacts found at the Wickham Transport Interchange, 2015



Figure 3: Aboriginal artefacts (shell material) found at the Wickham Transport Interchange, 2015



Figure 4: 1840s seawall and 1880s retaining wall uncovered at Balmain East, 2016



Figure 5: Sandstone pavers uncovered at Balmain East, 2016



Figure 6: Platform at Hamilton Station classified as a 'work' by the project archaeologist, Wickham Transport Interchange project, 2015



Figure 7: Sandstone flagging and cesspit, Wynyard Walk project, 2014



Figure 8: Chinese Ming Dynasty pottery and English porcelain/pottery dating back to the early nineteenth century, Wynyard Walk project, 2014



Figure 9: Pottery made by convict potter Thomas Ball during the early settlement period, Wynyard Walk project, 2014



Figure 10: Top left hand picture continuing clockwise: Stock camp remnants (Hume Highway Bypass at Tarcutta); linear archaeological feature with post holes (Hume Highway Duplication), animal bones (Hume Highway Bypass at Woomargama); cut wooden stake; glass jars, bottles, spoon and fork recovered from refuse pit associated with a Newcastle Hotel (Pacific Highway, Adamstown Heights, Newcastle area)



Figure 11: Culturally modified stone discovered on Main Road 92, about two kilometres west of Sassafras. The remaining images shown a selection of stone artefacts retrieved from test and salvage archaeological excavations during the Hume Highway Duplication and Bypass projects from 2006-2010

Appendix B: Unexpected heritage find recording form

Refer to [SM-21-00280658 Unexpected Heritage Find Recording Form](#).

Appendix C: Photographing unexpected heritage items

Photographs of unexpected finds in their current context (*in situ*) may assist archaeologists/Aboriginal heritage consultants to better identify the heritage values of the item. Emailing good quality photographs to specialists can allow for better quality and faster heritage advice. The key elements that must be captured in photographs of the item include its position, the item itself and any distinguishing features. All photographs must have a scale (ruler, scale bar, mobile phone, coin etc.) and a note describing the direction of the photograph.

C1: Context and detailed photographs

It is important to take a general photograph (below left) to convey the location and setting of the item. This will add value to the subsequent detailed photographs also required (below right – labelled Figure 2).

Removal of the item from its context (e.g. excavating from the ground) for photographic purposes is not permitted.

C2: Photographing distinguishing features

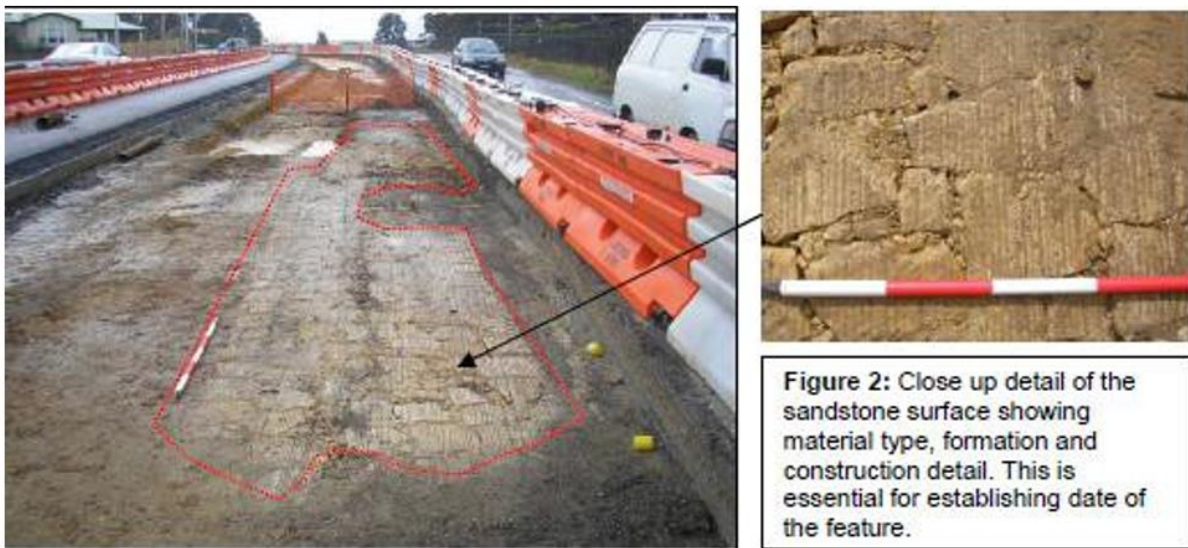


Figure 2: Close up detail of the sandstone surface showing material type, formation and construction detail. This is essential for establishing date of the feature.

Where unexpected items have a distinguishing feature, close up detailed photographs must be taken of these features, where practicable. In the case of a building or bridge, this may include diagnostic details architectural or technical features. See images next page, labelled Figures 3 and 4 for examples.



Figure 3: Ceramic bottle artefact with stamp.



Figure 4: Detail of the stamp allows 'Tooth & Co Limited' to be made out. This is helpful to a specialist in gauging the artefact's origin, manufacturing date and likely significance.

C3: Photographing bones

The majority of bones found on site will be animal bones often requiring no further assessment (unless they are in archaeological context). However, if bones are human, the police must be contacted immediately (see [Appendix E](#) for detailed guidance). Taking quality photographs of the bones can often resolve this issue quickly. The project archaeologist can confirm if bones are human or non-human if provided with appropriate photographs.

Ensure that photographs of bones are not concealed by foliage (example below left, labelled Figure 5) as this makes it difficult to identify. Minor hand removal of foliage can be undertaken as long as disturbance of the bone does not occur. Excavation of the ground to remove bone(s) should not occur, nor should they be pulled out of the ground if partially exposed.

Where sediment (adhering to a bone found on the ground surface) conceals portions of a bone (example below right, labelled Figure 6) ensure the photograph is taken of the bone (if any) that is not concealed by sediment.



Figure 5: Bone concealed by foliage.



Figure 6: Bone covered in sediment

Ensure that all close up photographs include the whole bone and then specific details of the bone (especially the ends of long bones, the *epiphysis*, which is critical for species identification). The images below (labelled Figure 7, left and Figure 8, right) are examples of good photographs of bones that can easily be identified from the photograph alone. They show sufficient detail of the complete bone and the epiphysis.



Figure 7: Photograph showing complete bone.



Figure 8: Close up of a long bone's epiphysis.

Appendix D: Archaeological/heritage advice checklist

Refer to [SM-21-00280680 Archaeological Heritage Advice Checklist](#).

Appendix E: Template notification letter

Refer to [SM-21-00280708 Unexpected Heritage Discovery Notification Letter Template](#).

ATTACHMENT 7 – RECORDS OF CONSULTATION

Consultation summary relevant to this SEMP.

Consultation	Date	Key Issues	Addressed
Parramatta City Council	31 May 2022	None raised	N/A

Document Transmittal

Transmittal No:	SMWSTWTP-SMD-TX-000377
Contract No:	WTP - 00013/13065 - Western Tunnelling Works Design and Construction Deed
Sub Contract:	
Date:	31 May 2022, 11:14 PM

Issued	Name
By	Denniel Custodio (Sydney Metro)

Issued	Name
To	Sasi Kumar (Parramatta City Council) ; Sandra Martin (Parramatta City Council)
Cc	Andrew Hendy (Sydney Metro) ; Ian Subramaniam (Sydney Metro) ; Matthew Marrinan (Sydney Metro) ; Denniel Custodio (Sydney Metro) ; Demi Tascas (Sydney Metro) ; Transmittal SMD OpenAccess (Sydney Metro) ; Sarah Lepre (Sydney Metro) ; Nikkita Cullum (Sydney Metro)

Reason for Issue	Issued for Review		
Respond By Message	Please submit your comments by	Respond By Date	14 June 2022
Subject	Sydney Metro West - WTP - Rosehill Site Establishment Management Plan - Rev C - Issued to Parramatta Council		

Dear Sasi,

Please find attached the Rosehill Site Establishment Management Plan (SEMP) for Parramatta Council review. The SEMP is provided as part of our consultation requirements under Condition A17, of our Planning Approval.

Any Council feedback is required within 2 weeks from issue.

Please note:

- Workflow has been activated for Council's review
- Mark your review as 'Complete' once done (use the 'checkbox' on the Document Review screen). This will avoid unnecessary reminders.
- Each comment has to be each item, please don't put two or more comments in one item
- Please don't paste image/photos, instead attach it to the comment as a file
- Please do not use sub-reviewer function
- Comments not made via Teambinder or outside of the **10 business days** will not be accepted
- Review the document to confirm open comments can be closed and raise new comments where applicable.

If you are a cc in this transmittal it has been issued for information only and there is no requirement to review

Regards,
Sydney Metro West

[Click here to download all Transmittal files.](#)

Item	Document No	Title	Rev	Sts	Type	Design Lots	Alt Doc No
1	SMWSTWTP-GLO-RSH-EN-PLN-000001	Sydney Metro West - WTP - Rosehill Site Establishment Management Plan	C.02	S3	PLN		

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From: Ian Subramaniam <Ian.Subramaniam@transport.nsw.gov.au>
Sent: Tuesday, 14 June 2022 5:02 PM
To: Andrew Hendy <Andrew.Hendy@transport.nsw.gov.au>
Cc: Tania Page <Tania.Page2@transport.nsw.gov.au>
Subject: FW: Sydney Metro West - WTP - Rosehill Site Establishment Management Plan - Rev C - Issued to Parramatta Council

Hi Andrew,

Council have confirmed they have no comments on the Rosehill SEMP.

Kind Regards,

Ian Subramaniam
Interface Manager West
Projects – Metro West
Sydney Metro

T 02 8588 4147 | M 0432 959 619

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Level 43, 680 George Street, Sydney NSW 2000
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From: Sasi Kumar <SKumar@cityofparramatta.nsw.gov.au>
Sent: Tuesday, 14 June 2022 5:00 PM
To: Ian Subramaniam <Ian.Subramaniam@transport.nsw.gov.au>
Cc: Sandra Martin <SMartin@cityofparramatta.nsw.gov.au>
Subject: RE: Sydney Metro West - WTP - Rosehill Site Establishment Management Plan - Rev C - Issued to Parramatta Council

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Hi Ian,

Council has no comments to offer on the WTP- Rosehill Site Establishment Management Plan – Rev C

Regards
Sasi Kumar
Development Project Manager- Sydney Metro West
Infrastructure Planning and Design
City Planning and Design
☎ (02) 9806 5593 | Mob 0437 113 827
✉ skumar@cityofparramatta.nsw.gov.au

From: Sasi Kumar
Sent: Friday, 10 June 2022 1:35 PM
To: Ian Subramaniam <Ian.Subramaniam@transport.nsw.gov.au>
Subject: RE: Sydney Metro West - WTP - Rosehill Site Establishment Management Plan - Rev C - Issued to Parramatta Council

ATTACHMENT 8 – ENVIRONMENTAL INSPECTION REPORT FORM

Project:					
Inspection Type	<input type="checkbox"/> Weekly	<input type="checkbox"/> Pre-Work	<input type="checkbox"/> Weather	<input type="checkbox"/> Shut down	<input type="checkbox"/> Other
Inspection Scope					
Date:		Start Time:		End Time:	
Attendees: (List both Gamuda Australia-Laing O'Rourke Consortium (GALC) and Subcontractor representatives)	Name	Company			

Observations					
Item	Yes	No	N/A	Comments	Timeline
General					
All Environment No-Go zones are well delineated and protected.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
All permits in place (discharge, enter no-go zones, clearing).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Environmental control plan is approved and displayed in a prominent location.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Soil and Water					
Upstream clean water diversions are in place.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Basins are capturing run off appropriately, have functioning sediment controls, and are checked after every rain event.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
All sumps, holding tanks, ponds, wheel wash pits, fish tanks, and basins are functional with no risk of overtopping.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
All construction water is treated and tested before leaving site.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Stockpiles are managed appropriately (topsoil segregation, VENM, ASS/PASS).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Wheel wash / shaker grid and hardstand areas are in place and functional at all exits.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Public roadways are clear of tracked sediment.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Flora and Fauna					
Boundary/clearing limits are clearly identified.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Retention trees are clearly identified, and drip zones are clear.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		

Weeds are being managed and invasion prevented.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Cultural Heritage					
All heritage items in vicinity are well protected.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Vibration monitoring is being undertaken where required.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Contamination					
Contaminated materials handled and stockpiled correctly (e.g., ACM segregated and covered).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Decontamination methods for plant and equipment are being implemented.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
The movement of contaminated materials are being monitored and tracked.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Noise and Vibration					
Appropriate noise and vibration mitigation measures are implemented., e.g., hoardings, screens.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Where required, noise and vibration monitoring is being undertaken and records are maintained.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Respite is being provided for high impact noise works e.g., 3/1.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Non-tonal reversing alarms in use.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Air Quality					
Effective dust suppression in place (e.g., water carts, misters).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Exposed areas are stabilised when not in use.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Visible emissions are less than 10 seconds from all machinery.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
No odour detectable at site boundary.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Waste					
Waste is segregated and bins are maintained (not overflowing).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Waste removal is tracked, and records kept.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Loads are covered prior to leaving site (including spoil haulage).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Hazardous Substances					
Spill kits are readily available and fully stocked.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Hazardous substances are stored in bunded containers, away from waterways and drains. Bunds are empty.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		

Refuelling and concrete wash out is located away from waterways or drainage lines.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Resource Use					
Fuel usage is recorded.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Water meters are installed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Non-potable water is used instead of potable water where possible, and tracked., e.g., water cart loads.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
All timber is reused, recycled, or sustainably sourced.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Where possible, site won material is being reused on-site., e.g., ENM or VENM.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Site sheds/offices have functioning weather seals, LED lighting, door-closers, push-button taps, and min. 5-star Energy Rating Labelled plug-in electrical equipment.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
People and Place					
Site security, and well-maintained fencing/hoarding is in place, e.g., no graffiti.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Temporary pedestrian diversions are well maintained and sign-posted, have clear sightlines, adequate lighting and appropriately spaced access and egress points.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Lights are positioned to avoid spill onto neighbouring properties.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Community concerns are considered, and feedback is provided to construction team.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
* RISK RANKING:	1 = High Action: Imminent safety / environment risk – issue must be rectified immediately	2 = Medium Action: Safety / environment risk not imminent however issue is to be rectified immediately.	3 = Low Action: Rectify within 24 hours or time frame specified.	4 = Observation Positive Observation / Good Practice	

ATTACHMENT 9 – EMERGENCY PREPAREDNESS AND RESPONSE PROCEDURE

The types of environmental emergencies that could occur on this site are tabulated below.

Note: This plan is designed to supplement both the Gamuda Australia's Project Emergency Response Plan and the Client's site emergency response plan/s, where available.

Emergency	Preparation	Response	Responsibility
Significant adverse dust event due to weather conditions: High winds	Monitor meteorological conditions for the area - develop contingency for wind speeds in excess of 16m/s (55km/hr) High wind 'stop works' protocols in place Establish contingency strategy for additional dust control measures, additional water carts, dust suppressants, stockpile covers etc	Dust generating activities will cease under direction of the HSE Manager or Supervisor until adverse conditions subside. Deploy additional mitigation measures to exposed areas stockpiles and other dust generating items will be water sprayed or covered.	Project HSEQ Representative / Supervisor
Discovery of friable asbestos.	Review previous land uses, environmental reports for potential for friable asbestos. Include asbestos awareness in the site induction where the potential exists Include contingency in relevant work procedures and SWMSs Identify potential service providers for asbestos control and removal.	Quarantine suspected area Cover or provide dust mitigation strategy Engage licensed/approved removal and disposal organisation Complete post removal verification	Head of Project / Construction Manager / Supervisor / Project HSEQ Representative
Flooding	Monitor meteorological conditions – develop contingency strategy for rainfall > 100mm in 24hours or potential for > 1in 5 ARI All chemicals, fuels and other hazardous substances to be in secured containers and stored within a sealable shipping container Remove plant and equipment from low lying areas Secure plant that cannot be removed Review site drainage flow paths:	Recover materials washed from site including sediment and other waste. Check effectiveness of erosion and sedimentation devices and other flood controls, maintain where required and safe to do so.	Construction Manager / Supervisor / Project HSEQ Representative

Emergency	Preparation	Response	Responsibility
	<p>Redirect site drainage to prevent flooding of residential/business premises</p> <p>Ensure site drainage does not concentrate surface flow</p> <p>Review and address the potential for excess water entering the site</p> <p>Review and maintain erosion and sedimentation controls</p>		
Temporary erosion and sediment controls are damaged during rainfall.	<p>Plan controls to be suitable for expected conditions</p> <p>Ensure sufficient materials, labour and plant are available for additional controls.</p>	<p>A review of the site to be undertaken by HSE Manager and Construction Manager / Supervisor. Controls to be repaired or replaced within 24 hours of detection, immediately if inclement weather current.</p>	<p>Construction Manager / Supervisor / Project HSEQ Representative</p>
Damage to sediment basin	<p>Check basins for suitability to project requirements; size, treatment type, etc</p> <p>Basin outlet to be designed to remain functional in 1 in 20 ARI event</p> <p>Ensure basin construction is in accordance with QA requirements including relevant ITPs.</p>	<p>Water in damaged basin to be pumped to another secure basin, or discharged if it meets the site criteria. Damage to be repaired as soon as practical. Repairs to be monitored when basin brought back online.</p>	<p>Construction Manager / Supervisor / Project HSEQ Representative</p>
Spill of hazardous or toxic substance (< 20L)	<p>Awareness training of appropriate response and procedures to be incorporated into Project Induction</p> <p>SDS on site for all materials and kept up to date</p> <p>Adequate supply of absorbent materials available in the site compound and on vehicles at work location</p>	<p>Report spills immediately to Construction Manager and/or the Project HSEQ Representative</p> <p>Attempts to be made to limit or contain the spill using sand bags to construct a bund wall, use of absorbent material, temporary sealing of cracks or leaks in containers, use of geotextile or silt fencing to contain the spill.</p> <p>Construction Manager and Supervisors to coordinate the response, clean up and disposal of the material</p> <p>Material to be disposed of in accordance with the manufacturers' recommendations and applicable legislation.</p>	<p>Construction Manager / Supervisor / Project HSEQ Representative</p>
Major spill of hazardous or toxic substance off site or to environmentally sensitive area (> 20L)	<p>Awareness training of appropriate response and procedures to be incorporated into Environmental and Safety Induction</p> <p>SDS on site for all materials and kept up to date</p>	<p>Report spill immediately to Head of Project and/or Construction Manager who will notify the client</p> <p>Attempts to be made to limit or contain the spill using sand bags to construct a bund wall, use of absorbent material, temporary sealing of cracks or leaks in containers, use of geotextile or silt fencing to contain the spill, transferring remaining material.</p>	<p>Head of Project Construction Manager / Supervisor / Project HSEQ Representative</p>

Emergency	Preparation	Response	Responsibility
	<p>Adequate supply of absorbent materials available in the site compound and on vehicles in work location</p> <p>Emergency telephone numbers for Emergency Response organisations/fire brigade prominently displayed around office and issued to supervisors</p> <p>Initial contact to be made with relevant organisations at project commencement</p>	<p>Implement procedures to notify the relevant authorities.</p> <p>Construction Manager to coordinate the response, clean up</p> <p>Fire brigade or emergency organisations should be called if spill cannot be controlled by site resources.</p> <p>Evacuation procedures are to be implemented to remove non-essential personnel from the affected area</p> <p>On site client personnel are informed of the incident, internal reporting as per potential Class 1 matter.</p> <p>Access and egress to the area is established to ensure the appropriate vehicles have effective access and congestion is minimised.</p> <p>Senior Officer from fire brigade /emergency organisation assumes control of the operation with Gamuda Australia personnel assisting as required.</p> <p>Commence data gathering and investigation once emergency is contained</p>	
Vibration causing structural damage	<p>Choose correct plant when working near structures; minimise size and impact</p> <p>Use safe working distances during planning phase</p> <p>Implement vibration monitoring at commencement of vibration generating works to ensure compliance with standards</p>	<p>Activities causing vibration would cease under direction of the Project HSEQ Representative or Construction Manager / Supervisor. Any occupants of buildings may be evacuated with due consideration to safety, and the area secured to prevent unauthorised access.</p> <p>A structural assessment to be undertaken; and if any damage is associated with construction, rectification work would be agreed.</p>	<p>Project HSEQ Representative Head of Project</p>
Unapproved clearing / damage to protected vegetation – threatened/endangered species	<p>Clearly demarcate site boundaries</p> <p>Clearly demarcate clearing areas and brief site personnel</p> <p>Identify/mark vegetation to be retained or that is protected.</p> <p>Identify species that may be impacted, include material within the project induction</p> <p>Included requirements within construction planning documentation.</p>	<p>Immediately cease activities</p> <p>Engage consultant to assess damage to vegetation and presence of any endangered or threatened communities.</p>	<p>Construction Manager / Supervisor / Project HSEQ Representative</p>

Emergency	Preparation	Response	Responsibility
Injury/death to protected/endangered/threatened fauna	Identify potentially impacted species prior to commencement on site. Identify species that may be impacted, include material within the project induction Review/inspect vegetation to be cleared prior to clearing – utilise ecologist/spotter where there is the potential for endangered/threatened species Engage with local vet/WIRES representative on the appropriate contact/procedure Site procedure for the short-term management of injured fauna	Immediately cease activities upon discovery of injured fauna Implement procedure for short-term stabilisation and transport to Vet or WIRES Undertake additional vegetation inspection to identify any remaining fauna prior to recommencement.	Construction Manager / Supervisor / Project HSEQ Representative
Damage / destruction of indigenous heritage item	Ensure site investigations detail any heritage items on or in proximity to the site. Include awareness material within the project induction Develop a 'stop works' protocol for any heritage find on site.	Cease works and stabilise the area, under the direction of the HSE Manager or Construction Manager / Supervisor. The Environmental Manager is to report the remnants to the client and regulatory authority. Request an archaeologist to assess the significance and archaeological potential of the uncovered feature.	Project HSEQ Representative
Damage / destruction of European heritage	Ensure site investigations detail any heritage items on or in proximity to the site. Develop a 'stop works' protocol for any heritage find on site.	Cease works and stabilise the area, under the direction of the Environmental Manager or Construction Manager / Supervisor. Contact an archaeologist to assess the significance and archaeological potential of the uncovered feature.	Project HSEQ Representative

ATTACHMENT 10 – ENVIRONMENTAL CONTROLS MAP

ENVIRONMENTAL CONTROL MAP – ROSEHILL SEMP



Revision	Date	Created By
02	19/05/2022	D. Windnagel

Rosehill Services Facility Environmental Control Measures

<p>Hours of Work</p> <p>Approved construction hours*:</p> <ul style="list-style-type: none"> 7:00am to 6:00pm Mondays to Fridays, inclusive 8:00am to 6:00pm Saturdays, and At no time on Sundays or public holidays. <p><u>Highly Noise Intensive Works</u></p> <p>For highly noise intensive works, the works must be undertaken between the hours of*:</p> <ul style="list-style-type: none"> 8:00 am to 6:00 pm Monday to Friday 8:00 am to 1:00 pm Saturday. <p><i>* Construction works may only be undertaken outside the approved hours as permitted by an EPL or permit.</i></p>	<p>Incident Response</p> <p>In the event of an environmental incident, the Project Manager and/or Environmental Manager must be notified immediately.</p> <p>The Project Director, Deputy Project Director and Construction Manager will be made aware as soon as possible.</p> <p>The Project Director will immediately verbally notify Sydney Metro, followed by written notification within 24 hours of the incident occurring.</p> <p>In the event an actual or potential incident is reported through the Community Complaints line, the Environment Manager will be contacted immediately to respond and investigate.</p>	<p>Stop Works Procedures</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 30%;">Event</th> <th>Procedure</th> </tr> </thead> <tbody> <tr> <td>Unexpected heritage finds</td> <td> <ul style="list-style-type: none"> Stop work and protect the heritage item by establishing a no-go zone Notify the Project Manager and Excavation Director The Excavation Director or Heritage Specialist will assess the unexpected find. </td> </tr> <tr> <td>Unexpected human remains</td> <td> <ul style="list-style-type: none"> Stop work and establish a no-go zone Call the local police and follow instructions Notify the Project Manager. </td> </tr> <tr> <td>Unexpected threatened species finds</td> <td> <ul style="list-style-type: none"> Stop work and determine if it is a threatened species. 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<p>Noise and Vibration</p> <p>Highly noise intensive works in continuous blocks will not exceed three hours, with a minimum respite of one hour before recommencing the activity.</p> <p><u>Behavioral Practices</u></p> <ul style="list-style-type: none"> No swearing or unnecessary shouting or loud stereos/radios on site. No dropping of materials from height, throwing of metal items, and slamming of doors. <p><u>Vehicle Movement</u></p> <ul style="list-style-type: none"> Delivery vehicles will be fitted with straps rather than chains for unloading, wherever possible. Loading and unloading of materials/deliveries will occur as far as possible from receivers. Truck drivers will avoid compression braking as far as practicable. Trucks will not idle near to sensitive receivers (e.g. residential receivers). Air brake silencers will be used on heavy vehicles that access the construction sites multiple times per night / over multiple nights. Where night-time works are required, heavy vehicles will use broadband reversing alarms. <p><u>Equipment Use</u></p> <ul style="list-style-type: none"> Power tools should use mains power where possible rather than generators. Shut down machinery, including generators, when not in operation. Avoid dropping materials from a height and dampen or line metal trays, as necessary. 	<p>Chemical Storage</p> <ul style="list-style-type: none"> Storage of chemicals on site will occur in accordance with suppliers' instructions and relevant Australian Standards and relevant legislation. All chemicals stored on site will be securely sealed and banded to 110% of their capacity. Incompatible chemicals will be stored separately in accordance with manufactures specifications and compatibility chart. An up-to-date register of hazardous chemicals and dangerous goods will be kept onsite at all times. 	<p>Heritage</p> <ul style="list-style-type: none"> If any heritage item is unexpectedly damaged, all work in the area must cease immediately until advice is obtained from the Heritage Specialist. Vibration intensive works will not be undertaken within the minimum distance for sensitive heritage buildings identified in the Detailed Noise and Vibration Impact Statement, unless approved. Archival photographic digital recording to be undertaken for unexpected finds. 																																																																				
<p>Soil, Water and Contamination</p> <p><u>Erosion Controls</u></p> <ul style="list-style-type: none"> Disturbed ground and exposed soils will be temporarily stabilised during periods of site inactivity, for more than ten days, to minimise the potential for erosion. Exposed surfaces will be minimised, and stabilised / revegetated as soon feasible and reasonable upon completion of construction. Stockpiles will be located away from sensitive receivers, traffic areas and watercourses. Level or gently sloping areas will be selected as stockpile sites to minimise erosion and potential soil loss where possible. 	<p>Visual Amenity</p> <ul style="list-style-type: none"> Offensive graffiti will be cleaned as soon as possible. Stockpiles will be located in a hoarded area and will be managed at appropriate heights to minimise visual and dust impacts, where practicable. Work vehicles will be parked in a designated area. Rubbish bins will be available and easily accessible from all areas of the construction site to minimise loose rubbish / materials around the site. Plant and equipment will be maintained regularly and cleared of dust/ mud when required to minimise visible leaks and track marks. Outward facing elements of site hoarding or noise barriers will be regularly maintained, including the removal of weeds. 	<p>Flora and Fauna</p> <ul style="list-style-type: none"> Where possible, construction activities would minimise disturbance to waterways and riparian land, through site fencing and signage. Equipment storage areas and stockpile areas are to be located in cleared areas and not within drip zones of trees. Stockpiling/storage of cleared timber is to be in designated areas and outside the critical root zone of remaining trees. No vegetation clearing will be undertaken outside the approved scope and only undertaken by a suitably qualified person. Preclearing surveys to be undertaken prior to clearing of existing vegetation. 																																																																				

Rosehill Services Facility Environmental Control Measures

Soil, Water and Contamination cont.

- Cleaning of hardstand areas would be undertaken as soon as practically possible.

Contamination

- Hydrocarbon spill kits will be kept onsite, and all staff inducted in their use. Used spill kits must be replaced immediately.
- All spills or leakages will be immediately contained and absorbed.
- The refuelling of plant and maintenance of machinery will be undertaken in designated bunded areas where possible. Refuelling will be attended at all times.
- Refuelling of machinery shall not occur within 30 metres of the upper banks of the watercourse and drainage lines.
- Vehicles will be properly maintained to minimise the risk of fuel/oil leaks.

Water

- Progressive Erosion and Sediment Control Plans will be implemented.
- The rainfall forecast will be monitored to identify and communicate the risk of potentially flooding rains.

Air Quality

- Regularly wet-down exposed and disturbed areas including stockpiles, especially during dry weather.
- Adjust the intensity of activities based on measured and observed dust levels and weather forecasts.
- Minimise the volume of materials stockpiled and position stockpiles away from surrounding receivers.
- Minimise the extent of opened and disturbed contaminated soil at any given time.
- Apply temporary coverings or odour suppressing agents to excavated areas where appropriate.
- Engine idling will be minimised while plant is stationary and engines to be switched off when not being used.
- Suitable dust suppression and/or collection techniques will be used during cutting, grinding or sawing activities likely to generate dust in close proximity to sensitive receivers.
- Weather conditions will be monitored daily.
- Position long-term stockpiles away from surrounding receivers.

Flora and Fauna cont.

- Appropriate tools would be used for pruning of vegetation, including loppers, chainsaws and vehicle mounted saws.
- Works in and around waterways would be avoided, where practicable, to allow sufficient flow and fish passage similar to current conditions.
- Any unexpected fauna found on site will be managed using the Fauna Rescue Procedure.

Exclusion Zones

- The access restrictions to Exclusion Zones would be obeyed at all times without a permit.
- Any damage to Exclusion Zone fencing or signage would be reported to the Site Supervisor or Environmental Advisor immediately.

Weed Control

- Use of pesticides would be in accordance with the Pesticides Act 1999, other relevant legislation, label directions and any relevant industry codes of practice.
- Herbicides will not be applied:
 - When plants are stressed on hot days
 - After seed has been set
 - Within 24 hrs of rain or when rain is imminent
 - During windy conditions when the use of pesticides may affect non-targeted areas.
- Vehicle, Plant and Equipment Movement hygiene procedures will be undertaken, including removal of dirt and/or plant matter vehicles at washdown areas.

Waste

- Waste will be exported to a site licensed by the EPA for the storage, treatment, processing, reprocessing or disposal of the subject waste, or a suitably licensed facility.
- All waste will be assessed, classified, managed, transported and disposed of in accordance with the EPA's Waste Classification Guidelines, with appropriate records and disposal dockets retained for audit purposes.
- Waste streams will be segregated to avoid cross-contamination of materials and maximise reuse and recycling opportunities.
- A materials tracking system will be implemented.