Utility Management Strategy Plan

SMCSWSSJ-JHL-WEC-UT-PLN-000001

Document and Revision History

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Table of Contents

1. Introduction

1.1 Background

The John Holland Laing O'Rourke joint venture (JHLOR) has been engaged to deliver the Southwest Metro Early Works (SMEW).

1.1.1 Permanent Works

The works include all permanent new infrastructure and modifications to existing infrastructure, which must be constructed to enable the construction of SMEW. The permanent new infrastructure and modifications to existing infrastructure to be constructed includes;

- Installation and commissioning of Combined Service Route (GST, GLT, pit & pipe)
- Sydney Trains signalling, communications and HV diversions
- Rail embankment stabilisation including retaining walls
- Installation of drainage and fencing
- Civil enabling works for a traction substation
- Vegetation clearing
- Access Road upgrades
- Bridge Remedial works

1.1.2 Temporary Works

The SMEW temporary works include:

- Temporary arrangements to divert and control pedestrians, public transport users, cyclists, public transport and traffic and to provide public access, amenity, security and safety during all stages of design and construction of the Works;
- Temporary arrangements for people and vehicles to safely access all property, including publicly accessible space affected by the Contractor's Activities;
- Temporary arrangements for people and vehicles to safely access the Site;
- Temporary access stairs, walkways and platforms within the Site;
- Temporary construction hoardings, fencing, noise walls, access gates and barriers on and around the Site;
- All environmental safeguards and measures necessary to mitigate environmental effects which may arise during the design and construction of the Works;
- Cleaning, maintenance, repair, replacement and reinstatement, as required, of all areas occupied by the Contractor during design and construction of the Works;
- Temporary site facilities required for design and construction of the Works,;
- Temporary infrastructure, safety screens and ground support installed or erected to undertake design and construction of the Works;
- Temporary arrangements for Utility Services including water, electricity, stormwater, sewerage, gas and electronic communications;
- Temporary works and measures required as a consequence of requirements arising from the stakeholder and community liaison process; and
- All other temporary works and measures required for the construction of the Works.
- Investigation works

The Southwest Metro Early Works are to be handed over to the Principal for incorporation into the operating Sydney Metro City & Southwest.

1.2 Project Location

The Southwest Metro Early Works are located largely within the rail corridor between Sydenham and Campsie, but exclude the corresponding Sydney Trains stations (which are shown for clarity only). Refer to Figure 1 for the project location map.

Figure 1 Project Location Map

1.3 Project Planning Approval and Conditions

In relation to the *Sydney Metro City & Southwest - Sydenham to Bankstown - Instrument of Approval* (SSI-8256), the following conditions relate the Utilities Management Strategy and the requirements thereof;

Table 1 Relevant Conditions of Approval

Condition of Approval	Requirement	Section Reference
E69	The Proponent must co-ordinate utility providers and relevant council(s) to identify opportunities for maintenance, replacement or augmentation of utilities that cross the rail corridor and facilitate and co-ordinate requests by the utility providers and relevant council(s) to undertake the Work during rail shutdowns, with particular reference to the final three (3) to six (6) month shutdown before metro services commence.	Section 1.6 Section 2
E70	Nothing in this approval allows for the undertaking of any third-party utility Work identified through the implementation of Condition E69 and not required for the purposes of the CSSI.	Section 1.6 Section 2

	Note: Third-party utility Work, including but not limited to drainage, water or energy supply etc. identified not required for the project is not the responsibility of the Proponent and is subject to separate approvals process.	
E71	A Utilities Management Strategy must be prepared and implemented in line with the Utilities Management Framework, provided as Appendix H of the SPIR for all utility Work. The Strategy must identify how utility Work will be defined and managed. The Utilities Management Strategy must include;	This Strategy
(a)	the functions of the Utility Coordination Manager as required by Condition E72;	Section 1.4
(b)	a description of all utility Work to be undertaken; and	Section 1.5
(c)	management measures to be implemented to manage dust, noise, traffic, access and lighting impacts associated with utility Work.	Section 4 Appendix A
E72	A Utility Coordination Manager must be appointed for the duration of the CSSI Work. The role of the Utility Coordination Manager must include, but not be limited to:	Section 1.4
(a)	the management and coordination of all utility Work associated with the delivery of the CSSI, to ensure respite is provided to the community, as required under Condition E22	Section 1.4
(b)	investigating complaints received from the Community Complaints Mediator relating to utility Work and providing a response to the Community Complaints Mediator	Section 1.4

1.4 Sydney Metro Utility Coordination Manager

The Sydney Metro Utilities Project Manager and the Utilities and Stakeholder Manager have been jointly appointed as the Sydney Metro Utility Coordination Manager (UCM) to coordinate delivery of the Sydenham to Bankstown CSSI project utility works.

Utility works include any construction or physical modification of utility infrastructure (e.g. connections / disconnections) to ensure continual operation of utility assets/services during the delivery of the Sydenham to Bankstown CSSI project. Utility works does not include investigative works (such as surveying or pot-holing of utility assets) to gather information to inform design and construction methodologies. Utility works for the Sydenham to Bankstown CSSI project may involve the following utility assets:

- Gas (Jemena, Qenos);
- Power (Ausgrid, Transgrid);
- Telecommunications (Telstra, NBN Co, TPG, Vocus, Optus);
- Water and sewer (Sydney Water); and
- Stormwater (Sydney Water, Canterbury-Bankstown Council, Inner West Council).

Several Contractors, including JHLOR, may be undertaking utility works on the Project at the same time.

The functions of the UCM include, but are not limited to:

- Establishing a Utilities Project Team with nominated representatives from utility service providers that may be impacted by the CSSI;
- Coordination of meetings with utility service providers as requested by Sydney Metro's Contractors;
- Involvement with reviews of CSSI designs and construction methodologies to assist with identifying potentially impacted utility assets;
- Assist with coordination of design and construction methodology reviews by utility service providers to identify necessary utility works;
- Communicate with the Utilities Project Team, Sydney Metro, and Sydney Metro's Contractors' delivery teams to understand the proposed program of works to coordinate intercepting, interconnecting and interrelated works and manage priorities as they may arise;
- Observation of utility works; and
- Manage escalation of utility work-related issues within Sydney Metro and the utility service providers as required.
- In conjunction with the Contractors, co-ordinate utility providers and relevant council(s) to identify opportunities for maintenance, replacement or augmentation of utilities that cross the rail corridor and facilitate and co-ordinate requests by the utility providers and relevant council(s) to undertake the Work during rail shutdowns

Respite for impacted receivers will be considered throughout the coordination and management of the utility works in accordance with the Sydney Metro City & Southwest Construction Noise & Vibration Strategy. Respite may be offered in the form of a reduction or absence of noise emissions for a period of time, or by removing the affected receiver from the noise emission point source (e.g. dinner/movie tickets and/or alternative accommodation offers). Consideration of respite will take into account many factors, including but not limited to the predicted noise level, duration, time of day, surrounding land uses and community feedback from Sydney Metro Place Managers of the proposed works. The UCM will endeavour to coordinate works to avoid the same receiver being affected over consecutive nights by more than one Contractor as much as possible. The UCM, where required, will facilitate information sharing between Contractors where concurrent utility works (or other works and utility works) may occur to ensure that these are appropriately assessed within noise predictions. The UCM will collaborate with Contractors to ensure utility work staging is appropriately captured within any Construction Noise and Vibration Impact Statement, to ensure that cumulative impacts from utility works are accounted for. Furthermore, the UCM will endeavour to stage the timing of works by different Contractors that affect the same receiver as much as possible in order to maximise the respite period between the works.

The UCM will collaborate with all Contractor Community and Stakeholder Managers and Place Managers to ensure that notifications for works are accurate and up to date. Where a community complaint is received the UCM will work with the Contractors' communications team to ensure the complaint is resolved in a timely manner and to put in place measures to mitigate the risk of future complaints, where possible.

In the case of ongoing complaints, the UCM will assist in investigating complaints received by the Community Complaints Mediator relating to utility works by responding to the Community Complaints Mediator on complaints related to utility works as requested.

1.5 JHLOR Utility Work Scope

For the purpose of this plan utility work will include applying protection to utilities or relocating of utilities. These activities have been categorised within Section 2.3 as Type 3 and Type 4 activities, respectively. Construction within the vicinity of utilities (Type 1 and Type 2 activities) are not deemed as utility work.

As such, JHLOR's utility scope will include;

Ausgrid

- Protection of AG6760 Ausgrid overhead powerline
- Protection of AG6780 Ausgrid conduits on Church Street Bridge, Hurlstone Park

Qenos

Sydney Metro has been notified that the Qenos pipeline located within the SMEW scope area has been decommissioned and will no longer be used. As such, the pipeline no longer requires protection. Portions of the pipeline will be removed by JHLOR in agreement with Qenos.

City of Canterbury Bankstown

- Protection of CC0030 City of Canterbury Bankstown brick culvert

Sydney Water

- Protection of WW6000 Sydney Water disused sewer main
- Protection of WW6100 DN300 Sydney Water sewer main
- Protection of PW3200 DN900 Sydney Water water main
- Protection of PW3250 Sydney Water building asset
- Protection of PW5300 Sydney Water water main

Telstra

- Protection of TE9400 Telstra conduit bank
- Protection of TE9690 Telstra conduit bank
- Protection of TE9950 Telstra conduit bank
- Protection of TE10300 Telstra conduit bank

Refer to Section 3 for further details on the above assets. JHLOR's full scope of works is currently subject to detailed design. Where additional utility work will occur this UMS will be updated.

The works may include the following activities;

- Service searching (non-destructive digging or hand excavation)
- Clearing and grubbing/tree removal;
- Removal of existing hard surfaces (i.e. concrete sawing and concrete breaking);
- Earthworks such as trenching, backfilling and compacting;
- Concreting works
- Restoration and landscaping works

These activities will be reviewed in relation to the environmental sensitivities specific to that location (i.e. sensitive noise receivers, potential archaeology, flora etc.). The appropriate mitigation measures will then be applied in accordance with Section 4 and Appendix A. All protection work, including the location, type and detailed methodology, will occur in consultation with the utility owner.

JHLOR works will also occur within the vicinity of known, and potentially unknown services. Although working in the vicinity of existing service would not meet the definition of Utility Works, it is important to identify these assets to inform design and to establish safe working distances for construction. Section 3 includes the known assets that JHLOR will work within the vicinity of during Southwest Metro Early Works (categorised as Type 1 and Type 2).

Section 2 of this document includes measures for identifying services, including unknown services, and measures for eliminating or mitigating impacts to existing services.

Section 4 of the document includes a series of key management measures for mitigating environmental impacts. These are based on the requirements of Condition of Approval E71(c), the Utilities Management Framework and JHLOR's past experience. It is noted that not all environmental aspects within Section 4 relate to JHLOR's current utility work scope, these have been included for completeness and to account for any scope changes.

Environmental Control Maps (ECMs) showing the indicative location of utility works are included in Appendix B.

1.6 Identified Utility Service Providers

The third party utility service providers listed below are known to have assets located within the project area. The nominated contact details for each utility provider has been included in Table 2.

For clarity, operational services associated with Sydney Trains, ARTC and/or Sydney Metro are not included and all interfaces with these services will sit outside of this Plan.

Table 2 Contact details for the utility service providers

Utility Provider	Utility General Contact Number
Ausgrid	(02) 4951 0899
Jemena	1300 880 906
Qenos	0438 168 750
Canterbury-Bankstown Council	(02) 9789 9300
Inner West Council	(02) 9392 5000
Sydney Water	13 20 92
Telstra	1800 653 935
Transgrid	1800 222 537

Viva Energy	(03) 8823 4444

In accordance with CoA E69, service providers and Councils will be provided the opportunity to maintain, replace or augment utilities within the Project area. The UCM and JHLOR's Design Manager and Construction Manager will facilitate these works through Coordination Meetings, as required.

In accordance with CoA E70 the Conditions of approval do not permit the undertaking of any third-party utility Work identified through the implementation of Condition E69 and not required for the purposes of the CSSI.
Note: Third-party utility Work, including but not limited to drainage, water or energy supply etc. identified not required for the project is not the responsibility of the Proponent and is subject to separate approvals process.

2. Utility co-ordination and protection

2.1 Identification and Location of Services

In order to accurately evaluate how the project works will interface or conflict with known existing utilities, JHLOR JV and the Design JV will carry out the following functions as part of the design development process;

- Identify potential touch points through desktop reviews of Dial Before you Dig (DBYD) and Sydney Trains Detailed Site Survey (DSS) information.
- Confirm location the physical location utilities using potholing, ground penetrating radar, or other suitable methods

Consultation will continue with asset owners on an ongoing basis to confirm and assess the locations of utilities. Updates to DBYD and DDS information will be reviewed and updated as required for the duration of the works.

2.2 Utility providers requirements

As the design progresses and the impact of project works on existing utilities becomes developed, utility asset owners (refer to Table 1 for asset owner contact) will be consulted on a regular basis. The aim of this consultation is to;

- Notify asset owner of the project works and interfaces,
- Confirm the technical or physical requirements for avoidance, protection or relocation.
- Obtain approval from the asset owner for the design, protection or relocation.

Utility provider requirements will be confirmed during initial consultations. These requirements will be incorporated into the design philosophy throughout the design process and the asset owner will be afforded opportunity to comment at each stage of the design process.

2.3 Mitigation measures

Where it has been determined that Utility services will interface with the project works, treatment measures will be implemented to manage and mitigate the interface. The range of proposed treatment measures have been nominated within Table 3.

Table 3 Treatment types

Control type	Works
Type 1	No impact is expected.
Type 2	An administrative or engineering control methodology to manage the asset owner requirements, which may include asset owner supervision
Type 3	The construction of temporary or permanent works is required to protect the asset to the asset owners requirements and approval.
Type 4	The asset must be relocated.

2.4 Design philosophy

Based on an assessment of the project scope, the interfaces with existing utilities can be deemed low risk in nature. As defined within Section 3, the majority of utility touch points fall with treatment Type 1 ‘no impact is expected’ and treatment Type 2 ‘An administrative or engineering control methodology to manage the asset owner requirements, which may include asset owner supervision’. As a consequence, the primary design philosophy is to prioritise the avoidance of clashes with utility assets.

Where treatment Type 3 solutions are necessary, the affected asset is to be protected. Section 2.1 and 2.2 of this Plan document how the design requirements and asset owner approvals will be developed in these instances.

At present, no services have been identified treatment Type 4 and therefore no utility diversions are required.

2.5 Change management

As the design develops and the requirements for individual asset is confirmed, there is risk that the identified treatment measures specified within Section 3 may change. In order to capture these changes this document will be revised periodically.

When a change is identified the following process will be undertaken.

Where an additional treatment Type 1 is identified, or a Type 1 treatment is upgraded to a Type 2 treatment, the affected utility service provider will be notified, however the Utility Management Plan will not require update.

Where a Type 1 or 2 treatment is upgraded to a Type 3 treatment, the affected utility service provider will be notified and the Utility Management Strategy Plan will be updated to reflect this change.

Where a Type 4 treatment is deemed necessary, since this will require a diversion to a utility service, the asset owner will be consulted as early as practicable to assist with the development of a viable design solution. The Utility Management Strategy Plan will be updated to account for the inclusion of the diversion works and will identify the specific risks, controls and works methodology associated with the diversion works.

2.6 Out of Hours Works

Where utilities work that is not subject to an EPL is scheduled to occur outside standard construction hours, the work will be undertaken in accordance with the Sydney Metro City & Southwest Out of Hours Work Protocol (as per CoA-E25).

Any utilities work that is subject to an EPL will be undertaken in accordance with the out of hours work provisions with the EPL. JHLOR works will be undertaken in accordance with the out of hours work provisions within the Laing O'Rourke EPL (21147). Refer to the SMEW Construction Environmental Management Plan and SMEW Construction Noise and Vibration Management Plan.

3. Identified Assets

3.1 Ausgrid

Table 4 Ausgrid

Row Labels	Approx. Sydney Metro Down Chainage	Zone	Lateral or Longitudinal	Treatment Type	Description
AG6425	6740	1	Lateral	Type 1	3 x 225 PE and 2 x 80 PE conduits / 33kV
AG6430	6830	1	Lateral	Type 2	In footpath on Victoria Rd side underbridge
AG6445	6740	1	Longitudinal	Type 1	4 x 225 PE and 2 x 80 PE conduits / 33kV
AG6490	8100	5	Lateral	Type 1	Overhead power lines at Albermarle St Bridge (LV and SL)
AG6601	8800	7	Lateral	Type 1	Under Terrace Rd underpass. Direct buried 2 x HV and 2 x AUX cables and 1 x LV cable
AG6610	8800	7	Lateral	Type 2	Overhead power lines through Terrace Rd underpass.
AG7000	9130	7	Lateral	Type 3	Overhead power lines parallel to Garnet St Overpass
AG6760	11150	13	Lateral	Type 1	Overhead power lines at Melford St Bridge.
AG6780	10420	11	Lateral	Type 3	1 x 125 PVC conduit / Low Voltage
AG6850	11360	13	Lateral	Type 1	3 x 120 PVC conduits / High Voltage
AG6900	11930	13	Lateral	Type 2	2 x 150AC conduits / 33kV
TG3000	11130	13	Lateral	Type 2	132kV / 132kV

3.2 Jemena

Table 5 Jemena

Row Labels	Approx. Sydney Metro Down Chainage	Zone	Lateral or Longitudinal	Treatment Type	Description
JE2005	6740	1	Lateral	Type 1	Isolated main extends from Meeks Road
JE2100	6740	1	Lateral	Type 1	250mm / High Pressure (Secondary)
JE4100	8800	7	Lateral	Type 1	550mm / High Pressure (Primary)
JE4105	8800	7	Lateral	Type 1	4 inch
JE6300	11350	13	Lateral	Type 1	110mm NY / Low Pressure

3.3 Qenos

Table 6 Qenos

Row Labels	Approx. Sydney Metro Down Chainage	Zone	Lateral or Longitudinal	Treatment Type	Size / Type
All*	6780 to 12000	1	Lateral	N/A	DN150 / High Pressure

*Sydney Metro has been notified that the Qenos pipeline located within the SMEW scope area has been decommissioned and will no longer be used. As such, the pipeline no longer requires protection. Portions of the pipeline will be removed by JHLOR in agreement with Qenos.

3.4 Canterbury-Bankstown Council

Table 7 Canterbury-Bankstown Council

Row Labels	Approx. Sydney Metro Down Chainage	Zone	Lateral or Longitudinal	Treatment Type	Description
CC0030	10010	9	Lateral	Type 3	Brick Culvert
CC0041	10500	11	Longitudinal	Type 2	TBC
CC0045	11180	13	Longitudinal	Type 2	TBC

3.5 Inner West Council

Table 8 Inner West Council

Row Labels	Approx. Sydney Metro Down Chainage	Zone	Lateral or Longitudinal	Treatment Type	Size / Type
MA3040	7610	3	Lateral	Type 2	DN1050 RC
MA3101	7760	3	Longitudinal	Type 2	Open channel
MA3400	8280	5	Longitudinal	Type 2	DN375 RC
MA3500	8280	5	Lateral	Type 2	DN375 RC

3.6 Sydney Water

Table 9 Sydney Water

Row Labels	Approx. Sydney Metro Down Chainage	Zone	Lateral or Longitudinal	Treatment Type	Size / Type
PW3200	7450	3	Lateral	Type 3	DN900 SCL IBL
PW3250	7450	3	Lateral	Type 3	Building
PW4300	0	0	Lateral	Type 1	DN750 CICL
PW4400	8310	5	Lateral	Type 1	DN100 CICL
PW5300	10150	9	Lateral	Type 1	DN100 CICL
PWMelford	10150	9	Lateral	Type 1	2 x DN200 PE sewer
PW5400	10510	11	Lateral	Type 2	DN1200 SCL IBL
PW6200	11350	13	Lateral	Type 1	DN150 oPVC
PW6300	11350	13	Lateral	Type 1	TBC / See comments
SW2800	6810	1	Lateral	Type 2	4877mm x 1803mm
SW2900	0	0	Lateral	Type 2	2057mm x 2591mm RC
SW3000	7470	3	Lateral	Type 2	2896mm x 2896mm
WW3000	6890	1	Lateral	Type 2	DN225 SGW
WW3200	7470	3	Lateral	Type 2	DN225 CONC
WW3300	7720	3	Lateral	Type 2	1371mm x 1676mm Brick Tunnel
WW4000	8300	5	Lateral	Type 2	DN225 VC
WW4300	8800	7	Lateral	Type 2	1066mm x 1371mm Brick Tunnel
WW6000	10420	11	Lateral	Type 3	Disused sewer main at Church St overpass.
WW6100	10420	11	Lateral	Type 3	DN300 CI
WW6200	10930	13	Lateral	Type 2	DN225 VC
WW6500	11930	13	Lateral	Type 3	DN1500 RC

3.7 Telstra

Table 10 Telstra

Row Labels	Approx. Sydney Metro Down Chainage	Zone	Lateral or Longitudinal	Treatment Type	Size / Type
TE10250	11350	13	Lateral	Type 1	P100 conduit / Mains Copper
TE10300	11940	13	Lateral	Type 1	8 x P100 conduits / Optic Fibre
TE6490	8100	5	Lateral	Type 1	Aerial Telstra cable
TE6497	7800	3	Lateral	Type 1	2 x aerial Foxtel coaxial cables located on Ausgrid poles
TE9400	8310	5	Lateral	Type 3	7 x A100 conduits / Optic Fibre
TE9650	8810	7	Lateral	Type 1	2 x E100 conduits / Optic Fibre
TE9690	9150	7	Lateral	Type 3	Through eastern footpath of Garnet Street Bridge. Major cable/conduit network.
TE9950	9895	9	Lateral	Type 3	Direct buried cable / Passing under existing railway tracks to the west of Foord Avenue underpass
TE10300	11935	13	Lateral	Type 3	Bank of conduits in a 2 x 4 P100 conduits configuration

3.8 Transgrid

Table 11 Transgrid

Row Labels	Approx. Sydney Metro Down Chainage	Zone	Lateral or Longitudinal	Treatment Type	Size / Type
N/A	N/A	N/A	N/A	N/A	N/A

3.9 Viva Energy

Table 12 Viva Energy

Row Labels	Approx. Sydney Metro Down Chainage	Zone	Lateral or Longitudinal	Treatment Type	Size / Type
VI0200	11070	13	Lateral	Type 1	High pressure

Refer to Appendix B for a Zone map.

4. Management Measures

Utilities works will be undertaken in accordance with the management measures for dust, noise, traffic, access and lighting impacts as identified within the Construction Environmental Management Plan, Construction Environmental Management Plan Sub-plans, the Construction Traffic Management Plan and this Utility Management Strategy.

If utility works are to occur within the pre-Construction phase, the works will be undertaken in accordance with an approved Pre-Construction Minor Works approval and this Utility Management Strategy.

Any utility work undertaken outside of standard construction hours will be subject to Out Of Hours Work Approval, to be approved by Sydney Metro and the Independent Environmental Representative prior to works.

Section 5 of the Utilities Management Framework (UMF) includes a number of typical mitigation measures that are to be implemented for utility work. An extract from the UMF containing these measures is included within Appendix A. JHLOR will implement these measures, where appropriate to the SMEW scope.

In addition, JHLOR has undertaken a risk analysis, based on the Southwest Metro Early Works scope and other risk factors known from JHLOR's experience on previous projects to develop key mitigation measures.

A summary of these key mitigation measures is included within the risk assessment below;

Table 13 Environmental Risk Assessment

Aspect	Potential Environmental Impact	Initial Risk Rating			Control Measures	Residual Risk Rating			Management of Residual Risk
		P X	C =	Risk		P X	C =	Risk	
Air Quality									
General construction works; site establishment, excavations	Dust activity in close proximity to residential and commercial premises due to utility works, complaints received.	3	2	6	Implement the controls within the Construction Environmental Management Plan (or relevant Pre-Construction Minor Works Approval). Toolbox training on Dust and Air Quality Management. Provide dust mitigation measures through water sprays/misting as required. Cover stockpiles that are not to be worked on for a period of greater than 10 days. Erosion and Sediment Control Plans approved before works commence. Controls are then reviewed for maintenance.	2	2	4	Undertake regular inspections of work areas pre, during and after works to ensure controls are in good condition.
Exhaust from plant and equipment.	Emissions from plant associated with utility works resulting in air pollution.	3	2	6	Inductions and toolbox training on Dust and Air Quality Management. Well maintained plant/ equipment and pre-start checks and servicing. Non-complaint vehicles removed from site / repaired.	2	2	4	Review plant check list prior to operating on site. Undertake verification checks a required.
Noise									
Noise from general utility works resulting in impact to residents.	Disturbance to residents or neighbouring businesses. Potential for complaints.	4	2	8	Control measures as per SMEW Construction Noise and Vibration Management Plan (CNVMP) (or relevant Pre-Construction Minor Works Approval) are to be implemented. Respond to community enquiries and complaints in accordance with Sydney Metro requirements and Community & Stakeholder Manager (Sydney Metro), control measures as per Community Communication Strategy (CCS) are to be implemented. Consult with the community in relation to upcoming activities that may result in concern.	3	2	6	Noise performance will be continually monitored as per the requirements of the Construction Noise and Vibration Management Plan. Where high impact noise is required, it will be restricted to the conditions of EPL 21147 with respite periods implemented.

					Monitor noise for compliance as the works progress at receiver locations. Provide periods of respite for high noise generating activities. Apply noise mitigation measures during entire project. Noise efficient equipment to be used on site.				
Noise during utility works required to be undertaken out of standard construction hours.	Disturbance to residents or neighbouring businesses with potential for complaints.	4	2	8	Implement noise mitigation strategies for out of standard hours work. Monitor noise for compliance to project goals. Obtain Out of Hours Work Approval as required. Control Measures as per the CNVMP are to be implemented.	3	3	6	Noise performance will be continually monitored as per the requirements of the Construction Noise and Vibration Management Plan. Where high impact noise is required, it will be restricted to the conditions of EPL 21147 with respite periods implemented.
Vibration									
Vibration intensive activities undertaken on the site such as vibratory rolling, etc.	Disruption, annoyance and nuisance to residents. Potential damage to adjacent residential and commercial residences and structures. Disruption to businesses as a result of vibration nuisance	3	2	6	Control Measures as per the CNVMP (or relevant Pre-Construction Minor Works Approval) are to be implemented. Determine vibration limits and structure/receiver offset distances. Consult with potentially affected parties prior to commencement of works on their upcoming activities that may be impacted by construction vibration. Ongoing vibration monitoring during vibration intensive works.	2	2	4	Standard and specific mitigation measures for sensitive receptors around the SMEW works will be applied as per the Construction Nosie and Vibration Management Plan and the Construction Noise and Vibration Impact Statement.
Traffic & Access									
Loss of on-street car parking in adjacent residential streets and commercial areas during construction.	Loss of parking availability to adjacent residential and commercial properties due to utility works could result in community complaints.	3	2	6	Implement the Construction Traffic Management Plan (CTMP) Community notifications in accordance with Sydney Metro Community Communication Strategy. Site vehicles shall be parked within the rail corridor and not affect public parking area where possible Develop Traffic Management Plan / Traffic control procedures.	2	2	4	Complete regular toolbox talks on how to minimise impacts in relation to traffic. Undertake regular inspections of worksite and adjacent streets. Supervisor and traffic controller to enforce traffic management requirements
General construction traffic disturbing public access	Disturbance to local residents due to utility works resulting in complaints being made, limited access, and	3	2	6	Implement the Construction Traffic Management Plan (CTMP) Deliveries of plant and materials shall be undertaken outside of peak periods where possible	2	2	4	Complete regular toolbox talks on how to minimise impacts in relation to traffic. Undertake regular inspections of worksite and adjacent streets.

between local roads.	potential for delays at local road access points resulting in complaints.				Site vehicles shall be parked within the rail corridor and not affect public parking areas Scheduled road movements shall be minimised where possible Oversized deliveries would be undertaken in accordance with the requirements of NSW Police or Roads and Maritime Services. Approved Traffic Management Plans in consultation with relevant authorities. Detour routes to be advertised/ notified. Approved access routes, detailed Traffic Control Plans. Clear notifications / signage.				
Management of heavy vehicles / access routes.	Complaints from sensitive receivers due to increased level and frequency of noise.	3	2	6	Implement the Construction Traffic Management Plan (CTMP) Deliveries of plant and materials shall be undertaken outside of peak periods where possible Site vehicles shall be parked within the rail corridor and not affect public parking areas Scheduled road movements shall be minimised where possible Oversized deliveries would be undertaken in accordance with the requirements of NSW Police or Roads and Maritime Services. Designated access routes. Approved Traffic Management Plans. Community Notifications. Pedestrian management with traffic controller in place where required.	2	2	4	Complete regular toolbox talks on how to minimise impacts in relation to traffic. Permits from local council and/or RMS
Pedestrian/Cyclist access	Loss or disruption of pedestrian and/or cyclist access around the project site due to utility works	3	2	6	Construction Traffic Management Plan (CTMP) to be in place Traffic Control Plans to be in place Clear signage Appropriate barriers, fencing or other to direct pedestrians and cyclists	2	2	4	Regular inspections of work fronts
Landscaping, urban design and visual amenity									

Landscaping, urban design and visual amenity	Surrounding aesthetic temporary altered during construction Lighting towers used during out of hours works may spill on nearby residents Post-construction surfaces	2	3	6	Implement the SMEW Visual Amenity Management Plan The work area shall be maintained in an orderly manner Lighting required during night works shall be directed towards the work area and are from adjacent sensitive receivers Any land disturbed for the works will be restored to its prior state or, where appropriate, restored to a state that is in line with the approved urban design	1	3	3	Undertake regular inspections of work areas pre, during and after works to ensure controls are in good condition.
Utilities									
Utility management	Service strike leading to environmental degradation	3	4	12	Develop and implement the Utilities Management Strategy in accordance with the Utilities Management Framework Implement a Permit to Disturb Induction and toolbox talks Detailed Site Survey to be managed by an appropriately qualified surveyor.	1	4	4	Permit to Disturb Service searching Detailed Site Survey management
Hazard and Risk									
Hazards and risk associated with utility works	Hazardous substances High risk works Exposure to radiation and electromagnetic fields				Work in accordance with the Safety Management Plan and relevant sub-plans Develop a Safe Work Method Statement (SWMS) for high risk works, works with hazardous substances or where anyone may be exposed to radiation or electromagnetic field issues. An occupational hygienist is review and supervise works as required.				Toolbox workers on requirements Undertake regular inspections
Heritage									
Non-aboriginal heritage	Impacts to build items and structures with heritage significance Impacts to areas of archaeological potential	3	4	12	Implement the mitigation measures included within the Construction Heritage Management Plan (or relevant Pre-Construction Minor Works Approval). Work to plant specific safe working distances for vibratory works and seek the advice of a heritage engineer. Implement the measures required by the Archaeological Assessment and Research Design Report (AARD) such as salvage, monitoring and investigation, where relevant. Implement the Sydney Metro Unexpected Heritage Finds Procedure	1	4	4	Toolbox workers on requirements Undertake regular inspections

Aboriginal heritage	Impacts to areas of archaeological potential	2	4	8	Implement the mitigation measures included within the Construction Heritage Management Plan (or relevant Pre-Construction Minor Works Approval). Ensure measures outlined within Aboriginal Cultural Heritage Assessment Report (ACHAR) such as salvage within areas of Potential Archaeological Deposits are implemented. Implement the Sydney Metro Unexpected Heritage Finds Procedure	1	4	4	Toolbox workers on requirements Undertake regular inspections
Biodiversity									
Flora	Unauthorised clearing of vegetation Impacting on threatened species, threatened vegetation communities or fauna habitat	3	3	9	Implements the measures within the Construction Environmental Management Plan (or relevant Pre-Construction Minor Works Approval). Implement a Vegetation Removal and Trimming Permit system Identify all sensitive areas, sign post and demarcate Establish tree protection zones An ecologist is to undertake a pre-clearance survey of all vegetation to be removed. An ecologist is to be present during the removal of native vegetation or fauna habitat.	1	3	3	Toolbox workers on requirements Undertake regular inspections
Fauna	Impacting on fauna	2	3	6	Implements the measures within the Construction Environmental Management Plan (or relevant Pre-Construction Minor Works Approval). Implement a Vegetation Removal and Trimming Permit system Identify all sensitive areas, sign post and demarcate Establish tree protection zones An ecologist is to undertake a pre-clearance survey of all vegetation to be removed. An ecologist is to be present during the removal of native vegetation or fauna habitat.	1	3	3	Toolbox workers on requirements Undertake regular inspections
Land use and Property									
Land use and Property	Changes to land use and property impacts Construction compounds impacting on nearby receivers	2	2	4	Design to avoid impacts to nearby properties Utilise existing hard stand within the rail corridor where possible Obtain required approvals for working within easements	1	2	2	

	Works through easements								
Soils and Contamination									
Soils and contamination	Encountering contamination Creating contamination through utility works Acid Sulphate Soils	3	4	12	Works to occur in accordance with Construction Soil and Water Management Plan (or relevant Pre-Construction Minor Works Approval). All waste is to be classified in Accordance with the Waste Classification Guidelines (NSW EPA, 2014) Acid Sulphate Soils are to be managed in accordance with the Acid Sulfate Soil Manual (ASSMAC, 1998) An occupational hygienist is to provide guidance and, where appropriate, supervise works with contaminated soils or substances Remove any excess hazardous substances from services before relocating	1	4	4	Toolbox workers on requirements Undertake regular inspections

Environmental Risk Assessment Rankings

This table may be used as a guide in determining the level of risk for each environmental issue.

For each identified issue, consider the 'maximum credible' (not absolute worst case) risk that could result with **minimal or no controls** other than existing and using normal construction practices.

Note: Any one of the listed consequences must result in the use of the applicable consequence grading.

Probability:			Consequence:		
	5 = Certain 4 = Likely 3 = Possible 2 = Unlikely 1 = Rare		5 = Severe 4 = Major 3 = Moderate 2 = Minor 1= Incidental		
1- 4 Acceptable 5 - 9 Acceptable with control measures 10 - 16 Requires the implementation of best practice 17 and Above = UNACCEPTABLE					
Likelihood (Probability and Frequency of Occurrence)			Consequence (Outcome or Severity of Occurrence)		
5	Certain	Common or repeating occurrence Consequence can reasonably be expected to occur in life of Project.	5	Severe	• Major pollution incident causing significant and widespread damage or potential to health or the environment • Persistent reduction in ecosystem function and value. • Ongoing disruption and loss of protected species. • Major prosecution likely, outcome in excess of $500,000
4	Likely	Known to have occurred / "has happened" Conditions may allow the consequence to occur on the Project during its lifetime The event has occurred within the Business Unit within the previous 5 years.	4	Major	• Significant widespread and persistent changes to habitat, species or environmental media • Significant pollution incident causing damage or potential damage to health or the environment external to the site. • Potential for prosecution. Potential outcome between $50,000 - $500,000 • Numerous substantial complaints • Actual material environmental harm
3	Possible	Could occur / "heard of it happening"	3	Moderate	• Localised irreversible habitat loss or effects on habitat, species or environmental media • Reportable incident to the relevant environmental regulator or other authority. • Demonstrated breach of legislative, licence or guideline requirements. • Likely infringement notice or fine, potential for prosecution up to $50,000.

		Exceptional conditions may allow consequences to occur on the Project, or has occurred nationally within the Australian Business.			• Will cause complaints.
2	Unlikely	Not likely to occur Reasonable to expect that the consequence will not occur on the Project. Has occurred in industry but not in Business Unit.	2	Minor	• Localised degradation of habitat or short term impacts to habitat, species or environmental media. • Pollution incident that marginally exceeds licence conditions or guidelines for acceptable pollution. • Fine unlikely. • Potential for complaints.
1	Rare	Practically impossible Not known to have occurred in industry or unheard of.	1	Incidental	• Localised or short term effects on habitat, species or environmental media. • Fully contained on site and can be fully remediated. Little potential for fine or complaints. • Insignificant or trivial incident

Probability ► ▼Consequence	CERTAIN 5	LIKELY 4	POSSIBLE 3	UNLIKELY 2	RARE 1
5 – Severe	25	20	15	10	5
4 – Major	20	16	12	8	4
3 – Moderate	15	12	9	6	3
2 – Minor	10	8	6	4	2
1 – Incidental	5	4	3	2	1

Appendix A – Utility Management Framework Management Measures

Environmental aspect	Typical mitigation measures to be adopted as required
Traffic and access	During detailed design: • Road occupancy licence(s) for temporary closure of roads would be obtained prior to construction, where required, from the relevant road authority. • A Traffic Control Plan would be developed during detailed design and would identify all traffic control arrangements required to be implemented during construction. • To keep the road user delays to a minimum, all works would be planned and staged to avoid road occupancies during peak periods, where possible. • An emergency response plan would be developed for construction traffic incidents. • A pre and post-construction assessment of road pavement assets would be conducted in areas likely to be used by construction traffic or disturbed by the proposed trenching and HDD activities. During construction: • Heavy vehicles would be restricted to allowable routes. • Where schools or child care centres occur in the immediate vicinity of the construction sites, heavy vehicle movement would be minimised (where reasonable and feasible), between 8 am and 9.30 am and 2.30 pm–400 pm Monday to Friday (on school days). • Traffic controllers would be located at worksite access point(s) as required to direct vehicle movements, vehicle deliveries, pedestrians and cyclists, where required. • Public communications would be conducted to notify the community and local residents of vehicle movements and anticipated effects on the local road network relating to the site works. • Access to all private properties adjacent to the works would be maintained during construction, where possible. Where access is known to be restricted, all proposed changes to existing access arrangements would be discussed with residents and/or businesses prior to the commencement of works. Upon completion of the construction works, the original property access would be reinstated. • Early advanced communication with affected properties would be undertaken to identify alternative arrangements. • During Project inductions, all heavy vehicle drivers would be provided with the emergency response plan for construction traffic incidents. • Project staging, vehicle movement and scheduling, equipment and resourcing would be coordinated to minimise impacts. • Construction vehicle parking would be discouraged on local roads and construction staff encouraged to use public transport, car share, or in some cases workers can park in a designated off-site area and ferried to site via a shuttle bus. • Temporary closure or relocation of any bus stops impacted by the works would be coordinated with bus companies and advertised locally in advance.

Environmental aspect	Typical mitigation measures to be adopted as required
Noise and vibration	During construction: • Carry out work mainly during standard construction hours when in the vicinity of residential receivers. • Use a portable barrier (or similar protection) to shield the drilling equipment where works occur in proximity to residential receivers where reasonable and feasible. The height and nature of the barrier would be determined when the equipment selection is finalised. The barrier would be constructed of a material of minimum mass 12 kilograms per metre squared such as 20 millimetre plywood or a proprietary barrier such as Echobarrier. • Provide periods of respite from use of the road saw. • Schedule the use of the road saw to times when the community are less sensitive by avoiding early morning and late evening/night periods, where feasible with respect to the proposed construction methodology. • Inform surrounding residents by mail of planned works prior to the works commencing. • Organise the site to avoid unnecessary use of reversing alarms on vehicles. • Truck drivers to use approved access routes to the site. • Orientate and place water pumps and vacuum trucks away from receivers. • Turn equipment off when not in use and avoid idling machinery or trucks near sensitive receivers. • Utilise vehicles, obstacles and stockpiles on site to provide shielding to receivers, where possible. • Avoid dropping tools or materials from height, striking materials or making metal-metal contact • Operate the excavator in a manner that avoids maximum noise levels associated with striking or shaking the bucket. • Educate workers on the importance of minimising noise and avoid creating short duration high noise level events. • Carry out a survey of sensitive receivers to ensure adequate acoustic performance of façade. During reinstatement/rehabilitation works: • Schedule deliveries to be carried out to avoid sensitive periods in the early morning and late evening/night. • Turn equipment off when not in use and avoid idling machinery or trucks near sensitive receivers. • Provide respite periods from tipper and compactor usage. • Select equipment such as a compactor and tipper trucks, based on lower noise emissions and use equipment that has lower noise levels • Inform surrounding residents by mail of planned works prior to the works commencing.
Non Aboriginal heritage	• Construction works associated with utilities relocation/adjustment with the potential to impact non Aboriginal heritage would be managed through a Heritage Management Plan that would be prepared for the Sydney Metro Sydenham to Bankstown upgrade project. • The presence or potential presence of a heritage item or archaeological deposit would inform the construction method adopted, for instance underboring using HDD may be preferable to trenching in some sensitive locations.

Environmental aspect	Typical mitigation measures to be adopted as required
Biodiversity	During construction • Where vegetation clearing is required, pre-clearing surveys would be completed to mitigate potential impacts and identify risks to flora, fauna and habitat prior to construction activities occurring and to identify the presence of any unidentified threatened or endangered species. • Where impacts to existing street trees are unavoidable, both the relevant Council and an ecologist or arborist would be consulted prior to removal or pruning of any trees • If the removal of any tree with hollows/dead trees/tree stump is unavoidable (subject to detailed design and advice from contractor) further assessment by a qualified ecologist would be undertaken. • Any sensitive areas along alignment would be identified during detailed design and/or pre-construction planning activities and would be indicated on a site environmental plan for the proposed works. Protective fencing and environmental signage would be installed as required. • Vegetation removal would only be carried out under a permit system. • Flora and/or fauna located during works would be subject to a Vegetation Clearing Procedure and/or Fauna Rescue Procedure. • Site office, stockpiles, machinery wash down areas, and plant storage areas would be located outside of any ecologically sensitive areas. • Fuel (or other chemical) storage would be located outside all identified riparian zones, and at least 10 metres from any retained ecologically sensitive areas onsite.

Environmental aspect	Typical mitigation measures to be adopted as required
Air quality	During construction: • Trucks carrying spoil onto or off site are to be covered. • Any stockpiling of materials would be located away from sensitive receivers, where feasible and reasonable, and protected from the elements through barriers or appropriate coverings. • On-going monitoring for dust (e.g. site inspections) would be undertaken during trenching works to assess the effectiveness of mitigation measures. • Water sprays and/or water carts would be used as required for dampening exposed surfaces to control dust generation. • Silt accumulated in sediment control devices (e.g. silt fences and spoon drains) would be removed on a regular basis to prevent dust generation. • Cutting, grinding or sawing equipment (such as for concrete/bitumen surfaces) must only be used in conjunction with suitable dust suppression techniques, such as water sprays or local extraction. • Dust generating activities would be assessed during periods of strong winds and rescheduled, where required. • Exhaust systems of construction plant, vehicles and machinery would be maintained to minimise exhaust emissions to the atmosphere. All equipment and vehicles are to be regularly maintained and records kept of maintenance. • Engines would be switched off when vehicles and plant are not in use, to minimise idling, and refuelling areas would be away from areas of public access and sensitive receivers. • Plant would be well maintained and serviced in accordance with manufacturers' recommendations. • Low emission vehicles and plant fitted with catalysts, diesel particulate filters or similar devices would be used, where feasible and reasonable. • Plant and other machinery (including generators) would be sited away from sensitive receivers, such as dwellings and schools, where feasible and reasonable. • The amount of excavated material stored on site would be minimised, and replaced within the open trench as soon as possible. • Dust generating activities would be assessed during periods of strong winds and rescheduled where required. • Dust complaints would be handled accordance with the complaints handling process in the Community Communication Strategy to be developed by each Sydney Metro Principal Contractor.

Environmental aspect	Typical mitigation measures to be adopted as required
Hazard and risk	With regard to EMF: • Where practical, site the electrical infrastructure in the carriageway of roads, away from residential property boundaries, so that the magnetic field contribution at and beyond them would be lower. • Adopt an underground cable concept rather than overhead lines. • Use 3-core cables, which greatly increase the rate at which the magnetic field levels drop off with increasing distance from the source when compared to the single core alternative. • Include consideration of public awareness/education as part of community information material to identify the minimal impacts with respect to EMF. General: • Hazardous substances would only be used onsite as required, in accordance with the manufacturer/ supplier instructions. • The use of any hazardous substance that could result in a spill would be undertaken away from drainage or stormwater lines and, wherever possible, within defined bunds • Contractors to operate under appropriate Work Health and Safety Plan
Property and land use	During pre-construction: • In consultation with utility providers, the ongoing maintenance and access requirements would be identified and the potential impact to an existing easement or need for a new easement considered. • The proposal would not permanently restrict any future access to residential, commercial, industrial or recreational land uses.
Soils and contamination	During construction: • All fuels, chemicals and hazardous liquids would be stored in accordance with Australian standards and EPA guidelines. • Any refuelling undertaken on site would be undertaken in designated areas only. • Spill kits would be available as part of any worksite for use in case of fuels, chemical or other spill(s) which may occur during construction. • All spills or leakages would be immediately contained and absorbed. • Should any signs of contamination be identified during work within the site, the material would be tested against the National Environment Protection Council's National Environment Protection (Assessment of Site Contamination) Measure 1999, and managed accordingly. • Soil excavated in areas with identified surrounding industrial land uses (including former uses) would be assessed for either its potential re-use on-site or classified for waste disposal purposes. • If groundwater is encountered during the works, groundwater quality would be investigated and appropriate management measures implemented to avoid further impacts. • In the event of unexpected finds of contamination a Contamination Unexpected Finds and Contingency (refer to the CSWMP) procedure would be implemented.

Environmental aspect	Typical mitigation measures to be adopted as required
Landscaping/urban design matters	During construction: • Visual mitigation measures would be implemented as soon a feasible and practical and remain in place during the construction period. • All effort would be made for vegetation to be retained where practical and feasible. • Site sheds, where required, would be located to minimise visual impact where it is feasible and reasonable to do so. • Hoarding banners for the external faces of hoardings and fences at each construction site would be a non-obtrusive colour, which would comply with the Sydney Metro style guidelines (co-branding). • Hoarding would be maintained in an excellent condition with prompt removal of graffiti. • No signage, advertising or branding (other than safety signage or other required signage) would be placed on the external face of any hoarding or fence without the prior written approval of TfNSW. • Temporary works to be designed and constructed as per the requirements of crime prevention through environmental design. • Temporary fencing, walls, and hoarding would be designed and implemented to increase natural surveillance with straight runs. • Way finding signage to direct pedestrians, commuters and vehicles around the construction site would be installed as required. • The storage of materials and construction machinery would be minimised as far as possible. • The site would be maintained in an orderly and tidy fashion through good housekeeping. • Cut-off and directed lighting would be used to ensure glare and light spill are minimised lit during night work periods (where this is required).

Aboriginal heritage	During construction
	• If suspected Aboriginal objects are located during construction, an archaeologist would be notified to assess the nature and significance of the find. If the find is an Aboriginal object, further investigation and permits may be required before works commence. If the find is an Aboriginal object, then OEH and the relevant Local Aboriginal Land Council (LALC) would be notified.
	• If suspected human skeletal remains were uncovered at any time within the area of the utility works, the following actions would need to be followed:
	  ○ immediately cease all excavation activity in the vicinity of the remains
	  ○ notify NSW Police
	  ○ notify OEH via the Environment Line on 131 555 to provide details of the remains and their location
	  ○ no recommencement of activity in the vicinity of the remains unless authorised in writing by OEH

Appendix B – Maps and ECMs

Note: ECMs are indicative only and are subject to change with design development.


SMEW - Zone Map
Map 1
Sun May 12 2019
Legend
Station
Project Boundary
Zone 1
Zone 2
Zone 3
Marrickville Station
Route L5 Cycleway
Leofrene Ave
Weeks Rd
Carrington Rd
Schwebel St
Harriet St
Charlotte Ave
Riverdale Ave
High St
Ivanhoe St
Junction St
Esk Ln
Grove St
Blamire Ln
Station St
Illawarra Rd
Stinson Ln
Warren Rd
Warren Ln
Church St
Greenbank St
Wardell St
Warburton St
Woolley Ln
Wrights Ave
Moncur St
Jersey St
Randall St
Livingstone Rd
Arthur St
Marrickville Ave
Hollands Ave
Francis St
Ann St
Byrnes St
O'Brien Ln
Central Ave
O'Hara St
Carey St
Queen St
Victoria Rd
Meeks Ln
Calvert St
Gladstone Ln
Fernbank St
Marrickville Ln
Gladstone St
Silver Ln
Silver St
Illawarra Ln
Petersham Rd
Albion St
Fletcher St
Robert Ln
Robert St
Pine St
Dot St
Central Ln
Seymour Ln
Marrickville Rd
Maud Ln
Google Earth
©2018 Google
200 m


SMEW - Zone Map
Map 2
Sun May 12 2019
Legend
Station
Project Boundary
Dulwich Hill Station
Zone 4
Zone 5
Zone 6
Zone 7
Dudley St
Bedford Crescent
Keith St
Margaret St
The Parade
Ness Ave
Wilga Ave
Kays Ave W
Kays Ave E
Wadell Rd
Wadell Ln
Keith Ln
Myra Ln
Garnet St
Floss St
Balfour St
Tennyson St
Riverside Crescent
Macarthur Parade
Blackwood Ln
Hercules Ln
Terrace Rd
Terrace Ln
Myra Rd
Garnet Ln
Hercules St
Marrickville Rd
Holland Ave
Pine St
Crail St Ave
Dot St
Crawford Pl
Harney St
Darley St
Jocelyn Ave
Warren Rd
Ewart St
Darley St
Murray Ln
School Parade
Albemarle St
Randall St
Osgood Ave
Wicks Ave
Dibble Ave
Pidding Ave
Beauchamp St
Tamar St
Ewing St
Google Earth
© 2019 Google
200 m
A34
N


SMEW - Zone Map
Map 3
Sun May 12 2019
Legend
Station
Project Boundary
Zone 7
Zone 8
Zone 9
Hurlstone Park Station
Tennyson St
Tennent Parade
Ness Ave
Ewart St
Garnet St
The Parade
Myra Rd
Myra Ln
Tampoon St
Garnet Ln
Marcia St
Wallace Ave
Short St
Barrie Ave
Barrie St
Wallace Ln
Fernhill St
Crinan St
Crinan La
Mill Ln
Mill St
Commons St
Hopetoun St
Smith Ave
Burnett St
Tarway St
Foord Ave
Kiel Ave
Hurlstone Ave
Cooks River Cycleway
Hutton St
Canberra St
Kilbride St
Dunstaffenage St
Acton St
Canterton St
Ross St
Euston Rd
Dunkeld Rd
Dunkeld Ln
Canterbury Rd
Google Earth
©2018 Google
300 m
N


SMEW - Zone Map
Map 4
Sun May 12 2019
Legend
Station
Project Boundary
Ronald Ave
Berna St
Berna Ln
Fore St
Close St
Cooks River Cycleway
Zone 10
Zone 11
Zone 12
Zone 13
Canterbury Station
Charles St
Tincombe St
Canberra St
Canterbury Rd
Broughton St
Jeffrey St
Blick Parade
Kilbride St
Acton St
Unwin St
Phillips Ave
Ward Ave
Wonga St
S Parade
John St
Google Earth
© 2018 Google
300 m
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SMEW - Zone Map
Map 5
Sun May 12 2019
Legend
Station
Project Boundary
Campsie Station
Zone 13
Zone 14
Waratah St
Ware Ave
Warrigal St
Regina St
Oswald St
Gould St
Duke St
Harold St
Beamish St
Anzac Square
Anglo Rd
S Parade
N Parade
Wilfred Ln
Ascot St
London St
Campsie St
Clissold Parade
Ninth Ave
Eighth Ave
Fifth Ave
Frederick St
Moore St
Nowra Ln
Bellona St
Cooks River Cycleway
Google Earth
©2013 Google
300 m
N


SMEW - Zone Map
Map 6
Sun May 12 2019
Legend
Station
Project Boundary
Campsie Station
Zone 14
Zone 15
Anzac Square
Hill Ln
Wonga Ln
Park St
Goold St
Duke St
Isaac St
Beamish St
Amy Ln
Rudd Parade
Dewar St
Amy St
Loch Ln
Anglo Rd
S Parade
N Parade
Frederick St
Moore St
Crissold Ln
Crissold Parade
Dispensary Ln
London St
Wilfred Ave
Wilfred Ln
Lilian St
Lilian Ln
Carrington St
Butler Ave
Assisi St
Campsie St
Williams Parade
Sixth Ave
Fifth Ave
Fourth Ave
Harcourt Ave
Ninth Ave
Loch St
Shakespeare St
Browning St
Burns St
Moore Ln
Dwyer St
Brighton Ave
Google Earth
©2019 Google
300 m
N

The ECMs are considered a "live document" and will continue to evolve as the works progress.

SMEW - Environmental Control Map		
ID	**Environmental Aspect**	**Description**
1	**Project**	• This ECM is a supplementary document to the SMEW Construction Environment Management Plan, Sydney Metro City and Southwest Sydenham to Bankstown Environmental Impact Statement, Submissions and Preferred Infrastructure Report, Instrument of Approval and all related planning documentation
2	**Site Access**	• Site access will be from various existing rail corridor access gates
3	**General**	• The team will be trained on this ECM, general environmental issues, location of sensitive areas and erosion/sediment controls. • Works will be subject to inspections by the ER, Sydney Metro Environment and Planning Manager and JHLOR Environmental Manager (or delegate). • This ECM will be displayed on site sheds.
4	**Contamination**	• If suspected contamination is encountered, works will cease in the immediate area, the area will be demarcated and sign-posted and the Occupational Hygienist will be called upon to confirm the contamination and provide advice on the best way to remove or remediate the contamination • Occupational hygienist and asbestos removalist will be in attendance for all shifts to manage contaminated soil.
5	**Air Quality**	• Air quality issues will be managed in accordance with the mitigation measures specified within the UMS and Air Quality Management Plan. • A water cart will be available to supress any dust. • Plant or machinery will not be left idling • Drive to conditions • Temporary spoil stockpiles to be covered to prevent wind erosion and dust.
6	**Waste**	• Waste will be managed in accordance with the mitigation measures specified within the UMS and Waste and Spoil Management Plan • Any construction waste generated will be stored within bins as appropriate • Any stockpiles of waste spoil will stockpiled onsite and appropriate erosion and sediments controls will be installed • All waste will be classified in accordance with the Waste Classification Guidelines (EPA, 2014) prior to disposal from site.
7	**Soils and water**	• Soil and water will be managed in accordance with the mitigation measures specified within the UMS and Construction Soil and Water Management Plan • Stockpiles will be covered to mitigate the risk of erosion • Drainage and waterways will be protected • Erosion and Sediment Control Plans will be implemented for work fronts and will be updated to reflect the progress of the works. • If water discharge is required, Sydney Metro Water Discharge or Reuse Approval form to be utilised. Form to be approved by JHLOR Environmental Manager (or delegate) prior to discharge.
8	**Heritage**	• Heritage will be managed in accordance with the mitigation measures outlined within the UMS and Construction Heritage Management Plan • Unexpected finds of heritage items must be reported to JHLOR Environmental Manager and Sydney Metro. The site is to be isolated and investigated by a heritage consultant. Approval to proceed required prior to re-commencing works. • If material that has the potential to be human remains are uncovered works in the area will cease immediately and the Environmental Manager will be informed.

9	**Noise and Vibration**	• Noise and vibration will be managed in accordance with the mitigation measures outlined within the UMS and Construction Noise and Vibration Management Plan • All works will be completed in compliance with Sydney Metro CEMF, Sydenham to Bankstown Planning Approval, OOHW Approvals, Construction Noise and Vibration Strategy and EPL 21147 requirements. • All plant will have non-tonal reversing alarms. • Staff and workers will be instructed to avoid shouting both on-site and off-site • The Community will be notified of works in accordance with the Construction Noise and Vibration Strategy. • Noise monitoring will be undertaken in accordance with the Construction Noise and Vibration Strategy and in response to complaints.
10	**Traffic and Transport**	• Traffic will be managed in accordance with the mitigation measures outlines within the UMS and Construction Traffic Management Plan. • Road Occupancy Licences will be obtained as required. • Additional traffic controls will be implemented in accordance with TCP(s) as approved by the relevant local council. • All vehicles to enter rail corridor immediately on arrival to gate • Plant and vehicles engines to be switched off when not in use, with engine idling minimised as much as possible. • Pedestrian and cyclist access will be maintained in public spaces or redirected as appropriate.
11	**Utilities**	• Utilities will be managed in accordance with the Utilities Management Strategy • Any impacts to utilities will be reported to site HSE Manager, supervisors, Sydney Trains and Sydney Metro.
12	**Biodiversity**	• No vegetation trimming/removal is must only occur with a valid JHLOR Vegetation Removal or Trimming Permit. • Protection will be put in place around any threatened vegetation communities • Pre-clearance surveys and clearance inspections will be undertaken by a qualified ecologist • If threatened flora or fauna species are identified on site, work in the vicinity of these species would stop immediately. A spotter/catcher/botanist would be engaged to survey the site and advise on species management • Where trenching or excavation is required, the location or route would be modified to avoid any damage to trees or tree roots, where possible • Stockpiles, plant, equipment and materials are to be located on existing cleared areas, away from the drip zone of trees and native vegetation • Soil and vegetation that could contain weed material should be removed from machinery prior to any movements off site
13	**Chemical, fuel storage and use**	• No chemicals or fuel required to be stored onsite. • If you are required to bring any chemicals onto site, they must be verified and registered in an SDS. SDS must be kept on site. • Spill kits located at site compound. Portable spill kits available in site vehicles. • Refuelling is to be undertaken using suitable measure to prevent contamination – this should include the use of absorbent pads, plant nappies, and portable spill trays to prevent splash back spills. • All plant and equipment will be checked daily to ensure there is no leaking oil, fuel or other liquids.
14	**Imported materials**	• Imported materials will include stabilised sand, recovered resources, quarry materials and will be sourced from licenced suppliers. Materials to be stockpiled temporarily within the rail corridor with controls around it.
15	**No-go zones**	• Construction activities will be restricted to the Project boundary. Activities outside site boundary will undergo a review for potential environmental impacts and require approval from Sydney Metro and ER as appropriate.

Contact Information		
Position	**Name**	**Phone**
JHLOR Project Leader	Malachy Breslin	0407 827 187
JHLOR Construction Manager	Paul Fields	0438 792 797
JHLOR Environment Manager	Dan Keegan	0435 859 160
JHLOR WHS Manager	Ann-Marie Hawkins	0438 791 013
ER	Jo Robertson	02 9659 5433
Sydney Metro Environmental Manager	Tim Solomon	0400 034 207
Sydney Metro Northwest Info Line		1800 019 989
Sydney Trains Info Line		131 500
Environmental Line / Pollution Incident Response Line		131 555
Office of Environment & Heritage Pollution Line		131 555
Emergency		000 or 112 (mobiles)
WIRES		1300 094 737

Standard Working Hours

As per Laing O'Rourke EPL 21147, audible construction works within the rail corridor will be restricted to the below hours unless otherwise approved by the Environmental Manager:

- **7:00AM to 6:00PM - Monday to Friday**
- **8:00AM to 1:00PM - Saturdays**
- **No work on Sundays or public holidays**

Any works outside of the hours above require OOHW and Sydney Metro and JHLOR Environmental Manager's Approval

Refer to Section 2.5 of the SMEW CEMP for works occurring outside the rail corridor.

As per Laing O'Rourke EPL 21147,

"High noise impact works and activities must only be undertaken:

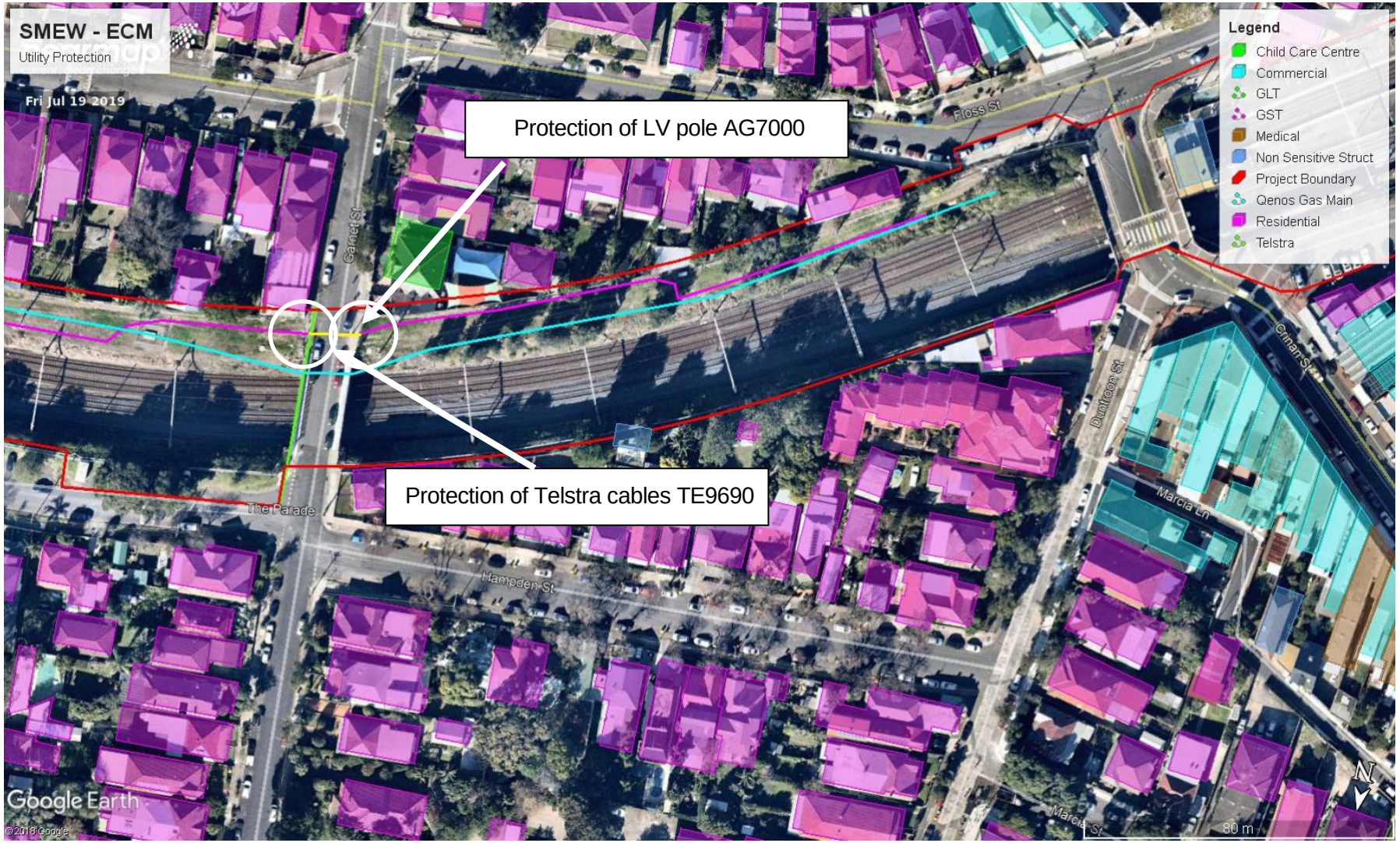
a) between the hours of 8:00am to 6:00pm Monday to Friday;
b) between the hours of 8:00am to 1:00pm Saturday; and
c) in continuous blocks not exceeding 3 hours each with a minimum respite from those activities and works of not less than 1 hour between each block"


SMEW - ECM
Utility Protection
Mon Jul 1 2019
Legend
Qenos Gas Main
Commercial
GST
GST Attached to Bridge
GST on Fence Zone
Industrial
Medical
Non Sensitive Struct
Project Boundary
Residential
Myrtle St
Victoria Rd
Route 5 Cycleway
Meeks Rd
Meeks Ln
Queen St
Google Earth
© 2018 Google
80 m
N


SMEW - ECM
Utility Protection
Mon Jul 1 2019
Warburton St
Moyes St
Ann St
Legend
Qenos Gas Main
Commercial
Education
GLT
GST
Industrial
Medical
Non Sensitive Struct
Place of Worship
Project Boundary
PW3200 Water Main
PW3250 Sydney Water Hut
Residential
Protection of Sydney Water water main PW3200 and Sydney Water Hut PW3250
Google Earth
© 2018 Google
80 m
N

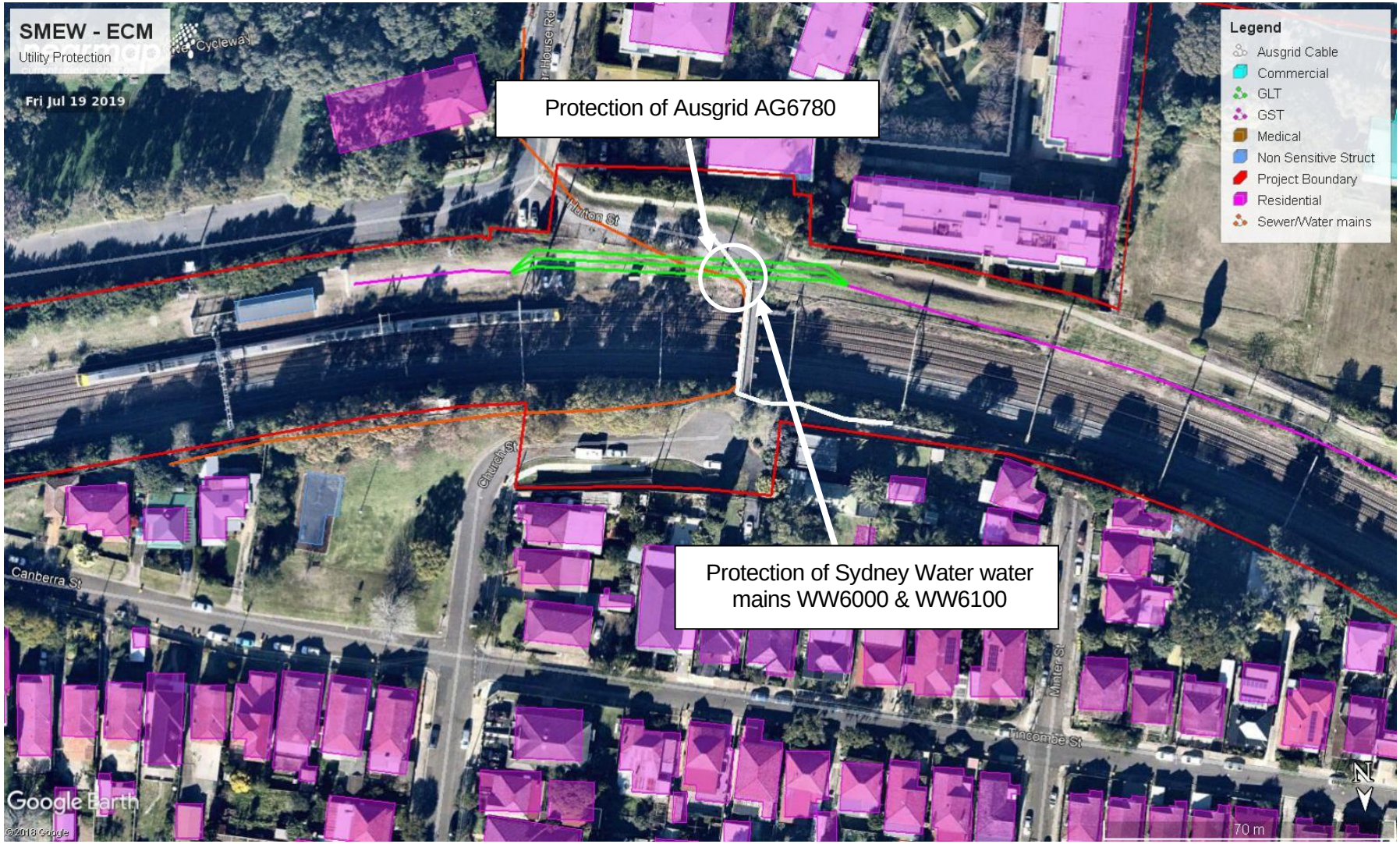

SMEW - ECM
Utility Protection
Mon Jul 1 2019
Legend
Commercial
Education
GST
Non Sensitive Struct
Project Boundary
Qenos Gas Main
Residential
Sydney Trains GLT relocation
TE9400 - Telstra
Transition
URX
School Parade
Bayley St
Kays Ave E
Albermarle St
Route 19 Cycleway
Dudley St
Protection of Telstra cables TE9400
Wilga Ave
Kays Ave W
Chalis Ave
Ward Rd
Google Earth
© 2018 Google
80 m
N

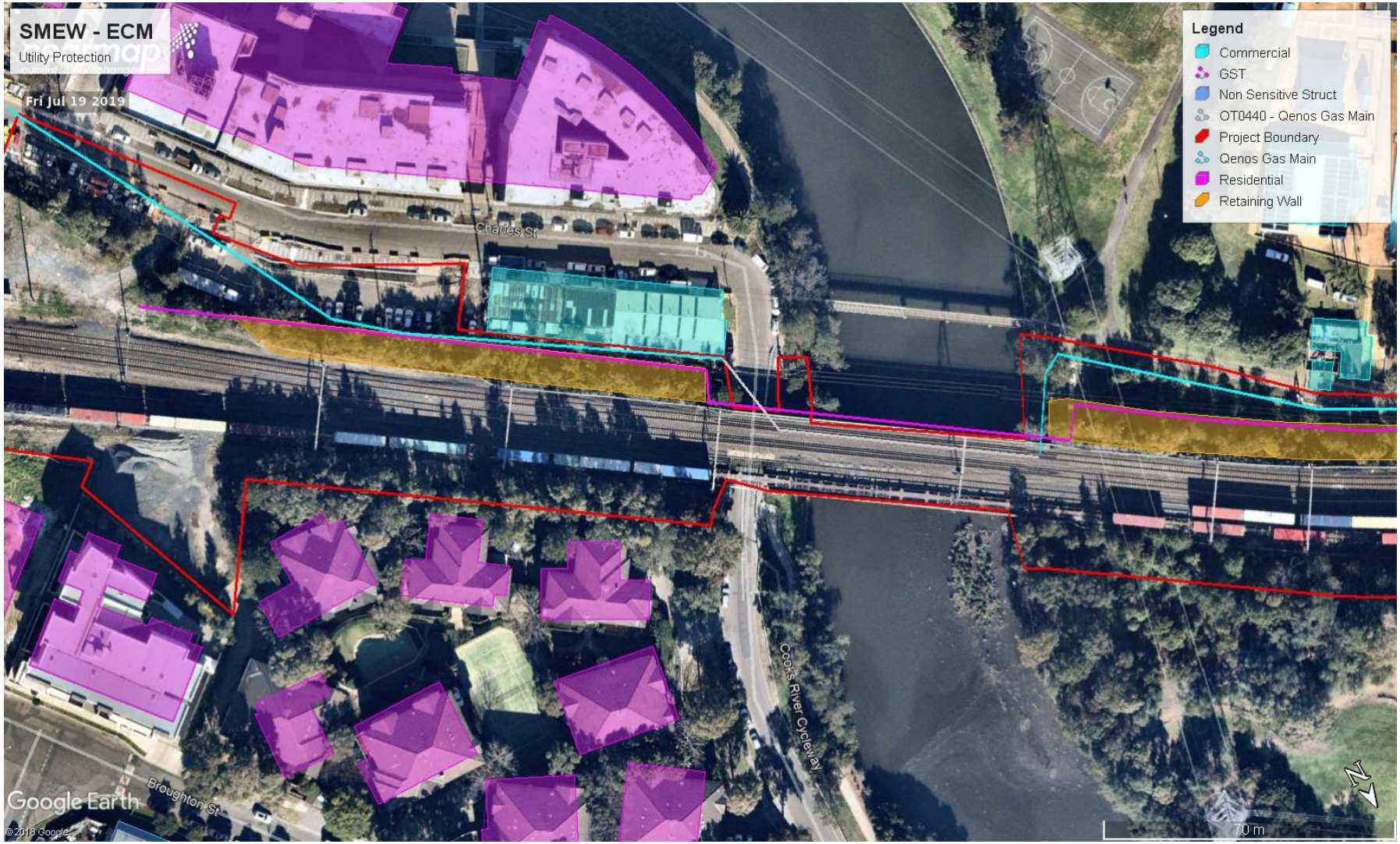

SMEW - ECM
Utility Protection
Fri Jul 19 2019
Legend
Child Care Centre
Commercial
Education
GLT
GST
GST Attached to Bridge Zone
Medical
Non Sensitive Struct
Place of Worship
Project Boundary
Qenos Gas Main
Residential
Telstra
Ness Ave
Ewart St
Garnet St
The Parade
The Greenway
Myra Rd
Myra Ln
Garnet Ln
Google Earth
©2018 Google
80 m
N

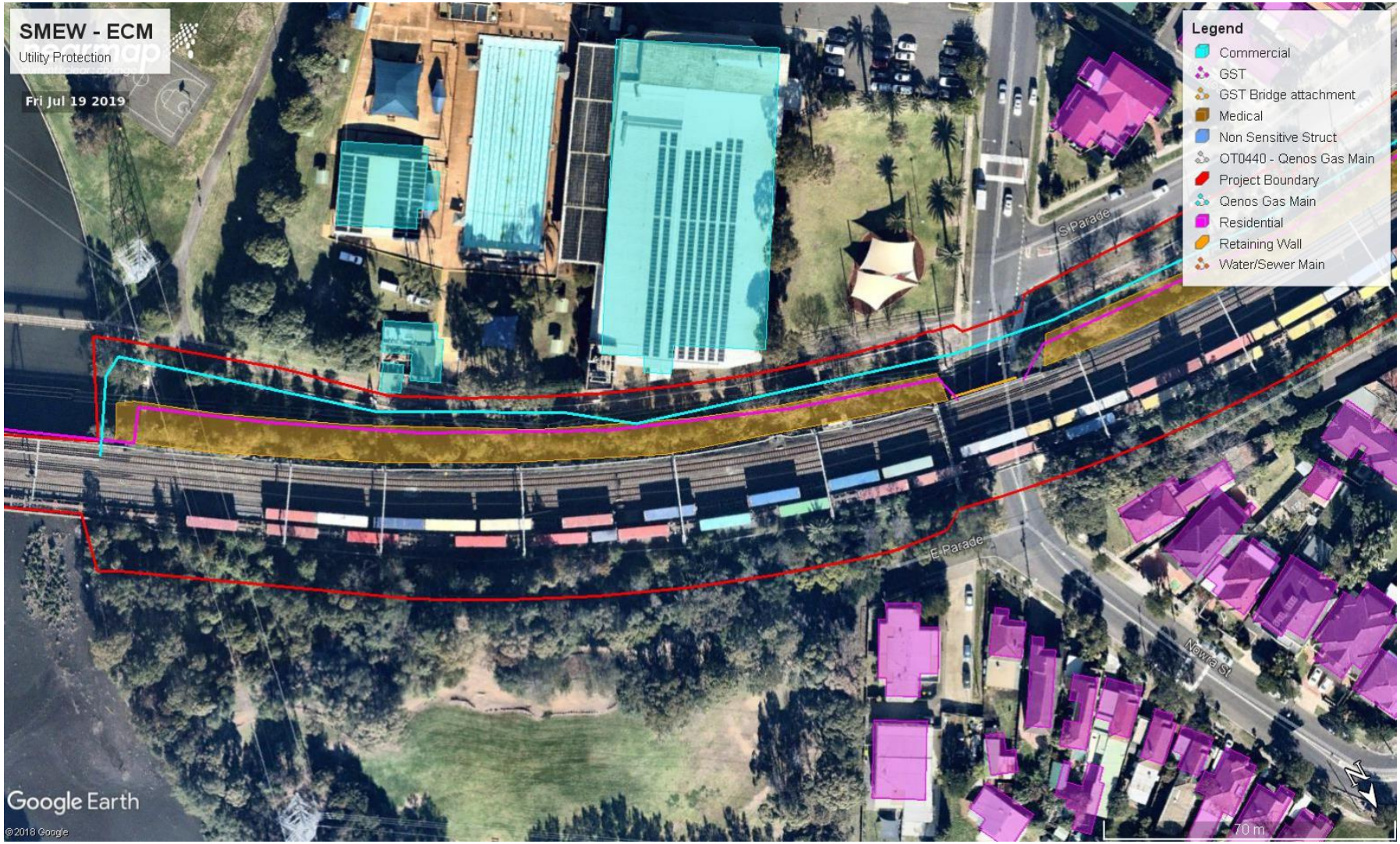

SMEW - ECM
Utility Protection
Fri Jul 19 2019
Protection of LV pole AG7000
Protection of Telstra cables TE9690
Legend
Child Care Centre
Commercial
GLT
GST
Medical
Non Sensitive Struct
Project Boundary
Qenos Gas Main
Residential
Telstra
Floss St
Garnet St
Durrieon St
Ciman St
Marcia Ln
The Parade
Hampden St
Marcia St
Google Earth
©2018 Google
80 m
N

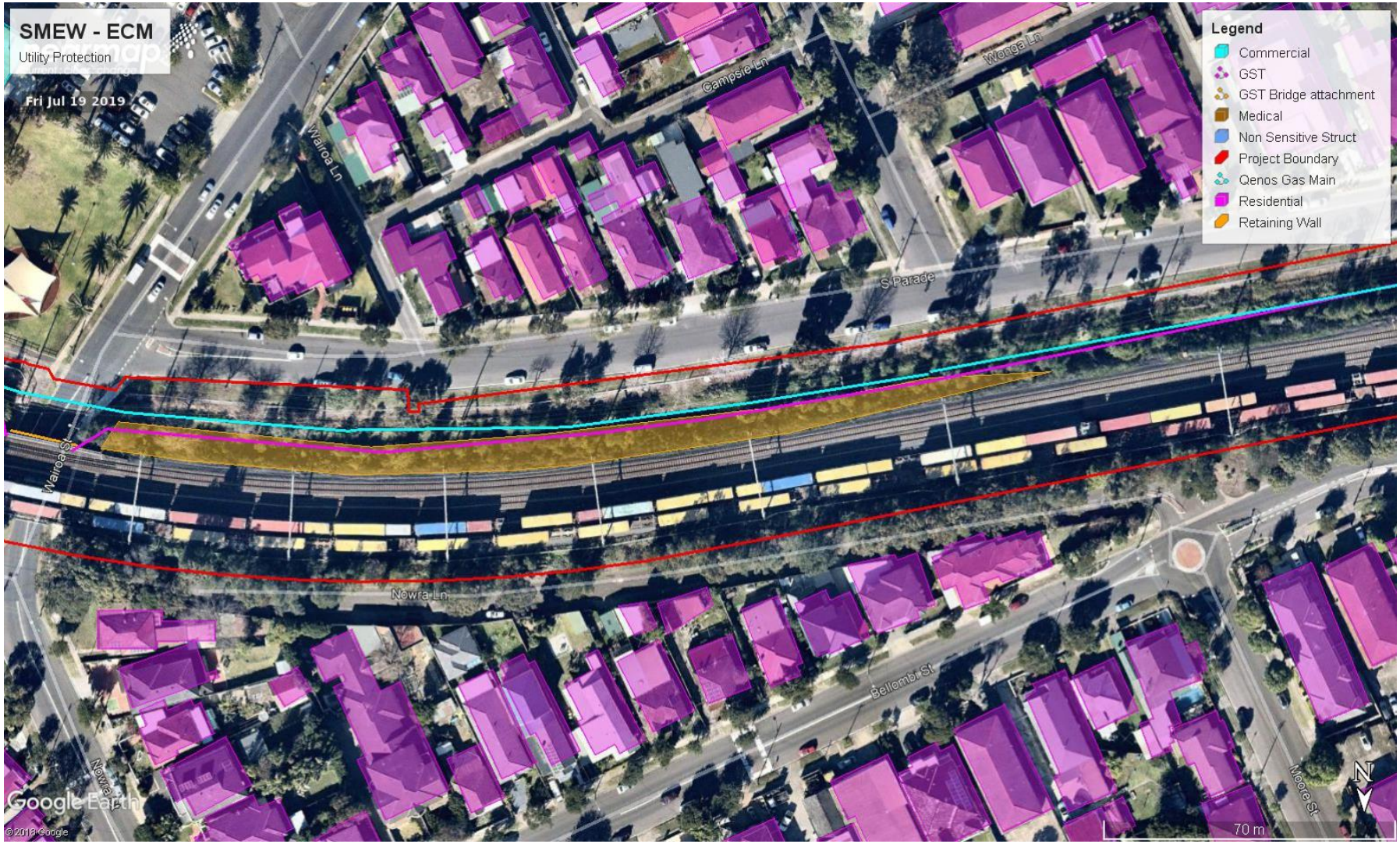

SMEW - ECM
Utility Protection
Fri Jul 19 2019
Legend
CC0030 - brick culvert
Commercial
GLT
GST
Medical
Non Sensitive Struct
Project Boundary
Residential
Telstra
Protection of CoCB culvert CC0030
Protection of Telstra cables TE9400
Kelr Ave
Kilbride St
Google Earth
©2018 Google
70 m
N


SMEW ECM
Utility Protection
Legend
AG6760 Ausgrid Cable
CC0030 - brick culvert
Child Care Centre
Commercial
Education
GST Zone
Industrial
Medical
Non Sensitive Struct
Place of Worship
Project Boundary
PW3250 Sydney Water Hut
Residential
Hurlstone Ave
Hutton St
Welford St
Canberra St
Note: Type 3 protection of Sydney Water sewer mains PW5300 and Ausgrid AG6760 no longer required due to design change
N
60 m


SMEW - ECM
Utility Protection
Fri Jul 19 2019
Protection of Ausgrid AG6780
Protection of Sydney Water water mains WW6000 & WW6100
Legend
Ausgrid Cable
Commercial
GLT
GST
Medical
Non Sensitive Struct
Project Boundary
Residential
Sewer/Water mains
Tilbrion St
Church St
Canberra St
Minter St
Lincombe St
Google Earth
©2018 Google
70 m
N


SMEW - ECM
Utility Protection
Fri Jul 19 2019
Legend
Commercial
GST
Non Sensitive Struct
OT0440 - Qenos Gas Main
Project Boundary
Qenos Gas Main
Residential
Retaining Wall
Charles St
Cooks River Cycleway
Broughton St
Google Earth
© 2019 Google
70 m
N


SMEW - ECM
Utility Protection
Fri Jul 19 2019
Legend
Commercial
GST
GST Bridge attachment
Medical
Non Sensitive Struct
OT0440 - Qenos Gas Main
Project Boundary
Qenos Gas Main
Residential
Retaining Wall
Water/Sewer Main
S Parade
E Parade
Nawra St
N
70 m
Google Earth
©2018 Google


SMEW - ECM
Utility Protection
Fri Jul 19 2019
Legend
Commercial
GST
GST Bridge attachment
Medical
Non Sensitive Struct
Project Boundary
Qenos Gas Main
Residential
Retaining Wall
Campsie Ln
Wonga Ln
Wairoa Ln
S Parade
Wairoa St
Nowra Ln
Bellomb St
Nowra St
Moore St
Google Earth
© 2019 Google
70 m
N


SMEW - ECM
Utility Protection
Fri Jul 19 2019
Legend
Child Care Centre
Commercial
GST
Medical
Non Sensitive Struct
Place of Worship
Project Boundary
Qenos Gas Main
Residential
Telstra
Gould St
Park St
S Parade
Browning St
Frederick St
Protection of Telstra TE10300
Google Earth
© 2018 Google
70 m
N


SMEW - ECM
Utility Protection
Fri Jul 19 2019
Legend
Child Care Centre
Commercial
GST
Medical
Non Sensitive Struct
Place of Worship
Project Boundary
Qenos Gas Main
Residential
Telstra
Protection of Telstra TE10300
Duke St
Harold St
S Parade
N Parade
Browning St
Cissold Pl
Beamish St
Cissold Parade
Google Earth
© 2018 Google
70 m
N