

SYDENHAM TO BANKSTOWN

SUBMISSIONS AND PREFERRED INFRASTRUCTURE REPORT

> Appendix H – Utilities management framework



Sydney Metro City and Southwest

Sydenham to Bankstown Upgrade

Utilities Management Framework

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1. Introduction

It is anticipated that the project will require the relocation, adjustment and protection of public utilities such as electricity, communications, gas, water and sewerage. While it is expected that the majority of utility relocations/adjustments would be contained within the rail corridor or existing road corridor), there will be occasions where a utility needs to be relocated in a new corridor or in some instances outside the project area. The details of each utility relocation are currently being determined as part of design development and early contractor involvement. To identify potential impacts associated with these works, which would typically be undertaken as part of construction phase of the project, a risk based approach has been adopted and is contained within this Utilities Management Framework (UMF).

This UMF has also been prepared to address the following Secretary's Environmental Assessment Requirements (SEARs) for the Sydney Metro City and Southwest Sydney Bankstown upgrade project (the project):

Key issue and Desired Performance Outcome	Requirement (specific assessment requirements in addition to the general requirement above)
16. Utilities This project is designed, constructed and operated to minimise impacts to utilities and provision of such to the public.	<ol style="list-style-type: none"> 1. The Proponent must identify impacts on key identified active or disused public trunk utilities infrastructure (including communications, electricity, gas, and water and sewerage). 2. Where impacts on utilities are expected, the Proponent must prepare a utilities management framework, to identify a management strategy for options, including relocation or adjustment of the utilities. 3. The utilities management framework must identify ways in which opportunities to integrate with and support initiatives adopted by Councils and utilities providers and how access to assets will be maintained during construction.

Chapter 4 includes a list of major utilities along the existing rail corridor that may require relocation / protection works. These utilities include:

- communications (Optus and Telstra)
- gas (Jemena and Qenos)
- power (Ausgrid and Transgrid)
- sewer (Sydney Water).

Environmental and community constraints have also been identified within proximity to the above utilities.

This document provides an overview of the type and location of utilities potentially affected by the construction and operation of the proposal and the principles and practices that would apply to the management of utilities during the construction of the project. It includes a list of active utilities located within and/or crossing the project area (either underground, aboveground or via existing road overbridges) with the potential to be affected by construction of the project, and outlines the approach to management of these utilities at a strategic level.

Should the project be approved, it is anticipated that Conditions of Approval (CoAs) for the project will require preparation of a Construction Environmental Management Plan (similar to

Chatswood to Sydenham project) that includes detail of the required utilities related activities (such as relocation, adjustment and protection works) during the construction phase (refer below for extract from the Chatswood to Sydenham project CoA):

UTILITIES AND SERVICES

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 and/or provider 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. All excavations adjacent to RMS road infrastructure must meet the requirements of RMS Technical Direction (GTD 2012/0001) 'Excavation adjacent to RMS infrastructure'.

In addition, the following CoA was applied to Chatswood to Sydenham (extract below) and it is expected that similar would be applied to Sydenham to Bankstown approval. This condition indicates that low impact activities such as utilities relocation and adjustments is outside the definition of construction for the purposes of planning approval unless it could impact heritage items or threatened species etc in which case the activity would be addressed as a construction matter in the project Construction Environmental Management Plan.

Construction includes all physical work required to construct the CSSI, including demolition, other than the following low impact work:

(j) relocation and connection of utilities where the relocation or connection has a minor impact to the environment as determined by the ER;

However, where heritage items, or threatened species, populations or ecological communities (within the meaning of the EP&A Act) are affected or potentially affected by any low impact work, that work is construction, unless otherwise determined by the Secretary in consultation with OEH or DPI Fisheries (in the case of impact upon fish, aquatic invertebrates or marine vegetation). The low impact work described in this definition becomes construction with the approval of a Construction Environmental Management Plan.

This UMF provides a mechanism for identifying, assessing and minimising impacts to the public because of required utilities relocation/adjustments.

2. Utilities overview

The location of trunk utilities has been determined by the design team to the current stage of design, based on Dial Before You Dig searches; and a review of utility data, including as-built surveys, and agency and council records. Preliminary consultation has also been held with utility owners, including Sydney Water, Ausgrid, Telstra, Axicom, TPG, Qenos, Transgrid, Optus, Jemena and NBN.

The following utility owners have assets which may require adjustment, protection, and/or relocation as part of the project:

- Sydney Water:
 - potable water mains
 - stormwater drains and channels
 - wastewater mains/tunnels including potentially disused assets
- Ausgrid:
 - underground electricity cables (potentially up to 132 kV)
 - 33 kV underground electricity cables
 - high voltage underground electricity cables
 - low voltage overhead and underground electricity cables
 - abandoned underground cables
- Jemena:
 - high pressure gas main (primary and secondary mains)
 - medium pressure gas main
 - low pressure gas main
- Qenos:
 - high pressure gas pipeline (150 millimetre diameter)
- Telstra:
 - underground cables
 - underground and above ground service connections (i.e. to stations)
 - optic fibre underground cables
 - underground copper wire
 - vacant cable conduits
- National Broadband Network (NBN):
 - network cables
- Optus:
 - underground optic fibre cables.

3. Approach to utilities management

A risk-based approach to the management of utilities would be adopted during the construction phase of the project to avoid damage throughout the project lifecycle. To ensure a consistent approach across all project activities the following steps would be undertaken:

- confirm utilities requiring relocation or protection works
- design refinement
- detailed assessment
- consultation with asset owners and relevant stakeholders
- integration with other assets
- construction management.

These stages are described below:

3.1. Confirm utilities requiring relocation or protection works

Dial Before You Dig searches and targeted site investigations have been undertaken to establish the full extent of services with the potential to be impacted by construction.

Utilities identified through the above searches and investigations have been mapped along the existing rail corridor. This mapping (using a web based GIS program) has been analysed to identify major utilities that may require relocation or protection works. Major utilities include communications, gas, power and sewer services.

Information such as size / type and owner of each major utility has been obtained, along with environmental and community constraints in proximity to each major utility that require consideration during any relocation / protection works.

Further assessment would be undertaken to confirm those major utilities that require relocation or protection works where they are in conflict with the proposed design.

3.2. Confirm preferred approach

Where an existing utility conflicts with the proposed design, it may be necessary to:

1. Provide physical protection where the utility is not directly affected but may be indirectly affected by vibration or accidental impact. This could include:
 - constructing a piled wall between the work site and the utility
 - plating over the utility to minimise the impact of construction traffic
 - marking or fencing the location of the utility to avoid it being accidentally damaged.
2. Modify construction methods to avoid impacting a nearby utility. For example, this could involve using hand excavation and compaction tools such as hand digging tools, a vibration plate, or pedestrian rollers where compacting within a specified distance of utilities.
3. Wrap and support the utility service to provide mechanical protection.
4. Divert the utility around the construction site.

5. Relocate the utility.
6. Abandon the utility.

3.3. Detailed assessment

Designs would be developed in accordance with each utility owner's specification once the provider requirements are agreed. Design packages would be produced for each geographic area, which would describe the utilities in the area, so that utility owners have confidence that the potential impacts have been adequately assessed. The design packages would be sent to the relevant utility owner for approval.

3.4. Opportunities to integrate with utility owners and other affected stakeholders

To manage integration with utility owners, Sydney Metro has established an internal Utilities Working Group. Ongoing consultation with all relevant utility owners and other stakeholders, including the Inner West and Canterbury Bankstown councils will be undertaken following project approval through the Sydney Metro Utilities Working Group. The following utility providers have dedicated resources / points of contact for Sydney Metro: Ausgrid, Sydney Water, Qenos, Transgrid, Telstra, Optus, TPG and Axicom.

Construction works that may directly or indirectly impact utilities would be coordinated with the relevant utility owners, including consideration of any proposed utility upgrades and access requirements, particularly maintaining access during project construction. Access to utilities within the project area would be maintained at all times.

4. Existing environment

4.1. Marrickville precinct

Environmental and community constraints have been identified within proximity to major utilities along the rail corridor that may require relocation / protection works. Major utilities include:

- communications (Optus and Telstra)
- gas (Jemena and Qenos)
- power (Ausgrid and Transgrid)
- sewer (Sydney Water).

Table 1 presents a list of the environmental and community constraints within the vicinity of each utility, as shown on 1 to Figure 4. The following constraints have been identified within 50 metres of each major utility:

- registered Aboriginal sites
- non-Aboriginal heritage (State Heritage Register, local heritage items listed under a local environmental plan, and Section 170 Heritage Register)
- biodiversity constraints (threatened species and ecological communities).

Community sensitive receivers (e.g. schools, churches) have the potential to be indirectly impacted by the project through the generation of noise and dust, and have therefore been identified within 100 metres of each utility along the rail corridor.

Some utilities extend across more than one precinct. In this instance, utility information for these services has been repeated, however environmental constraints have been identified for each precinct.

Table 1 Constraints within the vicinity of major utilities within the Marrickville precinct

Utility ID	Owner	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ¹
Gerald Street to Livingstone Road				
Gas (OT0100) Size: DN150 affected length: 830 Utility information: Pipeline traverses corridor. Alignment as per DSS information received from Sydney Trains apart from missing alignment	Qenos	Runs along the rail corridor	<ul style="list-style-type: none"> • State Heritage Register – Sewage Pumping Station 271 (01342) • Local heritage - Marrickville Railway (Sewer vent, Pumping Station and Edwardian House including interiors) (I167); Stone House including interiors (I114) • Section 170 Heritage Register - Marrickville Sewage Pumping Station 	<ul style="list-style-type: none"> • KIKOFF Fraser Park Soccer centre • Braddock Playground • Fraser Park

¹ Constraints have been derived from the Environmental Impact Statement prepared for the project

Utility ID	Owner	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ¹
information around northern boundary of Fraser Park. Prior to and along Meeks Road, Pipe in the order of 1.2 - 1.5 m deep as advised by Freyssinet.				
Gas (OT0120) Size: DN150 Affected length: 190 Utility information: Between suburban line and goods line tacks south of Meeks Road east of intersection with Victoria Road, Pipe in the order of 1.2 - 1.5 m deep as advised by Freyssinet.	Qenos	Runs along the rail corridor	<ul style="list-style-type: none"> State Heritage Register – Sewage Pumping Station 271 (01342) Local heritage - Marrickville Railway (Sewer vent, Pumping Station and Edwardian House including interiors) (I167); Stone House including interiors (I114) Section 170 Heritage Register - Marrickville Sewage Pumping Station 	<ul style="list-style-type: none"> KIKOFF Fraser Soccer centre Braddock Playground Fraser Park
Gas (OT0200) Size: DN150 Affected length: 990 Utility information: depth to be confirmed. Pipeline traverses corridor. Alignment as per DSS information received from Sydney Trains. Pipe crosses under Victoria Road, approx. CH 6 km 320, and just under the bridge at Livingstone Road, approx CH 7 km 150, as advised by Freyssinet.	Qenos	Runs along the rail corridor	<ul style="list-style-type: none"> Marrickville Railway Station Group (01186) Stone House including interiors (I114); Marrickville Station including interiors (I89) Marrickville Station Group 	<ul style="list-style-type: none"> McNeilly Park

Utility ID	Owner	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ¹
Gas (OT0210) Size: DN150 Affected length: 355 Utility information: Under Illawarra Road Bridge. Pipe sitting in concrete culvert on top of sewer at track level as advised by Freyssinet.	Qenos	Runs along the rail corridor	<ul style="list-style-type: none"> Marrickville Railway Station Group (01186) Stone House including interiors (I114); Marrickville Station including interiors (I89) Marrickville Station Group 	<ul style="list-style-type: none"> McNeilly Park
Sewer (WW2800) Size: Varied Affected length: 135 Utility information: Part 914 x 1219 brick tunnel passing under railway tracks and part 1828 x 3352 RC tunnel longitudinal to tracks to pumping station.	SWC - sewer	Off Meeks Road	<ul style="list-style-type: none"> State Heritage Register – Sewage Pumping Station 271 (01342) Local heritage - Marrickville Railway (Sewer vent, Pumping Station and Edwardian House including interiors) (I167) Section 170 Heritage Register - Marrickville Sewage Pumping Station 	<ul style="list-style-type: none"> KIKOFF Fraser Park Soccer centre Braddock Playground Fraser Park
Sewer (WW3008) Size: 660 mm x 990 mm Brick Tunnel Affected length: 140 Utility information: Brick tunnel.	SWC - sewer	Off Way Street	<ul style="list-style-type: none"> State Heritage Register – Sewage Pumping Station 271 (01342) Local heritage - Marrickville Railway (Sewer vent, Pumping Station and Edwardian House including interiors) (I167) Section 170 Heritage Register - Marrickville Sewage Pumping Station 	<ul style="list-style-type: none"> KIKOFF Fraser Park Soccer centre Braddock Playground Fraser Park
Sewer (WW2900) Size: DN225 VC Affected length: 125 Utility information: passing under goods line railway tracks north of SPS 0271.	SWC - sewer	Meeks Road	<ul style="list-style-type: none"> State Heritage Register – Sewage Pumping Station 271 (01342) Local heritage - Marrickville Railway (Sewer vent, Pumping Station and Edwardian House including interiors) (I167) Section 170 Heritage Register - Marrickville Sewage Pumping Station 	<ul style="list-style-type: none"> KIKOFF Fraser Park Soccer centre Braddock Playground Fraser Park

Utility ID	Owner	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ¹
Sewer (WW3015) Size: See comments Affected length: 53 Lateral Longitudinal: Yes Utility information: Heritage listed Sydney Water Pumping Station SPS 0271.	SWC - sewer	Off Meeks Road	<ul style="list-style-type: none"> State Heritage Register – Sewage Pumping Station 271 (01342) Local heritage - Marrickville Railway (Sewer vent, Pumping Station and Edwardian House including interiors) (I167) Section 170 Heritage Register - Marrickville Sewage Pumping Station 	<ul style="list-style-type: none"> KIKOFF Fraser Park Soccer centre Braddock Playground Fraser Park
Sewer (WW3003) Size: DN750 MSCL Affected length: 330 Utility information: Pressure sewer main.	SWC - sewer	Off Myrtle Street	<ul style="list-style-type: none"> State Heritage Register – Sewage Pumping Station 271 (01342) Local heritage - Marrickville Railway (Sewer vent, Pumping Station and Edwardian House including interiors) (I167); Stone House including interiors (I114) Section 170 Heritage Register - Marrickville Sewage Pumping Station 	<ul style="list-style-type: none"> KIKOFF Fraser Park Soccer centre Braddock Playground Fraser Park
Sewer (WW3007) Size: TBC Affected length: 65 Utility information: Disused sewer main.	SWC - sewer	Off Myrtle Street	<ul style="list-style-type: none"> State Heritage Register – Sewage Pumping Station 271 (01342) Local heritage - Marrickville Railway (Sewer vent, Pumping Station and Edwardian House including interiors) (I167) Section 170 Heritage Register - Marrickville Sewage Pumping Station 	<ul style="list-style-type: none"> KIKOFF Fraser Park Soccer centre Braddock Playground Fraser Park
Sewer (WW3005) Size: TBC Affected length: 124 Utility information: Disused sewer main.	SWC - sewer	Off Myrtle Street	<ul style="list-style-type: none"> State Heritage Register – Sewage Pumping Station 271 (01342) Local heritage - Marrickville Railway (Sewer vent, Pumping Station and Edwardian House including interiors) (I167); Stone House including interiors (I114) Section 170 Heritage Register - Marrickville Sewage Pumping Station 	<ul style="list-style-type: none"> KIKOFF Fraser Park Soccer centre Braddock Playground Fraser Park

Utility ID	Owner	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ¹
Sewer (WW3006) Size: TBC Affected length: 103 Utility information: Disused sewer main.	SWC - sewer	Off Myrtle Street	<ul style="list-style-type: none"> State Heritage Register – Sewage Pumping Station 271 (01342) Local heritage - Marrickville Railway (Sewer vent, Pumping Station and Edwardian House including interiors) (I167); Stone House including interiors (I114) Section 170 Heritage Register - Marrickville Sewage Pumping Station 	<ul style="list-style-type: none"> KIKOFF Fraser Park Soccer centre Braddock Playground Fraser Park
Sewer (WW3001) Size: DN225 VC Affected length: 450	SWC - sewer	Off Riverdale Avenue / Myrtle Street	<ul style="list-style-type: none"> State Heritage Register – Sewage Pumping Station 271 (01342) Local heritage - Marrickville Railway (Sewer vent, Pumping Station and Edwardian House including interiors) (I167); Stone House including interiors (I114) Section 170 Heritage Register - Marrickville Sewage Pumping Station 	<ul style="list-style-type: none"> KIKOFF Fraser Park Soccer centre Fraser Park
Sewer (WW3010) Size: DN600 CICAL Affected length: 663 Utility information: Pressure sewer main.	SWC - sewer	Station Street / Illawarra Road	<ul style="list-style-type: none"> State Heritage Register – Sewage Pumping Station 271 (01342); Marrickville Railway Station Group (01186) Local heritage - Marrickville Railway (Sewer vent, Pumping Station and Edwardian House including interiors) (I167); Stone House including interiors (I114); Marrickville Station including interiors (I89) Section 170 Heritage Register - Marrickville Sewage Pumping Station; Marrickville Railway Station Group 	<ul style="list-style-type: none"> KIKOFF Fraser Park Soccer centre Braddock Playground Fraser Park McNeilly Park
Sewer (WW3004) Size: TBC Affected length: 120 Utility information: Disused sewer main.	SWC - sewer	Off Riverdale Avenue / Myrtle Street	<ul style="list-style-type: none"> State Heritage Register – Sewage Pumping Station 271 (01342) Local heritage - Marrickville Railway (Sewer vent, Pumping Station and Edwardian House including interiors) (I167); Stone House including interiors (I114) Section 170 Heritage Register - Marrickville Sewage Pumping Station 	<ul style="list-style-type: none"> KIKOFF Fraser Park Soccer centre Braddock Playground Fraser Park

Utility ID	Owner	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ¹
Sewer (WW3002) Size: DN600 concrete pipe Affected length: 395 Utility information: Disused main.	SWC - sewer	Off Riverdale Avenue / Myrtle Street	<ul style="list-style-type: none"> State Heritage Register – Sewage Pumping Station 271 (01342) Local heritage - Marrickville Railway (Sewer vent, Pumping Station and Edwardian House including interiors) (I167); Stone House including interiors (I114) Section 170 Heritage Register - Marrickville Sewage Pumping Station 	<ul style="list-style-type: none"> KIKOFF Fraser Park Soccer centre Braddock Playground Fraser Park
Sewer (WW3000) Size: DN225 SGW Affected length: 58 Utility information: In tunnel. Passing under railway tracks west of Victoria Road underpass.	SWC - sewer	Victoria Road / Myrtle Street	<ul style="list-style-type: none"> Local heritage - Stone House including interiors (I114) 	<ul style="list-style-type: none"> None
Sewer (WW3020) Size: DN600 CICL Affected length: 252 Utility information: DBYD plans show it as a disused sewer main.	SWC - sewer	Station Street / Illawarra Road	<ul style="list-style-type: none"> State Heritage Register – Marrickville Railway Station Group (01186) Local heritage - Stone House including interiors (I114); Marrickville Station including interiors (I89) Section 170 Heritage Register – Marrickville Station Group 	<ul style="list-style-type: none"> None
Power (AG6360) Size: Direct laid cables Affected length: 302 Utility information: Direct buried cables from Meeks Road under goods line tracks along Fraser park and under existing suburban tracks towards Meeks Road stabling.	Ausgrid	Off Maude Street	<ul style="list-style-type: none"> State Heritage Register – Sewage Pumping Station 271 (01342) Local heritage - Marrickville Railway (Sewer vent, Pumping Station and Edwardian House including interiors) (I167) Section 170 Heritage Register - Marrickville Sewage Pumping Station 	<ul style="list-style-type: none"> KIKOFF Fraser Park Soccer centre Braddock Playground Fraser Park

Utility ID	Owner	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ¹
Through 4 x 100 conduits in 2 x 2 configuration under goods line, section RK1 on DBYD plans, with 0.9 m cover over the conduits and 0.8 m cover over the direct buried cables.				
<p>Power (AG6400)</p> <p>Size: 4 x 100 steel conduits</p> <p>Affected length: 45</p> <p>Utility information: Passing under existing tracks from Meeks Road to Carrington Road. HV, LV and AUX cables through conduits as per details on DBYD plans. DBYD plans show 1.2 m cover over the conduits under the tracks.</p>	Ausgrid	Meeks Road	<ul style="list-style-type: none"> State Heritage Register – Sewage Pumping Station 271 (01342) Local heritage - Marrickville Railway (Sewer vent, Pumping Station and Edwardian House including interiors) (I167) Section 170 Heritage Register - Marrickville Sewage Pumping Station 	<ul style="list-style-type: none"> KIKOFF Fraser Park Soccer centre Braddock Playground Fraser Park
<p>Power (AG6420)</p> <p>Size: 3 x 225 PE and 2 x 80 PE conduits</p> <p>Affected length: 280</p> <p>Utility information: Passing under goods line and suburban line tracks from Meeks Road west of Sydney Water Pumping Station. Conduits through a 900 mm bore under existing tracks. DBYD plans show the bore being 3.0 - 4.5 m below ground.</p>	Ausgrid	Meeks Road / Myrtle Street	<ul style="list-style-type: none"> State Heritage Register – Sewage Pumping Station 271 (01342) Local heritage - Marrickville Railway (Sewer vent, Pumping Station and Edwardian House including interiors) (I167); Stone House including interiors (I114) Section 170 Heritage Register - Marrickville Sewage Pumping Station 	<ul style="list-style-type: none"> KIKOFF Fraser Park Soccer centre Braddock Playground Fraser Park

Utility ID	Owner	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ¹
<p>Power (AG6440)</p> <p>Size: 3 x 225 PE and 2 x 80 PE conduits</p> <p>Affected length: 280</p> <p>Utility information: Parallel to AG6420. Passing under goods line and suburban line tracks from Meeks Road west of Sydney Water Pumping Station. Conduits through a 900 mm bore under existing tracks. DBYD plans show the bore being 3.0 - 4.5 m below ground.</p>	Ausgrid	Meeks Road / Myrtle Street	<ul style="list-style-type: none"> State Heritage Register – Sewage Pumping Station 271 (01342) Local heritage - Marrickville Railway (Sewer vent, Pumping Station and Edwardian House including interiors) (I167); Stone House including interiors (I114) Section 170 Heritage Register - Marrickville Sewage Pumping Station 	<ul style="list-style-type: none"> KIKOFF Fraser Park Soccer centre Braddock Playground Fraser Park
<p>Power (AG6460)</p> <p>Size: Direct laid cables</p> <p>Affected length: 60</p> <p>Utility information: Under eastern footpath of Victoria Road underpass. 4 off direct laid HV and AUX cables with 0.6 m cover as per details on DBYD plans.</p>	Ausgrid	Victoria Road	<ul style="list-style-type: none"> Local heritage - Stone House including interiors (I114) 	<ul style="list-style-type: none"> None
<p>Power (AG6470)</p> <p>Size: TBC</p> <p>Affected length: 34</p> <p>Utility information: Overhead powerlines at corner of Victoria Road and Charlotte Avenue.</p>	Ausgrid	Victoria Road / Charlotte Avenue	<ul style="list-style-type: none"> Local heritage - Stone House including interiors (I114) 	<ul style="list-style-type: none"> None

Utility ID	Owner	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ¹
Power (AG6480) Size: See comments Affected length: 36 Utility information: In Victoria Road underpass. Part underground, 1 x 19 GI conduit with SL cable and 0.4 m cover as per detail on DBYD plan and part overhead lines.	Ausgrid	Victoria Road	<ul style="list-style-type: none"> Local heritage - Stone House including interiors (I114) 	<ul style="list-style-type: none"> None
Power (TG2100) Size: 330 kV 2100 mm OD cased bore Affected length: 202 Utility information: Buried. Transgrid Cable No. 42 passes under existing tracks at western side of Fraser Park. 1.32 m - 1.49 m deep where it crosses the railway tracks south of Fraser Park. Approx. 1.1 m deep where longitudinal along Fraser Park southern boundary.	Transgrid	Carrington Road	<ul style="list-style-type: none"> State Heritage Register – Sewage Pumping Station 271 (01342) Local heritage - Marrickville Railway (Sewer vent, Pumping Station and Edwardian House including interiors) (I167) Section 170 Heritage Register - Marrickville Sewage Pumping Station 	<ul style="list-style-type: none"> KIKOFF Fraser Park Soccer centre Braddock Playground Fraser Park

Utility ID	Owner	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ¹
Gas (JE2100) Size: 250 mm Affected length: 96 Utility information: Steel main, secondary main 1050 kPa. Passing under existing track from Meeks Road to Carrington Road west of JE2000.	Jemena	Meeks Road west of Fraser Park	<ul style="list-style-type: none"> State Heritage Register – Sewage Pumping Station 271 (01342) Local heritage - Marrickville Railway (Sewer vent, Pumping Station and Edwardian House including interiors) (I167) Section 170 Heritage Register - Marrickville Sewage Pumping Station 	<ul style="list-style-type: none"> KIKOFF Fraser Park Soccer centre Braddock Playground Fraser Park
Gas (JE2000) Size: 250 mm Affected length: 96 Utility information: Steel main, secondary main 1050 kPa. Passing under existing track from Meeks Road to Carrington Road west of JE2000.	Jemena	Traverses the alignment between Meeks Road and Carrington Road	<ul style="list-style-type: none"> State Heritage Register – Sewage Pumping Station 271 (01342) Local heritage - Marrickville Railway (Sewer vent, Pumping Station and Edwardian House including interiors) (I167) Section 170 Heritage Register - Marrickville Sewage Pumping Station 	<ul style="list-style-type: none"> KIKOFF Fraser Park Soccer centre Braddock Playground Fraser Park
Communications (OP3000) Size: TBC Affected length: 87 Utility information: Through Victoria Road underpass. Optus owned underground cable and conduit.	Optus	Victoria Road / Charlotte Avenue	<ul style="list-style-type: none"> Local heritage - Stone House including interiors (I114) 	<ul style="list-style-type: none"> None

Utility ID	Owner	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ¹
<p>Communications (TE9150)</p> <p>Size: P20 Type: TBC Affected length: 46 Utility information: In Victoria Road underpass.</p>	Telstra	Victoria Road / Myrtle Street	<ul style="list-style-type: none"> Local heritage - Stone House including interiors (I114) 	<ul style="list-style-type: none"> None
<p>Power (AG6475)</p> <p>Size: TBC Affected length: 300 Utility information: Overhead powerlines longitudinal to railway corridor, cycleway, along full length of Marrickville Station.</p>	Ausgrid	Along cycleway from Station Street to Riverdale Avenue / Charlotte Avenue	<ul style="list-style-type: none"> State Heritage Register - Marrickville Railway Station Group (01186) Local heritage - Stone House including interiors (I114); Marrickville Station including interiors (I89) Section 170 Heritage Register – Marrickville Station Group 	<ul style="list-style-type: none"> None
<p>Communications (TE9300)</p> <p>Size: P20 Type: Service Connection Affected length: 50 Utility information: Service to platform building at Marrickville Station. Distribution/local area network.</p>	Telstra	Station Street / Illawarra Road	<ul style="list-style-type: none"> State Heritage Register - Marrickville Railway Station Group (01186) Local heritage – Marrickville Station including interiors (I89) Section 170 Heritage Register – Marrickville Station Group 	<ul style="list-style-type: none"> None

Utility ID	Owner	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ¹
<p>Communications (TE9200)</p> <p>Size: 3 x A100 conduits</p> <p>Type: Optic Fibre</p> <p>Affected length: 39</p> <p>Utility information: Through Illawarra Road Bridge western footway. Major cable/conduit network.</p>	Telstra	Illawarra Road bridge	<ul style="list-style-type: none"> State Heritage Register - Marrickville Railway Station Group (01186) Local heritage – Marrickville Station including interiors (I89) Section 170 Heritage Register – Marrickville Station Group 	<ul style="list-style-type: none"> McNeilly Park
<p>Gas (JE3000)</p> <p>Size: 110mm NY</p> <p>Affected length: 38</p> <p>Utility information: 110 mm nylon main inserted into 9 inch cast iron main, network main 210 kPa. Through Illawarra Road Bridge eastern footway.</p>	Jemena	Illawarra Road / Arthur Street	<ul style="list-style-type: none"> State Heritage Register - Marrickville Railway Station Group (01186) Local heritage – Marrickville Station including interiors (I89) Section 170 Heritage Register – Marrickville Station Group 	<ul style="list-style-type: none"> None
<p>Power (AG6481)</p> <p>Size: TBC</p> <p>Affected length: 14</p> <p>Utility information: Overhead powerlines at southern end of Illawarra Road Bridge.</p>	Ausgrid	Illawarra Road bridge	<ul style="list-style-type: none"> State Heritage Register - Marrickville Railway Station Group (01186) Local heritage – Marrickville Station including interiors (I89) Section 170 Heritage Register – Marrickville Station Group 	<ul style="list-style-type: none"> McNeilly Park

Utility ID	Owner	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ¹
Sewer (WW3100) Size: 1270 mm x 1574 mm Brick Tunnel Affected length: 60 Utility information: Brick tunnel. Passing under railway tracks and station under Illawarra Road Bridge.	SWC - sewer	Illawarra Road / Arthur Street	<ul style="list-style-type: none"> State Heritage Register - Marrickville Railway Station Group (01186) Local heritage – Marrickville Station including interiors (I89) Section 170 Heritage Register – Marrickville Station Group 	<ul style="list-style-type: none"> McNeilly Park
Power (AG6482) Size: TBC Affected length: 12 Utility information: Overhead powerlines at northern end of Illawarra Road Bridge.	Ausgrid	Illawarra Road / Arthur Street	<ul style="list-style-type: none"> State Heritage Register - Marrickville Railway Station Group (01186) Local heritage – Marrickville Station including interiors (I89) Section 170 Heritage Register – Marrickville Station Group 	<ul style="list-style-type: none"> None
Sewer (WW3200) Size: DN225 VC Affected length: 35 Utility information: Passing under railway tracks at McNeilly Park.	SWC - sewer	Traverses the alignment off McNeilly Park	<ul style="list-style-type: none"> No heritage listed items 	<ul style="list-style-type: none"> McNeilly Park
Sewer (WW3300) Size: 1371 mm x 1676 mm Brick Tunnel Affected length: 46 Utility information: Brick tunnel. Passing under railway tracks east of Livingstone Road.	SWC - sewer	Traverses the alignment off Jersey Street	<ul style="list-style-type: none"> Local heritage - Interwar Residential Precincts - Hollands Avenue (C35); St Nicholas Greek Orthodox Church, including interiors (I102) 	<ul style="list-style-type: none"> Ness Park St Nicholas Greek Orthodox Church



Utilities

- Not affected
- Affected/diverted
- Affected/removed

Design

Metro Stations



Heritage

State Heritage Curtilage



s170 Heritage (Jan 2014)



Heritage (LEP)



Conservation Area - General



Conservation Area - Aboriginal



Conservation Area - Landscape



Item - General



Item - Aboriginal



Item - Archaeological



Item - Landscape



Biodiversity

Threatened fauna



Threatened flora



Biodiversity assessment (South West)

Acacia Pubescens



Acacia Pubescens patches



Estuarine Mangrove Forest



Estuarine Swamp Oak Forest



Figure 1 Heritage and biodiversity constraints within the Marrickville precinct

4.2. Dulwich Hill precinct

Environmental and community constraints identified within the vicinity of major utilities in the Dulwich Hill precinct are presented in Table 2 and shown on Figure 2.

Table 2 Constraints within the vicinity of major utilities within the Dulwich Hill precinct

Utility ID	Owner	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ²
Livingstone Road to Garnet Street				
Gas (OT0200) Size: DN150 Affected length: 990 Utility information: depth to be confirmed. Pipeline traverses corridor. Alignment as per DSS information received from Sydney Trains. Pipe crosses under Victoria Road, approx. CH 6 km 320, and just under the bridge at Livingstone Road, approx CH 7 km 150, as advised by Freyssinet.	Qenos	Runs along the rail corridor	<ul style="list-style-type: none"> Local heritage - Interwar Residential Precincts - Hollands Avenue (C35) 	<ul style="list-style-type: none"> Ness Park St Nicholas Greek Orthodox Church

² Constraints have been derived from the Environmental Impact Statement prepared for the project

Utility ID	Owner	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ²
Gas (OT0300) Size: DN150 Affected length: 1775 Utility information: depth and location to be confirmed. Pipeline traverses corridor. No DSS information available. Pipe in steel casing on top of embankment under Wardell Road Bridge, approx. CH 7 km 820, and crosses under Terrace Road, approx. Ch 8 km 180 as advised by Freyssinet. At Hurlstone Park Station, approx CH 8 km 700 – 8 km 900 the pipe sits on top of the retaining wall, same height as gutter then runs down embankment and at back of building, and crosses under Foord St, approx CH 9 km 090.	Qenos	Runs along the rail corridor	<ul style="list-style-type: none"> Local heritage - South Dulwich Hill Conservation Area (C29); Gladstone Hall, including interiors (I13) Section 170 Heritage Register – Gladstone Hall Section 170 Heritage Register - Dulwich Hill Railway Station Group 	<ul style="list-style-type: none"> The Maronite Sisters of the Holy Family Village Montessori Learning Tree Jack Shanahan Park Dulwich Hill Skate Park Dulwich Hill Child Care Centre
Gas (OT0310) Size: DN150 Affected length: 22 Utility information: west of Randall St. Depth and location to be confirmed as not shown on Sydney trains DSS. Freyssinet have advised the pipe is laid shallow.	Qenos	Off Randall Street	<ul style="list-style-type: none"> Local heritage - South Dulwich Hill Conservation Area (C29) 	<ul style="list-style-type: none"> The Maronite Sisters of the Holy Family Village

Utility ID	Owner	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ²
Gas (OT0320) Size: DN150 Affected length: 29 Utility information: under Albermarle St bridge. Depth and location to be confirmed as not shown on Sydney Trains DSS. Freyssinet have advised the pipe is laid under the bridge.	Qenos	Albermarle Street	<ul style="list-style-type: none"> Local heritage - South Dulwich Hill Conservation Area (C29) 	<ul style="list-style-type: none"> None
Gas (OT0330) Size: DN150 Affected length: 15 Utility information: west of Wardell Road Bridge. Depth and location to be confirmed as not shown on Sydney Trains DSS.	Qenos	Wardell Road	<ul style="list-style-type: none"> Section 170 Heritage Register - Dulwich Hill Railway Station Group 	<ul style="list-style-type: none"> Montessori Learning Tree Jack Shanahan Park Dulwich Hill Skate Park
Gas (OT0340) Size: DN150 affected length: 55 Utility information: Adjacent to Dulwich Hill car park. Depth and location to be confirmed as not shown on Sydney Trains DSS.	Qenos	Wardell Road	<ul style="list-style-type: none"> Section 170 Heritage Register - Dulwich Hill Railway Station Group 	<ul style="list-style-type: none"> Montessori Learning Tree Jack Shanahan Park Dulwich Hill Skate Park

Utility ID	Owner	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ²
Gas (OT0350) Size: DN150 Affected length: 25 Utility information: Depth and location to be confirmed as not shown on Sydney Trains DSS. Pipe passes under road edge at end of Garnet Street Bridge as advised by Freyssinet.	Qenos	Garnett Street	<ul style="list-style-type: none"> No heritage listed items 	<ul style="list-style-type: none"> Dulwich Hill Child Care Centre
Communications (TE9310) Size: 3 x A100 conduits Type: Optic Fibre Affected length: 59 Utility information: Major cable/conduit network through Livingstone Road Bridge.	Telstra	Livingstone Road bridge	<ul style="list-style-type: none"> Local heritage - Interwar Residential Precincts - Hollands Avenue (C35); St Nicholas Greek Orthodox Church, including interiors (I102) 	<ul style="list-style-type: none"> Ness Park St Nicholas Greek Orthodox Church
Gas (JE3100) Size: 50 mm NY Affected length: 56 Utility information: 50 mm nylon main inserted into 9 inch cast iron main, network main 210 kPa. Through Livingstone Rd Bridge deck.	Jemena	Livingstone Road bridge	<ul style="list-style-type: none"> Local heritage - Interwar Residential Precincts - Hollands Avenue (C35); St Nicholas Greek Orthodox Church, including interiors (I102) 	<ul style="list-style-type: none"> Ness Park St Nicholas Greek Orthodox Church

Utility ID	Owner	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ²
Power (AG6492) Size: Direct laid cables Affected length: 53 Utility information: Direct laid cables through eastern footway of Livingstone Road Bridge. Number of cables and cover over cables to be confirmed.	Ausgrid	Livingstone Road bridge	<ul style="list-style-type: none"> Local heritage - Interwar Residential Precincts - Hollands Avenue (C35); St Nicholas Greek Orthodox Church, including interiors (I102) 	<ul style="list-style-type: none"> Ness Park St Nicholas Greek Orthodox Church
Power (AG6494) Size: Direct laid cables Affected length: 55 Utility information: 2 x direct laid cables, HV and AUX, in eastern footway of Livingstone Road Bridge parallel to 33kV cables.	Ausgrid	Livingstone Road bridge	<ul style="list-style-type: none"> Local heritage - Interwar Residential Precincts - Hollands Avenue (C35); St Nicholas Greek Orthodox Church, including interiors (I102) 	<ul style="list-style-type: none"> Ness Park St Nicholas Greek Orthodox Church
Power (AG6493) Size: Direct laid cables Affected length: 49 Utility information: Direct laid cables through western footway of Livingstone Road Bridge. Number of cables and cover over cables to be confirmed.	Ausgrid	Livingstone Road bridge	<ul style="list-style-type: none"> Local heritage - Interwar Residential Precincts - Hollands Avenue (C35); St Nicholas Greek Orthodox Church, including interiors (I102) 	<ul style="list-style-type: none"> Ness Park St Nicholas Greek Orthodox Church

Utility ID	Owner	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ²
Power (AG6491) Size: TBC Affected length: 75 Utility information: Overhead powerlines at Livingstone Road Bridge.	Ausgrid	Livingstone Road bridge	<ul style="list-style-type: none"> Local heritage - Interwar Residential Precincts - Hollands Avenue (C35); St Nicholas Greek Orthodox Church, including interiors (I102) 	<ul style="list-style-type: none"> Ness Park St Nicholas Greek Orthodox Church
Power (AG6495) Size: 2 x 150GI conduits Affected length: 57 Utility information: Conduits with HV and AUX cables and parallel 1 x direct laid cable in western footway of Livingstone Road Bridge parallel to 33kV cables.	Ausgrid	Livingstone Road bridge	<ul style="list-style-type: none"> Local heritage - Interwar Residential Precincts - Hollands Avenue (C35); St Nicholas Greek Orthodox Church, including interiors (I102) 	<ul style="list-style-type: none"> Ness Park St Nicholas Greek Orthodox Church
Power (AG6490) Size: TBC Affected length: 61 Utility information: Overhead powerlines at Albermarle Street Bridge.	Ausgrid	Albermarle Street / Kays Avenue	<ul style="list-style-type: none"> Local heritage - South Dulwich Hill Conservation Area (C29) 	<ul style="list-style-type: none"> None
Sewer (WW4000) Size: DN225 VC Affected length: 60 Utility information: passing under railway tracks east of Wilga Avenue to school Parade.	SWC - sewer	School Parade	<ul style="list-style-type: none"> Local heritage - South Dulwich Hill Conservation Area (C29) 	<ul style="list-style-type: none"> None

Utility ID	Owner	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ²
<p>Communications (TE9400)</p> <p>Size: 7 x A100 conduits</p> <p>Type: Optic Fibre</p> <p>Affected length: 53</p> <p>Utility information: Bank of conduits in a 2 x 3 conduit configuration plus a single conduit. Major cable/conduit network passing under existing railway tracks from Wilga Avenue to School Parade.</p>	Telstra	School Parade / Wilga Avenue	<ul style="list-style-type: none"> Local heritage - South Dulwich Hill Conservation Area (C29) 	<ul style="list-style-type: none"> None
<p>Sewer (WW4100)</p> <p>Size: 2032 mm x 2336 mm Brick Tunnel</p> <p>affected length: 90</p> <p>Utility information: In tunnel under existing station from Wardell Road to Dudley St.</p>	SWC - sewer	Wardell Road / Dudley Street	<ul style="list-style-type: none"> Section 170 Heritage Register - Dulwich Hill Railway Station Group Local heritage - South Dulwich Hill Conservation Area (C29) 	<ul style="list-style-type: none"> None

Utility ID	Owner	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ²
<p>Communications (TE9500)</p> <p>Size: 6 x A100 conduits</p> <p>Type: Optic Fibre</p> <p>Affected length: 52</p> <p>Utility information: Bank of conduits in a 2 x 3 conduits configuration. Major cable/conduit network. To be confirmed whether through eastern footpath in Wardell Road Bridge or through embankment and under existing platform.</p>	Telstra	Wardell Road / Bedford Crescent	<ul style="list-style-type: none"> Local heritage - South Dulwich Hill Conservation Area (C29) Section 170 Heritage Register - Dulwich Hill Railway Station Group 	<ul style="list-style-type: none"> None
<p>Power (AG6550)</p> <p>Size: TBC</p> <p>Affected length: 77</p> <p>Utility information: Overhead powerlines at Wardell Road Bridge.</p>	Ausgrid	Wardell Road / Dudley Street	<ul style="list-style-type: none"> Local heritage - South Dulwich Hill Conservation Area (C29) Section 170 Heritage Register - Dulwich Hill Railway Station Group 	<ul style="list-style-type: none"> None

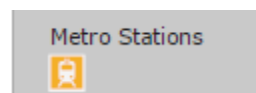
Utility ID	Owner	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ²
Power (AG6500) Size: 3 x 100 GI conduits Affected length: 46 Utility information: Conduits with HV and AUX cables through eastern footway in Wardell Road Bridge as per details on DBYD plans. DBYD plans show 0.3 m cover over conduits.	Ausgrid	Wardell Road bridge	<ul style="list-style-type: none"> Local heritage - South Dulwich Hill Conservation Area (C29) Section 170 Heritage Register - Dulwich Hill Railway Station Group 	<ul style="list-style-type: none"> None
Sewer (WW4200) Size: DN225 VC Affected length: 58 Utility information: In tunnel under existing station west of Wardell Road Bridge.	SWC - sewer	Wardell Road / Dudley Street	<ul style="list-style-type: none"> Local heritage - South Dulwich Hill Conservation Area (C29) Section 170 Heritage Register - Dulwich Hill Railway Station Group 	<ul style="list-style-type: none"> None
Power (AG6600) Size: See comments Affected length: 38 Utility information: Under Terrace Road underpass. Direct buried HV and AUX cables with 0.6 m cover and LV cable through trench with 0.6 m cover as per details on DBYD plans.	Ausgrid	Terrace Road / Ewart Street	<ul style="list-style-type: none"> Local heritage - Gladstone Hall including interiors (I13) Section 170 Heritage Register – Gladstone Hall 	<ul style="list-style-type: none"> Jack Shanahan Park Dulwich Hill Skate Park

Utility ID	Owner	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ²
Gas (JE4100) Size: 550 mm Affected length: 38 Utility information: Steel main, primary main 3500 kPa. In Terrace Road underpass.	Jemena	Terrace Road / Ewart Street	<ul style="list-style-type: none"> Local heritage - Gladstone Hall including interiors (I13) Section 170 Heritage Register – Gladstone Hall 	<ul style="list-style-type: none"> Jack Shanahan Park Dulwich Hill Skate Park
Power (AG6610) Size: TBC Affected length: 54 Lateral Longitudinal: Utility information: Overhead powerlines through Terrace Rd underpass.	Ausgrid	Terrace Road / Ewart Street	<ul style="list-style-type: none"> Local heritage - Gladstone Hall including interiors (I13) Section 170 Heritage Register – Gladstone Hall 	<ul style="list-style-type: none"> Jack Shanahan Park Dulwich Hill Skate Park
Communications (TE9650) Size: 2 x E100 conduits Type: Optic Fibre Affected length: 44 Utility information: In western footpath of Terrace Road underpass, 0.5 m cover. Major cable/conduit network.	Telstra	Terrace Road / Ewart Street	<ul style="list-style-type: none"> Local heritage - Gladstone Hall including interiors (I13) Section 170 Heritage Register – Gladstone Hall 	<ul style="list-style-type: none"> Jack Shanahan Park Dulwich Hill Skate Park

Utility ID	Owner	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ²
Sewer (WW4300) Size: 1066 mm x 1371 mm Brick Tunnel Affected length: 74 Utility information: Brick tunnel/oviform, Ewart Street to Terrace Road west of Terrace Road underpass.	SWC - sewer	Ewart Street / Terrace Road	<ul style="list-style-type: none"> Local heritage - Gladstone Hall including interiors (I13) Section 170 Heritage Register – Gladstone Hall 	<ul style="list-style-type: none"> Jack Shanahan Park Dulwich Hill Skate Park

**Utilities**

—	Not affected
—	Affected/diverted
—	Affected/removed

Design**Heritage**

—	State Heritage Curtilage
—	s170 Heritage (Jan 2014)
—	Heritage (LEP)
—	State Heritage Act
—	Conservation Area - General
—	Conservation Area - Aboriginal
—	Conservation Area - Landscape
—	Item - General
—	Item - Aboriginal
—	Item - Archaeological
—	Item - Landscape

Biodiversity

—	Threatened fauna
—	Threatened flora
—	Biodiversity assessment (South West)
—	Acacia Pubescens
—	Acacia Pubescens patches
—	Estuarine Mangrove Forest
—	Estuarine Swamp Oak Forest

Figure 2 Heritage and biodiversity constraints within the Dulwich Hill precinct

4.3. Hurlstone Park precinct

Environmental and community constraints identified within the vicinity of major utilities in the Hurlstone Park precinct are presented in Table 3 and shown on Figure 3.

Table 3 Constraints within the vicinity of major utilities within the Hurlstone Park precinct

Utility ID	Owner	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ³
Garnet Street to Melford Street				
Gas (OT0300) Size: DN150 Affected length: 1775 Utility information: depth and location to be confirmed. Pipeline traverses corridor. No DSS information available. Pipe in steel casing on top of embankment under Wardell Road Bridge, approx. CH 7 km 820, and crosses under Terrace Road, approx. Ch 8 km 180 as advised by Freyssinet. At Hurlstone Park Station, approx CH 8 km 700 – 8 km 900 the pipe sits on top of the retaining wall, same height as gutter then runs down embankment and at back of building, and crosses under Foord St, approx CH 9 km 090.	Qenos	Runs along the rail corridor	<ul style="list-style-type: none"> Local heritage - Victorian and Federation Railway Station Buildings (I24); Railway underbridge (I126) Section 170 Heritage Register - Hurlstone Park Station Railway Group; Hurlstone Park Underbridge 	<ul style="list-style-type: none"> Dulwich Hill Child Care Centre

³ Constraints have been derived from the Environmental Impact Statement prepared for the project

Utility ID	Owner	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ³
Gas (OT0360) Size: DN150 Affected length: 38 Utility information: Depth and location to be confirmed as not shown on Sydney Trains DSS. Pipe passes under edge of approach to Duntroon Street Bridge as advised by Freyssinet. Approx. CH 8 km 700.	Qenos	Floss Street	<ul style="list-style-type: none"> Local heritage - Victorian and Federation Railway Station Buildings (I24); Railway underbridge (I126) Section 170 Heritage Register - Hurlstone Park Station Railway Group; Hurlstone Park Underbridge 	<ul style="list-style-type: none"> None
Gas (OT0370) Size: DN150 Affected length: 52 Utility information: East of Foord Avenue underpass. Depth and location to be confirmed as not shown on Sydney Trains DSS.	Qenos	Off Railway Street	<ul style="list-style-type: none"> Local heritage - Railway underbridge (I126) Section 170 Heritage Register - Hurlstone Park Underbridge 	<ul style="list-style-type: none"> None

Utility ID	Owner	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ³
<p>Gas (OT0400)</p> <p>Size: DN150 Affected length: 1665 Utility information: depth to be confirmed. Pipeline traverses corridor. Alignment as per DSS information received from Sydney Trains apart from missing alignment between Cooks River and Canterbury Rd approx. track CH 10 km 350 - CH 10 km 100, and CH 9 km 300 - CH 9 km 100. Pipe set back from bridge at Canterbury Rd and runs offline from railway through to adjacent building however being relocated back to edge of property boundary to where shown on As-built /GIS, approx. CH 10 km 060 - CH 10 km 250. Pipe attached to bottom of rail bridge at Charles St. approx. CH 10 km 450.</p>	Qenos	Traverses Melford Street	<ul style="list-style-type: none"> Local heritage - Railway underbridge (I126) Section 170 Heritage Register - Hurlstone Park Underbridge 	<ul style="list-style-type: none"> Boat Harbour
<p>Communications (TE9690)</p> <p>Size: C150 conduit Type: TBC Affected Length: 40 Utility Information: Through eastern footpath of Garnet Street Bridge. Major cable/conduit network.</p>	Telstra	Garnet Street	<ul style="list-style-type: none"> No heritage listed items 	<ul style="list-style-type: none"> Dulwich Hill Child Care Centre

Utility ID	Owner	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ³
Power (AG6690) Size: TBC Affected Length: 44 Utility Information: Overhead powerlines at Garnet Street Bridge.	Ausgrid	Garnet Street Bridge	<ul style="list-style-type: none"> No heritage listed items 	<ul style="list-style-type: none"> Dulwich Hill Child Care Centre
Communications (OP5000) Size: P50 conduit Affected Length: 39 Utility Information: Through Duntroon Street Bridge eastern footway. Uecomm/Optus fibre optic cable. Location is approximate as sketched up from information obtained from DBYD and the alignment/location to be confirmed.	Optus	Floss Street / Duntroon Street	<ul style="list-style-type: none"> Section 170 Heritage Register - Hurlstone Park Station Railway Group Local heritage - Victorian and Federation Railway Station Buildings (I24) 	<ul style="list-style-type: none"> None
Communications (TE9700) Size: 2 x P100 conduits Type: Optic Fibre Affected Length: 39 Utility Information: Through eastern footpath of Duntroon Street Bridge, 0.2 m cover. Major cable/conduit network.	Telstra	Duntroon Street / Floss Street	<ul style="list-style-type: none"> Section 170 Heritage Register - Hurlstone Park Station Railway Group Local heritage - Victorian and Federation Railway Station Buildings (I24) 	<ul style="list-style-type: none"> None

Utility ID	Owner	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ³
<p>Gas (JE5000)</p> <p>Size: 75 mm NY Affected Length: 40 Utility Information: 75 mm nylon main inserted into 4 inch cast iron main, network main 210 kPa. Through Duntroon Street Bridge eastern footway.</p>	Jemena	Floss Street	<ul style="list-style-type: none"> Section 170 Heritage Register - Hurlstone Park Station Railway Group Local heritage - Victorian and Federation Railway Station Buildings (I24) 	<ul style="list-style-type: none"> None
<p>Power (AG6710)</p> <p>Size: TBC Affected Length: Null Utility Information: Overhead power lines over bridge and Duntroon Street / Floss Street intersection.</p>	Ausgrid	Floss Street / Duntroon Street	<ul style="list-style-type: none"> Section 170 Heritage Register - Hurlstone Park Station Railway Group Local heritage - Victorian and Federation Railway Station Buildings (I24) 	<ul style="list-style-type: none"> None
<p>Power (AG6700)</p> <p>Size: See comments Affected Length: 100 Utility Information: Direct buried and part through 2 x 125 PVC conduits HV, AUX and abandoned cables through western footway of Duntroon Street Bridge, 0.4 - 0.6 m cover.</p>	Ausgrid	Floss Street / Duntroon Street	<ul style="list-style-type: none"> Section 170 Heritage Register - Hurlstone Park Station Railway Group Local heritage - Victorian and Federation Railway Station Buildings (I24) 	<ul style="list-style-type: none"> None
<p>Power (AG6705)</p> <p>Size: See comments Affected Length: 30 Utility Information: Direct buried HV and abandoned cables under Duntroon Street and Floss Street intersection.</p>	Ausgrid	Floss Street	<ul style="list-style-type: none"> Section 170 Heritage Register - Hurlstone Park Station Railway Group Local heritage - Victorian and Federation Railway Station Buildings (I24) 	<ul style="list-style-type: none"> None

Utility ID	Owner	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ³
<p>Communications (TE9801)</p> <p>Size: Aerial cable Type: Service Connection Affected Length: 17 Utility Information: Service connection to existing property. Distribution/local area network.</p>	Telstra	Duntroon Street / Floss Street	<ul style="list-style-type: none"> Section 170 Heritage Register - Hurlstone Park Station Railway Group Local heritage - Victorian and Federation Railway Station Buildings (I24) 	<ul style="list-style-type: none"> None
<p>Sewer (WW5001)</p> <p>Size: DN225 VC Affected Length: 48 Utility Information: Sewer line along back boundary of 107 Duntroon Street. Sewer approx. 2 m deep based on DBYD received plans.</p>	SWC - sewer	Duntroon Street	<ul style="list-style-type: none"> Section 170 Heritage Register - Hurlstone Park Station Railway Group Local heritage - Victorian and Federation Railway Station Buildings (I24) 	<ul style="list-style-type: none"> None
<p>Sewer (WW5002)</p> <p>Size: DN225 VC Affected Length: 48 Utility Information: Sewer line along back boundary of 107 Duntroon Street. Sewer approx. 2 m deep based on DBYD received plans.</p>	SWC - sewer	Duntroon Street	<ul style="list-style-type: none"> Section 170 Heritage Register - Hurlstone Park Station Railway Group Local heritage - Victorian and Federation Railway Station Buildings (I24) 	<ul style="list-style-type: none"> None
<p>Sewer (WW5000)</p> <p>Size: 1066 mm x 1371 mm Conc Affected Length: 97 Utility Information: Passing under railway tracks from back of lots at Floss Street.</p>	SWC - sewer	Off Commons Street	<ul style="list-style-type: none"> Section 170 Heritage Register- Hurlstone Park Station Railway Group Local heritage - Victorian and Federation Railway Station Buildings (I24) 	<ul style="list-style-type: none"> None

Utility ID	Owner	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ³
<p>Sewer (WW5100)</p> <p>Size: 482 mm x 736 mm Conc</p> <p>Affected Length: 72</p> <p>Utility Information: In tunnel. Passing under railway tracks west of WW5000.</p>	SWC - sewer	Off Hopetoun Street	<ul style="list-style-type: none"> Section 170 Heritage Register - Hurlstone Park Station Railway Group Local heritage - Victorian and Federation Railway Station Buildings (I24) 	<ul style="list-style-type: none"> None
<p>Power (AG6720)</p> <p>Size: See comments</p> <p>Affected Length: 52</p> <p>Utility Information: Under Foord Rd underpass. Direct buried HV and abandoned cables with 0.8 m cover and LV cable through trench with 0.8 m cover as per details on DBYD plans.</p>	Ausgrid	Foord Avenue	<ul style="list-style-type: none"> Local heritage - Railway Underbridge (I26) Section 170 Heritage Register - Hurlstone Park Underbridge 	<ul style="list-style-type: none"> None
<p>Communications (TE9950)</p> <p>Size: Direct buried cable</p> <p>Type: TBC</p> <p>Affected Length: 44</p> <p>Utility Information: Passing under existing railway tracks to the west of Foord Avenue underpass. 0.3 - 0.4 m cover, to be confirmed.</p>	Telstra	Between Keir Avenue and Kilbride Street	<ul style="list-style-type: none"> No heritage listed items 	<ul style="list-style-type: none"> None

**Utilities**

- Not affected
- Affected/diverted
- Affected/removed

Design

Metro Stations

**Heritage**

State Heritage Curtilage



s170 Heritage (Jan 2014)



Heritage (LEP)

- State Heritage Act
- Conservation Area - General
- Conservation Area - Aboriginal
- Conservation Area - Landscape
- Item - General
- Item - Aboriginal
- Item - Archaeological
- Item - Landscape

Biodiversity

Threatened fauna



Threatened flora



Biodiversity assessment (South West)

Acacia Pubescens



Acacia Pubescens patches

 Estuarine Mangrove Forest Estuarine Swamp Oak Forest

Figure 3 Heritage and biodiversity constraints within the Hurlstone Park precinct

4.4. Canterbury precinct

Environmental and community constraints identified within the vicinity of major utilities in the Dulwich Hill precinct are presented in Table 4 and shown on Figure 4.

Table 4 Constraints within the vicinity of major utilities within the Canterbury precinct

Utility ID	Owner	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ⁴
Melford Street to Cooks River				
Gas (OT0400) Size: DN150 Affected length: 1665 Utility information: depth to be confirmed. Pipeline traverses corridor. Alignment as per DSS information received from Sydney Trains apart from missing alignment between Cooks River and Canterbury Rd approx. track CH 10 km 350 - CH 10 km 100, and CH 9 km 300 - CH 9 km 100. Pipe set back from bridge at Canterbury Rd and runs offline from railway through to adjacent building however being relocated back to edge of property boundary to where shown on As-built /GIS, approx. CH 10 km 060 - CH 10 km 250. Pipe attached to bottom of rail bridge at Charles St. approx. CH 10	Qenos	Traverses Melford Street	<ul style="list-style-type: none"> State Heritage Register – Old Sugarmill (00290); Canterbury Railway Station Group (01109) Local heritage - Canterbury Sugar Mill (former) (I82); Federation Railway Station Buildings (I67); Federation post office building (formerly Canterbury Post Office) (I66); Inter war hotel (former Hotel Canterbury) (I82); Federation railway bridge (I172) Section 170 Heritage Register - Electricity substation No. 275; Canterbury Railway Group; Canterbury (Cooks River Underbridge) Estuarine Mangrove Forest 	<ul style="list-style-type: none"> Boat harbour Warwick Reserve Former Canterbury Bowling and Community Club Dog Park Tasker Park Canterbury Aquatic Centre Little Tasker Park Aerialize, Sydney Aerial Theatre

⁴ Constraints have been derived from the Environmental Impact Statement prepared for the project

Utility ID	Owner	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ⁴
km 450.				
Gas (OT0410) Size: DN150 Affected length: 175 Utility information: West of Melford St Bridge. Pipeline laid shallow through this section, 1m depth, as advised by Freyssinet.	Qenos	Hutton Street	<ul style="list-style-type: none"> No heritage listed items 	<ul style="list-style-type: none"> Boat Harbour Warwick Reserve
Gas (OT0420) Size: DN150 Affected length: 45 Utility information: Near western end of Canterbury Station platforms. Depth and location to be confirmed as not show on Sydney Trains DSS.	Qenos	Charles Street	<ul style="list-style-type: none"> State Heritage Register – Canterbury Railway Station Group (01109) Local heritage - Federation Railway Station Buildings (I67) Section 170 Heritage Register - Canterbury Railway Group 	<ul style="list-style-type: none"> None
Power (AG6740) Size: Direct laid cables Affected Length: 43 Utility Information: 6 off direct laid cables through Melford Street Bridge with checker plate over cables. DBYD plans show checker plate over cables with 0.3 m cover.	Ausgrid	Melford Street	<ul style="list-style-type: none"> No heritage listed items 	<ul style="list-style-type: none"> Boat Harbour

Utility ID	Owner	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ⁴
Power (AG6760) Size: TBC Affected Length: 43 Utility Information: Overhead powerlines at Melford Street Bridge.	Ausgrid	Melford Street	<ul style="list-style-type: none"> No heritage listed items 	<ul style="list-style-type: none"> Boat Harbour
Sewer (WW6000) Size: TBC Affected Length: 35 Utility Information: Disused sewer main at Church Street overpass.	SWC - sewer	Off Church Street	<ul style="list-style-type: none"> State Heritage Register – Old Sugarmill (00290) Local heritage - Canterbury Sugar Mill (former) (I82) Section 170 Heritage Register - Electricity substation No. 275 	<ul style="list-style-type: none"> Former Canterbury Bowling and Community Club Warwick Reserve Boat Harbour
Power (AG6780) Size: 1 x 125 PVC conduit Affected Length: 62 Utility Information: Through pedestrian/cycle bridge from Church Street to Hutton Street in bridge concrete duct. No cover depth recorded on DBYD plans.	Ausgrid	Off Church Street	<ul style="list-style-type: none"> State Heritage Register – Old Sugarmill (00290) Local heritage - Canterbury Sugar Mill (former) (I82) Section 170 Heritage Register - Electricity substation No. 275 	<ul style="list-style-type: none"> Former Canterbury Bowling and Community Club Warwick Reserve Boat Harbour
Sewer (WW6100) Size: TBC Affected Length: 35 Utility Information: Disused sewer main at Church Street overpass.	SWC - sewer	Off Church Street	<ul style="list-style-type: none"> State Heritage Register – Old Sugarmill (00290) Local heritage - Canterbury Sugar Mill (former) (I82) Section 170 Heritage Register - Electricity substation No. 275 	<ul style="list-style-type: none"> Former Canterbury Bowling and Community Club Warwick Reserve Boat Harbour

Utility ID	Owner	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ⁴
<p>Communications (TE10140)</p> <p>Size: P100 conduit Type: TBC Affected Length: 21 Utility Information: Under footpath at corner of Tincombe Street and Canterbury Road.</p>	Telstra	Canterbury Road	<ul style="list-style-type: none"> State Heritage Register - Canterbury Railway Station Group (01109) Local heritage - Federation Railway Station Buildings (I67); Federation post office building (formerly Canterbury Post Office) (I66); Inter war hotel (former Hotel Canterbury) (I82) Section 170 Heritage Register - Canterbury Railway Group 	<ul style="list-style-type: none"> Former Canterbury Bowling and Community Club
<p>Communications (TE10100)</p> <p>Size: 12 x P100 conduits Type: Optic Fibre Affected Length: 39 Utility Information: Through Canterbury Road Bridge northern footway. Bank of conduits in a 3 x 4 conduits configuration. Major cable/conduit network, 0.4 - 0.7 m cover.</p>	Telstra	Canterbury Road	<ul style="list-style-type: none"> State Heritage Register - Canterbury Railway Station Group (01109) Local heritage - Federation Railway Station Buildings (I67); Federation post office building (formerly Canterbury Post Office) (I66); Inter war hotel (former Hotel Canterbury) (I82) Section 170 Heritage Register - Canterbury Railway Group 	<ul style="list-style-type: none"> Former Canterbury Bowling and Community Club
<p>Communications (TE10200)</p> <p>Size: P20 Type: TBC Affected Length: 35 Utility Information: Service line to Canterbury Station concourse.</p>	Telstra	Canterbury Road	<ul style="list-style-type: none"> State Heritage Register - Canterbury Railway Station Group (01109) Local heritage - Federation Railway Station Buildings (I67); Federation post office building (formerly Canterbury Post Office) (I66); Inter war hotel (former Hotel Canterbury) (I82) Section 170 Heritage Register - Canterbury Railway Group 	<ul style="list-style-type: none"> Former Canterbury Bowling and Community Club

Utility ID	Owner	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ⁴
<p>Communications (TE10120)</p> <p>Size: P20 Type: TBC Affected Length: 16 Utility Information: Under Canterbury Road on western side of Canterbury Road Bridge.</p>	Telstra	Canterbury Road	<ul style="list-style-type: none"> State Heritage Register - Canterbury Railway Station Group (01109) Local heritage - Federation Railway Station Buildings (I67); Federation post office building (formerly Canterbury Post Office) (I66); Inter war hotel (former Hotel Canterbury) (I82) Section 170 Heritage Register - Canterbury Railway Group 	<ul style="list-style-type: none"> Former Canterbury Bowling and Community Club
<p>Gas (JE6000)</p> <p>Size: 110 mm NY Affected Length: 40 Utility Information: 110 mm nylon main inserted into 12 inch cast iron main, network main 210 kPa. Through Canterbury Rd Bridge eastern footway.</p>	Jemena	Canterbury Road	<ul style="list-style-type: none"> State Heritage Register - Canterbury Railway Station Group (01109) Local heritage - Federation Railway Station Buildings (I67); Federation post office building (formerly Canterbury Post Office) (I66); Inter war hotel (former Hotel Canterbury) (I82) Section 170 Heritage Register - Canterbury Railway Group 	<ul style="list-style-type: none"> Former Canterbury Bowling and Community Club
<p>Gas (JE6200)</p> <p>Size: 75 mm NY Affected Length: 22 Utility Information: 75 mm nylon main inserted into 4 inch cast iron main, network main 7 kPa. Through Canterbury Road Bridge western footway.</p>	Jemena	Canterbury Road	<ul style="list-style-type: none"> State Heritage Register - Canterbury Railway Station Group (01109) Local heritage - Federation Railway Station Buildings (I67); Federation post office building (formerly Canterbury Post Office) (I66); Inter war hotel (former Hotel Canterbury) (I82) Section 170 Heritage Register - Canterbury Railway Group 	<ul style="list-style-type: none"> Former Canterbury Bowling and Community Club

Utility ID	Owner	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ⁴
Power (AG6800) Affected Length: 40 Utility Information: 8 off direct laid HV and abandoned cables through eastern footway of Canterbury Road Bridge with 0.6-0.7 m cover as per details on DBYD plans.	Ausgrid	Canterbury Road	<ul style="list-style-type: none"> State Heritage Register - Canterbury Railway Station Group (01109) Local heritage - Federation Railway Station Buildings (I67); Federation post office building (formerly Canterbury Post Office) (I66); Inter war hotel (former Hotel Canterbury) (I82) Section 170 Heritage Register - Canterbury Railway Group 	<ul style="list-style-type: none"> Former Canterbury Bowling and Community Club
Power (AG6820) Size: TBC Affected Length: 56 Utility Information: Overhead powerlines at Canterbury Rd Bridge.	Ausgrid	Canterbury Road	<ul style="list-style-type: none"> State Heritage Register - Canterbury Railway Station Group (01109) Local heritage - Federation Railway Station Buildings (I67); Federation post office building (formerly Canterbury Post Office) (I66); Inter war hotel (former Hotel Canterbury) (I82) Section 170 Heritage Register - Canterbury Railway Group 	<ul style="list-style-type: none"> Former Canterbury Bowling and Community Club
Sewer (WW6200) Size: DN225 VC Affected Length: 54 Utility Information: Passing under railway tracks east of Charles St underpass.	SWC - sewer	Off Charles Street	<ul style="list-style-type: none"> State Heritage Register - Canterbury Railway Station Group (01109) Local heritage - Federation Railway Station Buildings (I67) Section 170 Heritage Register - Canterbury Railway Group 	<ul style="list-style-type: none"> Canterbury Park Racecourse.

Utility ID	Owner	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ⁴
<p>Communications (OP6000)</p> <p>Size: TBC</p> <p>Affected Length: 30</p> <p>Utility Information: Under Charles Street west of Canterbury Station. Optus owned underground cable and conduit.</p>	Optus	Charles Street	<ul style="list-style-type: none"> No heritage listed items 	<ul style="list-style-type: none"> None



Utilities

- Not affected
- Affected/diverted
- Affected/removed

Design

Metro Stations



Heritage

State Heritage Curtilage



s170 Heritage (Jan 2014)



Heritage (LEP)



State Heritage Act



Conservation Area - General



Conservation Area - Aboriginal



Conservation Area - Landscape



Item - General



Item - Aboriginal



Item - Archaeological



Item - Landscape

Biodiversity

Threatened fauna



Threatened flora



Biodiversity assessment (South West)

Acacia Pubescens



Acacia Pubescens patches



Estuarine Mangrove Forest



Estuarine Swamp Oak Forest



Figure 4 Heritage and biodiversity constraints within the Canterbury precinct

4.5. Campsie precinct

Environmental and community constraints identified within the vicinity of major utilities in the Campsie precinct are presented in Table 5 and shown on Figure 5.

Table 5 Constraints within the vicinity of major utilities within the Campsie precinct

Utility ID	Owner	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ⁵
Cooks River to Browning and Park Streets				
Gas (OT0400) Size: DN150 Affected length: 1665 Utility information: depth to be confirmed. Pipeline traverses corridor. Alignment as per DSS information received from Sydney Trains apart from missing alignment between Cooks River and Canterbury Rd approx. track CH 10 km 350 - CH 10 km 100 and CH 9 km 300 - CH 9 km 100. Pipe set back from bridge at Canterbury Rd and runs offline from railway through to adjacent building however being relocated back to edge of property boundary to where shown on As-built /GIS, approx. CH 10 km 060 - CH 10 km 250. Pipe attached to bottom of rail bridge at Charles St. approx. CH 10 km 450.	Qenos	Traverses Wairose Street	<ul style="list-style-type: none"> Local heritage - Federation railway bridge (I172) Section 170 Heritage Register - Canterbury River (Cooks Underbridge) Estuarine Mangrove Forest 	<ul style="list-style-type: none"> Tasker Park Canterbury Aquatic Centre Little Tasker Park Canterbury Olympic Ice Rink

⁵ Constraints have been derived from the Environmental Impact Statement prepared for the project

Utility ID	Owner	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ⁵
<p>Gas (OT0500)</p> <p>Size: DN150 Affected length: 1770 Utility information: Depth to be confirmed. Pipeline traverses corridor. Alignment as per DSS information received from Sydney Trains. Pipeline crosses under Wairoa St, approx. CH 10km 720, at Campsie Station, CH 11 km 600 - CH 11 km 800, it runs up platform at 1m - 0.5 m from edge of lift well, and it then crosses and follows the good line.</p>	Qenos	South Parade	<ul style="list-style-type: none"> Threatened flora - Acacia bynoeana (Bynoe's Wattle) 	<ul style="list-style-type: none"> Canterbury Aquatic Centre Little Tasker Park Canterbury Olympic Ice Rink
<p>Power (TG3000)</p> <p>Size: 132kV Affected Length: 144 Utility Information: Overhead 132kV transmission lines west of Canterbury Station and The Cooks River.</p>	Transgrid	Cooks River	<ul style="list-style-type: none"> Local heritage - Federation railway bridge (I72) Section 170 Heritage Register - Canterbury (Cooks River Underbridge) Estuarine Mangrove Forest Estuarine Swamp Oak Forest 	<ul style="list-style-type: none"> Little Tasker Park Tasker Park Canterbury Aquatic Centre Canterbury Olympic Ice Rink Canterbury Park Racecourse
<p>Communications (TE10250)</p> <p>Size: P100 conduit Type: Mains Copper Affected Length: 57 Utility Information: In Wairoa Street underpass, 0.3 - 0.5 m cover.</p>	Telstra	Wairoa Street	<ul style="list-style-type: none"> No heritage listed items 	<ul style="list-style-type: none"> Canterbury Aquatic Centre Canterbury Olympic Ice Rink Little Tasker Park

Utility ID	Owner	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ⁵
Gas (JE6300) Size: 110 mm NY Affected Length: 55 Utility Information: Network main 7 kPa. In Wairoa St underpass. Location is approximate as sketched up from information obtained from DBYD and the alignment/location to be confirmed.	Jemena	Wairoa Street	<ul style="list-style-type: none"> No heritage listed items 	<ul style="list-style-type: none"> Canterbury Aquatic Centre Canterbury Olympic Ice Rink Little Tasker Park
Power (AG6850) Size: 3 x 120 PVC conduits Affected Length: 59 Utility Information: In Wairoa St underpass. Conduits with HV, AUX, LV and SL cables with 0.6 m cover over the conduits as per details on DBYD plans.	Ausgrid	Wairoa Street	<ul style="list-style-type: none"> No heritage listed items 	<ul style="list-style-type: none"> Canterbury Aquatic Centre Canterbury Olympic Ice Rink Little Tasker Park
Browning and Park Streets to Lincoln Street / Thorncraft Parade				
Gas (OT0510) Size: DN150 Affected length: 272 Utility information: runs up back of car park between Park St and Beamish Lane just outside railway fence line then crossing at 90 degrees, as advised by Freyssinet. Depth to be confirmed.	Qenos	South Parade	<ul style="list-style-type: none"> Local heritage - Federation house (I61); Federation villa (I62); Inter war commercial building - Station House (I42); Federation commercial building - Coffill's Buildings (I41) Section 170 Heritage Register - Campsie Railway Station Group 	<ul style="list-style-type: none"> Campsie Public School

Utility ID	Owner	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ⁵
Gas (OT0520) Size: DN150 Affected length: 23 Utility information: At western end of Campsie Station platforms. Depth to be confirmed.	Qenos	Canterbury Station	<ul style="list-style-type: none"> Local heritage - Federation railway station buildings (I40) Section 170 Heritage Register - Campsie Railway Station Group 	<ul style="list-style-type: none"> Campsie Medical and Dental Centre Anzac Park and Square (mall) Campsie RSL Club
Gas (OT0500) Size: DN150 Affected length: 1770 Utility information: Depth to be confirmed. Pipeline traverses corridor. Alignment as per DSS information received from Sydney Trains. Pipeline crosses under Wairoa St, approx. CH 10km 720, at Campsie Station, CH 11 km 600 - CH 11 km 800, it runs up platform at 1m - 0.5 m from edge of lift well, and it then crosses and follows the good line.	Qenos	Runs along the rail corridor	<ul style="list-style-type: none"> Local heritage - Federation house (I61); Federation villa (I62); Inter war commercial building - Station House (I42); Federation commercial building - Coffill's Buildings (I41); Federation railway station buildings (I40); Inter war court house (former Campsie Court House) (I44) Section 170 Heritage Register - Campsie Railway Station Group 	<ul style="list-style-type: none"> Campsie Public School Campsie Medical and Dental Centre Anzac Park and Square (mall) Campsie RSL Club Campsie Day Surgery Campsie Police Station
Power (AG6900) Size: 2 x 150AC conduits Affected Length: 45 Utility Information: Crossing the railway corridor from North Parade to South Parade. Part direct buried and part through 2 x 150 AC conduits, under tracks, cables with 1.3-1.8 m cover as per details on DBYD plans.	Ausgrid	Browning Street / Park Street	<ul style="list-style-type: none"> No heritage listed items 	<ul style="list-style-type: none"> None

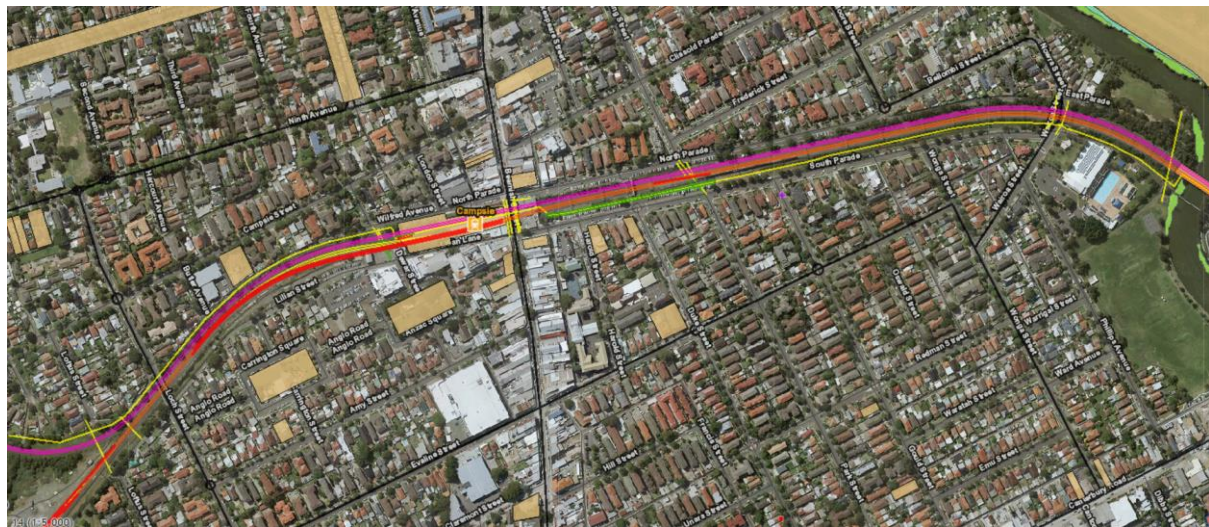
Utility ID	Owner	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ⁵
<p>Sewer (WW6500)</p> <p>Size: DN1500 RC</p> <p>Affected Length: 68</p> <p>Utility Information: Passing under railway tracks from Browning St to Park St.</p>	SWC - sewer	Browning Street / Park Street	<ul style="list-style-type: none"> No heritage listed items 	<ul style="list-style-type: none"> None
<p>Communications (TE10300)</p> <p>Size: 8 x P100 conduits</p> <p>Type: Optic Fibre</p> <p>Affected Length: 53</p> <p>Utility Information: Passing under existing track east of Campsie Station and along Bowing Street to Park Street alignment. Bank of conduits in a 2 x 4 conduits configuration. Major cable/conduits network.</p>	Telstra	Browning Street / Park Street	<ul style="list-style-type: none"> No heritage listed items 	<ul style="list-style-type: none"> None
<p>Communications (TE10500)</p> <p>Size: Varied</p> <p>Type: TBC</p> <p>Affected Length: 75</p> <p>Utility Information: Cables and conduits of varied configuration both major cable/conduit and distribution/local area network cables through western footpath on Beamish Road Bridge</p>	Telstra	North Parade / Beamish Street	<ul style="list-style-type: none"> Local heritage - Federation railway station buildings (I40); Federation commercial building - Coffill's Buildings (I41); Interwar commercial building - Station house (I42); War memorial clock tower (I34) Section 170 Heritage Register - Campsie Railway Station Group 	<ul style="list-style-type: none"> Campsie Medical and Dental Centre Campsie Public School

Utility ID	Owner	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ⁵
<p>Power (AG7000)</p> <p>Size: Direct laid cables</p> <p>Affected Length: 52</p> <p>Utility Information: 9 off direct laid HV and abandoned cables through eastern footway of Beamish Street Bridge with 0.2-0.6 m cover as per details on DBYD plans.</p>	Ausgrid	Beamish Street	<ul style="list-style-type: none"> Local heritage - Federation railway station buildings (I40); Federation commercial building - Coffill's Buildings (I41); Interwar commercial building - Station house (I42); War memorial clock tower (I34) Section 170 Heritage Register - Campsie Railway Station Group 	<ul style="list-style-type: none"> Campsie Medical and Dental Centre Campsie Public School
<p>Power (AG7050)</p> <p>SIZE: TBC</p> <p>Affected Length: 52</p> <p>Utility Information: Overhead powerlines at Beamish Street Bridge.</p>	Ausgrid	Beamish Street	<ul style="list-style-type: none"> Local heritage - Federation railway station buildings (I40); Federation commercial building - Coffill's Buildings (I41); Interwar commercial building - Station house (I42); War memorial clock tower (I34) Section 170 Heritage Register - Campsie Railway Station Group 	<ul style="list-style-type: none"> Campsie Medical and Dental Centre Campsie Public School
<p>Gas (JE7000)</p> <p>Size: 110mm NY</p> <p>Affected Length: 52</p> <p>Utility Information: 110 mm nylon main inserted into 6 inch cast iron main, network main 7 kPa. Through Beamish St Bridge eastern footway.</p>	Jemena	Beamish Street	<ul style="list-style-type: none"> Local heritage - Federation railway station buildings (I40); Interwar commercial building - Station house (I42); Federation commercial building - Coffill's Buildings (I41); War memorial clock tower (I34) Section 170 Heritage Register - Campsie Railway Station Group 	<ul style="list-style-type: none"> Campsie Medical and Dental Centre Campsie Public School

Utility ID	Owner	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ⁵
<p>Power (AG7100)</p> <p>Size: 2 x 125 PVC conduits</p> <p>Affected Length: 77</p> <p>Utility Information: HV cables through conduits under western footway of Beamish Street Bridge with 0.5 m cover as per details on DBYD plans.</p>	Ausgrid	Beamish Street	<ul style="list-style-type: none"> Local heritage - Federation railway station buildings (I40); Federation commercial building - Coffill's Buildings (I41); Interwar commercial building - Station house (I42); War memorial clock tower (I34) Section 170 Heritage Register - Campsie Railway Station Group 	<ul style="list-style-type: none"> Campsie Medical and Dental Centre Campsie Public School
<p>Gas (JE7100)</p> <p>Size: 75mm NY</p> <p>Affected Length: 52</p> <p>Utility Information: 75 mm nylon main inserted into 4 inch cast iron main, network main 7 kPa. Through Beamish Street Bridge western footway.</p>	Jemena	Beamish Street	<ul style="list-style-type: none"> Local heritage - Federation railway station buildings (I40); Federation commercial building - Coffill's Buildings (I41); Interwar commercial building - Station house (I42); War memorial clock tower (I34) Section 170 Heritage Register - Campsie Railway Station Group 	<ul style="list-style-type: none"> Campsie Medical and Dental Centre Campsie Public School
<p>Communications (TE10400)</p> <p>Size: Varied</p> <p>Type: TBC</p> <p>Affected Length: 60</p> <p>Utility Information: Cables and conduits of varied configuration both major cable/conduit and distribution/local area network cables through western footpath on Beamish Road Bridge</p>	Telstra	Beamish Street	<ul style="list-style-type: none"> Local heritage - Federation railway station buildings (I40); Federation commercial building - Coffill's Buildings (I41); Interwar commercial building - Station house (I42); War memorial clock tower (I34) Section 170 Heritage Register - Campsie Railway Station Group 	<ul style="list-style-type: none"> Campsie Medical and Dental Centre Campsie Public School

Utility ID	Owner	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ⁵
<p>Sewer (WW7000)</p> <p>Size: DN225 VC</p> <p>Affected Length: 50</p> <p>Utility Information: Relined sewer. Passing under railway tracks from Assets Street to Lillian Street.</p>	SWC - sewer	Assets Street / Dewar Street	<ul style="list-style-type: none"> Local heritage - Federation railway station buildings (I40) Section 170 Heritage Register - Campsie Railway Station Group 	<ul style="list-style-type: none"> Campsie RSL Club Campsie Medical and Dental Centre Anzac Park and Square (mall)
<p>Power (AG7200)</p> <p>Size: 6 x 100 PVC conduits</p> <p>Affected Length: 51</p> <p>Utility Information: Passing under existing tracks from Assets St to Dewar Street with 2 m cover over the conduits as per details on DBYD plans. Depth to be confirmed.</p>	Ausgrid	Assets Street / Dewar Street	<ul style="list-style-type: none"> Local heritage - Federation railway station buildings (I40) Section 170 Heritage Register - Campsie Railway Station Group 	<ul style="list-style-type: none"> Campsie RSL Club Campsie Medical and Dental Centre Anzac Park and Square (mall)
<p>Gas (JE7200)</p> <p>Size: 75 mm NY</p> <p>Affected Length: 42</p> <p>Utility Information: 75 mm nylon main inserted into 6 inch cast iron main, network main 7 kPa. Through Loch Street Bridge western footway.</p>	Jemena	Loch Street	<ul style="list-style-type: none"> No heritage listed items 	<ul style="list-style-type: none"> None
<p>Sewer (WW7100)</p> <p>Size: DN225 VC</p> <p>Affected Length: 45</p> <p>Utility Information: Passing under railway tracks from Loftus Street to Lillian Lane.</p>	SWC - sewer	Near Loch Street	<ul style="list-style-type: none"> No heritage listed items 	<ul style="list-style-type: none"> None

Utility ID	Owner	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ⁵
<p>Power (AG7300)</p> <p>Size: See comments</p> <p>Affected Length: 79</p> <p>Utility Information: 3 x 75 GI, 2 x 150 GI and 1 x 100 GI conduits, section HL1 on DBYD plans, passing under existing tracks at junction with freight line with HV and AUX cables through conduits. DBYD show 0.7-1.8 m cover over the conduits.</p>	Ausgrid	Loftus Street/ Lilian lane	<ul style="list-style-type: none"> No heritage listed items 	<ul style="list-style-type: none"> Peter Moore Fields



Utilities

- Not affected
- Affected/diverted
- Affected/removed

Design

Metro Stations



Heritage

- State Heritage Curtilage
- s170 Heritage (Jan 2014)
- Heritage (LEP)
 - State Heritage Act
 - Conservation Area - General
 - Conservation Area - Aboriginal
 - Conservation Area - Landscape
 - Item - General
 - Item - Aboriginal
 - Item - Archaeological
 - Item - Landscape

Biodiversity

- Threatened fauna
- Threatened flora
- Biodiversity assessment (South West)
 - Acacia Pubescens
 - Acacia Pubescens patches
 - Estuarine Mangrove Forest
 - Estuarine Swamp Oak Forest

Figure 5 Heritage and biodiversity constraints within the Campsie precinct

4.6. Belmore precinct

Environmental and community constraints identified within the vicinity of major utilities in the Dulwich Hill precinct are presented in Table 6 and shown on Figure 6.

Table 6 Constraints within the vicinity of major utilities within the Belmore precinct

Utility ID	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ⁶
Lincoln Street / Thorncraft Parade to Peel Street			
Sewer (WW7500) Size: DN400 VC Affected Length: 54 Utility Information: Relined sewer. In Belmore Park underpass.	Off Redman Parade	<ul style="list-style-type: none"> No heritage listed items 	<ul style="list-style-type: none"> Belmore Sports Ground
Power (AG8000) Size: 4 x 150 PVC conduits Affected Length: 95 Utility Information: Passing under existing tracks east of Belmore Station in a varied configuration (1 x 4 and 2 x 2 configuration) with HV and abandoned cables through conduits. DBYD plans show 1.8-2.2 m cover over the conduits.	Redman Parade	<ul style="list-style-type: none"> No heritage listed items 	<ul style="list-style-type: none"> Belmore Sports Ground Belmore Youth and Resource Centre
Communications (TE10510) Size: Varied Type: Optic Fibre Affected Length: Null Utility Information: From jointing pits in Redman Parade, 50 mm and 35 mm PVC ducts with optic fibre cables to existing buildings.	Redman Parade	<ul style="list-style-type: none"> State Heritage Register - Belmore Railway Station Group (01081) Local heritage - Federation railway station buildings (I11); Post-war bus shelter and public lavatories (I29) Section 170 Heritage Register - Belmore Railway Station Group 	<ul style="list-style-type: none"> Regis Delphi House Belmore The Maronite Sisters of the Holy Family Preschool, Montessori Australia Belmore Senior Citizens Centre Belmore Youth and Resource Centre Belmore Sports Ground

⁶ Constraints have been derived from the Environmental Impact Statement prepared for the project

Utility ID	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ⁶
<p>Communications (TE10550)</p> <p>Size: G20 Type: Mains Copper Affected Length: 14 Utility Information: Service line to Belmore Station concourse.</p>	Burwood Road	<ul style="list-style-type: none"> State Heritage Register - Belmore Railway Station Group (01081) Local heritage - Federation house (former station master's cottage) (I10); Federation railway station buildings (I11); Post-war bus shelter and public lavatories (I29) Section 170 Heritage Register - Belmore Railway Station Group 	<ul style="list-style-type: none"> Canterbury Leagues Club PCYC Belmore Regis Delphi House Belmore
<p>JE8000</p> <p>Size: 18 inch Affected Length: 32 Utility Information: Cast iron main, network main 7 kPa. Through Burwood Road eastern footway.</p>	Burwood Road	<ul style="list-style-type: none"> State Heritage Register - Belmore Railway Station Group (01081) Local heritage - Federation house (former station master's cottage) (I10); Federation railway station buildings (I11); Post-war bus shelter and public lavatories (I29) Section 170 Heritage Register - Belmore Railway Station Group 	<ul style="list-style-type: none"> Canterbury Leagues Club PCYC Belmore Regis Delphi House Belmore
<p>Power (AG8050)</p> <p>Size: TBC Affected Length: 40 Utility Information: Overhead powerlines at Burwood Road Bridge.</p>	Burwood Road	<ul style="list-style-type: none"> State Heritage Register - Belmore Railway Station Group (01081) Local heritage - Federation house (former station master's cottage) (I10); Federation railway station buildings (I11); Post-war bus shelter and public lavatories (I29) Section 170 Heritage Register - Belmore Railway Station Group 	<ul style="list-style-type: none"> Canterbury Leagues Club PCYC Belmore Regis Delphi House Belmore



Utilities

—	Not affected
—	Affected/diverted
—	Affected/removed

Design

Metro Stations

Heritage

■	State Heritage Curtilage
■	s170 Heritage (Jan 2014)
■	Heritage (LEP)
■	State Heritage Act
■	Conservation Area - General
■	Conservation Area - Aboriginal
■	Conservation Area - Landscape
■	Item - General
■	Item - Aboriginal
■	Item - Archaeological
■	Item - Landscape

Biodiversity

■	Threatened fauna
+	Threatened flora
+	Biodiversity assessment (South West)
+	Acacia Pubescens
■	Acacia Pubescens patches
■	Estuarine Mangrove Forest
■	Estuarine Swamp Oak Forest

Figure 6 Heritage and biodiversity constraints within the Belmore precinct

4.7. Lakemba precinct

Environmental and community constraints identified within the vicinity of major utilities in the Lakemba precinct are presented in Table 7 and shown on Figure 7.

Table 7 Constraints within the vicinity of major utilities within the Lakemba precinct

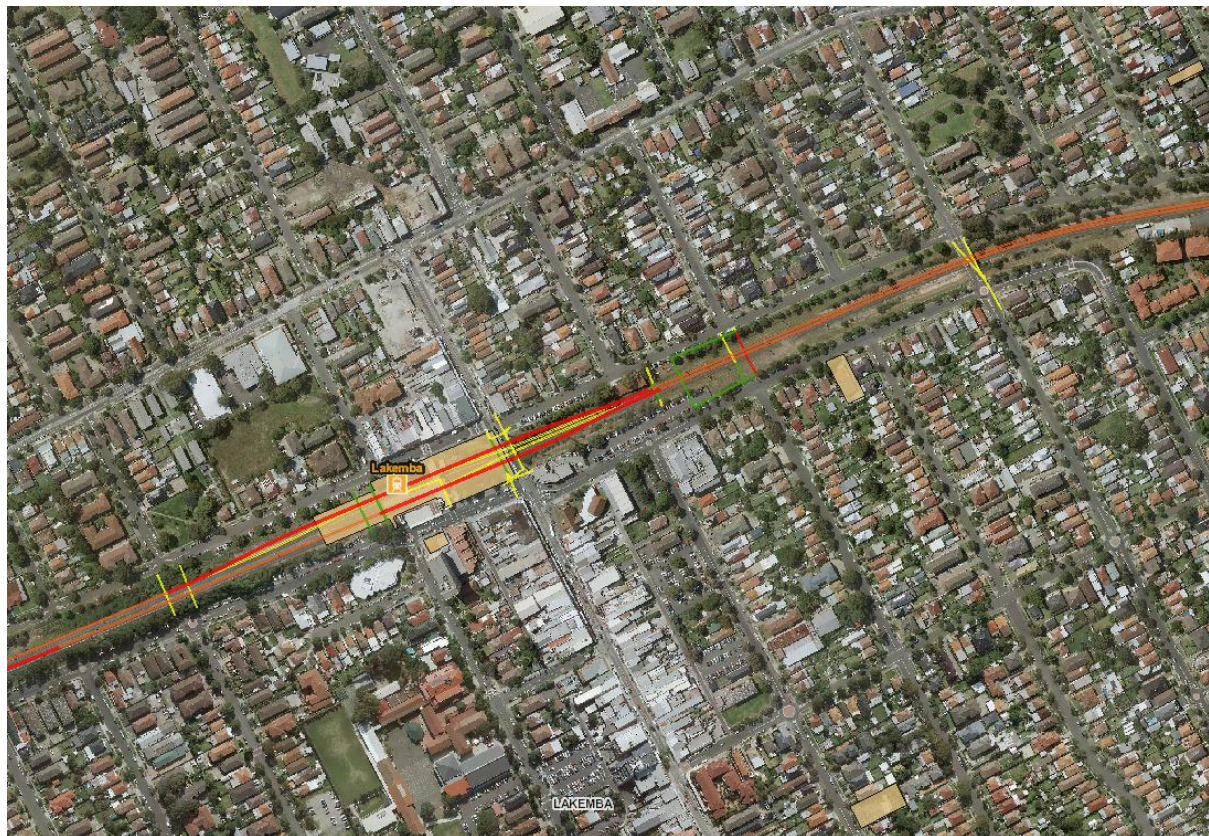
Utility ID	Owner	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ⁷
Peel Street to Ernest Street				
Power (AG8200) Size: Direct laid cables Affected Length: 41 Utility Information: 4 off direct laid HV and abandoned cables under eastern footway on Moreton Street Bridge. DBYD plans show 0.2 m cover over the cables.	Ausgrid	Moreton Street	<ul style="list-style-type: none"> No heritage listed items 	<ul style="list-style-type: none"> Peel Park
Power (AG8300) Size: TBC Affected Length: 49 Utility Information: Overhead powerlines at Moreton Street Bridge.	Ausgrid	Moreton Street	<ul style="list-style-type: none"> No heritage listed items 	<ul style="list-style-type: none"> Peek Park
Gas (JE9200) Size: 250 mm Affected Length: 47 Utility Information: Steel main, secondary main 1050 kPa. Passing under existing tracks along Dennis Street alignment from Railway Parade to The Boulevarde.	Jemena	Denis Street	<ul style="list-style-type: none"> No heritage listed items 	<ul style="list-style-type: none"> Canterbury City Community Centre The Lakemba Club
Sewer (WW9000) Size: DN225 SGW Affected Length: 47 Utility Information: In tunnel along Dennis St alignment.	SWC - sewer	Dennis Street	<ul style="list-style-type: none"> No heritage listed items 	<ul style="list-style-type: none"> Canterbury City Community Centre The Lakemba Club

⁷ Constraints have been derived from the Environmental Impact Statement prepared for the project

Utility ID	Owner	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ⁷
<p>Communications (TE10650)</p> <p>Size: 24 x A100 conduits</p> <p>Type: Optic Fibre</p> <p>Affected Length: 38</p> <p>Utility Information: Passing under existing tracks east of Lakemba Station and just to the east of Quigg Street alignment. Bank of conduits in a 6 x 4 conduits configuration. Major cable/conduits network.</p>	Telstra	Near Quigg Street	<ul style="list-style-type: none"> No heritage listed items 	<ul style="list-style-type: none"> The Lakemba Club Canterbury City Community Centre Lakemba Uniting Church
<p>Communications (Optus, OP9000)</p> <p>Size: TBC</p> <p>Affected Length: 38</p> <p>Utility Information: Passing under existing tracks east of Lakemba Station along Quigg Street alignment. Optus fibre through Telstra conduits. Refer Telstra asset.</p>	Optus	Near Quigg Street	<ul style="list-style-type: none"> No heritage listed items 	<ul style="list-style-type: none"> The Lakemba Club Canterbury City Community Centre Lakemba Uniting Church
<p>Power (AG9150)</p> <p>Size: TBC</p> <p>Affected Length: 46</p> <p>Utility Information: Overhead powerlines at Haldon Street Bridge.</p>	Ausgrid	Haldon Street	<ul style="list-style-type: none"> Local heritage - Federation railway station buildings (I143); Inter war post office building (I144) Section 170 Heritage Register- Lakemba Railway Station Group 	<ul style="list-style-type: none"> Lakemba Uniting Church Lakemba Medical Services Family Medical Centre
<p>Power (AG9000)</p> <p>Size: Direct laid cable</p> <p>Affected Length: 46</p> <p>Utility Information: 1 off direct laid HV cable in chase under eastern footpath on Haldon Street Bridge. DBYD plans show 0.4 m cover over the cable.</p>	Ausgrid	Haldon Street	<ul style="list-style-type: none"> Local heritage - Federation railway station buildings (I143); Inter war post office building (I144) Section 170 Heritage Register - Lakemba Railway Station Group 	<ul style="list-style-type: none"> Lakemba Uniting Church Lakemba Medical Services Family Medical Centre

Utility ID	Owner	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ⁷
Power (AG9050) Size: Direct laid cable Affected Length: 25 Utility Information: 1 off direct laid cable at southern approach to Haldon Street Bridge. Lateral to road. Cover depth and alignment to be confirmed.	Ausgrid	Haldon Street	<ul style="list-style-type: none"> Local heritage - Federation railway station buildings (I143); Inter war post office building (I144) Section 170 Heritage Register - Lakemba Railway Station Group 	<ul style="list-style-type: none"> Lakemba Uniting Church Lakemba Medical Services Family Medical Centre
Power (AG9100) Size: Direct laid cables Affected Length: 60 Utility Information: 4 off direct laid HV and abandoned cables in chase under western footpath on Haldon Street Bridge. DBYD plans show 0.2 m cover over the cables.	Ausgrid	Haldon Street	<ul style="list-style-type: none"> Local heritage - Federation railway station buildings (I143); Inter war post office building (I144) Section 170 Heritage Register - Lakemba Railway Station Group 	<ul style="list-style-type: none"> Canterbury City Community Centre Lakemba Uniting Church Lakemba Medical Services Family Medical Centre
Communications (TE10600) Size: Varied Type: TBC Affected Length: Null Utility Information: Cables and conduits of varied configuration both major cable/conduit and distribution/local area network cables through Haldon Street Bridge.	Telstra	Haldon Street	<ul style="list-style-type: none"> Local heritage - Federation railway station buildings (I143); Inter war post office building (I144) Section 170 Heritage Register - Lakemba Railway Station Group 	<ul style="list-style-type: none"> Lakemba Uniting Church Lakemba Medical Services Family Medical Centre
Sewer (WW9100) Size: DN400 VC Affected Length: 53 Utility Information: Passing under railway tracks from Bellevue Ave to Sproule St.	SWC - sewer	Bellevue Avenue / Sproule Street	<ul style="list-style-type: none"> No heritage listed items 	<ul style="list-style-type: none"> Anowara Health Care Centre Jubilee Reserve

Utility ID	Owner	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ⁷
JE9100 Size: 6 inch Affected Length: 35 Utility Information: Cast iron main, network main 7 kPa. Passing under existing tracks from Railway Pde to The Boulevarde. Location is approximate as sketched up from information obtained from DBYD and the alignment/location to be confirmed.	Jemena	Bellevue Avenue / Sproule Street	<ul style="list-style-type: none"> No heritage listed items 	<ul style="list-style-type: none"> Anowara Health Centre Care Jubilee Reserve Earnest Street Mosque



Utilities

	Not affected
	Affected/diverted
	Affected/removed

Design

	Metro Stations
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Heritage

	State Heritage Curtilage
	s170 Heritage (Jan 2014)
	Heritage (LEP)
	State Heritage Act
	Conservation Area - General
	Conservation Area - Aboriginal
	Conservation Area - Landscape
	Item - General
	Item - Aboriginal
	Item - Archaeological
	Item - Landscape

Biodiversity

	Threatened fauna
	Threatened flora
	Biodiversity assessment (South West)
	Acacia Pubescens
	Acacia Pubescens patches
	Estuarine Mangrove Forest
	Estuarine Swamp Oak Forest

Figure 7 Heritage and biodiversity constraints within the Lakemba precinct

4.8. Wiley Park precinct

Utility ID	Owner	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ⁸
Ernest Street to Robinson Street				
Power (AG9300) Size: 3 x 100 PVC conduits Affected Length: 43 Utility Information: Passing under existing tracks from Railway Parade south to Kathleen Street. Conduits with HV, AUX and abandoned cables through them with 0.6 m cover over the conduits as per details on DBYD plans.	Ausgrid	Kathleen Street	<ul style="list-style-type: none"> No heritage listed items 	None
Power (AG10000) Size: 3 x 125 PVC conduits Affected Length: 54 Utility Information: HV cables through conduits in eastern footway of King Georges Road Bridge. DBYD plans show 0.3 m cover.	Ausgrid	King Georges Road	<ul style="list-style-type: none"> Local heritage - Inter war railway station buildings Section 170 Heritage Register - Wiley Park Railway Station Group 	<ul style="list-style-type: none"> Wiley Park Public School Lakemba Public School Wiley Park Family Practice
Power (AG10200) Size: TBC Affected Length: 67 Utility Information: Overhead powerlines at King Georges Road Bridge.	Ausgrid	King Georges Road	<ul style="list-style-type: none"> Local heritage - Inter war railway station buildings Section 170 Heritage Register - Wiley Park Railway Station Group 	<ul style="list-style-type: none"> Wiley Park Public School Lakemba Public School Wiley Park Family Practice

⁸ Constraints have been derived from the Environmental Impact Statement prepared for the project

Utility ID	Owner	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ⁸
<p>Gas (JE10000)</p> <p>Size: 6 inch</p> <p>Affected Length: 54</p> <p>Utility Information: Cast iron main, network main 7 kPa. Through King Georges Road Bridge eastern footway.</p>	Jemena	King Georges Road	<ul style="list-style-type: none"> Local heritage - Inter war railway station buildings Section 170 Heritage Register - Wiley Park Railway Station Group 	<ul style="list-style-type: none"> Wiley Park Public School Lakemba Public School Wiley Park Family Practice
<p>Power (AG10150)</p> <p>Size: 4 x 140 AC conduits</p> <p>Affected Length: 27</p> <p>Utility Information: HV cables through conduits, section FV1 on DBYD plans, under King Georges Road on northern approach to King Georges Road Bridge. DBYD plans show 0.6 m cover over the conduits.</p>	Ausgrid	King Georges Road	<ul style="list-style-type: none"> Local heritage - Inter war railway station buildings Section 170 Heritage Register - Wiley Park Railway Station Group 	<ul style="list-style-type: none"> Wiley Park Public School Lakemba Public School Wiley Park Family Practice
<p>Communications (TE11040)</p> <p>Size: P50</p> <p>Type: Mains Copper</p> <p>Affected Length: 30</p> <p>Utility Information: Part underground and part overhead service line to Wiley Park Station.</p>	Telstra	King Georges Road	<ul style="list-style-type: none"> Local heritage - Inter war railway station buildings Section 170 Heritage Register - Wiley Park Railway Station Group 	<ul style="list-style-type: none"> Wiley Park Public School Lakemba Public School

Utility ID	Owner	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ⁸
<p>Gas (JE10100)</p> <p>Size: 6 inch Affected Length: 36 Utility Information: Cast iron main, network main 7 kPa. Through King Georges Rd Bridge western footway.</p>	Jemena	King Georges Road	<ul style="list-style-type: none"> Local heritage - Inter war railway station buildings Section 170 Heritage Register - Wiley Park Railway Station Group 	<ul style="list-style-type: none"> Wiley Park Public School Lakemba Public School
<p>Communications (TE11000)</p> <p>Size: Varied Type: Mains Copper Affected Length: 37 Lateral Longitudinal: Utility Information: Part underground and part overhead service line to Wiley Park Station concourse.</p>	Telstra	King Georges Road	<ul style="list-style-type: none"> Local heritage - Inter war railway station buildings Section 170 Heritage Register - Wiley Park Railway Station Group 	<ul style="list-style-type: none"> Wiley Park Public School Lakemba Public School
<p>Power (AG10100)</p> <p>Size: 4 x 150 AC conduits Affected Length: 41 Utility Information: HV cables through conduits under King Georges Rd on southern approach to King Georges Road Bridge. DBYD plans show 0.9-1.5 m cover over the conduits.</p>	Ausgrid	King Georges Road	<ul style="list-style-type: none"> Local heritage - Inter war railway station buildings Section 170 Heritage Register - Wiley Park Railway Station Group 	<ul style="list-style-type: none"> Wiley Park Public School Lakemba Public School

Utility ID	Owner	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ⁸
<p>Communications (TE11020)</p> <p>Size: 2 x C100 conduits</p> <p>Type: TBC</p> <p>Affected Length: 30</p> <p>Utility Information: Through King Georges Road and The Boulevarde intersection on southern approach to bridge.</p>	Telstra	King Georges Road	<ul style="list-style-type: none"> Local heritage - Inter war railway station buildings Section 170 Heritage Register - Wiley Park Railway Station Group 	<ul style="list-style-type: none"> Wiley Park Public School Lakemba Public School
<p>Sewer (WW10000)</p> <p>Size: DN375 CI</p> <p>Affected Length: 42</p> <p>Utility Information: Passing under railway tracks from Renown Avenue to The Boulevarde and also shown as being under a 3048 x 1448 RC stormwater channel.</p>	SWC - sewer	Between Urunga Parade and the Boulevarde	<ul style="list-style-type: none"> No heritage listed item 	<ul style="list-style-type: none"> Wiley Park Girls High School
<p>Power (AG10050)</p> <p>Size: See comments</p> <p>Affected Length: 44</p> <p>Utility Information: Underground HV cable through 1 x 150 GI conduit with parallel LV direct buried cable, section CN1 on DBYD plans, passing under existing tracks from Uringa Parade to Faux St. DBYD plans show 1.1 m cover over.</p>	Ausgrid	Between Defoe Street and Faux Street	<ul style="list-style-type: none"> No heritage listed item 	<ul style="list-style-type: none"> None

Utility ID	Owner	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ⁸
<p>Power (AG11050)</p> <p>Size: 3 x 125 PVC conduits</p> <p>Affected Length: 44</p> <p>Utility Information: Underground conduits with HV and AUX cables passing under existing tracks from Uringa Parade to The Boulevard. DBYD plans show 0.5 m cover over conduits.</p>	Ausgrid	Near Rosemont Street	<ul style="list-style-type: none"> No heritage listed item 	<ul style="list-style-type: none"> None

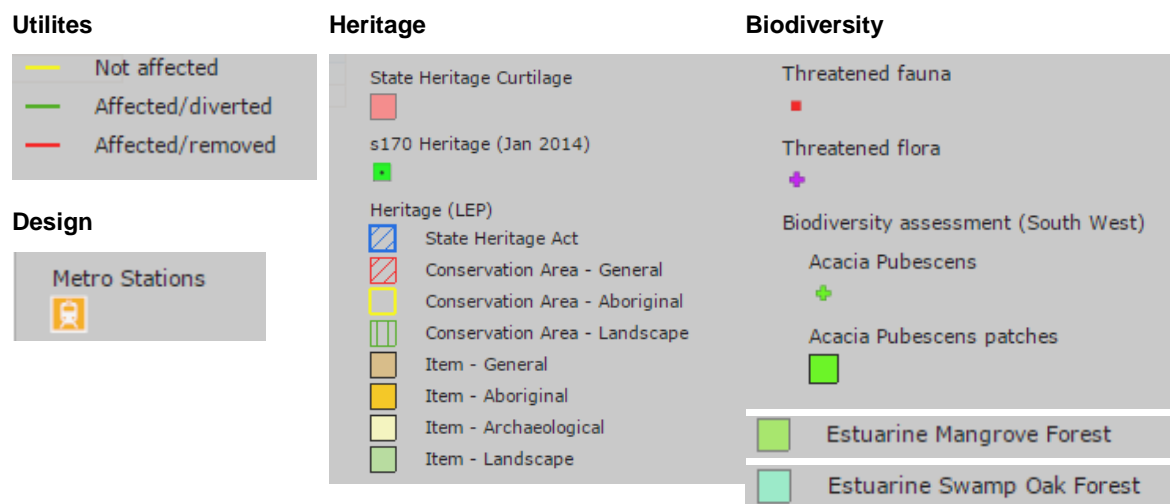
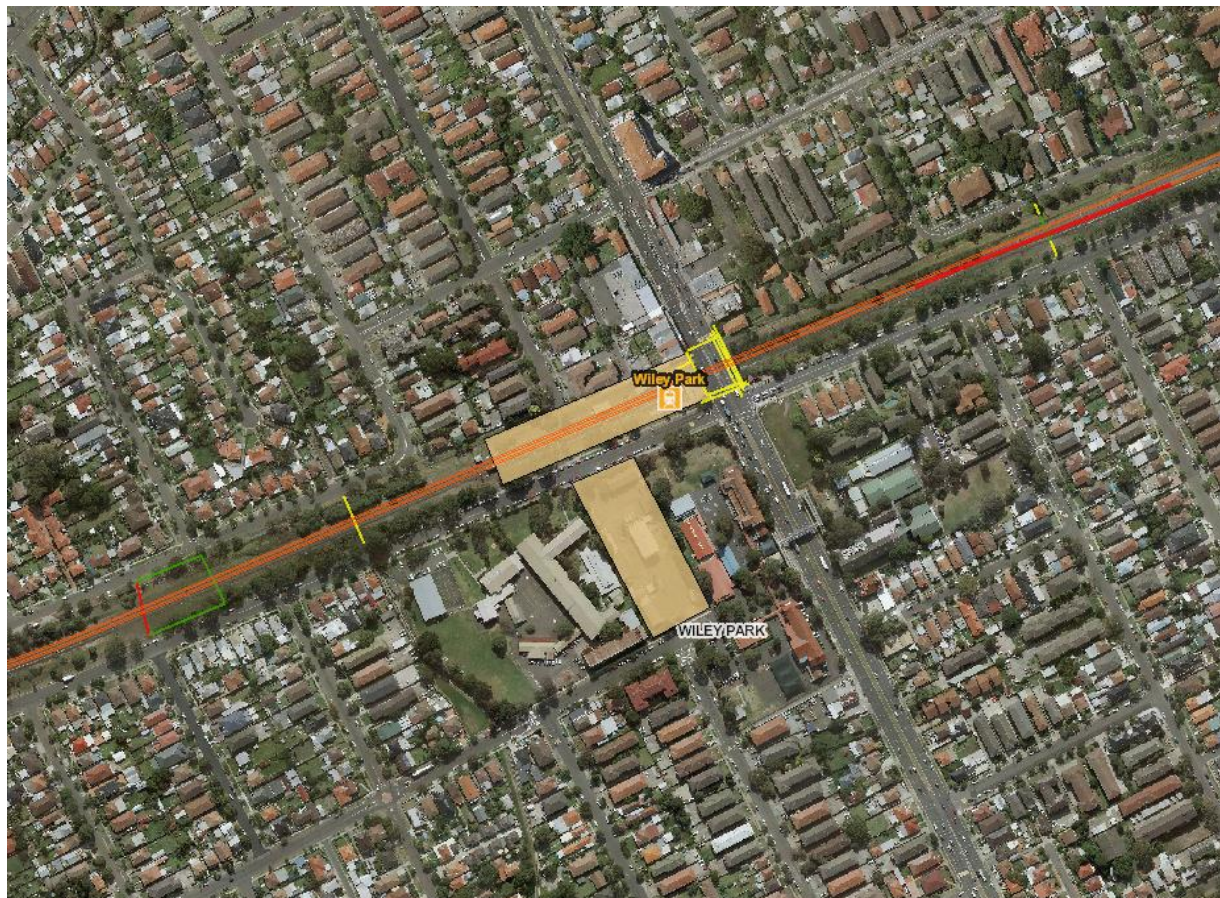


Figure 8 Heritage and biodiversity constraints within the Wiley Park precinct

4.9. Punchbowl precinct

Environmental and community constraints identified within the vicinity of major utilities in the Dulwich Hill precinct are presented in Table 8 and shown on Figure 9.

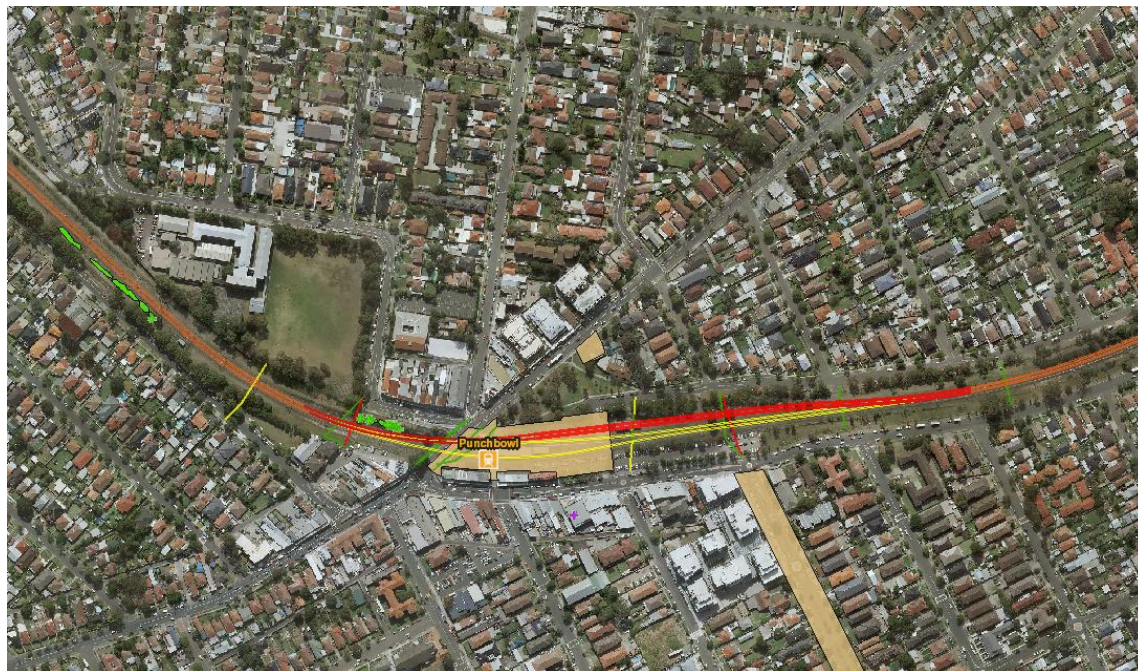
Table 8 Constraints within the vicinity of major utilities within the Punchbowl precinct

Utility ID	Owner	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ⁹
Robinson Street to Mount Lewis Avenue and Gowrie Avenue				
Power (AG11000) Size: 1 x 75 GI conduit Affected Length: 42 Utility Information: Underground conduit LV cable passing under existing tracks from Uringa Parade to The Boulevard to the east of The Broadway. DBYD plans show 0.6 m cover over the conduit.	Ausgrid	Dudley Street	<ul style="list-style-type: none"> No heritage listed item 	<ul style="list-style-type: none"> Playtime and Long Day Care Centre
Sewer (WW11000) Size: DN225 VC Affected Length: 94 Utility Information: In tunnel. Passing under existing railway tracks at eastern end of the station.	SWC - sewer	Between Uringa Parade and Matthews Street	<ul style="list-style-type: none"> Local heritage - Federal railway station buildings; Post-war civic building Section 170 Heritage Register - Punchbowl Railway Station Group 	<ul style="list-style-type: none"> Warren Reserve Punchbowl Childrens Centre Punchbowl Medical and Dental Centre
Power (AG11100) Size: 4 x 125 PVC conduits Affected Length: 66 Utility Information: HV cables through conduits in concrete bridge	Ausgrid	Punchbowl Road	<ul style="list-style-type: none"> Local heritage - Federal railway station buildings Section 170 Heritage Register - Punchbowl Railway Station Group 	<ul style="list-style-type: none"> Church of Jesus Christ of Latter Day Saints South Terrace Health Centre Warren Reserve Punchbowl Medical and Dental Centre

⁹ Constraints have been derived from the Environmental Impact Statement prepared for the project

Utility ID	Owner	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ⁹
structure in eastern footway of Punchbowl Road Bridge covered with removable footway covers. DBYD plans show 0.2-0.5 m cover.				
<p>Communications (Telstra, TE11200)</p> <p>Size: TBC</p> <p>Type: TBC</p> <p>Affected Length: 65</p> <p>Utility Information: Through western footway in Punchbowl Road Bridge.</p>	Telstra	Punchbowl Road	<ul style="list-style-type: none"> Local heritage - Federal railway station buildings Section 170 Heritage Register - Punchbowl Railway Station Group Threatened flora - Acacia Pubescens 	<ul style="list-style-type: none"> Church of Jesus Christ of Latter Day Saints Punchbowl Boys High School South Terrace Health Centre Warren Reserve Punchbowl Medical and Dental Centre
<p>Power (AG11200)</p> <p>Size: 3 x 125 PVC conduits</p> <p>Affected Length: 66</p> <p>Utility Information: HV cables through conduits in concrete bridge structure in western footway of Punchbowl Road Bridge. DBYD plans show 0.3 m cover.</p>	Ausgrid	Punchbowl Road	<ul style="list-style-type: none"> Local heritage - Federal railway station buildings Section 170 Heritage Register - Punchbowl Railway Station Group Threatened flora - Acacia Pubescens 	<ul style="list-style-type: none"> Church of Jesus Christ of Latter Day Saints Punchbowl Boys High School South Terrace Health Centre Warren Reserve Punchbowl Medical and Dental Centre
<p>Gas (JE11000)</p> <p>Size: 150 mm</p> <p>Affected Length: 62</p> <p>Utility Information: Steel main, network main 7 kPa. Through Punchbowl Road Bridge western footway.</p>	Jemena	Punchbowl Road	<ul style="list-style-type: none"> Local heritage - Federal railway station buildings Section 170 Heritage Register - Punchbowl Railway Station Group Threatened flora - Acacia Pubescens 	<ul style="list-style-type: none"> Church of Jesus Christ of Latter Day Saints Punchbowl Boys High School South Terrace Health Centre Warren Reserve Punchbowl Medical and Dental Centre

Utility ID	Owner	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ⁹
Power (AG11300) Size: TBC Affected Length: 50 Utility Information: Overhead powerlines over railway corridor west of Punchbowl Road Bridge.	Ausgrid	Near Kelly Street	<ul style="list-style-type: none"> No heritage listed item Threatened flora - Acacia Pubescens 	<ul style="list-style-type: none"> Punchbowl Boys High School Mary Barry Park South Terrace Health Centre Church of Jesus Christ of Latter Day Saints
Sewer (WW11100) Size: DN225 VC Affected Length: 42 Utility Information: In tunnel. Passing under railway tracks west of Punchbowl Road from Punchbowl Boys High School to South Terrace.	SWC - sewer	Off South Terrace	<ul style="list-style-type: none"> No heritage listed items 	<ul style="list-style-type: none"> Punchbowl Boys High School Mary Barry Park South Terrace Health Centre



Utilities

—	Not affected
—	Affected/diverted
—	Affected/removed

Design

	Metro Stations
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Heritage

	State Heritage Curtilage
	s170 Heritage (Jan 2014)
	Heritage (LEP)
	State Heritage Act
	Conservation Area - General
	Conservation Area - Aboriginal
	Conservation Area - Landscape
	Item - General
	Item - Aboriginal
	Item - Archaeological
	Item - Landscape

Biodiversity

	Threatened fauna
	Threatened flora
	Biodiversity assessment (South West)
	Acacia Pubescens
	Acacia Pubescens patches
	Estuarine Mangrove Forest
	Estuarine Swamp Oak Forest

Figure 9 Heritage and biodiversity constraints within the Punchbowl precinct

4.10. Bankstown precinct

Environmental and community constraints identified within the vicinity of major utilities in the Bankstown precinct are presented in Table 9 and shown on Figure 2 to Figure 9. No utilities require relocation / protection west of Meredith Street.

Table 9 Constraints within the vicinity of major utilities within the Bankstown precinct

Utility ID	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ¹⁰
Mount Lewis Avenue and Gowrie Avenue to Stacey Street			
Sewer (WW11200) Size: DN300 CICL Affected Length: 48 Utility Information: In tunnel. Passing under railway tracks.	Off Stansfield Avenue	<ul style="list-style-type: none"> No heritage listed item 	<ul style="list-style-type: none"> Bankstown Academy Childcare
Power (AG11400) Size: See comments Affected Length: 55 Utility Information: Underground transmission pilot cables. Type of transmission cables (11, 33 or 132kV) TBC as not shown on DBYD plans. DBYD plans show them to have 6 m cover, section CB1 on DBYD plans.	Between Stansfield Avenue and South Terrace	<ul style="list-style-type: none"> No heritage listed item 	<ul style="list-style-type: none"> None
Power (AG11450) Size: See comments Affected Length: 80 Utility Information: Underground 3 x 150 GI conduits with abandoned	Between Stansfield Avenue and South Terrace	<ul style="list-style-type: none"> No heritage listed item 	<ul style="list-style-type: none"> None

¹⁰ Constraints have been derived from the Environmental Impact Statement prepared for the project

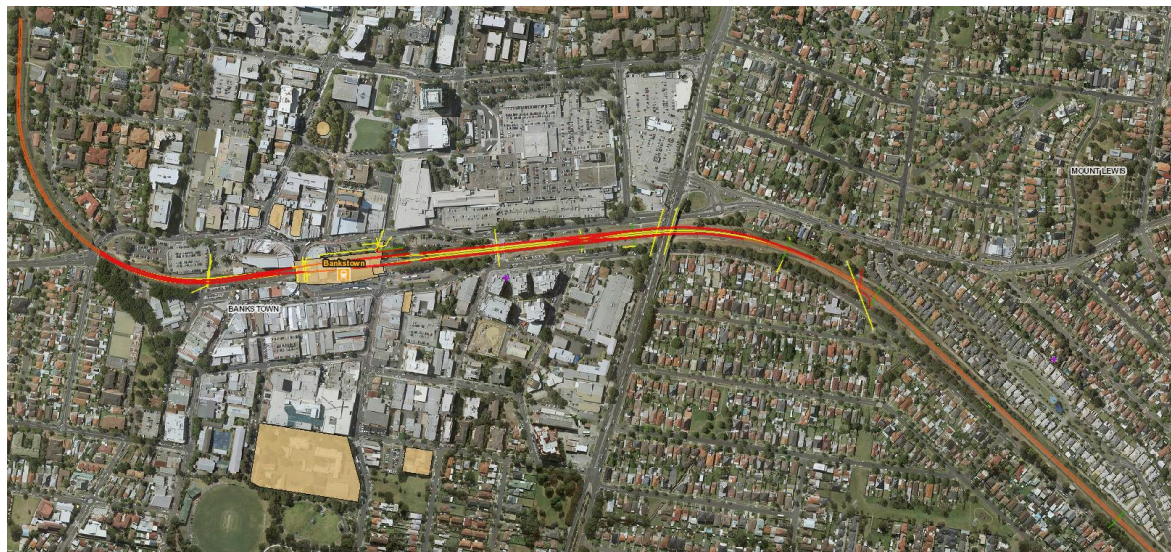
Utility ID	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ¹⁰
cables through them and 4 direct laid abandoned cables. To be confirmed with Ausgrid if abandoned. DBYD plans show them having 0.7-1.5 m cover.			
Power (TG4000) Size: 132kV Affected Length: 130 Utility Information: Overhead 132kV transmission lines east of Stacey Street, North Terrace to South Terrace.	Across South Terrace to Carnation Avenue	<ul style="list-style-type: none"> No heritage listed item 	<ul style="list-style-type: none"> None
Sewer (WW11300) Size: DN450 SGW Affected Length: 67 Utility Information: Passing under railway track and embankments.	South Terrace	<ul style="list-style-type: none"> No heritage listed item 	<ul style="list-style-type: none"> None
Stacey Street to Meredith Street and Bankstown Arts Centre			
Power (AG11500) Size: See comments Affected Length: 93 Utility Information: 1 x 100 PVC conduit with HV cable through it and direct laid SL cable through Stacey Street Bridge western footway including power poles. DBYD plans show 0.2 m	Stacey Street	<ul style="list-style-type: none"> No heritage listed item 	<ul style="list-style-type: none"> St Euphemia College

Utility ID	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ¹⁰
cover.			
<p>Power (AG11550)</p> <p>Size: 1 x 100 PVC conduit</p> <p>Affected Length: 93</p> <p>Utility Information: 1 x 100 PVC conduit SL cable through Stacey Street Bridge western footway including power poles. DBYD plans show 0.2 m cover.</p>	Stacey Street	<ul style="list-style-type: none"> No heritage listed item 	<ul style="list-style-type: none"> St Euphemia College
<p>Power (AG11600)</p> <p>Size: 5 x 100 PVC conduits</p> <p>Affected Length: 59</p> <p>Utility Information: Bore under railway tracks with HV cables through conduits from North Terrace to South Terrace west of Stacey St Bridge. No cover depth recorded under existing tracks. DBYD plans indicate 2.0 m cover on northern end of bore and 1.2 m cover on southern end of bore.</p>	Between Lady Cutler Avenue and South Terrace	<ul style="list-style-type: none"> No heritage listed item 	<ul style="list-style-type: none"> St Euphemia College
<p>Sewer (WW11400)</p> <p>Size: DN450 SGW</p> <p>Affected Length: 65</p> <p>Utility Information: Concrete encased. In subway underpass east</p>	North and South Terrace Connector	<ul style="list-style-type: none"> No heritage listed item Threatened flora - Acacia Pubescens 	<ul style="list-style-type: none"> Himalaya Emporium Function Centre Roly Poly Educational Child Care

Utility ID	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ¹⁰
of Bankstown Station and under stormwater channel.			
<p>Communications (TE11220)</p> <p>Size: TBC</p> <p>Type: TBC</p> <p>Affected Length: 45</p> <p>Utility Information: Underground cables and conduits to existing building on northern side of Bankstown Station, to be confirmed.</p>	North Terrace	<ul style="list-style-type: none"> Local heritage - former accommodation house (I2); Bankstown Railway Station building and Platform (I4); Bankstown Parcels Office (former) (I4) Section 170 Heritage Register - Bankstown Railway Station Group; Bankstown Parcels Office (former) (I4) 	<ul style="list-style-type: none"> None
<p>Sewer (WW11410)</p> <p>Size: DN225 SGW</p> <p>Affected Length: 144</p> <p>Utility Information: DBYD plans show the sewer as being between 1.2 - 1.9 m deep along the identified length.</p>	North Terrace	<ul style="list-style-type: none"> Local heritage - former accommodation house (I2); Bankstown Railway Station building and Platform (I4); Bankstown Parcels Office (former) (I4) Section 170 Heritage Register - Bankstown Railway Station Group; Bankstown Parcels Office (former) (I4) 	<ul style="list-style-type: none"> None
<p>Communications (TE11250)</p> <p>Size: P20</p> <p>Type: TBC</p> <p>Affected Length: 12</p> <p>Utility Information: Service line to Bankstown Station concourse.</p>	Bankstown City Plaza	<ul style="list-style-type: none"> Local heritage - former accommodation house (I2); Bankstown Railway Station building and Platform (I4) Section 170 Heritage Register - Bankstown Railway Station Group 	<ul style="list-style-type: none"> None
<p>Communications (TE11350)</p> <p>Size: 6 x P100 conduits</p> <p>Type: Optic Fibre</p> <p>Affected Length:</p>	Bankstown City Plaza	<ul style="list-style-type: none"> Local heritage - former accommodation house (I2); Bankstown Railway Station building and Platform (I4) Section 170 Heritage Register - Bankstown Railway Station Group 	<ul style="list-style-type: none"> None

Utility ID	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ¹⁰
35 Utility Information: Bank of conduits in a 3 x 2 conduits configuration. Major cable/conduit network through eastern footpath of South Terrace to North Terrace bridge over station.			
Communications (TE11400) Size: Varied Type: TBC Affected Length: 24 Utility Information: Through western footpath of South Terrace to North Terrace bridge.	Bankstown City Plaza	<ul style="list-style-type: none"> Local heritage - Bankstown Railway Station building and Platform (I4) Section 170 Heritage Register - Bankstown Railway Station Group 	<ul style="list-style-type: none"> None
Communications (TE11450) Size: 7 x A100 conduits Type: Optic Fibre Affected Length: 88 Utility Information: Passing under the existing tracks from Dale Parade to Marion Street west of Bankstown Station. Bank of conduits in a 3 x 2 bank plus a single conduit configuration. Major cable/conduit network.	Between Depot Place and Dale Parade	<ul style="list-style-type: none"> No heritage listed items 	<ul style="list-style-type: none"> Bankstown Art Centre Bankstown Sports Bowls
Power (AG11700) Size: See Comments Affected Length: 36	Between Depot Place and Dale Parade	<ul style="list-style-type: none"> No heritage listed items 	<ul style="list-style-type: none"> Bankstown Art Centre Bankstown Sports Bowls

Utility ID	Location (nearest road)	Constraints identified within 50 metres of the utility	Community receivers identified within 100 metres of the utility ¹⁰
Utility Information: 4 x 100 GI conduits under tracks splitting into 2 x 150 AC conduits and direct buried cables north of tracks towards Depot Place. Passing under the railway tracks west of Bankstown Station from Depot Place to Dale Parade.			



Utilities

—	Not affected
—	Affected/diverted
—	Affected/removed

Design

Metro Stations

Heritage

State Heritage Curtilage
s170 Heritage (Jan 2014)
Heritage (LEP)
State Heritage Act
Conservation Area - General
Conservation Area - Aboriginal
Conservation Area - Landscape
Item - General
Item - Aboriginal
Item - Archaeological
Item - Landscape

Biodiversity

Threatened fauna
Threatened flora
Biodiversity assessment (South West)
Acacia Pubescens
Acacia Pubescens patches
Estuarine Mangrove Forest
Estuarine Swamp Oak Forest

Figure 10 Heritage and biodiversity constraints within the Bankstown precinct

5. Environmental assessment and approval

Minor relocations within the existing rail corridor would be undertaken in accordance with a work method statement provided in the project Construction Environmental Management Plan. For relocations outside the rail corridor, the need for additional assessment and approval would be determined in line with the approach to design refinements for the project, described in Section 28.2 of the EIS.

5.1. Overview and context

In some cases construction works for the project will require the relocation/adjustment of utilities and in other cases utilities will require protection from potential impacts during construction works associated with other aspects of the project. If utilities are not managed adequately, by adjusting, relocating, or protecting them prior to construction, there would be the potential for rupture or breakage of connections. This could lead to service disruptions and/or pose a hazard in the form of electrocution, release of sewage from a wastewater main, or fire if a gas main is impacted. It may be necessary to establish a construction work zone (ie compound area and hard stand area etc) during the utility relocation/adjustment.

5.1.1. Potential impacts on utilities

Construction would have the potential to impact on utilities as a result of works to and around stations, track works, excavation, and works to overbridges. In most cases, utility impacts would be minimised by protecting utilities in place, or, where required, constructing a replacement utility ahead of re-connection thus minimising the duration of outages. Connection activities would be undertaken during planned periods of disruption, which would be notified in advance to affected communities. However, there is also the possibility of accidental damage or incidents if utilities are uncovered in locations not previously identified, leading to unplanned disruptions. Such disruptions can result in impacts to the operation of utility networks.

All works would be undertaken in accordance with the requirements of the relevant asset owners, which would be determined following consultation.

5.1.2. Utilities relocation/adjustment

Most utilities to be relocated/adjusted are located within the rail corridor and likely to be relocated within the rail corridor, as this is where the highest density of utilities typically occurs. In these situations, the works associated with relocating utilities would be consistent with the typical construction activities identified and assessed in the EIS.

However, in some locations, works would be required outside the rail corridor but still within the project area, for example at a construction compound site or a rail overbridge. Also, depending on the utility and the utility owners requirements, it may not always be possible to divert the utility at the point of intersection with the project, requiring consideration of upstream and downstream impacts. These impacts would be considered on a case by case basis drawing on a risk based framework outlined in Section 5.2 below.

5.2. Risk based environmental assessment

This framework establishes a risk based approach to the assessment and management of potential impacts associated with utilities management.

Typical environmental impacts associated with a range of anticipated utilities works likely to be required during the construction phase of the project are identified below:

Environmental aspect	Typical impacts
Traffic and access	<ul style="list-style-type: none"> • Additional construction related traffic • Changes/disruption to traffic movements • Changes/disruption to property access • Changes/disruption to bus services/routes • Changes/disruption to pedestrian and cyclist movements • Temporary reduction in available car parking
Noise and vibration	<ul style="list-style-type: none"> • Vibration depending on utility removal/installation technique eg horizontal directional drilling or trenching • Road traffic noise due to construction vehicle movements/haulage routes and changes in traffic movements associated with detours • Construction noise associated with physical works and type of plant of equipment proposed
Non Aboriginal Heritage	<ul style="list-style-type: none"> • Potential intrusion within heritage curtilage • Works within heritage conservation area • Potential impact to, or removal of, heritage trees • Potential impacts to views and vistas associated with heritage items • Potential impacts to heritage buildings/fabric from vibration
Biodiversity	<ul style="list-style-type: none"> • Removal of vegetation and/or trees • Impact to tree protection zone • Loss of habitat such as trees and other vegetation types causing habitat fragmentation • Impacts to fauna from construction related noise and vibration eg bats
Air quality	<ul style="list-style-type: none"> • Dust from construction works • Exhaust emissions from equipment, machinery and construction vehicles
Hazard and risk	<ul style="list-style-type: none"> • Potential electric and magnetic field impacts during operation (where electricity infrastructure is relocated to a new area) • Hazards specific to the Qenos pipeline relocation work include: <ul style="list-style-type: none"> • Abrasive blasting - potential contamination of air/soil/water from blasting material. • Radiation exposure – use of xray to inspect the new welds. • Welding – grinding/welding operation has risk of fire or injury to personnel • Horizontal directional drilling – potential for frac-out and damage to buried services • Hydrostatic testing – potential for injury to workers due to failure of high pressure fittings • Remaining ethylene product in the pipeline – there could be a minimal amount of product left in the pipeline that we need to be aware of during tie-in.

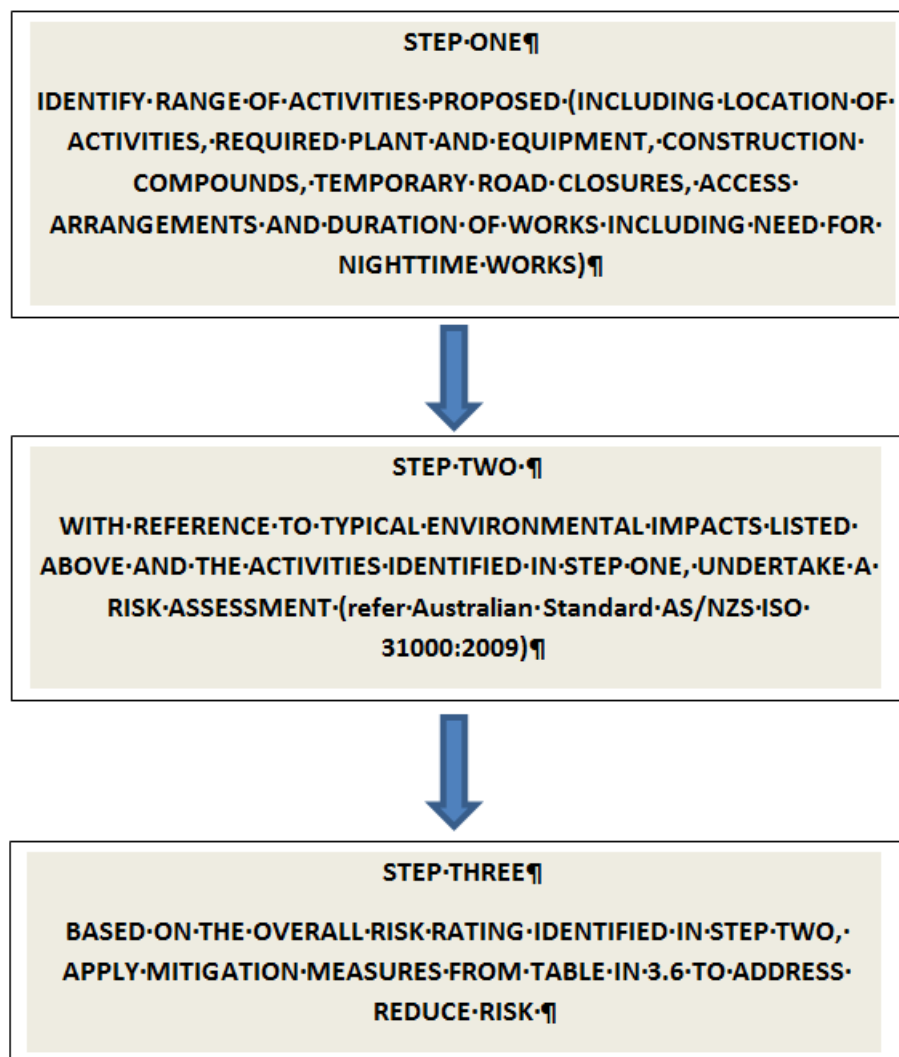
Environmental aspect	Typical impacts
Property and land use	<ul style="list-style-type: none"> • Potential leasing of property for construction works • Potential changes to, or requirements for, easement arrangements for utility
Soils and contamination	<ul style="list-style-type: none"> • Potential disturbance, handling and disposal of contaminated material including acid sulphate soils during construction
Landscaping/urban design matters	<ul style="list-style-type: none"> • Erection of fencing, barricades, gates and lighting • Potential light spill from night-works • General construction activities within the construction footprint, trenching, stockpiling of materials and the parking/use of construction plant and vehicles • Rehabilitation of land (potential replanting etc) following relocation/adjustment works
Aboriginal heritage	<ul style="list-style-type: none"> • Potential disturbance to registered sites • Potential disturbance to areas of potential archaeological deposits • Unexpected finds during utility relocation/adjustment works.

Note: this is not intended to limit the range of environmental aspects considered for a specific relocation, but rather provides a guide for likely matters to consider.

This utilities management framework is underpinned by the Australian Standard for risk management - [AS/NZS ISO 31000:2009, Risk management - Principles and guidelines](#). An analysis of potential impacts associated with utilities relocation/adjustments would be undertaken by considering consequence and likelihood as set out in the Australia Standard.

		Consequence				
		How severe could the outcomes be if the risk event occurred? →				
		1 Insignificant	2 Minor	3 Significant	4 Major	5 Severe
Likelihood	What's the chance the of the risk occurring? ↑	5 Almost Certain	5 Medium	10 High	15 Very high	20 Extreme
	4 Likely	4 Medium	8 Medium	12 High	16 Very high	20 Extreme
	3 Moderate	3 Low	6 Medium	9 Medium	12 High	15 Very high
	2 Unlikely	2 Very low	4 Low	6 Medium	8 Medium	10 High
	1 Rare	1 Very low	2 Very low	3 Low	4 Medium	5 Medium

The steps associated with the assessment are outlined in the figure below:



An assessment of these aspects and any other site specific matters would be undertaken prior to construction and mitigation adopted in the project Construction Environmental Management Plan.

6. Construction management

Construction would be managed in accordance with the requirements of the Construction Environmental Management Framework and the Construction Environmental Management Plan. This plan would address contingency management for any unplanned utilities interruptions.

Notwithstanding, the table below presents example mitigation measures that could be adapted to specific utilities work associated with the construction phase of the project

Environmental aspect	Typical mitigation measures to be adopted as required
Traffic and access	<p>During detailed design:</p> <ul style="list-style-type: none"> • 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. <p>During construction:</p> <ul style="list-style-type: none"> • 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	<p>During construction:</p> <ul style="list-style-type: none"> • 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. <p>During reinstatement/rehabilitation works:</p> <ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<p>During construction</p> <ul style="list-style-type: none"> 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	<p>During construction:</p> <ul style="list-style-type: none"> • 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	<p>With regard to EMF:</p> <ul style="list-style-type: none"> 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. <p>General:</p> <ul style="list-style-type: none"> 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	<p>During pre-construction:</p> <ul style="list-style-type: none"> 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	<p>During construction:</p> <ul style="list-style-type: none"> 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	<p>During construction:</p> <ul style="list-style-type: none"> • Visual mitigation measures would be implemented as soon as 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 during night work periods (where this is required).
Aboriginal heritage	<p>During construction</p> <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> ○ 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

6.1. Rehabilitation and re-instatement

Mitigation measures required for reinstatement or work sites will be incorporated into the CEMP and will include as a minimum:

- Principal Contractors will clear and clean all working areas and accesses at project completion
- At the completion of construction all plant, temporary buildings or vehicles not required for the subsequent stage of construction will be removed from the site
- All land, including roadways, footpaths, loading facilities or other land having been occupied temporarily will be returned to their pre-existing condition or better
- Reinstatement of community spaces, infrastructure and services will occur as soon as possible after completion of construction.

6.2. Communications and notifications

Throughout construction, Sydney Metro and the Principal Contractors will work closely with stakeholders and the community to ensure they are well informed regarding the construction works.

Stakeholders and the community will be informed of significant events or changes that affect or may affect individual properties, residences and businesses. These will include:

- Significant milestones
- Design changes
- Changes to traffic conditions and access arrangements for road users and the affected public
- Construction operations which will have a direct impact on stakeholders and the community including noisy works, interruptions to utility services or construction work outside of normal work hours.

A Community Communication Strategy will be developed by the Principal Contractor. Key elements of the Community Communication Strategy, which will be implemented at appropriate times in the construction process, will include:

- Notification (including targeted letterbox drops and email) of any works that may disturb local residents and businesses (such as noisy activities and night works) at least seven days prior to those works commencing
- Notification (including targeted letterbox drops and email) of works that may affect transport (such as road closures, changes to pedestrian routes and changes to bus stops)
- Traffic alerts (via email) to all key traffic and transport stakeholders advising of any changes to access and local traffic arrangements (at least seven days prior to significant events)
- Print and radio advertisements regarding major traffic changes
- 24-hour toll-free community project information phone line
- Complaints management process
- Community information sessions, as required

- Regular updates to the Sydney Metro website (sydneymetro.info), including uploading of all relevant documents, and contact details for the stakeholder and community relations team
- Provision of information to the Sydney Metro Community Information Centre including community newsletters, information brochures and fact sheets and interactive web based activities
- Clear signage at the construction sites
- Regular newspaper advertisements in local and metropolitan papers
- Regular inter-agency group meetings
- Community, business and stakeholder satisfaction surveys and feedback forms
- Translator and interpreter services
- The Principal Contractor's Community Relations Team will liaise with the Sydney Metro Project Communications team as the point of contact for the community.

Community liaison and complaints handling will be undertaken in accordance with the Construction Complaints Management System and will include:

- Principal Contractors will deal with complaints in a responsive manner so that stakeholders' concerns are managed effectively and promptly
- A verbal response will be provided to the complainant as soon as possible and within a maximum of two hours from the time of the complaint (unless the complainant requests otherwise). A detailed written response will then be provided, if required, to the complainant within one week.

7. Conclusion

This framework acts as an input and a reference for the development of the Construction Environmental Management Plan. This framework will guide the project team's approach to the management of utilities and integration with utility providers and relevant stakeholders, during the construction phase of the project.

SYDENHAM TO BANKSTOWN

SUBMISSIONS AND PREFERRED INFRASTRUCTURE REPORT

> Appendix H – Utilities management framework