



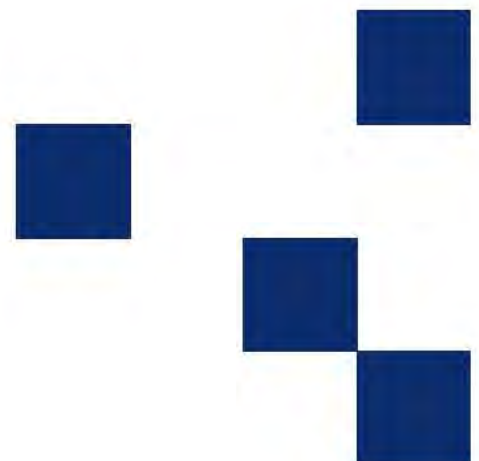
**Transport**  
Roads & Maritime  
Services

# **APPENDIX E**

## **Campbelltown Road MR177**

## **Strategic Assessment of Utilities**

**RMS 2013**



# Strategic Assessment of Utilities

Campbelltown Road Upgrade,  
Camden Valley Way to Brooks Road

600357

Prepared for  
Roads & Maritime Services

July 2012



## Document Information

Prepared for Roads & Maritime Services  
Project Name Campbelltown Road Upgrade, Camden Valley Way to Brooks Road  
File Reference 600357  
Job Reference 600357  
Date June 2012

## Document Control

Version	Date	Author	Author Initials	Reviewer	Reviewer Initials
<b>Draft</b>	29/06/2012	Craig Stoddart	CS	Boon Jin-Quah	BQ
<b>Final</b>	16/07/2012	Craig Stoddart	CS	Boon Jin-Quah	BQ

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## Appendices

A – MR177 Campbelltown Road – Camden Valley Way to Brooks Road, Campbelltown – Concept Design Interim design 4 Lanes

B – Existing Utilities Overlays

# 1 Introduction

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Cardno has been engaged to undertake a strategic assessment of utilities for the upgrade of Campbelltown Road between Camden Valley Way and Brooks Road.

The scope of the assessment is as follows:

## Stage 1 Desktop review with site inspection

The purpose of Stage 1 is to identify the existing utilities (based on desktop searches) and determine which of these utilities are likely to require protection or relocation when compared with the RMS Concept Design.

- 1) Site inspection
- 2) Review existing utilities location information provided by RMS (DBYD, survey and MX data files)
- 3) Produce plots of each utility type (power, water, sewer, communications, etc) over the RMS Concept Design
- 4) Prepare the strategic risk register for utilities using RMS risk register proforma
- 5) Prepare a report for RMS, including:
  - a) an indicative section showing typical utilities corridors (per Streets Opening Conference)
  - b) plots of potentially impacted utilities
  - c) identification of areas where there are likely constraints on the relocation of utilities
  - d) an action list for further development works (ie Stages 2 and 3)
  - e) comments on safety in design

## 2 References

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The following PDF files were provided by RMS for the purposes of this strategic assessment:

1. *MR177 Campbelltown Road – Camden Valley Way to Brooks Road, Campbelltown – Concept Design Interim design 4 Lanes* (Filename SK2001\_CD\_INTERIM.pdf dated 14/6/2012)
2. *Longitudinal Section Along Control Line MC00* (Filename dp\_Is1\_mc00\_dr\_001.pdf dated 14/6/2012)
3. *Longitudinal Section Along Control Line MC20* (Filename dp\_Is1\_mc20\_dr\_001.pdf dated 14/6/2012)
4. No title (Filename mc00\_cross\_sections.pdf)
5. *Plan Showing Underground Utilities as Investigated Within a Desk Top Study Over Parts of Campbelltown Road & Surrounds From Denham Court to Casula (UT3519)* (Locaters Utility Surveys dated Feb 2012)
6. *Glenfield to Leppington Rail Line – Campbelltown Road – Roadworks - General Arrangement Plan* (Filename GLRL-01DC- dwg-cb-rw-smc-0101-E- CAMPBELLTOWN ROAD ROADWORKS GENERAL ARRANEGMENT PLAN)
7. *Glenfield to Leppington Rail Line –Campbelltown Road Underbridge – Abutment A – Concrete Sheet 1 of 3* (Filename GLRL-01DC-CB-ST-SMC-0015-B-CAMPBELLTOWN ROAD UNDERBRIDGE ABUTMENT A CONCRETE SHEET 1 OF 3.pdf)
8. *Glenfield to Leppington Rail Line –Campbelltown Road Underbridge – Abutment B – Concrete Sheet 1 of 3* (Filename GLRL-01DC-CB-ST-SMC-0021-B-CAMPBELLTOWN ROAD UNDERBRIDGE ABUTMENT B CONCRETE SHEET 1 OF 3.pdf)
9. *GLRL – CAMPBELLTOWN ROAD (FUTURE) – FUTURE RTA DESIGN – PLAN* (Filename GLRL-01DC-RPT-CB-ST-SMC-0001-AROAD UNDERBRIDGE DESIGN REPORT 223.pdf)
10. *GLRL – CAMPBELLTOWN ROAD (FUTURE) – FUTURE RTA DESIGN – CROSS SECTIONS* (Filename GLRL-01DC-RPT-CB-ST-SMC-0001-AROAD UNDERBRIDGE DESIGN REPORT 224.pdf)
11. *Glenfield to Leppington Rail Line – Campbelltown Road –General – Notes - Sheet 2* (Filename GLRL-01DC-DWG-CB-GN-SMC-0007 CAMPBELLTOWN ROAD GENERAL NOTES – SHEET 2(2).pdf)

The following CAD files were also provided by RMS:

12. Concept\_design.dxf dated 8/6/2012
13. Ed park Roads.dwg dated 8/6/2012
14. SURVEY.dxf dated 8/6/2012
15. Survey\_Boundaries.dxf dated 8/6/2012
16. Utilities 2D.dxf dated 8/6/2012
17. X\_CB\_ST\_UB\_CTOWN.dwg dated 8/6/2012
18. design.dwg dated 8/6/2012
19. design\_triangulation.dwg dated 8/6/2012
20. L1202-15 (Genio file) dated 27/3/12

Cardno undertook a Dial Before You Dig search of the area on 28 May 2012. Responses were received from:

21. APA (Gorodok Ethane Pipe Gorodok)
22. Digsafe (Westlink M7)
23. Endeavour
24. Jemena

- 25. Optus
- 26. RMS
- 27. Sydney Water
- 28. Telstra

### 3 Background

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The site for this assessment is Campbelltown Road between Camden Valley Way to the north and Brooks Road to the south (the 'Section').

RMS provided the drawing *MR177 Campbelltown Road – Camden Valley Way to Brooks Road, Campbelltown – Concept Design Interim Design 4 Lanes* (Appendix A) which shows the concept design for the proposed upgrade over an aerial photograph. The nominal section is a four lane divided carriageway with a design speed of 80km/h.

It is understood that both the horizontal and vertical alignments are not yet set and that further changes are likely.

RMS advised that the Project is likely to be completed in three Stages, as follows:

Stage 1 South of Brooks Road (Ch 5300) to Ingleburn Gardens Road (Ch 2100)

Stage 2 Ingleburn Gardens Road (Ch 2100) to Parkers Farm Place (Ch 550)

Stage 3 Parkers Farm Place (Ch 550) to Camden Valley Way (Ch 100)

Additionally, the section from the proposed Croatia Avenue (Ch 3000) to north of the existing MacDonald Road (Ch 3700) is to be developed and constructed by Landcom as part of its Edmonson Park Development. This includes the realignment of MacDonald Road to the southern side of the Primary School.

This section of Campbelltown Road traverses the South West Growth Centre with the majority of the adjacent land within the Leppington Release Area. The new Glenfield to Leppington Rail Line (under construction at the time of this report) crosses Campbelltown Road at Ch 2500.

The status of the land as a residential release area and the new rail line indicate that there will be extensive development in the near future. This in turn dictates a substantial expansion of the existing utilities required to service these development areas.

Chainages referred to in this report shall relate to Chainages set out on the drawing *MR177 Campbelltown Road – Camden Valley Way to Brooks Road, Campbelltown – Concept Design Interim design 4 Lanes*.



## 4 Method of Review

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Prior to this assessment RMS engaged Locaters Utilities Surveys to undertake a desktop study of the existing utilities. Locaters provided the drawings set : *Plan Showing Underground Utilities as Investigated Within a Desk Top Study Over Parts of Campbelltown Road & Surrounds From Denham Court to Casula*, dated February 2012 (the "Locaters Drawings").

The Locaters Drawings were based on a Dial Before You Dig Search and an RMS existing surface survey. The 'Utility Positioning Classification' for the majority of utilities identified is "D – Indicated/ "Best Guess" to Diagrams/Features". There are some utilities that have been located to Classification "C – Aligned, to Utility Surface Features".

Craig Stoddart (Cardno Senior Project Manager) attended an inspection of the site with RMS personnel David Heins (PMO) and Rikard Smit (PMS) on 22 May 2012.

Cardno undertook a Dial Before You Dig search of the area on 28 May 2012.

Each of the utility types were separately plotted on the RMS Concept Design. The existing alignment was traced from the RMS survey data provided. The RMS existing services layers were used as the basis for the existing utilities.

The RMS existing services layers were checked against the DBYD data and the Locaters Drawings and found to be generally correct within the limitations of information of this nature. Overhead services were visually surveyed using photographs taken during the site inspection and Google Streetview. The overhead services were plotted between poles shown on the RMS survey layers.

The separate utility plots are included as Appendix B – *Existing Utilities Overlays*.

The utility plots were then analysed to identify potentially impacted utilities and areas where there are likely constraints on the relocation of utilities. The potentially impacted utilities and likely constraints are discussed further in the following sections.

A risk assessment was also undertaken (provided separately) for inclusion in the RMS Risk Register for the Project.

## 5 Impacted Utilities

### 5.1 General

This section of Campbelltown Road extends from the intersection with Camden Valley Way and the Hume Highway at Casula (Ch 100) to Brooks Road Denham Court (Ch 5300). Campbelltown Road consists of a four lane, two way divided carriageway with kerb and gutter from Camden Valley Way until the off ramp to the Hume Hwy just south of Beech Rd (Ch 1200).

Campbelltown Road then continues as a two lane, two way single carriageway, including a bridge over the M5, to the southern extent at Brooks Road. There is a localised divided carriageway at the intersection with Ingleburn Gardens Road. The road is essentially a rural road with generally no kerb and gutter through this section.

There has been minimal development on either side of Campbelltown Road with the exception of the Homemaker Centre on the eastern side of the road towards Camden Valley and Ingleburn Gardens on the western side of the road at Ingleburn Gardens Drive (currently under construction).

Transport for NSW is currently constructing the new Glenfield to Leppington Rail Line (under construction at the time of this report) which crosses Campbelltown Road at Ch 2500.



**Figure 5-1 Glenfield to Leppington Rail Line under construction**

This section of Campbelltown Road traverses the South West Growth Centre with the majority of the adjacent land within the Leppington Release Area. The status of the land as a residential release area and the new rail line indicate that there will be extensive development in the near future. This in turn dictates a substantial expansion of the existing utilities required to service these development areas.

Significant design features include construction of new roads (ie Croatia Road) the realignment of MacDonald Road, another bridge over the M5 (assumed to duplicate existing bridge) and significant fill areas (up to 2.1m).

It should also be noted that the proposed alignment switches from one side of the existing alignment to the other. This creates 'scissor points' which add complexity to utility relocation and construction staging. Relocated utilities can't simply be relocated to one side prior to road works, construction staging is more complex and relocated utilities need cross existing utilities at acute angles which exacerbates clearance issues.

## 5.2 Sydney Water

### 5.2.1 General

It should be noted that Sydney Water considers water mains above 200mm to be major assets and will require extended notification for any shut downs. The shut downs for major assets are likely to be more complicated (ie involve double shutdowns) and may be subject to shutdown windows (ie out of bush fire season).

Sydney Water may also require that adjacent high voltage electrical feeders are shut down during works on adjacent parallel, ferrous based watermains (CICL, DICL, SICL, etc) to minimise the risk of electric shock from induced current.

A Water Services Co-ordinator is required (by Sydney Water) to undertake further investigations, design and supervise construction. It is recommended that a Water Services Co-ordinator is engaged early in the design development process to properly assist in the interface with Sydney Water and provide advice on protection and relocation of water, sewer and recycled water mains.

RMS should refer to the *RTA Sydney Water Memorandum of Understanding* for further details on the protection and relocation of existing assets and Sydney Water reimbursement of costs for renewal of its assets.

It should be noted that the *Memorandum of Understanding* requires that watermains installed under 'significant cycleways' are 'maintenance free'. This incurs a substantial increase in cost for the provision of concrete encasement along the length of the watermain beneath cycleways.

The Sydney Water Dial Before Your Dig Response provides the following phone number for customer enquires 13 20 92.

### 5.2.2 Sydney Water – Sewer

Refer to Appendix B - *Existing Utilities Overlays – Sydney Water*.

The only sewer on the Section consists of a 225mm PVC crossing Campbelltown Road just south of the Parkers farm place intersection. Only minor relocation or protection works will be required.

Given the lack of sewer services in the area it is possible that SWC will want to install significant sewer services within the road corridor to meet the future development demands. Liaison with Sydney Water is required to determine their future requirements.

### 5.2.3 Sydney Water – Potable Water

Refer to Appendix B - *Existing Utilities Overlays – Sydney Water*.

The Sydney Water potable water network within the Section consists of:

- 1) Various sizes (250, 375 and 450 CICL/SICL) crossing Campbelltown Road between Parkers Farm Road and Camden Valley Way
  - a) It is likely that the majority of these crossings will not require relocation or protection. Protection would involve the replacement of the section to be protected with new SCL pipe.
- 2) 375mm uPVC along the northern side of Parkers Farm Road
  - a) It is unlikely that this water main will require relocation or protection. Protection would involve the replacement of the section to be protected with new SCL pipe.
- 3) 300mm (CICL/DICL/uPVC) main along the full length of the Section on the western side of Campbelltown Road until crossing to eastern side at Glenfield Road.
  - a) This watermain will require relocation for the section from Brooks Road to Beech Road (the majority of the length). It appears that this watermain traverses under the M5 (not over the M5 via the existing bridge). Provision for this relocated watermain may be required in the new bridge structure or under the M5 if the existing crossing is not usable.
- 4) 100mm/150mm (DICL) along the eastern side of Campbelltown Road between Brooks Road and Zouch Rd

- a) This watermain will require relocation over its full length
- 5) Various 100mm and 150mm (DICL and uPVC) crossing Campbelltown Road and extending along adjoining roads.
  - a) The crossings will require relocation to suit the relocated longitudinal watermains on either side of Campbelltown Road. The extensions along the adjoining roads will require adjustment for connection to the relocated watermains and to suit the revised road geometry.

It is likely that Sydney Water will look to increase the size of the many of these watermains to meet the future development demands. Liaison with Sydney Water is required to determine their future requirements.

#### 5.2.4 Sydney Water – Recycled Water

Refer to Appendix B - *Existing Utilities Overlays – Sydney Water*.

Sydney Water is currently constructing a water tower on the north eastern corner of the intersection with Zouch Road. It is assumed (but not confirmed) that the water tower is for recycled water given the new 600mm and 450mm recycled water mains shown as entering the site. It is also not clear if the tower is operational yet, however, completion appeared imminent during the site inspection in May 2012.

The Sydney Water recycled water network within the Section consists of:

- 1) 600mm and 450mm (DICL/SCL) along the eastern side of Campbelltown Road from the new water tower on the north eastern corner of the intersection with Zouch Road to Croatia Avenue (proposed) where the 600mm pipe connects to a 375mm pipe for the remainder of the length to the departure from the Section on the southern side of the M5.
  - a) There are extensive pits, valves and fittings where the 600mm and 450mm pipes turn into the new water tower. It is not clear if these pits, etc will be clear of the proposed road alignment. A detailed survey and comparison with the design alignment is required to determine if this these fittings and pits would require adjustment.
  - b) The section of both pipes from Zouch Road to the existing MacDonald Road appears to be clear of the existing alignment and is not likely to require relocation. Localised adjustment and protection of both pipes will be required at the new MacDonald Road alignment (including conversion to SCL).
  - c) The section of both pipes (375/600mm and 450mm) from the existing MacDonald Road to the departure from the Section on the southern side of the M5 will require relocation.
- 2) 250/300mm (uPVC/DICL) along the eastern side of Campbelltown Road from Beech Road to Glenfield Road.
  - a) It is not clear whether this pipe is clear of the proposed alignment. A detailed survey and comparison with the design alignment is required to determine if this pipe will require realignment.



**Figure 5-2 New Sydney Water tower at Zouch Rd**

For the purposes of road development recycled water should be treated similarly to potable water.

It is likely that Sydney Water will look to expand the recycled water network in the area to service new developments in the area. Liaison with Sydney Water is required to determine their future requirements.

## 5.3 Telecommunications

### 5.3.1 Telstra

Refer to Appendix B - *Existing Utilities Overlays – Telecoms*.

The Telstra network within the Section appears to be in two separate portions, north and south of Zouch Road, as follows:

#### South of Zouch Road

- 1) The network is still largely overhead along Campbelltown Road but is underground along Denham Court Road. There is a large optic fibre cable (312 fibre) extending along Denham Court Rd, crossing Campbelltown Rd on the southern side of the intersection before extending along Dickson Road. Otherwise the network consists of smaller optic fibre (12 fibre) and copper cables (100 – 300 pair).
  - a) It is likely that all of the overhead service will require relocation to underground given the proximity of the poles to the proposed alignment and RMS preference to remove poles from clear zones. Note that these poles cannot be demolished until both the Telstra and Endeavour Energy cables have been decommissioned.
  - b) The underground conduits are likely to require local adjustment to suit the revised road geometry and to provide connection to the relocated overhead services. Any changes to the pits or conduits containing the 312 fibre optic fibre cable will be considerably more involved given the size of that cable.

#### North of Zouch Road

The network is mainly underground with the exception of some local overhead distribution at Zouch Road. There is a large optic fibre cable (60 fibre) extending along the southern side of Zouch Road (east of Campbelltown Road) then along the western side of Campbelltown Road to approximately Ch 3800. Otherwise the network consists of smaller optic fibre (12 fibre) and copper cables (100 – 300 pair).

The network consists of:

- 2) 1 to 3 conduits along the eastern side of Campbelltown Road extending from Zouch Road to the southern side of the M5.
  - a) It is likely that all of the overhead services will require relocation to underground given the proximity of the poles to the proposed alignment and RMS preference to remove poles from clear zones. Note that these poles cannot be demolished until both the Telstra and Endeavour Energy cables have been decommissioned.
  - b) It is likely that the majority of the conduits between Zouch Road and Beech Road will require relocation.
  - c) Any changes to the pits or conduits containing the 60 fibre optic fibre cable will be considerably more involved given the size of that cable.
- 3) 4 conduits along the western side of Campbelltown Road from the southern side of the M5 (assumed through the existing bridge cableway under the footway on the eastern side) to Camden valley Way.
  - a) It is likely that the majority of the conduits between Zouch Road and Beech Road will require relocation.
- 4) 2 to 4 conduits from the eastern side of Campbelltown Road from Beech Road to Camden Valley Way
  - a) Conduits north of Beech Road may only require local protection. A detailed survey and comparison with the design alignment is required to determine if these conduits will require realignment.
  - b) There is an Optus sub-duct (conduit within a Telstra conduit) within the Telstra conduits on the western side of Campbelltown Road between Beech Road and Camden Valley Way. The Optus cables will need to be relocated prior to the demolition (if required) of these conduits.

It is likely that Telstra will look to expand the number of conduits along Campbelltown Road to service new developments in the area. Liaison with Telstra Water is required to determine their future requirements.

There is a large portion of the existing conduits identified as asbestos (“A100”). The asbestos conduits have been highlighted on the *Existing Utilities Overlays – Telecoms* (Refer to Appendix B). Removal of these conduits is expensive and takes an extended period of time. There is also less flexibility for modifications (such as spilt pipe) which in turn requires further relocations than for PVC conduits.

Fibre optic cables must be joined at node points. These points can be several hundred meters from the extent of the relocation meaning that the relocated cable will be considerably longer than the respective conduit in which it is to be installed. This also creates complexity in the staging of fibre optic cut over as the cables cannot be temporarily cut over at interstitial points as can be done with electricity or water.

Large optic fibre cables can take an extended period of time to cut over as it may only be possible to cut over a limited number of cables each day (say 4 – 6). This means a 312 fibre cable may take several weeks to cut over once installed. Even small optic fibre cables may be subject to limitations on cut over (ie private fibres, nurse call services, etc) that may lead to an extended time for cutting over to a new cable.

The Telstra Dial Before Your Dig Response provides the following phone numbers for response 1800 810 443 and Telstra NSW, Central 1800 653 935.

### 5.3.2 Optus

Refer to Appendix B - *Existing Utilities Overlays – Telecoms*.

The Optus network within the Section consists of one 32mm sub duct within the Telstra conduits on the western side of Campbelltown Road between Beech Road and Camden Valley Way. The Optus conduits ‘breaks out’ and cross Campbelltown Road at Parkers Farm Road and Beech Road.

The Optus cables will need to be relocated prior to the demolition (if required) of the Telstra conduits.

Optus provides very little detail on their Dial Before Your Dig information so it is not possible to assess the significance of their network.

Optus may look to expand the number of conduits along Campbelltown Road to service new developments in the area. Optus frequently leases sub ducts within Telstra conduits and may not require their own conduits. Liaison with Optus is required to determine their future requirements.

The Optus Dial Before Your Dig Response provides the following phone number for Optus Network Operations Asset Analysis on 1800 505 777.

### 5.3.3 Vodafone

Refer to Appendix B - *Existing Utilities Overlays – Telecoms*.

Vodafone did not respond to the Dial Before You Dig enquiry and doesn’t appear to have any assets in the Section except for a mobile base station on the south eastern corner of the intersection with Zouch Road.

This base station is located within the median of the proposed alignment. It may be possible to leave the base stations in position during construction but is likely to require relocation prior to completion of construction.

It may be possible relocate the existing pole-mounted transmission equipment on the newly constructed water tower on the opposite side of Campbelltown Road.

Vodafone may look to expand its network in the area to service new developments in the area. Liaison with Optus is required to determine their future requirements.

The phone number 1800 683 683 was stamped on a padlock on the security gate for the base station.

### 5.3.4 M7



Figure 5-3 Vodafone base station at Zouch Rd

Refer to Appendix B - *Existing Utilities Overlays – Telecoms*.

The M7 Dial Before Your Dig (Digsafe) response shows 'communications' conduits along the western side of Campbelltown Road between Beech Road and Camden Valley Way (similar alignment and extent to Optus). It is not clear if the conduits are dedicated or are subducts within the Telstra conduits through this section.

There is no other detail provided other than conduit location so it is not possible to assess the significance of their network.

The M7 Dial Before Your Dig (Digsafe) response shows 'Electrical cable/Devices' crossing Campbelltown Road in the vicinity of the M5. There is no other detail provided other than conduit location so it is not possible to assess the significance of their network. It is also not clear if the conduit crosses at Campbelltown Road level or at the M5 level.

The M7 (Digsafe) Dial Before You Dig Response provides the following phone numbers 9834 9203 and 9834 9200.

### **5.3.5 NBN**

NBN did not respond to the Dial Before You Dig enquiry and doesn't appear to have any assets in the Section. The NBN Co. website advises that roll out has not yet commenced in this area although work has commenced in adjacent suburbs.

NBN Co. may consider installing conduits along Campbelltown Road. Liaison with NBN Co. is required to determine their future requirements.

The NBN Co. web site provides the following phone number 1800 881 816 for new development.

### **5.3.6 RMS Intelligent Transport System**

RMS may look to install conduits for an Intelligent Transport System (ITS) 'backbone' through the Section.

The location of the ITS conduits is generally flexible and the conduits can cross the road at intersections if required. Given this flexibility, and RMS's control of the design, the ITS conduits will generally be designed after other utilities have been designed. It is, however, recommended that the ITS is designed as part of the detailed design for the roadworks and not left to the roadworks contractor to design.

Liaison with RMS ITS group is required to determine their future requirements.

## **5.4 Gas**

### **5.4.1 Jemena Gas**

Refer to Appendix B - *Existing Utilities Overlays – Gas*.

The Jemena network within the Section is as follows:

- 1) 110mm (NY/PE) along the eastern side of Campbelltown Road from Zouch Road to Ingleburn Gardens Drive.
  - a) The majority of this pipe will require relocation.
- 2) 150mm Secondary Main (High Pressure) along the northern side of the existing MacDonald Road terminating at a pressure regulator on the eastern side of Campbelltown Road.
  - a) The termination and pressure regulator will be impacted by the proposed alignment. Liaise with Landcom and Jemena to ensure that the proposed Campbelltown Road alignment is considered when relocating this Secondary Main given that it may be relocated by Landcom prior to the realignment of MacDonald Road.
- 3) 50/75mm (NY) along the eastern side of Campbelltown Road from Beech Road to Old Glenfield Road.
  - a) A detailed survey and comparison with the design alignment is required to determine if this pipe requires realignment or protection.
- 4) Two 150mm Secondary Mains (High Pressure) along the southern side of Old Glenfield Road, crossing Campbelltown Road to the southern side of Camden Valley Way.

- a) A detailed survey and comparison with the design alignment is required to determine if these pipes require realignment or protection.

Jemena requires that 1200mm cover is provided to high pressure mains within the carriage way and that there is 1000mm separation from other services. Jemena also places limits on the construction loadings that can be applied to the mains and limits machine excavation to 300mm from the main.

Refer to *Jemena Guidelines for construction activities over Jemena Gas Networks Assets*.

It is likely that Jemena will look to expand its network in the area to meet the future development demands. Local reticulation will also be required along the new roads (Croatia Rd, etc) and the realigned MacDonald Road. Liaison with Jemena is required to determine their future requirements.

The Jemena Dial Before Your Dig Response provides the following phone numbers:

- o High Pressure - Katarina Susic 9397 9106
- o Standard - Josh 9397 9103
- o Jemena Gas West 1300 880 906

#### **5.4.2 Gorodok Gas (APA)**

The Gorodok 550mm (Sydney to Moomba) Ethane Pipeline extends along the southern side of Old Glenfield Road, crossing Campbelltown Road to the southern side of Camden Valley Way. This pipeline is a major asset and any modifications would be expensive and time consuming. Whilst it is not likely that the proposed alignment will impact the pipeline, a detailed survey and comparison with the design alignment is required to determine to confirm this.

The APA (Gorodok) Dial Before Your Dig Response provides the following phone number Ethane Pipe (Gorodok) Young Control Office 1800 623 121.

### **5.5 Electricity**

#### **5.5.1 Endeavour Energy**

Refer to Appendix B - *Existing Utilities Overlays – Electrical*.

The Endeavour Energy network is a mix of underground and overhead services with Low Voltage (415V and street lighting) and High Voltage (11kV). There is no apparent Transmission (33kV and above), with the exception of the Transgrid assets, but this would need to be confirmed with Endeavour Energy via an Accredited Service Provider (ASP).

- 1) Underground and overhead services between Brooks Road and the southern side of the M5
  - a) It is likely that all of the overhead services will require relocation to underground given the proximity of the poles to the proposed alignment and RMS preference to remove poles from clear zones. Note that these poles cannot be demolished until both the Endeavour Energy and Telstra cables have been decommissioned.
  - b) The overhead and underground services along side roads will need to be locally adjusted to suit the revised road geometry and to provide connection to the relocated overhead services.
  - c) There are pole mounted substations at various locations through this section. These substations will require replacement will pad mounted substations where the overhead High Voltage is relocated underground. Pad mount substations are generally installed in private property adjacent the road reserve and will require the acquisition of property.
  - d) There is some conflicting information regarding the status of High Voltage (assumed) on the eastern side of Campbelltown Road. Data from Dial Before You Dig and RMS Survey shows some sections as both overhead and underground (possibly to suit the Glenfield Rail Line). Inspection from Google Street View shows that the poles remain but the cables have been removed. It is likely that the various data on this section not been kept up to date. A detailed survey and liaison Endeavour is required to confirm this.
- 2) Underground and overhead services between the northern side of the M5 and Camden Valley Way



- a) Generally these services appear to be clear of the proposed alignment and only localised relocation will be required. A detailed survey and comparison with the design alignment is required to determine if these services require realignment or protection.
- b) Endeavour Energy may look to relocate some its overhead services in this area to underground. RMS may also consider moving the overhead services as the poles are within the clear zone for an 80km/h road.

Endeavour Energy requires that an approved Accredited Service Provider be engaged to undertake the design of these relocations.

The circuit types (LV, HV, Transmission) have been identified through visual inspection only (and not by an ASP). These should be confirmed by Endeavour Energy via an Accredited Service Provider (ASP)

Low and High Voltage assets are considerably simpler and quicker to relocate than transmission assets. Should it be found that Transmission Feeders are impacted by the proposed alignment further advice should be sought on the impacts of relocation.

It is likely that Endeavour Energy will look to expand its network along Campbelltown Road to service new developments in the area and relocate overhead services to underground. Liaison with Endeavour Energy is required to determine their future requirements.

The Endeavour Energy Dial Before Your Dig Response provides the following phone number 9853 4161.

### 5.5.2 TransGrid

Refer to Appendix B - *Existing Utilities Overlays – Electrical*.

TransGrid did not respond to the Dial Before You Dig enquiry but overhead Transmission Feeders were identified crossing Campbelltown Road south of Beech Road.



**Figure 5-4 TransGrid transmission towers at Beech Rd**

It is understood that TransGrid requires a 30m clear zone around the base of the transmission towers for earthing grids and for allowing crane access to the tower. This has been plotted as a 'zone of influence' on the *Existing Utilities Overlays – Electrical* (refer Appendix B). This would need to be confirmed with TransGrid.

- a) The existing road appears to encroach on the zone of influence of the tower on the south western side of the Beech Road intersection. TransGrid may resist any further encroachment.
- b) Any raising of the vertical alignment will reduce the clearance to the cables. Any widening of the road away from the tower may also reduce the clearance and the road will be closer to the mid span cable sag.
- c) Liaison with TransGrid is required to determine the voltage and thus the safe clearance zones.

Any adjustment of these transmission cables or towers would be expensive and time consuming. There will be strict limitations on shut down of the transmission feeders.

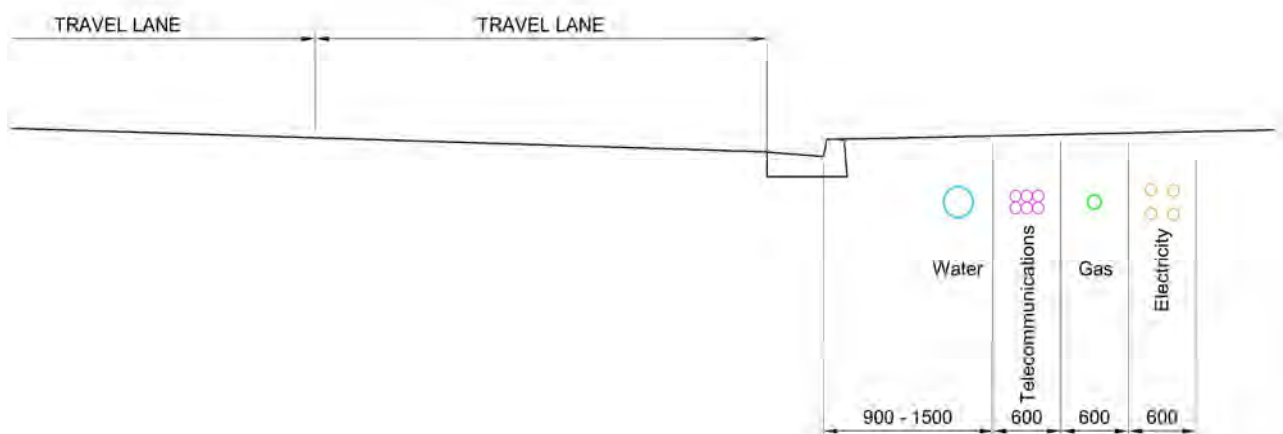
Liaison with TransGrid group is required to determine their future requirements.

The TransGrid web site provides the following phone number 1800 222 537.

## 6 Corridor Width

A standard Streets Opening Conference allocation (refer to Figure 6-1 Streets Opening Conference Standard Allocation Figure 6-1 Streets Opening Conference Standard Allocation) was used to generally assess if sufficient clearance is available between the RMS alignment, property boundaries (provided by RMS) and the SWRL bridge structure.

It is noted that the property impacted by the proposed widening has not been acquired in some sections and thus no assessment of the available width can be made in these sections.



**Figure 6-1 Streets Opening Conference Standard Allocation**

Generally there appeared to be sufficient width for a full allocation (up to 3.3m) on the western side of Campbelltown Road and under the SWRL bridge structure with the exception of a short section adjacent to MacDonald Road and opposite Ingleburn Gardens Drive.

However, there may be a lack of width on the eastern side of Campbelltown Road where the Sydney Water recycled water mains (450mm and 600mm) have been installed. The SWC allocation in this section will need to be in the order of 3m wide to accommodate these recycled water mains, increasing the overall allocation width to ~5m. The section between Beech Road and Camden Valley Way also appears to be insufficiently wide for the standard allocation.

It should be noted that this assessment assumes a full allocation on both sides of the road. It is likely that in some sections allocations for some utility types will only be required on one side of the road.

Further assessment of the utility allocation can only be effectively completed once feedback from utility authorities on proposed relocation and additional services is received. At that time the proposed and existing utilities should be modelled in 3D to check for sufficient width and clashes.

## 7 Safety in Design

The following outlines the risks associated with working adjacent to utilities.

### 7.1 Working adjacent to existing underground utilities

Existing utilities should be investigated to at least a 'Quality Level B' investigation, including the application of geophysical methods such as electro-magnetic and ground penetrating radar, to confirm location utilities.



**Figure 7-1 Ground penetrating radar with 3D survey location**

In areas of high risk, and in areas recommended in this Report, further investigation using physical location including potholing ('Quality Level A') should be undertaken to provide accurate location of significant existing utilities.



**Figure 7-2 Vacuum truck potholing to physically locate service**

The utility location information should then be plotted in 3D to allow review of analysis of clashes, construction staging, relocation and protection, and this information provided to contractors. Contractors should be required to utilise a rigorous 'Permit to Excavate System' during construction.

Refer to:

- 1) *Workcover Guide Work Near Underground Assets (2007)*
- 2) *Endeavour Energy – Where to draw the line on safety clearances from electricity assets, May 2011*
- 3) *Jemena Guidelines for construction activities over Jemena Gas Networks Assets.*

## 7.2 Working adjacent to relocated underground utilities

Relocated utilities present a significant additional risk as the location of each may not yet be recorded on utility asset databases, including *Dial Before You Dig*. Packaging utility relocation works with the road works contract reduces the risk of damage to relocated utilities as the road contractor has control of the relocation process and subsequent road construction works.

Other risk control measures include the use of sand backfill to readily identify the utility trenches and the use of marking tape. It is recommended that detectable marking tape is used to increase the ease at which utilities can be located. Detectable marking tape includes either foil or wire that is detectable with electro-magnetic detection equipment.

Intensive as-executed surveys should be undertaken of each relocated utility. The survey information should include physical location in three dimensions, conduits size and arrangement and conduit bank extents for multiple conduit banks. This allows for a real-time 3D model of the installed services to be maintained for review during permit to dig applications.

## 7.3 Low clearance to existing overhead services

It was observed during the site inspection that there are a number of overhead service (including electrical) throughout the Section. There is a risk of the cables being struck by construction vehicles and plant. Raising the vertical alignment of the road reduces the clearance to existing overhead services and increases the risk of strikes.

The overhead cables should be surveyed and the safety clearances plotted for the various cable types to determine the risk during construction.

The risk of striking cables can be eliminated by relocating the cables or avoiding low clearance locations when planning site accesses, haul roads, stockpile sites, etc. Risk mitigation controls such as 'tiger tails', signage and spotters can be implemented to control the risk of striking cables during construction.

Refer to:

- 1) *Workcover Code of Practice Work Near Overhead Power Lines (2006)*
- 2) *Endeavour Energy – Where to draw the line on safety clearances from electricity assets, May 2011*

## 7.4 Location of utility pits

Both existing and proposed utility pits need to be located such that each can be safely accessed both during construction and operation. This includes locating the pits away from live traffic lanes and heights (eg retaining walls or steep batters).

Pit depth should also be considered as changes in surface levels will increase existing pit depths. Deeper pits are difficult to access safely and efficiently and may require the use of confined space access equipment and procedures.

## 8 Recommendations for Further Actions

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- 1) Liaise with utility authorities to confirm the location and status of existing utilities, discuss potential requirements for protection or relocation, and determine future requirements. RMS should develop a preferred road alignment prior to liaison with the utility authorities.
- 2) Liaise with Landcom regarding its development of Campbelltown Rd (in the vicinity of MacDonald Road). It is important that the relocation of the High Pressure gas main be compatible with the RMS proposed alignment.
- 3) Further detailed investigation of existing utilities is required to confirm location and type of existing utilities and requirements for protection or relocation. This should include Quality Level B location of all utilities and Quality Level A location of high risk utilities. This should include utilities along the M5 in the vicinity of the Campbelltown Road bridge to ensure that future bridge foundations do not clash with existing or proposed utilities.
- 4) Survey overhead cables to determine impacts on design and construction.
- 5) Confirm which utilities are mounted on common poles as both utilities will need to be relocated if the pole is to be removed.
- 6) Review the vertical alignment to reduce larger cuts and fills. Significant changes in vertical alignment add complexity to utility relocations as clearance to overheads is reduced or poles are undermined, pits are buried or exposed and new conduits and pits may not be able to be built until significant earthworks have been completed. Changes in vertical alignment may also result in some utilities being relocated where there is no other reason to do so.
- 7) Review feedback from utility authorities and determine alignments for existing, relocated and future utilities within the proposed alignment. This should be plotted in the 3D road model to allow checking for available space and identification of clashes.
- 8) Review the proposed alignment for clearance to property boundaries and SWRL bridge footings for proposed services. This should be done after the utility authorities have advised their requirements. It should be noted that extra width corridors will need to be provided where services will exceed the width of the standard *Streets Opening Conference* allocations. An example of this is the section containing the 450mm and 600mm recycled water mains.
- 9) Look at providing a conduit way in the new bridge in lieu of boring under the M5.
- 10) Engage an Accredited Service Provider (ASP) to liaise with Endeavour Energy and TransGrid, to obtain circuit diagrams and network constraints, and provide advice on likely relocations.
- 11) Engage a Water Services Co-ordinator (WSC) to liaise with Sydney Water, to obtain as-executed network data and provide advice on likely relocations.
- 12) Review the utilities relocation with construction staging to ensure compatibility.
- 13) Plot existing and proposed utilities in 3D to serve as a base for road design, clash analysis and construction staging.
- 14) Review the current Memoranda of Understanding with utility authorities to determine cost sharing opportunities (ie Sydney Water).

## 9 Appendices

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A – MR177 Campbelltown Road – Camden Valley Way to Brooks Road, Campbelltown – Concept Design Interim design 4 Lanes

B – Existing Utilities Overlays