Blacktown City Council

St Bartholomew's Cemetery Expansion

Planning Proposal Servicing and Utilities Strategy Report

Utilities Strategy – Rev 2

Final | 28 June 2018

Job number 259202-00

Arup
Arup Pty Ltd ABN 18 000 966 165

Arup
Level 10 201 Kent Street
PO Box 76 Millers Point
Sydney 2000
Australia
www.arup.com

ARUP

Document Verification

ARUP

Job title		St Bartholomew's Cemetery Expansion			**Job number** 259202-00
Document title		Planning Proposal Servicing and Utilities Strategy Report			**File reference**
Document ref		Utilities Strategy – Rev 2			
Revision	**Date**	**Filename**	Utilities Strategy - Rev 1.docx		
Draft 1	25 Jan 2018	**Description**	First draft		
			Prepared by	Checked by	Approved by
		Name	M Knight	S Litsas	M Knight
		Signature			
Final	28 Jun 2018	**Filename**	Utilities Strategy - Rev 2.docx		
		Description	APP & BCC comments added		
			Prepared by	Checked by	Approved by
		Name	M Knight	Ivan Varga S	M Knight
		Signature			
		Filename			
		Description			
			Prepared by	Checked by	Approved by
		Name			
		Signature			
		Filename			
		Description			
			Prepared by	Checked by	Approved by
		Name			
		Signature			
				Issue Document Verification with Document	✓

Contents

Appendices

Appendix E

Electrical - Underground Conditions

Appendix F

Electrical - General Restrictions for Overhead Power Lines

Appendix G

Existing Telstra Plan

1 Background

The existing St Bartholomew's Church and Cemetery is located on a 3.17-hectares lot off Ponds Road, Prospect. The cemetery comprises approximately 3,600 occupied graves. In January 2016, Blacktown City Council (Council) received approximately 6 hectares of land east of St Bartholomew's Church from the New South Wales (NSW) State Government under a Land Transfer Agreement. In addition, Council intends to acquire approximately 2 hectares of land east of the existing cemetery. Further to this, Council is seeking to close St Bartholomew's Place (approximately 0.39 hectares), with the intention of including it in the expansion of the cemetery. This equates to a total of 11.56 hectares of land proposed to be used for the expanded cemetery.

A planning proposal (PP) is being prepared, which seeks to reactivate the existing church and cemetery on the 3.17-hectare land and to reclassify the Council-owned expansion lands from "community land" to "operational land" and to rezone the cemetery expansion lands from RE1 Public Recreation, RU4 Primary Production Small Lots and SP2 Classified Road, under BLEP2015 to SP1 Cemetery. In addition to the existing church and cemetery, the expanded cemetery is likely to include ancillary facilities such as an office, café, flower shop and potentially a chapel. They will most likely be in the vicinity of Tarlington Place. Details will be determined at the Development Application (DA) stage.

2 Existing Conditions

2.1 Land Use

The site is located on land between the Great Western Highway (GWH) to the north and M4 Western Motorway (M4) to the south and is bounded by the Prospect Highway to the west. The existing cemetery has an area of approximately 3.17 hectares, with the newly acquired land adding a further 6 hectares. A further 2.39 hectares of land is also intended to be acquired, including 2 hectares from other land owners and 0.39 hectares from the closure of St Bartholomew's Place, bringing the total area for the proposed cemetery site to 11.56 hectares. This is an increase of 8.39 hectares to the existing cemetery.

The existing cemetery is zoned SP1 Cemetery under Blacktown LEP 2015. The cemetery expansion land:

- Is predominantly zoned RE1 Public Recreation
- Includes land zoned RU4 Primary Production Small Lots (the site of the old Prospect Post Office)
- Includes land zoned SP2 Classified Road to the south of the existing cemetery.

The existing cemetery contains approximately 3,600 utilised graves. As the last church service was held on the site in 1967 and no new interment rights have been

sold at the cemetery since 1972, the existing cemetery site does not regularly attract many visitors.

The cemetery expansion land has been largely vacant and unused since the former Prospect Village (along Tarlington Place) was disrupted and eventually vacated/demolished following the realignment of the Great Western Highway in 1968 and the construction of the M4 Western Motorway in 1990.

The location of the site and its surrounding environs is shown in Figure 1.

Figure 1: Subject Site and its Environs

NOTES:

1. This Concept Plan shows the general intentions for a cemetery use of the land.
2. A Master Plan showing details such as proposed internal roads, location of new buildings, landscaping and areas for burials and ashes interment will be submitted with a Development Application for the cemetery - the next step if land is rezoned and reclassified.

LEGEND

EXISTING ST BARTHOLOMEW'S CHURCH AND CEMETERY
PROPOSED CEMETERY LAND
1/1192514 LOT NO'S

2.2 Access to the Site

Access to and from Tarlington Place can be achieved through the Great Western Highway in the eastbound and westbound directions. Eastbound access is gained via a right turn bay. Access points to the existing cemetery are from Ponds Road, Prospect.

2.3 Road Network

2.3.1 Adjoining Roads

Great Western Highway

The GWH is classified as a Roads and Maritime State Road and is aligned in an east-west direction to the site's north. It is a two-way road with 3 westbound lanes and 4 eastbound lanes near the site, set within a 32 metre carriageway with an approximately 9 metre central median. Being an arterial road, no parking is permitted. The GWH has a posted speed limit of 80 km/h.

Prospect Highway

The Prospect Highway is classified as a Roads and Maritime State Road and is aligned in a north-south direction to the site's west. It is a two-way road with generally one lane in each direction, set within an approximately seven-metre carriageway. Kerbside parking is not permitted, and the road has a posted speed limit of 60 km/h.

Ponds Road

Ponds Road is classified as a Roads and Maritime State Road and is aligned in an east-west direction along with the site's north-western boundary. It is a two-way road with 1 lane in each direction, set within an approximately 7 metre carriageway. Ponds Road functions as an exit-ramp to the GWH and connects with the Prospect Highway to the west. It also provides access to the existing cemetery and St Bartholomew's Church. Ponds Road has a posted speed limit of 60 km/h.

M4 Western Motorway

The M4 is classified as a Roads and Maritime State Road and is aligned in an east-west direction to the site's south. It is a two-way road with generally 3 lanes in each direction, set over an approximately 22-metre-wide carriageway including a central separation barrier. The Western Motorway has a posted speed limit of 100km/h in the vicinity of the site, with off and on ramps provided to/from the Prospect Highway.

Tarlington Place and St Bartholomew's Place

Tarlington Place and St Bartholomew's Place are classified as Local Roads and are internal roads located within the subject site. St Bartholomew's Place is an unsealed road which runs along the eastern boundary of the existing cemetery while Tarlington Place is a sealed road and primarily functions as the access road to 23 Tarlington Place (the old Prospect Post Office).

Council is looking to close St Bartholomew's Place (0.39 hectares) and absorb it into the cemetery expansion lands. It could, however, still function as an access point and internal cemetery road.

Vehicle access to the site is proposed via the existing 2 driveways along Ponds Road (access 1 and access 2) and Tarlington Place (access 3 St Bartholomew's

Place, whilst proposed to be closed, may also be used as an access point, depending on how the development is staged.

The internal road network will be determined at the Development Application stage. It is recommended that an internal link between the existing and expanded cemetery areas to be provided.

3 Future Conditions

3.1 Land Use

The proposal seeks to rezone 8.39 hectares of land to allow for the expansion of the existing St Bartholomew's Cemetery. The cemetery expansion will be developed in stages. New burial space is expected to become available in stages, approximately 5 years after development consent is granted for the cemetery. The site plan is outlined above in Figure 1.

The expanded cemetery is expected to ultimately include:

- Over 10,000 burial plots
- Above ground crypts
- Columbarium walls for ashes interment
- Ancillary facilities (such as an office, café, flower shop and potentially a chapel) with associated car parking, in the vicinity of Tarlington Place.

Table 1 Area Schedule

Use		Size
Existing Cemetery	Reactivation of existing church and cemetery [1]	3.17 hectares
Future Cemetery Expansion	Cemetery expansion and ancillary facilities [2]	8.39 hectares
Total		11.56 hectares

4 Executive Summary

Blacktown City Council is looking at the expansion of the existing St Bartholomew's Cemetery at Prospect, NSW. Arup has prepared this report, for Blacktown City Council, to support a planning proposal which seeks to rezone and expand the existing St Bartholomew's Cemetery. This will be done by consolidation of existing lots to the east including the existing St Bartholomew's Place (which is a paper road only.) This report applies to the proposed civil infrastructure and utilities requirements associated with the proposed development.

Due to the large amount of trunk utilities in the area, the proposed earthworks, service roads design/locations, and Tarlington Place upgrade will all require significant survey investigation and coordination to avoid damage and eliminate the need to relocate these utilities.

Existing major utilities are primarily to the north, east, and through the centre of the site. Three Sydney Water Corporation (SWC) trunk water supply mains, Endeavour Energy high voltage underground electrical mains, and Endeavour Energy overhead mains pass through the centre of the site along the existing St Bartholomew's Place alignment. Four Endeavour Energy 132kV feeder high voltage transmission lines traverse the site from the southwest to the north in the western portion of the site over the existing cemetery. The new service roads will need to consider these buried and overhead utilities in the alignment and design of the proposed service roads. Endeavour Energy have advised that they will permit future grave stones under the transmission lines.

In Tarlington Place there are three banks of Endeavour Energy underground electricity conduits on various non-standard alignments, a SWC trunk water supply main, and Telstra / Optus fibre optic cables within the existing road reserve. These services will need to be considered in the design of the upgraded Tarlington Place.

To enable detailed design, all buried utilities affected by proposed works should be potholed by non-destructive means with their depth and positions recorded. Similarly, the alignment and catenary levels of the transmission and high voltage electrical lines are required to be surveyed. This will assist in the future design and approvals process.

The cemetery expansion will be able to be serviced with drainage, sewerage, potable water supply, electricity and telecommunications. It is not economically viable to supply piped natural gas and it is recommended that LPG gas only be installed if required for cooking and heating.

Initial communication advises that the site has various areas of contaminated material. The extents and levels of contamination are being assessed by Prensa Pty Ltd.

In summary, the site can be serviced by all utilities required for the proposed development. As the rezoning application progresses and designs advance it is recommended that utilities planning continues to be coordinated with the relevant

utilities authorities. Where relocations and lead-in works are required to service the site, early planning is essential to accommodate lead times and prevent delays. Where access is required to private property as in the case of the sewerage early consultation is required to confirm access.

5 Report Scope

The scope of the work addressed in this report covers earthworks, road works drainage and utilities as affected by the proposed works.

6 Consultation

This strategy has been developed in close consultation with key utility stakeholders such as Sydney Water Corporation (SWC), Endeavour Energy, Telstra, NBN Co, Optus and Jemena. A summary of the consultation undertaken to date is provided in Table 2.

Table 2: Summary of stakeholder consultation

Agency/Stakeholder	Date	Method of Correspondence	Parties Involved	Discussion Details/ Response/Outcome
Sydney Water Corporation	21/12/2017	Email	Arup, Sydney Water	DBYD information requested only.
Sydney Water Corporation	21/12/2017	Email	Arup/Sydney Water	DBYD information plans were provided.
Endeavour Energy	10/01/2018	Email	Arup/Endeavour Energy	Arup sent an email to Endeavour Energy requesting constraints associated with building under transmission lines and working over buried cables through site.
Endeavour Energy	16/01/2018	Email	Arup/Endeavour Energy	Endeavour Energy emailed all conditions and requirements for easement and overhead transmission lines and acceptance for grave stones under transmission lines. Noting the need for vehicle access to be maintained.
Telstra	21/12/2017	Email	Arup, Telstra	DBYD information requested only. Note: no response was given from DBYD. Information plans were taken from adjoining project only.

Agency/Stakeholder	Date	Method of Correspondence	Parties Involved	Discussion Details/ Response/Outcome
NBN Co	21/12/2017	Email	Arup, NBN Co	DBYD information requested only.
NBN Co	21/12/2017	Email	Arup, NBN Co	DBYD information plans provided.
Optus	21/12/2017	Email	Arup, Optus	DBYD information requested only.
Optus	21/12/2017	Email	Arup, Optus	DBYD information plans provided.
Jemena	11/01/2018	Email	Arup, Jemena	Arup sent an email to Jemena notifying them of the nature of the proposed development and any requirements they may have in the supply of gas.
Jemena	15/01/2018	Email	Arup, Jemena	Jemena sent email confirming desktop audit had been completed. Jemena advised that gas supply was not viable based on cost without substantial monetary input by developer and recommended a LPG gas supply.

7 Servicing and Utility Strategy

The following servicing and utility strategy has been undertaken in two parts:

- Part 1 – Investigation into the existing utilities servicing the site and their availability in the area surrounding the site. This was done by submitting a Dial Before You Dig (DBYD) enquiry on 22 December 2017; and
- Part 2 – Desktop review of the existing and potential future requirements for each utility to service the proposed development. Refinement and final utility sizing will be required following the rezoning and ultimate layout for the development through the Development Application and Construction Certificate documentation process. The current concepts have been determined based on the preliminary St Bartholomew's Cemetery Extension – Prospect – Revised Concept Design plan included in Appendix A.

7.1 Earthworks

Significant earthworks are to be undertaken across the site for the proposed works. In the initial project meeting, Arup was advised of preliminary contamination issues found on the lots of the site and in Tarlington Place. A contamination assessment report was to be prepared to review contamination on and around the site. Refer to the Prensa Pty Ltd report on contamination and rehabilitation requirements and extents.

7.2 Roadworks

Roadworks and parking are proposed for the site and the upgrade of Tarlington Place. All works will be required to meet the requirements of the Blacktown City Council "Engineering Guide for Development – 2005 and as amended".

The new service roads through the site will tie in with the existing entrance to Ponds Road and use the existing concrete entrance. This will eliminate any works to be required to Ponds Road north of the site. In the middle of the site, the service road follows the existing alignment of St Bartholomew's Place. There are significant SWC water supply and Endeavour Energy electrical assets under this existing alignment and the proposed alignment. It will be necessary to consider these utilities in the design of this section of the service road.

It should also be noted that SWC proposes to build a future DN1200 trunk water main along this St Bartholomew's Place alignment, which will result in significant earthworks and changes in the future. Further discussions with Sydney Water are needed to understand the future delivery of this pipeline

Tarlington Place is proposed to be upgraded for its full length with new pavement, kerb, and guttering. The existing intersection with the Great Western Highway (to the north of the site) is to be retained. Beneath Tarlington Place, there are significant Endeavour Electricity underground high voltage electrical cables on varying alignments, a SWC trunk water main and Telstra and Optus optical fibre cables that will need to be considered in the design of this road.

The proposed carparks are to be designed in accordance AS2890.1-2004 Parking Facilities Part 1: Off-street car parking.

7.3 Stormwater Drainage Infrastructure

7.3.1 Existing Stormwater Drainage

Existing drainage infrastructure in the vicinity of the development site are the assets of either Blacktown City Council or Roads and Maritime Services (RMS). Refer Appendix B for plan of existing stormwater assets.

The existing catchment from the site is split by a ridgeline through the site with most of the site draining to the north and the Great Western Highway piped crossing. The remainder of the site drains to the south and the Western Motorway M4 piped crossing.

To the north of the site, along the southern verge of the Ponds Road and the Great Western Highway there is a kerb and gutter with piped drainage below. All stormwater pipes currently drain to a low point in the Great Western Highway, and then north under the highway.

To the south of the site, along the southern boundary of the M4 Western Motorway there are existing and proposed works which receives drainage from the site. This drainage system drains to existing detention basins south of the M4 Western Motorway.

7.3.2 Proposed Stormwater Drainage

The local stormwater drainage network for the development site is proposed to follow the philosophy of Water Sensitive Urban Design (WSUD) and connect to the existing drainage on the perimeter of the site. All works will be required to meet the requirement of Blacktown City Council "Engineering Guide for Development" – 2005 and as amended.

A description of flooding before and after the proposed development is to be included in the Flood Impact Assessment report (Arup, 2018).

7.4 Sewerage Infrastructure

7.4.1 Existing Sewerage

Existing sewerage infrastructure in the vicinity of the development site are the assets of SWC. Refer Appendix C for a plan of these assets.

The nearest sewer to the proposal is a DN150 vitrified clay sewer WO 48112 built in 1997 at the rear of Lot 2, 44 Great Western Highway (Lot 156 Rowood Road) to the north west of the intersection of the Great Western Highway and Tarlington Place. There is no other existing sewer infrastructure in the area.

7.4.2 Proposed Sewerage

Due to the location of the proposed and existing buildings in Tarlington Place adjacent the M4 Western Motorway, there is insufficient grade to drain the buildings back to the existing sewer end at IL 55.93 at the rear of Lot 2, 44 Great Western Highway (in Lot 156 Rowood Road).

It is recommended that a pressure sewer system be constructed to service the proposed cemetery buildings and the old post office site. The pressure main shall be constructed along the inside of the proposed development boundary of Tarlington Place and the Great Western Highway before passing under the highway to the connection discharge point at the rear of Lot 2, 44 Great Western Highway (in Lot 156 Rowood Road). As the connection is on private industrial land this will require an easement over the pressure main on the private land and permission to access and construct the pressure main.

This option will then provide a sewerage service to the proposed development.

7.5 Potable Water Supply Infrastructure

7.5.1 Existing Potable Water supply

Existing potable water supply infrastructure in the vicinity of the development site are the assets of SWC. Refer Appendix C for a plan of these assets. The assets include the following:

In Bartholomew's Place, there are two existing trunk water mains. The first is a DN500 cast iron cement lined water main (WO 30136, built in 1958). The second is a DN750 Steel Cement lined water main (WO 67408, built in 1964). Additionally, there is a proposed trunk DN1200 steel cement lined water main (WO 31541) which is intended to be constructed between and parallel to the above noted DN500 and DN750 mains in the future.

In Tarlington Place there is a trunk DN300 cast iron cement lined water main (WO N/A, built in 1929) in the northern verge.

At the intersection of Tarlington Place and the Great Western Highway on the west side, there is a trunk DN300 cast iron cement lined water main (WO 918280, built in 1967) crossing the Highway. At the same intersection on the south side, there is a reticulation DN100 cast iron cement lined water main (WO 91828, built in 1967) crossing Tarlington Place and in the southern verge of the Great Western Highway heading east.

In Ponds Road, there is an existing reticulation DN100 cast iron cement lined water main (WN 106713, built in 1990) on the southern verge. As the existing entrance to the cemetery is a concrete drive over the water main, no works are expected.

Following a review of the existing potable water supply infrastructure, it appears that there is sufficient water supply infrastructure locally to service the development.

7.5.2 Proposed Potable Water supply

The existing potable water supply infrastructure adjoining the site is believed to have sufficient capacity to service the proposed development site.

In Bartholomew's Place, there are two existing trunk water mains (a DN500 cast iron cement lined water main and a DN750 Steel Cement lined water main). These two mains need to be potholed to locate them in plan position and for depth. Any works near these trunk water mains is to be restricted. If filling works are to occur in the area, landscape works or repeated construction access is required over the mains. The mains are to be protected to the requirements of SWC. If the road reserve is removed in the consolidation of the lots, an easement is to be established to provide access for maintenance by SWC.

Also in Bartholomew's Place, there is a proposed trunk DN1200 steel cement lined water main (WO 31541) that is planned to be constructed between and parallel to the above noted DN500 and DN750 (future date of installation not nominated). Consultation with SWC should be undertaken to confirm the location

of this proposed main and its timing. Further, any additional easement width allowance should be considered if wider than that required for the two mains noted above.

As all adjoining water supply mains are trunk water supply mains, SWC generally does not allow property connections to trunk mains. It is therefore proposed to provide a new DN100 reticulation main along the southern verge of Tarlington Place from the existing DN100 cast iron cement lined water main (WO 91828) near the Great Western Highway and reconnect to the trunk DN 300 water main (WO N/A) adjacent to the M4 Western Motorway boundary. This will then provide a reticulation service to the site.

In Tarlington Place there is a trunk DN300 cast iron cement lined water main (WO N/A) in the northern verge. With the proposed upgrade of this road and the age of the existing trunk water main SWC will require this trunk main to be replaced. This is based on the 50 year design life use for mains. The main should be potholed to locate it in plan position and for depth.

Tarlington Place and the Great Western Highway intersection, both the trunk DN300 water main (WO 918280) and reticulation DN100 (WO 91828) should be considered when working in the vicinity of the intersection and the road. There is a possibility surface fittings will require adjustment to new footpath levels.

Any disused water meters on consolidated lots will be required to be removed and the main to meter connection shall be plugged on to the existing water main. The developer will need to install new water supply main to meter connections and fire booster assemblies for the new buildings to SWC requirements. All disused water meters are to be returned to SWC.

There should be sufficient potable water supply to service the proposed development.

7.6 Electrical Infrastructure

7.6.1 Existing Electrical supply

Existing electrical infrastructure in the vicinity of the development site are assets of Endeavour Energy, as shown in Appendix D. The assets include the following:

Beneath Ponds Road in the southern verge adjoining the proposed site for the full length down to the Great Western Highway, there are two banks of buried cables. The northern buried cables are 2 x DN100 PVC and the southern buried cables are 2 x DN100 PVC; it should be noted that all buried cables are listed as abandoned. Overhead power and street lighting are also located in the verge.

In Bartholomew's Place, there is a bank of buried cables on the western boundary. In the southern section, the cable bank contains 6 x DN125 PVC and 2 x DN50 PVC buried conduits. The middle and northern section comprises 4 x DN125 PVC and 1 x DN50 PVC of buried conduits. These conduits are supplemented with 11kV overhead electrical cables parallel to these buried conduits. In the

north-eastern side there is a second bank of 4 x DN125 PVC and 2 x DN50 PVC buried conduits. The depth of all conduits is unknown.

In Tarlington Place, there are 3 banks of electrical buried conduits and cables on various non-standard alignments across the road reserve. The northern bank contains 5 x DN150 PVC buried conduits with a connection pit buried mid length. The central bank contains 5 x DN150 PVC buried conduits with a buried connection pit buried mid length. The southern bank contains 5 x direct buried cables. The depth of all conduits is unknown. There are also existing overhead high and low voltage power lines and street lighting in the southern verge alignment. All works in the vicinity of the buried conduits will need to be undertaken in accordance with Endeavour Energy "Underground Conditions". More information can be found in Appendix E.

Four 132kV feeder high voltage transmission lines traverse the site from the south-western boundary of the existing cemetery to the north side of the Great Western Highway. There are two transmission towers in the south west of the site that support the power lines across the site to two other transmission towers north of the Great Western Highway. All works in the vicinity of the transmission lines will need to be undertaken in accordance with Endeavour Energy "General Restrictions for Overhead Power Lines". More information can be found in Appendix F.

7.6.2 Proposed Electrical supply

As no works are proposed outside the front boundary of the Ponds Road and Great Western Highway no electrical conduits should be affected.

In Bartholomew's Place, all conduits will be required to be potholed and located prior to any works being undertaken. The associated overhead power lines will need to be undergrounded or raised in height if substantial filling is done beneath these lines. Any earthworks proposed over buried conduits to be done in accordance with Endeavour Energy "Underground Conditions"

In Tarlington Place, the existing banks of buried conduits will all need to be potholed and located by position and depth to allow the design and construction of the new road over. To avoid the adjustment of these cables, it is recommended that the roadway and site levels be designed to avoid the adjustment of these cables in consultation with Endeavour Energy. The existing overhead power supply and street lighting will require extension to service the new road and new buildings on the northern side of Tarlington Place.

Should it be required, any electrical work on the proposed development site can be installed as private electrical supply and lighting.

7.7 Telecommunications Infrastructure

7.7.1 Existing Telecommunications

Existing telecommunication infrastructure in the vicinity of the development site are assets of Telstra. Refer Appendix G for a plan view of these assets. The assets include the following:

Along the Ponds Road and the Great Western Highway in the southern verge, there are existing cables with connection to each existing lot. These cables are referred to as "dead".

In Bartholomew's Place, there are no utilities shown on the plans.

In Tarlington Place in the northern verge, there are existing cables with connection to each existing lot. These cables are referred to as "dead". There are also 2 x DN100 Asbestos Cement ducts carrying fibre optic cables.

There are no NBNCo utilities currently in the area.

Optus fibre optic cables share Telstra ducts along the northern verge of Tarlington Place before running in Optus ducts across the Great Western Highway.

7.7.2 Proposed Telecommunications

New telecommunication connections will be required for the new buildings.

Any proposed roadworks in the vicinity of the Telstra cables will require cables to be potholed and any pits adjusted

7.8 Domestic Gas Infrastructure

7.8.1 Existing Gas

Existing natural gas infrastructure in the vicinity of the development site are the assets of Jemena. The nearest existing gas main to the site is 550m east of the intersection of Tarlington Place and the Great Western Highway in the Quarry Road, road reserve. The gas main is a DN100 1050kPa secondary main.

7.8.2 Proposed Gas

Arup was advised by the cemetery developer that the proposed development would not be a Crematorium and that gas would not be required for this purpose. The buildings however will have catering facilities, thus a piped gas supply to the site would be desirable for cooking and heating purposes.

To enable gas to be supplied to the site a new main would be required from the existing DN100 1050kPa secondary main 550m east of the intersection of Tarlington Place and the Great Western Highway in the Quarry Road, road reserve. To enable this to happen a main would have to be constructed along the southern verge of the Great Western Highway and down the southern verge of

Tarlington Place to the existing Post Office and the new cemetery buildings. The total length of the gas main being approximately 800m.

An approach to supply gas and construct the above noted gas main was made to Jemena who advised that the capital cost compared to the return on the gas supplied would not warrant the capital cost to construct the main. Should the developer wish to contribute a substantial amount to the construction of the new gas main it may be viable. It was thus recommended that should gas be needed at the new facility that an LPG gas system be installed.

Therefore, now allowance has been made for a mains gas supply.

8 Conclusions

This report has been prepared, for Blacktown City Council, to support a Planning proposal which seeks to rezone and expand the existing St Batholomew's Cemetery and land to the east including consolidation of existing lots and the existing St Bartholomew's Place a paper road. This report applies to the proposed civil infrastructure and utilities requirements associated with the proposed development.

Initial communication advises that the site has various areas of contaminated material which are to be assessed by Prensa Pty Ltd.

Due to the large amount of trunk utilities in the area proposed earthworks, the service roads design and location, plus the Tarlington Place upgrade will all require significant survey investigation and coordination to avoid damage and eliminate the need to relocate these utilities.

Existing major utilities are primarily to the north, east and through the centre of the site. 3 off SWC trunk water supply mains and Endeavour Energy high voltage underground electrical and overhead mains pass through the centre of the site along the existing St Bartholomew's Place alignment. Four Endeavour Energy 132kV feeder high voltage transmission lines traverse the site from the south west to the north in the western portion of the site over the existing cemetery. The new service roads will need to consider these buried and overhead utilities in the alignment and design of the proposed service roads. Endeavour Energy have advised that they will permit future grave stones under the transmission lines.

In Tarlington Place there are 3 banks of Endeavour Energy underground electricity conduits on various no standard alignments, a Sydney Water Corporation trunk water supply main, Telstra and Optus fibre optic cables within the existing road reserve. These services will need to be considered in the design of the upgraded Tarlington Place.

To enable detailed design all buried utilities affected by proposed works should be potholed by non-destructive means and their depth and positions recorded, similar alignment and catenary levels of the transmission lines are required. This will assist in the future design and approvals process.

The site will be able to be serviced with drainage, sewerage, potable water supply, electricity and telecommunications. It is not economically viable to supply piped

natural gas and it is recommended that LPG gas only be installed if required for cooking and heating.

In summary, the site can be serviced by all utilities required for the proposed development. As the rezoning application progresses and designs advance it is recommended that utilities planning continues to be coordinated with the relevant utilities authorities. Where relocations and lead-in works are required to service the site, early planning is essential to accommodate lead times and prevent delays. Where access is required to private property as in the case of the sewerage early consultation is required to confirm access.

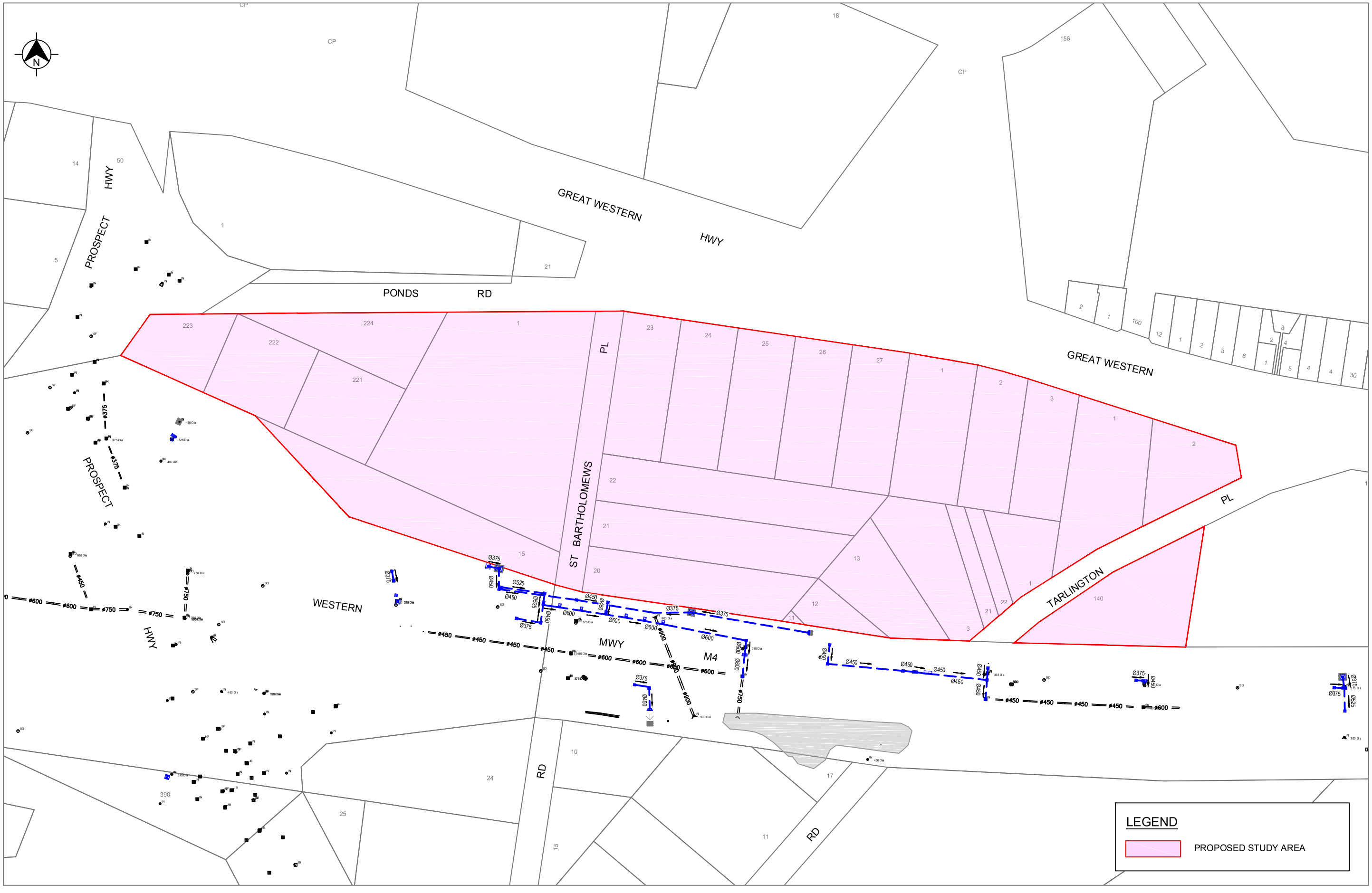
Appendix A

Proposed Development Plan

SITE PLAN

Appendix B

Existing Stormwater Drainage Plan



0 25 50 75 100 125
SCALE 1:2500m

ST BARTHOLOMEW'S CEMETERY
PROSPECT

BLACKTOWN CITY
COUNCIL

DRAINAGE

Appendix C

Existing Sewerage and Water Supply Plan

WATER MAIN WN 106713
DN100 DICL, BUILT 1990

SEWER MAIN WO 48112
DN150 VC, BUILT 1977

TRUNK WATER MAIN WO 30136
DN500 CICL, BUILT 1958

WATER MAIN PRO 20031030
DN125 PE, BUILT 2016

TRUNK WATER MAIN WO 67408
DN750 SCL, BUILT 1964

TRUNK WATER MAIN WO 918280
DN300 CICL, BUILT 1967

PROPOSED TRUNK WATER MAIN WO 31541
DN1200 SCL, BUILT 2015

TRUNK WATER MAIN WO N/A
DN300 CICL, BUILT 1929

TRANSGRID
HIGH VOLTAGE OVERHEAD
TRANSMISSION LINE EASEMENTS

WATER MAIN WO 91828
DN100 CICL, BUILT 1967

HWY
GREAT WESTERN
HWY
PONDS
ROAD
GREAT WESTERN
HIGHWAY
PROSPECT
BARTHOLOMEW'S PLACE
BARTHOLOMEWS
PL
ROWOOD
TARLINGTON
PL
WESTERN
HIGHWAY
MOTORWAY
M4
RD
RD
PROSPECT

LEGEND

PROPOSED
STUDY AREA

SYDNEY WATER CORPORATION EXISTING SEWERAGE & WATER SUPPLY PLAN

St BArtholomews Cemetery
Prospect
Map:189 Grid:B15 Edition:Sydney UBD Edition 41

0m 20m 40m 60m 80m 100m

Scale 1:2500

Page

Appendix D

Existing Electrical Plan

LEGEND

PROPOSED STUDY AREA

E EXISTING ELECTRICAL

N

PROSPECT HWY

PONDS RD

GREAT WESTERN HWY

ST BARTHOLOMEWS PL

TARLINGTON PL

WESTERN MWY M4

RD

JOINT BAY
5.0PL UNK COV
16-12-1997
FB086263

0 25 50 75 100 125
SCALE 1:2500m

ST BARTHOLOMEW'S CEMETERY
PROSPECT

BLACKTOWN CITY COUNCIL

ENDEAVOUR ENERGY
EXISTING ELECTRICAL

Appendix E

Electrical - Underground Conditions

Underground Conditions

- The approval is subject to agreement in writing within 45 days to the following conditions.
- The driveway where it crosses the easement for underground cables is to be constructed with reinforced concrete of not less than 200mm thick.
- All digging / excavation work is to be carried out by hand or toothless bucket and will be considered on an individual basis.
- No mechanical compaction of the concrete over the easement is to be conducted. Any compaction should only be carried out using static rollers.
- All approvals granted are subject to the encroachment being removed or relocated at the Owners Expense should Endeavour Energy require this for cable maintenance, construction or emergency works.
- Everyone working within the easement area is to be advised of the existence of the underground cables and its protecting easement.
- All work within the easement is to be conducted with extreme caution and at the owner's risk.
- A drawing to scale, showing the proposed encroachment on the easement and the easements position on the lot shall be clearly shown and displayed.
- Should the cable ducts or warning tape be exposed all work is to stop immediately. Endeavour Energy notified and no work will recommence until a full inspection is conducted.
- Concreting over the cable easement is acceptable as long as the ground cover is not reduced.
- If excavation is required due to an unsuitable sub-base, than details of the work method needs to be submitted and agreed to by Endeavour Energy prior to the excavation taking place.
- The planting of trees or the cultivation of shrubs with extensive root systems will not be permitted within the easement area. However the planting of small shrubs and the tilling of soil to a maximum depth of 200mm may be considered except within 2 metres of joint bays, surface installations, cable marker plates and posts.
- For Underground Services location you should contact "Dial before you Dig" on 1100.
- The placing of garbage, refuse or fallen timber is not permitted within the easement area.
- The parking of vehicles within the easement area will normally be permitted provided that an adequate surface exists which is capable of supporting the vehicles likely to be parked, thus preventing the crushing of the cables.
- Approval will normally be given for the operation of mobile plant and equipment within the easement area provided that an adequate surface exists which is capable of supporting the plant or equipment thus preventing the crushing of the cables. If a suitable surface does not exist, approval may be given subject to the activity being supervised by Endeavour Energy at the operator's expense.

- The erection of structures spanning the easement is not permitted. Consideration will be given if no other practicable alternative site is available, the cables will be required to be installed in ducts and if deemed necessary, concrete encased. Spare ducts may also be required to meet future cable requirements. The above works would be at the applicants expense,
- The placing of "fill" within underground easements is not usually permitted however, consideration will be given on an individual basis and after investigation by Endeavour Energy.
- Approval for reduction in ground cover over underground cable easements will only be considered if the depth of the cable / ducts exceeds minimum design requirements.
- Approval for concrete driveways is subject to the driveway being capable of supporting the heaviest vehicle likely to traverse it and the cables are to be installed in ducts and, if deemed necessary, concrete encased. Spare ducts may be required to be installed to meet future cable requirements with installation being at the owner's expense.
- The installation of metal pipes, fences, underground and overhead cables will be considered on an individual basis.
- Domestic recreation activities are usually permitted within the vicinity of the easement.
- The storage of non – flammable materials may be considered provided that the property owner can demonstrate that removal off such material can be achieved in a reasonable time frame.
- The construction of buildings within the easement area is prohibited.
- Retaining walls are not permitted within the easement area.
- The storage of flammable or explosive materials within the easement area is not permitted.
- It should be noted that these are guidelines only and **written permission** must be sought for any activity within the easement area.

Should you have any questions regarding this or any other matter please do not hesitate to contact Endeavour Energy.

Regards

Jeff Smith
Easement Management Officer
Transmission Northern Region
Endeavour Energy
D: +61 2 98537139
F: +61 2 98537100
E: Jeffrey.Smith@endeavourenergy.com.au

Appendix F

Electrical - General Restrictions for Overhead Power Lines

Last updated 11/1/18

General Restrictions for Overhead Power Lines

Endeavour Energy wishes to provide the following list of 'General Restrictions' applicable to the **'Easement Area'**. It should be noted that these are indicative guidelines only and that this information should be administered in conjunction with the requirements of the Work Health and Safety (WH&S) Act and WorkSafe NSW (formerly WorkCover) legislation.

Endeavour Energy recommends a policy of **'prudent avoidance'** be adopted in relation to the use of the easement area for ongoing staff activities or work areas. Additionally, WH&S and WorkSafe legislation should be consulted in relation to this matter.

As existing ground levels throughout the easement are unknown, it is assumed that minimum design clearances exist within the easement area. As such, references to permissible heights on any activity may alter from that stated within this document. **Written approval** must be sought for any activity within the easement area. For such approval, detailed plans drawn to scale and fully dimensioned showing property boundaries and other relevant information should be forwarded to Endeavour Energy.

Approval to encroach into the easement area will not be granted where an alternate site clear of the easement area exists. All approvals granted are subject to the encroachments being removed or relocated; at the owner's expense should Endeavour Energy require this for cable maintenance, construction or emergency works.

Should any earthing be disturbed whilst work is being carried out, all work should immediately cease and Endeavour Energy notified so that the earthing can be reinstated.

1. Construction of buildings (permanent or temporary) e.g. Houses, site-sheds, shipping containers, other substantial structures or parts thereof, includes eaves, guttering and footings, shall not be erected within the easement area.

2. No encroachment into an overhead Transmission easement will be permitted within 10 metres of the closest steel structure and 5 metres of the closest pole.

2b. No encroachment into an overhead Distribution easement will be permitted within 5 metres of the closest pole.

3. Changes to ground levels within the easement area are not permitted without the prior written approval of Endeavour Energy. Applications are to be supported by a geo-technical report prepared by a civil engineer.

4. **Statutory clearances to the conductors must be kept at all times**.

   It should be noted that power lines are designed to allow for sag and swing sideways, consequently allowance for this needs to be considered at all times. The statutory clearance from 0 kV to 132 kV conductors is minimum 3 metres, in all directions, at all times. This clearance also applies but not limited to; persons, vehicles, hand tools, equipment, cranes, lifting gear, plant and load. Consideration needs to be given and the clearances increased where there is the likelihood of any inadvertent movement or swinging of the plant, crane, load or lifting gear towards the power lines.

5. Construction of roads, car and truck parking areas, and subdivisions will only be considered for approval provided that access to the structures is maintained and the layout is such that; sufficient building area is left clear of the easement, it will not create numerous utility crossings or later requests for encroachments.

6. If required, In order for Endeavour Energy to carry out the necessary calculations, the applicant must submit a Centre Line Profile, a recent survey, showing the following information:

REQUIREMENTS FOR PROFILE CLEARANCE TO TRANSMISSION LINES

Note: Clearances cannot be determined and will not be processed unless all of the required information is submitted i.e. *Current levels **and** Proposed levels.*

THE INFORMATION TO BE SUPPLIED:

- In AutoCAD Format.
- Have a vertical exaggerated scale of 10:1. E.g. Horizontal Scales 1:1000 Vertical Scale 1:100 or Horizontal Scale 1:500 Vertical Scale 1:50.
- Information on the paper size that the drawing needs to be printed at for the scale to be correct e.g. Horizontal Scale 1:1000 Vertical Scale 1:100 when printed on A2.

THE CENTRE LINE PROFILE SURVEY IS TO INCLUDE ALL OF THE FOLLOWING INFORMATION:

- Lot and DP number of property.
- Clearly marked easement width.
- Total length of the conductor span affected.
- Conductor attachment height reading at each structure.
- Existing RL (Natural Ground Surface) and Final readings at the base of each structure.
- Indicate pole or structure identification numbers.
- Date, Time and Temperature at the time of each height reading taken.
- A height reading is required every 10 metres on the conductor closest to the ground of the Existing RL or as the terrain dictates for the entire span.

Note:

- The amount of distance required for each reading may be reduced on poles with smaller spans.

- Other information may be required where the structures are strained or changes of direction occur on pole lines.

7. A second survey may be required upon completion of work.

8. Vehicles with elevating or extending components such as earth moving vehicles, concrete pumping vehicles, loaders, fork lift trucks, tip trucks, cranes, including Derrick style cranes and hoists, Hiabs, Palfingers including others, and are not to proceed under the conductors until such components are returned to the travelling position.
Note: Concrete pumping vehicles are not permitted to operate within an easement for electricity purposes.

9. Vehicles, plant or equipment having a height when fully extended that exceeds 4 metres shall not be brought onto an easement area without the prior written approval of Endeavour Energy.

10. The area within the easement is not to be used for the loading or unloading of trucks.

11. No soil or other material is to be stored, loaded or unloaded within the easement area.

12. The area within the easement is not to be used for storage or stacking of goods or materials, especially flammable or explosive material.

13. Application for approval for the erection of non-climbable flagpoles, CTV cameras, security lighting, weather vanes, signs and the like might be granted, subject to a height limitation of 4 metres and the earthing of all metallic parts.

MINIMUM APPROACH DISTANCES OF PLANT AND LOADS TO LIVE ELECTRICAL APPARATUS (FOR NON-AUTHORISED PERSONS)

NOMINAL VOLTAGE	MINIMUM APPROACH DISTANCE
Not exceeding 132,000V	**3 metres**
Above 132,000V but not exceeding 330,000V	**6 metres**
Above 330,000V	**8 metres**

Caution: *The operator of the plant must be able to identify the voltage level of the apparatus that they are approaching with the plant or assume 8 metres as a minimum.*

14. All personnel are to be advised of the hazards of working in close proximity to high voltage wires. Extreme caution is to be observed when working within the easement area and around any poles and structures.

15. All machinery or plant within an electricity easement is to be operated by adequately trained and accredited persons.

16. Endeavour Energy recommends the use of a suitably trained safety observer when work is being carried out within the easement area.

17. A hazard identification and risk assessment should be carried out within the easement area. A safe work method statement should be provided for any work carried out within the easement area. All staff should be briefed regularly, or when there are any changes, as to the contents of the risk assessment and safe work method statement.

18. For the attention of staff and visitors to the site and to ensure constant vigilance, Endeavour Energy recommends that clearly visible safety signs be erected, in accordance with the relevant safety standards, alerting attention to the transmission lines and associated hazards.

19. Flammable, combustible or explosive materials, including gas bottles, are not permitted within the easement area. Flammable liquid carriers shall not be placed within the easement area.

20. Garbage, refuse or fallen timber is not permitted within the easement area. Burning off is not permitted within the easement area without the prior written approval of Endeavour Energy.

21. Any metallic fencing within the easement shall require earthing and isolating in accordance with the Australian Standards as per AS3000.

22. Structures such as detached garages, sheds, stables, carports, unroofed veranda's, shipping containers, water tanks, fixed plant and equipment, will only be considered for approval if no other practicable alternative site is available clear of the easement area.

    No approvals will be granted for any of the above where they are proposed within the aforementioned minimum clearances.

    No access is to be restricted whilst maintaining safety clearances at all times.

    Furthermore, any proposed structures must not exceed 2.5 metres in height if climbable and 4.3m if not climbable.

***Please Note**: -*

Due to the effects of induction and possible lightning/line fault step and touch potential, requests for pools, spas and some water tanks inside the easement will not be approved.

23. Installation of utility services, such as power, telephone, gas, water and sewerage (overhead, underground, or on the surface) may be considered for approval by Endeavour Energy's Overhead and Underground Mains Manager. Proposed site dimensions in relation to assets are required.

24. Trees, plants or shrubs with a *mature height* that do not exceed 3 metres may be planted within the easement area provided they are no closer than 3 metres from the nearest structure (i.e. pole or tower). Trees must be a minimum 3 metres from the vertical projection of the nearest conductor (i.e. overhead power line). No plants are permitted in an area where they may obstruct access.

25. Dogs and livestock shall not be kept within the easement area if they are likely to create a dangerous situation for Endeavour Energy staff and thus restrict access.

26. Normal agricultural pursuits are permitted however, care should be taken when ploughing or operating mobile machinery in the vicinity of structures or supporting guys. Earthing systems are particularly prone to damage from such activities. It is imperative that access to the easement area and structures be available at all times. Whilst reasonable care will be taken, Endeavour Energy will not be responsible for any damage to crops caused whilst accessing and working within the easement area. The restrictions applying to the heights of mobile plant and equipment must be observed.

27. 24 hour 7 day a week access is required to the easement for emergency and maintenance purposes. Any locked gates are to have an Endeavour Energy lock incorporated in the locking system. Please contact Integrity Locking 1300 366 488 for details.

In addition to the above, details of some fencing restrictions are provided for your information. Written approval must be sought prior to the commencement of work.

A. Brick, masonry walls or other substantial structures or parts thereof shall not be erected within the easement area.

B. All other types of fencing erected within the easement area are subject to a height limitation of 2.5 metres.

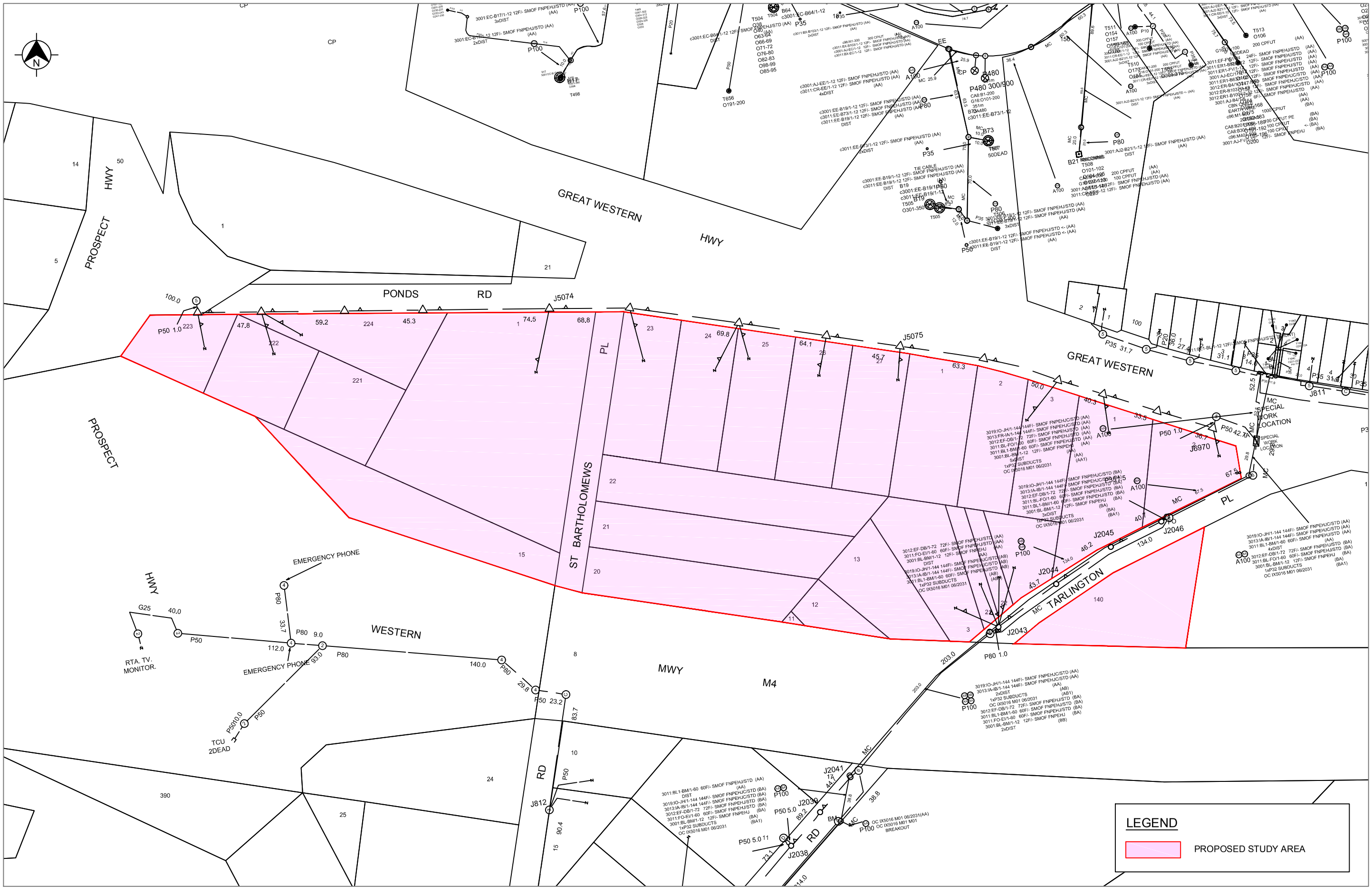
C. The erection of any fencing is not permitted within 10 metres of a structure or guy and is not permitted in a location that could create an unsafe working area for Endeavour Energy staff.

D. All metallic fences are required to be earthed and isolated in accordance with Endeavour Energy's specifications or Australian Standards AS3000.

E. Gates (4.2m) are required in boundary fences to facilitate longitudinal access to the easement area and associated structures by truck. All access gates are to include Endeavour Energy locks in the locking system. Please refer to the above point 27.

Appendix G

Existing Telstra Plan


GREAT WESTERN HWY
PROSPECT HWY
PONDS RD
PROSPECT
ST BARTHOLOMEWS PL
GREAT WESTERN
MC SPECIAL WORK LOCATION
MC TARLINGTON
RD
HWY
WESTERN
MWY
M4
EMERGENCY PHONE
RTA. TV. MONITOR.
TCU 2DEAD
J5074
J5075
J811
J6970
J2045
J2046
J2044
J2043
J2041
J2039
J2038
J812
LEGEND
PROPOSED STUDY AREA
0 25 50 75 100 125
SCALE 1:2500m
ST BARTHOLOMEW'S CEMETERY PROSPECT
BLACKTOWN CITY COUNCIL
TELSTRA EXISTING TELECOMMUNICATIONS