

## Uniting Waverley

### Hydraulic, Electrical and Civil Services Engineering Infrastructure Report

#### Prepared for:

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# Revision

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REVISION

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# Executive Summary

## 1. Executive Summary

The purpose of this report is to brief Uniting Care on the current provision and condition of the existing electrical, telecommunications, hydraulic and civil site infrastructure services at the Uniting Waverly.

The scope of the Uniting Care redevelopment is to provide the following:

- New Residential Aged Care facilities
- New Independent Living Units
- Refurbishment and reuse of existing miscellaneous facilities for new purposes.
- Upgrade to the existing hospital.

Limitations of this report are as follows:

- Only high level calculations were performed to check system capacities.
- No taking or testing of material samples was carried out.
- All information provided by others, particularly verbal information has been taken at face value.
- No testing for or advice is provided with respect to asbestos, microbiological or other contaminants.
- No detailed survey and detailed authority information is available.

### 1.1 Electrical & Telecommunications Services

The key points to consider from the electrical services are as follows:

- A total of up to three 1000 kVA substations will be required to service the ultimate development.
- The initial application to and response from Ausgrid on the availability of supply suggests both the staging and final development needs can be met from within the surrounding network. A detailed undertaking is required to confirm the exact details
- Telecommunications infrastructure, specifically NBN we suggest will be made available based on the size of the development.

### 1.2 Hydraulic Services

The key points to consider from the hydraulic services are as follows:

- The Sydney Water, water main infrastructure along each street frontage (except Church Street) consists of significant trunk mains and secondary distribution mains. Therefore limited capital costs would be associated with connecting the proposed development
- The water main infrastructure for stage 1 may require an upgrade to the water main along Church Street to 200mm and connect Carrington Street to Bronte Road.
- The Sydney Water sewer network review has identified limitations with regards to potential capacity constraints for the future development. Further applications to Sydney Water are required to provide further advice relating to capacity during the next phase of the development.
- Jemena owns and operates the surrounding natural gas network. Our review indicates that the 210kPa network is assumed to have capacity, however a further application to Jemena during the next project phase is required.

# Executive Summary

## 1.3 Civil Engineering

The key points to consider from the civil engineering review are as follows:

- The site is not considered to be in a flood zone and therefore no external flooding issues would need to be considered for the proposed development
- Our initial assessment suggests that the green corridor proposed through the site can be utilised for overland flow and aligns with the topography of the site
- The proposed development will require on site detention and water treatment . This will be managed per stage or as the development progresses a precinct wide strategy may be reviewed from a commercial perspective.
- There are no envisaged Waverly Council asset upgrade works/costs due to the onsite detention requirements to limit flows to pre-development conditions.

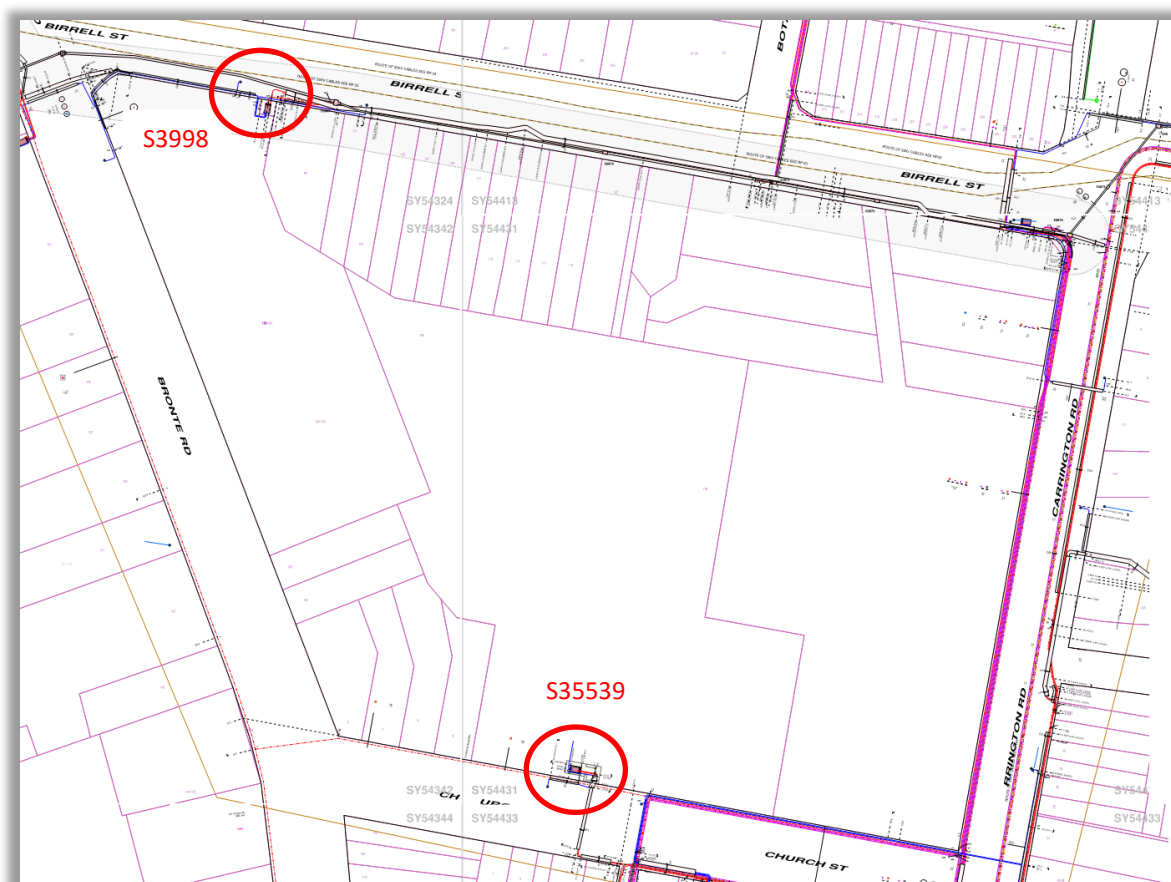
# Electrical & Telecommunications Services

## 2. Electrical & Telecommunications Services

### 2.1 Power Supply

#### 2.1.1 Existing Supply Authority Network

The Supply Authority is Ausgrid. The existing Supply Authority underground network in the vicinity is as depicted in the drawing below.



There are two existing kiosk substations on site:

- S3998 is located on the northwest corner of the site facing Birrell St and supplies the existing Edina Nursing Home and part of the existing overhead network on the street.
- S35539 is located on the southern side of the site facing Church St and supplies the existing hospital and part of the existing overhead network on Church St.

It is noted that if either of these substations are relocated or removed, it remains the developers responsibility to provide power to the existing street supply.

There is an existing overhead power network adjacent to the site on Church St, Bronte Rd and Birrell St. The majority of buildings on site, including all the residential properties are supplied by the existing overhead network. As these residential properties are demolished to make way for the development these overhead connections will be removed.

# Electrical & Telecommunications Services

## 2.1.2 Calculated Maximum Demand

The maximum demands for the site is calculated as to 3594 Amps (2586 kVA). This is based on the yields calculated by Cox.

- 230 ILUs,
- 114 RACF rooms and
- Commercial areas,
- Hospital areas

A summary of the calculated Maximum Demand for each stage is depicted below:

Stage	Area (m <sup>2</sup> )	Beds/Rooms	Subtotal (A)	Method of Determination
<b>Stage 1a</b>				
			<b>1377.1</b>	
<b>RACFs</b>		114	661.2	AS3000 Table C1 (See Stage 1 Tab)
<b>Commercial</b>	5340		594	AS3000 Table C3, 80VA/m <sup>2</sup>
<b>Hospital</b>	1219		121.9	NSW Health Infrastructure Guidelines
<b>Stage 1b</b>				
			<b>674</b>	
<b>ILUs</b>		90	594	AS3000 Table C1 (See Stage 2 Tab)
<b>Lifts</b>			80	2 x 40A lifts
<b>Stage 2</b>				
			<b>594.8</b>	
<b>ILUs</b>		78	514.8	Assume 23A per ILU additional load
<b>Lifts</b>			80	2 x 40A lifts
<b>Stage 3</b>				
			<b>489.2</b>	
<b>ILUs</b>		62	409.2	Assume 23A per ILU additional load
<b>Lifts</b>			80	2 x 40A lifts
<b>Future Stage</b>				
			<b>459</b>	
<b>Hospital</b>	4590		459	NSW Health Infrastructure Guidelines
<b>Total (A)</b>				
			3594	
<b>Total (kVA)</b>				
			2586	

# Electrical & Telecommunications Services

## 2.1.3 Substation Requirements

It is noted that Ausgrid may potentially require that any buildings connected to the overhead network are reconnected to an underground supply located on site. In order to supply the full redevelopment's maximum demand a total of 3 by 1000 kVA substations will ultimately need to be installed on site.

It is uncertain if the surrounding Ausgrid infrastructure has the capacity to support full 2500-3000kVA supply.

It is recommended that application is made to Ausgrid as soon as possible to determine whether there is capacity available in the network. This would also establish whether the existing heritage buildings on the eastern portion of the site may retain their connections from the street or if they would need to be supplied from a common point (e.g. the substation located facing Church St).

Substation options will largely depend on final site layout. Some combination of the following substation options may potentially be used to supply the site

- 1,000kVA kiosk type substation. Easement requirement of 5,300mm x 3,300mm per substation.
- 1,000kVA mini chamber substations (spatial requirements of 4,200mm street frontage x 4,600mm deep x 3,200mm clear headroom or 5,600mm street frontage x 2,800mm deep x 3,200mm clear headroom)
- 1 conventional chamber substation. Owing to associated cost and spatial requirements, this option is unlikely.

## 2.1.4 Staging of Installation of Substations

It is anticipated that the new substations will be installed in the following order to suit the demand of each stage.

### 2.1.4.1 Stage 1a & 1b

The existing substation adjacent to Church St (S35539) may be upgraded / retained to supply the Stage 1 development.

As the predicted maximum demand of the Stage 1 building exceeds the maximum capacity of a single 1000 kVA substation a second substation may need to be installed to supply the development and resupply the existing street connections.

This second substation may, if required, be used to supply the later stages of the development.

### 2.1.4.2 Stage 2

It is anticipated that the existing substation on the north east corner of the site (S3998) can be retained or upgraded to supply the Stage 1c portion of the development.

### 2.1.4.3 Later Stages

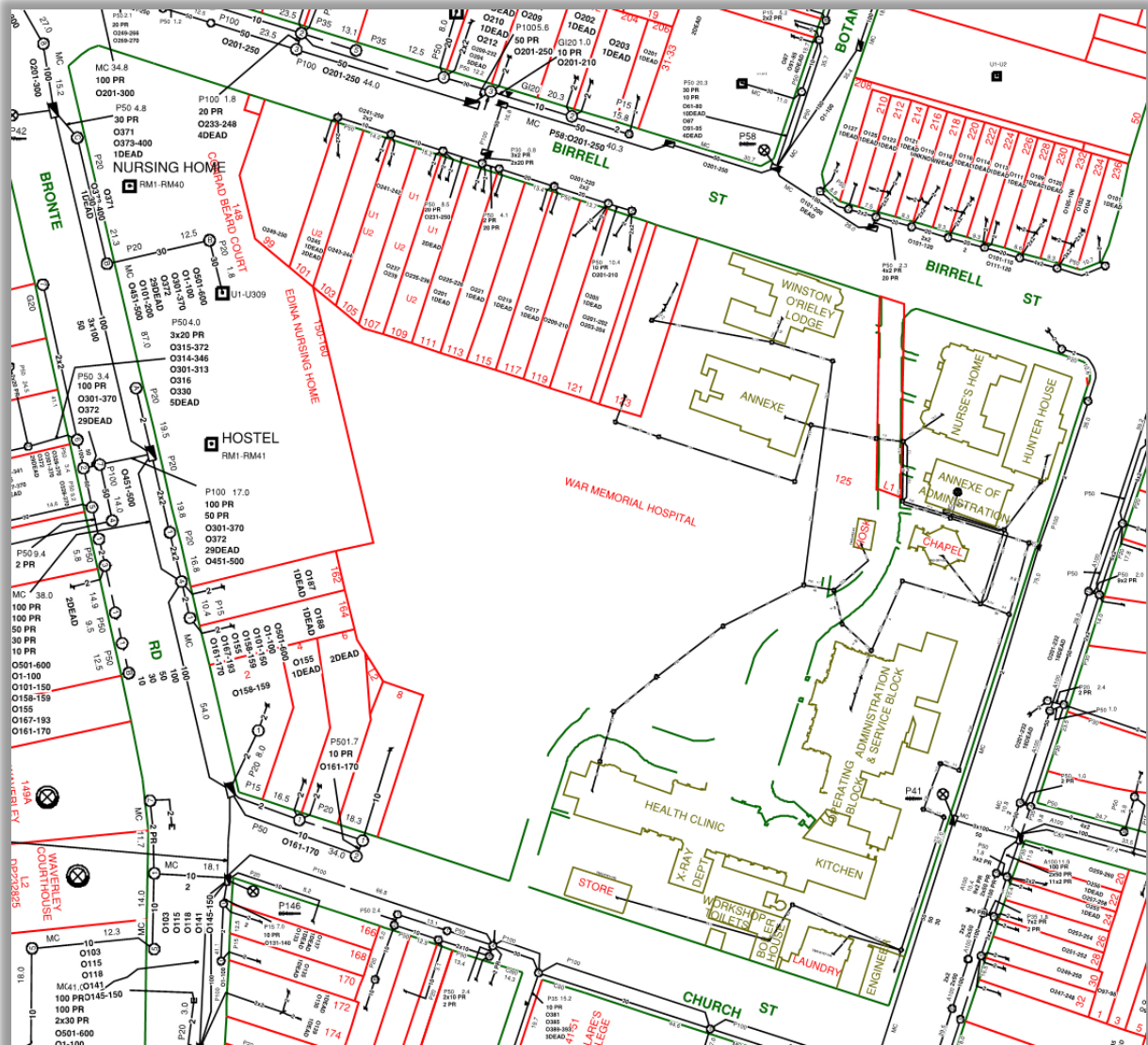
It is anticipated that the spare capacity which may be installed in Stage 1 may be used to supply any upgrades to the supply to the existing buildings and additional ILUs.

# Electrical & Telecommunications Services

## 2.2 Telecommunications

### 2.2.1 Existing Carrier Services Infrastructure

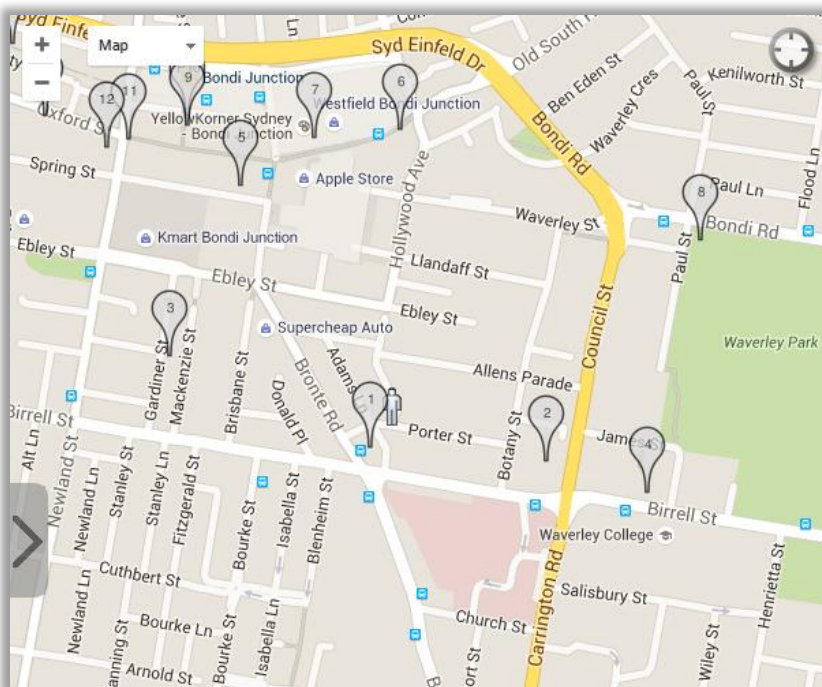
Telstra appears to be the only provider with services into the development. The Telstra cabling on site is shown in the picture below.



It is noted that Telstra's pit and conduit network extends into the eastern side of the site to supply the Hospital, Chapel, Nurses Home etc. Under the redevelopment it is would be preferred to retain this system to minimize disturbance and rework to the existing development.

## Electrical & Telecommunications Services

We have reviewed the *Mobile Site Safety* service and have included the below extract from the service.



It appears there are base stations on the other side of Birrell St however there are no stations on site which would be affected by the redevelopment.

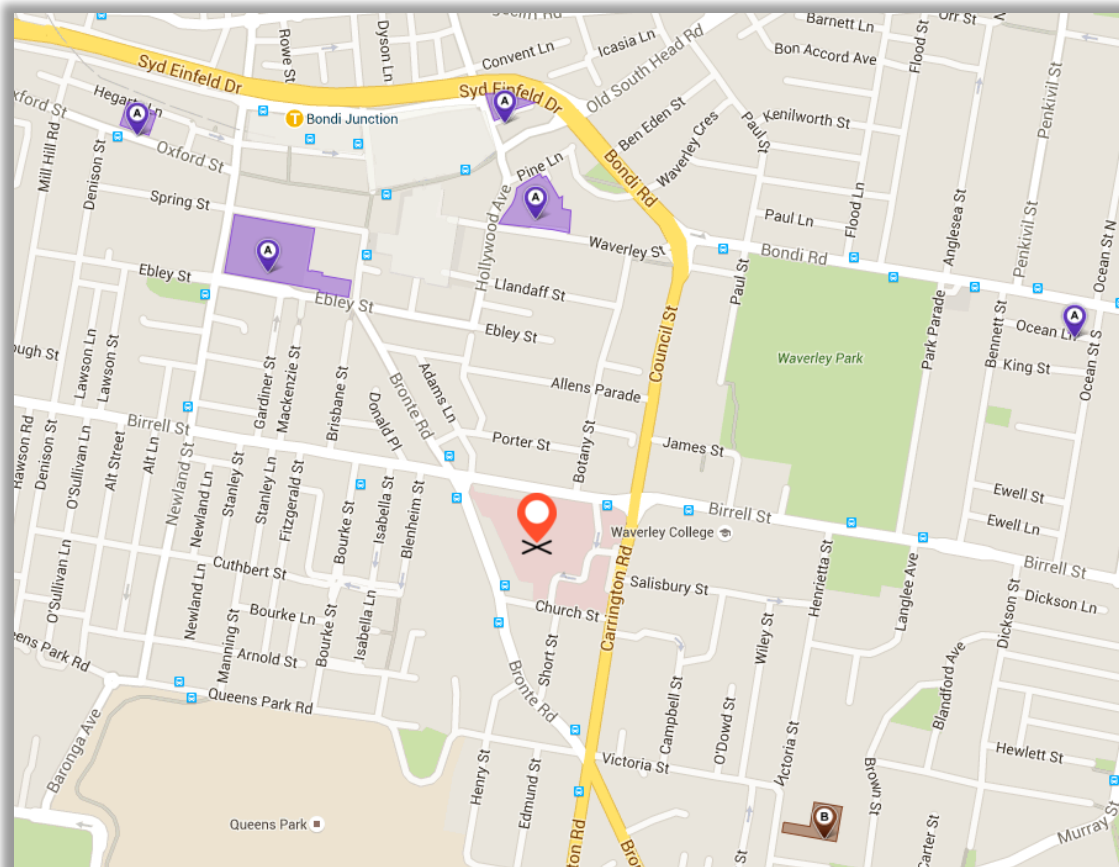
The Optus network adjacent to the site is pictured below.



## Electrical & Telecommunications Services

It is also noted that there are some Vocus services within the vicinity of the development however they have not made the extent of their services available to us at this time.

There are no NBN services installed within the vicinity of the project. The NBN rollout map in the area is shown in the picture below.



### 2.3 NBN application

An application for carrier services would need to be made to the NBN Co. As the development consists of more than 100 units it is envisaged that the application for NBN would be accepted.

# Hydraulic Services

## 3. Hydraulic Services

The hydraulic services in the following section provides information in regards to existing and proposed infrastructure across the following key utilities;

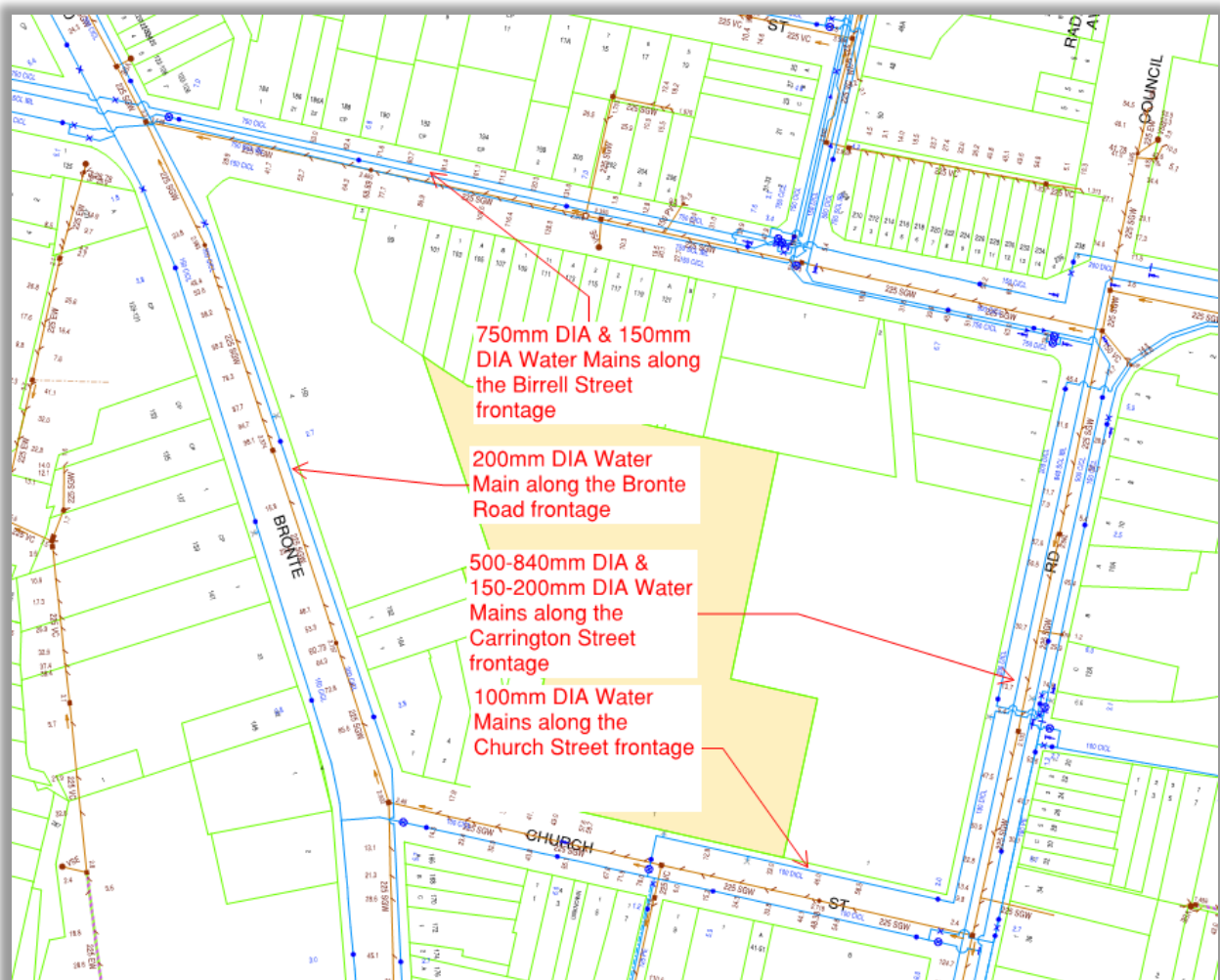
1. Water Supply Network (including fire water supply)
2. Sewer Network
3. Natural Gas Network

### 3.1 Water Supply Network

#### 3.1.1 Authority Services

Sydney Water owns and operates the water supply network. The site is provided with water main assets on all frontages, with specific trunk infrastructure in Carrington and Birrell Streets. The trunk infrastructure which includes mains in excess of 500mm diameter is also supported by local distribution water main networks between 150-200mm diameters. The smaller distribution water main mains would generally be the assets in which the existing connections to services the site are fed from.

The diagram below identifies the Sydney Water, water main assets around the site (blue lines);



## Hydraulic Services

### 3.1.2 Water Supply for Future Staged Development

As depicted in the Sydney Water infrastructure diagram in section 3.1.1, there are significant water mains within Birrell and Carrington Streets. This will provide the site with opportunity to expand in line with the yield table for the northern and eastern proposed stages.

The south western part of the site (stage 1), has frontage to the 200mm dia main in Bronte Road and the 100mm dia main in Church Street. Whilst these mains are substantial, the 120 RAC and associated retail/commercial will place a significant load on the mains and Sydney Water may request an upgrade. Potential solutions include providing a 200mm water main link from Carrington Street to Bronte Road within Church Street.

Fire water provisions based on the initial site assessment suggest that pumps and tanks will be required and can be incorporated into each specific development phase or multiple stages depending on the final masterplan.

# Hydraulic Services

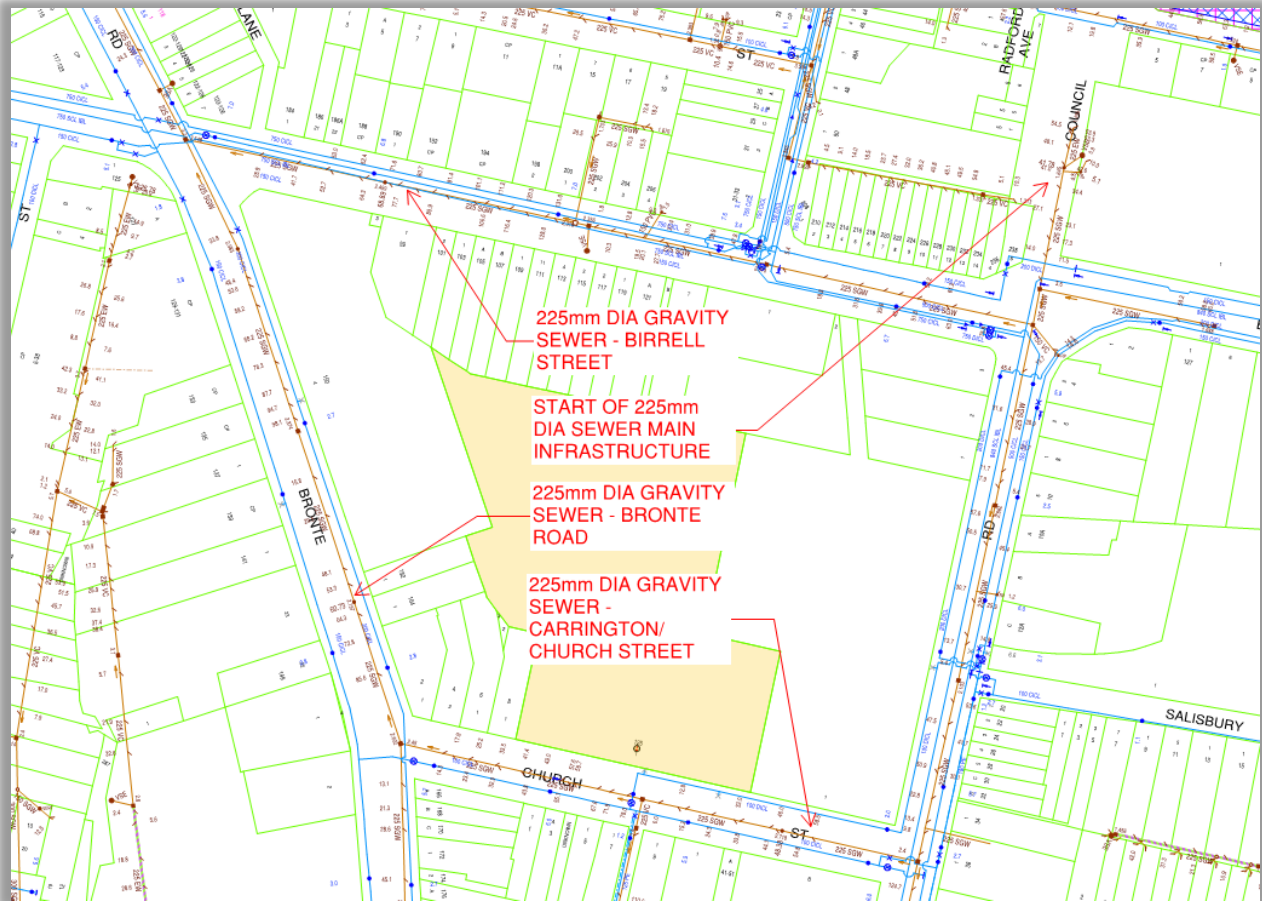
## 3.2 Sewer Network

### 3.2.1 Authority Services

Sydney Water owns and operates the sewer network around the site and the greater Sydney area. Within the sewer network the site is located at the top of a larger network that flows by gravity to the south and west. The head of the line is to the north east of the site.

The site is surrounded by low level residential, education facilities and light commercial. Therefore, the infrastructure is limited in certain areas. The overall network around the site is constrained to a 225mm gravity main.

The diagram below identifies the Sydney Water, sewer main assets around the site (brown lines);



## Hydraulic Services

### 3.2.2 Sewer Networks for Future Staged Development

The increased yield predicted for the site across the multiple stages will impact the existing private sewer sizes.

The current yield for the site has an approximate FSR of 0.52:1 and a final development yield FSR of 1.45:1. From a high level perspective there is a reasonably linear relationship between an increased floor space ratio and sewerage outflow, therefore a considerable increase will need to be accommodated.

Detailed discussions and negotiations with Sydney Water are required in order to define the infrastructure strategy for the sewer network moving forward.

In addition to discussion with Sydney Water, the design team may look at other initiatives to limit sewer outflow as part of the engineered solution.

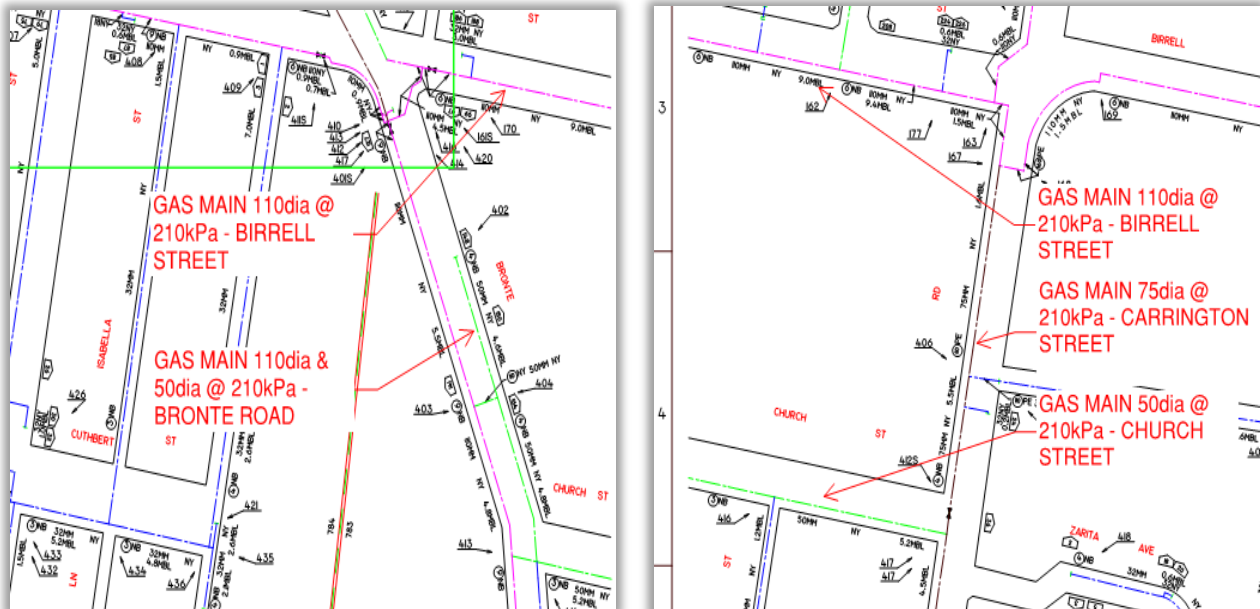
# Hydraulic Services

## 3.3 Gas Supply Network

### 3.3.1 Authority Services

Jemena owns and operates the natural gas supply network within the area. The site is provided with natural gas mains on all street frontages. The piping network size ranges from 50mm dia in Church Street to 110mm dia in Bronte road and Birrell Street, all operating at 210kPa. Whilst the pipe sizing is important, the capacity of the system is heavily reliant on the available pressure. The 210kPa pressure that is available would be considered reasonable for a suburban area, however there are no known secondary gas mains (operating at 1050kPa) within the area which would provide greater certainty of additional availability of supply for future development.

The diagram below identifies the Jemena natural gas assets around the site (blue lines);



### 3.3.2 Gas Supply for Future Staged Development

The current site usage for gas given the substantial central cooking and heating requirements noted in the site visit for the hospital and the independent living unit requirements indicates that the availability of gas supply in the area, along with the review of Jemena assets at 210kPa that the future development would have an available supply to services the increase in FSR.

An application for supply is required to further assess the availability of gas supply to the final development requirements.

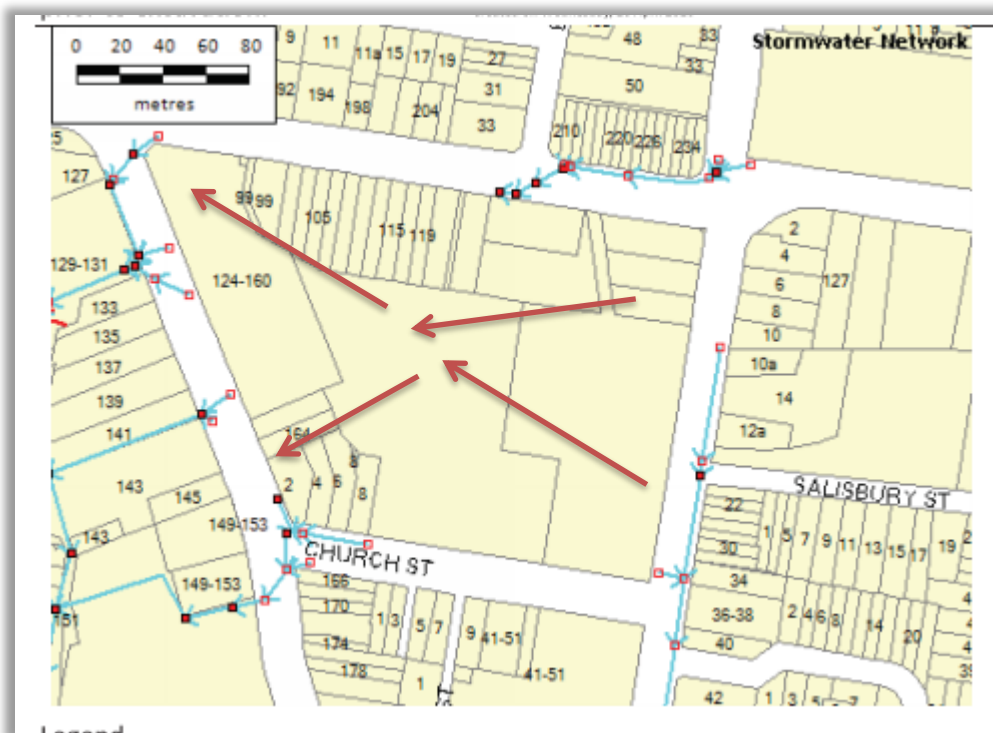
# Civil Engineering

## 4. Civil Engineering

### 4.1 Stormwater

#### 4.1.1 Existing Stormwater

Waverly Council is the owner and operator of the existing external stormwater network. This network is indicated in the image below.

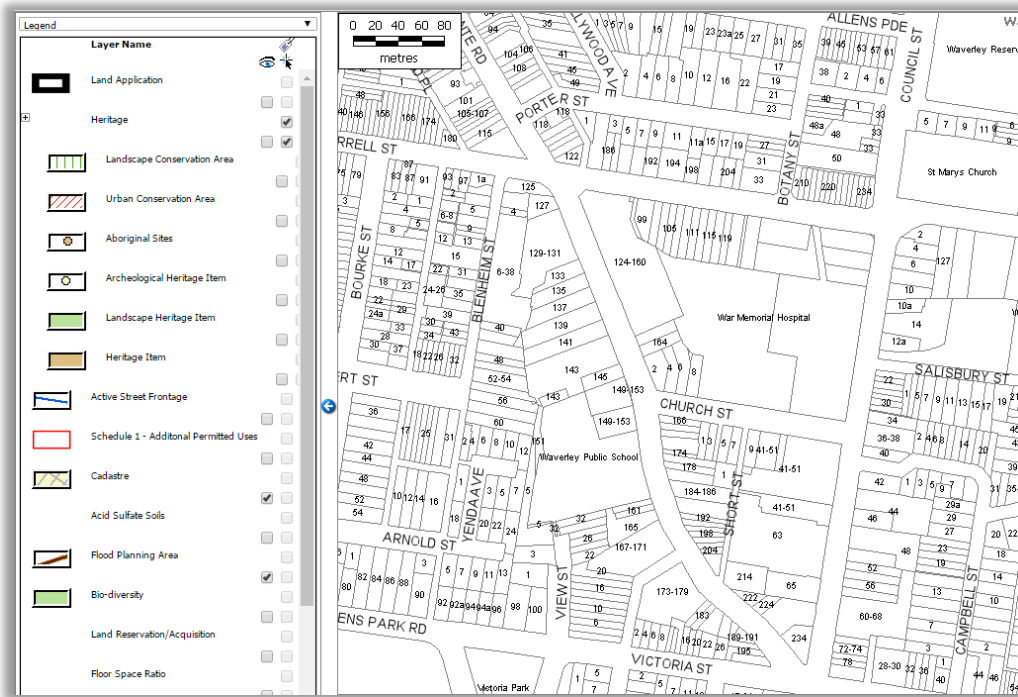


Also noted in the image above is the general arrangement arrows (red) of major stormwater infrastructure within the site. Due to the nature of the network within the site and the limited visual site inspection, a detailed survey would be required to confirm this information and any miscellaneous trunk main (s) not defined by the visual site inspection.

Draining to the North West is a trunk main in excess of 750mm diameter, capturing run off through a series of ground inlet pits. Additionally, trunk mains extend from the eastern side of the site to both the North West and South West.

## 4.2 Flooding

Referring to Waverley Council's online mapping the site is not identified as flood impacted (refer to map below).



Flooding on the site will be limited to local flooding occurring during large stormwater events where the in ground drainage does not have the capacity to convey the rainfall runoff flows occurring on site.

## 4.3 Authority Requirements For Future Staged Development

### 4.3.1 Flooding

As the site is not impacted by flood waters there will be no stringent design requirements that are likely to impact on the development. A condition of development will be that the development does not cause negative flooding impacts to adjacent developments caused by an increase in runoff flows discharging from the site. This will be designed out as part of the sites stormwater management system.

In any areas where there is a potential for stormwater to pond or adjacent to overland flow paths Waverley Council require a freeboard of 300mm above the 100 year water level for habitable floor levels. For all other areas habitable floor levels must be set to achieve 150mm freeboard minimum above the adjacent ground level.

## 4.3.2 Stormwater Management

In accordance with Waverley Council's Water Management Technical Manual:

### Stormwater Conveyance

- A stormwater management system is to be installed on each new development to ensure the conveyance of flows occurring during a 20 year design storm in areas where surcharge flows do not impact adjacent private properties.
- In areas where surcharge will impact adjacent private properties the system is to be designed to convey the 100 year design storm flows.
- All overland flows designed through the development must be capable of conveying the 100 year design storm runoff flows.

In most areas of the site surcharge will discharge onto councils public road corridors. This means that the majority of the in ground drainage system can be designed to convey the 20 year design storm flows with only trapped low points requiring in ground drainage capable of conveying the 100 year design storm runoff.

### Stormwater Detention

- The Permissible Site Discharge (PSD) flow rate is to be limited to the maximum discharge from the site during a 1 in 5 year ARI storm event under the existing site conditions (pre-development).
- The OSD storage volume requirement must allow for the detention of stormwater runoff resulting from a storm with an average recurrence interval (ARI) of 20 years where overland paths are not through private properties.

Development of the site will mean that council will condition the implementation of stormwater runoff attenuation. Attenuation will be required for all stages even if the extent of impermeable area is not increasing. This is due to the council requirement attenuate the 20 year design storm runoff back to the 5 year design storm runoff.

Detention for the site can be provided either on a stage by stage basis or by incorporating a precinct wide detention system on one of the stages meaning that future stages can connect directly into the detention. The preference should be to install a precinct wide detention system as this gives the following advantages:

- Limits the number of isolated detention tanks/basins located on site;
- Simplifies the maintenance requirements for the detention tanks/basins;
- Simplifies the stormwater drainage design (and approvals) for future stages.

A precinct wide detention system should be located at the lowest point of site to allow the entire site to drain to it. This would mean the detention system should be incorporated in the stages adjacent to Bronte Road.

Council has determined that acceptable detention storage designs are:

- above ground in a grassed or landscaped area where it can be provided with minimal adjustment to ground levels and existing vegetation or in a shallow pond in a driveway or carpark;
- below ground in tanks or oversized pipes;
- a combination of the above.

## 4.3.3 Stormwater Treatment

Waverley Council's Water Management Technical Manual states "Council strongly encourages that stormwater treatment measures as outlined in the 'Managing Urban Stormwater: Treatment Techniques' (NSW EPA 1997) be incorporated into the design of a development."

Managing Urban Stormwater: Treatment Techniques provides information on acceptable water quality treatment measures but does not set reduction targets. As such there is currently no formal water quality improvement targets set for development by Waverley Council.

Further discussion during design development may result in council requesting water quality treatment or it may be required for BASIX or Green Star compliance. If this is the case common water pollution reduction targets are noted below:

Pollutant Type	Reduction Target (%)
Total Nitrogen (TN)	45%
Total Phosphorus (TP)	65%
Total Suspended Solids (TSS)	85%

Reduction Targets (Water Sensitive Urban Design, Book 1: Landcom)

Stormwater treatment can be provided either on a stage by stage basis or as a precinct wide system. Deciding which the best option is will be based on several factors including:

- Initial capital investment for a system which will not be fully operational until all stages are developed;
- Future maintenance requirements;
- Integration requirements with stormwater management system.