

Services Strategy

Former Manly Hospital

80820189

Prepared for
Cox Architecture

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Executive Summary

Development and Transactions, Property NSW, Department of Planning, Industry and Environment are investigating services reticulation to supply a potential redevelopment of the site formerly known as Manly Hospital. Cardno was engaged to undertake a utility capacity assessment and propose methods of services supply to the subject development.

Public utility service infrastructure investigations were carried out for the followings:

- Water and wastewater;
- Gas;
- Electricity and Telecommunications, and;
- Fire safety provisions.

Cardno's investigations of the capacity of the existing services infrastructure in the locality to support additional development have found:

- Water and wastewater infrastructures are available to support this development for the supply of water and removal of wastewater using the existing Sydney water mains. A section 73 application will be required during the design development phase.
- The re-utilisation of existing Ausgrid 11kV feeders will facilitate the provision of power for this development;
- Authority Volumetric gas assembly and regulator will be installed at the site's main entrance adjacent to Darley road, where a natural gas main is available;
- NBN will be supplying any future telecommunication connections. The current technology that has been implemented is Fibre to the Curb. It can be safe to assume that NBN will be providing fibre to the development;
- The site will be provided with dry and wet fire protection services. Fire hydrant and sprinkler booster assembly can be installed at Daley Road entrance and reticulate within the site boundaries;
- Some of the existing Sydney Water assets are located within the site boundary. It is expected that future development will be outside of the zone of influence for subject assets. However, if required, additional protection methods will be provided to these assets or they will be relocated within affected areas.

Glossary and Abbreviations

A	Amps
ABS	Australian Bureau of Statistics
AEMO	Australian Energy Market Operator
BSP	Bulk Supply Point
C	Cable
CB	Circuit Breaker
D	Duct
ESOO	Electrical Statement of Opportunities
EX	Existing
FDR	First Tier, Downstream and Related Entities
kW	Kilowatts
Km	Kilometre
LGA	Local Government Area
M(k)VA	Mega (Kilo) Volt Amp
PC	Pull Cable
STJ	Straight Through Joint
T&R	Trenching and Reticulation
ZS	Zone Substation

1 Design criteria and standards

The design criteria are the minimum design standards and engineering guidelines to be used on the project. Guides, supplements and references.

1.1 Design reference documents and engineering standards

The following design reference documents and engineering standards will be used in the development of the design:

- Northern Beaches Council requirements and standards
- Ausgrid Network Standards
- Relevant Australian Standards, including (but not necessarily limited to):
 - AS 2890.1 Off-Street Car Parking.
 - AS 1428 Design for Access and Mobility
 - AS 1680 – Interior Lighting
 - AS 1158 – Public Lighting
 - AS 3000 – Wiring Rules
 - AS/NZS1221 – Fire hose reels
 - AS1470 – Health and safety at work – Principles and practices
 - AS/NZS2032 – Installation of PVC pipe systems
 - AS/NZS2033 – Installation of polyethylene pipe systems
 - AS2419.1 – Fire hydrant installations – System design, installation and commissioning
 - AS2419.2 – Fire hydrant installations – Fire hydrant valves
 - AS2444 – Fire extinguishers installation
 - AS1670.1 – Fire detection and alarm system
 - AS/NZS2441.1 – Installation of hose reels
 - AS/NZS3500.0 – Plumbing and drainage – Glossary of terms
 - AS/NZS3500.1 – Plumbing and drainage – Part 1: Water services
 - AS/NZS3500.2 – Plumbing and drainage – Part 2: Sanitary plumbing and drainage
 - AS/NZS3500.4 – Plumbing and drainage – Part 3: Stormwater drainage
 - AS/NZS2441 – Installation of fire hose reels
 - AS4809 – Copper pipe fittings – Installation and commissioning
- National Construction Code 2019 (NCC)
- Asset Standards Authority (ASA) standards
- Sydney Waster standards

1.2 Order of precedence

The following order of precedence shall apply in the event of any inconsistency, ambiguity or discrepancy between the brief, Reference Documents and other standards:

- Authority Standards
- National Code of Construction
- Australian Standards

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2 Introduction

2.1 Investigation Area

The site formerly known as Manly Hospital is off Darley Road, Manly. The site is connected to a national park on the Southern side, with all main services coming from Darley Road.

Figure 1: Area of Investigation



3 Electrical Services

3.1 Existing

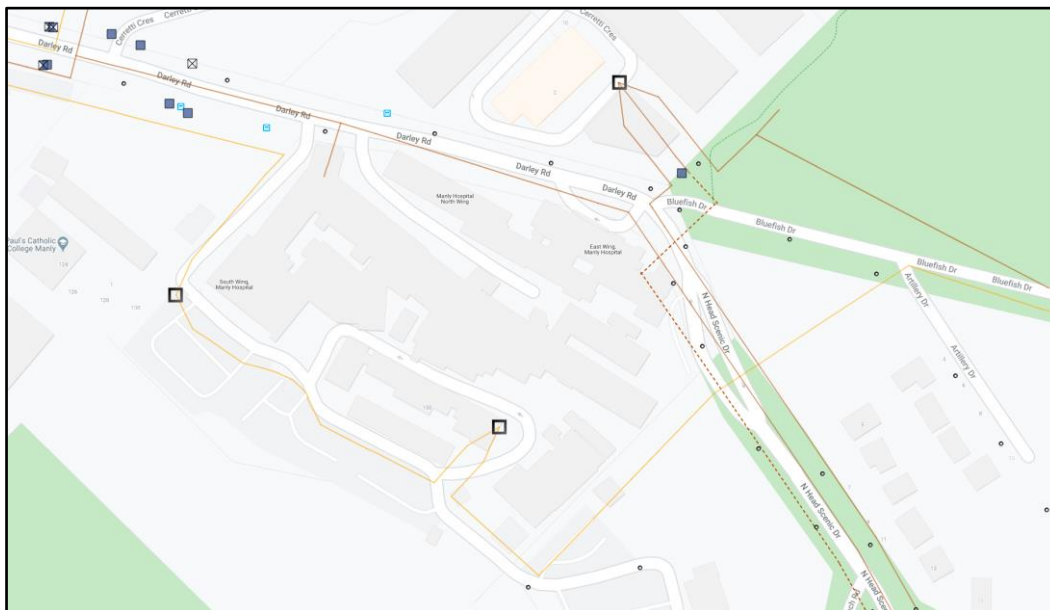
The electrical utility that supplies this area is Ausgrid.

The site is supplied by two-chamber style substations. The substations are in standalone buildings located along the driveways as shown:

Figure 2: Existing Chamber Substation Locations



Figure 3: Indicative Route of Existing Ausgrid 11kV Cables Underground



3.2 Proposed

3.2.1 Maximum Demand

The maximum demand of 1,583 kVA has been calculated based on the GFA assumed for potential future development and a VA per m² as per AS3000. A more accurate maximum demand calculation will need to be done during master planning and detailed design and the time of application to Ausgrid for the proposed connection.

Table 1: Maximum demand for the site has been assessed using AS3000 Table C3

Elements Plan	Heritage GFA	Assumed GFA	Load Description	VA/m2	Total (KVA)
Upper zone	65	6300	Complementary health and wellbeing/retail and personal services/food and drink	75	477.375
Middle zone	2800	3600	Seniors Living /Complementary health and wellbeing	60	384
Lower zone	2100	9000	Tertiary Education & Training/Seniors Living /Complementary health and wellbeing	65	721.5
TOTAL					
Total (KVA):					1,582.9
Total (A):					2,198.47

2 x 1000kVA substations will be required to supply the proposed development.

3.2.2 Supply Options

There are two viable options to supply the proposed development. These options assume that the existing buildings are being demolished/unused and do not require supply.

3.2.2.1 Option 1

This option replaces the existing substations S16194 and S16136. It is assumed that the existing 11kV (HV) cable will not be impacted by the potential development. A summary of the steps required for this option are listed below:

- > Rebuild the existing chamber substation.
- > Install a new MSBs within 30m of the chamber substation.
- > Run new LV cable from MSB to DBs within the development site. The cable is to be sized appropriately to allow to be redirected in later stages whilst maintaining minimum voltage drops.

3.2.2.2 Option 2

This option requires a new substation to be built near or in the proposed development building. The substation can be a kiosk or chamber type substation. It is assumed that the existing 11kV (HV) cable will

not be impacted by the potential development. A summary of the steps required for this option are listed below:

- > Demolish the existing substation;
- > Make the existing 11kV cable continuous and redirected a section of the cable to the new substation location;
- > Establish new substations within the buildings;
- > Establish an MSB near or in the development building;

4.2 Proposed

The future development will be supplied by NBN. An application will need to be made for a new connection.

A new communications room will be required to be built in the proposed development to supply this precinct.

A new floor distribution rack/cupboard will be required for each floor in each building.

5 Gas Services

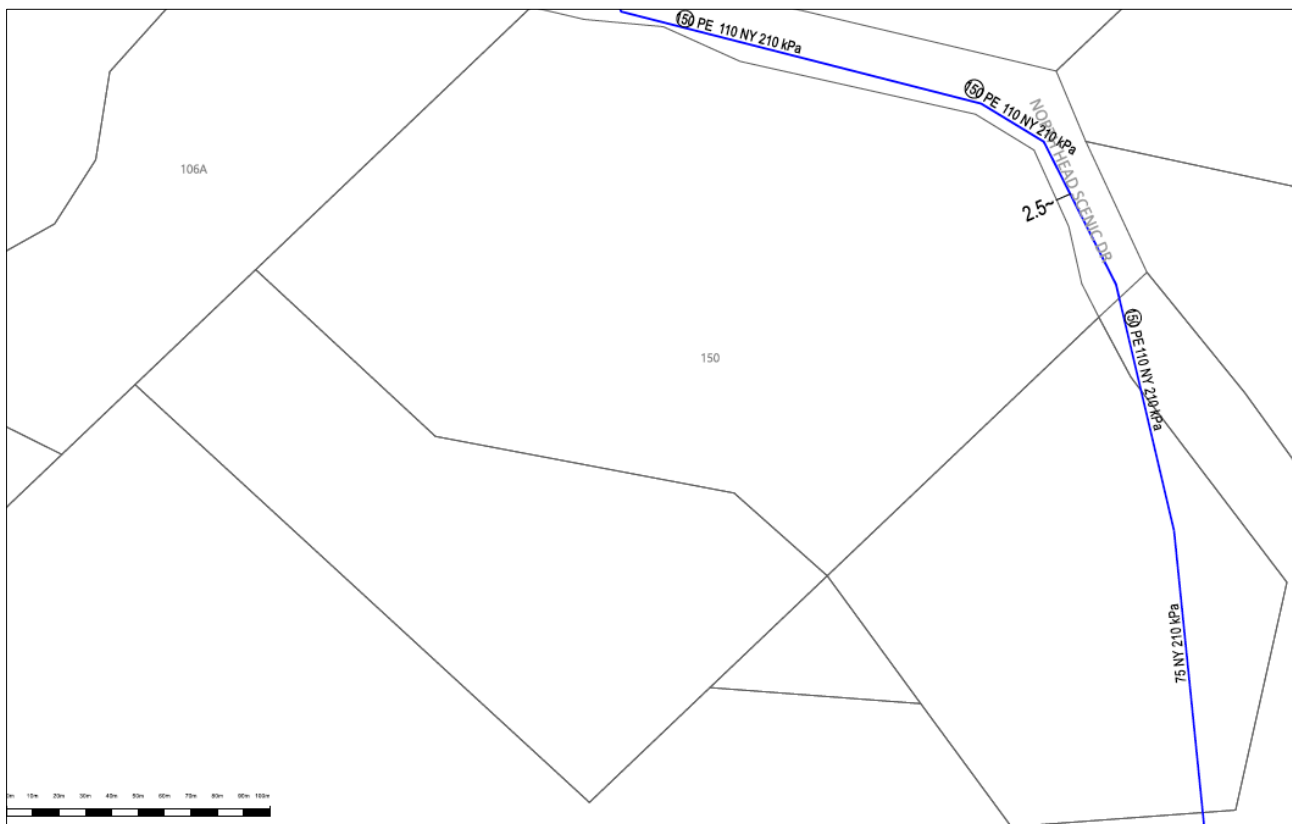
5.1 Existing

Jemena owns the existing natural gas infrastructure within the Former Manly Hospital area. Existing natural gas main consists of 110 NY pipe reticulating at 210kPa. The gas main is located at the north wing of the hospital site.

This gas main reduces to 75mm along North Head Scenic Drive towards Collins Beach Road.

The natural gas supply line for the majority of Manly Hospital runs up Darley Road. The meters are located between Buildings 10 and 16 on the grass bank and at the front of North Wing Building 1, adjacent to Darley Road (small domestic type meter).

Figure 6: Existing Jemena Gas Main Reticulation



5.2 Proposed

Natural gas service will be connected from Darley Road. Authority volumetric gas meter assembly and regulator set will be installed within the property boundary adjacent to Darley Road.

The supply pressure to the proposed development will be 7kPa.

The natural gas service will be reticulated to the kitchens, hot water plants, gas heaters and any other equipment requiring natural gas. The natural gas service will be in accordance with AS5601, NSW health Infrastructure Standards and Guidelines, the NCC volume 3. Plumbing Code of Australia and the Building Code of Australia.

Application for connection to Jemena will be carried out at the design stage.

6 Potable Water Services

6.1 Existing

Sydney Water Corporation owns the existing water infrastructure within the Former Manly Hospital area.

Existing water main consists of a 150mm CI/CL main in Darley Road, North of site. The flow and pressure are unknown at this stage in this main. A pressure and flow inquiry have been submitted to Sydney Water.

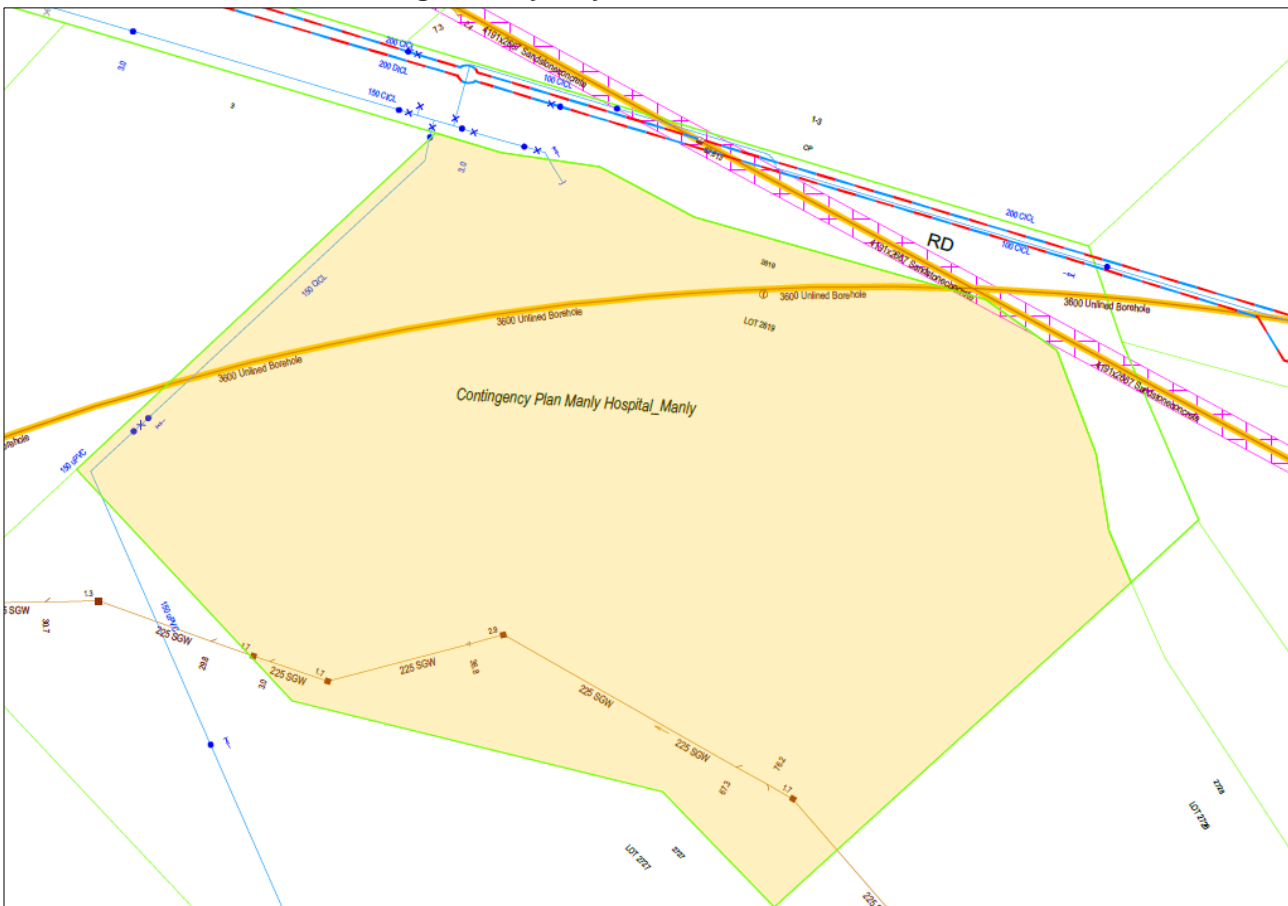
There is a 150mm Sydney water main traversing from the northern side with the property boundary to the south-west of the boundary.

A building plan approval will be required to be submitted to Sydney water to identify if the proposed development will affect this main.

Existing diameter 80mm main water meter and reduced pressure zone device are located near the main entrance to the hospital fed from 150mm water main in Darley Road.

A secondary 200mm diameter Sydney Water main is also available on the northern side of Darley Road.

Figure 7: Sydney Water Main Reticulation



6.2 Proposed

6.2.1 Cold Water Service

The future development can connect to the following authority water mains:

- 150mm diameter water main in Darley Road
- 200mm diameter water main in the north side of Darley Road (Alternate supply)

The cold water services for domestic supply will be a pump boosted system and be completed with new connections to the Sydney Water main.

A contingency domestic water storage tank will be provided in case of disaster and mains water supply failure. The storage volume should be able to accommodate 6 hrs of supply during the water outage.

Main water meter and backflow prevention device will be installed within the property boundary along Darley Road main entrance.

The cold water service will be reticulated to all fixtures, hot water plants, faucets, lab sinks, drinking fountains and other points of connection. The cold water service will be in accordance with AS3500, NSW Health Infrastructure Standards and Guidelines, the NCC volume 3. Plumbing Code of Australia and the Building Code of Australia.

A mains top-up system will be connected to the rainwater harvesting system. The non-potable supply from the rainwater will be reticulated via a pump to water closets, urinals and landscape irrigation within the proposed development.

6.2.2 Hot Water Service

The domestic hot water service will provide controlled temperature hot water to all fixtures and faucets requiring hot water.

The domestic hot water system for individual blocks will be centralised gas hot water plants. The reticulation of hot (50°C) water will be provided via centrally controlled Thermostatic Mixing Valves.

The hot/warm water service design will be in accordance with AS3500, NSW Health Infrastructure Standards and Guidelines, the NCC volume 3. Plumbing Code of Australia and the Building Code of Australia.

7 Sewer Services

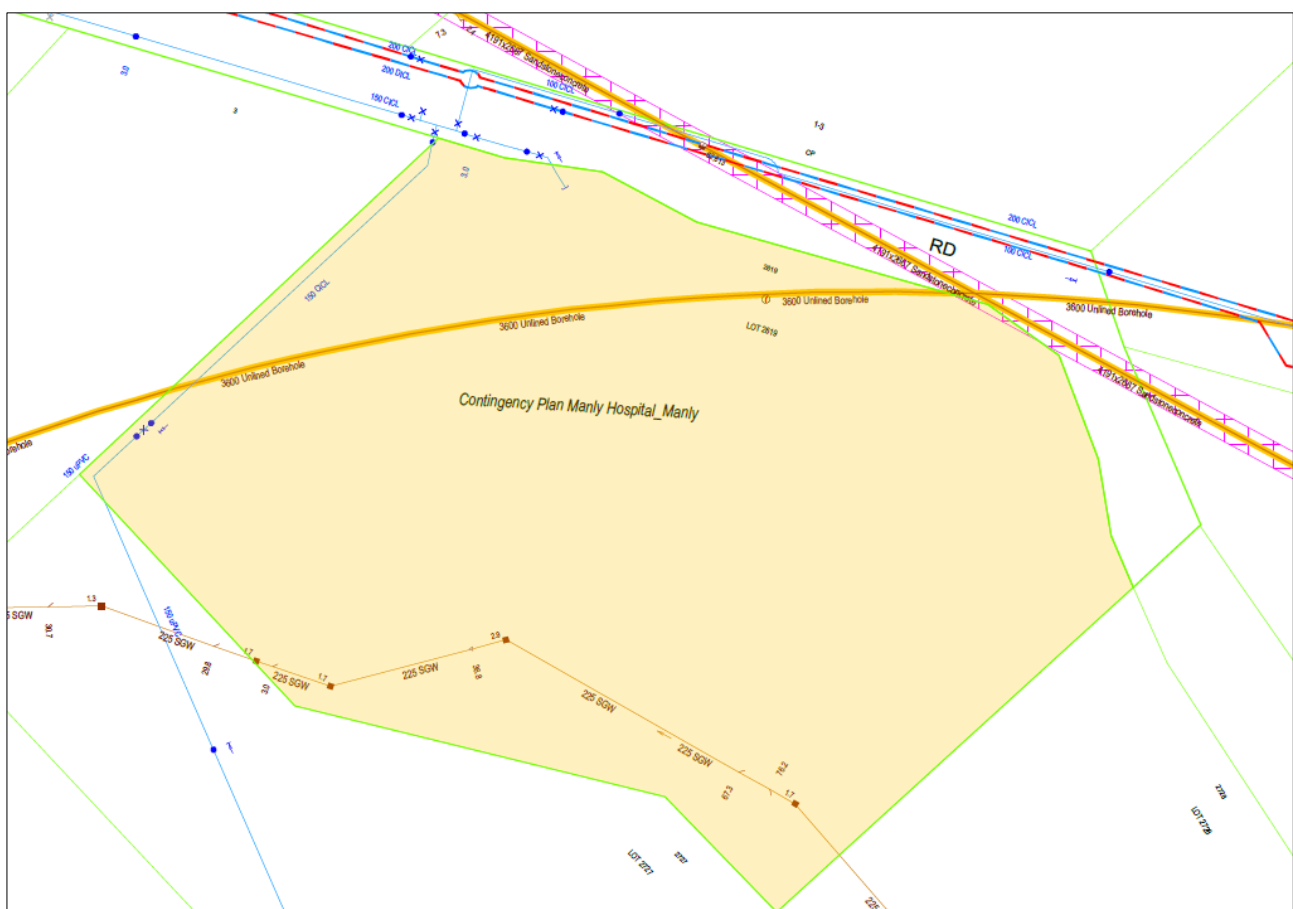
7.1 Existing

Sydney Water Corporation owns the existing sewer infrastructure within the Former Manly Hospital area. Existing sewer infrastructure consists of a 225mm diameter SGW main, with sewer manholes located south of the site. This sewer main will be diverted along the boundary site in the future to avoid clashes with the proposed site structures.

A building plan approval will be submitted to Sydney water to determine the clearance, protection or re-alignment of the sewer main required due to redevelopment of the site.

Manly Hospital has a 2 x 150mm sewer running from Building 4 (South Wing) and Building 3 (West Wing), all other Buildings are connected to a tank behind SW Carpark.

Figure 8: Sydney Water Sewer Main Reticulation



7.2 Proposed

7.2.1 Sanitary Plumbing and Drainage

The sanitary plumbing and drainage system will collect the discharge from the various sanitary fixtures and drainage points throughout the proposed development and will gravitate to the existing Sydney Water Sewer Mains.

A section 73 application and building plan approval will be required to be lodged to Sydney Water during the design phase to determine if this development will affect any of their assets. This will also determine if sewer and water have enough capacity to cater for the proposed development and upgrade to their infrastructure if required.

The system will be designed in accordance with AS3500, NSW Health Infrastructure Standards and Guidelines, the NCC volume 3. Plumbing Code of Australia, and the Building Code of Australia. The system will be a fully vented system using drainage principles.

Final Connections and arrangements for the sewer are subject to further negotiations with Sydney Water.

7.2.2 Trade Waste Drainage

A trade waste system disposal will collect the disposal from the kitchen and labs. This discharge will be appropriately pre-treated prior to releasing the waste into the sewer drainage.

Grease traps will pre-treat the discharge from the kitchen and the canteens. Dilution/cooling pits will pre-treat discharge from labs.

Sydney Water trade waste department will be contacted at the design stage for trade waste discharge approval and acceptance.

Design of trade waste arrestors for acid, grease, plaster and clay will include information relevant to design capacity, the estimated maximum rate of discharge per hour and per day, and the average daily discharge.

Waste disposal from Science sinks will include waste systems that are acid-resisting, and the dilution pit positioned between the acid-resisting branch line and main sewer.

7.2.3 Sanitary Fixtures, Faucets and General Equipment

The sanitary fixtures and faucets will be of a reasonable standard throughout to achieve high levels of energy and water efficiency. These will be 3A WELS rated (equivalent to previous AAA rating) or better in accordance with the requirements for this type and class of building.

All selected sanitary fixtures will be watermark approved.

Water reduction will be achieved via the use of dual flash cisterns for the water closets (3-litre half/6 litre full flush), and the use of water flow controls on faucets and temperature limiting devices.

Shower roses to be low flow type.

Isolation valves required to all toilets, bathrooms and kitchens

8 Fire Services

8.1 Existing

All hydrants are mains pressure with booster sets for use by Fire & Rescue NSW. Hydrants are all serviced and tested in accordance with AS 1851.4 by External Service Provider – Form 1 Fire Ph. 9966 4200.

Fire Hydrant booster assembly is located near the main entrance of the hospital and is fed from 150mm water main in Darley Road.

Manly Hospital has one main Fire Indicator Panel and seven Sub Fire Indicator Panels located throughout the site. All panels are installed in accordance with Australian Standard 1670 and maintained by an External Service Provider – Form 1 Fire Ph. 9966 4200, in accordance with relevant sections of Australian Standard 1851:2005.

Manly Hospital has a combination of Full Emergency Warning and Intercom Systems (EWIS) and Occupant Warning Systems (OWS) installed throughout the site. These systems are installed to AS 1670 and 2220 and maintained by External Service Provider – Form 1 Fire Ph. 9966 4200 in accordance with AS 1851.

8.2 Proposed

Below services might be required for this site:

- Fire Sprinkler system;
- Fire hydrant system;
- Fire hose reel system;
- Fire extinguishers;
- Fire detection and alarm system.

Wet fire services will reticulate internally from the main entrance point at Darley Road, where we connect to water main.

8.2.1 Fire sprinkler system

More investigation shall be conducted for the requirement of a sprinkler system. Building surveyor to provide input during the detailed design phase.

In general,

- In a Class 9c building: sprinkler shall be provided throughout the building and any fire compartment containing a Class 9c part.
- In a class 6 building: if the floor area of a fire compartment is more than 3500m²

8.2.2 Fire hydrant system

NCC 2019 DTS Clause E1.3 requires that a fire hydrant system must be provided to serve a building;

- (i) Having a total floor area greater than 500 m²; and
- (ii) Where a fire brigade station is available.

The minimum pressure required at the most disadvantaged fire hydrant outlet is 250 kPa without providing a pump.

The Statement of Available Pressure and Flow in Darley Road will determine if fire pumps and fire water storage tanks are required.

If the town main is not able to provide the required pressure for a hydrant system a pump room will be required. (Minimum dimension of 3.5m L x 5m D x 2.4m H).

If the town main cannot provide a minimum flow of 20L/s, a tank will be required. The tank capacity will be between 25kL and 288kL, depending on the available flow.

The following water connection is proposed to be provided to facilitate the new development:

Connection to be made to the DN150 water main in Darley Road and be provided with a fire hydrant booster assembly including the backflow prevention devices at the boundary.

External double-headed fire hydrants to be provided to facilitate the new development.

Internal fire hydrants shall be provided if coverage cannot be achieved with internal fire hydrants.

Booster assembly shall be:

1. At the boundary of the site and be within sight of the main entrance of the building;
2. Adjacent to the principal vehicular access to the site; and
3. located not less than 10m from the external wall of any building served
4. In a position not less than 10 m from any high voltage main electrical distribution equipment such as transformers and distribution boards, and from any liquefied petroleum gas and other combustible storage.
5. In a position so that the booster assembly is not obstructed or obscured by obstacles stored goods, vehicle, vegetable, etc.

8.2.3 Fire hose reel system

NCC 2019 DTS Clause E1.4 requires that a fire hose reel system must be provided:

- (i) To serve the whole building where one or more internal fire hydrants are installed; or
- (ii) Where internal fire hydrants are not installed, to serve any fire compartment with a floor area greater than 500m²

Fire hose reel reticulation shall be from a domestic water supply.

Fire hose reels are not required in class 2,3 and 5 part of the building.

8.2.4 Fire extinguishers

As per BCA 2019 Clause E1.6, Table E1.6, Fire extinguishers shall be provided throughout the buildings.

8.2.5 Fire detection and alarm system

As per NCC 2019 Clause E2.2, fire detection and alarm system need more investigation for the requirement of the system.

In General, In a

- a) Class 5 or 9b school or part of a building having a rise in storeys of more than 3; or
- b) Class 6, 7b, or 8 or 9b building or part of a building having a rise in storeys more than 2; or

Building having a rise in storeys of more than 2 and containing-

- (i) A class 5 or 9b school part; and
- (ii) A class 6, 7b, 8 or 9b part,

The building must be provided with an automatic smoke detection and alarm system complying with Specification E2.2a.

9 Sydney Water Assets Assessment

A detailed investigation of existing Sydney Water assets within the site is required in order to identify impacted infrastructure within the proposed development areas, in reference to the proposed works, to determine likely treatment methodologies for the existing assets (i.e. no action required, relocation and/or protection) and outline a way forward for the Sydney Water scope of the project. This assessment is inclusive of envisaged applications required and likely Sydney Water processes which we believe will be required to be implemented in order to enable the development of the overall site.

A detailed desktop analysis was completed for the site comprising of Nearmap assessment and review of Sydney Water's Internal Hydra network and documentation using eDeveloper software. Our assessment has concluded the following Sydney Water assets will likely be impacted by the intended works and will need to be assessed at the design development phase of the project in conjunction with the development bulk earthworks and corresponding civil and structural components in order to determine the extent of the impact and what actions will be required to enable the construction of the development and overall site servicing.

Potential impacted Sydney Water assets and associated commentary surrounding envisaged treatment has been summarised in Table 2, development Hydra sketch provided in Appendix A.

Table 2: Affected Sydney Water Assets

	Service	Size	Material	Details	Action
1	Sewer (Gravity)	DN225	SGW	Located along the southern side of the proposed development. Constructed under SDO16082. 264.00m to be assessed.	An Out of Scope Building Plan Approval will need to be submitted with Sydney Water as the pipe type is GSW. This will determine the requirements to do with the asset prior to construction. From a desktop analysis, the building footprint is not in the zone of influence of the asset – However if the design of the development changes in nature, this asset may be subject to relocation.
2	Sewer (Gravity)	DN3600	Unlined Borehole	Located underneath the existing Manly hospital. Constructed under PRO350568. 200.00m to be assessed.	An Out of Scope Building Plan Approval will be required to assess the impact of construction on the sewer main. It is likely that the sewer main will be deep enough to not be affected by construction and this will be addressed in Sydney Water's Notice of Requirements.
3	Water (Reticulation)	DN150	CICL	Located along the western edge of the development. Constructed under WO92480. 100.00m to be assessed.	An Out of Scope Building Plan Approval will be required to be submitted to Sydney Water to determine if the asset will be affected by the proposed development. From a desktop analysis, it appears that the water main will be outside the zone of influence of the building footprint - However, if the design of the development changes in nature, this asset may be subject to relocation.
4	Sewer	4191x2667	Sandstone Concrete	Located on the northeastern boundary of the development. Condition is in a tunnel – drill and blast tunnel	Assumed to be deep enough to not be affected by the development. Also, the proposed development does not sit close to the Sydney Water asset. Sydney Waterwork as constructed documentation has been ordered and will provide the details of the asset. An In-Scope Building Plan Approval will be required.

Our detailed assessment of the development site, proposed works and existing Sydney Water infrastructure has concluded that following two Sydney Water applications and deliverables:

1. Out of Scope Building Plan Approval (BPA) – for each of the assets numbered 1-3 detailed in Table 2, to determine the requirements surrounding the overall impact on the assets within the development site in respect to proposed works. This will also identify if relocation of any assets is required and/or extent of protection if required either during construction for the short term loadings during construction activities and/or as a permanent treatment to accommodate the mature, long-term loadings of the ultimate structures within the zone of influence.
2. In-Scope Building Plan Approval (BPA) – for asset numbered 4 detailed in Table 2, an In-Scope Building Plan Approval is required to determine if the proposed works will have any impact on the sewer line. This line is assumed to be reasonably deep and will not be affected, the Sydney Water work-as-constructed drawings will confirm its location.
3. Section 73 Certificate – to determine the servicing requirements of the proposed development. It is our understanding that the site is currently serviced, therefore, the extent of works required for this component of the project may vary subject to the extent of increase to hydraulic demand as a result of additional dwellings which could potentially result in the required upsizing of assets within the site in order to accommodate ultimate flows from the mature development.

A snippet of Appendix A – development HYDRA sketch, outlining the existing assets has been provided below in Figure 10:

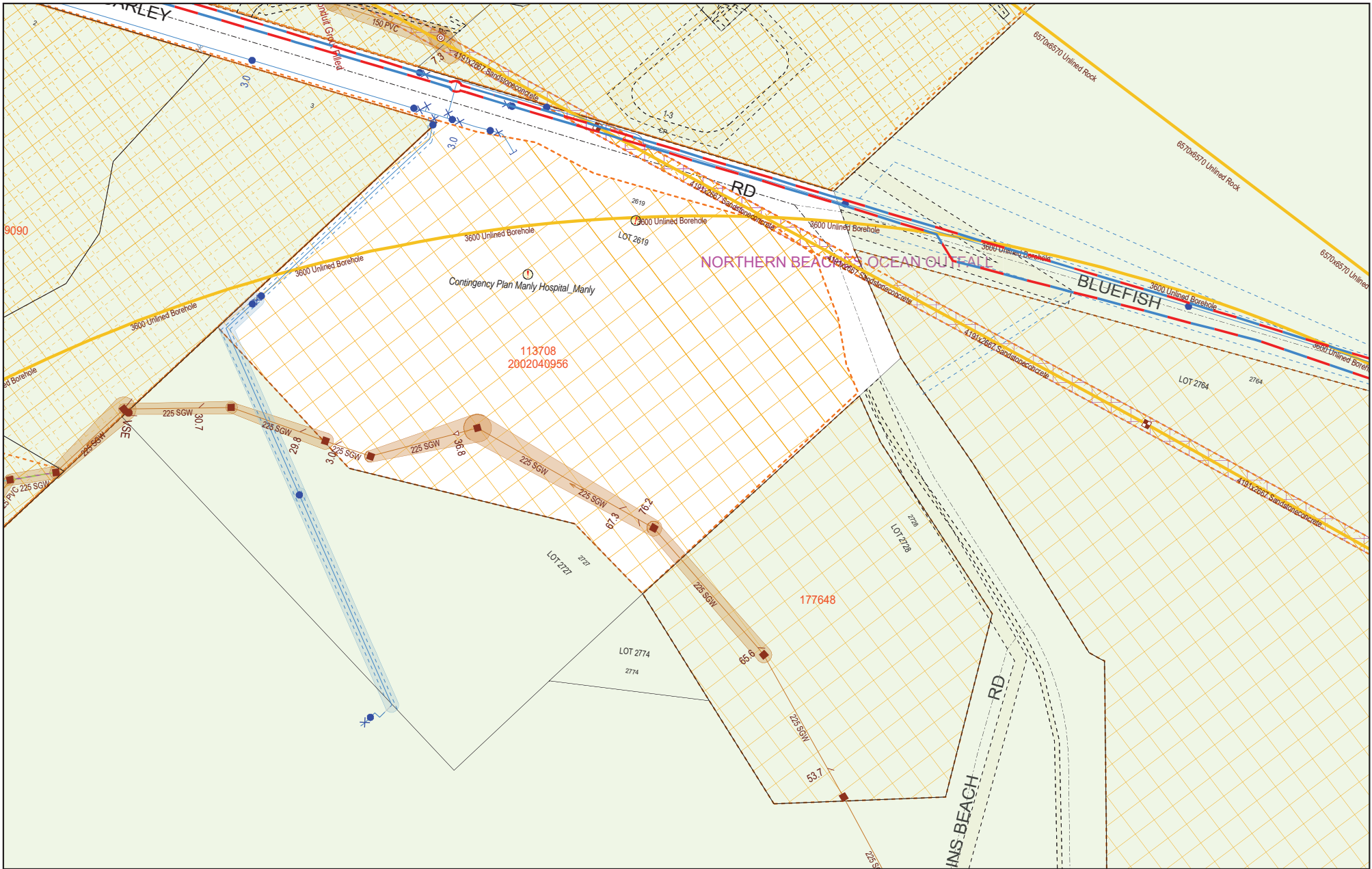
Figure 9: Development HYDRA Sketch Snippet



APPENDIX

A

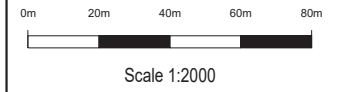
SYDNEY WATER ASSETS



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 SYDNEY WATER CORPORATION

Map:198 Grid:F13 Edition:Sydney UBD Edition 41



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