

NSW Health Infrastructure

**Nepean Hospital Stage 2  
Redevelopment**

Hydraulic & Fire Services State  
Significant Development Application

NHR-ARP-REP-HF-SSDA001

Final issue | 12 November 2021

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Job number 274355







Arup Pty Ltd ABN 18 000 966 165

**Arup Pty Ltd**  
Level 5  
151 Clarence Street  
Sydney NSW 2000  
Australia  
[www.arup.com](http://www.arup.com)

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		Name	Matthew Stivala	Greg Kalisz	Julian Soper		
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# 1 Executive Summary

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Health Infrastructure NSW (HI) is the applicant for the proposed Stage 2 Redevelopment of Nepean Hospital in Penrith Local Government Area (LGA).

The proposal is State Significant Development (SSD) for the purposes of the Environmental Planning and Assessment Act 1979 (EP&A Act) and clause 14(a) of Schedule 1 of the State Environmental Planning Policy (State and Regional Development) 2011 (SEPP SRD) as it involves development for the purposes of a hospital with a capital investment value in excess of \$30 million.

The Stage 2 Redevelopment seeks to deliver significantly enhanced acute services, as well as a new campus main entry and drop-off area. It complements the recent Stage 1 Redevelopment (SSD 8766) approved in February 2019 and due for completion by early 2022.

The proposed Stage 2 Tower will be located west of, and connected to, the Stage 1 Tower. Portions of the North Block (north section) will be demolished with the remaining sections of the North Block (to the south of the Stage 2 Tower) to remain operational.

Departments to be provided in the Stage 2 Tower include:

- Front of House, including retail;
- Education and Training Centre;
- Transit Lounge;
- Medical Imaging;
- Interventional Radiology;
- Intensive Care Unit and Close Observation Unit;
- In-Centre Dialysis and Renal Inpatient Unit;
- Paediatric In-patient Unit;
- Plant areas;
- Clinical Supports areas; and
- Kitchen.

The Stage 2 Redevelopment project scope includes:

- The Stage 2 Tower, being predominantly a 7-storey building, with roof plant;
- Demolition of parts of the existing North Block and other satellite buildings directly within the Stage 2 Tower footprint (excluding other buildings already approved under the Stage 1 SSD consent);
- Demolition of the Total Asset Management (TAM) facility;

- Reconfiguration of the loading dock area and back of house functions;
- Landscaping and other associated at-grade works within the Stage 2 Tower's immediate vicinity; and
- Barber Avenue upgrade and access road to the Stage 2 Tower's forecourt, port cochere, and front of house area.

The Stage 2 Redevelopment's SEARs was issued by the Department of Planning, Industry and Environment on 22 April 2021.

In preparing this report, the following SEARs General Requirements, Key Issues, and Agency's Advice letters have been addressed. The table below sets out the reference or location of these matters within this report.

General Requirement or Key Issue or Agency Advice	Reference / Location within this report
<p><i>Key Issue #14 – Utilities:</i></p> <p><i>In consultation with relevant service providers:</i></p> <ul style="list-style-type: none"> <li>• <i>assess the impacts of the development on existing utility infrastructure and service provider assets surrounding the site.</i></li> <li>• <i>identify any infrastructure upgrades required off-site to facilitate the development and any arrangements to ensure that the upgrades will be implemented on time and be maintained.</i></li> <li>• <i>provide an infrastructure delivery and staging plan, including a description of how infrastructure requirements would be co-ordinated, funded and delivered to facilitate the development.</i></li> </ul>	<p>Section 3.1 – Domestic Cold Water (page 6)</p> <p>Section 3.2 – Natural Gas (pages 6 &amp; 7)</p> <p>Section 3.3 – Sanitary Drainage (pages 7 &amp; 8)</p> <p>Section 3.4 – Rainwater Drainage (page 8)</p> <p>Section 3.5 – Fire Hydrant &amp; Sprinkler Service (pages 8 &amp; 9)</p>
<p><i>Sydney Water Agency Advice:</i></p> <p><i>1. The proponent of development should determine service demands following servicing investigations and demonstrate that satisfactory arrangements for drinking water, wastewater, and recycled water (if required) services have been made.</i></p>	<p>Section 3.1 – Domestic Cold Water (page 6)</p> <p>Section 3.3 – Sanitary Drainage (pages 7 &amp; 8)</p>

<p><i>Sydney Water Agency Advice:</i></p> <p>2. <i>The proponent must obtain endorsement and/or approval from Sydney Water to ensure that the proposed development does not adversely impact on any existing water, wastewater or stormwater main, or other Sydney Water asset, including any easement or property. When determining landscaping options, the proponent should take into account that certain tree species can cause cracking or blockage of Sydney Water pipes and therefore should be avoided.</i></p>	<p>Section 3.1 – Domestic Cold Water (page 6)</p> <p>Section 3.3 – Sanitary Drainage (page 7)</p>
<p><i>Sydney Water Agency Advice:</i></p> <p>4. <i>The proponent should outline any sustainability initiatives that will minimise/reduce the demand for drinking water, including any alternative water supply and end uses of drinking and non-drinking water that may be proposed, and demonstrate water sensitive urban design (principles are used), and any water conservation measures that are likely to be proposed. This will allow Sydney Water to determine the impact of the proposed development on our existing services and required system capacity to service the development.</i></p>	<p>Section 3.1 – Domestic Cold Water (page 6)</p>

## 2 Introduction

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Arup have been commissioned by NSW Health Infrastructure to provide the Hydraulic and Fire services schematic design for the Nepean Hospital Stage 2 Redevelopment.

This report provides Hydraulic and Fire services advice for the State Significant Development (SSD) Application, following the Stage 2 Secretary's Environmental Assessment Requirements (SEARs) submission by the Department of Planning, Industry and Environment (DPIE). Agency Advice letters have also been provided by the DPIE to supplement the SEARs. This report responds to all these requirements / requests related to the Hydraulic and Fire Services.

### 2.1 The Project

Nepean Hospital is located in the Western Sydney suburb of Kingswood at the foot of the Blue Mountains.

The Nepean Hospital Stage 2 Redevelopment seeks to deliver significantly enhanced acute services, as well as a new campus main entry and drop-off area. It complements the recent Stage 1 Redevelopment approved in February 2019 and due for completion by early 2022.

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- Demolition of the Total Asset Management (TAM) facility;
- Reconfiguration of the loading dock area and back of house functions;
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- Barber Avenue upgrade and access road to the Stage 2 Tower's forecourt, port cochere, and front of house area.



## 3 Hydraulic & Fire Services Infrastructure

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The existing Nepean Hospital campus is served by various utilities located in Parker Street, Derby Street, Somerset Street, and the Great Western Highway. The Stage 2 Redevelopment does not require any new connections to the Authority utilities.

### 3.1 Domestic Cold Water

#### 3.1.1 Stage 2 Building

The Stage 2 building water supply will connect into the 200mm capped connection installed during the Stage 1 works. This is located adjacent the North-West corner of the Stage 1 building under the Emergency driveway. This 200mm service connects into the 150mm cast iron cement mortar lined (CICL) Sydney Water town main in Somerset Street, and was sized during the Stage 1 design to accommodate the demands of both Stage 1 & 2 buildings.

The peak water demand flow rate for the Stage 2 building is estimated to be 8.92 L/s, which can be accommodated through an 80mm service. This calculation is based on “Plumbing Design for Health Care Installations NSW Australia” and AS3500, with an allowance of 1000 L/bed/day.

The existing 200mm service is sufficient to accommodate the water demands for both the Stage 1 & 2 buildings. This was endorsed/approved by Sydney Water during the Stage 1 design process.

The provision for a rainwater capture & reuse system has been documented within the Civil Services package, for irrigation use only.

#### 3.1.2 North Block Loading Dock & BOH Refurbishment

The North block is served by the campus private cold water ring main. No increase in water demands are expected as part of these works.

### 3.2 Natural Gas

#### 3.2.1 Stage 2 Building

The Stage 2 building natural gas supply will connect into the 200mm 100kPa capped connection installed during the Stage 1 works. This is located adjacent the North-West corner of the Stage 1 building under the Emergency driveway. This 200mm service formed part of the gas infrastructure works within the Stage 1 early works package. The gas infrastructure works comprised of extending the existing gas connection from Parker Street (Jemena Authority, 200mm @ 1050kPa) to the private gas mains infrastructure.

The Stage 2 building has the following gas demands:

Location of Gas Demand	Gas Demand (MJ/hr)	Information Reference
Ground floor Kitchen	500	'Project Chef' kitchen model by Cini Little
Levels 1 & 2 Retail Tenancies	2000	Retail Tenancy Brief
Level 4 Mechanical Plant	7388	Mechanical gas demand calculations
Level 10 Domestic Hot Water Plant	2460	Domestic hot water demand calculations and product selections

The Stage 1 gas infrastructure works made a natural gas allowance of 394m<sup>3</sup>/hr for the Stage 2 building. The peak gas demand (based on the above values) is expected to be 325m<sup>3</sup>/hr. The existing 200mm service is sufficient to accommodate the gas demands for the Stage 2 building.

### 3.2.2 North Block Loading Dock & BOH Refurbishment

The North block is served by the 100kPa campus natural gas supply. Natural gas supplies to existing buildings being demolished will need to be capped and removed.

No increase in gas demands are expected as part of these works.

## 3.3 Sanitary Drainage

### 3.3.1 Stage 2 Building

The Stage 2 building sanitary drainage service will connect into the 300mm capped connection installed during the Stage 1 works. This is located adjacent the North-West corner of the Stage 1 building under the Emergency driveway. This 300mm service connects into the 300mm vitrified clay Sydney Water town main in Somerset Street, and was sized during the Stage 1 design to accommodate the demands of both Stage 1 & 2 buildings.

Based on the expected peak sewer discharge of 8.47 L/s (95% of the peak water consumption), the existing 300mm service is more than sufficient to accommodate the sewer demands for both the Stage 1 & 2 buildings. This was endorsed/approved by Sydney Water during the Stage 1 design process.

### 3.3.2 North Block Loading Dock & BOH Refurbishment

The North block is served by existing in-ground sewer drains. These branch drain locations may need to be modified as part of the proposed ground level changes in the area, however this will not impact the main drains.

No increase in sewer demands are expected as part of these works.

## 3.4 Rainwater Drainage

### 3.4.1 Stage 2 Building

The Stage 2 building will be provided with downpipes for rainwater drainage. Using the BOM 2016 Rainfall IFD data system, a 1:100 storm event (adjusted to account for heavier rainfall events in the future) would result in a maximum roof drainage flow rate of 500 L/s. This water will be detained within an on-site detention tank, which is documented in the Civil Services documentation, before discharging to the Authority network.

### 3.4.2 North Block Loading Dock & BOH Refurbishment

Modifications to the existing rainwater drainage system will be required for the loading dock roof extensions. This small additional catchment will connect to the existing stormwater pipework. No new connections to Authority infrastructure are required.

## 3.5 Fire Hydrant & Sprinkler Service

### 3.5.1 Stage 2 Building

The hospital campus is serviced from a private fire services ring main which is supplied from the following utilities:

- 225mm/250mm CICL/uPVC/DICL Sydney Water town main in Barber Avenue;
- 150mm/100mm CICL/uPVC Sydney Water town main in Derby Street; and,
- 150mm CICL Sydney Water town main in Somerset Street.

As part of the Stage 1 works, a new water supply from the Barber Avenue town main was connected to the existing ring main to consolidate the system.

The configuration also incorporates an above ground storage tank and pump-sets.

The Stage 2 building combined fire hydrant & sprinkler service will connect directly into the Stage 1 infrastructure, which is supplied from the abovementioned ring main. This imposes no additional loadings to the current system, and no additional connections into Authority mains are required.

### 3.5.2 North Block Loading Dock & BOH Refurbishment

The North block fire hydrant system is currently provided from the existing fire services ring main. This service is to remain with small modifications required to suit the proposed layout; no additional loadings are required.

The new North block sprinkler system will be supplied from the abovementioned combined infrastructure. No additional connections to Authority mains are required.

## Appendix A – Combined Utilities Plan

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ELECTRICAL SERVICES LEGEND

- PROPOSED LOW VOLTAGE CONDUIT
- PROPOSED HIGH VOLTAGE CONDUIT
- PROPOSED GENERATOR SUPPLY
- EXISTING LOW VOLTAGE CONDUIT, TO BE RETAINED
- EXISTING HIGH VOLTAGE CONDUIT, TO BE RETAINED
- EXISTING GENERATOR SUPPLY, TO BE RETAINED
- PROPOSED COMMUNICATIONS CONDUIT
- PROPOSED COMMUNICATIONS TELCO CONDUIT
- EXISTING COMMUNICATIONS CONDUIT, TO BE RETAINED
- EXISTING COMMUNICATIONS TELCO CONDUIT, TO BE RETAINED

HYDRAULIC & FIRE SERVICES LEGEND

- PROPOSED DOMESTIC COLD WATER
- PROPOSED NATURAL GAS
- PROPOSED SEWER
- PROPOSED FIRE HYDRANT
- EXISTING DOMESTIC COLD WATER, TO BE RETAINED
- EXISTING NATURAL GAS, TO BE RETAINED
- EXISTING SEWER, TO BE RETAINED
- EXISTING FIRE HYDRANT, TO BE RETAINED

KEY/LEGEND

- SSDA BOUNDARY LINE
- CAMPUS BOUNDARY LINE
- NOT INCLUDED IN SSDA
- STAGE TWO TOWER
- ROOFS AND CANOPIES
- EXTERNAL WORKS
- ROADS AND HARD STAND AREAS WITHIN THE SSDA BOUNDARY
- FOR BOH AND LOADING DOCK SCOPE REFER TO DETAIL FLOOR PLANS & ELEVATIONS

PROPOSED STAGE 2 TOWER LV MAIN SWITCHROOM ON LEVEL 4

PROPOSED NEW 3 x 1500KVA CHAMBER SUBSTATION ON LEVEL 4 OF STAGE 2 TOWER

PROPOSED DIVERTED FIRE HYDRANT LINE CONNECTS TO EXISTING SERVICE

PROPOSED STAGE 2 TOWER GENERATOR ROOM ON LEVEL 4

PROPOSED DIVERTED FIRE HYDRANT LINE CONNECTS TO EXISTING SERVICE

PROPOSED ROUTE FOR STAGE 2 TELCO LEAD-IN PIT AND CONDUIT NETWORK

PROPOSED STAGE 2 CAMPUS DISTRIBUTOR (CD-2) ON LEVEL 0

EXISTING BUILDING DISTRIBUTOR ICT ROOM 02 (LEVEL 1) TO BE RETAINED

PROPOSED ROUTE FOR ICT BACKBONE INTERFACES TO EXISTING ICT ROOM 00

EXISTING CAMPUS DISTRIBUTOR ICT ROOM 00 (LEVEL 1) TO BE DOWNGRADED TO MAJOR BACKBONE NODE

PROPOSED ROUTE FOR ICT BACKBONE INTERFACES TO EXISTING (ICT ROOM 04)

PROPOSED STAGE 2 BUILDING DISTRIBUTOR 2 (BD-2) ROOM ON LEVEL 4  
PROPOSED ROUTE OF NEW STAGE 2 HV CABLE PIT AND CONDUIT NETWORK TO CONTINUE FROM STAGE 1 PROVISION THROUGH TO STAGE 2 SUBSTATION

ELECTRICAL & COMMS UNDERGROUND CONDUIT PROVISIONS FROM CENTRAL CORE RISER  
ICT CABLE MANAGEMENT INSTALLATION ON LEVELS 1, 2 & 4 BY STAGE 1 TEAM UP TO STAGE 1/STAGE 2 BUILDING INTERFACE

INTERFACING OF STAGE 2 HV PIT AND CONDUIT NETWORK TO STAGE 1 INFRASTRUCTURE

INDICATIVE ROUTES FOR STAGE 1 TO STAGE 2 ICT AND DAS BACKBONE INTERFACES

F/O CABLES BETWEEN CDs VIA DIVERSE PATHWAYS ON LEVEL 1 AND LEVEL 2

F/O CABLES BETWEEN CDs AND BDs VIA LEVEL 4

DAS INTERFACE CABLES VIA LEVEL 4

EXISTING STAGE 1 BUILDING DISTRIBUTOR ROOM ON LEVEL 4

EXISTING STAGE 1 CAMPUS DISTRIBUTOR & DAS ROOMS ON LEVEL 0

PROPOSED NEW HV SWITCHING STATION FOR STAGE 2 SUBJECT TO LEVEL 3 DESIGN

EXISTING STAGE 1 BOUNDARY HV SWITCHING STATION

PROPOSED NEW HV SWITCHING STATION FOR STAGE 2 SUBJECT TO LEVEL 3 DESIGN

EXISTING STAGE 1 HV FEEDER POTENTIAL ROUTE FOR STAGE 2 FEEDER SUBJECT TO LEVEL 3 DESIGN

PROPOSED ROUTE OF NEW STAGE 2 HV CABLE TO UTILISE SPARE CONDUITS PROVIDED UNDER STAGE 1



Telephone +61 2 8397 7200  
Facsimile +61 2 8397 7201  
www.bvn.com.au

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ISSUE	DATE	FOR
A	14/08/2021	PRELIMINARY
B	12/11/2021	PRELIMINARY

NOTE  
REFER TO CIVIL AND LANDSCAPE PACKAGE FOR EXTENT OF EXTERNAL WORKS

CLIENT



PROJECT MANAGERS

CBRE  
TEL 02 9333 3333

ARCHITECT  
BVN Architecture  
TEL 02 8287 7200

STRUCTURE / CIVIL  
BONACCI  
TEL 02 8247 8400

MECHANICAL  
ARUP  
TEL 02 9320 9320

ELECTRICAL / COMMS  
JHA  
TEL 02 9437 1000

HYDRAULIC  
ARUP  
TEL 02 9320 9320

FIRE ENGINEERING  
ARUP  
TEL 02 9320 9320

LANDSCAPE  
ARCADIA  
TEL 02 8571 2900

BCA / DDA  
BLACKETT MAGUIRE + GOLDSMITH  
TEL 02 9211 7777

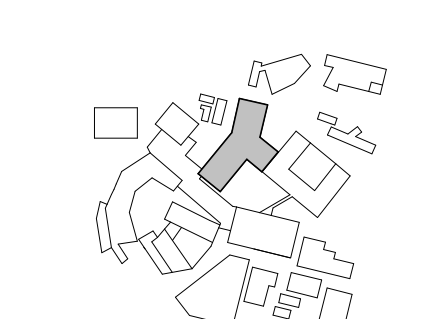
PROJECT

NEPEAN HOSPITAL - STAGE 2

DERBY ST  
KINGSWOOD NSW 2747

NEPEAN  
BVN PROJECT NUMBER  
1903020.000

DRAWING KEY



TRUE NORTH PROJECT NORTH

SCALE  
1:500 @A0 DO NOT SCALE  
0 1000 2000  
1:500mm

DRAWN BY: Author CHECKED BY: Checker

DESIGNED BY: Designer APPROVED BY: Approver

STATUS

DESIGN DEVELOPMENT

STAGE 2 PROPOSED SERVICES INFRASTRUCTURE FOR SSDA

DRAWING NUMBER ISSUE

A0-104 B