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RANDWICK CAMPUS REDEVELOPMENT – Integrated ASB (IASB) Addition

State Significant Development Application
Integrated Water Management Plan
HYDRAULIC SERVICES

Prepared by:

Central Plumbing Contracting

Central Plumbing Project Reference - SY180115

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REVISIONS

Revision	Date	Purpose	Prepared By	Approved By
A	10/05/2019	Draft Issue for LL review	Rhys Edwards	
B	11/06/2019	Draft Issue for LL Approval	Rhys Edwards	
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G	12/08/2019	Issue for ISSDA	Rhys Edwards	P.Johnson

Unless otherwise advised, the parties who have undertaken the Review and Endorsement confirm that the information contained in this document adequately describes the conditions of the site located at Magill St, Randwick, NSW, 2031.

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1 Executive Summary

This Integrated Water Management Plan (IWMP) addresses waste water and potable water systems for the proposed Integrated ASB Addition, as an addendum to the Integrated Water Management Plan previously submitted under SSD 9113 Prince of Wales Expansion. The content of this report relates on to the additional core scope elements of the Integrated ASB Addition (IASB).

This report is based on item 14 of the Secretary's Environmental Assessment Requirements (SEARs) for the State Significant Development Application (SSDA) and the associated Hydraulic Services design drawings, Health Infrastructure NSW (HI) briefing documents and subsequent ancillary information provided.

Scope of services covered within the plan include:

- sanitary and trade waste discharge
- roof water plumbing and drainage systems connecting to existing civil trunk stormwater
- domestic potable water supply systems

Hydraulic services of the IWMP can be summarised as follows:

- Consultation with relevant utility supply agencies has been conducted to verify the condition, capacity, compliance, reliability and efficiency of the existing sewer and water mains infrastructure and have found them to be acceptable for connection
- Sewer and trade waste water from the site to discharge to Sydney Water's sewer main via proposed internal 'house drainage' system in accordance with AS.3500: 2015 and Sydney Water's requirements
- Water pressure/flow results was obtained from Sydney Water (Refer to Appendix 'A' of this plan)
- Water supply provided will be in accordance with Australian Drinking Water Guidelines (2011, updated 2016, version 3.4)
- Rainwater from roof areas will be collected, stored and re-used for landscape irrigation purposes only
- Roofwater will drain/discharge through a series of rainwater outlets and eaves gutters systems designed in accordance with AS.3500: 2015
- Ecological Sustainable Development (ESD) principles as nominated in this plan will be incorporated into the designs and the construction of the facility

2 Key Design and Performance Principles

A major element of this IWMP is to outline the minimum building services design criteria to deliver compliance with HI guidelines, NSW Department of Health Engineering guidelines, Prince of Wales Hospital and UNSW briefing documents, user groups and all relevant statutory authority requirements, so that the most cost effective and energy efficient, maintainable solutions are achieved for the Project, with patient care and safety the main priority.

This IWMP is to be read in conjunction with the Hydraulic Services design drawings (Refer to Appendix 'B' of this plan), for full list of available hydraulic services drawings, which include:

- Building code compliance
- HI requirements
- Effective use and waste minimisation of limited water resource
- Authority infrastructure availability and capacity
- ESD principles

The hydraulic services systems currently documented will:

- Ensure the safety of building occupants and patients
- Minimise water wastage
- Minimise initial capital cost and ongoing maintenance and energy costs
- Ensure effective use of energy and resources

2.1 Standards and Codes

This plan has used the following Australian Standards and Codes as references:

- National Construction Code (NCC) – 2016 (being the current version at the time of writing this report)
- Building Code 2016
- AS 3500 Plumbing and Drainage Suite of standards – 2015 as ratified by the NCC
- AS 2419.1 Fire Hydrant Installations – 2005
- AS 2118.1 Fire Sprinkler Installations – 1999
- AS2118.6 Combined Sprinkler and hydrant systems - 2012

2.2 AUSHFG

- Australasian Health Facilities Guidelines (AUSHFG) Parts A - F
- Hospital acquired infections – Engineering down the risk – Handbook – HB 260 – 2003

2.3 Relevant Authorities

Key authorities directly relating to the hydraulic and fire services design are (please see **Table 1** below):

Table 1 Utility Authorities

Authority	Asset
Sydney Water	Water Supply / Sewer Drainage
Jemena Gas	Natural Gas supply and reticulation
NSW Fire and Rescue	Regulator for fire hydrants and automatic fire sprinklers
Randwick City Council	Stormwater Civil Drainage

3 The Development Site

The existing hospital site is bounded by High Street, Avoca Street, Barker Street and Hospital Road in Randwick, NSW.

Refer to Appendix 'C' of this plan for the Site Plan.

The IASB addition is on the eastern side of the ASB. The IASB addition scope comprises:

- UNSW eastern Extension (Base Building Only)
- Associated modifications within the ASB
- Lowering of Hospital Road
- Landscaping

The IASB Addition is described as 10 storey addition comprising of:

- **Level 00:** Clinical Innovation and Research
- **Level 01:** Clinical Transitional Lab Space
- **Level 02:** Clinical Transitional Lab Space
- **Level 03:** Biomedical Innovation Space
- **Level 04:** Biomedical Innovation Space
- **Level 05:** Education and Research Space
- **Level 06:** Education and Research Space
- **Level 07:** Education and Research Space
- **Level 08:** Education and Research Space
- **Level 09:** Plant

3.1 Design Standards

All building services will be designed in compliance with the National Construction Code of Australia (prescriptive or performance based requirements), all relevant Australian Standards and local Authority requirements.

Hydraulic Services systems will be designed and documented in accordance and fully comply with the requirements of the following client engineering briefing documents, guidelines and statutory bodies:

3.1.1 HI Guidelines

This IWMP will rely upon the full suite of HI guides and policies; however, the following are specific to the hydraulic services:

- NSW Health Policy Directives
- NSW Health Infrastructure Engineering Services Guidelines – Technical Series dated June 2016
- NSW Health Infrastructure Design Guidance Note No.19 – Helipad Landing Sites dated September 2016
- NSW Health Infrastructure Design Guidance Note No.24 – Building Importance Levels for NSW Health Projects dated 21 October 2016
- NSW Health – South Eastern Sydney Local Health Network – Engineering Facility Brief

3.1.2 Regulatory Bodies:

- Department of Energy, Utilities and Sustainability
- Randwick City Council
- Office of Environment and Heritage (OEH)
- Environment Protection Authority (EPA)
- Building Code of Australia / National Construction Code (NCC)
- Australian Standards
- WorkCover Authority
- Roads and Maritime Services (RMS)

4 Outline of Proposed Water Management Systems

4.1 Potable Water

Potable water systems for human consumption, hygiene purposes, cistern flushing and process equipment for the IASB addition will be supplied directly from the Sydney Water water main, indirectly via the ASB reticulation and designed and constructed in accordance with AS3500.1 (2015) , AS3500.4 (2015), Sydney Water requirements and Australian Drinking Water Guidelines.

The proposed potable water supply will be connected to the water supply main infrastructure within the ASB. Potable water will be reticulated throughout the IASB addition, above ground and typically within the corridor ceiling spaces. The potable water will connect all sanitary fixtures and fire hose reels. The potable water supplies will be segmented, with provision of isolation to suit departmental zones.

The water supply will be distributed to achieve:

- 350 kPa at the most disadvantaged outlet
- 1.5 m/sec velocity through the internally located pipes

Subsidiary meters will be provided on all floors.

All subsidiary meters will be connected to the building management system for the monitoring of department and/or area water consumptions as well as to identify areas where non-standard usage occurs i.e. leak detection. The water metering helps to identify water usage so that non-critical areas of the facility can be manually isolated in a staged manner under a disaster scenario or failure of service(s).

Refer to Appendix 'D' of this plan for the schematic of the potable cold water system.

4.2 Fire Hydrants and Fire Sprinklers

Fire hydrants and fire sprinklers will be a combined system and connected to the ASB mains. The description of the fire hydrant and sprinkler system is the subject of another report.

4.3 Sanitary Plumbing and Drainage

New sanitary drains will be constructed to the requirements of AS3500.2:2015 and Sydney Water requirements.

Sydney Water has been advised of the additional loads expected from the new development. ACOR Consultants Pty Ltd, acting as the project's Water Services Coordinator (WSC) have lodged an application

with the Authority for them to assess the impact of the additional loads to determine if any augmentation to their sewer network is required.

The informal response states that a sewer diversion will be required. These diversions are currently being constructed as part of the project's Enabling Works.

The proposed IASB addition will be connected to the sanitary drainage infrastructure within the ASB.

Within the IASB addition, will be a series of vertical stacks (a fully vented modified system), positioned against every second structural column, allowing future flexibility and full floor coverage. The drainage pipes will connect to all the fixtures within the building. Where stacks and relief vents pass through a floor where fixtures are not connected under the proposed scheme, sealed branches will be left terminated within the false ceiling which will allow for maximum coverage of the floor area for any future connection of fixtures.

The drainage systems will be designed for pipework to be constructed using uPVC. Any areas where pipework is to receive high acidity waste, High Density Polyethylene (HDPE) will be used.

Any drainage pipework traversing above sound sensitive areas will be acoustically treated.

New trade waste drains will be constructed to the requirements of AS3500.2 and Sydney Water requirements and follow the approach described above for Sanitary Plumbing and Drainage, albeit the majority of the pipework will be constructed using HDPE.

The trade waste envisaged will be for the collection of acidic waste from the laboratories and fume cupboards. An acid neutralising pit will be located at the lowest level and will be easily accessible.

Refer to Appendix 'E' of this plan for the schematic of the sanitary drainage system

4.4 Roofwater Plumbing and Drainage

Roof water plumbing from the IASB addition roof areas will be designed to convey the roof water down to the lowest level where it will be discharged into the main civil stormwater trunk main system.

The roof drainage system will be based on an Annual Recurrence Interval (ARI) of 1 in 100year with a 5 minute duration. All roofed areas will have an independent overflow system which has 100% capacity of the primary downpipe system. This rainfall ARI is compatible for buildings with box gutters or flat roofs. Eaves gutters are to be considered as they reduce the risk of water ingress.

Major downpipes will be offset within ceiling spaces directly below the capture areas and drop within common services shafts where possible through the building. Pipes within the ceilings will be acoustically insulated where required to minimise noise transmission.

Roof water collection, treatment and re-use will not be incorporated in the IASB addition.

As the site is located in the eastern suburbs of Sydney, (within the Birds Gully stormwater catchment) stormwater is directed to local council / authority drainage pipes which are carrying large volumes of upstream stormwater. Capturing and reusing the building's roof water will have negligible effect on the local council's stormwater infrastructure. In addition, the project strategy for stormwater management includes flood mitigation and on-site detention prior to discharge to the council system.

Refer to Appendix 'F' of this plan for the schematic of the stormwater drainage system

4.5 Domestic Potable Hot Water

The hot water generation for the potable water will be provided by the mechanical services boiler(s) on Level 9 of the ASB which will provide the required heat source for the domestic hot water for the IASB addition.

Sub-loops will be implemented off the main loop in order to achieve departmental isolation.

It is being proposed that the hot water distribution loop be recirculated at 65 degrees Celsius (°C) with a return velocity of no more than 1.0 m/sec. All hot water will be recirculated through the building on a distribution flow and return loop. All pipework shall be installed with thermal insulation of no less than 25 mm thickness.

Domestic hot water supply will follow the route of the cold water supply within the new building.

Generally, it is expected that 43.5°C water will take 20 seconds in a 10 m section of DN20 mm pipe to arrive at the tap outlet. Contrary, it will take approximately 8 seconds in a 10 m section of DN15 mm pipe.

Refer to Appendix 'G' of this plan for the schematic of the domestic hot water system

4.6 Non-Potable water

Non-potable water within the IASB addition will be fed from the potable water mains via approved backflow prevention devices in accordance with AS3500.1:2015, Council and Health Infrastructure requirements.

- High Hazard Zone: RPZD (Reduced Pressure Zone Device)
- Medium Hazard Zone: DCV (Double Check Valve)

Generally, the above devices will be supplied to individual outlets within the laboratories.

5 Advantages and Disadvantages

5.1 Advantages of Current Design

1. No risk of contaminated water between the ASB and the IASB addition
2. Conventional water supply and drainage systems implemented
3. Water supply pipe layout is efficient

5.2 Disadvantages of Current Design

1. Community expectations to include rainwater re-use for government buildings
 - a. The approved ASB under SSDA 9113 includes rainwater capture and reuse
2. Limited contribution to overall building's ESD performance

6 Fixtures, Fittings and Tapware

Sanitary fixtures, fittings and tapware where nominated on architectural plans and room data sheets will be in accordance with NSW Department of Health and UNSW requirements. Final selections will be based on whole of life cost, water/energy efficiency, W.E.L.S registration (4 star minimum except showers to be minimum 3 star), availability, ease of maintenance, aesthetic appearance and durability.

7 ESD Initiatives

The following ESD measures are to be implemented into the design:

- Metering of water supplies including hot water metering
- Increased thickness of thermal insulation on all hot water supplies
 - 25mm thick in lieu of 19mm thick
- Recyclable materials selection

Additional measures that are to be considered include:

- Solar contribution for water heating (minimum target to be a 50% annual solar gain)
 - Not implemented
- Low voltage power generation by converting liquid flow (either water supply or sewage) at authority points of connection into energy
 - Not implemented
- Capture of fire services test water
 - Not implemented
- Capturing of waste water from the cooling towers
 - Not implemented
- Grey water treatment and reticulation to building – limited to staff amenities
 - Not implemented
- Black water treatment and reticulation
 - Not implemented

Appendix A - Sydney Water Pressure and Flow Information



Statement of Available Pressure and Flow

Jamie-Lee MacDonald
24 Falcon Street
Crows Nest, 2065

Attention: Jamie-Lee MacDonald

Date: 07/08/2018

Pressure & Flow Application Number: 475412
Your Pressure Inquiry Dated: 2018-06-27
Property Address: 103 Botany St, Randwick 2031

The expected maximum and minimum pressures available in the water main given below relate to modelled existing demand conditions, either with or without extra flows for emergency fire fighting, and are not to be construed as availability for normal domestic supply for any proposed development.

ASSUMED CONNECTION DETAILS

Street Name: Botany Street	Side of Street: West
Distance & Direction from Nearest Cross Street	1 metres South from Magill Street
Approximate Ground Level (AHD):	50 metres
Nominal Size of Water Main (DN):	150 mm

EXPECTED WATER MAIN PRESSURES AT CONNECTION POINT

Normal Supply Conditions	
Maximum Pressure	60 metre head
Minimum Pressure	46 metre head

WITH PROPERTY FIRE PREVENTION SYSTEM DEMANDS	Flow l/s	Pressure head m
Fire Hose Reel Installations (Two hose reels simultaneously)	0.66	45
Fire Hydrant / Sprinkler Installations (Pressure expected to be maintained for 95% of the time)	5	50
	10	47
	15	45
	20	41
	26	36
	30	32
Fire Installations based on peak demand (Pressure expected to be maintained with flows combined with peak demand in the water main)	5	43
	10	41
	15	37
	20	33
	26	28
	30	23
Maximum Permissible Flow	36	15

(Please refer to reverse side for Notes)

For any further inquiries regarding this application please email :

swtapin@sydneywater.com.au

Appendix B - Hydraulic Services Reference Drawings

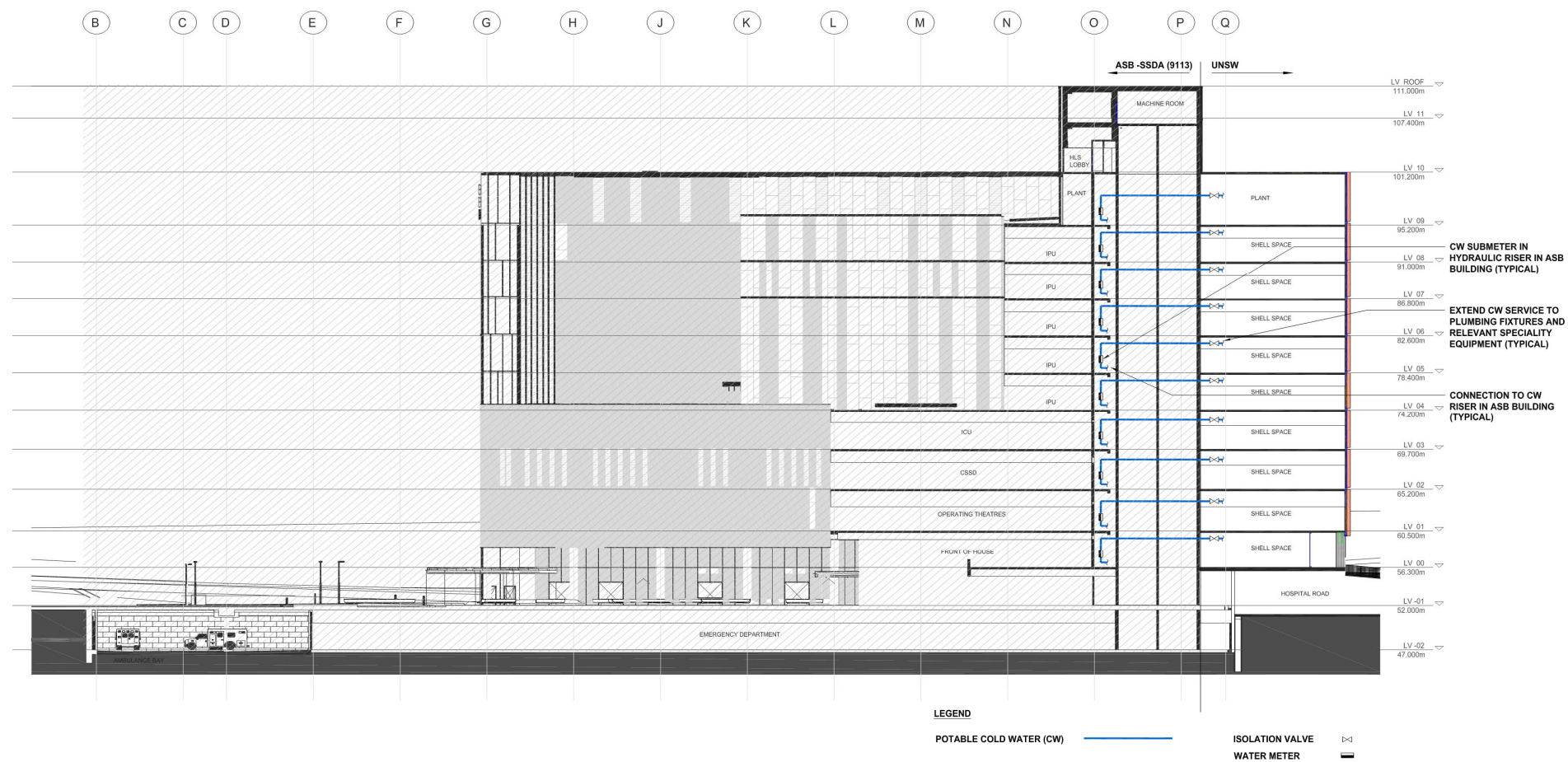
DRAWING No.	DRAWING NAME
00-000000	COVER SHEET
DR-0000001	LEVEL 00 DRAINAGE
DR-0100001	LEVEL 01 DRAINAGE
DR-0200001	LEVEL 02 DRAINAGE
DR-0300001	LEVEL 03 DRAINAGE
DR-0400001	LEVEL 04 DRAINAGE
DR-0500001	LEVEL 05 DRAINAGE
DR-0600001	LEVEL 06 DRAINAGE
DR-0700001	LEVEL 07 DRAINAGE
DR-0800001	LEVEL 08 DRAINAGE
DR-0900001	LEVEL 09 DRAINAGE
DR-1000001	ROOF DRAINAGE
DR-B100001	LEVEL -01 DRAINAGE ZONE 1
DR-B100002	LEVEL -01 DRAINAGE ZONE 2
DR-B200001	LEVEL -02 DRAINAGE
DS-0000001	DETAIL SHEET 1
DS-0000002	DETAIL SHEET 2
RD-0000001	LEVEL 00 HOSPITAL RD LOWERING DRAINAGE
RD-B100001	LEVEL -01 HOSPITAL RD LOWERING DRAINAGE
RW-B200001	LEVEL -02 HOSPITAL RD LOWERING DRAINAGE ZONE 1
RW-B2DEM01	LEVEL -02 DEMOLITION – ZONE 1
RW-B2DEM01	LEVEL -02 DEMOLITION – ZONE 2
RW-B200001	LEVEL -02 HOSPITAL RD LOWERING WATER & GAS - ZONE 1

RW-B200002	LEVEL -02 HOSPITAL RD LOWERING WATER & GAS -ZONE 2
SC-0000001	COLD & HOT WATER SCHEMATICS
SC-0000002	SEWER & STORMWATER SCHEMATICS
WG-0000001	LEVEL 00 WATER & GAS
WG-0100001	LEVEL 01 WATER & GAS
WG-0200001	LEVEL 02 WATER & GAS
WG-0300001	LEVEL 03 WATER & GAS
WG-0400001	LEVEL 04 WATER & GAS
WG-0500001	LEVEL 05 WATER & GAS
WG-0600001	LEVEL 06 WATER & GAS
WG-0700001	LEVEL 07 WATER & GAS
WG-0800001	LEVEL 08 WATER & GAS
WG-0900001	LEVEL 09 WATER & GAS

Appendix C - Site Plan

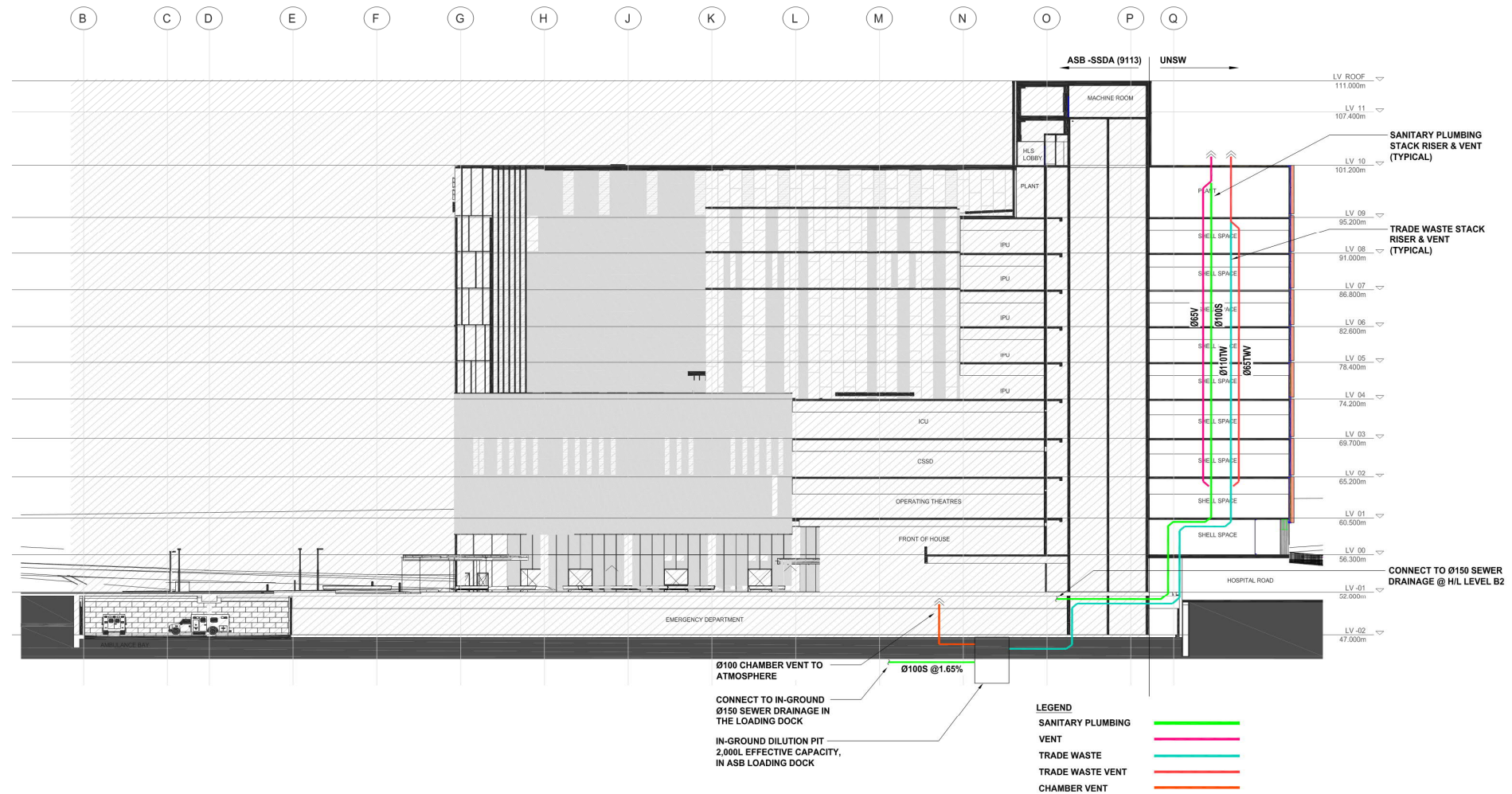


Appendix D - Potable Water Supply Schematic

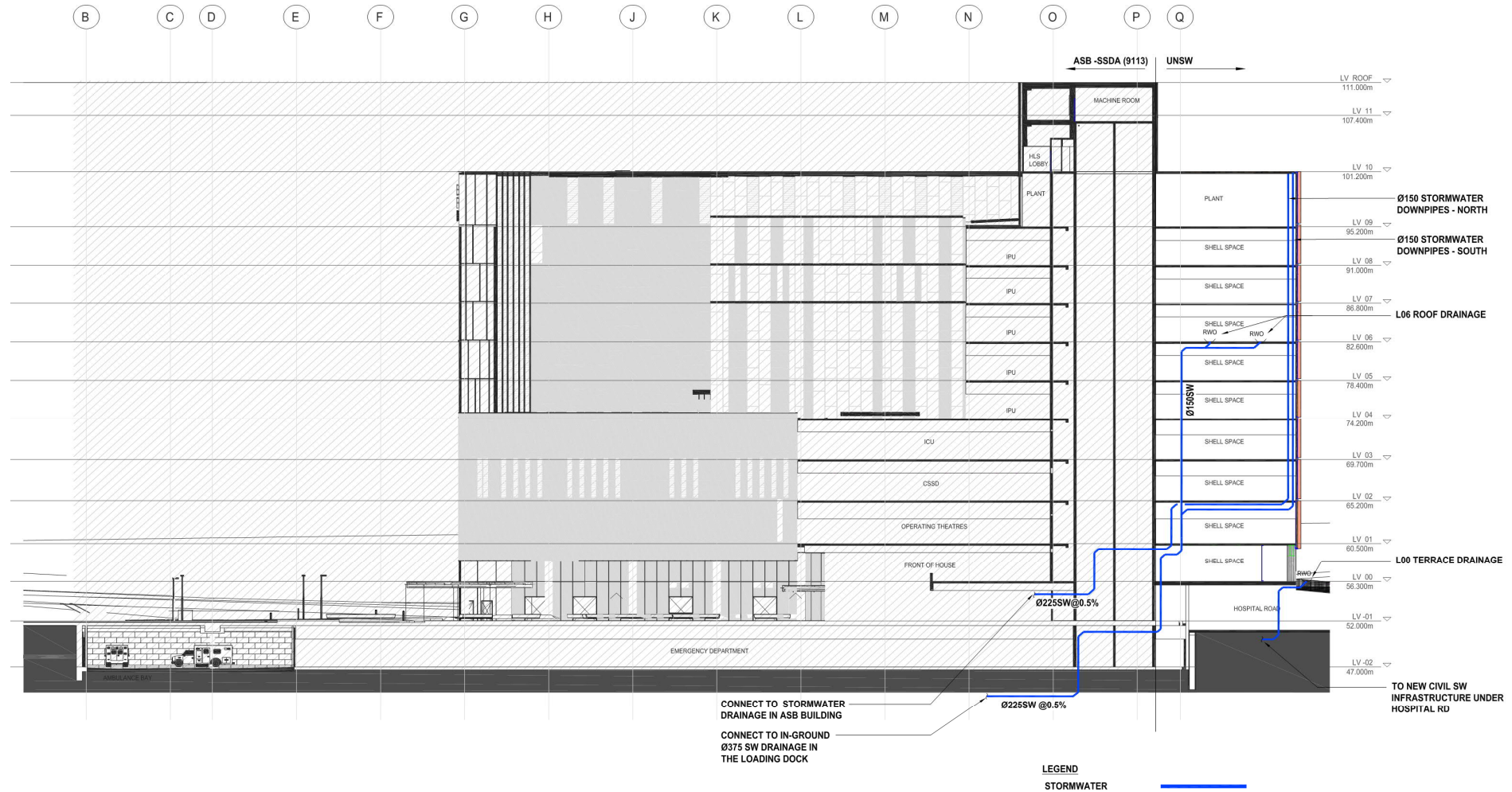


COLD WATER SUPPLY SCHEMATIC

Appendix E - Sanitary Plumbing Schematic

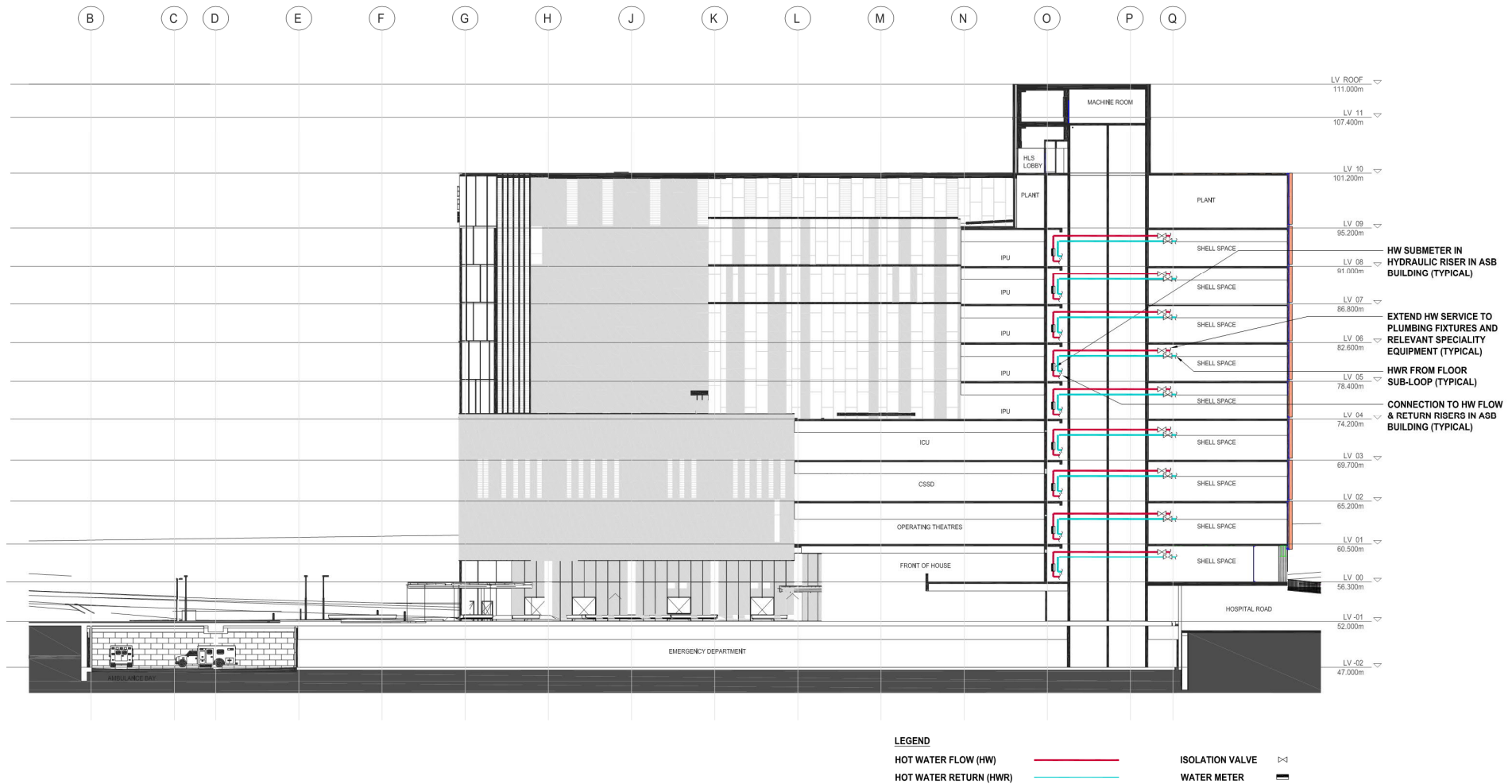


Appendix F - Stormwater Schematic



STORMWATER DRAINAGE SCHEMATIC

Appendix G - Hot Water Schematic



HOT WATER SUPPLY SCHEMATIC