Civil Works SSDA SEARS Conditions Report

Nepean Hospital Development – Stage 2 Tower & Future Developments Civil

Project Reference: 12260-01

November 2021

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REV	ISSUE/AMENDMENT	AUTHOR/S	REVIEWER/S	DATE
A	SSDA SEARS Conditions Report	Neil Carino	Janaraj Thangarajah	10.08.2021
B	SSDA SEARS Conditions Report	Neil Carino	Stephen Naughton	02.09.2021
C	SSDA SEARS Conditions Report	Neil Carino	Stephen Naughton	03.11.2021

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1 Executive Summary

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 a 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 Support 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 were issued by the Department of Planning, Industry and Environment on 22 April 2021.

2 Planning Secretary's Environmental Assessment Requirements

Section 4.12(8) of the Environmental Planning and Assessment Act 1979
Schedule 2 of the Environmental Planning assessment Regulation 2000

This report addresses the following SEARS conditions:

Application Number	SSD-16928008	
Project Name	Nepean Hospital Redevelopment Project – Stage 2	
Location	Derby Street, Kingswood	
Applicant	Health Administration Corporation	
Item No.	General Requirements Key Issue or Agency Advice	Reference / Location within this report.
2.	Built Form and Urban Design. • Address: ○ The Kingswood public domain manual for the upgrade of Barber Avenue	Details of how the Civil Design addresses the requirements detailed in the Kingswood Public Domain Manual are documented in Section 4.2.1

17.	Soil and Water
	• Provide:
	  ○ An assessment of potential impacts on surface and groundwater (quality and quantity), soil, related infrastructure and watercourse(s) where relevant
	  ○ Details of measures to minimise and manage the generation of off-site transmission of sediment, dust and fine particles
	  ○ An assessment of salinity and acid sulphate soil impact, including a Salinity Management Plan and/or Acid Sulphate Soils Management Plan where relevant.
	Relevant Policies and Guidelines:
	• Managing Urban Stormwater – Soils and Construction Volume 1 (Landcom 2004)
	• Acid Sulfate Soil Manual
	• Acid Sulfate Soils Assessment Guidelines (DoP, 2008)
	• Managing Urban Stormwater – Soils and Construction Volume 1 (Landcom 2004) and Volume 2 (A. Installation of Services B. Waste Landfills C. Unsealed Roads D. Main Roads E Mines and Quarries) (DECC2008)
		Refer to Section 4.2.7 and 4.2.10 of this report for Soil and Water assessment and measures (both during and post-construction) and Civil Drawings for details.

3 Existing Site Conditions

3.1 Location

The proposed site is located within the Penrith City Council Local Government Area (LGA). The proposed development is located on the existing Nepean Hospital Campus, Kingswood NSW. The campus is bordered by Parker Street to the west, Barber Avenue and the Great Western Highway to the north, Somerset Street to the east and Derby Street to the south.

The Stage 2 Tower site is adjacent to the currently under construction Stage 1 Tower (see Site Layout below) The Stage 2 Tower will be located to the west of the currently under construction Stage 1 Tower. Its footprint will require demolition works to the existing North Block.

3.2 Existing Stormwater System and Water Courses

The Nepean Hospital Campus broadly operates as four separate catchment quadrants.

The North-West quadrant includes portions of North Block, West Block, the Multi-storey carpark and adjacent service roads. This catchment discharges to Parker Street and Barber Avenue. Overland flow is directed to Parker Street.

The South-West quadrant comprises of the West Block car park, disused helipad, portions of West Block and portions of South Block and discharges into the Council system in Parker Street.

The North-East quadrant is the largest and includes Cancer Care, Tresillian, Hope Cottage, portions of North Block, Doctor's Accommodation, Gateway, Drug and Alcohol, Stage 1 (currently under construction) and East Block. The storm water is discharged at the site boundary into a dual pipe system opposite Rogers Street.

The South-East catchment (which includes Mental Health, Maintenance, Oral Health and a multi-deck car park) discharge directly into Derby St and Somerset St via individual systems, each of which generally includes on site detention.

3.3 Geotechnical

Several geotechnical investigations have been undertaken on and around the proposed development site (including historical borehole logs from previous developments). These investigations include:

- JK Geotechnics Report December 2020 - Ref: 33570LTrpt
- JK Geotechnics Report March 2020 - Ref: 29845L5
- JK Geotechnics Report September 2018 - Ref: 29845L3rpt
- JK Geotechnics Report February 2017 - Ref: 29845Lrpt
- JK Geotechnics Report February 2017 - Ref: 29845L1rpt MWCDB
- Golder Associates July 2010 - Ref: 107622059_002_R_Rev1
- Golder Associates June 2010 - Ref: 107622058_002_R_Rev0
- Golder Associates July 2009 - Ref: 097622055_002 Rev1
- Golder Associates January 2009 - Ref: 087623133_003_R Rev1

The most recent investigation conducted in December of 2020 included boreholes within the footprint of the Stage 2 Tower (shown in red outline in Figure 3.3A below). The Geotechnical reports note that site is located in an area that has an extremely low probability of containing Acid Sulfate Soils.

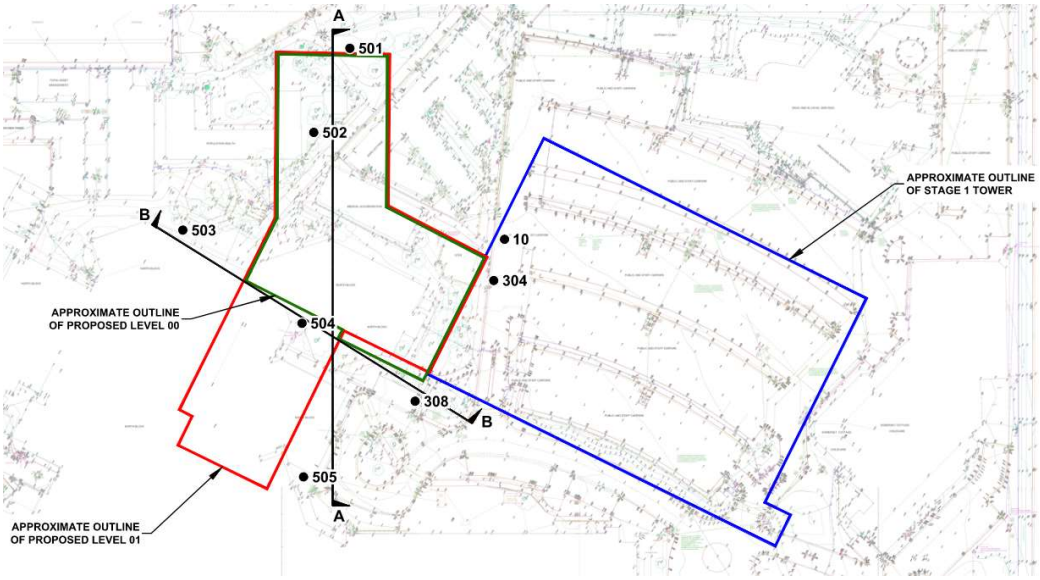


Figure 3.3-A - Latest Geotechnical Investigation (JK Geotechnics - 33570LTrpt)

4 Proposed Development

4.1 General Description

The proposed development comprises of a new 8 storey acute services building adjacent to the currently under construction Stage 1 Tower ('Main Tower') – refer Figure 4.1-A.

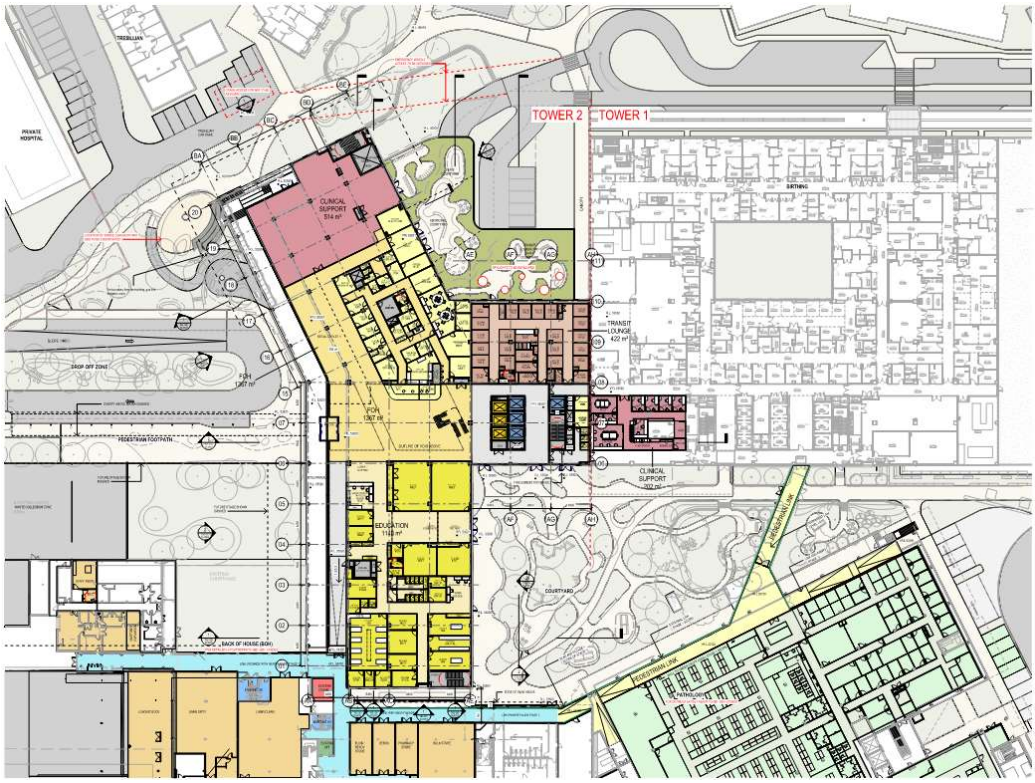


Figure 4.1-A - Level 01 General Arrangement Plan (Source: BVN)

The refurbishment and demolition of adjacent buildings including North Block, and Pathology is required for integration of the new Tower 2 building with existing buildings. Hope Cottage, Doctor's Accommodation, Population Health, Asset Management and part of North Block will be demolished to make way for the Stage 2 Tower.

4.2 Civil Works

Along with the construction of the new Stage 2 Tower, the redevelopment requires extension of and adjustment to Barber Avenue to the new Stage 2 Tower main entrance, new access to a drop off area and associated car parking. Figure 4.2-A shows civil works overlay and architectural layout for the site.

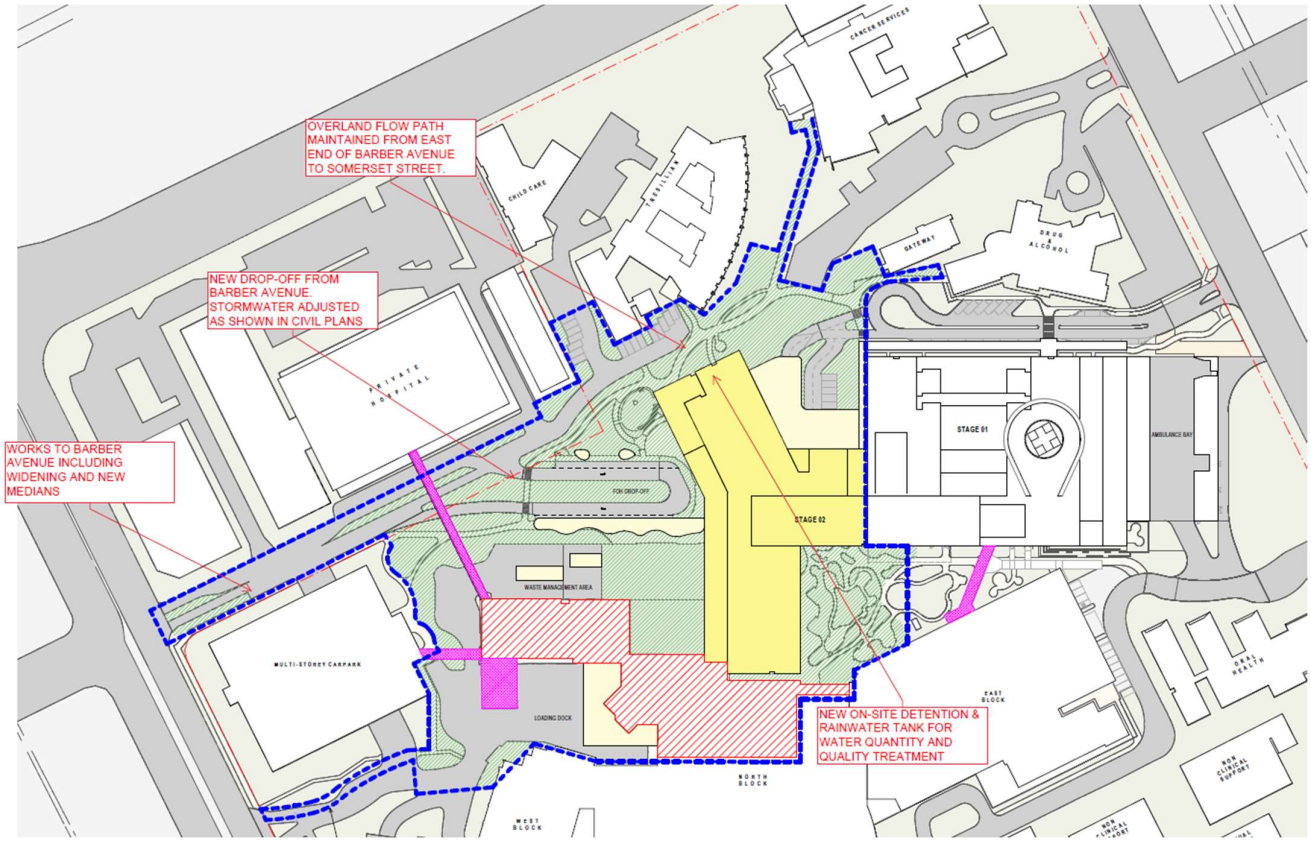


Figure 4.2-A: Civil Works Overlay

4.2.1 Barber Avenue Works – Kingswood Public Domain Requirements

The following items have been considered in the design:

1. The typical street section as detailed in the Kingswood Public Domain Manual (refer Figure 4.2-B)
2. The required traffic flow to accommodate the existing Multi-storey carpark, the existing adjacent landowners, access requirements to existing facilities on the Hospital Campus including Tresillian and Childcare and the new access to the proposed Stage 2 front entry,
3. Diversion/decommissioning of existing underground services including existing stormwater lines within Stage 2 building footprint. E.g. Water main, electrical, gas and telecommunication.
4. Retention of significant existing trees near Barber Avenue within the proposed ceremonial garden and northern landscape following the advice from the arborist consultant.

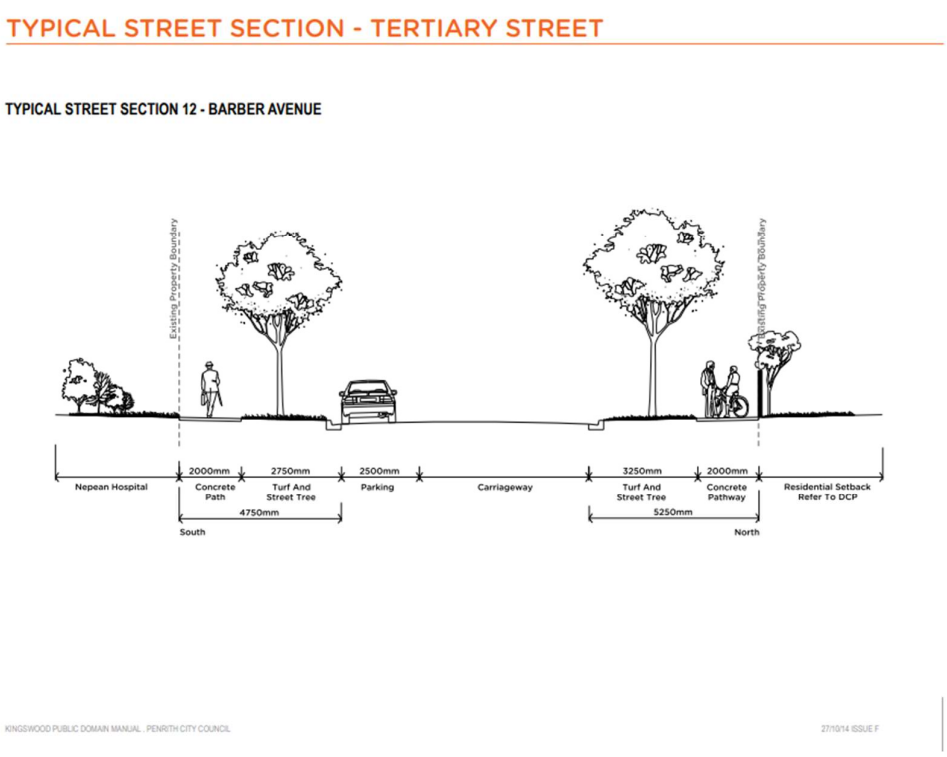


Figure 4.2-B: Kingswood Public Domain Manual Barber Avenue Section

The proposed adjustment to Barber Avenue is generally consistent with the section shown in Figure 4.2-B (from Kingswood Public Domain Manual). The final road adjustment layout will be confirmed during consultation with Penrith City Council – the requirement to allow for the new entry to the Stage 2 building, whilst maintain access to the adjacent Private Medical centre and multi-storey carpark will limit the amount of on-street parking on the Nepean Hospital side of Barber Avenue. Road widening on the Nepean Hospital side of Barber Avenue is proposed to cater for a 2m wide footpath and carriageway lanes as shown in Figure 4.2-C below.

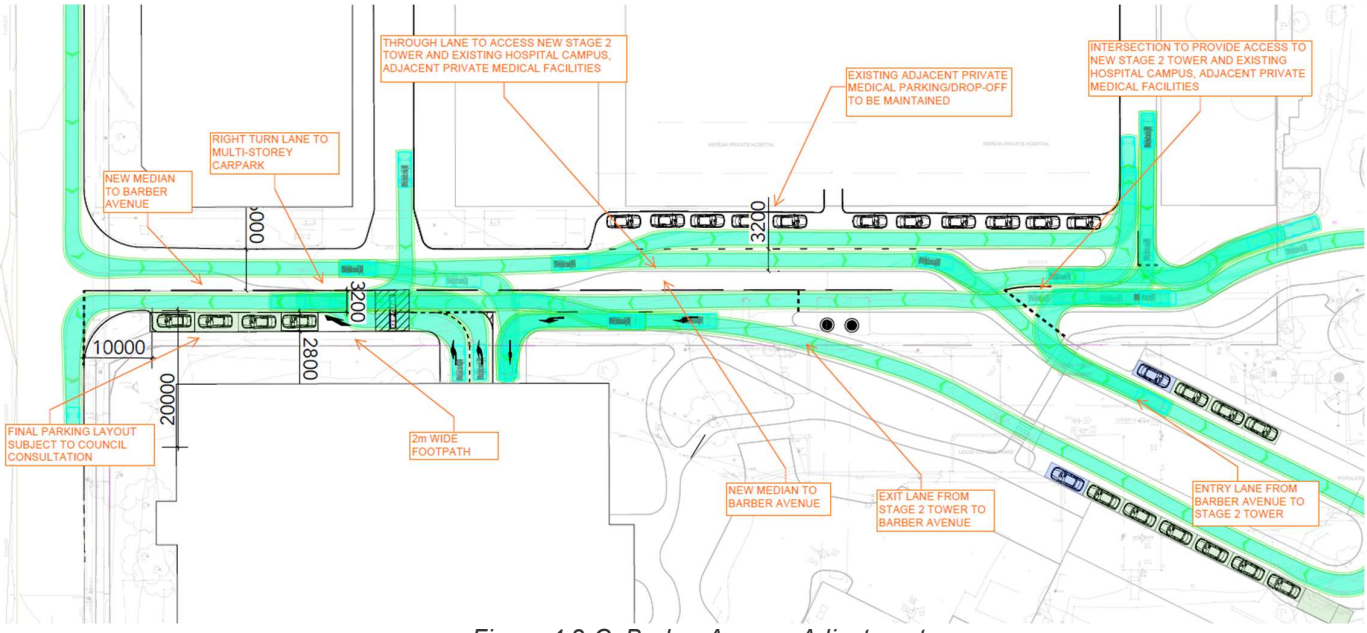


Figure 4.2-C: Barber Avenue Adjustments

4.2.2 Stormwater Drainage Works

Stormwater works proposed consist of:

- Barber Avenue pits and pipes, including adjustment of the connecting stormwater system within the Hospital Campus which conveys stormwater to the east, where it joins the Council stormwater network at Somerset Street (refer Green outline in Figure 4.2-C).
- Adjusted stormwater system to the northern area of Stage 2 works, which connects to the Council pit and pipe system in Barber Avenue (refer Orange outline in Figure 4.2-C).
- Stormwater system for Stage 2 building – which consists of the building footprint being directed to a combined On-site Detention and Rainwater tank and then connected to the main through-site stormwater system (refer Figure 4.2-H)

The proposed stormwater adjustments are shown in Figure 4.2-C.

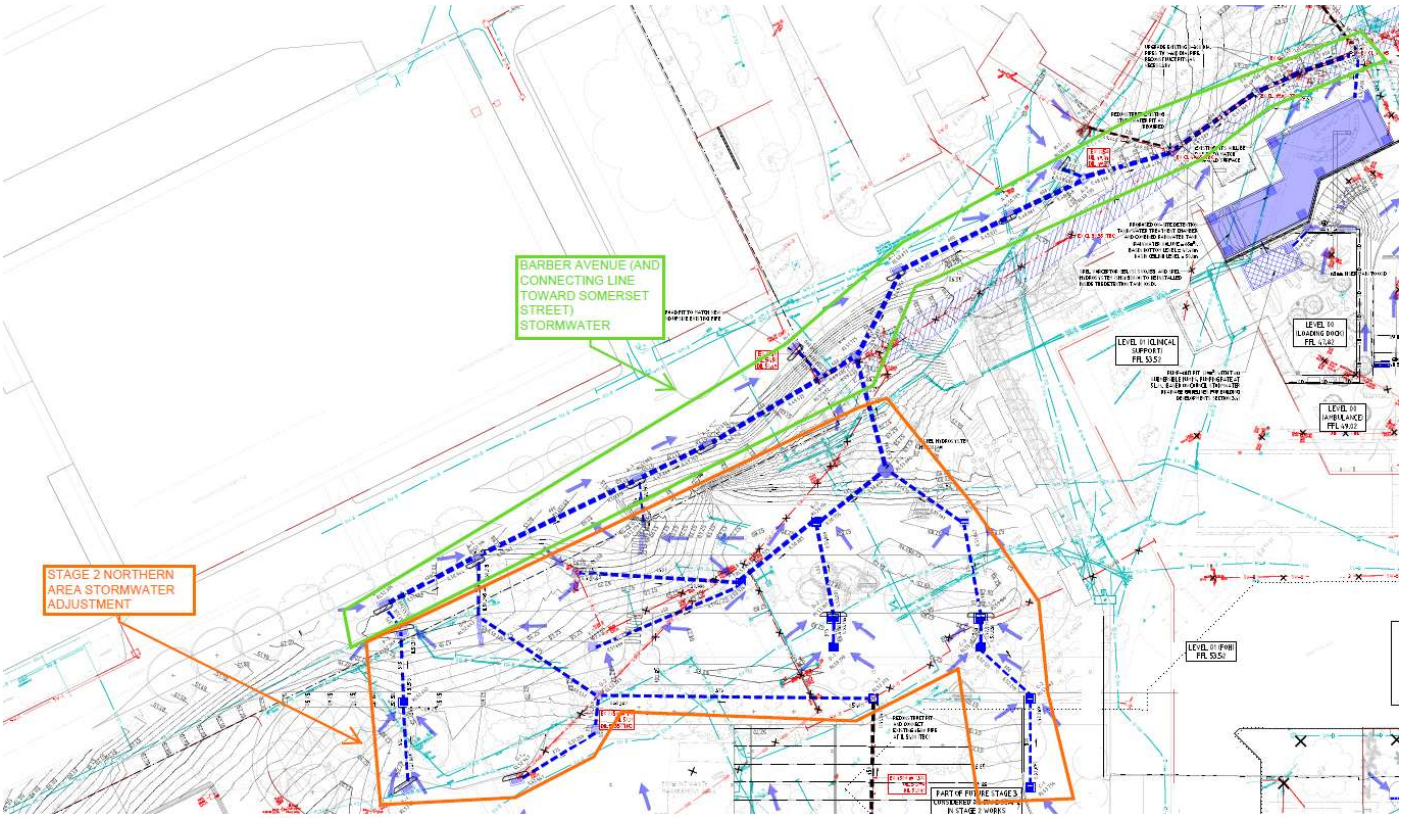


Figure 4.2-D: Stormwater Adjustments for Stage 2

Assessment of existing and proposed pervious/impervious areas within Stage 2 works has been undertaken. Figures 4.2-E and 4.2-F show existing and proposed layouts. Table 4.2-A details the change in impervious area.

Figure 4.2-E: Proposed impervious area analysis within Stage 2

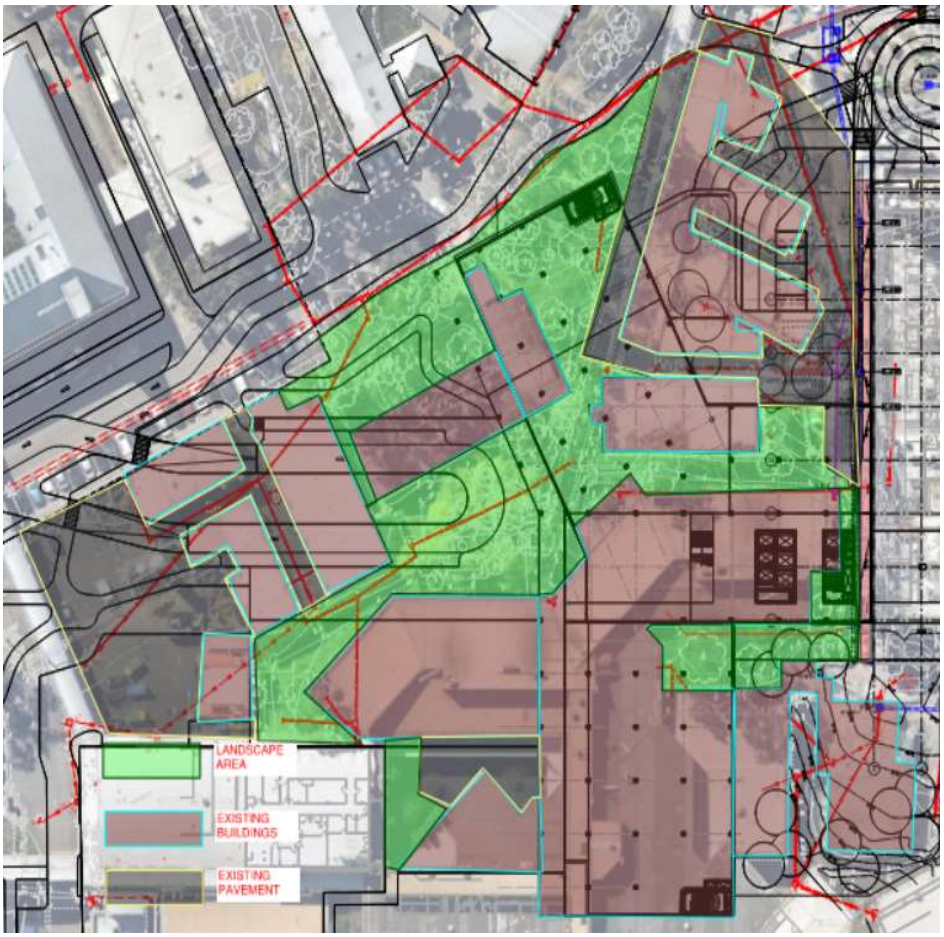


Figure 4.2-F: Existing impervious analysis within Stage 2

Area of Stage 2 works	**1.245 Ha.**	
Proposed Pervious area	**0.77 Ha**	
Proposed Percentage of impervious area		**38%**
Existing Pervious area	**1.02 Ha**	**(considering demountable buildings as pervious)**
Percentage of existing impervious area		**15%**

The proposed development results in an increase in impervious area when compared to the pre-developed site.

4.2.3 Diversion of Drainage Lines

The existing stormwater line traversing within the Stage 2 building footprint will be diverted to the west of Stage 2 building and will be connected to the existing stormwater line. The drainage system has been designed to accommodate the drainage requirements of the proposed Stage 2 works, and the diversions required for the construction stage. During the construction stage, the western diversion line will be constructed and connected to proposed stormwater line as shown in Figure 4.2-E below.

An assessment of the existing stormwater pits in the back-of-house loading dock area has been undertaken. Some of these pits require relocation.

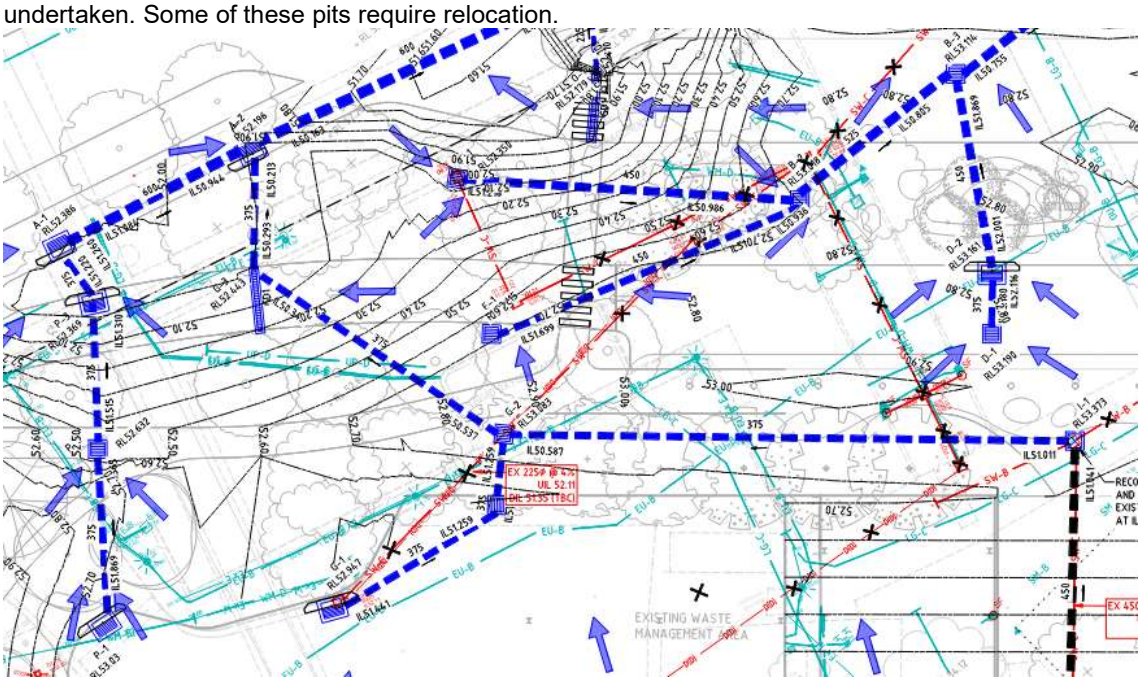


Figure 4.2-G: Diversion of existing stormwater lines from North Block

The proposed stormwater drainage and the diversion stormwater lines will be connected to the stormwater trunk drainage line which is located to the east of Barber Avenue. This line needs to be upgraded to safely convey stormwater flows from the proposed stormwater system. The proposed 600mm diameter stormwater line will adequately convey the diverted stormwater and the existing flows from the Barber Avenue pit and pipe system. This main stormwater line also carries flows east of Barber Avenue. An easement benefiting Council over this stormwater line is to be provided as part of Stage 1 works. Upgrade of this stormwater line and diversion of the upstream catchments will ensure the construction site and adjacent hospital operations do not experience any interruptions due to stormwater issues. Adjustment of the easement will be undertaken if required due to Stage 2 works (due to upgrade of the stormwater line, or to allow pit and pipe relocation based on the final landscape, architectural and services design).

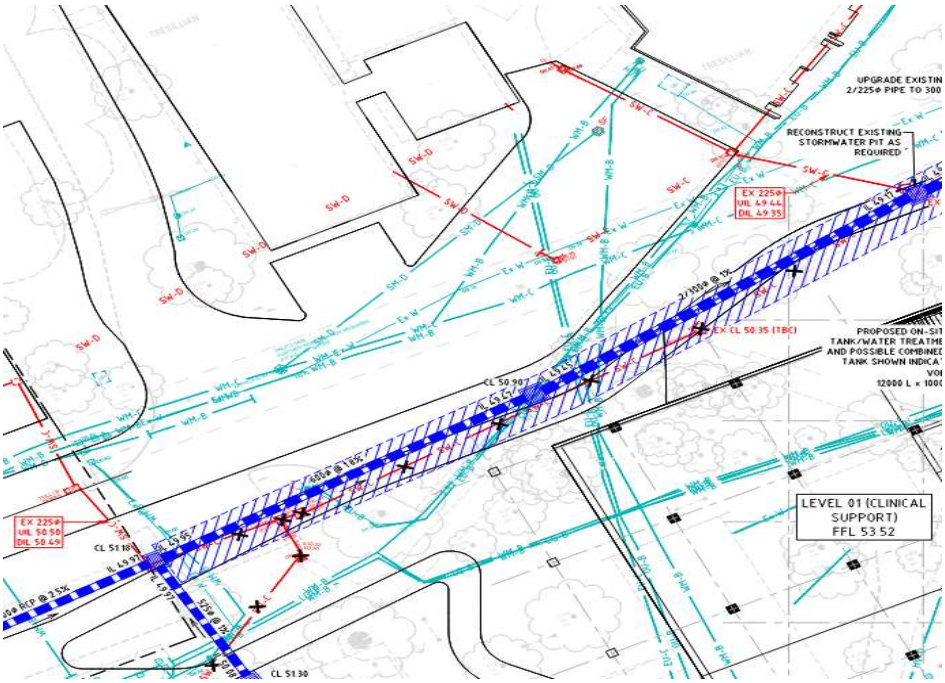


Figure 4.2-H: Proposed 600mm stormwater pipe to replace the existing 375mm pipe from the eastern end of Barber Avenue

Diversion of drainage lines may be undertaken as early works to enable the decommissioning of existing stormwater lines within the construction site. They will be integrated into the final stormwater drainage network at the completion of the works. The diversion stormwater strategy for the site is shown in Figure 4.2-G.

4.2.4 Stage 2 Courtyard

The Stage 2 courtyard works consist of landscaped areas, which drain to a stormwater pit and pipe network that will connect to the system constructed during Stage 1 works. A pedestrian path is proposed between North Block and Stage 1 and the overland flow path can be seen in Figure 4.2-I.

No stormwater pipeline diversions are required in the landscaped courtyard located between Stage 1 tower and north block. Existing stormwater lines in this area have been considered in the Stage 1 design. The design has been checked to make sure the underground pipe network has sufficient capacity to convey stormwater runoff from 20-year ARI event without causing any flooding in the area.

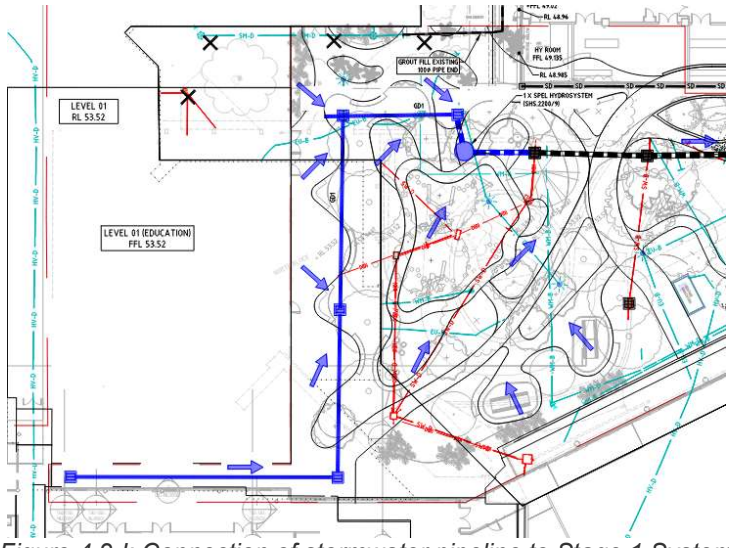


Figure 4.2-I: Connection of stormwater pipeline to Stage 1 System

4.2.5 Kitchen Loading Dock

The proposed kitchen loading dock is located at level 0 of Stage 2 tower. The apron of the dock is proposed to drain to a holding tank, with the finished floor level 0 at RL 47.82. This area will be pumped to the on-site detention tank, located adjacent the dock. The dock is mainly undercover, so the holding tank will not be subject to significant direct rainfall. A crest has been proposed at the start of loading apron to protect the loading dock from overland flooding. From this crest, the levels have been graded out toward the existing overland flow path. The ambulance bay is proposed at RL 49.02, and drains to the north toward the existing overland flow path. An emergency overland flow path is proposed adjacent to the Stage 1 building (highlighted in blue).

Discharge from the kitchen loading dock area is proposed to be captured via a network of stormwater pits and grated drains and conveyed through stormwater pipes to the northern stormwater easement, connecting to the existing stormwater trunk drainage line (Refer to Figure 4.2-H).

The ambulance bay and outlet from proposed OSD will also be connected to the existing stormwater pipe towards the north of the building- traversing parallel to Stage 1 and 2 towers, in a west to east trajectory.

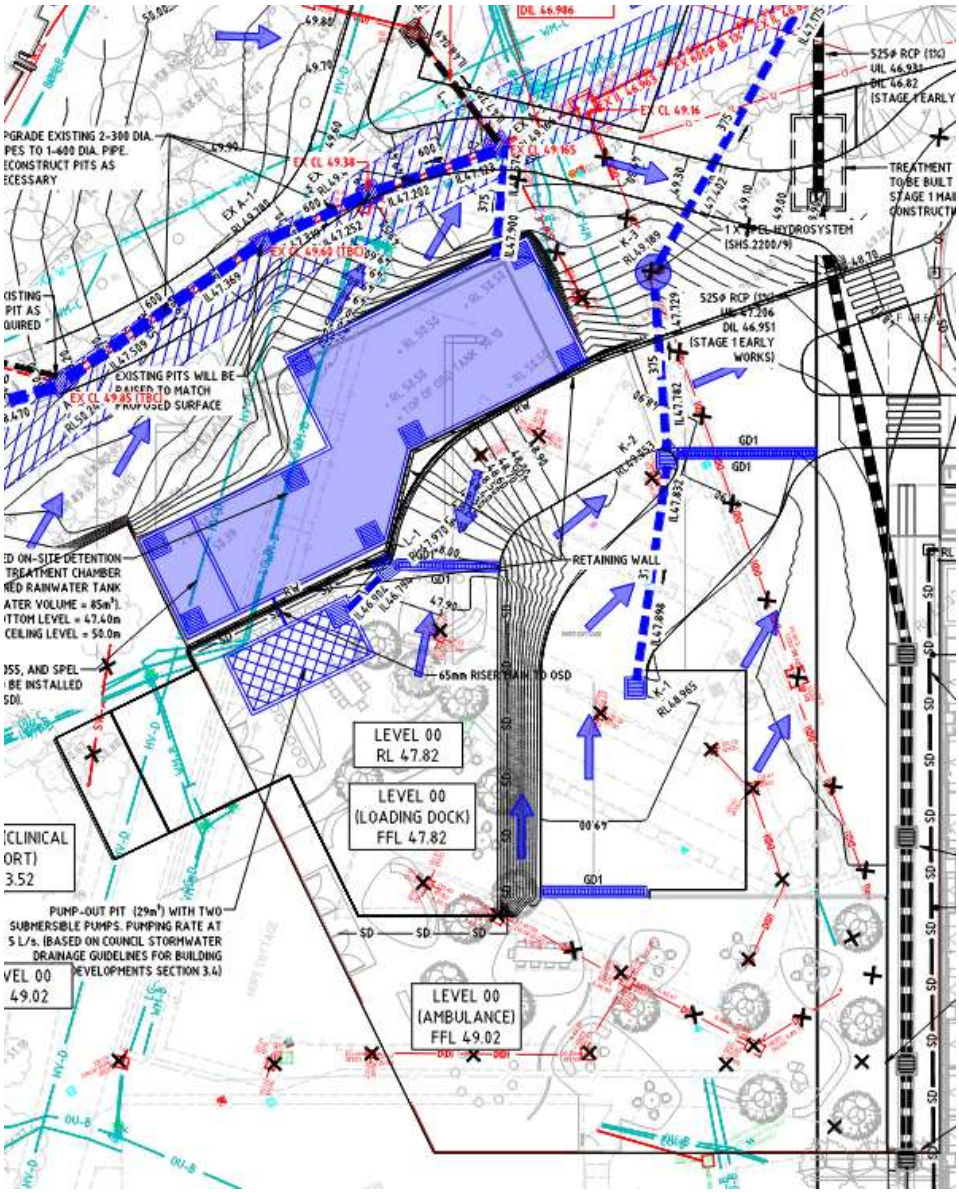


Figure 4.2-J: Stormwater drainage strategy for Kitchen Loading Dock

4.2.6 On Site Detention

A combined rainwater and OSD tank has been proposed to reduce peak stormwater discharge from Stage 2 tower and decreases the runoff from the developed site to less than the pre-development peak flow. The Drains schematic layout is shown below in Figure 4.2-I, with Table 4.2-A detailing the peak flows for the modelled scenarios (pre and post development, with and without On-Site Detention).

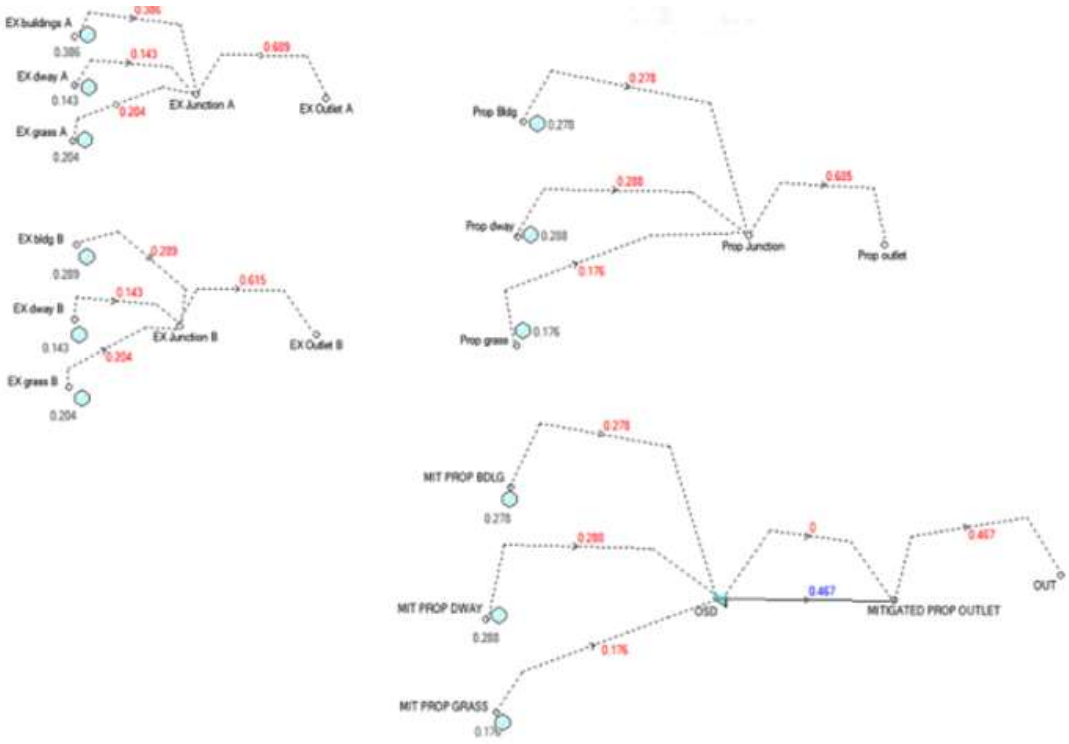


Figure 4.2-K "Drains" Schematic Layout

	Pre-Development	Post-Development (No OSD)	Post-Development (With 180m3 OSD)
Q100 flow (m3/s)	0.615	0.685	0.467

Table 4.2-A: Peak Discharge Results from the site (with and without OSD)

The combined rainwater tank and on-site detention volumes have been modelled in DRAINS with pre- and post-development scenarios incorporated.

A total volume of 180m^3 is required for On-Site Detention, along with 20m^3 of rainwater tank capacity to cater for irrigation demand of the site.

The provision of the nominated On-Site Detention volume limits peak post-development flows (which are increased from pre-development rates due to the increase in impervious area) to less than pre-development peak flows. This satisfies the requirements of Penrith City Council.

4.2.7 Stormwater Quality

The water quality treatment measure for the proposed Stage 2 Main Tower is designed to satisfy the requirements set by *Penrith City Council's Water Sensitive Urban Design (WSUD) Policy, December 2013*. The water quality targets set by *Penrith City Council's WSUD policy are* provided below:

- Reduction of Mean annual Load of Gross Pollutants – 90% (greater than 5mm)

- Reduction of Mean annual Load of Total Suspended Solids – 85%
- Reduction of Mean annual Load of Total Phosphorous –60%
- Reduction of Mean annual Load of Total Nitrogen – 45%

The proposed strategy provides water quality measures specifically for the new tower and associated infrastructure. The proposed water quality strategy for the site is described in detail below. Water Sensitive Urban Design measures have been incorporated in the proposed development in accordance with best practice (including providing, where possible, opportunity for infiltration of stormwater runoff).

Water Quality Strategy

The water quality treatment measures for the site are provided to reduce pollutant loads in accordance with Penrith City Council requirements. The water quality targets set by *Penrith City Council* will be adhered to.

The water quality strategy for the site incorporates a rainwater tank, OceanGuard pit baskets and stormfilter cartridges. The Stage 2 tower roof will be directed to a 20kL rainwater tank (for irrigation reuse only), with the overflow to a detention tank with a stormfilter cartridge chamber for treatment. Locations of downpipes and connection to the proposed rainwater tank and any roof area that will bypass the rainwater tank will be coordinated with the hydraulic engineer.

There is an existing hardstand area where an overland flow path has been designed to bypass the stormfilter chamber. This area is to be treated by OceanGuard pit inserts, which are to be installed in the existing stormwater pits. The remainder of the hardstand area, including the front of house drop off area is captured and filtered by an OceanGuard in each stormwater inlet pit before passing through a Stormfilter chamber to meet Council's water quality targets.

The treatment train operates as a complete system removing the target pollutants to the required level. The results of modelling have confirmed the effectiveness of the proposed treatment train which satisfies the requirements of Penrith City Council's Water Sensitive Urban Design (WSUD) Policy, December 2013.

The proposed stormwater layout which incorporates the water quality treatment train can be seen in in Figure 4.2-J.

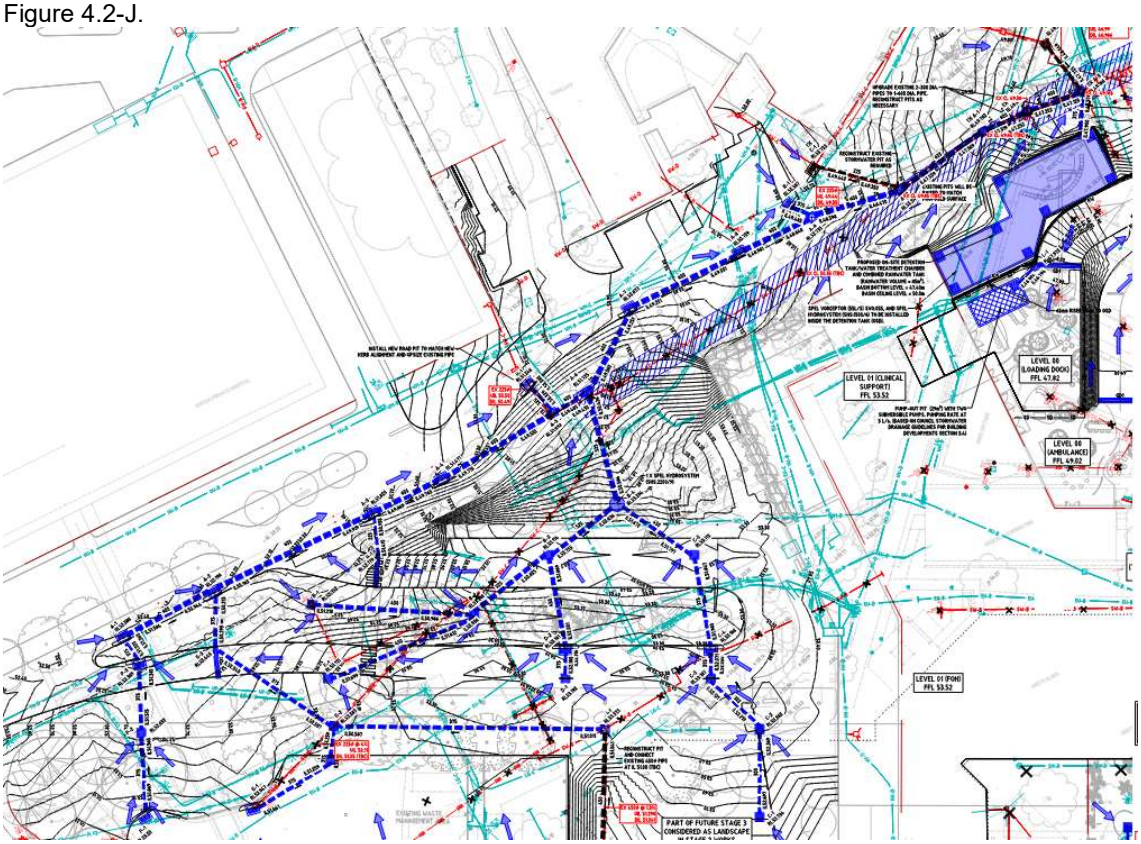


Figure 4.2-L:Proposed stormwater layout.

Water Quality Model

The *MUSIC* model was established using Penrith City Council's *MUSIC link* as per *Section 4* in *WSUD Technical Guidelines, June 2015*. A screen shot of the Music model representing the site is provided below in Figure 4.2-K.

The Pollutant generation parameters for the site are as per Penrith city Council's WSUD Technical Guidelines.

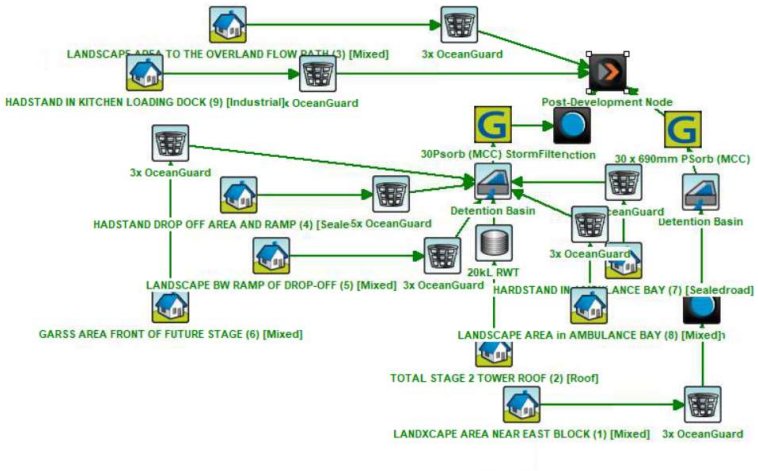
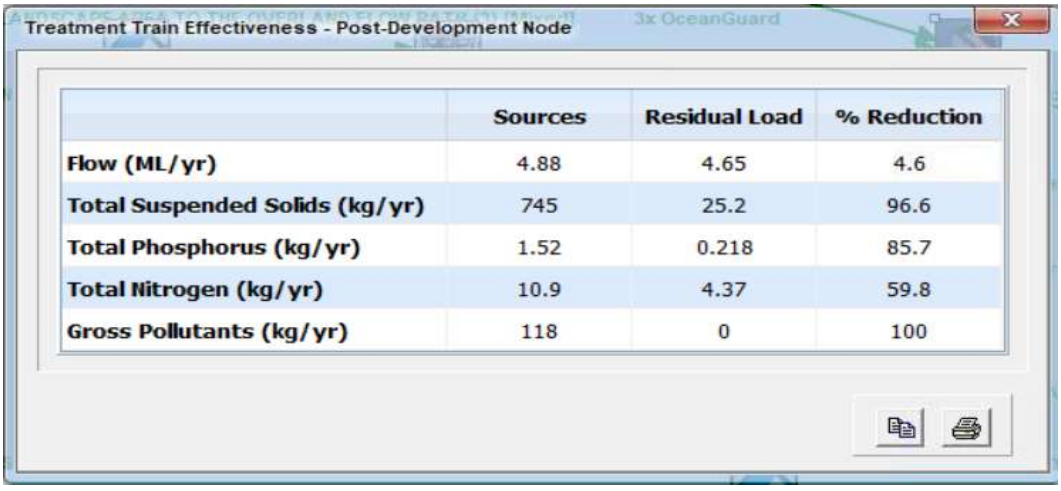


Figure 4.2-M: A Schematic diagram of the Music Model showing proposed scenario

Water Quality Results

The results of MUSIC modelling show that the pollutant removal rate achieves pollutant reduction targets provided in beginning of Section 4.2.7. The results from the MUSIC model are shown below in **Error! Reference source not found.**L.



	Sources	Residual Load	% Reduction
Flow (ML/yr)	4.88	4.65	4.6
Total Suspended Solids (kg/yr)	745	25.2	96.6
Total Phosphorus (kg/yr)	1.52	0.218	85.7
Total Nitrogen (kg/yr)	10.9	4.37	59.8
Gross Pollutants (kg/yr)	118	0	100

Figure 4.2-N: Music model results

4.2.8 Earthworks

It is not intended that the earthworks extend significantly beyond the footprint of the new proposed building.

The concept bulk earthworks for the proposed Stage 2 tower and associated hardstand area are detailed on Figure 4.2-O. The proposed finished floor L00 for the Stage 2 tower is RL49.02 with the kitchen loading dock FFL at 47.82.

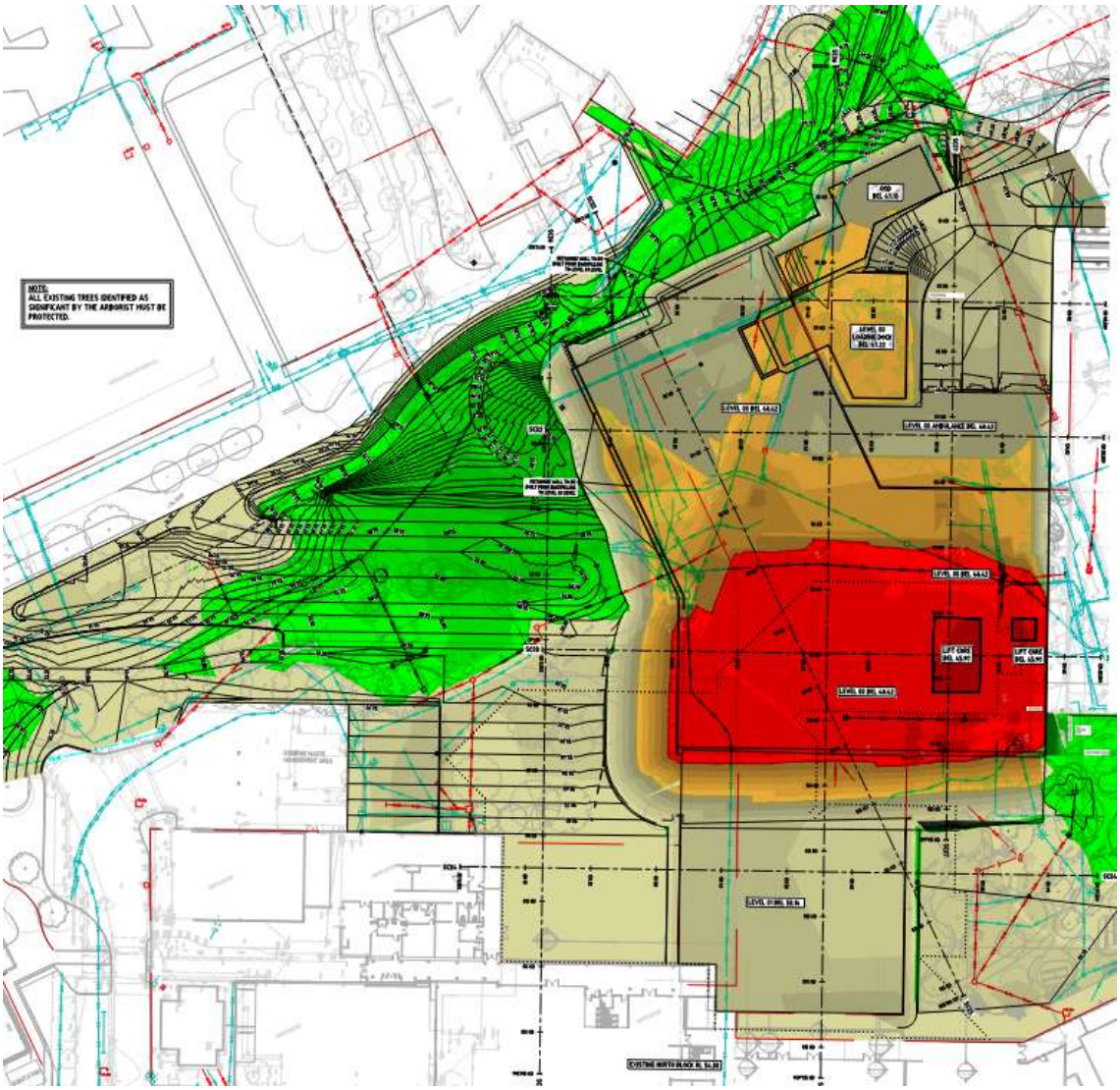


Figure 4.2-P - Bulk Earthworks Plan

For Stage 2 works, approximately 23,000 m^3 of cut volume and 3000 m^3 of fill volume is estimated as bulk earthwork quantities. A portion of the east block courtyard was included during Stage 1 temporary works where it was turfed-temporarily, however additional works will be required to complete this area during Stage 2. Some earthworks works will be required to Barber Avenue to allow for new front of house access and traffic flow in the revised road layout.

4.2.9 Soil and Water Management

A Soil and water management plan will be implemented during construction. The design of these measures is in accordance with the Landcom “Blue Book”. Refer Civil Drawings in the Appendix.

In general, where there is less than 150m^3 per year of soil loss, the building of a sediment retention basin can be considered unnecessary (Section 6.3.2 “The Blue Book”). Nonetheless, the excavation of the Stage 2 Tower may act as a sediment basin to provide an opportunity to further improve water quality. Additionally, the following measures are provided to minimise the risk of sediments being washed into neighbourhood property and erosion of the site.

- A sediment fence/catch drain (or diversion bund) around the site
- Sandbag/Geotextile pit filters to be placed at stormwater inlet pits
- Temporary access to site with shaker pad
- An indicative stockpile area with sediment fence around it during construction. The stockpile must be located out of water flow paths (and be protected by earth banks/drains as required).

4.2.10 Design Standards

The civil design is in accordance with the latest revision of all relevant Australian Design Standards, Codes and other statutory requirements. As a minimum requirement, the design shall be based on but not limited to:

Table 4.2-B - Civil Design Guidelines and Standards

Design Element	Guideline or Standard
Site Grading	• AS1428.1:2009 Design for Access and Mobility Part 1: General Requirements for Access – New Building Works • Penrith City Council's Development Control Plan • AS2890.2 – Parking Facilities Part 2: Off-street commercial Vehicle facilities • AS2890.6 – Parking Facilities: Off-street Parking for People with Disabilities • Kingswood Public Domain Manual
Stormwater Management	• AS3500 Plumbing and Drainage Part 3 – Stormwater Drainage • Australian Rainfall and Runoff • Penrith City Council's Development Control Plan • College, Orth, and Werrington catchment overland flow flood study
Erosion and Sediment Control	• Soils and Construction Volume 1 (4th edition), Landcom, 2004

Appendix A – Civil Engineering Drawings