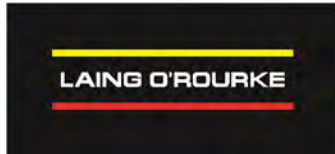


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UNIVERSITY OF SYDNEY HEALTH PRECINCT STAGE 1 REDEVELOPMENT

Civil Design Report for SSDA

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Reviewer: John Williams

A handwritten signature in blue ink, appearing to read "J Williams", written over a horizontal line.

Report no: 2021876A

Rev B

For SSDA

Date:

14 July 2017

Report Amendment Register

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APPENDICES

Appendix A	Stormwater Concept Plan
Appendix B	Sediment and Erosion Control Plan
Appendix C	Architectural Plan DA18-001 (GA Level 0) and Landscape Plan (Stage One Plan)

1 INTRODUCTION

Consent is being sought for a State Significant Development for a new Faculty of Health building. The proposed building falls within the Health Precinct and is located adjacent to Royal Prince Alfred Hospital (to the west), Bosch 1B (to the south) and Bosch 1A (to the east). The site is currently occupied by the Blackburn Building. Sydney University Oval number 1 grandstand is located to the north of the proposed building. The proposed building is Stage 1 of the Health Precinct redevelopment.

2 SCOPE

2.1 CIVIL WORKS

The proposed civil works will include documentation for:

- Erosion and sediment control
- Demolition
- Drainage works for the site (including diversion of existing stormwater assets)
- Site works.

2.2 SSDA SUBMISSION

The following drawings are included in this SSDA submission:

- Erosion and Sediment Control Plan. Refer to Appendix A (Drawing Nos. 202187601C C005, C006 and C007)
- Stormwater Drainage Concept Plan Refer to Appendix A (Drawing No. 202187601C C020)

This report relies on the following reports (which have been reviewed and accepted as a basis of design in relation to flood assessment)

- WMA Water – University of Sydney Camperdown Campus Flood Mitigation Master Plan (October 2015)
- Warren Smith and Partners University of Sydney Camperdown Campus Stormwater Concept Design Report (December 2015)

3 DESIGN CRITERIA

3.1 BASIS OF DESIGN

The design of the civil works for the SSDA submission has been based on:

- Architectural Layout of the building and site prepared by BLP
- Landscape Design prepared by Arcadia
- Survey by RPS
- University of Sydney Campus Infrastructure & Services Standards

3.2 DESIGN CRITERIA AND STANDARDS

The design criteria and standards for the civil works include:

- Stormwater design in accordance with Australian Rainfall & Runoff
- City of Sydney guidelines including
 - o Sydney DCP 2012
 - o Interim Floodplain Management Policy (2014)
- Australian Standards
- Austroads Design Guides
- Sydney Water policies and requirements
- Landcom's Publication - Managing Urban Stormwater: Soils and Construction (the "Blue Book")
- University of Sydney Campus Infrastructure & Services Standards
- Warren Smith and Partners – Camperdown Campus Stormwater Concept Design Report (December 2015)
- WMA Water – University of Sydney Camperdown Campus Flood Mitigation Master Plan (October 2015)
- SEARs (SSD 7974)
- Stage 1 (CIP) Consent (SSD 6123) Condition B29

4 EXISTING SERVICES

All existing services located adjacent to, or within the proposed location of the Stage 1 Health Precinct building, that may be affected by the development are to be:

- Capped, sealed and removed, if redundant or
- Isolated and diverted if being retained

All works associated with capping, diverting or connecting to Sydney University infrastructure shall be coordinated with Campus Infrastructure Services (CIS) prior to any works being carried out. These works are to be coordinated with any enabling works.

5 STORMWATER

5.1 EXISTING DRAINAGE

The existing site generally falls from the south to the north. There is a trapped low point at the southern edge of the Stage 1 site (the existing loading dock servicing Bosch 1B). There are a number of stormwater pits on the south side of the existing Blackburn building (refer Figure 5-1). These pits will be demolished to allow construction of the new building (as the existing loading dock servicing Bosch 1B is to be retained, the stormwater pits will be reconstructed).

There are significant overland flowpaths that convey stormwater through the site from the south (St. Andrews Oval) to the north (University Oval Number 1). The existing Blackburn building has stormwater connections to the existing system to the east of the building. There is a courtyard within the existing building that has drainage connections under the building to the east. The lowest internal floor level of the Blackburn building is lower than the ground surface level at the building entrance.

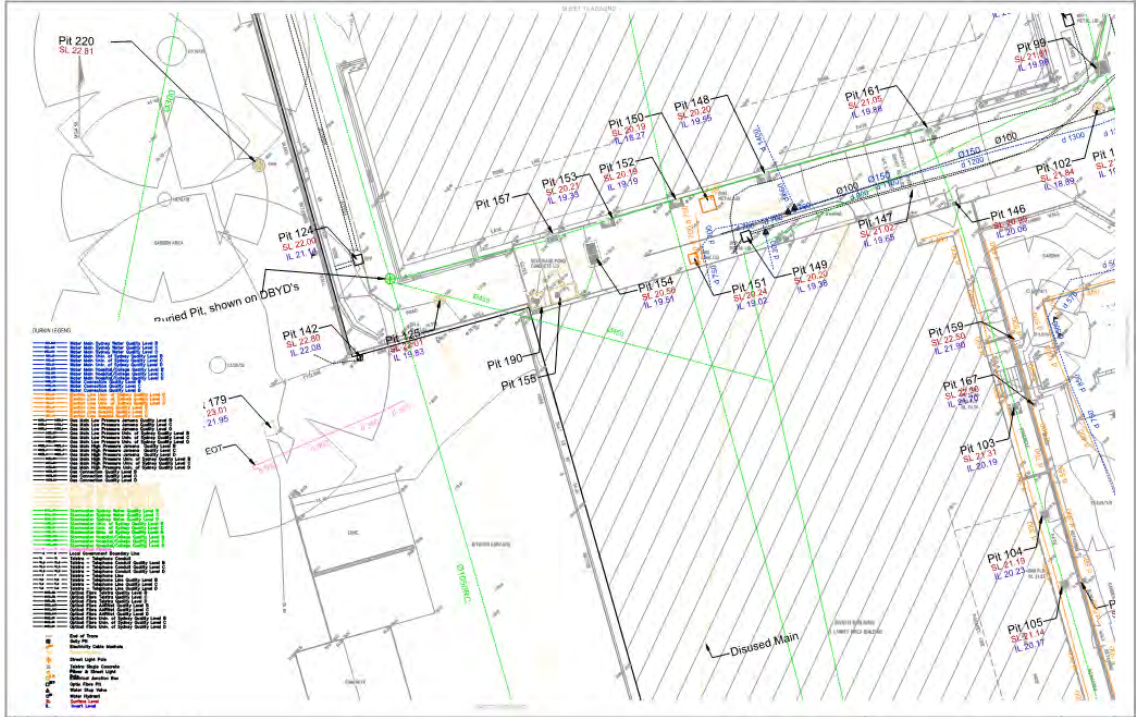


Figure 5-1 Site Survey – South side of Site (Source: RPS Sheet 10)

There are two Sydney Water assets identified on the survey within the site.

- A 1200mm diameter concrete pipe is located to the west of the existing building. This pipe falls from the south to the north. This is to be maintained and protected during construction of the new building.
- A 900mm diameter concrete pipe is shown passing beneath the existing Blackburn building (green line in Figure 5-2). Initial investigations indicate that this pipe may not be conveying water through the site (advice provided by University of Sydney and Warren Smith and Partners staff at a drainage meeting in June 2017). The pipe is noted as starting just south of the site (information provided by survey – it is believed that this was obtained from Dial-before-you-dig services search). Further investigation of this pipe is required to determine whether it can be capped and made redundant or whether it needs to be maintained and protected.

The site survey also identifies a stormwater pipe passing through the north west corner of the site. Advice provided by University of Sydney and Warren Smith and Partners staff at a drainage meeting in June 2017 indicates that this stormwater pipe does not exist or is not conveying water. Further investigation of this pipe is required.

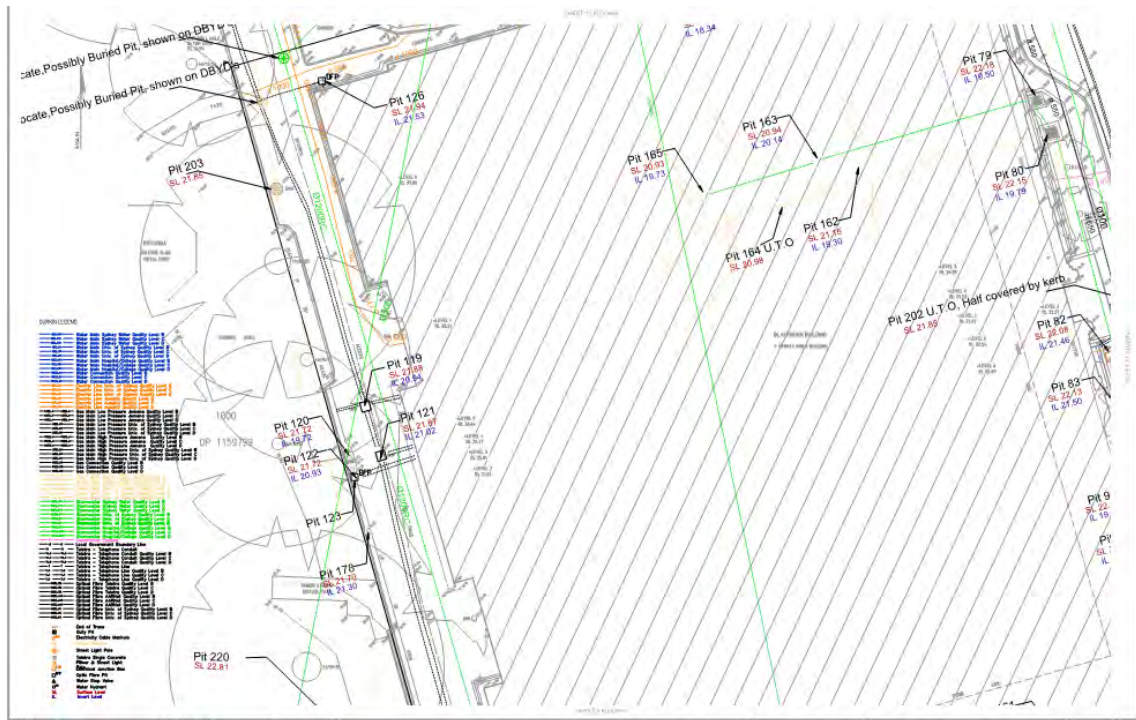


Figure 5-2 Site Survey – North side of Site (Source: RPS Sheet 10)

5.2 FLOODING

Bonacci has relied on the WMA Water - University of Sydney Camperdown Campus Flood Mitigation Master Plan and the WMA Water – University of Sydney Flood Risk Management Stage 1 – Flood Study Review to develop a flood strategy for the site. The site is affected by flooding, as described in WMA Water Flood Study, with flood flows passing around the existing Blackburn building. The campus wide strategy detailed in the Flood Mitigation Master Plan requires the redevelopment of the health precinct to maintain existing flowpaths (refer extract in Figure 5-4, noting the yellow hatched areas which represent the six metre wide west-east flowpath and the ten metre wide south-north flowpath).

The proposed building layout has allowed for more flood conveyance than the flowpaths nominated in the WMA reports (detailed in Figure 5-4), with a flowpath through the sub-floor space (south to north) approximately twenty metres wide. In addition to this, the proposed building edge is approximately one metre east of the existing Blackburn building, allowing additional conveyance to the west of the site.

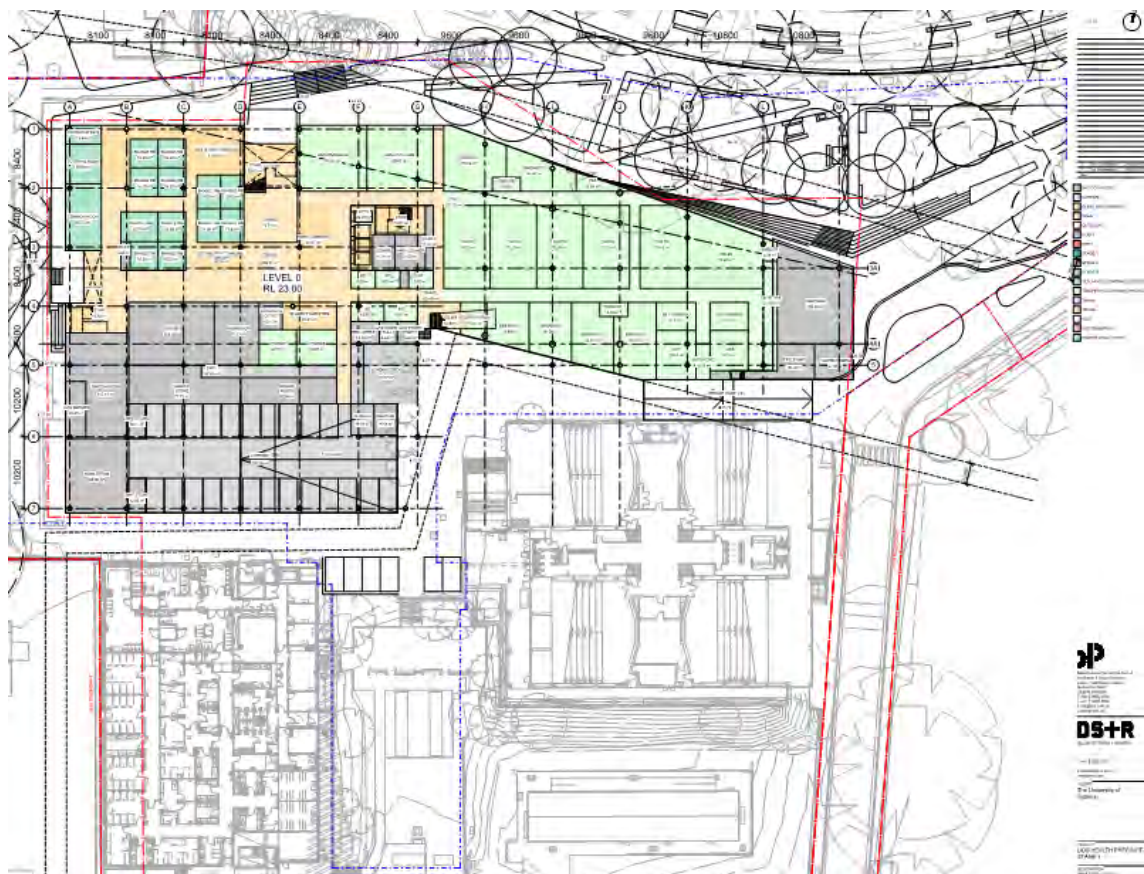


Figure 5-3 Stage 1 Area Plan – Level 0 (Source: BLP/DSR Architects)

The survey identifies the existing Blackburn building floor levels as:

- RL 20.24m AHD (Level 1)
- RL 21.23m AHD (Level 2)

which are below the adjacent ground surface levels (which are approximately RL 21.90m AHD to the west and RL 22.1m AHD to the east. It is proposed to demolish the existing Blackburn building, which will require excavation below the existing building floor levels. The excavated level can be retained below the proposed building floor level and utilised as a sub-floor flood flowpath. This area will also provide flood storage.

This will alleviate any increase in flood level to the RPA land as a result of the Stage 1 redevelopment.

Level 0 of the proposed building has been set at RL 23.00m AHD. This is above the existing 1% AEP flood level (which is approximately RL22.5m AHD at the south east corner of the site, where the loading dock entrance is located). The floor level complies with the City of Sydney Flood Planning Level Requirements which specify that "Floor level of a business, schools and child care facilities are subject to merits approach with a minimum of the 1% AEP level).

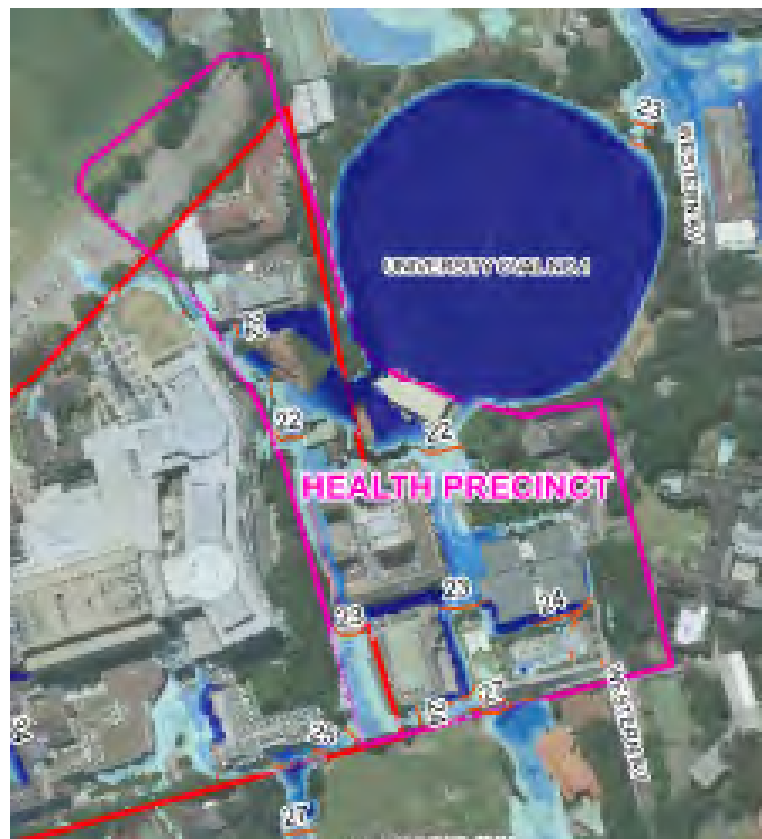


Figure 5-4 Site 1% AEP Flood Levels (Source: WMA Water Flood Study)

It is anticipated that the sub-floor flowpath will only discharge to the north of the site in major events (the 1% AEP event). The proposed flowpath under the new building Floor Level 0 will discharge through an opening on the north side of the site. For lower intensity storm events, water may pond at the low point to the south of the site (as in the existing situation). This may overflow to the sub-floor space, where it can be stored (replicating the existing situation, whereby the health precinct provides flood storage as modelled by WMA Water). Minor sub-floor drainage pits and pipes will allow this area to drain once the downstream hydraulic grade line is low enough.

The intention for the Stage 1 health precinct redevelopment is to maintain the existing drainage conditions around the site as far as possible, in order to minimise any risk of causing adverse flood impacts. The implementation of an enhanced stormwater overland flow path (reducing the building blockage by moving the building extent to the east in addition to providing the sub-floor space flowpath) further reduces flooding impacts in the area.

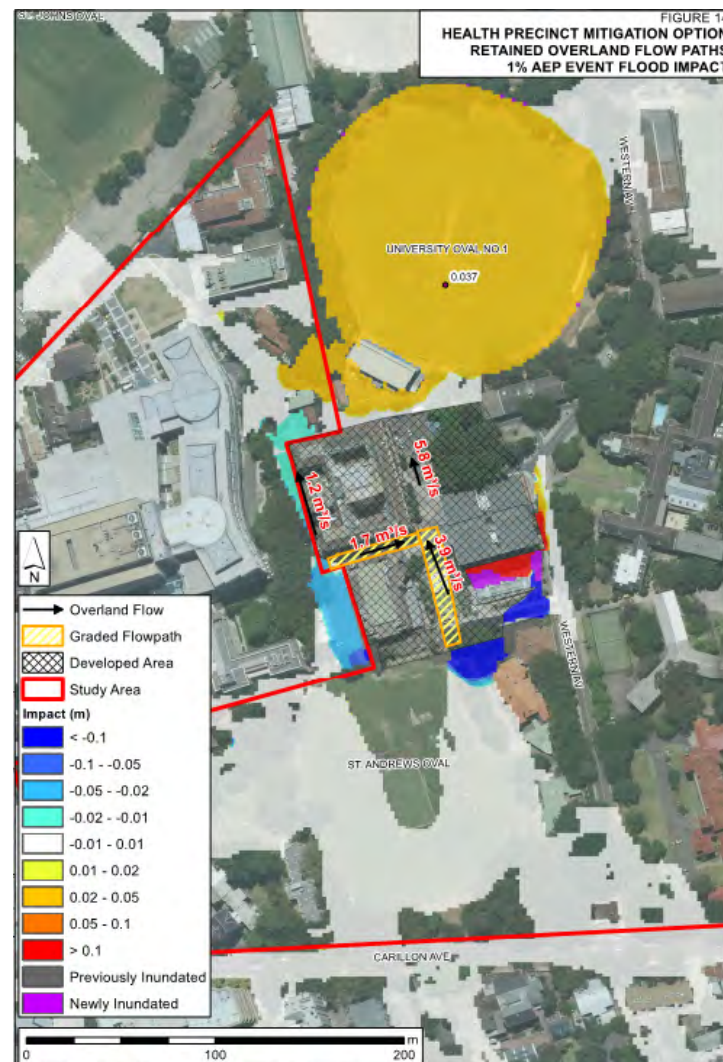


Figure 5-5 WMA Water University of Sydney Camperdown Campus Flood Mitigation Master Plan (Figure 14 Health Precinct)

5.3 CONCEPT STORMWATER DESIGN

The concept stormwater drainage design has been provided in accordance with the requirements of the City of Sydney, Sydney Water and Australian Standard 3500.3 Plumbing and Drainage. The key drainage criteria include:

- Minor drainage system capturing and conveying the 5% AEP
- Minimum pipe grade of 1%
- Minimum pipe diameter of 225mm
- Minimum fall through a pit of 20mm
- Pipe material to be steel reinforced concrete pipe

The stormwater strategy incorporates diversion of the existing 525mm diameter stormwater to the east of the existing building, maintenance/enhancement of the existing overland flow paths through the site (by utilising sub-floor space under Level 0 of the proposed building), capture and reuse of roof water in a rainwater tank and podium drainage as required to capture and convey stormwater through the site.

Refer to Appendix A Stormwater Drainage Concept Plan (Drawing 2021876 01C – C020).

5.4 ON SITE DETENTION (OSD)

The WMA Water – University of Sydney Camperdown Campus Flood Mitigation Master Plan has identified a methodology to facilitate the redevelopment of Sydney University land. This methodology has been accepted by Sydney Water and involves mitigating the affects of development via a campus-wide strategy. As a result, on-site detention is not required for this site.

5.5 WATER QUALITY

The Warren Smith and Partners University of Sydney Stormwater Concept Design Report notes “it will not be practical to achieve the City of Sydney reduction percentages for each project due to site constraints”.

The site stormwater strategy incorporates Water Sensitive Urban Design principles by allowing for infiltration opportunities where possible (through the use of deep landscaping elements on podium) and site roof runoff being captured and reused for irrigation from a central rainwater tank.

Incorporation of Enviropods where possible (in particular to the south side of the site adjacent to Bosch 1B loading dock and to the pit that takes the overflow from the rainwater reuse tank) is proposed.

MUSIC modelling was undertaken to assess the impact of the redevelopment on water quality (refer Figure 5-5). The results show that the redeveloped site approaches the City of Sydney water quality targets, and provides water quality benefit when compared to the existing site.

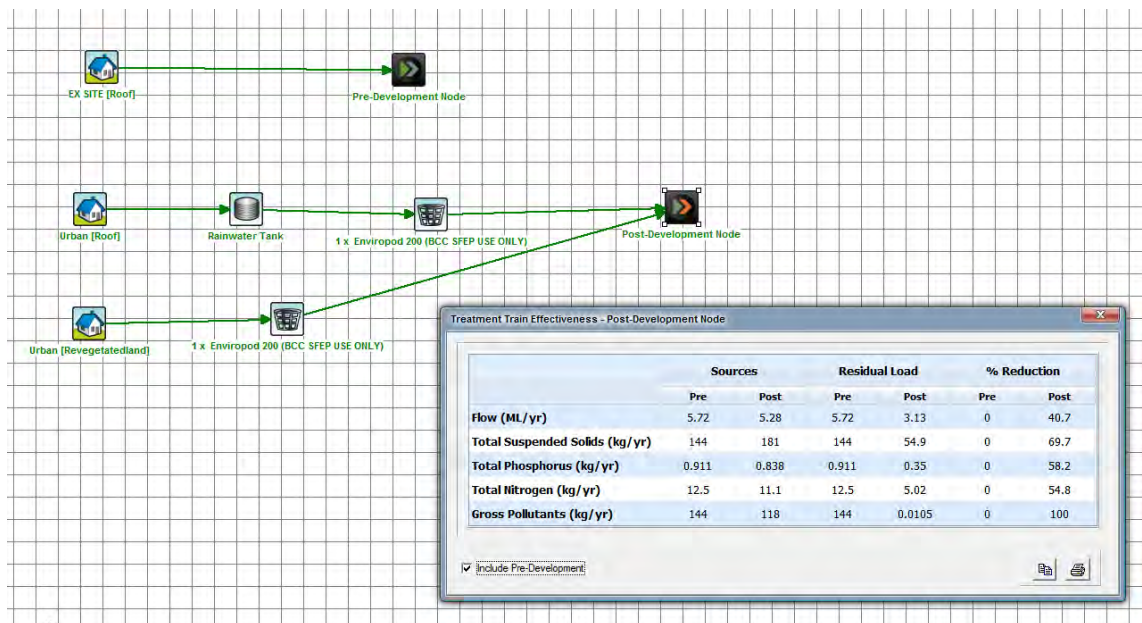


Figure 5-6 MUSIC Model Schematic Layout of Proposed Redevelopment (Including results)

5.6 SUSBOIL DRAINAGE

Sub-soil drainage will be provided to retaining walls, sub-floor space and podium planting/landscaping in accordance with structural engineer and landscape architect's requirements. The sub-soil drainage will discharge into the stormwater drainage system.

6 SITEWORKS

Siteworks will consist of:

- demolition of the existing Blackburn Building (including excavation and removal of existing footings) in accordance with an approval under Part 5 of the Environmental and Planning and Assessment Act (REF dated 14 February 2017). These works are part of a separate scope/approval process to the SSD Development Application. The existing level of the underside of structure for the lowest floor of Blackburn Building (noted as Level 2 with FFL of RL 21.23 on survey drawings) is approximately equal to the finished level of the sub-floor space (flood storage/flowpath level of RL 20.8).
- Excavation of the eastern side of the building (maximum depth approximately 2m, where the new building is adjacent Western Avenue) – refer architectural drawing DA18-0001 GA – Level 0 included in Appendix C. It is anticipated that approximately 1600m³ of cut will be required for the building.

- Stairs and ramp access on the west side of the new building – refer architectural drawing DA18-0001 GA – Level 0 included in Appendix C
- Interface to the existing surface to the north of the new building – refer architectural drawing DA18-0001 GA – Level 0 and Landscape Stage One Plan included in Appendix C

7 EROSION AND SEDIMENT CONTROL

A sediment and erosion control plan has been prepared in accordance with Landcoms *Managing Urban Stormwater: Soils and Construction Volume 1* (the “Blue Book”).

The erosion and sediment control measures have been designed to meet the requirements of the Blue Book – the Contractor will be responsible for confirming the design and phasing the installation of the measures to suit the construction staging.

Refer to Appendix B Sediment and Erosion Control Plan (Drawings 2021876 01C – C005, C006 and C007).

Appendix A – Stormwater Concept Plan

Project Name	UOS HEALTH PRECINCT STAGE 1		PRELIMINARY		
Drawing Title	Designed	RB	Project Director Approved	Date	North 
	Drawn	RB			
	Scale	NOTED	Project Ref	Drawing No	Rev
	Date	JUNE 2017	20 21876 01	C020	P1
	Sheet				