St John of God Richmond Hospital Redevelopment

Civil Schematic Design Report

Revision 1

Prepared By: Eve Wu

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Issued For: Schematic Design Report

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Report Amendment Register

Rev. No.	Issue/Amendment	Author/Initials		Reviewer/Initials		Date
0	Final Issue	Eve Wu	EW	Stephen Naughton	SN	04/12/2019
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Prepared by: Eve Wu

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Project No: 12056

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Discipline: Civil

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1. Introduction

Bonacci Group (NSW) Pty Ltd has been engaged by Silver Thomas Hanley (STH) to provide civil consultancy services for the proposed redevelopment on St. John of God Richmond Hospital (SJGRH).

This Schematic Civil Report outlines the proposed stormwater drainage network, new road/pavement works, and bulk earthworks associated with the redevelopment. This report also incorporates the water quality and quantity strategy for the site to treat stormwater runoff in accordance Hawkesbury City Council's (HCC) relevant requirements.

The following resources were used during our desk-top review:

- Existing Site Survey by Mark Castelletti Surveying, 20th June 2019
- Existing Services Survey by Mark Castelletti Surveying, 5th September 2019
- Hawkesbury City Council's Flood Extent Maps
- Dial Before You Dig (DBYD) enquiry
- NSW ePlanning Portal
- Clean Water Toolkit
- NSW Government Six Maps website https://maps.six.nsw.gov.au
- Near Maps website www.nearmap.com
- Proposed Overall Ground Floor Plan by Silver Thomas Hanley SJOG, 17th January 2020
- Hawkesbury Floodplain Risk Management Study & Plan – Flood Maps and Annotated Bibliography, December 2012

2. Site Description

2.1 Location

The proposed redevelopment is located at 177 Grose Vale Road, North Richmond, NSW and is part of Hawkesbury City Council. Entrance to the main site is via an access road (approx. 580m long) from Grose Vale Road. The surrounding terrain consists of natural landscape (cleared for grazing and other agricultural activity). Hawkesbury River is located 140m southeast from the main site. Refer to Figure 2-1 below for an aerial map image of the proposed redevelopment.

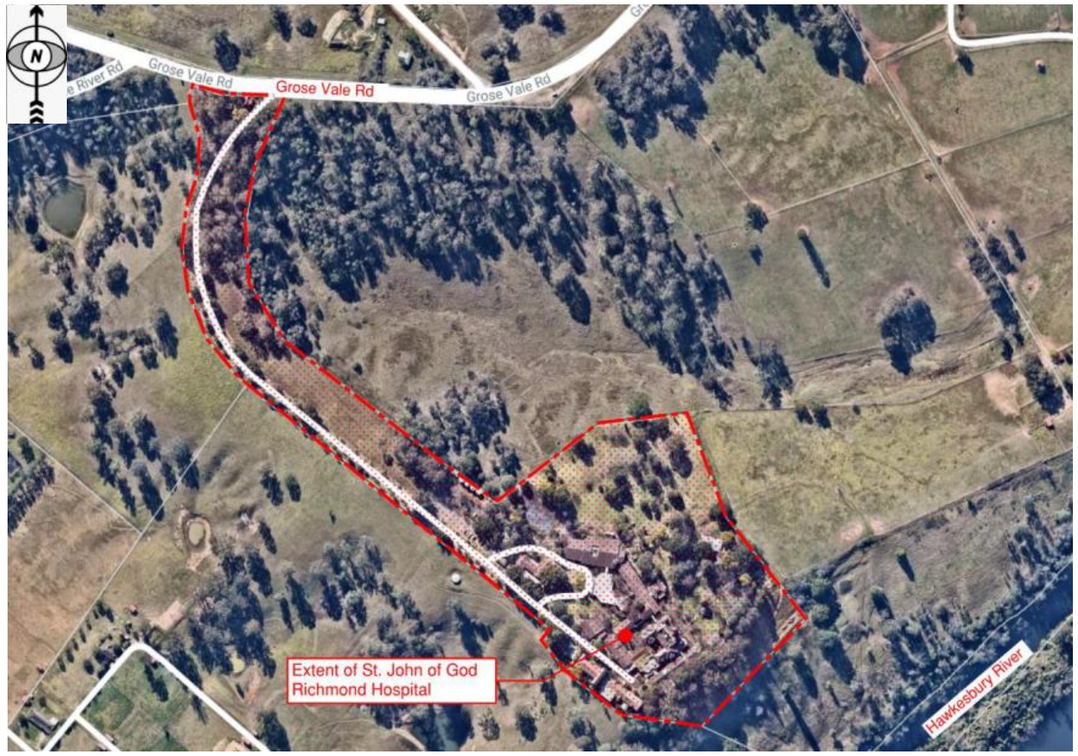


Figure 2-1 Aerial Image and Locality Map (Source: Nearmaps)

2.2 Existing Site Conditions

2.2.1 Topography

The site area is approx. 10 hectares in size. Based on the contour information from Six Maps (see Figure 2-2), the site is located on a ridge and not subject to an external upstream catchment. The site has a grassed steep batter along the southeast and northern boundaries.

Figure 2-2 Contour Diagram (Source: Six Maps)

2.2.2 Flooding

Based on the information from Hawkesbury City Council's Flood Extent Maps (see Figure 2-3a and Figure 2-3b), the site is located outside the 100-year Average Recurrence Interval (ARI) and Probable Maximum Flood (PMF) flood extents.

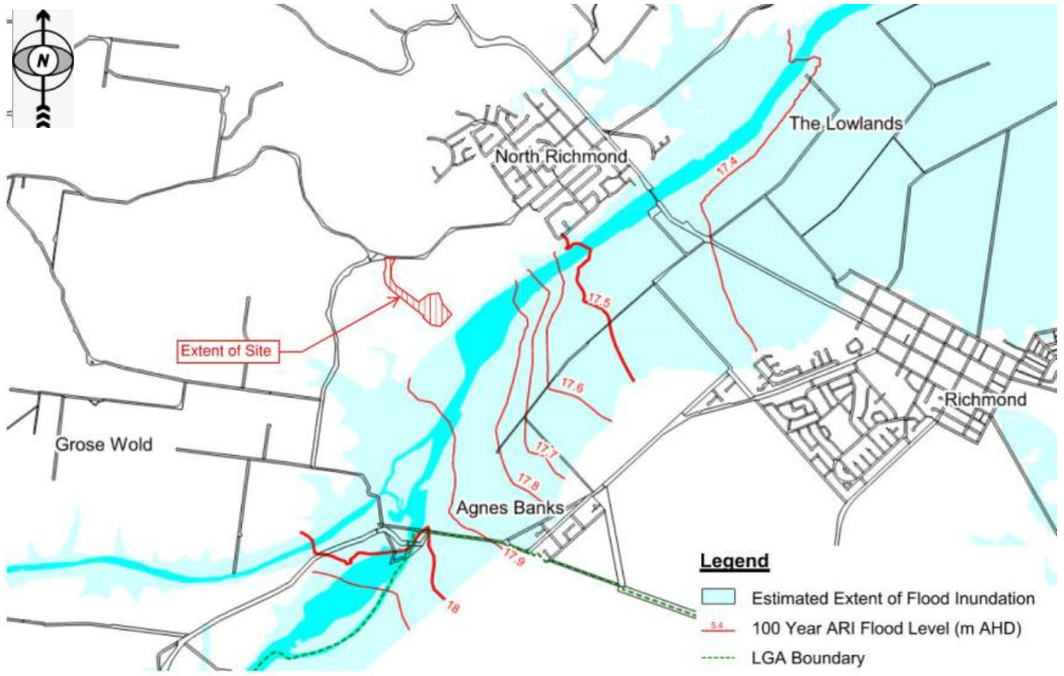


Figure 2-3a Hawkesbury Floodplain Risk Management Study & Plan – 100 Year ARI Flood Extent and Flood Level Contours (December 2012)

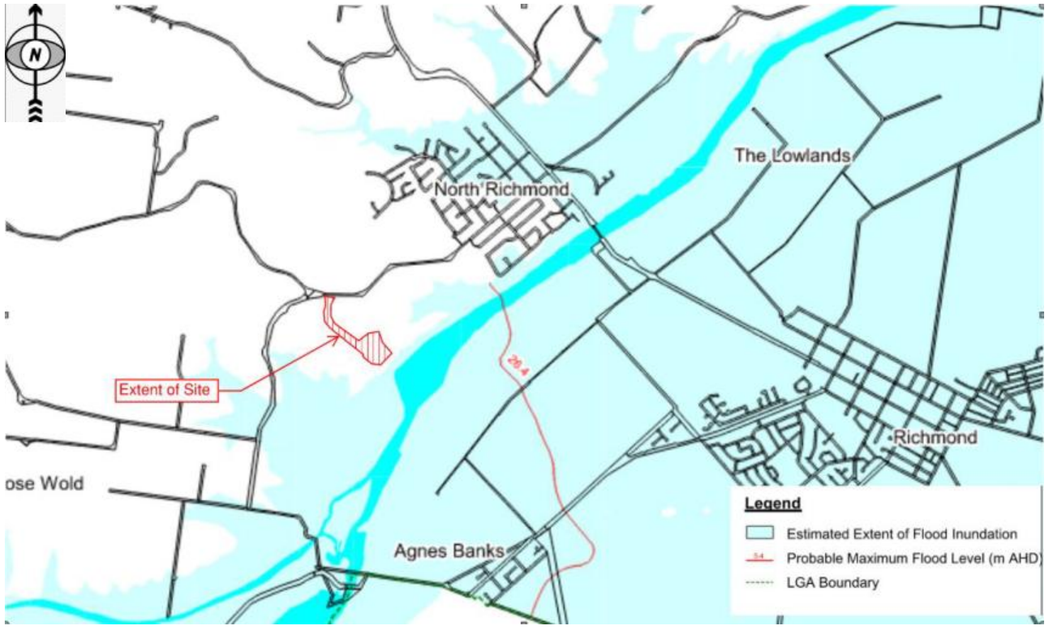


Figure 2-3b Hawkesbury Floodplain Risk Management Study & Plan – PMF Flood Extent and Flood Level Contours (December 2012)

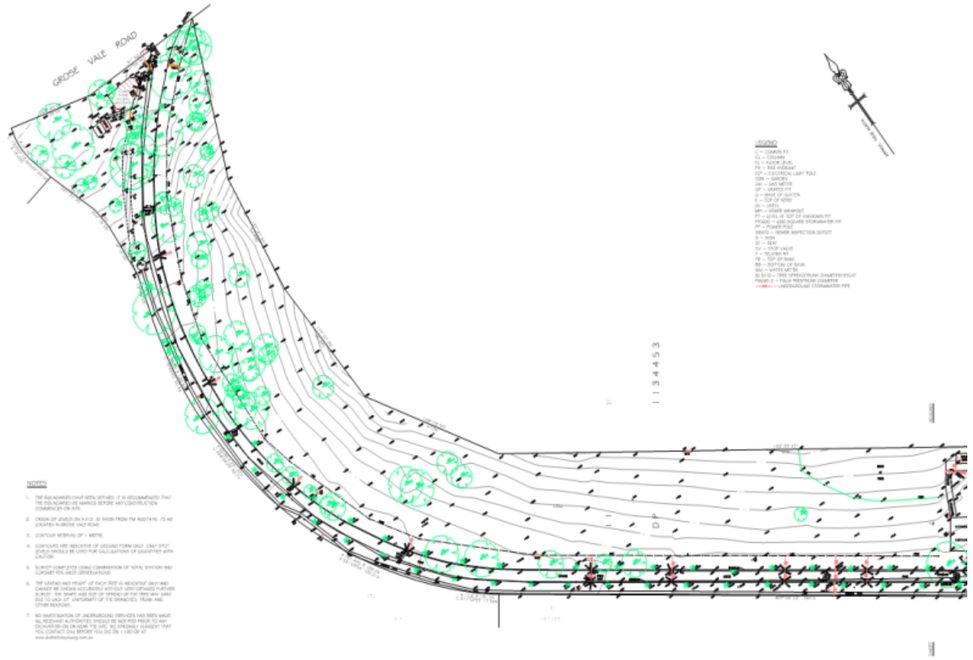


Figure 2-4 Detailed Survey – Internal Access Road (Source: Mark Castelletti Surveying on 20.06.19)

2.2.3 Existing Stormwater Layout and Conditions

2.2.3.1 SJGRH Access Road from Grose Vale Road to Main Area

A site survey has been undertaken by Mark Castelletti Surveying on 11th September 2019 (see Figures 2-4). This survey shows 150mm uPVC pipe crossings at roughly 60m intervals along the bitumen internal access road from Grose Vale Road. Pits are located at these crossings to capture road runoff which ultimately discharge to the steep batter towards adjacent undeveloped land. The pipe crossings and pits appear to be in generally good condition based on site visit observations.

2.2.3.2 SJGRH Main Area

From the site survey (see Figure 2-5) and Six Maps contour information it appears the site is divided into two main sub-catchments. The northern portion of the site discharges north towards adjacent undeveloped land. The south-eastern portion of the site discharges southeast towards the Hawkesbury River. The proposed redevelopment is mostly contained within the southeast catchment.

Figure 2-5 Detailed Survey – Main Site Area (Source: Mark Castelletti Surveying on 20.06.19)

2.2.3.3 SJGRH Main Area Internal Site Drainage

The internal site drainage which consists of pits/pipes and brick channels are distributed within the hospital facility (see Images 2-6 & Image 2-7). A defined/completed network is not visible in the site survey.

Image 2-6 Existing Stormwater Surface Inlet Pit (Bonacci Site Visit on 17.09.2019)

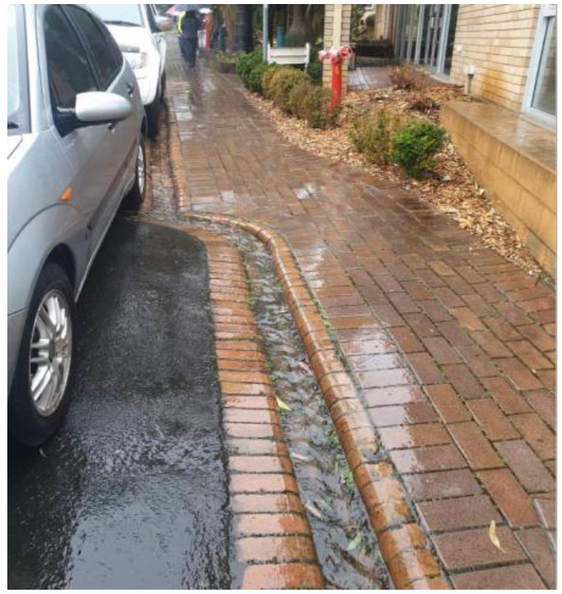


Image 2-7 Existing Brick Channel (Bonacci Site Visit on 17.09.2019)

2.2.3.4 SJGRH Main Area Stormwater Discharge

It appears the southern stormwater discharge point has been diverted to the east. See Image 2-8 which shows the uPVC diversion pipe intact with the headwall.

Image 2-8 Existing Headwall and uPVC Diversion Pipe (Bonacci Site Visit on 17.09.2019)

2.2.3.5 SJGRH Main Area Water Storage Tanks

There are existing water storage tanks located north of Xavier building (see Image 2-9). Note: On-site detention and water quality control devices/measures were not identified in the survey or during the site visit.

Image 2-9 Existing Water Storage Tanks (Bonacci Site Visit on 17.09.2019)

2.3 Existing Overland Flow Path

Based on the existing survey information and the recent site visit observation, the existing overland flow is from Grose Vale Road and along the internal access road kerb and gutter and discharges to the undeveloped bushland in the southeast towards Hawkesbury River direction. Refer to Figure 2-10 for the existing overland flow path in red arrows.

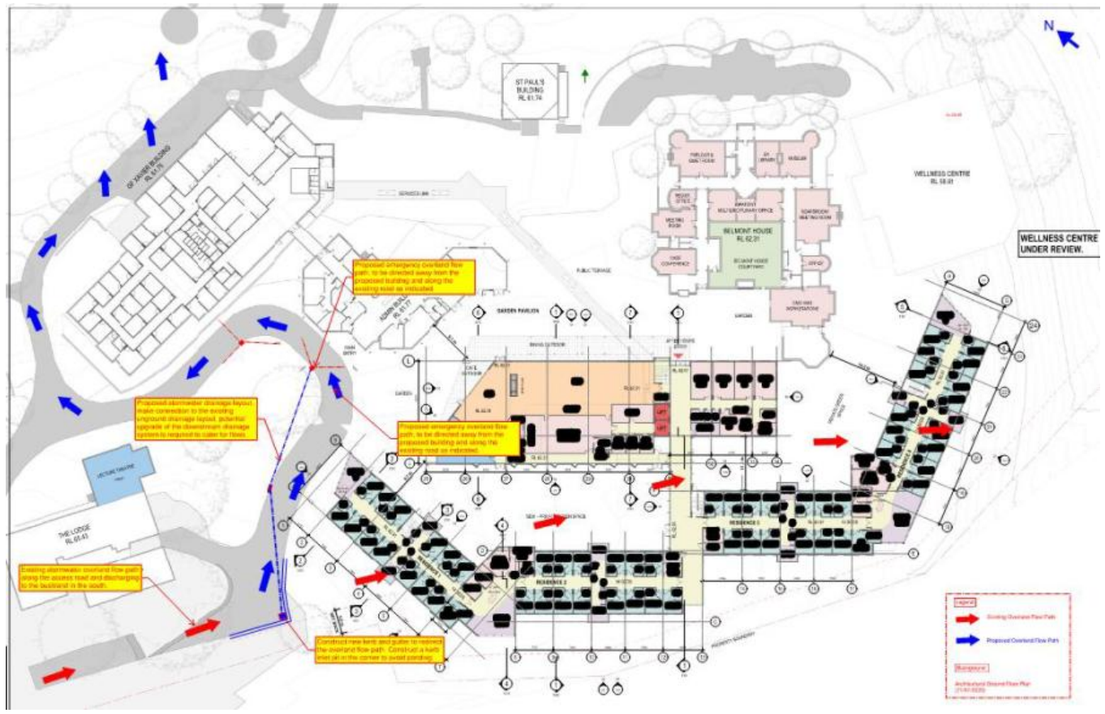


Figure 2-10 Existing and Proposed Overland Flow Path

As it can be seen the existing overland flow path is blocked by the proposed buildings. New overland flow path shall be provided along the existing internal road and towards the northern undeveloped land (flow arrows in blue). Redirecting the overland flow path can be achieved by constructing new kerb and gutter for a portion of the existing access road between Residence 1&2 and the stables. Refer to **Appendix B** for proposed overland flow path.

2.3 Existing Services

A DBYD enquiry has been undertaken and the results show utilities including electrical, water and telecommunication are located outside the site boundary on Grose Vale Road.

A Services Plan has been undertaken by Mark Castelletti Surveying on 05th September 2019. In addition to stormwater drainage lines, other services have also been identified within the site boundary including Telstra cables, underground electrical cables, communications cables, sewer main, above ground water valve etc. However, no underground water main has been recorded in the Services Plan.

A service and access easement is located on the south eastern corner of the site. Refer to the site survey on **Appendix A**.

2.4 Existing Pavement

The site consists of a mixture of asphalt (refer to Image 2-11) and concrete pavements. It is noted that the suitability of these pavement to service the redevelopment are to be confirmed with a geotechnical investigation. It is likely the existing internal road will be maintained existing mostly while southeast portion of the road shall be demolished to suit the proposed building footprint.

Figure 2-11 Existing Asphalt Pavement (Bonacci Site Visit on 17.09.2019)

2.5 Planning Schemes

2.5.1 Acid Sulfate Soils

Based on the NSW ePlanning Portal information, the site is located within a Class 5 Acid Sulfate Zone which indicates that acid sulfate soils are not 'typically found' in these areas. However, further geotechnical assessment will be required to confirm the soil conditions on site. See Figure 2-12 for NSW ePlanning Portal Acid Sulfate Map.

Figure 2-12 Acid Sulfate Soil Map (Source: NSW ePlanning Portal)

2.5.2 Riparian Lands and Water Courses

Based on NSW ePlanning Portal information, the site is not located within a riparian lands and water courses protection zone (See Figure 2-13).

Figure 2-13 Riparian Lands and Watercourses Map (Source: NSW ePlanning Portal)

3. Proposed Development

The proposed development comprises of the demolition of several existing buildings, construction of new buildings, refurbishing of the existing Xavier Building and Admin Building and expanding the existing car parking.

See Figure 3-1 for the Architectural Overall Ground Floor Plan (17/01/2020) by STH.

Figure 3-1 Proposed Overall Ground Floor Plan (Source: STH on 17.01.2020)

3.1 Earthworks

Bulk earthwork cut and fill will be required based on the level difference between the proposed Finished Floor Level (FFL) and the existing ground levels around the new buildings area.

3.1.1 Earthworks Cut

The proposed finished floor level (issued on 21/01/2020 by STH) for Residence 1&2 is set to be RL 62.91. The existing ground level around the proposed Residence 1&2 varies from RL 64.60 to RL 62.95 grading from northwest to southeast. Hence, it is anticipated there will be a bulk earthwork cut up to 1.9m with the maximum cut on the northwest corner of Residence 1&2.

3.1.2 Earthworks Fill

The proposed finished floor level for Residence 3&4 is set to be at RL 62.91. The existing ground level around the proposed Residence 2&4 varies from RL 62.50 to RL 59.00 grading from northwest to southeast. It is anticipated there will be bulk earthwork fill in the area of Residence 3&4. However, considering the south portion of Residence 3&4 will be on stilt, fill depth and extent shall be determined in detailed stage.

Refer to **Appendix B** for anticipated bulk earthworks plans and longitudinal sections based on the architectural plan layout issued on 10/12/2019. Geotechnical assessment is required to further determine the nature of earthworks which will report on aspects such as the suitability of the existing pavements and uncontrolled fill.

3.2 Drainage

In accordance with *Hawkesbury Development Control Plan Appendix E – Civil Works Specification (2002)*, the "Major/Minor" concept is adopted by the Council for urban drainage design. The Design Average Recurrence Intervals are as shown in Figure 3-2. The proposed development is required to install/upgrade the minor stormwater drainage system including pits, underground pipes and kerb and gutter to cater for storm events up to the 5-year Average Recurrence Interval (ARI). A preliminary stormwater layout is shown in **Appendix B** SK01. To be noted, the stormwater drainage layout is preliminary, other services plans (water, gas, fire, sewer etc) have been reviewed and further coordination is required in detailed design stage will be required to refine the stormwater drainage design.

It is preferable to maintain the existing points of discharge for the underground stormwater drainage system wherever possible, which is towards the undeveloped bushland in the southeast of the site. The discharge shall be via a level spreader and will ensure no nuisance flows enter neighbouring properties.

A major system is also required for the proposed developments in the form of overland flow paths. The major system should be designed to convey flows that exceed the capacity of the underground drainage system for storm events up to 100-year ARI. The overland flow is to be directed away from the building and car parking and towards the undeveloped bushland at the north and southeast boundaries. If adequate grade cannot be achieved for overland fl3.2 and ow path to be directed away from the building entrance, alternatively, the drainage system is to be sized to cater for major storm events up to 100-year ARI. See **Appendix B** for potential overland flow path.

Location	Minor System (Years)	Major System (Years)
Residential	5	100
Commercial/Industrial	20	100

Figure 3-2Hawkesbury City Council Design Average Recurrence Intervals

3.3 Water Quantity

In accordance with *Hawkesbury City Council Development Control Plan (DCP) Appendix E – Civil Works Specification*, a detention storage system is required on site for the mitigation of increased flows. Council has given two options for sizing the storage volume and site discharge flow rate:

- Option 1: On-site detention (OSD) is sized to ensure that the post-development peak flow rates for all recurrence intervals from 1-year ARI to 100 year ARI less than the pre-development peak flow rates.

- Option 2: Use pre-determined rates for both the permissible discharge rate and site storage volume as detailed in Figure 3-3:

	Land Use	
	Residential/ Medium Density/ Commercial	Industrial
Permissible Site Discharge (l/s/ha)	65	39
Site Storage Volume (cu.m/ha)	200	283

Note that the area to be used in this method is the total site area, not just the area of the dwellings and driveways.

Figure 3-3 Council Pre-determined Rates for PSD and SSV Design

With the large site area of approximately 10 hectares, adopting the pre-determined rates from Option 2 will trigger the installation of approximately 2000m^3 OSD storage. Given the relatively small redevelopment area (less than 2 hectares), it is preferable to use Option 1 to determine the Site Storage Volume (SSV) in order to have an OSD with higher efficiency.

Based on the concept plan proposed by STH, the redevelopment area will be mainly confined on the south-east portion of the site. It is likely the northern portion of the site will remain undisturbed and the existing discharge characteristics for the northern catchment will be retained.

Option 1 is to limit the post-development flows to the pre-development flow conditions which requires a hydraulic analysis using DRAINS modelling software. A hydraulic model reflecting the pre and post development conditions has been set up and analysed to calculate the OSD volume, the model is assuming 30% of the proposed landscape area within the development catchment is impervious. The layout and results are shown in Figure 3-4. The results suggest an OSD with a volume of at least 40 m^3 is required on site to maintain the existing flow rates. Please note the OSD volume is indicative only and is subject to change with layout confirmation.

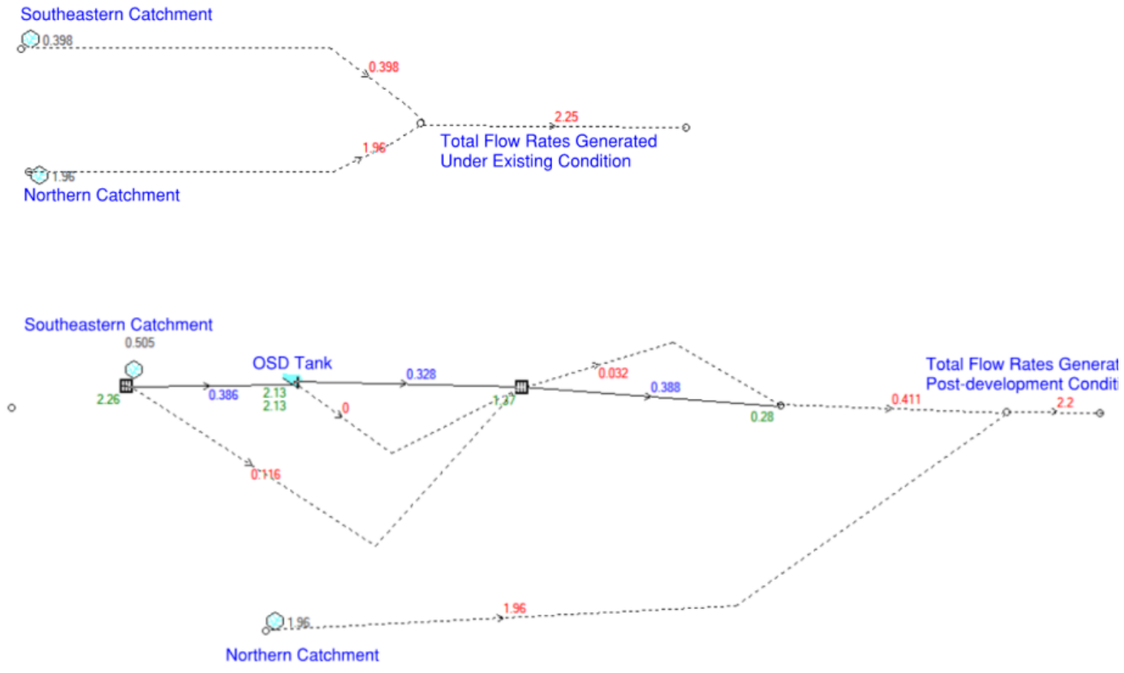


Figure 3-4 DRAINS Modelling Results Showing Pre and Post Development Flow Rates

It is likely the OSD will be provided at the southern portion of the site on the basement level of Residence 4. The OSD is likely to be combined with water quality control devices and rainwater tank. Outlet from the OSD is likely to be discharged to the south-eastern undeveloped land via a level spreader and ultimately to Hawkesbury River.

3.4 Water Quality

In accordance with *Hawkesbury City Council (DCP) Appendix E – Civil Works Specification*, consideration needs to be given to the impact from the development on receiving water bodies. Council stipulates a minimum requirement of the average annual pollutant load discharge from the developed site to be no greater than the pollutant discharge from the existing site.

Due to the site constraints, proprietary water quality treatment products including Enviropods and stormfilter cartridges are likely to be used on site. Installation of rainwater tank(s) can also assist in meeting water quality requirements.

In the preliminary modelling, 5 stormfilter cartridges, 3 Enviropods, a grassed buffer and a rainwater tank with volume of 15kL are provided as the treatment train.

A MUSIC model including the pre and post development conditions has been set up, layout is shown in Figure 3-5 below.

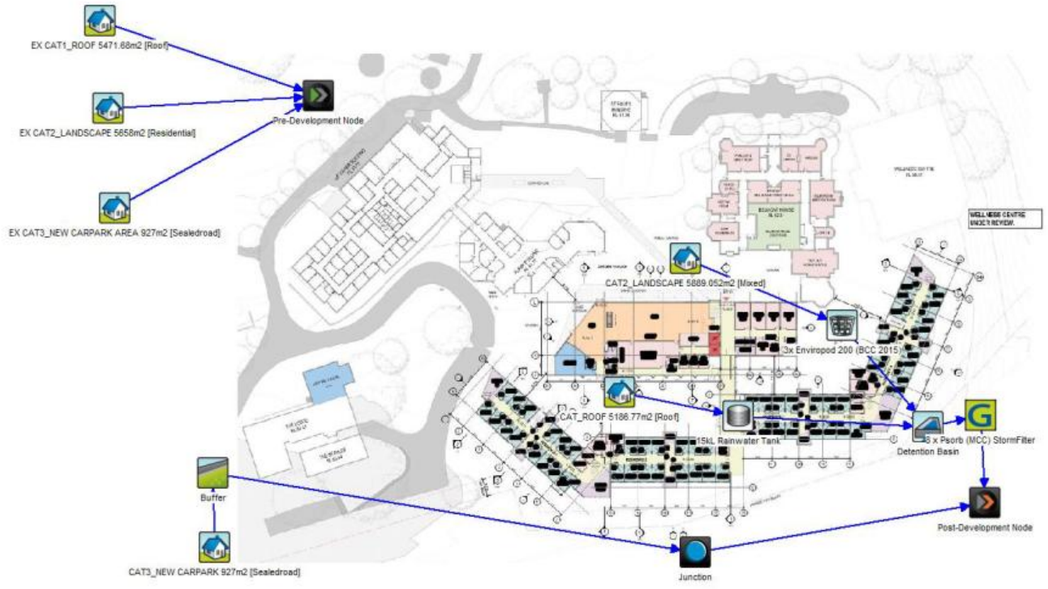
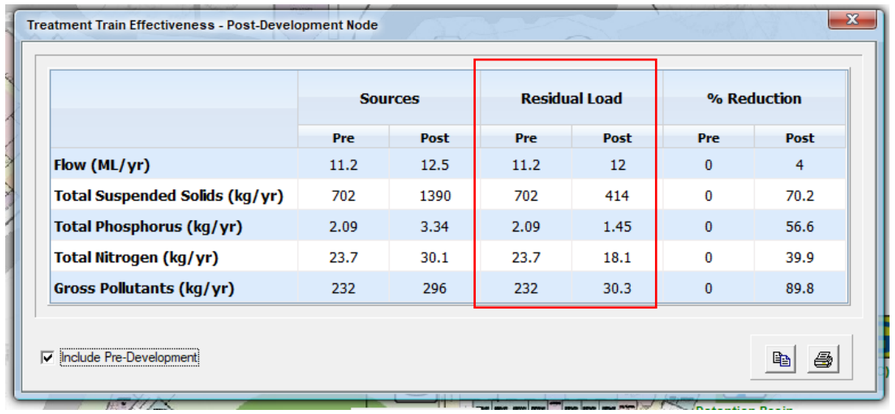


Figure 3-5 MUSIC Modelling Layout

MUSIC modelling results are as shown in Figure 3-5, the results indicate that with the water quality control measures implemented, the total pollutant rates have been reduced for post development condition.



	Sources		Residual Load		% Reduction	
	Pre	Post	Pre	Post	Pre	Post
Flow (ML/yr)	11.2	12.5	11.2	12	0	4
Total Suspended Solids (kg/yr)	702	1390	702	414	0	70.2
Total Phosphorus (kg/yr)	2.09	3.34	2.09	1.45	0	56.6
Total Nitrogen (kg/yr)	23.7	30.1	23.7	18.1	0	39.9
Gross Pollutants (kg/yr)	232	296	232	30.3	0	89.8

Figure 3-6 MUSIC Modelling Results

Other landscape measures can also provide water quality improvement benefit, implementing Water Sensitive Urban Design (WSUD) measures including grassed swales, raingarden can reduce the number of proprietary water quality

treatment products. However, further modelling and finalised landscape layout is required to achieve this object. Refer to Figure 3-7 for a typical raingarden section.

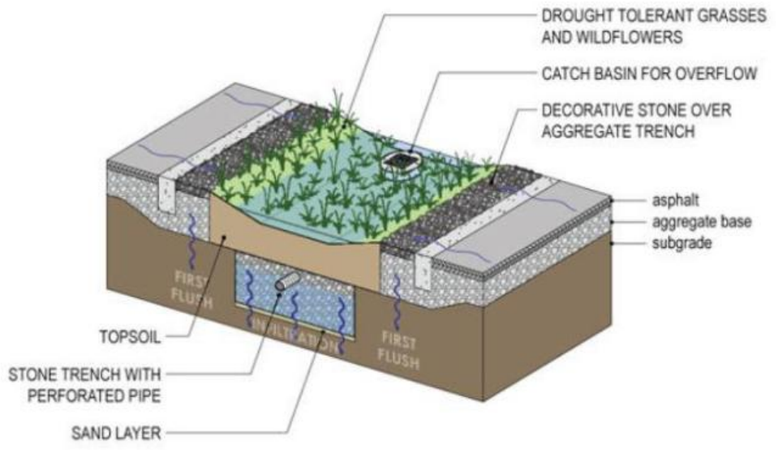


Figure 3-7 Typical Raingarden Section (Source: Clean Water Toolkit)

- *Sediment removed from any sediment trapping device shall be relocated where further pollution to downslope lands and waterways cannot occur.*
- *Water shall be prevented from entering the permanent drainage system unless it is sediment free. Drainage pits are to be protected in accordance with the final approved Sediment and Erosion Control Plan.*
- *Trapped sediment shall be removed immediately from areas subject to runoff or concentrated flow.*
- *Trapped sediment shall be removed where the capacity of sedimentation trapping devices fall below 60%.*
- *Revegetation schemes are to be adhered to and any grass coverings are kept healthy, including watering and mowing.*

3.5 Erosion & Sediment Control (During Construction)

The erosion and sediment control measures for the site will be implemented during construction. The design of these measures is to be in accordance with the Managing Urban Stormwater – Soil & Construction Volume 1 (Landcom, 2004)

For erosion and sediment control of the site, the following measures are provided to minimise the risk of sediments laden runoff being discharged from the site:

- *A sediment fence/hoarding to be provided around the site*
- *Catch drain (or diversion bund) diverting external catchment away from site*
- *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).*
- *Geotextile inlet pit filters or sandbags to be placed around existing stormwater pits.*
- *Water cart to spray excavated surfaces to reduce dust pollution.*
- *All disturbed areas are to be stabilised within 14 working days of the completion of earthworks. All disturbed areas are to be protected so that the land is permanently stabilised within six months.*

4. Other Considerations and Potential Risks

- The requirement for compliance of Disability Discrimination Act (DDA) is to be confirmed by project manager.
- The current Digital Terrain Models (DTM) provided by the surveyor on 10th December 2019 is inconsistent with survey information (contour) provided on 20th June 2019. Further clarification from the surveyor is required. Bulk earthworks is subject to change should an updated survey plan is provided.
- The proposed building footprint is blocking the existing overland flow path carrying the overland flows generated from the internal access road. A new overland flow path shall be provided redirecting the flow away from the building entrances.
- The proposed footpath linking the Belmont House and the Health & Wellness Centre is in 1:6 grade which exceeds the allowed maximum ramp grade (1:14). Stairs or switch back ramp may be required.
- Civil comments on the relevant items from *Planning Secretary's Environmental Assessment Requirements (SEARs)* (05.12.2019) have been provided in **Appendix C**.

5. Appendix A - Site Survey Plans

GROSE VALE ROAD

91° 52' 25" 58.965

105° 40' 25" 39.55

C 19.635, 19.05, 393.45° 39.55'
A 19.635
R 29.79
10.18

25.3
341° 31' 55"

9.35
354° 15' 55"

25.05
41° 16' 55"

16° 46' 55"
7.5

A 50.29 R 89.85
C 174.355° 50.41

A 50.85 R 201.35
C 354° 34' 25" 50.74

A 101.425 R 189.25
C 331° 03' 55" 100.215

A 17.6 R 131.75
C 311° 52' 55" 17.585

203° 15' 40"
72.575

187° 47' 35"
54.795

177° 57' 30"
60.365

148° 28' 50"
67.82

125° 59' 55"
270

307° 02' 55" 282.5

1 STOREY STONE BUILDING GATEHOUSE

TANK

ROAD

ACCESS

CONCRETE PATH

BITUMEN

DISHDRAIN

FENCE

POWER

METAL SHED

1 Oha

PT6

D P 703308

D P 1134453

ADJOINS

SHEET

APPROX. TRUE NORTH

LEGEND

C ~ COMMS PIT
CL ~ COLUMN
FH ~ FIRE HYDRANT
ELP ~ ELECTRICAL LIGHT POLE
EPIT ~ ELECTRICAL PIT
GM ~ GAS METER
GP ~ GRATED PIT
HW ~ HEADWALL
IL ~ INVERT LEVEL
OL ~ OBVERT LEVEL
LN ~ LINTEL
MH ~ SEWER MANHOLE
PT ~ LEVEL AT TOP OF UNKNOWN PIT
PIT600 ~ 600 SQUARE STORMWATER PIT
PP ~ POWER POLE
SWPIT ~ STORMWATER PIT
SEWIO ~ SEWER INSPECTION OUTLET
SV ~ STOP VALVE
T ~ TELSTRA PIT
WM ~ WATER METER
SW ~ UNDERGROUND STORMWATER PIPE
E ~ UNDERGROUND ELECTRICAL CABLES
T ~ TELSTRA CABLES
C ~ COMMUNICATIONS CABLES
S ~ SEWER MAIN

NOTES

1. THE BOUNDARIES HAVE BEEN DEFINED. IT IS RECOMMENDED THAT THE BOUNDARIES BE MARKED BEFORE ANY CONSTRUCTION COMMENCES ON SITE.
2. ORIGIN OF LEVELS ON A.H.D. IS TAKEN FROM PM 46074 RL 73.48 LOCATED IN GROSE VALE ROAD.
3. SURVEY COMPLETED USING COMBINATION OF TOTAL STATION AND CORSNET RTK GNSS OBSERVATIONS.
4. NO INVESTIGATION OF UNDERGROUND SERVICES BEYOND IMMEDIATE PIT VICINITY HAS BEEN MADE. ALL RELEVANT AUTHORITIES SHOULD BE NOTIFIED PRIOR TO ANY EXCAVATION ON OR NEAR THE SITE. WE STRONGLY SUGGEST THAT YOU CONTACT DIAL BEFORE YOU DIG ON 1100 OR AT www.dialbeforeyoudig.com.au

0 10 15 20 30 40 50 60
SCALE 1:400 @ A0

SURVEY: M.C.	**Mark Castelletti Surveying**	DATE: 05/09/19	CLIENT: ST JOHN OF GOD HEALTH CARE
DESIGN:	REGISTERED SURVEYOR ABN: 38 840 577 857 1 Mahony Road, Constitution Hill NSW 2145 Phone/Fax: (02) 9688 1592 Mobile: 0418 332 563 Email: mcsurveying@dodo.com.au	R.R.: 1:400	SERVICES PLAN SHOWING PIT LOCATION & LEVELS ON AHD OVER LOT 11 IN DP 1134453 AT GROSE VALE ROAD, NORTH RICHMOND
DRAWN: M.L.		DATUM: AHD	
CHECKED: M.C.		REF: C3019	
		SHT. 1 OF 2 SHTS.	L.G.A.: HAWKESBURY

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LEGEND

C ~ COMMS PIT
CL ~ COLUMN
FH ~ FIRE HYDRANT
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WM ~ WATER METER
SW UNDERGROUND STORMWATER PIPE
E UNDERGROUND ELECTRICAL CABLES
T TELSTRA CABLES
C COMMUNICATIONS CABLES
S SEWER MAIN

APPROX. TRUE NORTH

ADJOINS

SHEET

(A)
(B)
(G)
(C) (D) (E)
CONTINUED
BELOW

81° 53' 55" 90.715
157° 20' 20" 108.81
139° 33' 30" 126.76
51° 41' 25" 127.785
306° 48' 55" 108.76
34° 54' 55" 12.845
42.34 321° 31' 55"
305° 33' 15" 69.02
81.545 276° 20' 05"
151.28 221° 46' 15"

LOT 1 IN DP 1134453
DP 703333

CONCRETE SEWERAGE TANK
1 STOREY STEEL BUILDING (MAINTENANCE DEPOT)
TRACK
CONCRETE
PUMP HOUSE
1 STOREY STONE BUILDING (CONSERVATORY)
ROAD
2 STOREY BRICK BUILDING (XAVIER)
2 STOREY BRICK BUILDING (ST PAULS)
2 STOREY CONCRETE BUILDING
CONCRETE PATH
BITUMEN
BRIDGE
DRAIN
1 STOREY BRICK BUILDING (ADMINISTRATION & RECEPTION)
COVERED WALKWAY
3 STOREY STONE BUILDING (BELMONT HOUSE)
FOUNTAIN COURTYARD
(CAFE)
2 STOREY BRICK BUILDING (CTC)
BALCONY
2 STOREY BRICK BUILDING (MEDICAL CENTRE)
AWNING
COURTYARD
1 STOREY BRICK BUILDING (DINING)
1 STOREY BRICK BUILDING (CHAPEL)
1 STOREY BRICK BUILDING (MEDICAL CENTRE)
1 STOREY BRICK BUILDING (EDUCATION CENTRE)
RICHMOND COUNSELLING & THERAPY CENTRE
TENNIS COURTS (CONCRETE)
METAL SHED
CARPARK
VERANDAH
1 STOREY BRICK & STONE BUILDING (LODGE)
1 STOREY STONE BUILDING (STABLES)
DISHDRAIN
ACCESS
2 & 3 STOREY BRICK BUILDING (MONASTERY)
1 STOREY BRICK BUILDING (ARTS & ARCHIVES)
BRICK SHED
STEEL TOWER
BRICK

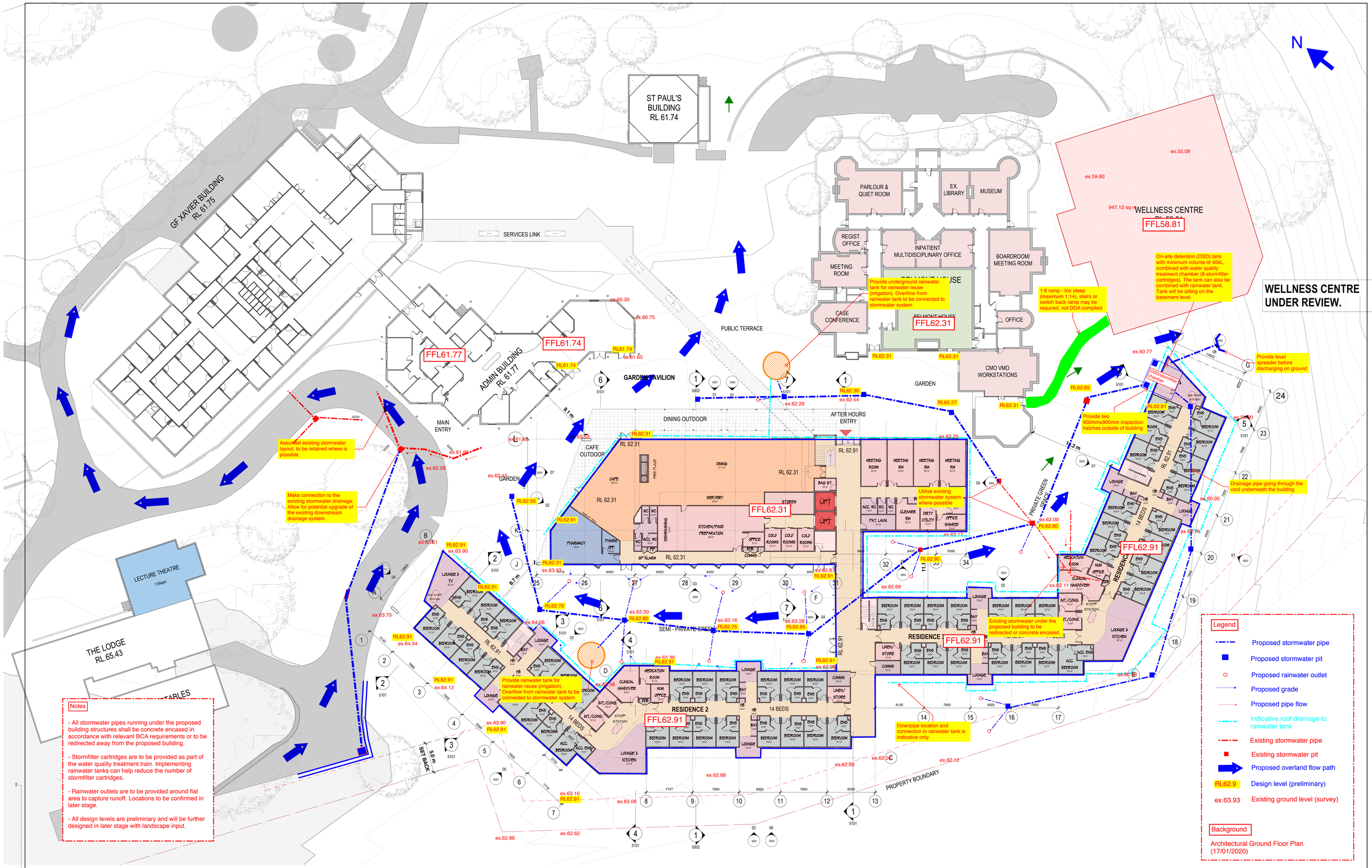
HAWKESBURY RIVER

0 10 15 20 30 40 50 60
SCALE 1:400 @ A0

(A) EASEMENT FOR SERVICES 10 WIDE (DP 1134453)
(B) EASEMENT FOR SERVICES 10 WIDE CENTRED OVER EXISITNG WATER SUPPLY PIPELINE (APPROX. POSITION) (DP 1134453)
(C) EASEMENT FOR SERVICES 10.2 WIDE (DP 1134453)
(D) RIGHT OF FOOTWAY 10.2 WIDE (DP 1134453)
(E) RIGHT OF CARRIAGEWAY 10.2 WIDE (DP 1134453)
(G) EASEMENT FOR SERVICES 10 WIDE CENTRED OVER EXISITNG LINE OF SEWER PIPES (APPROX. POSITION) (DP 1134453)

SURVEY: M.C.	**Mark Castelletti Surveying**	DATE: 20/06/19	CLIENT: ST JOHN OF GOD HEALTH CARE
DESIGN:	REGISTERED SURVEYOR	R.R.: 1:400	SERVICES PLAN SHOWING PIT LOCATION & LEVELS ON AHD OVER LOT 11 IN DP 1134453 AT GROSE VALE ROAD, NORTH RICHMOND
DRAWN: M.L.	ABN: 38 840 577 857	DATUM: AHD	
CHECKED: M.C.	1 Mahony Road, Constitution Hill NSW 2145	REF: C3019	
	Phone/Fax: (02) 9688 1592	SHT. 2 OF 2 SHTS.	L.G.A.: HAWKESBURY
	Mobile: 0418 332 563 Email: mcsurveying@dodo.com.au		

6. Appendix B - Civil Schematic Design Plans



Rev	Description	Date	By	App
-	Preliminary Issue	21/01	EW	

Rev	Description	Date	By	App

BONACCI
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sydney@bonaccigroup.com
www.bonaccigroup.com

Project Name: St John of God Richmond Hospital Redevelopment

Drawing Title: Stormwater Drainage Plan

Designed
Drawn
Scale
Date
Sheet

Project Director Approved
Date: 21/01/2020
North

Project Ref: 12056
Drawing No
Rev

N

ST PAUL'S BUILDING RL 61.74

GF XAVIER BUILDING RL 61.75

SERVICES LINK

PARLOUR & QUIET ROOM

EX. LIBRARY

MUSEUM

REGIST. OFFICE

INPATIENT MULTIDISCIPLINARY OFFICE

BOARDROOM/ MEETING ROOM

MEETING ROOM

BELMONT HOUSE RL 62.31

BELMONT HOUSE COURTYARD

CASE CONFERENCE

OFFICE

CMO VMO WORKSTATIONS

WELLNESS CENTRE RL 58.81

ex.55.08

WELLNESS CENTRE UNDER REVIEW.

PUBLIC TERRACE

GARDEN

ADMIN BUILDING RL 61.77

MAIN ENTRY

GARDEN PAVILION

DINING OUTDOOR

AFTER HOURS ENTRY

CAFE OUTDOOR

RL 62.31

RL 62.91

CAFE

DINING

FIRE PLACE

SERVERY

STORES

BAG ST.

LIFT

LIFT

KITCHEN/FOOD PREPARATION

DISHWASHING

COLD ROOMS

COLD ROOMS

COLD ROOMS

OFFICE

EHS COMMS

WC

WC

5P ALARM

MEETING ROOM

MEETING RM

MEETING RM

MEETING RM

ACC. WC

WC

FAT. LAUN.

CLEANER RM

BEV. BAY

DIRTY UTILITY

OFFICE SHARED

OFFICE

PRIVATE GREEN SPACE

SEMI - PRIVATE GREEN SPACE

RESIDENCE 1

RESIDENCE 2

RESIDENCE 3

RESIDENCE 4

14 BEDS

LOUNGE

TV

BEDROOM

ENS

HB

BAY

MEDICATION ROOM

CLINICAL HANDOVER

NUM. OFFICE

INT./CONS.

STAFF STATION

LOUNGE & KITCHEN

LINEN/ STORE

COMMS

ACC. BEDROOM

ACC. ENS

LECTURE THEATRE 118sqm

THE LODGE RL 65.43

PROPERTY BOUNDARY

SET BACK 5.0 m

9.1 m

8.7 m

11.1 m

14.2 m

Proposed emergency overland flow path, to be directed away from the proposed building and along the existing road as indicated.

Proposed stormwater drainage layout, make connection to the existing unground drainage layout, potential upgrade of the downstream drainage system is required to cater for flows.

Proposed emergency overland flow path, to be directed away from the proposed building and along the existing road as indicated.

Existing stormwater overland flow path along the access road and discharging to the bushland in the south.

Construct new kerb and gutter to redirect the overland flow path. Construct a kerb inlet pit in the corner to avoid ponding.

Legend

- Existing Overland Flow Path
- Proposed Overland Flow Path

Background

Architectural Ground Floor Plan (21/01/2020)

Rev	Description	Date	By	App
1	Preliminary Issue	21/01/2020	EW	

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www.bonaccigroup.com

Project Name: St John of God Richmond Hospital Redevelopment

Drawing Title: Overland Flow Path

PRELIMINARY

Designed
Drawn
Scale
Date
Sheet

Project Director Approved
Date 21/01/19

Project Ref 12056
Drawing No SK02
Rev 1

EARTHWORKS DEPTH RANGE			
Lower_value		Upper_value	Colour
-100	to	-1	2
-1	to	-.5	2
-.5	to	0	2
0	to	.5	2
.5	to	1	2
1	to	100	2

VOLUME SUMMARY

- BUILDINGS (INCLUDING EXTERNAL COURTYARD AREAS)
  CUT = 10,537m³
  FILL = 3,935m³
  CUT EXCESS = 6,602m³
- CARPARK
  CUT = 83m³
  FILL = 1,185m³
  FILL EXCESS = 1,102m³

  TOTAL CUT = 10,620m³
  TOTAL FILL = 5,120m³
  CUT EXCESS = 5,500m³

NOTES
1. VOLUMES ARE APPROXIMATE ONLY, WHICH ARE IN PLACE AND DO NOT INCORPORATE BULKING FACTORS, OVER EXCAVATION AND OSD.
2. GROUND WATER SEEPAGE MAY OCCUR IN EXCAVATED AREAS. DE-WATERING MAY BE REQUIRED IN THIS INSTANCE.

EXISTING CONCRETE TANKS AND PUMPHOUSE
EXISTING SUMMER HOUSE CONSERVATORY
EXISTING GYM
WELLNESS CENTRE BEL 58.51
EXISTING XAVIER BUILDING FFL 61.75
EXISTING BELMONT HOUSE FFL 62.31
EXISTING ADMIN BUILDING FFL 61.77
BASEMENT (TANKS/PUMP ROOM) BEL 57.53
ENTERTAINMENT QUARTER BEL 62.01
RESIDENCE 1 BEL 62.61
RESIDENCE 1 BEL 62.61
RESIDENCE 1 BEL 62.61
RESIDENCE 1 BEL 62.61
EXISTING TENNIS COURTS
EXISTING LODGE BUILDING
EXISTING STABLES
EXISTING WATER TANKS
EXISTING CARPARK
EXISTING GAS TANKS
LONG TERM CARPARK
REFER TO SHEET C012
REFER TO SHEET C011

Rev	Description	Date	By	App
P1	ISSUED FOR SCHEMATIC DESIGN	17.12.19	JF	--

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ST JOHN OF GOD Health Care

Project Name: ST JOHN OF GOD HOSPITAL REDEVELOPMENT
177 GROSE VALE RD NORTH RICHMOND NSW 2753

Drawing Title: OVERALL BULK EARTHWORKS PLAN

PRELIMINARY

Designed	JF	Project Director Approved	Date
Drawn	JF		
Scale	1:500		
Date	DEC 2019	Project Ref	Drawing No / Rev
Sheet	A0	12056 01	C010 P1

EARTHWORKS DEPTH RANGE

Lower_value		Upper_value		Colour
-100	to	-1	2	
-1	to	-.5	2	
-.5	to	0	2	
0	to	.5	2	
.5	to	1	2	
1	to	100	2	

VOLUME SUMMARY

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  CUT EXCESS = 6,602m³
- CARPARK
  CUT = 83m³
  FILL = 1,185m³
  FILL EXCESS = 1,102m³

TOTAL CUT = 10,620m³
TOTAL FILL = 5,120m³
CUT EXCESS = 5,500m³

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SURVEY LEGEND

- SITE BOUNDARY
- EX SURFACE LEVEL
- EX SURFACE CONTOUR
- EX TREE
- Ex SW — EXISTING STORMWATER DRAINAGE LINE
- Ex S — EXISTING SEWER LINE
- Ex W — EXISTING WATER MAIN
- Ex G — EXISTING GAS LINE
- Ex T — EXISTING TELECOMMUNICATIONS LINE
- Ex E — EXISTING ELECTRICAL LINE
- EXISTING UNKNOWN SERVICE

BULK EARTHWORKS LEGEND

BEL 62.01 — FINISHED BULK EXCAVATION LEVEL

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Rev	Description	Date	By	App
P1	ISSUED FOR SCHEMATIC DESIGN	17.12.19	JF	-

St John of God Health Care

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Project Name: ST JOHN OF GOD HOSPITAL REDEVELOPMENT
177 GROSE VALE RD NORTH RICHMOND NSW 2753

Drawing Title: BULK EARTHWORKS PLAN SHEET 1

PRELIMINARY

Designed JF | Drawn JF | Scale 1:200 | Date DEC 2019 | Sheet A0

Project Director Approved | Date | North

Project Ref: 12056 01 | Drawing No: C011 | Rev: P1

CONSTRUCT 1:2 PERMANENT BATTER WITH SLOPE STABILITY SYSTEM TO AVOID EXTENDING WITHIN THE EXISTING TREE PROTECTION ZONE. ALTERNATIVELY, CONSTRUCT MAXIMUM 2m HIGH RETAINING WALL SYSTEM

LINE OF EXISTING TREES (TPZ) TO BE CONFIRMED ON-SITE

LONG TERM CARPARK

GROVE OF TREES

SCG08

CH 75.968 CH 70 CH 60 CH 50 CH 40 CH 30 CH 20 CH 10 CH 0.000

REFER TO SHEET C011 FOR CONTINUATION

EARTHWORKS DEPTH RANGE

Lower_value		Upper_value	Colour
-100	to	-1	2
-1	to	-.5	2
-.5	to	0	2
0	to	.5	2
.5	to	1	2
1	to	100	2

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- CARPARK
  CUT = 83m³
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  TOTAL CUT = 10,620m³
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NOTES
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2. GROUND WATER SEEPAGE MAY OCCUR IN EXCAVATED AREAS. DE-WATERING MAY BE REQUIRED IN THIS INSTANCE.

SURVEY LEGEND

- SITE BOUNDARY
- EX SURFACE LEVEL
- EX SURFACE CONTOUR
- EX TREE
- Ex SW — EXISTING STORMWATER DRAINAGE LINE
- Ex S — EXISTING SEWER LINE
- Ex W — EXISTING WATER MAIN
- Ex G — EXISTING GAS LINE
- Ex T — EXISTING TELECOMMUNICATIONS LINE
- Ex E — EXISTING ELECTRICAL LINE
- EXISTING UNKNOWN SERVICE

BULK EARTHWORKS LEGEND

BEL 62.01 — FINISHED BULK EXCAVATION LEVEL

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Rev	Description	Date	By	App
P1	ISSUED FOR SCHEMATIC DESIGN	17.12.19	JF	-

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Project Name: ST JOHN OF GOD HOSPITAL REDEVELOPMENT
177 GROSE VALE RD NORTH RICHMOND NSW 2753

Drawing Title: BULK EARTHWORKS PLAN SHEET 2

PRELIMINARY

Designed	JF	Project Director Approved	Date
Drawn	JF		
Scale	1:200		
Date	DEC 2019	Project Ref	Drawing No / Rev
Sheet	A0	12056 01	C012 P1

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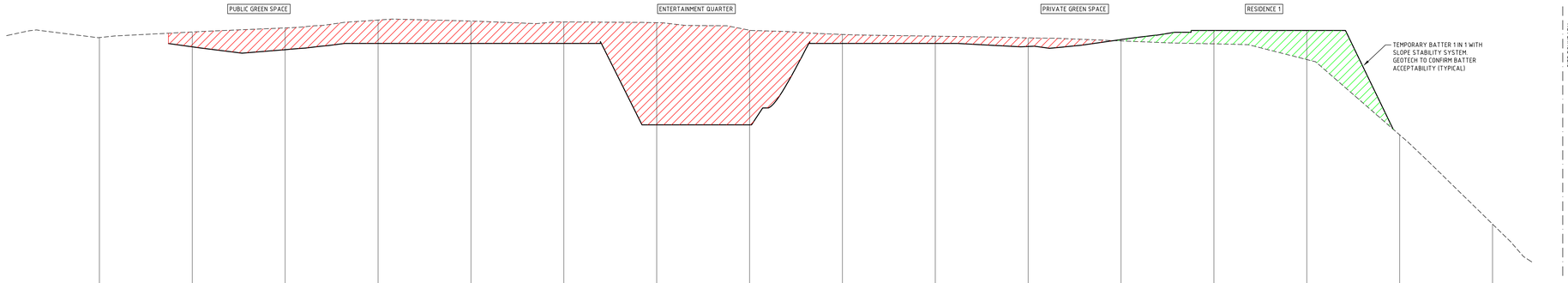


DESIGN GRADELINE

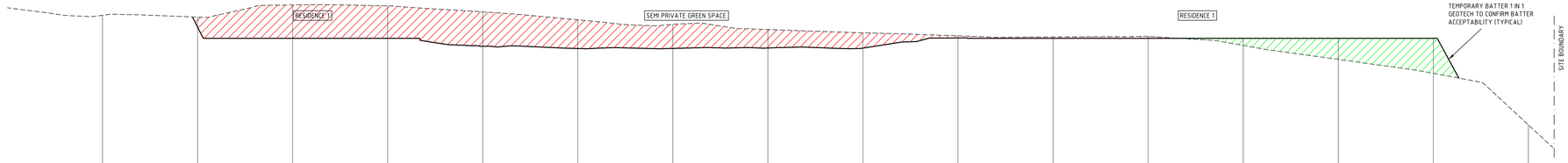
HORIZONTAL GEOMETRY

DATUM 44.1

SC01																	
BULK EARTHWORKS SURFACE		61.727	61.572	61.910	61.910	61.910	57.530	57.530	61.910	61.910	61.746	62.119	62.619	62.619			
EXISTING SURFACE	62.229	62.508	62.747	63.171	63.117	63.047	63.028	62.624	62.395	62.301	62.211	62.247	61.888	61.143	56.990	57.185	
CHAINAGES	0.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	100.000	110.000	120.000	130.000	140.000	150.000	160.000	164.299

1 in 200 HORIZONTAL
1 in 100 VERTICAL

SC01 LONGITUDINAL SECTION



DESIGN GRADELINE

HORIZONTAL GEOMETRY

DATUM 50.8

SC02																	
BULK EARTHWORKS SURFACE		63.204	62.619	62.619	62.792	62.077	62.078	62.100	62.093	62.639	62.618	62.618	62.618	62.619	62.618		
EXISTING SURFACE	63.824	63.329	64.368	64.319	64.007	63.586	63.346	63.074	62.901	62.743	62.684	62.710	62.236	61.498	60.766	58.850	
CHAINAGES	0.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	100.000	110.000	120.000	130.000	140.000	150.000	160.000	161.999

1 in 200 HORIZONTAL
1 in 100 VERTICAL

SC02 LONGITUDINAL SECTION

Rev	Description	Date	By	App
P1	ISSUED FOR SCHEMATIC DESIGN	17.12.19	JF	--

Rev	Description	Date	By	App

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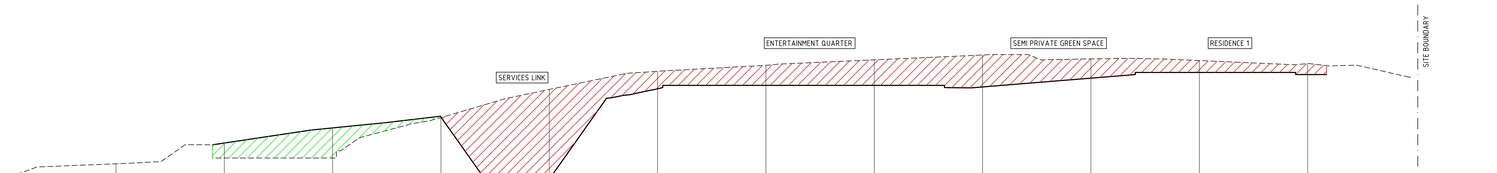
Project Name	ST JOHN OF GOD HOSPITAL REDEVELOPMENT 177 GROSE VALE RD NORTH RICHMOND NSW 2753
Drawing Title	BULK EARTHWORKS PLAN LONGITUDINAL SECTIONS SHEET 1

PRELIMINARY

Designed	JF	Project Director Approved	Date
Drawn	JF		
Scale	AS SHOWN		
Date	DEC 2019		
Sheet	A0		

North

Project Ref	Drawing No	Rev
12056 01	C015	P1

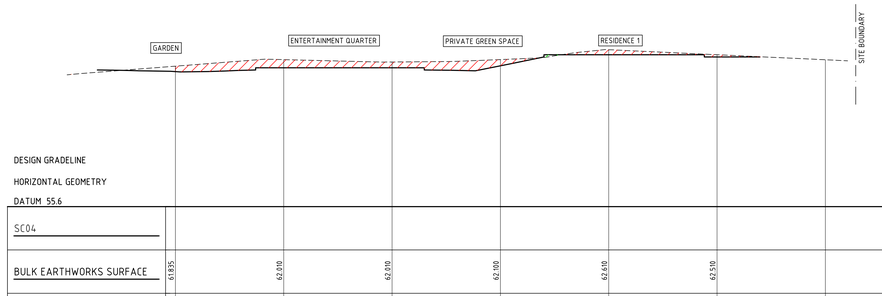


DESIGN GRADELINE
HORIZONTAL GEOMETRY
DATUM 51.5

SC03												
BULK EARTHWORKS SURFACE		59.352	60.050	60.540	57.683	61.854	62.010	62.010	61.940	62.345	62.610	62.510
EXISTING SURFACE	58.392	58.660	58.660	65.527	61.822	62.662	62.936	63.100	63.414	63.234	63.158	63.017
CHAINAGES	0.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	100.000	110.000	120.000	126.198

1 in 200 HORIZONTAL
1 in 100 VERTICAL

SC03 LONGITUDINAL SECTION

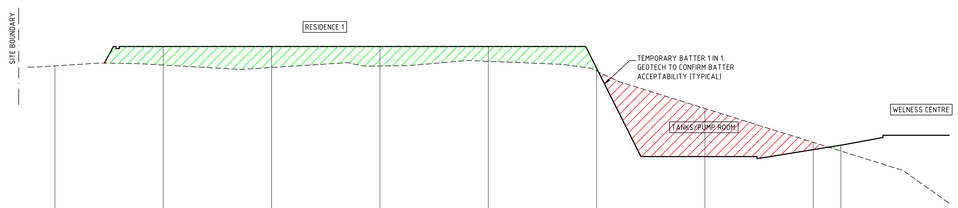


DESIGN GRADELINE
HORIZONTAL GEOMETRY
DATUM 55.6

SC04								
BULK EARTHWORKS SURFACE	61.835	62.010	62.010	62.100	62.610	63.510		
EXISTING SURFACE	62.084	62.386	62.277	62.388	62.845	62.617	62.380	
CHAINAGES	0.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	70.276

1 in 200 HORIZONTAL
1 in 100 VERTICAL

SC04 LONGITUDINAL SECTION

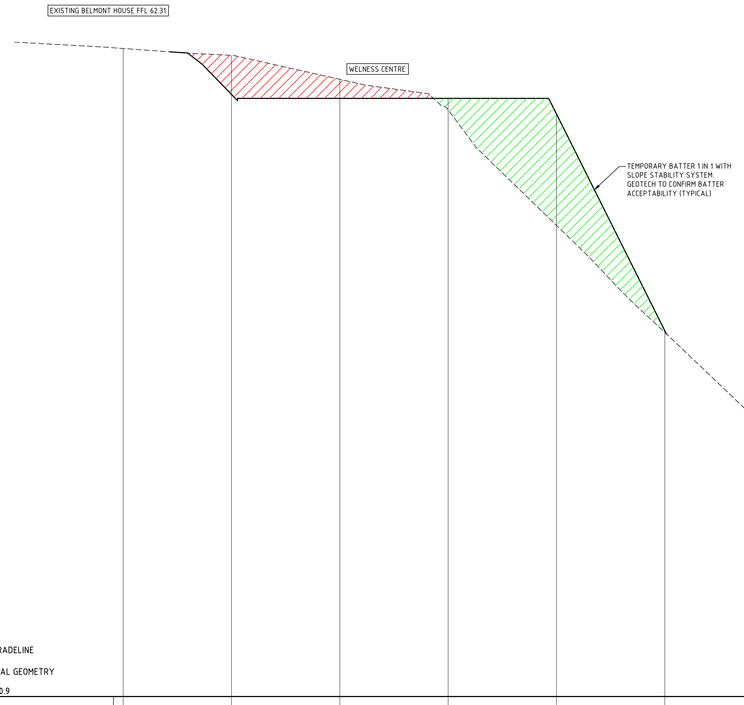


DESIGN GRADELINE
HORIZONTAL GEOMETRY
DATUM 49.3

SC05									
BULK EARTHWORKS SURFACE			62.610	62.610	62.610	62.610	61.606	57.530	57.859	58.055
EXISTING SURFACE		61.714	61.754	61.640	61.719	61.924	61.476	59.748	58.184	57.786
CHAINAGES	0.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	82.541

1 in 200 HORIZONTAL
1 in 100 VERTICAL

SC05 LONGITUDINAL SECTION



DESIGN GRADELINE
HORIZONTAL GEOMETRY
DATUM 30.9

SC06								
BULK EARTHWORKS SURFACE		58.614	58.510	58.510	57.786	47.786		
EXISTING SURFACE	60.814	60.495	59.390	57.981	52.647	47.109	42.945	39.815	38.647
CHAINAGES	0.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	79.472

1 in 200 HORIZONTAL
1 in 100 VERTICAL

SC06 LONGITUDINAL SECTION

Rev	Description	Date	By	App
P1	ISSUED FOR SCHEMATIC DESIGN	17.12.19	JF	-

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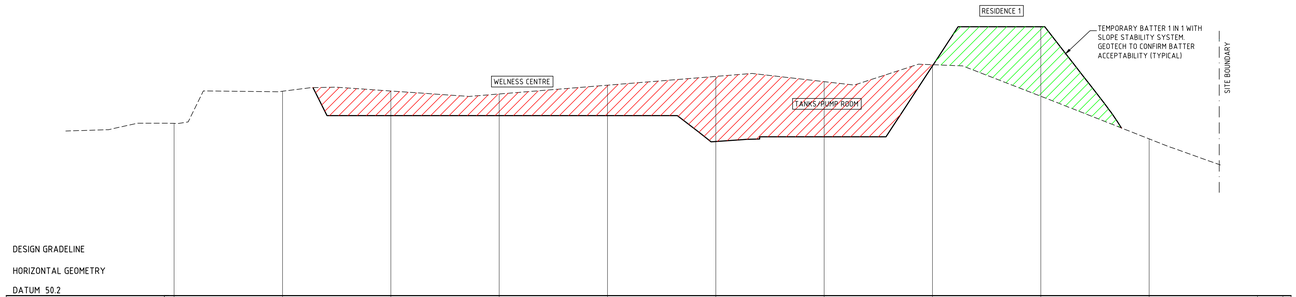
Project Name: ST JOHN OF GOD HOSPITAL REDEVELOPMENT
177 GROSE VALE RD NORTH RICHMOND NSW 2753

Drawing Title: BULK EARTHWORKS PLAN
LONGITUDINAL SECTIONS
SHEET 2

PRELIMINARY

Designed	JF	Project Director Approved	Date
Drawn	JF		
Scale	AS SHOWN		
Date	DEC 2019	Project Ref	Drawing No / Rev
Sheet	A0	12056 01	C016 P1

North



DESIGN GRADELINE

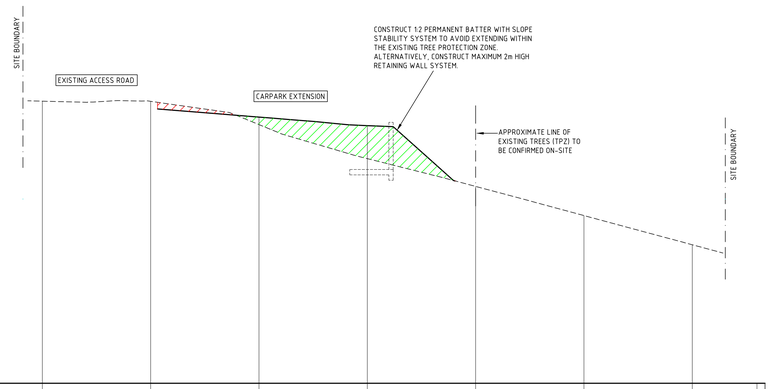
HORIZONTAL GEOMETRY

DATUM 50.2

SC07											
BULK EARTHWORKS SURFACE		58.510	58.510	58.510	57.315	57.539	60.864	62.610			
EXISTING SURFACE	58.855	59.635	59.646	57.508	59.914	60.319	60.077	60.860	59.403	57.434	
CHAINAGES	0.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	100.000	107.247

1 in 200 HORIZONTAL
1 in 100 VERTICAL

SC07 LONGITUDINAL SECTION



DESIGN GRADELINE

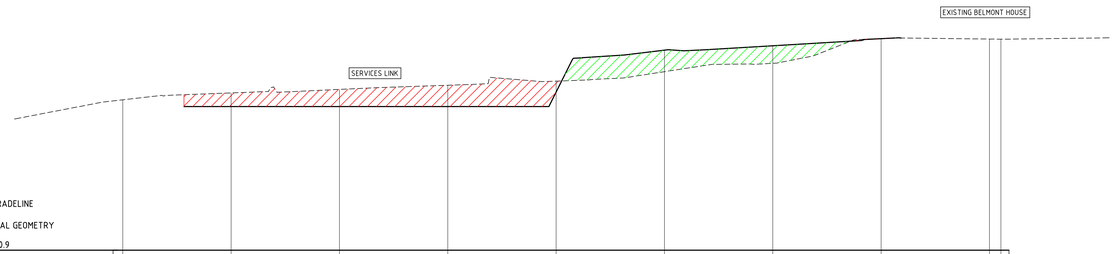
HORIZONTAL GEOMETRY

DATUM 53.5

SC08								
BULK EARTHWORKS SURFACE			65.389	65.395				
EXISTING SURFACE		66.523	66.516	65.442	63.870	62.589	61.743	59.895
CHAINAGES	0.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	75.968

1 in 200 HORIZONTAL
1 in 100 VERTICAL

SC08 LONGITUDINAL SECTION



DESIGN GRADELINE

HORIZONTAL GEOMETRY

DATUM 50.9

SC09									
BULK EARTHWORKS SURFACE		57.530	57.530	57.530	58.199	60.131	60.374	60.663	
EXISTING SURFACE	57.840	58.159	58.320	58.511	58.783	59.139	59.526	60.672	60.646	60.649
CHAINAGES	0.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	81.693

1 in 200 HORIZONTAL
1 in 100 VERTICAL

SC09 LONGITUDINAL SECTION

Rev	Description	Date	By	App
P1	ISSUED FOR SCHEMATIC DESIGN	17.12.19	JF	–

Rev Description Date By App

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ST JOHN OF GOD Health Care

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Project Name: ST JOHN OF GOD HOSPITAL REDEVELOPMENT
177 GROSE VALE RD NORTH RICHMOND NSW 2753

Drawing Title: BULK EARTHWORKS PLAN LONGITUDINAL SECTIONS SHEET 3

PRELIMINARY

Designed	JF	Project Director Approved	Date
Drawn	JF		
Scale	AS SHOWN		
Date	DEC 2019	Project Ref	Drawing No Rev
Sheet	A0	12056 01	C017 P1

North

7. Appendix C – Civil Comments on SEARs (Issued on 05.12.2019)

Relevant Policies and Guidelines:

- NSW Noise Policy for Industry 2017 (NSW Environment Protection Authority (EPA)
- Interim Construction Noise Guideline (Department of Environment and Climate Change, 2009)
- Assessing Vibration: A Technical Guideline 2006 (Department of Environment and Conservation, 2006)
- Development Near Rail Corridors and Busy Roads - Interim Guideline (Department of Planning, 2008)
- Australian Standard 2363:1999 Acoustics - Measurement of noise from helicopter operations.

12. Contamination

- Assess and quantify any soil and groundwater contamination and demonstrate that the site is suitable for the proposed use in accordance with SEPP 55.
- Undertake a hazardous materials survey of all existing structures and infrastructure prior to any demolition or site preparation works.

Relevant Policies and Guidelines:

- Managing Land Contamination: Planning Guidelines - SEPP 55 Remediation of Land (DUAP, 1998)
- Sampling Design Guidelines (EPA, 1995)
- Guidelines for Consultants Reporting on Contaminated Sites (OEH, 2011)
- National Environment Protection (Assessment of Site Contamination) Measure (National Environment Protection Council, as amended 2013)

13. Utilities

- Prepare an Infrastructure Management Plan in consultation with relevant agencies, detailing information on the existing capacity and any augmentation and easement requirements of the development for the provision of utilities including staging of infrastructure.
- Prepare an Integrated Water Management Plan detailing any proposed alternative water supplies, proposed end uses of potable and non-potable water, and water sensitive urban design.

14. Contributions

- Address Council's 'Section 7.11 (previously S94) Contribution Plan 2015' and/or details of any Voluntary Planning Agreement, which may be required to be amended because of the proposed development.

15. Drainage

- Detail measures to minimise operational water quality impacts on surface waters and groundwater.
- Stormwater plans detailing the proposed methods of drainage without impacting on the downstream properties.

Relevant Policies and Guidelines:

- Guidelines for developments adjoining land managed by the Office of Environment and Heritage (OEH, 2013).

16. Flooding

Identify flood risk on-site (detailing the most recent flood studies for the project area) and consideration of any relevant provisions of the NSW Floodplain Development Manual (DIPNR, 2005), including the potential effects of climate change, sea level rise and an increase in rainfall intensity. If there is a material flood risk, include

15.
- Water quality modelling has been developed using MUSIC software. Modelling results indicate the development is meeting the Council's adopted pollutant removal targets. Refer to Civil Schematic Design Report (21.01.2020) Section 3.4 for proposed water quality control measures.

- A hydraulic analysis model has been developed using DRAINS software to ensure the development has no adverse impact on the downstream properties by providing on-site detention system. Refer to Civil Schematic Design Report (21.01.2020) Section 3.2 and 3.3 for proposed preliminary water quantity and drainage design.

16.
Flood risk has been identified for the site based on *Hawkesbury Floodplain Risk Management Study & Plan – Flood Maps and Annotated Bibliography, (December 2012)*

Above document suggests that the site is not located within the Probable Maximum Flood and 1% AEP (Annual Exceedance Probability) extent.

Refer to Civil Schematic Design Report (21.01.2020) Section 2.2.2

design solutions for mitigation.

17. Bushfire

Address bushfire hazard and, if relevant, prepare a report that addresses the requirements for Special Fire Protection Purpose Development as detailed in Planning for Bush Fire Protection 2006 (NSW RFS).

18. Biodiversity Assessment

- Unless a waiver has been issued by the Planning Secretary, biodiversity impacts related to the proposed development (SSD-10394) are to be assessed in accordance with Section 7.9 of the Biodiversity Conservation Act 2017, the Biodiversity Assessment Method and documented in a Biodiversity Development Assessment Report (BDAR). The BDAR must include information in the form detailed in the *Biodiversity Conservation Act 2016* (s6.12), *Biodiversity Conservation Regulation 2017* (s6.8) and Biodiversity Assessment Method.
- The BDAR must document the application of the avoid, minimise and offset framework including assessing all direct, indirect and prescribed impacts in accordance with the Biodiversity Assessment Method.
- The BDAR must include details of the measures proposed to address the offset obligation as follows:
  - the total number and classes of biodiversity credits required to be retired for the development/project
  - the number and classes of like-for-like biodiversity credits proposed to be retired
  - the number and classes of biodiversity credits proposed to be retired in accordance with the variation rules
  - any proposal to fund a biodiversity conservation action
  - any proposal to make a payment to the Biodiversity Conservation Fund.
- If seeking approval to use the variation rules, the BDAR must contain details of the reasonable steps that have been taken to obtain requisite like-for-like biodiversity credits.
- The BDAR must be submitted with all spatial data associated with the survey and assessment as per the BAM.
- The BDAR must be prepared by a person accredited in accordance with the Accreditation Scheme for the Application of the Biodiversity Assessment Method Order 2017 under s6.10 of the *Biodiversity Conservation Act 2016*.
- Where a Biodiversity Assessment Report is not required, engage a suitably qualified person to assess and document the flora and fauna impacts related to the proposal.
- Where a waiver has been issued, confirm that the project for which a waiver was granted is consistent with the proposal.

Note: Notwithstanding these requirements, the Biodiversity Conservation Act 2016 requires that State Significant Development Applications be accompanied by a Biodiversity Development Assessment Report unless otherwise specified under the Act.

19.
Sediment & Erosion Control measures have been outlined in Civil Schematic Design Report (21.01.2020) Section 3.5.

19. Sediment, Erosion and Dust Controls

Detail measures and procedures to minimise and manage the generation and off-site transmission of sediment, dust and fine particles.

Relevant Policies and Guidelines:

- Managing Urban Stormwater - Soils & Construction Volume 1 2004 (Landcom)
- Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (EPA)