HCE Engineers

Ref. (22288)

MATERIAL CHANGE OF USE – PLACE OF WORSHIP (CHURCH)
3303 - 3305 LOGAN ROAD, UNDERWOOD

STORMWATER MANAGEMENT PLAN

REVISION 0



LOGAN CITY COUNCIL

APPROVED DOCUMENT

This is an approved document for Development Application

MCUI/24/2023

The Stormwater Management Plan is approved in concept only and is subject to detailed design at the Operational Works stage.

Prepared For

EVANGELICAL FORMOSAN CHURCH OF ROHI INC. – LOGAN ROAD

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REPORT CONTROL SHEET

HCE Ref. No.:	22288
Site:	**3303 - 3305 Logan Road, Underwood**
Report Title:	Stormwater Management Plan

Rev No.	Date	Written By	Reviewed By	Authorised By	Signed
DRAFT	28/04/23	TC	MN	TC	
0	09/05/23	TC	GH	GH	 Digitally signed by Greg Henwood DN: C=AU, E=ghenwood@hce-engineers.com.au, O=HCE Engineers, CN=Greg Henwood Date: 2023.05.09 13:51:02+10'00'

DISTRIBUTION

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INDEX

1. Introduction
2. Earthworks
3. Stormwater Drainage
4. Flooding
5. Sewerage Reticulation
6. Water Reticulation
7. Vehicle Manoeuvering on Site
8. Conclusions

Appendix A – Concept Drawings

Appendix B – Logan City Council Flood Response Letters

Appendix C – Flood Hazard Code

Appendix D – Filling and Excavation Code

Appendix E – Infrastructure Code

1. INTRODUCTION

HCE Engineers have been engaged to prepare a Civil Engineering Assessment Report to accompany the development application for a Place of Worship (Church) at 3303 - 3305 Logan Road, Underwood (Lot 36 and 37 on SP 10904). The proposed development is for the construction of a church building with associated carparking and landscaping. The site has a total area of approximately 3,441m^2.

A general description of proposed works and items of particular note is contained within the body of this report. Tabular responses to each of the performance criteria within the Flood Hazard Overlay Code, Filling & Excavation Code and the Infrastructure Code are included as Appendices.



Image 1: *Site Location (image from Nearmap.com)*

2. EARTHWORKS

Minor earthworks are proposed to provide desired interface with the road frontage, to facilitate suitable vehicular access grades and for stormwater management purposes. No earthworks are proposed beneath the proposed church building. The architectural drawings indicate a suspended floor.

Refer to Sketch No. 22288-SK02 for the concept earthworks plan.

1. INTRODUCTION

HCE Engineers have been engaged to prepare a Stormwater Management Plan to accompany the development application for a Place of Worship (Church) at 3303 - 3305 Logan Road, Underwood.

This report identifies stormwater quality and quantity management measures that should be incorporated into the proposed site in order to satisfy Logan City Council's Planning Scheme Policy 5 and the Infrastructure Code.

This report has been prepared expressly to provide commentary regarding compliance with Council requirements for the proposed development on the subject site. Information presented in this report should not be applied to properties or developments other than the subject development. No responsibility is accepted for use of any part of this report in any other context or for any other purposes or by any third party.

2. EXISTING SITE AND CATCHMENT DESCRIPTION

The development site is located at Lot 36 and 37 on SP 10904 but is more commonly known as 3303 - 3305 Logan Road, Underwood. This site is currently developed with an existing building, concrete and bitumen hardstand over approximately 88% of the site and landscaped areas. The site falls away from Logan Road with the lowest point on the site being the southeast rear corner. The site has a total area of approximately 3,441m^2.

The Logan Road kerb and channel fronting the site directs any surface flow from the road reserve away from the site. No external catchments direct surface flow to the subject site



Image 1: *Site Location (image from Nearmap.com)*

3. WATER QUANTITY MANAGEMENT

3.1. Overview

Currently, stormwater runoff from the site is collected via an internal stormwater pit and pipe system that is connected to the existing HumesCeptor (STC2) for water quality treatment prior to discharge via the existing 375mm diameter pipe located in the southeast corner of the site. The existing 375mm diameter outlet pipe discharges directly to Slacks Creek immediately adjacent to the southern boundary of the site.

It is proposed to utilise the existing internal stormwater system and incorporate additional pit and pipe stormwater infrastructure to manage site runoff. Site runoff will discharge from the site via the existing 375mm diameter outlet pipe. Refer to the concept design drawing for details.

3.2. Stormwater Runoff Conditions

The proposed development decreases the impervious site area. Refer to Table 1 below.

Rational Method calculations for the existing and developed conditions have been undertaken. Table 1 below summaries the catchment areas utilised in the Rational Method calculations. Table 2 below outlines the predicted site discharge rates. Refer to Appendix B for details and concept sketches for the stormwater quantity catchment plans.

Table 1 – *Existing and Developed Rational Method Parameters*

Parameters	Existing Conditions	Developed Conditions
Impervious Roof Areas (m^2)	69	770
Impervious Hardstand Areas (m^2)	2,946	2,186
Pervious Areas (m^2) (Landscaped Areas)	426	485
Percent Impervious (%)	88	86

Table 2 – *Predicted Existing and Developed Flow Rates*

AEP	Existing Peak Discharge (m^3/s)	Developed Peak Discharge (m^3/s)	Difference (m^3/s)
39%	0.099	0.089	-0.010
18%	0.137	0.123	-0.014
10%	0.160	0.144	-0.016
5%	0.193	0.173	-0.020
2%	0.241	0.217	-0.024
1%	0.269	0.246	-0.023

It is demonstrated in Table 2 that post development flow decreases from that of existing conditions. Accordingly, stormwater detention is not proposed for the development site.

Given the above, the proposed development does not result in an increase in peak discharge from the site and will not result in adverse impacts to neighbouring properties in accordance with Section 3.6.2.10 of Council's Planning Scheme Policy 5 - Infrastructure.

3.3. Existing 375mm Pipe Capacity

The estimated capacity of the existing 375mm diameter outlet pipe is approximately 0.38m^3/s as outlined in Table 3 below. Rational Method calculations for the developed site are presented in Table 2 above. It can be inferred from Table 2 and 3 that the existing pipe has the capacity to convey developed site flows up to and including the 1% AEP event.

If pipe flow is reduced due to inlet restrictions or pipe blockage, excess runoff will be conveyed as surface flow over the rear site boundary to Slacks Creek.

***Table 3** – Pipe Capacity Details*

Parameter	Result
Pipe Diameter (mm)	375
Grade (%)	4.6
Manning's n	0.013
Pipe capacity @ 2.5m/s (m^3/s)	0.28

4. WATER QUALITY MANAGEMENT

Currently, water quality treatment for the site is provided via the existing HumesCeptor (STC2). Stormwater runoff from the site is collected via internal stormwater grated pits and piped to the HumesCeptor prior to discharge from the site.

As stated in Section 3.2 above, the proposed development decreases the impervious site area. It is therefore expected that pollutant load generation will not increase as a consequence of the development. As such, with the use of the existing HumesCeptor current water quality treatment levels will not worsen. No further water quality treatment measures are proposed.

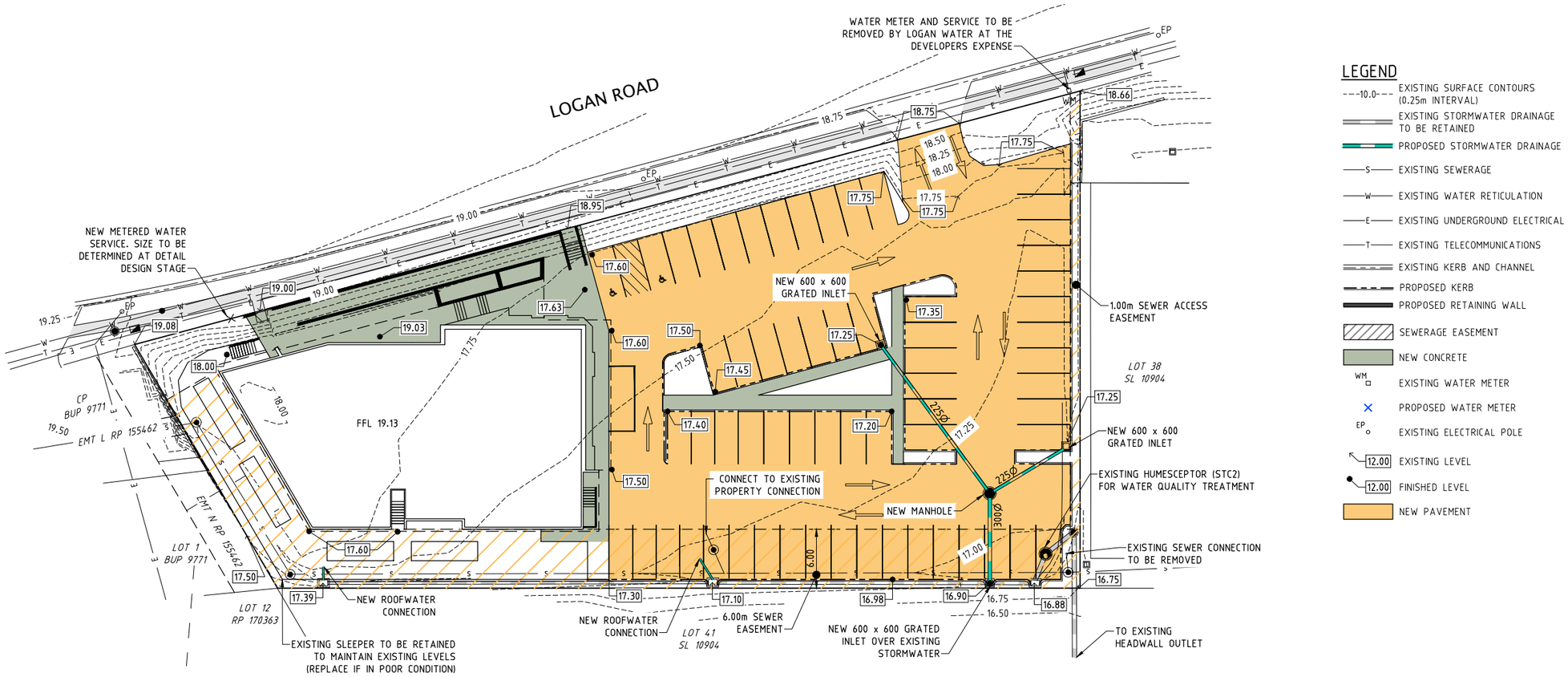
It is also noted that the design objectives for frequent flow management and waterway stability are not required to be met because peak flows and the volume of flow discharging from the site are decreased from that of existing conditions via virtue of the proposed reduction in site impervious areas.

5. CONCLUSIONS

The proposed development is for the construction of a church with associated parking and landscaped areas. The proposed development decreases the impervious site area and does not result in an increase in peak discharge from the site. As a result there will not be any adverse impacts to neighbouring properties in accordance with Section 3.6.2.10 of Council's Planning Scheme Policy 5 – Infrastructure. Stormwater detention is therefore not proposed for the development site.

It is proposed to utilise existing water quality treatment infrastructure on site. No further water quality treatment measures are proposed.

APPENDIX A – CONCEPT DRAWINGS



LEGEND

- EXISTING SURFACE CONTOURS (0.25m INTERVAL)
- EXISTING STORMWATER DRAINAGE TO BE RETAINED
- PROPOSED STORMWATER DRAINAGE
- EXISTING SEWERAGE
- EXISTING WATER RETICULATION
- EXISTING UNDERGROUND ELECTRICAL
- EXISTING TELECOMMUNICATIONS
- EXISTING KERB AND CHANNEL
- PROPOSED KERB
- PROPOSED RETAINING WALL
- SEWERAGE EASEMENT
- NEW CONCRETE
- EXISTING WATER METER
- PROPOSED WATER METER
- EXISTING ELECTRICAL POLE
- 12.00 EXISTING LEVEL
- 12.00 FINISHED LEVEL
- NEW PAVEMENT

PLAN

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PROJECT	TITLE	CLIENT
3303 - 3305 LOGAN ROAD UNDERWOOD QLD 4119 LOT 36-37 SL 10904	CONCEPT CIVIL SERVICING AND FINISHED LEVEL PLAN	JOAS CHRISTOFAN

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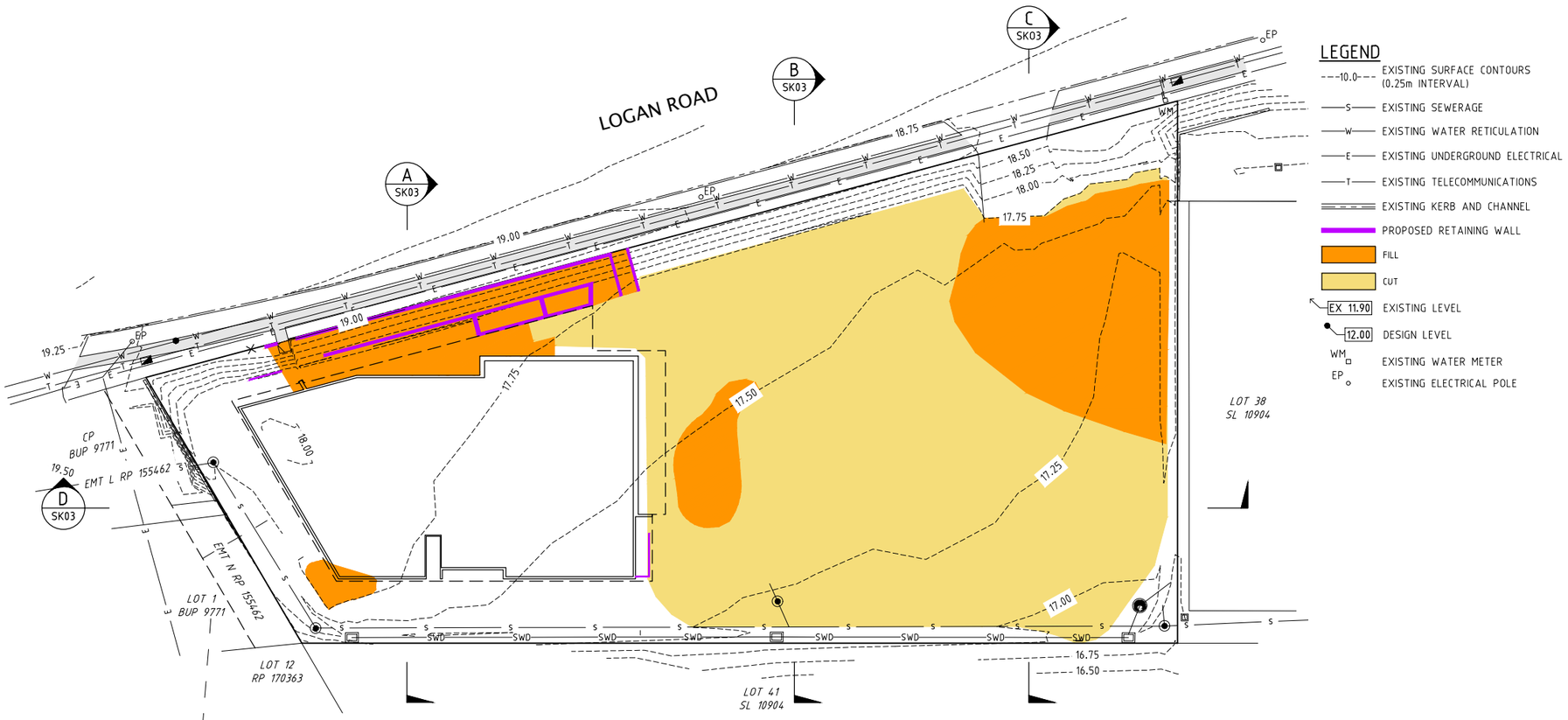
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TC	JW/TC	28/04/2023

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PLAN

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PROJECT	TITLE	CLIENT
3303 - 3305 LOGAN ROAD UNDERWOOD QLD 4119 LOT 36-37 SL 10904	CONCEPT EARTHWORKS PLAN	JOAS CHRISTOFAN

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REVISION	AMENDMENT	DATE
A	ISSUED FOR COMMENT	28/04/23

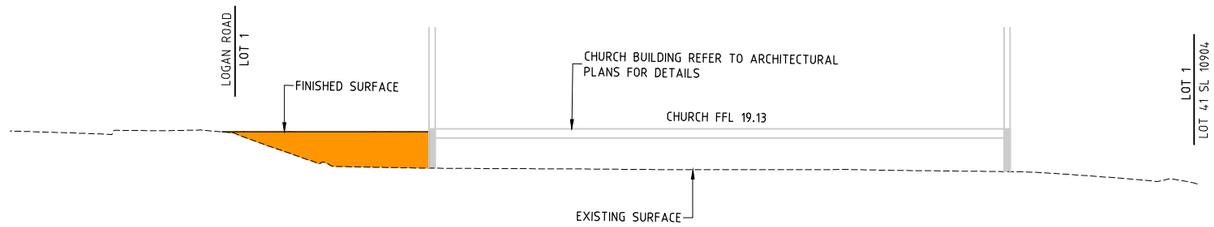
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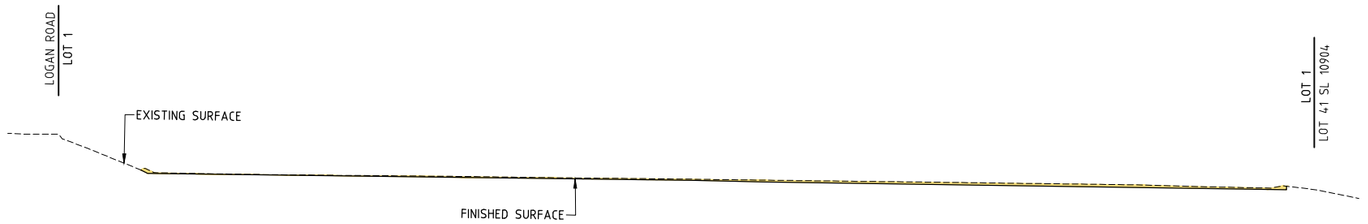
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TC	JW/TC	28/04/2023

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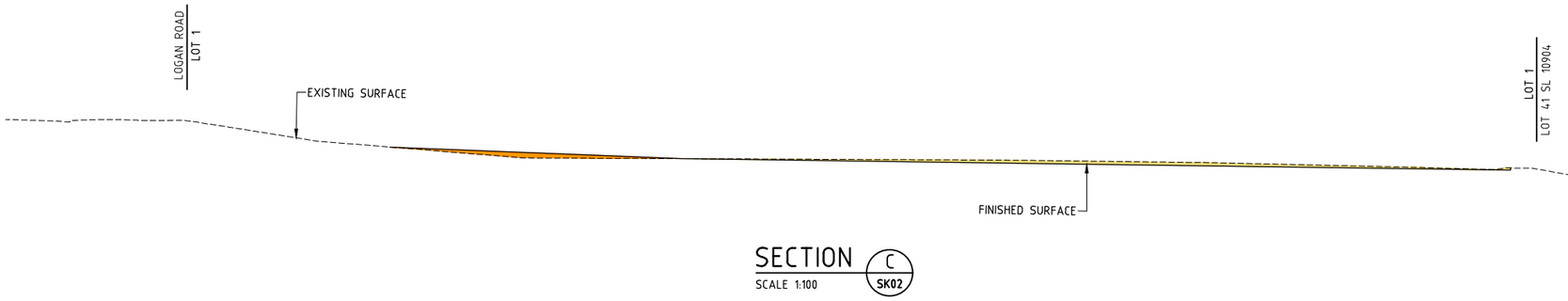
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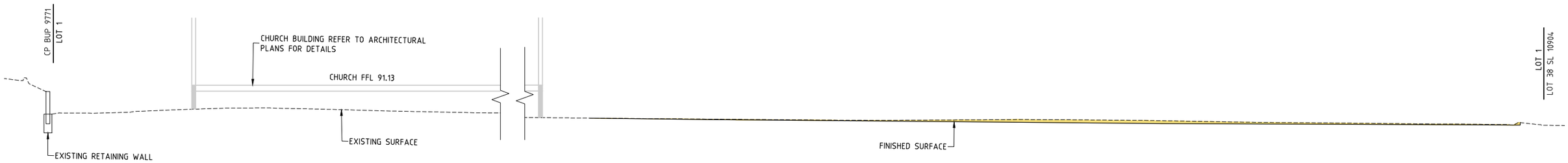
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SECTION B
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SK02



SECTION C
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SECTION D
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LEGEND
- EXISTING SURFACE
- FINISHED SURFACE
- FILL
- CUT

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PROJECT	TITLE	CLIENT
3303 - 3305 LOGAN ROAD UNDERWOOD QLD 4119 LOT 36-37 SL 10904	CONCEPT EARTHWORKS SECTIONS	JOAS CHRISTOFAN

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REVISION	AMENDMENT	DATE
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APPENDIX B – RATIONAL METHOD CALCULATIONS

RATIONAL METHOD CALCULATIONS - EXISTING SITE

Job Reference	22288
Site Address	3303 - 3305 Logan Road, Underwood
Council	Logan City Council

Number of Sub-Catchments	3	
Minor Storm Event	Q2	*(As per QUDM Table 7.02.1)*
Major Storm Event	Q100	*(As per QUDM Table 7.02.1)*

Subcatchment Summary Table

Number	Catchment Name	Catchment Description	C_{10}	tc
1	roof	Impervious Roof	0.90	6
2	landscape	Open Space (eg parks)	0.70	6
3	hardstand	Significant paved areas	0.88	6

Catchment Calculations (Major and Minor Storm ARI's)

Number	Area	C2	I2	Q2	C100	I100	Q100
	ha		mm/hr	m^3/s		mm/hr	m^3/s
1	0.007	0.77	142	0.002	1.00	286	0.006
2	0.043	0.60	142	0.010	0.84	286	0.029
3	0.295	0.75	142	0.087	1.00	286	0.234

Total Runoff	Minor	0.099	m^3/s
	Major	0.269	m^3/s
Total Area		0.345	ha

Overland Flow Calculations		
Trunk SW Infrastructure		
Pipe Diameter	N/A	m
Number of Pipes	0	
Grade	0	m/m
mannings	0	
Pipe Capacity		m^3/s
Pipe Velocity		m/s
Capacity @ 3m/s		m^3/s
Overland Flow		m^3/s

All Storm ARI's		
ARI	Peak Discharge	
3 Month	0.037	m^3/s
1	0.073	m^3/s
2	0.099	m^3/s
5	0.137	m^3/s
10	0.160	m^3/s
20	0.193	m^3/s
50	0.241	m^3/s
100	0.269	m^3/s

RATIONAL METHOD CALCULATIONS - DEVELOPED SITE

Job Reference	22288
Site Address	3303 - 3305 Logan Road, Underwood
Council	Logan City Council

Number of Sub-Catchments	3	
Minor Storm Event	Q10	*(As per QUDM Table 7.02.1)*
Major Storm Event	Q50	*(As per QUDM Table 7.02.1)*

Subcatchment Summary Table

Number	Catchment Name	Catchment Description	C_{10}	tc
1	Roof/Impervious	Impervious Roof	0.90	6
2	Landscaped	Open Space (eg parks)	0.70	6
3	Impervious	Significant paved areas	0.88	6

Catchment Calculations (Major and Minor Storm ARI's)

Number	Area	C10	I10	Q10	C50	I50	Q50
	ha		mm/hr	m^3/s		mm/hr	m^3/s
1	0.077	0.90	195	0.038	1.00	258	0.055
2	0.219	0.70	195	0.083	0.81	258	0.126
3	0.049	0.88	195	0.023	1.00	258	0.035

Total Runoff	Minor	0.144	m^3/s
	Major	0.217	m^3/s
Total Area		0.345	ha

Overland Flow Calculations		
Trunk SW Infrastructure		
Pipe Diameter	0.375	m
Number of Pipes	1	
Grade	0.045	m/m
mannings	0.013	
Pipe Capacity	0.372	m^3/s
Pipe Velocity	3.368	m/s
Capacity @ 2.5/s	0.276	m^3/s
Overland Flow	-0.059	m^3/s

All Storm ARI's		
ARI	Peak Discharge	
3 Month	0.033	m^3/s
1	0.066	m^3/s
2	0.089	m^3/s
5	0.123	m^3/s
10	0.144	m^3/s
20	0.173	m^3/s
50	0.217	m^3/s
100	0.246	m^3/s