

July 2026

MNCE Ref: S15582

SITE BASED STORMWATER MANAGEMENT PLAN

Y-Care, Lot 8011 Baringa Drive, Baringa

Commissioned By
Mode Design

PLANS AND DOCUMENTS
referred to in the PDA
DEVELOPMENT APPROVAL

Approval no: DEV2026/CAS/4694

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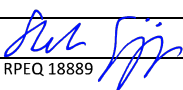
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REPORT CONTROL SHEET

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Report Title:	Site Based Stormwater Management Plan
Report Author:	Stefan Spirig

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D	S15582-260618-CALCS-MUSIC-REVC	S15582-260605-DRAINS-REVB	S15582-260605-RM CALCS-REVB
E	S15582-260713-CALCS-MUSIC-REVE	see above	see above
F	S15582-260716-CALCS-MUSIC-REVF	see above	see above

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1 INTRODUCTION

1.1 Overview and Background

A development application for a Material Change of Use is proposed to be lodged over Lot 8001 on SP298744 at Baringa Drive, Baringa. The site is located within the Sunshine Coast Council local government area, specifically within the Caloundra South Priority Development Area (PDA) – Sub-Precinct 2.9. The site has a total area of approximately 0.46 ha. Figure 1.1 provides an aerial view of the site and surrounding areas.



Figure 1.1: Subject Site bound by Baringa Drive to the south (QLD Globe)

The proposed development involves the construction of an educational establishment and community facility, with an associated car park and circulation roadway. Refer to Appendix A for the proposed development layout.

The site generally falls in a northerly direction towards Lamerough Creek, with a grade of approximately 1–2%. A stormwater manhole and a 525 mm diameter stormwater main are located in the north-western corner of the site. An outgoing 525 mm pipe from the site connects to existing stormwater manholes to the north, which are located within the northern sports fields and convey stormwater southwards towards Lamerough Creek.

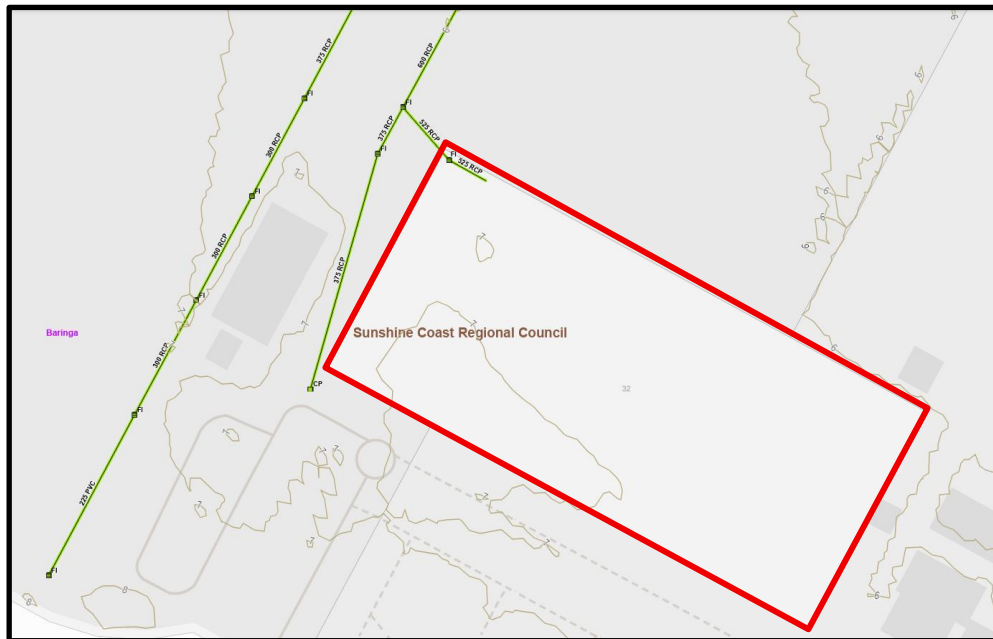


Figure 1.2: Stormwater Infrastructure close-up (SCS MyMaps)

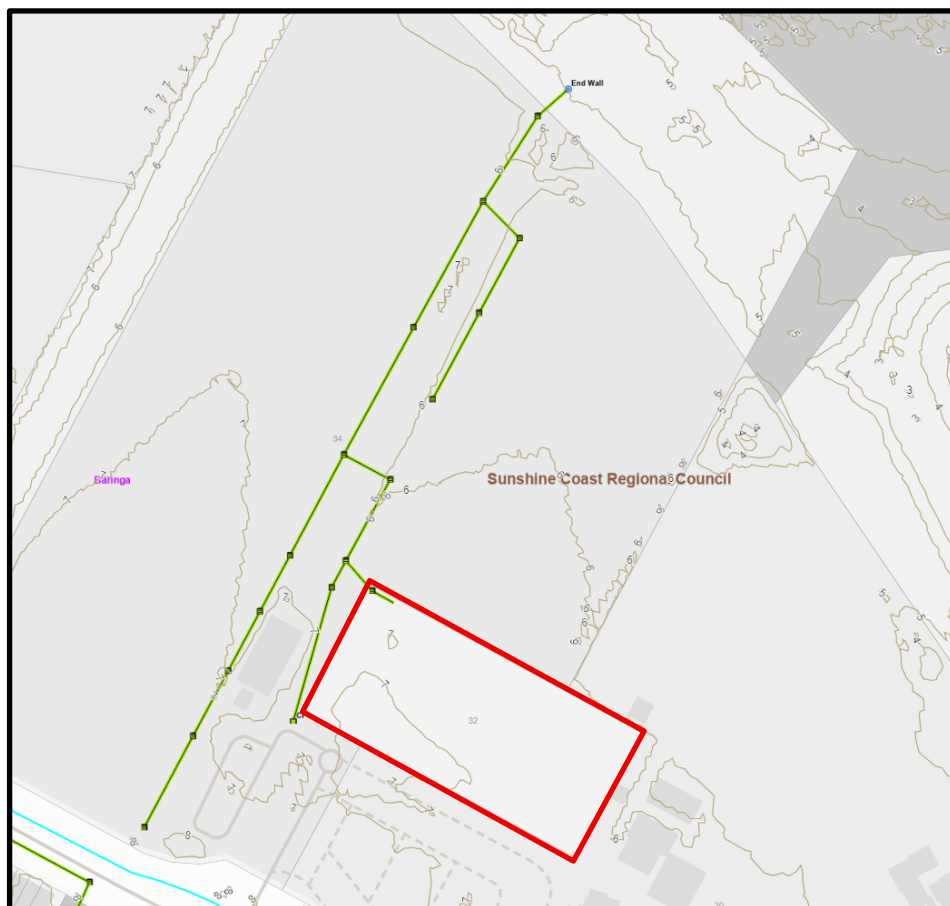


Figure 1.3: Stormwater Infrastructure (SCS MyMaps)

Sunshine Coast Council overlay maps indicate that the site is not identified as being affected by low, moderate, or high flood risk.

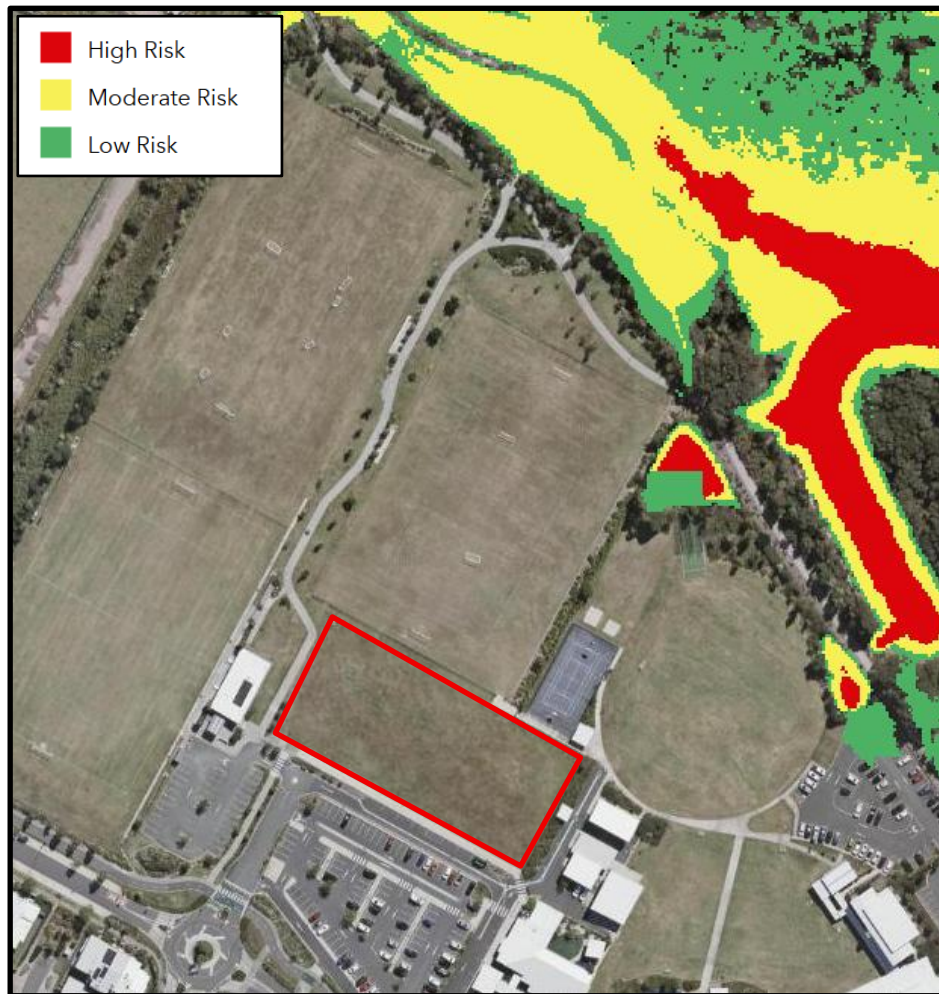


Figure 1.4: Flood risk map (SCC MyMaps)

1.2 Objectives and Scope

Milanovic Neale Consulting Engineers have been commissioned by Mode Design to undertake an assessment of stormwater quality and quantity impacts associated with the proposed development. Stormwater management strategies are also to be identified for the proposed development as required.

The scope of works undertaken for this project is summarized below:

1. Assessment of the development against State and Local Government legislation to identify water quality management measures to be adopted for the proposed development.
2. Undertake pollutant export modelling of anticipated pre and post development pollutant concentrations and loads and conceptual design of water quality improvement devices.
3. Assessment of the pre and post development stormwater discharge and undertake preliminary design and commentary of any mitigation devices required to control site discharge if required.

2 DATA

2.1 State and Local Government Policies

The *Planning Scheme Policy for Development Works* and *Flooding and Stormwater Management Guidelines 2020* from Sunshine Coast Council's *Planning Scheme 2014* have been used to establish the stormwater objectives and requirements for the development. Furthermore, the *Guideline Caloundra South – Northern Locality – Precinct 2 and Part of Precinct 6 – Plan of Development* (December 2023) (RPS Group, Approval No. DEV2013/430/173, approved 15 February 2024) will also be utilised.

2.2 Level and Modelling Data

Contour information for the site and adjacent properties was obtained from publicly available elevation data on ELVIS (Elevation and Depth -Foundation Spatial Data) which comprise surface level contours at 0.5m intervals.

Rainfall data for the Sunshine Coast Region was extracted from AR&R 2019 through the IFD tool on the Bureau of Meteorology website.

The Music Modelling Guidelines 2010, the Queensland Urban Drainage Manual (QUDM) and the Australian Rainfall and Runoff Guidelines have been used as a guide to establish the modelling inputs and methodologies applicable for the development.

3 OPPORTUNITIES AND CONSTRAINTS

3.1 Site Opportunities

Currently there are no stormwater quality measures on site, thus there are some opportunities to improve the quality of the stormwater leaving the site before discharge through stormwater treatment devices.

3.2 Site Constraints

The rear northern boundary of the site is slightly lower than the southern site frontage. A minor retaining wall is proposed along the north-western portion of the northern boundary. On the north-eastern portion of the site, the proposed grassed area will remain approximately at the existing level, and no retaining wall works are proposed along the north-eastern boundary.

4 WATER QUALITY MANAGEMENT

This section of the report will provide an assessment of the development against State and Local Government legislation to identify water quality management measures to be adopted for the proposed development.

Pollutant export modelling will also be undertaken of anticipated pre- and post-development pollutant concentrations and loads and conceptual design of water quality improvement devices.

4.1 Risk Category

The *State Planning Policy – July 2017* and the *Flooding and Stormwater Management Guidelines 2020* from *Sunshine Coast Council's Planning Scheme Policy 2014* identifies developments as high risk with respect to stormwater quality if any of the following criteria are triggered:

1. Material change of use urban purposes that involves a land area greater than 2,500m² that:
 - a. Will result in an impervious area greater than 25 percent of the net developable area; or
 - b. Will result in six or more dwellings, or
2. Reconfiguring a Lot for urban purposes that involves a land area greater than 2,500m² and will result in 6 or more Lots; or
3. Operational work for urban purposes that involves disturbing more than 2,500m² of land;

With respect to the above, the Policy can be applied to the material change of use of the site due to point 1(a) and 3 being triggered. Therefore, in order to demonstrate required stormwater quality objectives are achieved, pollutant export modelling will be incorporated in the design of stormwater quality treatment train for the site.

Furthermore, Table 26 – Design Standards for Sub-Precinct 2.9 (DS10.6 and DS11.1) of the *Guideline Caloundra South – Northern Locality – Precinct 2 and Part of Precinct 6 – Plan of Development* (December 2023) (RPS Group, Approval No. DEV2013/430/173, approved 15 February 2024) requires that standard best practice pollutant rates are satisfied (refer to Table 4.1).

4.2 Water Quality Objectives

4.2.1 Construction Phase

The *Urban Stormwater Quality Guidelines 2010* identify that eroded soils and litter are major pollutant sources during construction activity. There is also potential for hydro-modification of streams due to increased run-off coefficients when subsoils are exposed, for longer term major developments. Water sensitive urban design principles and reducing erosion during construction are fundamental to achieving water quality objectives in relevant waterways.

It is therefore proposed to prepare an erosion and sediment management plan during the operational works phase of the development which will incorporate a range of control measures to be implemented during the construction phase of the project.

4.2.2 Operational Phase

Stormwater quality management design objectives for the operational phase of the development are identified in the following table, in accordance with the *Urban Stormwater Quality Guidelines 2010* and Table 26 – Design Standards for Sub-Precinct 2.9 (DS10.6 and DS11.1) of the *Guideline Caloundra South – Northern Locality – Precinct 2 and Part of Precinct 6 – Plan of Development* (December 2023) (RPS Group, Approval No. DEV2013/430/173, approved 15 February 2024). These objectives emphasise the reduction of mean annual pollutant loadings associated with suspended sediments and nutrients.

Table 4.1: Stormwater Quality Objectives

Region	Minimum Reductions in Mean Annual Loads from Unmitigated Development (%)			
	Total Suspended Solids (TSS)	Total Phosphorus (TP)	Total Nitrogen (TN)	Gross Pollutants > 5mm (GP)
South-East Queensland	80	60	45	90

4.3 Pollutant Export Modelling

4.3.1 Model Selection

In order to determine on site pollutant generation, discharge concentrations of target pollutants and the effectiveness of Stormwater Quality Improvement Devices the Model for Urban Stormwater Improvement Conceptualisation (MUSIC) has been used to model the development proposal.

4.3.2 MUSIC Model Configuration

The following sections identify the modelling parameters used in the configuration of the MUSIC Model adopted for the development. The following figure provides a screenshot of the MUSIC model schematic for reference.

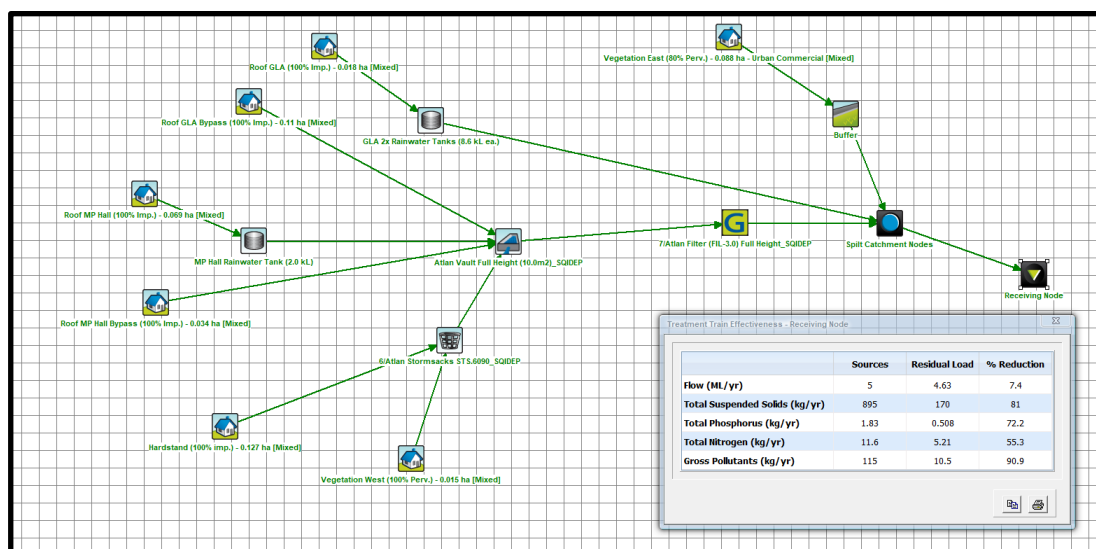


Figure 4.1: MUSIC Model Layout

4.3.2.1 Meteorological and Time Step

Meteorological Data used in the MUSIC model has been identified in accordance with the *MUSIC Modelling Guidelines 2010*, incorporating the following parameters:

Rainfall Period: 01/01/1997 12:00 AM to 31/12/2006 11:54 PM

Rainfall Station: 40496 Cloundra

A model time step of 6 minutes has also been adopted as recommended in Section 3.2 of the *MUSIC Modelling Guidelines 2010*.

4.3.2.2 Catchment Properties

The MUSIC model for the development adopts a split catchment approach, whereby the site has been broken down into various catchments in accordance with site specific land uses. The following table provides a summary of the catchment data used in the MUSIC analysis.

Table 4.2: MUSIC Catchment Parameters

Catchment Name	Area (ha)	Fraction Impervious (%)	MUSIC Source Node
Roof GLA	0.018	100	Commercial
Roof GLA Bypass	0.110	100	Commercial
Roof MP Hall	0.069	100	Commercial
Roof MP Hall Bypass	0.034	100	Commercial
Hardstand	0.127	100	Commercial
Vegetation	0.015	0	Commercial
Bypass East	0.088	20	Commercial

4.3.2.3 Rainfall Runoff Parameters

The following table provides a summary of the rainfall runoff parameters adopted for the source nodes used in the MUSIC analysis which has been extracted from Table 3.7 of the *MUSIC Modelling Guidelines 2010*.

Table 4.3: MUSIC Source Node Base and Storm Flow Concentration Parameters

Land Use	Parameter	Total Suspended Solids (Log ₁₀ mg/L)		Total Phosphorus (Log ₁₀ mg/L)		Total Nitrogen (Log ₁₀ mg/L)	
Roof	Mean	N/A	1.30	N/A	-0.89	N/A	0.37
	Std Deviation	N/A	0.38	N/A	0.34	N/A	0.34
Road	Mean	0.78	2.43	-0.60	-0.30	0.32	0.37
	Std Deviation	0.39	0.38	0.50	0.34	0.30	0.34
Ground	Mean	0.78	2.16	-0.6	0.5	0.32	0.37
	Std Deviation	0.39	0.38	0.39	0.34	0.37	0.34

4.3.2.4 Pollutant Export Parameters

The following table provides a summary of the pollutant export parameters for split catchment surface types which have been adopted for the source nodes used in the MUSIC analysis. This information has been extracted from Table 3.8 of the *MUSIC Modelling Guidelines 2010*.

Table 4.4: MUSIC Catchment Parameters

Parameter	Quantity
Rainfall Threshold (mm)	1
Soil Storage Capacity (mm)	18
Initial Storage (%)	10
Field Capacity (mm)	80
Infiltration Capacity Coefficient a	243
Infiltration Capacity Coefficient b	0.6
Daily Recharge Rate (%)	0
Daily Base-Flow Rate (%)	31
Daily Seepage Rate (%)	0

4.3.3 Developed Unmitigated Conditions

MUSIC Modelling has been performed to determine the pollutant export and corresponding concentrations from the development site under the proposed conditions. The mean annual loads that have been estimated for proposed unmitigated conditions are given in Table 4.5 below, also shown are the mean annual load percentage reductions required to meet current State Planning Policy objectives.

Table 4.5: MUSIC Unmitigated Mean Annual Loads (kg/yr)

Pollutant	Unmitigated Mean Annual Load (kg/yr)	Reduction required to meet Council Requirements (%)
Total Suspended Solids (TSS)	895	80
Total Phosphorous (TP)	1.83	60
Total Nitrogen (TN)	11.6	45
Gross Pollutants (GP)	115	90

Refer Appendix D for MUSIC summary report.

4.3.4 Developed Mitigated Conditions

4.3.4.1 Proposed Rainwater tanks

Rainwater re-use tanks have been modelled MUSIC with the following parameters:

General Learning Area:

- Total. Tank Volume (GLA) = 17.2kL
- Captured Roof area = 0.018 ha
- Total Surface Area = 9.2 m²
- Overflow diameter = 90mm
- Indoor re-use = 1.1 kL/day (10 people/day × 10 L/flush × 20 toilets, averaged over 200 school days per year)
- Outdoor re-use = 50 kL/year

The total rainwater used in one year for the General Learning Area is (0.223 - 0.037 ML/yr) = 0.19 ML/yr.

Total Rainwater Usage GLA (0.19 ML/yr) / Total demand (1.1 kL/day = 0.40ML/yr) = 48%.

Multi-Purpose Hall:

- Total. Tank Volume (MP Hall) = 2.0kL
- Captured Roof area = 0.069 ha
- Total Surface Area = 1.2 m²
- Overflow diameter = 90mm
- Indoor re-use = 0.11 kL/day (10 people/day × 10 L/flush × 2 toilets, averaged over 200 school days per year)
- Outdoor re-use = 50 kL/year

The total rainwater used in one year for the MP Hall is (0.855 - 0.673 ML/yr) = 0.18 ML/yr.

Total Rainwater Usage MP Hall (0.18 ML/yr) / Total demand (0.11 kL/day + 50 kL/yr = 0.10 ML/yr) = 180% (Capped at 100%).

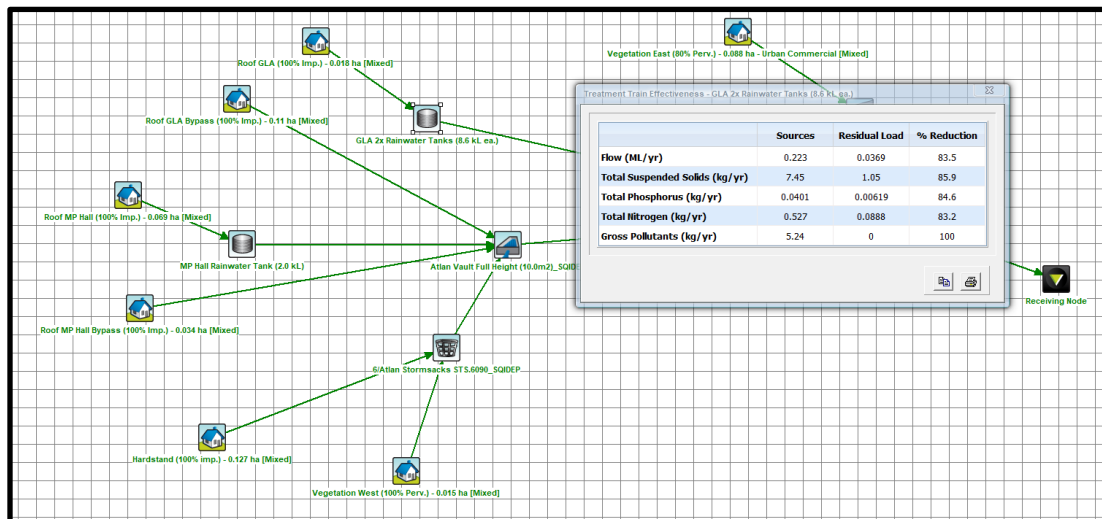


Figure 4.1: MUSIC Model for GLA Rainwater Tanks

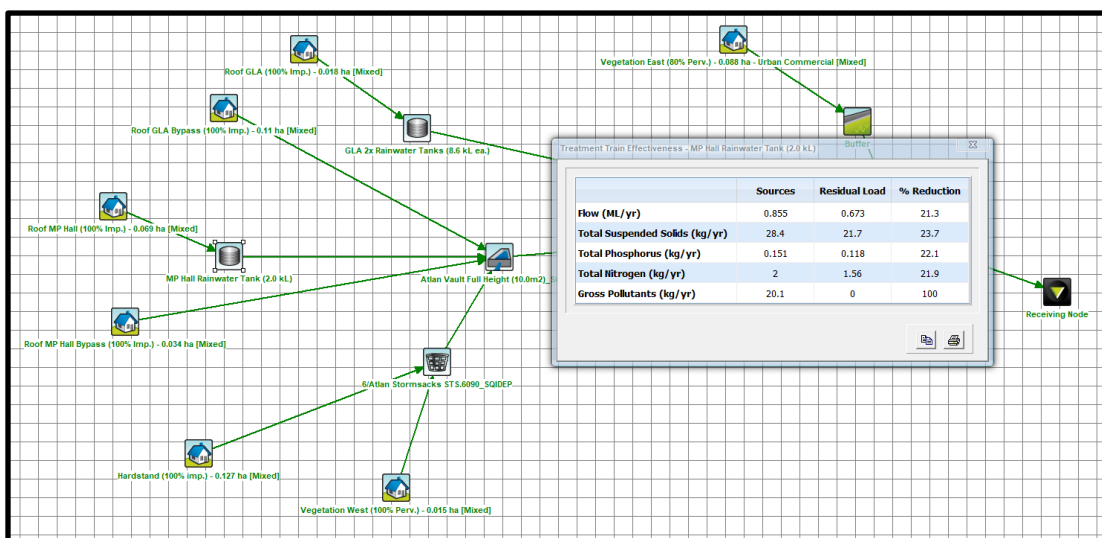


Figure 4.2: MUSIC Model for MP Hall Rainwater Tank

From the MUSIC modelling it has been determined that the rainwater tanks for the General Learning Area will supply approximately 48% of the total water re-use demand (indoor toilet flushing and outdoor irrigation), with the remaining 52% to be sourced from the potable mains supply. It has also been determined that the rainwater tanks for the Multi-Purpose Hall will supply 100% of the total water re-use demand (indoor toilet flushing and outdoor irrigation). Mains top-up ensures continuity of supply to indoor fixtures during extended dry periods when tank storage is depleted.

4.3.4.2 Developed Mitigated Results

The scale of the development is large enough to support the implementation of effective water quality design measures. Therefore, a consideration of a variety of best

management measures has been given with a focus on water quality treatment measures and reducing polluted runoff volumes from the site.

Key elements of the proposed stormwater management plan are as follows:

- Runoff associated with the proposed access, car parking and landscaped areas is to be captured and initially treated through 6 No. source pollutant filters (Atlan Stormsacks or similar) before being piped to the proposed stormwater treatment tank to the north-west of the site (see Section 5).
- A total rainwater tank volume of approximately 19.2 kL is proposed. This volume is intended for reuse purposes, and the final location will be determined by the architect. The rainwater tank has been designed to provide storage for toilet and urinal flushing within the educational establishment, as well as for irrigation purposes.
- Runoff associated with proposed roof areas to be piped to the proposed stormwater treatment tank which is to be fitted with 7 No. Atlan cartridges.
- Treated and detained site flows to be discharged into existing stormwater infrastructure within the rear sporting fields

The table below demonstrates that the required pollutant reductions have been achieved through the implementation of the proposed stormwater treatment train.

Table 4.6: MUSIC Model Removal Efficiencies

Pollutant	Unmitigated Mean Annual Load (kg/yr)	Residual Mean Annual Load (kg/yr)	Reduction required to meet Council Requirements (%)	Removal Efficiency Achieved (%)
Total Suspended Solids (TSS)	895	170	80	81.0
Total Phosphorous (TP)	1.83	0.508	60	72.2
Total Nitrogen (TN)	11.6	5.21	45	55.3
Gross Pollutants (GP)	115	10.5	90	90.9

4.3.5 Sensitivity Analysis of Rainwater Tanks – EDQ Comparison

4.3.5.1 EDQ Rainwater tanks

EDQ recommends 50% of the roof area drain to the tanks and allows for 1.5kL demand per toilet. Based on this assumption rainwater re-use tanks have been modelled in the MUSIC model with parameters recommended by EDQ:

General Learning Area:

- Total. Tank Volume (GLA) = 30.0kL
- Captured Roof area = 0.064 ha
- Total Surface Area = 13.8 m²
- Overflow diameter = 90mm
- Indoor re-use = 1.1 kL/day (10 people/day × 10 L/flush × 20 toilets, averaged over 200 school days per year)
- Outdoor re-use = 50 kL/year

The total rainwater used in one year for the General Learning Area is (0.793 - 0.280 ML/yr) = 0.513 ML/yr.

Total Rainwater Usage GLA (0.513 ML/yr) / Total demand (1.1 kL/day = 0.40ML/yr) = 128% (Capped at 100%).

Multi-Purpose Hall:

- Total. Tank Volume (MP Hall) = 3.0kL
- Captured Roof area = 0.052 ha
- Total Surface Area = 1.8 m²
- Overflow diameter = 90mm
- Indoor re-use = 0.11 kL/day (10 people/day × 10 L/flush × 2 toilets, averaged over 200 school days per year)
- Outdoor re-use = 50 kL/year

The total rainwater used in one year for the MP Hall is (0.644 - 0.440 ML/yr) = 0.204 ML/yr.

Total Rainwater Usage MP Hall (0.204 ML/yr) / Total demand (0.11 kL/day + 50 kL/yr = 0.10 ML/yr) = 204% (Capped at 100%).

The table below shows the comparison between the two rainwater tank sizing methodologies (Proposed Option and EDQ) for the GLA and MP Hall buildings.

Table 4.7: Sensitivity Analysis Rainwater Tank Models (MUSIC)

Model	Building	Total Rainwater Usage (ML/yr)	Total Demand (ML/yr)	Usage (%)
Proposed Option	GLA	0.19	0.40	48%
	MP Hall	0.18	0.10	100% (Capped)
EDQ	GLA	0.51	0.40	100% (Capped)
	MP Hall	0.20	0.10	100% (Capped)

Comparing the two sizing methodologies, the EDQ model results in a larger rainwater tank usage than the proposed option model for both buildings, reflecting its more conservative 50% roof area allocation and 1.5kL per toilet demand allowance. For the GLA, the EDQ model achieves 100% (Capped) usage against demand compared to 48% under the proposed option, while for the MP Hall both models achieves 100% usage (100% (Capped) under the proposed option and 100% (Capped) under EDQ), indicating that the rainwater supply exceeds the reuse demand for this building under either methodology. Overall, the EDQ model provides a more conservative (higher-yield) estimate of rainwater tank performance across both buildings, while the proposed option model reflects a more moderate demand-based approach. Based on the architectural building and roof layout constraints, the proposed capture rate of 48% and 100% respectively is considered sufficient.

5 WATER QUANTITY MANAGEMENT

This section of the report will provide an assessment of the pre and post development stormwater discharge and undertake preliminary design and commentary of any mitigation devices required to control site discharge.

5.1 Existing Conditions

This section of the report will analyse and comment on the existing site stormwater discharge conditions. The modelling software DRAINS will be used to generate the hydrographs and peak median flows from the site for all storm events up to an including the 1% AEP storm event.

5.2 Existing Hydrologic Model

5.2.1 Catchment Definition

An examination of the existing site land topography and land use was undertaken to quantify the number of sub catchments and sub catchment areas applicable for the site. One fundamental sub catchment was considered for the site; the pervious grassed area which is currently utilised as sports field. This catchment currently drains to the west, and the residual portion of the site drains to the east.

Refer Table 5.1 below for existing site catchment details and existing catchments. For details refer MNCE Pre-Developed Catchment Plan in Appendix A. Manning's 'n' numbers were adopted for specific surface areas and the catchment slope has been determined following review of the architectural drawing set (refer Appendix A for architectural drawings).

Table 5.1: Catchment Data Summary Table

Catchment	Sub Catchment	Area (ha)	Impervious (%)	Slope (%)	Manning's 'n'
Existing Vegetation West	Impervious/ Pervious	0.1274	0	2	0.035
Existing Vegetation East	Impervious/ Pervious	0.3391	0	2	0.035
EXT 1	Impervious/ Pervious	0.2722	80/20	2	0.015/0.035
EXT 2a	Impervious/ Pervious	0.1019	80/20	2	0.015/0.035

EXT 2b	Impervious/ Pervious	0.0258	80/20	2	0.015/0.035
EXT 3	Impervious/ Pervious	0.1109	100	2	0.035
EXT 4	Impervious/ Pervious	0.4516	100	2	0.035
EXT 5	Impervious/ Pervious	0.1682	100	2	0.035
EXT 6	Impervious/ Pervious	0.6089	100	2	0.035
EXT 7	Impervious/ Pervious	0.4851	100	2	0.035

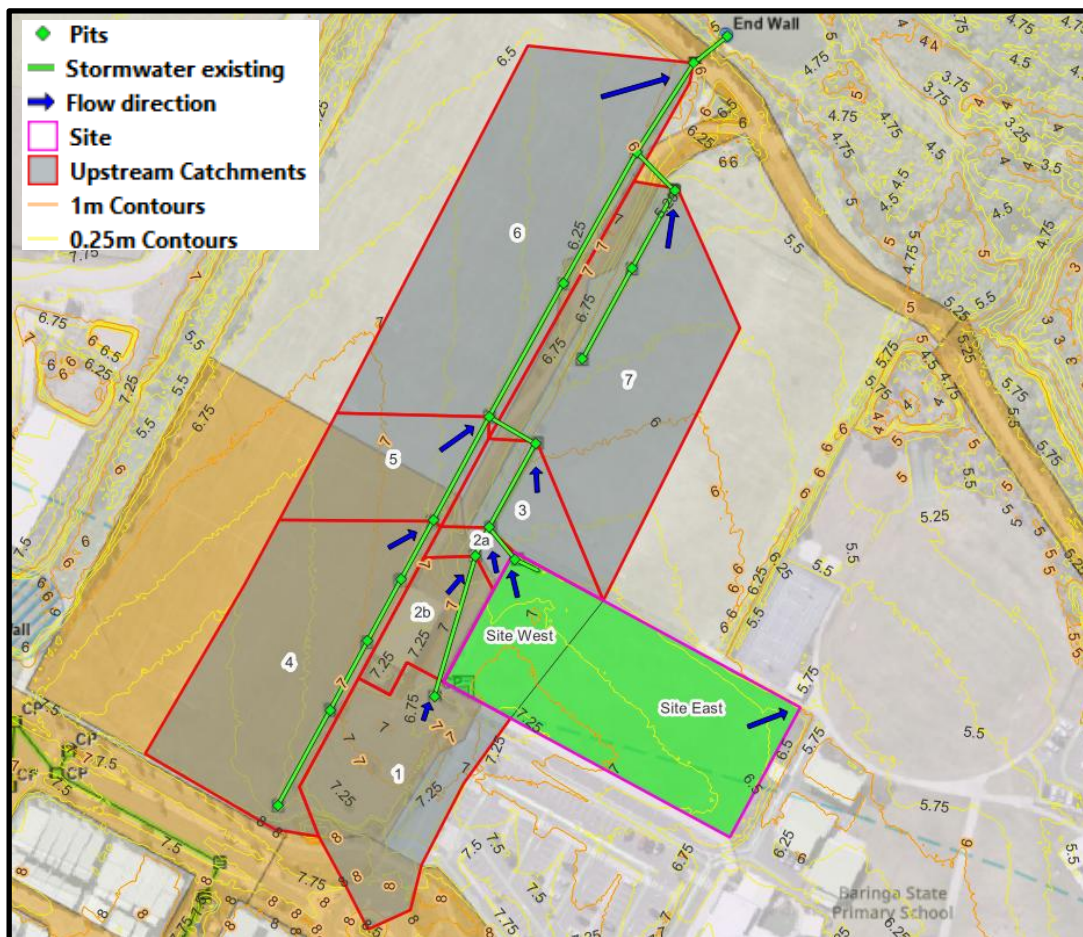


Figure 5.1: Overview of existing stormwater infrastructure and catchments

5.2.2 Rainfall Parameters and Losses

As indicated in Section 2.2 above, Rainfall data relative to the subject site has been extracted from AR&R 2016 through the IFD tool on the Bureau of Meteorology website. The uniform loss method was adopted to account for rainfall losses throughout the existing catchment. Based on information provided in the *ARR Data Hub tool*, initial and continuing loss coefficients adopted for the impervious and pervious sub catchments have been tabulated below. It is noted that an initial loss coefficient equal to approximately 70% of the rural loss value provided in the ARR Data Hub has been considered to reference to *Book 5 of ARR 2019*.

Table 5.2: Initial and Continuing Loss Parameters

Parameter	Value (mm)
Initial Loss (Pervious)	19.0
Initial Loss (Impervious)	1.0
Continuing Loss (Pervious)	2.7
Continuing Loss (Impervious)	0.0

Temporal patterns applicable to East Coast North have been adopted in accordance with the *Australian Rainfall and Runoff, A Guide to Flood Estimation*.

Furthermore a 20% climate change factor has been included within DRAINS model (as recommended by the Sunshine Coast Planning Scheme).

5.2.3 Existing Hydrological Results

The following table provides a summary of the peak median discharge from the existing site that was estimated by the DRAINS software for all storm events up to and including the 1% AEP storm event.

Table 5.3: Existing Site Peak Discharge

Storm Event	DRAINS Peak Runoff West (m ³ /s)	DRAINS Peak Runoff East (m ³ /s)	DRAINS Peak Runoff Total (m ³ /s)
39% AEP	0.035	0.092	0.126
18% AEP	0.044	0.119	0.162
10% AEP	0.052	0.138	0.189
5% AEP	0.061	0.162	0.222
2% AEP	0.072	0.193	0.264
1% AEP	0.081	0.217	0.297

5.2.4 Runoff Comparison

QUDM Section 4.1.3 recommends hydrologic models are calibrated with actual flow data rather than to an alternate runoff routing model. In the absence of such data, Section 4.1.3 continues to state that as an alternative, model results may be compared with the results to a Rational Method peak discharge for catchments less than 500ha.

Based on the methods outlined in *QUDM*, the following parameters were used to estimate the peak runoff from the upstream catchment affecting the site. Refer Appendix C for detailed rational method calculation summary.

Table 5.4: Rational Method Parameters

Name	Area (ha)	Runoff Coefficient (C10)	Time of Concentration (mins)
Site West	0.1274	0.88	6
Site East	0.3391	0.74	15
Total	0.4665	0.85	

The following table provides a comparison of the results of both the Rational Method and DRAINS Model results for peak discharges up to and including the 1% AEP storm event.

Table 5.5: Existing Site Discharge Comparison

Storm Event	Rational Method Peak Runoff (m ³ /s)	DRAINS Peak Runoff (m ³ /s)	Difference	
			+/-	%
39% AEP	0.081	0.126	0.045	56%
18% AEP	0.120	0.162	0.042	35%
10% AEP	0.147	0.189	0.042	29%
5% AEP	0.176	0.222	0.042	26%
2% AEP	0.223	0.264	0.041	19%
1% AEP	0.257	0.297	0.040	16%

As can be seen above, the DRAINS IL-CL model generates peak flows that are larger than to what is estimated by the Rational Method for the catchment. This is mostly due to the climate change factor that was included within the DRAINS model. The scenario that has been modelled is within 16-56% and is therefore considered suitable.

5.3 Developed Conditions

This section of the report will analyse and comment on the developed site stormwater discharge conditions. The DRAINS modelling software, utilising the IL-CL model, will be used to generate the hydrographs and peak median flows from the site for all storm events up to and including the 1% AEP storm event.

5.4 Developed Unmitigated Model

5.4.1 Catchment Definition

An examination of the developed site land topography and land use was undertaken to establish the quantity of sub catchments applicable to the proposed development. Three fundamental sub catchments were considered for the site: proposed development roof, hardstand, and vegetation.

The ground surface has been further broken down to pervious and impervious sub catchments and Manning's 'n' numbers were adopted for specific surface areas. Refer Table 5.6 below for developed site catchment details and Appendix A for supporting catchment plan.

Catchment slopes have been defined in accordance with current earthworks plans by MNCE.

Table 5.6: Catchment Data Summary Table

Catchment	Sub Catchment	Area (ha)	Impervious (%)	Slope (%)	Manning's 'n'
Site Roof (West)	Impervious/ Pervious	0.236	100/0	17	0.012
Site Hardstand (West)	Impervious/ Pervious	0.127	100/0	1	0.015
Site Vegetation (West)	Impervious/ Pervious	0.015	0/100	1	0.035
Bypass Pervious (East)	Impervious/ Pervious	0.088	20/80	5	0.035
EXT 1	Impervious/ Pervious	0.2722	80/20	2	0.015/0.035
EXT 2a	Impervious/ Pervious	0.1019	80/20	2	0.015/0.035

EXT 2b	Impervious/ Pervious	0.0258	80/20	2	0.015/0.035
EXT 3	Impervious/ Pervious	0.1109	100	2	0.035
EXT 4	Impervious/ Pervious	0.4516	100	2	0.035
EXT 5	Impervious/ Pervious	0.1682	100	2	0.035
EXT 6	Impervious/ Pervious	0.6089	100	2	0.035
EXT 7	Impervious/ Pervious	0.4851	100	2	0.035

5.4.2 Rainfall Parameters and Losses

Rainfall Parameters and Losses have been adopted in accordance with Section 5.2.2 of this report.

5.4.3 Developed Hydrological Results

The following table provides a summary of the peak median discharge from the developed site that was estimated by the DRAINS modelling for all storm events up to and including the 1% AEP storm event.

Table 5.7: Developed Site Peak Discharges

Storm Event	DRAINS Peak Runoff West (m ³ /s)	DRAINS Peak Runoff East (m ³ /s)	DRAINS Peak Runoff Total (m ³ /s)
39% AEP	0.166	0.023	0.189
18% AEP	0.204	0.031	0.235
10% AEP	0.234	0.035	0.269
5% AEP	0.269	0.041	0.310
2% AEP	0.308	0.050	0.358
1% AEP	0.340	0.055	0.395

5.4.4 Runoff Comparison

As noted in Section 5.2.4 of this report, a comparison between the DRAINS discharge and Rational Method peak discharge is recommended to be undertaken by *QUDM*.

Based on the methods outlined in *QUDM*, the following parameters were used to estimate the peak runoff from the upstream catchment affecting the site. Refer Appendix C for detailed rational method calculation summary.

Table 5.8: Rational Method Parameters

Name	Area (ha)	Runoff Coefficient (C10)	Time of Concentration (mins)
Prop. Site	0.465	0.87	9

The following table provides a comparison of the results of both the Rational Method and DRAINS Model results for peak discharges up to and including the 1% AEP storm event.

Table 5.9: Developed Site Peak Discharge Comparison

Storm Event	Rational Method Peak Runoff (m ³ /s)	Total DRAINS Peak Runoff (m ³ /s)	Difference	
			+/-	%
39% AEP	0.117	0.189	0.072	62%
18% AEP	0.173	0.235	0.062	36%
10% AEP	0.212	0.269	0.057	27%
5% AEP	0.254	0.310	0.056	22%
2% AEP	0.323	0.358	0.035	11%
1% AEP	0.357	0.395	0.039	11%

As can be seen above, the DRAINS IL-CL model generates peak flows that are larger than to what is estimated by the Rational Method for the catchment. This is mostly due to the additional climate change factor that was included within the DRAINS model. The scenario that has been modelled is within 11-62% and is therefore considered suitable.

5.5 Potential Impacts of Development

The following table provides a summary of the peak runoff from the site under both existing and developed scenarios.

Table 5.10: Runoff Comparison

Storm Event	Existing Peak Runoff (m ³ /s)	Total Developed Peak Runoff (m ³ /s)	Difference	
			+/-	%
39% AEP	0.126	0.189	0.063	50%
18% AEP	0.162	0.235	0.073	45%
10% AEP	0.189	0.269	0.080	42%
5% AEP	0.222	0.310	0.088	40%
2% AEP	0.264	0.358	0.094	36%
1% AEP	0.297	0.395	0.098	33%

The proposed development has increased the proportion of the site that is impervious, consequently the runoff characteristics from the site will be altered as a result of the development. As demonstrated above, the development has increased runoff volumes and peak flow rates downstream in comparison to the existing conditions for all storm events. As a result, the capacity of the downstream network will be assessed to determine whether the increase in runoff from the site can be adequately accommodated.

5.6 Developed Mitigated Model

5.6.1 DRAINS model of post-developed case downstream stormwater system

The runoff from the proposed development is increased towards the western side of the site. This increase is due to a larger portion of the site draining towards the western side, increased imperviousness, and the inclusion of a climate change factor in the model. Conversely, runoff towards the eastern side of the site is reduced.

The hydraulic grade line of the downstream stormwater system was modelled, and it was found that the hydraulic grade line increased, resulting in insufficient freeboard (minimum 150 mm) at various existing pits during the minor design storm event (10% AEP).

The freeboard requirement is important in dense urban settings; however, given that the downstream stormwater system is located adjacent to a sports field, with no downstream buildings or urban infrastructure, the 150 mm freeboard requirement can be waived for the proposed development. It is also noted that the modelled site flows include a climate change factor, which significantly increases the generated flows.

Furthermore, it was found that surcharging occurs at one location, namely Pit 5, where the hydraulic grade line is slightly higher than the surface level. The surcharging stormwater can discharge via the existing grassed swale located alongside the sports field, which conveys stormwater parallel to the sports field towards the northern creek.

Most of the site runoff is captured and discharged into the proposed in-ground stormwater pit and pipe network, as well as an on-site water quality treatment manhole (for water quality treatment only). Runoff from the proposed eastern grassed courtyard area bypasses the combined stormwater treatment system and is discharged from the site as sheet flow, consistent with existing conditions.

The site is located immediately upstream of the creek into which it discharges, and no private properties are affected by overflow from the site. Furthermore, the developed flows from the eastern site catchment are reduced compared to the existing eastern catchment flows, as the majority of stormwater is diverted to the existing stormwater system on the western side.

During larger storm events (5%, 2%, and 1% AEP), site runoff may sheet flow across the existing grassed downstream areas. No private infrastructure is impacted. The flow is then captured by the existing grassed channel adjacent to the downstream sports fields, from which all runoff is conveyed via overland flow into Lamerough Creek.

5.6.2 Minor DRAINS modelling results of developed downstream stormwater system

The proposed development site discharges a mitigated flow of approx. $0.234\text{m}^3/\text{s}$ into the existing downstream drainage system as per the DRAINS modelling results in the minor design event (10% AEP). The flows are conveyed via a proposed inground pipe connections to manholes "Pit 5", which is the governing pit in the downstream stormwater system.

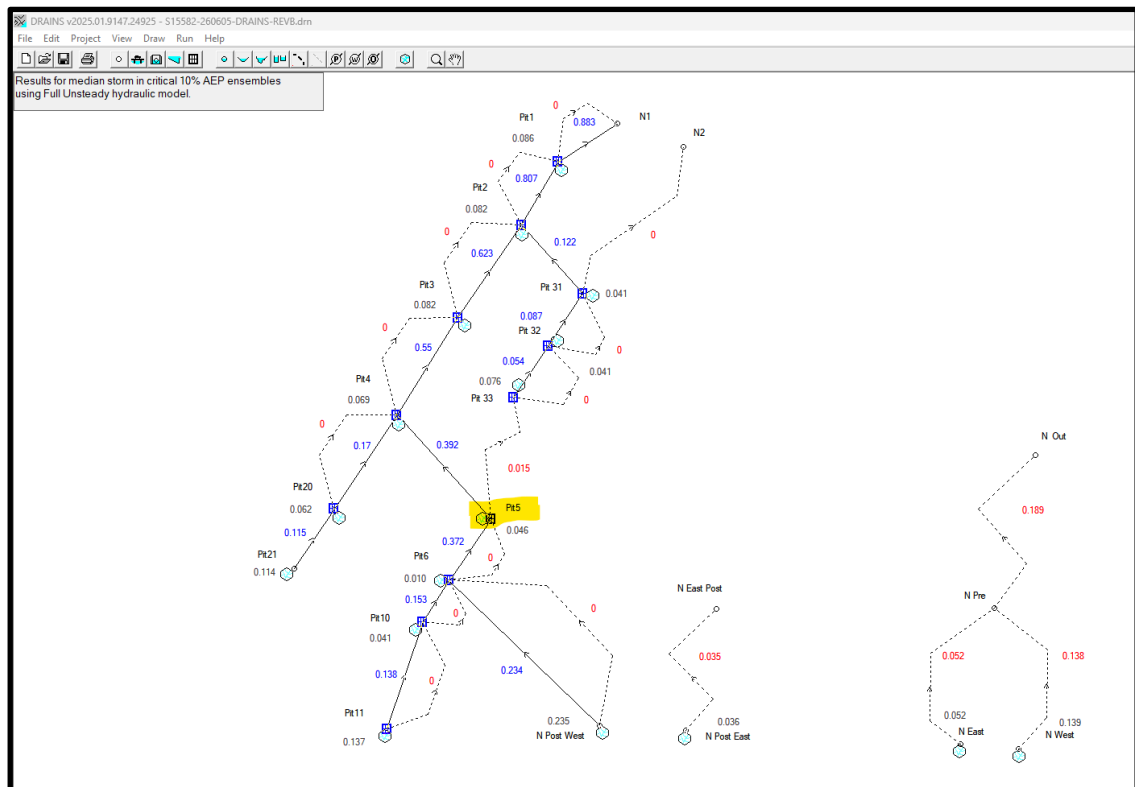


Figure 5.2: Developed 10% AEP DRAINS modelling results (Pit 5 marked up in yellow)

The hydraulic grade in impacted by the development flows. The following Figures 5.3 – 5.6 illustrate the locations where the proposed hydraulic grade line within the downstream stormwater system provides less than 150 mm of freeboard. This occurs in four pipe runs between "Pit 11" and "Pit4".

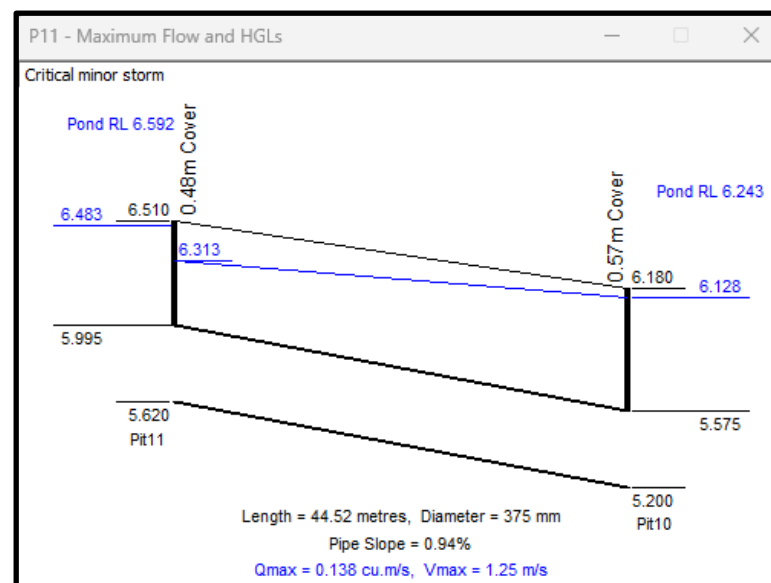


Figure 5.3: 10% AEP Hydraulic Grade Line Long Section – Existing Pipe Between Pit 11 and Pit 10

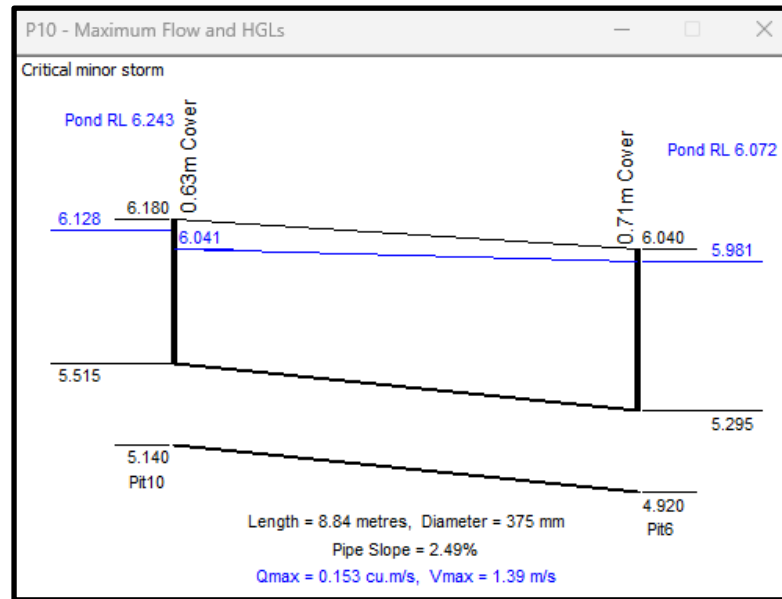


Figure 5.4: 10% AEP Hydraulic Grade Line Long Section – Existing Pipe Between Pit 10 to Pit 6

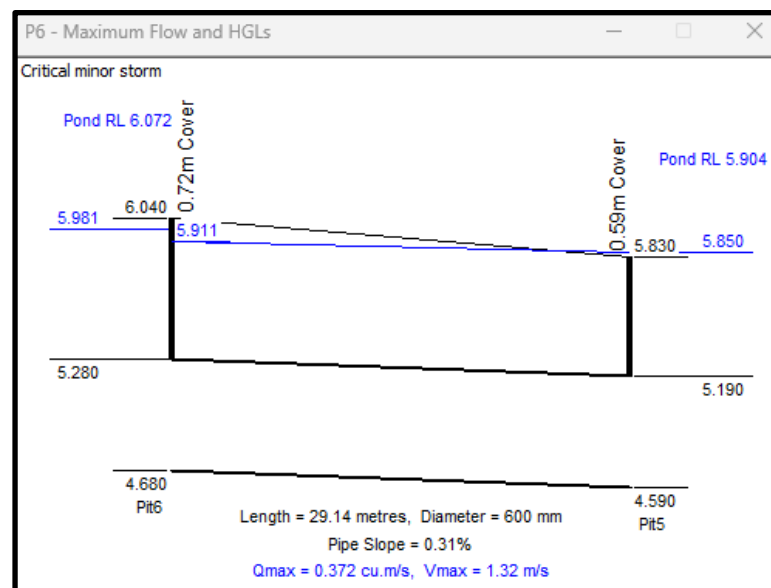


Figure 5.5: 10% AEP Hydraulic Grade Line Long Section – Existing Pipe Between Pit 6 to Pit 5

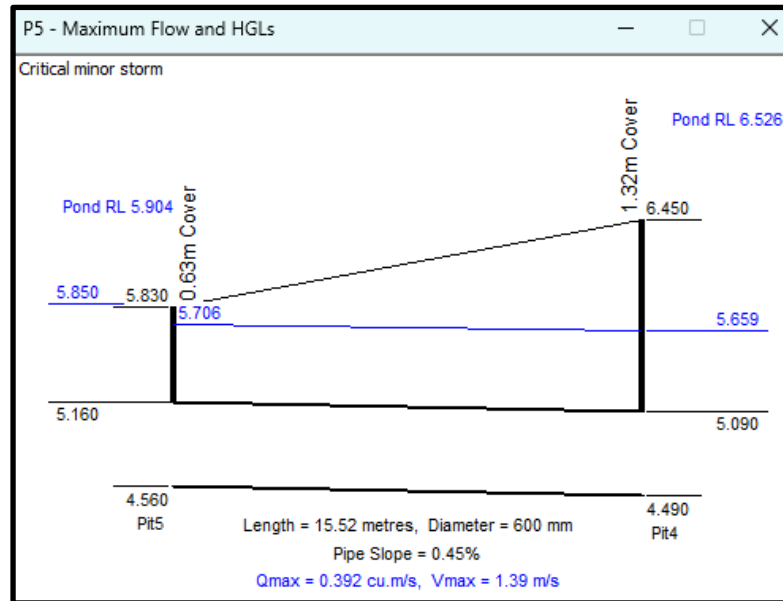


Figure 5.6: 10% AEP Hydraulic Grade Line Long Section – Existing Pipe Between Pit 5 to Pit 4

The above long sections demonstrate that the downstream drainage pit “Pit 11”, Pit 10 and Pit “6” can accommodate fully developed peak flows from the catchment in accordance with Council’s standard of service, however with reduced freeboard. However, surcharging occurs during the minor 10% AEP design event at “Pit 5”.

5.6.3 Pit 5 Assessment

Pit 5 was identified as the critical downstream stormwater pit, as this is the location where surcharging occurs. All storm events, including the relevant 10% AEP minor design storm event, were reviewed using the DRAINS software package at the surcharging location.

Table 5.11: Developed Runoff at downstream location Pit 5

Storm Event	Flow in pipe (m ³ /s)	Surcharging flow at Pit 5 (m ³ /s)	Total flow at Pit 5 (m ³ /s)
39% AEP	0.254	0.000	0.254
18% AEP	0.326	0.000	0.326
10% AEP	0.392	0.015	0.407
5% AEP	0.435	0.059	0.494
2% AEP	0.466	0.174	0.640
1% AEP	0.495	0.288	0.783

At the downstream location, Pit 5, the post-developed stormwater flows associated with the smaller storm events (39% and 18% AEP) can be contained within the existing 600 mm pipe. For the minor design storm event (10% AEP), Pit 5 is predicted to surcharge with a flow of 0.015 m³/s. For the larger storm events (5% AEP to 1% AEP), the pit is predicted to surcharge at rates ranging from 0.059 m³/s to 0.288 m³/s.

All stormwater discharged from Pit 5 flows into an existing grassed swale, which runs parallel to the sports field and conveys runoff to the downstream creek.

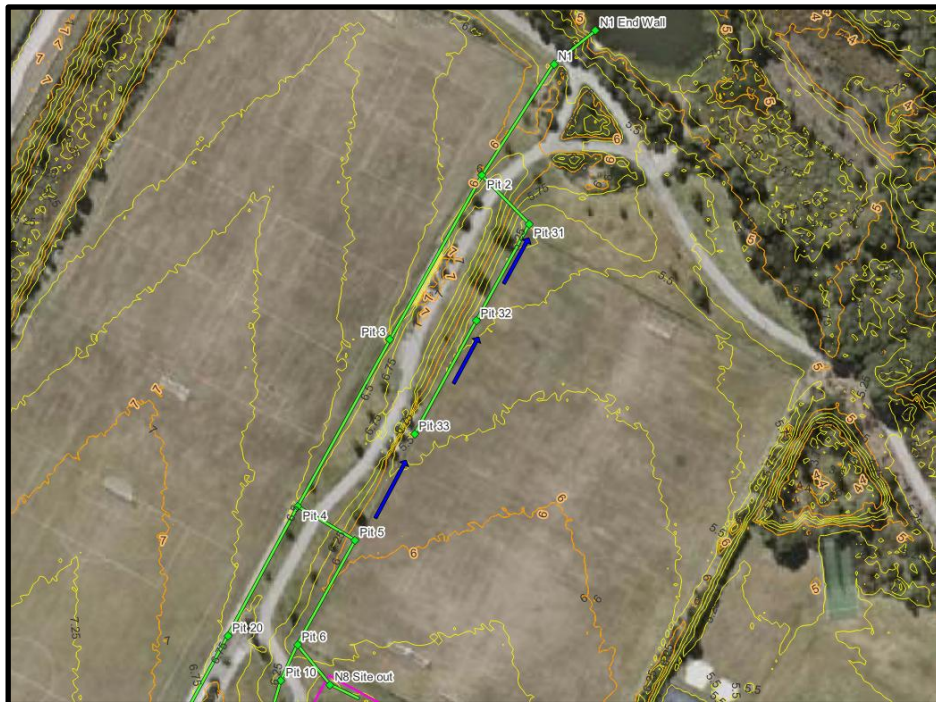


Figure 5.6: Existing grassed swale adjacent to sports field (Grade 0.75%, 1:4 batters)

The swale has a grade of 0.75–0.80% and 1:4 batters. The relevant flow rates were obtained from the DRAINS model (10% AEP: 0.015 m³/s, 2% AEP: 0.174 m³/s, and 1% AEP: 0.288 m³/s) and were utilised in the following Manning's calculations for minor and major storm events (Figures 5.7 to 5.9).

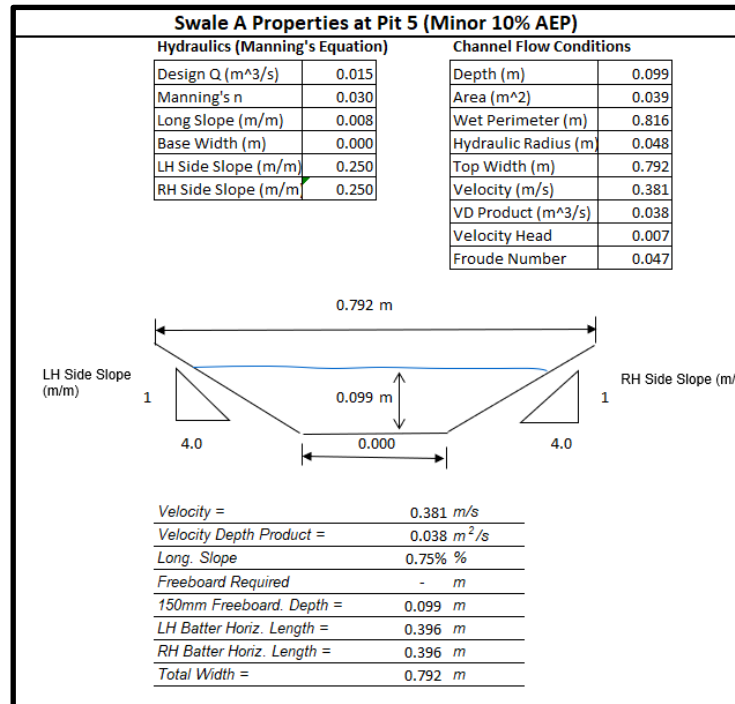


Figure 5.7: Grassed swale results for 10%AEP

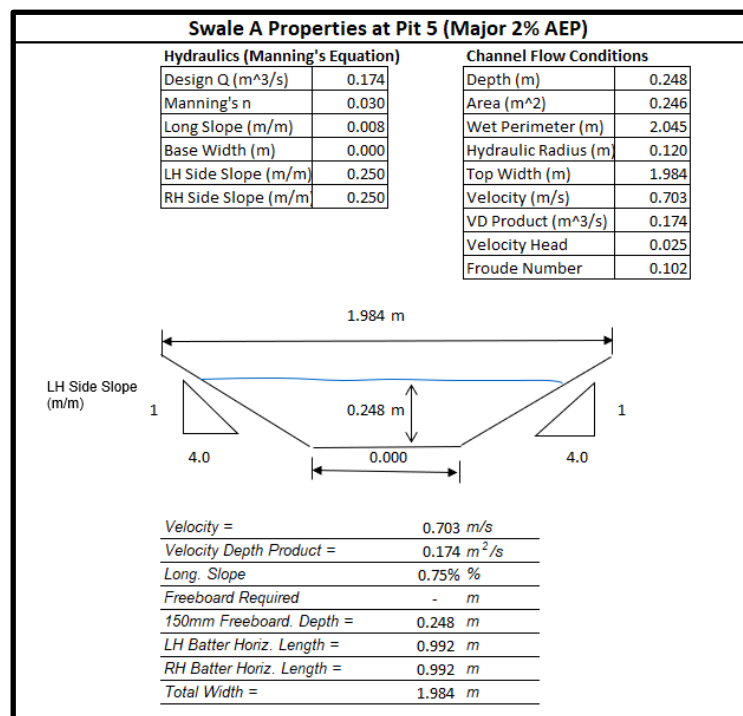


Figure 5.8: Grassed swale results for 2%AEP

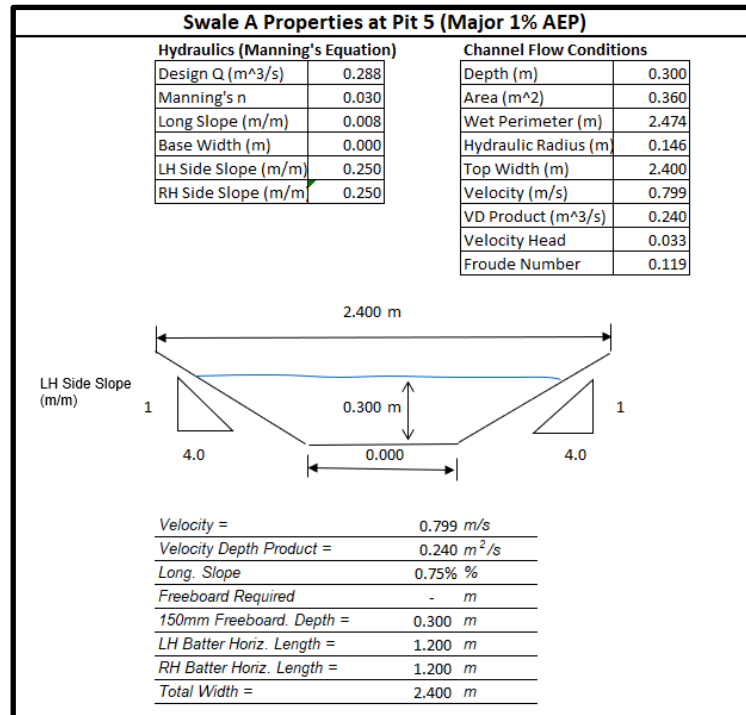


Figure 5.9: Grassed swale results for 1%AEP

In the 10% AEP minor design storm event (Figure 5.7), the surcharge flow from Pit 5 generates a flow depth of 0.099 m within the existing channel. The velocity (0.38 m/s) and the DV product (0.038 m²/s) can be considered safe in accordance with QUDM. It can therefore be concluded that the surcharge flow occurring at Pit 5 has only a minimal impact on the downstream swale. All flow is contained within the existing grassed swale.

During the larger major storm events (2% AEP in Figure 5.8 and 1% AEP in Figure 5.9), the flow depth within the channel increases to 0.248 m and 0.300 m, respectively, due to the in-ground stormwater system reaching capacity.

6 INTERPRETATION AND CONCLUSIONS

A legal point of discharge for the proposed development will be obtained by utilising an existing stormwater manhole in the north-western corner of the site. Site flows are to be captured and discharged to a stormwater treatment tank which is located beneath the proposed car parking area in the north-western portion of the proposed development.

The proposed development, if unmitigated, would have a negative effect on runoff water quality from the site. Best practices in water quality design have been implemented to improve the quality of the stormwater runoff generated on the site.

The predicted pollutant export load concentrations for the mitigated conditions as determined by the MUSIC model show that the proposed water quality treatment measures comply with Council's mean annual load reduction requirements for total suspended solids (TSS), total phosphorous (TP), total nitrogen (TN) and gross pollutants (GP).

Key elements of the proposed stormwater treatment train are as follows:

- Runoff associated with the proposed access, car parking and landscaped areas is to be captured and initially treated through 6 No. source pollutant filters (Atlan Stormsacks or similar) before being piped to the proposed stormwater treatment tank to the north-west of the site (see Section 5).
- A total rainwater tank volume of approximately 19.2 kL is proposed. This volume is intended for reuse purposes, and the final location will be determined by the architect. The rainwater tank has been designed to provide storage for toilet and urinal flushing within the educational establishment, as well as for irrigation purposes.
- Runoff associated with proposed roof areas to be piped to the proposed stormwater treatment tank which is to be fitted with 7 No. Atlan cartridges.
- Treated and detained site flows to be discharged into existing stormwater infrastructure within the rear sporting fields

An analysis of the pre and post development site discharge has been undertaken which has revealed that the development has increased runoff volumes and peak flow rates downstream in comparison to the existing conditions for all storm events.

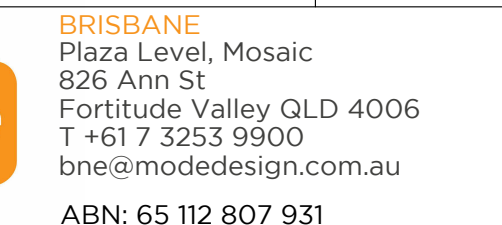
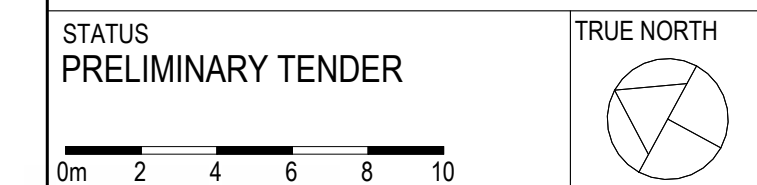
The downstream hydraulic grade line in the existing downstream inground stormwater system is impacted by the development flows. The minor design storm event (10% AEP) experiences reduced freeboard (<150mm) for Pit 11, Pit 10, Pit 6 and Pit 5. Surcharging occurs at Pit 5 in the order of 0.015 m³/s. The surcharge flow occurring at Pit 5 has only

a minimal impact on the downstream swale. All flow is contained within the existing grassed swale and generally complies with QUDM.

Most of the site catchment runoff (west) is to be captured and discharged directly into a proposed inground stormwater pit and pipe system water quality tank. Runoff associated with the proposed small north-eastern grassed courtyard area (east) is to bypass the stormwater water quality treatment and free drain as sheet flow from site as per existing conditions.

APPENDIX A: PROPOSED DEVELOPMENT LAYOUT

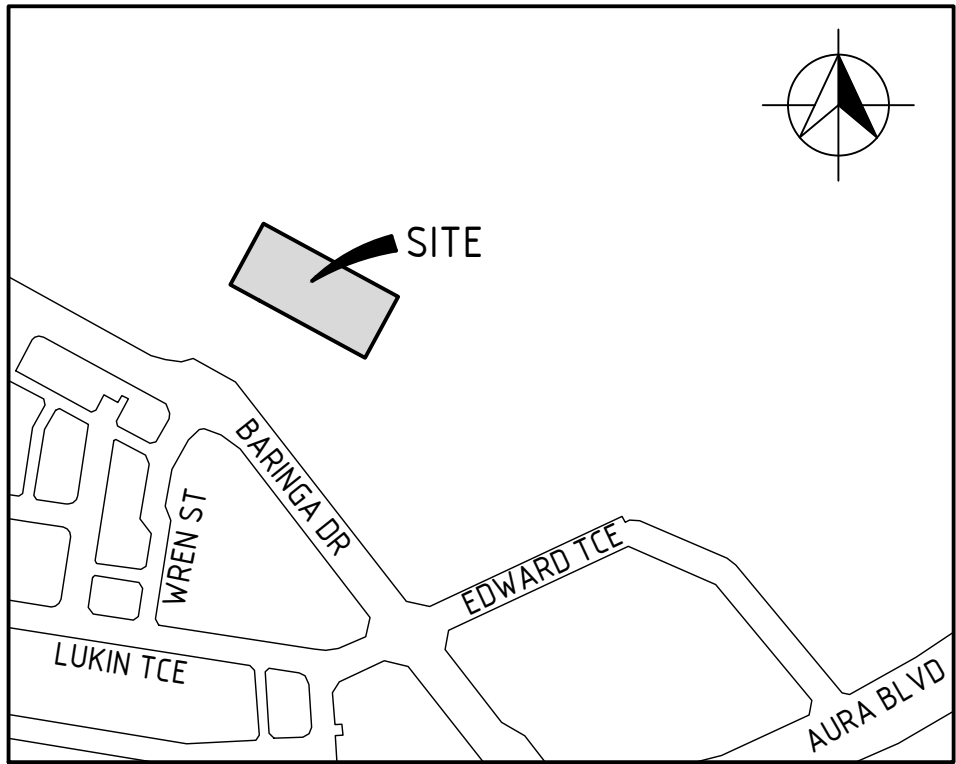
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| 2 | 50% DD ISSUE | EH | AP | 13.05.26 |
| 3 | COORDINATION ISSUE | EH | AP | 28.05.26 |
| 4 | 80% DD ISSUE | EH | AP | 01.06.26 |
| 5 | 100% DD ISSUE | EH | AP | 22.06.26 |
| 6 | COORDINATION ISSUE | EH | AP | 30.06.26 |



PROJECT
Y-CARE NEW
EDUCATIONAL FACILITY
LOT 8011, BARINGA DRIVE, BARINGA

DRAWN JM	CHECKED AP
ISSUE 30/06/2026 3:13:06 PM	SCALE @ A1 1 : 200

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LOCALITY PLAN
SCALE 1:5000

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- TID(D) EXISTING TELECOMMUNICATION
- SW(D) EXISTING STORMWATER DRAINAGE
- S(D) EXISTING SEWERAGE MAIN
- W(D) EXISTING WATER MAIN
- 9.999 EXISTING CONTOURS
- 9.9 PROPOSED FINISHED SURFACE CONTOURS
- SW PROPOSED STORMWATER DRAINAGE
- S PROPOSED SEWERAGE MAIN
- W PROPOSED WATER MAIN
- EXISTING CONCRETE
- PROPOSED CONCRETE
- PROPOSED FILL
- PROPOSED CUT
- PROPOSED RETAINING WALL
- PROPOSED LANDSCAPE EDGE
- × ###.## EXISTING SURFACE LEVEL
- ###.## PROPOSED SURFACE LEVEL

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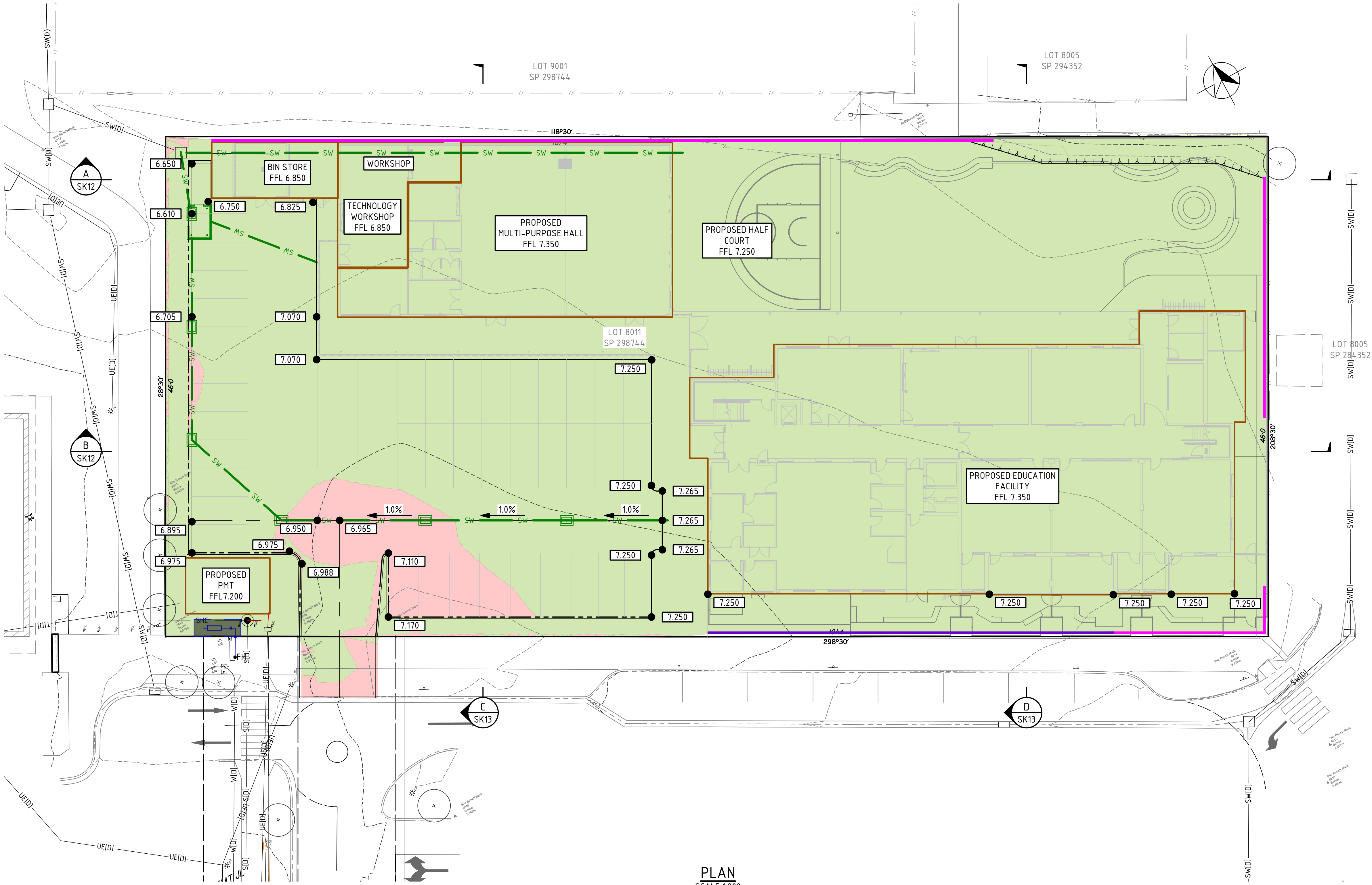
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EXISTING SERVICES NOTE:

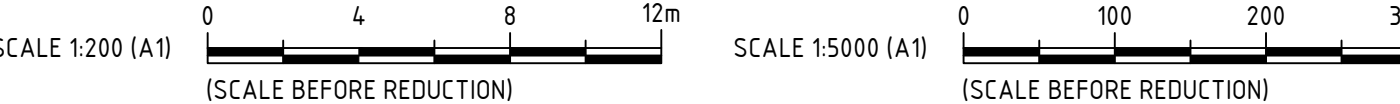
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LOT 8011 ON SP298744

DRAWN SM	DESIGNED SM	DATE MAR 2026
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DRAWING No. S15582 - SK11		



PLAN
SCALE 1:200



MILANOVIC NEALE
CONSULTING ENGINEERS

CIVIL
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MODE DESIGN

32 BARINGA DRIVE, BARINGA

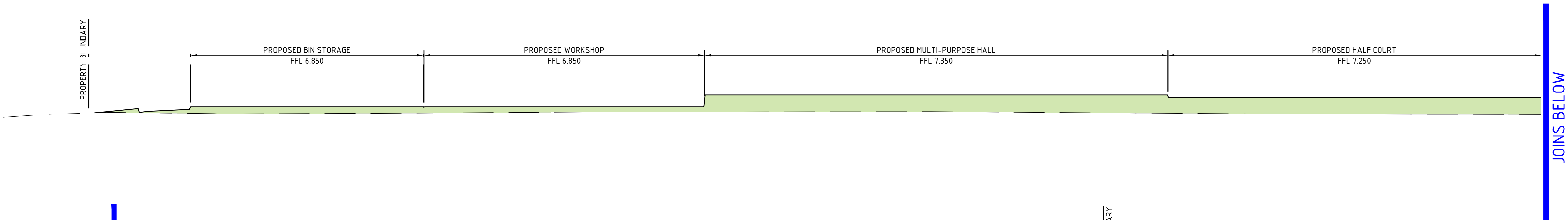
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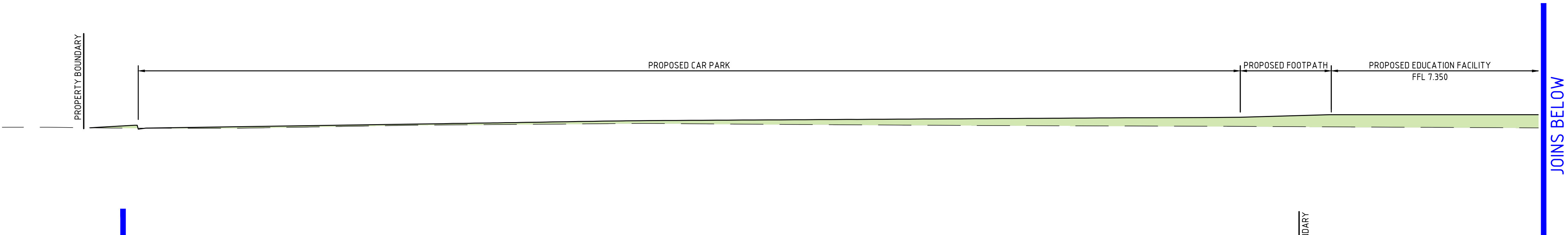
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SECTION A
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SK11

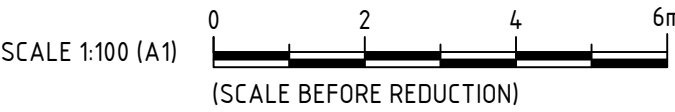


SECTION B
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TRAFFIC
PROJECT MANAGEMENT**

MODE DESIGN

32 BARINGA DRIVE, BARINGA

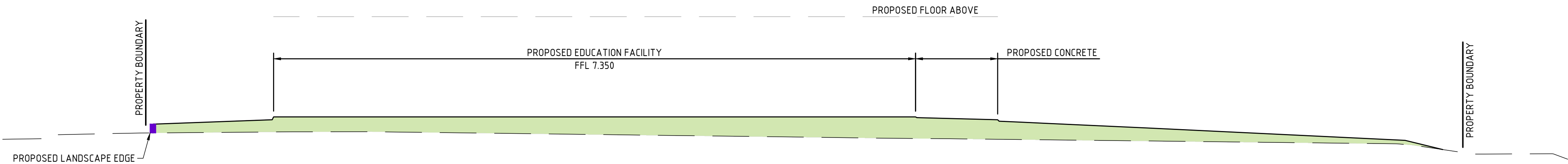
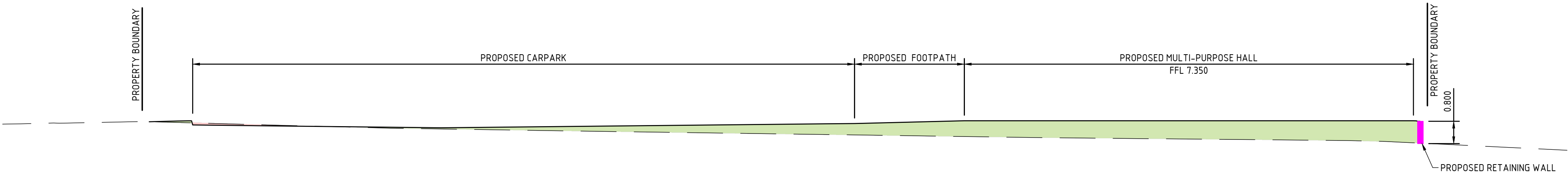
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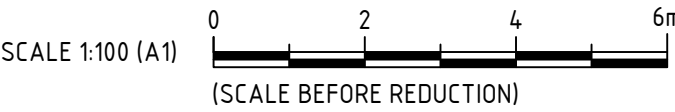
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- PROPOSED SURFACE LEVEL
- PROPOSED RETAINING WALL
- PROPOSED FILL
- PROPOSED CUT



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PROJECT MANAGEMENT**

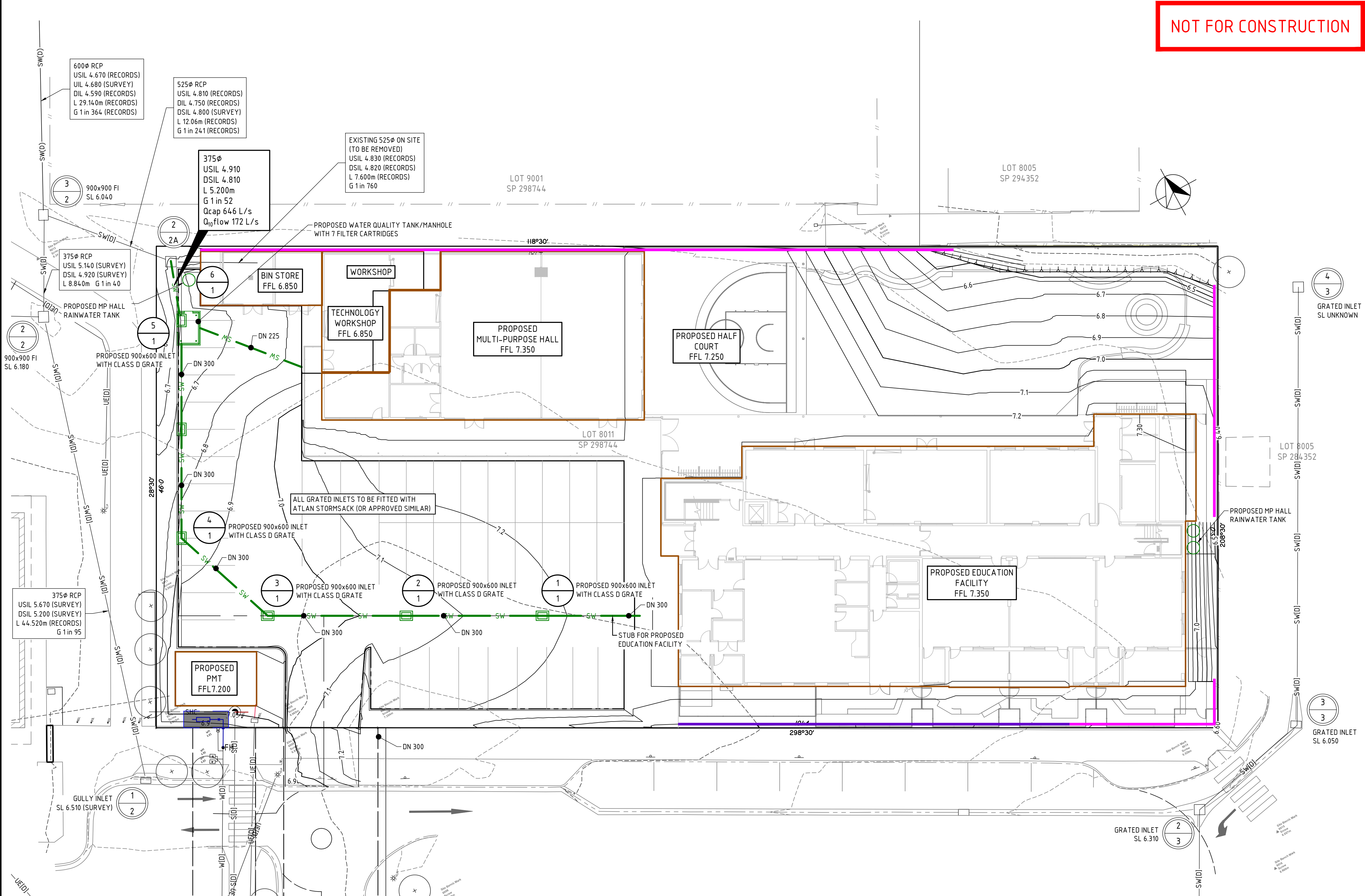
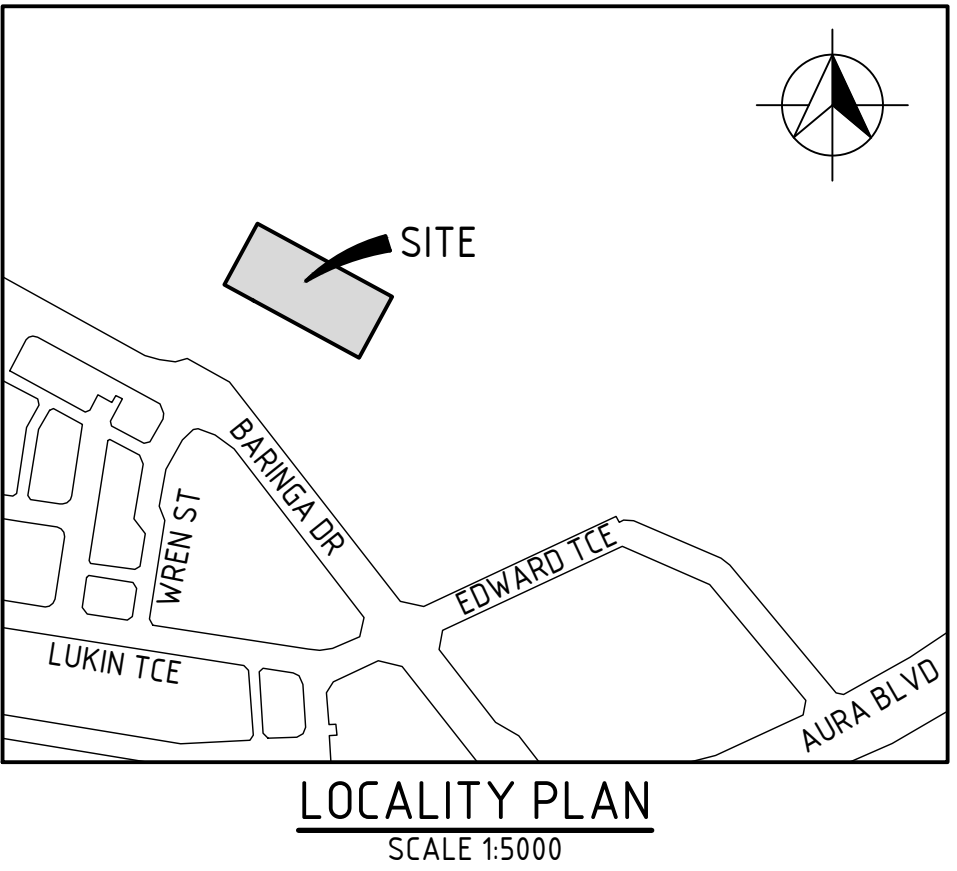
MODE DESIGN

32 BARINGA DRIVE, BARINGA

PRELIMINARY BULK EARTHWORKS
SECTIONS - SHEET 2 OF 2

DRAWN SM	DESIGNED SM	DATE MAR 2026
CHECKED SS	APPROVED RPEQ 18889	
DRAWING No. S15582 - SK13	REV. B	

NOT FOR CONSTRUCTION



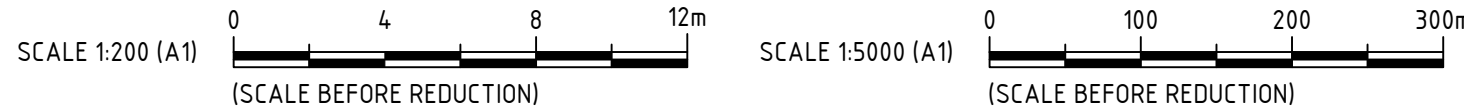
PLAN
SCALE 1:200

LEGEND

- UE[D]— EXISTING ELECTRICAL UNDERGROUND
- T[D]— EXISTING TELECOMMUNICATION
- SW[D]— EXISTING STORMWATER DRAINAGE
- S[D]— EXISTING SEWERAGE MAIN
- W[D]— EXISTING WATER MAIN
- 9.999 - - - - - EXISTING CONTOURS
- SW — PROPOSED STORMWATER DRAINAGE
- S — PROPOSED SEWERAGE CONNECTION
- W — PROPOSED WATER CONNECTION
- ⊕ EXISTING TREE (TO BE RETAINED)
- EXISTING CONCRETE
- PROPOSED CONCRETE
- PROPOSED RETAINING WALL
- PROPOSED LANDSCAPE EDGE
- 1/1 PROPOSED DRAINAGE STRUCTURE NUMBER
- 1/1 EXISTING DRAINAGE STRUCTURE NUMBER

NOTES:
1. THIS DRAWING TO BE USED FOR DESIGN REVIEW AND ACCESS PERMISSION ONLY. NOT TO BE USED FOR CONSTRUCTION.
2. LEVELS ON SITE TO BE CONFIRMED BY DETAILED SURVEY AND DESIGN REVISED PRIOR TO CONSTRUCTION.
3. APPROPRIATE APPROVALS FROM THE LOCAL AUTHORITIES ARE REQUIRED PRIOR TO CONSTRUCTION.

EXISTING SERVICES NOTE:
THIS DESIGN HAS BEEN PREPARED BASED ON SERVICE AUTHORITY AS CONSTRUCTED INFORMATION OR FIELD SURVEY, IF MADE AVAILABLE TO MNCE AT THE TIME OF DESIGN. THE LOCATION OF UNDERGROUND SERVICES ARE NOTED WITH THEIR RESPECTIVE CLASS IN ACCORDANCE WITH ASS408:2022, THE AUSTRALIAN STANDARDS FOR CLASSIFICATION OF SUBSURFACE UTILITY INFORMATION (SUI). NO POT HOLING HAS BEEN UNDERTAKEN TO VERIFY EXISTING SERVICE LOCATIONS AND DEPTHS. IT IS THE CONTRACTORS RESPONSIBILITY TO UNDERTAKE FURTHER SURVEY AND POT HOLING AS REQUIRED, TO CONFIRM THE NATURE AND LOCATION OF THESE SERVICES AND VERIFY THE DESIGN.



REAL PROPERTY DESCRIPTION
LOT 8011 ON SP298744

REV.	DESCRIPTION	DATE	DRAWN	REVIEWED	VERIFIED
A	PRELIMINARY ISSUE	24.03.26	SH	JHU	
B	RFI RESPONSE	09.06.26	PF	SS	SS
C	UPDATED RAINWATER TANKS	16.07.26	PF	SS	SS

MILANOVIC NEALE
CONSULTING ENGINEERS

**CIVIL
STRUCTURAL
TRAFFIC
PROJECT MANAGEMENT**

MODE DESIGN

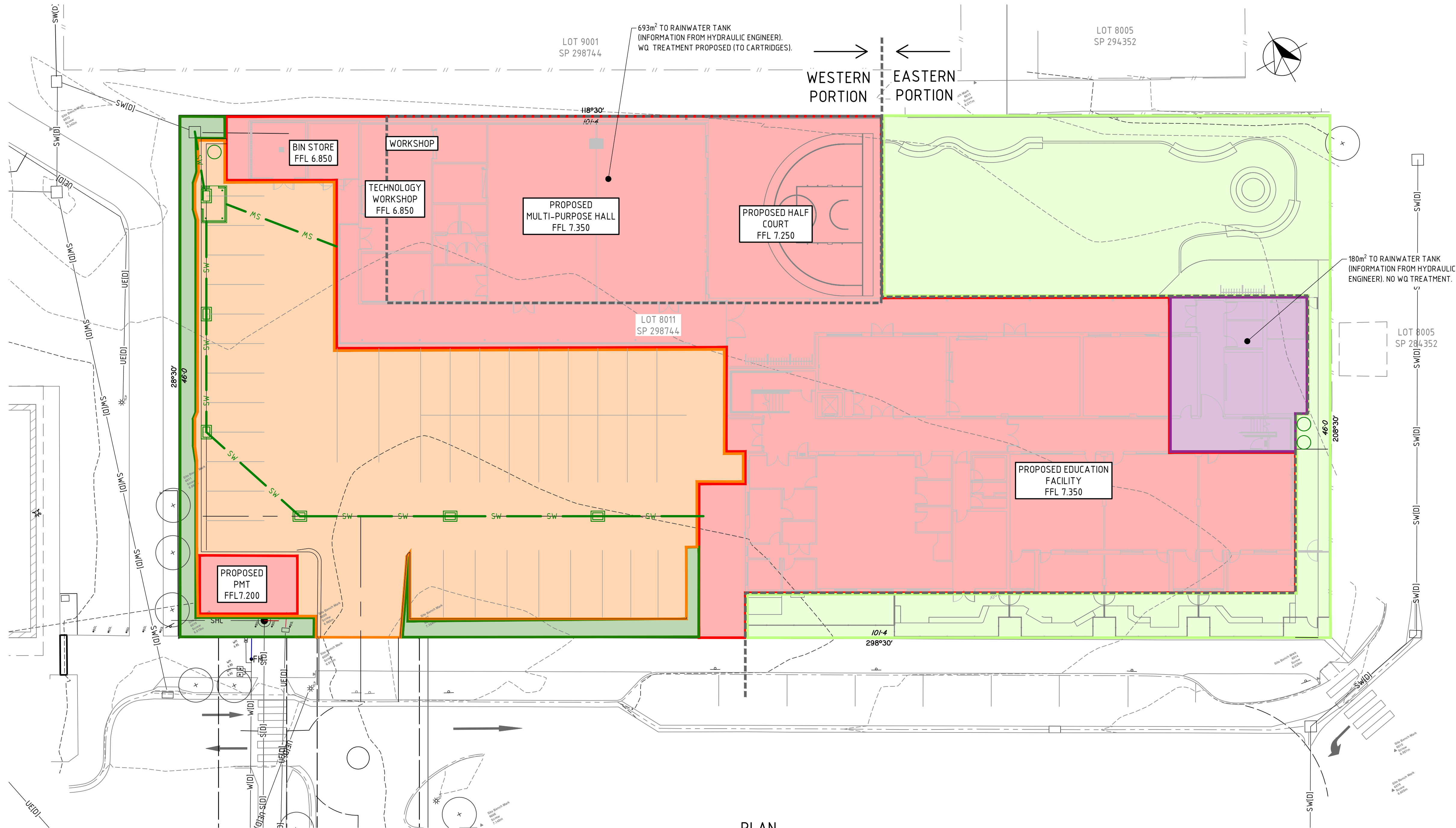
32 BARINGA DRIVE, BARINGA

STORMWATER MANAGEMENT
LAYOUT PLAN

DRAWN	DESIGNED	DATE
SH	SS	MAR 2026
CHECKED	APPROVED	
SS	<i>Paul Spj</i> RPEQ 18889	
DRAWING No.	REV.	
S15582 - SK21	C	

DO NOT SCALE FROM DRAWING
ALL SCALES ARE AS SHOWN (A1)

NOT FOR CONSTRUCTION



PLAN
SCALE 1:200

DEVELOPED CATCHMENT	
ROOF CATCHMENT (WEST)	
A	0.231ha
I	100%
S	17%
n	0.015
ROOFWATER BYPASS	
A	0.018ha
I	100%
S	17%
n	0.015
HARDSTAND (WEST)	
A	0.127ha
I	100%
S	2%
n	0.015
VEGETATION CATCHMENT (WEST)	
A	0.015
I	0%
S	2%
n	0.015
BYPASS (EAST)	
A	0.088ha
I	20%
S	2%
n	0.015
TOTAL	0.466ha

- NOTES:
- THIS DRAWING TO BE USED FOR DESIGN REVIEW AND ACCESS PERMISSION ONLY. **NOT TO BE USED FOR CONSTRUCTION.**
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 - APPROPRIATE APPROVALS FROM THE LOCAL AUTHORITIES ARE REQUIRED PRIOR TO CONSTRUCTION.

EXISTING SERVICES NOTE:

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SCALE 1:200 (A1)
(SCALE BEFORE REDUCTION)

REAL PROPERTY DESCRIPTION
LOT 8011 ON SP298744

REV.	DESCRIPTION	DATE	DRAWN	REVIEWED	VERIFIED
A	PRELIMINARY ISSUE	24.03.26	SH	JHU	
B	RFI RESPONSE	09.06.26	PF	SS	SS
C	UPDATED RAINWATER TANKS	16.07.26	PF	SS	SS

MILANOVIC NEALE
CONSULTING ENGINEERS

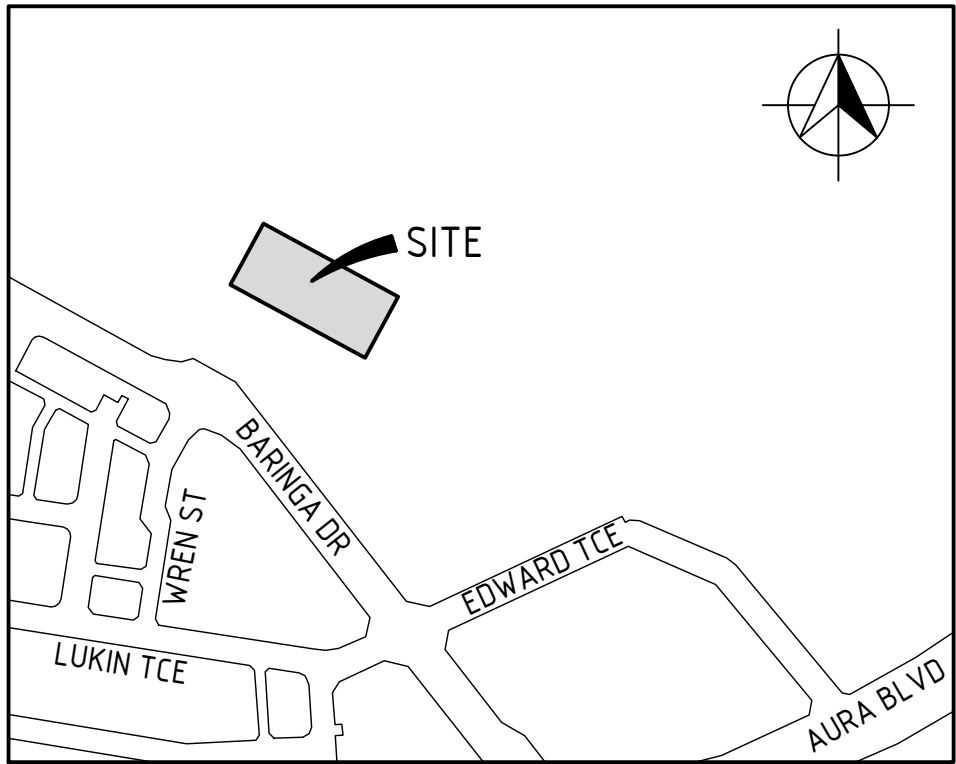
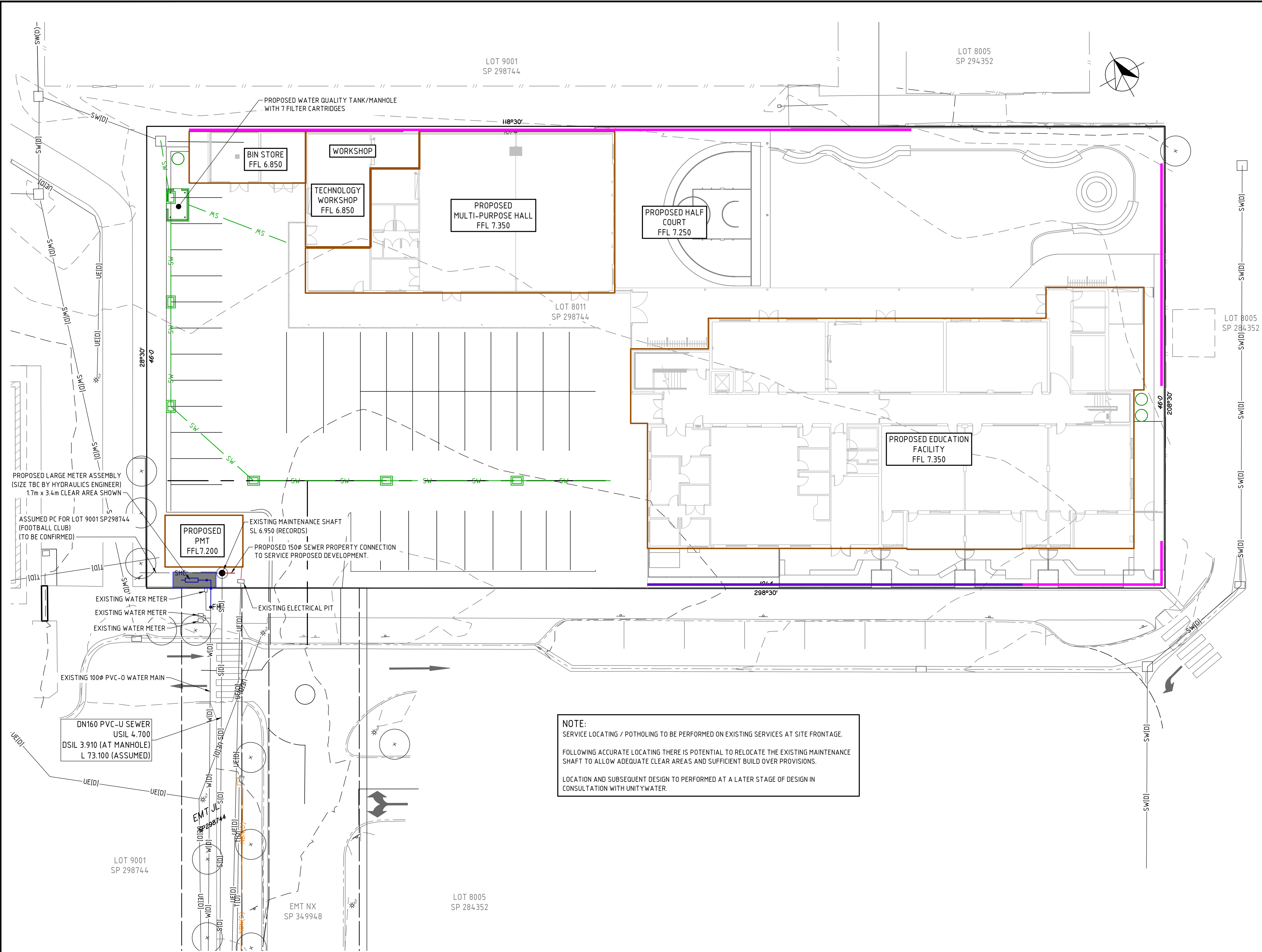
**CIVIL
STRUCTURAL
TRAFFIC
PROJECT MANAGEMENT**

MODE DESIGN

32 BARINGA DRIVE, BARINGA

STORMWATER MANAGEMENT
CATCHMENT PLAN

DRAWN	DESIGNED	DATE
SH	SS	MAR 2026
CHECKED	APPROVED	
SS	<i>Paul Spj</i> RPEQ 18889	
DRAWING No.	REV.	
S15582 - SK22	C	



LOCALITY PLAN
SCALE 1:5000

NOT FOR CONSTRUCTION

LEGEND

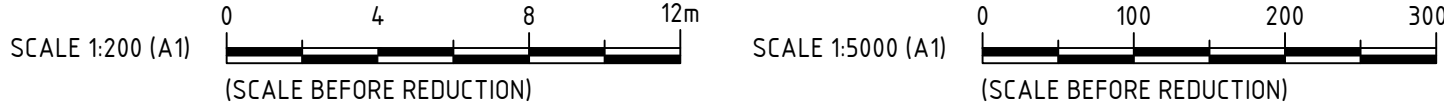
- UE(D) EXISTING ELECTRICAL UNDERGROUND
- TD(D) EXISTING TELECOMMUNICATION
- SW(D) EXISTING STORMWATER DRAINAGE
- SD(D) EXISTING SEWERAGE MAIN
- WD(D) EXISTING WATER MAIN
- 9.999 EXISTING CONTOURS
- SW PROPOSED STORMWATER DRAINAGE
- SHC PROPOSED SEWERAGE CONNECTION
- W PROPOSED WATER CONNECTION
- PROPOSED RETAINING WALL
- PROPOSED LANDSCAPE EDGE

NOTE:
SERVICE LOCATING / POT HOLING TO BE PERFORMED ON EXISTING SERVICES AT SITE FRONTAGE.
FOLLOWING ACCURATE LOCATING THERE IS POTENTIAL TO RELOCATE THE EXISTING MAINTENANCE SHAFT TO ALLOW ADEQUATE CLEAR AREAS AND SUFFICIENT BUILD OVER PROVISIONS.
LOCATION AND SUBSEQUENT DESIGN TO BE PERFORMED AT A LATER STAGE OF DESIGN IN CONSULTATION WITH UNITYWATER.

- NOTES:
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EXISTING SERVICES NOTE:
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PLAN
SCALE 1:200



REAL PROPERTY DESCRIPTION
LOT 8011 ON SP298744

REV.	DESCRIPTION	DATE	DRAWN	REVIEWED	VERIFIED
A	PRELIMINARY ISSUE	24.03.26	SH	JHU	
B	RFI RESPONSE	09.06.26	PF	SS	SS
C	UPDATED RAINWATER TANKS	16.07.26	PF	SS	SS

MILANOVIC NEALE
CONSULTING ENGINEERS

CIVIL
STRUCTURAL
TRAFFIC
PROJECT MANAGEMENT

MODE DESIGN

32 BARINGA DRIVE, BARINGA

PRELIMINARY SERVICES LAYOUT
PLAN

DRAWN	DESIGNED	DATE
SH	JHU	MAR 2026
CHECKED	APPROVED	
SS	<i>[Signature]</i> RPEQ 18889	
DRAWING No.	REV.	
S15582 - SK31	C	

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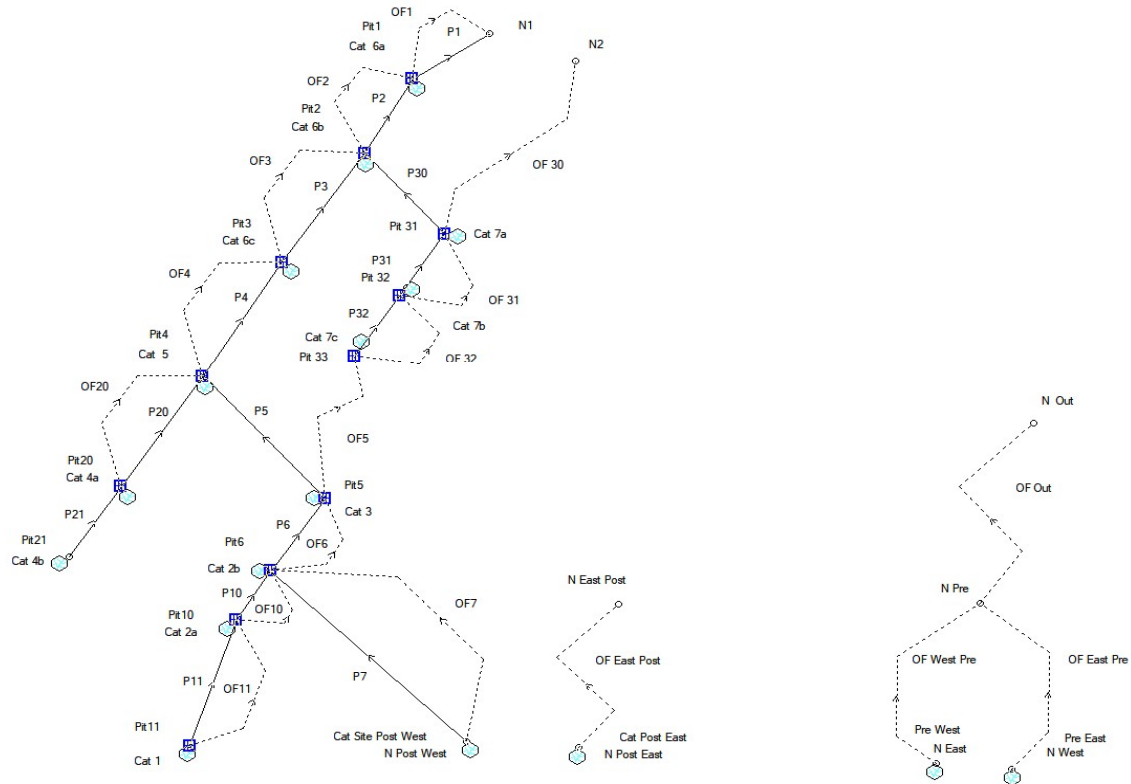
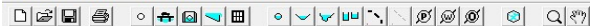
APPENDIX B: DRAINS DATA

DRAINS RESULTS

2y ARI			5y ARI			10y ARI			20y ARI			50y ARI			100y ARI		
0.5 EY			0.2 EY			10% AEP			5% AEP			2% AEP			1% AEP		
PRE	POST		PRE	POST		PRE	POST		PRE	POST		PRE	POST		PRE	POST	
0.035	0.166		0.044	0.204		0.052	0.234		0.061	0.269		0.072	0.308		0.081	0.340	
0.092	0.023		0.119	0.031		0.138	0.035		0.162	0.041		0.193	0.050		0.217	0.055	
0.126	0.189		0.162	0.235		0.189	0.269		0.222	0.310		0.264	0.358		0.297	0.395	

DRAINS v2025.01.9147.24925 - S15582-260605-DRAINS-REVb.drn

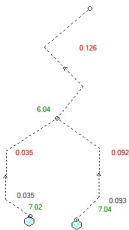
File Edit Project View Draw Run Help



PRE	POST unmitigated			
0.126	0.189	0.063	33%	50%
0.162	0.235	0.073	31%	45%
0.189	0.269	0.08	30%	42%
0.222	0.31	0.088	28%	40%
0.264	0.358	0.094	26%	36%
0.297	0.395	0.098	25%	33%

PRE	POST mitigated			
0.126	0	-0.126	#DIV/0!	-100%
0.162	0	-0.162	#DIV/0!	-100%
0.189	0	-0.189	#DIV/0!	-100%
0.222	0	-0.222	#DIV/0!	-100%
0.264	0	-0.264	#DIV/0!	-100%
0.297	0	-0.297	#DIV/0!	-100%

This model has no pipes with non-return valves



DRAINS results prepared from Version 2025.01.9147.24925

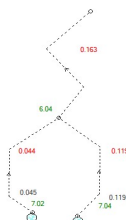
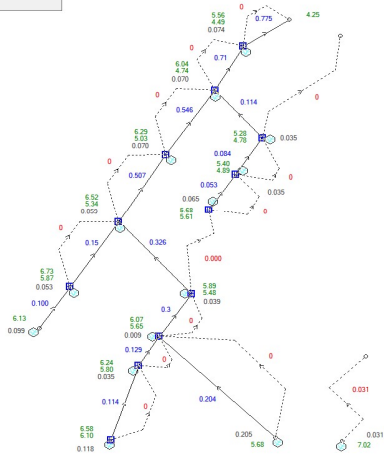
SUB-CATCHMENT DETAILS									
Name	Max	EIA	Max Q ₁₀ (cu.m/s)	Remaining	EIA	RIA	PA	Due to Storm	
	Flow Q ₁₀ (cu.m/s)	Max Q ₁₀ (cu.m/s)		Tc (min)	Tc (min)		TC (min)		
Cat 4b	0.075	0	0.075	15	15	0	18	0.5EY AEP, 30 min burst, Storm 8	
Cat 4	0.042	0	0.042	0	0	0	15	0.5EY AEP, 30 min burst, Storm 7	
Cat 5	0.046	0	0.046	0	0	0	15	0.5EY AEP, 30 min burst, Storm 7	
Cat 6c	0.055	0	0.055	0	0	0	15	0.5EY AEP, 30 min burst, Storm 7	
Cat 6b	0.055	0	0.055	0	0	0	15	0.5EY AEP, 30 min burst, Storm 7	
Cat 6a	0.057	0	0.057	0	0	0	15	0.5EY AEP, 30 min burst, Storm 7	
Cat 7c	0.051	0	0.051	0	0	0	15	0.5EY AEP, 30 min burst, Storm 7	
Cat 7b	0.027	0	0.027	0	0	0	15	0.5EY AEP, 30 min burst, Storm 7	
Cat 7a	0.027	0	0.027	0	0	0	15	0.5EY AEP, 30 min burst, Storm 7	
Cat Site Post West	0.167	0.167	0.002	6	5	13	0.5EY AEP, 10 min burst, Storm 3		
Cat 2b	0.007	0.002	0.006	0	0	0	15	0.5EY AEP, 30 min burst, Storm 5	
Cat 3	0.033	0	0.033	0	0	0	15	0.5EY AEP, 30 min burst, Storm 7	
Pre West	0.035	0	0.035	5	0	0	15	0.5EY AEP, 30 min burst, Storm 7	
Pre East	0.093	0	0.093	7	5	15	0.5EY AEP, 30 min burst, Storm 7		
Cat Post East	0.023	0.006	0.019	7	5	15	0.5EY AEP, 30 min burst, Storm 10		
Cat 1	0.094	0.091	0.003	10	18	18	0.5EY AEP, 10 min burst, Storm 5		

CHANNEL DETAILS		
Name	Max Q (cu m/s)	Max V (m/s)
Due to Storm		

DETENTION BASIN DETAILS					
Name	Max WL	MaxVol	Max Q Total	Max Q Low Level	Max Q High Level

No water upwelling from any pit.
Freeboard was adequate at all pits.
Flows were safe in all overflow rou

Results for median storm in critical 0.2EY ensembles using Full Unsteady hydraulic model.



DBAINS Data:

DBAIRS results prepared from Version 2025.01.9147.24925

NIT / NODE DETAILS	Max HGL	Version 8					Overflow	Constraint
		Max Pond	Max Surfa	Max Pond	Min			
		HGL	Flow Arriv	Volume	Freeboard			
		(cu.m/s)	(cu.m)	(cu.m/s)	(m)	(cu.m/s)		
PH21	6.13		0.168					
PH20	5.87	6.73	0.063	0.5	0.79	0	Inlet Capacity	
PH4	5.34	6.52	0.07	0.5	1.11	0	Inlet Capacity	
PH3	5.03	6.29	0.083	0.6	1.18	0	Inlet Capacity	
PH2	4.74	6.04	0.083	0.6	1.22	0	Inlet Capacity	
PH1	4.49	1.56	0.087	0.6	0.99	0	Inlet Capacity	
N1	4.25		0					
PH 33	5.61	5.68	0.101	1.2	0	0	Outlet System	
PH 32	4.89	5.4	0.041	0.7	0.45	0	Inlet Capacity	
PH 31	4.78	5.28	0.041	0.7	0.445	0	Inlet Capacity	
N Post West	5.68		0.233					
PH5	5.65	6.07	0.012	0	0.39	0	Inlet Capacity	
PH6	5.48	5.89	0.046	0.4	0.35	0	Inlet Capacity	
N East	7.02		0.053					
N West	7.04		0.141					
N Pre	6.04		0.192					
N Post East	7.02		0.039					
PH11	6.1	6.58	0.132	1.7	0.41	0	Inlet Capacity	
N10	5.8	6.24	0.046	0.4	0.38	0	Inlet Capacity	

SUB-CATCHMENT DETAILS							
Name	Max Flow Q (cu.m/s)	EIA Max Q (cu.m/s)	Remaining EIA Max Q (cu.m/s)	Ria TC (min)	PA TC (min)	Due to Storm	
						(min)	
Cat 4b	0.059	0	0.059	15	0	15	15.02 EYEP, 30 min burst, Storm 9
Cat 4	0.053	0	0.053	0	0	15	15.02 EYEP, 30 min burst, Storm 7
Cat 5	0.059	0	0.059	0	0	15	15.02 EYEP, 30 min burst, Storm 7
Cat 6c	0.07	0	0.07	0	0	15	15.02 EYEP, 30 min burst, Storm 7
Cat 6b	0.07	0	0.07	0	0	15	15.02 EYEP, 30 min burst, Storm 7
Cat 6a	0.074	0	0.074	0	0	15	15.02 EYEP, 30 min burst, Storm 7
Cat 7c	0.065	0	0.065	0	0	15	15.02 EYEP, 30 min burst, Storm 7
Cat 7b	0.095	0	0.095	0	0	15	15.02 EYEP, 30 min burst, Storm 7
Cat 7a	0.035	0	0.035	0	0	15	15.02 EYEP, 30 min burst, Storm 7
Site Post West Wet	0.205	0.205	0.003	6	5	15	15.02 EYEP, 10 min burst, Storm 3
Cat 2b	0.009	0.002	0.007	5	0	15	15.02 EYEP, 30 min burst, Storm 5
Pre E2	0.029	0	0.029	7	5	15	15.02 EYEP, 30 min burst, Storm 7
Pre Wet	0.045	0	0.045	5	5	15	15.02 EYEP, 30 min burst, Storm 5
Pre East	0.119	0	0.119	7	5	15	15.02 EYEP, 30 min burst, Storm 7
Post East Exit	0.031	0.007	0.024	7	5	15	15.02 EYEP, 30 min burst, Storm 5
Cat 1	0.118	0.112	0.006	10	5	15	15.02 EYEP, 10 min burst, Storm 5
Cat 2a	0.035	0.008	0.028	5	0	15	15.02 EYEP, 30 min burst, Storm 5

PPE DETAILS		Max Q (cc/min)	Max V	Max U/S HGL (in)	Max D/S HGL (in)	Due to Storm
P21		0.1	1.63	6.133	5.915	0.250 AEP, 30 min burst, Storm 9
P22		0.15	1.67	5.834	5.337	0.250 AEP, 30 min burst, Storm 9
P4		0.507	1.42	5.183	5.038	0.250 AEP, 30 min burst, Storm 8
P2		0.546	1.57	4.749	4.749	0.250 AEP, 30 min burst, Storm 8
M		0.775	1.19	4.623	4.490	0.250 AEP, 30 min burst, Storm 7
P1		0.775	2.19	4.328	4.248	0.250 AEP, 30 min burst, Storm 7
P31		0.053	1.14	3.502	4.897	0.250 AEP, 30 min burst, Storm 5
P11		0.084	0.76	8.386	4.78	0.250 AEP, 30 min burst, Storm 5
P30		0.114	0.53	4.754	4.744	0.250 AEP, 30 min burst, Storm 7
P7		0.204	0.94	5.681	5.687	0.250 AEP, 30 min burst, Storm 7
P3		0.3	1.06	5.588	5.488	0.250 AEP, 30 min burst, Storm 7
P5		0.326	1.15	5.372	5.337	0.250 AEP, 30 min burst, Storm 9
P11		0.114	1.1	5.957	5.8	0.250 AEP, 30 min burst, Storm 3
P1		0.567	1.126	5.647	5.647	0.250 AEP, 30 min burst, Storm 3

CHANNEL DETAILS			
Name	Max Q (cu m/s)	Max V (m/s)	Due to Storm

OVERFLOW ROUTE DETAILS								
Name	Max Q U/S	Max Q D/S Safe Q	Max D	Max Div	Max Width	Max V	Due to Storm	
OF20	0	0	0	0	0	0	0	
OF4	0	0	0	0	0	0	0	
OF1	0	0	0	0	0	0	0	
OF2	0	0	0	0	0	0	0	
OF3	0	0	0	0	0	0	0	
OF 32	0	0	0	0	0	0	0	
OF 31	0	0	0	0	0	0	0	
OF 30	0	0	0	0	0	0	0	
OF7	0	0	0.054	0	0	0	0	
OF6	0	0	0.054	0	0	0	0	
OF5	0	0	0	0	0	0	0	
OF West Pre	0.044	0.044	0.908	0.032	0.03	4	1.33	0.2EY AEP, 30
OF Pre	0.119	0.119	0.908	0.047	0.05	4	1.13	0.2EY AEP, 30
OF Out	0.163	0.163	0.908	0.046	0.06	4	1.32	0.2EY AEP, 30
OF East Post	0.031	0.03	0.908	0.029	0.03	4	1.72	0.2EY AEP, 30
OF	0	0	0	0	0	0	0	
OF10	0	0	0	0	0	0	0	

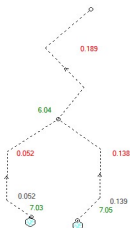
DETENTION BASIN DETAILS					
Name	Max WL	MaxVol	Max Q Total	Max Q Low Level	Max Q High Level

Run Log for DRAINS v2025.01.9147.24925 - S15582-260605-DRAINS-REVR

Run Log for DRAINS v2025.01.9147.24925 - S15582-260605-DRAINS-REVB

No water upwelling from any pit.
Freeboard was less than 0.15m and
Flows were safe in all overflow runs.

Results for median storm in critical 10% AEP ensembles using Full Unsteady hydraulic model.



DRAINS results prepared from Version 2025.01.9147.24925

PIT / NODE DETAILS

7th NODE details	Max HGL	Max HGL	Max Surface	Max Pond	Min	Overflow	Constraint
Name	HGL	HGL	Flow In/Out Volume (cu.m/s) (cu.m)	Flow In/Out Volume (cu.m/s) (cu.m)	Freeboard (m)	Freeboard (m)	
PH21	6.39			0.13			
PH21	6.13	6.74	0.072	0.6	0.53	0	Inlet Capacity
PH4	5.66	6.53	0.08	0.6	0.79	0	Inlet Capacity
PH3	5.27	6.29	0.095	0.7	0.94	0	Inlet Capacity
PH2	4.91	6.04	0.095	0.7	1.00	0	Inlet Capacity
N1	4.57	5.57	0.099	0.7	0.91	0	Inlet Capacity
PH1	4.37						
PH 23	5.63	5.7	0.163	1.7	0	0	Outlet System
PH 32	5.06	5.4	0.141	1.7	0.28	0	Inlet Capacity
PH 31	4.59	5.28	0.051	0.9	0.27	0	Inlet Capacity
PH West							
PH5	5.88	6.07	0.028	0	0.06	0	Inlet Capacity
N5	6.02	5.9	0.253	0.4	0	0.015	Outlet System
N East	7.03		0.06				
N West	7.05		0.161				
N Pre	6.04		0.219				
N Post East	7.02		0.042				
PH4	6.59	6.48	1.7	0.03	0	0	Inlet Capacity
PH3	6.13	6.24	0.059	0.9	0.05	0	Inlet Capacity

SUB-CATCHMENT DETAILS

Name	Max Flow Qc (m³/s)	Max EA Qc (m³/s)	Remaining EA Qc (m³/s)	RIA Tc (min)	PA Tc (min)	Due to Storm (min)
Cell 4a	0.114	0	0.114	15	15	18 10% AEP, 30 min storm, Storm 4
Cell 4a	0.062	0	0.062	0	0	15 10% AEP, 25 min storm, Storm 4
Cell 5	0.069	0	0.069	0	0	15 10% AEP, 25 min storm, Storm 7
Cell 6c	0.082	0	0.082	0	0	15 10% AEP, 25 min storm, Storm 7
Cell 6b	0.082	0	0.082	0	0	15 10% AEP, 25 min storm, Storm 7
Cell 6a	0.086	0	0.086	0	0	15 10% AEP, 25 min storm, Storm 7
Cell 7a	0.076	0	0.076	0	0	15 10% AEP, 25 min storm, Storm 7
Cell 7b	0.041	0	0.041	0	0	15 10% AEP, 25 min storm, Storm 7
Cell 7a	0.041	0	0.041	0	0	15 10% AEP, 25 min storm, Storm 7
Cell 2a	0.235	0.02	0.215	10	10	15 10% AEP, 10 min storm, Storm 6
Cell 2b	0.01	0.003	0.008	5	0	15 10% AEP, 25 min storm, Storm 7
Cell 3	0.046	0	0.046	0	0	15 10% AEP, 25 min storm, Storm 7
Cell 4	0.052	0	0.052	0	0	15 10% AEP, 25 min storm, Storm 7
Pre East	0.139	0	0.139	7	5	15 10% AEP, 25 min storm, Storm 7
Cell Post East	0.036	0.01	0.029	7	5	15 10% AEP, 25 min storm, Storm 6
Cell 1	0.137	0.128	0.009	10	18	15 10% AEP, 10 min storm, Storm 6
Cell 2	0.041	0.012	0.029	10	18	15 10% AEP, 10 min storm, Storm 6

PIPE DETAILS

P21	Max V	Max D	Max O	Stor
P22	Max V	Max D	Max O	Stor
P23	Max V	Max D	Max O	Stor
P24	Max V	Max D	Max O	Stor
P25	Max V	Max D	Max O	Stor
P26	Max V	Max D	Max O	Stor
P27	Max V	Max D	Max O	Stor
P28	Max V	Max D	Max O	Stor
P29	Max V	Max D	Max O	Stor
P30	Max V	Max D	Max O	Stor
P31	Max V	Max D	Max O	Stor
P32	Max V	Max D	Max O	Stor
P33	Max V	Max D	Max O	Stor
P34	Max V	Max D	Max O	Stor
P35	Max V	Max D	Max O	Stor
P36	Max V	Max D	Max O	Stor
P37	Max V	Max D	Max O	Stor
P38	Max V	Max D	Max O	Stor
P39	Max V	Max D	Max O	Stor
P40	Max V	Max D	Max O	Stor
P41	Max V	Max D	Max O	Stor
P42	Max V	Max D	Max O	Stor
P43	Max V	Max D	Max O	Stor
P44	Max V	Max D	Max O	Stor
P45	Max V	Max D	Max O	Stor
P46	Max V	Max D	Max O	Stor
P47	Max V	Max D	Max O	Stor
P48	Max V	Max D	Max O	Stor
P49	Max V	Max D	Max O	Stor
P50	Max V	Max D	Max O	Stor
P51	Max V	Max D	Max O	Stor
P52	Max V	Max D	Max O	Stor
P53	Max V	Max D	Max O	Stor
P54	Max V	Max D	Max O	Stor
P55	Max V	Max D	Max O	Stor
P56	Max V	Max D	Max O	Stor
P57	Max V	Max D	Max O	Stor
P58	Max V	Max D	Max O	Stor
P59	Max V	Max D	Max O	Stor
P60	Max V	Max D	Max O	Stor
P61	Max V	Max D	Max O	Stor
P62	Max V	Max D	Max O	Stor
P63	Max V	Max D	Max O	Stor
P64	Max V	Max D	Max O	Stor
P65	Max V	Max D	Max O	Stor
P66	Max V	Max D	Max O	Stor
P67	Max V	Max D	Max O	Stor
P68	Max V	Max D	Max O	Stor
P69	Max V	Max D	Max O	Stor
P70	Max V	Max D	Max O	Stor
P71	Max V	Max D	Max O	Stor
P72	Max V	Max D	Max O	Stor
P73	Max V	Max D	Max O	Stor
P74	Max V	Max D	Max O	Stor
P75	Max V	Max D	Max O	Stor
P76	Max V	Max D	Max O	Stor
P77	Max V	Max D	Max O	Stor
P78	Max V	Max D	Max O	Stor
P79	Max V	Max D	Max O	Stor
P80	Max V	Max D	Max O	Stor
P81	Max V	Max D	Max O	Stor
P82	Max V	Max D	Max O	Stor
P83	Max V	Max D	Max O	Stor
P84	Max V	Max D	Max O	Stor
P85	Max V	Max D	Max O	Stor
P86	Max V	Max D	Max O	Stor
P87	Max V	Max D	Max O	Stor
P88	Max V	Max D	Max O	Stor
P89	Max V	Max D	Max O	Stor
P90	Max V	Max D	Max O	Stor
P91	Max V	Max D	Max O	Stor
P92	Max V	Max D	Max O	Stor
P93	Max V	Max D	Max O	Stor
P94	Max V	Max D	Max O	Stor
P95	Max V	Max D	Max O	Stor
P96	Max V	Max D	Max O	Stor
P97	Max V	Max D	Max O	Stor
P98	Max V	Max D	Max O	Stor
P99	Max V	Max D	Max O	Stor
P100	Max V	Max D	Max O	Stor
P1	0.12	1.29	6.32	100 AEP, 30 min burst, Storm 4
P2	0.17	1.54	6.006	100 AEP, 25 min burst, Storm 4
P4	0.55	1.54	5.463	100 AEP, 25 min burst, Storm 8
P10	0.623	1.74	5.153	4.906 K AEP, 30 min burst, Storm 8
P17	0.867	1.88	4.567	4.567 K AEP, 30 min burst, Storm 8
P31	0.283	2.23	4.239	4.239 AEP, 25 min burst, Storm 7
P32	0.054	1.36	5.388	5.008 AEP, 30 min burst, Storm 8
P33	0.087	0.79	5.033	4.947 AEP, 30 min burst, Storm 8
P34	0.10	0.57	4.931	4.906 AEP, 30 min burst, Storm 8
P7	0.234	1.08	6.016	5.981 AEP, 10 min burst, Storm 8
P6	0.372	1.32	5.911	5.858 AEP, 10 min burst, Storm 6
P10	0.192	1.39	5.706	5.691 AEP, 10 min burst, Storm 6
P15	0.125	1.25	6.113	6.12

CHANNEL DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Due to Storm
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OVERFLOW ROUTE DETAILS

Name	Max Q U/S	Max Q D/S	Safe Q	Max D	Max Sv/D	Max Width	Max V	Due to Storm
OF20	0	0	0	0	0	0	0	
OF4	0	0	0	0	0	0	0	
OF3	0	0	0	0	0	0	0	
OF1	0	0	0	0	0	0	0	
OF 32	0	0	0	0	0	0	0	
OF 31	0	0	0	0	0	0	0	
OF 30	0	0	0	0	0	0	0	
OF7	0	0	0.054	0	0	0	0	
OF6	0	0	0.908	0	0	0	0	
OF15	0.015	0.015	0.054	0.014	0	6.59	0.29	10% AEP, 30 min burst, Storm B
OF West Pre	0.052	0.051	0.908	0.034	0.03	4	1.23	10% AEP, 25 min burst, Storm 8
OF East Pre	0.138	0.138	0.908	0.05	0.05	4	1.15	10% AEP, 25 min burst, Storm 7
OF Out	0.189	0.189	0.908	0.049	0.07	4	1.4	10% AEP, 25 min burst, Storm 7
OF East Post	0.035	0.035	0.908	0.03	0.03	4	1.62	10% AEP, 25 min burst, Storm 7
OF10	0	0	0	0	0	0	0	
OF11	0	0	0	0	0	0	0	

DETENTION BASIN DETAILS

Name	Max WL	MaxVol	Max Q Total	Max Q Low Level	Max Q High Level
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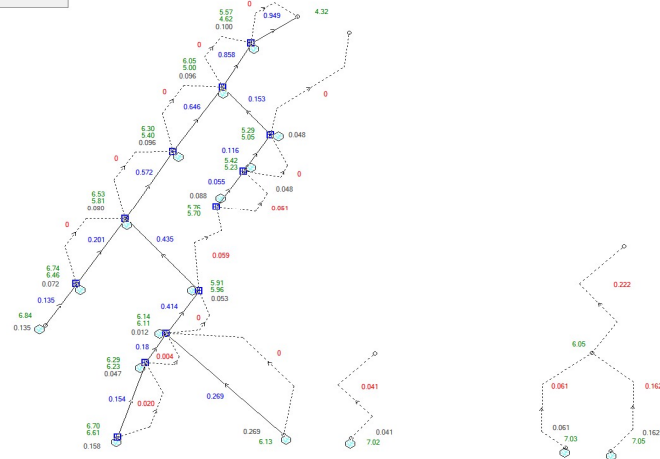
Run Log for DRAINS v2025.01.9147.24925 - 515582-260605-DRAINS-REVE

Run Log for DRAINS v2025.01.9147.24925 - S15582-260605-DRAINS-REVB.drn run at 11:31:31 on 5/6/2026

No water upwelling from any pit.

Freeboard was less than 0.15m at Pit11, Pit 33, Pit10, Pit6, Pit5

The maximum flow in these overflow routes is unsafe: QES



DRAINS Data:

DRAINS results prepared from Version 2025.01.9147.24925

RT / NODE DETAILS

Name	Max HGL	Max Pond HGL	Version 8		Min Freeboard (cu.m/s)	Overflow (cu.m/s)	Constraint
			Max Surf. Flow Arriv (cu.m/s)	Max Pond Volume (cu.m)			
P121	6.84			0.152			
P120	6.46	6.74	0.082	0.9	0.2	0	Inlet Capacity
P14	5.81	6.53	0.091	0.7	0.64	0	Inlet Capacity
P13	5.4	6.3	0.109	0.8	0.81	0	Inlet Capacity
P12	5	6.05	0.109	0.8	0.96	0	Inlet Capacity
P11	4.62	5.57	0.114	0.9	0.86	0	Inlet Capacity
N1	4.32						
P133	5.7	5.76	0.256	1.7	0	0.051	Outlet System
P132	5.23	5.42	0.266	1.7	0.11	0	Inlet Capacity
P131	5.05	5.29	0.238	1.7	0.17	0	Inlet Capacity
N Post West	6.13	6.19					
P16	6.11	6.14	0.082	0.1	0	0	Outlet System
P15	5.96	5.91	0.081	0.4	0	0.059	Outlet System
N East	7.03		0.069				
N West	7.05		0.184				
N Pre	6.05		0.252				
N Post East	7.02		0.05				
P111	6.61	6.7	0.17	1.7	0	0.02	Outlet System
P110	6.23	6.29	0.1	0.9	0	0.004	Outlet System

SUB-CATCHMENT DETAILS

Name	Max Flow Q (cu.m/s)	EIA Max Q (cu.m/s)	Remaining Max Q (cu.m/s)	EIA Tc (min)	RIA Tc (min)	PA Tc (min)	Due to Storm
Cat 4b	0.135	0	0.135	15	15	18	5% AEP, 25 min burst, Storm 8
Cat 4a	0.072	0	0.072	0	0	15	5% AEP, 25 min burst, Storm 8
Cat 5	0.08	0	0.08	0	0	15	5% AEP, 25 min burst, Storm 8
Cat 6c	0.096	0	0.096	0	0	15	5% AEP, 25 min burst, Storm 8
Cat 6b	0.096	0	0.096	0	0	15	5% AEP, 25 min burst, Storm 8
Cat 6a	0.1	0	0.1	0	0	15	5% AEP, 25 min burst, Storm 8
Cat 7c	0.088	0	0.088	0	0	15	5% AEP, 25 min burst, Storm 8
Cat 7b	0.048	0	0.048	0	0	15	5% AEP, 25 min burst, Storm 8
Cat 7a	0.048	0	0.048	0	0	15	5% AEP, 25 min burst, Storm 8
Cat Site Post West	0.269	0.267	0.005	6	5	13	5% AEP, 10 min burst, Storm 3
Cat 2b	0.012	0.003	0.01	5	0	15	5% AEP, 20 min burst, Storm 6
Cat 3	0.053	0	0.053	0	0	15	5% AEP, 25 min burst, Storm 8
Pre West	0.061	0	0.061	5	5	15	5% AEP, 25 min burst, Storm 8
Pre East	0.162	0	0.162	7	5	15	5% AEP, 25 min burst, Storm 8
Cat Post East	0.041	0.01	0.034	7	5	15	5% AEP, 25 min burst, Storm 8
Cat 1	0.158	0.147	0.011	10	18	18	5% AEP, 10 min burst, Storm 6
Cat 2a	0.047	0.013	0.038	5	0	15	5% AEP, 20 min burst, Storm 6

PIPE DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Max U/S HGL (m)	Max D/S HGL (m)	Due to Storm
P21	0.135	1.91	6.842	6.46	5% AEP, 25 min burst, Storm 8
P20	0.201	1.82	6.29	5.813	5% AEP, 25 min burst, Storm 7
P4	0.572	1.6	5.604	5.402	5% AEP, 30 min burst, Storm 8
P3	0.846	1.81	5.27	5.002	5% AEP, 30 min burst, Storm 8
P2	0.858	1.94	4.81	4.619	5% AEP, 25 min burst, Storm 7
P1	0.949	2.32	4.408	4.32	5% AEP, 25 min burst, Storm 7
P32	0.055	1.39	5.499	5.23	5% AEP, 45 min burst, Storm 1
P31	0.116	1.05	5.143	5.032	5% AEP, 45 min burst, Storm 1
P30	0.153	0.71	5.016	5.002	5% AEP, 45 min burst, Storm 1
P7	0.269	1.24	6.133	6.106	5% AEP, 10 min burst, Storm 5
P6	0.414	1.46	6.029	5.963	5% AEP, 10 min burst, Storm 6
P5	0.35	1.54	5.85	5.813	5% AEP, 10 min burst, Storm 6
P11	0.154	1.39	6.431	6.234	5% AEP, 10 min burst, Storm 7
P10	0.18	1.63	6.158	6.106	5% AEP, 30 min burst, Storm 8

CHANNEL DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Due to Storm

OVERFLOW ROUTE DETAILS

Name	Max Q U/S	Max Q D/S	Max Q Safe Q	Max D	Max Dv/V	Max Width	Max V	Due to Storm
OF20	0	0	0	0	0	0	0	
OF4	0	0	0	0	0	0	0	
OF3	0	0	0	0	0	0	0	
OF2	0	0	0	0	0	0	0	
OF1	0	0	0	0	0	0	0	
OF 32	0.051	0.051	0	0.023	0.01	7.85	0.45	5% AEP, 45 min burst, Storm 1
OF 31	0	0	0	0	0	0	0	
OF 30	0	0	0	0	0	0	0	
OF7	0	0	0.054	0	0	0	0	
OF6	0	0	0.054	0	0	0	0	
OF5	0.059	0.059	0	0.025	0.01	8.32	0.45	5% AEP, 25 min burst, Storm 7
OF West Pre	0.061	0.061	0.908	0.036	0.03	4	1.17	5% AEP, 25 min burst, Storm 8
OF East Pre	0.162	0.162	0.908	0.053	0.06	4	1.18	5% AEP, 25 min burst, Storm 8
OF Out	0.222	0.222	0.908	0.053	0.08	4	1.47	5% AEP, 25 min burst, Storm 8
OF East Post	0.041	0.041	0.908	0.032	0.03	4	1.4	5% AEP, 25 min burst, Storm 8
OF11	0.02	0.02	0	0.016	0.01	6.44	0.33	5% AEP, 30 min burst, Storm 2
OF10	0.004	0.004	0	0.007	0	4.41	0.22	5% AEP, 30 min burst, Storm 8

DETENTION BASIN DETAILS

Name	Max WL	Max Vol	Max Q Total	Max Q Low Level	Max Q High Level

Run Log for DRAINS v2025.01.9147.24925 - S15582-260605-DRAINS-REV.B

Run Log for DRAINS v2025.01.9147.24925 - S15582-260605-DRAINS-REV.Bdm run at 11:33:11 on 5/6/2026.

Upwelling occurred at: P15

Freeboard was less than 0.15m at P111, P132, P133, P110, P16

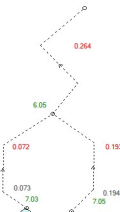
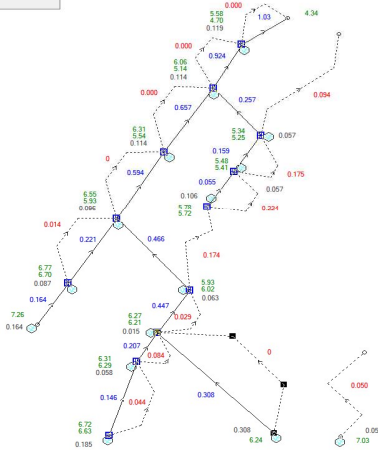
The maximum flow in these overflow routes is unsafe: OF11, OF 32, OF10, OF5

2% AEP

DRAINS v2025.01.9147.24925 - S15582-260605-DRAINS-REV8.drn

File Edit Project View Draw Run Help

Results for median storm in critical 2% AEP ensembles
using Full Unsteady hydraulic model.



DRAINS Data:

DRAINS results prepared from Version 2025.01.9147.24925

RT / NODE DETAILS

Name	Version 8						Overflow	Constraint
	Max HGL	Max Pond	Max Surfa	Max Pond	Min	Freeboard		
	HGL	Flow Arriv	Volume	Flow Arriv	Freeboard	Flow Arriv		
		(cu.m/s)	(cu.m)	(cu.m/s)	(m)	(cu.m/s)		
P121	7.26				0.171			
P120	6.7	6.77	0.097	0.9	0	0.014	Outlet System	
P14	5.93	6.55	0.144	0.9	0.52	0	Inlet Capacity	
P13	5.54	6.31	0.128	0.9	0.67	0	Inlet Capacity	
P12	5.14	6.06	0.129	0.9	0.82	0	Inlet Capacity	
P11	4.7	5.58	0.135	0.9	0.78	0	Inlet Capacity	
N1	4.34		0.003					
P16 33	5.72	5.78	0.404	1.7	0	0.224	Outlet System	
P16 32	5.41	5.48	0.423	1.7	0	0.175	Outlet System	
P16 31	5.25	5.34	0.409	1.7	0	0.094	Outlet System	
N Post West	6.24		0.35					
P16	6.21	6.27	0.158	0.1	0	0.029	Outlet System	
P15	6.02	5.93	0.161	0.4	0	0.174	Outlet System	
N East	7.03		0.082					
N West	7.05		0.218					
N Pre	6.05		0.298					
N Post East	7.03		0.058					
P111	6.63	6.72	0.19	1.7	0	0.044	Outlet System	
P110	6.29	6.31	0.139	0.9	0	0.084	Outlet System	

SUB-CATCHMENT DETAILS

Name	Max		EIA		Remaining EIA		RIA		PA		Due to Storm
	Flow Q	Max Q	Flow Q	Max Q	Flow Q	Max Q	Flow Q	Max Q	Flow Q	Max Q	
	(cu.m/s)	(cu.m/s)	(cu.m/s)	(cu.m/s)	(cu.m/s)	(cu.m/s)	(cu.m/s)	(cu.m/s)	(cu.m/s)	(cu.m/s)	
Cat 4b	0.164	0	0.164	15	15	15	15	15	15	15	2% AEP, 25 min burst, Storm 8
Cat 4a	0.087	0	0.087	0	0	0	0	0	0	0	15 2% AEP, 25 min burst, Storm 9
Cat 5	0.096	0	0.096	0	0	0	0	0	0	0	15 2% AEP, 25 min burst, Storm 9
Cat 6c	0.114	0	0.114	0	0	0	0	0	0	0	15 2% AEP, 25 min burst, Storm 9
Cat 6b	0.114	0	0.114	0	0	0	0	0	0	0	15 2% AEP, 25 min burst, Storm 9
Cat 6a	0.119	0	0.119	0	0	0	0	0	0	0	15 2% AEP, 25 min burst, Storm 9
Cat 7c	0.106	0	0.106	0	0	0	0	0	0	0	15 2% AEP, 25 min burst, Storm 9
Cat 7b	0.057	0	0.057	0	0	0	0	0	0	0	15 2% AEP, 25 min burst, Storm 9
Cat 7a	0.057	0	0.057	0	0	0	0	0	0	0	15 2% AEP, 25 min burst, Storm 9
Cat Site Post West	0.308	0.301	0.007	6	5	13	13	13	13	13	2% AEP, 10 min burst, Storm 4
Cat 2b	0.015	0.003	0.012	5	0	15	15	15	15	15	2% AEP, 25 min burst, Storm 4
Cat 3	0.063	0	0.063	0	0	15	15	15	15	15	2% AEP, 25 min burst, Storm 9
Pre West	0.073	0	0.073	5	5	15	15	15	15	15	2% AEP, 25 min burst, Storm 9
Pre East	0.194	0	0.194	7	5	15	15	15	15	15	2% AEP, 25 min burst, Storm 9
Cat Post East	0.05	0.011	0.039	7	5	15	15	15	15	15	2% AEP, 25 min burst, Storm 4
Cat 1	0.185	0.171	0.014	10	18	18	18	18	18	18	2% AEP, 10 min burst, Storm 7
Cat 2a	0.058	0.013	0.046	5	0	15	15	15	15	15	2% AEP, 25 min burst, Storm 4

PIPE DETAILS

Name	Max Q		Max V		Max U/S		Max D/S		Due to Storm
	(cu.m/s)	(m/s)	(cu.m/s)	(m/s)	(cu.m/s)	(m/s)	(cu.m/s)	(m/s)	
P21	0.164	2.33	7.264	6.699	2% AEP, 25 min burst, Storm 8				
P20	0.221	2	6.498	5.934	2% AEP, 25 min burst, Storm 4				
P4	0.594	1.66	5.734	5.542	2% AEP, 10 min burst, Storm 7				
P3	0.657	1.84	5.409	5.139	2% AEP, 25 min burst, Storm 5				
P2	0.824	2.09	4.516	4.696	2% AEP, 25 min burst, Storm 4				
P1	1.03	2.41	4.452	4.344	2% AEP, 25 min burst, Storm 4				
P32	0.055	1.39	5.589	5.406	2% AEP, 15 min burst, Storm 3				
P31	0.159	1.44	5.328	5.246	2% AEP, 20 min burst, Storm 10				
P30	0.257	1.19	5.169	5.139	2% AEP, 25 min burst, Storm 4				
P7	0.308	1.42	6.242	6.211	2% AEP, 10 min burst, Storm 4				
P6	0.447	1.58	6.11	6.023	2% AEP, 10 min burst, Storm 8				
P5	0.466	1.65	5.956	5.934	2% AEP, 10 min burst, Storm 4				
P11	0.146	1.32	6.47	6.293	2% AEP, 10 min burst, Storm 7				
P10	0.207	1.88	6.244	6.211	2% AEP, 10 min burst, Storm 7				

CHANNEL DETAILS

Name	Max Q		Max V	Due to Storm
	(cu.m/s)	(m/s)		

OVERFLOW ROUTE DETAILS

Name	Max Q U/S		Max Q D/S		Safe Q	Max D	Max Dev	Max Width	Max V	Due to Storm
	(cu.m/s)	(m/s)	(cu.m/s)	(m/s)	(cu.m/s)	(m)	(m/s)	(m)	(m/s)	
OF20	0.014	0.014	0	0.014	0	6.07	0.28	2% AEP, 25 min burst, Storm 4		
OF4	0	0	0	0	0	0	0	0	0	
OF3	0	0	0	0	0	0	0	0	0	
OF2	0	0	0	0	0	0	0	0	0	
OF1	0	0	0	0	0	0	0	0	0	
OF 32	0.224	0.224	0	0.044	0.03	11.03	0.71	2% AEP, 25 min burst, Storm 4		
OF 31	0.175	0.175	0	0.044	0.02	11.09	0.54	2% AEP, 25 min burst, Storm 4		
OF 30	0.094	0.092	0	0.025	0.02	8.43	0.73	2% AEP, 25 min burst, Storm 4		
OF7	0	0	0.054	0	0	0	0	0	0	
OF6	0.029	0.029	0.054	0.066	0.04	1.57	0.57	2% AEP, 25 min burst, Storm 4		
OF5	0.174	0.174	0	0.04	0.03	10.68	0.62	2% AEP, 25 min burst, Storm 4		
OF West Pre	0.072	0.072	0.908	0.039	0.03	4	1.13	2% AEP, 25 min burst, Storm 9		
OF East Pre	0.193	0.193	0.908	0.058	0.07	4	1.23	2% AEP, 25 min burst, Storm 9		
OF Out	0.264	0.264	0.908	0.057	0.09	4	1.58	2% AEP, 25 min burst, Storm 9		
OF East Post	0.05	0.05	0.908	0.034	0.03	4	1.34	2% AEP, 25 min burst, Storm 4		
OF11	0.044	0.044	0	0.021	0.01	7.62	0.43	2% AEP, 15 min burst, Storm 5		
OF10	0.084	0.084	0	0.027	0.02	8.67	0.57	2% AEP, 25 min burst, Storm 4		

DETENTION BASIN DETAILS

Name	Max WL		Max Vol	Max Q	Max Q	Max Q
	(m)	(m)		Total	Low Level	High Level

Run Log for DRAINS v2025.01.9147.24925 - S15582-260605-DRAINS-REV8

Run Log for DRAINS v2025.01.9147.24925 - S15582-260605-DRAINS-REV8.drn run at 14:19:54 on 5/6/2026.

Upwelling occurred at: P110, P16, P15

Freeboard was less than 0.15m at P111, P16 32, P16 31, P16 33, P120

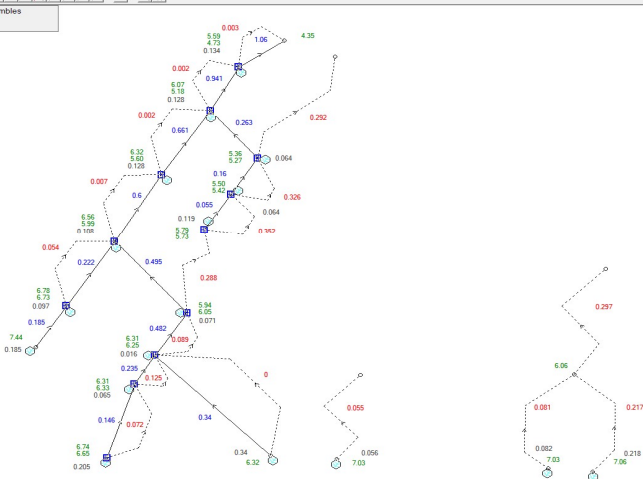
The maximum flow in these overflow routes is unsafe: OF11, OF 32, OF 31, OF 30, OF10, OF5, OF20These sag pits have unsafe water levels for minor storms: P16

1% AEP

DRAINS v2025.01.9147.24925 - S15582-260605-DRAINS-REV.B.drn

File Edit Project View Draw Run Help

Results for median storm in critical 1% AEP ensembles
using Full Unsteady hydraulic model.



DRAINS Data:

DRAINS results prepared from Version 2025.01.9147.24925

RT / NODE DETAILS

Name	Version 8						Overflow	Constraint
	Max HGL	Max Pond	Max Surf	Max Pond	Min	Freeboard		
	HGL		Flow Arriv	Volume	Freeboard	(cu.m/s)		
			(cu.m/s)	(cu.m)	(m)			
PH21	7.44			0.19				
PH20	6.73	6.78	0.108	0.9	0	0.054	Outlet System	
PH4	5.99	6.56	0.195	0.9	0.46	0.007	Inlet Capacity	
PH3	5.6	6.32	0.165	0.9	0.61	0.002	Inlet Capacity	
PH2	5.18	6.07	0.148	0.9	0.78	0.002	Inlet Capacity	
PH1	4.73	5.59	0.155	0.9	0.75	0.003	Inlet Capacity	
N1	4.35		0.012					
PH 33	5.73	5.79	0.501	1.7	0	0.352	Outlet System	
PH 32	5.42	5.5	0.53	1.7	0	0.326	Outlet System	
PH 31	5.27	5.36	0.528	1.7	0	0.292	Outlet System	
N Post West	6.32		0.387					
PH6	6.25	6.31	0.196	0.1	0	0.089	Outlet System	
PH5	6.05	5.94	0.208	0.4	0	0.288	Outlet System	
N East	7.03		0.091					
N West	7.06		0.241					
N Pre	6.06		0.331					
N Post East	7.03		0.064					
PH11	6.65	6.74	0.21	1.7	0	0.072	Outlet System	
PH10	6.33	6.31	0.17	0.9	0	0.125	Outlet System	

SUB-CATCHMENT DETAILS

Name	EIA		Remaining EIA		RIA		PA		Due to Storm
	Max Flow Q	Max Q	Max Q	Tc	Max Q	Tc	Max Q	Tc	
	(cu.m/s)	(cu.m/s)	(cu.m/s)	(min)	(cu.m/s)	(min)	(cu.m/s)	(min)	
Cat 4b	0.185	0	0.185	15	15	15	18	1% AEP, 25 min burst, Storm 8	
Cat 4a	0.097	0	0.097	0	0	0	15	1% AEP, 25 min burst, Storm 3	
Cat 5	0.108	0	0.108	0	0	0	15	1% AEP, 25 min burst, Storm 3	
Cat 6c	0.128	0	0.128	0	0	0	15	1% AEP, 25 min burst, Storm 3	
Cat 6b	0.128	0	0.128	0	0	0	15	1% AEP, 25 min burst, Storm 3	
Cat 6a	0.134	0	0.134	0	0	0	15	1% AEP, 25 min burst, Storm 3	
Cat 7c	0.119	0	0.119	0	0	0	15	1% AEP, 25 min burst, Storm 3	
Cat 7b	0.064	0	0.064	0	0	0	15	1% AEP, 25 min burst, Storm 3	
Cat 7a	0.064	0	0.064	0	0	0	15	1% AEP, 25 min burst, Storm 3	
Cat Site Post West	0.34	0.332	0.008	6	5	13	1% AEP, 10 min burst, Storm 4		
Cat 2b	0.016	0.004	0.013	5	0	0	15	1% AEP, 25 min burst, Storm 4	
Cat 3	0.071	0	0.071	0	0	0	15	1% AEP, 25 min burst, Storm 3	
Pre West	0.082	0	0.082	5	5	15	1% AEP, 25 min burst, Storm 3		
Pre East	0.218	0	0.218	7	5	15	1% AEP, 25 min burst, Storm 3		
Cat Post East	0.056	0.012	0.044	7	5	15	1% AEP, 25 min burst, Storm 4		
Cat 1	0.205	0.188	0.017	10	18	18	1% AEP, 10 min burst, Storm 7		
Cat 2a	0.065	0.015	0.051	5	0	15	1% AEP, 25 min burst, Storm 4		

PIPE DETAILS

Name	Max Q		Max V		Max U/S		Max D/S		Due to Storm
	(cu.m/s)	(m/s)	(cu.m/s)	(m/s)	HGL (m)	HGL (m)	HGL (m)	HGL (m)	
P21	0.185	2.61	7.436	6.735	1% AEP, 25 min burst, Storm 9				
P20	0.222	2.01	6.532	5.986	1% AEP, 30 min burst, Storm 4				
P4	0.6	1.68	5.789	5.6	1% AEP, 10 min burst, Storm 7				
P3	0.661	1.85	5.463	5.185	1% AEP, 15 min burst, Storm 6				
P2	0.841	2.13	4.954	4.725	1% AEP, 25 min burst, Storm 4				
P1	1.061	2.45	4.468	4.353	1% AEP, 25 min burst, Storm 4				
P32	0.055	1.39	5.601	5.423	1% AEP, 1 hour burst, Storm 6				
P31	0.16	2.45	5.349	5.273	1% AEP, 25 min burst, Storm 4				
P30	0.263	1.21	5.21	5.185	1% AEP, 25 min burst, Storm 4				
P7	0.34	1.57	6.325	6.254	1% AEP, 5 min burst, Storm 1				
P6	0.482	1.7	6.147	6.055	1% AEP, 5 min burst, Storm 1				
P5	0.465	1.75	6.003	5.986	1% AEP, 5 min burst, Storm 1				
P11	0.146	1.32	6.496	6.326	1% AEP, 5 min burst, Storm 1				
P10	0.235	2.13	6.284	6.254	1% AEP, 10 min burst, Storm 4				

CHANNEL DETAILS

Name	Max Q		Due to Storm
	(cu.m/s)	(m/s)	

OVERFLOW ROUTE DETAILS

Name	Max Q U/S		Max Q D/S		Max D		Max Width		Due to Storm
	(cu.m/s)	(m/s)	(cu.m/s)	(m/s)	(cu.m/s)	(m/s)	(cu.m/s)	(m/s)	
OF20	0.054	0.054	0.288	0.024	0.01	8.2	0.43	1% AEP, 25 min burst, Storm 9	
OF4	0.007	0.007	0.288	0.01	0	5.39	0.24	1% AEP, 25 min burst, Storm 4	
OF3	0.002	0.002	0.288	0.006	0	3.77	0.18	1% AEP, 25 min burst, Storm 4	
OF2	0.002	0.002	0.288	0.006	0	3.7	0.2	1% AEP, 25 min burst, Storm 4	
OF1	0.003	0.003	0.288	0.008	0	4.58	0.19	1% AEP, 25 min burst, Storm 4	
OF 32	0.352	0.352	0.288	0.053	0.04	11.97	0.83	1% AEP, 25 min burst, Storm 4	
OF 31	0.326	0.326	0.288	0.059	0.04	12.56	0.66	1% AEP, 25 min burst, Storm 4	
OF 30	0.292	0.292	0.288	0.041	0.04	10.74	1.03	1% AEP, 25 min burst, Storm 4	
OF7	0	0	0.159	0	0	0	0		
OF6	0.089	0.089	0.159	0.102	0.07	2.45	0.71	1% AEP, 25 min burst, Storm 4	
OF5	0.288	0.288	0.288	0.05	0.04	11.68	0.74	1% AEP, 25 min burst, Storm 4	
OF West Pre	0.081	0.081	1.479	0.04	0.04	4	1.12	1% AEP, 25 min burst, Storm 3	
OF East Pre	0.217	0.216	1.479	0.061	0.07	4	1.26	1% AEP, 25 min burst, Storm 3	
OF Out	0.297	0.297	1.479	0.06	0.1	4	1.66	1% AEP, 25 min burst, Storm 3	
OF East Post	0.055	0.055	1.479	0.035	0.03	4	1.19	1% AEP, 25 min burst, Storm 4	
OF11	0.072	0.072	0.288	0.027	0.01	8.67	0.49	1% AEP, 10 min burst, Storm 6	
OF10	0.125	0.125	0.288	0.032	0.02	9.72	0.64	1% AEP, 25 min burst, Storm 4	

DETENTION BASIN DETAILS

Name	Max WL		Max Vol	Max Q		Max Q
	(cu.m/s)	(m/s)		Total	Low Level	High Level

Run Log for DRAINS v2025.01.9147.24925 - S15582-260605-DRAINS-REV.B

Run Log for DRAINS v2025.01.9147.24925 - S15582-260605-DRAINS-REV.B.drn run at 14:21:45 on 5/6/2026.

Upwelling occurred at: PH10, PH6, PH5

Freeboard was less than 0.15m at PH11, PH 32, PH 31, PH 33, PH20

The maximum pond depth in these sag pits is unsafe: PH11, PH 32, PH 33, PH6/line

The maximum flow in these overflow routes is unsafe: OF 32, OF 31, OF5

APPENDIX C: RATIONAL METHOD CALCULATION SUMMARY

RATIONAL METHOD CALCULATIONS - EXISTING SITE

Job Reference	S15582
Site Address	Y-Care Baringa Drive, Baringa - Site West
Council	SCC

Number of Sub-Catchments	2
Minor Storm Event	10% AEP (As per QUDM Table 7.02.1)
Major Storm Event	1% AEP (As per QUDM Table 7.02.1)

Subcatchment Summary Table				
Number	Catchment Name	Catchment Description	C ₁₀	tc
1	West	Rural areas (2-5 dwelling units/ha)	0.74	15
2	East	Rural areas (2-5 dwelling units/ha)	0.74	15

Site C₁₀ 0.74

Catchment Calculations (Major and Minor Storm ARI's)							
Number	Area	C10	I10	10% AEP	C100	I100	1% AEP
	ha		mm/hr	m ³ /s		mm/hr	m ³ /s
1	0.127	0.74	153	0.040	0.89	223	0.070
2	0.339	0.74	153	0.107	0.89	223	0.187

Total Runoff	Minor	0.147 m ³ /s
	Major	0.257 m ³ /s
Total Area		0.467 ha

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

Runoff Summary		
Freq.	Peak Discharge	
4 EY	0.034	m ³ /s
63% AEP	0.068	m ³ /s
39% AEP	0.081	m ³ /s
15% AEP	0.120	m ³ /s
10% AEP	0.147	m ³ /s
5% AEP	0.176	m ³ /s
2% AEP	0.223	m ³ /s
1% AEP	0.257	m ³ /s

RATIONAL METHOD CALCULATIONS - DEVELOPED SITE

Job Reference	S15582
Site Address	Y-Care Baringa Drive, Baringa
Council	SCC

Number of Sub-Catchments	1
Minor Storm Event	10% AEP (As per QUDM Table 7.02.1)
Major Storm Event	1% AEP (As per QUDM Table 7.02.1)

Subcatchment Summary Table				
Number	Catchment Name	Catchment Description	C₁₀	tc
1	Prop. Site	Low-medium to high density residential areas	0.87	9

Site C₁₀ 0.87

Catchment Calculations (Major and Minor Storm ARI's)							
Number	Area	C10	I10	10% AEP	C100	I100	1% AEP
	<i>ha</i>		<i>mm/hr</i>	<i>m³/s</i>		<i>mm/hr</i>	<i>m³/s</i>
1	0.465	0.87	189	0.212	1.00	276	0.357

Total Runoff	Minor	0.212 m ³ /s
	Major	0.357 m ³ /s
Total Area		0.465 ha

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

Runoff Summary		
<i>Freq.</i>	<i>Peak Discharge</i>	
4 EY	0.049	m ³ /s
63% AEP	0.098	m ³ /s
39% AEP	0.117	m ³ /s
15% AEP	0.173	m ³ /s
10% AEP	0.212	m ³ /s
5% AEP	0.254	m ³ /s
2% AEP	0.323	m ³ /s
1% AEP	0.357	m ³ /s

APPENDIX D: MUSIC MODEL SUMMARY REPORT

Source nodes

Location, Roof GLA (100% Imp.) - 0.018 ha, Hardstand (100% imp.) - 0.127 ha, Vegetation West (100% Perv.) - 0.015 ha, Vegetation East (80% Perv.) - 0.088 ha - Urban Commercial, Roof GLA Bypass (100% Imp.) - 0.11 ha, Roof MP Hall (100% Imp.) - 0.069 ha, Roof MP Hall Bypass (100% Imp.) - 0.034 ha
ID, 1, 2, 3, 5, 13, 14, 15

Node

Type, UrbanSourceNode, UrbanSourceNode, UrbanSourceNode, UrbanSourceNode, UrbanSourceNode, UrbanSourceNode, UrbanSourceNode

Zoning Surface Type, Mixed, Mixed, Mixed, Mixed, Mixed, Mixed, Mixed, Mixed

Total Area (ha), 0.018, 0.127, 0.015, 0.088, 0.11, 0.069, 0.034

Area Impervious (ha), 0.018, 0.127, 0, 0.0179086567164179, 0.11, 0.069, 0.034

Area Pervious (ha), 0, 0, 0.015, 0.0700913432835821, 0, 0, 0

Field Capacity (mm), 80, 80, 80, 80, 80, 80, 80, 80

Pervious Area Infiltration Capacity coefficient - a, 243, 243, 243, 243, 243, 243, 243

Pervious Area Infiltration Capacity exponent - b, 0.6, 0.6, 0.6, 0.6, 0.6, 0.6, 0.6

Impervious Area Rainfall Threshold (mm/day), 1, 1, 1, 1, 1, 1, 1, 1

Pervious Area Soil Storage Capacity (mm), 18, 80, 80, 80, 18, 18, 18

Pervious Area Soil Initial Storage (% of Capacity), 10, 10, 10, 10, 10, 10, 10, 10

Groundwater Initial Depth (mm), 50, 50, 50, 50, 50, 50, 50, 50

Groundwater Daily Recharge Rate (%), 0, 0, 0, 0, 0, 0, 0, 0

Groundwater Daily Baseflow Rate (%), 31, 31, 31, 31, 31, 31, 31, 31

Groundwater Daily Deep Seepage Rate (%), 0, 0, 0, 0, 0, 0, 0, 0

Stormflow Total Suspended Solids Mean (log mg/L), 1.3, 2.43, 1.92, 1.92, 1.3, 1.3, 1.3

Stormflow Total Suspended Solids Standard Deviation (log

mg/L), 0.44, 0.44, 0.44, 0.44, 0.44, 0.44, 0.44

Stormflow Total Suspended Solids Estimation

Method, Stochastic, Stochastic, Stochastic, Stochastic, Stochastic, Stochastic, Stochastic

Stormflow Total Suspended Solids Serial Correlation, 0, 0, 0, 0, 0, 0, 0, 0

Stormflow Total Phosphorus Mean (log

mg/L), -0.89, -0.3, -0.45, -0.59, -0.89, -0.89, -0.89

Stormflow Total Phosphorus Standard Deviation (log

mg/L), 0.36, 0.36, 0.25, 0.36, 0.36, 0.36, 0.36

Stormflow Total Phosphorus Estimation

Method, Stochastic, Stochastic, Stochastic, Stochastic, Stochastic, Stochastic, Stochastic

Stormflow Total Phosphorus Serial Correlation, 0, 0, 0, 0, 0, 0, 0, 0

Stormflow Total Nitrogen Mean (log mg/L), 0.25, 0.25, 0.25, 0.25, 0.25, 0.25, 0.25

Stormflow Total Nitrogen Standard Deviation (log

mg/L), 0.32, 0.32, 0.32, 0.32, 0.32, 0.32, 0.32

Stormflow Total Nitrogen Estimation

Method, Stochastic, Stochastic, Stochastic, Stochastic, Stochastic, Stochastic, Stochastic

Stormflow Total Nitrogen Serial Correlation, 0, 0, 0, 0, 0, 0, 0, 0

Baseflow Total Suspended Solids Mean (log mg/L), 0, 0.78, 0.78, 0.78, 0, 0, 0

Baseflow Total Suspended Solids Standard Deviation (log

mg/L), 0, 0.45, 0.45, 0.45, 0, 0, 0

Baseflow Total Suspended Solids Estimation

Method, Stochastic, Stochastic, Stochastic, Stochastic, Stochastic, Stochastic, Stochastic

Baseflow Total Suspended Solids Serial Correlation, 0, 0, 0, 0, 0, 0, 0, 0

Baseflow Total Phosphorus Mean (log mg/L), 0, -1.1, -1.11, -1.11, 0, 0, 0

Baseflow Total Phosphorus Standard Deviation (log mg/L), 0, 0.48, 0.48, 0.48, 0, 0, 0

Baseflow Total Phosphorus Estimation

Method,Stochastic,Stochastic,Stochastic,Stochastic,Stochastic,Stochastic,Stochastic,Stochastic

Baseflow Total Phosphorus Serial Correlation,0,0,0,0,0,0,0,0

Baseflow Total Nitrogen Mean (log mg/L),0,0.14,0.14,0.14,0,0,0

Baseflow Total Nitrogen Standard Deviation (log mg/L),0,0.2,0.2,0.2,0,0,0

Baseflow Total Nitrogen Estimation

Method,Stochastic,Stochastic,Stochastic,Stochastic,Stochastic,Stochastic,Stochastic

Baseflow Total Nitrogen Serial Correlation,0,0,0,0,0,0,0

Flow based constituent generation - enabled,Off,Off,Off,Off,Off,Off,Off

Flow based constituent generation - flow file, , , , , , ,

Flow based constituent generation - base flow column, , , , , , ,

Flow based constituent generation - pervious flow column, , , , , , ,

Flow based constituent generation - impervious flow column, , , , , , ,

Flow based constituent generation - unit, , , , , , ,

OUT - Mean Annual Flow (ML/yr),0.223,1.57,60.3E-3,0.501,1.36,0.855,0.421

OUT - TSS Mean Annual Load (kg/yr),7.45,719,8.60,71.3,45.7,28.4,14.5

OUT - TP Mean Annual Load (kg/yr),40.1E-3,1.11,25.6E-3,0.178,0.249,0.151,74.6E-3

OUT - TN Mean Annual Load (kg/yr),0.527,3.64,0.141,1.17,3.18,2.00,0.976

OUT - Gross Pollutant Mean Annual Load

(kg/yr),5.24,37.0,0.00,10.5,32.0,20.1,9.90

Rain In (ML/yr),0.242519,1.7111,0.202099,1.18565,1.48206,0.929655,0.458091

ET Loss

(ML/yr),0.0194638,0.137328,0.141879,0.684917,0.118944,0.0746105,0.0367651

Deep Seepage Loss (ML/yr),0,0,0,0,0,0,0

Baseflow Out (ML/yr),0,0,0,0,0,0,0

Imp. Stormflow Out (ML/yr),0.223055,1.57378,0,0.218098,1.36312,0.855044,0.421326

Perv. Stormflow Out (ML/yr),0,0,0.0602831,0.282929,0,0,0

Total Stormflow Out

(ML/yr),0.223055,1.57378,0.0602831,0.501027,1.36312,0.855044,0.421326

Total Outflow

(ML/yr),0.223055,1.57378,0.0602831,0.501027,1.36312,0.855044,0.421326

Change in Soil Storage (ML/yr),0,0,-6.31E-5,-0.0002959,0,0,0

TSS Baseflow Out (kg/yr),0,0,0,0,0,0,0

TSS Total Stormflow Out

(kg/yr),7.4516,719.419,8.59578,71.3095,45.7371,28.4472,14.4844

TSS Total Outflow (kg/yr),7.4516,719.419,8.59578,71.3095,45.7371,28.4472,14.4844

TP Baseflow Out (kg/yr),0,0,0,0,0,0,0

TP Total Stormflow Out

(kg/yr),0.0401201,1.11078,0.0255555,0.178395,0.248629,0.151155,0.0745542

TP Total Outflow

(kg/yr),0.0401201,1.11078,0.0255555,0.178395,0.248629,0.151155,0.0745542

TN Baseflow Out (kg/yr),0,0,0,0,0,0,0

TN Total Stormflow Out

(kg/yr),0.527282,3.64305,0.141355,1.17202,3.18298,1.99549,0.976397

TN Total Outflow

(kg/yr),0.527282,3.64305,0.141355,1.17202,3.18298,1.99549,0.976397

GP Total Outflow (kg/yr),5.24124,36.9798,0,10.4916,32.0298,20.0914,9.90012

No Imported Data Source nodes

USTM treatment nodes

Location,Atlan Vault Full Height (10.0m2)_SQIDEP,Buffer,GLA 2x Rainwater Tanks

(8.6 kL ea.),MP Hall Rainwater Tank (2.0 kL)
 ID,8,10,11,12
 Node Type,DetentionBasinNode,BufferNode,RainWaterTankNode,RainWaterTankNode
 Lo-flow bypass rate (cum/sec),0, ,0,0
 Hi-flow bypass rate (cum/sec),100, ,100,100
 Inlet pond volume,0, ,0,0
 Area (sqm),10,8.95432835820895,4.6,1.2
 Initial Volume (m^3), , ,8.6,2
 Extended detention depth (m),0.85, ,0.15,0.15
 Number of Rainwater tanks, , ,1,1
 Permanent Pool Volume (cubic metres),0, ,8.6,2
 Proportion vegetated,0, ,0,0
 Equivalent Pipe Diameter (mm),125, ,90,90
 Overflow weir width (m),2, ,10,10
 Notional Detention Time (hrs),70.3E-3, ,26.2E-3,6.84E-3
 Orifice Discharge Coefficient,0.6, ,0.6,0.6
 Weir Coefficient,1.7, ,1.7,1.7
 Number of CSTR Cells,1, ,2,2
 Total Suspended Solids - k (m/yr),1, ,400,400
 Total Suspended Solids - C* (mg/L),20, ,12,12
 Total Suspended Solids - C** (mg/L),20, ,12,12
 Total Phosphorus - k (m/yr),1, ,300,300
 Total Phosphorus - C* (mg/L),0.13, ,0.13,0.13
 Total Phosphorus - C** (mg/L),0.13, ,0.13,0.13
 Total Nitrogen - k (m/yr),1, ,40,40
 Total Nitrogen - C* (mg/L),1.4, ,1.4,1.4
 Total Nitrogen - C** (mg/L),1.4, ,1.4,1.4
 Threshold Hydraulic Loading for C** (m/yr),3500, ,0,0
 Horizontal Flow Coefficient, , , ,
 Reuse Enabled,Off,Off,On,On
 Max drawdown height (m), , ,1.8695652173913,1.66666666666667
 Annual Demand Enabled,Off,Off,On,On
 Annual Demand Value (ML/year), , ,0.5,0.5
 Annual Demand Distribution, , ,PET,PET
 Annual Demand Monthly Distribution: Jan, , , ,
 Annual Demand Monthly Distribution: Feb, , , ,
 Annual Demand Monthly Distribution: Mar, , , ,
 Annual Demand Monthly Distribution: Apr, , , ,
 Annual Demand Monthly Distribution: May, , , ,
 Annual Demand Monthly Distribution: Jun, , , ,
 Annual Demand Monthly Distribution: Jul, , , ,
 Annual Demand Monthly Distribution: Aug, , , ,
 Annual Demand Monthly Distribution: Sep, , , ,
 Annual Demand Monthly Distribution: Oct, , , ,
 Annual Demand Monthly Distribution: Nov, , , ,
 Annual Demand Monthly Distribution: Dec, , , ,
 Daily Demand Enabled,Off,Off,On,On
 Daily Demand Value (ML/day), , ,0.0012,0.0012
 Custom Demand Enabled,Off,Off,Off,Off
 Custom Demand Time Series File, , , ,
 Custom Demand Time Series Units, , , ,
 Filter area (sqm), , , ,
 Filter perimeter (m), , , ,
 Filter depth (m), , , ,

Filter Median Particle Diameter (mm), , , ,
 Saturated Hydraulic Conductivity (mm/hr), , , ,
 Infiltration Media Porosity, , , ,
 Length (m), , , ,
 Bed slope, , , ,
 Base Width (m), , , ,
 Top width (m), , , ,
 Vegetation height (m), , , ,
 Vegetation Type, , , ,
 Total Nitrogen Content in Filter (mg/kg), , , ,
 Orthophosphate Content in Filter (mg/kg), , , ,
 Is Base Lined?, , , ,
 Is Underdrain Present?, , , ,
 Is Submerged Zone Present?, , , ,
 Submerged Zone Depth (m), , , ,
 B for Media Soil Texture, -9999, -9999, -9999, -9999
 Proportion of upstream impervious area treated, , 0.5, ,
 Exfiltration Rate (mm/hr), 0, 0, 0, 0
 Evaporative Loss as % of PET, 0, , 0, 0
 Depth in metres below the drain pipe, , , ,
 TSS A Coefficient, , , ,
 TSS B Coefficient, , , ,
 TP A Coefficient, , , ,
 TP B Coefficient, , , ,
 TN A Coefficient, , , ,
 TN B Coefficient, , , ,
 Sfc, , , ,
 S*, , , ,
 Sw, , , ,
 Sh, , , ,
 Emax (m/day), , , ,
 Ew (m/day), , , ,
 IN - Mean Annual Flow (ML/yr), 4.09, 0.501, 0.223, 0.855
 IN - TSS Mean Annual Load (kg/yr), 482, 71.3, 7.45, 28.4
 IN - TP Mean Annual Load (kg/yr), 1.04, 0.178, 40.1E-3, 0.151
 IN - TN Mean Annual Load (kg/yr), 8.56, 1.17, 0.527, 2.00
 IN - Gross Pollutant Mean Annual Load (kg/yr), 41.9, 10.5, 5.24, 20.1
 OUT - Mean Annual Flow (ML/yr), 4.09, 0.501, 36.9E-3, 0.673
 OUT - TSS Mean Annual Load (kg/yr), 483, 50.7, 1.05, 21.7
 OUT - TP Mean Annual Load (kg/yr), 1.05, 0.146, 6.19E-3, 0.118
 OUT - TN Mean Annual Load (kg/yr), 8.53, 1.06, 88.8E-3, 1.56
 OUT - Gross Pollutant Mean Annual Load (kg/yr), 0.00, 10.5, 0.00, 0.00
 Flow In (ML/yr), 4.09081, 0.500993, 0.223035, 0.854808
 ET Loss (ML/yr), 0, 0, 0, 0
 Infiltration Loss (ML/yr), 0, 0, 0, 0
 Low Flow Bypass Out (ML/yr), 0, 0, 0, 0
 High Flow Bypass Out (ML/yr), 0, 0.250496, 0, 0
 Orifice / Filter Out (ML/yr), 3.80022, 0.250496, 0.0369042, 0.602168
 Weir Out (ML/yr), 0.291086, 0, 5.5805E-6, 0.0709901
 Transfer Function Out (ML/yr), 0, 0, 0, 0
 Reuse Supplied (ML/yr), 0, 0, 0.187101, 0.182185
 Reuse Requested (ML/yr), 0, 0, 0.936, 0.936
 % Reuse Demand Met, 0, 0, 19.9894, 19.4642
 % Load Reduction, -0.0121247, 0.000199604, 83.4511, 21.2504

TSS Flow In (kg/yr),482.33,71.3094,7.4516,28.4473
 TSS ET Loss (kg/yr),0,0,0,0
 TSS Infiltration Loss (kg/yr),0,0,0,0
 TSS Low Flow Bypass Out (kg/yr),0,0,0,0
 TSS High Flow Bypass Out (kg/yr),0,35.6547,0,0
 TSS Orifice / Filter Out (kg/yr),449.417,15.0651,1.05151,19.4119
 TSS Weir Out (kg/yr),33.6,0,0.000235172,2.28829
 TSS Transfer Function Out (kg/yr),0,0,0,0
 TSS Reuse Supplied (kg/yr),0,0,3.42619,4.85588
 TSS Reuse Requested (kg/yr),0,0,0,0
 TSS % Reuse Demand Met,0,0,0,0
 TSS % Load Reduction,-0.142434,28.8736,85.8856,23.7179
 TP Flow In (kg/yr),1.04315,0.178394,0.0401201,0.151155
 TP ET Loss (kg/yr),0,0,0,0
 TP Infiltration Loss (kg/yr),0,0,0,0
 TP Low Flow Bypass Out (kg/yr),0,0,0,0
 TP High Flow Bypass Out (kg/yr),0,0.0891972,0,0
 TP Orifice / Filter Out (kg/yr),0.975055,0.0564667,0.0061915,0.106152
 TP Weir Out (kg/yr),0.0699966,0,8.83172E-7,0.011561
 TP Transfer Function Out (kg/yr),0,0,0,0
 TP Reuse Supplied (kg/yr),0,0,0.0277392,0.0302065
 TP Reuse Requested (kg/yr),0,0,0,0
 TP % Reuse Demand Met,0,0,0,0
 TP % Load Reduction,-0.182294,18.3471,84.5654,22.1243
 TN Flow In (kg/yr),8.55553,1.17202,0.527282,1.99549
 TN ET Loss (kg/yr),0,0,0,0
 TN Infiltration Loss (kg/yr),0,0,0,0
 TN Low Flow Bypass Out (kg/yr),0,0,0,0
 TN High Flow Bypass Out (kg/yr),0,0.586011,0,0
 TN Orifice / Filter Out (kg/yr),7.94509,0.475813,0.0887645,1.40396
 TN Weir Out (kg/yr),0.584522,0,1.53835E-5,0.153891
 TN Transfer Function Out (kg/yr),0,0,0,0
 TN Reuse Supplied (kg/yr),0,0,0.405637,0.416521
 TN Reuse Requested (kg/yr),0,0,0,0
 TN % Reuse Demand Met,0,0,0,0
 TN % Load Reduction,0.302939,9.40223,83.1627,21.9314
 GP Flow In (kg/yr),41.9299,10.4916,5.24124,20.0914
 GP ET Loss (kg/yr),0,0,0,0
 GP Infiltration Loss (kg/yr),0,0,0,0
 GP Low Flow Bypass Out (kg/yr),0,0,0,0
 GP High Flow Bypass Out (kg/yr),0,5.24582,0,0
 GP Orifice / Filter Out (kg/yr),0,0,0,0
 GP Weir Out (kg/yr),0,0,0,0
 GP Transfer Function Out (kg/yr),0,0,0,0
 GP Reuse Supplied (kg/yr),0,0,0,0
 GP Reuse Requested (kg/yr),0,0,0,0
 GP % Reuse Demand Met,0,0,0,0
 GP % Load Reduction,100,49.9998,100,100
 PET Scaling Factor, , , ,

Generic treatment nodes

Location,6/Atlan Stormsacks STS.6090_SQIDEP,7/Atlan Filter (FIL-3.0) Full
 Height_SQIDEP
 ID,7,9

Node Type,GPTNode,GenericNode
Lo-flow bypass rate (cum/sec),0,0
Hi-flow bypass rate (cum/sec),0.192,0.021
Flow Transfer Function
Input (cum/sec),0,0
Output (cum/sec),0,0
Input (cum/sec),10,10
Output (cum/sec),10,10
Input (cum/sec), ,
Output (cum/sec), ,
Input (cum/sec), ,
Output (cum/sec), ,
Input (cum/sec), ,
Output (cum/sec), ,
Input (cum/sec), ,
Output (cum/sec), ,
Input (cum/sec), ,
Output (cum/sec), ,
Input (cum/sec), ,
Output (cum/sec), ,
Input (cum/sec), ,
Output (cum/sec), ,
Gross Pollutant Transfer Function
Enabled,True,True
Input (kg/ML),0,0
Output (kg/ML),0,0
Input (kg/ML),15,15
Output (kg/ML),0,15
Input (kg/ML), ,
Output (kg/ML), ,
Input (kg/ML), ,
Output (kg/ML), ,
Input (kg/ML), ,
Output (kg/ML), ,
Input (kg/ML), ,
Output (kg/ML), ,
Input (kg/ML), ,
Output (kg/ML), ,
Input (kg/ML), ,
Output (kg/ML), ,
Input (kg/ML), ,
Output (kg/ML), ,
Total Nitrogen Transfer Function
Enabled,True,True
Input (mg/L),0,0
Output (mg/L),0,0
Input (mg/L),100,100
Output (mg/L),75,41
Input (mg/L), ,
Output (mg/L), ,

Input (mg/L), ,
 Output (mg/L), ,
 Input (mg/L), ,
 Output (mg/L), ,
 TSS Flow based Efficiency Enabled,Off,Off
 TSS Flow based Efficiency, ,
 TP Flow based Efficiency Enabled,Off,Off
 TP Flow based Efficiency, ,
 TN Flow based Efficiency Enabled,Off,Off
 TN Flow based Efficiency, ,
 GP Flow based Efficiency Enabled,Off,Off
 GP Flow based Efficiency, ,
 IN - Mean Annual Flow (ML/yr),1.63,4.09
 IN - TSS Mean Annual Load (kg/yr),728,483
 IN - TP Mean Annual Load (kg/yr),1.14,1.05
 IN - TN Mean Annual Load (kg/yr),3.78,8.53
 IN - Gross Pollutant Mean Annual Load (kg/yr),37.0,0.00
 OUT - Mean Annual Flow (ML/yr),1.63,4.09
 OUT - TSS Mean Annual Load (kg/yr),400,118
 OUT - TP Mean Annual Load (kg/yr),0.602,0.356
 OUT - TN Mean Annual Load (kg/yr),2.84,4.06
 OUT - Gross Pollutant Mean Annual Load (kg/yr),0.00,0.00
 Flow In (ML/yr),1.63406,4.09129
 ET Loss (ML/yr),0,0
 Infiltration Loss (ML/yr),0,0
 Low Flow Bypass Out (ML/yr),0,0
 High Flow Bypass Out (ML/yr),0,0.466336
 Orifice / Filter Out (ML/yr),0,0
 Weir Out (ML/yr),0,0
 Transfer Function Out (ML/yr),1.63406,3.62502
 Reuse Supplied (ML/yr),0,0
 Reuse Requested (ML/yr),0,0
 % Reuse Demand Met,0,0
 % Load Reduction,0,-0.00159363
 TSS Flow In (kg/yr),728.019,483.017
 TSS ET Loss (kg/yr),0,0
 TSS Infiltration Loss (kg/yr),0,0
 TSS Low Flow Bypass Out (kg/yr),0,0
 TSS High Flow Bypass Out (kg/yr),0,53.7268
 TSS Orifice / Filter Out (kg/yr),0,0
 TSS Weir Out (kg/yr),0,0
 TSS Transfer Function Out (kg/yr),400.407,64.3935
 TSS Reuse Supplied (kg/yr),0,0
 TSS Reuse Requested (kg/yr),0,0
 TSS % Reuse Demand Met,0,0
 TSS % Load Reduction,45.0004,75.5453
 TP Flow In (kg/yr),1.13633,1.04505
 TP ET Loss (kg/yr),0,0
 TP Infiltration Loss (kg/yr),0,0
 TP Low Flow Bypass Out (kg/yr),0,0
 TP High Flow Bypass Out (kg/yr),0,0.113914
 TP Orifice / Filter Out (kg/yr),0,0
 TP Weir Out (kg/yr),0,0
 TP Transfer Function Out (kg/yr),0.602258,0.242097

TP Reuse Supplied (kg/yr),0,0
 TP Reuse Requested (kg/yr),0,0
 TP % Reuse Demand Met,0,0
 TP % Load Reduction,46.9999,65.9337
 TN Flow In (kg/yr),3.7844,8.52965
 TN ET Loss (kg/yr),0,0
 TN Infiltration Loss (kg/yr),0,0
 TN Low Flow Bypass Out (kg/yr),0,0
 TN High Flow Bypass Out (kg/yr),0,0.948199
 TN Orifice / Filter Out (kg/yr),0,0
 TN Weir Out (kg/yr),0,0
 TN Transfer Function Out (kg/yr),2.83831,3.10838
 TN Reuse Supplied (kg/yr),0,0
 TN Reuse Requested (kg/yr),0,0
 TN % Reuse Demand Met,0,0
 TN % Load Reduction,24.9996,52.4415
 GP Flow In (kg/yr),36.9793,0
 GP ET Loss (kg/yr),0,0
 GP Infiltration Loss (kg/yr),0,0
 GP Low Flow Bypass Out (kg/yr),0,0
 GP High Flow Bypass Out (kg/yr),0,0
 GP Orifice / Filter Out (kg/yr),0,0
 GP Weir Out (kg/yr),0,0
 GP Transfer Function Out (kg/yr),0,0
 GP Reuse Supplied (kg/yr),0,0
 GP Reuse Requested (kg/yr),0,0
 GP % Reuse Demand Met,0,0
 GP % Load Reduction,100,100

Other nodes

Location,Spilt Catchment Nodes,Receiving Node
 ID,4,6
 Node Type,JunctionNode,ReceivingNode
 IN - Mean Annual Flow (ML/yr),4.63,4.63
 IN - TSS Mean Annual Load (kg/yr),170,170
 IN - TP Mean Annual Load (kg/yr),0.508,0.508
 IN - TN Mean Annual Load (kg/yr),5.21,5.21
 IN - Gross Pollutant Mean Annual Load (kg/yr),10.5,10.5
 OUT - Mean Annual Flow (ML/yr),4.63,4.63
 OUT - TSS Mean Annual Load (kg/yr),170,170
 OUT - TP Mean Annual Load (kg/yr),0.508,0.508
 OUT - TN Mean Annual Load (kg/yr),5.21,5.21
 OUT - Gross Pollutant Mean Annual Load (kg/yr),10.5,10.5
 % Load Reduction,7.37,7.37
 TSS % Load Reduction,81.0,81.0
 TN % Load Reduction,55.3,55.3
 TP % Load Reduction,72.2,72.2
 GP % Load Reduction,90.9,90.9

Links

Location,Drainage Link,Drainage Link,Drainage Link,Drainage Link,Drainage
 Link,Drainage Link,Drainage Link,Drainage Link,Drainage Link,Drainage
 Link,Drainage Link,Drainage Link,Drainage Link,Drainage Link
 Source node ID,2,3,7,8,9,4,5,10,1,12,13,14,15,11

Target node ID,7,7,8,9,4,6,10,4,11,8,8,12,8,4
 Muskingum-Cunge Routing,Not Routed,Not Routed,Not Routed,Not Routed,Not
 Routed,Not Routed,Not Routed,Not Routed,Not Routed,Not Routed,Not Routed,Not
 Routed,Not Routed,Not Routed
 Muskingum K, , , , , , , , , , , , , ,
 Muskingum theta, , , , , , , , , , , , , ,
 IN - Mean Annual Flow
 (ML/yr),1.57,60.3E-3,1.63,4.09,4.09,4.63,0.501,0.501,0.223,0.673,1.36,0.855,0.42
 1,36.9E-3
 IN - TSS Mean Annual Load
 (kg/yr),719,8.60,400,483,118,170,71.3,50.7,7.45,21.7,45.7,28.4,14.5,1.05
 IN - TP Mean Annual Load
 (kg/yr),1.11,25.6E-3,0.602,1.05,0.356,0.508,0.178,0.146,40.1E-3,0.118,0.249,0.15
 1,74.6E-3,6.19E-3
 IN - TN Mean Annual Load
 (kg/yr),3.64,0.141,2.84,8.53,4.06,5.21,1.17,1.06,0.527,1.56,3.18,2.00,0.976,88.8
 E-3
 IN - Gross Pollutant Mean Annual Load
 (kg/yr),37.0,0.00,0.00,0.00,0.00,10.5,10.5,10.5,5.24,0.00,32.0,20.1,9.90,0.00
 OUT - Mean Annual Flow
 (ML/yr),1.57,60.3E-3,1.63,4.09,4.09,4.63,0.501,0.501,0.223,0.673,1.36,0.855,0.42
 1,36.9E-3
 OUT - TSS Mean Annual Load
 (kg/yr),719,8.60,400,483,118,170,71.3,50.7,7.45,21.7,45.7,28.4,14.5,1.05
 OUT - TP Mean Annual Load
 (kg/yr),1.11,25.6E-3,0.602,1.05,0.356,0.508,0.178,0.146,40.1E-3,0.118,0.249,0.15
 1,74.6E-3,6.19E-3
 OUT - TN Mean Annual Load
 (kg/yr),3.64,0.141,2.84,8.53,4.06,5.21,1.17,1.06,0.527,1.56,3.18,2.00,0.976,88.8
 E-3
 OUT - Gross Pollutant Mean Annual Load
 (kg/yr),37.0,0.00,0.00,0.00,0.00,10.5,10.5,10.5,5.24,0.00,32.0,20.1,9.90,0.00

Catchment Details

Catchment Name,S15582-260716-MUSIC-REVF
 Timestep,6 Minutes
 Start Date,1/01/1997
 End Date,31/12/2006 11:54:00 PM
 Rainfall Station, 40496 CALOUNDRA
 ET Station,User-defined monthly PET
 Mean Annual Rainfall (mm), 1348
 Mean Annual ET (mm), 1618

APPENDIX E: MANNINGS CALCULATION

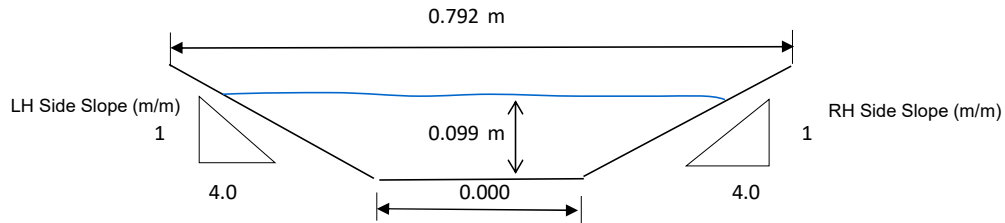
Swale A Properties at Pit 5 (Minor 10% AEP)

Hydraulics (Manning's Equation)

Design Q (m ³ /s)	0.015
Manning's n	0.030
Long Slope (m/m)	0.008
Base Width (m)	0.000
LH Side Slope (m/m)	0.250
RH Side Slope (m/m)	0.250

Channel Flow Conditions

Depth (m)	0.099
Area (m ²)	0.039
Wet Perimeter (m)	0.816
Hydraulic Radius (m)	0.048
Top Width (m)	0.792
Velocity (m/s)	0.381
VD Product (m ³ /s)	0.038
Velocity Head	0.007
Froude Number	0.047



Velocity =	0.381 m/s
Velocity Depth Product =	0.038 m ² /s
Long. Slope	0.75 %
Freeboard Required	- m
150mm Freeboard. Depth =	0.099 m
LH Batter Horiz. Length =	0.396 m
RH Batter Horiz. Length =	0.396 m
Total Width =	0.792 m

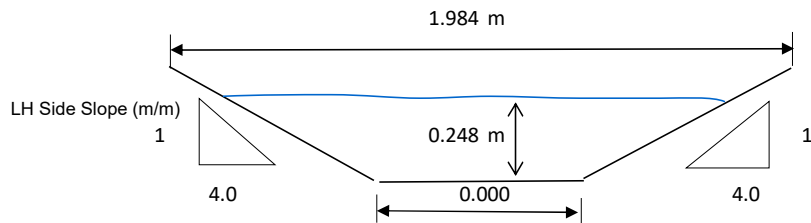
Swale A Properties at Pit 5 (Major 2% AEP)

Hydraulics (Manning's Equation)

Design Q (m ³ /s)	0.174
Manning's n	0.030
Long Slope (m/m)	0.008
Base Width (m)	0.000
LH Side Slope (m/m)	0.250
RH Side Slope (m/m)	0.250

Channel Flow Conditions

Depth (m)	0.248
Area (m ²)	0.246
Wet Perimeter (m)	2.045
Hydraulic Radius (m)	0.120
Top Width (m)	1.984
Velocity (m/s)	0.703
VD Product (m ³ /s)	0.174
Velocity Head	0.025
Froude Number	0.102



Velocity =	0.703 m/s
Velocity Depth Product =	0.174 m ² /s
Long. Slope	0.75 %
Freeboard Required	- m
150mm Freeboard. Depth =	0.248 m
LH Batter Horiz. Length =	0.992 m
RH Batter Horiz. Length =	0.992 m
Total Width =	1.984 m

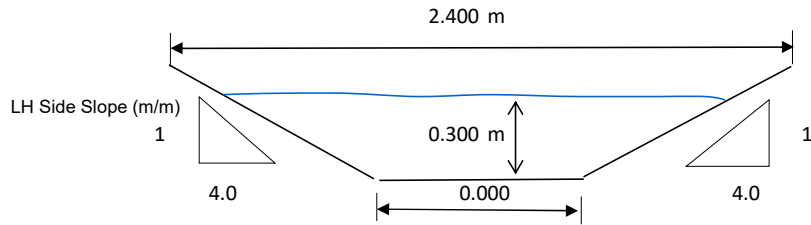
Swale A Properties at Pit 5 (Major 1% AEP)

Hydraulics (Manning's Equation)

Design Q (m ³ /s)	0.288
Manning's n	0.030
Long Slope (m/m)	0.008
Base Width (m)	0.000
LH Side Slope (m/m)	0.250
RH Side Slope (m/m)	0.250

Channel Flow Conditions

Depth (m)	0.300
Area (m ²)	0.360
Wet Perimeter (m)	2.474
Hydraulic Radius (m)	0.146
Top Width (m)	2.400
Velocity (m/s)	0.799
VD Product (m ³ /s)	0.240
Velocity Head	0.033
Froude Number	0.119



Velocity =	0.799 m/s
Velocity Depth Product =	0.240 m ² /s
Long. Slope	0.75% %
Freeboard Required	- m
150mm Freeboard. Depth =	0.300 m
LH Batter Horiz. Length =	1.200 m
RH Batter Horiz. Length =	1.200 m
Total Width =	2.400 m