KING + CAMPBELL

STORMWATER MANAGEMENT PLAN

Multi Dwelling Housing at
Lot 3 DP801467,
286-310 Gregory Street,
South West Rocks 2431

Prepared for:

South West Rocks Living

Prepared by:

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Revision Schedule

Revision Number	Date	Description	Staff
A	10/02/2025	Issued for DA approval	JCK/BC
B	04/03/2025	Issue for DA Approval	BC

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1. INTRODUCTION

This Stormwater Management Plan has been prepared in support of a Development Application for a multi-dwelling housing estate proposed at 286 – 310 Gregory Street, South West Rocks.

The report demonstrates how the stormwater impacts generated from the development (quantity and quality), can be adequately mitigated through implementation of the Stormwater Management Plan, satisfying the stormwater objectives of Kempsey Shire Council (KSC).

The report identifies the site conditions, including location, flooding, lawful point of discharge, land topography, and soil types prevalent. The stormwater quantity impacts of the development were assessed using DRAINS modelling of mitigation measures to satisfy Council objectives. The stormwater quality impacts of the development were assessed using MUSIC. Results are provided for mitigation measures to satisfy Council objectives.

1.1. Legislation, Standards, & Guidelines

The following legislation, standards and guidelines are relevant to the subject Stormwater Management Plan:

- Kempsey Shire Council AUS-SPEC: including D5 Stormwater Drainage Design, and D7 Erosion Control and Stormwater Management
- Australian Rainfall & Runoff 2019
- NSW MUSIC Modelling Guidelines 2015

1.2. Data Used

The following data was used as part of this Stormwater Management Plan:

- Detailed survey undertaken by King & Campbell (Sept 2024)
- Online mapping (Kempsey Flood Planning, eSPADE, Before You Dig Australia search, ELVIS Elevation Data)
- Stormupdated.com.au – BoM The Builder (MUSIC Rainfall and PET Data)

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2. SITE CONDITIONS

2.1. Location

The following details apply to the Subject Site:

- Address: 286 – 310 Gregory Street South West Rocks
- Legal description: Lot 3 DP 801467
- Land use zone: R1 General Residential and R3 Medium Density Residential
- Approximate site area: 4.16ha

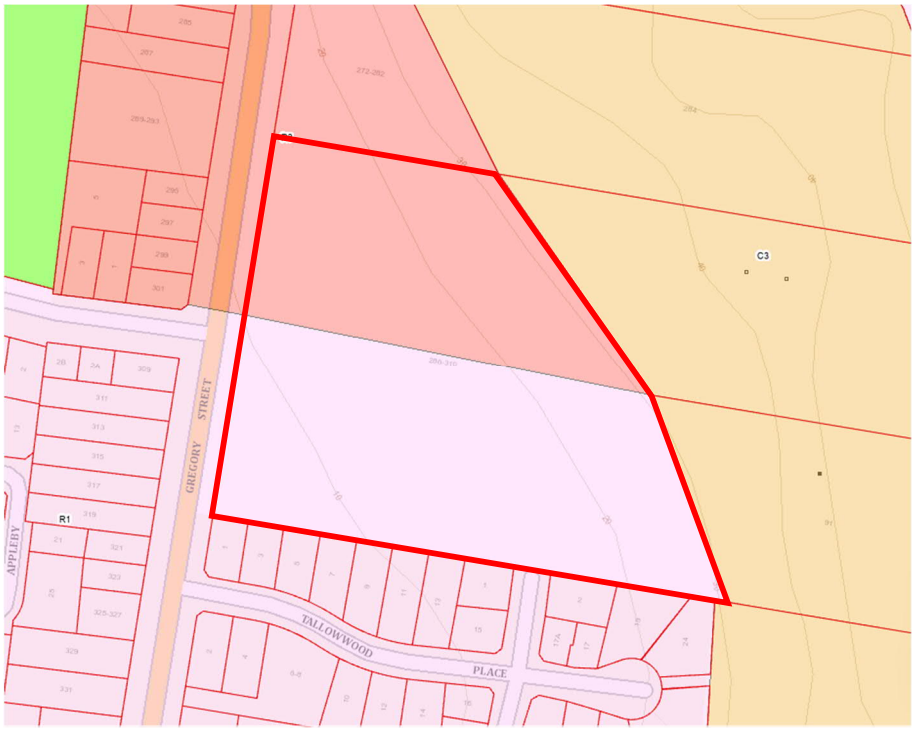

Figure 1 – NSW Planning Portal Spatial Viewer

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2.2. Flooding

The subject site is not impacted by flooding as evidenced by mapping as follows on the Kempsey Flood Planning Map (Accessed 13 November 2024)
https://experience.arcgis.com/experience/0a9b0fa2fcaf43ca828fc3c8ef4d4d63/page/Page/?views=View-4

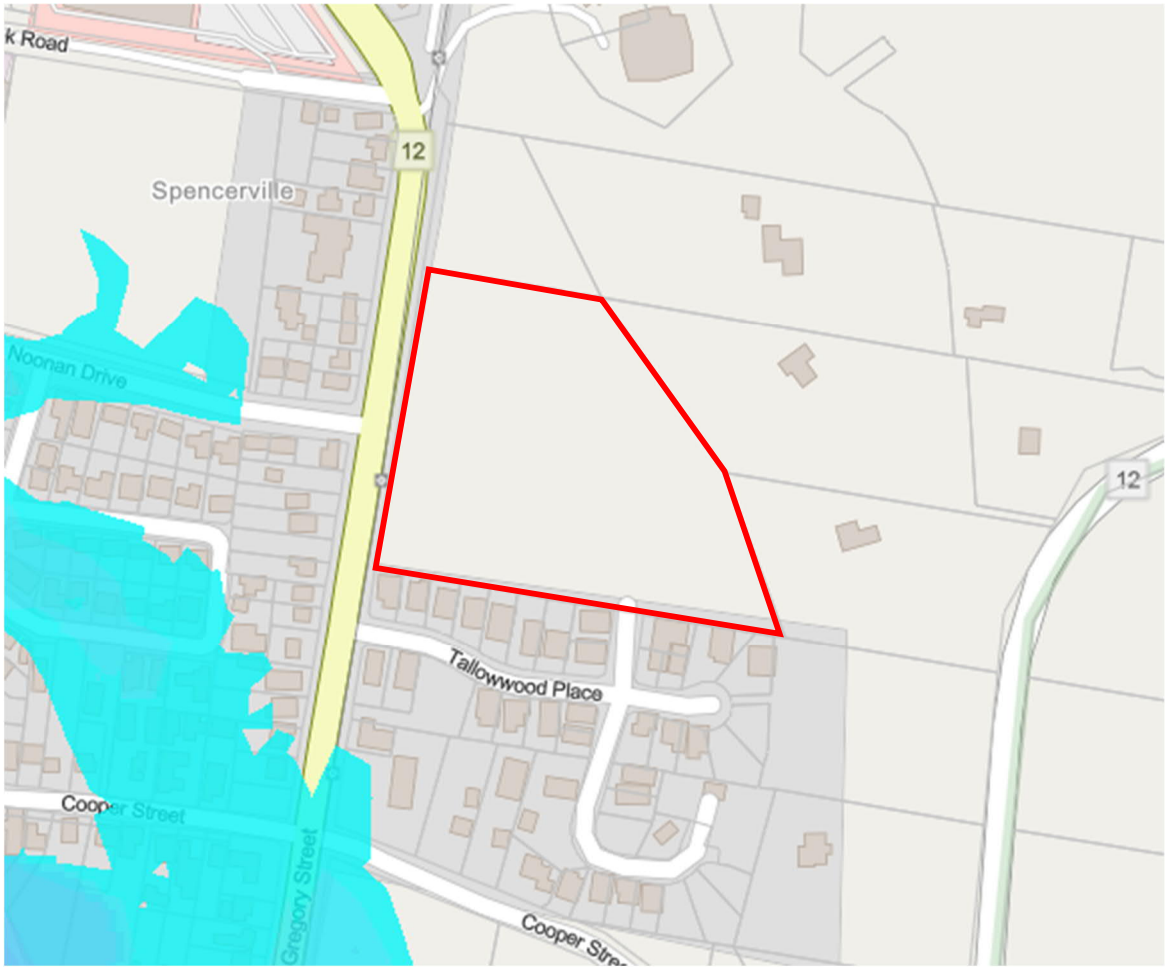

Figure 2 – 1% AEP with SLR and CC (2100) Kempsey Flood Planning Extract

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2.3. Lawful Point of Discharge

The lawful point of discharge for the subject site is defined as KSC grated stormwater pit within an existing stormwater swale in the southwest corner of the subject site. It is proposed to discharge the site stormwater towards council's assets at equal to, or less than, the predevelopment flow rates for the 20%, 5%, and 1% AEP storms.

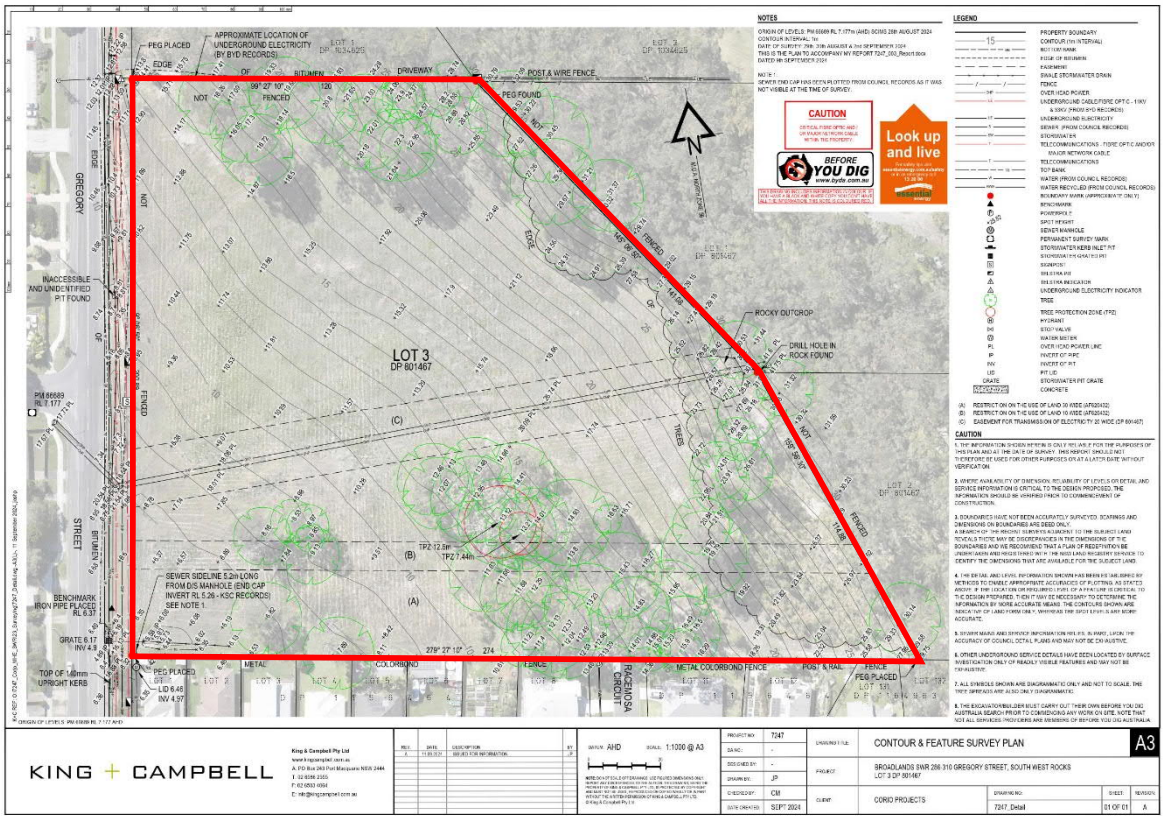

Figure 3 – King & Campbell Detail Survey (Sept 2024)

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2.4. Topography

The subject site is situated on the southwest face of a hill. The general topography of the site falls to the southwest with elevations from 31.5 m AHD to 5.7 m AHD. 1 m contours are shown below illustrating this grade.

The site does not contain any significant watercourses apart from minor drainage swales.

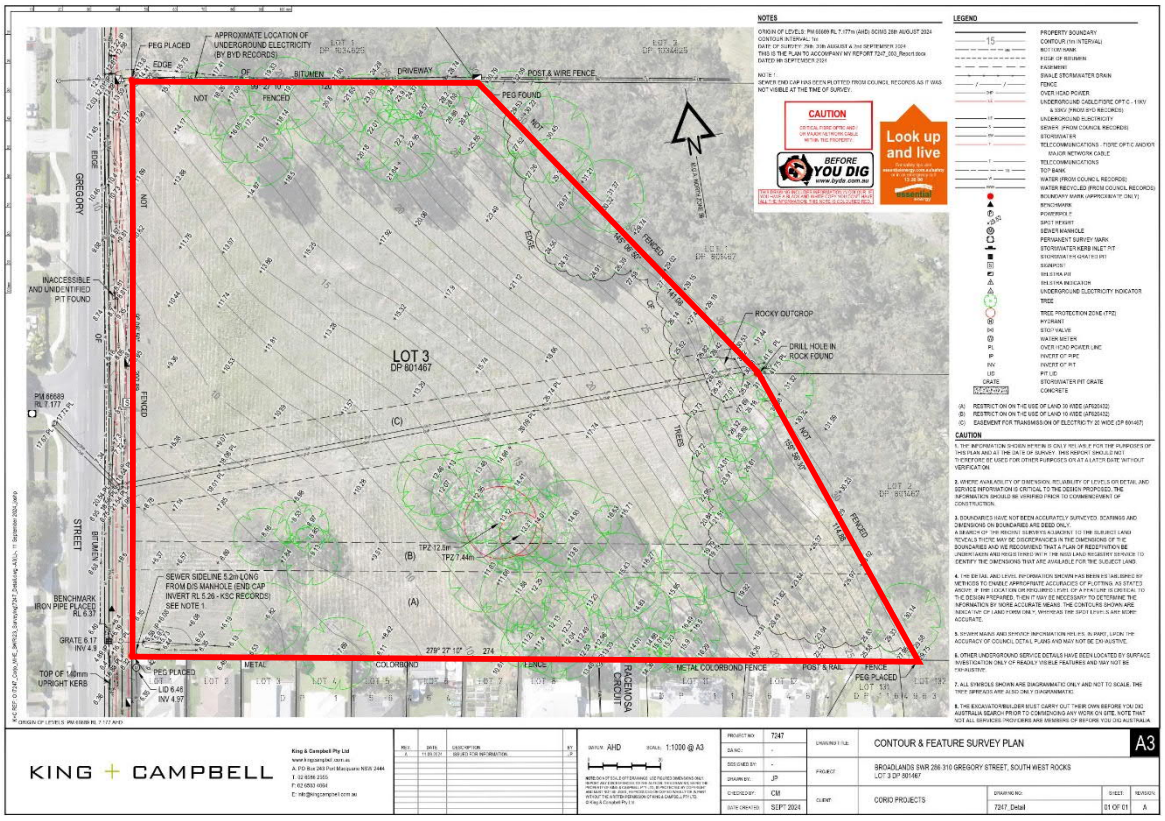

Figure 4 – King and Campbell Detail Survey (Sept 2024)

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2.5. Soils

The subject site has falls into two hydrological soil groups. Type C – Slow infiltration over majority of the subject and type A – High infiltration in the southwest corner as per the NSW Hydrologic Soil Group classification and eSPADE mapping system as shown below.

Site regrading works will result in existing high infiltration soils located in the south western corner of the site being overlain by fill material sourced from the remainder of the site, resulting in the entirety of the site being Type C post development. Type C soil type has been adopted for modelling purposes for the entirety of the site.

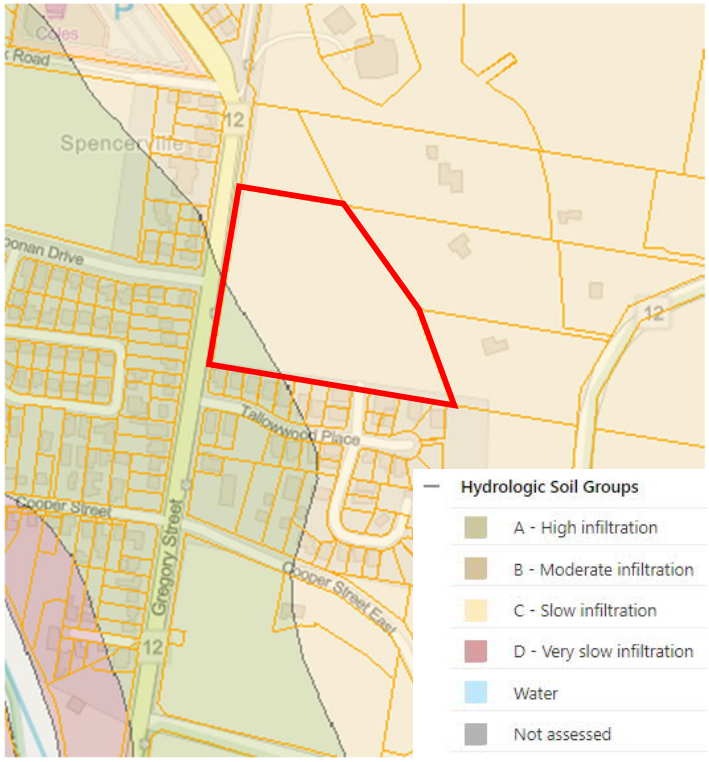

Figure 5 – NSW Planning Portal Spatial Viewer Hydrologic Soil Group classification of Subject Site

The subject site is located outside of the NSW SEED Acid Sulfate Soils Extract Map as shown below, and as such is unlikely to be affected by Acid Sulphate Soils.

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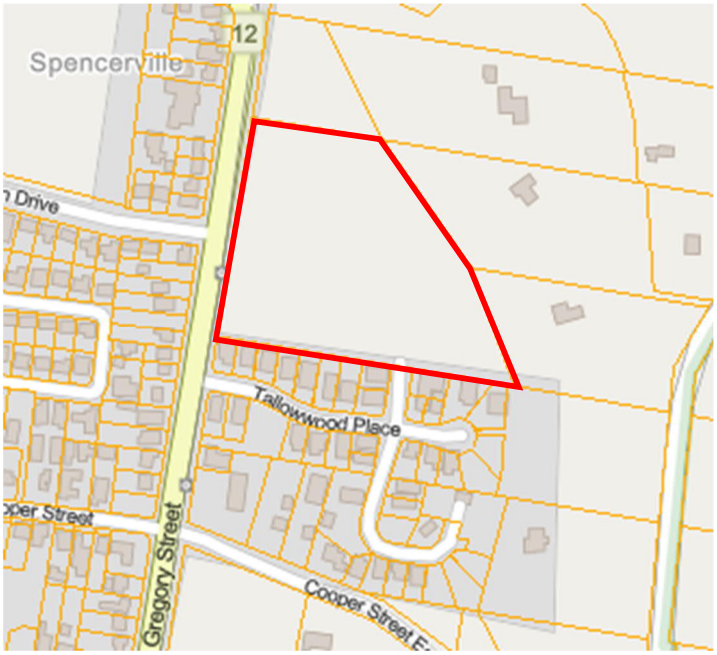

Figure 6 – NSW SEED Acid Sulfate Soils Extract

3. STORMWATER QUANTITY

3.1. Objective

To meet the objectives of the Kempsey Shire Council, without detrimentally affecting the environment, surface and subsurface water quality, groundwater infiltration characteristics, the adjoining landowners and other landowners near the drainage outlet and water course either upstream or downstream of the development.

To ensure that existing stormwater infrastructure downstream is not adversely affected by the proposed development, by limiting site stormwater discharge to be equal to, or less than, the predevelopment flow rates for the Major and Minor storms for residential developments (20%, 5% and 1% AEP storms).

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3.2. Hydrology & Hydraulics (Pre & Post Development)

The pre-development sub-catchment arrangement is conceptualised as shown within the following figure.

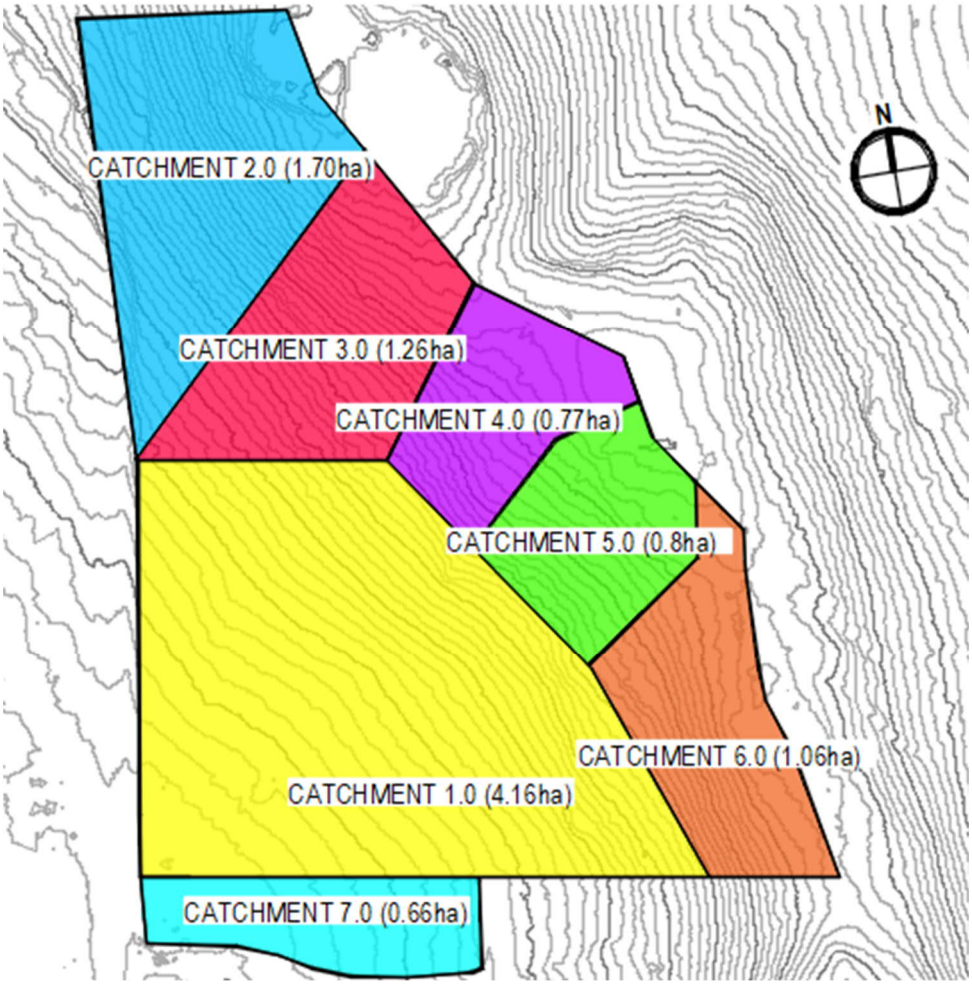

Figure 7 – Subject Site Catchments Pre-development

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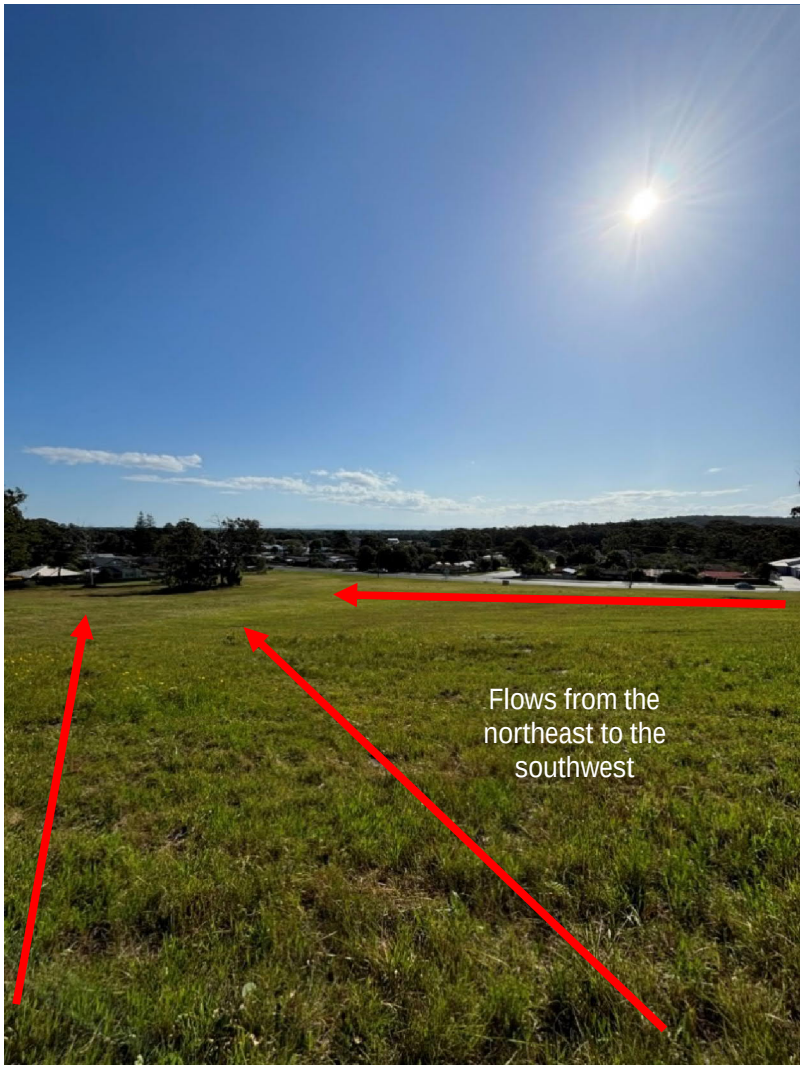

Figure 8 – Photograph northeast of the development site (Sept 2024)

Figure 9 – South on the development site, Facing west to Gregory Street (Sept 2024)

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Figure 10 – Southwest corner of the development site, Facing northeast (Oct 2023)

- The upper catchments 4.0, 5.0 and 6.0 of the pre-development sites, fall generally to the southwest. It is assumed that the stormwater flows from these upper catchments through catchment 1.0 and typically concentrate within the swale in the southwest of the subject site. The swale conveys the flows into KSC's 300mm diameter pipe which outlets into a stormwater pit and a 900mm diameter trunk main that travels south along Gregory Street.
- Stormwater flows from catchments 2.0 and 3.0 flow southwest and concentrate within KSC's swale drain within the Gregory Street road reserve to the stormwater pit referenced above.
- Stormwater flows from catchment 7.0 flow north westwards, entering the site from the south, and are concentrating within the existing stormwater stormwater swale located along the southern boundary of the site. Catchment 7.0 consists of the lots north of Tallowwood Place, within the adjoining "Seachange" residential development.

The post-development sub-catchment arrangement is conceptualised as shown within the following figure.

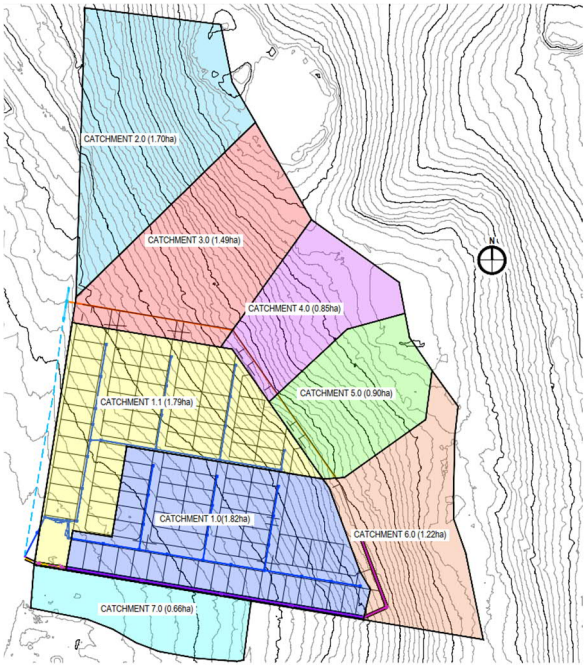

Figure 11 – Subject Site Catchment Post-development

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Post-development it is proposed that

- Stormwater flows from catchment 2.0 will be conveyed southward to KSC's 900mm diameter trunk main via an upgraded swale in place of KSC's existing swale.
- Stormwater flows from the subject site (Catchments 1.0 & 1.1) will have a high early discharge. These flows will be conveyed by a network of pit and pipes to the southeast corner and discharge too KSC's stormwater network.
- Stormwater flows from catchment 3.0 and 4.0 will be captured by a swale which will run along the north eastern retaining walls and be conveyed into the western bypass line by a series of pits which will send flows westward to discharge via a headwall into the proposed upgraded swale within the Gregory Street Road reserve.
- Flows from catchments 5.0 and 6.0 will be captured by a swale which will run along the eastern retaining and be conveyed into the eastern bypass line by a series of pits. The eastern bypass line will discharge into a 350m^3 detention basin. A suitable stormwater outlet will be outlined in the design phase. This outlet will discharge to councils existing stormwater network in Gregory Street Road reserve.
- Stormwater flows from catchment 7.0 flow north westwards, entering the site from the south, and are concentrating within the proposed stormwater pipe and swale system located along the southern boundary of the site.
- See servicing strategy for further detail.

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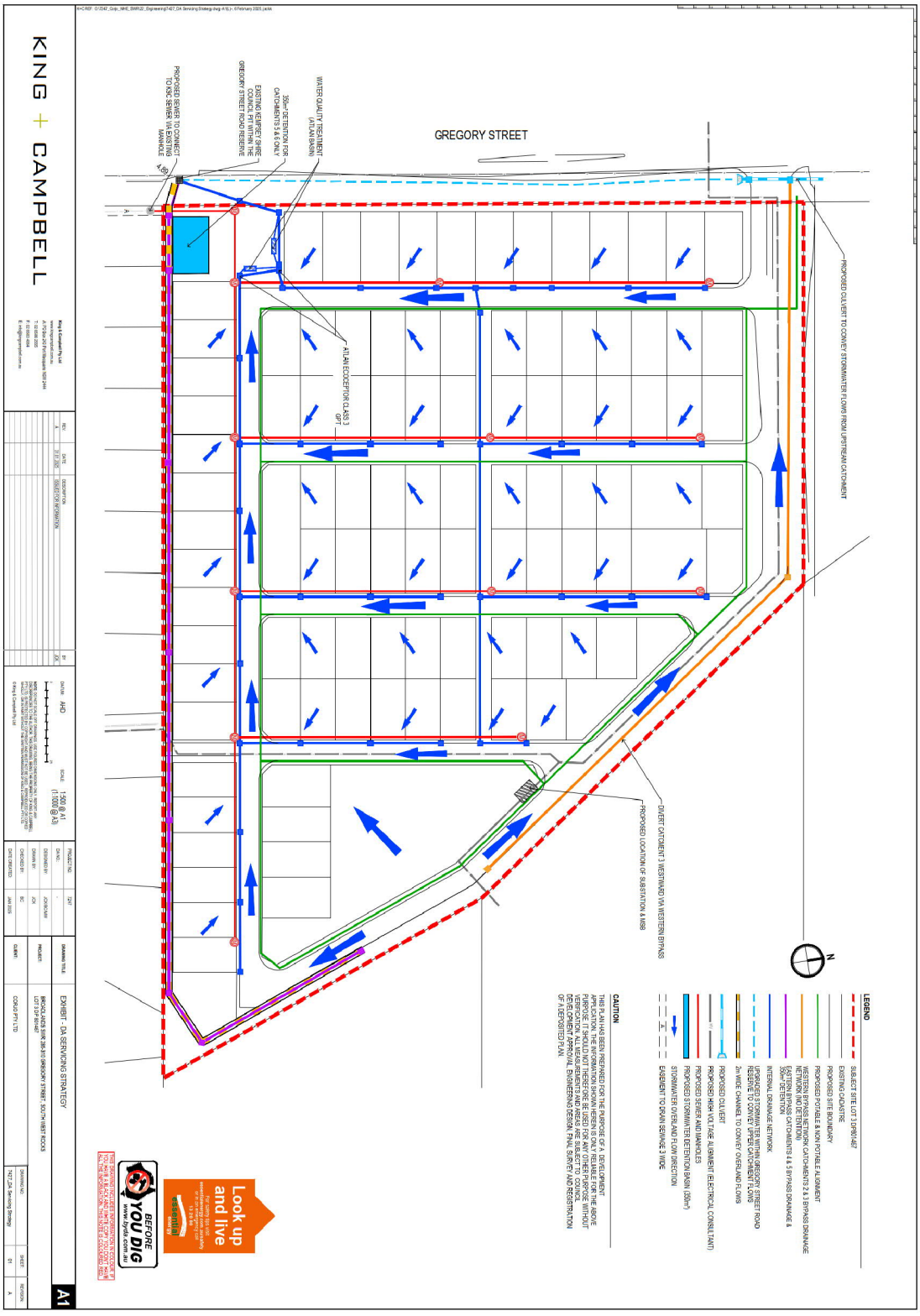

Figure 12 – Extract Servicing Strategy Plan showing Stormwater Layout and Features

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3.3. Modelling Results

DRAINS software version 2023.02.8444.20204 with ARR 2019 methodologies has been used to model the stormwater quantity requirements. Parameter inputs are in accordance with AUS-SPEC D5.

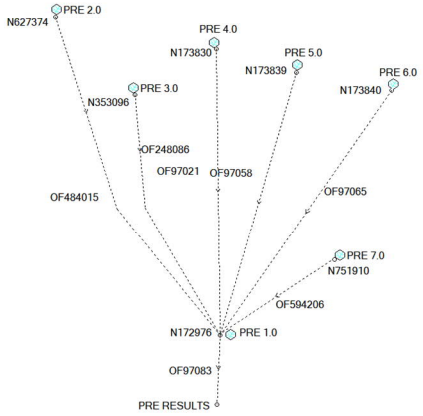
The DRAINS model includes the following

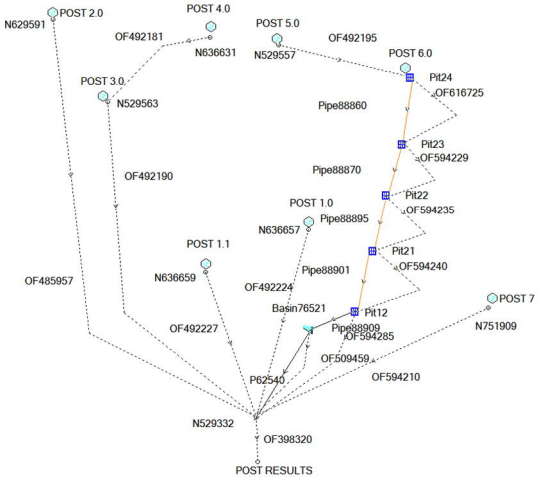
- 350m³ detention tank in the southwest corner of Lot 3 DP801467 (DRAINS node 'Basin76521').
- A suitable outlet to discharge to councils existing stormwater network in Gregory Street Road reserve to limit flows to pre-development rates, designed with a suitable stage/discharge parameters during the detailed design phase.

The below table illustrates that the post-development site stormwater discharge, with the incorporation of a detention basin, does not exceed the pre-development discharge rates for the 20%, 5% and 1% AEP storms:

South-West Catchment			
AEP (%)	Pre-Development (l/s)	Post Development (l/s)	Post ≤ **Pre**
20	2140	2050	OK
5	3330	3040	OK
1	4580	4440	OK

Please see the following pages for screenshots of the DRAINS model results.





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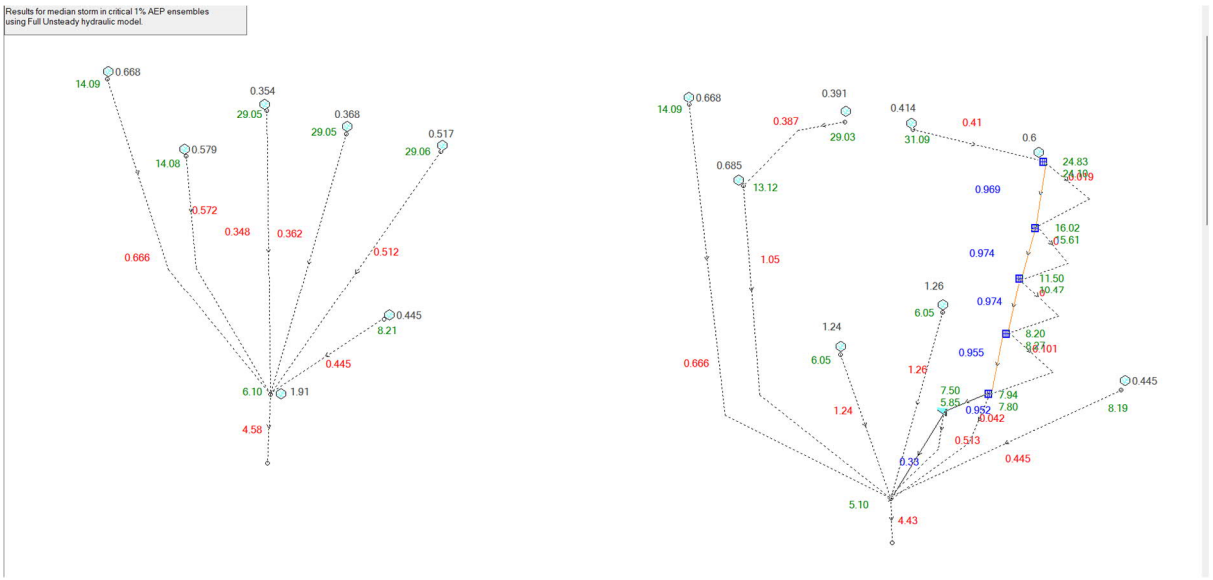
RAINS RESULTS

1% AEP Results



5% AEP Results

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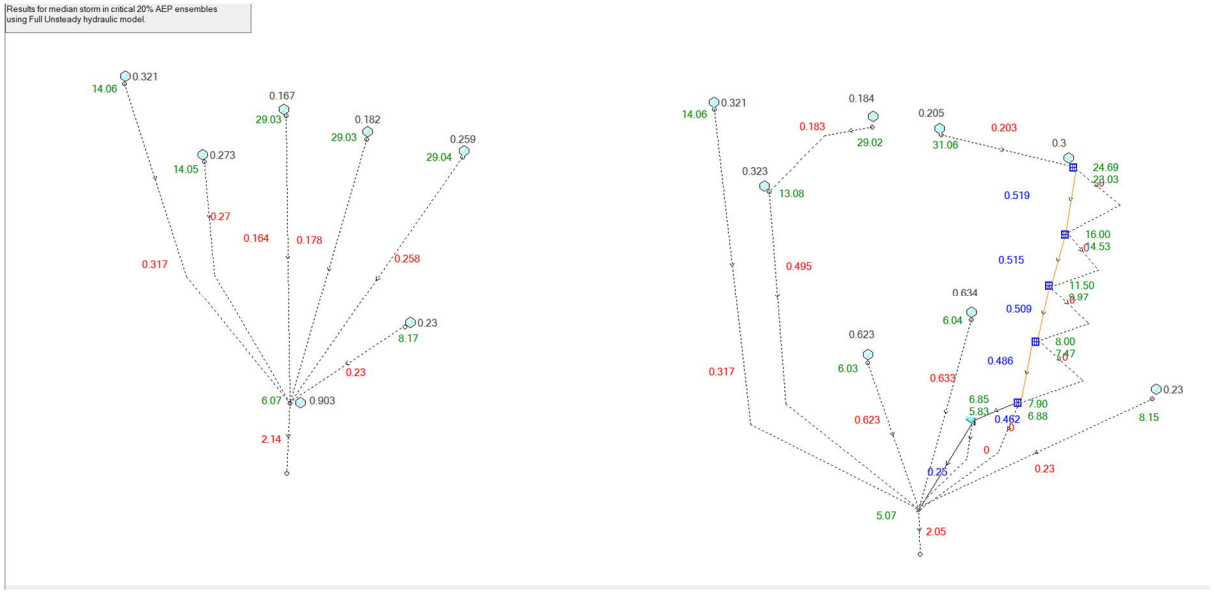
20% AEP Results



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4. STORMWATER QUALITY

4.1. Objective

To meet the load and reduction targets in accordance with AUS-SPEC D7 – Stormwater Management the following pollutant reduction targets have been adopted as water quality objectives as follows:-

- 80% Reduction for Suspended Solids
- 45% Reduction Phosphorus
- 45% Reduction Nitrogen

In addition to the above water quality targets and in the absence of long term water quality data for the receiving waters, a precautionary approach has been adopted whereby the post development stormwater concentrations should be no worse than existing to ensure minimal impact on the receiving waters.

4.2. Modelling Results

MUSIC software version 6.3.0 has been adopted to model the stormwater quality requirements. The parameters input are in accordance with AUS-SPEC D7 and NSW MUSIC Modelling Guidelines 2015, utilising local rainfall data for the Kempsey region, and regionally appropriate evapotranspiration values within the model.

The model features two privately managed Atlan basins, two privately managed Atlan Ecoceptors as the main features of the treatment train.

The below results illustrate that the water quality objectives can be achieved with the proposed treatment train.

It should be noted that the proposed detention tank referenced within the stormwater quantity section of this report provides retention to stormwater flows from the upstream catchment only and does not form part of the treatment train for the proposed development.

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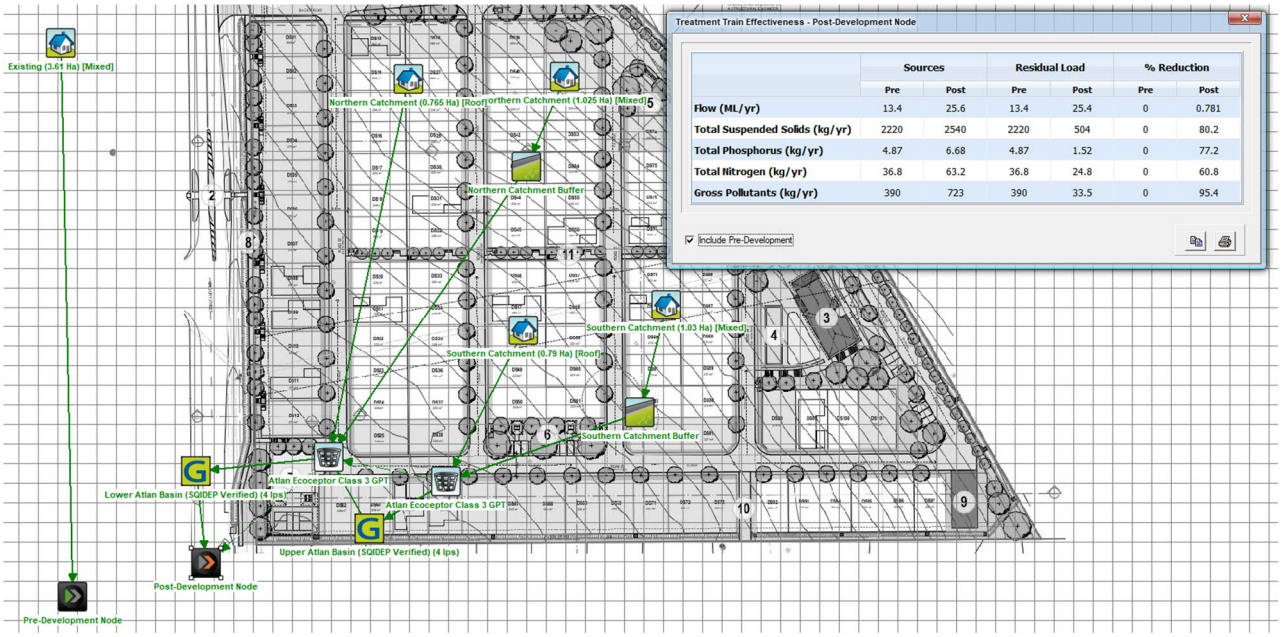

	Sources		Residual Load		% Reduction	
	Pre	Post	Pre	Post	Pre	Post
Flow (ML/yr)	13.4	25.6	13.4	25.4	0	0.781
Total Suspended Solids (kg/yr)	2220	2540	2220	504	0	80.2
Total Phosphorus (kg/yr)	4.87	6.68	4.87	1.52	0	77.2
Total Nitrogen (kg/yr)	36.8	63.2	36.8	24.8	0	60.8
Gross Pollutants (kg/yr)	390	723	390	33.5	0	95.4

Figure 13 - MUSIC Treatment Train Effectiveness

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5. CONCLUSION

The report demonstrates how all stormwater impacts (quantity and quality) generated from the development, can be adequately mitigated through implementation of the Stormwater Management Plan, satisfying the stormwater objectives of Kempsey Shire Council. This is achieved with:

- 350m³ detention tank in the southwest corner of Lot 3 DP801467 (DRAINS node 'Basin76521').
- A suitable outlet to discharge to councils existing stormwater network in Gregory Street Road reserve.
- Two Atlan Ecoceptor Class 3 GPT and two Atlan Basin (SQIDDEP verified) 4l/s systems located in the southwest corner and southern parts of the subject site respectively.

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6. DRAINS & MUSIC MODELLING DATA

DRAINS Stormwater Quantity Model

Drains 1% AEP Results

DRAINS results prepared from Version 2025.01.9147.24925																
PIT / NODE DETAILS				Version 8												
Name	Max HGL	Max Pond	Max Surfa	Max Pond	Min	Overflow	Constraint									
		HGL	Flow Arriv	Volume	Freeboard	(cu.m/s)										
			(cu.m/s)	(cu.m)	(m)											
N172976	6.1		5.964													
N173830	29.05		0.454													
N173839	29.05		0.478													
N173840	29.06		0.65													
N353096	14.08		0.743													
N529557	31.09		0.538													
N529563	13.12		1.371													
N596230	29.19		0.454													
N596232	14.1		1.19													
N596235	31.1		0.478													
N596237	30.08		1.124													
N608746	28.09		0.805													
N608819	30.08		0.487													
N608827	15.1		0.85													
N608829	28.2		0.469													
N608821	5.1		5.533													
N627374	14.09		0.809													
N629518	6.05		1.521													
N629591	14.09		0.809													
N629593	14.09		0.809													
N636631	29.03		0.501													
N636657	6.05		1.555													
N636659	6.05		1.529													
N653583	14.09		0.809													
N596228	5.1		3.145													
N751909	8.19		0.573													
N751910	8.21		0.573													
Pit24	24.1	24.83	1.289	1.7	0.4	0.019	Inlet Capacity									
Pit23	15.61	16.02	0.175	1.7	0.39	0	Inlet Capacity									
Pit22	10.47	11.5	0.12	1.7	1.03	0	Inlet Capacity									
Pit21	8.27	8.2	0	1.7	0	0.101	Outlet System									
Pit12	7.8	7.94	0.321	1.1	0.1	0.042	Inlet Capacity									
N529332	5.1		5.479													
SUB-CATCHMENT DETAILS																
Name	Max	Paved	Grassed	Paved	Grassed	Supp.	Due to Storm									
	Flow Q	Max Q	Max Q	Tc	Tc	Tc										
	(cu.m/s)	(cu.m/s)	(cu.m/s)	(min)	(min)	(min)										
PRE 1.0	1.912	0.264	1.68	5	15	0	1% AEP, 20 min burst, Storm 10									
PRE 4.0	0.354	0.049	0.311	5	15	2	1% AEP, 20 min burst, Storm 10									
PRE 5.0	0.368	0.054	0.329	5	14	2	1% AEP, 15 min burst, Storm 6									
PRE 6.0	0.517	0.069	0.464	5	12	2	1% AEP, 15 min burst, Storm 8									
PRE 3.0	0.579	0.08	0.509	5	15	2	1% AEP, 20 min burst, Storm 10									
POST 5.0	0.414	0.061	0.37	5	14	2	1% AEP, 15 min burst, Storm 6									

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POST 3.0	0.685	0.095	0.602	5	15	2	1% AEP, 20 min burst, Storm 10								
POST U3.1	0.354	0.049	0.311	5	15	2	1% AEP, 20 min burst, Storm 10								
POST U2.1	0.579	0.08	0.509	5	15	2	1% AEP, 20 min burst, Storm 10								
POST U4.1	0.368	0.054	0.329	5	14	2	1% AEP, 15 min burst, Storm 6								
POST U5.1	0.517	0.069	0.464	5	12	2	1% AEP, 15 min burst, Storm 8								
Cat347434	0.516	0	0.516	5	12	2	1% AEP, 15 min burst, Storm 8								
Cat347436	0.393	0	0.393	5	12	2	1% AEP, 15 min burst, Storm 8								
Cat347441	0.605	0.082	0.547	5	13	2	1% AEP, 15 min burst, Storm 8								
Cat347438	0.378	0	0.378	5	12	2	1% AEP, 15 min burst, Storm 8								
Cat347432	2.915	2.662	0.253	5	13	0	1% AEP, 5 min burst, Storm 1								
PRE 2.0	0.668	0.108	0.573	5	20	2	1% AEP, 20 min burst, Storm 10								
POST L2	1.233	1.139	0.094	5	15	0	1% AEP, 5 min burst, Storm 1								
POST 2.0	0.668	0.108	0.573	5	20	2	1% AEP, 20 min burst, Storm 10								
POST U1.1	0.668	0.108	0.573	5	20	2	1% AEP, 20 min burst, Storm 10								
POST 4.0	0.391	0.054	0.343	5	15	2	1% AEP, 20 min burst, Storm 10								
POST 1.0	1.261	1.165	0.096	5	15	0	1% AEP, 5 min burst, Storm 1								
POST 1.1	1.24	1.146	0.094	5	15	0	1% AEP, 5 min burst, Storm 1								
Cat379651	0.668	0.108	0.573	5	20	2	1% AEP, 20 min burst, Storm 10								
POST L1.1	1.656	1.53	0.126	5	15	0	1% AEP, 5 min burst, Storm 1								
POST 7	0.445	0.298	0.164	6	6	2	1% AEP, 10 min burst, Storm 1								
PRE 7.0	0.445	0.298	0.164	6	6	2	1% AEP, 10 min burst, Storm 1								
POST 6.0	0.6	0.08	0.539	5	12	2	1% AEP, 15 min burst, Storm 8								
PIPE DETAILS															
Name	Max Q	Max V	Max U/S	Max D/S	Due to Storm										
	(cu.m/s)	(m/s)	HGL (m)	HGL (m)											
P74368	0.211	5.04	9.191	8.168	1% AEP, 20 min burst, Storm 7										
P78925	1.884	6.48	8.351	7.249	1% AEP, 20 min burst, Storm 2										
Pipe88860	0.969	4.48	23.025	15.611	1% AEP, 25 min burst, Storm 9										
Pipe88870	0.974	4.5	14.525	10.468	1% AEP, 15 min burst, Storm 8										
Pipe88895	0.974	3.49	10.076	8.271	1% AEP, 15 min burst, Storm 8										
Pipe88901	0.955	2.16	8.02	7.8	1% AEP, 15 min burst, Storm 8										
Pipe88909	0.952	2.16	7.52	7.499	1% AEP, 15 min burst, Storm 8										
P62540	0.33	5.4	6.396	5.153	1% AEP, 25 min burst, Storm 3										
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 DxV	Max Width	Max V	Due to Storm							
OF97083	4.576	4.577	1.479	0.104	1.34	4	12.87	1% AEP, 20 min burst, Storm 10							
OF97021	0.348	0.347	1.355	0.053	0.13	4	2.63	1% AEP, 20 min burst, Storm 9							
OF97058	0.362	0.362	1.363	0.053	0.13	4	2.66	1% AEP, 20 min burst, Storm 2							
OF97065	0.512	0.511	1.364	0.064	0.17	4	2.78	1% AEP, 15 min burst, Storm 8							
OF248086	0.572	0.572	1.412	0.082	0.18	4	2.16	1% AEP, 20 min burst, Storm 10							
OF492195	0.41	0.408	1.48	0.086	0.12	4	1.46	1% AEP, 15 min burst, Storm 6							
OF492190	1.049	1.051	1.412	0.116	0.3	4	2.61	1% AEP, 20 min burst, Storm 9							
OF456943	0.351	0.349	1.208	0.21	0.46	1.68	2.42	1% AEP, 20 min burst, Storm 9							

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OF456777	0.916	0.918	1.412	0.104	0.27	4	2.58	1% AEP, 20 min burst, Storm 9							
OF456940	0.364	0.362	1.48	0.097	0.11	4	1.13	1% AEP, 15 min burst, Storm 6							
OF456700	0.858	0.859	1.382	0.084	0.26	4	3.1	1% AEP, 25 min burst, Storm 9							
OF467776	0.478	3.213	1.355	0.172	0.88	4	5.11	1% AEP, 5 min burst, Storm 1							
OF467849	0.392	0.905	1.442	0.127	0.26	4	2.12	1% AEP, 15 min burst, Storm 8							
OF467998	0.971	0.972	1.497	0.105	0.28	4	2.73	1% AEP, 15 min burst, Storm 8							
OF468004	0.377	0.975	1.292	0.33	0.84	2.64	2.91	1% AEP, 15 min burst, Storm 8							
OF468010	2.62	2.62	1.479	0.12	0.75	4	6.25	1% AEP, 20 min burst, Storm 7							
OF467996	4.4	4.4	1.479	0.105	1.29	4	12.35	1% AEP, 20 min burst, Storm 5							
OF484015	0.666	0.666	1.412	0.089	0.2	4	2.27	1% AEP, 25 min burst, Storm 9							
OF485881	1.233	1.233	1.479	0.055	0.44	4	8.5	1% AEP, 5 min burst, Storm 1							
OF485957	0.666	0.665	1.412	0.089	0.2	4	2.27	1% AEP, 25 min burst, Storm 9							
OF485967	0.666	0.665	1.412	0.089	0.2	4	2.27	1% AEP, 25 min burst, Storm 9							
OF492181	0.387	0.385	1.018	0.033	0.06	9.84	1.97	1% AEP, 20 min burst, Storm 9							
OF492224	1.262	1.275	1.479	0.056	0.45	4	8.54	1% AEP, 5 min burst, Storm 1							
OF492227	1.24	1.258	1.479	0.056	0.44	4	8.49	1% AEP, 5 min burst, Storm 1							
OF507176	0.666	0.665	1.412	0.089	0.2	4	2.27	1% AEP, 25 min burst, Storm 9							
OF456856	4.233	4.234	1.479	0.1	1.25	4	12.59	1% AEP, 20 min burst, Storm 10							
OF594210	0.445	0.445	1.292	0.191	0.58	1.53	3.05	1% AEP, 10 min burst, Storm 1							
OF594206	0.445	0.445	1.292	0.191	0.58	1.53	3.05	1% AEP, 10 min burst, Storm 1							
OF616725	0.019	0.019	0.725	0.037	0.06	0.73	1.76	1% AEP, 25 min burst, Storm 9							
OF594229	0	0	0.791	0	0	0	0								
OF594235	0	0	0.821	0	0	0	0								
OF594240	0.101	0.098	0.87	0.139	0.09	2	0.79	1% AEP, 25 min burst, Storm 3							
OF594285	0.042	0.042	0.76	0.044	0.09	0.88	2.13	1% AEP, 25 min burst, Storm 3							
OF509459	0.513	0.513	1.314	0.058	0.18	4	3.25	1% AEP, 25 min burst, Storm 3							
OF398320	4.433	4.433	1.479	0.103	1.3	4	12.73	1% AEP, 20 min burst, Storm 3							
DETENTION BASIN DETAILS															
Name	Max WL	MaxVol	Max Q	Max Q	Max Q										
			Total	Low Level	High Level										
Basin7373	9.28	1536.7	2.831	0.211	2.62										
Basin7823	8.98	302.8	1.884	1.884	0										
Basin7652	7.5	359.9	0.843	0.33	0.513										
Run Log for DRAINS v2025.01.9147.24925 - 7247 OSD Job REVB 20250129_Backup															
Run Log for DRAINS v2025.01.9147.24925 - 7247 OSD Job REVB 20250129_Backup.drn run at 16:42:36 on 31/1/2025.															
Upwelling occurred at: Pit21															
Freeboard was less than 0.15m at Pit12															
The maximum pond depth in these sag pits is unsafe: Pit24\line															
The maximum flow in these overflow routes is unsafe: OF492227, OF492224, OF485881, OF468010, OF467996, OF467776, OF456856, OF398320, OF97083															

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Drains Input Data

PIT / NODE DETAILS			Version 15																		
Name	Type	Family	Size	Ponding Volume (cu.m)	Pressure Change Coeff. Ku	Surface Elev (m)	Max Pond Depth (m)	Base Inflow (cu.m/s)	Blocking Factor	x	y	Bolt-down lid	id	Part Full Shock Los	Inflow Hydrograph	Pit is	Internal Width (mm)	Inflow is Misaligne	Minor Safe Pond Dep (m)	Major Safe Pond Depth (m)	
N172976	Node							0		30.186	-10.301		366525		No						
N173830	Node							0		29.51	38.808		368258		No						
N173839	Node							0		43.312	34.738		368298		No						
N173840	Node							0		59.598	31.75		368304		No						
PRE RESUI	Node							0		29.641	-22.162		368338		No						
N353096	Node							0		15.619	31.022		826685		No						
POST RESI	Node							0		137.557	-35.975		1286884		No						
N529557	Node							0		141.165	35.534		1287852		No						
N529563	Node					14		0		111.869	25.815		1287874		No						
N596078	Node							0		244.584	-54.038		1465180		No						
N596230	Node					31		0		244.289	40.189		1465358		No						
N596232	Node					15		0		218.788	21.109		1465360		No						
N596235	Node							0		262.248	39.318		1465364		No						
N596237	Node					30		0		280.849	30.017		1465367		No						
N608746	Node					28		0		412.275	12.197		1498526		No						
N608819	Node							0		393.926	21.046		1498672		No						
N608823	Node							0		382.657	-49.82		1498678		No						
N608827	Node					15		0		355.784	12.811		1498688		No						
N608829	Node					31		0		378.539	23.213		1498694		No						
N608821	Node					5		0		382.44	-35.516		1498674		No						
N627374	Node							0		1.994	44.205		1548020		No						
N629518	Node							0		237.073	-9.682		1553845		No						
N629591	Node							0		102.484	39.955		1554213		No						
N629593	Node							0		201.222	33.839		1554232		No						
N636631	Node					31		0		129.493	36.897		1573226		No						
N636657	Node							0		146.332	3.878		1573356		No						
N636659	Node							0		128.708	-3.447		1573364		No						
N653583	Node							0		324.352	23.678		1619249		No						
N596228	Node					10		0		244.445	-40.227		1465338		No						
N751909	Node					8		0		177.163	-9.522		1888682		No						
N751910	Node					8		0		49.773	2.677		1888683		No						
Pit24	Sag	Grated Pit	0.9x0.9	2	1.5	24.5	0.3	0	0	163.76	29.994	No	1888713	1 x Ku	No	New			0.15	0.2	
Pit23	Sag	Grated Pit	0.9x0.9	2	1.5	16	0.1	0	0	162.322	18.57	No	1888712	1 x Ku	No	New			0.15	0.2	
Pit22	Sag	Grated Pit	0.9x0.9	2	1.5	11.5	0.1	0	0	159.599	9.87	No	1888711	1 x Ku	No	New			0.15	0.2	
Pit21	Sag	Grated Pit	0.9x0.9	2	1.5	8	0.1	0	0	157.329	0.187	No	1888710	1 x Ku	No	New			0.15	0.2	
Pit12	Sag	Grated Pit	0.9x0.9	2	1.5	7.9	0.1	0	0	154.303	-10.253	No	1888697	1 x Ku	No	New			0.15	0.2	
N529332	Node					8		0		137.359	-28.303		1287029		No						

DETENTION BASIN DETAILS																
Name	Elev	Surf. Area	Not Used	Outlet Typ	K	Dia(mm)	Centre RL	Pit Family	Pit Type	x	y	HED	Crest RL	Crest Leng	id	
Basin7373	8	1200		Culvert	0.5					383.524	-19.696	No			1498708	
	9	1200														
	10	1200														
Basin7823	8	310		Culvert	0.5					260.287	-0.98	No			1626152	
	9	310														
	10	310														

Basin7652	5.7	200		Culvert	0.5					146.461	-13.403	No			1573314						
	6.7	200																			
	7.7	200																			

SUB-CATCHMENT DETAILS																						
Name	Pit or Node	Total Area (ha)	Paved Area %	Grass Area %	Supp Area %	Paved Time (min)	Grass Time (min)	Supp Time (min)	Paved Length (m)	Grass Length (m)	Supp Length (m)	Paved Slope(%) %	Grass Slope %	Supp Slope %	Paved Rough	Grass Rough	Supp Rough	Lag Time or Factor	Gutter Length (m)	Gutter Slope %	Gutter FlowFacto	Rainfall Multiplier
PRE 1.0	N172976	4.16	10	90	0	5	15	0										0				1
PRE 4.0	N173830	0.77	10	90	0	5	15	2										0				1
PRE 5.0	N173839	0.8	10	90	0	5	14	2										0				1
PRE 6.0	N173840	1.05	10	90	0	5	12	2										0				1
PRE 3.0	N353096	1.26	10	90	0	5	15	2										0				1
POST 5.0	N529557	0.9	10	90	0	5	14	2										0				1
POST 3.0	N529563	1.49	10	90	0	5	15	2										0				1
POST U3.1	N596230	0.77	10	90	0	5	15	2										0				1
POST U2.1	N596232	1.26	10	90	0	5	15	2										0				1
POST U4.1	N596235	0.8	10	90	0	5	14	2										0				1
POST U5.1	N596237	1.05	10	90	0	5	12	2										0				1
Cat347434	N608746	1.05	0	100	0	5	12	2										0				1
Cat347436	N608819	0.8	0	100	0	5	12	2										0				1
Cat347441	N608827	1.26	10	90	0	5	13	2										0				1
Cat347438	N608829	0.77	0	100	0	5	12	2										0				1
Cat347432	Basin7373	4.16	75	25	0	5	13	0										0				1
PRE 2.0	N627374	1.7	10	90	0	5	20	2										0				1
POST L2	N629518	1.78	75	25	0	5	15	0										0				1
POST 2.0	N629591	1.7	10	90	0	5	20	2										0				1
POST U1.1	N629593	1.7	10	90	0	5	20	2										0				1
POST 4.0	N636631	0.85	10	90	0	5	15	2										0				1
POST 1.0	N636657	1.82	75	25	0	5	15	0										0				1
POST 1.1	N636659	1.79	75	25	0	5	15	0										0				1
Cat379651	N653583	1.7	10	90	0	5	20	2										0				1
POST L1.1	Basin7823	2.39	75	25	0	5	15	0										0				1
POST 7	N751909	0.66	60	40	0	6	6	2										0				1
PRE 7.0	N751910	0.66	60	40	0	6	6	2										0				1
POST 6.0	Pit24	1.22	10	90	0	5	12	2										0				1

PIPE DETAILS																			
Name	From	To	Length (m)	U/S IL (m)	D/S IL (m)	Slope (%)	Type	Dia (mm)	I.D. (mm)	Rough	Pipe Is	No. Pipes	Chg From	At Chg	Chg (m)	Rl (m)	Chg (m)	RL (m)	etc (m)
P74368	Basin7373	N608821	10	9	8.1	9	uPVC, not	375	386	0.03	NewFixed	3	Basin7373	0					
P78925	Basin7823	N596228	10	8	7.1	9	uPVC, not	375	386	0.03	NewFixed	7	Basin7823	0					
Pipe88860	Pit24	Pit23	56	22.5	14	15.18	Concrete,	525	525	0.3	Existing	1	Pit24	0					
Pipe88870	Pit23	Pit22	56	14	9.5	8.04	Concrete,	525	525	0.3	Existing	1	Pit23	0					
Pipe88895	Pit22	Pit21	60	9.5	7	4.17	Concrete,	600	600	0.3	Existing	1	Pit22	0					
Pipe88901	Pit21	Pit12	60	7	5.8	2	Concrete,	750	750	0.3	Existing	1	Pit21	0					
Pipe88909	Pit12	Basin7652	5	5.8	5.7	2	Concrete,	750	750	0.3	New	1	Pit12	0					
P62540	Basin7652	N529332	10	5.7	5	7	uPVC, not	225	242	0.03	NewFixed	2	Basin7652	0					

DETAILS of SERVICES CROSSING PIPES

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Pipe	Chg	Bottom	Height of S	Chg	Bottom	Height of S	Chg	Bottom	Height of S	etc											
	(m)	Elev (m)	(m)	(m)	Elev (m)	(m)	(m)	Elev (m)	(m)	etc											
CHANNEL DETAILS																					
Name	From	To	Type	Length	U/S IL	D/S IL	Slope	Base Widt	L.B. Slope	R.B. Slope	Manning	Depth	Roofed								
				(m)	(m)	(m)	(%)	(m)	(1:?)	(1:?)	n	(m)									
OVERFLOW ROUTE DETAILS																					
Name	From	To	Travel	Spill	Crest	Weir	Cross	Safe Depth	SafeDepth	Safe	Bed	D/S Area		id	U/S IL	D/S IL	Length (m)				
			Time	Level	Length	Coeff. C	Section	Major Stor	Minor Stor	DxV	Slope	Contributing									
			(min)	(m)	(m)			(m)	(m)	(sq.m/sec	(%)	%									
OF97083	N172976	PRE RESUL	0.1				4 m wide p	0.3	0.15	0.4	1	100		368337	6	5	1				
OF97021	N173830	N172976	1				4 m wide p	0.3	0.15	0.4	10	0		368249	29	6	230				
OF97058	N173839	N172976	0.9				4 m wide p	0.3	0.15	0.4	10.13	0		368299	29	6	227				
OF97065	N173840	N172976	1.1				4 m wide p	0.3	0.15	0.4	9.27	0		368307	29	6	248				
OF248086	N353096	N172976	1.1				4 m wide p	0.3	0.15	0.4	4	0		826758	14	6	200				
OF492195	N529557	Pit24	1				4 m wide p	0.3	0.15	0.4	0.87	0		1573263	31	29	115				
OF492190	N529563	N529332	1.1				4 m wide p	0.3	0.15	0.4	4	0		1573247	13	6	200				
OF456943	N596230	N596232	0.6				Swale with	0.45	0.3	1	12.5	0		1465346	29	14	120				
OF456777	N596232	N596228	1.1				4 m wide p	0.3	0.15	0.4	4	0		1465028	14	6	200				
OF456940	N596235	N596237	1				4 m wide p	0.3	0.15	0.4	0.87	0		1465343	31	30	115				
OF456700	N596237	Basin782	1.2				4 m wide p	0.3	0.15	0.4	8.73	0		1464951	30	8	275				
OF467776	N608746	Basin737	1.1				4 m wide p	0.3	0.15	0.4	10	100		1498379	28	8	260				
OF467849	N608819	N608746	0.6				4 m wide p	0.3	0.15	0.4	2	100		1498452	30	28	95				
OF467998	N608827	N608821	2.3				4 m wide p	0.3	0.15	0.4	0.5	0		1498680	15	5	225				
OF468004	N608829	N608827	0.7				Swale with	0.45	0.3	1	10	100		1498690	28	15	125				
OF468010	Basin737	N608821	0.1	9	10	2	4 m wide p	0.3	0.15	0.4	1	1		1498715	9	7.1	10				
OF467996	N608821	N608823	0.1				4 m wide p	0.3	0.15	0.4	1	100		1498676	5	4.1	1				
OF484015	N627374	N172976	1.1				4 m wide p	0.3	0.15	0.4	4	0		1548054	14	6	200				
OF485881	N629518	N596228	0.1				4 m wide p	0.3	0.15	0.4	1	100		1553919	6	5	1				
OF485957	N629591	N529332	1.1				4 m wide p	0.3	0.15	0.4	4	0		1554215	14	6	200				
OF485967	N629593	N596228	1.1				4 m wide p	0.3	0.15	0.4	4	0		1554229	14	6	200				
OF492181	N636631	N529563	0.8				Overflow a	0.05	0	0.6	12.5	0		1573220	29	13	120				
OF492224	N636657	N529332	0.1				4 m wide p	0.3	0.15	0.4	1	100		1573352	6	5	1				
OF492227	N636659	N529332	0.1				4 m wide p	0.3	0.15	0.4	1	100		1573361	6	5	1				
OF507176	N653583	N608821	1.1				4 m wide p	0.3	0.15	0.4	4	0		1619322	14	6	200				
OF456856	N596228	N596078	0.1				4 m wide p	0.3	0.15	0.4	1	100		1465107	5	4	1				
OF594210	N751909	N529332	0.1				Swale with	0.45	0.3	1	10	0		1888693	8	6	10				
OF594206	N751910	N172976	0.1				Swale with	0.45	0.3	1	10	0		1888688	8	6	10				
OF616725	Pit24	Pit23	0.2				2m Chann	0.3	0.3	0.6	15.18	0		3376590	24.5	16	56				
OF594229	Pit23	Pit22	0.2				2m Chann	0.3	0.3	0.6	7.5	0		1888803	16	11.5	56				
OF594235	Pit22	Pit21	0.3				2m Chann	0.3	0.3	0.6	5.83	0		1888810	11.5	8	60				
OF594240	Pit21	Pit12	0.3				2m Chann	0.3	0.3	0.6	3.33	0		1888816	8	7.9	60				
OF594285	Pit12	N529332	0.1				2m Chann	0.3	0.3	0.6	10	0		1888896	7.9	5	20				
OF509459	Basin765	N529332	0.1	7.4	10	2	4 m wide p	0.3	0.15	0.4	19	1		1626308	7.4	6	10				
OF398320	N529332	POST RESU	0.1				4 m wide p	0.3	0.15	0.4	1	100		1286956	5	4	1				

PIPE COVER DETAILS					
Name	Type	Dia (mm)	Safe Cover	Cover (m)	
P74368	uPVC, not	386	0.3	-3.49	Unsafe
P78925	uPVC, not	386	0.3	-0.39	Unsafe
Pipe88860	Concrete,	525	0.45	1.43	
Pipe88870	Concrete,	525	0.45	1.43	
Pipe88895	Concrete,	600	0.45	0.36	Unsafe
Pipe88901	Concrete,	750	0.45	0.19	Unsafe
Pipe88909	Concrete,	750	0.45	-0.81	Unsafe
P62540	uPVC, not	242	0.3	-0.25	Unsafe

This model has no pipes with non-return valves

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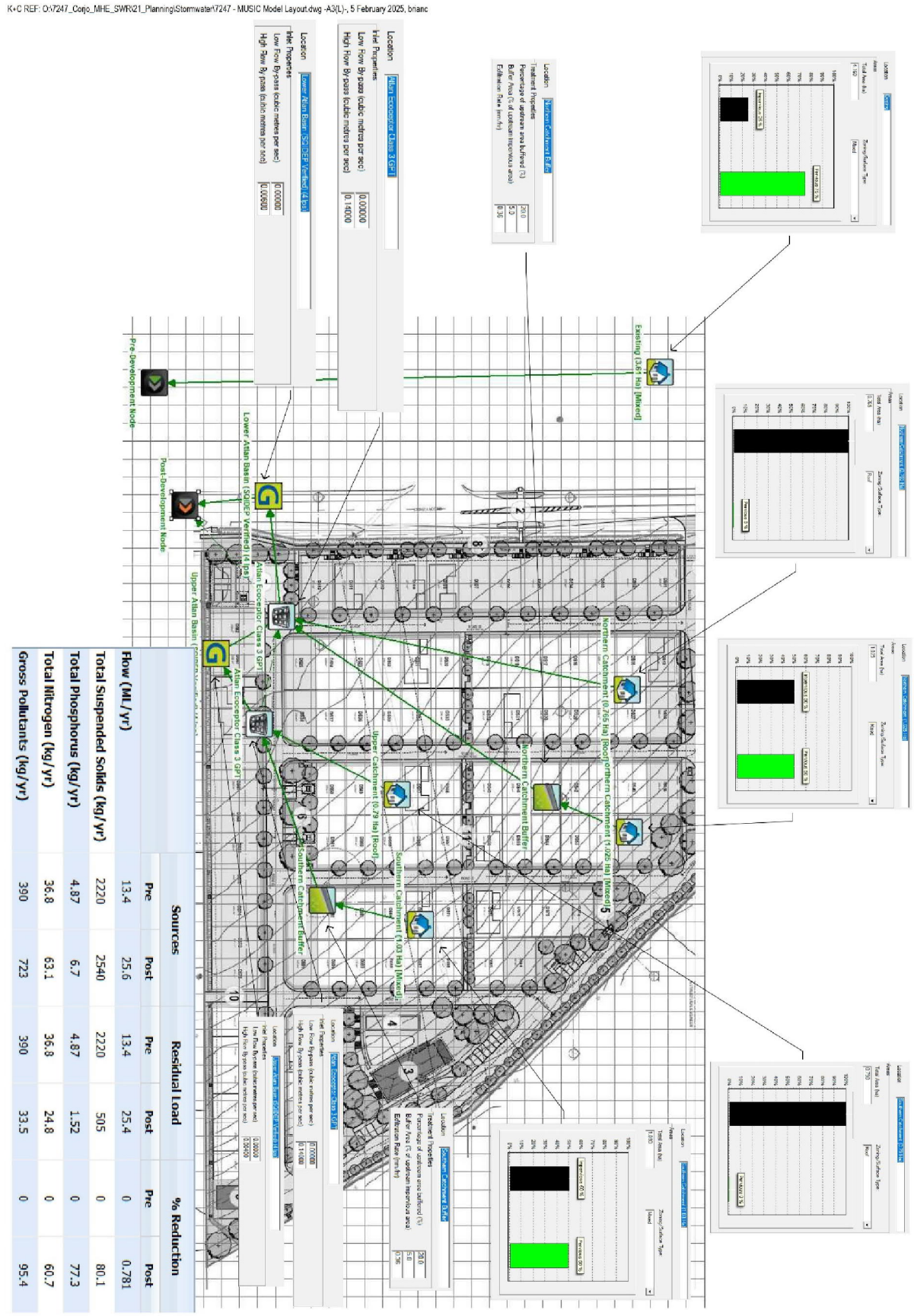
MUSIC Stormwater Quality Model



	Sources		Residual Load		% Reduction	
	Pre	Post	Pre	Post	Pre	Post
Flow (ML/yr)	13.4	25.6	13.4	25.4	0	0.781
Total Suspended Solids (kg/yr)	2220	2540	2220	505	0	80.1
Total Phosphorus (kg/yr)	4.87	6.7	4.87	1.52	0	77.3
Total Nitrogen (kg/yr)	36.8	63.1	36.8	24.8	0	60.7
Gross Pollutants (kg/yr)	390	723	390	33.5	0	95.4

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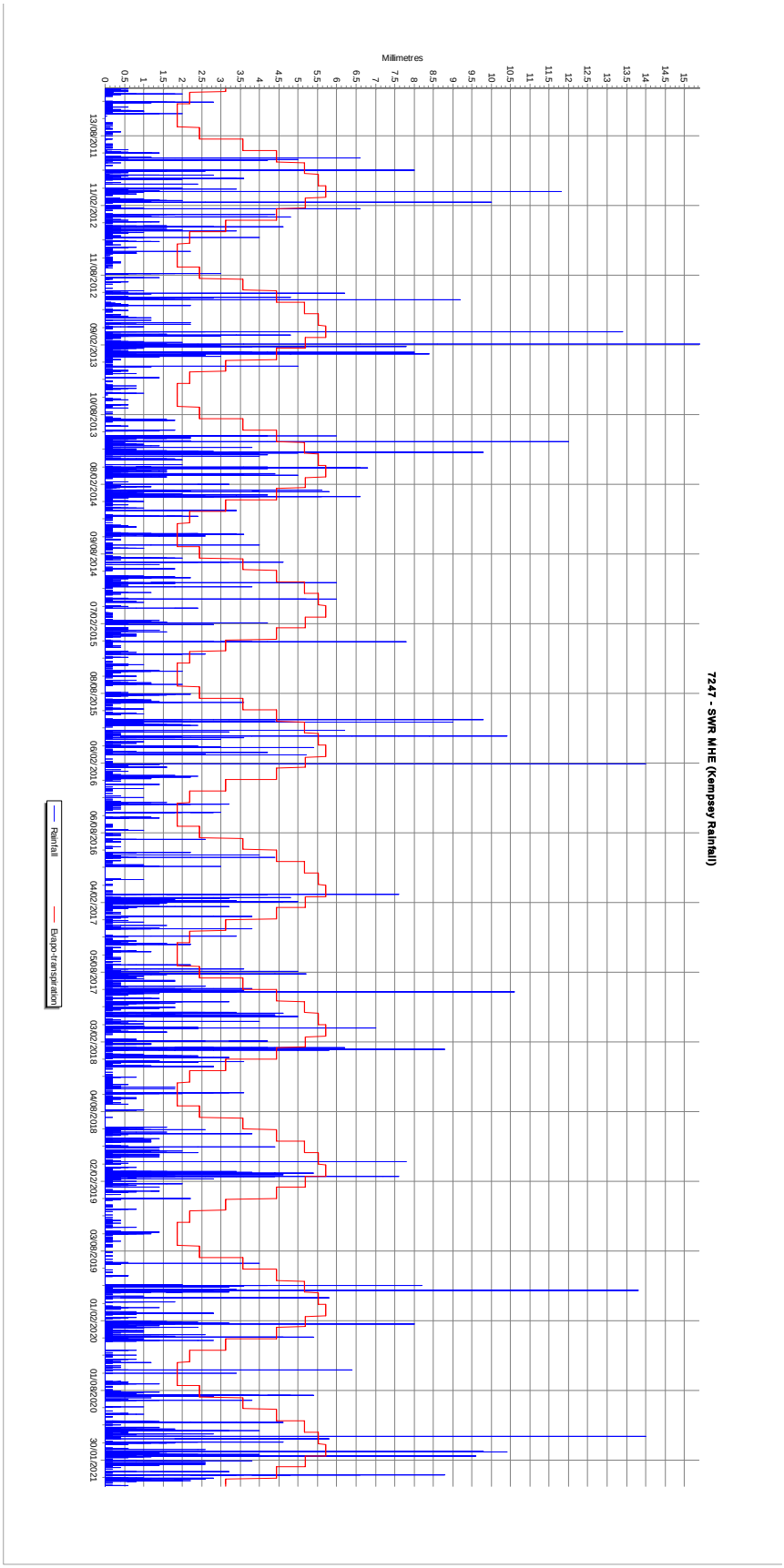

Figure 14 – Adopted Kempsey Rainfall and Evapotranspiration Data (www.stormupdated.com.au)

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Source nodes
Location,Existing (3.61 Ha),Northern Catchment (1.025 Ha),Northern Catchment (0.765
Ha),Southern Catchment (1.03 Ha),Southern Catchment (0.79 Ha)
ID,1,2,7,8,9
Node Type,UrbanSourceNode,UrbanSourceNode,UrbanSourceNode,UrbanSourceNode,UrbanSourceNode
Zoning Surface Type,Mixed,Mixed,Roof,Mixed,Roof
Total Area (ha),3.61,1.025,0.765,1.03,0.79
Area Impervious (ha),0.907079850746269,0.5125,0.765,0.518881716417911,0.79
Area Pervious (ha),2.70292014925373,0.5125,0,0.511118283582089,0
Field Capacity (mm),80,80,80,80,80
Pervious Area Infiltration Capacity coefficient - a,200,200,200,200,200
Pervious Area Infiltration Capacity exponent - b,1,1,1,1,1
Impervious Area Rainfall Threshold (mm/day),1,1,1,1,1
Pervious Area Soil Storage Capacity (mm),120,120,120,120,120
Pervious Area Soil Initial Storage (% of Capacity),25,25,25,25,25
Groundwater Initial Depth (mm),10,10,10,10,10
Groundwater Daily Recharge Rate (%),25,25,25,25,25
Groundwater Daily Baseflow Rate (%),5,5,5,5,5
Groundwater Daily Deep Seepage Rate (%),0,0,0,0,0
Stormflow Total Suspended Solids Mean (log mg/L),2.2,2.2,1.3,2.2,1.3
Stormflow Total Suspended Solids Standard Deviation (log mg/L),0.32,0.32,0.32,0.32,0.32
Stormflow Total Suspended Solids Estimation
Method,Stochastic,Stochastic,Stochastic,Stochastic,Stochastic
Stormflow Total Suspended Solids Serial Correlation,0,0,0,0,0
Stormflow Total Phosphorus Mean (log mg/L),-0.45,-0.45,-0.89,-0.45,-0.89
Stormflow Total Phosphorus Standard Deviation (log mg/L),0.25,0.25,0.25,0.25,0.25
Stormflow Total Phosphorus Estimation
Method,Stochastic,Stochastic,Stochastic,Stochastic,Stochastic
Stormflow Total Phosphorus Serial Correlation,0,0,0,0,0
Stormflow Total Nitrogen Mean (log mg/L),0.42,0.42,0.3,0.42,0.3
Stormflow Total Nitrogen Standard Deviation (log mg/L),0.19,0.19,0.19,0.19,0.19
Stormflow Total Nitrogen Estimation
Method,Stochastic,Stochastic,Stochastic,Stochastic,Stochastic
Stormflow Total Nitrogen Serial Correlation,0,0,0,0,0
Baseflow Total Suspended Solids Mean (log mg/L),1.1,1.1,1.1,1.1,1.1
Baseflow Total Suspended Solids Standard Deviation (log mg/L),0.17,0.17,0.17,0.17,0.17
Baseflow Total Suspended Solids Estimation
Method,Stochastic,Stochastic,Stochastic,Stochastic,Stochastic
Baseflow Total Suspended Solids Serial Correlation,0,0,0,0,0
Baseflow Total Phosphorus Mean (log mg/L),-0.82,-0.82,-0.82,-0.82,-0.82
Baseflow Total Phosphorus Standard Deviation (log mg/L),0.19,0.19,0.19,0.19,0.19
Baseflow Total Phosphorus Estimation
Method,Stochastic,Stochastic,Stochastic,Stochastic,Stochastic
Baseflow Total Phosphorus Serial Correlation,0,0,0,0,0
Baseflow Total Nitrogen Mean (log mg/L),0.32,0.32,0.32,0.32,0.32
Baseflow Total Nitrogen Standard Deviation (log mg/L),0.12,0.12,0.12,0.12,0.12
Baseflow Total Nitrogen Estimation
Method,Stochastic,Stochastic,Stochastic,Stochastic,Stochastic
Baseflow Total Nitrogen Serial Correlation,0,0,0,0,0
Flow based constituent generation - enabled,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),13.4,5.68,7.02,5.70,7.25
OUT - TSS Mean Annual Load (kg/yr),2.22E3,1.07E3,183,1.09E3,190
OUT - TP Mean Annual Load (kg/yr),4.87,2.22,1.08,2.26,1.11
OUT - TN Mean Annual Load (kg/yr),36.8,15.9,15.3,16.1,15.9
OUT - Gross Pollutant Mean Annual Load (kg/yr),390,174,184,174,190
Rain In (ML/yr),37.0929,10.5319,7.86039,10.5832,8.11725
ET Loss (ML/yr),23.5604,4.83476,0.839691,4.85831,0.86715
Deep Seepage Loss (ML/yr),0,0,0,0,0
Baseflow Out (ML/yr),2.91327,0.55145,0,0.55414,0
Imp. Stormflow Out (ML/yr),8.28259,4.7034,7.02069,4.72634,7.25013
Perv. Stormflow Out (ML/yr),2.22279,0.420749,0,0.422802,0
Total Stormflow Out (ML/yr),10.5054,5.12415,7.02069,5.14914,7.25013
Total Outflow (ML/yr),13.4186,5.6756,7.02069,5.70328,7.25013
Change in Soil Storage (ML/yr),0.113765,0.0215345,0,0.0216396,0
TSS Baseflow Out (kg/yr),39.655,7.49551,0,7.53205,0
TSS Total Stormflow Out (kg/yr),2182.72,1064.15,183.086,1082.96,190.157
TSS Total Outflow (kg/yr),2222.37,1071.64,183.086,1090.5,190.157
TP Baseflow Out (kg/yr),0.485455,0.0918021,0,0.0923337,0
TP Total Stormflow Out (kg/yr),4.38263,2.13172,1.08116,2.17006,1.1114
TP Total Outflow (kg/yr),4.86808,2.22353,1.08116,2.26239,1.1114
TN Baseflow Out (kg/yr),6.32606,1.19761,0,1.20267,0
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TN Total Stormflow Out (kg/yr),30.4613,14.6824,15.2905,14.9077,15.9209
TN Total Outflow (kg/yr),36.7873,15.88,15.2905,16.1103,15.9209
GP Total Outflow (kg/yr),393.66,174.297,184.408,175.147,190.435

No Imported Data Source nodes

USTM treatment nodes
Location,Northern Catchment Buffer,Southern Catchment Buffer
ID,3,10
Node Type,BufferNode,BufferNode
Lo-flow bypass rate (cum/sec), ,
Hi-flow bypass rate (cum/sec), ,
Inlet pond volume, ,
Area (sqm),256.25,259.440858208955
Initial Volume (m^3), ,
Extended detention depth (m), ,
Number of Rainwater tanks, ,
Permanent Pool Volume (cubic metres), ,
Proportion vegetated, ,
Equivalent Pipe Diameter (mm), ,
Overflow weir width (m), ,
Notional Detention Time (hrs), ,
Orifice Discharge Coefficient, ,
Weir Coefficient, ,
Number of CSTR Cells, ,
Total Suspended Solids - k (m/yr), ,
Total Suspended Solids - C* (mg/L), ,
Total Suspended Solids - C** (mg/L), ,
Total Phosphorus - k (m/yr), ,
Total Phosphorus - C* (mg/L), ,
Total Phosphorus - C** (mg/L), ,
Total Nitrogen - k (m/yr), ,
Total Nitrogen - C* (mg/L), ,
Total Nitrogen - C** (mg/L), ,
Threshold Hydraulic Loading for C** (m/yr), ,
Horizontal Flow Coefficient, ,
Reuse Enabled,Off,Off
Max drawdown height (m), ,
Annual Demand Enabled,Off,Off
Annual Demand Value (ML/year), ,
Annual Demand Distribution, ,
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
Daily Demand Value (ML/day), ,
Custom Demand Enabled,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), ,
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B for Media Soil Texture,-9999,-9999
Proportion of upstream impervious area treated,0.2,0.2
Exfiltration Rate (mm/hr),0.36,0.36
Evaporative Loss as % of PET, ,
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),5.68,5.70
IN - TSS Mean Annual Load (kg/yr),1.07E3,1.09E3
IN - TP Mean Annual Load (kg/yr),2.22,2.26
IN - TN Mean Annual Load (kg/yr),15.9,16.1
IN - Gross Pollutant Mean Annual Load (kg/yr),174,174
OUT - Mean Annual Flow (ML/yr),5.56,5.58
OUT - TSS Mean Annual Load (kg/yr),917,933
OUT - TP Mean Annual Load (kg/yr),2.01,2.05
OUT - TN Mean Annual Load (kg/yr),14.8,15.0
OUT - Gross Pollutant Mean Annual Load (kg/yr),173,174
Flow In (ML/yr),5.67023,5.69756
ET Loss (ML/yr),0,0
Infiltration Loss (ML/yr),0.120185,0.120971
Low Flow Bypass Out (ML/yr),0,0
High Flow Bypass Out (ML/yr),4.53506,4.5575
Orifice / Filter Out (ML/yr),1.01489,1.01961
Weir Out (ML/yr),0,0
Transfer Function Out (ML/yr),0,0
Reuse Supplied (ML/yr),0,0
Reuse Requested (ML/yr),0,0
% Reuse Demand Met,0,0
% Load Reduction,2.12123,2.11422
TSS Flow In (kg/yr),1071.64,1090.5
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),857.314,872.396
TSS Orifice / Filter Out (kg/yr),59.3758,60.5613
TSS Weir Out (kg/yr),0,0
TSS Transfer Function Out (kg/yr),0,0
TSS Reuse Supplied (kg/yr),0,0
TSS Reuse Requested (kg/yr),0,0
TSS % Reuse Demand Met,0,0
TSS % Load Reduction,14.4593,14.4465
TP Flow In (kg/yr),2.22353,2.26239
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),1.77882,1.80992
TP Orifice / Filter Out (kg/yr),0.232719,0.236483
TP Weir Out (kg/yr),0,0
TP Transfer Function Out (kg/yr),0,0
TP Reuse Supplied (kg/yr),0,0
TP Reuse Requested (kg/yr),0,0
TP % Reuse Demand Met,0,0
TP % Load Reduction,9.53378,9.54692
TN Flow In (kg/yr),15.88,16.1102
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),12.7039,12.8882
TN Orifice / Filter Out (kg/yr),2.11774,2.14485
TN Weir Out (kg/yr),0,0
TN Transfer Function Out (kg/yr),0,0
TN Reuse Supplied (kg/yr),0,0
TN Reuse Requested (kg/yr),0,0
TN % Reuse Demand Met,0,0
TN % Load Reduction,6.66419,6.6864
GP Flow In (kg/yr),173.62,174.467
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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),138.896,139.574
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,19.9998,20.0001
PET Scaling Factor, ,

Generic treatment nodes
Location,Lower Atlan Basin (SQIDEP Verified) (4 lps),Upper Atlan Basin (SQIDEP Verified) (4
lps),Atlan Ecoceptor Class 3 GPT,Atlan Ecoceptor Class 3 GPT
ID,4,11,12,13
Node Type,GenericNode,GenericNode,GPTNode,GPTNode
Lo-flow bypass rate (cum/sec),0,0,0,0
Hi-flow bypass rate (cum/sec),0.006,0.004,0.14,0.14
Flow Transfer Function
Input (cum/sec),0,0,0,0
Output (cum/sec),0,0,0,0
Input (cum/sec),10,10,10,10
Output (cum/sec),10,10,10,10
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), , , ,
Input (cum/sec), , , ,
Output (cum/sec), , , ,
Gross Pollutant Transfer Function
Enabled,True,True,True,True
Input (kg/ML),0,0,0,0
Output (kg/ML),0,0,0,0
Input (kg/ML),150,150,15,15
Output (kg/ML),1.5,1.5,0.7,0.7
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), , , ,
Input (kg/ML), , , ,
Output (kg/ML), , , ,
Total Nitrogen Transfer Function
Enabled,True,True,True,True
Input (mg/L),0,0,0,0
Output (mg/L),0,0,0,0
Input (mg/L),50,50,50,50
Output (mg/L),25,25,26.5,26.5
Input (mg/L), , , ,
Output (mg/L), , , ,
Input (mg/L), , , ,
Output (mg/L), , , ,
Input (mg/L), , , ,
Output (mg/L), , , ,
Input (mg/L), , , ,
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Output (mg/L), , , ,
Input (mg/L), , , ,
Output (mg/L), , , ,
Input (mg/L), , , ,
Output (mg/L), , , ,
Input (mg/L), , , ,
Output (mg/L), , , ,
Input (mg/L), , , ,
Output (mg/L), , , ,
Total Phosphorus Transfer Function
Enabled,True,True,True,True
Input (mg/L),0,0,0,0
Output (mg/L),0,0,0,0
Input (mg/L),10,10,5,5
Output (mg/L),3.5,3.5,1.55,1.55
Input (mg/L), , , ,
Output (mg/L), , , ,
Input (mg/L), , , ,
Output (mg/L), , , ,
Input (mg/L), , , ,
Output (mg/L), , , ,
Input (mg/L), , , ,
Output (mg/L), , , ,
Input (mg/L), , , ,
Output (mg/L), , , ,
Input (mg/L), , , ,
Output (mg/L), , , ,
Input (mg/L), , , ,
Output (mg/L), , , ,
Input (mg/L), , , ,
Output (mg/L), , , ,
Total Suspended Solids Transfer Function
Enabled,True,True,True,True
Input (mg/L),0,0,0,0
Output (mg/L),0,0,0,0
Input (mg/L),1000,1000,1000,1000
Output (mg/L),140,140,290,290
Input (mg/L), , , ,
Output (mg/L), , , ,
Input (mg/L), , , ,
Output (mg/L), , , ,
Input (mg/L), , , ,
Output (mg/L), , , ,
Input (mg/L), , , ,
Output (mg/L), , , ,
Input (mg/L), , , ,
Output (mg/L), , , ,
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,Off,Off
TSS Flow based Efficiency, , , ,
TP Flow based Efficiency Enabled,Off,Off,Off,Off
TP Flow based Efficiency, , , ,
TN Flow based Efficiency Enabled,Off,Off,Off,Off
TN Flow based Efficiency, , , ,
GP Flow based Efficiency Enabled,Off,Off,Off,Off
GP Flow based Efficiency, , , ,
IN - Mean Annual Flow (ML/yr),22.3,12.2,12.8,25.4
IN - TSS Mean Annual Load (kg/yr),347,309,1.12E3,1.41E3
IN - TP Mean Annual Load (kg/yr),1.07,0.932,3.16,4.03
IN - TN Mean Annual Load (kg/yr),20.7,15.6,31.0,45.3
IN - Gross Pollutant Mean Annual Load (kg/yr),15.6,16.5,364,373
OUT - Mean Annual Flow (ML/yr),22.3,12.2,12.8,25.4
OUT - TSS Mean Annual Load (kg/yr),293,250,366,558
OUT - TP Mean Annual Load (kg/yr),0.930,0.787,1.08,1.66
OUT - TN Mean Annual Load (kg/yr),18.6,13.7,17.1,26.9
OUT - Gross Pollutant Mean Annual Load (kg/yr),10.3,9.86,22.0,38.8
Flow In (ML/yr),22.2765,12.2302,12.8154,25.3755
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),17.4716,9.16702,0.585162,3.10262
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Orifice / Filter Out (ML/yr),0,0,0,0
Weir Out (ML/yr),0,0,0,0
Transfer Function Out (ML/yr),4.82789,3.07642,12.2302,22.2765
Reuse Supplied (ML/yr),0,0,0,0
Reuse Requested (ML/yr),0,0,0,0
% Reuse Demand Met,0,0,0,0
% Load Reduction,-0.103386,-0.108071,-0.000253811,-0.0142562
TSS Flow In (kg/yr),345.959,308.802,1121.06,1403.88
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),284.286,240.588,56.3943,211.278
TSS Orifice / Filter Out (kg/yr),0,0,0,0
TSS Weir Out (kg/yr),0,0,0,0
TSS Transfer Function Out (kg/yr),8.70839,9.61237,308.802,345.959
TSS Reuse Supplied (kg/yr),0,0,0,0
TSS Reuse Requested (kg/yr),0,0,0,0
TSS % Reuse Demand Met,0,0,0,0
TSS % Load Reduction,15.3095,18.9772,67.4242,60.3075
TP Flow In (kg/yr),1.0648,0.930834,3.15344,4.02404
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),0.856265,0.708971,0.150559,0.590441
TP Orifice / Filter Out (kg/yr),0,0,0,0
TP Weir Out (kg/yr),0,0,0,0
TP Transfer Function Out (kg/yr),0.0734616,0.0780476,0.930834,1.0648
TP Reuse Supplied (kg/yr),0,0,0,0
TP Reuse Requested (kg/yr),0,0,0,0
TP % Reuse Demand Met,0,0,0,0
TP % Load Reduction,12.6856,15.4502,65.7075,58.8661
TN Flow In (kg/yr),20.6889,15.593,30.9084,45.2113
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),16.4845,11.7282,1.48983,6.17874
TN Orifice / Filter Out (kg/yr),0,0,0,0
TN Weir Out (kg/yr),0,0,0,0
TN Transfer Function Out (kg/yr),2.11591,1.9417,15.593,20.6889
TN Reuse Supplied (kg/yr),0,0,0,0
TN Reuse Requested (kg/yr),0,0,0,0
TN % Reuse Demand Met,0,0,0,0
TN % Load Reduction,10.0948,12.3336,44.7305,40.5732
GP Flow In (kg/yr),15.6024,16.4864,364.219,372.707
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),10.2283,9.81671,5.49645,23.2139
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),0.0319915,0.0422282,16.4864,15.6024
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,34.4441,40.4556,98.4909,93.7715

Other nodes
Location,Post-Development Node,Pre-Development Node
ID,5,6
Node Type,PostDevelopmentNode,PreDevelopmentNode
IN - Mean Annual Flow (ML/yr),25.4,13.4
IN - TSS Mean Annual Load (kg/yr),504,2.22E3
IN - TP Mean Annual Load (kg/yr),1.52,4.87
IN - TN Mean Annual Load (kg/yr),24.8,36.8
IN - Gross Pollutant Mean Annual Load (kg/yr),33.5,390
OUT - Mean Annual Flow (ML/yr),25.4,13.4
OUT - TSS Mean Annual Load (kg/yr),504,2.22E3
OUT - TP Mean Annual Load (kg/yr),1.52,4.87
OUT - TN Mean Annual Load (kg/yr),24.8,36.8
OUT - Gross Pollutant Mean Annual Load (kg/yr),33.5,390
% Load Reduction,0.941,0.00
TSS % Load Reduction,80.1,0.00
TN % Load Reduction,60.8,0.00
TP % Load Reduction,77.2,0.00
GP % Load Reduction,95.4,0.00
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Links
Location,Drainage Link,Drainage Link,Drainage Link,Drainage Link,Drainage Link,Drainage Link,Drainage Link,Drainage Link,Secondary Drainage Link,Drainage Link,Drainage Link,Drainage Link,Secondary Drainage Link
Source node ID,1,2,4,8,10,12,9,11,12,3,7,13,13
Target node ID,6,3,5,10,12,11,12,13,13,13,13,4,5
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
Muskingum K, , , , , , , , , , , , ,
Muskingum theta, , , , , , , , , , , , ,
IN - Mean Annual Flow
(ML/yr),13.4,5.68,22.3,5.70,5.58,12.2,7.25,12.2,0.585,5.56,7.02,22.3,3.10
IN - TSS Mean Annual Load
(kg/yr),2.22E3,1.07E3,293,1.09E3,933,309,190,250,56.4,917,183,347,211
IN - TP Mean Annual Load
(kg/yr),4.87,2.22,0.930,2.26,2.05,0.932,1.11,0.787,0.151,2.01,1.08,1.07,0.590
IN - TN Mean Annual Load
(kg/yr),36.8,15.9,18.6,16.1,15.0,15.6,15.9,13.7,1.49,14.8,15.3,20.7,6.18
IN - Gross Pollutant Mean Annual Load
(kg/yr),390,174,10.3,174,174,16.5,190,9.86,5.50,173,184,15.6,23.2
OUT - Mean Annual Flow
(ML/yr),13.4,5.68,22.3,5.70,5.58,12.2,7.25,12.2,0.585,5.56,7.02,22.3,3.10
OUT - TSS Mean Annual Load
(kg/yr),2.22E3,1.07E3,293,1.09E3,933,309,190,250,56.4,917,183,347,211
OUT - TP Mean Annual Load
(kg/yr),4.87,2.22,0.930,2.26,2.05,0.932,1.11,0.787,0.151,2.01,1.08,1.07,0.590
OUT - TN Mean Annual Load
(kg/yr),36.8,15.9,18.6,16.1,15.0,15.6,15.9,13.7,1.49,14.8,15.3,20.7,6.18
OUT - Gross Pollutant Mean Annual Load
(kg/yr),390,174,10.3,174,174,16.5,190,9.86,5.50,173,184,15.6,23.2

Catchment Details
Catchment Name,7247 - SWR MHE (Kempsey Rainfall)
Timestep,6 Minutes
Start Date,11/04/2011
End Date,7/04/2021 11:54:00 PM
Rainfall Station, 042069 RAINMLB
ET Station,User-defined monthly PET
Mean Annual Rainfall (mm), 1028
Mean Annual ET (mm), 1384

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