Water Cycle Management Plan

Tangala Residential Subdivision

8141900501

Prepared for

Tovedale Developments

30 August 2019

Cardno

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1 Introduction

1.1 Background

Tovedale Developments has engaged Cardno NSW/ACT Pty Ltd (Cardno) to conduct a Water Cycle Management Plan (WCMP) for the proposed 50 lot residential subdivision at Tapitallee, NSW. Cardno previously prepared a WCMP to accompany the DA. This version of the WCMP incorporates the CC level design and Councils conditions of consent along with clarifications made during consultation between Cardno & Council, including the meetings on 15th April 2019 & 8th July 2019.

1.2 Site Description

The site, identified as 7 Bangalee Rd, Tapitallee (Lot 2, DP 609294) and 771 Illaroo Rd, Tapitallee (Lot 5, DP 609294), covers an area of approximately 30 Ha. The site is bounded to the north by Illaroo Rd, to the east by Bangalee Rd and to the south and west by heavily vegetated, undeveloped land. Bengalee Creek, a tributary to Shoalhaven River, is located approximately 600 m south west of the site.

1.3 Scope of work

The purpose of this assessment is to:

- Address Council comments regarding the site hydrology
- Ensure that peak flow rates do not exceed existing peak flow rates as a result of this development by provision of On-Site Detention (OSD) strategies.
- Determine the proposed approach for the site regarding stormwater design and hydrology

2 Hydrologic Model

The computer program Watershed Bounded Network Model (WBNM) was used to analyse the site hydrology. WBNM models have been developed for the site for both the existing and developed scenario's. Comparison of the two models allows for this assessment to size proposed mitigation measures.

2.1 Catchment Areas

The catchment areas were defined through analysis of detailed survey and Aerial Laser Scanning (ALS) elevation data, where detailed survey was not available. A total of 21 sub-catchment areas were defined resulting in 7 different discharge areas with a total charge points. A catchment plan is provided in **Appendix A**.

2.2 Impervious Percentage

The percentage of impervious land for each catchment was input into the WBNM models. Impervious fractions were calculated for the catchment based on aerial photography and plans for neighbouring development. Adopted impervious factors are presented in **Table 2-1.** An impervious value of 5% was adopted for existing land as per the DA submission. 55% was adopted for road assuming a 100% impervious road carriageway and approximately 9% impervious roadside verge and swales. The flow contributed from new roof areas are not considered. The stormwater quantity strategy uses attenuation tanks to reduce the flow rates from the roof area within each lot to the existing flow rate from the undeveloped land. Lot areas with attenuation tanks have an estimated impervious percentage of 10%, allowing for additional concreted areas, i.e. driveways

Table 2-1 Impervious Percentages

Land Use Type	Adopted Impervious Percentage (%)
Existing land	5
Road	55
Roof and Concrete	100
Driveway	95
Open Water	100
Lots (with attenuation)	10

2.3 Hydrological Parameters

Hydrological parameters adopted for the WBNM model are consistent with those used as part of the DA submission.

2.4 Rainfall Data

Rainfall data for the site was sourced from the Bureau of Meteorology (BOM). The data used to generate the design storm bursts in the WBNM model is presented in **Table 2-2**.

Table 2-2 Rainfall data

Parameter	Value
2 Year 1 Hour Intensity	47.34 mm/hr
2 Year 12 Hour Intensity	9.92 mm/hr
2 Year 72 Hour Intensity	3.41 mm/hr
50 Year 1 Hour Intensity	95.27 mm/hr
50 Year 12 Hour Intensity	22.57 mm/hr
50 Year 72 Hour Intensity	7.69 mm/hr
F2 Geographic Factor	4.27
F50 Geographic Factor	15.77
Location Skew Coefficient	0.02
% Roughness	0
Moisture Adjustment Factor	0.67

3 Stormwater Quantity Management

3.1 Council Comments

It is understood that Shoalhaven City Council are concerned that the proposed impervious areas will increase the flow rate of drainage to Illaroo Road and Bangalee Road, impacting on the existing drainage infrastructure. At Illaroo Road Council is specifically concerned about an increase in flow rates to the table drain at the western boundary of 108 Illaroo Road.

Through consultation with Shoalhaven City Council, Cardno has been informed by Council that additional flow can be discharged to the heavily vegetated area to the south-west of the site without the need for attenuation. Appropriate velocity reduction measures are to be implemented at these outlets.

3.2 Stormwater Quantity Strategy

The proposed site hydrology is designed to minimise the potential impacts on the existing drainage infrastructure on both Bangalee and Illaroo Roads. In order to achieve this, earthworks, attenuation tanks, swales and a pit and pipe networks have been designed to convey flows to suitable points of discharge.

Through earthworks, a portion of the existing catchment which drains towards Illaroo Road is to be redirected south-west towards the heavily vegetated area of the site. A portion of the existing catchment which drains to Bangalee Road are to also be redirected south-west towards the heavily vegetated area of the site via a swale in conjunction with a pit and pipe network.

It is noted that the flow rates to the heavily vegetated area to the south-west will exceed existings flows in the developed scenario. Due to the extent of the flow path and the lack of development around the Bengalee Creek, this change in flow rate is not expected to be detrimental.

3.2.1 Attenuation Tanks

In addition to the above measure, attenuation tanks are used to attenuate roof flows back to flow rates expected from existing un-developed land. A 5kL tank is to be used to attenuate at least 50% of a total roof area up to 600sq.m. A larger total roof area will require further assessment and attenuation by the lot owner. An out flow orifice size of each tank is to be 80mm in diameter. Detail on attenuation tanks calculations are provided in **Appendix C.**

Shoalhaven city council's sustainable stormwater technical guidelines, **section 4.1.2**. Attenuation Tank Methodology notes that up to 50% of the attenuation tank volume may be used for reuse.

The computer program Watershed Bounded Network Model (WBNM) was used to analyse the roof area attenuation independently of the site hydrology. The hydrological parameters and rainfall data used were consistent with the site hydrology assessment (**Section 2**).

Catchment areas were based on a maximum roof area of 600sq.m. The existing case assumed an impervious percentage of 0%. The developed case assumed an impervious percentage of 100%. In the developed case half of the catchment was directed into an attenuation tank while the remaining half bypassed the attenuation tank. The structure representing the attenuation tank was based on a 5KL tank with a diameter of 1.85m and an internal height of 2.05m. An orifice size of 80mm in diameter with an invert set at the bottom of the tank has been adopted.

3.2.1.1 Attenuation Tank Results

A comparison between existing scenario and proposed scenario flow rates is provided in **Table 3-1**. Results demonstrate that there is no increase in peak outflow from the roof areas using an attenuation tank.

Table 3-1 Comparison of Existing and Proposed Scenario Peak Outlow Rates from roof areas (m^3/s)

Case	Node	5 year ARI	20 year ARI	100 year ARI
Existing	EXIST	0.028	0.038	0.047
Proposed	HOMEOUT	0.027	0.036	0.045
Max tank water elevation (m)		1.078	1.43	1.776
Difference in Outflow (m3/s)		-0.001	-0.002	-0.002

3.2.2 Velocity and scour protection

At the outlets discharging towards the heavily vegetated area to the south-west of the site, scour protection has been considered. Additionally, any other outlets that have a velocity greater than 2m/s in the 100yr ARI event are also scour protected. Scour protection has been designed in accordance with the Catchments & Creeks Pty Ltd. Document “Rock sizing for single pipe outlets”. Scour protection detail is provided in the detailed design drawing set

4 Hydrology Results

4.1 Existing

Detailed analysis of the site Hydrology in the existing case is provided in **Appendix B**.

4.2 Developed

An assessment has been undertaken to size the minimum catchment areas which are required to be diverted away from Bangalee and Illaroo Roads in order to ensure developed flow rates do not exceed existing.

An analysis of proposed site Hydrology in the developed case is provided in **Appendix B**.

It was found that the development arrangement resulted in a diversion of 0.033Ha from the western to the eastern discharge point on Illaroo road. A further 0.171Ha was diverted away from the western discharge point on Illaroo road towards the heavily vegetated are to the south-west. A remaining 0.29Ha was diverted away from the eastern discharge point on Illaroo road towards the heavily vegetated are to the south-west. This resulted with the developed flow rates at both discharge points Along Illaroo road being less than existing. A comparison between existing scenario and proposed scenario flow rates to Illaroo road is provided in **Table 4-1** and **Table 4-2.**

Approximately 2.9Ha of the site is redirected from the outlets along Bangalee road towards the heavily vegetated area in the south-west of the site via a swale in conjunction with a pit and pipe network. This resulted with the developed flow rates at all discharge points along Bangalee road being less than existing. A comparison between existing scenario and proposed scenario flow rates to Bangalee road is provided in **Table 4-3** and **Table 4-4.**

Results demonstrate that there is no increase in peak flow rate to critical points defined by Shoalhaven Council.

Additional **Table 4-5** demonstrates that the developed case flows discharging to the South (on Road 3) are less than existing due to some minor catchments changes due to the development and a largely unchanged portion of bushland.

Table 4-1 Comparison of Existing and Proposed Scenario Peak Flow Rates to the culvert at 108 Illaroo Road (east) (m^3/s)

Case		5 year ARI	20 year ARI	100 year ARI
Existing	ILLAROO_EAST	2.814	3.876	4.998
Proposed	ILLAROO_EAST	2.812	3.861	4.962
Difference		-0.002	-0.015	-0.036

Table 4-2 Comparison of Existing and Proposed Scenario Peak Flow Rates to the culvert at 789 Illaroo Road (west) (m^3/s)

Case		5 year ARI	20 year ARI	100 year ARI
Existing	ILLAROO_WEST	0.760	1.044	1.342
Proposed	ILLAROO_WEST	0.732	1.003	1.283
Difference		-0.028	-0.041	-0.059

Table 4-3 Comparison of Existing and Proposed Scenario Peak Flow Rates to Bangalee Road (At lots 36-37) (m^3/s)

Case		5 year ARI	20 year ARI	100 year ARI
Existing	BANGALEE	2.600	3.570	4.581
Proposed	BANGALEE	1.911	2.604	3.307
Difference		-0.689	-0.966	-1.274

Table 4-4 Comparison of Existing and Proposed Scenario Peak Flow Rates to Bangalee Road (At lot 31). (m^3/s)

Case		5 year ARI	20 year ARI	100 year ARI
Existing	D2	0.701	0.962	1.233
Proposed	D2	0.671	0.916	1.169
Difference		-0.030	-0.046	-0.064

Table 4-5 Comparison of Existing and Proposed Scenario Peak Flow Rates at Road 03 (Sothern outlets). (m^3/s)

Case		5 year ARI	20 year ARI	100 year ARI
Existing	G1	0.696	0.948	1.206
Proposed	G1	0.680	0.924	1.171
Difference		-0.016	-0.024	-0.035

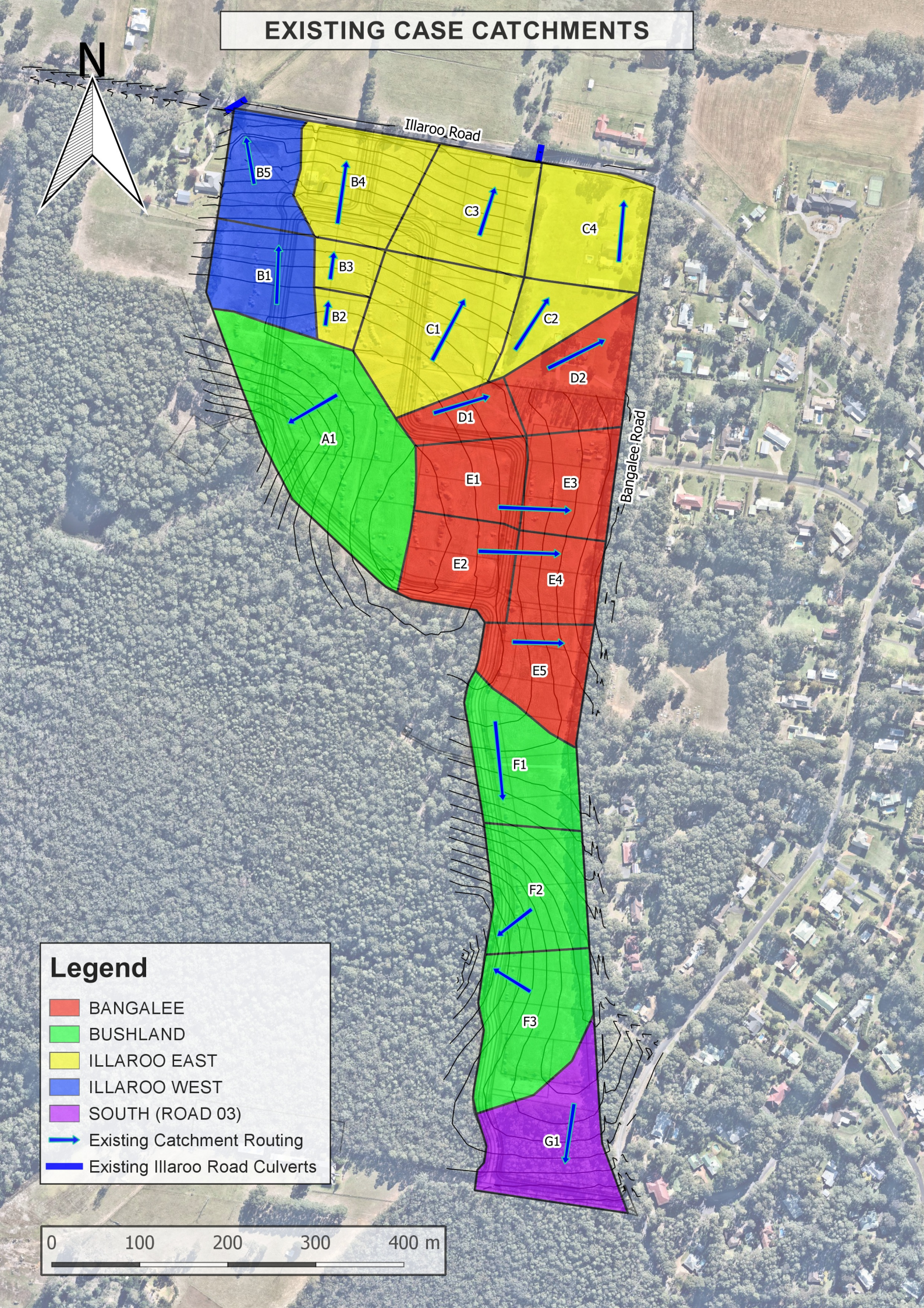
5 Conclusions

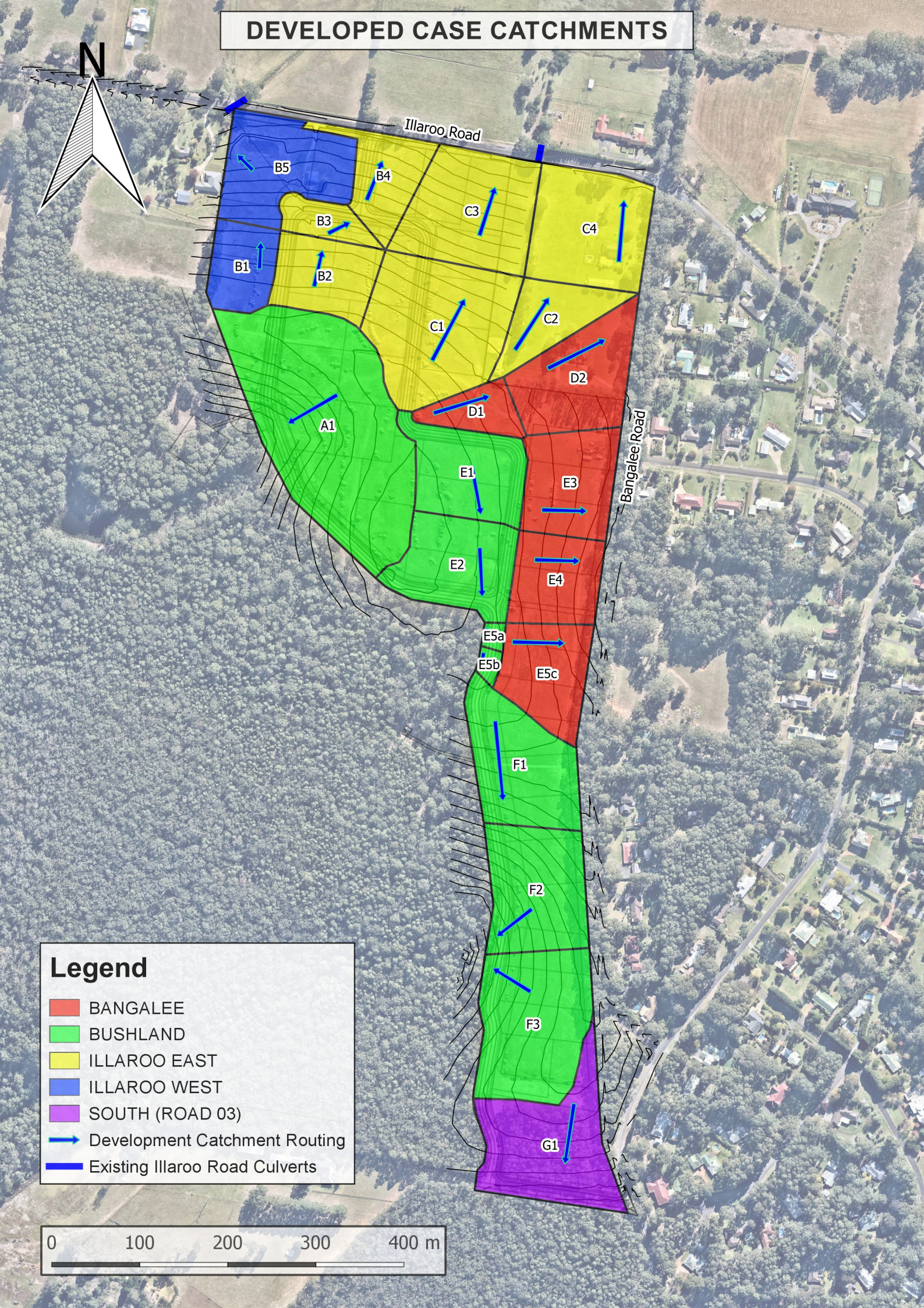
The following is concluded from this report:

- The proposed measures will reduce the developed flow rate to the existing open drain running through 108 Illaroo Road to less than existing flow rates.
- The proposed developed flowrate will be less than the existing flow rate directed toward the culvert crossing Illaroo road at lot 789
- The proposed measures will reduce the developed flow rate to Bangalee Road to less than existing flow rates
- The use of 5KL attenuation tanks for each lot has been adopted as part of the stormwater quantity strategy
- Discharge points towards the heavily vegetated area to the south-west of the site are to be protected from scour with rock lining to control velocity as detailed in the engineering plans.

APPENDIX A

CATCHMENT PLAN


EXISTING CASE CATCHMENTS
N
Illaroo Road
Bangalee Road
B5
B4
C3
C4
B1
B3
B2
C1
C2
D2
D1
A1
E1
E3
E2
E4
E5
F1
F2
F3
G1
Legend
BANGALEE
BUSHLAND
ILLAROO EAST
ILLAROO WEST
SOUTH (ROAD 03)
Existing Catchment Routing
Existing Illaroo Road Culverts
0
100
200
300
400 m


DEVELOPED CASE CATCHMENTS
N
Illaroo Road
Bangalee Road
B5
B4
B3
B2
B1
C3
C4
C2
C1
D2
D1
A1
E1
E3
E2
E4
E5a
E5b
E5c
F1
F2
F3
G1
Legend
BANGALEE
BUSHLAND
ILLAROO EAST
ILLAROO WEST
SOUTH (ROAD 03)
Development Catchment Routing
Existing Illaroo Road Culverts
0
100
200
300
400 m

APPENDIX B

WBNM OUTPUTS

2. Catchment Details

Steps 2.1 to 2.4: Enter Data for each Subarea in the Model, including Topology, Surface and Flowpath Blocks and Loss Details

Catchment Statistics

Total Area [ha]	30.4
Total Impervious Percent [%]	7.4
No. of Subareas	27
No. of Subareas with WC Factor	27

2.1 **Catchment Details**

Routing Options | Sort Subareas

2.2 **Lag Parameters**

Populate

2.3 **Flowpaths**

Populate

2.4 **Rainfall Losses**

Continuing Loss Rate | Populate

								1.6	0.1	R	1	0	2	0
Subarea Name	D/S Subarea	Area	CG Coords (MGA)		Outlet Coords (MGA)		Imp Fraction	C	Imp Lag	Type	Value	IL	CLR	Imp IL
		ha	E	N	E	N	%					mm	mm/hr	mm
A1	BUSH_NORTH	3.791	0	0	0	0	5	1.6	0.1	R	1	0	2	0
B1	B5	1.273	0	0	0	0	5	1.6	0.1	R	1	0	2	0
B2	B3	0.322	0	0	0	0	5	1.6	0.1	R	1	0	2	0
B3	B4	0.411	0	0	0	0	5	1.6	0.1	R	1	0	2	0
B4	ILLAROO_EAS	1.662	0	0	0	0	11.457	1.6	0.1	R	1	0	2	0
B5	ILLAROO_WES	1.11	0	0	0	0	13.04	1.6	0.1	R	1	0	2	0
C1	C3	2.473	0	0	0	0	5.134	1.6	0.1	R	1	0	2	0
C2	C4	0.825	0	0	0	0	8.237	1.6	0.1	R	1	0	2	0
C3	ILLAROO_EAS	1.819	0	0	0	0	7.434	1.6	0.1	R	1	0	2	0
C4	ILLAROO_EAS	1.71	0	0	0	0	16.337	1.6	0.1	R	1	0	2	0
D1	D2	0.681	0	0	0	0	5	1.6	0.1	R	1	0	2	0
D2	BANGALEE	1.447	0	0	0	0	9.124	1.6	0.1	R	1	0	2	0
E1	E3	1.102	0	0	0	0	5	1.6	0.1	R	1	0	2	0
E2	E4	1.281	0	0	0	0	5	1.6	0.1	R	1	0	2	0
E3	BANGALEE	1.204	0	0	0	0	5	1.6	0.1	R	1	0	2	0
E4	BANGALEE	1.001	0	0	0	0	5	1.6	0.1	R	1	0	2	0
E5	BANGALEE	1.263	0	0	0	0	5	1.6	0.1	R	1	0	2	0
F1	F2	1.567	0	0	0	0	6.959	1.6	0.1	R	1	0	2	0
F2	DUMMY_F	1.549	0	0	0	0	5	1.6	0.1	R	1	0	2	0
F3	DUMMY_F	1.918	0	0	0	0	5	1.6	0.1	R	1	0	2	0
G1	SINK	1.957	0	0	0	0	13.765	1.6	0.1	R	1	0	2	0
BUSH_NORTH	BUSH	0	0	0	0	0	0	1.6	0.1	R	1	0	2	0
ILLAROO_EAST	SINK	0	0	0	0	0	0	1.6	0.1	R	1	0	2	0
ILLAROO_WEST	SINK	0	0	0	0	0	0	1.6	0.1	R	1	0	2	0
BANGALEE	SINK	0	0	0	0	0	0	1.6	0.1	R	1	0	2	0
DUMMY_F	BUSH_SOUTH	0	0	0	0	0	0	1.6	0.1	R	1	0	2	0
BUSH_SOUTH	SINK	0	0	0	0	0	0	1.6	0.1	R	1	0	2	0

6. Results-Tables

ET Results
ET Strc on: CAT2
Inflow Peak (m3/s)

View Results in Tabular Format

Results for Runfile: \\aunowcfs03\Projects\FY19\005_Tangala Residential Subdivision\Des-

6.1 Results

View Results at Location: OUTLET Outflow

Storm No.	1	2	3	4	5
ARI	**5**	**20**	**100**		
Duration	90	90	90		
VOLUMES at Outlet [m3]					
A1	2586	3476	4655		
B1	880	1181	1580		
B2	223	300	402		
B3	507	681	913		
B4	1652	2218	2969		
B5	1644	2207	2953		
C1	1698	2281	3053		
C2	573	769	1028		
C3	2931	3940	5276		
C4	1753	2352	3146		
D1	473	634	848		
D2	1469	1972	2638		
E1	763	1023	1369		
E2	885	1188	1590		
E3	1588	2133	2855		
E4	1571	2111	2825		
E5	873	1172	1568		
F1	1083	1453	1944		
F2	2139	2874	3847		
F3	1321	1774	2374		
G1	1355	1818	2431		
BUSH_NORTH	2586	3476	4655		
ILLAROO_EAST	6336	8510	11391		
ILLAROO_WEST	1644	2207	2953		
BANGALEE	5501	7387	9887		
DUMMY_F	3460	4647	6221		
BUSH_SOUTH	3460	4647	6221		
PEAK FLOWRATES [m3/s]					
PEAK Stream Top					
A1	0	0	0		
B1	0	0	0		
B2	0	0	0		
B3	0.134	0.181	0.228		
B4	0.274	0.373	0.473		
B5	0.457	0.624	0.794		
C1	0	0	0		

C2	0	0	0
C3	0.807	1.108	1.42
C4	0.317	0.431	0.545
D1	0	0	0
D2	0.264	0.358	0.453
E1	0	0	0
E2	0	0	0
E3	0.403	0.55	0.698
E4	0.46	0.627	0.798
E5	0	0	0
F1	0	0	0
F2	0.553	0.755	0.962
F3	0	0	0
G1	0	0	0
BUSH_NORTH	1.15	1.585	2.042
ILLAROO_EAST	2.814	3.876	4.998
ILLAROO_WEST	0.76	1.044	1.342
BANGALEE	2.6	3.57	4.581
DUMMY_F	1.584	2.179	2.804
BUSH_SOUTH	1.584	2.179	2.804
PEAK Stream Bottom			
A1	0	0	0
B1	0	0	0
B2	0	0	0
B3	0.111	0.152	0.194
B4	0.205	0.284	0.369
B5	0.365	0.505	0.655
C1	0	0	0
C2	0	0	0
C3	0.632	0.88	1.151
C4	0.231	0.319	0.415
D1	0	0	0
D2	0.195	0.269	0.349
E1	0	0	0
E2	0	0	0
E3	0.316	0.437	0.567
E4	0.372	0.514	0.665
E5	0	0	0
F1	0	0	0
F2	0.429	0.593	0.773
F3	0	0	0
G1	0	0	0
BUSH_NORTH	1.15	1.585	2.042
ILLAROO_EAST	2.814	3.876	4.998
ILLAROO_WEST	0.76	1.044	1.342
BANGALEE	2.6	3.57	4.581
DUMMY_F	1.584	2.179	2.804
BUSH_SOUTH	1.584	2.179	2.804
PEAK Local Perv			
A1	1.058	1.462	1.89
B1	0.425	0.582	0.742
B2	0.126	0.171	0.215

B3	0.157	0.213	0.269
B4	0.503	0.689	0.881
B5	0.35	0.478	0.608
C1	0.745	1.025	1.318
C2	0.283	0.386	0.489
C3	0.564	0.774	0.991
C4	0.491	0.673	0.86
D1	0.246	0.335	0.425
D2	0.457	0.626	0.799
E1	0.376	0.513	0.653
E2	0.428	0.585	0.746
E3	0.405	0.554	0.706
E4	0.345	0.472	0.6
E5	0.422	0.578	0.737
F1	0.499	0.683	0.873
F2	0.503	0.689	0.881
F3	0.603	0.828	1.06
G1	0.565	0.775	0.992
BUSH_NORTH	0	0	0
ILLAROO_EAST	0	0	0
ILLAROO_WEST	0	0	0
BANGALEE	0	0	0
DUMMY_F	0	0	0
BUSH_SOUTH	0	0	0
PEAK Local Imp			
A1	0.092	0.123	0.151
B1	0.032	0.042	0.052
B2	0.008	0.011	0.013
B3	0.01	0.014	0.017
B4	0.093	0.124	0.153
B5	0.071	0.094	0.116
C1	0.062	0.083	0.102
C2	0.034	0.045	0.055
C3	0.066	0.088	0.108
C4	0.134	0.178	0.22
D1	0.017	0.023	0.028
D2	0.065	0.086	0.106
E1	0.028	0.037	0.045
E2	0.032	0.042	0.052
E3	0.03	0.04	0.049
E4	0.025	0.033	0.041
E5	0.032	0.042	0.052
F1	0.054	0.072	0.089
F2	0.039	0.051	0.063
F3	0.048	0.063	0.078
G1	0.13	0.173	0.214
BUSH_NORTH	0	0	0
ILLAROO_EAST	0	0	0
ILLAROO_WEST	0	0	0
BANGALEE	0	0	0
DUMMY_F	0	0	0
BUSH_SOUTH	0	0	0

PEAK Directed to Btm			
A1	0	0	0
B1	0	0	0
B2	0	0	0
B3	0	0	0
B4	0	0	0
B5	0	0	0
C1	0	0	0
C2	0	0	0
C3	0	0	0
C4	0	0	0
D1	0	0	0
D2	0	0	0
E1	0	0	0
E2	0	0	0
E3	0	0	0
E4	0	0	0
E5	0	0	0
F1	0	0	0
F2	0	0	0
F3	0	0	0
G1	0	0	0
BUSH_NORTH	0	0	0
ILLAROO_EAST	0	0	0
ILLAROO_WEST	0	0	0
BANGALEE	0	0	0
DUMMY_F	0	0	0
BUSH_SOUTH	0	0	0
PEAK OUTLET Inflow			
A1	1.15	1.585	2.042
B1	0.457	0.624	0.794
B2	0.134	0.181	0.228
B3	0.274	0.373	0.473
B4	0.778	1.068	1.369
B5	0.76	1.044	1.342
C1	0.807	1.108	1.42
C2	0.317	0.431	0.545
C3	1.198	1.662	2.16
C4	0.837	1.147	1.468
D1	0.264	0.358	0.453
D2	0.701	0.962	1.233
E1	0.403	0.55	0.698
E2	0.46	0.627	0.798
E3	0.728	1.002	1.289
E4	0.716	0.986	1.27
E5	0.454	0.62	0.788
F1	0.553	0.755	0.962
F2	0.933	1.289	1.666
F3	0.651	0.891	1.138
G1	0.696	0.948	1.206
BUSH_NORTH	1.15	1.585	2.042
ILLAROO_EAST	2.814	3.876	4.998

ILLAROO_WEST	0.76	1.044	1.342
BANGALEE	2.6	3.57	4.581
DUMMY_F	1.584	2.179	2.804
BUSH_SOUTH	1.584	2.179	2.804
PEAK OUTLET Outflow			
A1	1.15	1.585	2.042
B1	0.457	0.624	0.794
B2	0.134	0.181	0.228
B3	0.274	0.373	0.473
B4	0.778	1.068	1.369
B5	0.76	1.044	1.342
C1	0.807	1.108	1.42
C2	0.317	0.431	0.545
C3	1.198	1.662	2.16
C4	0.837	1.147	1.468
D1	0.264	0.358	0.453
D2	0.701	0.962	1.233
E1	0.403	0.55	0.698
E2	0.46	0.627	0.798
E3	0.728	1.002	1.289
E4	0.716	0.986	1.27
E5	0.454	0.62	0.788
F1	0.553	0.755	0.962
F2	0.933	1.289	1.666
F3	0.651	0.891	1.138
G1	0.696	0.948	1.206
BUSH_NORTH	1.15	1.585	2.042
ILLAROO_EAST	2.814	3.876	4.998
ILLAROO_WEST	0.76	1.044	1.342
BANGALEE	2.6	3.57	4.581
DUMMY_F	1.584	2.179	2.804
BUSH_SOUTH	1.584	2.179	2.804
TIME to Peaks [mins]			
TIME Stream Top			
A1	0	0	0
B1	0	0	0
B2	0	0	0
B3	30	30	30
B4	30	30	30
B5	30	30	30
C1	0	0	0
C2	0	0	0
C3	30	30	30
C4	30	30	30
D1	0	0	0
D2	30	30	30
E1	0	0	0
E2	0	0	0
E3	30	30	30
E4	30	30	30
E5	0	0	0

F1	0	0	0
F2	30	30	30
F3	0	0	0
G1	0	0	0
BUSH_NORTH	30	30	30
ILLAROO_EAST	30	30	30
ILLAROO_WEST	30	30	30
BANGALEE	30	30	30
DUMMY_F	30	30	30
BUSH_SOUTH	30	30	30
TIME Stream Bottom			
A1	0	0	0
B1	0	0	0
B2	0	0	0
B3	31	31	31
B4	34	33	33
B5	32	32	32
C1	0	0	0
C2	0	0	0
C3	33	33	33
C4	33	32	32
D1	0	0	0
D2	33	32	32
E1	0	0	0
E2	0	0	0
E3	32	32	32
E4	32	32	32
E5	0	0	0
F1	0	0	0
F2	33	32	32
F3	0	0	0
G1	0	0	0
BUSH_NORTH	30	30	30
ILLAROO_EAST	30	30	30
ILLAROO_WEST	30	30	30
BANGALEE	30	30	30
DUMMY_F	30	30	30
BUSH_SOUTH	30	30	30
TIME Local Perv			
A1	30	30	30
B1	30	30	30
B2	30	30	30
B3	30	30	30
B4	30	30	30
B5	30	30	30
C1	30	30	30
C2	30	30	30
C3	30	30	30
C4	30	30	30
D1	30	30	30
D2	30	30	30
E1	30	30	30

E2	30	30	30
E3	30	30	30
E4	30	30	30
E5	30	30	30
F1	30	30	30
F2	30	30	30
F3	30	30	30
G1	30	30	30
BUSH_NORTH	0	0	0
ILLAROO_EAST	0	0	0
ILLAROO_WEST	0	0	0
BANGALEE	0	0	0
DUMMY_F	0	0	0
BUSH_SOUTH	0	0	0
TIME Local Imp			
A1	30	30	30
B1	30	30	30
B2	30	30	30
B3	30	30	30
B4	30	30	30
B5	30	30	30
C1	30	30	30
C2	30	30	30
C3	30	30	30
C4	30	30	30
D1	30	30	30
D2	30	30	30
E1	30	30	30
E2	30	30	30
E3	30	30	30
E4	30	30	30
E5	30	30	30
F1	30	30	30
F2	30	30	30
F3	30	30	30
G1	30	30	30
BUSH_NORTH	0	0	0
ILLAROO_EAST	0	0	0
ILLAROO_WEST	0	0	0
BANGALEE	0	0	0
DUMMY_F	0	0	0
BUSH_SOUTH	0	0	0
TIME Directed to Btm			
A1	0	0	0
B1	0	0	0
B2	0	0	0
B3	0	0	0
B4	0	0	0
B5	0	0	0
C1	0	0	0
C2	0	0	0
C3	0	0	0

C4	0	0	0
D1	0	0	0
D2	0	0	0
E1	0	0	0
E2	0	0	0
E3	0	0	0
E4	0	0	0
E5	0	0	0
F1	0	0	0
F2	0	0	0
F3	0	0	0
G1	0	0	0
BUSH_NORTH	0	0	0
ILLAROO_EAST	0	0	0
ILLAROO_WEST	0	0	0
BANGALEE	0	0	0
DUMMY_F	0	0	0
BUSH_SOUTH	0	0	0
TIME OUTLET Inflow			
A1	30	30	30
B1	30	30	30
B2	30	30	30
B3	30	30	30
B4	30	30	30
B5	30	30	30
C1	30	30	30
C2	30	30	30
C3	30	30	30
C4	30	30	30
D1	30	30	30
D2	30	30	30
E1	30	30	30
E2	30	30	30
E3	30	30	30
E4	30	30	30
E5	30	30	30
F1	30	30	30
F2	30	30	30
F3	30	30	30
G1	30	30	30
BUSH_NORTH	30	30	30
ILLAROO_EAST	30	30	30
ILLAROO_WEST	30	30	30
BANGALEE	30	30	30
DUMMY_F	30	30	30
BUSH_SOUTH	30	30	30
TIME OUTLET Outflow			
A1	30	30	30
B1	30	30	30
B2	30	30	30
B3	30	30	30
B4	30	30	30

B5	30	30	30
C1	30	30	30
C2	30	30	30
C3	30	30	30
C4	30	30	30
D1	30	30	30
D2	30	30	30
E1	30	30	30
E2	30	30	30
E3	30	30	30
E4	30	30	30
E5	30	30	30
F1	30	30	30
F2	30	30	30
F3	30	30	30
G1	30	30	30
BUSH_NORTH	30	30	30
ILLAROO_EAST	30	30	30
ILLAROO_WEST	30	30	30
BANGALEE	30	30	30
DUMMY_F	30	30	30
BUSH_SOUTH	30	30	30

2. Catchment Details

Steps 2.1 to 2.4: Enter Data for each Subarea in the Model, including Topology, Surface and Flowpath Blocks and Loss Details

Catchment Statistics

Total Area [ha]	30.4
Total Impervious Percent [%]	16.5
No. of Subareas	29
No. of Subareas with WC Factor	29

2.1 **Catchment Details**

Routing Options | Sort Subareas

2.2 **Lag Parameters**

Populate

2.3 **Flowpaths**

Populate

2.4 **Rainfall Losses**

Continuing Loss Rate | Populate

								1.6	0.1	R	1	0	2	0	0
Subarea Name	D/S Subarea	Area	CG Coords (MGA)		Outlet Coords (MGA)		Imp Fraction	C	Imp Lag	Type	Value	IL	CLR	Imp IL	
		ha	E	N	E	N	%					mm	mm/hr	mm	
A1	BUSH_NORTH	4.187	0	0	0	0	16.751	1.6	0.1	R	1	0	2	0	
B1	B5	0.71	0	0	0	0	10	1.6	0.1	R	1	0	2	0	
B2	B3	0.975	0	0	0	0	17.033	1.6	0.1	R	1	0	2	0	
B3	B4	0.417	0	0	0	0	33.045	1.6	0.1	R	1	0	2	0	
B4	ILLAROO_EAS	0.876	0	0	0	0	29.835	1.6	0.1	R	1	0	2	0	
B5	ILLAROO_WES	1.482	0	0	0	0	12.485	1.6	0.1	R	1	0	2	0	
C1	C3	2.321	0	0	0	0	15.019	1.6	0.1	R	1	0	2	0	
C2	C4	0.825	0	0	0	0	8.237	1.6	0.1	R	1	0	2	0	
C3	ILLAROO_EAS	1.819	0	0	0	0	14.095	1.6	0.1	R	1	0	2	0	
C4	ILLAROO_EAS	1.711	0	0	0	0	16.337	1.6	0.1	R	1	0	2	0	
D1	D2	0.497	0	0	0	0	10.325	1.6	0.1	R	1	0	2	0	
D2	BANGALEE	1.447	0	0	0	0	14.35	1.6	0.1	R	1	0	2	0	
E1	E2	1.293	0	0	0	0	23.683	1.6	0.1	R	1	0	2	0	
E2	E5a	1.344	0	0	0	0	24.324	1.6	0.1	R	1	0	2	0	
E3	BANGALEE	1.211	0	0	0	0	10.461	1.6	0.1	R	1	0	2	0	
E4	BANGALEE	1.001	0	0	0	0	9.998	1.6	0.1	R	1	0	2	0	
E5a	E5b	0.074	0	0	0	0	42.182	1.6	0.1	R	1	0	2	0	
E5b	F1	0.092	0	0	0	0	40.653	1.6	0.1	R	1	0	2	0	
E5c	BANGALEE	1.098	0	0	0	0	9.993	1.6	0.1	R	1	0	2	0	

6. Results-Tables

ET Results
ET Strc on: CAT2
Inflow Peak (m3/s)

View Results in Tabular Format

Results for Runfile: \\aunowcfs03\Projects\FY19\005_Tangala Residential Subdivision\Des-

6.1 Results

View Results at Location: OUTLET Outflow

Storm No.	1	2	3	4	5
ARI	**5**	**20**	**100**		
Duration	90	90	90		
VOLUMES at Outlet [m3]					
A1	2880	3865	5170		
B1	494	662	885		
B2	680	911	1217		
B3	971	1301	1738		
B4	1581	2117	2829		
B5	1516	2034	2721		
C1	1606	2154	2880		
C2	573	769	1028		
C3	2848	3823	5115		
C4	1754	2353	3147		
D1	346	464	620		
D2	1347	1807	2416		
E1	904	1210	1616		
E2	1836	2459	3286		
E3	840	1127	1507		
E4	695	932	1247		
E5a	1885	2527	3376		
E5b	1948	2610	3488		
E5c	762	1022	1367		
F1	3017	4047	5412		
F2	4060	5452	7295		
F3	1405	1883	2517		
G1	1286	1723	2303		
BUSH_NORTH	2880	3865	5170		
ILLAROO_EAST	6183	8293	11090		
ILLAROO_WEST	1516	2034	2721		
BANGALEE	3644	4888	6537		
DUMMY_F	5465	7335	9812		
BUSH_SOUTH	5465	7335	9812		
PEAK FLOWRATES [m3/s]					
PEAK Stream Top					
A1	0	0	0		
B1	0	0	0		
B2	0	0	0		
B3	0.381	0.517	0.652		
B4	0.501	0.683	0.869		

B5	0.279	0.379	0.478
C1	0	0	0
C2	0	0	0
C3	0.811	1.107	1.409
C4	0.317	0.431	0.545
D1	0	0	0
D2	0.203	0.274	0.345
E1	0	0	0
E2	0.504	0.683	0.861
E3	0	0	0
E4	0	0	0
E5a	0.888	1.213	1.549
E5b	0.881	1.204	1.544
E5c	0	0	0
F1	0.895	1.228	1.576
F2	1.214	1.68	2.184
F3	0	0	0
G1	0	0	0
BUSH_NORTH	1.357	1.857	2.376
ILLAROO_EAST	2.812	3.861	4.962
ILLAROO_WEST	0.732	1.003	1.283
BANGALEE	1.911	2.604	3.307
DUMMY_F	2.208	3.06	3.979
BUSH_SOUTH	2.208	3.06	3.979
PEAK Stream Bottom			
A1	0	0	0
B1	0	0	0
B2	0	0	0
B3	0.33	0.451	0.577
B4	0.423	0.581	0.75
B5	0.205	0.283	0.367
C1	0	0	0
C2	0	0	0
C3	0.625	0.865	1.128
C4	0.231	0.319	0.415
D1	0	0	0
D2	0.145	0.201	0.259
E1	0	0	0
E2	0.389	0.534	0.688
E3	0	0	0
E4	0	0	0
E5a	0.857	1.172	1.499
E5b	0.865	1.187	1.525
E5c	0	0	0
F1	0.766	1.059	1.377
F2	1.091	1.513	1.985
F3	0	0	0
G1	0	0	0
BUSH_NORTH	1.357	1.857	2.376
ILLAROO_EAST	2.812	3.861	4.962
ILLAROO_WEST	0.732	1.003	1.283
BANGALEE	1.911	2.604	3.307

DUMMY_F	2.208	3.06	3.979
BUSH_SOUTH	2.208	3.06	3.979
PEAK Local Perv			
A1	1.03	1.423	1.839
B1	0.244	0.332	0.42
B2	0.3	0.409	0.519
B3	0.116	0.157	0.198
B4	0.236	0.321	0.406
B5	0.452	0.618	0.789
C1	0.645	0.886	1.136
C2	0.283	0.386	0.489
C3	0.53	0.726	0.928
C4	0.492	0.673	0.86
D1	0.177	0.24	0.303
D2	0.434	0.594	0.758
E1	0.357	0.487	0.62
E2	0.366	0.5	0.637
E3	0.387	0.529	0.673
E4	0.33	0.45	0.572
E5a	0.02	0.027	0.034
E5b	0.026	0.034	0.043
E5c	0.357	0.488	0.621
F1	0.446	0.61	0.778
F2	0.447	0.611	0.78
F3	0.567	0.777	0.995
G1	0.509	0.698	0.892
BUSH_NORTH	0	0	0
ILLAROO_EAST	0	0	0
ILLAROO_WEST	0	0	0
BANGALEE	0	0	0
DUMMY_F	0	0	0
BUSH_SOUTH	0	0	0
PEAK Local Imp			
A1	0.328	0.435	0.537
B1	0.035	0.047	0.058
B2	0.081	0.108	0.133
B3	0.068	0.09	0.111
B4	0.126	0.167	0.207
B5	0.09	0.12	0.148
C1	0.167	0.221	0.273
C2	0.034	0.045	0.055
C3	0.124	0.165	0.203
C4	0.135	0.179	0.22
D1	0.026	0.034	0.042
D2	0.101	0.135	0.166
E1	0.147	0.196	0.241
E2	0.157	0.208	0.257
E3	0.063	0.083	0.103
E4	0.05	0.066	0.081
E5a	0.016	0.021	0.026
E5b	0.019	0.025	0.031
E5c	0.054	0.072	0.089

F1	0.14	0.185	0.229
F2	0.129	0.172	0.212
F3	0.159	0.211	0.261
G1	0.171	0.226	0.28
BUSH_NORTH	0	0	0
ILLAROO_EAST	0	0	0
ILLAROO_WEST	0	0	0
BANGALEE	0	0	0
DUMMY_F	0	0	0
BUSH_SOUTH	0	0	0
PEAK Directed to Btm			
A1	0	0	0
B1	0	0	0
B2	0	0	0
B3	0	0	0
B4	0	0	0
B5	0	0	0
C1	0	0	0
C2	0	0	0
C3	0	0	0
C4	0	0	0
D1	0	0	0
D2	0	0	0
E1	0	0	0
E2	0	0	0
E3	0	0	0
E4	0	0	0
E5a	0	0	0
E5b	0	0	0
E5c	0	0	0
F1	0	0	0
F2	0	0	0
F3	0	0	0
G1	0	0	0
BUSH_NORTH	0	0	0
ILLAROO_EAST	0	0	0
ILLAROO_WEST	0	0	0
BANGALEE	0	0	0
DUMMY_F	0	0	0
BUSH_SOUTH	0	0	0
PEAK OUTLET Inflow			
A1	1.357	1.857	2.376
B1	0.279	0.379	0.478
B2	0.381	0.517	0.652
B3	0.501	0.683	0.869
B4	0.748	1.022	1.308
B5	0.732	1.003	1.283
C1	0.811	1.107	1.409
C2	0.317	0.431	0.545
C3	1.226	1.691	2.185
C4	0.838	1.147	1.469
D1	0.203	0.274	0.345

D2	0.671	0.916	1.169
E1	0.504	0.683	0.861
E2	0.888	1.213	1.549
E3	0.45	0.612	0.776
E4	0.379	0.515	0.653
E5a	0.881	1.204	1.544
E5b	0.895	1.228	1.576
E5c	0.412	0.56	0.709
F1	1.214	1.68	2.184
F2	1.482	2.072	2.723
F3	0.726	0.989	1.256
G1	0.68	0.924	1.171
BUSH_NORTH	1.357	1.857	2.376
ILLAROO_EAST	2.812	3.861	4.962
ILLAROO_WEST	0.732	1.003	1.283
BANGALEE	1.911	2.604	3.307
DUMMY_F	2.208	3.06	3.979
BUSH_SOUTH	2.208	3.06	3.979
PEAK OUTLET Outflow			
A1	1.357	1.857	2.376
B1	0.279	0.379	0.478
B2	0.381	0.517	0.652
B3	0.501	0.683	0.869
B4	0.748	1.022	1.308
B5	0.732	1.003	1.283
C1	0.811	1.107	1.409
C2	0.317	0.431	0.545
C3	1.226	1.691	2.185
C4	0.838	1.147	1.469
D1	0.203	0.274	0.345
D2	0.671	0.916	1.169
E1	0.504	0.683	0.861
E2	0.888	1.213	1.549
E3	0.45	0.612	0.776
E4	0.379	0.515	0.653
E5a	0.881	1.204	1.544
E5b	0.895	1.228	1.576
E5c	0.412	0.56	0.709
F1	1.214	1.68	2.184
F2	1.482	2.072	2.723
F3	0.726	0.989	1.256
G1	0.68	0.924	1.171
BUSH_NORTH	1.357	1.857	2.376
ILLAROO_EAST	2.812	3.861	4.962
ILLAROO_WEST	0.732	1.003	1.283
BANGALEE	1.911	2.604	3.307
DUMMY_F	2.208	3.06	3.979
BUSH_SOUTH	2.208	3.06	3.979
TIME to Peaks [mins]			
TIME Stream Top			
A1	0	0	0

B1	0	0	0
B2	0	0	0
B3	30	30	30
B4	30	30	30
B5	30	30	30
C1	0	0	0
C2	0	0	0
C3	30	30	30
C4	30	30	30
D1	0	0	0
D2	30	30	30
E1	0	0	0
E2	30	30	30
E3	0	0	0
E4	0	0	0
E5a	30	30	30
E5b	31	30	30
E5c	0	0	0
F1	31	31	31
F2	30	30	30
F3	0	0	0
G1	0	0	0
BUSH_NORTH	30	30	30
ILLAROO_EAST	30	30	30
ILLAROO_WEST	30	30	30
BANGALEE	30	30	30
DUMMY_F	30	30	30
BUSH_SOUTH	30	30	30
TIME Stream Bottom			
A1	0	0	0
B1	0	0	0
B2	0	0	0
B3	31	31	31
B4	33	32	32
B5	32	32	32
C1	0	0	0
C2	0	0	0
C3	33	32	32
C4	33	32	32
D1	0	0	0
D2	32	32	32
E1	0	0	0
E2	32	32	32
E3	0	0	0
E4	0	0	0
E5a	31	31	31
E5b	31	31	31
E5c	0	0	0
F1	35	34	34
F2	36	35	35
F3	0	0	0
G1	0	0	0

BUSH_NORTH	30	30	30
ILLAROO_EAST	30	30	30
ILLAROO_WEST	30	30	30
BANGALEE	30	30	30
DUMMY_F	30	30	30
BUSH_SOUTH	30	30	30

Tangala Residential Subdivision

APPENDIX

C

ATTENUATION TANK CALCULATIONS

2. Catchment Details

Steps 2.1 to 2.4: Enter Data for each Subarea in the Model, including Topology, Surface and Flowpath Blocks and Loss Details

Catchment Statistics

Total Area [ha]	0.1
Total Impervious Percent [%]	
No. of Subareas	5
No. of Subareas with WC Factor	5

2.1 **Catchment Details**

Routing Options | Sort Subareas

2.2 **Lag Parameters**

Populate

2.3 **Flowpaths**

Populate

2.4 **Rainfall Losses**

Continuing Loss Rate | Populate

								1.6	0.1	R	1	0	2	0
Subarea Name	D/S Subarea	Area	CG Coords (MGA)		Outlet Coords (MGA)		Imp Fraction	C	Imp Lag	Type	Value	IL	CLR	Imp IL
		ha	E	N	E	N	%					mm	mm/hr	mm
EXIST	SINK	0.06	0	0	0	0	0	1.6	0.1	R	1	0	2	0
HOMEBP	HOMEOUT	0.03	0	0	0	0	100	1.6	0.1	R	1	0	2	0
HOME	TANK5	0.03	0	0	0	0	100	1.6	0.1	R	1	0	2	0
TANK5	HOMEOUT	0	0	0	0	0	0	1.6	0.1	R	1	0	2	0
HOMEOUT	SINK	0	0	0	0	0	0	1.6	0.1	R	1	0	2	0

3. Local & Outlet Structures

Steps 3.1 to 3.3: Enter Data for each Structure in the Model (both outlet structures and local structures)

Structure Statistics

No. of Structures	1
No. of Outlet Structures	1
No. Local Structures	0

Populate after steps 3.2 & 3.3 (optional)

	Structure Summary					Local			Fuse	Basin Details			Directed Subareas				
3.1	Lock	ID	Subarea	Type	Description of Structure	Local / Out	%Per to LS	%Imp to LS	Fuse Plug	IWL	Surf_Area	Stor_Fac	1	2	3	4	5
GOTO	TRUE	1	HOME	HS	TANK	OUTLET				0	0	1	TANK5				
GOTO	TRUE	2															
GOTO	TRUE	3															
GOTO	TRUE	4															
GOTO	TRUE	5															

Lock/Unlock ALL

Structure Templates

3.2 **Build Structure Templates From Structure Summary**

3.3 **Edit Individual Structure Templates**

TOP

ID	1	ID	2	ID	3
Weir	1	Weir	1	Weir	1
Subarea	TANK5	Subarea		Subarea	
Crest Elev.	2.05	Crest Elev.		Crest Elev.	
Length [m]	1	Length [m]		Length [m]	
Weir Coeff.	1.7	Weir Coeff.		Weir Coeff.	
Disch_Fac	1	Disch_Fac		Disch_Fac	
Blck_Time	0	Blck_Time		Blck_Time	
Directed to	TOP	Directed to		Directed to	
Delay [mins]	0	Delay [mins]		Delay [mins]	
Pipe/Box	1	Pipe/Box	1	Pipe/Box	1
Subarea	TANK5	Subarea		Subarea	
Invert	0	Invert		Invert	
No.	1	No.		No.	
Ent. Type	1	Ent. Type		Ent. Type	
Dia / Width	80	Dia / Width		Dia / Width	
Height		Height		Height	
Disch_Fac	1	Disch_Fac		Disch_Fac	
Blck_Time		Blck_Time		Blck_Time	
Directed to	TOP	Directed to		Directed to	
Delay [mins]	0	Delay [mins]		Delay [mins]	
Ent. Coeff		Ent. Coeff		Ent. Coeff	
Length [m]		Length [m]		Length [m]	
Out Invert		Out Invert		Out Invert	
n		n		n	
HSQ	1	HSQ	1	HSQ	1
Sub		Sub		Sub	
DFactor		DFactor		DFactor	
Btime		Btime		Btime	
T/B		T/B		T/B	
Delay		Delay		Delay	

H	S	H	Q	H	S	Q1	Q2	Q3	Q4	Q5	H	S	Q1	Q2	Q3	Q4	Q5
m	m3	m	m3/s	m	m3	m3/s	m3/s	m3/s	m3/s	m3/s	m	m3	m3/s	m3/s	m3/s	m3/s	m3/s
0	0																
2.05	5																
2.25	5.2																

6. Results-Tables

ET Results
ET Strc on: CAT2
Inflow Peak (m3/s)

View Results in Tabular Format

Results for Runfile: \\aunowcfs03\Projects\FY19\005_Tangala Residential Subdivision\Des-

6.1 Results

View Results at Location: OUTLET Outflow

Storm No.	1	2	3	4	5
ARI	**5**	**20**	**100**		
Duration	90	90	90		
VOLUMES at Outlet [m3]					
EXIST	41	56	74		
HOMEBP	21	29	38		
HOME	21	29	38		
TANK5	21	29	38		
HOMEOUT	42	58	76		
PEAK FLOWRATES [m3/s]					
PEAK Stream Top					
EXIST	0	0	0		
HOMEBP	0	0	0		
HOME	0	0	0		
TANK5	0.012	0.016	0.02		
HOMEOUT	0.027	0.036	0.045		
PEAK Stream Bottom					
EXIST	0	0	0		
HOMEBP	0	0	0		
HOME	0	0	0		
TANK5	0.012	0.016	0.02		
HOMEOUT	0.027	0.036	0.045		
PEAK Local Perv					
EXIST	0.028	0.038	0.047		
HOMEBP	0	0	0		
HOME	0	0	0		
TANK5	0	0	0		
HOMEOUT	0	0	0		
PEAK Local Imp					
EXIST	0	0	0		
HOMEBP	0.015	0.02	0.025		
HOME	0.015	0.02	0.025		
TANK5	0	0	0		
HOMEOUT	0	0	0		
PEAK Directed to Btm					
EXIST	0	0	0		
HOMEBP	0	0	0		
HOME	0	0	0		
TANK5	0	0	0		
HOMEOUT	0	0	0		
PEAK OUTLET Inflow					
EXIST	0.028	0.038	0.047		

HOMEBP	0.015	0.02	0.025
HOME	0.015	0.02	0.025
TANK5	0.012	0.016	0.02
HOMEOUT	0.027	0.036	0.045
PEAK OUTLET Outflow			
EXIST	0.028	0.038	0.047
HOMEBP	0.015	0.02	0.025
HOME	0.012	0.016	0.02
TANK5	0.012	0.016	0.02
HOMEOUT	0.027	0.036	0.045
TIME to Peaks [mins]			
TIME Stream Top			
EXIST	0	0	0
HOMEBP	0	0	0
HOME	0	0	0
TANK5	30	30	30
HOMEOUT	30	30	30
TIME Stream Bottom			
EXIST	0	0	0
HOMEBP	0	0	0
HOME	0	0	0
TANK5	30	30	30
HOMEOUT	30	30	30
TIME Local Perv			
EXIST	30	30	30
HOMEBP	0	0	0
HOME	0	0	0
TANK5	0	0	0
HOMEOUT	0	0	0
TIME Local Imp			
EXIST	0	0	0
HOMEBP	30	30	30
HOME	30	30	30
TANK5	0	0	0
HOMEOUT	0	0	0
TIME Directed to Btm			
EXIST	0	0	0
HOMEBP	0	0	0
HOME	0	0	0
TANK5	0	0	0
HOMEOUT	0	0	0
TIME OUTLET Inflow			
EXIST	30	30	30
HOMEBP	30	30	30
HOME	30	30	30
TANK5	30	30	30
HOMEOUT	30	30	30
TIME OUTLET Outflow			
EXIST	30	30	30
HOMEBP	30	30	30
HOME	30	30	30
TANK5	30	30	30
HOMEOUT	30	30	30

OUTLET Results			
OUTLET Strc on: HOME			
Inflow Peak (m3/s)	0.015	0.02	0.025
Outflow Peak (m3/s)	0.012	0.016	0.02
Inflow Volume (m3)	21	29	38
Max Vol. Stored (m3)	3	3	4
Max Water Elevation (m)	1.078	1.43	1.776