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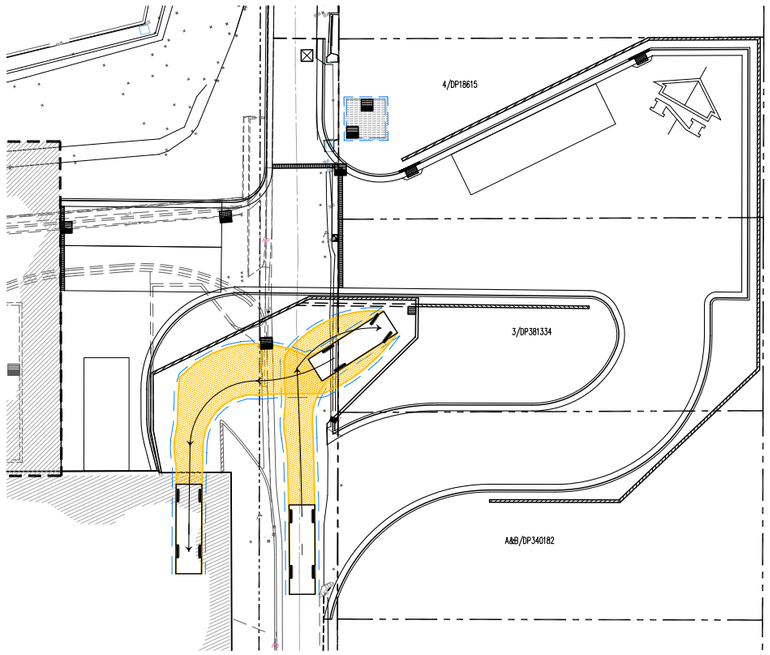

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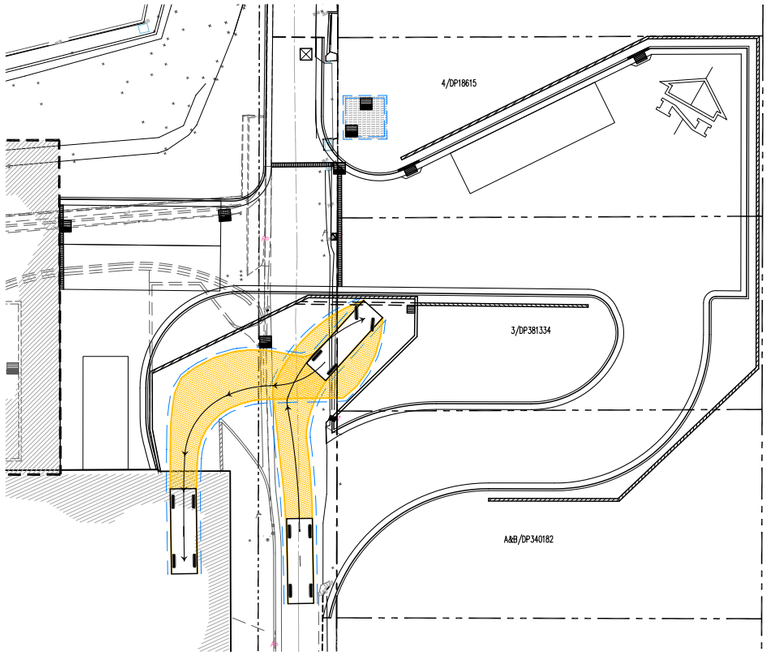

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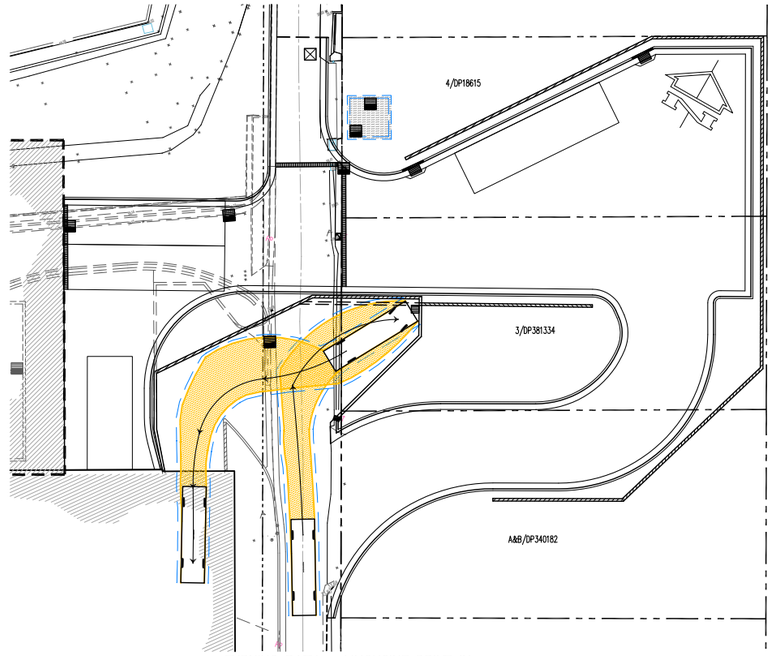

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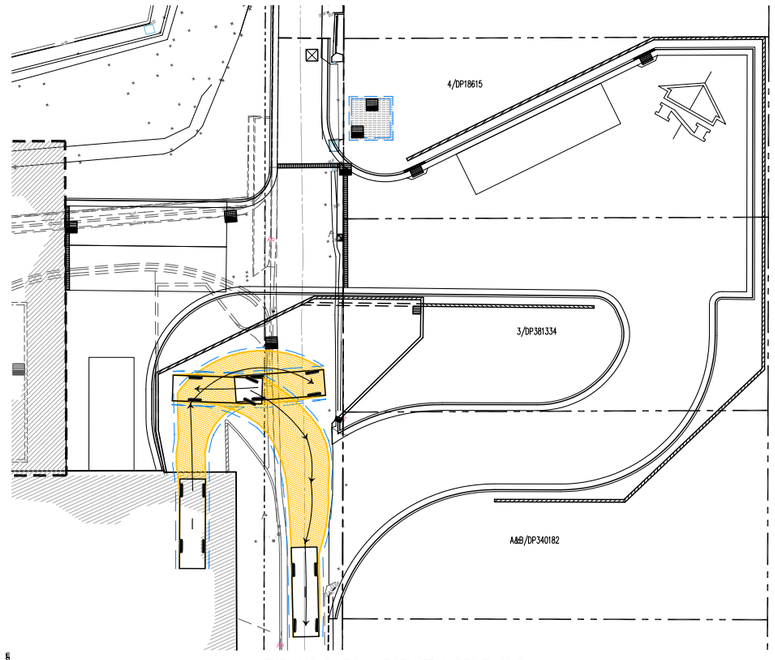

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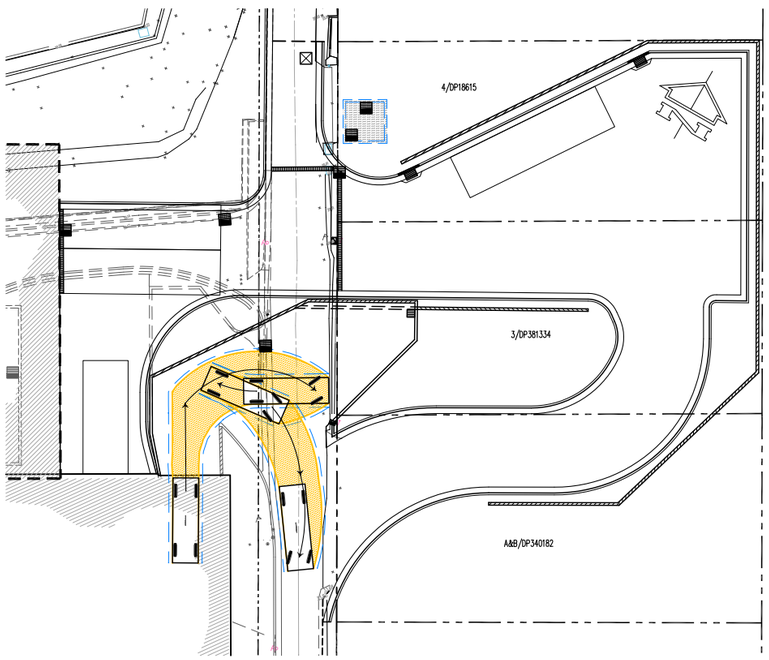

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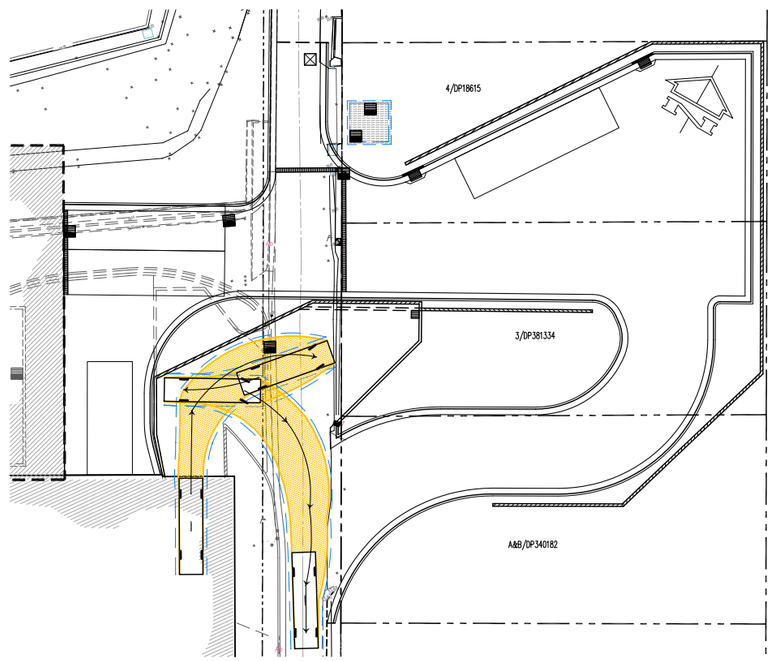

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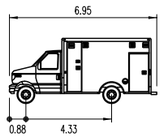

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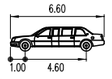

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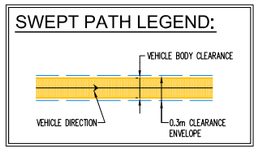

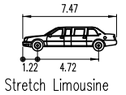

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Project: LISMORE BASE HOSPITAL REDEVELOPMENT
60 Uralba Street Lismore NSW 2480

Sheet Subject: STAGE 3B TURNING PATHS - MORTURAY

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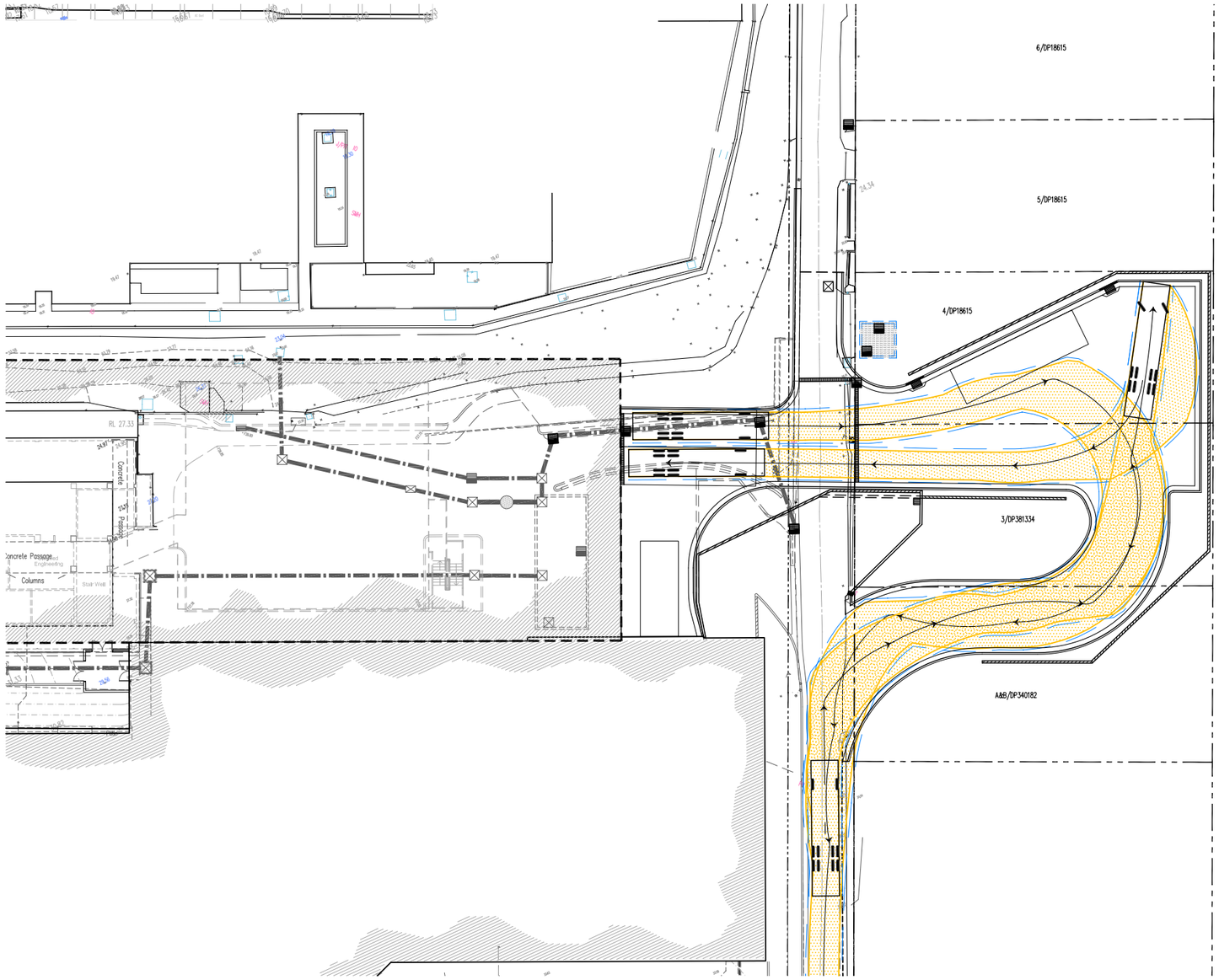

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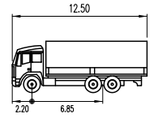

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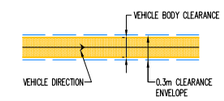

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Sheet Subject: STAGE 3B TURNING PATHS - LOADING TRUCK

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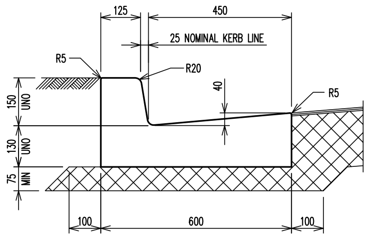

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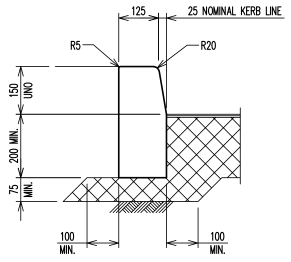

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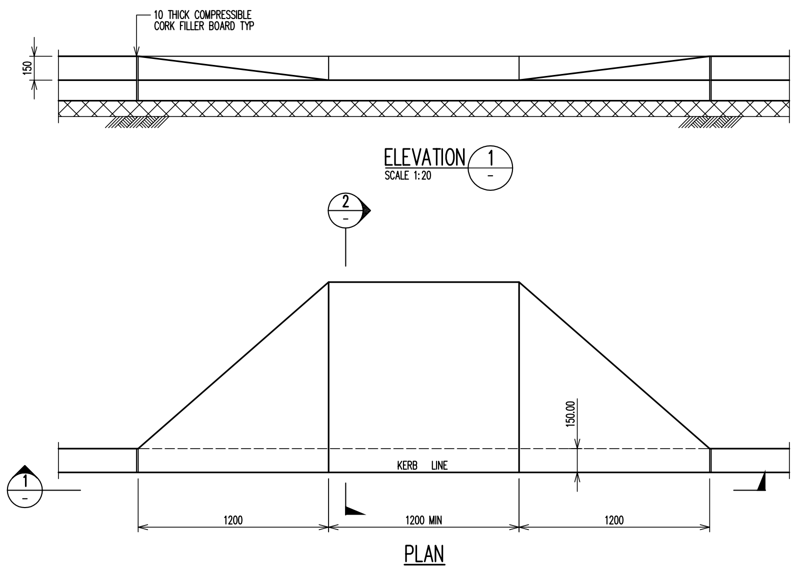

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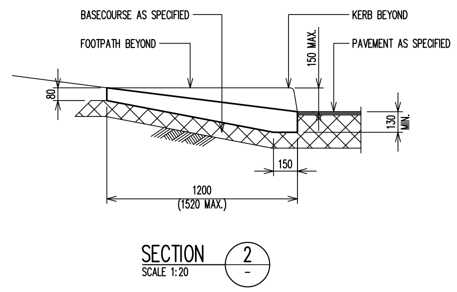

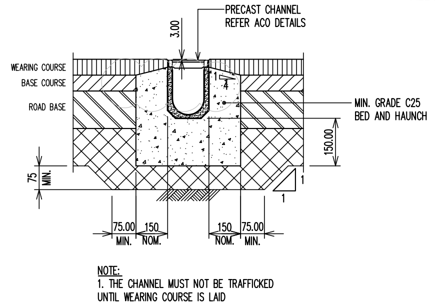

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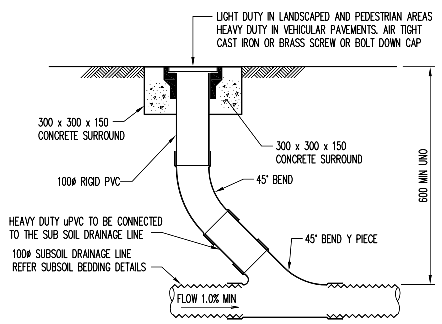

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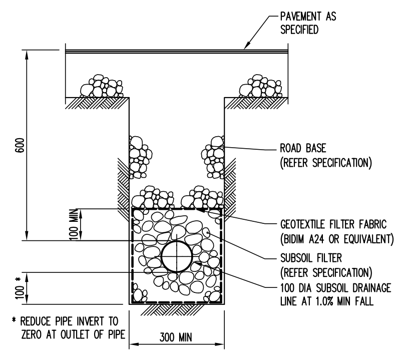

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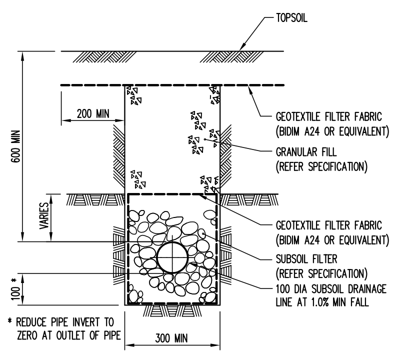

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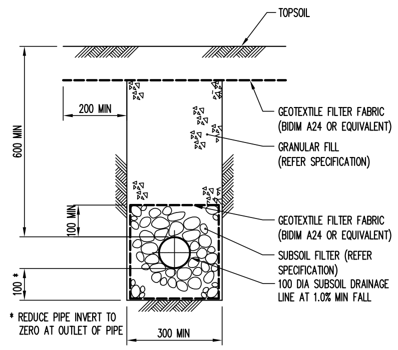

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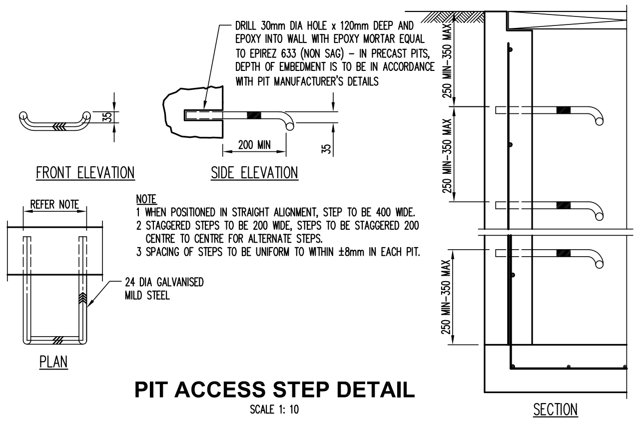

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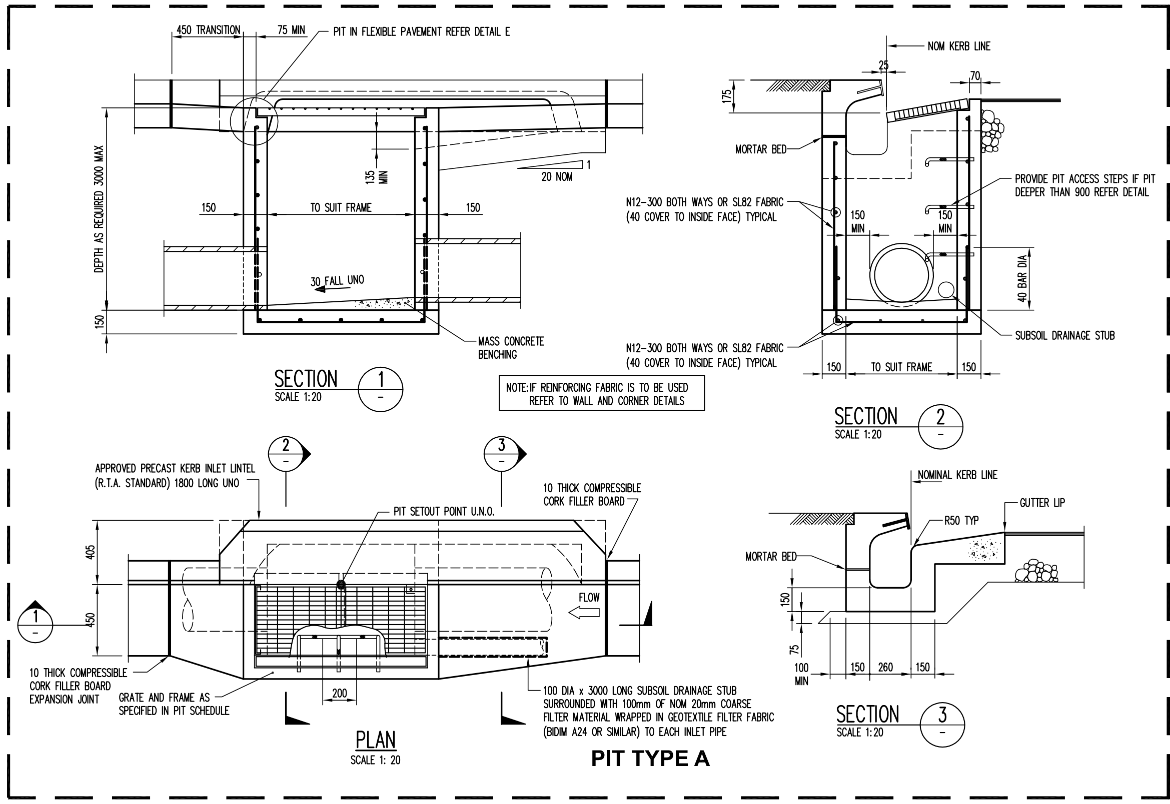

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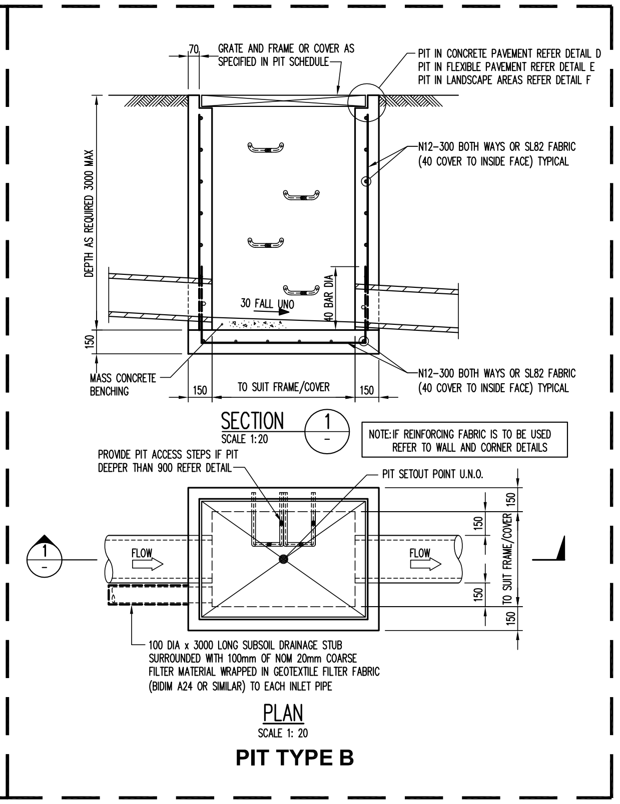

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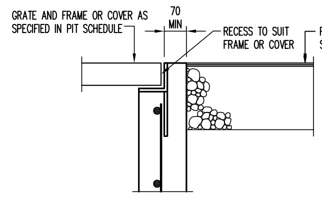

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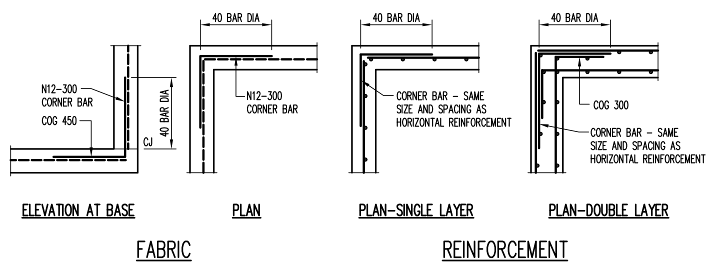

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Project: LISMORE BASE HOSPITAL REDEVELOPMENT, 60 Uralba Street Lismore NSW 2480

Sheet Subject: STAGE 3B DETAILS SHEET

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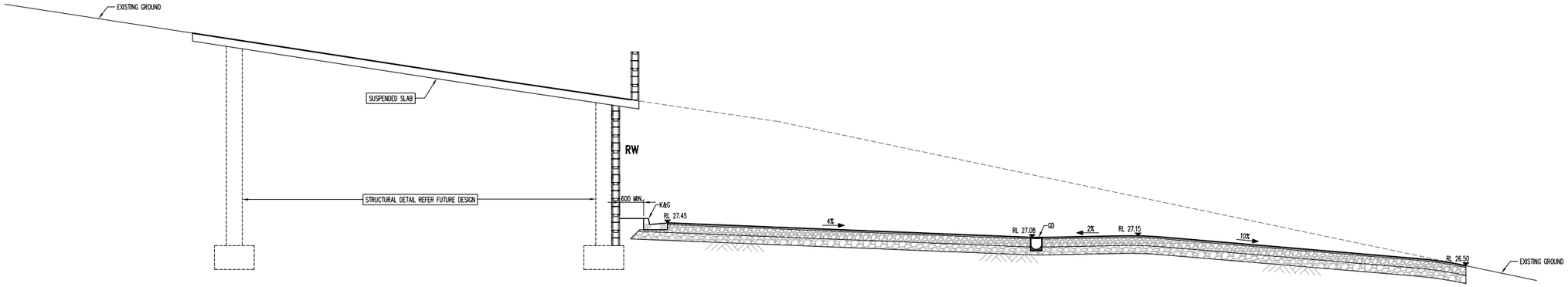

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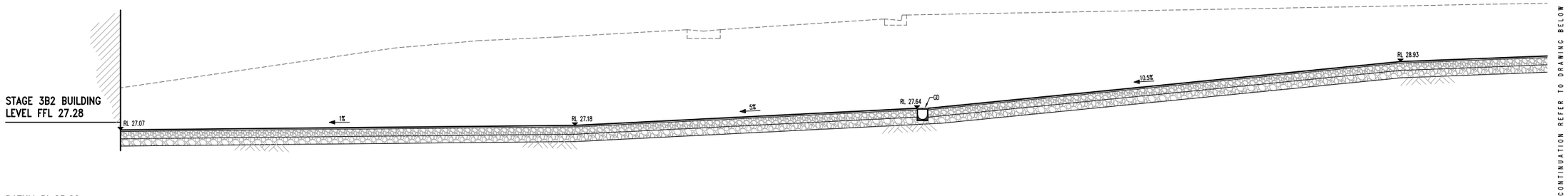

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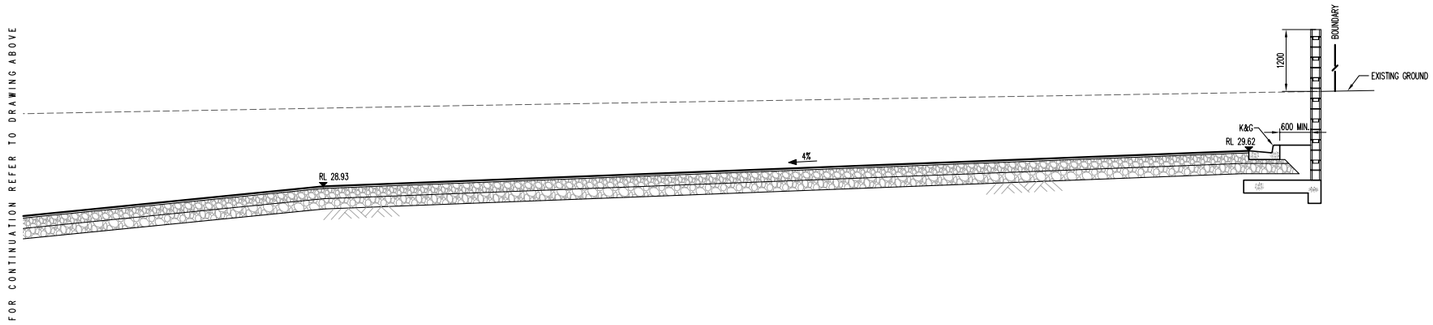

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60 Uralba Street Lismore NSW 2480

Sheet Subject: STAGE 3B SECTION SHEET 1

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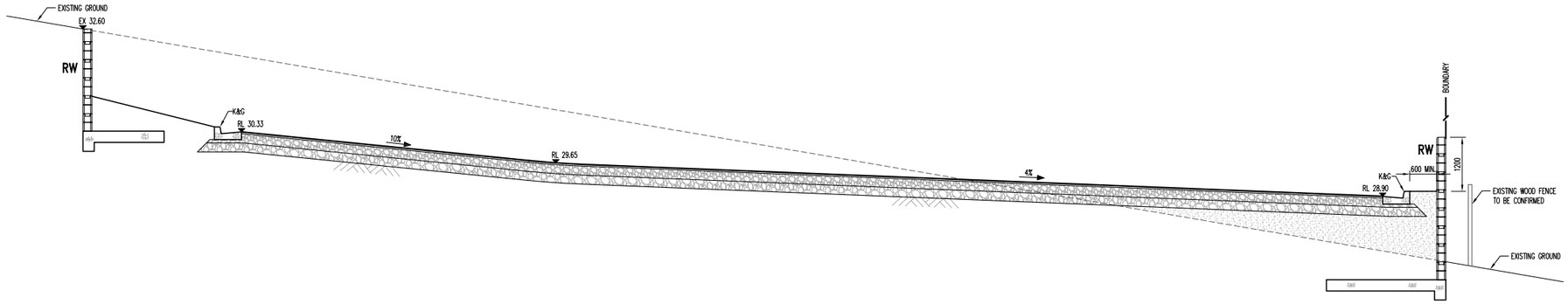

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Sheet Subject: STAGE 3B SECTION SHEET 1

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APPENDIX B

Stage 3A Stormwater Management Report

Civil

TTW TaylorThomsonWhitting

Stormwater Management DDR Report

Lismore Base Hospital Stage 3a Redevelopment

for Health Infrastructure

SEPTEMBER 2013

121204

Taylor Thomson Whitting (NSW) Pty Ltd Consulting Engineers ACN 113 578 377

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TABLE OF CONTENTS

1.0 INTRODUCTION

This stormwater management plan is submitted by Engineering Consultancy firm Taylor Thomson Whitting (TTW) who have been engaged by Health Infrastructure to investigate and design the stormwater for the Lismore Base Hospital Stage 3A redevelopment. The purpose of this plan is to satisfy Lismore City Council's requirements that the proposed development will not have an adverse impact on stormwater runoff for the existing site and the downstream catchment.

2.0 DEVELOPMENT SITE

Lismore Base Hospital is located in Lismore the Health Precinct which is approximately 2km north-east of the city centre. The redevelopment site is situated on the corner of Uralba and Little Uralba Streets and is part of the existing grounds of Lismore Base Hospital.

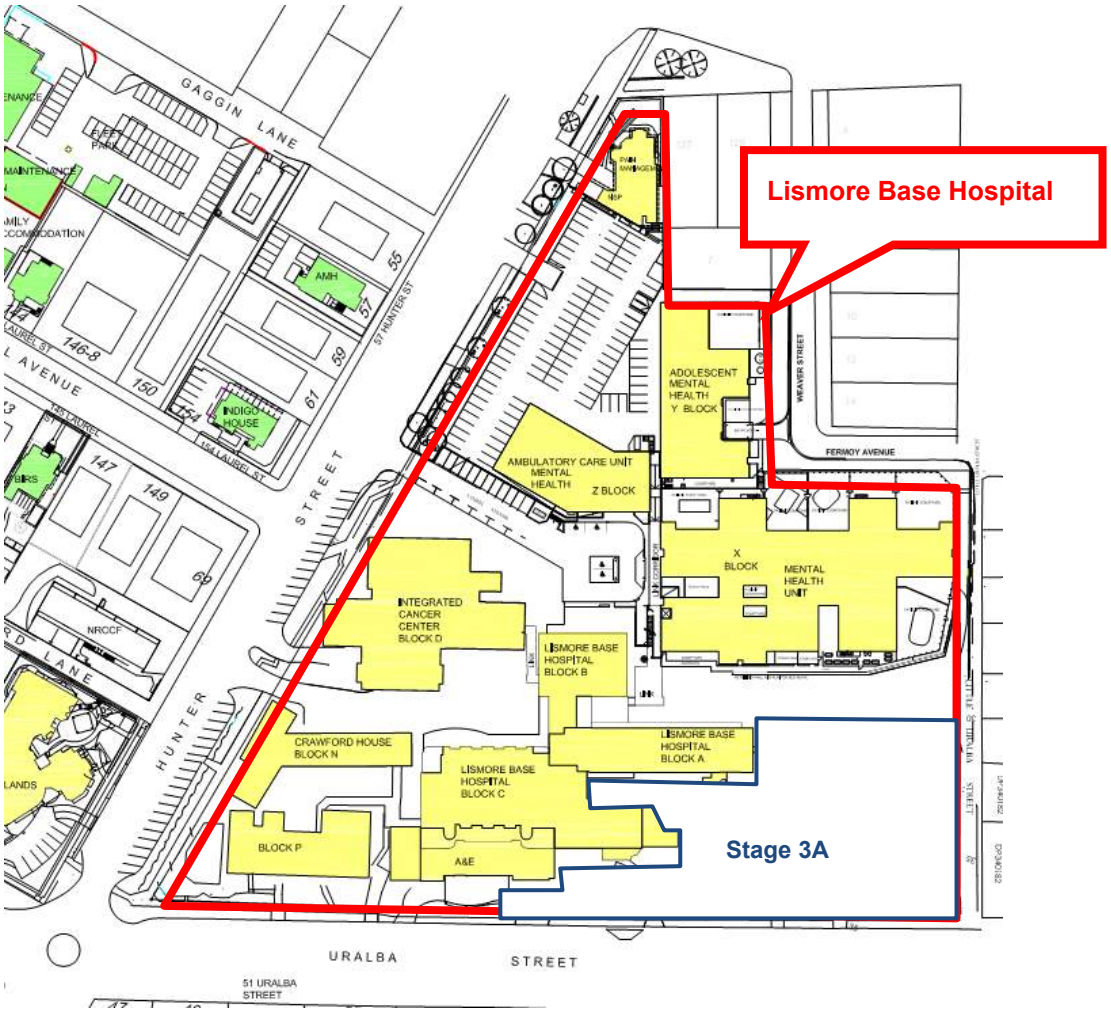

Figure 1 Development Site

3.0 LOCAL TOPOGRAPHY

The local topography is generally sloping to the north and south from a local ridge at Uralba Street. Contours of the land can be seen on the Lismore City Council Flood Hazard Categories Map in this report. Wilsons River lies to the west and north-west of Lismore Base Hospital.

Uralba Street falls to the west at about 3% grade. Little Uralba Street falls to the north, starting at 6% at the intersection and increasing to 12% adjacent the development site and further increasing to 20% adjacent the Mental health Unit to Fermoy Street.

4.0 PROPOSED DEVELOPMENT

The proposed development includes works as listed following;

- a new five-story building (Stage 3a) at the southeast corner of the site,
- relocation of some community health services back to the hospital campus through internal refurbishment of Block C,
- altered vehicular access on Little Uralba Street for a temporary service yard at Level 3 north of the new building,
- new vehicular access on Little Uralba Street at Level 4 to serve the proposed mortuary,
- front entry improvements including ambulance and ambulatory access and road reservation re-alignment,
- earthworks cut for the new building and service yard,
- stormwater drainage re-routing, on-site detention storage and water quality treatment,
- Coordination of overland flow paths with building entry points and pedestrian zones,
- Coordination with service routes and future development stages.

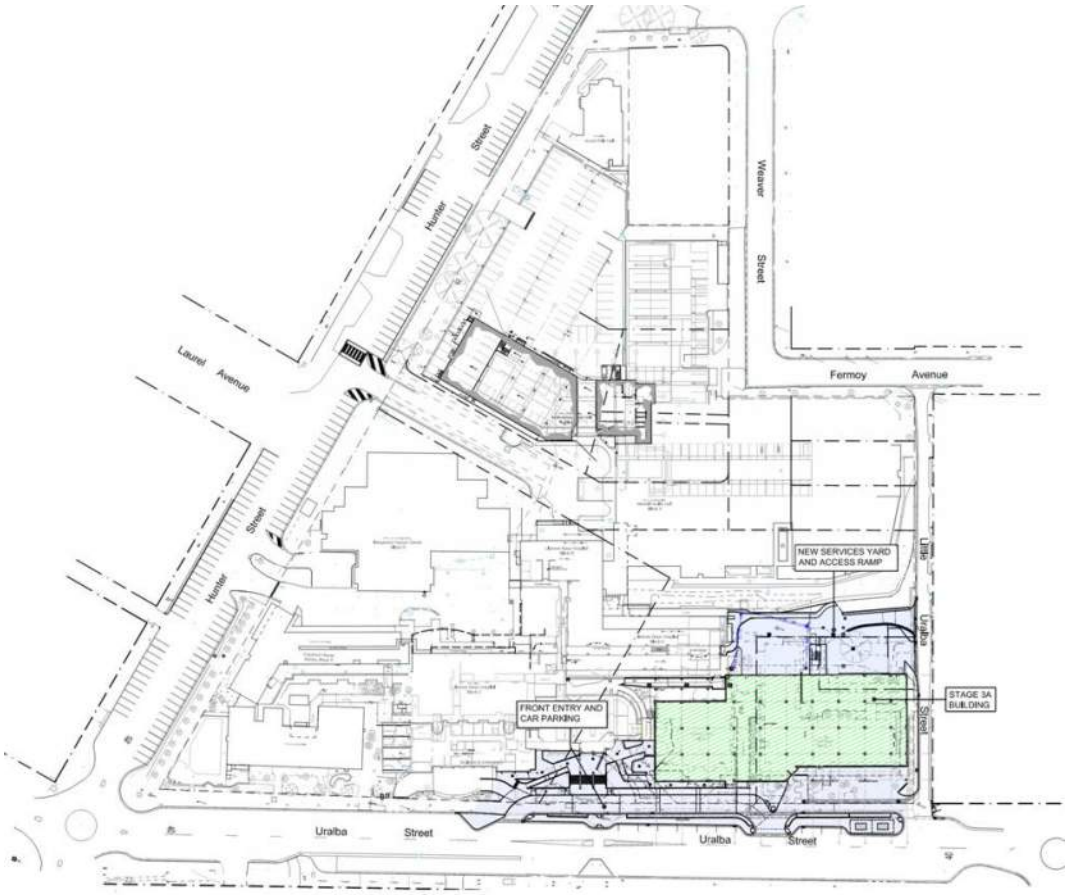

Figure 2 Site Plan

5.0 FLOOD RISK

The majority of the Lismore Base Hospital site is located outside of the Lismore City Council Flood Risk Area, but the northeast corner of the site (existing car park at grade and under the Mental Health Unit) is located within the Low Flood Risk Area which is defined in Chapter 8 – Flood Prone Lands of the Council Development Control Plan (DCP) as area within the limits of the Probable Maximum Flood (PMF), but outside of the limits of the 1 in 100 year Annual Recurrence Interval (ARI) flood level.

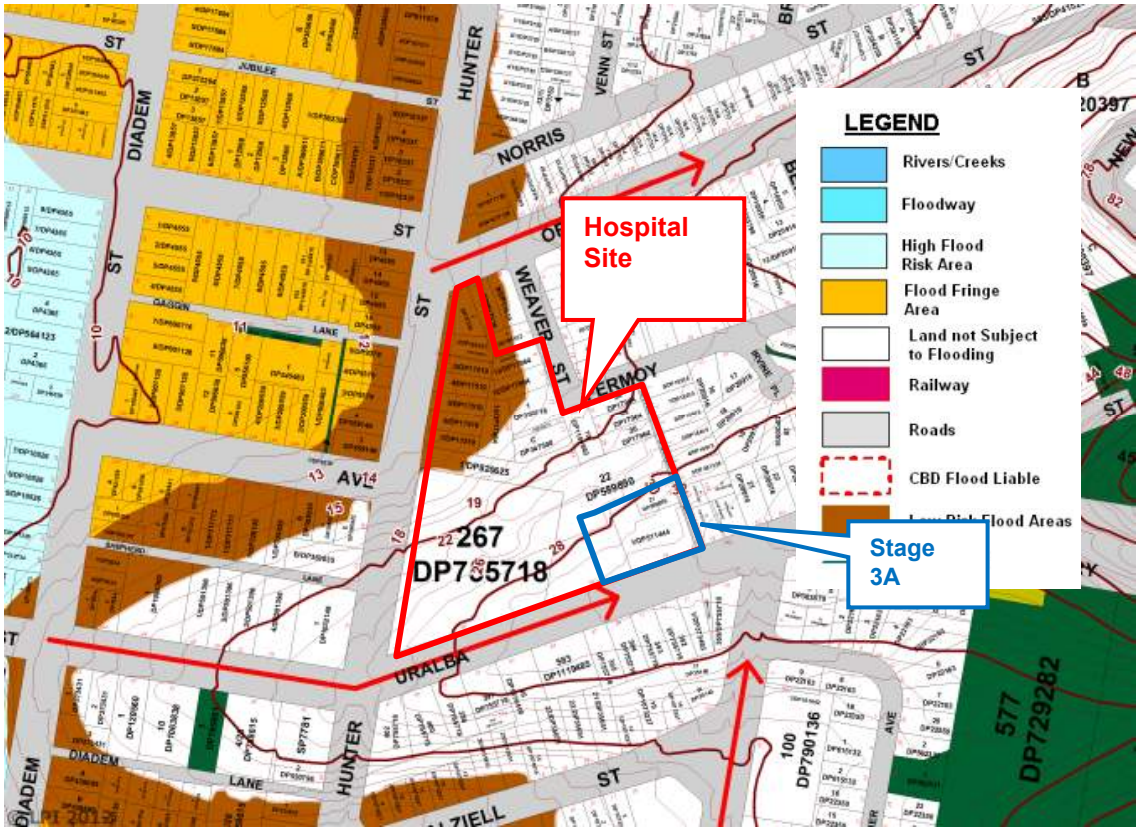

Figure 8 – Lismore City Council Flood Hazard Categories Map

The proposed Stage 3A development area is outside of the Council mapped Flood Risk Area as shown on the map above.

6.0 HYDROLOGY AND ON-SITE STORMWATER DETENTION

The Hospital falls from southeast to northwest and can be divided into five catchments. The Block H/T catchment currently drains via a 450m diameter pipe under Mental Health Block X and an overland flow path around the south and east sides of Block X to the intersection of Fermoy Avenue and Weaver Street. The other four hospital catchments have pipe connections to the Council system in Hunter Street with overland flow to Uralba Street and Hunter Street.

In previous discussions, Council advised that they are not aware of any localised drainage issues on the site currently. Council noted that localized drainage issues do occur downstream of the hospital site at the intersection of Hunter Street and Orion Street. The proposed hospital redevelopment will reduce or maintain stormwater flows for the 1-year through to the 100-year ARI storm events and will have no negative downstream impact.

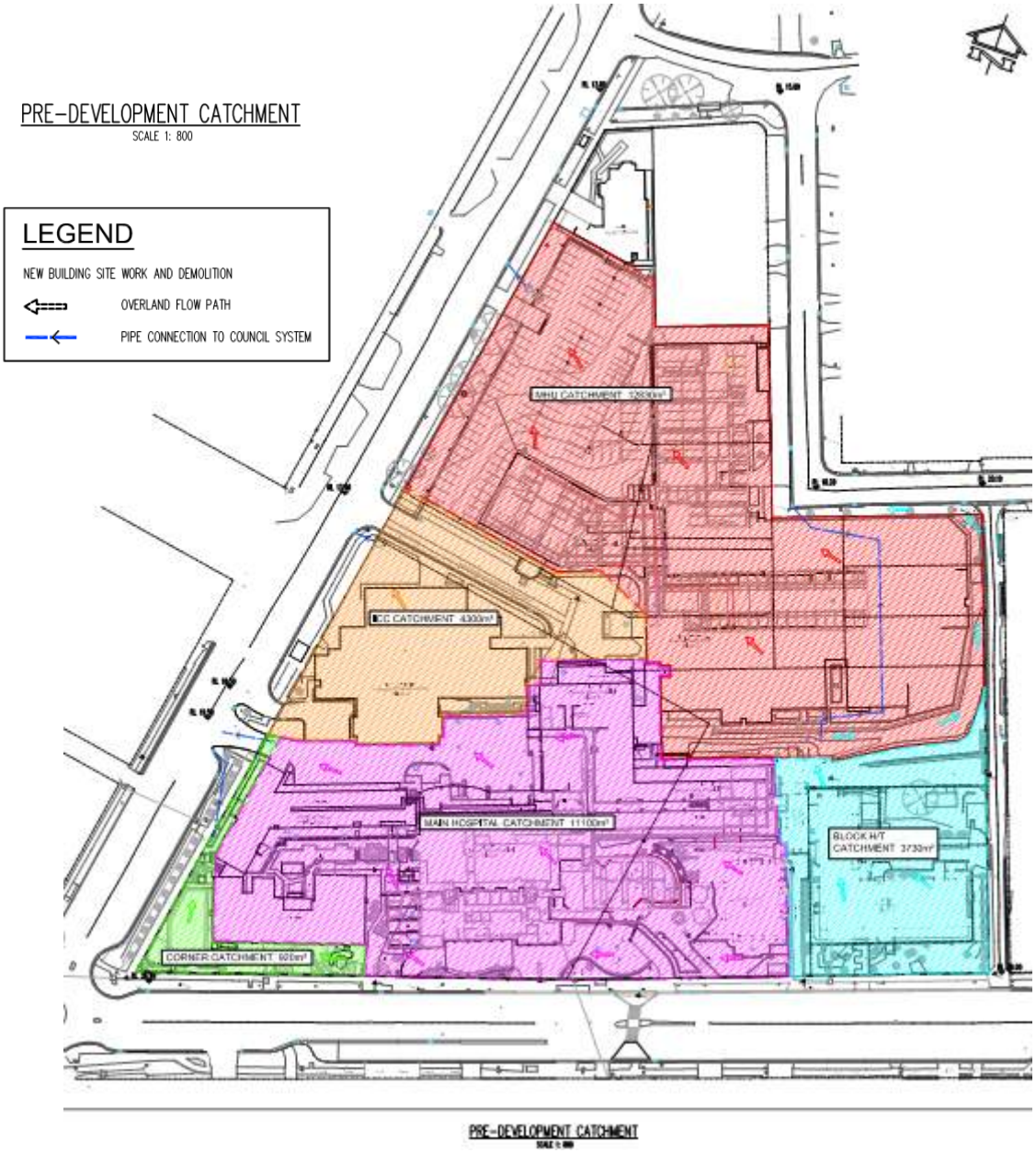

Figure 4 – Pre-Development Catchment Plan

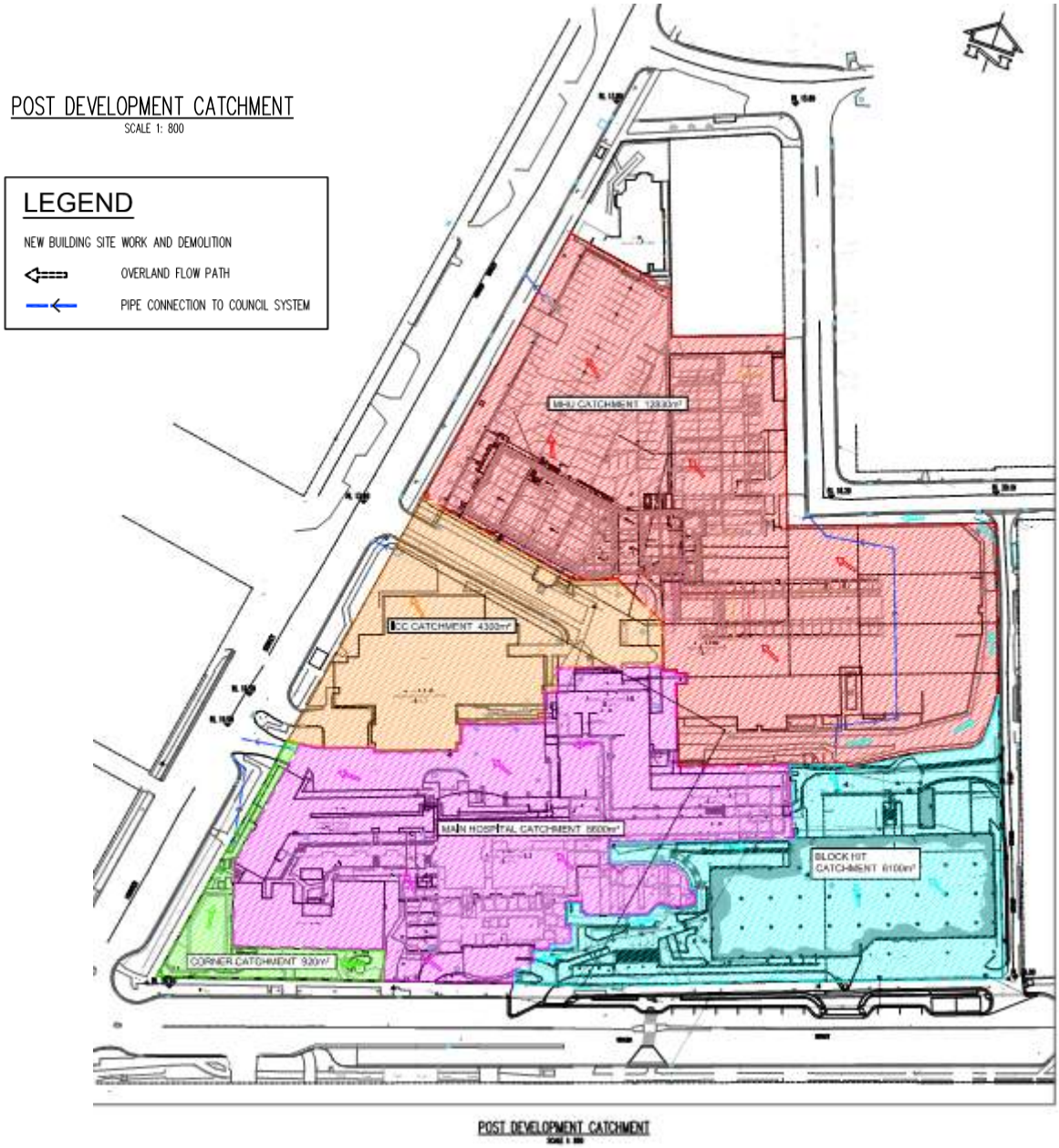

Figure 5 – Post-Development Catchment Plan

The proposed development requires management of the overland flow paths particularly at the ambulatory entry precinct, the service yard and in an existing trapped catchment bounded by existing Blocks A, C, and J.

The stormwater for the ambulatory entry is managed by a piped system and overland flow paths to the southwest.

The service yard is served by a primary piped system with 100 year capacity running under Mental Health Block X to the intersection of Weaver Street and Fermoy Avenue. In addition, an overland flow path exists around Mental Health Block X.

The existing trapped catchment is currently served by a piped system under Block A. As a risk management treatment, a piped overflow system which has 100 year capacity is recommended under the proposed main building. This system is proposed to function as the primary system with the existing system under Block A acting as a reliever in the case of blockage.

Figure 6 – Existing Trapped Catchment

In Phase 3A, stormwater detention and water quality treatment will be required for the Block H/T catchment due to the proposed increase in existing impervious area and increase in the catchment contributing area (contributing area increase is due to transfer of Stage 3A building area from Main Hospital catchment to Block H/T catchment). The detention required is about 88 cu.m.

Other catchments within the LBH site are not impacted by the proposed development.

6.1 Catchment Comparison

A comparison of the pre and post-development catchments has been made to ensure that any impacts of flow into the pipe connections to Council's system are addressed as part of the stormwater management. A comparison of the catchments is shown in the table following.

Catchment	Pre-Development Area m²	Post Development Area m²	% Change
Block H/T	3730	6,100	+63.5
Main Hospital	11100	8600	-22.5
Corner	920	920	0
ICC	4300	4300	0
MHU	12830	12830	0

Table 1 Catchment Comparison Following Development

6.2 On-site Stormwater Detention

On-site stormwater detention will be provided within the Block H/T catchment for Stage 3A.

An in-ground tank is proposed with an orifice outlet as the discharge control. The tank has been designed and analysed using DRAINS to ensure that the Permissible Site Discharge (PSD) does not

exceed the pre-developed flows for all storm events from the 1 to 100-year ARI. Design has been carried in accordance with the Council's Development Control Plan (DCP) and Northern Rivers Local Government Handbook of Stormwater Drainage Design.

The DRAINS analysis and results is attached in Appendix A. Summary of the results is tabulated following.

Storm Event	Pre-developed catchment flow = PSD (cu.m/s)
1 year ARI	0.104
5 year ARI	0.170
20 year ARI	0.217
100 year ARI	0.260

Table 2 Block H/T Catchment PSD

The "Main Hospital" catchment is reduced in area; therefore the flows to the pipe connection to Council's system will be reduced. On-site stormwater detention will not be provided for this catchment.

Corner, ICC and MHU catchments are outside the area of development.

7.0 WATER SENSITIVE URBAN DESIGN

In addition to stormwater detention, stormwater quality control filtering such as oil and silt traps will be required prior to discharge from impervious areas. As compared to baseline, Council's Water Sensitive Design DCP requires the following reduction in mean annual pollutant loading:

- 75% reduction in Total Suspended Solids (TSS)
- 65% reduction in Total Phosphorus (TP)
- 40% reduction in Total Nitrogen (TN)
- 90% reduction in Gross Pollutants (GP)

Council's "Deemed to Comply" water quality treatment solution in the DCP is 1.8% of the site area to be set aside for bio retention. This would be about 600 sq.m for the hospital site. To maximize developable area, TTW recommend a treatment train consisting of the OSD tank, OSD trash rack, a Humeceptor and 3xSPEL Filters.

MUSIC modelling has been carried to design the treatment train and results showing compliance with Council's pollutant loading reduction targets are shown in the following figure.

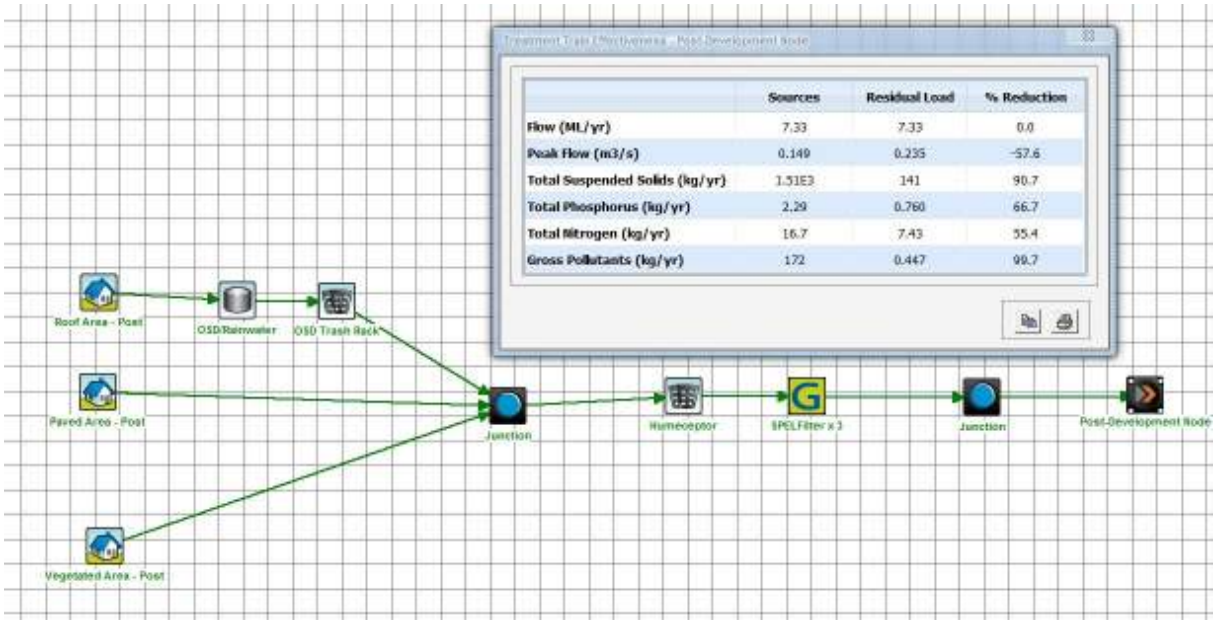

Figure 3 MUSIC Model Results

7.1 Erosion and Sediment Control

TTW have prepared a schematic Erosion and Sediment Control plan for the project in accordance with *Managing Urban Stormwater – Soils & Construction Volume 1 2004 (Landcom).*

8.0 STORMWATER RUNOFF ANALYSIS

The proposed stormwater system for the Stage 3a building and surrounds will consist of a pit and pipe system. Existing drainage paths across the site have been maintained in coordination with the proposed works.

For each catchment, stormwater runoff has been analysed using DRAINS for the 20 and 100-year ARI, with multiple storm durations between 5 and 120 minutes. The proposed OSD tank has been analysed for the 1 to 100-year ARI storm events.

Full calculations and results from DRAIN model are included in Appendix A.

9.0 SUMMARY OF DEVELOPMENT IMPACT

The proposed development alters the catchment characteristics as detailed in this report and on the engineering drawings.

As part of the stormwater management controls will be implemented to ensure that;

The peak runoff from the site is not increased.

The risk of downstream and on-site flooding is reduced

The quality of the stormwater runoff is improved.

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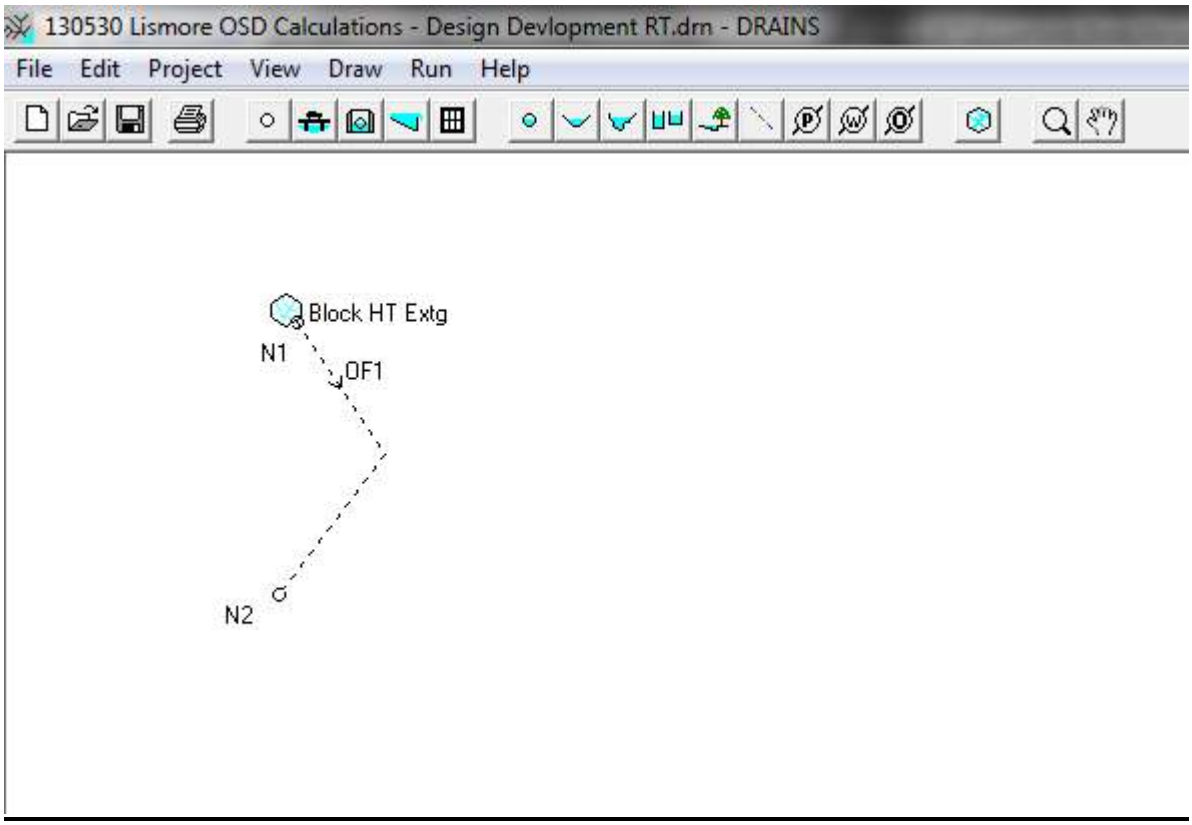
APPENDIX A – STORMWATER ANALYSIS

PRE-DEVELOPMENT FROM BLOCK H/T

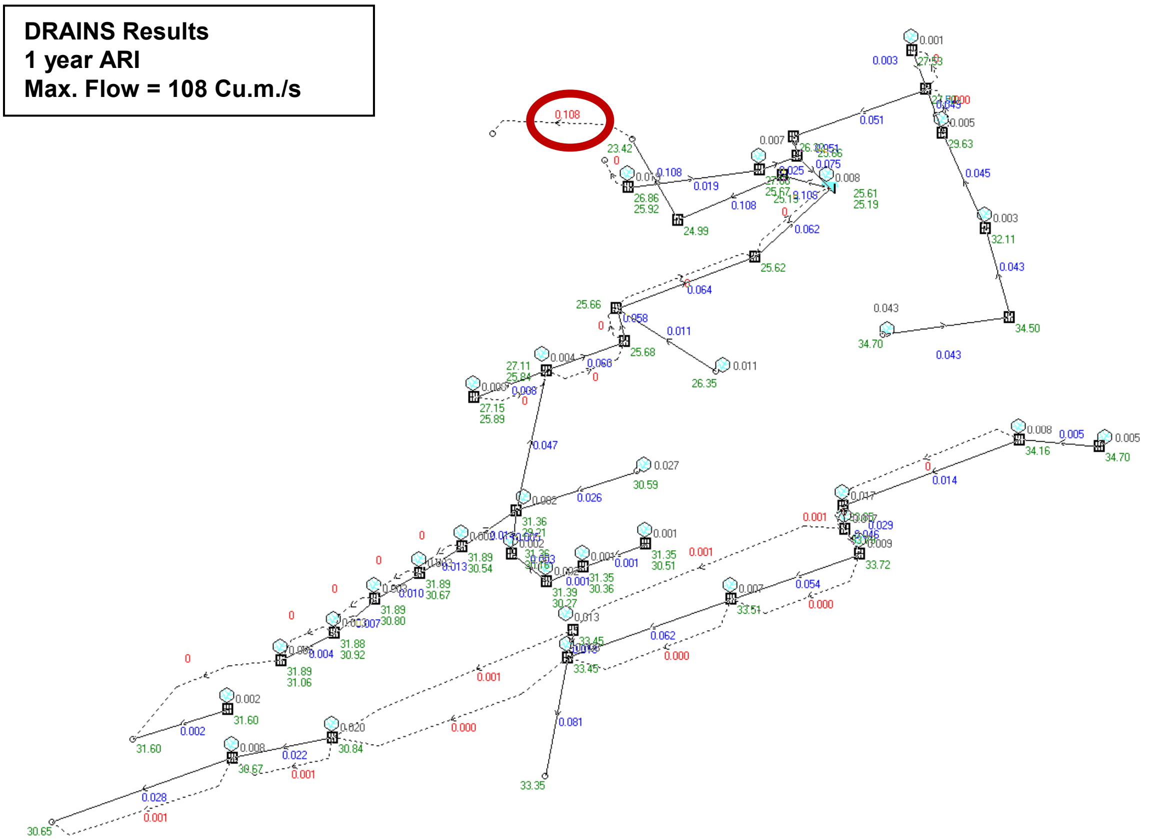


Calculation of predevelopment flows to determine PSD

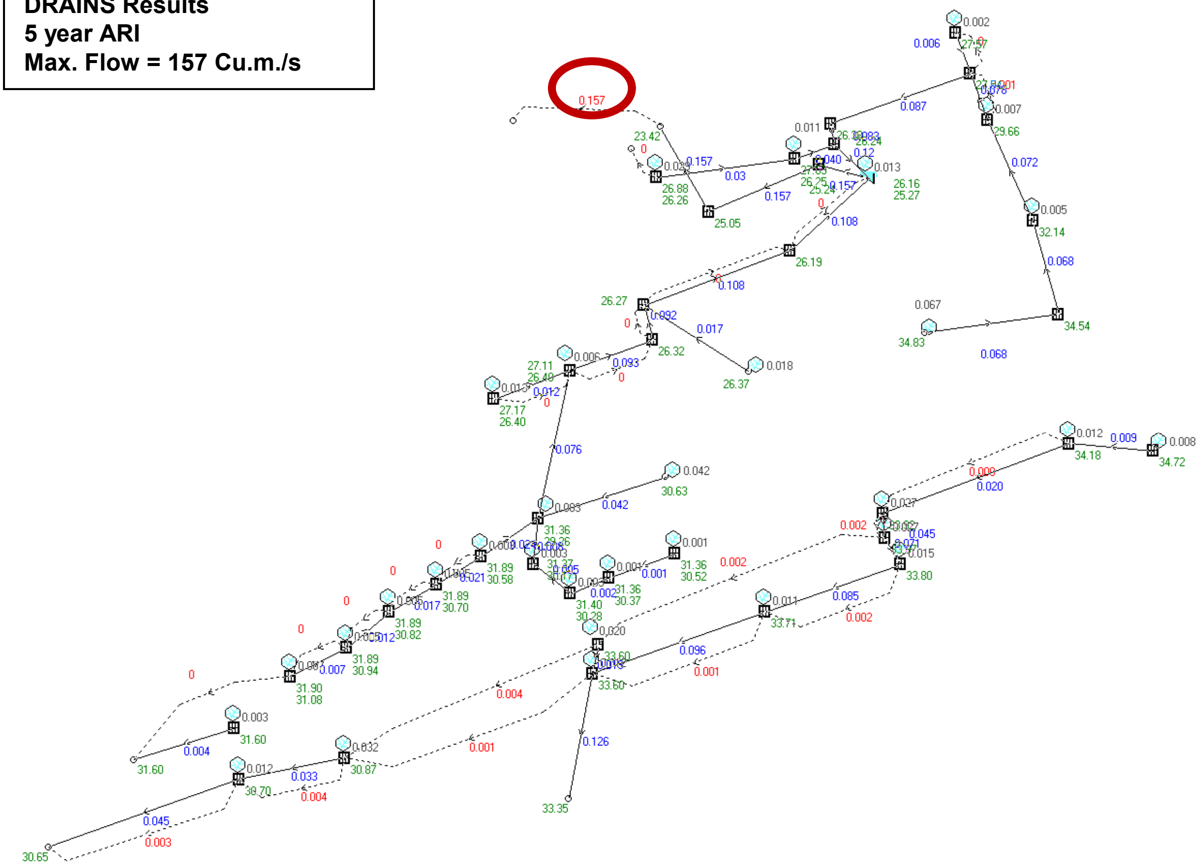
DRAINS RESULTS

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)							
Block HT Extg	0.104	0.077	0.027	5.5	5.5	5.5	AR&R 1 year, 25 minutes storm, average 57.4 mm/h, Zone 1						
Block HT Extg	0.170	0.122	0.048	5.5	5.5	5.5	AR&R 5 year, 25 minutes storm, average 91.5 mm/h, Zone 1						
Block HT Extg	0.217	0.155	0.063	5.5	5.5	5.5	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1						
Block HT Extg	0.260	0.185	0.075	5.5	5.5	5.5	AR&R 100 year, 15 minutes storm, average 191 mm/h, Zone 1						

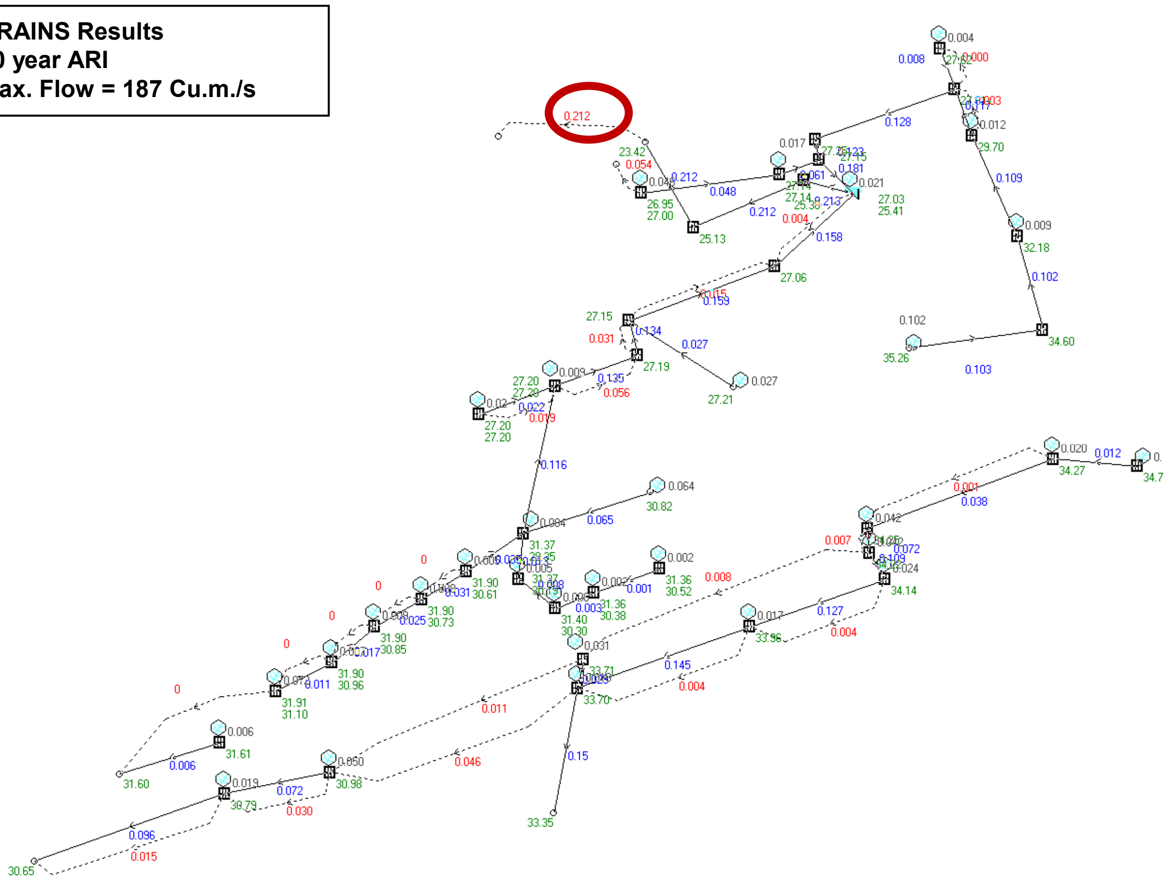
DRAINS Results
1 year ARI
Max. Flow = 108 Cu.m./s



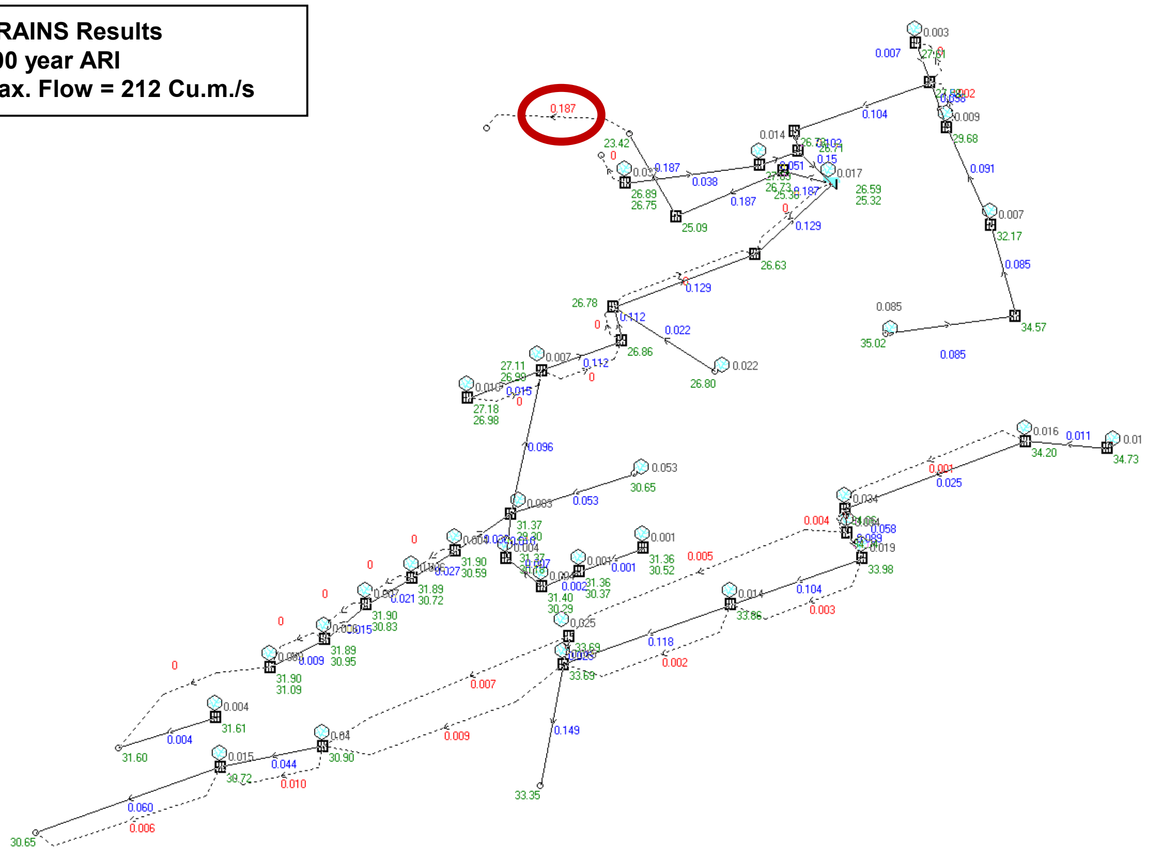
DRAINS Results
5 year ARI
Max. Flow = 157 Cu.m./s



DRAINS Results
20 year ARI
Max. Flow = 187 Cu.m./s



DRAINS Results
100 year ARI
Max. Flow = 212 Cu.m./s



DRAINS results prepared 11 July, 2013 from Version 2013.06

PIT / NODE DETAILS

Name	Max HGL	Max Pond HGL	Max Surface Flow Arriving (cu.m/s)	Version 8 Max Pond Volume (cu.m)	Min Freeboard (m)	Overflow (cu.m/s)	Constraint
Pit10	26.98	27.18	0.016	1.6	0.12	0	Inlet Capacity
Pit9	26.98	27.11	0.007	0.1	0.12	0	Inlet Capacity
Pit8	26.86		0		0.42	0	None
Pit7	26.78		0		0.37	0	None
Pit6	26.63		0		0.59	0	None
Pit2 GPT	25.3		0		1.85		None
Pit1 GPT	25.09		0		1.91		None
N747	23.42		0				
Pit15	30.52	31.36	0.001	0.1	0.83		Inlet Capacity
Pit14	30.37	31.36	0.001	0.1	0.98		Inlet Capacity
Pit13	30.29	31.4	0.004	0.4	1.09		Inlet Capacity
Pit12	30.18	31.37	0.004	0.4	1.17		Inlet Capacity
Pit11	29.3	31.37	0.003	0.3	2.05		Inlet Capacity
Pit22	26.75	26.89	0.037	0.6	0.05	0	Inlet Capacity
Pit21	26.73	27.09	0.014	0.3	0.32		Inlet Capacity
Pit 16	26.71		0		0.49		None
Pit23	27.61		0.003		0.89		None
Pit18	27.58		0.002		2.12	0	None
Pit 17	26.78		0		0.47		None
Pit42	30.9		0.056		1.6	0.01	Inlet Capacity
Pit41	30.72		0.025		1.18	0.006	Inlet Capacity
N745	30.65		0.006				
Pit51	33.69		0.03		0.41	0.007	Inlet Capacity
Pit50	33.69		0.017		0.01	0.009	Inlet Capacity
N742	33.35		0				
Pit57	34.73		0.01		1.39		None
Pit56	34.2		0.016		1.5	0.001	Inlet Capacity
Pit55	34.06		0.034		1.44	0.004	Inlet Capacity
Pit54	34.04		0.038		1.46	0.005	Inlet Capacity
Pit53	33.98		0.019		1.12	0.003	Inlet Capacity
Pit52	33.86		0.016		0.59	0.002	Inlet Capacity
Ex31	31.61		0.004		0.19		None
N30	31.6		0				
Pit32	31.09	31.9	0.009	0.9	0.78	0	Inlet Capacity
Pit33	30.95	31.89	0.006	0.8	0.92	0	Inlet Capacity
Pit34	30.83	31.9	0.007	1	1.04	0	Inlet Capacity
Pit35	30.72	31.89	0.006	0.9	1.15	0	Inlet Capacity
Pit36	30.59	31.9	0.004	0.8	1.29	0	Inlet Capacity
NRoof4&2	35.02		0.085				
Pit20A	34.57		0		0.83		None
Pit20	32.17		0.007		1.33		None
Pit19	29.68		0.009		1.32	0.002	Inlet Capacity
NRoof 1	26.8		0.022				
NRoof3	30.65		0.053				

SUB-CATCHMENT DETAILS

Name	Max Flow Q (cu.m/s)	Paved Max Q (cu.m/s)	Grassed Max Q (cu.m/s)	Paved Tc (min)	Grassed Tc (min)	Supp. Tc (min)	Due to Storm
Cat10	0.016	0.016	0	0.52	0	0	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1
Cat9	0.007	0.007	0	0.58	0	0	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1
Cat4	0.017	0.017	0	1.06	0	0	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1
Cat15	0.001	0.001	0	0.82	0	0	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1
Cat14	0.001	0.001	0	0.69	0	0	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1
Cat13	0.004	0.004	0	1.03	0	0	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1
Cat12	0.004	0.004	0	0.82	0	0	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1
Cat11	0.003	0.003	0	0.53	0	0	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1
Cat22	0.037	0.037	0	1.37	0	0	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1
Cat21	0.014	0.014	0	0.92	0	0	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1
Cat23	0.003	0.003	0	0.83	0	0	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1
Cat42	0.04	0.04	0	2.55	0	0	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1
Cat41	0.015	0.015	0	2.06	0	0	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1
Cat51	0.025	0.025	0	2.55	0	0	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1
Cat50	0.015	0.015	0	2.06	0	0	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1
Cat57	0.01	0.01	0	1.64	0	0	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1
Cat56	0.016	0.016	0	2.3	0	0	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1
Cat55	0.034	0.034	0	2.33	0	0	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1
Cat54	0.034	0.034	0	3.67	0	0	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1
Cat53	0.019	0.019	0	2.06	0	0	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1
Cat52	0.014	0.014	0	1.88	0	0	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1
Cat31	0.004	0.004	0	0.92	0	0	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1
Cat32	0.009	0.009	0	1.67	0	0	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1
Cat33	0.006	0.006	0	1.04	0	0	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1
Cat34	0.007	0.007	0	1.01	0	0	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1
Cat35	0.006	0.006	0	0.64	0	0	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1
Cat36	0.004	0.004	0	0.48	0	0	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1
CatRoof4&2	0.085	0.085	0	5	0	0	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1
Cat20	0.007	0.007	0	1.76	0	0	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1
Cat19	0.009	0.009	0	0.98	0	0	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1
CatRoof1	0.022	0.022	0	5	0	0	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1
CatRoof3	0.053	0.053	0	5	0	0	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1

Outflow Volumes for Total Catchment (0.87 impervious + 0.00 pervious = 0.87 total ha)

Storm	Total Rainfall cu.m	Total Runoff cu.m (Runoff %)	Impervious Runoff cu.m (Runoff %)	Pervious Runoff cu.m (Runoff %)
AR&R 20 year, 5 minutes storm, average 222 mm/h, Zone 1	160.19	151.53 (94.6%)	151.53 (94.6%)	0.00 (0.0%)
AR&R 20 year, 10 minutes storm, average 172 mm/h, Zone 1	248.22	239.56 (96.5%)	239.56 (96.5%)	0.00 (0.0%)
AR&R 20 year, 15 minutes storm, average 149.5 mm/h, Zone 1	323.63	314.97 (97.3%)	314.97 (97.3%)	0.00 (0.0%)
AR&R 20 year, 20 minutes storm, average 127 mm/h, Zone 1	366.56	357.91 (97.6%)	357.91 (97.6%)	0.00 (0.0%)
AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1	416.71	408.05 (97.9%)	408.05 (97.9%)	0.00 (0.0%)
AR&R 20 year, 30 minutes storm, average 104 mm/h, Zone 1	450.27	441.62 (98.1%)	441.62 (98.1%)	0.00 (0.0%)
AR&R 20 year, 45 minutes storm, average 87.9 mm/h, Zone 1	570.84	562.19 (98.5%)	562.19 (98.5%)	0.00 (0.0%)
AR&R 20 year, 1 hour storm, average 71.7 mm/h, Zone 1	620.85	612.19 (98.6%)	612.19 (98.6%)	0.00 (0.0%)
AR&R 20 year, 1.5 hours storm, average 59.3 mm/h, Zone 1	770.22	761.56 (98.9%)	761.56 (98.9%)	0.00 (0.0%)
AR&R 20 year, 2 hours storm, average 46.9 mm/h, Zone 1	812.21	803.55 (98.9%)	803.55 (98.9%)	0.00 (0.0%)
AR&R 20 year, 3 hours storm, average 36.3 mm/h, Zone 1	942.97	934.34 (99.1%)	934.34 (99.1%)	0.00 (0.0%)

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)				
Pipe125	0.015	0.14	26.976	26.976	AR&R 20 year, 15 minutes storm, average 149.5 mm/h, Zone 1			
Pipe127	0.112	1.02	26.902	26.859	AR&R 20 year, 20 minutes storm, average 127 mm/h, Zone 1			
Pipe129	0.112	1.01	26.787	26.778	AR&R 20 year, 20 minutes storm, average 127 mm/h, Zone 1			
Pipe132	0.129	1.17	26.686	26.632	AR&R 20 year, 20 minutes storm, average 127 mm/h, Zone 1			
Pipe135	0.129	1.17	26.608	26.586	AR&R 20 year, 20 minutes storm, average 127 mm/h, Zone 1			
Pipe211	0.187	1.54	25.322	25.298	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1			
Pipe223	0.187	2.11	25.125	25.092	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1			
Pipe216	0.187	5.2	24.855	23.425	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1			
Pipe107	0.001	0.87	30.508	30.408	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1			
Pipe111	0.002	0.71	30.366	30.302	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1			
Pipe113	0.007	1.3	30.262	30.199	AR&R 20 year, 15 minutes storm, average 149.5 mm/h, Zone 1			
Pipe116	0.01	1.59	30.146	30.092	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1			
Pipe326	0.096	4.4	29.125	26.976	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1			
Pipe201	0.038	0.35	26.728	26.727	AR&R 20 year, 5 minutes storm, average 222 mm/h, Zone 1			
Pipe202	0.051	0.47	26.715	26.714	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1			
Pipe198	0.15	1.36	26.588	26.586	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1			
Pipe188	0.007	0.2	27.589	27.583	AR&R 20 year, 2 hours storm, average 46.9 mm/h, Zone 1			
Pipe180	0.104	3.54	27.45	26.783	AR&R 20 year, 15 minutes storm, average 149.5 mm/h, Zone 1			
Pipe195	0.102	0.93	26.718	26.714	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1			
Pipe101	0.044	2.65	30.788	30.722	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1			
Pipe104	0.06	1.42	30.669	30.65	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1			
Pipe314	0.023	0.21	33.694	33.693	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1			
Pipe78	0.149	1.35	33.508	33.35	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1			
Pipe81	0.011	3.17	34.676	34.576	AR&R 20 year, 15 minutes storm, average 149.5 mm/h, Zone 1			
Pipe85	0.025	1.31	34.154	34.061	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1			
Pipe88	0.058	0.56	34.041	34.039	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1			
Pipe310	0.089	0.81	34.036	33.983	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1			
Pipe60	0.104	0.94	33.958	33.864	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1			
P63	0.118	1.07	33.777	33.693	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1			
Pipe161	0.004	0.11	31.605	31.6	AR&R 20 year, 5 minutes storm, average 222 mm/h, Zone 1			
Pipe155	0.009	6.35	31.017	30.962	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1			
Pipe153	0.015	1.2	30.929	30.843	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1			
Pipe150	0.021	1.32	30.81	30.725	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1			
Pipe145	0.027	1.4	30.689	30.607	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1			
Pipe290	0.03	1.44	30.564	30.459	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1			
Pipe237	0.085	2.17	35.025	34.567	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1			
Pipe344	0.085	4.25	34.439	32.165	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1			
Pipe169	0.091	4.34	32.083	30.042	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1			
Pipe175	0.098	4.43	29.598	28.746	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1			
Pipe240	0.022	0.55	26.801	26.778	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1			
Pipe247	0.053	1.6	30.654	30.455	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1			
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 Widt	Max V	Due to Storm
OF169	0	0	0.399	0	0	0	0	
OF214	0	0	0.256	0	0	0	0	
OF222	0	0	0.256	0	0	0	0	
OF224	0	0	0.256	0	0	0	0	
OF226	0	0	0.256	0	0	0	0	
OF220	0	0	0.256	0	0	0	0	
OF148	0	0	0.307	0	0	0	0	
OF142	0.01	0.01	0.376	0.048	0.05	0.4	1.01	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1
OF167	0.006	0.006	0.445	0.038	0.04	0.31	1.02	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1
OF197	0.007	0.007	0.465	0.01	0	3.44	0.38	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1
OF133	0.009	0.009	0.376	0.047	0.05	0.39	1.01	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1
OF155	0.001	0.001	0.184	0.021	0.01	0.18	0.3	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1
OF157	0.004	0.004	0.181	0.012	0	4.04	0.16	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1
OF159	0.005	0.005	0.432	0.034	0.03	0.28	0.95	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1
OF123	0.003	0.003	0.376	0.03	0.02	0.25	0.73	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1
OF126	0.002	0.002	0.376	0.026	0.02	0.22	0.7	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1
OF186	0	0	0.181	0	0	0	0	
OF181	0	0	0.181	0	0	0	0	
OF178	0	0	0.181	0	0	0	0	
OF174	0	0	0.181	0	0	0	0	
OF171	0	0	0.181	0	0	0	0	
OF144	0.002	0.002	0.238	0.03	0.01	0.25	0.46	AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1
DETENTION BASIN DETAILS								
Name	Max WL	MaxVol	Max Q	Max Q	Max Q			
			Total	Low Level	High Level			
OSD-Tank	26.59	68.2	0.187	0.187	0			

CONTINUITY CHECK for AR&R 20 year, 25 minutes storm, average 115.5 mm/h, Zone 1				
Node	Inflow	Outflow	Storage Change	Difference
	(cu.m)	(cu.m)	(cu.m)	%
Pit10	12.02	11.85	0	1.4
Pit9	91.65	91.23	0	0.5
Pit8	91.23	91.54	0	-0.3
Pit7	108.05	107.49	0	0.5
Pit6	107.49	108.01	0	-0.5
OSD-Tank	236.8	236.61	0.19	0
Pit2 GPT	236.61	236.74	0	-0.1
Pit1 GPT	236.74	236.77	0	0
N747	236.77	236.77	0	0
Pit15	0.94	0.93	0	1.6
Pit14	1.87	1.87	0	0.2
Pit13	5.17	5.12	0	1
Pit12	7.94	7.96	0	-0.2
Pit11	74.61	74.38	0	0.3
Pit22	27.8	27.58	0	0.8
Pit21	37.95	37.96	0	0
Pit 16	116.07	116.07	0	0
Pit23	2.12	2.08	0	2
Pit18	78.32	78.07	0	0.3
Pit 17	78.07	78.11	0	0
Pit42	34.41	34.44	0	-0.1
Pit41	45.75	45.68	0	0.2
N745	45.68	45.68	0	0
Pit51	20.68	20.69	0	-0.1
Pit50	121.85	121.84	0	0
N742	120.36	120.36	0	0
Pit57	7.54	7.51	0	0.4
Pit56	19.29	19.33	0	-0.2
Pit55	44.77	44.67	0	0.2
Pit54	70.12	70.11	0	0
Pit53	82.42	82.39	0	0
Pit52	92.76	92.63	0	0.1
Ex31	3.3	3.3	0	0
N30	3.3	3.3	0	0
Pit32	7.07	7.01	0	0.8
Pit33	11.49	11.44	0	0.4
Pit34	16.63	16.57	0	0.3
Pit35	21.29	21.23	0	0.3
Pit36	24.06	24.02	0	0.1
NRoof4&2	64.14	64.14	0	0
Pit20A	64.14	64.06	0	0.1
Pit20	69.24	69.2	0	0.1
Pit19	76.27	76.24	0	0
NRoof 1	16.64	16.51	0	0.8
NRoof3	40.06	40.03	0	0.1
N832	0	0	0	0
Run Log for 130711 Lismore Hospital Drainage.drn run at 16:05:18 on 11/7/2013				
No water upwelling from any pit.				
Freeboard was less than 0.15m at Pit9, Pit50, Pit22, Pit10				
Flows were safe in all overflow routes.				

DRAINS results prepared 11 July, 2013 from Version 2013.06

PIT / NODE DETAILS

Name	Max HGL	Max Pond HGL	Max Surface Flow Arriving (cu.m/s)	Max Pond Volume (cu.m)	Min Freeboard (m)	Overflow (cu.m/s)	Constraint
				Version 8			
Pit10	27.2	27.2	0.02	2.6	-0.1	0.019	Outlet System
Pit9	27.2	27.2	0.027	2.6	-0.1	0.056	Outlet System
Pit8	27.19		0.056		0.09	0.031	Inlet Capacity
Pit7	27.15		0.031		0	0.015	Outlet System
Pit6	27.06		0.015		0.16	0.004	Inlet Capacity
Pit2 GPT	25.38		0		1.77		None
Pit1 GPT	25.13		0		1.87		None
N747	23.42		0				
Pit15	30.52	31.36	0.002	0.2	0.83		Inlet Capacity
Pit14	30.38	31.36	0.002	0.2	0.97		Inlet Capacity
Pit13	30.3	31.4	0.006	0.5	1.08		Inlet Capacity
Pit12	30.19	31.37	0.005	0.4	1.16		Inlet Capacity
Pit11	29.35	31.37	0.004	0.4	2		Inlet Capacity
Pit22	27	26.95	0.046	1.3	-0.2	0.054	Outlet System
Pit21	27.14	27.14	0.017	1	-0.09		Outlet System
Pit 16	27.15		0		0.05		None
Pit23	27.62		0.004		0.88		None
Pit18	27.61		0.003		2.09	0	None
Pit 17	27.25		0		0		None
Pit42	30.98		0.107		1.52	0.03	Inlet Capacity
Pit41	30.79		0.048		1.11	0.015	Inlet Capacity
N745	30.65		0.015				
Pit51	33.71		0.04		0.39	0.011	Inlet Capacity
Pit50	33.7		0.022		0	0.046	Outlet System
N742	33.35		0				
Pit57	34.73		0.013		1.39		None
Pit56	34.27		0.02		1.43	0.001	Inlet Capacity
Pit55	34.25		0.043		1.25	0.007	Inlet Capacity
Pit54	34.22		0.049		1.28	0.008	Inlet Capacity
Pit53	34.14		0.024		0.96	0.004	Inlet Capacity
Pit52	33.96		0.022		0.49	0.004	Inlet Capacity
Ex31	31.61		0.006		0.19		None
N30	31.6		0				
Pit32	31.1	31.91	0.012	1.1	0.77	0	Inlet Capacity
Pit33	30.96	31.9	0.007	1	0.91	0	Inlet Capacity
Pit34	30.85	31.9	0.009	1.2	1.02	0	Inlet Capacity
Pit35	30.73	31.9	0.008	1.1	1.14	0	Inlet Capacity
Pit36	30.61	31.9	0.005	1	1.27	0	Inlet Capacity
NRoof4&2	35.26		0.102				
Pit20A	34.6		0		0.8		None
Pit20	32.18		0.009		1.32		None
Pit19	29.7		0.012		1.3	0.003	Inlet Capacity
NRoof 1	27.21		0.027				
NRoof3	30.82		0.064				

SUB-CATCHMENT DETAILS

Name	Max Flow Q (cu.m/s)	Paved Max Q (cu.m/s)	Grassed Max Q (cu.m/s)	Paved Tc (min)	Grassed Tc (min)	Supp. Tc (min)	Due to Storm
Cat10	0.02	0.02	0	0.36	0	0	AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1
Cat9	0.009	0.009	0	0.41	0	0	AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1
Cat4	0.021	0.021	0	0.74	0	0	AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1
Cat15	0.002	0.002	0	0.57	0	0	AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1
Cat14	0.002	0.002	0	0.48	0	0	AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1
Cat13	0.006	0.006	0	0.72	0	0	AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1
Cat12	0.005	0.005	0	0.57	0	0	AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1
Cat11	0.004	0.004	0	0.37	0	0	AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1
Cat22	0.046	0.046	0	0.96	0	0	AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1
Cat21	0.017	0.017	0	0.64	0	0	AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1
Cat23	0.004	0.004	0	0.58	0	0	AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1
Cat42	0.05	0.05	0	1.78	0	0	AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1
Cat41	0.019	0.019	0	1.44	0	0	AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1
Cat51	0.031	0.031	0	1.78	0	0	AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1
Cat50	0.019	0.019	0	1.44	0	0	AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1
Cat57	0.013	0.013	0	1.15	0	0	AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1
Cat56	0.02	0.02	0	1.61	0	0	AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1
Cat55	0.042	0.042	0	1.63	0	0	AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1
Cat54	0.042	0.042	0	2.56	0	0	AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1
Cat53	0.024	0.024	0	1.44	0	0	AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1
Cat52	0.017	0.017	0	1.31	0	0	AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1
Cat31	0.006	0.006	0	0.65	0	0	AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1
Cat32	0.012	0.012	0	1.17	0	0	AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1
Cat33	0.007	0.007	0	0.73	0	0	AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1
Cat34	0.009	0.009	0	0.7	0	0	AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1
Cat35	0.008	0.008	0	0.44	0	0	AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1
Cat36	0.005	0.005	0	0.33	0	0	AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1
CatRoof4&2	0.102	0.102	0	5	0	0	AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1
Cat20	0.009	0.009	0	1.23	0	0	AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1
Cat19	0.012	0.012	0	0.68	0	0	AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1
CatRoof1	0.027	0.027	0	5	0	0	AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1
CatRoof3	0.064	0.064	0	5	0	0	AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1

Outflow Volumes for Total Catchment (0.87 impervious + 0.00 pervious = 0.87 total ha)

Storm	Total Rainfall (cu.m)	Total Runoff (cu.m (Runoff %))	Impervious Runoff (cu.m (Runoff %))	Pervious Runoff (cu.m (Runoff %))
AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1	204.21	195.55 (95.8%)	195.55 (95.8%)	0.00 (0.0%)
AR&R 100 year, 10 minutes storm, average 220 mm/h, Zone 1	317.5	308.84 (97.3%)	308.84 (97.3%)	0.00 (0.0%)
AR&R 100 year, 15 minutes storm, average 191 mm/h, Zone 1	413.47	404.81 (97.9%)	404.81 (97.9%)	0.00 (0.0%)
AR&R 100 year, 20 minutes storm, average 162 mm/h, Zone 1	467.59	458.92 (98.1%)	458.92 (98.1%)	0.00 (0.0%)
AR&R 100 year, 25 minutes storm, average 147.5 mm/h, Zone 1	532.17	523.51 (98.4%)	523.51 (98.4%)	0.00 (0.0%)
AR&R 100 year, 30 minutes storm, average 133 mm/h, Zone 1	575.82	567.16 (98.5%)	567.16 (98.5%)	0.00 (0.0%)
AR&R 100 year, 45 minutes storm, average 112.6 mm/h, Zone 1	731.25	722.61 (98.8%)	722.61 (98.8%)	0.00 (0.0%)
AR&R 100 year, 1 hour storm, average 92.2 mm/h, Zone 1	798.36	789.69 (98.9%)	789.69 (98.9%)	0.00 (0.0%)
AR&R 100 year, 1.5 hours storm, average 76.3 mm/h, Zone 1	991.02	982.43 (99.1%)	982.43 (99.1%)	0.00 (0.0%)
AR&R 100 year, 2 hours storm, average 60.3 mm/h, Zone 1	1044.28	1035.61 (99.2%)	1035.61 (99.2%)	0.00 (0.0%)
AR&R 100 year, 3 hours storm, average 46.8 mm/h, Zone 1	1215.72	1207.06 (99.3%)	1207.06 (99.3%)	0.00 (0.0%)

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)									
Pipe125	0.022	0.2	27.2	27.2	AR&R 100 year, 25 minutes storm, average 147.5 mm/h, Zone 1								
Pipe127	0.135	1.22	27.182	27.189	AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1								
Pipe129	0.134	1.22	27.146	27.15	AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1								
Pipe132	0.159	1.44	27.087	27.055	AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1								
Pipe135	0.158	1.43	27.039	27.035	AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1								
Pipe211	0.213	1.41	25.407	25.384	AR&R 100 year, 1.5 hours storm, average 76.3 mm/h, Zone 1								
Pipe223	0.212	1.62	25.259	25.126	AR&R 100 year, 1.5 hours storm, average 76.3 mm/h, Zone 1								
Pipe216	0.212	5.39	24.863	23.425	AR&R 100 year, 1.5 hours storm, average 76.3 mm/h, Zone 1								
Pipe107	0.001	0.98	30.508	30.41	AR&R 100 year, 15 minutes storm, average 191 mm/h, Zone 1								
Pipe111	0.003	0.74	30.369	30.304	AR&R 100 year, 15 minutes storm, average 191 mm/h, Zone 1								
Pipe113	0.008	1.33	30.267	30.204	AR&R 100 year, 15 minutes storm, average 191 mm/h, Zone 1								
Pipe116	0.013	1.48	30.156	30.098	AR&R 100 year, 15 minutes storm, average 191 mm/h, Zone 1								
Pipe326	0.116	4.65	29.134	27.2	AR&R 100 year, 15 minutes storm, average 191 mm/h, Zone 1								
Pipe201	0.048	0.43	27.143	27.144	AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1								
Pipe202	0.061	0.56	27.144	27.147	AR&R 100 year, 15 minutes storm, average 191 mm/h, Zone 1								
Pipe198	0.181	1.64	27.04	27.035	AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1								
Pipe188	0.008	0.17	27.612	27.611	AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1								
Pipe180	0.128	4.37	27.449	27.249	AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1								
Pipe195	0.123	1.11	27.157	27.147	AR&R 100 year, 15 minutes storm, average 191 mm/h, Zone 1								
Pipe101	0.072	3.86	30.796	30.792	AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1								
Pipe104	0.096	1.77	30.701	30.65	AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1								
Pipe314	0.029	0.26	33.706	33.7	AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1								
Pipe78	0.15	1.36	33.517	33.35	AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1								
Pipe81	0.012	3.61	34.676	34.581	AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1								
Pipe85	0.038	0.72	34.247	34.251	AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1								
Pipe88	0.072	0.65	34.223	34.219	AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1								
Pipe310	0.109	0.99	34.147	34.135	AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1								
Pipe60	0.127	1.15	34.034	33.958	AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1								
P63	0.145	1.31	33.827	33.7	AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1								
Pipe161	0.006	0.14	31.605	31.6	AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1								
Pipe155	0.011	7.67	31.017	30.967	AR&R 100 year, 15 minutes storm, average 191 mm/h, Zone 1								
Pipe153	0.017	1.24	30.936	30.851	AR&R 100 year, 15 minutes storm, average 191 mm/h, Zone 1								
Pipe150	0.025	1.37	30.819	30.734	AR&R 100 year, 15 minutes storm, average 191 mm/h, Zone 1								
Pipe145	0.031	1.46	30.7	30.618	AR&R 100 year, 15 minutes storm, average 191 mm/h, Zone 1								
Pipe290	0.035	1.49	30.576	30.471	AR&R 100 year, 15 minutes storm, average 191 mm/h, Zone 1								
Pipe237	0.103	2.59	35.256	34.595	AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1								
Pipe344	0.102	4.48	34.448	32.183	AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1								
Pipe169	0.109	4.57	32.092	30.051	AR&R 100 year, 15 minutes storm, average 191 mm/h, Zone 1								
Pipe175	0.117	4.66	29.607	28.755	AR&R 100 year, 15 minutes storm, average 191 mm/h, Zone 1								
Pipe240	0.027	0.67	27.213	27.15	AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1								
Pipe247	0.065	1.72	30.817	30.485	AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1								
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 Widt	Max V	Due to Storm					
OF169	0.019	0.019	1.754	0.049	0.02	1.94	0.39	AR&R 100 year, 1.5 hours storm, average 76.3 mm/h, Zone 1					
OF214	0.056	0.056	7.665	0.028	0.01	9.43	0.42	AR&R 100 year, 1.5 hours storm, average 76.3 mm/h, Zone 1					
OF222	0.031	0.031	7.665	0.023	0.01	7.63	0.36	AR&R 100 year, 1.5 hours storm, average 76.3 mm/h, Zone 1					
OF224	0.015	0.015	7.665	0.018	0.01	5.84	0.29	AR&R 100 year, 1.5 hours storm, average 76.3 mm/h, Zone 1					
OF226	0.004	0.004	7.665	0.01	0	3.44	0.23	AR&R 100 year, 1.5 hours storm, average 76.3 mm/h, Zone 1					
OF220	0.054	0.054	7.665	0.028	0.01	9.43	0.4	AR&R 100 year, 1.5 hours storm, average 76.3 mm/h, Zone 1					
OF148	0	0	0.307	0	0	0	0						
OF142	0.03	0.03	0.91	0.07	0.09	0.97	1.27	AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1					
OF167	0.015	0.015	0.76	0.054	0.07	0.44	1.29	AR&R 100 year, 15 minutes storm, average 191 mm/h, Zone 1					
OF197	0.011	0.011	13.924	0.012	0.01	4.04	0.46	AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1					
OF133	0.046	0.046	0.91	0.079	0.11	1.29	1.34	AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1					
OF155	0.001	0.001	1.341	0.026	0.01	0.22	0.33	AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1					
OF157	0.007	0.007	5.42	0.015	0	4.94	0.18	AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1					
OF159	0.008	0.008	0.778	0.043	0.05	0.35	1.09	AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1					
OF123	0.004	0.004	0.91	0.035	0.03	0.29	0.84	AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1					
OF126	0.004	0.004	0.91	0.033	0.03	0.27	0.79	AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1					
OF186	0	0	5.42	0	0	0	0						
OF181	0	0	5.42	0	0	0	0						
OF178	0	0	5.42	0	0	0	0						
OF174	0	0	5.42	0	0	0	0						
OF171	0	0	5.42	0	0	0	0						
OF144	0.003	0.003	1.19	0.035	0.02	0.29	0.53	AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1					
DETENTION BASIN DETAILS													
Name	Max WL	MaxVol	Max Q	Max Q	Max Q								
			Total	Low Level	High Level								
OSD-Tank	27.03	76.9	0.213	0.213	0								

CONTINUITY CHECK for AR&R 100 year, 5 minutes storm, average 283 mm/h, Zone 1													
Node	Inflow	Outflow	Storage Change	Difference									
	(cu.m)	(cu.m)	(cu.m)	%									
Pit10	5.76	5.73	0	0.5									
Pit9	44.15	43.57	0	1.3									
Pit8	43.57	44.03	0	-1.1									
Pit7	51.92	51.27	0	1.2									
Pit6	51.27	52.22	0	-1.8									
OSD-Tank	113.92	113.76	0.16	0									
Pit2 GPT	113.76	114.32	0	-0.5									
Pit1 GPT	114.32	114.41	0	-0.1									
N747	114.41	114.41	0	0									
Pit15	0.45	0.44	0	2.3									
Pit14	0.89	0.9	0	-0.3									
Pit13	2.48	2.48	0	0									
Pit12	3.83	3.78	0	1.2									
Pit11	35.82	35.83	0	0									
Pit22	13.32	13.13	0	1.5									
Pit21	18.1	18.25	0	-0.8									
Pit 16	55.71	55.6	0	0.2									
Pit23	1.02	0.97	0	5.2									
Pit18	37.55	37.42	0	0.3									
Pit 17	37.42	37.46	0	-0.1									
Pit42	24.04	24.06	0	-0.1									
Pit41	29.48	29.41	0	0.2									
N745	29.41	29.41	0	0									
Pit51	10.83	10.89	0	-0.5									
Pit50	57.06	57.21	0	-0.3									
N742	50.12	50.12	0	0									
Pit57	3.61	3.55	0	1.9									
Pit56	9.19	9.32	0	-1.4									
Pit55	21.51	21.27	0	1.1									
Pit54	33.46	33.41	0	0.2									
Pit53	38.39	38.41	0	0									
Pit52	43.38	43.25	0	0.3									
Ex31	1.58	1.58	0	0									
N30	1.58	1.58	0	0									
Pit32	3.39	3.37	0	0.6									
Pit33	5.51	5.5	0	0.2									
Pit34	7.98	7.97	0	0.1									
Pit35	10.23	10.22	0	0.1									
Pit36	11.58	11.6	0	-0.2									
NRoof4&2	30.74	30.75	0	0									
Pit20A	30.75	30.71	0	0.1									
Pit20	33.2	33.19	0	0									
Pit19	36.58	36.58	0	0									
NRoof 1	7.97	7.89	0	1.1									
NRoof3	19.2	19.19	0	0.1									
N832	0	0	0	0									
Run Log for 130711 Lismore Hospital Drainage.drn run at 16:03:00 on 11/7/2013													
Upwelling occurred at Pit9, Pit50, Pit22, Pit21													
Freeboard was less than 0.15m at Pit 16, Pit 17, Pit10, Pit8, Pit7													
Flows were safe in all overflow routes.													
The following overflow routes carried water uphill (adding energy): OF224, OF214													
These results may be invalid. You should check for water flowing round in circles at these locations. You may need to reformulate the model.													