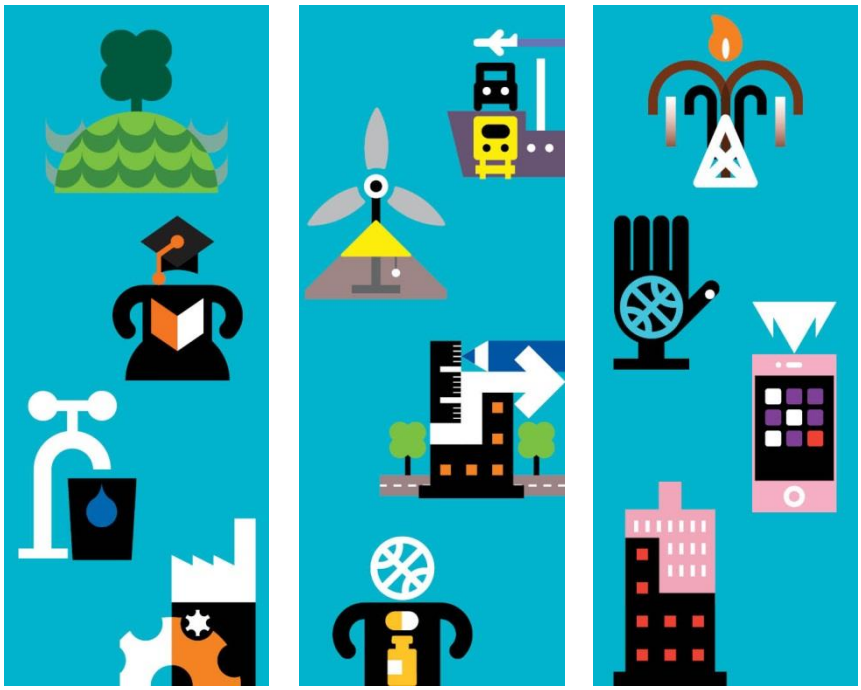

Camden Medical Campus

Stormwater Management and Servicing Strategy Report

January 2020

Mott MacDonald

Camden Medical Campus

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Contents

1 Introduction

1.1 Purpose of Report

This Stormwater Management and Servicing Strategy Report has been prepared by Mott MacDonald (MM) to accompany a Section 4.55(2) modification application for the proposed Camden Medical Campus located on Lot number 846 within the Gregory Hills Corporate Park development. This amended report describes the proposed stormwater management measures and review of the servicing strategy for the proposed site. The report has been prepared in response to SEARS Application specifically items 10, 14 and 15.

1.2 Site Location and Description

The site is located on Lot number 846 within the Gregory Hills Corporate Park development at Gregory Hills. The proposed site is bounded by the South Creek Tributary Way to the west, Digitaria Drive to the north, the Hermitage Way to the east and a proposed future medical centre to the south. The site generally has a fall from east to west with all of the site runoff directed towards the South Creek Tributary.

1.3 Basis of Report

The engineering detail in this report has been developed based on the following documentation:

- Existing site survey undertaken by Burton and Field Surveyors.
- Draft DP plan prepared by Burton and Field Surveyors.
- Civil engineering documentation prepared by Mott MacDonald for the Stage 3 to 6 Gregory Hills Corporate Park Development Application, DA 997/2014.
- Civil Engineering documentation for Stage 4 of Gregory Hills Corporate Park prepared by Mott MacDonald.
- Civil Engineering documentation for the South Creek Tributary works in the Gregory Hills Corporate Park site prepared by Mott MacDonald.
- Civil engineering DA drawings for Stage 2 of the Gregory Hills Corporate Park development prepared by Mott MacDonald submitted as DA 864/2014.
- Civil Engineering documentation for Stage 2 of Gregory Hills Corporate Park prepared by Mott MacDonald.
- Sydney Water drawings for Stage 4 of Gregory Hills Corporate Park prepared by Mott MacDonald.
- Civil engineering documentation prepared by Tribeca Homes for the residential Development to the east of the proposed site.

2 Stormwater Management

2.1 Design Philosophy

The stormwater drainage for the site has been designed in accordance with the following criteria that has been approved by council and is consistent with the overall estate design philosophy.

Approved Overall Estate Drainage Criteria:

- Road network drainage system designed to convey the 10-year ARI storm event runoff from the road areas as well as the detained flows from each of the individual development lots.
- Outlet pipes from each of the lots designed to convey the detained 10-year ARI storm event runoff from the lots. This is as a result of detention being required on each of the individual development lots so that the peak flow from the post developed site (including compensatory storage for the adjacent road area) does not exceed the pre developed flows for all storm events from the 1 year to the 100-year ARI storm events.

Proposed Site Drainage Criteria:

- Internal drainage system designed to convey the 10-year ARI storm event runoff from the site.
- Detention provided so that the peak flow from the post developed site (including compensatory storage for the adjacent road area) does not exceed the pre-developed flows for all storm events from the 1-year to the 100-year ARI storm events. In accordance with detention sizing provided as part of the approved DA 997/2014.

To achieve this design criteria, drainage is proposed to collect runoff from the carpark and building areas discharging via a detention tank into the proposed external mains system in Digitaria Drive. The proposed drainage layout is shown on MM drawing numbers MMD-368851-C-DR-CA-DA-0130 to MMD-368851-C-DR-CA-DA-0134.

2.2 Onsite Detention

The Turner Road Precinct Development Control Plan 2007 requires that the development attenuates the 100-year ARI peak post development flow back to the pre-development flow rates. In accordance with Camden Council Engineering Design Specification on site detention shall manage peak discharges for all storms up to the 100-year ARI event.

As documented in the "*Civil Engineering Report – Stage 3 to 6 Development Application, Mott MacDonald, March 2015*" which was prepared by Mott MacDonald as part of the DA submission, the basis for the lot-based detention design for the Gregory Hills Corporate Park site is as follows:

- The general principles of on-site detention for each commercial lot are as approved in the development consent 277/2012 and 997/2014. The development consent states that "*if necessary an on-site detention system must be provided to restrict stormwater discharges from the site to pre development flows in accordance with Camden Council's current Engineering Design Specifications*".
- The detention volume for each lot has been designed to provide compensatory detention for the adjacent road frontage including the proportion of Gregory Hills Drive adjacent to the site.

- The calculated proportion of adjacent road area that each individual lot provides compensatory storage for was taken as the percentage of the total lot area of each individual lot.
- Each lot was modelled so that the peak flow from the post developed site (including flows that bypass the detention basin from the adjacent road area) does not exceed the pre-developed flows for all storm events from the 1-year to the 100-year ARI storm events.
- The assumed depth of the proposed detention tanks is taken as 1m.

From the calculations undertaken as part of the DA submission the following detention requirements have been calculated for Lot 846:

Detention Volume = **1,375 m^3**

Orifice Diameter = **390 mm**

The following catchment data was used to calculate the detention volume required for the site.

Table 2.1: Lot 846 – Input Data

Item	Value
Pre-Developed (Total) Area	5.175 ha
Lot Area	4.145 ha
Percentage of Total Lot Area	26.77%
Adjacent Road Area	1.030 ha

Source: *Civil Engineering Report – Stage 3 to 6 Development Application, Mott MacDonald, March 2015*

With the following allowable discharge required from the site:

Table 2.2: Lot 846 - Detention Calculations DRAINS Output

Storm Event	Pre-Developed Flow (m^3/s)	Post Developed Pipe Flow from Site (m^3/s)	Post Developed Overland Flow from Site (m^3/s)	Post Developed Flow Bypassing Detention (m^3/s)	Total Post Developed Flow (m^3/s)
1 year	0.396	0.189	0	0.207	0.396
10 year	1.270	0.275	0.008	0.367	0.650
100 year	2.070	0.310	0.910	0.513	1.733

Source: *Civil Engineering Report – Stage 3 to 6 Development Application, Mott MacDonald, March 2015*

Due to the layout of the site which results in not all of the runoff being able to be directed through the proposed detention system these calculations have been revisited as shown in Section 2.3.8.

2.3 Stormwater Modelling

Modelling of the proposed stormwater system was undertaken using the DRAINS software package. The following parameters were used in the model.

2.3.1 Hydrologic Parameters

The Intensity-Frequency-Duration (IFD) information from Camden Councils Engineering Design Specification was used. The proposed stormwater drainage system was analysed for a range of durations

(between 5 minutes to 2 hours) to ascertain the effectiveness of the proposed system under multiple design rainfall scenarios.

Table 2.3 lists the loss parameters utilised in the DRAINS model. These parameters are as outlined in the Camden Council Engineering Design Specification.

Table 2.3: DRAINS Model Loss Parameters

Parameter	Value
Impervious (Paved) Depression Storage	1 mm
Pervious (Grassed) Depression Storage	5 mm
Soil Type	3

2.3.2 Pit Inlet Capacities

For all pits throughout the development, the pit capacity relationships within *DRAINS* were adopted. These relationships are based on published results of scale model testing. For the 100-year storm event a blockage factor of 50% was applied on all pits as per Camden Council requirements.

2.3.3 Pipe and Pit Friction Losses

A Manning's friction coefficient of 0.013 was adopted for reinforced concrete pipes and 0.009 for uPVC pipes as specified by Camden Council.

Pit loss values were derived from the Missouri chart as set out in the Camden Council Engineering Design Specification and are summarised in the DRAINS Input data.

2.3.4 Pipes

Proposed pipes were graded at a minimum slope of 1%, with a desirable minimum cover of 600mm over the pipe.

2.3.5 Catchments

Catchment areas for each pit are shown in the DRAINS Input data attached in Appendix A and on the Catchment Plan, MM drawing number MMD-368851-C-DR-CA-DA-0210.

The DRAINS Input data in Appendix A lists the areas for each catchment and the adopted pervious and impervious percentages.

2.3.6 Overland Flow Paths

Typical cross-sections based on the gutter shape and pavement type were input to DRAINS representing the overland flow paths. Slopes were derived from the proposed pit surface levels.

2.3.7 Tailwater Levels

The tailwater level at the connection point to the downstream drainage system was set at the HGL level from the Stage 4 Gregory Hills Corporate Park design.

2.3.8 Detention

Using the design criteria as discussed in Section 2.2, the detention volume for the site was revisited due to areas of the site not able to be drained through the proposed detention system. The tank was sized to satisfy the following:

The post-developed flow from the site (including the flows bypassing detention)	+	The external post-developed flows from the public domain areas	=	The pre-developed flows for all flows from the 1-year to the 100-year storm event.

To meet these requirements, it is proposed to install a detention tank with a high early discharge pit. The high early discharge pit has been utilised to provide a detention system with a smaller storage volume requirement but still however meeting the site discharge requirements. As a result, the following detention system is proposed:

- Detention Volume = **1,000 m^3**
- Orifice diameter for low flows = **340mm**
- Weir level = **RL 98.8**
- Outlet pipe diameter for high flows = **600mm**

The detention system is proposed to be an underground tank. Other options include utilising storage in the pipe system by upsizing the pipe size within the site. This can be investigated further during the detailed design phase.

The outflows from the site utilising the detention system as specified above are summarised in Section 2.3.9.

2.3.9 Results

The model was run to provide 150mm freeboard at all the pits during the 10-year ARI storm event. The results from the DRAINS model are attached in Appendix A. The total outflows from the site are summarised below against the required outflows as identified in Section 2.2.

Table 2.4: DRAINS Output

Storm Event	Pre-Developed Flow (m3/s)	Post-Developed Flow Bypassing OSD from external to site (m3/s)	Post-Developed Flow Piped from Site (m3/s)	Post-Developed Overland Flow from OSD (m3/s)	Post-Developed Flow Bypassing OSD from Site (m3/s)	Total Post-Developed Flow (m3/s)
1 year	0.396	0.207	0.152	0	0.032	0.391
10 year	1.27	0.367	0.431	0	0.066	0.864
100 year	2.07	0.513	0.981	0.219	0.129	1.842

2.4 Stormwater Quality Management

As part of this development it is proposed to provide an onsite water quality management system to meet the requirements in accordance with Camden Councils guidelines as summarised in Table 2.5 below:

Table 2.5: Camden Council Water Quality Targets

Pollutant	% Reduction in Pollutant Loads
Gross Pollutants (>5mm)	90%
Total Suspended Solids	85%
Total Phosphorus	65%
Total Nitrogen	45%

Source: Camden Council Engineering Design Specification

The above objectives are expressed as the reduction in pollutant loads required, compared to the proposed development with no stormwater control measures.

As approved in the Gregory Hills Corporate Park Development Consent for the whole estate, a development condition shall be imposed on all private lot developments to manage water quality onsite prior to discharging flows into the public domain system. The runoff within the public domain is being treated with a separate at source treatment on the public domain roads prior to entry into the piped system.

2.4.1 Proposed Treatments

To achieve the required pollutant reductions to satisfy Camden Councils requirements, the following water quality treatment train is proposed. A HumeGard® GPT will be used as the primary treatment followed by a JellyFish® filter as a tertiary treatment device. The proposed treatment train is discussed in more detail in the following sections.

2.4.1.1 HumeGard® Gross Pollutant Trap (GPT)

For primary treatment of the stormwater runoff, a HumeGard® Gross Pollutant Trap is to be provided. The HumeGard is a pollution control device specifically designed to remove gross pollutants and coarse sediments in residential and commercial developments. The MUSIC node from Hume's was used for this model with the input data as summarised below.

Table 2.6: HumeGard® GPT MUSIC Input Parameters

Pollutant	Input	Output	Adopted Rate
Suspended Solids (mg/L)	500	295	41%
Phosphorus (mg/L)	5	3.3	34%
Nitrogen (mg/L)	5	3.8	24%
Gross Pollutants (kg/ML)	15	2.2	85%

Source: *Humes*

2.4.1.2 HumeCeptor® Oil and Silt Arrestor

For secondary treatment of the stormwater runoff, a HumeCeptor® oil and silt arrestor is to be provided. The HumeCeptor is a pollution control device specifically designed to remove Total Suspended Solids and hydrocarbons from runoff. The MUSIC node from Hume's was used for this model with the input data as summarised below.

Table 2.7: HumeCeptor® MUSIC Input Parameters

Pollutant	Input	Output	Adopted Rate
Suspended Solids (mg/L)	500.3	100.3	80%
Phosphorus (mg/L)	4.998	3.519	30%
Nitrogen (mg/L)	5.0	3.5	30%
Gross Pollutants (kg/ML)	15.1	14.9	1.3%

Source: *Humes*

2.4.1.3 JellyFish® Filter

The JellyFish® filter are to be provided to be used as a final treatment device for stormwater runoff from the proposed development. Using filtration cartridges, the JellyFish® filter is able to capture a high level of stormwater pollutants including total suspended solids, total nitrogen, total phosphorous, total copper and total zinc. In developing the MUSIC model for the proposed development, a JellyFish® JF3000-16-4 cartridge system by Hume's with a treatable flow rate of 88L/s has been proposed as an end-of-line treatment prior to discharge. The position of the JellyFish® system has been proposed to maximise flows and allow easy access for maintenance. The MUSIC node from Hume's was used for this model with the input data as summarised below.

Table 2.8: JellyFish® Filter MUSIC Input Parameters

Pollutant	Input	Output	Adopted Rate
Suspended Solids (mg/L)	200	22	89%
Phosphorus (mg/L)	0.4	0.14	65%
Nitrogen (mg/L)	7	3.2	54%
Gross Pollutants (kg/ML)	100	1	99%

Source: *Humes*

2.4.2 Water Quality Modelling

A MUSIC (Version 6) model was created for the site to ensure the treatment measures provided onsite achieve the pollutant removal objectives as set by Camden Council. The following methodology and parameters were incorporated in the MUSIC model:

- The MUSIC model's default pluviograph data for Sydney 6-minute interval was utilised within the model. This was deemed acceptable for the site since the years utilised had both wet and dry periods and were close to the site.
- A MUSIC model was setup to represent the post developed site. The site was split up into 3 sub catchments representing the landscaped area, the carpark and sealed footpath area and the roofed areas.

Table 2.9: MUSIC Post-Developed Catchments

Post-Developed Region	Area (Ha)
Roof water discharging to water quality treatment	1.769 ha
Sealed road and footpath discharging to water quality treatment	1.451 ha
Landscaping discharging to water quality treatment	0.741 ha
Landscaping Bypass	0.067 ha
Sealed road and footpath bypass	0.120 ha

For the MUSIC catchment plan, refer to MM drawing number MMD-368851-C-DR-CA-DA-0220.

- Pollutant concentration parameters used within the model were based on the recommended model defaults for different land use categories as specified in the MUSIC modeling guidelines prepared for the Sydney Catchment Authority (SCA). These are summarised in the following table:

Table 2.10: Post-Development Areas – MUSIC Node Classification

MUSIC Node	Category
Roof	"Roof Area"
Hardstand	"Roads"
Landscaping	"Pervious"

Source: NSW MUSIC modeling guidelines.

- A treatment train was designed to incorporate a series of treatment nodes including a HumeGard, HumeCeptor and a JellyFish Filter. The effectiveness of the proposed treatments is summarised in Section 2.4.3.

2.4.3 MUSIC Results

The following results were achieved within the model.

Table 2.11: MUSIC Results of Total Site

Pollutant	Post – Development (kg/yr)		Removal Rate (%)	Target Removal (%)
	Untreated	Residual		
Suspended Solids	12,300	1050	91.5	85
Phosphorus	20.9	5.83	72.1	65
Nitrogen	114	39.3	65.5	45
Gross Pollutants	1120	54	95.2	90

According to the results of the MUSIC analysis, the water quality treatment train provided will provide adequate treatment for the proposed development runoff from the proposed development in accordance with the water quality targets as set out by Camden Council.

2.5 Flooding

As part of the design works for the proposed South Creek Tributary a HEC-RAS model was prepared to determine the flood levels within the proposed creek alignment. The design of the creek tributary is as documented in the "*Civil Engineering Report – South Creek Tributary CC, Mott MacDonald, September 2015*". A plan summarising the results from the HEC-RAS model taken from the above-mentioned report is attached in Appendix B. As per council requirements, the finished surface level for all habitable floor levels is to be in accordance with Camden Councils Flood Risk Management Policy, for critical utilities and public facilities for which this site is classified. Further to this advice was received from council in response to the initial SEARS application stating that the site was to have a minimum freeboard of 2.3m above the riparian corridor.

Table 2.12: Flood Levels

Location	Minimum Creek Surface Level RL (m)	100 Year Flood Level RL (m)	PMF Flood Level RL (m)	Minimum Allowable Floor Level 2.3m above Creek Level (m)
North western corner of the site	95.22	95.99	98.48	97.52
South western corner of the site	97.19	97.85	98.74	99.49

Source: *Civil Engineering Report – Tributary CC, Mott MacDonald, September 2015*

The proposed finished floor levels for the site are as summarised below:

- The proposed finished floor level for the main building of the site is RL 102.50. This provides a freeboard of 4.02m above the PMF flood level and a freeboard of 4.98m above the recommended minimum allowable floor level as identified in the SEARS response letter.
- The proposed basement located adjacent to the north eastern corner of the site has a finished surface level of RL 99.50. This provides a freeboard of 1.02m above the PMF flood level and a freeboard of 1.98m above the recommended minimum allowable floor level as identified in the SEARS response letter.
- The proposed multi deck carpark has a minimum proposed level of RL 100.55 in the south western corner of the site. This provides a freeboard of 1.81m above the PMF flood level and a freeboard of 1.06m above the recommended minimum allowable floor level as identified in the SEARS response letter.

As summarised above, the proposed finished floor levels are acceptable and in accordance with Council's requirements as set out in Camden Council's Flood Risk Management Policy.

3 Servicing Strategy

The following section provides a summary of the servicing strategy for the site. It is noted that the servicing infrastructure as discussed below has already been constructed.

3.1 Water

A 150mm diameter DICL water main has been constructed as part of the Stage 4 works of the Gregory Hills Corporate Park development on the northern side of Digitaria Drive. 2 x 150mm diameter tees have been constructed off this main to provide a connection point to Lot 846 in the north western corner of the site, for both potable water and fire services. The design of these works has been undertaken by Mott MacDonald as the Water Servicing Coordinators (WSCs) for the proposed development. A 150mm diameter PVC is also located on the eastern side of the Hermitage Way, with connection also being able to be provided to this pipe if required. Connections provided to the site are sufficient for the proposed hospital site, with no amplification required.

3.2 Sewer

An existing 375mm diameter PVC main runs within the South Creek tributary along the western boundary of the subject site. As part of the Stage 4 works of the Gregory Hills Corporate Park development, a 225mm diameter PVC pipe with terminal maintenance shaft has been provided off the 375mm diameter main for the connection of Lot 846, with realignment of this 225mm line required to accommodate the proposed basement in the Biomedical Building. The design of these works has been undertaken by Mott MacDonald, as the water servicing coordinators for the proposed development. Connections provided to the site are sufficient for the proposed hospital site, with no amplification required.

3.3 Electricity

An underground electrical network has been constructed as part of the Stage 4 works of the Gregory Hills Corporate Park development within Digitaria Drive and the Hermitage Way on both sides of the road. The design of these works has been undertaken by Estate Power Design Pty Ltd with allowance made for the connection of Lot 846. An electrical substation has been provided for the hospital site along Digitaria Drive.

3.4 Gas

A 110mm gas main is located along the eastern boundary of the site on the eastern side of the Hermitage Way. Connection to this main is proposed for the site. Connection requirements are to be determined during the detailed design phase once usage requirements have been determined.

3.5 Telecommunications

An underground telecommunications network has been constructed as part of the Stage 4 works of the Gregory Hills Corporate Park development within Digitaria Drive and the Hermitage way on both sides of the road. Connection to these cables is proposed for this development.

Appendices

Appendix A. Drains Input / Output

DRAINS Input

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 Loss	Inflow Hydrograph	Pit is
PitG1	Sag	NSW Dept. of Housing RM7 Inlet, 3% crossfall-1% grade	RM.7 Grated Accessway Pit at 1% longitudinal grade	5	1.5	101.35	0.1	0	0.5	294184.898	6233226.567	No	217	1 x Ku	No	New
PitA3	OnGrade	Dummy	GPT		0.5	99.7		0	0.5	294147.371	6233265.109	Yes	91	1 x Ku	No	New
PitA2	OnGrade	Junction	JP		0.5	99.4		0	0.5	294147.032	6233269.285	Yes	92	1 x Ku	No	New
PitA1	OnGrade	Junction	JP		0.5	99.2		0	0.5	294146.987	6233273.891	Yes	34298752	1 x Ku	No	New
PitA0	OnGrade	Junction	JP		0.5	99		0	0.5	294147.099	6233279.977	Yes	154	1 x Ku	No	Existing
NOut	Node					98.7		0		294146.97	6233281.982		93		No	
NBypass1	Node					100		0		294155.461	6233281.909		241		No	
NBypass2	Node					100		0		294243.851	6233276.221		242		No	
NBypassSum	Node					99		0		294053.968	6233156.728		289		No	
NBypassOut	Node					98		0		293980.089	6233156.714		290		No	
NRoof5	Node					110		0		294185.468	6233270.471		348		No	
PitB1	Sag	NSW Dept. of Housing RM7 Inlet, 3% crossfall-1% grade	RM.7 Grated Accessway Pit at 1% longitudinal grade	5	1.5	99.5	0.15	0	0.5	294185.365	6233273.513	No	207	1 x Ku	No	New
NRoof4	Node					110		0		294330.875	6233229.875		475		No	
PitB5	OnGrade	NSW Dept. of Housing RM7 Inlet, 3% crossfall-1% grade	RM.7 Grated Accessway Pit at 1% longitudinal grade		0.5	101.82		0	0.5	294330.687	6233241.799	No	548	1 x Ku	No	New
PitB4	OnGrade	NSW Dept. of Housing RM7 Inlet, 3% crossfall-1% grade	RM.7 Grated Accessway Pit at 1% longitudinal grade		0.5	101.2		0	0.5	294311.761	6233247.181	No	523	1 x Ku	No	New
PitB3	Sag	NSW Dept. of Housing RM7 Inlet, 3% crossfall-1% grade	RM.7 Grated Accessway Pit at 1% longitudinal grade	5	0.5	100.7	0.1	0	0.5	294294.306	6233251.766	No	429	1 x Ku	No	New
PitB2	OnGrade	NSW Dept. of Housing RM7 Inlet, 3% crossfall-1% grade	RM.7 Grated Accessway Pit at 1% longitudinal grade		0.5	100.35		0	0.5	294243.713	6233266.068	No	387	1 x Ku	No	New
NBypass3	Node					100		0		294281.492	6233266.26		512		No	
NBypass4	Node					100		0		294320.503	6233256.345		537		No	
PitB6	OnGrade	NSW Dept. of Housing RM7 Inlet, 3% crossfall-1% grade	RM.7 Grated Accessway Pit at 1% longitudinal grade		4	102.3		0	0.5	294369.55	6233222.884	No	560	1 x Ku	No	New
NBypass7	Node					100		0		294139.8	6233195.582		652		No	
NRoof1	Node					110		0		294164.475	6233130.225		168265		No	
PitA6	Sag	NSW Dept. of Housing RM7 Inlet, 3% crossfall-1% grade	RM.7 Grated Accessway Pit at 1% longitudinal grade	5	2	101.6	0.25	0	0.5	294161.018	6233140.422	No	590	1 x Ku	No	New
PitA5	Sag	NSW Dept. of Housing RM7 Inlet, 3% crossfall-1% grade	RM.7 Grated Accessway Pit at 1% longitudinal grade	5	0.5	101.5	0.25	0	0.5	294162.052	6233184.849	No	580	1 x Ku	No	New
NRoof2	Node					110		0		294168.766	6233214.782		168277		No	
NBypass5	Node					100		0		294238.239	6233021.741		168315		No	
NRoof3	Node					110		0		294196.357	6233131.999		252700		No	
PitH1	OnGrade	NSW Dept. of Housing RM7 Inlet, 3% crossfall-1% grade	RM.7 Grated Accessway Pit at 1% longitudinal grade		4	102		0	0.5	294196.777	6233143.642	No	606	1 x Ku	No	New
PitA7	OnGrade	NSW Dept. of Housing RM7 Inlet, 3% crossfall-1% grade	RM.7 Grated Accessway Pit at 1% longitudinal grade		2	101.85		0	0.5	294187.403	6233126.386	No	604	1 x Ku	No	New
NBypass6	Node					100		0		294144.778	6233073.761		5102305		No	
PitE4	Sag	NSW Dept. of Housing RM7 Inlet, 3% crossfall-1% grade	RM.7 Grated Accessway Pit at 1% longitudinal grade	2	4	102.25	0.1	0	0.5	294220.178	6233031.544	No	16955448	1 x Ku	No	New
PitE3	Sag	NSW Dept. of Housing RM7 Inlet, 3% crossfall-1% grade	RM.7 Grated Accessway Pit at 1% longitudinal grade	1	1.5	102.3	0.15	0	0.5	294234.516	6233067.385	No	168338	1 x Ku	No	New
PitE2	Sag	NSW Dept. of Housing RM7 Inlet, 3% crossfall-1% grade	RM.7 Grated Accessway Pit at 1% longitudinal grade	1	1.5	102.3	0.15	0	0.5	294245.458	6233088.219	No	38653216	1 x Ku	No	New
PitE1	Sag	NSW Dept. of Housing RM7 Inlet, 3% crossfall-1% grade	RM.7 Grated Accessway Pit at 1% longitudinal grade	1	2	102.2	0.15	0	0.5	294248.32	6233094.006	No	38653241	1 x Ku	No	New
PitA8	OnGrade	NSW Dept. of Housing RM7 Inlet, 3% crossfall-1% grade	RM.7 Grated Accessway Pit at 1% longitudinal grade		2	101.6		0	0.5	294235.53	6233100.813	No	605	1 x Ku	No	New
PitC2	OnGrade	NSW Dept. of Housing RM7 Inlet, 3% crossfall-1% grade	RM.7 Grated Accessway Pit at 1% longitudinal grade		0.5	102.1		0	0.5	294267.431	6233121.106	No	38653283	1 x Ku	No	New
PitC1	Sag	NSW Dept. of Housing RM7 Inlet, 3% crossfall-1% grade	RM.7 Grated Accessway Pit at 1% longitudinal grade	1	1.5	101.8	0.15	0	0.5	294257.373	6233104.877	No	38653277	1 x Ku	No	New
PitA12	OnGrade	NSW Dept. of Housing RM7 Inlet, 3% crossfall-1% grade	RM.7 Grated Accessway Pit at 1% longitudinal grade		0.5	102.9		0	0.5	294314.545	6233176.329	No	38653285	1 x Ku	No	New
PitA11	OnGrade	NSW Dept. of Housing RM7 Inlet, 3% crossfall-1% grade	RM.7 Grated Accessway Pit at 1% longitudinal grade		0.5	102.2		0	0.5	294267.982	6233151.157	No	38653290	1 x Ku	No	New
PitA10	OnGrade	NSW Dept. of Housing RM7 Inlet, 3% crossfall-1% grade	RM.7 Grated Accessway Pit at 1% longitudinal grade		0.5	101.65		0	0.5	294243.131	6233115.174	No	38653287	1 x Ku	No	New
PitD2	OnGrade	NSW Dept. of Housing RM7 Inlet, 3% crossfall-1% grade	RM.7 Grated Accessway Pit at 1% longitudinal grade		0.5	101.85		0	0.5	294257.005	6233126.794	No	38653297	1 x Ku	No	New
PitD1	Sag	NSW Dept. of Housing RM7 Inlet, 3% crossfall-1% grade	RM.7 Grated Accessway Pit at 1% longitudinal grade	1	1.5	101.6	0.15	0	0.5	294247.771	6233113.029	No	38653295	1 x Ku	No	New
PitF3	OnGrade	NSW Dept. of Housing RM7 Inlet, 3% crossfall-1% grade	RM.7 Grated Accessway Pit at 1% longitudinal grade		0.5	102.67		0	0.5	294307.603	6233152.681	No	38653303	1 x Ku	No	New
PitF2	Sag	NSW Dept. of Housing RM7 Inlet, 3% crossfall-1% grade	RM.7 Grated Accessway Pit at 1% longitudinal grade	1	2	102.45	0.15	0	0.5	294298.904	6233139.174	No	38653305	1 x Ku	No	New
PitF1	OnGrade	NSW Dept. of Housing RM7 Inlet, 3% crossfall-1% grade	RM.7 Grated Accessway Pit at 1% longitudinal grade		0.5	102.32		0	0.5	294288.075	6233147.331	No	38653300	1 x Ku	No	New
PitN2	Sag	NSW Dept. of Housing RM7 Inlet, 3% crossfall-1% grade	RM.7 Grated Accessway Pit at 1% longitudinal grade	1	4	102.1	0.15	0	0.5	294142.809	6233083.124	No	38653491	1 x Ku	No	New
PitN1	Sag	NSW Dept. of Housing RM7 Inlet, 3% crossfall-1% grade	RM.7 Grated Accessway Pit at 1% longitudinal grade	5	0.5	101.8	0.2	0	0.5	294148.233	6233106.174	No	4899836	1 x Ku	No	New

DETENTION BASIN DETAILS

Name	Elev	Surf. Area	Not Used	Outlet Type	K	Dia(mm)	Centre RL	Pit Family	Pit Type	x	y	HED	Crest RL	Crest Length(m)	id
OSDA4	97.61	1		Orifice		340	97.78			294155.884	6233252.372	No			89
	97.88	750													
	99.5	750													
	99.51	1													
	100	1													
	101.8	1													
OSDWeir	97.6	1		Culvert	0.5					294153.72	6233255.618	No			8371174
	100	1													

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 FlowFactor	Rainfall Multiplier
CatG1	PitG1	0.1238	80	20	0	5	10	0										0				1
CatA4	OSDA4	0.2381	30	70	0	5	10	0										0				1
CatBypass1	NBypass1	0.0375	60	40	0	5	10	0										0				1
CatBypass2	NBypass2	0.0313	20	80	0	5	10	0										0				1
CatRoof5	NRoof5	0.3932	100	0	0	5	10	0										0				1
CatB1	PitB1	0.0904	0	100	0	5	10	0										0				1
CatRoof4	NRoof4	0.4061	100	0	0	5	10	0										0				1
CatB5	PitB5	0.012	100	0	0	5	10	0										0				1
CatB4	PitB4	0.0217	87	13	0	5	10	0										0				1
CatB3	PitB3	0.0177	100	0	0	5	10	0										0				1
CatB2	PitB2	0.015	100	0	0	5	10	0										0				1
CatBypass3	NBypass3	0.0078	10	90	0	5	10	0										0				1
CatBypass4	NBypass4	0.0074	25	75	0	5	10	0										0				1
CatB6	PitB6	0.1626	0	100	0	5	10	0										0				1
CatBypass7	NBypass7	0.0313	0	100	0	5	10	0										0				1
CatRoof1	NRoof1	0.2771	100	0	0	5	10	0										0				1
CatA6	PitA6	0.1141	90	10	0	5	10	0										0				1
CatA5	PitA5	0.0954	70	30	0	5	10	0										0				1
CatRoof2	NRoof2	0.2338	100	0	0	5	10	0										0				1
CatBypass5	NBypass5	0.0099	100	0	0	5	10	0										0				1
CatRoof3	NRoof3	0.3634	100	0	0	5	10	0										0				1
CatH1	PitH1	0.0498	60	40	0	5	10	0										0				1
CatBypass6	NBypass6	0.0764	100	0	0	5	10	0										0				1
CatE4	PitE4	0.0518	87	13	0	5	10	0										0				1
CatE3	PitE3	0.1142	87	13	0	5	10	0										0				1
CatE2	PitE2	0.0839	78	22	0	5	10	0										0				1
CatE1	PitE1	0.1135	90	10	0	5	10	0										0				1
CatA8	PitA8	0.1012	82	18	0	5	10	0										0				1
CatC2	PitC2	0.0354	85	15	0	5	10	0										0				1
CatC1	PitC1	0.054	85	15	0	5	10	0										0				1
CatA12	PitA12	0.0484	80	20	0	5	10	0										0				1
CatA11	PitA11	0.1339	40	60	0	5	10	0										0				1
CatA10	PitA10	0.0474	80	20	0	5	10	0										0				1
CatD2	PitD2	0.0516	90	10	0	5	10	0										0				1
CatD1	PitD1	0.0474	95	5	0	5	10	0										0				1
CatF3	PitF3	0.0484	80	20	0	5	10	0										0				1
CatF2	PitF2	0.0469	80	20	0	5	10	0										0				1
CatF1	PitF1	0.0363	90	10	0	5	10	0										0				1

CatN2	PitN2	0.0862	80	20	0	5	10	0	0	1
CatN1	PitN1	0.0988	0	100	0	5	10	0	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)
PipeG1-A4	PitG1	OSDA4	22.6	100.45	100.22	1.02	RCP	300	300	0.013	NewFixed	1	OSDA4	0					
P OSD	OSDA4	OSDWeir	2	97.61	97.6	0.5	RCP	450	450	0.013	NewFixed	1	OSDWeir	2					
Pipe A4-A3	OSDWeir	PitA3	2	97.6	97.59	0.5	RCP	600	600	0.013	NewFixed	1	PitA3	2					
PipeA3-A2	PitA3	PitA2	2	97.55	97.54	0.5	RCP	600	600	0.013	New	1	PitA2	0					
PipeA2-A1	PitA2	PitA1	2	97.46	97.45	0.5	RCP	600	600	0.013	New	1	PitA1	0					
PipeA1-A0	PitA1	PitA0	2	97.39	97.38	0.5	RCP	600	600	0.013	New	1	PitA0	0					
PipeA0-NOut	PitA0	NOut	10	97.36	97.26	1	RCP	750	750	0.013	Existing	1	NOut	0					
PipeRoof5-B1	NRoof5	PitB1	22.9	98.59	98.36	1	RCP	375	375	0.013	New	1	PitB1	1					
PipeB1-A4	PitB1	OSDA4	24.6	98.34	98.09	1.02	RCP	600	600	0.013	NewFixed	1	OSDA4	0					
PipeRoof4-B5	NRoof4	PitB5	8.1	100.58	100.48	1.23	RCP	375	375	0.013	New	1	PitB5	10					
PipeB5-B4	PitB5	PitB4	19.9	99.97	99.77	1.01	RCP	525	525	0.013	New	1	PitB4	0					
PipeB4-B3	PitB4	PitB3	39.6	99.75	99.35	1.01	RCP	525	525	0.013	New	1	PitB3	0					
PipeB3-B2	PitB3	PitB2	43.5	99.32	98.88	1.01	RCP	525	525	0.013	New	1	PitB2	0					
PipeB2-B1	PitB2	PitB1	50.7	98.86	98.36	0.99	RCP	525	525	0.013	New	1	PitB1	0					
PipeB6-B5	PitB6	PitB5	31.1	101.4	100.92	1.54	RCP	300	300	0.013	New	1	PitB5	0					
PipeRoof1-A6	NRoof1	PitA6	17.6	99.07	98.89	1.02	RCP	375	375	0.013	New	1	PitA6	1					
PipeA6-A5	PitA6	PitA5	41.3	98.87	98.46	0.99	RCP	675	675	0.013	New	1	PitA5	0					
PipeA5-A4	PitA5	OSDA4	47.7	98.44	97.96	1.01	RCP	675	675	0.013	NewFixed	1	OSDA4	0					
PipeRoof2-A4	NRoof2	OSDA4	17.4	100.83	100.65	1.03	RCP	375	375	0.013	NewFixed	1	OSDA4	2					
PipeRoof3-H1	NRoof3	PitH1	2	99.43	99.41	1	RCP	375	375	0.013	New	1	PitH1	2					
PipeH1-A7	PitH1	PitA7	12.4	99.39	99.26	1.05	RCP	600	600	0.013	New	1	PitA7	0					
PipeA7-A6	PitA7	PitA6	34.8	99.24	98.89	1.01	RCP	600	600	0.013	New	1	PitA6	0					
PipeE4-E3	PitE4	PitE3	21.7	101.25	101.03	1.01	RCP	300	300	0.013	New	1	PitE3	0					
PipeE3-E2	PitE3	PitE2	28.7	101.01	100.72	1.01	RCP	300	300	0.013	New	1	PitE2	0					
PipeE2-E1	PitE2	PitE1	8.8	100.7	100.61	1.02	RCP	300	300	0.013	New	1	PitE1	0					
PipeE1-A8	PitE1	PitA8	16.1	99.92	99.76	0.99	RCP	300	300	0.013	New	1	PitA8	0					
PipeA8-A7	PitA8	PitA7	48.2	99.74	99.26	1	RCP	600	600	0.013	New	1	PitA7	0					
PipeC2-C1	PitC2	PitC1	20.2	101.2	100.92	1.39	RCP	300	300	0.013	New	1	PitC1	0					
PipeC1-E1	PitC1	PitE1	17.9	100.9	100.3	3.35	RCP	300	300	0.013	New	1	PitE1	0					
PipeA12-A11	PitA12	PitA11	45	102	101.3	1.56	RCP	300	300	0.013	New	1	PitA11	0					
PipeA11-A10	PitA11	PitA10	46.7	101.2	100.65	1.18	RCP	375	375	0.013	New	1	PitA10	0					
PipeA10-A8	PitA10	PitA8	16.9	100.6	100.43	1.01	RCP	375	375	0.013	New	1	PitA8	0					
PipeD2-D1	PitD2	PitD1	21.2	100.95	100.7	1.18	RCP	300	300	0.013	New	1	PitD1	0					
PipeA10-D1	PitD1	PitA10	3.4	100.68	100.64	1.18	RCP	300	300	0.013	New	1	PitA10	0					
PipeF3-F2	PitF3	PitF2	17.8	101.77	101.55	1.24	RCP	300	300	0.013	New	1	PitF2	0					
PipeF2-F1	PitF2	PitF1	12.4	101.53	101.41	0.97	RCP	300	300	0.013	New	1	PitF1	0					
PipeF1-A11	PitF1	PitA11	17.6	101.39	101.22	0.97	RCP	300	300	0.013	New	1	PitA11	0					
PipeN2-N1	PitN2	PitN1	26.2	101.1	100.84	0.99	RCP	375	375	0.013	New	1	PitN1	0					
PipeN1-A6	PitN1	PitA6	19.5	99.47	99.27	1.03	RCP	300	300	0.013	New	1	PitA6	0					

AILS of SERVICES CROSSING PIPES

Pipe	Chg (m)	Bottom Elev (m)	Height of Service (m)	Chg (m)	Bottom Elev (m)	Height of Service (m)	Chg (m)	Bottom Elev (m)	Height of Service (m)	etc etc

CHANNEL DETAILS

Name	From	To	Type	Length (m)	U/S IL (m)	D/S IL (m)	Slope (%)	Base Width (m)	L.B. Slope (1:?)	R.B. Slope (1:?)	Manning n	Depth (m)	Roofed

OVERFLOW ROUTE DETAILS

Name	From	To	Travel Time (min)	Spill Level (m)	Crest Length (m)	Weir Coeff. C	Cross Section	Safe Depth Major Storms (m)	SafeDepth Minor Storms (m)	Safe DxV (sq.m/sec)	Bed Slope (%)	D/S Area Contributing %	id	
OFD1	PitG1	OSDA4	0.1			Dummy used to model flow acr		0.2	0.05	0.6	1	0	573	10
OF OSD	OSDA4	OSDWeir	0.1	98.8	5	1.704	odel flow acr	0.2	0.05	0.6	1	0	8371194	1
OFA4	OSDWeir	NOut	0.1	100	5	1.704	odel flow acr	0.2	0.05	0.6	1	0	24862794	13
Bypass1	NBypass1	NBypassSum	0.1			Dummy used to model flow acr		0.2	0.05	0.6	1	0	298	10
Bypass2	NBypass2	NBypassSum	0.1			Dummy used to model flow acr		0.2	0.05	0.6	1	0	408	10
BypassTotal	NBypassSum	NBypassOut	0.1			Dummy used to model flow acr		0.2	0.05	0.6	1	0	292	10
OFB1	PitB1	NBypassSum	0.2			Dummy used to model flow acr		0.2	0.05	0.6	1	0	454	20
OFB7	PitB5	NBypass4	0.1			Dummy used to model flow acr		0.2	0.05	0.6	1	0	556	5
OFB6	PitB4	NBypass4	0.1			Dummy used to model flow acr		0.2	0.05	0.6	1	0	542	5
OFB5	PitB3	NBypass3	0.2			Dummy used to model flow acr		0.2	0.05	0.6	1	0	520	25
OFB3	PitB2	NBypass2	0.1			Dummy used to model flow acr		0.2	0.05	0.6	1	0	446	5
Bypass3	NBypass3	NBypassSum	0.1			Dummy used to model flow acr		0.2	0.05	0.6	1	0	517	10
Bypass4	NBypass4	NBypassSum	0.1			Dummy used to model flow acr		0.2	0.05	0.6	1	0	544	10
OFB8	PitB6	PitB5	0.2			Dummy used to model flow acr		0.2	0.05	0.6	1	0	562	30
Bypass5	NBypass7	NBypassSum	0.1			Dummy used to model flow acr		0.2	0.05	0.6	1	0	657	5
OFA5	PitA5	OSDA4	0.4			Dummy used to model flow acr		0.2	0.05	0.6	1	0	339397	50
Bypass7	NBypass5	NBypassSum	0.6			Dummy used to model flow acr		0.2	0.05	0.6	1	0	168321	80
OFH1	PitH1	PitA7	0.2			Dummy used to model flow acr		0.2	0.05	0.6	1	0	38814432	16.6
Bypass6	NBypass6	NBypassSum	0.5			Dummy used to model flow acr		0.2	0.05	0.6	1	0	4899879	50
OFE3	PitE4	NBypassSum	0.6			Dummy used to model flow acr		0.2	0.05	0.6	1	0	16955486	60
OFA8	PitA8	PitA5	1			Dummy used to model flow acr		0.2	0.05	0.6	1	0	38814439	95.6
OFC2	PitC2	PitC1	0.2			Dummy used to model flow acr		0.2	0.05	0.6	1	0	38814427	16.7
OFA12	PitA12	PitA11	0.5			Dummy used to model flow acr		0.2	0.05	0.6	1	0	38814423	45.4
OFA11	PitA11	PitA10	0.4			Dummy used to model flow acr		0.2	0.05	0.6	1	0	38814410	37.8
OFA10	PitA10	PitA8	0.1			Dummy used to model flow acr		0.2	0.05	0.6	1	0	38814419	14.1
OFD2	PitD2	PitD1	0.1			Dummy used to model flow acr		0.2	0.05	0.6	1	0	38814404	14.3
OFF3	PitF3	PitF2	0.1			Dummy used to model flow acr		0.2	0.05	0.6	1	0	38814390	13.8
OFF2	PitF2	PitF1	0.1			Dummy used to model flow acr		0.2	0.05	0.6	1	0	38814394	11.7
OFF1	PitF1	PitA11	0.2			Dummy used to model flow acr		0.2	0.05	0.6	1	0	38814397	17.6
OFN1	PitN1	NBypassSum	0.1			Dummy used to model flow acr		0.2	0.05	0.6	1	0	4899877	10

PIPE COVER DETAILS

Name	Type	Dia (mm)	Safe Cover (m)	Cover (m)	
PipeG1-A4	RCP	300	0.6	-2.94	Unsafe
P OSD	RCP	450	0.6	-0.49	Unsafe
Pipe A4-A3	RCP	600	0.6	-0.64	Unsafe
PipeA3-A2	RCP	600	0.6	1.22	
PipeA2-A1	RCP	600	0.6	1.11	
PipeA1-A0	RCP	600	0.6	0.98	
PipeA0-NOut	RCP	750	0.6	0.63	
PipeRoof5-B1	RCP	375	0.6	0.73	
PipeB1-A4	RCP	600	0.6	-1.12	Unsafe
PipeRoof4-B5	RCP	375	0.6	0.93	
PipeB5-B4	RCP	525	0.6	0.86	
PipeB4-B3	RCP	525	0.6	0.78	
PipeB3-B2	RCP	525	0.6	0.81	
PipeB2-B1	RCP	525	0.6	0.57	Unsafe
PipeB6-B5	RCP	300	0.6	0.57	Unsafe

PipeRoof1-A6	RCP	375	0.6	2.3	
PipeA6-A5	RCP	675	0.6	2	
PipeA5-A4	RCP	675	0.6	-1.08	Unsafe
PipeRoof2-A4	RCP	375	0.6	-3.45	Unsafe
PipeRoof3-H1	RCP	375	0.6	2.18	
PipeH1-A7	RCP	600	0.6	1.95	
PipeA7-A6	RCP	600	0.6	1.97	
PipeE4-E3	RCP	300	0.6	0.67	
PipeE3-E2	RCP	300	0.6	0.96	
PipeE2-E1	RCP	300	0.6	1.26	
PipeE1-A8	RCP	300	0.6	1.51	
PipeA8-A7	RCP	600	0.6	1.22	
PipeC2-C1	RCP	300	0.6	0.55	Unsafe
PipeC1-E1	RCP	300	0.6	0.57	Unsafe
PipeA12-A11	RCP	300	0.6	0.57	Unsafe
PipeA11-A10	RCP	375	0.6	0.59	Unsafe
PipeA10-A8	RCP	375	0.6	0.64	
PipeD2-D1	RCP	300	0.6	0.57	Unsafe
PipeA10-D1	RCP	300	0.6	0.59	Unsafe
PipeF3-F2	RCP	300	0.6	0.57	Unsafe
PipeF2-F1	RCP	300	0.6	0.58	Unsafe
PipeF1-A11	RCP	300	0.6	0.6	
PipeN2-N1	RCP	375	0.6	0.55	Unsafe
PipeN1-A6	RCP	300	0.6	2	

nodel has no pipes with non-return valves

DRAINS Output - 1 Year ARI Storm Event

DRAINS results prepared from Version 2019.09

PIT / NODE DETAILS

Version 8

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
PitG1	100.57	101.41	0.025	0.2	0.78	0	Inlet Capacity
PitA3	97.83		0		1.87		None
PitA2	97.74		0		1.66		None
PitA1	97.67		0		1.53		None
PitA0	97.59		0		1.41		None
NOut	97.45		0				
NRoof5	98.79		0.093				
PitB1	98.65	99.52	0.007	0	0.85	0	Inlet Capacity
NRoof4	100.77		0.096				
PitB5	100.18		0.004		1.64	0	None
PitB4	99.97		0.005		1.23	0	None
PitB3	99.53	100.71	0.004	0	1.17	0	Inlet Capacity
PitB2	99.08		0.004		1.27	0	None
PitB6	101.49		0.012		0.81	0.001	Inlet Capacity
NRoof1	99.3		0.066				
PitA6	99.28	101.66	0.025	0.1	2.32		Inlet Capacity
PitA5	98.84	101.55	0.022	0	2.66	0	Inlet Capacity
NRoof2	100.97		0.055				
NRoof3	99.71		0.086				
PitH1	99.71		0.008		2.29	0	None
PitA7	99.63		0		2.22		None
PitE4	101.36	102.28	0.011	0	0.89	0	Inlet Capacity
PitE3	101.18	102.36	0.024	0	1.12		Inlet Capacity
PitE2	100.89	102.35	0.017	0	1.41		Inlet Capacity
PitE1	100.4	102.26	0.025	0	1.8		Inlet Capacity
PitA8	100.09		0.022		1.51	0.005	Inlet Capacity
PitC2	101.26		0.007		0.84	0	None
PitC1	101.01	101.83	0.011	0	0.79		Inlet Capacity
PitA12	102.07		0.01		0.83	0	Inlet Capacity
PitA11	101.36		0.018		0.84	0.003	Inlet Capacity
PitA10	100.81		0.013		0.84	0.001	Inlet Capacity
PitD2	101.03		0.011		0.82	0.001	Inlet Capacity
PitD1	100.84	101.63	0.012	0	0.76		Inlet Capacity
PitF3	101.84		0.01		0.83	0	Inlet Capacity
PitF2	101.64	102.48	0.01	0	0.81	0	Inlet Capacity
PitF1	101.52		0.008		0.8	0	None
PitN2	101.19	102.15	0.017	0	0.91		Inlet Capacity
PitN1	99.58	101.82	0.008	0	2.22	0	Inlet Capacity

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
CatG1	0.025	0.023	0.001	5	10	0	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
CatA4	0.027	0.016	0.013	5	10	0	AR&R 1 year, 1.5 hours storm, average 20.8 mm/h, Zone 1
CatBypass1	0.006	0.005	0.001	5	10	0	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
CatBypass2	0.003	0.001	0.002	5	10	0	AR&R 1 year, 1.5 hours storm, average 20.8 mm/h, Zone 1
CatRoof5	0.093	0.093	0	5	10	0	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
CatB1	0.007	0	0.007	5	10	0	AR&R 1 year, 1.5 hours storm, average 20.8 mm/h, Zone 1
CatRoof4	0.096	0.096	0	5	10	0	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
CatB5	0.003	0.003	0	5	10	0	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
CatB4	0.005	0.004	0	5	10	0	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
CatB3	0.004	0.004	0	5	10	0	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
CatB2	0.004	0.004	0	5	10	0	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
CatBypass3	0.001	0	0.001	5	10	0	AR&R 1 year, 1.5 hours storm, average 20.8 mm/h, Zone 1
CatBypass4	0.001	0	0	5	10	0	AR&R 1 year, 1.5 hours storm, average 20.8 mm/h, Zone 1
CatB6	0.012	0	0.012	5	10	0	AR&R 1 year, 1.5 hours storm, average 20.8 mm/h, Zone 1
CatBypass7	0.002	0	0.002	5	10	0	AR&R 1 year, 1.5 hours storm, average 20.8 mm/h, Zone 1
CatRoof1	0.066	0.066	0	5	10	0	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
CatA6	0.025	0.024	0.001	5	10	0	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
CatA5	0.017	0.016	0.002	5	10	0	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
CatRoof2	0.055	0.055	0	5	10	0	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
CatBypass5	0.002	0.002	0	5	10	0	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
CatRoof3	0.086	0.086	0	5	10	0	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
CatH1	0.008	0.007	0.001	5	10	0	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
CatBypass6	0.018	0.018	0	5	10	0	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
CatE4	0.011	0.011	0	5	10	0	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
CatE3	0.024	0.024	0.001	5	10	0	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
CatE2	0.017	0.015	0.001	5	10	0	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
CatE1	0.025	0.024	0.001	5	10	0	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
CatA8	0.021	0.02	0.001	5	10	0	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
CatC2	0.007	0.007	0	5	10	0	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
CatC1	0.011	0.011	0	5	10	0	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
CatA12	0.01	0.009	0.001	5	10	0	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
CatA11	0.017	0.012	0.006	5	10	0	AR&R 1 year, 1.5 hours storm, average 20.8 mm/h, Zone 1
CatA10	0.01	0.009	0.001	5	10	0	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
CatD2	0.011	0.011	0	5	10	0	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
CatD1	0.011	0.011	0	5	10	0	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
CatF3	0.01	0.009	0.001	5	10	0	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
CatF2	0.009	0.009	0.001	5	10	0	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1

CatF1	0.008	0.008	0	5	10	0	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
CatN2	0.017	0.016	0.001	5	10	0	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
CatN1	0.008	0	0.008	5	10	0	AR&R 1 year, 1.5 hours storm, average 20.8 mm/h, Zone 1

Outflow Volumes for Total Catchment (3.10 impervious + 0.92 pervious = 4.02 total ha)

Storm	Total Rainf	Total Runo	Impervious Runoff	Pervious Runoff
	cu.m	cu.m (Run	cu.m (Runoff %)	cu.m (Runoff %)
AR&R 1 year, 5 minutes storm	293.77	195.51 (66	195.51 (86.3%)	0.00 (0.0%)
AR&R 1 year, 10 minutes stor	450.36	319.49 (70	316.23 (91.1%)	3.26 (3.2%)
AR&R 1 year, 15 minutes stor	564.12	418.30 (74	403.93 (92.9%)	14.38 (11.1%)
AR&R 1 year, 20 minutes stor	654.46	496.57 (75	473.57 (93.9%)	23.00 (15.3%)
AR&R 1 year, 25 minutes stor	731.15	561.56 (76	532.69 (94.5%)	28.87 (17.2%)
AR&R 1 year, 30 minutes stor	797	612.12 (76	583.45 (95.0%)	28.67 (15.7%)
AR&R 1 year, 45 minutes stor	957.6	747.43 (78	707.26 (95.8%)	40.18 (18.3%)
AR&R 1 year, 1 hour storm, a	1084.08	855.32 (78	804.75 (96.3%)	50.56 (20.4%)
AR&R 1 year, 1.5 hours storm	1252.74	985.69 (78	934.78 (96.8%)	50.91 (17.7%)
AR&R 1 year, 2 hours storm, a	1389.19	1096.38 (7	1039.97 (97.1%)	56.41 (17.7%)
AR&R 1 year, 3 hours storm, a	1590.08	1246.62 (7	1194.84 (97.5%)	51.78 (14.2%)

PIPE DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Max U/S HGL (m)	Max D/S HGL (m)	Due to Storm
PipeG1-A4	0.023	2.01	100.517	100.32	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
P OSD	0.152	0.96	98.051	98.046	AR&R 1 year, 1 hour storm, average 27 mm/h, Zone 1
Pipe A4-A3	0.152	1.4	97.845	97.836	AR&R 1 year, 1 hour storm, average 27 mm/h, Zone 1
PipeA3-A2	0.152	1.42	97.792	97.786	AR&R 1 year, 1 hour storm, average 27 mm/h, Zone 1
PipeA2-A1	0.152	1.42	97.702	97.696	AR&R 1 year, 1 hour storm, average 27 mm/h, Zone 1
PipeA1-A0	0.152	1.42	97.632	97.626	AR&R 1 year, 1 hour storm, average 27 mm/h, Zone 1
PipeA0-NOut	0.152	1.76	97.547	97.447	AR&R 1 year, 1 hour storm, average 27 mm/h, Zone 1
PipeRoof5-B1	0.093	1.55	98.789	98.648	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
PipeB1-A4	0.202	2.72	98.525	98.435	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
PipeRoof4-B5	0.096	1.76	100.767	100.666	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
PipeB5-B4	0.107	1.89	100.132	99.968	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
PipeB4-B3	0.107	1.66	99.928	99.53	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
PipeB3-B2	0.113	1.92	99.486	99.085	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
PipeB2-B1	0.112	1.66	99.044	98.648	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
PipeB6-B5	0.012	3.15	101.43	100.985	AR&R 1 year, 1 hour storm, average 27 mm/h, Zone 1
PipeRoof1-A6	0.065	0.92	99.299	99.28	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
PipeA6-A5	0.368	5.42	99.035	98.837	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
PipeA5-A4	0.382	2.3	98.759	98.435	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
PipeRoof2-A4	0.055	1.42	100.973	100.794	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
PipeRoof3-H1	0.086	0.96	99.714	99.705	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
PipeH1-A7	0.092	0.87	99.631	99.631	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
PipeA7-A6	0.276	2.82	99.467	99.28	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
PipeE4-E3	0.011	0.9	101.317	101.181	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
PipeE3-E2	0.033	1.25	101.131	100.891	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
PipeE2-E1	0.049	2.12	100.809	100.76	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
PipeE1-A8	0.091	1.29	100.227	100.086	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
PipeA8-A7	0.184	1.9	99.965	99.631	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
PipeC2-C1	0.007	0.9	101.252	101.01	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
PipeC1-E1	0.021	1.84	100.965	100.397	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
PipeA12-A11	0.009	1	102.055	101.358	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
PipeA11-A10	0.048	1.44	101.328	100.81	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
PipeA10-A8	0.079	1.6	100.771	100.606	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
PipeD2-D1	0.01	0.94	101.014	100.838	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
PipeA10-D1	0.021	0.7	100.814	100.81	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
PipeF3-F2	0.009	0.93	101.829	101.64	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
PipeF2-F1	0.019	2.12	101.585	101.518	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
PipeF1-A11	0.026	1.15	101.497	101.358	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
PipeN2-N1	0.017	5.84	101.123	100.918	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
PipeN1-A6	0.022	1.21	99.562	99.367	AR&R 1 year, 1.5 hours storm, average 20.8 mm/h, Zone 1

CHANNEL DETAILS

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

OVERFLOW ROUTE DETAILS

Name	Max Q U/S	Max Q D/S	Safe Q	Max D	Max DxV	Max Width	Max V	Due to Storm
OFD1	0	0	0.256	0	0	0	0	
OF OSD	0	0	0.256	0	0	0	0	
OFA4	0	0	0.256	0	0	0	0	
Bypass1	0.006	0.006	0.256	0.012	0	4.04	0.25	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
Bypass2	0.003	0.003	0.256	0.009	0	3.14	0.21	AR&R 1 year, 1.5 hours storm, average 20.8 mm/h, Zone 1
BypassTotal	0.032	0.032	0.256	0.023	0.01	7.63	0.37	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
OFB1	0	0	0.256	0	0	0	0	
OFB7	0	0	0.256	0	0	0	0	
OFB6	0	0	0.256	0	0	0	0	
OFB5	0	0	0.256	0	0	0	0	
OFB3	0	0	0.256	0	0	0	0	
Bypass3	0.001	0.001	0.256	0.006	0	1.95	0.12	AR&R 1 year, 1.5 hours storm, average 20.8 mm/h, Zone 1
Bypass4	0.001	0.001	0.256	0.006	0	1.95	0.14	AR&R 1 year, 1.5 hours storm, average 20.8 mm/h, Zone 1
OFB8	0.001	0.001	0.256	0.007	0	2.25	0.15	AR&R 1 year, 1.5 hours storm, average 20.8 mm/h, Zone 1
Bypass5	0.002	0.002	0.256	0.009	0	2.84	0.2	AR&R 1 year, 1.5 hours storm, average 20.8 mm/h, Zone 1
OFA5	0	0	0.256	0	0	0	0	
Bypass7	0.002	0.002	0.256	0.009	0	2.84	0.19	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
OFH1	0	0	0.256	0	0	0	0	
Bypass6	0.018	0.018	0.256	0.018	0.01	6.14	0.32	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1

OFE3	0	0	0.256	0	0	0	0	
OFA8	0.005	0.005	0.256	0.011	0	3.74	0.22	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
OFC2	0	0	0.256	0	0	0	0	
OFA12	0	0	0.256	0	0	0	0	
OFA11	0.003	0.003	0.256	0.009	0	3.14	0.21	AR&R 1 year, 1.5 hours storm, average 20.8 mm/h, Zone 1
OFA10	0.001	0.001	0.256	0.007	0	2.25	0.14	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
OFD2	0.001	0.001	0.256	0.006	0	1.95	0.14	AR&R 1 year, 25 minutes storm, average 43.7 mm/h, Zone 1
OFF3	0	0	0.256	0	0	0	0	
OFF2	0	0	0.256	0	0	0	0	
OFF1	0	0	0.256	0	0	0	0	
OFN1	0	0	0.256	0	0	0	0	

DETENTION BASIN DETAILS

Name	Max WL	MaxVol	Max Q Total	Max Q Low Level	Max Q High Level
OSDA4	98.43	486	0.152	0.152	0
OSDW eir	98.05	0.4	0.152	0.152	0

CONTINUITY CHECK for AR&R 1 year, 1.5 hours storm, average 20.8 mm/h, Zone 1

Node	Inflow (cu.m)	Outflow (cu.m)	Storage Change (cu.m)	Difference %
PitG1	31.28	31.32	0	-0.1
OSDA4	936.84	848.13	88.71	0
OSDW eir	848.13	847.42	0.25	0.1
PitA3	847.42	847.14	0	0
PitA2	847.14	846.87	0	0
PitA1	846.87	846.59	0	0
PitA0	846.59	846.07	0	0.1
NOut	846.07	846.07	0	0
NBypass1	7.63	7.63	0	0
NBypass2	3.28	3.28	0	0
NBypassSum	40.19	40.19	0	0
NBypassOut	40.19	40.19	0	0
NRoof5	118.75	118.38	0	0.3
PitB1	274.1	272.14	0	0.7
NRoof4	122.65	122.69	0	0
PitB5	135.04	135.15	0	-0.1
PitB4	141.01	140.38	0	0.4
PitB3	145.73	145.84	0	-0.1
PitB2	150.37	150.72	0	-0.2
NBypass3	0.62	0.62	0	0
NBypass4	0.87	0.87	0	0
PitB6	9	8.73	0	3
NBypass7	1.73	1.73	0	0
NRoof1	83.69	83.54	0	0.2
PitA6	515.24	513.88	0	0.3
PitA5	536.93	531.97	0	0.9
NRoof2	70.61	70.62	0	0
NBypass5	2.99	2.99	0	0
NRoof3	109.75	109.73	0	0
PitH1	119.85	119.68	0	0.1
PitA7	372.05	372.75	0	-0.2
NBypass6	23.07	23.07	0	0
PitE4	13.98	13.98	0	0
PitE3	44.81	44.73	0	0.2
PitE2	65.52	65.69	0	-0.3
PitE1	120.86	120.73	0	0.1
PitA8	253.75	253.67	0	0
PitC2	9.38	9.37	0	0.1
PitC1	23.68	23.69	0	0
PitA12	12.23	12.23	0	0
PitA11	66.87	66.96	0	-0.1
PitA10	106.97	106.95	0	0
PitD2	14.31	14.31	0	0
PitD1	28.04	28.03	0	0
PitF3	12.23	12.23	0	0
PitF2	24.08	24.04	0	0.2
PitF1	34.11	34.01	0	0.3
PitN2	21.78	21.78	0	0
PitN1	27.25	27.3	0	-0.2

Run Log for 368851 2020 run at 09:27:49 on 14/1/2020
No water upwelling from any pit. Freeboard was adequate at all pits.
Flows were safe in all overflow routes.

DRAINS Output - 10 Year ARI Storm Event

DRAINS results prepared from Version 2019.09

PIT / NODE DETAILS

Version 8

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
PitG1	100.61	101.43	0.044	0.3	0.74	0	Inlet Capacity
PitA3	98.06		0		1.64		None
PitA2	97.97		0		1.43		None
PitA1	97.89		0		1.31		None
PitA0	97.76		0		1.24		None
NOut	97.58		0				
NRoof5	98.94		0.154				
PitB1	98.92	99.56	0.022	0.1	0.58	0	Inlet Capacity
NRoof4	100.84		0.159				
PitB5	100.26		0.016		1.56	0.002	Inlet Capacity
PitB4	100.06		0.008		1.14	0	None
PitB3	99.61	100.72	0.007	0	1.09	0	Inlet Capacity
PitB2	99.17		0.006		1.18	0	None
PitB6	101.54		0.04		0.76	0.013	Inlet Capacity
NRoof1	99.66		0.108				
PitA6	99.6	101.69	0.043	0.1	2		Inlet Capacity
PitA5	99.02	101.59	0.049	0.1	2.48	0	Inlet Capacity
NRoof2	101.02		0.091				
NRoof3	100.13		0.142				
PitH1	100.12		0.016		1.88	0.002	Inlet Capacity
PitA7	100.06		0.002		1.79		None
PitE4	101.46	102.3	0.019	0.1	0.79	0	Inlet Capacity
PitE3	101.43	102.39	0.042	0	0.87		Inlet Capacity
PitE2	101.29	102.37	0.03	0	1.01		Inlet Capacity
PitE1	101.13	102.29	0.042	0	1.07		Inlet Capacity
PitA8	100.32		0.045		1.28	0.017	Inlet Capacity
PitC2	101.28		0.013		0.82	0.001	Inlet Capacity
PitC1	101.16	101.85	0.021	0	0.64		Inlet Capacity
PitA12	102.09		0.017		0.81	0.003	Inlet Capacity
PitA11	101.42		0.043		0.78	0.015	Inlet Capacity
PitA10	100.9		0.032		0.75	0.009	Inlet Capacity
PitD2	101.04		0.019		0.81	0.004	Inlet Capacity
PitD1	100.93	101.66	0.022	0	0.67		Inlet Capacity
PitF3	101.86		0.017		0.81	0.003	Inlet Capacity
PitF2	101.69	102.5	0.02	0	0.76	0	Inlet Capacity
PitF1	101.56		0.014		0.76	0.002	Inlet Capacity
PitN2	101.23	102.17	0.031	0	0.87		Inlet Capacity
PitN1	99.68	101.86	0.024	0.1	2.12	0	Inlet Capacity

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
CatG1	0.044	0.039	0.006	5	10	0	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
CatA4	0.065	0.028	0.038	5	10	0	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
CatBypass1	0.012	0.009	0.003	5	10	0	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
CatBypass2	0.008	0.002	0.006	5	10	0	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
CatRoof5	0.154	0.154	0	5	10	0	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
CatB1	0.022	0	0.022	5	10	0	AR&R 10 year, 2 hours storm, average 28.5 mm/h, Zone 1
CatRoof4	0.159	0.159	0	5	10	0	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
CatB5	0.005	0.005	0	5	10	0	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
CatB4	0.008	0.007	0.001	5	10	0	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
CatB3	0.007	0.007	0	5	10	0	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
CatB2	0.006	0.006	0	5	10	0	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
CatBypass3	0.002	0	0.002	5	10	0	AR&R 10 year, 2 hours storm, average 28.5 mm/h, Zone 1
CatBypass4	0.002	0.001	0.001	5	10	0	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
CatB6	0.04	0	0.04	5	10	0	AR&R 10 year, 2 hours storm, average 28.5 mm/h, Zone 1
CatBypass7	0.008	0	0.008	5	10	0	AR&R 10 year, 2 hours storm, average 28.5 mm/h, Zone 1
CatRoof1	0.108	0.108	0	5	10	0	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
CatA6	0.043	0.04	0.003	5	10	0	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
CatA5	0.032	0.026	0.007	5	10	0	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
CatRoof2	0.091	0.091	0	5	10	0	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
CatBypass5	0.004	0.004	0	5	10	0	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
CatRoof3	0.142	0.142	0	5	10	0	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
CatH1	0.016	0.012	0.005	5	10	0	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
CatBypass6	0.03	0.03	0	5	10	0	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
CatE4	0.019	0.018	0.002	5	10	0	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
CatE3	0.042	0.039	0.003	5	10	0	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
CatE2	0.03	0.026	0.004	5	10	0	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
CatE1	0.042	0.04	0.003	5	10	0	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
CatA8	0.036	0.032	0.004	5	10	0	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
CatC2	0.013	0.012	0.001	5	10	0	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
CatC1	0.02	0.018	0.002	5	10	0	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
CatA12	0.017	0.015	0.002	5	10	0	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
CatA11	0.039	0.021	0.018	5	10	0	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
CatA10	0.017	0.015	0.002	5	10	0	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
CatD2	0.019	0.018	0.001	5	10	0	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
CatD1	0.018	0.018	0.001	5	10	0	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
CatF3	0.017	0.015	0.002	5	10	0	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
CatF2	0.017	0.015	0.002	5	10	0	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1

CatF1	0.014	0.013	0.001	5	10	0	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
CatN2	0.031	0.027	0.004	5	10	0	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
CatN1	0.024	0	0.024	5	10	0	AR&R 10 year, 2 hours storm, average 28.5 mm/h, Zone 1

Outflow Volumes for Total Catchment (3.10 impervious + 0.92 pervious = 4.02 total ha)

Storm	Total Rainf	Total Runo	Impervious Runoff	Pervious Runoff
	cu.m	cu.m (Run	cu.m (Runoff %)	cu.m (Runoff %)
AR&R 10 year, 5 min	486.16	368.01 (75	343.83 (91.7%)	24.18 (21.7%)
AR&R 10 year, 10 mi	743.46	607.36 (81	542.18 (94.6%)	65.18 (38.3%)
AR&R 10 year, 15 mi	930.5	780.40 (83	686.36 (95.7%)	94.04 (44.1%)
AR&R 10 year, 20 mi	1080.06	918.45 (85	801.66 (96.3%)	116.79 (47.2%)
AR&R 10 year, 25 mi	1206.2	1030.36 (8	898.90 (96.7%)	131.46 (47.6%)
AR&R 10 year, 30 mi	1314.95	1125.84 (8	982.73 (96.9%)	143.11 (47.5%)
AR&R 10 year, 45 mi	1577.93	1361.09 (8	1185.46 (97.5%)	175.63 (48.6%)
AR&R 10 year, 1 hou	1782.7	1542.60 (8	1343.32 (97.7%)	199.27 (48.8%)
AR&R 10 year, 1.5 ho	2071.79	1792.59 (8	1566.17 (98.1%)	226.41 (47.7%)
AR&R 10 year, 2 hou	2288.61	1978.60 (8	1733.31 (98.2%)	245.29 (46.8%)

PIPE DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Max U/S HGL (m)	Max D/S HGL (m)	Due to Storm
PipeG1-A4	0.042	2.3	100.541	100.357	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
P OSD	0.202	1.27	98.331	98.324	AR&R 10 year, 1.5 hours storm, average 34.4 mm/h, Zone 1
Pipe A4-A3	0.433	1.83	98.072	98.059	AR&R 10 year, 2 hours storm, average 28.5 mm/h, Zone 1
PipeA3-A2	0.431	1.97	97.986	97.974	AR&R 10 year, 2 hours storm, average 28.5 mm/h, Zone 1
PipeA2-A1	0.431	1.92	97.903	97.894	AR&R 10 year, 2 hours storm, average 28.5 mm/h, Zone 1
PipeA1-A0	0.431	1.99	97.82	97.81	AR&R 10 year, 2 hours storm, average 28.5 mm/h, Zone 1
PipeA0-NOut	0.43	2.36	97.683	97.584	AR&R 10 year, 2 hours storm, average 28.5 mm/h, Zone 1
PipeRoof5-B1	0.153	1.42	98.94	98.919	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
PipeB1-A4	0.367	1.33	98.9	98.894	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
PipeRoof4-B5	0.158	1.96	100.838	100.738	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
PipeB5-B4	0.199	2.15	100.203	100.058	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
PipeB4-B3	0.201	1.98	100	99.615	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
PipeB3-B2	0.209	2.25	99.553	99.173	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
PipeB2-B1	0.209	2.03	99.113	98.919	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
PipeB6-B5	0.027	4.11	101.445	101.019	AR&R 10 year, 2 hours storm, average 28.5 mm/h, Zone 1
PipeRoof1-A6	0.108	0.98	99.66	99.6	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
PipeA6-A5	0.647	2.54	99.322	99.016	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
PipeA5-A4	0.692	2.42	98.943	98.894	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
PipeRoof2-A4	0.091	1.62	101.02	100.84	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
PipeRoof3-H1	0.141	1.28	100.132	100.119	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
PipeH1-A7	0.154	0.54	100.069	100.063	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
PipeA7-A6	0.459	1.62	99.837	99.6	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
PipeE4-E3	0.021	0.46	101.433	101.427	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
PipeE3-E2	0.061	0.86	101.382	101.289	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
PipeE2-E1	0.083	1.18	101.188	101.126	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
PipeE1-A8	0.149	2.11	100.685	100.321	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
PipeA8-A7	0.322	1.47	100.174	100.063	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
PipeC2-C1	0.012	1.04	101.264	101.161	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
PipeC1-E1	0.036	0.57	101.146	101.126	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
PipeA12-A11	0.014	1.14	102.07	101.418	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
PipeA11-A10	0.085	1.68	101.376	100.896	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
PipeA10-A8	0.144	1.95	100.838	100.69	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
PipeD2-D1	0.015	1.06	101.028	100.925	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
PipeA10-D1	0.036	0.66	100.9	100.896	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
PipeF3-F2	0.014	1.06	101.844	101.69	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
PipeF2-F1	0.033	2.06	101.614	101.564	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
PipeF1-A11	0.045	1.33	101.535	101.418	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
PipeN2-N1	0.03	10.06	101.124	100.945	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
PipeN1-A6	0.052	1.12	99.658	99.6	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1

CHANNEL DETAILS

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

OVERFLOW ROUTE DETAILS

Name	Max Q U/S	Max Q D/S	Safe Q	Max D	Max DxV	Max Width	Max V	Due to Storm
OFD1	0	0	0.256	0	0	0	0	
OF OSD	0.246	0.246	0.256	0.049	0.03	13.79	0.66	AR&R 10 year, 2 hours storm, average 28.5 mm/h, Zone 1
OFA4	0	0	0.256	0	0	0	0	
Bypass1	0.012	0.012	0.256	0.016	0	5.24	0.29	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
Bypass2	0.008	0.008	0.256	0.014	0	4.64	0.25	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
BypassTotal	0.066	0.066	0.256	0.03	0.01	10.02	0.44	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
OFB1	0	0	0.256	0	0	0	0	
OFB7	0.002	0.002	0.256	0.009	0	2.84	0.2	AR&R 10 year, 2 hours storm, average 28.5 mm/h, Zone 1
OFB6	0	0	0.256	0	0	0	0	
OFB5	0	0	0.256	0	0	0	0	
OFB3	0	0	0.256	0	0	0	0	
Bypass3	0.002	0.002	0.256	0.008	0	2.54	0.2	AR&R 10 year, 2 hours storm, average 28.5 mm/h, Zone 1
Bypass4	0.004	0.004	0.256	0.011	0	3.74	0.2	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
OFB8	0.013	0.013	0.256	0.017	0	5.54	0.29	AR&R 10 year, 2 hours storm, average 28.5 mm/h, Zone 1
Bypass5	0.008	0.008	0.256	0.013	0	4.34	0.27	AR&R 10 year, 2 hours storm, average 28.5 mm/h, Zone 1
OFA5	0	0	0.256	0	0	0	0	
Bypass7	0.004	0.004	0.256	0.01	0	3.44	0.22	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
OFH1	0.002	0.002	0.256	0.009	0	2.84	0.2	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
Bypass6	0.03	0.03	0.256	0.022	0.01	7.33	0.37	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
OFE3	0	0	0.256	0	0	0	0	

OFA8	0.017	0.017	0.256	0.018	0.01	6.14	0.29	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
OFC2	0.001	0.001	0.256	0.007	0	2.25	0.17	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
OFA12	0.003	0.003	0.256	0.009	0	3.14	0.19	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
OFA11	0.015	0.015	0.256	0.018	0.01	5.84	0.3	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
OFA10	0.009	0.009	0.256	0.014	0	4.64	0.27	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
OFD2	0.004	0.004	0.256	0.01	0	3.44	0.21	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
OFF3	0.003	0.003	0.256	0.009	0	3.14	0.19	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
OFF2	0	0	0.256	0	0	0	0	
OFF1	0.002	0.002	0.256	0.008	0	2.54	0.16	AR&R 10 year, 25 minutes storm, average 72.1 mm/h, Zone 1
OFN1	0	0	0.256	0	0	0	0	

DETENTION BASIN DETAILS

Name	Max WL	MaxVol	Max Q Total	Max Q Low Level	Max Q High Level
OSDA4	98.89	830.6	0.447	0.202	0.246
OSDWeir	98.32	0.7	0.433	0.433	0

CONTINUITY CHECK for AR&R 10 year, 2 hours storm, average 28.5 mm/h, Zone 1

Node	Inflow (cu.m)	Outflow (cu.m)	Storage Change (cu.m)	Difference %
PitG1	62.06	61.69	0	0.6
OSDA4	1867.51	1735.24	132.27	0
OSDWeir	1735.24	1734.26	0.29	0
PitA3	1734.26	1734.15	0	0
PitA2	1734.15	1733.95	0	0
PitA1	1733.95	1733.55	0	0
PitA0	1733.55	1733	0	0
NOut	1733	1733	0	0
NBypass1	16.6	16.6	0	0
NBypass2	10.18	10.18	0	0
NBypassSum	89.02	89.02	0	0
NBypassOut	89.02	89.02	0	0
NRoof5	220.19	219.66	0	0.2
PitB1	547.15	545.01	0	0.4
NRoof4	227.42	227.41	0	0
PitB5	277.35	276.38	0	0.3
PitB4	286.97	286.02	0	0.3
PitB3	295.93	295.51	0	0.1
PitB2	303.91	303.39	0	0.2
NBypass3	2.31	2.31	0	0
NBypass4	3.25	3.25	0	0
PitB6	43.36	43.21	0	0.3
NBypass7	8.35	8.35	0	0
NRoof1	155.18	154.77	0	0.3
PitA6	1002.65	999.05	0	0.4
PitA5	1050.22	1045.56	0	0.4
NRoof2	130.93	130.8	0	0.1
NBypass5	5.54	5.54	0	0
NRoof3	203.5	203.66	0	-0.1
PitH1	225.7	224.94	0	0.3
PitA7	720.8	718.24	0	0.4
NBypass6	42.78	42.78	0	0
PitE4	27.03	26.89	0	0.5
PitE3	86.49	86.19	0	0.3
PitE2	127.76	127.61	0	0.1
PitE1	233.75	232.97	0	0.3
PitA8	502.39	501.99	0	0.1
PitC2	18.27	18.22	0	0.2
PitC1	46.09	45.91	0	0.4
PitA12	24.26	24.09	0	0.7
PitA11	142.15	141.95	0	0.1
PitA10	218.75	218.1	0	0.3
PitD2	27.38	27.35	0	0.1
PitD1	53.2	53.04	0	0.3
PitF3	24.26	24.21	0	0.2
PitF2	47.72	47.6	0	0.3
PitF1	66.86	66.64	0	0.3
PitN2	43.21	43.04	0	0.4
PitN1	69.38	69.09	0	0.4

Run Log for 368851 2020 run at 09:33:17 on 14/1/2020
No water upwelling from any pit. Freeboard was adequate at all pits.
Flows were safe in all overflow routes.

DRAINS Output - 100 Year ARI Storm Event

DRAINS results prepared from Version 2019.09

PIT / NODE DETAILS Version 8

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
PitG1	100.63	101.45	0.062	0.4	0.72	0.011	Inlet Capacity
PitA3	99.12		0		0.58		None
PitA2	98.76		0		0.64		None
PitA1	98.4		0		0.8		None
PitA0	98.04		0		0.96		None
NOut	97.81		0.219				
NRoof5	99.64		0.226				
PitB1	99.39	99.58	0.036	0.1	0.11	0	Inlet Capacity
NRoof4	100.99		0.233				
PitB5	100.32		0.039		1.5	0.013	Inlet Capacity
PitB4	100.12		0.011		1.08	0.001	Inlet Capacity
PitB3	99.79	100.73	0.01	0.1	0.91	0	Inlet Capacity
PitB2	99.61		0.009		0.74	0	Inlet Capacity
PitB6	101.56		0.065		0.74	0.034	Inlet Capacity
NRoof1	100.58		0.159				
PitA6	100.46	101.71	0.061	0.1	1.14		Inlet Capacity
PitA5	99.64	101.64	0.091	0.1	1.86	0	Inlet Capacity
NRoof2	101.08		0.134				
NRoof3	101.17		0.209				
PitH1	101.15		0.023		0.85	0.005	Inlet Capacity
PitA7	101.03		0.005		0.82		None
PitE4	102.34	102.35	0.027	0.2	0	0.024	Outlet System
PitE3	102.35	102.45	0.06	0.1	0		Outlet System
PitE2	102.22	102.39	0.042	0	0.08		Inlet Capacity
PitE1	102	102.31	0.061	0	0.2		Inlet Capacity
PitA8	101.3		0.077		0.3	0.045	Inlet Capacity
PitC2	102.1		0.018		0	0.038	Outlet System
PitC1	101.95	101.95	0.066	0.1	0		Outlet System
PitA12	102.1		0.024		0.8	0.005	Inlet Capacity
PitA11	101.68		0.068		0.52	0.037	Inlet Capacity
PitA10	101.5		0.06		0.15	0.027	Inlet Capacity
PitD2	101.69		0.028		0.16	0.007	Inlet Capacity
PitD1	101.57	101.67	0.033	0	0.03		Inlet Capacity
PitF3	101.87		0.024		0.8	0.005	Inlet Capacity
PitF2	101.8	102.52	0.029	0	0.65	0	Inlet Capacity
PitF1	101.76		0.019		0.56	0.004	Inlet Capacity
PitN2	101.26	102.19	0.043	0	0.84		Inlet Capacity
PitN1	100.6	101.88	0.04	0.1	1.2	0	Inlet Capacity

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
CatG1	0.062	0.052	0.01	5	10	0	AR&R 100 year, 25 minutes storm, average 108.3 mm/h, Zone 1
CatA4	0.102	0.038	0.064	5	10	0	AR&R 100 year, 25 minutes storm, average 108.3 mm/h, Zone 1
CatBypass1	0.018	0.012	0.006	5	10	0	AR&R 100 year, 25 minutes storm, average 108.3 mm/h, Zone 1
CatBypass2	0.013	0.003	0.01	5	10	0	AR&R 100 year, 25 minutes storm, average 108.3 mm/h, Zone 1
CatRoof5	0.226	0.226	0	5	10	0	AR&R 100 year, 5 minutes storm, average 218.9 mm/h, Zone 1
CatB1	0.036	0	0.036	5	10	0	AR&R 100 year, 20 minutes storm, average 121.4 mm/h, Zone 1
CatRoof4	0.233	0.233	0	5	10	0	AR&R 100 year, 5 minutes storm, average 218.9 mm/h, Zone 1
CatB5	0.007	0.007	0	5	10	0	AR&R 100 year, 5 minutes storm, average 218.9 mm/h, Zone 1
CatB4	0.011	0.011	0	5	10	0	AR&R 100 year, 5 minutes storm, average 218.9 mm/h, Zone 1
CatB3	0.01	0.01	0	5	10	0	AR&R 100 year, 5 minutes storm, average 218.9 mm/h, Zone 1
CatB2	0.009	0.009	0	5	10	0	AR&R 100 year, 5 minutes storm, average 218.9 mm/h, Zone 1
CatBypass3	0.003	0	0.003	5	10	0	AR&R 100 year, 25 minutes storm, average 108.3 mm/h, Zone 1
CatBypass4	0.003	0.001	0.002	5	10	0	AR&R 100 year, 25 minutes storm, average 108.3 mm/h, Zone 1
CatB6	0.065	0	0.065	5	10	0	AR&R 100 year, 20 minutes storm, average 121.4 mm/h, Zone 1
CatBypass7	0.013	0	0.013	5	10	0	AR&R 100 year, 20 minutes storm, average 121.4 mm/h, Zone 1
CatRoof1	0.159	0.159	0	5	10	0	AR&R 100 year, 5 minutes storm, average 218.9 mm/h, Zone 1
CatA6	0.061	0.059	0.002	5	10	0	AR&R 100 year, 5 minutes storm, average 218.9 mm/h, Zone 1
CatA5	0.046	0.035	0.011	5	10	0	AR&R 100 year, 25 minutes storm, average 108.3 mm/h, Zone 1
CatRoof2	0.134	0.134	0	5	10	0	AR&R 100 year, 5 minutes storm, average 218.9 mm/h, Zone 1
CatBypass5	0.006	0.006	0	5	10	0	AR&R 100 year, 5 minutes storm, average 218.9 mm/h, Zone 1
CatRoof3	0.209	0.209	0	5	10	0	AR&R 100 year, 5 minutes storm, average 218.9 mm/h, Zone 1
CatH1	0.023	0.016	0.008	5	10	0	AR&R 100 year, 25 minutes storm, average 108.3 mm/h, Zone 1
CatBypass6	0.044	0.044	0	5	10	0	AR&R 100 year, 5 minutes storm, average 218.9 mm/h, Zone 1
CatE4	0.027	0.026	0.001	5	10	0	AR&R 100 year, 5 minutes storm, average 218.9 mm/h, Zone 1
CatE3	0.06	0.057	0.003	5	10	0	AR&R 100 year, 5 minutes storm, average 218.9 mm/h, Zone 1
CatE2	0.042	0.034	0.007	5	10	0	AR&R 100 year, 25 minutes storm, average 108.3 mm/h, Zone 1
CatE1	0.061	0.059	0.002	5	10	0	AR&R 100 year, 5 minutes storm, average 218.9 mm/h, Zone 1
CatA8	0.051	0.048	0.003	5	10	0	AR&R 100 year, 5 minutes storm, average 218.9 mm/h, Zone 1
CatC2	0.018	0.017	0.001	5	10	0	AR&R 100 year, 5 minutes storm, average 218.9 mm/h, Zone 1
CatC1	0.028	0.026	0.001	5	10	0	AR&R 100 year, 5 minutes storm, average 218.9 mm/h, Zone 1
CatA12	0.024	0.02	0.004	5	10	0	AR&R 100 year, 25 minutes storm, average 108.3 mm/h, Zone 1
CatA11	0.059	0.028	0.031	5	10	0	AR&R 100 year, 25 minutes storm, average 108.3 mm/h, Zone 1

CatA10	0.024	0.02	0.004	5	10	0	AR&R 100 year, 25 minutes storm, average 108.3 mm/h, Zone 1
CatD2	0.028	0.027	0.001	5	10	0	AR&R 100 year, 5 minutes storm, average 218.9 mm/h, Zone 1
CatD1	0.026	0.026	0	5	10	0	AR&R 100 year, 5 minutes storm, average 218.9 mm/h, Zone 1
CatF3	0.024	0.02	0.004	5	10	0	AR&R 100 year, 25 minutes storm, average 108.3 mm/h, Zone 1
CatF2	0.023	0.02	0.004	5	10	0	AR&R 100 year, 25 minutes storm, average 108.3 mm/h, Zone 1
CatF1	0.019	0.019	0.001	5	10	0	AR&R 100 year, 5 minutes storm, average 218.9 mm/h, Zone 1
CatN2	0.043	0.036	0.007	5	10	0	AR&R 100 year, 25 minutes storm, average 108.3 mm/h, Zone 1
CatN1	0.04	0	0.04	5	10	0	AR&R 100 year, 20 minutes storm, average 121.4 mm/h, Zone 1

Outflow Volumes for Total Catchment (3.10 impervious + 0.92 pervious = 4.02 total ha)

Storm	Total Rainf	Total Runo	Impervious Runoff	Pervious Runoff
	cu.m	cu.m (Run	cu.m (Runoff %)	cu.m (Runoff %)
AR&R 100 year, 5 m	732.42	612.97 (83	533.67 (94.5%)	79.31 (47.3%)
AR&R 100 year, 10	1119.54	981.68 (87	832.10 (96.4%)	149.58 (58.3%)
AR&R 100 year, 15	1400.27	1247.16 (8	1048.50 (97.1%)	198.66 (61.9%)
AR&R 100 year, 20	1624.78	1458.63 (8	1221.58 (97.5%)	237.05 (63.7%)
AR&R 100 year, 25	1811.81	1630.84 (9	1365.76 (97.8%)	265.08 (63.9%)
AR&R 100 year, 30	1975.43	1782.36 (9	1491.89 (98.0%)	290.46 (64.2%)
AR&R 100 year, 45	2369.91	2147.38 (9	1796.00 (98.3%)	351.37 (64.7%)
AR&R 100 year, 1 h	2678.07	2432.18 (9	2033.55 (98.5%)	398.63 (65.0%)
AR&R 100 year, 1.5	3113.71	2830.16 (9	2369.41 (98.7%)	460.75 (64.6%)
AR&R 100 year, 2 h	3444.96	3130.78 (9	2624.72 (98.8%)	506.05 (64.1%)

PIPE DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Max U/S HGL (m)	Max D/S HGL (m)	Due to Storm
PipeG1-A4	0.051	2.56	100.547	100.373	AR&R 100 year, 20 minutes storm, average 121.4 mm/h, Zone 1
P OSD	0.203	1.28	100.073	100.087	AR&R 100 year, 25 minutes storm, average 108.3 mm/h, Zone 1
Pipe A4-A3	0.981	3.47	99.166	99.115	AR&R 100 year, 1.5 hours storm, average 51.7 mm/h, Zone 1
PipeA3-A2	0.981	3.47	98.808	98.759	AR&R 100 year, 1.5 hours storm, average 51.7 mm/h, Zone 1
PipeA2-A1	0.981	3.47	98.451	98.402	AR&R 100 year, 1.5 hours storm, average 51.7 mm/h, Zone 1
PipeA1-A0	0.981	3.47	98.095	98.045	AR&R 100 year, 1.5 hours storm, average 51.7 mm/h, Zone 1
PipeA0-NOut	0.981	3.14	97.859	97.813	AR&R 100 year, 1.5 hours storm, average 51.7 mm/h, Zone 1
PipeRoof5-B1	0.227	2.06	99.642	99.387	AR&R 100 year, 5 minutes storm, average 218.9 mm/h, Zone 1
PipeB1-A4	0.505	1.79	99.196	99.106	AR&R 100 year, 15 minutes storm, average 139.5 mm/h, Zone 1
PipeRoof4-B5	0.234	2.21	100.991	100.822	AR&R 100 year, 5 minutes storm, average 218.9 mm/h, Zone 1
PipeB5-B4	0.268	2.27	100.251	100.117	AR&R 100 year, 15 minutes storm, average 139.5 mm/h, Zone 1
PipeB4-B3	0.286	2.29	100.045	99.791	AR&R 100 year, 25 minutes storm, average 108.3 mm/h, Zone 1
PipeB3-B2	0.287	1.51	99.752	99.611	AR&R 100 year, 15 minutes storm, average 139.5 mm/h, Zone 1
PipeB2-B1	0.288	1.33	99.574	99.387	AR&R 100 year, 15 minutes storm, average 139.5 mm/h, Zone 1
PipeB6-B5	0.035	4.53	101.45	101.031	AR&R 100 year, 30 minutes storm, average 98.4 mm/h, Zone 1
PipeRoof1-A6	0.164	1.49	100.584	100.459	AR&R 100 year, 5 minutes storm, average 218.9 mm/h, Zone 1
PipeA6-A5	0.834	2.33	99.98	99.64	AR&R 100 year, 15 minutes storm, average 139.5 mm/h, Zone 1
PipeA5-A4	0.908	2.54	99.505	99.106	AR&R 100 year, 15 minutes storm, average 139.5 mm/h, Zone 1
PipeRoof2-A4	0.136	1.78	101.077	100.895	AR&R 100 year, 5 minutes storm, average 218.9 mm/h, Zone 1
PipeRoof3-H1	0.209	1.9	101.171	101.148	AR&R 100 year, 5 minutes storm, average 218.9 mm/h, Zone 1
PipeH1-A7	0.232	0.82	101.049	101.033	AR&R 100 year, 5 minutes storm, average 218.9 mm/h, Zone 1
PipeA7-A6	0.559	1.98	100.697	100.459	AR&R 100 year, 5 minutes storm, average 218.9 mm/h, Zone 1
PipeE4-E3	0.039	0.54	102.345	102.346	AR&R 100 year, 5 minutes storm, average 218.9 mm/h, Zone 1
PipeE3-E2	0.074	1.05	102.296	102.222	AR&R 100 year, 5 minutes storm, average 218.9 mm/h, Zone 1
PipeE2-E1	0.117	1.66	102.092	102.003	AR&R 100 year, 5 minutes storm, average 218.9 mm/h, Zone 1
PipeE1-A8	0.178	2.51	101.597	101.3	AR&R 100 year, 10 minutes storm, average 167.3 mm/h, Zone 1
PipeA8-A7	0.387	1.37	101.174	101.033	AR&R 100 year, 5 minutes storm, average 218.9 mm/h, Zone 1
PipeC2-C1	0.031	0.43	102.1	101.95	AR&R 100 year, 5 minutes storm, average 218.9 mm/h, Zone 1
PipeC1-E1	0.055	0.78	101.95	102.003	AR&R 100 year, 5 minutes storm, average 218.9 mm/h, Zone 1
PipeA12-A11	0.019	1.24	102.08	101.677	AR&R 100 year, 25 minutes storm, average 108.3 mm/h, Zone 1
PipeA11-A10	0.124	1.12	101.658	101.503	AR&R 100 year, 15 minutes storm, average 139.5 mm/h, Zone 1
PipeA10-A8	0.19	1.72	101.446	101.3	AR&R 100 year, 15 minutes storm, average 139.5 mm/h, Zone 1
PipeD2-D1	0.028	0.4	101.683	101.568	AR&R 100 year, 2 hours storm, average 42.9 mm/h, Zone 1
PipeA10-D1	0.058	0.82	101.516	101.503	AR&R 100 year, 1.5 hours storm, average 51.7 mm/h, Zone 1
PipeF3-F2	0.019	1.14	101.855	101.801	AR&R 100 year, 25 minutes storm, average 108.3 mm/h, Zone 1
PipeF2-F1	0.046	0.78	101.767	101.756	AR&R 100 year, 5 minutes storm, average 218.9 mm/h, Zone 1
PipeF1-A11	0.061	0.87	101.742	101.677	AR&R 100 year, 5 minutes storm, average 218.9 mm/h, Zone 1
PipeN2-N1	0.042	14.35	101.124	100.965	AR&R 100 year, 25 minutes storm, average 108.3 mm/h, Zone 1
PipeN1-A6	0.08	1.13	100.576	100.459	AR&R 100 year, 25 minutes storm, average 108.3 mm/h, Zone 1

CHANNEL DETAILS

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

OVERFLOW ROUTE DETAILS

Name	Max Q U/S	Max Q D/S	Safe Q	Max D	Max DxV	Max Width	Max V	Due to Storm
OFD1	0.011	0.011	7.665	0.016	0	5.24	0.27	AR&R 100 year, 25 minutes storm, average 108.3 mm/h, Zone 1
OF OSD	1.442	1.442	7.665	0.101	0.11	24.21	1.06	AR&R 100 year, 1.5 hours storm, average 51.7 mm/h, Zone 1
OFA4	0.219	0.219	7.665	0.047	0.03	13.43	0.62	AR&R 100 year, 1.5 hours storm, average 51.7 mm/h, Zone 1
Bypass1	0.018	0.018	7.665	0.018	0.01	6.14	0.31	AR&R 100 year, 25 minutes storm, average 108.3 mm/h, Zone 1
Bypass2	0.013	0.013	7.665	0.017	0	5.54	0.28	AR&R 100 year, 25 minutes storm, average 108.3 mm/h, Zone 1
BypassTotal	0.129	0.129	7.665	0.038	0.02	11.63	0.54	AR&R 100 year, 25 minutes storm, average 108.3 mm/h, Zone 1
OFB1	0	0	7.665	0	0	0	0	
OFB7	0.013	0.013	7.665	0.017	0	5.54	0.28	AR&R 100 year, 20 minutes storm, average 121.4 mm/h, Zone 1
OFB6	0.001	0.001	7.665	0.006	0	1.95	0.15	AR&R 100 year, 5 minutes storm, average 218.9 mm/h, Zone 1
OFB5	0	0	7.665	0	0	0	0	

OFB3	0	0	7.665	0	0	0	0	
Bypass3	0.003	0.003	7.665	0.009	0	3.14	0.21	AR&R 100 year, 25 minutes storm, average 108.3 mm/h, Zone 1
Bypass4	0.016	0.016	7.665	0.018	0.01	5.84	0.32	AR&R 100 year, 25 minutes storm, average 108.3 mm/h, Zone 1
OFB8	0.034	0.034	7.665	0.024	0.01	7.93	0.36	AR&R 100 year, 20 minutes storm, average 121.4 mm/h, Zone 1
Bypass5	0.013	0.013	7.665	0.016	0	5.24	0.3	AR&R 100 year, 20 minutes storm, average 121.4 mm/h, Zone 1
OFA5	0	0	7.665	0	0	0	0	
Bypass7	0.006	0.006	7.665	0.012	0	4.04	0.23	AR&R 100 year, 5 minutes storm, average 218.9 mm/h, Zone 1
OFH1	0.005	0.005	7.665	0.011	0	3.74	0.23	AR&R 100 year, 25 minutes storm, average 108.3 mm/h, Zone 1
Bypass6	0.044	0.044	7.665	0.026	0.01	8.53	0.4	AR&R 100 year, 5 minutes storm, average 218.9 mm/h, Zone 1
OFE3	0.024	0.024	7.665	0.021	0.01	7.03	0.33	AR&R 100 year, 15 minutes storm, average 139.5 mm/h, Zone 1
OFA8	0.045	0.045	7.665	0.026	0.01	8.83	0.38	AR&R 100 year, 25 minutes storm, average 108.3 mm/h, Zone 1
OFC2	0.038	0.038	7.665	0.025	0.01	8.23	0.38	AR&R 100 year, 5 minutes storm, average 218.9 mm/h, Zone 1
OFA12	0.005	0.005	7.665	0.011	0	3.74	0.25	AR&R 100 year, 25 minutes storm, average 108.3 mm/h, Zone 1
OFA11	0.037	0.037	7.665	0.024	0.01	7.93	0.39	AR&R 100 year, 25 minutes storm, average 108.3 mm/h, Zone 1
OFA10	0.027	0.027	7.665	0.021	0.01	7.03	0.36	AR&R 100 year, 25 minutes storm, average 108.3 mm/h, Zone 1
OFD2	0.007	0.007	7.665	0.013	0	4.34	0.24	AR&R 100 year, 5 minutes storm, average 218.9 mm/h, Zone 1
OFF3	0.005	0.005	7.665	0.011	0	3.74	0.25	AR&R 100 year, 25 minutes storm, average 108.3 mm/h, Zone 1
OFF2	0	0	7.665	0	0	0	0	
OFF1	0.004	0.004	7.665	0.01	0	3.44	0.21	AR&R 100 year, 5 minutes storm, average 218.9 mm/h, Zone 1
OFN1	0	0	7.665	0	0	0	0	

DETENTION BASIN DETAILS

Name	Max WL	MaxVol	Max Q Total	Max Q Low Level	Max Q High Level
OSDA4	99.11	989.4	1.645	0.203	1.442
OSDWeir	100.09	2.5	1.2	0.981	0.219

CONTINUITY CHECK for AR&R 100 year, 25 minutes storm, average 108.3 mm/h, Zone 1

Node	Inflow (cu.m)	Outflow (cu.m)	Storage Change (cu.m)	Difference %
PitG1	50.84	49.72	0	2.2
OSDA4	1482.66	889.75	592.91	0
OSDWeir	889.75	888.47	0.48	0.1
PitA3	888.47	887.97	0	0.1
PitA2	887.97	887.58	0	0
PitA1	887.58	886.9	0	0.1
PitA0	886.9	885.96	0	0.1
NOut	885.96	885.96	0	0
NBypass1	14.25	14.25	0	0
NBypass2	9.98	9.98	0	0
NBypassSum	84.22	84.22	0	0
NBypassOut	84.22	84.22	0	0
NRoof5	173.5	172.49	0	0.6
PitB1	443.23	435.11	0	1.8
NRoof4	179.19	179.17	0	0
PitB5	231.17	229.52	0	0.7
PitB4	234.59	233.01	0	0.7
PitB3	240.66	239.02	0	0.7
PitB2	245.64	244.69	0	0.4
NBypass3	2.37	2.37	0	0
NBypass4	6.65	6.65	0	0
PitB6	46.86	46.71	0	0.3
NBypass7	9.02	9.02	0	0
NRoof1	122.27	121.69	0	0.5
PitA6	780.78	772.66	0	1
PitA5	829.33	815.38	0	1.7
NRoof2	103.16	102.9	0	0.3
NBypass5	4.37	4.37	0	0
NRoof3	160.35	160.51	0	-0.1
PitH1	179.43	178.14	0	0.7
PitA7	551.01	547.31	0	0.7
NBypass6	33.71	33.71	0	0
PitE4	21.83	21.44	0	1.8
PitE3	65.69	64.99	0	1.1
PitE2	99.18	98.68	0	0.5
PitE1	172.88	171.87	0	0.6
PitA8	393.93	391.82	0	0.5
PitC2	14.81	14.78	0	0.2
PitC1	37.37	25.85	0	30.8
PitA12	19.87	19.62	0	1.3
PitA11	120.25	119.47	0	0.7
PitA10	181.01	180.18	0	0.5
PitD2	21.98	21.87	0	0.5
PitD1	42.42	42.09	0	0.8
PitF3	19.87	19.8	0	0.4
PitF2	39.05	38.77	0	0.7
PitF1	54.23	53.85	0	0.7
PitN2	35.4	35.05	0	1
PitN1	63.52	63.19	0	0.5

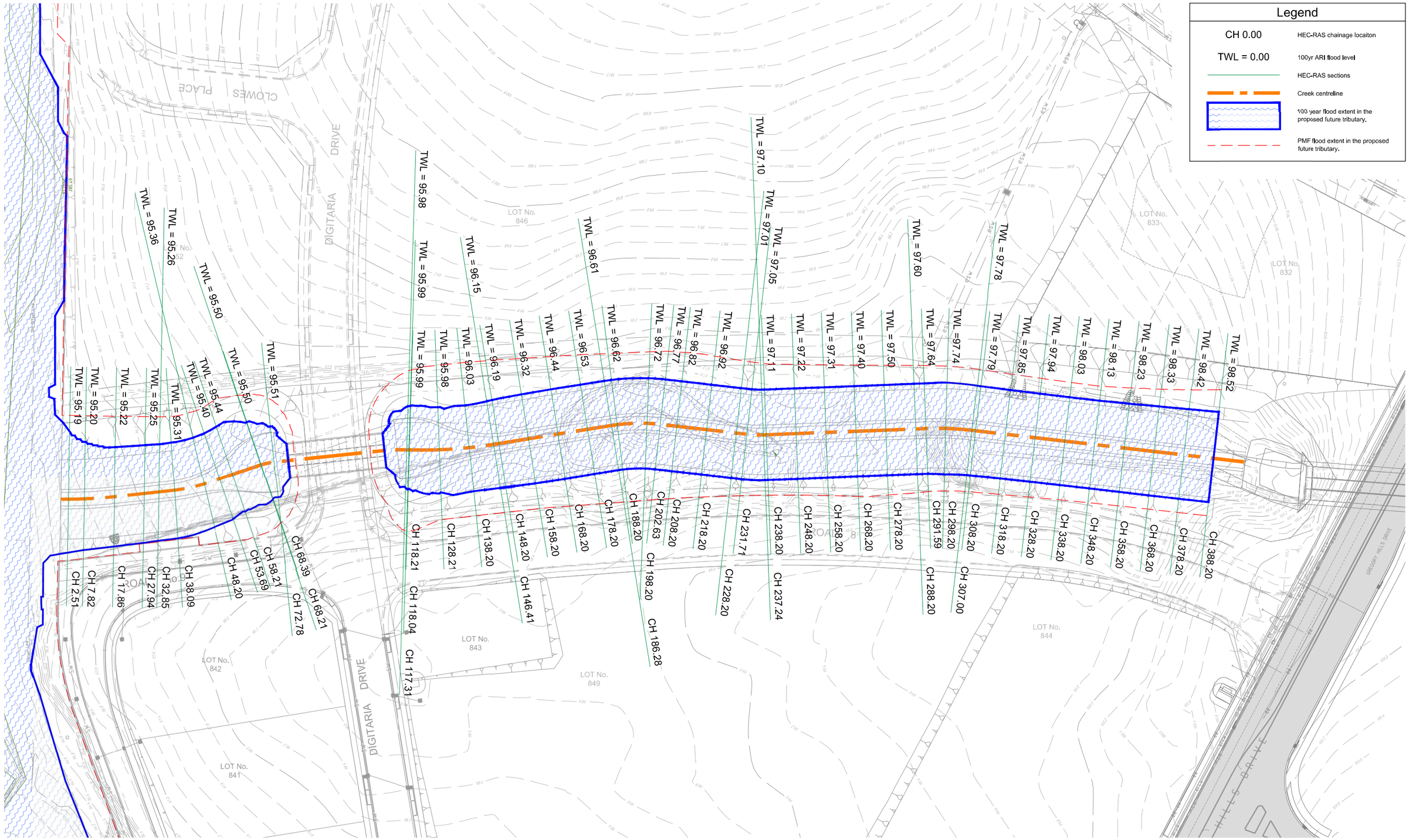
Run Log for 368851 2020 run at 09:35:44 on 14/1/2020

The maximum water level in these storages exceeds the maximum elevation you specified: OSDWeir.
DRAINS has extrapolated the Elevation vs Storage table to a higher Elevation. Please provide accurate values for higher elevations.
Water was lost from the system at: PitC1, PitE3. If this water re-enters the system further downstream you should draw an overflow route from these locations.

Upwelling occurred at: PitC2
Freeboard was less than 0.15m at PitD1, PitA10, PitC1, PitE2, PitE4, PitE3, PitB1
Flows were safe in all overflow routes.

These overflow routes carried water uphill (adding energy): OFA8, OF OSD. These results may be invalid. You should check for water flowing round in circles (e.g. negative flo

Appendix B. Flooding Plan



Issued for information

Rev	Amendment / Reason For Issue	Date	Drawing Completed by	Designed & Checked by	Verified by X=Not verified	Issue Authorised (*)
P1	Issued for information	28.08.15	MMc	GC	SR	CJA

* Drawing Status Warning: Unless there is an authorised Mott MacDonald signature at *, this drawing is not authorised for issue.

This Drawing may have been prepared using COLOUR, and may be incomplete if copied to BLACK & WHITE

4 0 10 20 40
PLAN Scale 1:600 @ A1

NORTH

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Project: Gregory Hills Corporate Park South Creek Tributary Works

Client: Gregory Hills Development Company Pty Ltd

Architect/Project Manager: Gregory Hills Development Company Pty Ltd

Drawing Title: HEC-RAS Sections

Drawing No.: MMD-343049-C-SK-075

Sheet: Of

Rev: P1

300mm A1 SHEET
200mm
100mm
0

Date : 28-8-15 Time : 7:33am Plotted By : nc15164 Filename : P:\parramatta\Projects\343xxx\343049\04 working\Civil\Autocad\Sketches\MMD-343049-C-SK075.dwg