City of Greater Geelong, Statutory Planning - Date Received 14/10/2026

BLOCK1 PTY LTD
STRUCTURAL ENGINEERS
ABN 19 639 931 490

CI_CALCS_002
SITE STORMWATER DISCHARGE
41 CLIFTON SPRINGS ROAD, DRYSDALE

ENQUIRIES: ASHLEY WILLIS
PROJECT: 26.141
DATE 12.10.2026

RE: **SITE STORMWATER DISCHARGE TO LPOD FOR**

41 CLIFTON SPRINGS ROAD, DRYSDALE, VIC 3222

Block1 have designed the civil stormwater system for this rear subdivision of an existing allotment.

We have calculated the site stormwater detention volumes using OSD4W Swinburn software.

We have entered all the site information into Bluefactor with a score of 100% - refer report attached

We have calculated the original site roof area / paved area and compared to the proposed with the addition of the new residence and its driveway in the rear allotment.

The site parameters are

- The overall site area is 1526 sqm
- The existing site has a pool and two existing sheds with roof areas of 60+291sqm.
- The proposed site has the addition of a new private residence with roof area 213sqm
- The existing site has 1045sqm garden and the proposed 807sqm garden.
- Coefficient of run-off is 0.37 existing and 0.47 proposed.
- ARI of 20yrs for overall site discharge calculation, ARI of 10yrs for onsite detention volume.

We have performed calculations in accordance with AS3500.3 Plumbing and Drainage Part3 Stormwater Drainage, that demonstrate that the OSD tank of 5000L with 3500 detention is applicable.

Based on the above input criteria and rainfall data, the overall discharge of the site is calculated to be 13.8L/sec, which is less than the 16L/sec stipulated by Barwon Water as being the maximum allowable.

CONCLUSION

THE SITE STORMWATER DISCHARGE COMPLIES WITH THE COGG LPOD REQUIREMENTS.

STATUS – APPROVED

If you've got any questions, don't hesitate to contact me at ashley.willis@block1.com.au / 0434 891 623.

Yours faithfully,

Signed and Certified

Ashley Willis, Block1 Pty Ltd
Chartered Professional Engineer
MIEAust CPEng NER PE0000170 (Vict)

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A completed small-scale low risk site with no public roads or external user parking areas will usually generate very little sediment, referred to as total suspended solids (TSS). It is common that the 80% TSS target will not easily be achieved for this type of site.

Other sites may generate significant total suspended solids (TSS) as well as litter, referred to as gross pollutants and should meet all targets.

The generation of sediment and litter during the construction phase is a significant problem and must be addressed effectively for all developments.

You should demonstrate what appropriate controls will be used to ensure the generation of litter and sediment is prevented and controlled during construction to minimise risk of harm.

Blue Factor is designed to support a range of developments of less than 10,000 square metres including small scale residential, apartment developments, small scale commercial and small public use developments which must meet planning requirements including stormwater management quality objectives in the EPA Urban stormwater management guidelines (EPA - Publication 1739.1) It is recommended that MUSIC is used for larger and more complex projects to demonstrate compliance.

DRAFT
REPORT

City of Greater Geelong, Statutory Planning - Date Received 14/10/2026

Connections

Configuration 1

 **shed** Roof, 291m2

 **house** Roof, 213m2

 **pool shed** Roof, 60m2

 **Rainwater Tank 1**
Rainwater tank retention volume in kilolitres: 5

 **Building 1** Residential Detached house, 3 bedroom(s)

DRAFT

Catchments

 **shed** Roof, 291m2

 **house** Roof, 213m2

REPORT

 **pool shed** Roof, 60m2

 **drive way** Paved, 154m2 Untreated

 **Catchment 5** Pervious (garden and lawn), 842m2

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Treatments



Rainwater Tank 1
Rainwater tank retention volume in kilolitres: 5

127%

DRAFT
REPORT

City of Greater Geelong, Statutory Planning - Date Received 14/10/2026

Buildings & dwellings



Building 1 Residential Detached house, 3 bedroom(s)

Water sources	I want to calculate my water use based on fixtures and fittings
Basin taps - Primary water source	Mains water
Basin taps - Efficiency	6 star WELS rating
Showers - Primary water source	Mains water
Showers - Efficiency	3 star WELS rating (> 4.5 but < 6 litres per minute)
Clothes Washer - Primary water source	Mains water
Clothes Washer - Efficiency	6 star WELS rating
Toilets connected to mains water	0
Toilets connected to rainwater	3
Toilets connected to recycled water	0
Toilets efficiency	4 star WELS rating
Garden water use	Garden water demands are in use
Garden primary water source	Rainwater
Irrigated garden area supplied by:	
• **Mains**	0 m^2
• **Rainwater Tank**	600 m^2
• **Recycled Water**	0 m^2
Garden water use efficiency	High

DRAFT REPORT

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Project # 6863DE19
41 Clifton Springs Rd
Taj Dillon - taj@block1.com.au
41 Clifton Springs Rd, Drysdale VIC 3222, Australia
12 October 2026 12:31 p.m.

BLUE FACTOR®

41 Clifton Springs Rd

Nitrogen reduction target has been met, and a small low-risk project is deemed to comply. Higher risk projects need to meet all targets.

100%
SCORE

Project details

Name	41 Clifton Springs Rd
Project ID	6863DE19
Street address	41 Clifton Springs Rd, Drysdale VIC 3222, Australia
Municipality	Greater Geelong
Site area	1560 m^2
Planning Number	

Results

Item	Result	Target
Total suspended solids (%)	51%	>80%
Total phosphorus (%)	48%	>45%
Total nitrogen (%)	45%	>45%
Total gross pollutants (%)	76%	>70%
Mean annual runoff volume harvested or evapotranspired (%)	44%	>32%
Mean annual runoff volume infiltrated or filtered (%)	78%	>3%

DRAFT REPORT

For small low-risk sites, Total Nitrogen has been used as a proxy for other pollutants indicating compliance has been adequately met for many years. This has meant that if the Blue Factor score meets 100% based on Nitrogen, the Responsible Authority has the discretion to accept stormwater management design responses that do not meet all the individual pollutant load reduction targets on small low-risk sites.

Larger, high-risk projects, with roads, car parks or activities that may yield higher than typical pollutant loads, must meet all water quality targets fully. All projects should manage flow volume reductions through harvesting and evapotranspiration as well as infiltration to a level that is reasonably practicable.

Additional considerations

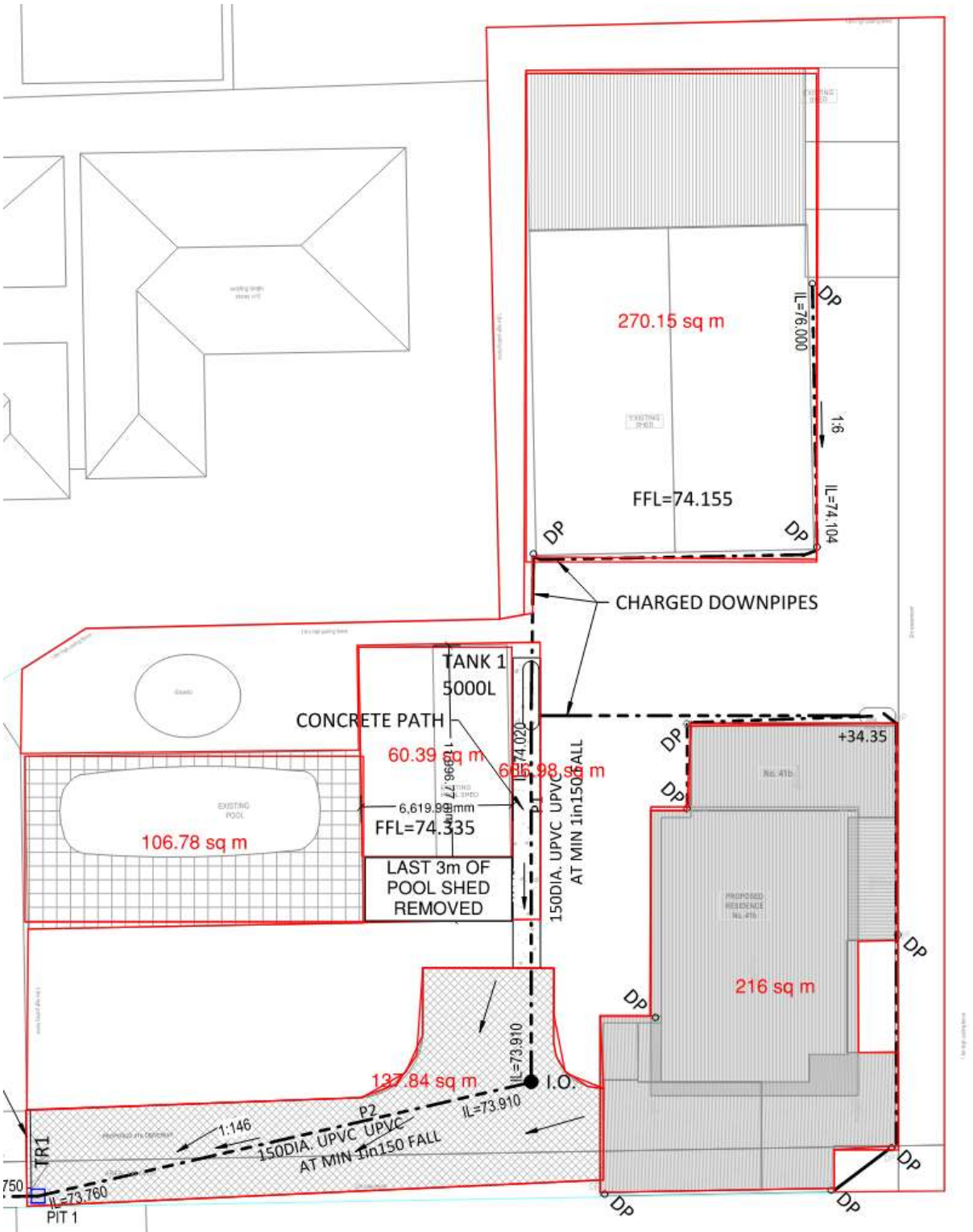
Flow and other pollutant load reductions should also be considered. The EPA Urban stormwater management guidelines (EPA - Publication 1739.1) are referenced in the VPPs as a policy document and support compliance with the General Environmental Duty.

You can use the guidelines to help minimise risks from urban stormwater so far as reasonably practicable (epa.vic.gov.au/about-epa/laws ew-laws/what-is-reasonablypracticable). Doing what is reasonably practicable means putting in proportionate controls to minimise the risk of harm to human health and the environment relative to the values being protected and risks presented by the site.

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CI_CALCS_002
SITE STORMWATER DISCHARGE
41 CLIFTON SPRINGS ROAD, DRYSDALE

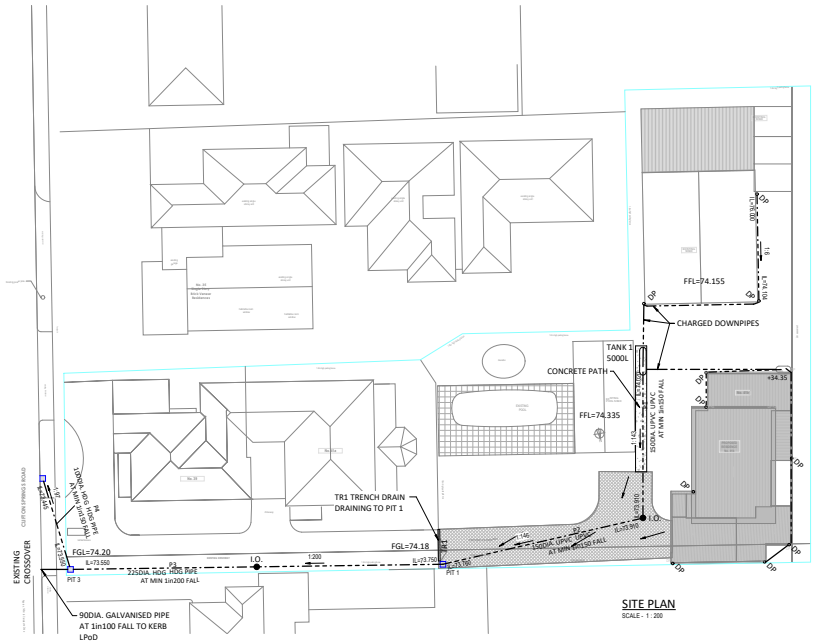


SITE PLAN
SCALE - 1 : 200

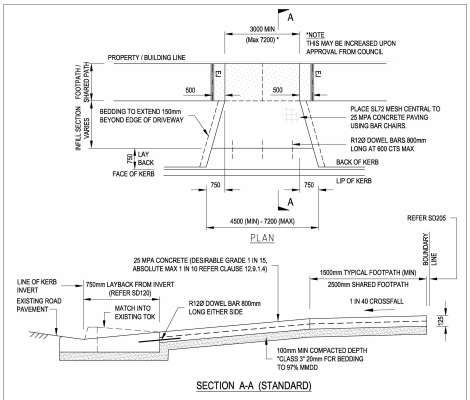
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STRUCTURAL ENGINEERS
ABN 19 639 931 490

CI_CALCS_001
SITE STORMWATER DISCHARGE
41 CLIFTON SPRINGS ROAD, DRYSDALE



SITE PLAN
SCALE - 1 : 200



SECTION A-A (STANDARD)

NOTE:
1. FOR GRADES STEEPER THAN 1 IN 10 REFER CLAUSE 12.9.1.4. LAYBACK & CROSSOVER, TO BE CONSTRUCTED IN PLAIN CONCRETE ONLY (NO COLOURED CONCRETE BEYOND PROPERTY BOUNDARY)
2. T.O.K. DENOTES TOP OF KERB
3. FOR STEEP TERRAIN CONTACT THE COUNCIL FOR GUIDANCE
4. REFER SD235 FOR DETAILS TO RETROFIT VEHICLE CROSSING INTO EXISTING.

LEGEND:
EJ EXPANSION JOINT
WEAKENED PLANE JOINTS

ALL MEASUREMENTS IN MILLIMETRES

NEW RESIDENTIAL SINGLE VEHICLE CROSSING DETAIL		LAST UPDATED 27/03/2025
Infrastructure Design Manual Standard Drawings	A copy of the Infrastructure Design Manual can be viewed on the Design Manual website www.designmanual.au	SD 240
Local Government Infrastructure Design Association		NOT TO SCALE

PIT SCHEDULE					
PIT TAG	SIZE	CLASS	LID TYPE	IL	PIT LID RL
PIT 1	600x600	C	PIT - GRATED LID	73.820	74.000
PIT 3	600x600	C	PIT - GRATED LID	73.550	74.200
PIT 3	600x600	C	PIT - GRATED LID	73.445	74.200

PIPE SCHEDULE			
PIPE TAG	TYPE	START I.L.	END I.L.
P1	150DIA. UPVC	74.020	73.910
P2	150DIA. UPVC	73.910	73.760
P3	225DIA. HDG	73.750	73.550
P4	100DIA. HDG	73.550	73.445

WARNING
BEWARE OF UNDERGROUND SERVICES
THE LOCATION OF UNDERGROUND SERVICES HAVE NOT BEEN DETERMINED AND THEIR EXACT POSITION SHOULD BE PROVEN ON SITE. NO GUARANTEE IS GIVEN THAT ALL EXISTING SERVICES ARE SHOWN.

REV	DESCRIPTION	DRAWN	APP'D	DATE
1	CONSTRUCTION ISSUE	N.H.	ADW	21.08.2026

CLIENT | ARCHITECT

BLOCK1 PTY LTD
STRUCTURAL ENGINEERS
ABN 19 639 931 490

PROJECT: CIVIL WORKS — 41 CLIFTON SPRINGS ROAD
TITLE: SITE PLAN

STRUCTURAL ENGINEERING DRAWINGS AND DETAILS

FOR CONSTRUCTION

SCALE @A1	PROJECT No.	DRAWING No.	REV.
1 : 200	26.141	C02	1

City of Greater Geelong, Statutory Planning - Date Received 14/10/2026

BLOCK1 PTY LTD
STRUCTURAL ENGINEERS
ABN 19 639 931 490

41 CLIFTON SPRINGS ROAD
DRYSDALE

REAR SUBDIVISION

Project 26.141
Engineer ADW
Date 27.07.2026

JEFF REDMAN_v1

STORMWATER DETENTION V5.03

Block1 Pty Ltd

Location: Geelong, VIC
Site: 1526m² with tc = 10 and tcs = 5 mins.
PSD: ARI of 5 years, Above ground PSD = 12.99L/s
Storage: ARI of 10 years, Above ground volume = 4.68m³

RESULT
5000L RETENTION
80mm ORIFICE MAX
13L/sec OUTFLOW

Design Criteria

Location = Geelong, VIC
PSD average recurrance interval (ARI) = 5 years
Storage average recurrance interval (ARI) = 10 years

Site Geometry

Pre-development coefficient (Cp) = 0.40
Post development coefficient (Cw) = 0.50

Site area (As) = 1526 m² = 0.1526 Ha

Total catchment (tc) = 10 minutes
Upstream catchment to site (tcs) = 5 minutes

Coefficient Calculations

Pre-development

Zone	Area (m²)	C	Area * C
Concrete	111	0.90	100
Roof	370	0.90	333
Gravel	0	0.30	0
Garden	1045	0.17	178
Total	1526 m²		611

Cp = 0.400

Post development

Zone	Area (m²)	C	Area * C
Concrete	111	0.90	100
Roof	582	0.90	524
Gravel	0	0.30	0
Garden	833	0.17	142
Total	1526 m²		765

Cw = 0.502

Permissible Site Discharge (PSD) (ARI of 5 years)

PSD Intensity (I) = 70.9 mm/hr For catchment tc = 10 mins.
Pre-development (Qp = Cp*I*As/0.36) = 12.02 L/s
Peak post development (Qa = 2*Cw*I*As/0.36) = 30.18 L/s =(0.426 x I) Eq. 2.24

Storage method = A (A)bove,(P)ipe,(U)nderground,(C)ustom

Permissible site discharge (Qu = PSD) = 12.990 L/s

Above ground - Eq 3.8

$0 = PSD^2 - 2*Qa/tc*(0.667*tc*Qp/Qa + 0.75*tc+0.25*tcs)*PSD + 2*Qa*Qp$

Taking x as = PSD and solving

a = 1.0 b = -68.8 c = 725.5

$PSD = -b \pm \sqrt{(b^2-4ac)}/(2a)$

PSD = 12.990 L/s

Below ground pipe - Eq 3.3

$Qp = PSD*[1.6*tcs/\{tc*(1-2*PSD/(3*Qa))\}-0.6*tcs^{2\cdot67}/\{tc*(1-2*PSDp/(3*Qa))\}^{2\cdot67}]$

= 12.02

PSD = 13.417 L/s

Below ground rectangular tank - Eq 3.4

t =tcs/(tc*(1-2*PSD/(3*Qa))) = 0.702

$Qp = PSD*[0.005-0.455*t+5.228*t^2-1.045*t^3-7.199*t^4+4.519*t^5]$

= 12.02

PSD = 13.030 L/s

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STORMWATER DETENTION V5.03

Design Storage Capacity (ARI of 10 years)

Above ground (Vs) = [0.5*Qa*td-[(0.875*PSD*td)(1-0.917*PSD/Qa)+(0.427*td*PSD²/Qa)]]*60/10³ m³ Eq 4.23
Below ground pipe (Vs) = [(0.5*Qa-0.637*PSD+0.089*PSD²/Qa)*td]*60/10³ m³ Eq 4.8
Below ground rect. tank (Vs) = [(0.5*Qa-0.572*PSD+0.048*PSD²/Qa)*td]*60/10³ m³ Eq 4.13

td (mins)	I (mm/hr)	Qa (L/s)	Above Vs (m³)	Pipe Vs (m³)	B/G Vs (m³)
5	108.5	46.2	3.93		
7	94.9	40.4	4.37		
8	89.7	38.2	4.50		
9	85.2	36.3	4.59		
10	81.2	34.6	4.65		
11	77.7	33.1	4.68		
12	74.6	31.7	4.68		
13	71.7	30.5	4.66		
14	69.2	29.4	4.62		
15	66.8	28.4	4.57		

Table 1 - Storage as function of time for 10 year ARI

Type	td (mins)	I (mm/hr)	Qa (L/s)	Vs (m³)
Above Pipe B/ground	11.7	75.5	32.1	**4.68**

Table 2 - Storage requirements for 10 year ARI

Frequency of operation of Above Ground storage

Qop2 = 0.75 Cl 2.4.5.1
Qp2 =Qop2*Qp1 (where Qp1=PSD) = 9.74 L/s at which time above ground storage occurs
I = 360*Qp2/(2*Cw*As*10³) = 22.9 mm/h Eq 4.24

Period of Storage

Time to Fill:

Above ground (tf) = td*(1-0.92*PSD/Qa) Eq 4.27
Below ground pipe (tf) = td*(1-2*PSD/(3*Qa)) Eq 3.2
Below ground rect. tank (tf) = td*(1-2*PSD/(3*Qa)) Eq 3.2

Time to empty:

Above ground (te) = (Vs+0.33*PSD²*td/Qa*60/10³)*(1.14/PSD)*(10³/60) Eq 4.28
Below ground pipe (te) = 1.464/PSD*(Vs+0.333*PSD²*td/Qa*60/10³)*(10³/60) Eq 4.32
Below ground rect. tank (te) = 2.653/PSD*(Vs+0.333*PSD²*td/Qa*60/10³)*(10³/60) Eq 4.36

Storage period (Ps = tf + te) Eq 4.26

Type	td (mins)	Qa (L/s)	Vs (L/s)	tf (mins)	te (mins)	Ps (mins)
Above Pipe B/ground	11.7	32.1	4.7	7.3	8.6	16.0

Table 3 - Period of Storage requirements for 10 year ARI

Orifice

Permissible site discharge (Qu=PSD) = 12.99 L/s (Above ground storage)
Orifice coefficient (CD) = 0.61 For sharp circular orifice
Gravitational acceration (g) = 9.81 m/s²
Maximum storage depth above orifice (H) = 900 mm
Orifice flow (Q) = CD*Ao*√(2*g*H)

Therefore:
Orifice area (Ao) = 5068 mm²
Orifice diameter (D = √(4*Ao/π)) = 80.3 mm

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41 CLIFTON SPRINGS ROAD, DRYSDALE

RAINFALL INTENSITY IN mm/h FOR VARIOUS DURATIONS AND RETURN PERIODS

	RETURN PERIOD (YEARS)						
DURATION	1	2	5	10	20	50	100
5 mins	44.8	59.6	81.1	95.9	116.	145.	169.
6 mins	41.7	55.6	75.4	89.2	108.	135.	157.
10 mins	34.0	45.1	60.5	71.2	85.6	106.	124.
20 mins	24.7	32.5	42.9	49.8	59.3	72.8	84.0
30 mins	20.0	26.1	34.1	39.5	46.7	57.1	65.5
1 hour	13.3	17.4	22.4	25.7	30.2	36.5	41.7
2 hours	8.80	11.2	14.2	16.2	19.0	22.8	25.9
3 hours	6.61	8.55	10.8	12.3	14.3	17.2	19.5
6 hours	4.18	5.39	6.77	7.66	8.90	10.6	12.0
12 hours	2.63	3.38	4.24	4.80	5.57	6.64	7.51
24 hours	1.61	2.09	2.64	3.01	3.51	4.21	4.78
48 hours	951	1.24	1.60	1.84	2.17	2.63	3.01
72 hours	.680	.890	1.16	1.34	1.59	1.94	2.22

(Raw data: 17.91, 3.48, 0.91, 33.59, 6.14, 1.78 skew= 0.420)

HYDROMETEOROLOGICAL ADVISORY SERVICE
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