ZAFIRIS & ASSOCIATES PTY. LTD.
CONSULTING CIVIL & STRUCTURAL ENGINEERS
ACN 008 085 952

STORMWATER DRAINAGE CALCULATIONS

CLIENT: MR. & MRS. BLEFARI **JOB NO:** 2181113

SITE: 19 ALEXANDER AVE., CAMPBELLTOWN

PROJECT DETAILS: **STORMWATER DRAINAGE DESIGN**

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DESIGN:	DATE:
PZ	30/11/2018

ADDRESS: 19 ALEXANDER AVE., CAMPBELLTOWN

STORMWATER COMPUTATIONS:

Post development runoff to be restricted to Q_5 flow for the critical flow up to 100 years ARI. Event

EXISTING SITE DISCHARGE:

	Ex. Paving		Ex. Landscape		Ex. House + Shed	
Q_{EXIST}=[	75 (0.9)	+	589 (0.1)	+	162 (1.0)]x(80/3600)	
Ex. Flow $5I_5$ =	**6.4**	L/s				

PROPOSED DEVELOPMENT RUNOFF:

Direct discharge to street, Q_{ground} :

	Paving		Landscape		Roof direct discharge	
Q_{ground}= [	120 (0.9)	+	193 (0.1)	+	105 (1.0)]	x (I/3600)
=	0.06	I				

Roof runoff, Q_{Roof} :

	Roof Area		Roof direct discharge				
Q_{Roof}=[(	513.00	-	105	) x 1.0]	x (I/3600)	=	0.11 I

DESIGN FOR 100 YEARS ARI EVENTS:

Storm duration	Intensity I(mm/hr)	Q_{ground} (L/s)	Q_{Roof} (L/s)	Q_{all} (net)	Storage Paving (L)	Required Tank (L)
5min	181	10.86	19.91	6.96	2088	2045
6min	168	10.08	18.48	6.18	2225	2151
10min	132	7.92	14.52	4.02	**2412**	2442
20min	90.8	5.45	9.99	1.55	1860	2798
30min	71	4.26	7.81	0.36	648	**2912**
60min	45.4	2.72	4.99	-1.18	-4248	1943

Allow 0.5 L/s discharge from each 15mm Ø, outlet of RW tanks

2.5 L/s total = 5 tanks, 5 buildings

$Q_{orifice}$ (outlets) $\rightarrow$ $Q_o = CA\sqrt{(2gH)}$

C=	0.65	(outake coefficient)	g=	9.81	m/s
A=	0.00017	m^2 (15mm Ø)	H=	1	m

Q_o = 0.65 x 0.00017 $\sqrt{(}$ 2 x 9.81 x1) = 0.0005 m^3/s = 0.5 L/s

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GROUND STORAGE REQUIRED: CONSIDER, WORST CASE @ 10MIN STORM

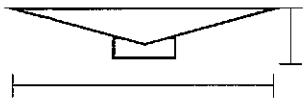
Net flow to be detained on site, Q_{all} :

Q_{all} = (Q_{ground} 7.92 - Q_{exist} 6.4) + RW tank o/f 2.5 = **4.02** L/s

Storage Volume = 4.02 x 10 (minute) x 60 (seconds) = **2412**

Volume= 4.02 x 10 x 60/1000 = **2.41** m^3

ALLOW PONDING AROUND SUMPS:



Volume= $\frac{5.0^2 \times 0.05}{3}$ x 5 sumps = **2.08** m^3

ALLOW PIPE STORAGE:

Volume = $\Pi r^2 L$

	90mmØ	
r =	0.045	m
L =	150	m
Volume =	**0.95**	m^3

Sump Ponding + Total Pipe Storage = 2.08 + 0.95 = **3.03** m^3 > 2.41 m^3 OK

ROOF STORAGE TANK REQUIRED → WORST CASE @ 30MIN STORM

Roof Storage Required = [(Q_{Roof} 7.81 - RW tank 2.5)] x 30 x 60/5 res

= Detention 1912 + Retention 1000L = **2912** L

[Provide 2000L detention tanks & 1000L retention tanks for proposed residences]