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STORMWATER MANAGEMENT CALCULATIONS

DATE:

9 March 2017

SITE:

**4 Redwood Street
ROSTREVOR**

CLIENT:

Paul Coscia

REFERENCE NO:

170248

Stormwater Management Calculations

4 Redwood Street, ROSTREVOR

Council Criteria - Campbelltown City Council

- Post development stormwater run-off from the site for a 1 in 20 yr ARS storm (tc=10mins) must not exceed pre-development run-off from the site from a 1 in 5 yr ARS (tc=10mins) storm event.

Pre development site conditions

- Total site area : $697m^2$

- Existing Impervious area - Main dwelling roof $\approx 180m^2$
/ car port
- Covered deck/outbuildings $= 80m^2$
- Paving $= 80m^2$ $C=0.9$

$$\text{Hence } Q_s^R = \frac{260 \times 0.9 \times 60}{3600} = 3.9 l/s$$

$$Q_s^P = \frac{80 \times 0.9 \times 60}{3600} = 1.2 l/s$$

$Q_{\text{TOTAL}} : 5.1 l/s$ - Maximum allowable development discharge flow rate.

- Post development site conditions ARS 1 in 20 yr (tc=10m) $\approx 90mm/hr$

Roof areas - Residences $1 \frac{1}{2} = 160m^2$
" $3 \frac{1}{4} = 125m^2$ } $C=1.0$

Paving - Common driveway : $230m^2$ $C=1.0$

$$Q_{20}^R = \frac{285 \times 1 \times 90}{3600} = 7.1 l/s$$

$$Q_{20}^P = \frac{230 \times 1 \times 90}{3600} = 5.8 l/s$$

Total undetained post development flows $Q_{\text{TOTAL}} = 12.9 l/s$

Proposed detention arrangement

- Direct min 60% of total roof area runoff to detention tanks
- Limit total release rate from detention tanks to a max.

- 40% of remaining roof area (Residences 1-3+4) directed to holding tank/chamber

- 40% of Residence 2 roof area direct to street watercourse

$$Q = \frac{(160/2 \times 0.4) \times 1 \times 90}{3600} = 0.8 \text{ l/s}$$

- Dwelling 2 detention tank $Q = 0.4 \text{ l/s}$ (1.2)

- Allow approx. 30% of paved driveway to contribute direct to watercourse undetained $Q_p = 5.8 \times 0.3 = 1.7 \text{ l/s}$ (2.9 l/s)

- Remaining 70% of paved driveway area to be collected and directed to holding/pump chamber.

Pump system to release at a maximum 2.2 l/s

- Required volume 3000 litres approx.

- Total post development flow rate $Q = \underline{5.1 \text{ l/s}}$

Detention Tanks Orifice Plate Calculations

$$Q = c \cdot a \sqrt{2gH} \quad \text{where } Q = Q_{\max} = 0.4 \text{ l/s} = 0.0004 \text{ m}^3/\text{s}$$

(Residences 1+2)

$$c = 0.61$$

a : area of orifice

$$g = 9.81 \text{ m/s}^2$$

$$H = 1.5 \text{ (Head)}$$

$$\text{Hence } a = \frac{0.0004}{0.61 \sqrt{2 \times 9.81 \times 1.5}}$$

$$= 0.12 \times 10^{-3} \text{ m}$$

- Radius of orifice $r = \sqrt{\frac{a}{\pi}} : 6 \text{ mm}$

- Select Orifice diameter : 12mm (Residence 1+2)

Residence 3+4

$$Q = 0.3 \text{ l/s} \quad \text{Adopt 12mm min. orifice diameter}$$

170248-Holding
1in20 Year Holding Tank

A Time Period	B Time min	70% Driveway			40% roof catchment D1-3&4			D-Tanks		E Q-in=Total Q l/s	F Q-out l/s	G=(E-F) Q-tot l/s	H Storm Duration s	I=(G*H) Vol with 2.2 l/s release (l)	J=max(I) Max Vol with Detention
		C n/a	A-rf m^2	Q-rf l/s	C n/a	A-rf m^2	Q-rf l/s	Q-rf l/s	Q-rf l/s						
5min	5	0.9	160.00	4.82	1	80.00	2.68	1.00	8.49	2.2	6.29	6.29	300.00	1,887.47	3,272.00 litres 3.27 m^3
6min	6	0.9	160.00	4.47	1	80.00	2.48	1.00	7.95	2.2	5.75	5.75	360.00	2,070.08	
10min	10	0.9	160.00	3.55	1	80.00	1.97	1.00	6.52	2.2	4.32	4.32	600.00	2,591.47	
15min	15	0.9	160.00	2.88	1	80.00	1.60	1.00	5.49	2.2	3.29	3.29	900.00	2,957.60	
20min	20	0.9	160.00	2.46	1	80.00	1.37	1.00	4.83	2.2	2.63	2.63	1,200.00	3,152.00	
30min	30	0.9	160.00	1.94	1	80.00	1.08	1.00	4.02	2.2	1.82	1.82	1,800.00	3,272.00	
60min	60	0.9	160.00	1.24	1	80.00	0.69	1.00	2.94	2.2	0.74	0.74	3,600.00	2,646.40	

170248-Tanks
1in20 Yr Detention Tanks D1-2

A	B	C	60% roof catch. D1-D2			T	E	F	G=(E-F)	H	Volume In		Volume Out		I=(G*H)	J=max(I)
Time Period	Time min	I mm/hr	C n/a	A-rf m^2	Q-rf l/s	Tc min.	Q-in=Total Q l/s	Q-out l/s	Q-tot l/s	Storm Duration s	V in litres	V in litres	V out litres	Detention Vol litres	Max Vol with Detention	
5min	5	120.40	1	96.00	3.21	10	3.21	0.8	2.41	300.00	963.20		360.00	603.20		
6min	6	111.70	1	96.00	2.98	10	2.98	0.8	2.18	360.00	1,072.32		384.00	688.32		
10min	10	88.70	1	96.00	2.37	10	2.37	0.8	1.57	600.00	1,419.20		480.00	939.20		
15min	15	72.10	1	96.00	1.92	10	1.92	0.8	1.12	900.00	1,730.40		600.00	1,130.40		
20min	20	61.50	1	96.00	1.64	10	1.64	0.8	0.84	1,200.00	1,968.00		720.00	1,248.00		
30min	30	48.50	1	96.00	1.29	10	1.29	0.8	0.49	1,800.00	2,328.00		960.00	1,368.00		
60min	60	31.10	1	96.00	0.83	10	0.83	0.8	0.03	3,600.00	2,985.60		1680.00	1,305.60		
90min	90	23.93	1	96.00	0.64	10	0.64	0.8	-0.16	5,400.00	3,445.92		2400.00	1,045.92		
120min	120	19.76	1	96.00	0.53	10	0.53	0.8	-0.27	7,200.00	3,793.92		3120.00	673.92		

170248-Tanks
1in20 Yr Detention Tanks D3-D4

A		B	C	60% roof catch. D3-D4			T		E		F	G=(E-F)		H	Volume In		Volume Out		I=(G*H)	J=max(I)
Time	Time	I	C	A-rf	Q-rf		Tc	Q-in=Total Q	Q-out			Q-tot	Storm Duration		V in	V out			Detention Vol	Max Vol with Detention
Period	min	mm/hr	n/a	m^2	l/s		min.	l/s	l/s			l/s	s		litres	litres			litres	
5min	5	120.40	1	75.00	2.51		10	2.51	0.6			1.91	300.00		752.50	270.00			482.50	
6min	6	111.70	1	75.00	2.33		10	2.33	0.6			1.73	360.00		837.75	288.00			549.75	
10min	10	88.70	1	75.00	1.85		10	1.85	0.6			1.25	600.00		1,108.75	360.00			748.75	1,098.75 litres 1.10 m^3
15min	15	72.10	1	75.00	1.50		10	1.50	0.6			0.90	900.00		1,351.88	450.00			901.88	
20min	20	61.50	1	75.00	1.28		10	1.28	0.6			0.68	1,200.00		1,537.50	540.00			997.50	
30min	30	48.50	1	75.00	1.01		10	1.01	0.6			0.41	1,800.00		1,818.75	720.00			1,098.75	
60min	60	31.10	1	75.00	0.65		10	0.65	0.6			0.05	3,600.00		2,332.50	1260.00			1,072.50	
90min	90	23.93	1	75.00	0.50		10	0.50	0.6			-0.10	5,400.00		2,692.13	1800.00			892.13	
120min	120	19.76	1	75.00	0.41		10	0.41	0.6			-0.19	7,200.00		2,964.00	2340.00			624.00	

1,098.75 litres
1.10 m^3



4 Redwood St

Judith St

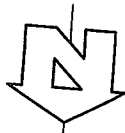
Redwood St

Google Earth

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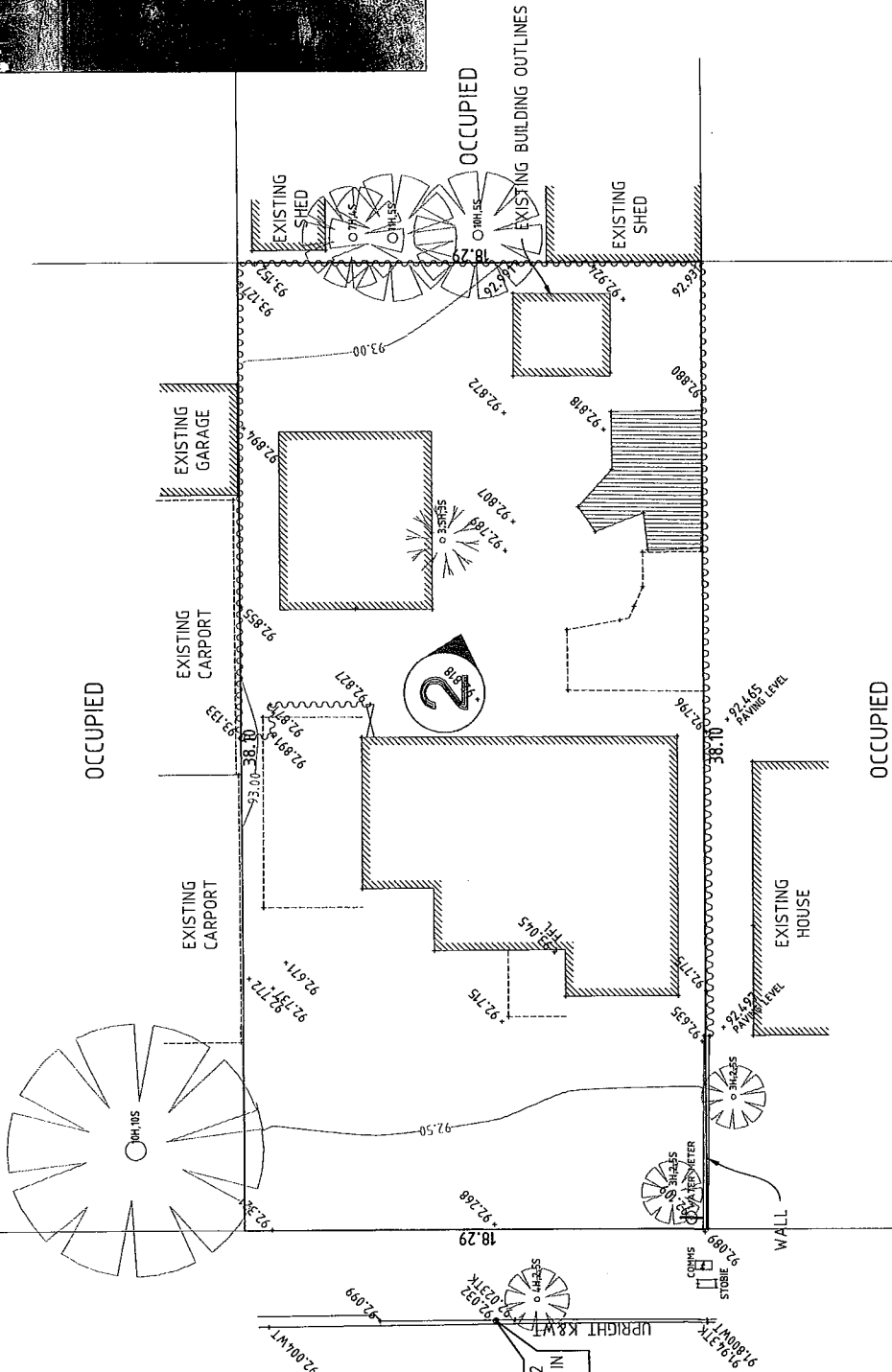
Imagery Date: 1/7/2016 54 H 287793.63 m E 6136518.41 m S elev 93 m eye alt 178 m



STREET

REDWOOD

TBM RL 92.032
RAMSET NAIL IN
KERB. (A.H.D.)



NOTE: THIS IS AN ENGINEERING DETAIL SURVEY.
BOUNDARIES HAVE NOT BEEN CHECKED.
TREE SIZES AND LOCATIONS ARE APPROXIMATE ONLY.
REFER TO CERTIFICATE OF TITLE FOR EASEMENT DETAILS

NOTE: SMALL TREES AND SHRUBS WITHIN
ALLOTMENT HAVE NOT BEEN SHOWN.

* ALLOTMENT NOT PEGGED AT TIME OF SURVEY
* SEWER CONNECTION NOT FOUND AT TIME OF SURVEY

Damrob Survey & Imaging Solutions		PO Box 84 Henley Beach SA 5022		No. REVISION	
M 0408 826 047 T 08 8353 6666 E survey@damrob.com.au www.damrob.com.au		JOB No. 170067		BY DATE	
SURVEY DATE 23/02/2017		PREPARED FOR LELIO BIBBO PTY LTD		REVISION	
ISSUE DATE FEBRUARY 2017		LOT 1 REDWOOD STREET ROSTREVOR		DATE	
SHEET 1 OF 1		DETAIL SURVEY		BY DATE	
		SCALE 1:200		SHEET SIZE A3	
		SURVEYED DG		DRAWN RG	
		EQUIPMENT S3/RG		LEVEL DATUM AHD	
		DERIVED FROM 6628/19/40		LTO PLAN REFERENCE D6795	