Stewart Consulting		Job No		Sheet No	Rev
Calculation Sheet		54193	47	01	
Project Title		Member	Location : Ac	uifer and storage	Design
Development @ Nexten Conon School Site		Drawing	Ref:		
Development @ Norton Canon School Site		Made by	: GSt	Date February 2020	Chk
In accordance with BRE Digest 365 - Aquif	er des	sign			
The impermeable area is calculated from the largest plot 2 Area = House, garage & drveway = 180m2					
Design rainfall intensity					
Location of catchment area;	Other	r			
Impermeable area drained to the system;	A = 1	80.0 m ²	2		
Return period; Perio			yr		
Ratio 60 min to 2 day rainfall of 5 yr return perio				r = 0.360	
5-year return period rainfall of 60 minutes	duratic	on;		M5_60min = 1 9	9.0 mm
Increase of rainfall intensity due to global	warmir	ng;		p _{climate} = 20 %	
Infiltration trench details	Deete				
l rench type;	Recta	angular			
Winimum depin of trench,	a = 1	200 mm			
Length of trench:	VV - 1	000 mm	1		
Percentage free volume:	1 – 24 V =	= 20 %	11		
	• nee	20 /0			
Soil infiltration rate (BRE digest 365)					
Length of trial pit;	$I_{trial} =$	1750 m	m		
Width of trial pit;	b _{trial} =	• 600 m	m		
Depth of trial pit;	$d_{trial} =$	• 1500 n	nm		
Free volume (if fill used);	V _{trial} =	= 40 %;			
75% depth of nit:	d =	(d) 75) = 1125 00	mm	
50% depth of pit:	d ₅₀ =		() 50) = 750 00 (nm	
25% depth of pit:	d _{oc} =) 25) = 375 00 (mm	
	u ₂₅		<i>5.20)</i> 676.00		
Test 1 - time to fall from 75% depth to 25%	6 depth	า;	T1 = 375 min		
Test 2 - time to fall from 75% depth to 25%	6 dept	า;	T2 = 350 min		
Test 3 - time to fall from 75% depth to 25%	6 dept	า;	T3 = 325 min		
Longest time to fall from 75% depth to 25%	% dept	h;	t _{lg} = max(T1, T	2, T3) = 375 min	
Storage volume from 75% to 25% depth;	V _{p75} 2	$_{25} = (I_{trial})$	imes b _{trial} $ imes$ (d ₇₅ - d	₂₅)) × V _{trial} = 0.32 m	3
Internal surface area to 50% depth;	a _{p50} =	= ((I _{trial} ×	b_{trial}) + (I_{trial} + b_{t}	$_{rial}) \times 2 \times d_{50}) = 4.58$	3 m ²
Surface area of soakaway to 50% storage	depth	•	$A_{s50} = 2 \times (I_{trial})$	+ b_{trial}) × d_{trial} / 2 = 3	3.525 m ²
Soil infiltration rate;	f = V _n	_{075 25} / (a	$a_{p50} \times t_{la}$) = 3.06	× 10⁻⁶ m/s	
Wetted area of pit 50% full:	a _{s50} =	: I × d +	w × d = 300000)00 mm ²	

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Calculation Sheet

Project Title

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5419347	02					
Member/Location	Aquifer and storage Desi	gn				
Drawing Ref:						
Made by: GSt	Date February 2020 C	:hk				

Duration, D (min)	Growth factor Z1	M5 rainfalls (mm)	Growth factor Z2	100 year rainfall, M100 (mm)	Inflow (m³)	Outflow (m³)	Storage required (m ³)
5;	0.36;	8.2;	1.87;	15.3;	2.76;	0.03;	2.73
10;	0.51;	11.6;	1.94;	22.5;	4.05;	0.06;	4.00
15;	0.62;	14.1;	1.98;	27.9;	5.03;	0.08;	4.95
30;	0.79;	18.0;	2.01;	36.3;	6.53;	0.17;	6.36
60;	1.00;	22.8;	2.02;	46.0;	8.29;	0.33;	7.95
120;	1.22;	27.8;	1.99;	55.3;	9.95;	0.66;	9.29
240;	1.48;	33.7;	1.94;	65.5;	11.78;	1.32;	10.46
360;	1.67;	38.1;	1.91;	72.5;	13.06;	1.98;	11.08
600;	1.90;	43.3;	1.86;	80.7;	14.53;	3.30;	11.23
1440;	2.42;	55.2;	1.77;	97.9;	17.63;	7.93;	9.69

Time for emptying soakaway to half volume; t_{s50} = S_{req} × 0.5 / (a_{s50} × f); = 16hr 58min 59s

Soakaway discharge time less than or equal to 24 hour

S_{req} = **11.23** m³ Aquifer required storage volume per plot; $S_{act} = I \times d \times w \times V_{free} = 5.76 \text{ m}^3$ Aquifer storage volume per house plot

Aquifer storage volume per plot inadequate on its own

Additional storage

Hydro International Stormbloc Optimum attenuation cellular modular system. Block dimensions = 800mm x 800mm x 600mm dp Volume = 3.2*3.2*0.6m dp = 6.144m³

Total storage capacity per plot = $5.76+6.144 = 11.90 \text{ m}^3$

Total storage volume greater than required

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Project Title

Development @ Norton Canon School Site

Job No	Sheet No	Rev
5419347	01	
Member/Location :	Soakaway Design	
Drawing Ref:		
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