

Pump Track and Learn to ride Area

The following calculations are submitted to comply with the planning conditions raised. Soakaway tests in the Pump track area were unsuccessful as the ground is predominately Clay, with no measurable infiltration from two pits dug. An adjacent sewer is unavailable to drain to hence the need to drain to the adjacent existing water course across the car park. No buildings or cellars are affected by the proposed scheme which contains runoff to the Greenfield equivalent by attenuation of the discharge.

Discharge Estimate

From the FEH Wallingford method the predicted 100 year storm for the discharge point proposed in Wythenshaw Park for a 6 hour storm as the planning condition requirement was down loaded from the FEH website extract given over page. The planning conditions also require to allow for a 40% uplift for climate change to these design values. The footprint of the hard standings in the in the Pump Track and Learn to ride area is 1,095m² with a total catchment area of 5,688m². Hence we can estimate the greenfield run off;



Greenfield runoff rate estimation for sites

www.uksubs.com | Greenfield runoff tool

Calculated by: paul drobig

Site name: Wythenshaw park

Site location: discharge point

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments": S0030219 (2013), the SuDS Manual (2015) (Cris, 2015) and the non-statutory standards for SuDS (Delta, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Runoff estimation approach: IH124

Site characteristics

Total site area (ha): 0.5688

Methodology

Q_{BAR} estimation method: Calculate from SPR and SAAR

SPR estimation method: Calculate from SOIL type

Soil characteristics

Default

Edited

SOIL type: 2 2

HOST class: N/A N/A

SPR/SPRHOST: 0.3 0.3

Hydrological characteristics

Default

Edited

SAAR (mm): 829 829

Hydrological region: 10 10

Growth curve factor 1 year: 0.87 0.87

Growth curve factor 30 years: 1.7 1.7

Growth curve factor 100 years: 2.08 2.08

Growth curve factor 200 years: 2.37 2.37

Site Details

Latitude: 53.40714° N

Longitude: 2.28528° W

Reference: 1071316889

Date: Mar 28 2022 11:57

Notes

(1) Is Q_{BAR} < 2.0 l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is SPR/SPRHOST ≤ 0.3?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates	Default	Edited
Q _{BAR} (l/s):	1.26	1.26
t in 1 year (l/s):	1.1	1.1
t in 30 years (l/s):	2.15	2.15
t in 100 year (l/s):	2.63	2.63
t in 200 years (l/s):	2.99	2.99

This report was produced using the greenfield runoff tool developed by HR Wallingford and available at www.uksubs.com. The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at www.uksubs.com/terms-and-conditions.htm. The outputs from this tool are estimates of greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for the use of this data in the design or operational characteristics of any drainage scheme.

We can then calculate the attenuation requirement as the table below assuming a permitted discharge rate of 5 lt/sec is agreed. This shows it peaking at 115m³, so it is proposed to provide attenuation for 118m³ of storage with a hydro brake set at 5lt/s discharge.

Attenuation storage									
Areas;				m2					
LTR				328	90%		295.2		
Balance				602	90%		541.8		
Pump LTR				165	90%		148.5		
grass areas				4593	25%		1148.25		
			Total area	5688	m2		2133.75	m2	
100yr return period 6 hour storm +40%									
duration	100yr					greenfield	discharge		
hours	rain	rain	rain+40%	area	volume	discharge	volume	storage	
	mm	mm/hr	mm/hr	m2	m3	l/s	m3	m3	
0.25	24.18	96.72	135.41	2133.75	72.2	5.00	4.50	67.7	
0.5	32.92	65.84	92.18	2133.75	98.3	5.00	9.00	89.3	
0.75	38.37	51.16	71.62	2133.75	114.6	5.00	13.50	101.1	
1	42.42	42.42	59.39	2133.75	126.7	5.00	18.00	108.7	
1.25	45.11	36.09	50.52	2133.75	134.8	5.00	22.50	112.3	
1.5	47.21	31.47	44.06	2133.75	141.0	5.00	27.00	114.0	peak volume 115m3
1.75	48.95	27.97	39.16	2133.75	146.2	5.00	31.50	114.7	
2	50.44	25.22	35.31	2133.75	150.7	5.00	36.00	114.7	volume proposed
2.25	51.83	23.04	32.25	2133.75	154.8	5.00	40.50	114.3	7x14x1.2m
2.5	53.08	21.23	29.72	2133.75	158.6	5.00	45.00	113.6	
2.75	54.22	19.72	27.60	2133.75	162.0	5.00	49.50	112.5	117.6 m3
3	55.26	18.42	25.79	2133.75	165.1	5.00	54.00	111.1	
3.25	56.23	17.30	24.22	2133.75	168.0	5.00	58.50	109.5	therefor FOS =
3.5	57.13	16.32	22.85	2133.75	170.7	5.00	63.00	107.7	1.03
3.75	57.98	15.46	21.65	2133.75	173.2	5.00	67.50	105.7	
4	58.77	14.69	20.57	2133.75	175.6	5.00	72.00	103.6	
4.25	59.51	14.00	19.60	2133.75	177.8	5.00	76.50	101.3	
4.5	60.22	13.38	18.74	2133.75	179.9	5.00	81.00	98.9	
4.75	60.89	12.82	17.95	2133.75	181.9	5.00	85.50	96.4	
5	61.54	12.31	17.23	2133.75	183.8	5.00	90.00	93.8	
5.25	62.15	11.84	16.57	2133.75	185.7	5.00	94.50	91.2	
5.5	62.74	11.41	15.97	2133.75	187.4	5.00	99.00	88.4	
5.75	63.31	11.01	15.41	2133.75	189.1	5.00	103.50	85.6	
6	63.85	10.64	14.90	2133.75	190.7	5.00	108.00	82.7	

Download extract from FEH web service for predicted 100 year 6 hour storm.

VERSION	"FEH Web Version	1.0.0	exported a	10:23:34	GMT	Thu	#####			
Parameters										
Rainfall model=	FEH 2013									
Calculation type=	Design rainfall									
Calculation mode=	Typical point in catchment									
Calculation location=	Catchment GB	380750	389950	SJ 80750 89950						
Catchment area=	5.01 km**2									
Duration=	6 Hours									
Fixed duration=	no									
Return period=	100 Years									
Annual maximum=	yes									
An areal reduction factor of 0.965 has been applied to a point rainfall of 66.2 mm to yield a catchment design rainfall of 63.85 mm.										
This design rainfall has been calculated for a return period on the annual maximum scale.										
The data in the following table have been computed using sliding durations.										
					Duration hours	Duration days	100 year rainfall (mm)			
					0.25	0.010417	24.18			
					0.5	0.020833	32.92			
					0.75	0.03125	38.37			
					1	0.041667	42.42			
					1.25	0.052083	45.11			
					1.5	0.0625	47.21			
					1.75	0.072917	48.95			
					2	0.083333	50.44			
					2.25	0.09375	51.83			
					2.5	0.104167	53.08			
					2.75	0.114583	54.22			
					3	0.125	55.26			
					3.25	0.135417	56.23			
					3.5	0.145833	57.13			
					3.75	0.15625	57.98			
					4	0.166667	58.77			
					4.25	0.177083	59.51			
					4.5	0.1875	60.22			
					4.75	0.197917	60.89			
					5	0.208333	61.54			
					5.25	0.21875	62.15			
					5.5	0.229167	62.74			
					5.75	0.239583	63.31			
					6	0.25	63.85			