gmcsurveys
Surveys,Setting Out Civil Engineering Design

Surface Water Soakaways

Client: Bob Milton Properties Ltd

Site Address: Orquidish Road
Fochabers
Phase 1 (Plots 1 - 8)

Date: 29/07/2015

Job No 2013

Completed By Gary Mackintosh Bsc
gmcsurveys
34 castle Street
Forres
Moray
IV36 1PW
T: 07557 431 702
E:gmcsurveys@gmail.com

Ground Investigation

Test holes were carried out on the 24th July 2015 within the areas of plots 1 - 8 and excavated to a depth 1.6m.

The existing ground conditions comprise of 300 – 400mm TOPSOIL overlying light brown medium course gravelly SANDS and dark brown medium silty SANDS proved to the depth of the excavation.

I can confirm that there was no evidence of fill material or contamination within the test holes and the natural ground has a bearing capacity of 100kn/$m^{2.}$

Proposed Soakaway

Infiltration testing was carried out within the test holes and provided an infiltration rate of 0.0000323m/s or 3.23 $x10^{-5}$ m/s

From the site investigation and the calculations provided below I can confirm that the existing soils are suitable for the use of perforated precast concrete rings with a 300mm granular surround as a method for dispersal of surface waters.

Plots 1, 5 and 8

House type – Craigton.

Impermeable area = 194m^2

From the calculation below I can confirm the suitability of a perforated precast concrete soakaway ring with dimensions:

1500mm diam ring with a depth of 1.5m below the invert of the pipe and a 300mm granular surround.

MasterDrain
SW 14.13

GMC Surveys	Shireen Villa, 34 Castle Street, Forres IV36 1FN Mobile: 07557 431 702 email: gmcsurveys@gmail.com	Job No. 2013 Sheet no. 1 Date 29/07/15	
Project Orquidish Road, Fochabers		By GM	Checked / Reviewed
Title Plots 1, 5 and 8 Surface Water Soakaway			

Concrete ring design:-

Ring diameter = 1500 mm
Percentage voids = 30.0
Return period = 10 yrs
Imperm. area = 194m²
Depth below invert = 1.5m
Pit side length = 2.1m

Calculations :-

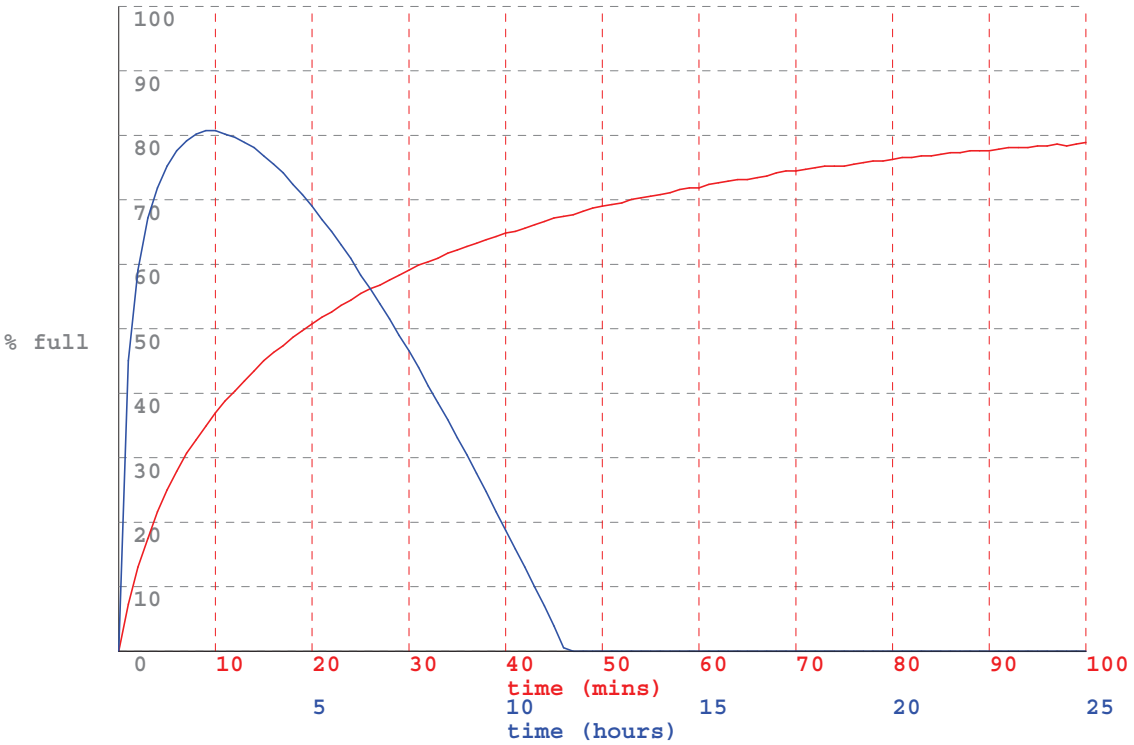
Surface area of soakaway to 50% depth - a_{s50} = Length of side x 4 x Depth/2 = 6.3 m² (base not included).

Outflow factor - OFact = a_{s50} x f =0.0002016 m³/s where Infilt. factor (f)= 0.000032 m/s

Soakaway ring storage volume - S_{actual} = Pi x (Ring diam/2000)² x depth = 2.7 m³

Gross soakaway pit storage volume - S_{pit} = Length of side² x depth = 6.6 m³

Nett soakaway pit storage volume - S_{nett} = Gross pit volume - infill = 3.8 m³ (storage + void)



Required volume (S_{reqd}) = 3.1 m³

Available storage volume = 3.8 m³

Spare capacity = 0.74 m³

Emptying time to 50% volume = 04:10

Soakaway emptying time OK.

Soakaway dimensions OK.

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Shireen Villa,
34 Castle Street,
Forres IV36 1FN
Mobile: 07557 431 702
email: gmcsurveys@gmail.com

Job No. 2013
Sheet no. 2
Date 29/07/15

Project: Orquidish Road, Fochabers
Title: Soakaway data - 100 mins

By: GM
Checked:
Reviewed:

Duration	Rain mm/hr	Inflow m³	Outflow m³	Storage m³	Voids m³	Emp. time hr:min	Duration	Rain mm/hr	Inflow m³	Outflow m³	Storage m³	Voids m³	Emp. time hr:min
1	90.6	0.29	0.01	0.28	-	00:23	51	19.9	3.28	0.62	2.66	0.01	03:40
2	81.0	0.52	0.02	0.50	-	00:41	52	19.6	3.30	0.63	2.67	0.02	03:41
3	73.6	0.71	0.04	0.67	-	00:55	53	19.4	3.33	0.64	2.69	0.04	03:42
4	67.7	0.88	0.05	0.83	-	01:09	54	19.2	3.35	0.65	2.70	0.05	03:43
5	62.9	1.02	0.06	0.96	-	01:19	55	19.0	3.38	0.67	2.71	0.06	03:44
6	58.9	1.14	0.07	1.07	-	01:28	56	18.8	3.40	0.68	2.72	0.07	03:45
7	55.5	1.26	0.08	1.18	-	01:38	57	18.6	3.42	0.69	2.73	0.08	03:46
8	52.6	1.36	0.10	1.26	-	01:44	58	18.4	3.45	0.70	2.75	0.10	03:47
9	50.0	1.45	0.11	1.34	-	01:51	59	18.2	3.47	0.71	2.76	0.11	03:48
10	47.7	1.54	0.12	1.42	-	01:57	60	18.0	3.49	0.73	2.76	0.11	03:48
11	45.7	1.62	0.13	1.49	-	02:03	61	17.8	3.52	0.74	2.78	0.13	03:50
12	43.8	1.70	0.15	1.55	-	02:08	62	17.6	3.54	0.75	2.79	0.14	03:51
13	42.2	1.77	0.16	1.61	-	02:13	63	17.5	3.56	0.76	2.80	0.15	03:51
14	40.7	1.84	0.17	1.67	-	02:18	64	17.3	3.58	0.77	2.81	0.16	03:52
15	39.3	1.91	0.18	1.73	-	02:23	65	17.1	3.60	0.79	2.81	0.16	03:52
16	38.1	1.97	0.19	1.78	-	02:27	66	17.0	3.62	0.80	2.82	0.17	03:53
17	36.9	2.03	0.21	1.82	-	02:30	67	16.8	3.64	0.81	2.83	0.18	03:54
18	35.8	2.09	0.22	1.87	-	02:35	68	16.7	3.67	0.82	2.85	0.20	03:56
19	34.8	2.14	0.23	1.91	-	02:38	69	16.5	3.69	0.83	2.86	0.21	03:56
20	33.9	2.19	0.24	1.95	-	02:41	70	16.4	3.71	0.85	2.86	0.21	03:56
21	33.0	2.24	0.25	1.99	-	02:45	71	16.2	3.73	0.86	2.87	0.22	03:57
22	32.2	2.29	0.27	2.02	-	02:47	72	16.1	3.75	0.87	2.88	0.23	03:58
23	31.5	2.34	0.28	2.06	-	02:50	73	16.0	3.77	0.88	2.89	0.24	03:59
24	30.7	2.38	0.29	2.09	-	02:53	74	15.8	3.79	0.90	2.89	0.24	03:59
25	30.0	2.43	0.30	2.13	-	02:56	75	15.7	3.80	0.91	2.89	0.24	03:59
26	29.4	2.47	0.31	2.16	-	02:59	76	15.6	3.82	0.92	2.90	0.25	04:00
27	28.8	2.51	0.33	2.18	-	03:00	77	15.4	3.84	0.93	2.91	0.26	04:01
28	28.2	2.55	0.34	2.21	-	03:03	78	15.3	3.86	0.94	2.92	0.27	04:01
29	27.7	2.59	0.35	2.24	-	03:05	79	15.2	3.88	0.96	2.92	0.27	04:01
30	27.1	2.63	0.36	2.27	-	03:08	80	15.1	3.90	0.97	2.93	0.28	04:02
31	26.6	2.67	0.37	2.30	-	03:10	81	15.0	3.92	0.98	2.94	0.29	04:03
32	26.2	2.71	0.39	2.32	-	03:12	82	14.8	3.93	0.99	2.94	0.29	04:03
33	25.7	2.74	0.40	2.34	-	03:13	83	14.7	3.95	1.00	2.95	0.30	04:04
34	25.3	2.78	0.41	2.37	-	03:16	84	14.6	3.97	1.02	2.95	0.30	04:04
35	24.8	2.81	0.42	2.39	-	03:18	85	14.5	3.99	1.03	2.96	0.31	04:05
36	24.4	2.85	0.44	2.41	-	03:19	86	14.4	4.01	1.04	2.97	0.32	04:06
37	24.1	2.88	0.45	2.43	-	03:21	87	14.3	4.02	1.05	2.97	0.32	04:06
38	23.7	2.91	0.46	2.45	-	03:23	88	14.2	4.04	1.06	2.98	0.33	04:06
39	23.3	2.94	0.47	2.47	-	03:24	89	14.1	4.06	1.08	2.98	0.33	04:06
40	23.0	2.97	0.48	2.49	-	03:26	90	14.0	4.07	1.09	2.98	0.33	04:06
41	22.7	3.00	0.50	2.50	-	03:27	91	13.9	4.09	1.10	2.99	0.34	04:07
42	22.3	3.03	0.51	2.52	-	03:28	92	13.8	4.11	1.11	3.00	0.35	04:08
43	22.0	3.06	0.52	2.54	-	03:30	93	13.7	4.12	1.12	3.00	0.35	04:08
44	21.7	3.09	0.53	2.56	-	03:32	94	13.6	4.14	1.14	3.00	0.35	04:08
45	21.4	3.12	0.54	2.58	-	03:33	95	13.5	4.16	1.15	3.01	0.36	04:09
46	21.2	3.15	0.56	2.59	-	03:34	96	13.4	4.17	1.16	3.01	0.36	04:09
47	20.9	3.17	0.57	2.60	-	03:35	97	13.4	4.19	1.17	3.02	0.37	04:10
48	20.6	3.20	0.58	2.62	-	03:37	98	13.3	4.20	1.19	3.01	0.36	04:09
49	20.4	3.23	0.59	2.64	-	03:38	99	13.2	4.22	1.20	3.02	0.37	04:10
50	20.1	3.25	0.60	2.65	-	03:39	100	13.1	4.24	1.21	3.03	0.38	04:10

GMC Surveys

Shireen Villa,
34 Castle Street,
Forres IV36 1FN
Mobile: 07557 431 702
email: gmcsurveys@gmail.com

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Job No.	2013
Sheet no.	3
Date	29/07/15
Project	Orquidish Road, Fochabers
Title	Soakaway data - 100 hours
By	GM
Checked	
Reviewed	

Duration	Rain mm/hr	Inflow m³	Outflow m³	Storage m³	Voids m³	Emp. time hr:min	Duration	Rain mm/hr	Inflow m³	Outflow m³	Storage m³	Voids m³	Emp. time hr:min
0.25	39.3	1.91	0.18	1.73	-	02:23	12.75	3.5	8.68	9.25	-	-	-
0.50	27.1	2.63	0.36	2.27	-	03:08	13.00	3.5	8.73	9.43	-	-	-
0.75	21.4	3.12	0.54	2.58	-	03:33	13.25	3.4	8.79	9.62	-	-	-
1.00	18.0	3.49	0.73	2.76	0.11	03:48	13.50	3.4	8.85	9.80	-	-	-
1.25	15.7	3.80	0.91	2.89	0.24	03:59	13.75	3.3	8.90	9.98	-	-	-
1.50	14.0	4.07	1.09	2.98	0.33	04:06	14.00	3.3	8.96	10.16	-	-	-
1.75	12.7	4.31	1.27	3.04	0.39	04:11	14.25	3.3	9.01	10.34	-	-	-
2.00	11.7	4.53	1.45	3.08	0.43	04:15	14.50	3.2	9.07	10.52	-	-	-
2.25	10.8	4.73	1.63	3.10	0.45	04:16	14.75	3.2	9.12	10.70	-	-	-
2.50	10.1	4.91	1.81	3.10	0.45	04:16	15.00	3.2	9.17	10.89	-	-	-
2.75	9.5	5.08	2.00	3.08	0.43	04:15	15.25	3.1	9.22	11.07	-	-	-
3.00	9.0	5.24	2.18	3.06	0.41	04:13	15.50	3.1	9.28	11.25	-	-	-
3.25	8.6	5.39	2.36	3.03	0.38	04:10	15.75	3.1	9.33	11.43	-	-	-
3.50	8.2	5.54	2.54	3.00	0.35	04:08	16.00	3.0	9.38	11.61	-	-	-
3.75	7.8	5.67	2.72	2.95	0.30	04:04	16.25	3.0	9.43	11.79	-	-	-
4.00	7.5	5.80	2.90	2.90	0.25	04:00	16.50	3.0	9.48	11.98	-	-	-
4.25	7.2	5.93	3.08	2.85	0.20	03:56	16.75	2.9	9.53	12.16	-	-	-
4.50	6.9	6.05	3.27	2.78	0.13	03:50	17.00	2.9	9.57	12.34	-	-	-
4.75	6.7	6.17	3.45	2.72	0.07	03:45	17.25	2.9	9.62	12.52	-	-	-
5.00	6.5	6.28	3.63	2.65	-	03:39	17.50	2.8	9.67	12.70	-	-	-
5.25	6.3	6.38	3.81	2.57	-	03:32	17.75	2.8	9.72	12.88	-	-	-
5.50	6.1	6.49	3.99	2.50	-	03:27	18.00	2.8	9.76	13.06	-	-	-
5.75	5.9	6.59	4.17	2.42	-	03:20	18.25	2.8	9.81	13.25	-	-	-
6.00	5.7	6.69	4.35	2.34	-	03:13	18.50	2.7	9.85	13.43	-	-	-
6.25	5.6	6.78	4.54	2.24	-	03:05	18.75	2.7	9.90	13.61	-	-	-
6.50	5.5	6.88	4.72	2.16	-	02:59	19.00	2.7	9.94	13.79	-	-	-
6.75	5.3	6.97	4.90	2.07	-	02:51	19.25	2.7	9.99	13.97	-	-	-
7.00	5.2	7.06	5.08	1.98	-	02:44	19.50	2.7	10.03	14.15	-	-	-
7.25	5.1	7.14	5.26	1.88	-	02:35	19.75	2.6	10.08	14.33	-	-	-
7.50	5.0	7.23	5.44	1.79	-	02:28	20.00	2.6	10.12	14.52	-	-	-
7.75	4.9	7.31	5.62	1.69	-	02:20	20.25	2.6	10.16	14.70	-	-	-
8.00	4.8	7.39	5.81	1.58	-	02:11	20.50	2.6	10.21	14.88	-	-	-
8.25	4.7	7.47	5.99	1.48	-	02:02	20.75	2.5	10.25	15.06	-	-	-
8.50	4.6	7.55	6.17	1.38	-	01:54	21.00	2.5	10.29	15.24	-	-	-
8.75	4.5	7.62	6.35	1.27	-	01:45	21.25	2.5	10.33	15.42	-	-	-
9.00	4.4	7.70	6.53	1.17	-	01:37	21.50	2.5	10.37	15.60	-	-	-
9.25	4.3	7.77	6.71	1.06	-	01:28	21.75	2.5	10.41	15.79	-	-	-
9.50	4.3	7.84	6.89	0.95	-	01:19	22.00	2.4	10.46	15.97	-	-	-
9.75	4.2	7.91	7.08	0.83	-	01:09	22.25	2.4	10.50	16.15	-	-	-
10.00	4.1	7.98	7.26	0.72	-	01:00	22.50	2.4	10.54	16.33	-	-	-
10.25	4.0	8.05	7.44	0.61	-	00:50	22.75	2.4	10.58	16.51	-	-	-
10.50	4.0	8.12	7.62	0.50	-	00:41	23.00	2.4	10.61	16.69	-	-	-
10.75	3.9	8.18	7.80	0.38	-	00:31	23.25	2.4	10.65	16.87	-	-	-
11.00	3.9	8.25	7.98	0.27	-	00:22	23.50	2.3	10.69	17.06	-	-	-
11.25	3.8	8.31	8.16	0.15	-	00:12	23.75	2.3	10.73	17.24	-	-	-
11.50	3.8	8.37	8.35	0.02	-	00:02	24.00	2.3	10.77	17.42	-	-	-
11.75	3.7	8.44	8.53	-	-	-	24.25	2.3	10.81	17.60	-	-	-
12.00	3.6	8.50	8.71	-	-	-	24.50	2.3	10.85	17.78	-	-	-
12.25	3.6	8.56	8.89	-	-	-	24.75	2.3	10.88	17.96	-	-	-
12.50	3.6	8.62	9.07	-	-	-	25.00	2.3	10.92	18.14	-	-	-

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GMC Surveys	Shireen Villa, 34 Castle Street, Forres IV36 1FN Mobile: 07557 431 702 email: gmcsurveys@gmail.com	Job No. 2013		
		Sheet no. 4		
		Date 29/07/15		
Project Orquidish Road, Fochabers		By GM	Checked	Reviewed
Title Hydrology data				

Location hydrological data (FSR):-

Location	= FOCHABERS	Grid reference	= NJ3458
M5-60 (mm)	= 15.1	r	= 0.26
Soil index	= 0.15	SAAR (mm/yr)	= 780
WRAP	= 1	Area = Scotland and N. Ireland	

Soil classification for WRAP type 1

i) Well drained permeable sandy or loam soils and shallower analogues over highly permeable limestone, chalk, sandstone or related drifts;

ii) Earthy peat soils drained by dykes and pumps;

iii) Less permeable loamy over clayey soils on plateaux adjacent to very permeable soils in valleys.

N.B. The rainfall rates are calculated using the location specific values above in accordance with the Wallingford procedure.

Plots 2 and 3

House type – Hopeton.

Impermeable area = 103m^2

From the calculation below I can confirm the suitability of a perforated precast concrete soakaway ring with dimensions:

1200mm diam ring with a depth of 1.2m below the invert of the pipe and a 300mm granular surround.

MasterDrain
SW 14.13

GMC Surveys	Shireen Villa, 34 Castle Street, Forres IV36 1FN Mobile: 07557 431 702 email: gmcsurveys@gmail.com	Job No. 2013		
		Sheet no. 1		
		Date 29/07/15		
Project Orquidish Road, Fochabers		By GM	Checked	Reviewed
Title Plots 2 and 3 Surface Water Soakaway				

Concrete ring design:-

Ring diameter = 1200 mm
Percentage voids = 30.0
Return period = 10 yrs
Imperm. area = 103m²
Depth below invert = 1.2m
Pit side length = 1.8m

Calculations :-

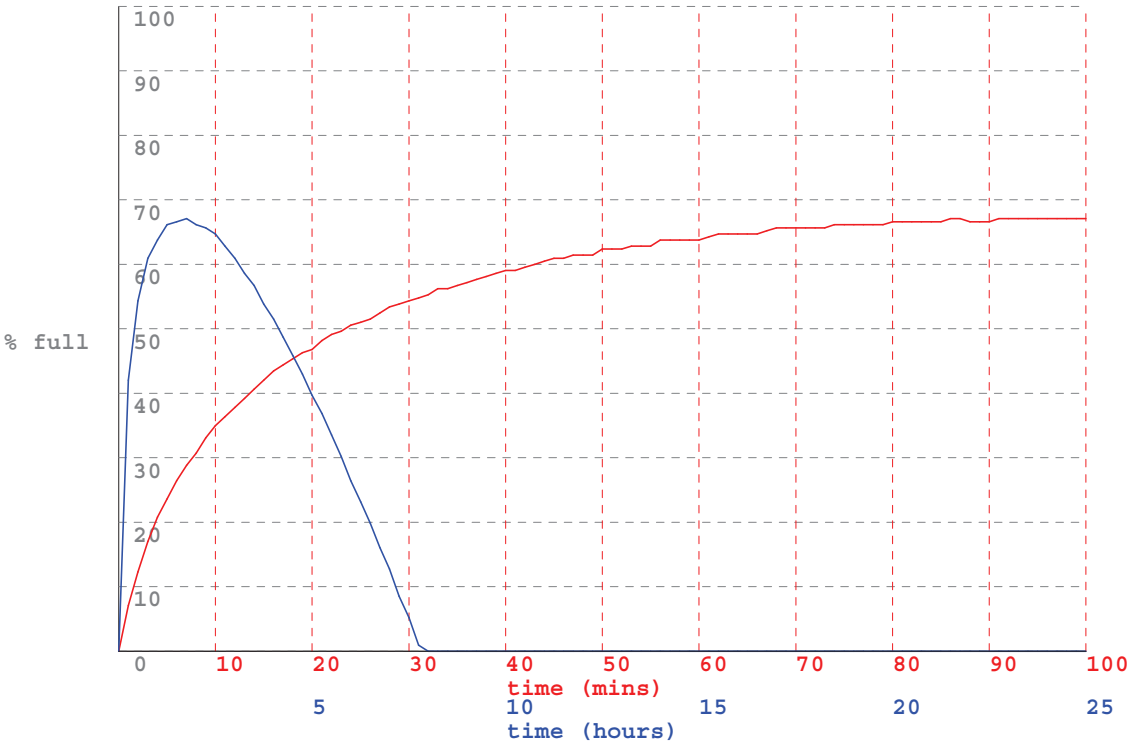
Surface area of soakaway to 50% depth - a_{s50} = Length of side x 4 x Depth/2 = 4.3 m² (base not included).

Outflow factor - OFact = a_{s50} x f =0.0001382 m³/s where Infilt. factor (f)= 0.000032 m/s

Soakaway ring storage volume - S_{actual} = Pi x (Ring diam/2000)² x depth = 1.4 m³

Gross soakaway pit storage volume - S_{pit} = Length of side² x depth = 3.9 m³

Nett soakaway pit storage volume - S_{nett} = Gross pit volume - infill = 2.1 m³ (storage + void)



Required volume (S_{reqd}) = 1.4 m³

Available storage volume = 2.1 m³

Spare capacity = 0.70 m³

Emptying time to 50% volume = 02:51

Soakaway emptying time OK.

Soakaway side length could be excessive.

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GMC Surveys

Shireen Villa,
34 Castle Street,
Forres IV36 1FN
Mobile: 07557 431 702
email: gmcsurveys@gmail.com

Job No. 2013
Sheet no. 2
Date 29/07/15

Project: Orquidish Road, Fochabers
Title: Soakaway data - 100 mins

By: GM
Checked:
Reviewed:

Duration	Rain mm/hr	Inflow m³	Outflow m³	Storage m³	Voids m³	Emp. time hr:min	Duration	Rain mm/hr	Inflow m³	Outflow m³	Storage m³	Voids m³	Emp. time hr:min
1	90.6	0.16	0.01	0.15	-	00:18	51	19.9	1.74	0.42	1.32	-	02:39
2	81.0	0.28	0.02	0.26	-	00:31	52	19.6	1.75	0.43	1.32	-	02:39
3	73.6	0.38	0.02	0.36	-	00:43	53	19.4	1.77	0.44	1.33	-	02:40
4	67.7	0.47	0.03	0.44	-	00:53	54	19.2	1.78	0.45	1.33	-	02:40
5	62.9	0.54	0.04	0.50	-	01:00	55	19.0	1.79	0.46	1.33	-	02:40
6	58.9	0.61	0.05	0.56	-	01:08	56	18.8	1.81	0.46	1.35	-	02:43
7	55.5	0.67	0.06	0.61	-	01:14	57	18.6	1.82	0.47	1.35	-	02:43
8	52.6	0.72	0.07	0.65	-	01:18	58	18.4	1.83	0.48	1.35	-	02:43
9	50.0	0.77	0.07	0.70	-	01:24	59	18.2	1.84	0.49	1.35	-	02:43
10	47.7	0.82	0.08	0.74	-	01:29	60	18.0	1.85	0.50	1.35	-	02:43
11	45.7	0.86	0.09	0.77	-	01:33	61	17.8	1.87	0.51	1.36	0.00	02:44
12	43.8	0.90	0.10	0.80	-	01:36	62	17.6	1.88	0.51	1.37	0.01	02:45
13	42.2	0.94	0.11	0.83	-	01:40	63	17.5	1.89	0.52	1.37	0.01	02:45
14	40.7	0.98	0.12	0.86	-	01:44	64	17.3	1.90	0.53	1.37	0.01	02:45
15	39.3	1.01	0.12	0.89	-	01:47	65	17.1	1.91	0.54	1.37	0.01	02:45
16	38.1	1.05	0.13	0.92	-	01:51	66	17.0	1.92	0.55	1.37	0.01	02:45
17	36.9	1.08	0.14	0.94	-	01:53	67	16.8	1.94	0.56	1.38	0.02	02:46
18	35.8	1.11	0.15	0.96	-	01:56	68	16.7	1.95	0.56	1.39	0.03	02:48
19	34.8	1.14	0.16	0.98	-	01:58	69	16.5	1.96	0.57	1.39	0.03	02:48
20	33.9	1.16	0.17	0.99	-	01:59	70	16.4	1.97	0.58	1.39	0.03	02:48
21	33.0	1.19	0.17	1.02	-	02:03	71	16.2	1.98	0.59	1.39	0.03	02:48
22	32.2	1.22	0.18	1.04	-	02:05	72	16.1	1.99	0.60	1.39	0.03	02:48
23	31.5	1.24	0.19	1.05	-	02:07	73	16.0	2.00	0.61	1.39	0.03	02:48
24	30.7	1.27	0.20	1.07	-	02:09	74	15.8	2.01	0.61	1.40	0.04	02:49
25	30.0	1.29	0.21	1.08	-	02:10	75	15.7	2.02	0.62	1.40	0.04	02:49
26	29.4	1.31	0.22	1.09	-	02:11	76	15.6	2.03	0.63	1.40	0.04	02:49
27	28.8	1.33	0.22	1.11	-	02:14	77	15.4	2.04	0.64	1.40	0.04	02:49
28	28.2	1.36	0.23	1.13	-	02:16	78	15.3	2.05	0.65	1.40	0.04	02:49
29	27.7	1.38	0.24	1.14	-	02:17	79	15.2	2.06	0.66	1.40	0.04	02:49
30	27.1	1.40	0.25	1.15	-	02:19	80	15.1	2.07	0.66	1.41	0.05	02:50
31	26.6	1.42	0.26	1.16	-	02:20	81	15.0	2.08	0.67	1.41	0.05	02:50
32	26.2	1.44	0.27	1.17	-	02:21	82	14.8	2.09	0.68	1.41	0.05	02:50
33	25.7	1.46	0.27	1.19	-	02:23	83	14.7	2.10	0.69	1.41	0.05	02:50
34	25.3	1.47	0.28	1.19	-	02:23	84	14.6	2.11	0.70	1.41	0.05	02:50
35	24.8	1.49	0.29	1.20	-	02:25	85	14.5	2.12	0.71	1.41	0.05	02:50
36	24.4	1.51	0.30	1.21	-	02:26	86	14.4	2.13	0.71	1.42	0.06	02:51
37	24.1	1.53	0.31	1.22	-	02:27	87	14.3	2.14	0.72	1.42	0.06	02:51
38	23.7	1.55	0.32	1.23	-	02:28	88	14.2	2.14	0.73	1.41	0.05	02:50
39	23.3	1.56	0.32	1.24	-	02:30	89	14.1	2.15	0.74	1.41	0.05	02:50
40	23.0	1.58	0.33	1.25	-	02:31	90	14.0	2.16	0.75	1.41	0.05	02:50
41	22.7	1.59	0.34	1.25	-	02:31	91	13.9	2.17	0.75	1.42	0.06	02:51
42	22.3	1.61	0.35	1.26	-	02:32	92	13.8	2.18	0.76	1.42	0.06	02:51
43	22.0	1.63	0.36	1.27	-	02:33	93	13.7	2.19	0.77	1.42	0.06	02:51
44	21.7	1.64	0.36	1.28	-	02:34	94	13.6	2.20	0.78	1.42	0.06	02:51
45	21.4	1.66	0.37	1.29	-	02:36	95	13.5	2.21	0.79	1.42	0.06	02:51
46	21.2	1.67	0.38	1.29	-	02:36	96	13.4	2.22	0.80	1.42	0.06	02:51
47	20.9	1.69	0.39	1.30	-	02:37	97	13.4	2.22	0.80	1.42	0.06	02:51
48	20.6	1.70	0.40	1.30	-	02:37	98	13.3	2.23	0.81	1.42	0.06	02:51
49	20.4	1.71	0.41	1.30	-	02:37	99	13.2	2.24	0.82	1.42	0.06	02:51
50	20.1	1.73	0.41	1.32	-	02:39	100	13.1	2.25	0.83	1.42	0.06	02:51

GMC Surveys

Shireen Villa,
34 Castle Street,
Forres IV36 1FN
Mobile: 07557 431 702
email: gmcsurveys@gmail.com

MasterDrain
SW 14.13

Job No.	2013
Sheet no.	3
Date	29/07/15
Project	Orquidish Road, Fochabers
Title	Soakaway data - 100 hours
By	GM
Checked	
Reviewed	

Duration	Rain mm/hr	Inflow m³	Outflow m³	Storage m³	Voids m³	Emp. time hr:min	Duration	Rain mm/hr	Inflow m³	Outflow m³	Storage m³	Voids m³	Emp. time hr:min
0.25	39.3	1.01	0.12	0.89	-	01:47	12.75	3.5	4.61	6.35	-	-	-
0.50	27.1	1.40	0.25	1.15	-	02:19	13.00	3.5	4.64	6.47	-	-	-
0.75	21.4	1.66	0.37	1.29	-	02:36	13.25	3.4	4.67	6.59	-	-	-
1.00	18.0	1.85	0.50	1.35	-	02:43	13.50	3.4	4.70	6.72	-	-	-
1.25	15.7	2.02	0.62	1.40	0.04	02:49	13.75	3.3	4.73	6.84	-	-	-
1.50	14.0	2.16	0.75	1.41	0.05	02:50	14.00	3.3	4.76	6.97	-	-	-
1.75	12.7	2.29	0.87	1.42	0.06	02:51	14.25	3.3	4.78	7.09	-	-	-
2.00	11.7	2.40	1.00	1.40	0.04	02:49	14.50	3.2	4.81	7.22	-	-	-
2.25	10.8	2.51	1.12	1.39	0.03	02:48	14.75	3.2	4.84	7.34	-	-	-
2.50	10.1	2.61	1.24	1.37	0.01	02:45	15.00	3.2	4.87	7.46	-	-	-
2.75	9.5	2.70	1.37	1.33	-	02:40	15.25	3.1	4.90	7.59	-	-	-
3.00	9.0	2.78	1.49	1.29	-	02:36	15.50	3.1	4.92	7.71	-	-	-
3.25	8.6	2.86	1.62	1.24	-	02:30	15.75	3.1	4.95	7.84	-	-	-
3.50	8.2	2.94	1.74	1.20	-	02:25	16.00	3.0	4.98	7.96	-	-	-
3.75	7.8	3.01	1.87	1.14	-	02:17	16.25	3.0	5.00	8.09	-	-	-
4.00	7.5	3.08	1.99	1.09	-	02:11	16.50	3.0	5.03	8.21	-	-	-
4.25	7.2	3.15	2.12	1.03	-	02:04	16.75	2.9	5.06	8.34	-	-	-
4.50	6.9	3.21	2.24	0.97	-	01:57	17.00	2.9	5.08	8.46	-	-	-
4.75	6.7	3.27	2.36	0.91	-	01:50	17.25	2.9	5.11	8.58	-	-	-
5.00	6.5	3.33	2.49	0.84	-	01:41	17.50	2.8	5.13	8.71	-	-	-
5.25	6.3	3.39	2.61	0.78	-	01:34	17.75	2.8	5.16	8.83	-	-	-
5.50	6.1	3.45	2.74	0.71	-	01:26	18.00	2.8	5.18	8.96	-	-	-
5.75	5.9	3.50	2.86	0.64	-	01:17	18.25	2.8	5.21	9.08	-	-	-
6.00	5.7	3.55	2.99	0.56	-	01:08	18.50	2.7	5.23	9.21	-	-	-
6.25	5.6	3.60	3.11	0.49	-	00:59	18.75	2.7	5.26	9.33	-	-	-
6.50	5.5	3.65	3.23	0.42	-	00:51	19.00	2.7	5.28	9.46	-	-	-
6.75	5.3	3.70	3.36	0.34	-	00:41	19.25	2.7	5.30	9.58	-	-	-
7.00	5.2	3.75	3.48	0.27	-	00:33	19.50	2.7	5.33	9.70	-	-	-
7.25	5.1	3.79	3.61	0.18	-	00:22	19.75	2.6	5.35	9.83	-	-	-
7.50	5.0	3.84	3.73	0.11	-	00:13	20.00	2.6	5.37	9.95	-	-	-
7.75	4.9	3.88	3.86	0.02	-	00:02	20.25	2.6	5.40	10.08	-	-	-
8.00	4.8	3.92	3.98	-	-	-	20.50	2.6	5.42	10.20	-	-	-
8.25	4.7	3.97	4.11	-	-	-	20.75	2.5	5.44	10.33	-	-	-
8.50	4.6	4.01	4.23	-	-	-	21.00	2.5	5.46	10.45	-	-	-
8.75	4.5	4.05	4.35	-	-	-	21.25	2.5	5.49	10.58	-	-	-
9.00	4.4	4.09	4.48	-	-	-	21.50	2.5	5.51	10.70	-	-	-
9.25	4.3	4.13	4.60	-	-	-	21.75	2.5	5.53	10.82	-	-	-
9.50	4.3	4.16	4.73	-	-	-	22.00	2.4	5.55	10.95	-	-	-
9.75	4.2	4.20	4.85	-	-	-	22.25	2.4	5.57	11.07	-	-	-
10.00	4.1	4.24	4.98	-	-	-	22.50	2.4	5.59	11.20	-	-	-
10.25	4.0	4.27	5.10	-	-	-	22.75	2.4	5.61	11.32	-	-	-
10.50	4.0	4.31	5.23	-	-	-	23.00	2.4	5.64	11.45	-	-	-
10.75	3.9	4.34	5.35	-	-	-	23.25	2.4	5.66	11.57	-	-	-
11.00	3.9	4.38	5.47	-	-	-	23.50	2.3	5.68	11.70	-	-	-
11.25	3.8	4.41	5.60	-	-	-	23.75	2.3	5.70	11.82	-	-	-
11.50	3.8	4.45	5.72	-	-	-	24.00	2.3	5.72	11.94	-	-	-
11.75	3.7	4.48	5.85	-	-	-	24.25	2.3	5.74	12.07	-	-	-
12.00	3.6	4.51	5.97	-	-	-	24.50	2.3	5.76	12.19	-	-	-
12.25	3.6	4.54	6.10	-	-	-	24.75	2.3	5.78	12.32	-	-	-
12.50	3.6	4.57	6.22	-	-	-	25.00	2.3	5.80	12.44	-	-	-

MasterDrain
SW 14.13

GMC Surveys	Shireen Villa, 34 Castle Street, Forres IV36 1FN Mobile: 07557 431 702 email: gmcsurveys@gmail.com	Job No. 2013		
		Sheet no. 4		
		Date 29/07/15		
Project Orquidish Road, Fochabers		By GM	Checked	Reviewed
Title Hydrology data				

Location hydrological data (FSR):-

Location	= FOCHABERS	Grid reference	= NJ3458
M5-60 (mm)	= 15.1	r	= 0.26
Soil index	= 0.15	SAAR (mm/yr)	= 780
WRAP	= 1	Area = Scotland and N. Ireland	

Soil classification for WRAP type 1

i) Well drained permeable sandy or loam soils and shallower analogues over highly permeable limestone, chalk, sandstone or related drifts;

ii) Earthy peat soils drained by dykes and pumps;

iii) Less permeable loamy over clayey soils on plateaux adjacent to very permeable soils in valleys.

N.B. The rainfall rates are calculated using the location specific values above in accordance with the Wallingford procedure.

Plots 4

House type – Scotton.

Impermeable area = 177m^2

From the calculation below I can confirm the suitability of a perforated precast concrete soakaway ring with dimensions:

1500mm diam ring with a depth of 1.2m below the invert of the pipe and a 300mm granular surround.

MasterDrain
SW 14.13

GMC Surveys	Shireen Villa, 34 Castle Street, Forres IV36 1FN Mobile: 07557 431 702 email: gmcsurveys@gmail.com	Job No. 2013 Sheet no. 1 Date 29/07/15	
Project Orquidish Road, Fochabers		By GM	Checked / Reviewed
Title Plot 4 Surface Water Soakaway			

Concrete ring design:-

Ring diameter = 1500 mm
Percentage voids = 30.0

Return period = 10 yrs
Imperm. area = 177m²

Depth below invert = 1.2m
Pit side length = 2.1m

Calculations :-

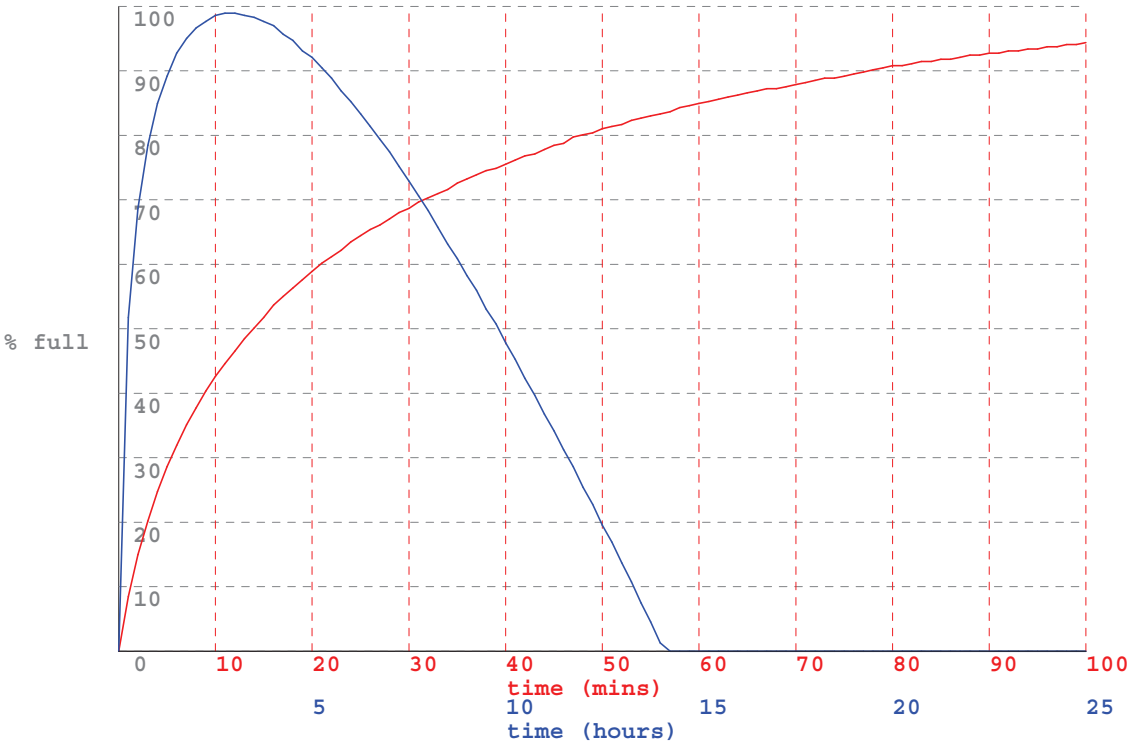
Surface area of soakaway to 50% depth - a_{s50} = Length of side x 4 x Depth/2 = 5.0 m² (base not included).

Outflow factor - OFact = a_{s50} x f =0.0001613 m³/s where Infilt. factor (f)= 0.000032 m/s

Soakaway ring storage volume - S_{actual} = Pi x (Ring diam/2000)² x depth = 2.1 m³

Gross soakaway pit storage volume - S_{pit} = Length of side² x depth = 5.3 m³

Nett soakaway pit storage volume - S_{nett} = Gross pit volume - infill = 3.1 m³ (storage + void)



Required volume (S_{reqd}) = 3.0 m³

Available storage volume = 3.1 m³

Spare capacity = 0.03 m³

Emptying time to 50% volume = 05:00

Soakaway emptying time OK.

Soakaway dimensions OK.

GMC Surveys

Shireen Villa,
34 Castle Street,
Forres IV36 1FN
Mobile: 07557 431 702
email: gmcsurveys@gmail.com

MasterDrain
SW 14.13

Job No.	2013
Sheet no.	2
Date	29/07/15
Project	Orquidish Road, Fochabers
Title	Soakaway data - 100 mins
By	GM
Checked	
Reviewed	

Duration	Rain mm/hr	Inflow m³	Outflow m³	Storage m³	Voids m³	Emp. time hr:min	Duration	Rain mm/hr	Inflow m³	Outflow m³	Storage m³	Voids m³	Emp. time hr:min
1	90.6	0.27	0.01	0.26	-	00:27	51	19.9	2.99	0.49	2.50	0.38	04:18
2	81.0	0.48	0.02	0.46	-	00:48	52	19.6	3.01	0.50	2.51	0.39	04:19
3	73.6	0.65	0.03	0.62	-	01:04	53	19.4	3.04	0.51	2.53	0.41	04:21
4	67.7	0.80	0.04	0.76	-	01:19	54	19.2	3.06	0.52	2.54	0.42	04:22
5	62.9	0.93	0.05	0.88	-	01:31	55	19.0	3.08	0.53	2.55	0.43	04:24
6	58.9	1.04	0.06	0.98	-	01:41	56	18.8	3.10	0.54	2.56	0.44	04:25
7	55.5	1.15	0.07	1.08	-	01:52	57	18.6	3.12	0.55	2.57	0.45	04:26
8	52.6	1.24	0.08	1.16	-	02:00	58	18.4	3.15	0.56	2.59	0.47	04:28
9	50.0	1.33	0.09	1.24	-	02:08	59	18.2	3.17	0.57	2.60	0.48	04:29
10	47.7	1.41	0.10	1.31	-	02:15	60	18.0	3.19	0.58	2.61	0.49	04:30
11	45.7	1.48	0.11	1.37	-	02:22	61	17.8	3.21	0.59	2.62	0.50	04:31
12	43.8	1.55	0.12	1.43	-	02:28	62	17.6	3.23	0.60	2.63	0.51	04:32
13	42.2	1.62	0.13	1.49	-	02:34	63	17.5	3.25	0.61	2.64	0.52	04:33
14	40.7	1.68	0.14	1.54	-	02:39	64	17.3	3.27	0.62	2.65	0.53	04:34
15	39.3	1.74	0.15	1.59	-	02:44	65	17.1	3.29	0.63	2.66	0.54	04:35
16	38.1	1.80	0.15	1.65	-	02:51	66	17.0	3.31	0.64	2.67	0.55	04:36
17	36.9	1.85	0.16	1.69	-	02:55	67	16.8	3.33	0.65	2.68	0.56	04:37
18	35.8	1.90	0.17	1.73	-	02:59	68	16.7	3.34	0.66	2.68	0.56	04:37
19	34.8	1.95	0.18	1.77	-	03:03	69	16.5	3.36	0.67	2.69	0.57	04:38
20	33.9	2.00	0.19	1.81	-	03:07	70	16.4	3.38	0.68	2.70	0.58	04:39
21	33.0	2.05	0.20	1.85	-	03:11	71	16.2	3.40	0.69	2.71	0.59	04:40
22	32.2	2.09	0.21	1.88	-	03:14	72	16.1	3.42	0.70	2.72	0.60	04:41
23	31.5	2.13	0.22	1.91	-	03:17	73	16.0	3.44	0.71	2.73	0.61	04:42
24	30.7	2.18	0.23	1.95	-	03:22	74	15.8	3.45	0.72	2.73	0.61	04:42
25	30.0	2.22	0.24	1.98	-	03:25	75	15.7	3.47	0.73	2.74	0.62	04:43
26	29.4	2.26	0.25	2.01	-	03:28	76	15.6	3.49	0.74	2.75	0.63	04:44
27	28.8	2.29	0.26	2.03	-	03:30	77	15.4	3.51	0.75	2.76	0.64	04:45
28	28.2	2.33	0.27	2.06	-	03:33	78	15.3	3.52	0.75	2.77	0.65	04:46
29	27.7	2.37	0.28	2.09	-	03:36	79	15.2	3.54	0.76	2.78	0.66	04:47
30	27.1	2.40	0.29	2.11	-	03:38	80	15.1	3.56	0.77	2.79	0.67	04:48
31	26.6	2.44	0.30	2.14	0.02	03:41	81	15.0	3.57	0.78	2.79	0.67	04:48
32	26.2	2.47	0.31	2.16	0.04	03:43	82	14.8	3.59	0.79	2.80	0.68	04:49
33	25.7	2.50	0.32	2.18	0.06	03:45	83	14.7	3.61	0.80	2.81	0.69	04:50
34	25.3	2.53	0.33	2.20	0.08	03:47	84	14.6	3.62	0.81	2.81	0.69	04:50
35	24.8	2.57	0.34	2.23	0.11	03:50	85	14.5	3.64	0.82	2.82	0.70	04:51
36	24.4	2.60	0.35	2.25	0.13	03:53	86	14.4	3.65	0.83	2.82	0.70	04:51
37	24.1	2.63	0.36	2.27	0.15	03:55	87	14.3	3.67	0.84	2.83	0.71	04:52
38	23.7	2.66	0.37	2.29	0.17	03:57	88	14.2	3.69	0.85	2.84	0.72	04:53
39	23.3	2.68	0.38	2.30	0.18	03:58	89	14.1	3.70	0.86	2.84	0.72	04:53
40	23.0	2.71	0.39	2.32	0.20	04:00	90	14.0	3.72	0.87	2.85	0.73	04:55
41	22.7	2.74	0.40	2.34	0.22	04:02	91	13.9	3.73	0.88	2.85	0.73	04:55
42	22.3	2.77	0.41	2.36	0.24	04:04	92	13.8	3.75	0.89	2.86	0.74	04:56
43	22.0	2.79	0.42	2.37	0.25	04:05	93	13.7	3.76	0.90	2.86	0.74	04:56
44	21.7	2.82	0.43	2.39	0.27	04:07	94	13.6	3.78	0.91	2.87	0.75	04:57
45	21.4	2.85	0.44	2.41	0.29	04:09	95	13.5	3.79	0.92	2.87	0.75	04:57
46	21.2	2.87	0.45	2.42	0.30	04:10	96	13.4	3.81	0.93	2.88	0.76	04:58
47	20.9	2.90	0.45	2.45	0.33	04:13	97	13.4	3.82	0.94	2.88	0.76	04:58
48	20.6	2.92	0.46	2.46	0.34	04:14	98	13.3	3.84	0.95	2.89	0.77	04:59
49	20.4	2.94	0.47	2.47	0.35	04:15	99	13.2	3.85	0.96	2.89	0.77	04:59
50	20.1	2.97	0.48	2.49	0.37	04:17	100	13.1	3.87	0.97	2.90	0.78	05:00

MasterDrain
SW 14.13

GMC Surveys

Shireen Villa,
34 Castle Street,
Forres IV36 1FN
Mobile: 07557 431 702
email: gmcsurveys@gmail.com

Job No. 2013
Sheet no. 3
Date 29/07/15

Project: Orquidish Road, Fochabers

Title: Soakaway data - 100 hours

By: GM
Checked:
Reviewed:

Duration	Rain mm/hr	Inflow m³	Outflow m³	Storage m³	Voids m³	Emp. time hr:min	Duration	Rain mm/hr	Inflow m³	Outflow m³	Storage m³	Voids m³	Emp. time hr:min
0.25	39.3	1.74	0.15	1.59	-	02:44	12.75	3.5	7.92	7.40	0.52	-	00:54
0.50	27.1	2.40	0.29	2.11	-	03:38	13.00	3.5	7.97	7.55	0.42	-	00:43
0.75	21.4	2.85	0.44	2.41	0.29	04:09	13.25	3.4	8.02	7.69	0.33	-	00:34
1.00	18.0	3.19	0.58	2.61	0.49	04:30	13.50	3.4	8.07	7.84	0.23	-	00:24
1.25	15.7	3.47	0.73	2.74	0.62	04:43	13.75	3.3	8.12	7.98	0.14	-	00:14
1.50	14.0	3.72	0.87	2.85	0.73	04:55	14.00	3.3	8.17	8.13	0.04	-	00:04
1.75	12.7	3.94	1.02	2.92	0.80	05:02	14.25	3.3	8.22	8.27	-	-	-
2.00	11.7	4.13	1.16	2.97	0.85	05:07	14.50	3.2	8.27	8.42	-	-	-
2.25	10.8	4.31	1.31	3.00	0.88	05:10	14.75	3.2	8.32	8.56	-	-	-
2.50	10.1	4.48	1.45	3.03	0.91	05:13	15.00	3.2	8.37	8.71	-	-	-
2.75	9.5	4.64	1.60	3.04	0.92	05:14	15.25	3.1	8.42	8.85	-	-	-
3.00	9.0	4.78	1.74	3.04	0.92	05:14	15.50	3.1	8.46	9.00	-	-	-
3.25	8.6	4.92	1.89	3.03	0.91	05:13	15.75	3.1	8.51	9.14	-	-	-
3.50	8.2	5.05	2.03	3.02	0.90	05:12	16.00	3.0	8.56	9.29	-	-	-
3.75	7.8	5.18	2.18	3.00	0.88	05:10	16.25	3.0	8.60	9.43	-	-	-
4.00	7.5	5.30	2.32	2.98	0.86	05:08	16.50	3.0	8.65	9.58	-	-	-
4.25	7.2	5.41	2.47	2.94	0.82	05:04	16.75	2.9	8.69	9.73	-	-	-
4.50	6.9	5.52	2.61	2.91	0.79	05:01	17.00	2.9	8.73	9.87	-	-	-
4.75	6.7	5.62	2.76	2.86	0.74	04:56	17.25	2.9	8.78	10.02	-	-	-
5.00	6.5	5.73	2.90	2.83	0.71	04:52	17.50	2.8	8.82	10.16	-	-	-
5.25	6.3	5.83	3.05	2.78	0.66	04:47	17.75	2.8	8.86	10.31	-	-	-
5.50	6.1	5.92	3.19	2.73	0.61	04:42	18.00	2.8	8.91	10.45	-	-	-
5.75	5.9	6.01	3.34	2.67	0.55	04:36	18.25	2.8	8.95	10.60	-	-	-
6.00	5.7	6.10	3.48	2.62	0.50	04:31	18.50	2.7	8.99	10.74	-	-	-
6.25	5.6	6.19	3.63	2.56	0.44	04:25	18.75	2.7	9.03	10.89	-	-	-
6.50	5.5	6.27	3.77	2.50	0.38	04:18	19.00	2.7	9.07	11.03	-	-	-
6.75	5.3	6.36	3.92	2.44	0.32	04:12	19.25	2.7	9.11	11.18	-	-	-
7.00	5.2	6.44	4.06	2.38	0.26	04:06	19.50	2.7	9.15	11.32	-	-	-
7.25	5.1	6.52	4.21	2.31	0.19	03:59	19.75	2.6	9.19	11.47	-	-	-
7.50	5.0	6.59	4.35	2.24	0.12	03:51	20.00	2.6	9.23	11.61	-	-	-
7.75	4.9	6.67	4.50	2.17	0.05	03:44	20.25	2.6	9.27	11.76	-	-	-
8.00	4.8	6.74	4.64	2.10	-	03:37	20.50	2.6	9.31	11.90	-	-	-
8.25	4.7	6.81	4.79	2.02	-	03:29	20.75	2.5	9.35	12.05	-	-	-
8.50	4.6	6.88	4.94	1.94	-	03:20	21.00	2.5	9.39	12.19	-	-	-
8.75	4.5	6.95	5.08	1.87	-	03:13	21.25	2.5	9.43	12.34	-	-	-
9.00	4.4	7.02	5.23	1.79	-	03:05	21.50	2.5	9.46	12.48	-	-	-
9.25	4.3	7.09	5.37	1.72	-	02:58	21.75	2.5	9.50	12.63	-	-	-
9.50	4.3	7.15	5.52	1.63	-	02:48	22.00	2.4	9.54	12.77	-	-	-
9.75	4.2	7.22	5.66	1.56	-	02:41	22.25	2.4	9.58	12.92	-	-	-
10.00	4.1	7.28	5.81	1.47	-	02:32	22.50	2.4	9.61	13.06	-	-	-
10.25	4.0	7.34	5.95	1.39	-	02:24	22.75	2.4	9.65	13.21	-	-	-
10.50	4.0	7.40	6.10	1.30	-	02:14	23.00	2.4	9.68	13.35	-	-	-
10.75	3.9	7.46	6.24	1.22	-	02:06	23.25	2.4	9.72	13.50	-	-	-
11.00	3.9	7.52	6.39	1.13	-	01:57	23.50	2.3	9.76	13.64	-	-	-
11.25	3.8	7.58	6.53	1.05	-	01:49	23.75	2.3	9.79	13.79	-	-	-
11.50	3.8	7.64	6.68	0.96	-	01:39	24.00	2.3	9.83	13.93	-	-	-
11.75	3.7	7.70	6.82	0.88	-	01:31	24.25	2.3	9.86	14.08	-	-	-
12.00	3.6	7.75	6.97	0.78	-	01:21	24.50	2.3	9.90	14.22	-	-	-
12.25	3.6	7.81	7.11	0.70	-	01:12	24.75	2.3	9.93	14.37	-	-	-
12.50	3.6	7.86	7.26	0.60	-	01:02	25.00	2.3	9.96	14.52	-	-	-

MasterDrain
SW 14.13

GMC Surveys	Shireen Villa, 34 Castle Street, Forres IV36 1FN Mobile: 07557 431 702 email: gmcsurveys@gmail.com	Job No. 2013		
		Sheet no. 4		
		Date 29/07/15		
Project Orquidish Road, Fochabers		By GM	Checked	Reviewed
Title Hydrology data				

Location hydrological data (FSR):-

Location	= FOCHABERS	Grid reference	= NJ3458
M5-60 (mm)	= 15.1	r	= 0.26
Soil index	= 0.15	SAAR (mm/yr)	= 780
WRAP	= 1	Area = Scotland and N. Ireland	

Soil classification for WRAP type 1

i) Well drained permeable sandy or loam soils and shallower analogues over highly permeable limestone, chalk, sandstone or related drifts;

ii) Earthy peat soils drained by dykes and pumps;

iii) Less permeable loamy over clayey soils on plateaux adjacent to very permeable soils in valleys.

N.B. The rainfall rates are calculated using the location specific values above in accordance with the Wallingford procedure.

Plots 6

House type – Chilton.

Impermeable area = 150m^2

From the calculation below I can confirm the suitability of a perforated precast concrete soakaway ring with dimensions:

1200mm diam ring with a depth of 1.5m below the invert of the pipe and a 300mm granular surround.

MasterDrain
SW 14.13

GMC Surveys	Shireen Villa, 34 Castle Street, Forres IV36 1FN Mobile: 07557 431 702 email: gmcsurveys@gmail.com	Job No. 2013		
		Sheet no. 1		
		Date 29/07/15		
Project Orquidish Road, Fochabers		By GM	Checked	Reviewed
Title Plot 6 Surface Water Soakaway				

Concrete ring design:-

Ring diameter = 1200 mm
Percentage voids = 30.0

Return period = 10 yrs
Imperm. area = 150m²

Depth below invert = 1.5m
Pit side length = 1.8m

Calculations :-

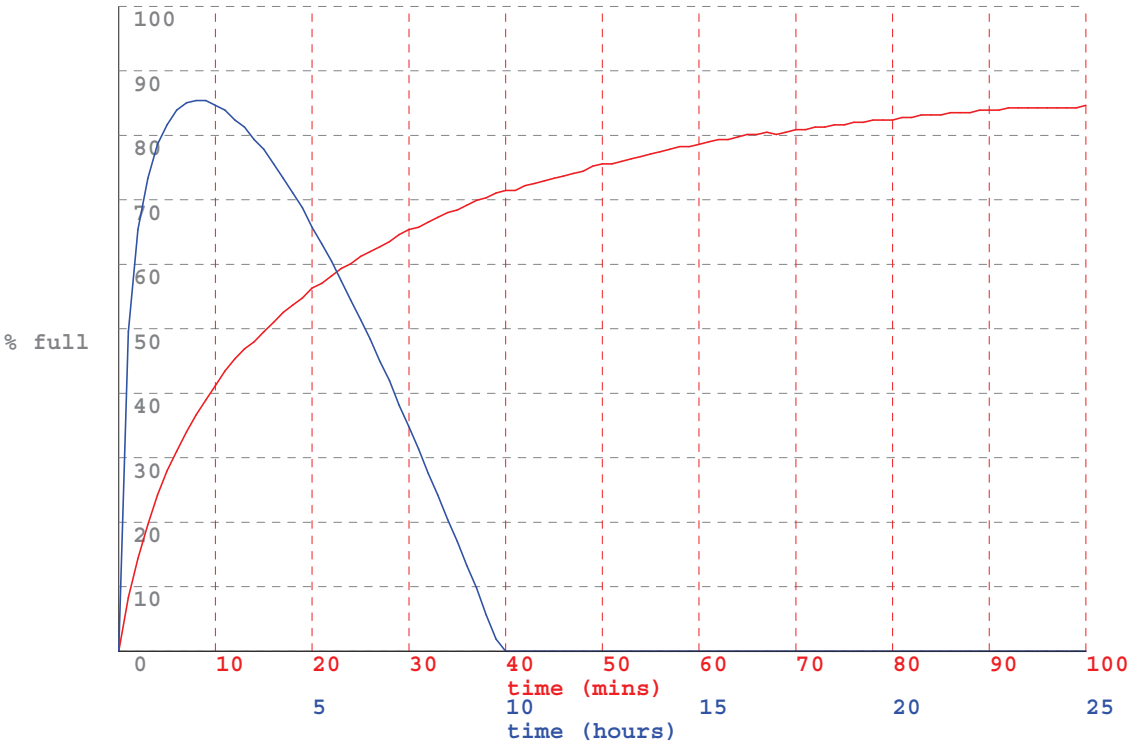
Surface area of soakaway to 50% depth - a_{s50} = Length of side x 4 x Depth/2 = 5.4 m² (base not included).

Outflow factor - OFact = a_{s50} x f =0.0001728 m³/s where Infilt. factor (f)= 0.000032 m/s

Soakaway ring storage volume - S_{actual} = Pi x (Ring diam/2000)² x depth = 1.7 m³

Gross soakaway pit storage volume - S_{pit} = Length of side² x depth = 4.9 m³

Nett soakaway pit storage volume - S_{nett} = Gross pit volume - infill = 2.6 m³ (storage + void)



Required volume (S_{reqd}) = 2.3 m³

Available storage volume = 2.6 m³

Spare capacity = 0.39 m³

Emptying time to 50% volume = 03:36

Soakaway emptying time OK.

Soakaway dimensions OK.

MasterDrain
SW 14.13

GMC Surveys

Shireen Villa,
34 Castle Street,
Forres IV36 1FN
Mobile: 07557 431 702
email: gmcsurveys@gmail.com

Job No. 2013
Sheet no. 2
Date 29/07/15

Project: Orquidish Road, Fochabers
Title: Soakaway data - 100 mins

By: GM
Checked:
Reviewed:

Duration	Rain mm/hr	Inflow m³	Outflow m³	Storage m³	Voids m³	Emp. time hr:min	Duration	Rain mm/hr	Inflow m³	Outflow m³	Storage m³	Voids m³	Emp. time hr:min
1	90.6	0.23	0.01	0.22	-	00:21	51	19.9	2.53	0.53	2.00	0.30	03:13
2	81.0	0.40	0.02	0.38	-	00:37	52	19.6	2.55	0.54	2.01	0.31	03:14
3	73.6	0.55	0.03	0.52	-	00:50	53	19.4	2.57	0.55	2.02	0.32	03:15
4	67.7	0.68	0.04	0.64	-	01:02	54	19.2	2.59	0.56	2.03	0.33	03:16
5	62.9	0.79	0.05	0.74	-	01:11	55	19.0	2.61	0.57	2.04	0.34	03:17
6	58.9	0.88	0.06	0.82	-	01:19	56	18.8	2.63	0.58	2.05	0.35	03:18
7	55.5	0.97	0.07	0.90	-	01:27	57	18.6	2.65	0.59	2.06	0.36	03:19
8	52.6	1.05	0.08	0.97	-	01:34	58	18.4	2.67	0.60	2.07	0.37	03:20
9	50.0	1.12	0.09	1.03	-	01:39	59	18.2	2.68	0.61	2.07	0.37	03:20
10	47.7	1.19	0.10	1.09	-	01:45	60	18.0	2.70	0.62	2.08	0.38	03:21
11	45.7	1.26	0.11	1.15	-	01:51	61	17.8	2.72	0.63	2.09	0.39	03:22
12	43.8	1.32	0.12	1.20	-	01:56	62	17.6	2.74	0.64	2.10	0.40	03:23
13	42.2	1.37	0.13	1.24	-	02:00	63	17.5	2.75	0.65	2.10	0.40	03:23
14	40.7	1.42	0.15	1.27	-	02:02	64	17.3	2.77	0.66	2.11	0.41	03:24
15	39.3	1.47	0.16	1.31	-	02:06	65	17.1	2.79	0.67	2.12	0.42	03:24
16	38.1	1.52	0.17	1.35	-	02:10	66	17.0	2.80	0.68	2.12	0.42	03:24
17	36.9	1.57	0.18	1.39	-	02:14	67	16.8	2.82	0.69	2.13	0.43	03:25
18	35.8	1.61	0.19	1.42	-	02:17	68	16.7	2.83	0.71	2.12	0.42	03:24
19	34.8	1.65	0.20	1.45	-	02:20	69	16.5	2.85	0.72	2.13	0.43	03:25
20	33.9	1.70	0.21	1.49	-	02:24	70	16.4	2.87	0.73	2.14	0.44	03:26
21	33.0	1.73	0.22	1.51	-	02:26	71	16.2	2.88	0.74	2.14	0.44	03:26
22	32.2	1.77	0.23	1.54	-	02:29	72	16.1	2.90	0.75	2.15	0.45	03:27
23	31.5	1.81	0.24	1.57	-	02:31	73	16.0	2.91	0.76	2.15	0.45	03:27
24	30.7	1.84	0.25	1.59	-	02:33	74	15.8	2.93	0.77	2.16	0.46	03:28
25	30.0	1.88	0.26	1.62	-	02:36	75	15.7	2.94	0.78	2.16	0.46	03:28
26	29.4	1.91	0.27	1.64	-	02:38	76	15.6	2.96	0.79	2.17	0.47	03:29
27	28.8	1.94	0.28	1.66	-	02:40	77	15.4	2.97	0.80	2.17	0.47	03:29
28	28.2	1.97	0.29	1.68	-	02:42	78	15.3	2.99	0.81	2.18	0.48	03:30
29	27.7	2.01	0.30	1.71	0.01	02:45	79	15.2	3.00	0.82	2.18	0.48	03:30
30	27.1	2.04	0.31	1.73	0.03	02:47	80	15.1	3.01	0.83	2.18	0.48	03:30
31	26.6	2.06	0.32	1.74	0.04	02:48	81	15.0	3.03	0.84	2.19	0.49	03:31
32	26.2	2.09	0.33	1.76	0.06	02:50	82	14.8	3.04	0.85	2.19	0.49	03:31
33	25.7	2.12	0.34	1.78	0.08	02:52	83	14.7	3.06	0.86	2.20	0.50	03:32
34	25.3	2.15	0.35	1.80	0.10	02:54	84	14.6	3.07	0.87	2.20	0.50	03:32
35	24.8	2.17	0.36	1.81	0.11	02:55	85	14.5	3.08	0.88	2.20	0.50	03:32
36	24.4	2.20	0.37	1.83	0.13	02:56	86	14.4	3.10	0.89	2.21	0.51	03:33
37	24.1	2.23	0.38	1.85	0.15	02:58	87	14.3	3.11	0.90	2.21	0.51	03:33
38	23.7	2.25	0.39	1.86	0.16	02:59	88	14.2	3.12	0.91	2.21	0.51	03:33
39	23.3	2.28	0.40	1.88	0.18	03:01	89	14.1	3.14	0.92	2.22	0.52	03:34
40	23.0	2.30	0.41	1.89	0.19	03:02	90	14.0	3.15	0.93	2.22	0.52	03:34
41	22.7	2.32	0.43	1.89	0.19	03:02	91	13.9	3.16	0.94	2.22	0.52	03:34
42	22.3	2.35	0.44	1.91	0.21	03:04	92	13.8	3.18	0.95	2.23	0.53	03:35
43	22.0	2.37	0.45	1.92	0.22	03:05	93	13.7	3.19	0.96	2.23	0.53	03:35
44	21.7	2.39	0.46	1.93	0.23	03:06	94	13.6	3.20	0.97	2.23	0.53	03:35
45	21.4	2.41	0.47	1.94	0.24	03:07	95	13.5	3.21	0.98	2.23	0.53	03:35
46	21.2	2.43	0.48	1.95	0.25	03:08	96	13.4	3.23	1.00	2.23	0.53	03:35
47	20.9	2.45	0.49	1.96	0.26	03:09	97	13.4	3.24	1.01	2.23	0.53	03:35
48	20.6	2.47	0.50	1.97	0.27	03:10	98	13.3	3.25	1.02	2.23	0.53	03:35
49	20.4	2.50	0.51	1.99	0.29	03:12	99	13.2	3.26	1.03	2.23	0.53	03:35
50	20.1	2.52	0.52	2.00	0.30	03:13	100	13.1	3.28	1.04	2.24	0.54	03:36

GMC Surveys

Shireen Villa,
34 Castle Street,
Forres IV36 1FN
Mobile: 07557 431 702
email: gmcsurveys@gmail.com

MasterDrain
SW 14.13

Job No.	2013
Sheet no.	3
Date	29/07/15
Project	Orquidish Road, Fochabers
Title	Soakaway data - 100 hours
By	GM
Checked	
Reviewed	

Duration	Rain mm/hr	Inflow m³	Outflow m³	Storage m³	Voids m³	Emp. time hr:min	Duration	Rain mm/hr	Inflow m³	Outflow m³	Storage m³	Voids m³	Emp. time hr:min
0.25	39.3	1.47	0.16	1.31	-	02:06	12.75	3.5	6.71	7.93	-	-	-
0.50	27.1	2.04	0.31	1.73	0.03	02:47	13.00	3.5	6.75	8.09	-	-	-
0.75	21.4	2.41	0.47	1.94	0.24	03:07	13.25	3.4	6.80	8.24	-	-	-
1.00	18.0	2.70	0.62	2.08	0.38	03:21	13.50	3.4	6.84	8.40	-	-	-
1.25	15.7	2.94	0.78	2.16	0.46	03:28	13.75	3.3	6.88	8.55	-	-	-
1.50	14.0	3.15	0.93	2.22	0.52	03:34	14.00	3.3	6.93	8.71	-	-	-
1.75	12.7	3.34	1.09	2.25	0.55	03:37	14.25	3.3	6.97	8.86	-	-	-
2.00	11.7	3.50	1.24	2.26	0.56	03:38	14.50	3.2	7.01	9.02	-	-	-
2.25	10.8	3.66	1.40	2.26	0.56	03:38	14.75	3.2	7.05	9.18	-	-	-
2.50	10.1	3.80	1.56	2.24	0.54	03:36	15.00	3.2	7.09	9.33	-	-	-
2.75	9.5	3.93	1.71	2.22	0.52	03:34	15.25	3.1	7.13	9.49	-	-	-
3.00	9.0	4.05	1.87	2.18	0.48	03:30	15.50	3.1	7.17	9.64	-	-	-
3.25	8.6	4.17	2.02	2.15	0.45	03:27	15.75	3.1	7.21	9.80	-	-	-
3.50	8.2	4.28	2.18	2.10	0.40	03:23	16.00	3.0	7.25	9.95	-	-	-
3.75	7.8	4.39	2.33	2.06	0.36	03:19	16.25	3.0	7.29	10.11	-	-	-
4.00	7.5	4.49	2.49	2.00	0.30	03:13	16.50	3.0	7.33	10.26	-	-	-
4.25	7.2	4.58	2.64	1.94	0.24	03:07	16.75	2.9	7.36	10.42	-	-	-
4.50	6.9	4.68	2.80	1.88	0.18	03:01	17.00	2.9	7.40	10.58	-	-	-
4.75	6.7	4.77	2.95	1.82	0.12	02:56	17.25	2.9	7.44	10.73	-	-	-
5.00	6.5	4.85	3.11	1.74	0.04	02:48	17.50	2.8	7.48	10.89	-	-	-
5.25	6.3	4.94	3.27	1.67	-	02:41	17.75	2.8	7.51	11.04	-	-	-
5.50	6.1	5.02	3.42	1.60	-	02:34	18.00	2.8	7.55	11.20	-	-	-
5.75	5.9	5.10	3.58	1.52	-	02:27	18.25	2.8	7.58	11.35	-	-	-
6.00	5.7	5.17	3.73	1.44	-	02:19	18.50	2.7	7.62	11.51	-	-	-
6.25	5.6	5.25	3.89	1.36	-	02:11	18.75	2.7	7.65	11.66	-	-	-
6.50	5.5	5.32	4.04	1.28	-	02:03	19.00	2.7	7.69	11.82	-	-	-
6.75	5.3	5.39	4.20	1.19	-	01:55	19.25	2.7	7.72	11.98	-	-	-
7.00	5.2	5.46	4.35	1.11	-	01:47	19.50	2.7	7.76	12.13	-	-	-
7.25	5.1	5.52	4.51	1.01	-	01:37	19.75	2.6	7.79	12.29	-	-	-
7.50	5.0	5.59	4.67	0.92	-	01:29	20.00	2.6	7.82	12.44	-	-	-
7.75	4.9	5.65	4.82	0.83	-	01:20	20.25	2.6	7.86	12.60	-	-	-
8.00	4.8	5.71	4.98	0.73	-	01:10	20.50	2.6	7.89	12.75	-	-	-
8.25	4.7	5.77	5.13	0.64	-	01:02	20.75	2.5	7.92	12.91	-	-	-
8.50	4.6	5.83	5.29	0.54	-	00:52	21.00	2.5	7.96	13.06	-	-	-
8.75	4.5	5.89	5.44	0.45	-	00:43	21.25	2.5	7.99	13.22	-	-	-
9.00	4.4	5.95	5.60	0.35	-	00:34	21.50	2.5	8.02	13.37	-	-	-
9.25	4.3	6.01	5.75	0.26	-	00:25	21.75	2.5	8.05	13.53	-	-	-
9.50	4.3	6.06	5.91	0.15	-	00:14	22.00	2.4	8.08	13.69	-	-	-
9.75	4.2	6.12	6.07	0.05	-	00:05	22.25	2.4	8.12	13.84	-	-	-
10.00	4.1	6.17	6.22	-	-	-	22.50	2.4	8.15	14.00	-	-	-
10.25	4.0	6.22	6.38	-	-	-	22.75	2.4	8.18	14.15	-	-	-
10.50	4.0	6.28	6.53	-	-	-	23.00	2.4	8.21	14.31	-	-	-
10.75	3.9	6.33	6.69	-	-	-	23.25	2.4	8.24	14.46	-	-	-
11.00	3.9	6.38	6.84	-	-	-	23.50	2.3	8.27	14.62	-	-	-
11.25	3.8	6.43	7.00	-	-	-	23.75	2.3	8.30	14.77	-	-	-
11.50	3.8	6.47	7.15	-	-	-	24.00	2.3	8.33	14.93	-	-	-
11.75	3.7	6.52	7.31	-	-	-	24.25	2.3	8.36	15.09	-	-	-
12.00	3.6	6.57	7.46	-	-	-	24.50	2.3	8.39	15.24	-	-	-
12.25	3.6	6.62	7.62	-	-	-	24.75	2.3	8.42	15.40	-	-	-
12.50	3.6	6.66	7.78	-	-	-	25.00	2.3	8.44	15.55	-	-	-

MasterDrain
SW 14.13

GMC Surveys	Shireen Villa, 34 Castle Street, Forres IV36 1FN Mobile: 07557 431 702 email: gmcsurveys@gmail.com	Job No. 2013		
		Sheet no. 4		
		Date 29/07/15		
Project Orquidish Road, Fochabers		By GM	Checked	Reviewed
Title Hydrology data				

Location hydrological data (FSR):-

Location	= FOCHABERS	Grid reference	= NJ3458
M5-60 (mm)	= 15.1	r	= 0.26
Soil index	= 0.15	SAAR (mm/yr)	= 780
WRAP	= 1	Area = Scotland and N. Ireland	

Soil classification for WRAP type 1

i) Well drained permeable sandy or loam soils and shallower analogues over highly permeable limestone, chalk, sandstone or related drifts;

ii) Earthy peat soils drained by dykes and pumps;

iii) Less permeable loamy over clayey soils on plateaux adjacent to very permeable soils in valleys.

N.B. The rainfall rates are calculated using the location specific values above in accordance with the Wallingford procedure.

Plots 7

House type – Sutton.

Impermeable area = 113m^2

From the calculation below I can confirm the suitability of a perforated precast concrete soakaway ring with dimensions:

1200mm diam ring with a depth of 1.2m below the invert of the pipe and a 300mm granular surround.

MasterDrain
SW 14.13

GMC Surveys	Shireen Villa, 34 Castle Street, Forres IV36 1FN Mobile: 07557 431 702 email: gmcsurveys@gmail.com	Job No. 2013 Sheet no. 1 Date 29/07/15	
Project Orquidish Road, Fochabers		By GM	Checked / Reviewed
Title Plot 7 Surface Water Soakaway			

Concrete ring design:-

Ring diameter = 1200 mm
Percentage voids = 30.0
Return period = 10 yrs
Imperm. area = 113m²
Depth below invert = 1.2m
Pit side length = 1.8m

Calculations :-

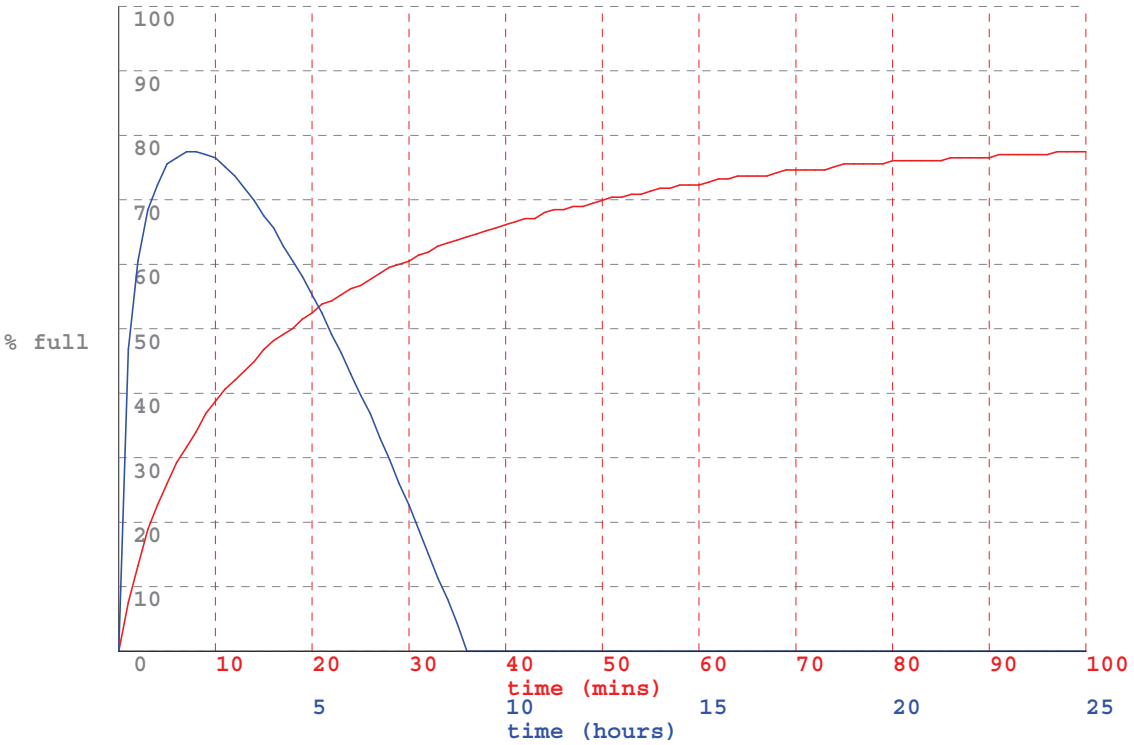
Surface area of soakaway to 50% depth - a_{s50} = Length of side x 4 x Depth/2 = 4.3 m² (base not included).

Outflow factor - OFact = a_{s50} x f =0.0001382 m³/s where Infilt. factor (f)= 0.000032 m/s

Soakaway ring storage volume - S_{actual} = Pi x (Ring diam/2000)² x depth = 1.4 m³

Gross soakaway pit storage volume - S_{pit} = Length of side² x depth = 3.9 m³

Nett soakaway pit storage volume - S_{nett} = Gross pit volume - infill = 2.1 m³ (storage + void)



Required volume (S_{reqd}) = 1.6 m³

Available storage volume = 2.1 m³

Spare capacity = 0.48 m³

Emptying time to 50% volume = 03:18

Soakaway emptying time OK.

Soakaway side length could be excessive.

MasterDrain
SW 14.13

GMC Surveys

Shireen Villa,
34 Castle Street,
Forres IV36 1FN
Mobile: 07557 431 702
email: gmcsurveys@gmail.com

Job No. 2013
Sheet no. 2
Date 29/07/15

Project: Orquidish Road, Fochabers
Title: Soakaway data - 100 mins

By: GM
Checked:
Reviewed:

Duration	Rain mm/hr	Inflow m³	Outflow m³	Storage m³	Voids m³	Emp. time hr:min	Duration	Rain mm/hr	Inflow m³	Outflow m³	Storage m³	Voids m³	Emp. time hr:min
1	90.6	0.17	0.01	0.16	-	00:19	51	19.9	1.91	0.42	1.49	0.13	03:00
2	81.0	0.30	0.02	0.28	-	00:34	52	19.6	1.92	0.43	1.49	0.13	03:00
3	73.6	0.42	0.02	0.40	-	00:48	53	19.4	1.94	0.44	1.50	0.14	03:01
4	67.7	0.51	0.03	0.48	-	00:58	54	19.2	1.95	0.45	1.50	0.14	03:01
5	62.9	0.59	0.04	0.55	-	01:06	55	19.0	1.97	0.46	1.51	0.15	03:02
6	58.9	0.67	0.05	0.62	-	01:15	56	18.8	1.98	0.46	1.52	0.16	03:03
7	55.5	0.73	0.06	0.67	-	01:21	57	18.6	1.99	0.47	1.52	0.16	03:03
8	52.6	0.79	0.07	0.72	-	01:27	58	18.4	2.01	0.48	1.53	0.17	03:04
9	50.0	0.85	0.07	0.78	-	01:34	59	18.2	2.02	0.49	1.53	0.17	03:04
10	47.7	0.90	0.08	0.82	-	01:39	60	18.0	2.03	0.50	1.53	0.17	03:04
11	45.7	0.95	0.09	0.86	-	01:44	61	17.8	2.05	0.51	1.54	0.18	03:06
12	43.8	0.99	0.10	0.89	-	01:47	62	17.6	2.06	0.51	1.55	0.19	03:07
13	42.2	1.03	0.11	0.92	-	01:51	63	17.5	2.07	0.52	1.55	0.19	03:07
14	40.7	1.07	0.12	0.95	-	01:55	64	17.3	2.09	0.53	1.56	0.20	03:08
15	39.3	1.11	0.12	0.99	-	01:59	65	17.1	2.10	0.54	1.56	0.20	03:08
16	38.1	1.15	0.13	1.02	-	02:03	66	17.0	2.11	0.55	1.56	0.20	03:08
17	36.9	1.18	0.14	1.04	-	02:05	67	16.8	2.12	0.56	1.56	0.20	03:08
18	35.8	1.21	0.15	1.06	-	02:08	68	16.7	2.13	0.56	1.57	0.21	03:09
19	34.8	1.25	0.16	1.09	-	02:11	69	16.5	2.15	0.57	1.58	0.22	03:10
20	33.9	1.28	0.17	1.11	-	02:14	70	16.4	2.16	0.58	1.58	0.22	03:10
21	33.0	1.31	0.17	1.14	-	02:17	71	16.2	2.17	0.59	1.58	0.22	03:10
22	32.2	1.33	0.18	1.15	-	02:19	72	16.1	2.18	0.60	1.58	0.22	03:10
23	31.5	1.36	0.19	1.17	-	02:21	73	16.0	2.19	0.61	1.58	0.22	03:10
24	30.7	1.39	0.20	1.19	-	02:23	74	15.8	2.20	0.61	1.59	0.23	03:12
25	30.0	1.41	0.21	1.20	-	02:25	75	15.7	2.22	0.62	1.60	0.24	03:13
26	29.4	1.44	0.22	1.22	-	02:27	76	15.6	2.23	0.63	1.60	0.24	03:13
27	28.8	1.46	0.22	1.24	-	02:30	77	15.4	2.24	0.64	1.60	0.24	03:13
28	28.2	1.49	0.23	1.26	-	02:32	78	15.3	2.25	0.65	1.60	0.24	03:13
29	27.7	1.51	0.24	1.27	-	02:33	79	15.2	2.26	0.66	1.60	0.24	03:13
30	27.1	1.53	0.25	1.28	-	02:34	80	15.1	2.27	0.66	1.61	0.25	03:14
31	26.6	1.56	0.26	1.30	-	02:37	81	15.0	2.28	0.67	1.61	0.25	03:14
32	26.2	1.58	0.27	1.31	-	02:38	82	14.8	2.29	0.68	1.61	0.25	03:14
33	25.7	1.60	0.27	1.33	-	02:40	83	14.7	2.30	0.69	1.61	0.25	03:14
34	25.3	1.62	0.28	1.34	-	02:42	84	14.6	2.31	0.70	1.61	0.25	03:14
35	24.8	1.64	0.29	1.35	-	02:43	85	14.5	2.32	0.71	1.61	0.25	03:14
36	24.4	1.66	0.30	1.36	0.00	02:44	86	14.4	2.33	0.71	1.62	0.26	03:15
37	24.1	1.68	0.31	1.37	0.01	02:45	87	14.3	2.34	0.72	1.62	0.26	03:15
38	23.7	1.70	0.32	1.38	0.02	02:46	88	14.2	2.35	0.73	1.62	0.26	03:15
39	23.3	1.71	0.32	1.39	0.03	02:48	89	14.1	2.36	0.74	1.62	0.26	03:15
40	23.0	1.73	0.33	1.40	0.04	02:49	90	14.0	2.37	0.75	1.62	0.26	03:15
41	22.7	1.75	0.34	1.41	0.05	02:50	91	13.9	2.38	0.75	1.63	0.27	03:17
42	22.3	1.77	0.35	1.42	0.06	02:51	92	13.8	2.39	0.76	1.63	0.27	03:17
43	22.0	1.78	0.36	1.42	0.06	02:51	93	13.7	2.40	0.77	1.63	0.27	03:17
44	21.7	1.80	0.36	1.44	0.08	02:54	94	13.6	2.41	0.78	1.63	0.27	03:17
45	21.4	1.82	0.37	1.45	0.09	02:55	95	13.5	2.42	0.79	1.63	0.27	03:17
46	21.2	1.83	0.38	1.45	0.09	02:55	96	13.4	2.43	0.80	1.63	0.27	03:17
47	20.9	1.85	0.39	1.46	0.10	02:56	97	13.4	2.44	0.80	1.64	0.28	03:18
48	20.6	1.86	0.40	1.46	0.10	02:56	98	13.3	2.45	0.81	1.64	0.28	03:18
49	20.4	1.88	0.41	1.47	0.11	02:57	99	13.2	2.46	0.82	1.64	0.28	03:18
50	20.1	1.89	0.41	1.48	0.12	02:58	100	13.1	2.47	0.83	1.64	0.28	03:18

GMC Surveys

Shireen Villa,
34 Castle Street,
Forres IV36 1FN
Mobile: 07557 431 702
email: gmcsurveys@gmail.com

MasterDrain
SW 14.13

Job No.	2013
Sheet no.	3
Date	29/07/15
Project	Orquidish Road, Fochabers
Title	Soakaway data - 100 hours
By	GM
Checked	
Reviewed	

Duration	Rain mm/hr	Inflow m³	Outflow m³	Storage m³	Voids m³	Emp. time hr:min	Duration	Rain mm/hr	Inflow m³	Outflow m³	Storage m³	Voids m³	Emp. time hr:min
0.25	39.3	1.11	0.12	0.99	-	01:59	12.75	3.5	5.05	6.35	-	-	-
0.50	27.1	1.53	0.25	1.28	-	02:34	13.00	3.5	5.09	6.47	-	-	-
0.75	21.4	1.82	0.37	1.45	0.09	02:55	13.25	3.4	5.12	6.59	-	-	-
1.00	18.0	2.03	0.50	1.53	0.17	03:04	13.50	3.4	5.15	6.72	-	-	-
1.25	15.7	2.22	0.62	1.60	0.24	03:13	13.75	3.3	5.19	6.84	-	-	-
1.50	14.0	2.37	0.75	1.62	0.26	03:15	14.00	3.3	5.22	6.97	-	-	-
1.75	12.7	2.51	0.87	1.64	0.28	03:18	14.25	3.3	5.25	7.09	-	-	-
2.00	11.7	2.64	1.00	1.64	0.28	03:18	14.50	3.2	5.28	7.22	-	-	-
2.25	10.8	2.75	1.12	1.63	0.27	03:17	14.75	3.2	5.31	7.34	-	-	-
2.50	10.1	2.86	1.24	1.62	0.26	03:15	15.00	3.2	5.34	7.46	-	-	-
2.75	9.5	2.96	1.37	1.59	0.23	03:12	15.25	3.1	5.37	7.59	-	-	-
3.00	9.0	3.05	1.49	1.56	0.20	03:08	15.50	3.1	5.40	7.71	-	-	-
3.25	8.6	3.14	1.62	1.52	0.16	03:03	15.75	3.1	5.43	7.84	-	-	-
3.50	8.2	3.22	1.74	1.48	0.12	02:58	16.00	3.0	5.46	7.96	-	-	-
3.75	7.8	3.30	1.87	1.43	0.07	02:52	16.25	3.0	5.49	8.09	-	-	-
4.00	7.5	3.38	1.99	1.39	0.03	02:48	16.50	3.0	5.52	8.21	-	-	-
4.25	7.2	3.45	2.12	1.33	-	02:40	16.75	2.9	5.55	8.34	-	-	-
4.50	6.9	3.52	2.24	1.28	-	02:34	17.00	2.9	5.58	8.46	-	-	-
4.75	6.7	3.59	2.36	1.23	-	02:28	17.25	2.9	5.60	8.58	-	-	-
5.00	6.5	3.66	2.49	1.17	-	02:21	17.50	2.8	5.63	8.71	-	-	-
5.25	6.3	3.72	2.61	1.11	-	02:14	17.75	2.8	5.66	8.83	-	-	-
5.50	6.1	3.78	2.74	1.04	-	02:05	18.00	2.8	5.69	8.96	-	-	-
5.75	5.9	3.84	2.86	0.98	-	01:58	18.25	2.8	5.71	9.08	-	-	-
6.00	5.7	3.90	2.99	0.91	-	01:50	18.50	2.7	5.74	9.21	-	-	-
6.25	5.6	3.95	3.11	0.84	-	01:41	18.75	2.7	5.77	9.33	-	-	-
6.50	5.5	4.01	3.23	0.78	-	01:34	19.00	2.7	5.79	9.46	-	-	-
6.75	5.3	4.06	3.36	0.70	-	01:24	19.25	2.7	5.82	9.58	-	-	-
7.00	5.2	4.11	3.48	0.63	-	01:16	19.50	2.7	5.84	9.70	-	-	-
7.25	5.1	4.16	3.61	0.55	-	01:06	19.75	2.6	5.87	9.83	-	-	-
7.50	5.0	4.21	3.73	0.48	-	00:58	20.00	2.6	5.89	9.95	-	-	-
7.75	4.9	4.26	3.86	0.40	-	00:48	20.25	2.6	5.92	10.08	-	-	-
8.00	4.8	4.30	3.98	0.32	-	00:39	20.50	2.6	5.94	10.20	-	-	-
8.25	4.7	4.35	4.11	0.24	-	00:29	20.75	2.5	5.97	10.33	-	-	-
8.50	4.6	4.40	4.23	0.17	-	00:20	21.00	2.5	5.99	10.45	-	-	-
8.75	4.5	4.44	4.35	0.09	-	00:11	21.25	2.5	6.02	10.58	-	-	-
9.00	4.4	4.48	4.48	-	-	-	21.50	2.5	6.04	10.70	-	-	-
9.25	4.3	4.53	4.60	-	-	-	21.75	2.5	6.07	10.82	-	-	-
9.50	4.3	4.57	4.73	-	-	-	22.00	2.4	6.09	10.95	-	-	-
9.75	4.2	4.61	4.85	-	-	-	22.25	2.4	6.11	11.07	-	-	-
10.00	4.1	4.65	4.98	-	-	-	22.50	2.4	6.14	11.20	-	-	-
10.25	4.0	4.69	5.10	-	-	-	22.75	2.4	6.16	11.32	-	-	-
10.50	4.0	4.73	5.23	-	-	-	23.00	2.4	6.18	11.45	-	-	-
10.75	3.9	4.77	5.35	-	-	-	23.25	2.4	6.21	11.57	-	-	-
11.00	3.9	4.80	5.47	-	-	-	23.50	2.3	6.23	11.70	-	-	-
11.25	3.8	4.84	5.60	-	-	-	23.75	2.3	6.25	11.82	-	-	-
11.50	3.8	4.88	5.72	-	-	-	24.00	2.3	6.27	11.94	-	-	-
11.75	3.7	4.91	5.85	-	-	-	24.25	2.3	6.30	12.07	-	-	-
12.00	3.6	4.95	5.97	-	-	-	24.50	2.3	6.32	12.19	-	-	-
12.25	3.6	4.98	6.10	-	-	-	24.75	2.3	6.34	12.32	-	-	-
12.50	3.6	5.02	6.22	-	-	-	25.00	2.3	6.36	12.44	-	-	-

MasterDrain
SW 14.13

GMC Surveys	Shireen Villa, 34 Castle Street, Forres IV36 1FN Mobile: 07557 431 702 email: gmcsurveys@gmail.com	Job No. 2013		
		Sheet no. 4		
		Date 29/07/15		
Project Orquidish Road, Fochabers		By GM	Checked	Reviewed
Title Hydrology data				

Location hydrological data (FSR):-

Location	= FOCHABERS	Grid reference	= NJ3458
M5-60 (mm)	= 15.1	r	= 0.26
Soil index	= 0.15	SAAR (mm/yr)	= 780
WRAP	= 1	Area = Scotland and N. Ireland	

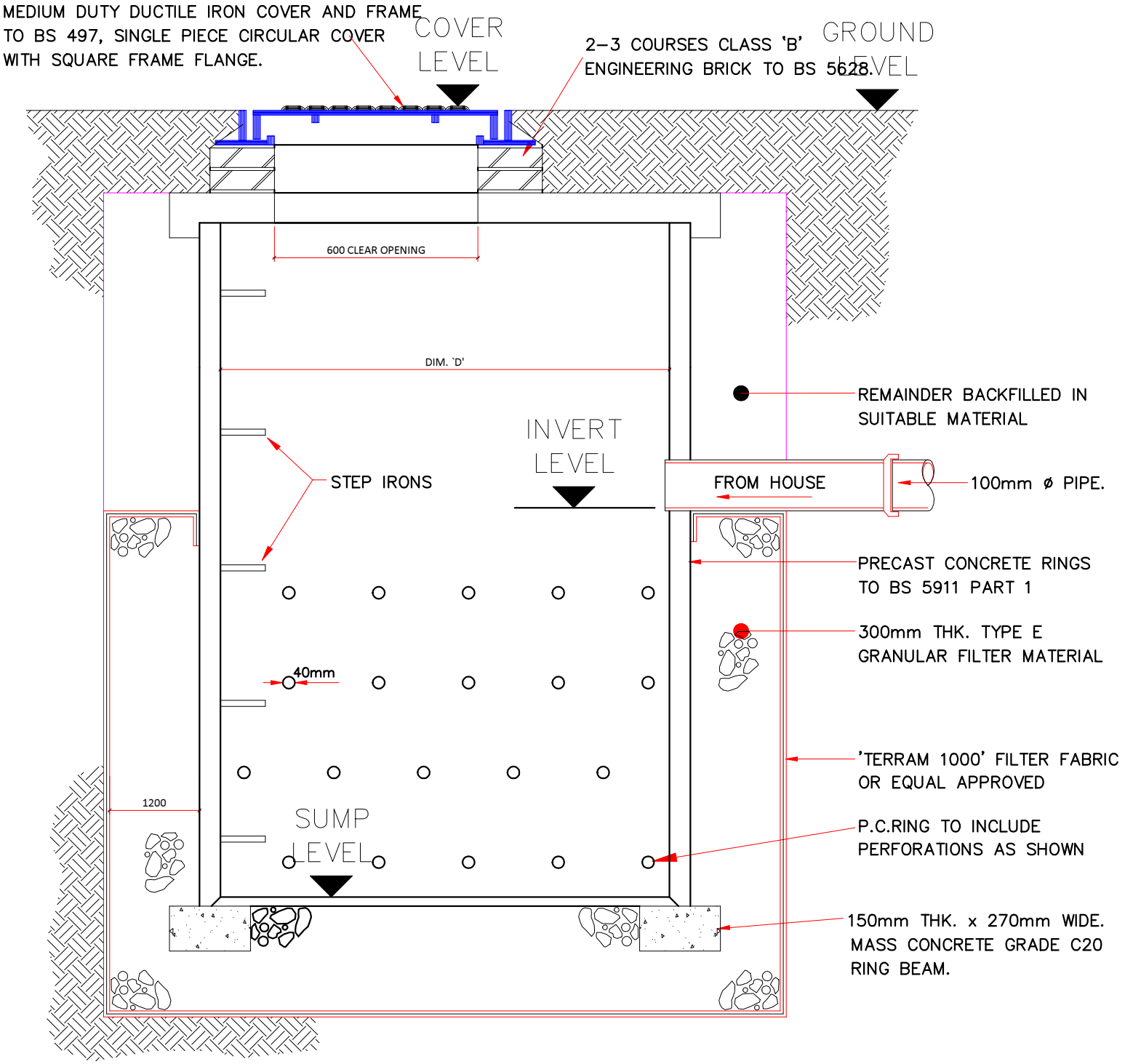
Soil classification for WRAP type 1

i) Well drained permeable sandy or loam soils and shallower analogues over highly permeable limestone, chalk, sandstone or related drifts;

ii) Earthy peat soils drained by dykes and pumps;

iii) Less permeable loamy over clayey soils on plateaux adjacent to very permeable soils in valleys.

N.B. The rainfall rates are calculated using the location specific values above in accordance with the Wallingford procedure.



gmcsurveys
Surveys, Setting Out, Civil Engineering Design
T: 07557 431 702
E: gmcsurveys@gmail.com

DRAWING TITLE
Standard Surface Water Soakway

LOCATION
Orquidish Road, Fochabers

SCALE
NTS (At A4)

DATE
July 2015

CLIENT
Bob Milton Properties Ltd

DRAWING NO.
Appendix A