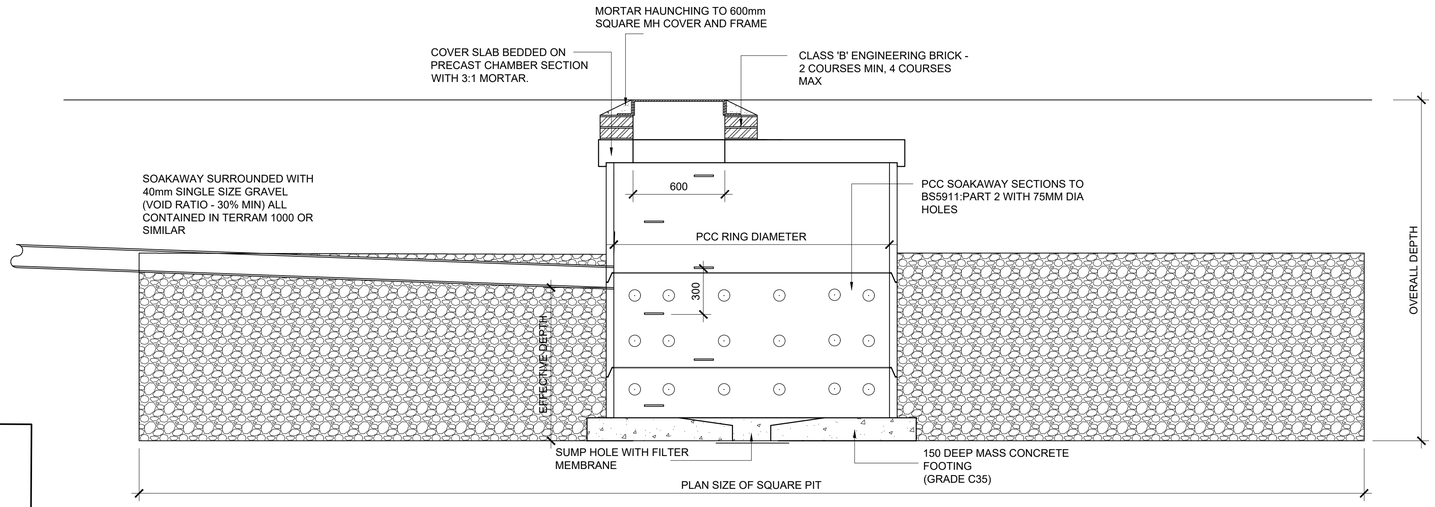
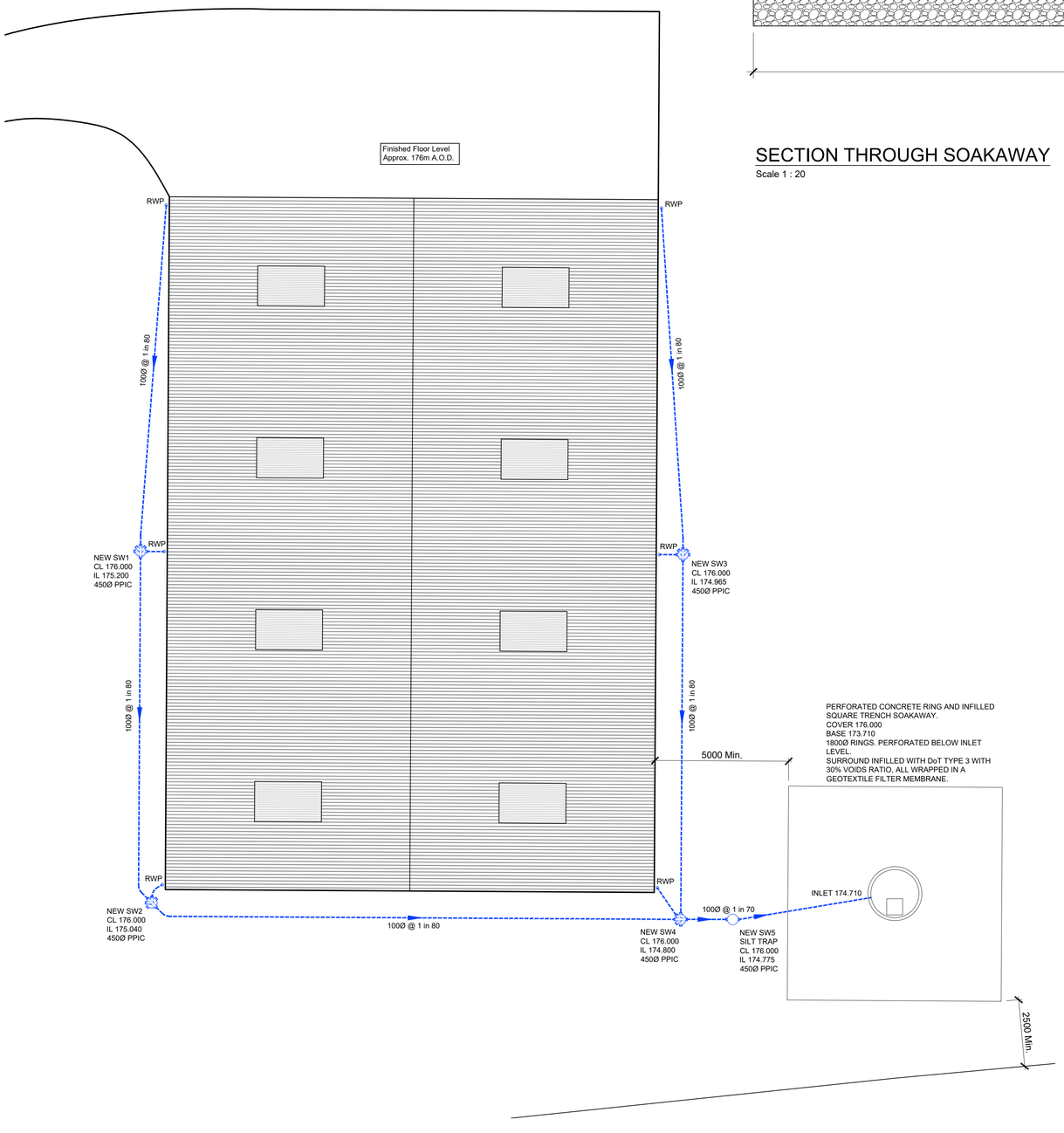


SECTION THROUGH SOAKAWAY

Scale 1 : 20



Dunster Consulting Ltd
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Bridge End Farm, Slaidburn

Section:	Square Soakaway & Perforated Ring	Job No:	23-999	Revision	
		Prepared By:	DJC	Page:	C/01
				Date:	05/07/2024

SUMMARY OF CALCULATIONS

critical design rainfall duration 't_{crit}' =	360	*min*
required storage volume 'V_{req}' =	20.59	m^3
provided storage volume 'V_{prov}' =	20.89	m^3
utilisation factor =	**0.99**	***.OK***
required time to discharge 50% 't_{50}' =	12.09	*hours*
utilisation factor =	**0.50**	***.OK***

GENERAL DATA

site location:	**England and Wales**
soakaway type:	**perforated concrete ring**
pit shape:	**square pit around ring**
impermeable area drained to soakaway 'A' *[m^2]* =	**473**
60 min rainfall depth of 5 year return period 'R' *[mm]* =	**20**
M5-60 to M5-2d rainfall ratio 'r' =	**0.40**
allowance for climate change:	**40%**

SOAKAWAY DATA

number of ring soakaways:	**1**
square pit side length 'L' [m] =	**8.00**
soakaway ring internal diameter 'D_{ss}' *[mm]* =	**1800**
total depth from ground level 'D_s' *[m]* =	**2.23**
depth to drain invert level 'D_s' *[m]* =	**1.23**
soakaway effective depth 'D_{se}' *[m]* =	1.00
free volume in infill aggregate *[%]* =	**30**

SOIL INFILTRATION DATA

allowance for infiltration through soakaway base:	**No**
available on-site infiltration test results:	○ Yes ◉ No
soil infiltration rate 'f' *[m/s]* =	**1.50E-05**

REQUIRED STORAGE CAPACITY PER RAINFALL DURATION

rainfall duration *[min]*	rainfall factor Z1	M5-D rainfalls *[mm]*	M10-D Z2	M10-D rainfalls *[mm]*	M10-D inflow *[m^3]*	ignore Z2	ignore rainfalls *[mm]*	ignore inflow *[m^3]*	ignore Z2	ignore rainfalls *[mm]*	ignore inflow *[m^3]*	outflow from soakaway *[m^3]*	required storage *[m^3]*
5	0.37	7.47	1.20	12.59	5.96							0.07	5.89
10	0.52	10.47	1.22	17.90	8.47							0.14	8.32
15	0.63	12.67	1.23	21.82	10.32							0.22	10.11
30	0.80	16.07	1.24	27.89	13.19							0.43	12.76
60	1.00	20.00	1.24	34.72	16.42							0.86	15.56
120	1.21	24.13	1.24	41.90	19.82							1.73	18.09
240	1.45	28.93	1.22	49.59	23.46							3.46	20.00
360	1.60	32.07	1.21	54.49	25.77							5.18	**20.59**
600	1.79	35.87	1.20	60.38	28.56							8.64	19.92
1440	2.24	44.80	1.18	74.03	35.02							20.74	14.28

** Z2 is growth factor from M5 rainfalls*

Spreadsheet provided by: ***www.YourSpreadsheets.co.uk*** calculations are based on **BRE Guidelines (Digest 365)**

Drainage Notes:

1. Manhole covers shall/must have a clear opening of 600mm and shall be Class D400 to BS EN 124 with 150mm deep frames in highways.
2. Sewers to be laid in Class "S" Bedding (150mm granular bed and surround). Where depth of cover to top of the sewer is less than 1.2m in highways then lean mix concrete bed and surround should be provided.
3. Bedding and backfill material to conform to the requirement of Water Industry Specification 4-08-02 (Table A2).
4. The chamber size of manholes with more than one connection in them may need to be increased an increment to accommodate the connections and bends.
5. The minimum crushing strength for clay pipes should be as follows: 100mm dia. 40kn/m, 150mm dia. 40kn/m, 225mm dia. 45kn/m, and 300mm dia. 72kn/m. The minimum crushing strength for concrete pipes should be - (class 120 to EN 1916/BS5911-1 2002). Plastic pipes should conform to WIS 4-35-01 and BS EN13476.
6. All surface water manholes to be 450Ø PPIC U.N.O.
7. All new surface water sewers to be 100Ø plastic at 1 in 80 min gradient.
8. On site permeability testing has been carried out in the vicinity of the foul discharge resulting in a Vp = 65.2 secs/mm

Legend

	Proposed Surface Water (SW)
	Proposed Foul Water (FW)
	Proposed Combined Water (CW)
G	Gully
BIG	Back Inlet Gully
FWMH1	Foul Water Manhole
BSWMH1	Building Surface Water Manhole
BSWMH1	Hardstanding Surface Water MH
RWP	Rain Water Pipe
SS	Soil Stack
SVP	Soil Vent Pipe
AAV	Air Admittance Valve
BD	Back Drop
RE	Rodding Eye

Alternative Soakaway:

Geocellular below ground crates wrapped in a geotextile filter membrane, with 95% voids ratio. Vent pipe and access turrets required for de-silting. 26m x 1m x 0.8m deep required.

Maintenance:

Periodic inspections of the soakaway chamber and upstream silt trap should be completed every six months, with and build up of silts removed.

Soil Infiltration Rate:

Vp = 65.2 secs/mm, therefore:
f = (1/65.2)/1000 = 1.5 x 10^{-5} m/s.

rev	amendments	by	date

Dunster Consulting
civil & structural engineering

Client: **A & J Coupland**

Project: **Proposed Agricultural Building**
Bridge End Farm
Wood House Lane
Slaidburn
BB7 3AH

Title: **Drainage Strategy**

Drawing Status:	Date Created:	Drawing Scale:
Planning	**July 2024**	**1 : 100, 20**

Drawing Number: **24-999.A1.001** Rev: **-**

Project Leader:	Drawn By:	Initial Review:
DC	**DC**	**DD**