

Coughlan Consulting Engineering

Consulting Structural & Civil Engineering 25 Kiltipper Avenue, Aylesbury, Tallaght, D4 F2NR T 086 3872337 / E robertcoughlan@ymail.com

22047

17th August 2022

SD21B/0641 - 32, St. Patrick's Cottages, Rathfarnham, Dublin 14 - Conditions 4 and 5

Item 4. There are no soil percolation test results, design calculations or dimensions submitted for the proposed soakaway. The applicant is requested to submit a report showing site specific soil percolation test results and design calculations for the proposed soakaway in accordance with BRE Digest 365 – Soakaway Design.

Item 5. The applicant is requested to submit a revised drawing showing plan & cross-sectional views, dimensions, and location of proposed soakaway. Any proposed soakaway shall be located fully within the curtilage of the property and shall be:

- (i) At least 5m from any building, public sewer, road boundary or structure.
- (ii) Generally, not within 3m of the boundary of the adjoining property.
- (iii) Not in such a position that the ground below foundations is likely to be adversely affected.
- (iv) 10m from any sewage treatment percolation area and from any watercourse / floodplain.
- (v) Where practical soakaways must include an overflow connection to the surface water drainage network.

Response:

Coughlan Consulting Engineering were appointed by Gail and Ronan Carey of 32, St. Patrick's Cottages, Rathfarnham, Dublin 14 to prepare an engineering response to Items 4 and 5 above.

Coughlan Consulting Engineering instructed an infiltration test on site to determine the required size for the soakaway test. The test hole excavated was 1mx1m in area and 1m deep.

The hardstanding area considered in the soakaway calculation caters for the flat roofs on ground and 1st floor and is circa 45m². Note the existing single storey flat roof currently connects to the private drainage system and by taking this rainwater from this network and into the soakpit, improves the available capacity of the existing drainage system.

Item 4 - Please see Soakaway Calculations in Appendix A.

Item 5 - Please see marked up site plan of extent of soakaway, together with through section of soakaway.

For and on behalf of: Cou

Coughlan Consulting Engineering

Robert Coughlan

25 Kiltipper Avenue,

Aylesbury, Tallaght, Dublin 24.

Signed:

Name: Robert Coughlan

Qualifications: BE, CEng, MIEI, MIStuctE, BER Assessor.

Professional Body/Membership No. MIEI No.: 053927

Appendix A : Soakaway Calculations

Project	Project 22047 32 St Patrocks Cottages			Job no. 22047	
Calcs for	Soakaw	ay Deisgn		Start page no./	Revision
Calcs by RC	Calcs date 17/08/2022	Checked by	Checked date	Approved by	Approved date

SOAKAWAY DESIGN

In accordance with BRE Digest 365 - Soakaway design

Tedds calculation version 2.0.04

Design rainfall intensity

Location of catchment area

Other

Impermeable area drained to the system

 $A = 43.0 \text{ m}^2$

Return period

Period = 30 yr

Ratio 60 min to 2 day rainfall of 5 yr return period

r = 0.360

5-year return period rainfall of 60 minutes duration M5_60min = 19.0 mm

Increase of rainfall intensity due to global warming pclimate = 10 %

Soakaway / infiltration trench details

Soakaway type

Rectangular

Minimum depth of pit (below incoming invert)

d = 949 mm

Width of pit

w = 2750 mm

Length of pit

I = 1500 mm

Percentage free volume

Vfree = 30 %

Soil infiltration rate (BRE digest 365)

Length of trial pit

Itrial = 1000 mm

Width of trial pit

btrial = 1000 mm

Depth of trial pit (below invert)

d_{trial} = 1000 mm

Free volume (if fill used)

Vtrial = 100 %

75% depth of pit

 $d_{75} = (d_{trial} \times 0.75) = 750.00 \text{ mm}$

50% depth of pit

 $d_{50} = (d_{trial} \times 0.50) = 500.00 \text{ mm}$

25% depth of pit

 $d_{25} = (d_{trial} \times 0.25) = 250.00 \text{ mm}$

Test 1 - time to fall from 75% depth to 25% depth

T1 = 180 min

Test 2 - time to fall from 75% depth to 25% depth

T2 = 190 min

Test 3 - time to fall from 75% depth to 25% depth

T3 = 180 min

Longest time to fall from 75% depth to 25% depth Storage volume from 75% to 25% depth

 $t_{ig} = max(T1, T2, T3) = 190 min$ $V_{p75_25} = (I_{trial} \times b_{trial} \times (d_{75} - d_{25})) \times V_{trial} = 0.50 \text{ m}^3$

 $a_{p50} = ((I_{trial} \times b_{trial}) + (I_{trial} + b_{trial}) \times 2 \times d_{50}) = 3.00 \text{ m}^2$

Internal surface area to 50% depth Surface area of soakaway to 50% storage depth

 $A_{s50} = 2 \times (I_{trial} + b_{trial}) \times d_{trial} / 2 = 2.000 \text{ m}^2$

Soil infiltration rate

 $f = V_{p75_25} / (a_{p50} \times t_{lg}) = 14.6 \times 10^{-6} \text{ m/s}$

Wetted area of pit 50% full

 $a_{s50} = I \times d + w \times d = 4033261 \text{ mm}^2$

Table equations

Inflow (cl.3.3.1)

 $I = M30 \times A$

Outflow (cl.3.3.2)

 $O = a_{s50} \times f \times D$

Storage (cl.3.3.3)

S=1-0

Duration, D (min)	Growth factor Z1	M5 rainfalls (mm)	Growth factor Z2	30 year rainfall, M30 (mm)	Inflow (m³)	Outflow (m³)	Storage required (m³)
5	0.36;	7.5;	1.47;	11.0;	0.47;	0.02;	0.46
10	0.51;	10.7;	1.49;	15.9;	0.68;	0.04;	0.65
15	0.62;	13.0;	1.49;	19.3;	0.83;	0.05;	0.78
30	0.79;	16.5;	1.49;	24.6;	1.06;	0.11;	0.95

Project	Project 22047 32 St Patrocks Cottages Calcs for Soakaway Deisgn				Job no. 22047 Start page no./Revision 2	
Calcs for						
Calcs by RC	Calcs date 17/08/2022	Checked by	Checked date	Approved by	Approved date	

Duration, D (min)	Growth factor Z1	M5 rainfalls (mm)	Growth factor Z2	30 year rainfall, M30 (mm)	Inflow (m³)	Outflow (m³)	Storage required (m³)
60	1.00;	20.9;	1.47;	30.7;	1.32;	0.21;	1.11
120	1.22;	25.5;	1.46;	37.2;	1.60;	0.42;	1.17
240	1.48;	30.9;	1.44;	44.6;	1.92;	0.85;	1.07
360	1.67;	34.9;	1.43;	49.9;	2.14;	1.27;	0.87
600	1.90;	39.7;	1.41;	56.2;	2.41;	2.12;	0.29
1440	2.42;	50.6;	1.37;	69.4;	2.98;	5.09;	0.00

Required storage volume

Soakaway storage volume

 $S_{req} = 1.17 \text{ m}^3$

 $S_{act} = I \times d \times w \times V_{free} = 1.17 \text{ m}^3$

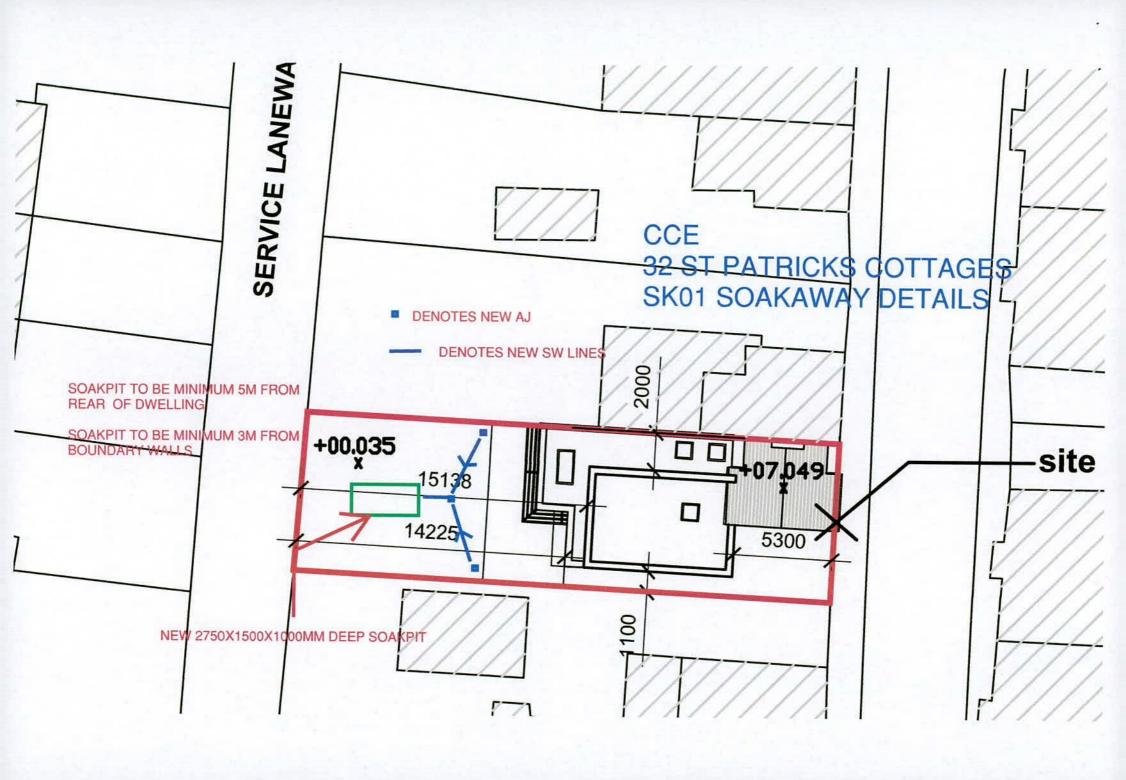
PASS - Soakaway storage volume

Time for emptying soakaway to half volume

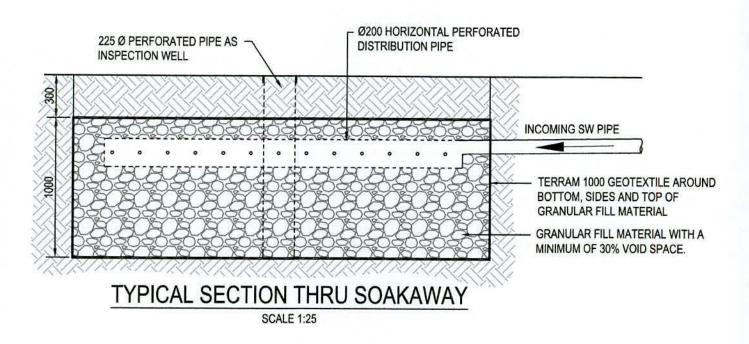
 $t_{s50} = S_{req} \times 0.5 / (a_{s50} \times f) = 2hr 45min 22s$

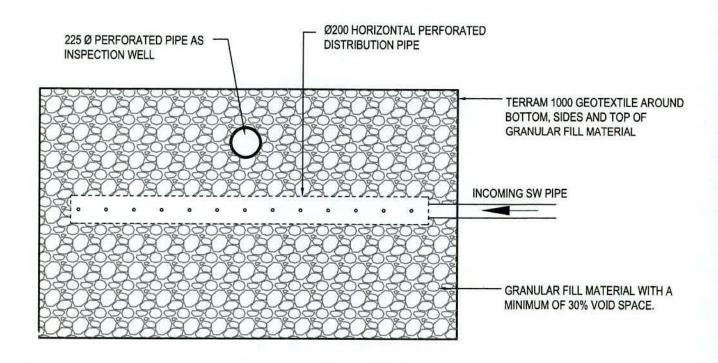
PASS - Soakaway discharge time less than or equal to 24 hours

Appendix B : Soakaway Drawings



CCE 32 ST PATRICKS COTTAGES TYPICAL SOAKAWAY DETAILS NOT TO SCALE SK02





TYPICAL PLAN OF SOAKAWAY

SCALE 1:25