



ESC **Environmental Ltd**

Rondesere Ltd,

Grange Road,

Baldoyle,

Co. Dublin,

Reference: Grange Road BRE



Project Ref. : Grange Road BRE

Report nature: BRE digest test for stormwater soakaway

Envrn. Classification: N/A.

Report status: Proposal

Report Parameters: Report is produced following BRE Digest test carried out by Wastewater maintenance.

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Introduction

Environmental Services Consultancy have been requested to put in place suitable proposals for Surface water drainage at Grange Road, Baldoyle, Co. Dublin. The proposals outlined are based on a BRE 365 Test. The calculations and proposals are based on the hardstanding area, the rain fall catchment to proposed soakaway.

Site Specific Information

Site area = 1504 m²

The site being serviced is the proposed roof area of an apartment development along the Grange Road in Dublin.

Four soakaways are proposed for the area to maximise total surface area due to the slow infiltration rate into the soil.

Impermeable area discharging to soakaway:

The soakaways are to be located within the landscaped area to the west and north west of the site and will have a surface area of 1504 m² draining to it.

Rainfall Information as per Met Eireann:

Rainfall depth: 24.8mm + 10% climate change factor= 27.28mm
30-year return period 60 minutes

Soakaway : 1504 m² x 27.28 mm x 0.8 = 32.82 m³ (Run-off co-efficient is set at 0.8 as per BRE365)

Methodology

A test hole was dug at locations where soakaways may be located on 14/01/2021. The hole was filled with approx. 1000lt of water and levels and times were recorded. Indicated below are the soil infiltration rates for the hole. For a valid design, the time for the soakaway to become half empty from full should be less than 24hours (T50). The soakaway has adequate dimensions when the free volume provided (V) equals the storage required.

Test Hole: The dimensions of the hole were 1.5m long x 0.7m wide X 1.6m deep. The hole was filled with water to a level of 0.4m.

$$\text{Soil infiltration rate, } f = \frac{V_{p75-25}}{ap50 \times tp75-25} = \frac{0.648}{4.26 \times 40,980} = 0.000001979 \text{ m/sec}$$



Where:

V_{p75-25} = the effective storage volume of water in the trial pit between 75% and 25% effective depth;

a_{p50} = the internal surface area of the trial pit up to 50% effective depth and including the base area;

t_{p75-25} = the time for the water level to fall from 75% to 25% effective depth.

Soakaway - Size Calculations

The soakaways are to be located within the landscaped area to the west and north west of the site and will have a surface area of 1504 m² draining to it.

Due to the slow infiltration rate into the soil, 4 soakaways will be necessary.

Inflow to soakaways:

$$I = A \times R = 1504 \text{ m}^2 \times 27.28 \text{ mm} = 41 \text{ m}^3$$

Inflow – outflow = Volume required

$$41 \text{ m}^3 - 1.14 \text{ m}^3 = 39.86 \text{ m}^3$$

Soakaway 1 dimensions

At 50% free space:

28.5 m x 0.5 m x 1.4 m effective depth

Soakaway 2 dimensions

At 50% free space:

28.5 m x 0.5 m x 1.4 m effective depth

Soakaway 3 dimensions

At 50% free space:

28.5 m x 0.5 m x 1.4 m effective depth



Soakaway 4 dimensions

At 50% free space:

28.5 m x 0.5 m x 1.4 m effective depth

T50 = 17.4687 hrs

Surface Water Drainage Design

The soil on site has a slow soil infiltration rate, and due to this the soakaways required need significant space to work properly.

The design calls for four soakaways of the size **28.5 m x 0.5m x 1.4 m deep**.

For this development it is proposed to collect all surface and storm water run-off via 225mm Ø UPVC pipe to 4 number proposed underground stone soakaway areas with 50% void ratio for attenuation. The storm water will drain into the stone and existing ground in normal circumstances. During a 1 in 100-year storm the adequately sized attenuation area will store the excess water run-off on-site. A 2l/sec JFC or similar flow control device will slowly release storm water to the outfall location during heavy rainfall events. Please refer to the proposed JFC hydro-valve detail enclosed.

Regulations Applied: PPG 3 Guidelines, SI No. 272 Surface water regulations, 80/86 EEC Ground water protection. EPA 2009, Code of Practice, Site Characterization. GDSDS Vol 2, the "British standards: Guidance for the Investigation of Potentially Contaminated Sites (BS: 10175:2001)"

Oversight and Completion Report

All works will be overseen by Mitchell Environmental. A completion report, including photographs will be provided upon installation of all items. The above proposal is in line with the attached BRE 365 Report. The completion of all installations will be signed off by a chartered engineer.

References

- SUDS CIRA 697
- S.I. No. 610 of 2010
- Water framework directive
- BRE 365. Wastewater maintenance



Appendix

Photographs and Maps



Photograph 1: BRE test in progress



Map 1: BRE test location