DRA
CONSULTING ENGINEERS

# Drainage Design Report

## Development:

Extension to Building No. 3 with New Yard Slab at Heiton Steel

## Architect:

RDF Architecture & Planning

## Date of Report:

21/07/2021

## Project Ref. No.:

21194

## Table of Contents



## Document Control

| Producer: | Date: | Reviewer: | Date: | Approver: | Date: | Revision Status: | Comments: |
|---|---|---|---|---|---|---|---|
| STR | 17/06/2021 | BMcG | 17/06/2021 | AD | 17/06/2021 | 1st | 1st issue |
| GM | 21/07/2021 | BMcG | 21/07/2021 | AD | 21/07/2021 | 2nd | Added proposed new roofed area. Proposed toilet location altered |
| BMG | 17/12/2021 | CC | 17/12/2021 | AD | 21/07/2021 | 3rd | Surface Water Drainage Revised. SUDS measures added |
| CC | 13/01/2022 | BMG | 13/01/2022 | AD | 13/01/2022 | 4th | Surface Water Drainage Revised |

## 1.0 Introduction

DRA Consulting Engineers were appointed by RDF Architecture & Planning to prepare a drainage design for the proposed extension works at Heiton Steel, Ashfield, Co. Dublin.

The proposed development consists of an extension of an existing warehouse, new concrete slab yard, new on-site stormwater disposal, re-location of existing toilet and ancillary site works. This Report includes a description of the proposed drainage works and the relative design appendices.

This report should be read in conjunction with the following drawing which is contained in Appendix A:-

- Drawing no. 21194-150 Rev3: *Proposed Drainage Layout*

*In follow-up to the submitted Planning Application, South Dublin County Council have issued a request for Additional Information (RFI) dated 12/10/2021. This report has been updated to provide the drainage details requested in the RFI and take into account comments made.*

## 2.0 Foul Water Design

As part of the proposed works, it is proposed to demolish the existing toilet facilities and reconstruct it in the new extension. The new toilet facilities will match the size of the existing arrangement. For this reason, the proposed development will not increase the foul load on the existing foul sewer.

A new 100mm foul line service connection will be required in order to connect toilet from the new location into existing manhole. Foul drainage calculations are included in Appendix B of this report.

## 3.0 Storm Water Drainage

The proposed works that influence the surface water drainage flow consist of:

- construction of a new concrete yard slab;
- construction of a new extension to the existing Building No. 3 at the south-west end;
- construction of a footpath at the side of the new extension.

The existing arrangement consists of the following:-

- Proposed Yard Area
  This area is currently a stoned area, with a small section of green hedging. Surface water drains by percolating through this stone.
- New Extension Area
  ¾ of this area is currently a concrete slab, surface water drains via gullies to the existing surface water drainage network.
  The remaining ¼ area is currently a stoned area, surface water drains by percolating through this stone.

It is proposed to install a roof finish to the two number portal frame bays at the north-east gable end of the exiting building. This area is covered with an impermeable concrete slab and the surface water drains to the existing drainage network. This concrete slab was constructed under planning grant reference No. S00A/0379. The roof gutters to the new section of roof will connect to the existing gutters and rainwater down pipes. The proposed arrangement does not change the extent of hard area currently draining to the existing drainage system and so no further drainage measures are proposed.

### 3.1 SUDS Measures

South Dublin County Council in their RFI indicated a preference for SUDS drainage solutions which do not involve the provision of underground attenuation storage unless alternative approaches are unfeasible.

Taking this into account we have revised the originally proposed drainage design and now propose the following SuDS measures:

- Provision of 3m wide Swale with a Soakaway along the southern boundary of the site. The developer is involved in the All Ireland Pollinator Plan which encourages the provision of green and planted areas for bees. This swale can be planted with suitable native grasses in line with this Plan.
- The new concrete yard slab is to connect to the proposed Swale.
- The new extension roof is a pitched roof to match the existing roof, because of this a Green Roof drainage solution is not suitable. We propose to connect the roof drainage to the Swale.
- The footpath at the side of the building is proposed as Permeable Paving.

### 3.2 Stormwater Drainage Design

The surface water drainage has been designed in accordance with the requirements of the Greater Dublin Strategic Drainage Study (GDSDS).

Drawing no. 21194-150 Rev3 (Proposed Drainage Layout) shows the proposed surface water layout and SuDS measures, this is contained in Appendix A.

The areas draining to the Swale and Soakaway are:

- Extension Roof 734.8m²
- Concrete Yard Slab 3387.2m²
- Total Impermeable Area 4122m² – these areas (roof & slab) have been given a runoff coefficient of 1.

The area draining to permeable paving is:

- Footpath 48m²

The area currently draining via soakage into the ground is 3570m².(Yard area + ¼ Extension footprint)
The area currently draining into the existing drainage network is 599m2 (¾ Extension footprint + footpath)
The proposed arrangement represents a reduction in area draining to the exiting surface water network.

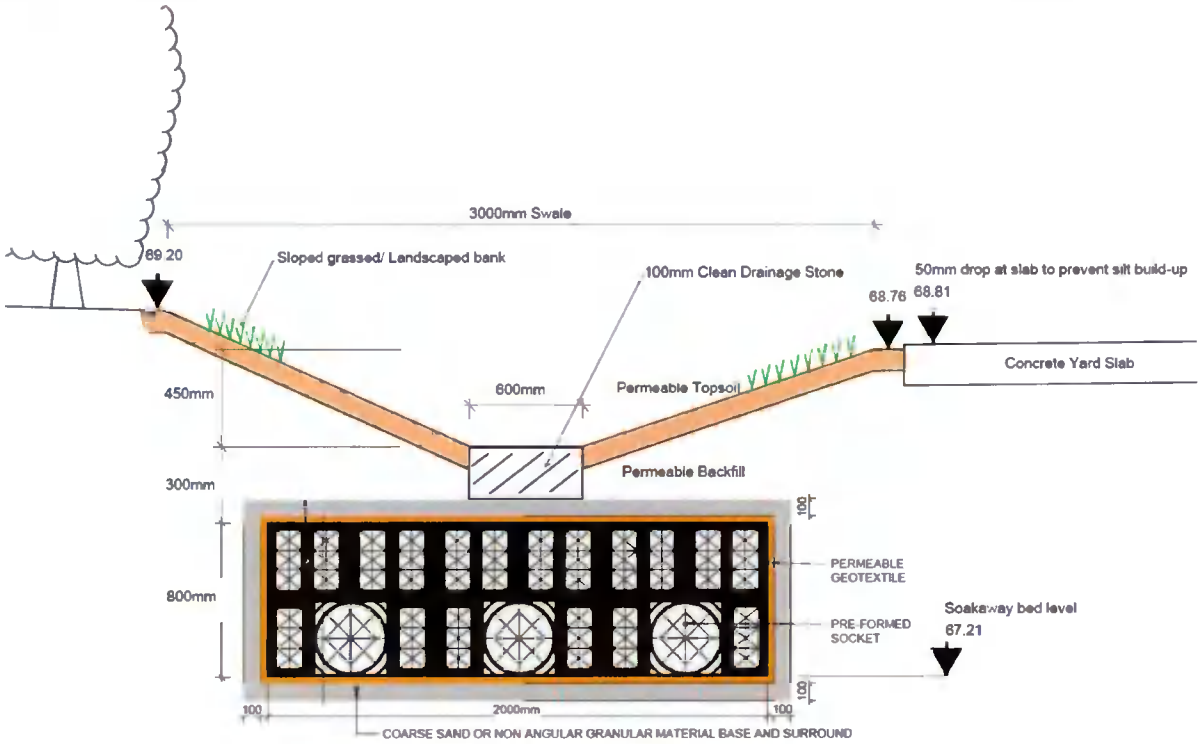
The design of the Soakaway and associated storage is contained in Appendix C.

The design soakaway storage volume has been increased by 20% to take into account climate change.

The soakage rate used in the Soakaway design is based on a site soakage test carried out. The soakage test report is contained in Appendix D.

The rainfall data used in the design is based on site specific rainfall data issued By Met Eireann, a copy of this data is contained in Appendix E.

Figure 1 below gives details of the proposed Swale and Soakaway.




Section Through Swale and Soakaway

**Figure 1**

**SAAR**

As per the RFI; the estimated SAAR (Standard Average Annual Rainfall) value has been estimated to be 877mm using the Greenfield runoff tool available on the website www.uksuds.com. This was used to calculate the estimated Greenfield Runoff Rate for the site, this has been estimated to be 2.31 l/s (1 in 30 year) and 2.83 l/s (1 in 100 year, see Appendix F.

***End of Report***

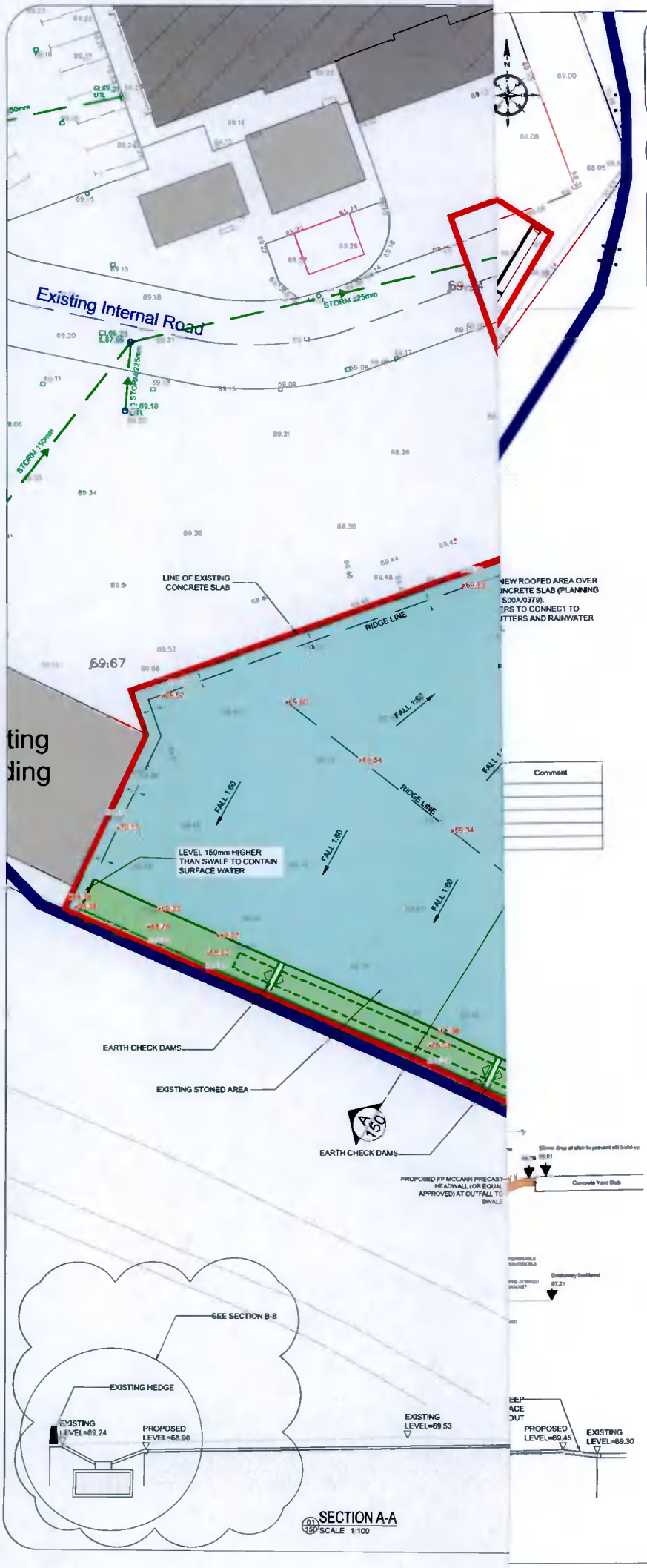
Yours sincerely,

**Barry McGinn**
Chartered Engineer

**Date:** 17/12/2021

# APPENDIX A

## PROPOSED DRAINAGE LAYOUT








NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES AND LEVELS IN METRES UNLESS NOTED OTHERWISE.
2. USE FIGURED DIMENSIONS ONLY. DO NOT SCALE.
3. DRAWINGS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ENGINEER'S, ARCHITECT'S AND SERVICE ENGINEER'S DRAWINGS AND SPECIFICATIONS.
4. ALL WORKS TO BE CARRIED OUT IN ACCORDANCE WITH CURRENT BUILDING REGULATIONS.
5. ALL DRAINAGE TO COMPLY WITH THE BUILDING REGULATIONS TECHNICAL GUIDANCE DOCUMENT H - DRAINAGE AND WASTE WATER DISPOSAL
6. FOUL DRAINAGE TO BE CONSTRUCTED IN ACCORDANCE WITH IRISH WATER'S (IW) "WASTEWATER INFRASTRUCTURE STANDARD DETAILS" AND "CODE OF PRACTICE FOR WASTEWATER INFRASTRUCTURE" DEFER TO IRISH WATER DOCUMENT NO. I.W.-CDS-5030-01 AND0.W.-CDS-5030-03
7. SURFACE WATER DRAINAGE TO BE CONSTRUCTED IN ACCORDANCE WITH THE GREATER DUBLIN REGIONAL CODE OF PRACTICE FOR DRAINAGE WORKS

LEGEND

- SITE BOUNDARY
- EXISTING SURFACE WATER SEWER
- PROPOSED SURFACE WATER SEWER
- PROPOSED ROAD GULLY
- 100Ø SW @ MINIMUM 1:80 (CONCRETE ENCASED)
- EXISTING FOUL SEWER
- PROPOSED FOUL INSPECTION CHAMBER AS PER PART H (600-1000mm DEEP, Ø450mm)
- PROPOSED FOUL AJ AS PER PART H (460-600mm DEEP, Ø300mm)
- 100Ø FOUL @ MINIMUM 1:80 (CONCRETE ENCASED)
- x68.32 PROPOSED LEVELS
- +69.34 EXISTING LEVELS
- PROPOSED 3M WIDE SWALE WITH SOAKAWAY
- PERMEABLE PAVING FOOTPATH
- CONCRETE YARD SLAB

SOAKAWAY DETAILS:

- HEIGHT = 0.8m
- LENGTH = 91m
- WIDTH = 2m
- BED LEVEL = 67.21
- SOAK PIT TO BE WAVIN AQUA CELL OR SIMILAR APPROVED
- SOAK PIT STORAGE VOLUME TO BE 130m³

| REV. | DESCRIPTION | PROD. | VERIF | APPR. | DATE |
|---|---|---|---|---|---|
| 4 | DRAINAGE REVISED | CC | BMcG | AD | 17/12/2021 |
| 3 | DRAINAGE REVISED | CC | BMcG | AD | 17/12/2021 |
| 2 | ADDED PROPOSED NEW ROOFED AREA. PROPOSED TOILET LOCATION ALTERED | GM | BMcG | AD | 21/07/2021 |
| 1 | ISSUED FOR PLANNING | STR | BMcG | AD | 30/06/2021 |

PLANNING

DRA CONSULTING ENGINEERS
DUBLIN T: 01-216-2956 | LIMERICK 061-310-701 | WEXFORD 053-915-2614
E: info@draconsulting.ie W: www.draconsulting.ie

ARCHITECT: RDF ARCHITECTS & PLANNING
UNIT 19, CHARLEVILLE TOWN CENTRE,
CHARLEVILLE,
CO.CORK

PROJECT: EXTENSION TO BUILDING NO. 3 WITH NEW YARD SLAB

TITLE: PROPOSED DRAINAGE LAYOUT

| | | | |
|---|---|---|---|
| DATE: | 17/06/2021 | SCALES: 1:250, 1:100 @ A1 | |
| DESIGNER: | STR | DRG. No. | REV. |
| PRODUCER: | STR | 21194-150 | 4 |
| VERIFIER: | BMcG | | |
| APPROVER: | AD | | |

# APPENDIX B

## FOUL DRAINAGE CALCULATIONS

## Design Settings

| | | | |
|---|---|---|---|
| Frequency of use (kDU) | 0.60 | Minimum Velocity (m/s) | 0.75 |
| Flow per dwelling per day (l/day) | 4000 | Connection Type | Level Inverts |
| Domestic Flow (l/s/ha) | 0.0 | Minimum Backdrop Height (m) | 0.200 |
| Industrial Flow (l/s/ha) | 0.0 | Preferred Cover Depth (m) | 0.400 |
| Additional Flow (%) | 0 | Include Intermediate Ground | ✓ |

## Nodes

| Name | Cover Level (m) | Manhole Type | Easting (m) | Northing (m) | Depth (m) |
|---|---|---|---|---|---|
| FOUL AJ 1.0 | 68.930 | Adoptable | 708236.000 | 730389.000 | 0.430 |
| EX. FOUL | 68.840 | Adoptable | 708221.000 | 730384.000 | 0.706 |
| FOUL AJ 1.1 | 68.930 | Adoptable | 708230.000 | 730379.000 | 0.624 |

## Links

| Name | US Node | DS Node | Length (m) | ks (mm) / n | US IL (m) | DS IL (m) | Fall (m) | Slope (1:X) | Dia (mm) |
|---|---|---|---|---|---|---|---|---|---|
| 1.000 | FOUL AJ 1.0 | FOUL AJ 1.1 | 11.662 | 1.500 | 68.500 | 68.306 | 0.194 | 60.1 | 100 |
| 1.001 | FOUL AJ 1.1 | EX. FOUL | 10.296 | 1.500 | 68.306 | 68.134 | 0.172 | 60.0 | 100 |

| Name | Pro Vel @ 1/3 Q (m/s) | Vel (m/s) | Cap (l/s) | Flow (l/s) | US Depth (m) | DS Depth (m) | Σ Area (ha) | Σ Dwellings (ha) | Σ Units (ha) | Σ Add Inflow (ha) | Pro Depth (mm) | Pro Velocity (m/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.000 | 0.000 | 0.859 | 6.7 | 0.0 | 0.330 | 0.524 | 0.000 | 0 | 0.0 | 0.0 | 0 | 0.000 |
| 1.001 | 0.000 | 0.860 | 6.8 | 0.0 | 0.524 | 0.606 | 0.000 | 0 | 0.0 | 0.0 | 0 | 0.000 |

# APPENDIX C

## SURFACE WATER DRAINAGE CALCULATIONS

| | | | |
|---|---|---|---|
| **Project:** | Extension At Helton Steel, Ashfield, Dublin 22 | **Job No.:** | 20307 |
| | | **Date:** | 12/17/21 |
| **Section:** | Soakaway - Wavin Cells | **Revision:** | 0 |
| | | **Designer** | BMG |
| **Architect:** | RDF Architects | **Checked** | BMG |
| | | **Approved** | AD |

DRA CONSULTING ENGINEERS

NSAI

TABLE 1 - Areas (Existing & Proposed Development):

| | Area m2 | Permblty Co-eff | Net non Permeable Area m2 |
|---|---|---|---|
| Green Ar. | 0 | 0.15 | 0.0 |
| Paving | 3387.2 | 1.00 | 3387.2 |
| Roof | 734.8 | 1.00 | 734.8 |
| TOTAL | 4122.0 | - | 4122.0 |

**Soakaway Details**

| | | |
|---|---|---|
| Length | 91 | m |
| Width | 2 | m |
| Depth | 0.8 | m |
| as 50 | 74.4 | m2 |
| Free Volume | 90 | % |
| Soil Infiltration *f* | 0.000255 | m/s |

**Storage Summary**

| | | |
|---|---|---|
| 1 in 10 | 45.34 | m3 |
| 1 in 30 | 76.83 | m3 |
| 1 in 50 | 96.12 | m3 |
| 1 in 100 | 129.41 | m3 |
| Provided | 131.04 | m3 |

TABLE 2 - Maximum Rainfall (mm) over indicated duration (expected in the indicated return period)

| Duration | | | Return Period (Years) - From Met Eireann for Ashfield | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Seconds | 2.0 | 3.0 | 4.0 | 5.0 | 10.0 | 20.0 | 30.0 | 50.0 | 100.0 |
| 1 | min | 60 | 0.00 | | | | 0.00 | | 0.00 | 0.00 | 0.00 |
| 2 | min | 120 | 0.00 | | | | 0.00 | | 0.00 | 0.00 | 0.00 |
| 5 | min | 300 | 4.20 | | | | 8.10 | | 11.50 | 13.40 | 16.60 |
| 10 | min | 600 | 5.90 | | | | 11.30 | | 16.00 | 18.70 | 23.10 |
| 15 | min | 900 | 6.90 | | | | 13.30 | | 18.80 | 22.00 | 27.20 |
| 30 | min | 1800 | 8.90 | | | | 17.00 | | 23.80 | 27.70 | 34.00 |
| 60 | min | 3600 | 11.60 | | | | 21.60 | | 30.10 | 35.00 | 42.70 |
| 2 | hours | 7200 | 15.00 | | | | 27.60 | | 38.10 | 44.10 | 53.50 |
| 4 | hours | 14400 | 19.50 | | | | 35.20 | | 48.20 | 55.50 | 67.10 |
| 6 | hours | 21600 | 22.70 | | | | 40.60 | | 55.30 | 63.60 | 76.60 |
| 12 | hours | 43200 | 29.50 | | | | 51.80 | | 70.00 | 80.10 | 96.00 |
| 24 | hours | 86400 | 38.20 | | | | 66.10 | | 88.50 | 100.90 | 120.30 |
| 48 | hours | 172800 | 46.20 | | | | 76.40 | | 100.00 | 112.80 | 132.60 |

TABLE 3 - Total volume of water on site (expected in the indicated return period)

| Duration | | | Return Period (Years) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Seconds | 2 | 3 | 4 | 5 | 10 | 20 | 30 | 50 | 100 |
| 1 | min | 60 | 0.0 | | | | 0.0 | | 0.0 | 0.0 | 0.0 |
| 2 | min | 120 | 0.0 | | | | 0.0 | | 0.0 | 0.0 | 0.0 |
| 5 | min | 300 | 17.3 | | | | 33.4 | | 47.4 | 55.2 | 68.4 |
| 10 | min | 600 | 24.3 | | | | 46.6 | | 66.0 | 77.1 | 95.2 |
| 15 | min | 900 | 28.4 | | | | 54.8 | | 77.5 | 90.7 | 112.1 |
| 30 | min | 1800 | 36.7 | | | | 70.1 | | 98.1 | 114.2 | 140.1 |
| 60 | min | 3600 | 47.8 | | | | 89.0 | | 124.1 | 144.3 | 176.0 |
| 2 | hours | 7200 | 61.8 | | | | 113.8 | | 157.0 | 181.8 | 220.5 |
| 4 | hours | 14400 | 80.4 | | | | 145.1 | | 198.7 | 228.8 | 276.6 |
| 6 | hours | 21600 | 93.6 | | | | 167.4 | | 227.9 | 262.2 | 315.7 |
| 12 | hours | 43200 | 121.6 | | | | 213.5 | | 288.5 | 330.2 | 395.7 |
| 24 | hours | 86400 | 157.5 | | | | 272.5 | | 364.8 | 415.9 | 495.9 |
| 48 | hours | 172800 | 190.4 | | | | 314.9 | | 412.2 | 465.0 | 546.6 |

TABLE 4 - Infiltration to ground (m3) over given period of time

| Duration | | | Return Period (Years) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Seconds | 2 | 3 | 4 | 5 | 10 | 20 | 30 | 50 | 100 |
| 1 | min | 60 | 1.1 | | | | 1.1 | | 1.1 | 1.1 | 1.1 |
| 2 | min | 120 | 2.3 | | | | 2.3 | | 2.3 | 2.3 | 2.3 |
| 5 | min | 300 | 5.7 | | | | 5.7 | | 5.7 | 5.7 | 5.7 |
| 10 | min | 600 | 11.4 | | | | 11.4 | | 11.4 | 11.4 | 11.4 |
| 15 | min | 900 | 17.0 | | | | 17.0 | | 17.0 | 17.0 | 17.0 |
| 30 | min | 1800 | 34.1 | | | | 34.1 | | 34.1 | 34.1 | 34.1 |
| 60 | min | 3600 | 68.2 | | | | 68.2 | | 68.2 | 68.2 | 68.2 |
| 2 | hours | 7200 | 136.3 | | | | 136.3 | | 136.3 | 136.3 | 136.3 |
| 4 | hours | 14400 | 272.7 | | | | 272.7 | | 272.7 | 272.7 | 272.7 |
| 6 | hours | 21600 | 409.0 | | | | 409.0 | | 409.0 | 409.0 | 409.0 |
| 12 | hours | 43200 | 818.0 | | | | 818.0 | | 818.0 | 818.0 | 818.0 |
| 24 | hours | 86400 | 1636.0 | | | | 1636.0 | | 1636.0 | 1636.0 | 1636.0 |
| 48 | hours | 172800 | 3271.9 | | | | 3271.9 | | 3271.9 | 3271.9 | 3271.9 |

TABLE 5 - Storage volume required (m3)

| Duration | | | Return Period (Years) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Seconds | 2 | 3 | 4 | 5 | 10 | 20 | 30 | 50 | 100 |
| 1 | min | 60 | 0.0 | | | | 0.0 | | 0.0 | 0.0 | 0.0 |
| 2 | min | 120 | 0.0 | | | | 0.0 | | 0.0 | 0.0 | 0.0 |
| 5 | min | 300 | 11.6 | | | | 27.7 | | 41.7 | 49.6 | 62.7 |
| 10 | min | 600 | 13.0 | | | | 35.2 | | 54.6 | 65.7 | 83.9 |
| 15 | min | 900 | 11.4 | | | | 37.8 | | 60.5 | 73.6 | 95.1 |
| 30 | min | 1800 | 2.6 | | | | 36.0 | | 64.0 | 80.1 | 106.1 |
| 60 | min | 3600 | 0.0 | | | | 20.9 | | 55.9 | 76.1 | 107.8 |
| 2 | hours | 7200 | 0.0 | | | | 0.0 | | 20.7 | 45.4 | 84.2 |
| 4 | hours | 14400 | 0.0 | | | | 0.0 | | 0.0 | 0.0 | 3.9 |
| 6 | hours | 21600 | 0.0 | | | | 0.0 | | 0.0 | 0.0 | 0.0 |
| 12 | hours | 43200 | 0.0 | | | | 0.0 | | 0.0 | 0.0 | 0.0 |
| 24 | hours | 86400 | 0.0 | | | | 0.0 | | 0.0 | 0.0 | 0.0 |
| 48 | hours | 172800 | 0.0 | | | | 0.0 | | 0.0 | 0.0 | 0.0 |
| **Max Storage Required** | | | **13.0** | | | | **37.8** | | **64.0** | **80.1** | **107.8** |
| **+ 20% Climate Change** | | | **15.55** | | | | **45.34** | | **76.83** | **96.12** | **129.41** |

# APPENDIX D

## SOAKAGE TEST REPORT

soakawaytests.ie

- SOAKAWAY TESTS
- SOAKAWAY DESIGN
- DRAINAGE DESIGN
- PERCOLATION TESTS
- SITE CHARACTERISATION TESTS

Declan Kearns & Associates Ltd. t/a
Soakaway Tests
Tullywest
Kildare
Co. Kildare
Ireland

Phone: 01 539 4447
Phone: 045 520642
Mob: 086 2111590
Email: info@soakawaytests.ie
Visit: www.soakawaytests.ie

**Factual Report on**
**Soakaway Test**
**at**

**Proposed Development at**
**Ashfield, Naas Road, Dublin 22**

**on behalf of**
**Heiton Steel**

**Date : 01/12/21**

## 1. INTRODUCTION

It is understood that it will be necessary to dispose of the storm water from the proposed Development at Ashfield, Naas Road, Dublin 22 by means of a soakaway system on site.

An investigation has been carried out to assess the suitability of the sub-soils for this purpose and to determine soakaway requirements.

## 2. FIELDWORK

One trial pit was excavated (see Appendix 1 for testhole location and photos) in order to ascertain subsoil conditions and the depth to groundwater. ST1 was excavated to 1.50m. Groundwater was not encountered after 48 hours.

The soakaway trial pit details are located in Appendix 2.

## 3. TESTING

To determine the soil infiltration rate, water was poured into the pit and records made of the fall in water level against time. Testing was continued until a constant rate of fall was established.

From the rate of fall in water level and measurement of the average internal surface area of the test pit over the test zone, the soil infiltration rate "f" was calculated.

The field data and calculations are located in Appendix 2.

The infiltration rate (f value) in the area of trial pit ST1 was determined to be 0.01527m/min.

Signed :

Declan Kearns
Consultant Civil / Geotechnical Engineer
for and on behalf of
Declan Kearns & Associates Ltd. t/a
Soakaway Tests

# Appendix 1

## Site Layout Plan & Photographs


Morgans Timber
Soakaway Test
ST1

Figure 1. Testhole ST1

Figure 2. Arisings of ST1

Figure 3. View of ST1

Figure 4. Filling ST1 with water

# Appendix 2

## Field Data Records & Calculations

soakawaytests.ie

# Soakaway Design f -value from field tests

Contract: Ashfield, Naas Road, Dublin 22
Test No. ST1
Client Heiton Steel
Date: 20/11/2021

Summary of Ground Conditions

| From | To | Description | Ground water |
|---|---|---|---|
| 0.00 | 0.30 | MADE GROUND (comprised of crushed rock) | Not met |
| 0.30 | | MADE GROUND (comprised of Grey brown sandy gravelly clay with pieces of steel, | |
| | 1.50 | wood and plastic) | |
| | | | |

Notes:

Field Data (from 3rd fill)

| Depth to Water (m) | Elapsed Time (min) |
|---|---|
| 0.950 | 0 |
| 1.070 | 2 |
| 1.145 | 5 |
| 1.320 | 10 |
| 1.445 | 15 |

Field Test

| | | |
|---|---|---|
| Depth of Pit (D) | 1.50 | m |
| Width of Pit (B) | 0.80 | m |
| Length of Pit (L) | 1.10 | m |
| Initial depth to Water (25%) = | 1.09 | m |
| Final depth to water (75%) = | 1.36 | m |
| Elapsed time (mins)= | 8.2 | |
| Top of permeable soil | 0.60 | m |
| Base of permeable soil | 1.50 | m |
| Base area= | 0.88 | m2 |
| *Av. side area of permeable stratum over test period= | 1.045 | m2 |
| Total Exposed area = | 1.925 | m2 |

Infiltration rate (f) = Volume of water used/unit exposed area / unit time

**f= 0.015268 m/min or 2.545E-04 m/sec**

# APPENDIX E

MET EIREANN
RETURN PERIOD RAINFALL DEPTHS FOR SLIDING DURATIONS
IRISH GRID: EASTING: 308288, NORTHING: 230307

Met Eireann
Return Period Rainfall Depths for sliding Durations
Irish Grid: Easting: 308288, Northing: 230307,

| | Interval | | Years | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DURATION | 6months, | 1year, | 2, | 3, | 4, | 5, | 10, | 20, | 30, | 50, | 75, | 100, | 150, | 200, | 250, | 500, |
| 5 mins | 2.4, | 3.6, | 4.2, | 5.2, | 5.8, | 6.4, | 8.1, | 10.1, | 11.5, | 13.4, | 15.2, | 16.6, | 18.7, | 20.4, | 21.8, | N/A , |
| 10 mins | 3.4, | 5.0, | 5.9, | 7.2, | 8.1, | 8.9, | 11.3, | 14.1, | 16.0, | 18.7, | 21.2, | 23.1, | 26.1, | 28.4, | 30.4, | N/A , |
| 15 mins | 4.0, | 5.9, | 6.9, | 8.5, | 9.6, | 10.4, | 13.3, | 16.6, | 18.8, | 22.0, | 24.9, | 27.2, | 30.7, | 33.4, | 35.8, | N/A , |
| 30 mins | 5.3, | 7.6, | 8.9, | 10.9, | 12.3, | 13.4, | 17.0, | 21.1, | 23.8, | 27.7, | 31.3, | 34.0, | 38.3, | 41.7, | 44.5, | N/A , |
| 1 hours | 6.9, | 9.9, | 11.6, | 14.1, | 15.8, | 17.2, | 21.6, | 26.7, | 30.1, | 35.0, | 39.3, | 42.7, | 47.9, | 52.0, | 55.4, | N/A , |
| 2 hours | 9.1, | 12.9, | 15.0, | 18.2, | 20.4, | 22.1, | 27.6, | 33.9, | 38.1, | 44.1, | 49.4, | 53.5, | 59.9, | 64.9, | 69.0, | N/A , |
| 3 hours | 10.6, | 15.1, | 17.5, | 21.2, | 23.6, | 25.5, | 31.8, | 39.0, | 43.7, | 50.4, | 56.4, | 61.1, | 68.2, | 73.8, | 78.5, | N/A , |
| 4 hours | 11.9, | 16.9, | 19.5, | 23.5, | 26.2, | 28.3, | 35.2, | 43.0, | 48.2, | 55.5, | 62.0, | 67.1, | 74.9, | 80.9, | 85.9, | N/A , |
| 6 hours | 14.0, | 19.7, | 22.7, | 27.3, | 30.4, | 32.8, | 40.6, | 49.5, | 55.3, | 63.6, | 70.9, | 76.6, | 85.3, | 92.1, | 97.7, | N/A , |
| 9 hours | 16.4, | 23.0, | 26.5, | 31.7, | 35.2, | 37.9, | 46.8, | 56.9, | 63.5, | 72.8, | 81.0, | 87.4, | 97.2, | 104.8, | 111.0, | N/A , |
| 12 hours | 18.4, | 25.6, | 29.5, | 35.2, | 39.1, | 42.1, | 51.8, | 62.8, | 70.0, | 80.1, | 89.0, | 96.0, | 106.6, | 114.8, | 121.6, | N/A , |
| 18 hours | 21.6, | 29.9, | 34.3, | 40.9, | 45.3, | 48.7, | 59.8, | 72.2, | 80.3, | 91.7, | 101.8, | 109.5, | 121.4, | 130.7, | 138.3, | N/A , |
| 24 hours | 24.2, | 33.4, | 38.2, | 45.4, | 50.3, | 54.0, | 66.1, | 79.7, | 88.5, | 100.9, | 111.9, | 120.3, | 133.2, | 143.2, | 151.4, | 180.1, |
| 2 days | 30.3, | 40.7, | 46.2, | 54.1, | 59.4, | 63.5, | 76.4, | 90.7, | 100.0, | 112.8, | 124.0, | 132.6, | 145.6, | 155.6, | 163.9, | 192.2, |
| 3 days | 35.2, | 46.7, | 52.5, | 61.1, | 66.8, | 71.1, | 84.8, | 99.8, | 109.5, | 122.7, | 134.3, | 143.0, | 156.4, | 166.6, | 174.9, | 203.5, |
| 4 days | 39.6, | 51.8, | 58.1, | 67.2, | 73.1, | 77.7, | 92.1, | 107.7, | 117.7, | 131.4, | 143.3, | 152.3, | 165.9, | 176.3, | 184.8, | 213.8, |
| 6 days | 47.1, | 60.8, | 67.7, | 77.7, | 84.2, | 89.1, | 104.7, | 121.4, | 132.0, | 146.4, | 158.9, | 168.3, | 182.5, | 193.3, | 202.1, | 231.9, |
| 8 days | 53.8, | 68.7, | 76.2, | 86.9, | 93.9, | 99.1, | 115.6, | 133.3, | 144.4, | 159.5, | 172.5, | 182.3, | 197.0, | 208.1, | 217.2, | 247.8, |
| 10 days | 59.9, | 75.9, | 83.9, | 95.3, | 102.6, | 108.2, | 125.5, | 144.0, | 155.6, | 171.3, | 184.7, | 194.8, | 210.0, | 221.5, | 230.8, | 262.1, |
| 12 days | 65.7, | 82.6, | 91.0, | 103.0, | 110.7, | 116.5, | 134.7, | 153.8, | 165.9, | 182.1, | 196.0, | 206.4, | 222.0, | 233.8, | 243.3, | 275.4, |
| 16 days | 76.3, | 95.0, | 104.2, | 117.2, | 125.5, | 131.8, | 151.3, | 171.8, | 184.6, | 201.8, | 216.4, | 227.4, | 243.8, | 256.0, | 266.0, | 299.3, |
| 20 days | 86.1, | 106.3, | 116.2, | 130.2, | 139.1, | 145.8, | 166.5, | 188.1, | 201.5, | 219.6, | 234.9, | 246.3, | 263.4, | 276.1, | 286.4, | 320.9, |
| 25 days | 97.7, | 119.5, | 130.2, | 145.2, | 154.7, | 161.9, | 183.9, | 206.8, | 221.0, | 240.0, | 256.0, | 268.0, | 285.8, | 299.1, | 309.8, | 345.5, |

NOTES:
N/A Data not available
These values are derived from a Depth Duration Frequency (DDF) Model
For details refer to:
'Fitzgerald D. L. (2007), Estimates of Point Rainfall Frequencies, Technical Note No. 61, Met Eireann, Dublin',
Available for download at www.met.ie/climate/dataproducts/Estimation-of-Point-Rainfall-Frequencies_TN61.pdf

# APPENDIX F

## GREEN FIELD RUNOFF RATE

HR Wallingford
Working with water

# Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

| | |
|---|---|
| Calculated by: | sandra torrico |
| Site name: | HEITON STEEL |
| Site location: | Ashfield |

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", SC030219 (2013) , the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

## Site Details

| | |
|---|---|
| Latitude: | 53.31392° N |
| Longitude: | 6.37808° W |
| Reference: | 1686977397 |
| Date: | Jun 17 2021 10:55 |

## Runoff estimation approach

IH124

## Site characteristics

Total site area (ha): 0.4565

## 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): | 877 | 877 |
| Hydrological region: | 12 | 12 |
| Growth curve factor 1 year: | 0.85 | 0.85 |
| Growth curve factor 30 years: | 2.13 | 2.13 |
| Growth curve factor 100 years: | 2.61 | 2.61 |
| Growth curve factor 200 years: | 2.86 | 2.86 |

## 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): | 1.08 | 1.08 |
| 1 in 1 year (l/s): | 0.92 | 0.92 |
| 1 in 30 years (l/s): | 2.31 | 2.31 |
| 1 in 100 year (l/s): | 2.83 | 2.83 |
| 1 in 200 years (l/s): | 3.1 | 3.1 |