WCE

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Consulting Engineers

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RELOCATION OF LEIXLIP PLAYGROUND
(PART 8)

at

LEIXLIP AMENITIES CENTRE

for

KILDARE COUNTY COUNCIL

Engineering Report

Job No. 2023/02
March 2023

CONTENTS

1. INTRODUCTION

1.1. Site Location

The site is located at Leixlip Amenities Centre, Leixlip, Co. Kildare.

1.2. Proposed Development

A Part 8 application is for being made for permission to re-locate the existing playground to a new location within the grounds of Leixlip Amenities Centre.

1.3. Site Conditions

The existing playground area is covered with soft landscaping. It is proposed to relocate the existing playground and provide a tarmacdam surface for additional car parking in this area. The area to which it is proposed to relocate the playground to is currently used for overflow parking and consists of a compacted hardcore surface.

2. SURFACE WATER DRAINAGE

2.1. Existing Surface Water Arrangements

The surface water from the existing car park is collected by a traditional gully and pipe system and then discharged to the public surface water sewer to the south of the site at the Royal Canal.

2.2. Proposed Surface Water Arrangements – Preliminary Design

At preliminary design stage, the preferred method of disposal of the surface water generated by the additional car parking area and new playground area was to discharge to ground by means of permeable paving and soak ways. To this end, site testing consisting of soak away tests to BRE 365 and in-situ plate loading tests were commissioned and carried out by Ground Investigation Ireland (see Appendix A). The locations chosen for the soak away tests were within the new playground area as shown in the Report. The results of both soak away tests indicate that the ground conditions are not suitable for the installation of a soak away and drainage to ground by means of permeable paving is not possible.

2.3. Proposed Surface Water Arrangements

The proposed surface water drainage network has been designed as a single

network out falling to existing Kildare County Council Manhole SW 1023247 in the adjacent lands to the east. Surface water from the proposed new car park area will be collected by a traditional gully and pipe system (refer to Drawings 300 & 301). Land drains installed under the new playground soft landscaping will connect to the collector drain by means of inspection chambers. Surface water will discharge at a rate of 2l/s to the public sewer network. The allowable run off rate has been calculated based on the existing greenfield run off rate with an appropriate expansion factor applied for the design 1 in 100 year storm (see Appendix B).

2.4. Storage Requirements

The total quantity of surface water discharged from the development has been calculated on the basis of the impermeable area (1,705m^2) plus an allowance for the surface water collected by the land drains under the new playground. Excess storm water will be attenuated in a grass detention basin located in the new playground with a storage volume of c.74m^3. This is sufficient to store surface water from a 100-year storm event inclusive of an additional 10% for climate change (see Appendix C). After a storm event, surface water will be released at the controlled rate of 2l/s via a hydrobrake manhole.

2.5. Water Quality

The proposed detention basin will provide treatment to the storm water before it discharges to the public surface water system. Sedimentation along with infiltration through the base of the basin will remove pollutants. There will also be some biological filtration due to vegetation at the bottom of the basin. The CIRIA Report provides a method of calculating the “first flush” volume i.e. the treatment volume (Vt). The treatment volume for this site has been calculated as 40m^3. As there is c. 74m^3 storage provided in the detention basin, the whole of the treatment volume will be stored. Trapped road gullies will be installed in the proposed new car parking area in order to minimise the risk of contamination of the surface water system due to floating debris. Surface water will finally pass through a petrol interceptor which will provide further treatment of the runoff and remove pollutants before it enters the public surface water sewer.

Yours Faithfully,

EOIN WYNNE BE, M.I.E.I *for*
Wynne Civil Engineering Ltd.

APPENDIX A

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

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Ground Investigations Ireland

Proposed Playground Leixlip, County Kildare

Kildare County Council

Ground Investigation Report

November 2022

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DOCUMENT CONTROL SHEET

Project Title	Proposed Playground, Leixlip, County Kildare
Client	Kildare County Council
Project No	12237-09-22
Document Title	Ground Investigation Report

Rev.	Status	Author(s)	Reviewed By	Approved By	Office of Origin	Issue Date
A	Final	P. Moloney	F. McNamara	F. McNamara	Dublin	21 November 2022

Ground Investigations Ireland Ltd. present the results of the fieldworks and laboratory testing in accordance with the specification and related documents provided by or on behalf of the client The possibility of variation in the ground and/or groundwater conditions between or below exploratory locations or due to the investigation techniques employed must be taken into account when this report and the appendices inform designs or decisions where such variation may be considered relevant. Ground and/or groundwater conditions may vary due to seasonal, man-made or other activities not apparent during the fieldworks and no responsibility can be taken for such variation. The data presented and the recommendations included in this report and associated appendices are intended for the use of the client and the client's geotechnical representative only and any duty of care to others is excluded unless approved in writing.

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CONTENTS

APPENDICES

1.0 Preamble

On the instructions of Kildare County Council, a site investigation was carried out by Ground Investigations Ireland Ltd., in October 2022 at the site of the proposed playground in Leixlip, County Kildare.

2.0 Overview

2.1. Background

It is proposed to construct a new playground with associated services, access roads and car parking at the proposed site. The site is currently occupied by a carpark. The proposed construction is envisaged to consist of conventional foundations and pavement make up with some local excavations for services and plant.

2.2. Purpose and Scope

The purpose of the site investigation was to investigate subsurface conditions utilising a variety of investigative methods in accordance with the project specification. The scope of the work undertaken for this project included the following:

- Visit project site to observe existing conditions
- Carry out 2 No. Plate Tests (CBR's)
- Carry out 2 No. Soakaways to determine a soil infiltration value to BRE digest 365
- Report with recommendations

3.0 Subsurface Exploration

3.1. General

During the ground investigation a programme of intrusive investigation specified by the Consulting Engineer was undertaken to determine the sub surface conditions at the proposed site. Regular sampling and in-situ testing was undertaken in the exploratory holes to facilitate the geotechnical descriptions and to enable laboratory testing to be carried out on the soil samples recovered during excavation and drilling.
The procedures used in this site investigation are in accordance with Eurocode 7 Part 2: Ground Investigation and testing (ISEN 1997 – 2:2007) and B.S. 5930:2015.

3.2. Soakaway Testing

The soakaway testing was carried out in selected trial pits at the locations shown in the exploratory hole location plan in Appendix 1. These pits were carefully excavated and filled with water to assess the infiltration characteristics of the proposed site. The pits were allowed to drain and the drop in water level was recorded over time as required by BRE Digest 365. The pits were logged prior to completing the soakaway test and were backfilled with arising's upon completion. The soakaway test results are provided in Appendix 2 of this Report.

3.3. Insitu Plate Bearing Test

The plate bearing tests were carried out using a 450mm diameter plate at the locations shown on the site plan in Appendix 1. The plate was loaded in increments using a hydraulic jack and an excavator to provide a reaction and the displacement was monitored in accordance with BS1377 Part 9 using independently mounted digital strain gauges. The constrained modulus and equivalent CBR are calculated in accordance with HD29/75 and are provided on the test reports in Appendix 3 of this Report.

4.0 Ground Conditions

4.1. General

The ground conditions encountered during the investigation are summarised below with reference to insitu and laboratory test results. The full details of the strata encountered during the ground investigation are provided in the exploratory hole logs included in the appendices of this report.

The sequence of strata encountered were variable across the site and generally comprised;

- Made Ground
- Cohesive Deposits

MADE GROUND: Made Ground deposits were encountered beneath the and were present to depths of between 0.00m and 0.30mBGL. These deposits were described generally as *Grey fine to coarse subangular to subrounded Gravel.*

COHESIVE DEPOSITS: Cohesive deposits were encountered beneath the Made Ground and were described typically as *brown slightly sandy gravelly CLAY with occasional cobbles*. These deposits had some occasional cobble content, where noted on the exploratory hole logs.

4.2. Groundwater

Groundwater strikes are noted on the exploratory hole logs where they occurred and where possible drilling was suspended for twenty minutes to allow the subsequent rise in groundwater to be recorded. We would point out that these exploratory holes did not remain open for sufficiently long periods of time to establish the hydrogeological regime and groundwater levels would be expected to vary with the tide, time of year, rainfall, nearby construction and other factors.

5.0 Recommendations & Conclusions

5.1. General

The recommendations given and opinions expressed in this report are based on the findings as detailed in the exploratory hole records. Where an opinion is expressed on the material between exploratory hole locations, this is for guidance only and no liability can be accepted for its accuracy. No responsibility can be accepted for conditions which have not been revealed by the exploratory holes. Limited information has been provided at the ground investigation stage and any designs based on the recommendations or conclusions should be completed in accordance with the current design codes, taking into account the variation and the specific details contained within the exploratory hole logs.

5.2. External Pavements

The proposed pavements are recommended to be designed in accordance with the CBR test results included in the Appendices of this Report. The CBR test results indicate that a capping layer or a sufficient depth of crushed stone fill may be required. Plate bearing tests are recommended at the time of construction to verify the design assumptions for the proposed pavement make up and to verify adequate compaction has been achieved. The use of a geogrid and separation membrane may improve the performance of the proposed pavement and enable a more economical pavement design to be achieved, a specialist supplier is recommended to advise of the required strength, depth and type of geotextile for the proposed design.

5.3. Excavations

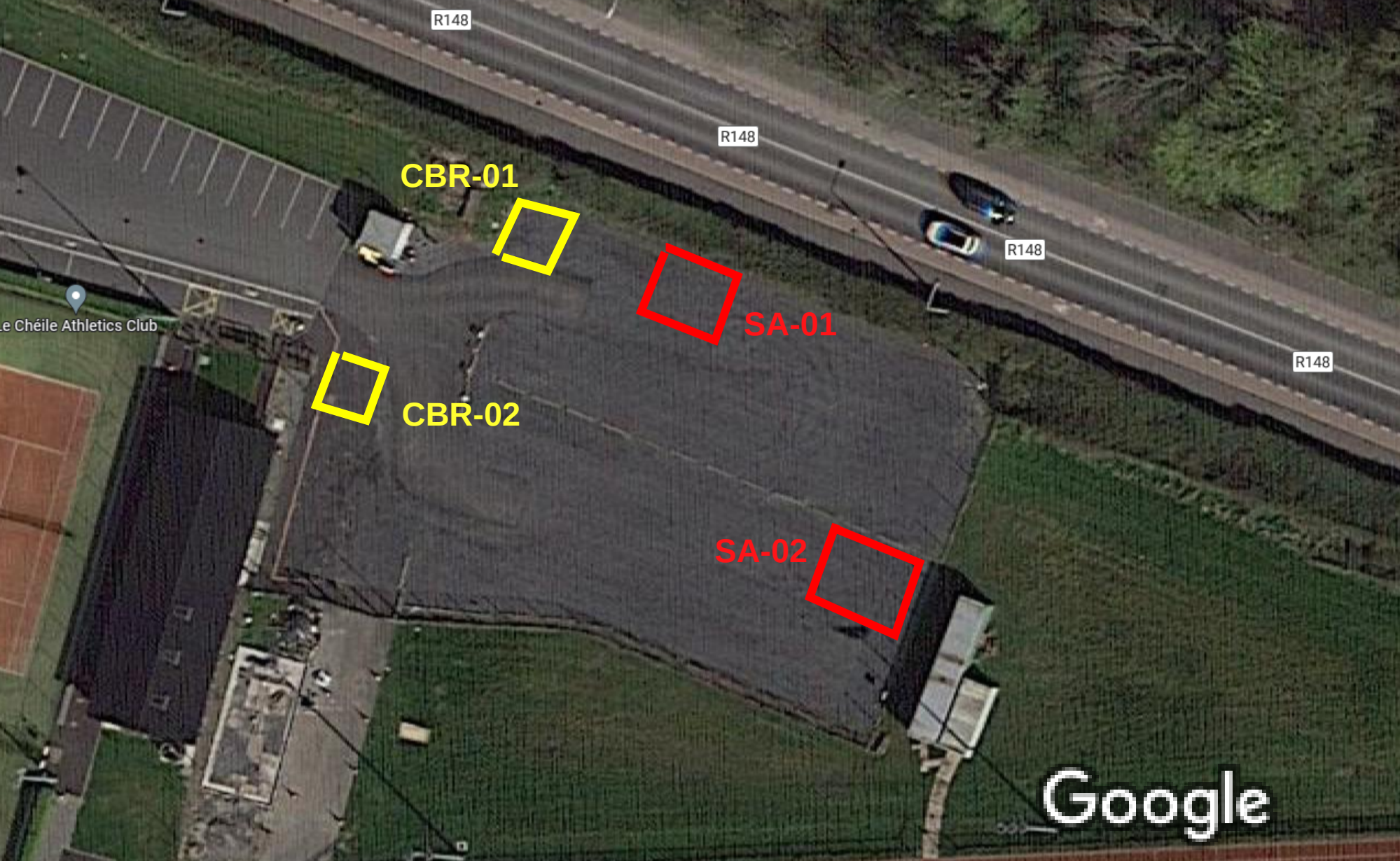
Short term temporary excavations in the cohesive deposits will remain stable for a limited time only and will require to be appropriately battered or the sides supported if the excavation is below 1.25mBGL or is required to permit man entry. Excavations in the Made Ground will require to be appropriately battered or the sides supported due to the low strength of these deposits. The groundwater and stability noted on the trial pit logs should be consulted when determining the most appropriate construction methods for excavations.

5.4. Soakaway Design

At the locations of SA-01 and SA-02 the water level dropped too slowly to allow calculation of ‘f’ the soil infiltration rate. These locations are therefore not recommended as suitable for soakaway design and construction.

The recommendations provided in this report should be verified in the design of the proposed buildings, using the full details of the loading conditions and taking into consideration the allowable tolerable settlements/movements that the building can accommodate. The founding strata should be inspected and verified by a suitably qualified engineer prior to construction of the building foundations.

APPENDIX 1 - Site Location Plan


R148
R148
R148
R148
CBR-01
SA-01
CBR-02
SA-02
Le Chéile Athletics Club
Google

APPENDIX 2 – Soakaway Test Records

Ground Investigations Ireland Ltd
www.gii.ie

Site Soakaway Tests Leixlip Playground			**Trial Pit Number** SA01
Machine : JCB **Method :** Trial Pit	**Dimensions** (1.90m x 0.50m x 2.00m) (L x W x D)	**Ground Level (mOD)**	**Client** Kildare Co. Council	**Job Number** 12237-09-22
	Location	**Dates** 28/10/2022	**Project Contractor** GII	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.30)	Grey fine to coarse subangular to subrounded Gravel FILL		
					0.30			
					(0.50)	Firm brown slightly sandy gravelly cobbly CLAY		
					0.80			
					(1.20)	Stiff brown slightly sandy slightly gravelly CLAY		
					2.00			
						Complete at 2.00m		

Plan

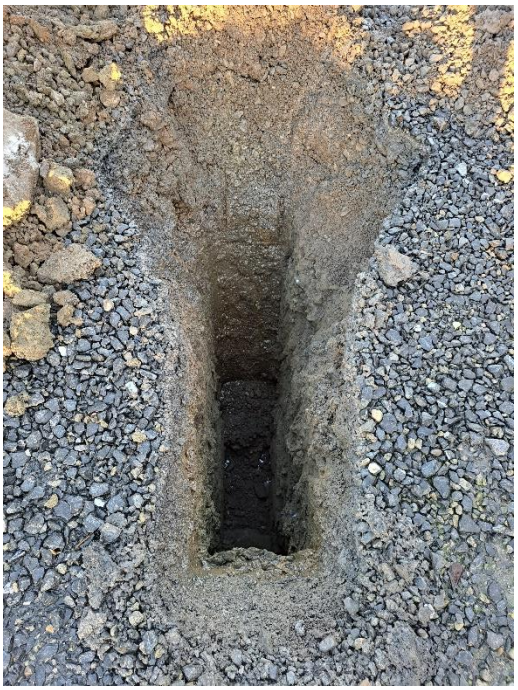
Remarks

Trial pit complete at 2.00m
Trial pit stable
Groundwater ingress once trial pit was opened
Trial pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	MK	12237-09-22.SA01

Leixlip Playground Soakaways– Trial Pit Photographs

SA01



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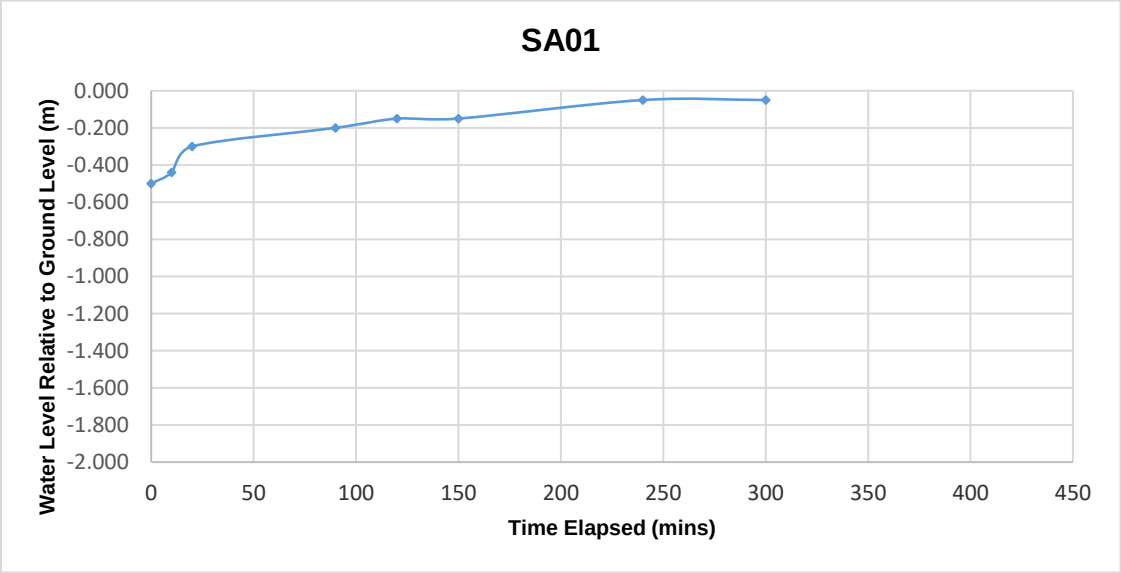
SA01

Soakaway Test to BRE Digest 365
Trial Pit Dimensions: 1.90m x 0.50m 2.0m (L x W x D)

Date	Time	Water level (m bgl)
28/10/2022	0	-0.500
28/10/2022	10	-0.440
28/10/2022	20	-0.300
28/10/2022	90	-0.200
28/10/2022	120	-0.150
28/10/2022	150	-0.150
28/10/2022	240	-0.050
28/10/2022	300	-0.050

***Soakaway failed - Pit backfilled**

Start depth	Depth of Pit	Diff	75% full	25%full
0.50	2.000	1.500	0.875	1.625



Ground Investigations Ireland Ltd
www.gii.ie

Site Soakaway Tests Leixlip Playground			**Trial Pit Number** SA02
Machine : JCB **Method :** Trial Pit	**Dimensions** (1.80m x 0.45m x 2.00m) (L x W x D)	**Ground Level (mOD)**	**Client** Kildare Co. Council	**Job Number** 12237-09-22
	Location	**Dates** 28/10/2022	**Project Contractor** GII	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.30)	Grey fine to coarse subangular to subrounded Gravel FILL		
					0.30			
					(0.40)	Firm brown slightly sandy gravelly cobbly CLAY		
					0.70			
					(1.30)	Stiff brown slightly sandy slightly gravelly CLAY		
					2.00			
						Complete at 2.00m		

Plan

Remarks

Trial pit complete at 2.00m
Trial pit stable
Groundwater ingress once trial pit was opened
Trial pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	MK	12237-09-22.SA02

Leixlip Playground Soakaways– Trial Pit Photographs

SA02

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Tel: 01 601 5175 / 5176
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Web: www.gii.ie

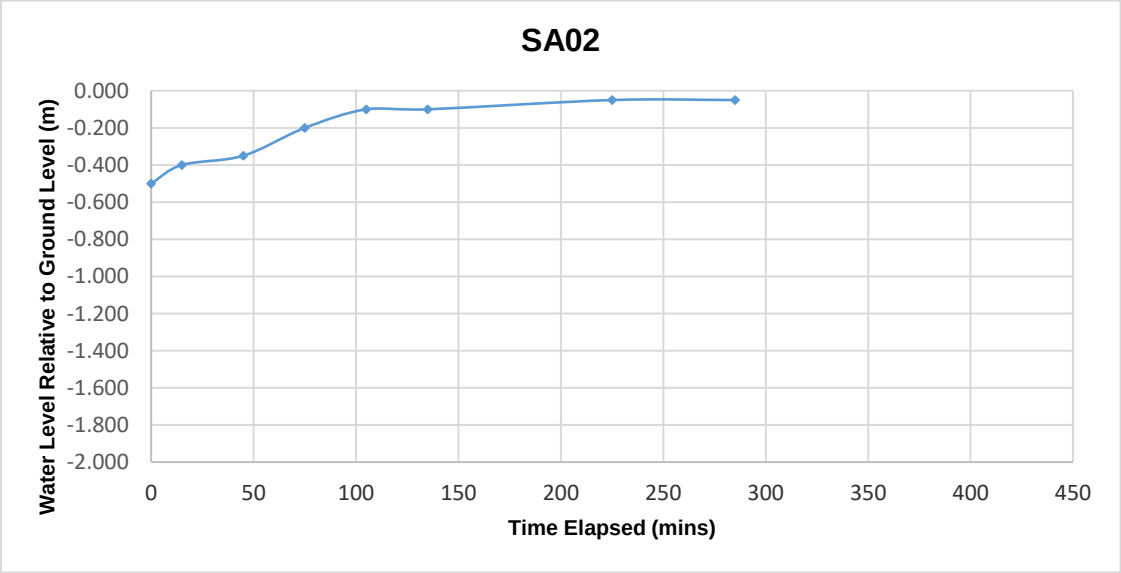
SA02

Soakaway Test to BRE Digest 365
Trial Pit Dimensions: 1.80m x 0.45m 2.0m (L x W x D)

Date	Time	Water level (m bgl)
28/10/2022	0	-0.500
28/10/2022	15	-0.400
28/10/2022	45	-0.350
28/10/2022	75	-0.200
28/10/2022	105	-0.100
28/10/2022	135	-0.100
28/10/2022	225	-0.050
28/10/2022	285	-0.050

***Soakaway failed - Pit backfilled**

Start depth	Depth of Pit	Diff	75% full	25%full
0.50	2.000	1.500	0.875	1.625

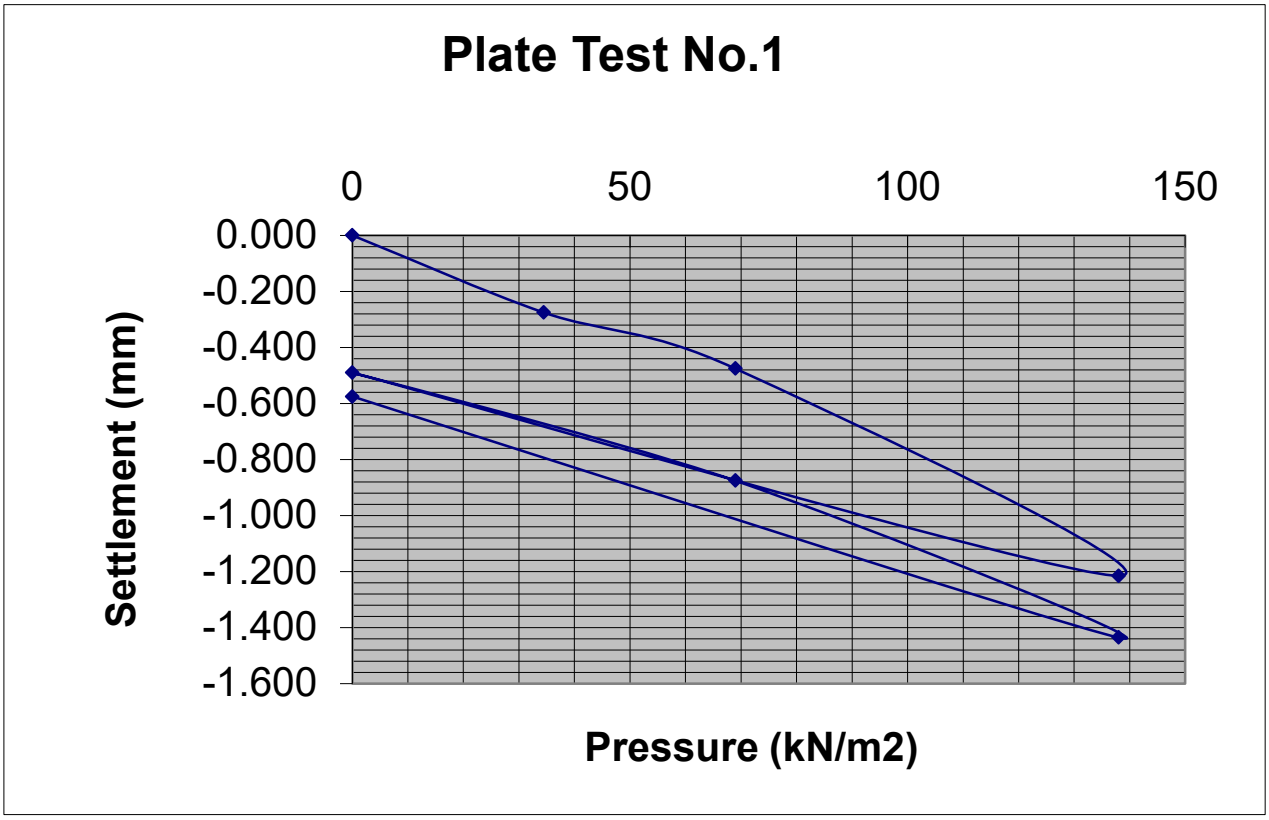


APPENDIX 3 – Plate Test Records

Applied Load	Gauge settlement
0	**0.000**
34.5	-0.275
69	-0.475
138	-1.215
0	-0.49
69	-0.875
138	-1.435
0	-0.575

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Leixlip Playground	**MATERIAL**	
CONTRACT NO.	12237-09-22		Brown slightly sandy gravelly cobbly CLAY
DATE	28/10/2022		
CLIENT	Kildare Co. Council	**DEPTH**	0.50m
PLATE DIAMETER	305mm	**NOTES**	
TEST NO.	Test 1	**SAMPLES**	



Modulus of subgrade reaction, K (Initial) = **66.02 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **81.46 MN/m2/m**

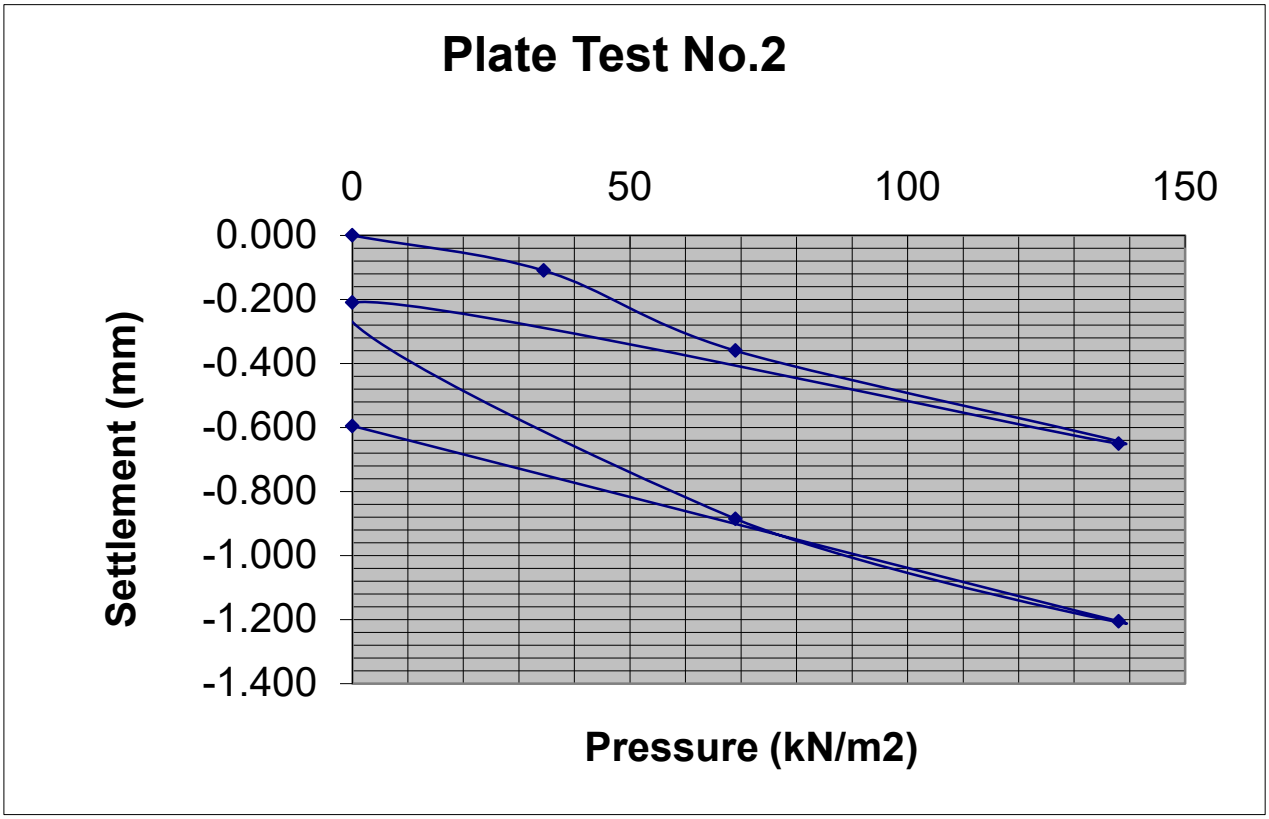
Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **13.74 %**

Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **19.77 %**

Applied Load	Gauge settlement
0	**0.000**
34.5	-0.11
69	-0.36
138	-0.65
0	-0.21
69	-0.885
138	-1.205
0	-0.595

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Leixlip Playground	**MATERIAL**	
CONTRACT NO.	12237-09-22		Brown slightly sandy gravelly cobbly CLA`
DATE	28/10/2022		
CLIENT	Kildare Co. Council	**DEPTH**	0.50m
PLATE DIAMETER	305mm	**NOTES**	
TEST NO.	Test 1	**SAMPLES**	



Modulus of subgrade reaction, K (Initial) = **87.11 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **46.46 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **22.21 %**

Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **7.47 %**

APPENDIX B

Print | Close Report

HR Wallingford
Working with water

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by: eoin wynne

Site name: Leixlip Playground

Site location: Leixlip, Co. Kildare

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: 53.37080° N

Longitude: 6.51265° W

Reference: 3263197345

Date: Mar 28 2023 08:36

Runoff estimation approach IH124

Site characteristics

Total site area (ha): .28

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):	914	914
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):	0.7	0.7
1 in 1 year (l/s):	0.59	0.59
1 in 30 years (l/s):	1.49	1.49
1 in 100 year (l/s):	1.82	1.82
1 in 200 years (l/s):	1.99	1.99

APPENDIX C

WYNNE CIVIL ENGINEERING LTD. **Greenhills, Kill, Co. Kildare**	*SURFACE WATER DRAINAGE*	DOCUMENT REF 001
CLIENT Kildare County Council	PROJECT TITLE Relocation of playground at Leixlip Amenities Centre	
SUBJECT Surface Water Storage Calculation		PLANNING REFERENCE n/a

ISSUE	AUTHOR	PAGES	DATE	COMMENTS
1	EW	1	29/03/2023	
2				
3				

30 YEAR STORM				**Q_{BAR} = 1.49 l/sec (uk Suds.com)**		
Duration	**Total Rainfall**	**Impermeable Area**	**Total Run-off During Storm**	**Discharge Allowed**	**Required Storage**	**Comments**
mins	m	m^2	m^3	1.49 l/s	m^3	
5	1.06E-02	1,746	18.51	0.60	17.91	
10	1.48E-02	1,746	25.84	1.20	24.64	
15	1.74E-02	1,746	30.38	1.80	28.58	
30	2.18E-02	1,746	38.06	3.60	34.46	
60	2.73E-02	1,746	47.67	7.20	40.47	
120	3.41E-02	1,746	59.54	14.40	45.14	
180	3.89E-02	1,746	67.92	21.60	46.32	
240	4.28E-02	1,746	74.73	28.80	45.93	Storage Required
360	4.88E-02	1,746	85.20	43.20	42.00	
540	5.56E-02	1,746	97.08	64.80	32.28	

100 YEAR STORM				**Q_{BAR} = 1.82 l/sec (uk Suds.com)**		
Duration	**Total Rainfall**	**Impermeable Area**	**Total Run-off During Storm**	**Discharge Allowed**	**Required Storage**	**Comments**
mins	m	m^2	m^3	1.82 l/s	m^3	
5	1.52E-02	1,746	26.54	0.60	25.94	
10	2.12E-02	1,746	37.02	1.20	35.82	
15	2.50E-02	1,746	43.65	1.80	41.85	
30	3.09E-02	1,746	53.95	3.60	50.35	
60	3.82E-02	1,746	66.70	7.20	59.50	
120	4.72E-02	1,746	82.41	14.40	68.01	
180	5.34E-02	1,746	93.24	21.60	71.64	
240	5.84E-02	1,746	101.97	28.80	73.17	Storage Required
360	6.61E-02	1,746	115.41	43.20	72.21	
540	7.48E-02	1,746	130.60	64.80	65.80	