FEHILY TIMONEY

CONSULTANTS IN ENGINEERING,
ENVIRONMENTAL SCIENCE
& PLANNING

APPENDIX 9.1

Site Investigation Report

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Ground Investigations Ireland

Cappogue Dublin 11 Phase 1A

Thorntons Recycling

Ground Investigation Report

June 2022

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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.

CONTENTS

APPENDICES

1.0 Preamble

On the instructions of Fehily Timoney, a site investigation was carried out by Ground Investigations Ireland Ltd. (GII) between January and May 2022, at the site of the proposed waste management facility in Cappogue, Dublin 11.

2.0 Overview

2.1. Background

It is proposed to construct a new waste management facility with associated services, access roads and car parking at the proposed site. At the time of the site investigation the site was mostly greenfield however the western portion of the site had previously been occupied by a vehicle breakers yard, based on historic google earth images. The site is situated south of Cappogue Industrial Estate in Cappogue, Dublin 11. 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 23 No. Trial Pits to a maximum depth of 3.50m BGL
- Carry out 6 No. Dynamic Probes to determine soil strength/density characteristics
- Carry out 4 No. Cable Percussion boreholes to a maximum depth of 3.90m BGL
- Carry out 4 No. Rotary Core Follow-On Boreholes to a maximum depth of 8.40m BGL
- Installation of 2 No. Groundwater monitoring wells
- Geotechnical & Environmental Laboratory testing
- Factual Report

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+A1:2020.

3.2. Trial Pits

The trial pits were excavated using a JCB 3CX excavator at the locations shown in the exploratory hole location plan in Appendix 1. The locations were checked using a CAT scan to minimise the potential for encountering services during the excavation. The trial pits were sampled, logged, and photographed by a Geotechnical Engineer/Engineering Geologist prior to backfilling with arisings. Notes were made of any services, inclusions, pit stability, groundwater encountered, and the characteristics of the strata encountered and are presented on the trial pit logs which are provided in Appendix 2 of this Report.

3.3. Dynamic Probing

The dynamic probe tests (DPH) were carried out at the locations shown in the location plan in Appendix 1 in accordance with B.S. 1377: Part 9 1990. The test consists of mechanically driving a cone with a 50kg weight in 100mm intervals and monitoring the number of blows required. An equivalent Standard Penetration Test (SPT) 'N' value may be calculated by dividing the total number of blows over a 300mm drive length by 1.5. The dynamic probe logs are provided in Appendix 3 of this Report.

3.4. Cable Percussion Boreholes

The Cable Percussion Boreholes were drilled using a Dando 2000 drilling rig with regular in-situ testing and sampling undertaken to facilitate the production of geotechnical logs and laboratory testing.

The standard method of boring in soil for site investigation is known as the Cable Percussion method. It consists of using a Shell in non-cohesive soils and a clay cutter in cohesive soils, both operated on a wire cable. Very hard soils, boulders and other hard obstructions are broken up by chiselling and the fragments removed with the Shell. Where ground conditions made it necessary, the borehole was lined with 200mm diameter steel casing. While the use of the Cable Percussion method of boring gives the maximum data on soil conditions, some mixing of laminated soil is inevitable. For this reason, thin lenses of granular material may not be noticed. Disturbed samples were taken from the boring tools at suitable depths, so that there is a representative sample at the top of each change in stratum and thereafter at regular intervals down the borehole until the next stratum was encountered. The disturbed samples were then sealed and sent to the laboratory where they were visually examined to confirm the description of the relevant strata.

Standard Penetration Tests were carried out in the boreholes. The results of these tests, together with the depths at which the tests were taken are shown on the accompanying borehole records. The test consists of a thick wall sampler tube, 50mm external diameter, being driven into the soil by a monkey weighing 63.5kg and with a free drop of 760mm. For gravels and glacial till the driving shoe was replaced by a solid 60º cone. The Standard Penetration Test number referred to as the 'N' value is the number of blows required to drive the tube 300mm, after an initial penetration of 150mm. The number gives a guide to the consistency of the soil and can also be used to estimate the relative strength/density at the depth of the test and also to estimate the bearing capacity and compressibility of the soil. The cable percussion with rotary borehole logs are provided in Appendix 4 of this Report.

3.5. Rotary Boreholes

The rotary coring was carried out by a track mounted T47S Beretta rig at the locations shown on the location plan in Appendix 1. The rotary boreholes were completed from ground level as the cable percussion needed to be backfilled due to horses being present on the site.

The T47 Beretta is equipped with rubber tracks which allow for short travel on pavement surfaces avoiding any damage to the surface. The T47 Beretta utilises a triple tube core barrel system operated using a wireline drilling process. The outer barrel is rotated by the drill rods and at its lower end, carries the coring bit. The inner barrel is mounted on a swivel so that it does not rotate during the process. The third barrel or liner is placed within the second one to retain the core intact and to preserve as much as possible the fabric of the drilling stratum. The core is cut by the coring bit and passes to the inner liner. The core is brought up to the surface within the inner barrel on a small diameter wire rope or line attached to the “overshoot” recovery tool which is then placed into a core box in order of recovery. A drilling fluid, typically air mist or water flush is passed from the surface through hollow drill rods to the drill bit and is used to cool the drill bit. Temporary casing is used in some situations to support unstable ground or to seal off fissures or voids. It should be noted that the rotary coring can only achieve limited recovery in overburden, particularly granular or weakly cemented strata due to the flushing medium washing away the cohesive fraction during coring. The recovery achieved, where required is noted on the borehole logs and core photographs are provided to allow assessment of the core recovered. The cable percussion with rotary borehole logs are provided in Appendix 4 of this Report.

3.6. Groundwater Monitoring Installations

Groundwater Monitoring Installations were installed upon the completion of the boreholes to enable sampling and the determination of the equilibrium groundwater level. The typical groundwater monitoring installation consists of a 50mm uPVC/HDPE slotted pipe with a pea gravel response zone and bentonite seal installed to the Engineers specification. Where required the standpipe is sealed with a gas tap and finished with a durable steel cover fixed in place with a concrete surround. The installation details are provided on the exploratory hole logs in the appendices of this Report.

3.7. Laboratory Testing

Samples were selected from the exploratory holes for a range of geotechnical and environmental testing to assist in the classification of soils and to provide information for the proposed design.

Environmental & Chemical testing as required by the specification, including the Engineers Ireland Suite E, Diesel Range Organics (DRO) and sulphate testing was carried out by Element Materials Technology Laboratory in the United Kingdom (UK). A groundwater test suite specified by the engineer was also completed at the same laboratory.

Geotechnical testing consisting of moisture content, Atterberg limits, Particle Size Distribution (PSD), California Bearing Ratio (CBR), Moisture Condition Value (MCV) and 2.5kg Compaction tests were carried out by Professional Soils Laboratory (PSL) in the UK.
Rock strength testing including Point Load (Is_{50}) and Unconfined Compressive Strength (UCS) testing was carried out by PSL in the UK.
The results of the laboratory testing are included in Appendix 5 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/consistent across the site and generally comprised;

- Topsoil/Surfacing
- Made Ground
- Cohesive Deposits
- Granular Deposits
- Bedrock

TOPSOIL: Topsoil was encountered at most exploratory holes and was present to a maximum depth of 0.30m BGL.

SURFACING: Concrete surfacing was encountered in the existing waste management facility at BH01 and TP23 and was present typically to a depth of 0.35m BGL.

MADE GROUND: Made Ground deposits were encountered from surface or beneath the Topsoil/Surfacing and were present to a relatively consistent depth of 0.40m to 1.30m BGL. These deposits were described generally as *brown/dark brown slightly sandy slightly gravelly Clay with occasional cobbles and boulders* or a *grey/greyish brown sandy subangular to subrounded fine to coarse Gravel with occasional cobbles and boulders*. These deposits contained *rare fragments of concrete, red brick, metal, and plastic.* At TP23, a possible made ground deposit was noted to a depth of 1.50m BGL. It has been referred to as possible made ground due to its low strength, however, no anthropogenic material was observed within these deposits.

COHESIVE DEPOSITS: Cohesive deposits were encountered beneath the Made Ground and were described typically as *brown slightly sandy slightly gravelly CLAY with occasional cobbles and boulders* overlying a *dark grey slightly sandy slightly gravelly CLAY with occasional cobbles and boulders*. The secondary sand and gravel constituents varied across the site and with depth, with granular lenses occasionally present in the glacial till matrix. The strength of the cohesive deposits typically increased with depth and was firm to stiff or stiff below 1.20m BGL at each of the borehole locations. These deposits had occasional (<5%), some (5%-20%) or many (20%-50%) cobble and boulder content, where noted on the exploratory hole logs.

GRANULAR DEPOSITS: The granular deposits were encountered below the cohesive deposits at some locations and were typically described as g*rey and brown slightly clayey sandy subangular to subrounded fine to coarse GRAVEL with occasional cobbles.* The secondary sand and fines constituents varied across the site and with depth, while occasional (<5%), some (5%-20%) or many (20%-50%) cobble and boulder content was also present, where noted on the exploratory hole logs.
It should be noted that many of the trial pits where granular deposits or groundwater were encountered, experienced instability. This was noted in the remarks section at the base of the trial pit logs.

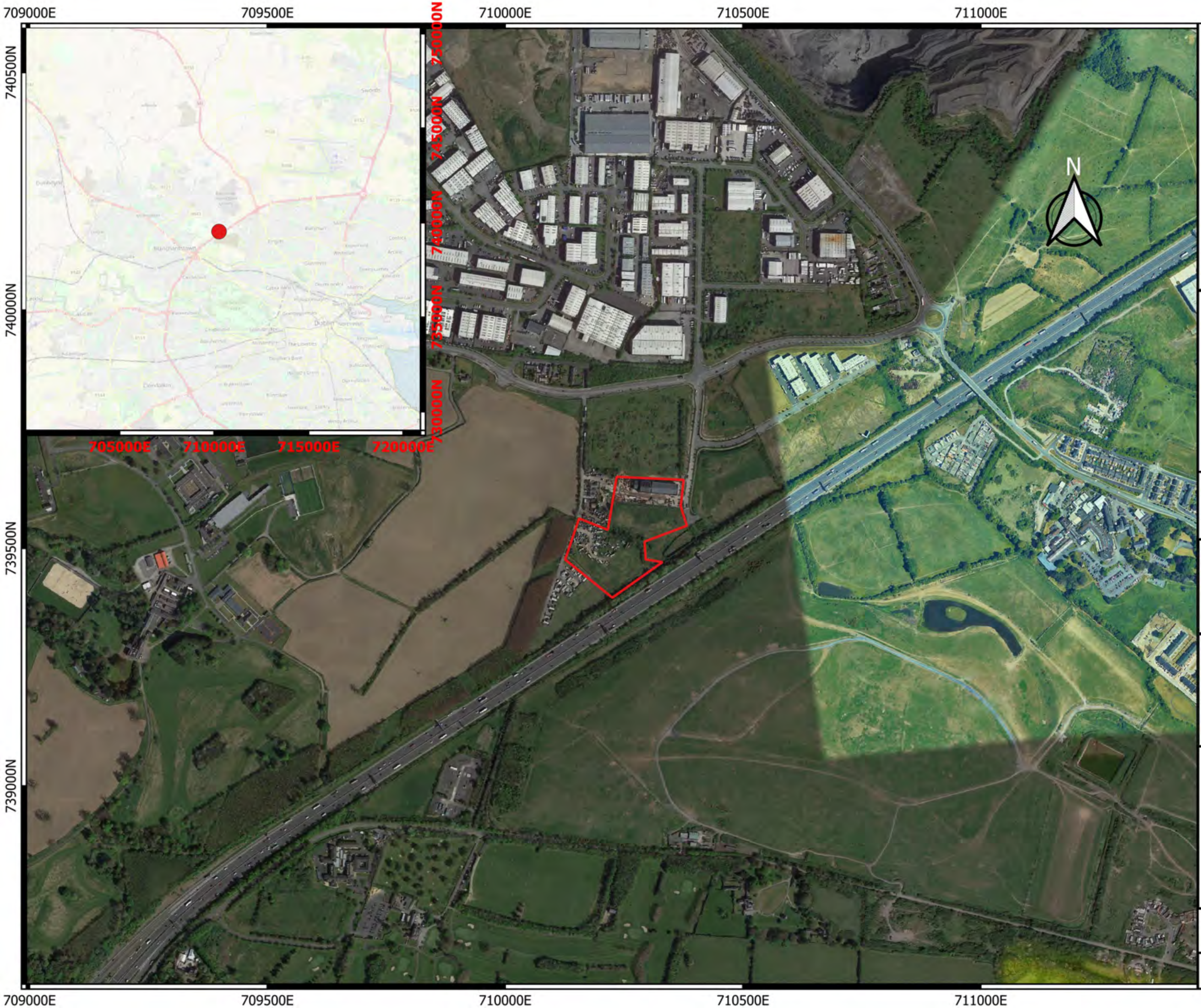
BEDROCK: The rotary core boreholes recovered *medium strong thinly bedded dark grey fine grained argillaceous fossiliferous LIMESTONE.* The degree of weathering ranged from unweathered to partially weathered. This is typical of the Tober Colleen Formation, which is noted on the Geological Survey of Ireland's mapping of the proposed site. Rare calcite veins were also noted during logging.

The depth to rock varies from 3.30m BGL in BH08 to a maximum of 4.15m BGL in BH01. The total core recovery is good, typically 100%. The SCR is relatively good throughout the drill runs, typically recorded as over 80% in the upper zones, and improves to near 100% at most locations. The RQD is relatively poor in the upper weathered zone, however it shows an improvement with depth in each of the boreholes.

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. For this reason, standpipes were installed in BH08 and BH09 to allow the equilibrium groundwater level to be determined. The groundwater monitoring is included in Appendix 6 of this Report.

APPENDIX 1 - Figures



● Site Location

▭ Indicative Site Boundary

Engineer:

FEHILY TIMONEY

Project Code:

11334-12-21

Project Title:

Cappogue Dublin 11

Drawing Title:

Figure 1 Site Location

GROUND INVESTIGATIONS IRELAND
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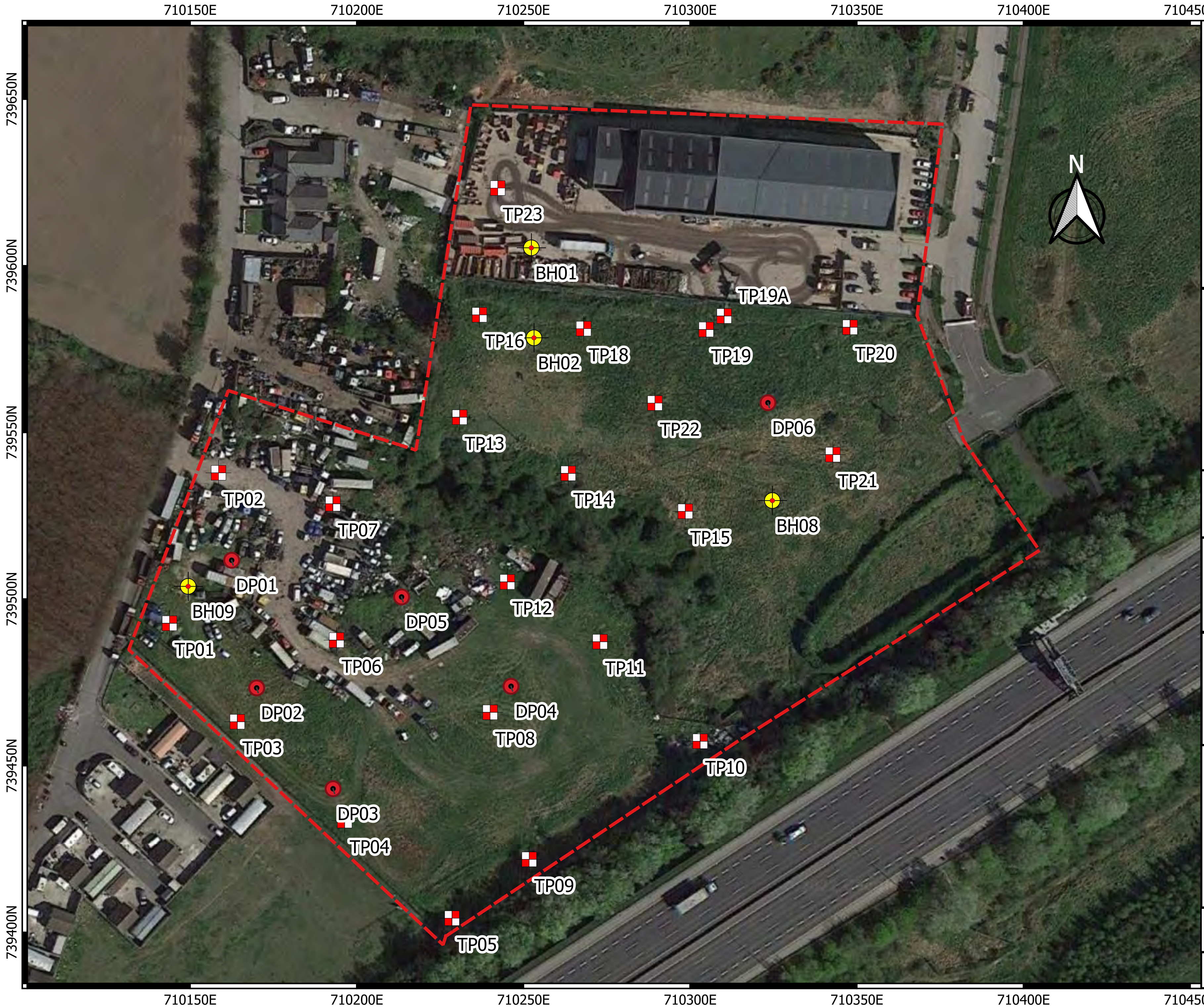
www.gii.ie 01-6015175/5176

0 80 160 240 320 400 m

Drawn By: AB	Date: 17/05/2022



Engineer

FEHILY
TIMONEY

Project Code:
11334-12-21

Project Title:
Cappogue Dublin 11

Drawing Title:
Figure 2 SI Points

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

Ground Investigations Ireland Ltd.
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Newcastle, Co. Dublin
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0 10 20 30 40 50 m

Drawn By:
FOD

Date:
08/06/2022

APPENDIX 2 – Trial Pit Records

Ground Investigations Ireland Ltd
www.gii.ie

Machine : JCB 3CX **Method :** Trial Pit	**Dimensions** 3.00m x 0.60m x 3.30m L x W x D	**Ground Level (mOD)** 73.52	**Client** Thorntons Recycling	**Job Number** 11334-12-21
	Location (dGPS) 710143.8 E 739492.4 N	**Dates** 12/01/2022	**Engineer** Fehily Timoney	**Sheet** 1/1

Site
Cappogue Dublin 11 Phase 1A

Trial Pit Number
TP01

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.15)	TOPSOIL		
				73.37	0.15 (0.35)	MADE GROUND: Dark brown slightly sandy slightly gravelly Clay with rare fragments of ceramics		
0.50 0.50	B ES			73.02	0.50 (0.70)	MADE GROUND: Dark brown slightly sandy slightly gravelly Clay with occasional subangular to subrounded cobbles and boulders and rare fragments of timber, fabric, plastic, glass and metal		
2.00	B			72.32	1.20 (1.50)	Firm brown mottled grey slightly sandy slightly gravelly CLAY with granular lenses. Gravel is subangular to subrounded fine to coarse		
3.00	B		Seepage(1) at 2.70m.	70.82	2.70 (0.60)	Brownish grey clayey silty sandy subangular to subrounded fine to coarse GRAVEL Obstruction: Possible bedrock or boulder		∇1
				70.22	3.30	Complete at 3.30m		

Plan

Remarks

Groundwater encountered at 2.70m BGL
Trial pit stability poor
Trial pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	MB	11334-12-21.TP01

Ground Investigations Ireland Ltd www.gii.ie			**Site** Cappogue Dublin 11 Phase 1A	**Trial Pit Number** **TP02**
Machine : JCB 3CX **Method :** Trial Pit	**Dimensions** 3.00m x 0.60m x 3.40m L x W x D	**Ground Level (mOD)** 73.24	**Client** Thorntons Recycling	**Job Number** 11334-12-21
	Location (dGPS) 710158.5 E 739537.5 N	**Dates** 12/01/2022	**Engineer** Fehily Timoney	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				73.04	(0.20) 0.20	MADE GROUND:Dark grey sandy subangular to subrounded fine to coarse Gravel	▨	
				72.74	(0.30) 0.50	MADE GROUND: Greyish brown clayey sandy subangular to subrounded fine to coarse Gravel with some subangular to subrounded cobbles with rare fragments of plastic	▨	
				72.34	(0.40) 0.90	MADE GROUND: Brown slightly sandy slightly gravelly Clay with occasional subrounded cobbles and boulders and rare fragments of red brick	▨	
1.00 1.50	ES B		Medium ingress(1) at 2.20m.	70.84	(1.50) 2.40	Firm brown slightly sandy slightly gravelly CLAY with occasional subrounded cobbles and granular lenses. Gravel is subangular to subrounded fine to coarse	▨	∇1
2.50	B			69.84	(1.00) 3.40	Firm brown slightly sandy gravelly CLAY with occasional subangular to subrounded cobbles and granular lenses. Gravel is subangular to subrounded fine to coarse Obstruction: Possible bedrock or boulder	▨	
						Complete at 3.40m		

Plan

Remarks

Groundwater encountered at 2.20m BGL
Trial pit stability poor
Trial pit backfilled upon completion

Scale (approx)	**Logged By**	**Figure No.**
1:25	MB	11334-12-21.TP02

Site Cappogue Dublin 11 Phase 1A				**Trial Pit Number** **TP03**
Machine : JCB 3CX **Method :** Trial Pit	**Dimensions** 3.00m x 0.60m x 3.50m L x W x D	**Ground Level (mOD)** 73.01	**Client** Thorntons Recycling	**Job Number** 11334-12-21
	Location (dGPS) 710164.1 E 739462.8 N	**Dates** 18/01/2022	**Engineer** Fehily Timoney	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.30)	TOPSOIL		
				72.71	0.30	MADE GROUND: Brown slightly sandy slightly gravelly Clay with occasional cobbles and rare fragments of metal and plastic		
0.50	ES				(0.60)			
				72.11	0.90	Firm brown mottled grey slightly sandy slightly gravelly CLAY with occasional subrounded cobbles and granular lenses. Gravel is subangular to subrounded fine to coarse		
					(0.60)			
				71.51	1.50	Firm brown mottled grey slightly sandy gravelly CLAY with occasional subrounded cobbles and granular lenses. Gravel is subangular to subrounded fine to coarse		
					(1.50)			
3.00	B			70.01	3.00	Firm to stiff dark grey slightly sandy slightly gravelly CLAY with occasional subangular cobbles. Gravel is subangular to subrounded fine to coarse		
					(0.40)			
			Medium ingress(1) at 3.20m.					∇1
				69.61	3.40	Grey angular to subangular fine to coarse GRAVEL		
					(0.10)			
				69.51	3.50	Obstruction: Possible bedrock or boulder		
						Complete at 3.50m		

Plan

Remarks

Groundwater encountered at 3.20m BGL
Trial pit stability moderate
Trial pit backfilled upon completion

Scale (approx)	**Logged By**	**Figure No.**
1:25	SG	11334-12-21.TP03

Ground Investigations Ireland Ltd www.gii.ie	**Site** Cappogue Dublin 11 Phase 1A		**Trial Pit Number** **TP04**
Machine : JCB 3CX **Method :** Trial Pit	**Dimensions** 3.00m x 0.60m x 1.90m L x W x D	**Ground Level (mOD)** 71.64	**Client** Thorntons Recycling
	Location (dGPS) 710196.3 E 739433.1 N	**Dates** 18/01/2022	**Engineer** Fehily Timoney

Job Number	**Sheet**
11334-12-21	1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.30)	TOPSOIL	▨	
				71.34	0.30 (0.20)	Soft to firm brown slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse	▨	
				71.14	0.50 (0.60)	Firm brown and grey slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse	▨	
1.00 1.00	B ES			70.54	1.10 (0.50)	Firm to stiff dark grey slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse	▨	▽1
			Medium ingress(1) at 1.50m.	70.04	1.60 (0.30)	Dark grey slightly clayey slightly sandy subangular fine to coarse GRAVEL with occasional subangular cobbles Obstruction: Possible bedrock or boulder	▨	
1.90	B			69.74	1.90	Complete at 1.90m		

Plan

Remarks

Groundwater encountered at 1.50m BGL
Trial pit stability good
Trial pit backfilled upon completion

Scale (approx)	**Logged By**	**Figure No.**
1:25	SG	11334-12-21.TP04

Ground Investigations Ireland Ltd
www.gii.ie

Machine : JCB 3CX **Method :** Trial Pit	**Dimensions** 3.00m x 0.60m x 2.20m L x W x D	**Ground Level (mOD)** 71.24	**Site** Cappogue Dublin 11 Phase 1A **Client** Thorntons Recycling	**Trial Pit Number** **TP05** **Job Number** 11334-12-21
	Location (dGPS) 710228.6 E 739403.8 N	**Dates** 18/01/2022	**Engineer** Fehily Timoney	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.15)	TOPSOIL		
				71.09	0.15	Firm brown slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse		
					(0.45)			
0.50 0.50	B ES							
				70.64	0.60	Firm dark grey slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse		
					(0.60)			
				70.04	1.20	Firm to stiff dark grey slightly sandy slightly gravelly CLAY with some subangular to subrounded cobbles. Gravel is subangular to subrounded fine to coarse		
1.50	B							
					(1.00)			∇1
			Slow ingress(1) at 1.80m.					
						Obstruction: Possible bedrock or boulder		
				69.04	2.20	Complete at 2.20m		

Plan

Remarks

Groundwater encountered at 1.80m BGL
Trial pit stability moderate
Trial pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	SG	11334-12-21.TP05

Ground Investigations Ireland Ltd
www.gii.ie

Machine : JCB 3CX **Method :** Trial Pit	**Dimensions** 3.00m x 0.60m x 3.20m L x W x D	**Ground Level (mOD)** 72.72	**Client** Thorntons Recycling	**Job Number** 11334-12-21
	Location (dGPS) 710193.9 E 739487.3 N	**Dates** 18/01/2022	**Engineer** Fehily Timoney	**Sheet** 1/1

Site	Cappogue Dublin 11 Phase 1A
Trial Pit Number	**TP06**

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.80)	MADE GROUND: Dark brown slightly sandy slightly gravelly Clay with occasional cobbles and occasional fragments of metal, plastic, wires, cardboard and red brick	▨	
0.50	ES							
				71.92	0.80	Soft to firm light brown slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse	▒	
1.00	B				(0.50)			
				71.42	1.30	Firm greyish brown slightly sandy slightly gravelly CLAY with occasional subrounded cobbles. Gravel is subangular to subrounded fine to coarse	▒	
					(1.30)			
				70.12	2.60	Firm dark grey slightly sandy slightly gravelly CLAY with occasional subangular cobbles. Gravel is subangular to subrounded fine to coarse	▒	
					(0.60)			
3.00	B					Obstruction: Possible bedrock or boulder		
			Seepage(1) at 3.20m.	69.52	3.20	Complete at 3.20m		∇1

Plan

Remarks

Groundwater encountered at 3.20m BGL
Trial pit stability poor
Trial pit backfilled upon completion

Scale (approx)	**Logged By**	**Figure No.**
1:25	SG	11334-12-21.TP06

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Site: Cappogue Dublin 11 Phase 1A

Trial Pit Number: TP07

Machine : JCB 3CX

Method : Trial Pit

Dimensions: 3.00m x 0.60m x 2.90m
L x W x D

Ground Level (mOD): 73.11

Client: Thorntons Recycling

Job Number: 11334-12-21

Location (dGPS): 710192.8 E 739528.2 N

Dates: 12/01/2022

Engineer: Fehily Timoney

Sheet: 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.35)	MADE GROUND: Greyish brown slightly sandy slightly gravelly Clay with occasional fragments of timber, plastic and large fragments of concrete	▨	
				72.76	0.35	MADE GROUND : Brown slightly sandy slightly gravelly Clay with occasional cobbles and occasional fragments of timber, metal, plastic, fabric, bricks (hydrocarbon odour)	▨	
					(0.95)			
1.00	ES							
				71.81	1.30	Firm brown mottled grey slightly sandy slightly gravelly CLAY . Gravel is subangular to subrounded fine to coarse	⁘	
2.00	B				(1.50)			
			Slow ingress(1) at 2.80m.	70.31	2.80	Brown sandy subangular fine to coarse GRAVEL	⁘	∇1
					(0.10)	Obstuction: Possible bedrock or boulder		
				70.21	2.90	Complete at 2.90m		

Plan

Remarks

Groundwater encountered at 2.80m BGL.
Trial pit moderately stable
Trial pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	MB	11334-12-21.TP07

Ground Investigations Ireland Ltd
www.gii.ie

Site Cappogue Dublin 11 Phase 1A

Trial Pit Number TP08

Machine : JCB 3CX
Method : Trial Pit

Dimensions 3.00m x 0.60m x 3.30m
L x W x D

Ground Level (mOD) 72.18

Client Thorntons Recycling

Job Number 11334-12-21

Location (dGPS) 710240 E 739465.6 N

Dates 18/01/2022

Engineer Fehily Timoney

Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.15)	TOPSOIL	▨	
				72.03	0.15	MADE GROUND: Dark brown slightly sandy slightly gravelly Clay with occasional cobbles and rare fragments of metal, ceramic, plastic and brick	▨	
					(0.55)			
0.50	ES							
				71.48	0.70	Firm brown slightly sandy slightly gravelly CLAY with occasional subrounded cobbles and granular lenses. Gravel is subangular to subrounded fine to coarse	▨	
1.50	B				(1.70)			
			Seepage(1) at 2.30m.					∇1
				69.78	2.40	Firm to stiff black slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles. Gravel is subangular to subrounded fine to coarse	▨	
					(0.80)			
3.00	B					Obstruction: Possible bedrock or boulder		
			Medium ingress(2) at 3.20m.	68.98	3.20	Complete at 3.30m		∇2

Plan

Remarks

Groundwater encountered at 2.30m and 3.20m BGL
Trial pit stability moderate to poor
Trial pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	SG	11334-12-21.TP08

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Site	Cappogue Dublin 11 Phase 1A			**Trial Pit Number** TP09
Machine : JCB 3CX **Method :** Trial Pit	**Dimensions** 3.00m x 0.60m x 2.30m L x W x D	**Ground Level (mOD)** 71.24	**Client** Thorntons Recycling	**Job Number** 11334-12-21
	Location (dGPS) 710251.7 E 739421.5 N	**Dates** 12/01/2022	**Engineer** Fehily Timoney	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20)	TOPSOIL		
				71.04	0.20	Firm brown slightly sandy slightly gravelly CLAY with occasional subrounded cobbles. Gravel is subangular to subrounded fine to coarse		
0.50 0.50	B ES							
					(1.20)			
			Medium ingress(1) at 1.40m.	69.84	1.40	Firm to stiff dark grey slightly sandy gravelly CLAY with occasional cobbles and granular lenses. Gravel is subangular to subrounded fine to coarse		▽1
					(0.30)			
				69.54	1.70	Dark grey clayey sandy subangular to subrounded fine to coarse GRAVEL with occasional subangular cobbles		
2.00	B							
					(0.60)			
				68.94	2.30	Complete at 2.30m		

Plan

Remarks

Groundwater encountered at 1.40m BGL
Trial pit stability poor
Trial pit backfilled upon completion

Scale (approx)	**Logged By**	**Figure No.**
1:25	MB	11334-12-21.TP09

Ground Investigations Ireland Ltd www.gii.ie		**Site** Cappogue Dublin 11 Phase 1A	**Trial Pit Number** **TP10**
Machine : JCB 3CX **Method :** Trial Pit	**Dimensions** 3.00m x 0.60m x 2.30m L x W x D	**Ground Level (mOD)** 71.14	**Client** Thorntons Recycling	**Job Number** 11334-12-21
	Location (dGPS) 710303 E 739456.9 N	**Dates** 12/01/2022	**Engineer** Fehily Timoney	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.40)	MADE GROUND: Brown slightly sandy slightly gravelly Clay with occasional cobbles and rare fragments of metal and plastic	▨	
				70.74	0.40 (0.60)	Firm brown slightly sandy slightly gravelly CLAY with occasional subrounded cobbles. Gravel is subangular to subrounded fine to coarse		
1.00	B			70.14	1.00 (0.80)	Stiff brown slightly sandy slightly gravelly CLAY with occasional subrounded cobbles. Gravel is subangular to subrounded fine to coarse		
			Slow ingress(1) at 1.80m.	69.34	1.80 (0.40)	Stiff dark grey slightly sandy gravelly CLAY with occasional subrounded cobbles. Gravel is subangular to subrounded fine to coarse		∇1
2.00 2.00	B ES							
				68.94	2.20 (0.10)	Grey clayey silty sandy subangular fine to coarse GRAVEL with occasional subangular cobbles		
				68.84	2.30	Obstuction: Possible bedrock or boulder Complete at 2.30m		

Plan

Remarks

Groundwater encountered at 1.80m BGL.
Trial pit stability good
Trial pit backfilled upon completion

Scale (approx)	**Logged By**	**Figure No.**
1:25	MB	11334-12-21.TP10

Ground Investigations Ireland Ltd www.gii.ie			**Site** Cappogue Dublin 11 Phase 1A	**Trial Pit Number** **TP11**
Machine : JCB 3CX **Method :** Trial Pit	**Dimensions** 3.00m x 0.60m x 2.50m L x W x D	**Ground Level (mOD)** 71.59	**Client** Thorntons Recycling	**Job Number** 11334-12-21
	Location (dGPS) 710272.9 E 739486.8 N	**Dates** 12/01/2022	**Engineer** Fehily Timoney	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.30)	TOPSOIL		
				71.29	0.30 (0.30)	Soft brown slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse		
1.00 1.00	B ES			70.99	0.60 (1.10)	Firm brown slightly sandy slightly gravelly CLAY with occasional subrounded cobbles. Gravel is subangular to subrounded fine to coarse		
2.00	B		Fast ingress(1) at 1.70m.	69.89	1.70 (0.80)	Grey clayey sandy subangluar to subrounded fine to coarse GRAVEL Beds of grey slightly sandy slighly gravelly CLAY Obstruction: Possible bedrock or boulder		∇1
				69.09	2.50	Complete at 2.50m		

Plan

Remarks

Groundwater encountered at 1.70m BGL.
Trial pit stability poor
Trial pit backfilled upon completion

Scale (approx)	**Logged By**	**Figure No.**
1:25	MB	11334-12-21.TP11

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Site	Cappogue Dublin 11 Phase 1A			**Trial Pit Number** **TP12**
Machine : JCB 3CX **Method :** Trial Pit	**Dimensions** 3.00m x 0.60m x 3.30m L x W x D	**Ground Level (mOD)** 72.19	**Client** Thorntons Recycling	**Job Number** 11334-12-21
	Location (dGPS) 710245.1 E 739504.8 N	**Dates** 12/01/2022	**Engineer** Fehily Timoney	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.30)	TOPSOIL	▨	
				71.89	0.30 (0.40)	MADE GROUND: Dark brown slightly sandy slightly gravelly Clay	▨	
0.80	ES			71.49	0.70 (0.40)	MADE GROUND: Brown slightly sandy slightly gravelly Clay with occasional subrounded cobbles and granular lenses	▨	
1.50	B			71.09	1.10 (1.30)	Firm to stiff brown slightly sandy slightly gravelly CLAY with occasional subrounded cobbles. Gravel is subangular to subrounded fine to coarse	░	
2.50	B		Medium ingress(1) at 2.40m.	69.79	2.40 (0.60)	Firm to stiff dark grey slightly sandy gravelly CLAY with occasional subangular to subrounded cobbles. Gravel is subangular to subrounded fine to coarse	░	▽1
				69.19	3.00 (0.30)	Grey very clayey very sandy subangular to subrounded fine to coarse GRAVEL Obstruction: Possible bedrock or boulder	░	
				68.89	3.30	Complete at 3.30m		

Plan

Remarks

Groundwater encountered at 2.40m BGL.
Trial pit stability poor
Trial pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	MB	11334-12-21.TP12

Ground Investigations Ireland Ltd www.gii.ie			**Site** Cappogue Dublin 11 Phase 1A	**Trial Pit Number** **TP13**
Machine : JCB 3CX **Method :** Trial Pit	**Dimensions** 3.00m x 0.60m x 2.30m L x W x D	**Ground Level (mOD)** 72.21	**Client** Thorntons Recycling	**Job Number** 11334-12-21
	Location (dGPS) 710230.8 E 739554.2 N	**Dates** 11/01/2022	**Engineer** Fehily Timoney	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20)	TOPSOIL		
				72.01	0.20	Firm light brown mottled grey slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse		
					(0.40)			
0.50 0.50	B ES							
				71.61	0.60	Firm grey slightly sandy slightly gravelly CLAY with occasional subrounded cobbles. Gravel is subangular to subrounded fine to coarse		
					(0.60)			
				71.01	1.20	Firm grey slightly sandy gravelly CLAY with some subangular to subrounded cobbles. Gravel is subangular to subrounded fine to coarse		
					(0.50)			
				70.51	1.70	Grey clayey very sandy subangular to subrounded fine to coarse GRAVEL with some subangular to subrounded cobbles		∇1
			Seepage(1) at 1.80m.					
					(0.60)			
2.00	B							
						Obstruction: Possible bedrock or boulder		
				69.91	2.30	Complete at 2.30m		

Plan

Remarks

Groundwater encountered at 1.80m BGL
Trial pit stability poor
Trial pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	MB	11334-12-21.TP13

Ground Investigations Ireland Ltd
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Site	Cappogue Dublin 11 Phase 1A			**Trial Pit Number** TP14
Machine : JCB 3CX **Method :** Trial Pit	**Dimensions** 3.00m x 0.60m x 2.30m L x W x D	**Ground Level (mOD)** 71.90	**Client** Thorntons Recycling	**Job Number** 11334-12-21
	Location (dGPS) 710263.4 E 739537.3 N	**Dates** 11/01/2022	**Engineer** Fehily Timoney	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20)	TOPSOIL		
				71.70	0.20 (0.20)	MADE GROUND: Brown slightly sandy slightly gravelly Clay with rare fragments of plastic and pipe		
				71.50	0.40 (0.90)	Firm greyish brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles. Gravel is subangular to subrounded fine to coarse		
1.00	B							
				70.60	1.30 (0.90)	Firm grey slightly sandy gravelly CLAY with occasional subrounded to subangular cobbles. Gravel is subangular to subrounded fine to coarse		
			Slow ingress(1) at 1.70m.					∇1
2.00 2.00	B ES							
				69.70	2.20 (0.10)	Grey clayey sandy subangular to subrounded fine to coarse GRAVEL		
				69.60	2.30	Obstruction: possible bedrock or boulder Complete at 2.30m		

Plan

Remarks

Groundwater encountered at 1.70m BGL
Trial pit stability poor
Trial pit backfilled upon completion

Scale (approx)	**Logged By**	**Figure No.**
1:25	MB	11334-12-21.TP14

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Site Cappogue Dublin 11 Phase 1A				**Trial Pit Number** TP15
Machine : JCB 3CX **Method :** Trial Pit	**Dimensions** 3.00m x 0.60m x 2.80m L x W x D	**Ground Level (mOD)** 72.12	**Client** Thorntons Recycling	**Job Number** 11334-12-21
	Location (dGPS) 710298.5 E 739525.9 N	**Dates** 11/01/2022	**Engineer** Fehily Timoney	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20)	TOPSOIL		
				71.92	0.20	Soft to firm brown slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse		
					(0.60)			
				71.32	0.80	Firm brownish grey slightly sandy slightly gravelly CLAY with occasional subrounded cobble. Gravel is subangular to subrounded fine to coarse		
1.50	B				(1.60)			
			Seepage(1) at 2.40m.	69.72	2.40	Firm to stiff black slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles. Gravel is subangular to subrounded fine to coarse		∇1
2.50 2.50	B ES				(0.40)			
				69.32	2.80	Complete at 2.80m		

Plan

Remarks

Groundwater encountered: Seepage at 2.40m BGL
Trial pit stability good
Trial pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	MB	11334-12-21.TP15

Ground Investigations Ireland Ltd www.gii.ie			**Site** Cappogue Dublin 11 Phase 1A	**Trial Pit Number** **TP16**
Machine : JCB 3CX **Method :** Trial Pit	**Dimensions** 3.00m x 0.60m x 2.60m L x W x D	**Ground Level (mOD)** 72.82	**Client** Thorntons Recycling	**Job Number** 11334-12-21
	Location (dGPS) 710236.8 E 739584.9 N	**Dates** 11/01/2022	**Engineer** Fehily Timoney	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.90)	MADE GROUND: Brown slightly sandy slightly gravelly Clay with occasional fragments of ceramic, red brick, concrete, plastic and metal		
				71.92	0.90 (0.90)	Firm grey mottled brown slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse		
1.50	B							
			Medium ingress(1) at 2.00m.	71.02	1.80 (0.80)	Firm dark grey slightly sandy slightly gravelly silty CLAY. Gravel is subangular to subrounded fine to coarse		∇1
2.50 2.50	B ES			70.22	2.60	Obstruction: Possible bedrock or boulder Complete at 3.20m		

Plan

Remarks

Groundwater encountered at 2.00m BGL
Trial pit stability poor
Trial pit backfilled upon completion

Scale (approx)	**Logged By**	**Figure No.**
1:25	MB	11334-12-21.TP16

Ground Investigations Ireland Ltd www.gii.ie			**Site** Cappogue Dublin 11 Phase 1A	**Trial Pit Number** **TP18**
Machine : JCB 3CX **Method :** Trial Pit	**Dimensions** 3.00m x 0.60m x 3.20m L x W x D	**Ground Level (mOD)** 72.15	**Client** Thorntons Recycling	**Job Number** 11334-12-21
	Location (dGPS) 710268.1 E 739580.8 N	**Dates** 11/01/2022	**Engineer** Fehily Timoney	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.30)	TOPSOIL	▨	
				71.85	0.30 (0.20)	Soft to firm light brown slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse	▒	
				71.65	0.50 (1.20)	Firm brownish grey slightly sandy slightly gravelly CLAY with many subangular to subrounded cobbles. Gravel is subangular to subrounded fine to coarse	▒	
1.50	B							
			Seepage(1) at 1.70m.	70.45	1.70 (1.50)	Bluish grey clayey silty very sandy subangular to subrounded fine to coarse GRAVEL with some subrounded cobbles	░	∇1
3.00 3.00	B ES							
				68.95	3.20	Obstruction: Possible bedrock or boulder Complete at 3.20m		

Plan

Remarks

Groundwater encountered at 1.70m BGL
Trial pit stability poor
Trial pit backfilled upon completion

Scale (approx)	**Logged By**	**Figure No.**
1:25	MB	11334-12-21.TP18

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Site Cappogue Dublin 11 Phase 1A				**Trial Pit Number** TP19
Machine : JCB 3CX **Method :** Trial Pit	**Dimensions** 3.00m x 0.60m x 3.00m L Xx W x D	**Ground Level (mOD)** 72.41	**Client** Thorntons Recycling	**Job Number** 11334-12-21
	Location (dGPS) 710304.8 E 739580.5 N	**Dates** 11/01/2022	**Engineer** Fehily Timoney	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				72.21	(0.20) 0.20	TOPSOIL		
				72.01	(0.20) 0.40	MADE GROUND Brown slightly sandy slightly gravelly Clay with rare fragments of plastic		
				71.71	(0.30) 0.70	Soft to firm brown slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse		
1.00	B			71.31	(0.40) 1.10	Firm brown mottled grey slightly sandy slighlty gravelly CLAY. Gravel is subangular to subrounded fine to coarse		
				70.41	(0.90) 2.00	Firm grey mottled brown slightly sandy slightly gravelly CLAY with occasional subrounded cobbles. Gravel is subangular to subrounded fine to coarse		
2.00 2.00	B ES		Medium ingress(1) at 2.50m.	69.81	(0.60) 2.60	Firm to stiff grey slighty sandy slightly gravelly silty CLAY with occasional subrounded cobbles and boulders. Gravel is subangular to subrounded fine to coarse		∇1
3.00	B			69.41	(0.40) 3.00	Firm to stiff slightly sandy gravelly CLAY with occasional subangular to subrounded cobbles and boulders. Gravel is subangular to subrounded fine to coarse		
						Complete at 3.00m		

Plan

Remarks

Groundwater encountered at 2.50m BGL
Trial pit stability good
Trial pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	MB	11334-12-21.TP19

Ground Investigations Ireland Ltd
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Machine : JCB 3CX **Method :** Trial Pit	**Dimensions** 1.50m x 0.60m x 0.80m L Xx W x D	**Ground Level (mOD)** 73.36	**Site** Cappogue Dublin 11 Phase 1A	**Trial Pit Number** **TP19A**
	Location (dGPS) 710310.2 E 739584.6 N	**Dates** 11/01/2022	**Client** Thorntons Recycling	**Job Number** 11334-12-21
			Engineer Fehily Timoney	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.80)	MADE GROUND: Brown slightly sandy slightly slightly gravelly Clay with occasional fragments of red brick, metal, and concrete	▨	
0.50	ES							
				72.56	0.80	Complete at 0.80m		

Plan

Remarks

Trial pit terminated, reached natural strata

Scale (approx)	Logged By	Figure No.
1:25	MB	11334-12-21.TP19A

Ground Investigations Ireland Ltd
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Machine : JCB 3CX **Method :** Trial Pit	**Dimensions** 3.00m x 0.60m x 3.00m L x W x D	**Ground Level (mOD)** 72.81	**Client** Thorntons Recycling	**Job Number** 11334-12-21
	Location (dGPS) 710347.9 E 739581.2 N	**Dates** 11/01/2022	**Engineer** Fehily Timoney	**Sheet** 1/1

Site Cappogue Dublin 11 Phase 1A

Trial Pit Number TP20

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20)	TOPSOIL.		
				72.61	0.20	Soft to firm brown slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse		
					(0.60)			
				72.01	0.80	Firm brown slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse		
1.00 1.00	B ES							
					(1.00)			
				71.01	1.80	Grey mottled brown slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse		
2.00	B							
					(0.80)			
				70.21	2.60	Firm bluish grey slightly sandy gravelly CLAY with occasional subangular to subrounded cobbles. Gravel is subangular to subrounded fine to coarse		
					(0.40)			▽1
			Seepage(1) at 2.80m.			Obstruction: Possible bedrock or boulder		
				69.81	3.00	Complete at 3.00m		
3.00	B							

Plan

Remarks

Groundwater encountered at 2.80m BGL
Trial pit stability good
Trial pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	MB	11334-12-21.TP20

Ground Investigations Ireland Ltd
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Site Cappogue Dublin 11 Phase 1A				**Trial Pit Number** **TP21**
Machine : JCB 3CX **Method :** Trial Pit	**Dimensions** 3.00m x 0.60m x 2.40m L x W x D	**Ground Level (mOD)** 72.50	**Client** Thorntons Recycling	**Job Number** 11334-12-21
	Location (dGPS) 710342.8 E 739542.9 N	**Dates** 11/01/2022	**Engineer** Fehily Timoney	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.30)	TOPSOIL		
				72.20	0.30	Soft to firm brown slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse		
0.50-1.00	ES				(0.80)			
				71.40	1.10	Firm to stiff slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles. Gravel is subangular to subrounded fine to coarse		
					(1.30)			
2.00	B							
				70.10	2.40	Obstruction: Possible bedrock or boulder		
						Complete at 2.40m		

Plan

Remarks

Groundwater not encountered
Trial pit stability good
Trial pit backfilled upon completion

Scale (approx)	**Logged By**	**Figure No.**
1:25	MB	11334-12-21.TP21

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Site Cappogue Dublin 11 Phase 1A				**Trial Pit Number** **TP22**
Machine : JCB 3CX **Method :** Trial Pit	**Dimensions** 3.00m x 0.60m x 2.60m L x W x D	**Ground Level (mOD)** 72.28	**Client** Thorntons Recycling	**Job Number** 11334-12-21
	Location (dGPS) 710289.4 E 739558.4 N	**Dates** 11/01/2022	**Engineer** Fehily Timoney	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				71.98	(0.30) 0.30	TOPSOIL		
0.50 0.50	B ES			70.78	(1.20) 1.50	Firm brown slightly sandy slightly gravelly CLAY with occasional subrounded cobbles. Gravel is subangular to subrounded fine to coarse		
2.00 2.00	B ES		Seepage(1) at 2.10m.	69.68	(1.10) 2.60	Firm to stiff brownish grey slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles and boulders. Gravel is subangular to subrounded fine to coarse		▽1
						Obstruction: Possible bedrock or boulder Complete at 2.60m		

Plan

Remarks

Groundwater encountered at 2.10m BGL
Trial pit stability good
Trial pit backfilled upon completion

Scale (approx)	**Logged By**	**Figure No.**
1:25	MB	11334-12-21.TP22

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Site Cappogue Dublin 11 Phase 1A

Trial Pit Number TP23

Machine : JCB 3CX
Method : Trial Pit

Dimensions 2.60m x 0.65m x 3.20m
L x W x D

Ground Level (mOD) 73.24

Client Thorntons Recycling

Job Number 11334-12-21

Location (dGPS) 710242.3 E 739622.9 N

Dates 18/01/2022

Engineer Fehily Timoney

Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20)	Reinforced CONCRETE		
0.50	ES			73.04	0.20 (0.90)	MADE GROUND: Grey clayey sandy subangular to subrounded fine to coarse Gravel with some cobbles and boulders and occasional fragments of fabric, timber, concrete, metal, red brick, plastic and large fragments of concrete (putrid odour)		
			Fast ingress(1) at 1.10m.	72.14	1.10 (0.20)	MADE GROUND slightly clayey slightly sandy subangular fine to coarse Gravel with occasional fragments of steel (putrid odour)		∇1
				71.94	1.30 (0.20)	Possible MADE GROUND: Grey slightly sandy slightly gravelly silty Clay		
				71.74	1.50 (0.60)	Firm brown mottled grey slightly silty slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse		
2.00 2.00	B ES			71.14	2.10 (0.50)	Grey slightly clayey sandy subangular to subrounded fine to coarse GRAVEL		
3.00	B			70.64	2.60 (0.60)	Firm to stiff dark brownish grey slightly sandy slightly gravelly silty CLAY. Gravel is subangular to subrounded fine to coarse Obstruction: Possible bedrock or boulder		
				70.04	3.20	Complete at 3.20m		

Plan

Remarks

Groundwater encountered at 1.10m BGL
Trial pit stability moderate to poor
Trial pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	SG	11334-12-21.TP23

Cappogue Dublin 11 Phase 1A – Trial Pit Photographs

TP01

TP01

Cappogue Dublin 11 Phase 1A – Trial Pit Photographs

TP01

TP01

Cappogue Dublin 11 Phase 1A – Trial Pit Photographs

TP02

TP02

Cappogue Dublin 11 Phase 1A – Trial Pit Photographs

TP02

TP02

Cappogue Dublin 11 Phase 1A – Trial Pit Photographs

TP03

TP03

Cappogue Dublin 11 Phase 1A – Trial Pit Photographs

TP03

TP03

Cappogue Dublin 11 Phase 1A – Trial Pit Photographs

TP04

TP04

Cappogue Dublin 11 Phase 1A – Trial Pit Photographs

TP04

TP04

Cappogue Dublin 11 Phase 1A – Trial Pit Photographs

TP05

TP05

Cappogue Dublin 11 Phase 1A – Trial Pit Photographs

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TP05

Cappogue Dublin 11 Phase 1A – Trial Pit Photographs

TP06

TP06

Cappogue Dublin 11 Phase 1A – Trial Pit Photographs

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TP06

Cappogue Dublin 11 Phase 1A – Trial Pit Photographs

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TP07

Cappogue Dublin 11 Phase 1A – Trial Pit Photographs

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Cappogue Dublin 11 Phase 1A – Trial Pit Photographs

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Cappogue Dublin 11 Phase 1A – Trial Pit Photographs

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Cappogue Dublin 11 Phase 1A – Trial Pit Photographs

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Cappogue Dublin 11 Phase 1A – Trial Pit Photographs

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Cappogue Dublin 11 Phase 1A – Trial Pit Photographs

TP10

TP10

Cappogue Dublin 11 Phase 1A – Trial Pit Photographs

TP10

TP10

Cappogue Dublin 11 Phase 1A – Trial Pit Photographs

TP11

TP11

Cappogue Dublin 11 Phase 1A – Trial Pit Photographs

TP11

TP11

Cappogue Dublin 11 Phase 1A – Trial Pit Photographs

TP12

TP12

Cappogue Dublin 11 Phase 1A – Trial Pit Photographs

TP12

TP12

Cappogue Dublin 11 Phase 1A – Trial Pit Photographs

TP13

TP13

Cappogue Dublin 11 Phase 1A – Trial Pit Photographs

TP13

TP13

Cappogue Dublin 11 Phase 1A – Trial Pit Photographs

TP14

TP14

Cappogue Dublin 11 Phase 1A – Trial Pit Photographs

TP14

TP14

Cappogue Dublin 11 Phase 1A – Trial Pit Photographs

TP15

TP15

Cappogue Dublin 11 Phase 1A – Trial Pit Photographs

TP15

TP15

Cappogue Dublin 11 Phase 1A – Trial Pit Photographs

TP16

TP16

Cappogue Dublin 11 Phase 1A – Trial Pit Photographs

TP16

TP16

Cappogue Dublin 11 Phase 1A – Trial Pit Photographs

TP18

TP18

Cappogue Dublin 11 Phase 1A – Trial Pit Photographs

TP18

TP18

Cappogue Dublin 11 Phase 1A – Trial Pit Photographs

TP19

TP19

Cappogue Dublin 11 Phase 1A – Trial Pit Photographs

TP19

TP19

Cappogue Dublin 11 Phase 1A – Trial Pit Photographs

TP20

TP20

Cappogue Dublin 11 Phase 1A – Trial Pit Photographs

TP20

TP20

Cappogue Dublin 11 Phase 1A – Trial Pit Photographs

TP21

TP21

Cappogue Dublin 11 Phase 1A – Trial Pit Photographs

TP21

TP21

Cappogue Dublin 11 Phase 1A – Trial Pit Photographs

TP22

TP22

Cappogue Dublin 11 Phase 1A – Trial Pit Photographs

TP22

TP22

Cappogue Dublin 11 Phase 1A – Trial Pit Photographs

TP23

TP23

Cappogue Dublin 11 Phase 1A – Trial Pit Photographs

TP23

TP23

APPENDIX 3 – Dynamic Probe Records

Ground Investigations Ireland Ltd
www.gii.ie

Site
Cappogue Dublin 11 Phase 1A

Probe Number
DP01

Method
Dynamic Probe Heavy
Hammer Weight 50kg, Fall
Height 500mm

Cone Dimensions
Diameter 43.7mm

Ground Level (mOD)
73.29

Client
Thorntons Recycling

Job Number
11334-12-21a

Location
710162.4 E 739511.6 N

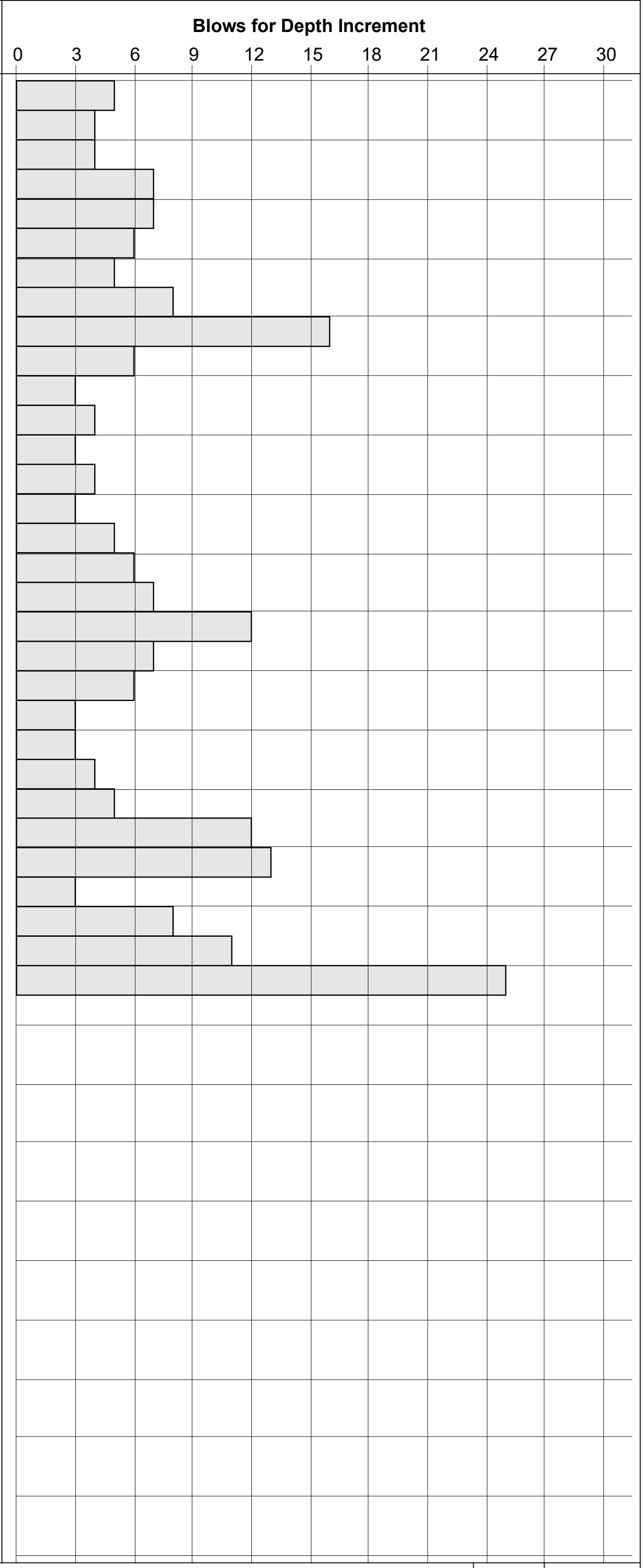
Dates
27/04/2022

Engineer
Fehily Timoney

Sheet
1/1

Depth (m)	Blows for Depth Increment	Field Records
0.00-0.10	5	
0.10-0.20	4	
0.20-0.30	4	
0.30-0.40	7	
0.40-0.50	7	
0.50-0.60	6	
0.60-0.70	5	
0.70-0.80	8	
0.80-0.90	16	
0.90-1.00	6	
1.00-1.10	3	
1.10-1.20	4	
1.20-1.30	3	
1.30-1.40	4	
1.40-1.50	3	
1.50-1.60	5	
1.60-1.70	6	
1.70-1.80	7	
1.80-1.90	12	
1.90-2.00	7	
2.00-2.10	6	
2.10-2.20	3	
2.20-2.30	3	
2.30-2.40	4	
2.40-2.50	5	
2.50-2.60	12	
2.60-2.70	13	
2.70-2.80	3	
2.80-2.90	8	
2.90-3.00	11	
3.00-3.10	25	

Level (mOD)	Depth (m)
73.29	0.00
72.79	0.50
72.29	1.00
71.79	1.50
71.29	2.00
70.79	2.50
70.29	3.00
69.79	3.50
69.29	4.00
68.79	4.50
68.29	5.00



Remarks
Refusal at 3.10m BGL

Scale (approx)
1:25

Logged By
FOD

Figure No.
11334-12-21a.DP01

Ground Investigations Ireland Ltd
www.gii.ie

Site
Cappogue Dublin 11 Phase 1A

Probe Number
DP02

Method
Dynamic Probe Heavy
Hammer Weight 50kg, Fall
Height 500mm

Cone Dimensions
Diameter 43.7mm

Ground Level (mOD)
72.90

Client
Thorntons Recycling

Job Number
11334-12-21a

Location
710169.9 E 739473.3 N

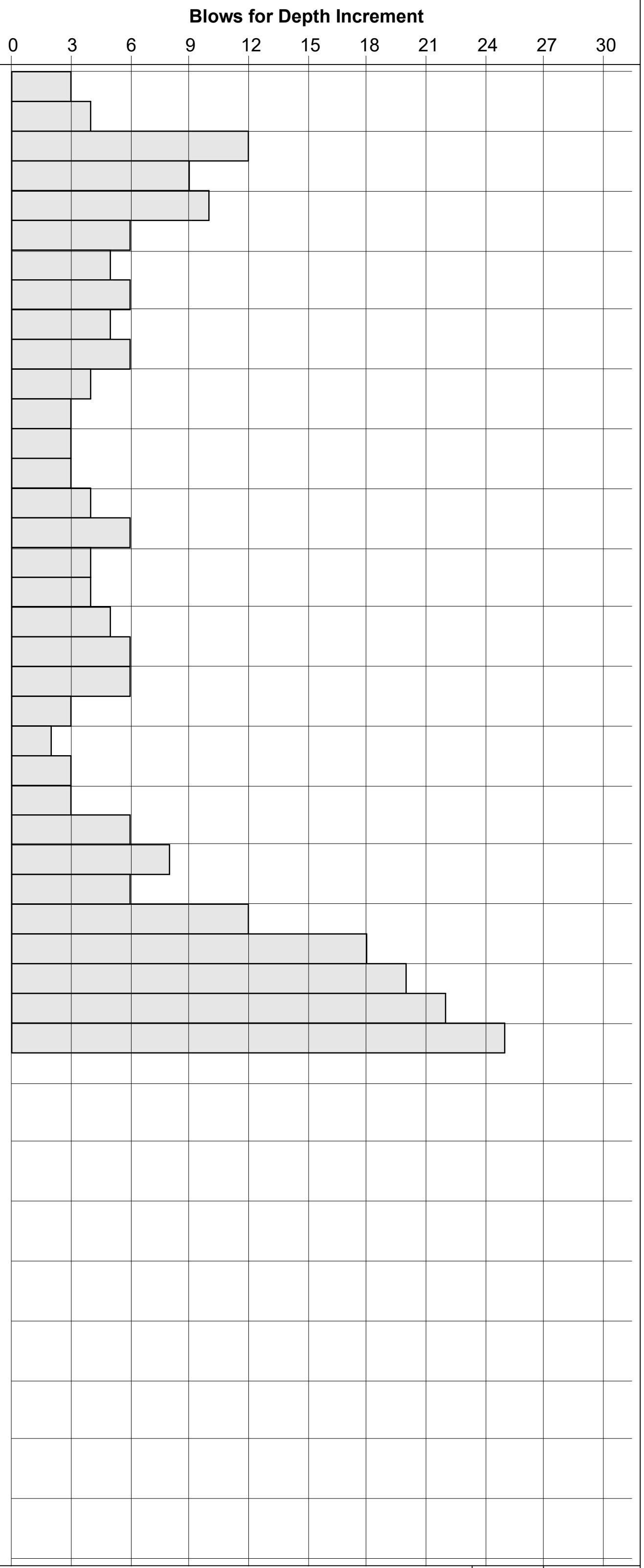
Dates
27/04/2022

Engineer
Fehily Timoney

Sheet
1/1

Depth (m)	Blows for Depth Increment	Field Records
0.00-0.10	3	
0.10-0.20	4	
0.20-0.30	12	
0.30-0.40	9	
0.40-0.50	10	
0.50-0.60	6	
0.60-0.70	5	
0.70-0.80	6	
0.80-0.90	5	
0.90-1.00	6	
1.00-1.10	4	
1.10-1.20	3	
1.20-1.30	3	
1.30-1.40	3	
1.40-1.50	4	
1.50-1.60	6	
1.60-1.70	4	
1.70-1.80	4	
1.80-1.90	5	
1.90-2.00	6	
2.00-2.10	6	
2.10-2.20	3	
2.20-2.30	2	
2.30-2.40	3	
2.40-2.50	3	
2.50-2.60	6	
2.60-2.70	8	
2.70-2.80	6	
2.80-2.90	12	
2.90-3.00	18	
3.00-3.10	20	
3.10-3.20	22	
3.20-3.30	25	

Level (mOD)	Depth (m)
72.90	0.00
72.40	0.50
71.90	1.00
71.40	1.50
70.90	2.00
70.40	2.50
69.90	3.00
69.40	3.50
68.90	4.00
68.40	4.50
67.90	5.00



Remarks
Refusal at 3.30m BGL

Scale (approx)
1:25

Logged By
FOD

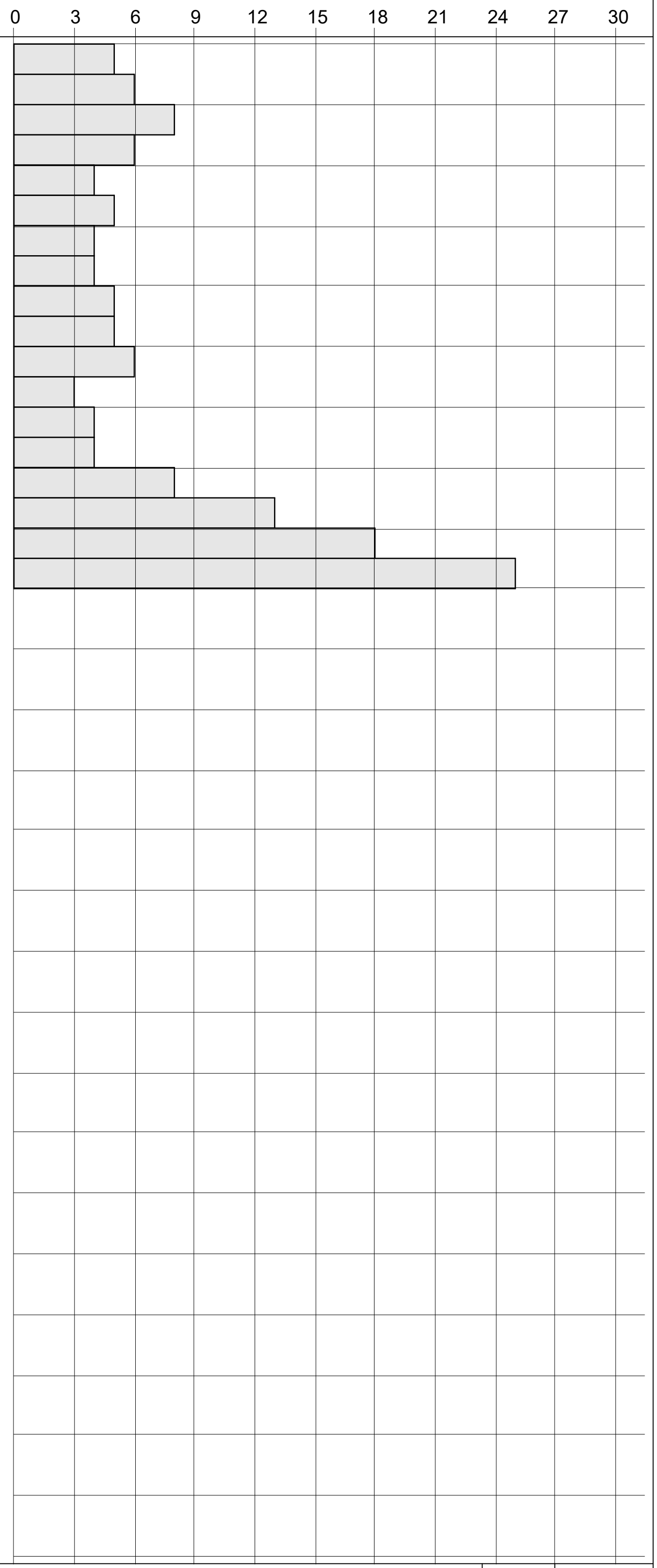
Figure No.
11334-12-21a.DP02

Ground Investigations Ireland Ltd www.gii.ie			**Site** Cappogue Dublin 11 Phase 1A	**Probe Number** **DP03**
Method Dynamic Probe Heavy Hammer Weight 50kg, Fall Height 500mm	**Cone Dimensions** Diameter 43.7mm	**Ground Level (mOD)** 72.05	**Client** Thorntons Recycling	**Job Number** 11334-12-21a
	Location 710192.9 E 739443.1 N	**Dates** 27/04/2022	**Engineer** Fehily Timoney	**Sheet** 1/1

Depth (m)	Blows for Depth Increment	Field Records
0.00-0.10	5	
0.10-0.20	6	
0.20-0.30	8	
0.30-0.40	6	
0.40-0.50	4	
0.50-0.60	5	
0.60-0.70	4	
0.70-0.80	4	
0.80-0.90	5	
0.90-1.00	5	
1.00-1.10	6	
1.10-1.20	3	
1.20-1.30	4	
1.30-1.40	4	
1.40-1.50	8	
1.50-1.60	13	
1.60-1.70	18	
1.70-1.80	25	

Level (mOD)	Depth (m)
72.05	0.00
71.55	0.50
71.05	1.00
70.55	1.50
70.05	2.00
69.55	2.50
69.05	3.00
68.55	3.50
68.05	4.00
67.55	4.50
67.05	5.00

Blows for Depth Increment



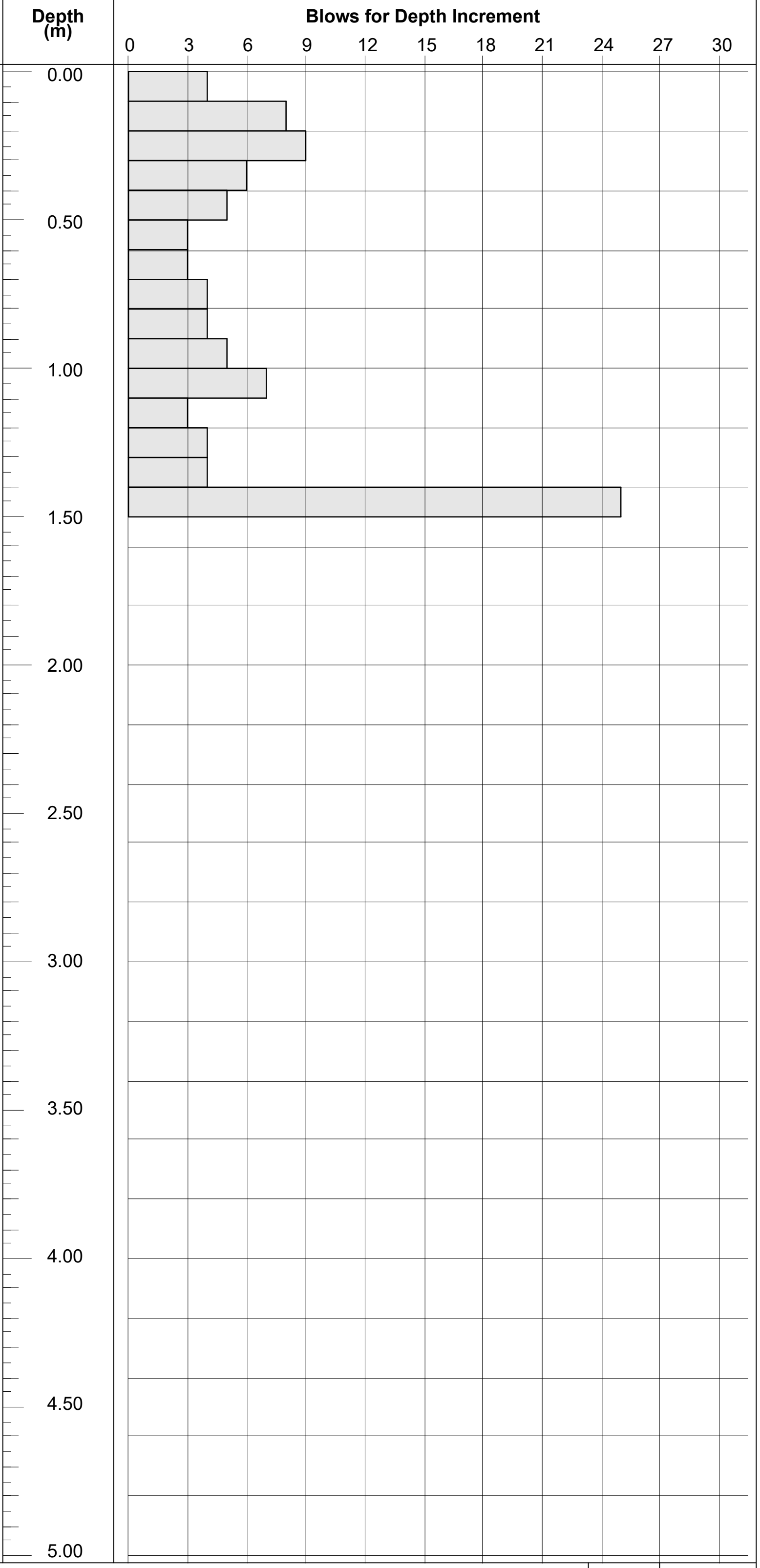
Remarks
Two attempts carried out in area
Refusal at 1.80m BGL

Scale (approx) 1:25	**Logged By** FOD
Figure No. 11334-12-21a.DP03	

Ground Investigations Ireland Ltd
www.gii.ie

Site Cappogue Dublin 11 Phase 1A				**Probe Number** DP03A
Method Dynamic Probe Heavy Hammer Weight 50kg, Fall Height 500mm	**Cone Dimensions** Diameter 43.7mm	**Ground Level (mOD)**	**Client** Thorntons Recycling	**Job Number** 11334-12-21a
	Location	**Dates** 27/04/2022	**Engineer** Fehily Timoney	**Sheet** 1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)
0.00-0.10	4		
0.10-0.20	8		
0.20-0.30	9		
0.30-0.40	6		
0.40-0.50	5		
0.50-0.60	3		
0.60-0.70	3		
0.70-0.80	4		
0.80-0.90	4		
0.90-1.00	5		
1.00-1.10	7		
1.10-1.20	3		
1.20-1.30	4		
1.30-1.40	4		
1.40-1.50	25		



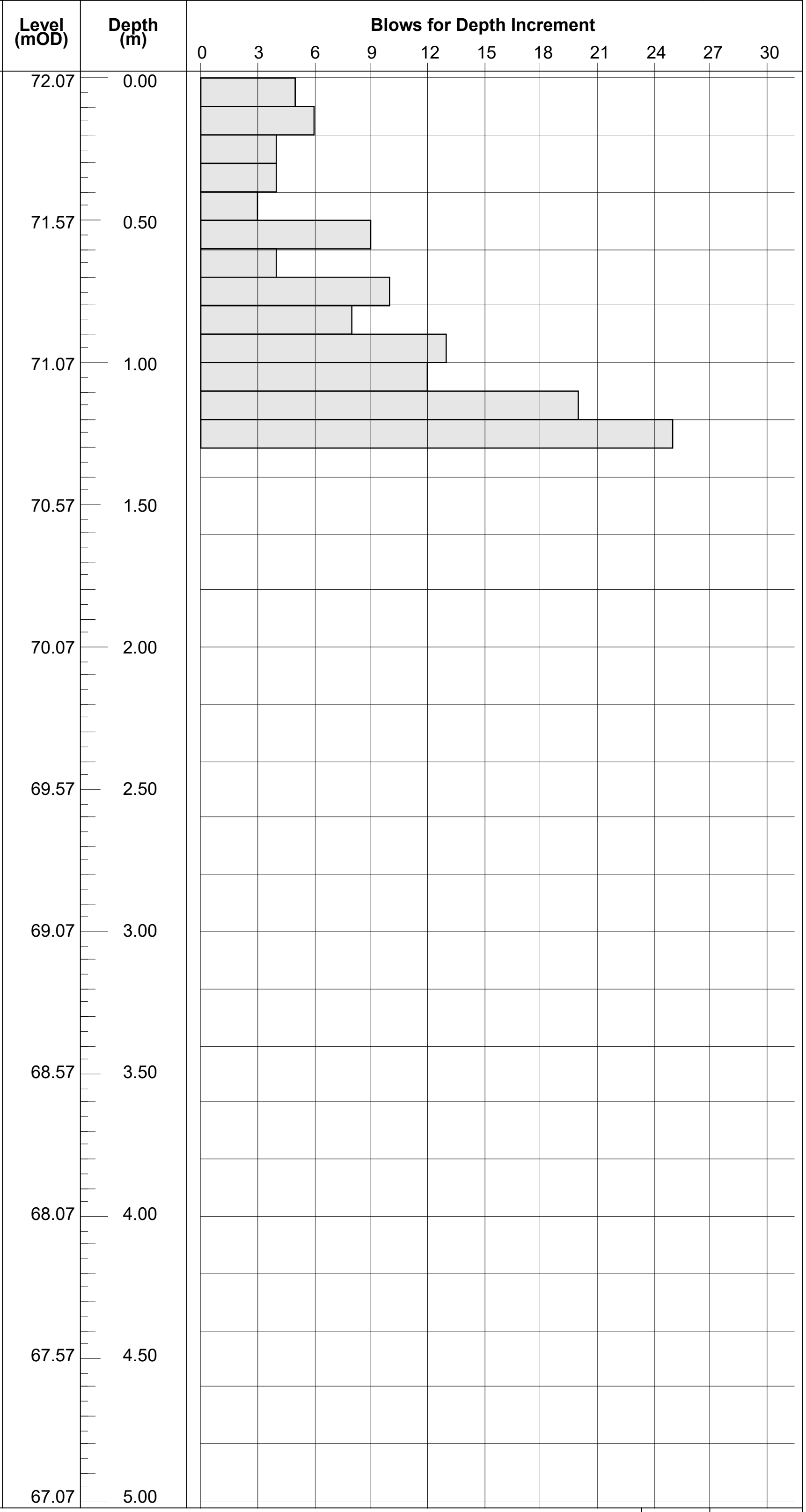
Remarks
Two attempts carried out in area
Refusal at 1.50m BGL

Scale (approx) 1:25
Logged By FOD
Figure No. 11334-12-21a.DP03A

Ground Investigations Ireland Ltd
www.gii.ie

Site Cappogue Dublin 11 Phase 1A				**Probe Number** DP04
Method Dynamic Probe Heavy Hammer Weight 50kg, Fall Height 500mm	**Cone Dimensions** Diameter 43.7mm	**Ground Level (mOD)** 72.07	**Client** Thorntons Recycling	**Job Number** 11334-12-21a
	Location 710246.3 E 739473.8 N	**Dates** 27/04/2022	**Engineer** Fehily Timoney	**Sheet** 1/1

Depth (m)	Blows for Depth Increment	Field Records
0.00-0.10	5	
0.10-0.20	6	
0.20-0.30	4	
0.30-0.40	4	
0.40-0.50	3	
0.50-0.60	9	
0.60-0.70	4	
0.70-0.80	10	
0.80-0.90	8	
0.90-1.00	13	
1.00-1.10	12	
1.10-1.20	20	
1.20-1.30	25	



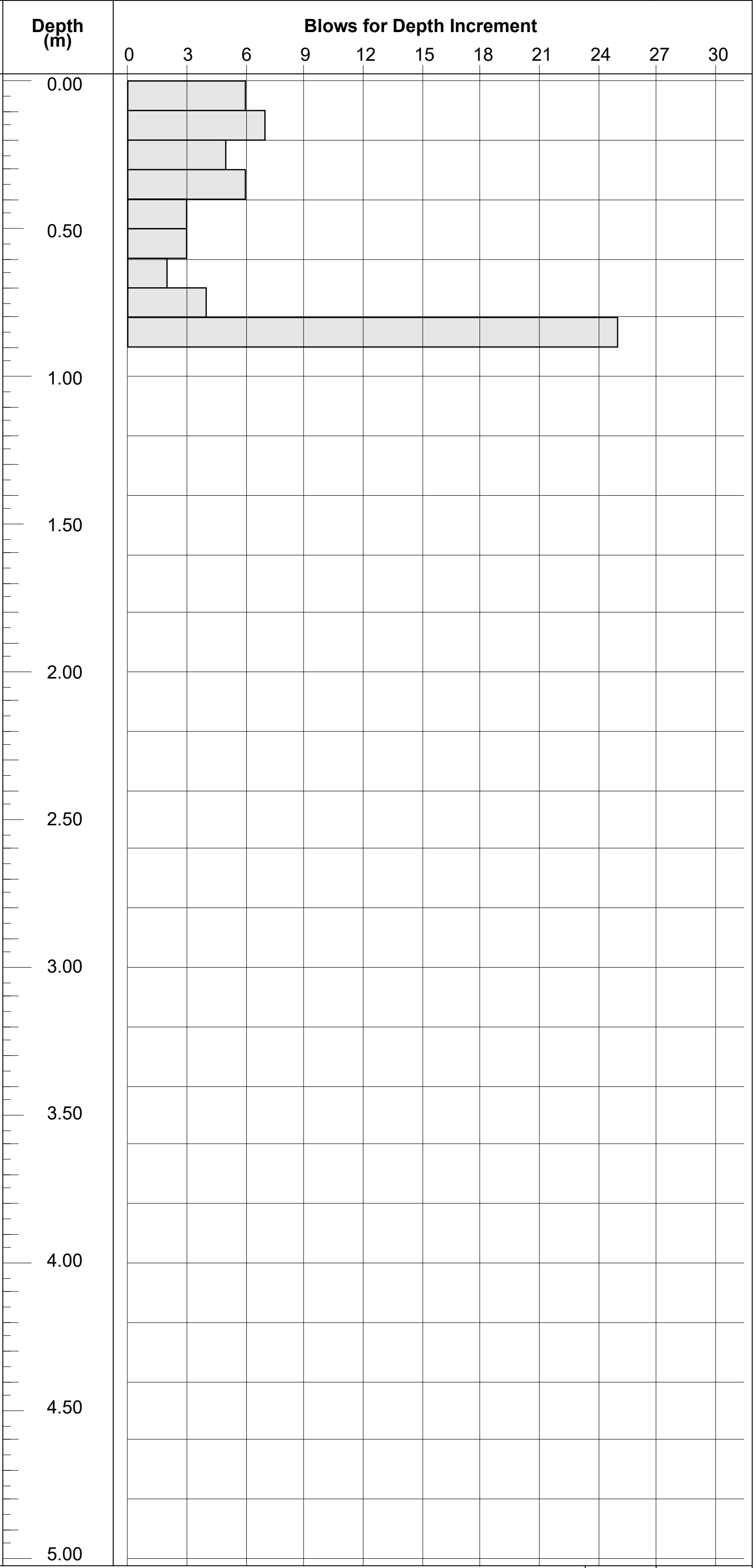
Remarks
Three attempts in this area
Refusal at 1.30 BGL

Scale (approx) 1:25	**Logged By** FOD
Figure No. 11334-12-21a.DP04	

Ground Investigations Ireland Ltd
www.gii.ie

Method Dynamic Probe Heavy Hammer Weight 50kg, Fall Height 500mm	**Cone Dimensions** Diameter 43.7mm	**Ground Level (mOD)**	**Site** Cappogue Dublin 11 Phase 1A **Client** Thorntons Recycling	**Probe Number** DP04A **Job Number** 11334-12-21a
	Location	**Dates** 27/04/2022	**Engineer** Fehily Timoney	**Sheet** 1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)
0.00-0.10	6		
0.10-0.20	7		
0.20-0.30	5		
0.30-0.40	6		
0.40-0.50	3		
0.50-0.60	3		
0.60-0.70	2		
0.70-0.80	4		
0.80-0.90	25		



Remarks
Two attempts carried out in area
Refusal at 0.90m BGL

Scale (approx) 1:25
Logged By FOD
Figure No. 11334-12-21a.DP04A

Ground Investigations Ireland Ltd
www.gii.ie

Site
Cappogue Dublin 11 Phase 1A

Probe Number
DP04B

Method
Dynamic Probe Heavy
Hammer Weight 50kg, Fall
Height 500mm

Cone Dimensions
Diameter 43.7mm

Ground Level (mOD)

Client
Thorntons Recycling

Job Number
11334-12-21a

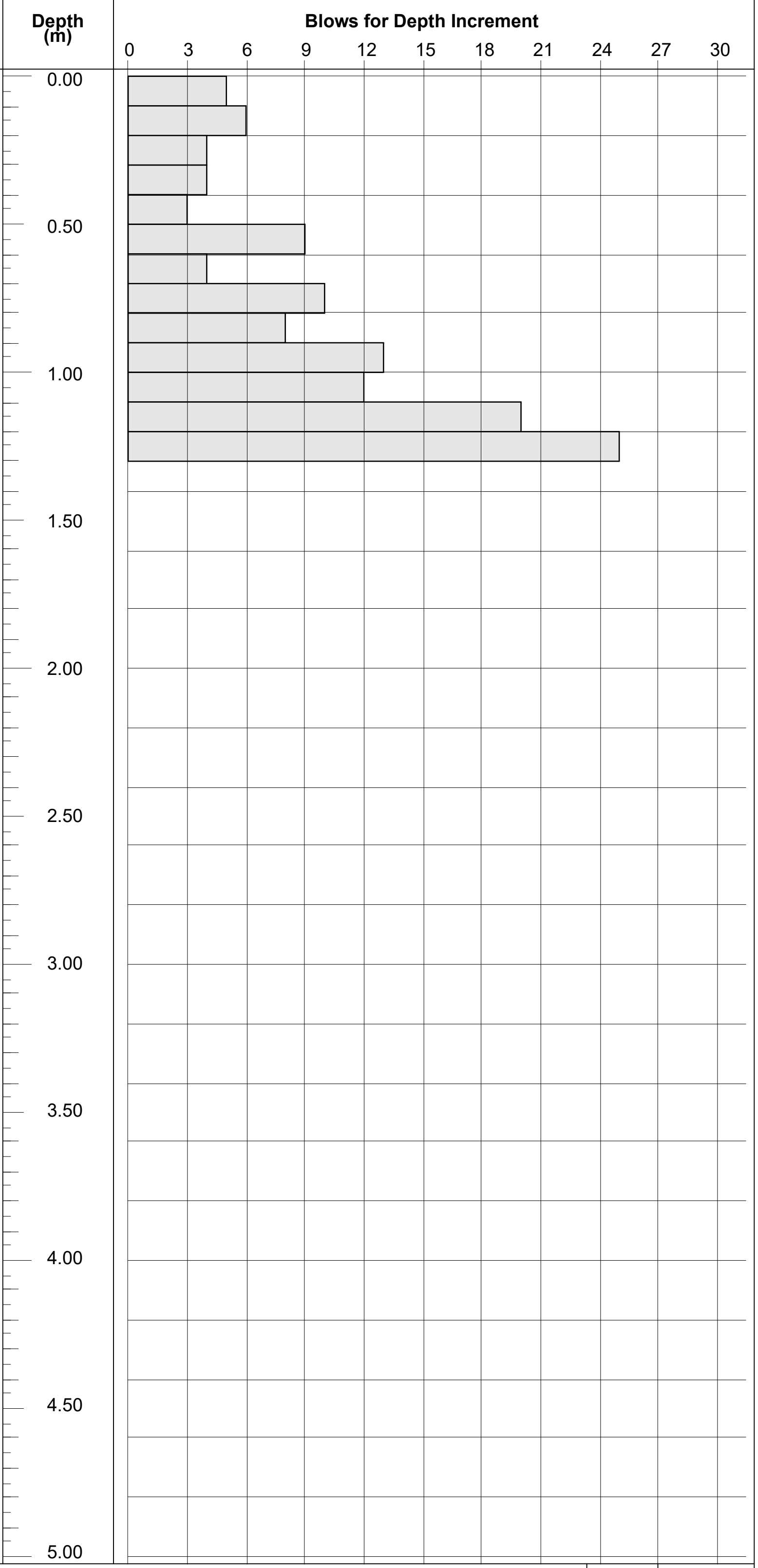
Location

Dates
27/04/2022

Engineer
Fehily Timoney

Sheet
1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)
0.00-0.10	5		
0.10-0.20	6		
0.20-0.30	4		
0.30-0.40	4		
0.40-0.50	3		
0.50-0.60	9		
0.60-0.70	4		
0.70-0.80	10		
0.80-0.90	8		
0.90-1.00	13		
1.00-1.10	12		
1.10-1.20	20		
1.20-1.30	25		



Remarks
Three attempts carried out in area
Refusal at 1.30m BGL

Scale (approx)
1:25

Logged By
FOD

Figure No.
11334-12-21a.DP04B

Ground Investigations Ireland Ltd
www.gii.ie

Site Cappogue Dublin 11 Phase 1A

Probe Number DP05

Method
Dynamic Probe Heavy
Hammer Weight 50kg, Fall
Height 500mm

Cone Dimensions Diameter 43.7mm

Ground Level (mOD) 72.54

Client Thorntons Recycling

Job Number 11334-12-21a

Location 710213.4 E 739500.6 N

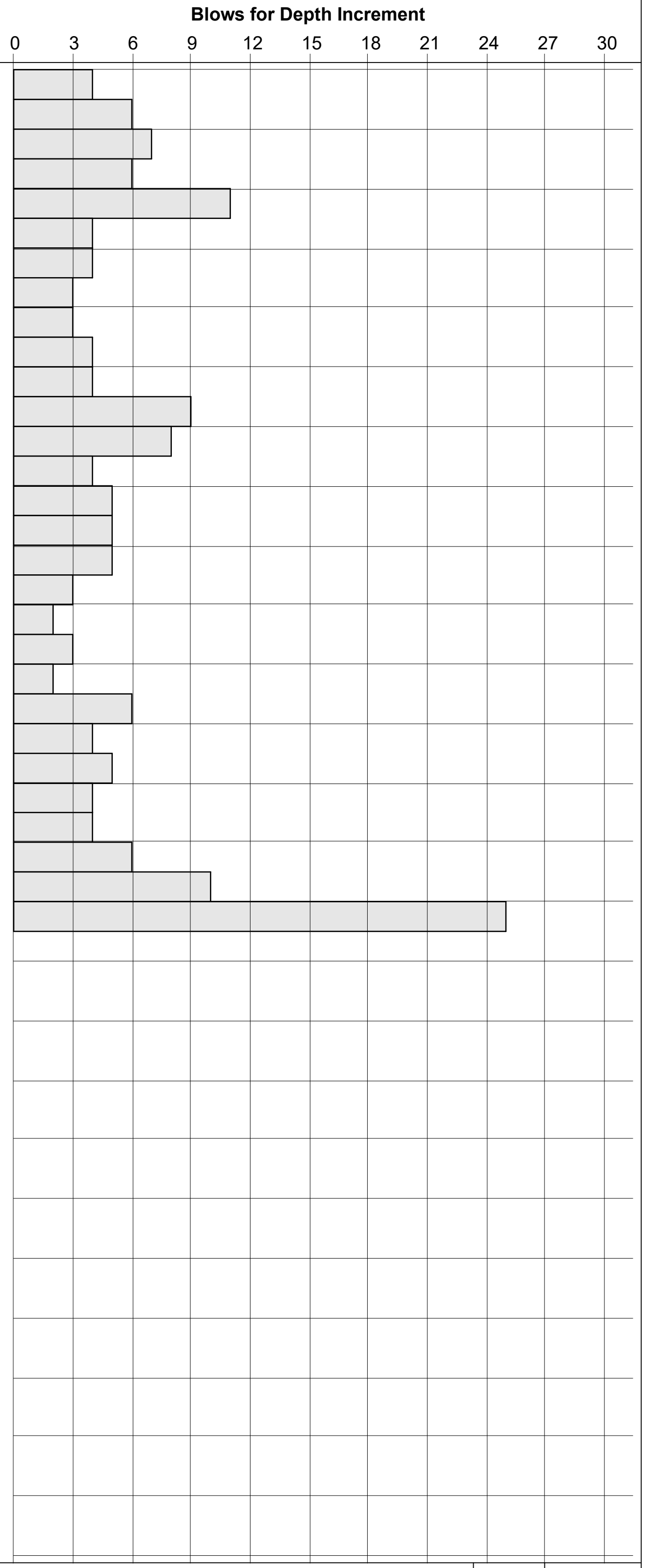
Dates 27/04/2022

Engineer Fehily Timoney

Sheet 1/1

Depth (m)	Blows for Depth Increment	Field Records
0.00-0.10	4	
0.10-0.20	6	
0.20-0.30	7	
0.30-0.40	6	
0.40-0.50	11	
0.50-0.60	4	
0.60-0.70	4	
0.70-0.80	3	
0.80-0.90	3	
0.90-1.00	4	
1.00-1.10	4	
1.10-1.20	9	
1.20-1.30	8	
1.30-1.40	4	
1.40-1.50	5	
1.50-1.60	5	
1.60-1.70	5	
1.70-1.80	3	
1.80-1.90	2	
1.90-2.00	3	
2.00-2.10	2	
2.10-2.20	6	
2.20-2.30	4	
2.30-2.40	5	
2.40-2.50	4	
2.50-2.60	4	
2.60-2.70	6	
2.70-2.80	10	
2.80-2.90	25	

Level (mOD)	Depth (m)
72.54	0.00
72.04	0.50
71.54	1.00
71.04	1.50
70.54	2.00
70.04	2.50
69.54	3.00
69.04	3.50
68.54	4.00
68.04	4.50
67.54	5.00



Remarks
Two attempts carried out in area
Refusal at 2.90 BGL

Scale (approx) 1:25

Logged By FOD

Figure No. 11334-12-21a.DP04

Ground Investigations Ireland Ltd
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Site
Cappogue Dublin 11 Phase 1A

Probe Number
DP05A

Method
Dynamic Probe Heavy
Hammer Weight 50kg, Fall Height 500mm

Cone Dimensions
Diameter 43.7mm

Ground Level (mOD)

Client
Thorntons Recycling

Job Number
11334-12-21a

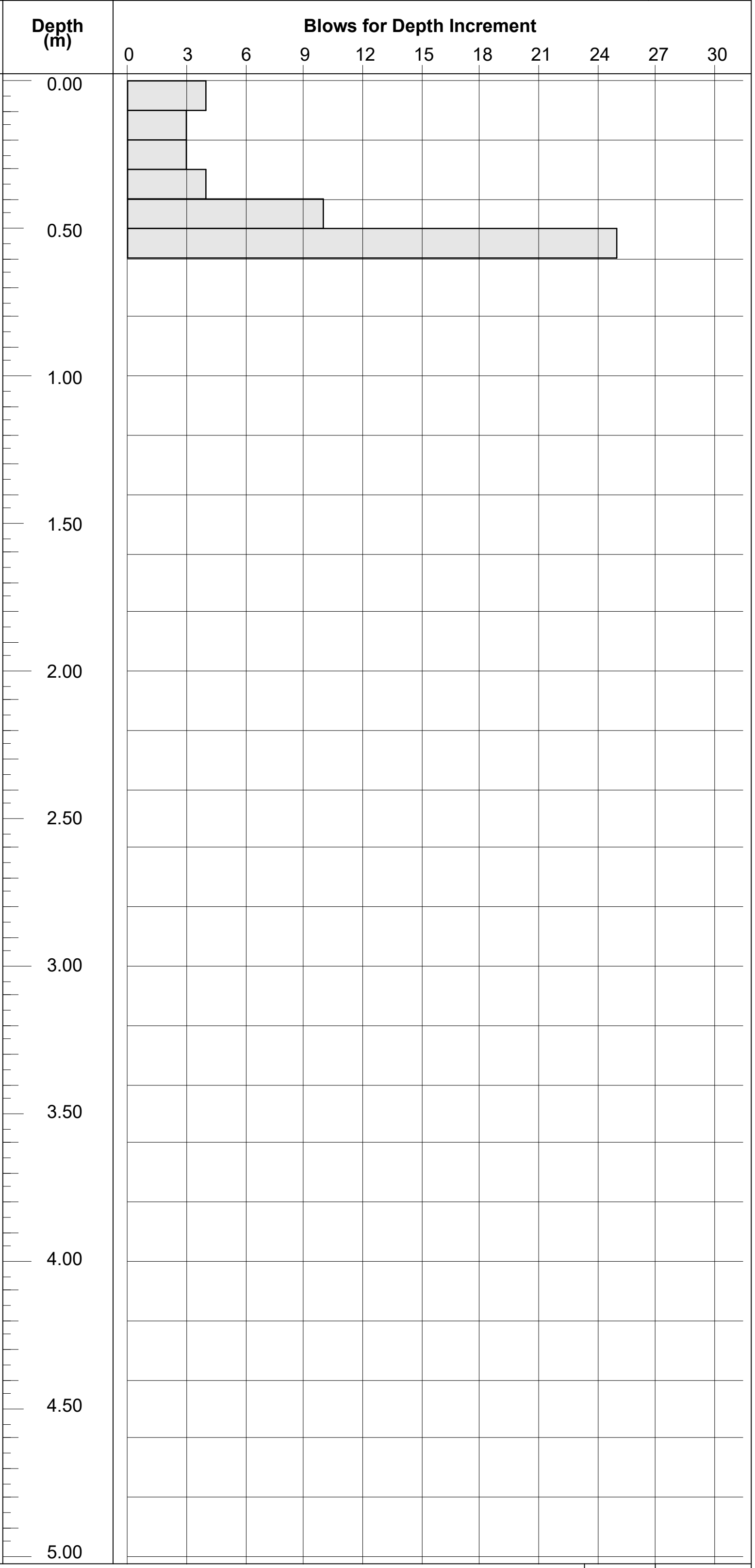
Location

Dates
27/04/2022

Engineer
Fehily Timoney

Sheet
1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)
0.00-0.10	4		
0.10-0.20	3		
0.20-0.30	3		
0.30-0.40	4		
0.40-0.50	10		
0.50-0.60	25		



Remarks
Two attempts carried out in area
Refusal at 0.60 BGL

Scale (approx)
1:25

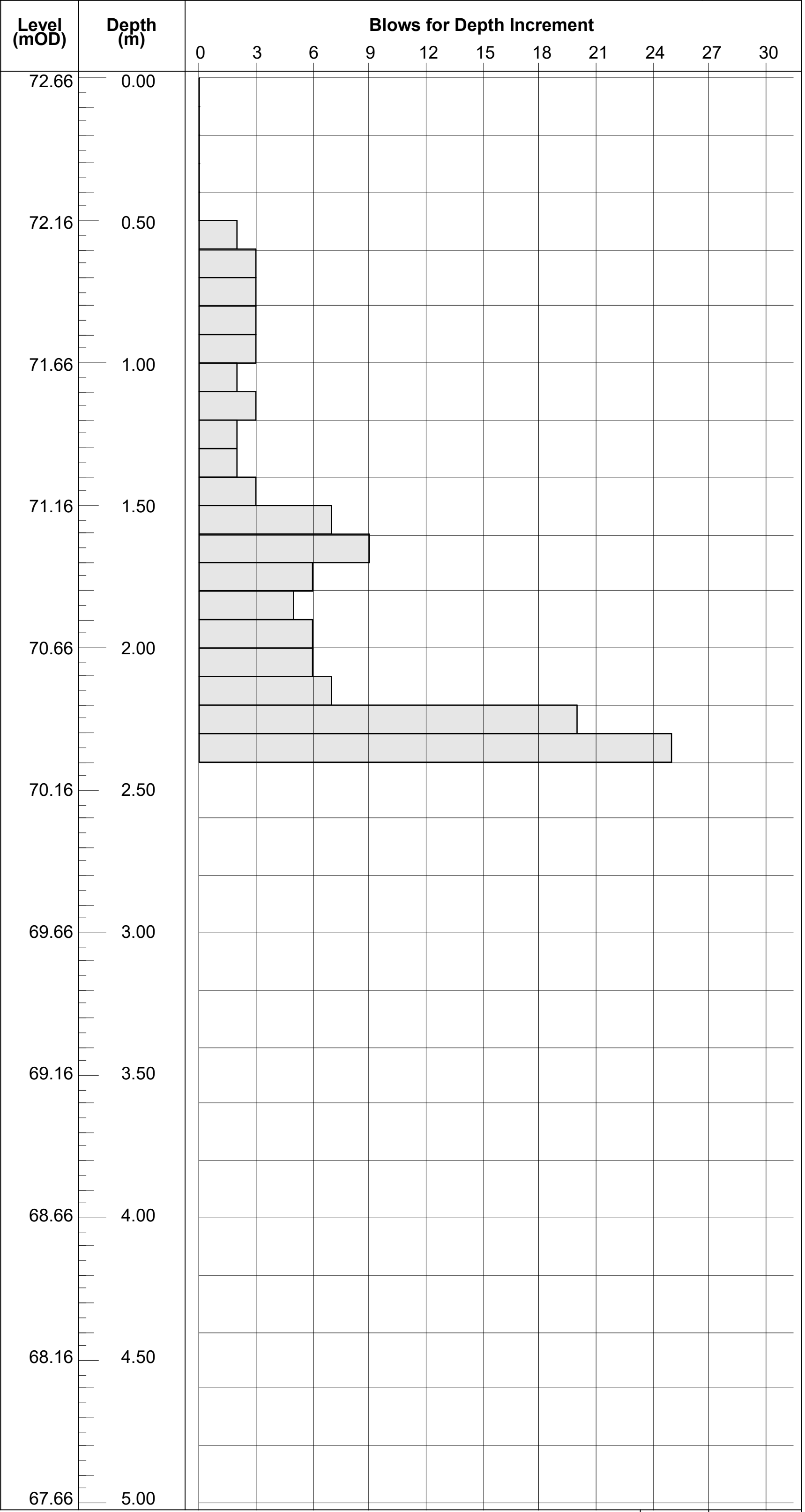
Logged By
FOD

Figure No.
11334-12-21a.DP05A

Ground Investigations Ireland Ltd
www.gii.ie

Site	Cappogue Dublin 11 Phase 1A
Probe Number	DP06
Method	Dynamic Probe Heavy Hammer Weight 50kg, Fall Height 500mm
Cone Dimensions	Diameter 43.7mm
Ground Level (mOD)	72.66
Client	Thorntons Recycling
Job Number	11334-12-21a
Location	710323.3 E 739558.9 N
Dates	27/04/2022
Engineer	Fehily Timoney
Sheet	1/1

Depth (m)	Blows for Depth Increment	Field Records
0.00-0.10	0	
0.10-0.20	0	
0.20-0.30	0	
0.30-0.40	0	
0.40-0.50	0	
0.50-0.60	2	
0.60-0.70	3	
0.70-0.80	3	
0.80-0.90	3	
0.90-1.00	3	
1.00-1.10	2	
1.10-1.20	3	
1.20-1.30	2	
1.30-1.40	2	
1.40-1.50	3	
1.50-1.60	7	
1.60-1.70	9	
1.70-1.80	6	
1.80-1.90	5	
1.90-2.00	6	
2.00-2.10	6	
2.10-2.20	7	
2.20-2.30	20	
2.30-2.40	25	



Remarks
Two attempts carried out in area
Refusal at 2.40 BGL

Scale (approx)	1:25
Logged By	FOD
Figure No.	11334-12-21a.DP06

APPENDIX 4 - Cable Percussion & Rotary Borehole Records

Ground Investigations Ireland Ltd
www.gii.ie

Site Cappogue Dublin 11 Phase 1A

Borehole Number BH01

Boring Method Cable percussion with rotary core follow-on
Rotary redrilled from ground level

Casing Diameter 200mm cased to 3.90m
96mm cased to 8.20m

Ground Level (mOD) 73.26

Client Thorntons Recycling

Job Number 11334-12-21a

Location (dGPS) 710252.4 E 739605.3 N

Dates 18/02/2022-04/05/2022

Engineer Fehily Timoney

Sheet 1/1

Depth (m)	Sample / Tests		Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
							(0.35)	CONCRETE		
						72.91	0.35	MADE GROUND: Grey very sandy subangular fine to coarse Gravel with occasional fragments of concrete, red brick and plastic		
							(0.85)			
1.00-1.45	SPT(C) N=16				1,1/3,4,4,5					
						72.06	1.20	Firm to stiff grey mottled brown slightly silty slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse		
							(1.60)			
2.00-2.45 2.00	SPT(C) N=12 B				2,3/3,3,2,4					
										▼1 ▽1
					Water strike(1) at 2.80m, rose to 2.60m in 20 mins.	70.46	2.80	Medium Dense grey clayey sandy subangular to subrounded fine to coarse GRAVEL		
3.00 3.00-3.45	B SPT(C) N=12				1,7/3,5,2,2					
							(1.10)			
3.90					B					
	TCR	**SCR**	**RQD**	**FI**						
3.90	50					69.36	3.90 (0.25)	Recovery consists of brown coarse Sand onto Gravel. Driller notes; brown and grey GRAVEL		
4.00 4.15						69.11	4.15	Medium strong thinly bedded dark grey fine grained argillaceous fossilerous LIMESTONE. Partially weathered with clay sediment infill between some fractures. Discontinuities: 3 No. fracture sets. F1 - 0 to 10 degree fractures closely spaced planar, smooth. F2 - 35 to 50 degree fractures medium spaced planar to stepped, rough. F3 - 80 to 90 degrees fractures medium to widely spaced planar, rough		
4.50-4.60					PL					
	100	85	62	8						
5.30-5.50					UC					
5.50 5.60										
				20+						
6.20	100	89	53				(4.05)			
6.80-6.95					PL					
7.00				9						
	100	86	37							
8.20						65.06	8.20	Complete at 8.20m		

Remarks
Groundwater encountered at 2.80m BGL.
Borehole backfilled upon completion.
Chiselling from 3.90m to 3.90m for 1 hour.

Scale (approx) 1:50

Logged By SG

Figure No. 11334-12-21a.BH01

Ground Investigations Ireland Ltd
www.gii.ie

Site	Cappogue Dublin 11 Phase 1A			**Borehole Number** **BH02**
Boring Method Cable percussion with rotary core follow-on Rotary redrilled from ground level	**Casing Diameter** 200mm cased to 3.60m 96mm cased to 7.10m	**Ground Level (mOD)** 72.23	**Client** Thorntons Recycling	**Job Number** 11334-12-21a
	Location (dGPS) 710253.1 E 739578.3 N	**Dates** 29/04/2022- 05/05/2022	**Engineer** Fehily Timoney	**Sheet** 1/1

Depth (m)	Sample / Tests		Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Water
							(0.20)	TOPSOIL	
						72.03	0.20 (0.20)	Soft to firm redish brown slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse	
						71.83	0.40	Stiff grey mottled brown slightly sandy slightly gravelly CLAY with occasional cobbles. Gravel is subangular to subrounded fine to coarse	
0.50	B								
							(1.10)		
1.00-1.45 1.00	SPT(C) N=17 B				17,7/4,4,4,5				
						70.73	1.50	Stiff grey slightly sandy slightly gravelly silty CLAY with occasional cobbles. Gravel is subangular to subrounded fine to coarse	
2.00-2.45 2.00	SPT(C) N=17 B				3,4/4,5,4,4				▼1
					Water strike(1) at 2.20m, rose to 2.00m in 20 mins.		(1.90)		∇1
3.00-3.42 3.00	SPT(C) 50/265 B				3,7/7,8,16,19				
3.40	TCR	SCR	RQD	FI		68.83	3.40	Medium strong thinly bedded dark grey fine grained argillaceous fossilerous LIMESTONE with rare white mineral veins. Partially weathered Discontinuities: 1 No. fracture set. F1 - 0 to 10 degree fractures very closely spaced planar, smooth	
	100	67	0						
				14			(1.10)		
4.00									
4.45-4.60					PL				
4.50	100	95	62			67.73	4.50	Medium strong thinly bedded dark grey fine grained argillaceous fossilerous LIMESTONE with rare white mineral veins. Largely unweathered Discontinuities: 1 No. fracture set. F1 - 0 to 10 degree fractures close to medium spaced planar, smooth	
5.32-5.50					UC				
5.50									
				4			(2.60)		
	100	96	83						
7.00-7.10					PL				
7.10						65.13	7.10	Complete at 7.10m	

Remarks
Groundwater encountered at 2.20m BGL.
Borehole backfilled upon completion.
Chiselling from 3.40m to 3.60m for 1 hour.

Scale (approx)	**Logged By**
1:50	SG

Figure No.
11334-12-21a.BH02

Ground Investigations Ireland Ltd
www.gii.ie

Site Cappogue Dublin 11 Phase 1A

Borehole Number BH08

Boring Method Cable percussion with rotary core follow-on
Rotary redrilled from ground level

Casing Diameter 200mm cased to 3.10m
96mm cased to 7.00m

Ground Level (mOD) 72.58

Client Thorntons Recycling

Job Number 11334-12-21a

Location (dGPS) 710324.7 E 739529.5 N

Dates 28/04/2022-05/05/2022

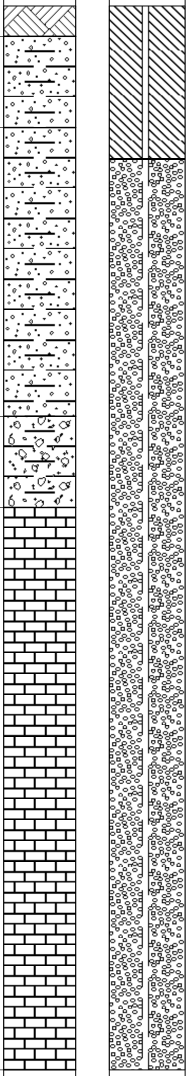
Engineer Fehily Timoney

Sheet 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records
0.50	B			
1.00-1.45	SPT(C) N=16			2,4/4,4,4,4
1.00	B			
2.00-2.45	SPT(C) N=20			2,3/4,5,6,5
2.00	B			
				12,13/50 50/40
3.00-3.16				SPT(C) 25*/120
3.00				B
3.35-3.55				PL
3.10				
3.28				
4.00				
4.40-4.55				UC
5.05				
5.40-5.50				PL
5.50				
7.00				

TCR	SCR	RQD	FI
97	69	60	12
100	96	69	
100	99	88	4

Level (mOD)	Depth (m) (Thickness)	Description
72.38	(0.20) 0.20	TOPSOIL
71.78	(0.60) 0.80	Soft to firm redish brown slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse
69.88	(1.90) 2.70	Stiff brown slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse
69.28	(0.60) 3.30	Stiff black slightly sandy slightly gravelly CLAY with occasional cobbles. Gravel is subangular to subrounded fine to coarse
65.58	(3.70) 7.00	Medium strong thinly bedded dark grey fine grained argillaceous fossilerous LIMESTONE. Largely unweathered with rare staining on fracture surfaces and little clay infill Discontinuities: 2 No. fracture sets. F1 - 0 to 10 degree fractures close to medium spaced planar, smooth. F2 - 45 degree fracture at 5.20m BGL planar, rough
		Complete at 7.00m



Remarks
No groundwater encountered.
CP borehole backfilled upon completion.
Install: 50mm slotted pipe with gravel surround from 7.00m to 1.00m BGL. 50mm solid pipe with bentonite surround from 1.00m BGL to ground level.
Chiselling from 3.10m to 3.10m for 1 hour.

Scale (approx) 1:50

Logged By SG

Figure No. 11334-12-21a.BH08

Ground Investigations Ireland Ltd
www.gii.ie

Site	Cappogue Dublin 11 Phase 1A
Borehole Number	**BH09**
Boring Method	Cable percussion with rotary core follow-on Rotary redrilled from ground level
Casing Diameter	200mm cased to 3.70m 96mm cased to 7.10m
Ground Level (mOD)	73.45
Client	Thorntons Recycling
Job Number	11334-12-21a
Location (dGPS)	710149.4 E 739503.8 N
Dates	29/04/2022- 05/05/2022
Engineer	Fehily Timoney
Sheet	1/1

Depth (m)	Sample / Tests	TCR	SCR	RQD	FI	Field Records
0.50	B					
1.00-1.45	SPT(C) N=11					2,2/3,2,2,4
1.00	B					
2.00-2.45	SPT(C) N=12					3,2/2,3,3,4
2.00	B					
3.00	B					7,7/19,31
3.00-3.27						SPT(C) 50/120
3.20						Water strike(1) at 3.20m, rose to 3.00m in 20 mins.
3.40-3.53						PL
3.70		100	100	63		B
4.00						
4.40-4.55						UC
		100	85	39		
5.33-5.45					11	PL
5.50						
		100	86	37		
7.10						

Level (mOD)	Depth (m) (Thickness)	Description	Water
	(0.80)	MADE GROUND: Brown and black slightly sandy slightly gravelly Clay with rare fragments of steel, plastic and paper	
72.65	0.80 (0.70)	Firm grey slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse	
71.95	1.50 (0.70)	Firm grey mottled brown slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse	
71.25	2.20 (1.00)	Firm to stiff brown slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse	▼1 ▽1
70.25	3.20 (0.50)	Possible WEATHERED BEDROCK: Recovered as; dark grey clayey sandy subangular fine to coarse GRAVEL	
69.75	3.70 (3.40)	Medium strong thinly bedded dark grey fine grained argillaceous fossilerous LIMESTONE with occasional white mineral veins less than 3mm thick, with one at base of borehole 30mm thick. Partially weathered with oxidation staining on fracture surfaces. Discontinuities: 3 No. fracture sets. F1 - 0 to 15 degree fractures closely spaced planar, smooth. F2 - 45 to 60 degree fractures medium to widely spaced stepped, rough. F3 - 80 to 90 degrees fractures widely spaced planar, rough	
66.35	7.10	Complete at 7.10m	

Remarks
No groundwater encountered.
CP borehole backfilled upon completion.
Install: 50mm slotted pipe with gravel surround from 7.10m to 1.10m BGL. 50mm solid pipe with bentonite surround from 1.10m BGL to ground level.
Chiselling from 3.20m to 3.70m for 1 hour.

Scale (approx)	1:50
Logged By	SG
Figure No.	11334-12-21a.BH03

Cappogue Dublin 11 – Rotary Core Photographs

BH01

BH01

BH02


GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental
Client: FEHILY TIMONEY
Site: CAPPOGUE, DUBLIN
Borehole ref: BH02
Box No: 1 of 2
Job Ref: 11334-12-21
Date: 11-05-22
Depth: From 3.40m to 6.10mBGL
CM 10 20 30 40 50 60 70 80 90 100
3.4m START
4m
5.5
5.5m

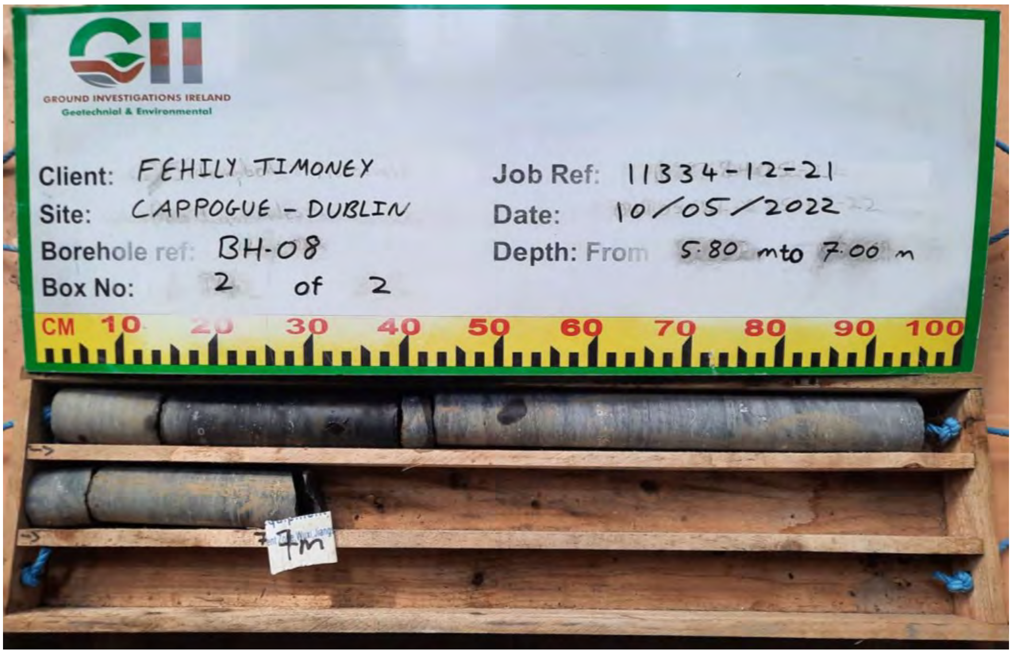
BH02


GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental
Client: FEHILY TIMONEY
Site: CAPPOGUE, DUBLIN
Borehole ref: BH02
Box No: of 2
Job Ref: 11334-12-21
Date: 11-05-22
Depth: From 6.10m to 7.10mBGL
CM 10 20 30 40 50 60 70 80 90 100
7.1m
7.1m

BH08

Client: FEHILY TIMONEY
Site: CAPPOGUE, DUBLIN
Borehole ref: BH02
Box No: 1 of 2
Job Ref: 11334-12-21
Date: 11-05-22
Depth: From 3·40m to 6·80 BGL

BH08



Client: FEHILY TIMONEY
Site: CAPPOGUE - DUBLIN
Borehole ref: BH-08
Box No: 2 of 2
Job Ref: 11334-12-21
Date: 10/05/2022
Depth: From 5·80 mto 7·00 m

BH09


GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental
Client: FEHILY TIMONEY
Site: CAPPOGUE - DUBLIN
Borehole ref: BH-09
Box No: 1 of 2
Job Ref: 11334-12-21
Date: 10/05/2022
Depth: From 3.20m to 5.95m
CM 10 20 30 40 50 60 70 80 90 100
4m
5.5m

BH09


GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental
Client: FEHILY TIMONEY
Site: CAPPOGUE - DUBLIN
Borehole ref: BH-09
Box No: 2 of 2
Job Ref: 11334-12-21
Date: 10/05/2022
Depth: From 5.95m to 7.10m
CM 10 20 30 40 50 60 70 80 90 100
7.1m
7.1M

APPENDIX 5 – Laboratory Testing

element

Element Materials Technology
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Ground Investigations Ireland
Catherinestown House
Hazelhatch Road
Newcastle
Co. Dublin
Ireland

4225

Attention :	James Cashen
Date :	26th January, 2022
Your reference :	11334-12-21
Our reference :	Test Report 22/442 Batch 1
Location :	Cappogue Dublin 11 Phase 1A
Date samples received :	14th January, 2022
Status :	Final Report
Issue :	1

Seventeen samples were received for analysis on 14th January, 2022 of which fourteen were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:

HAProwse

Hayley Prowse
Project Manager

Client Name: Ground Investigations Ireland
Reference: 11334-12-21
Location: Cappogue Dublin 11 Phase 1A
Contact: James Cashen
EMT Job No: 22/442

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	1-4	5-8	9-12	17-20	21-24	25-28	29-32	33-36	41-44	45-48			
Sample ID	TP01	TP02	TP07	TP10	TP11	TP12	TP13	TP14	TP16	TP18			
Depth	0.50	1.00	1.00	2.00	1.00	0.80	0.50	2.00	2.50	3.00			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	12/01/2022	12/01/2022	12/01/2022	12/01/2022	12/01/2022	12/01/2022	11/01/2022	11/01/2022	11/01/2022	11/01/2022			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1	LOD/LOR	Units	Method No.
Date of Receipt	14/01/2022	14/01/2022	14/01/2022	14/01/2022	14/01/2022	14/01/2022	14/01/2022	14/01/2022	14/01/2022	14/01/2022			
Arsenic#	8.2	14.5	11.8	8.9	7.8	8.3	8.8	6.1	5.3	5.7	<0.5	mg/kg	TM30/PM15
Cadmium#	1.0	2.7	1.6	1.0	2.1	2.0	1.8	1.1	1.3	3.4	<0.1	mg/kg	TM30/PM15
Chromium#	54.9	39.8	38.2	22.9	20.9	26.2	25.9	20.5	29.4	17.5	<0.5	mg/kg	TM30/PM15
Copper#	19	48	38	27	24	27	25	25	19	22	<1	mg/kg	TM30/PM15
Lead#	23	48	67	25	16	14	14	14	20	18	<5	mg/kg	TM30/PM15
Mercury#	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM30/PM15
Nickel#	32.8	46.8	40.0	45.7	31.9	35.6	42.3	38.4	27.0	33.1	<0.7	mg/kg	TM30/PM15
Selenium#	<1	<1	1	4	<1	<1	<1	2	3	1	<1	mg/kg	TM30/PM15
Water Soluble Boron#	0.5	1.1	2.5	0.5	0.3	0.3	0.5	0.6	0.4	0.5	<0.1	mg/kg	TM74/PM32
Zinc#	68	158	217	95	59	103	125	83	82	949	<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene#	<0.04	0.16	0.11	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	0.05	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Acenaphthene#	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM4/PM8
Fluorene#	<0.04	0.11	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Phenanthrene#	0.04	0.34	0.17	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Anthracene#	<0.04	0.06	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Fluoranthene#	0.09	0.42	0.19	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Pyrene#	0.08	0.39	0.19	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene#	0.08	0.22	0.17	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	mg/kg	TM4/PM8
Chrysene#	0.06	0.24	0.19	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene#	0.10	0.37	0.24	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene#	<0.04	0.19	0.13	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene#	0.06	0.15	0.11	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene#	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene#	0.04	0.14	0.13	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Coronene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
PAH 17 Total	<0.64	2.84	1.63	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	mg/kg	TM4/PM8
Benzo(b)fluoranthene	0.07	0.27	0.17	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.03	0.10	0.07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	87	86	85	63^{SV}	85	88	85	68^{SV}	100	96	<0	%	TM4/PM8
EPH (C8-C40) (EH_1D_Total)#	135	507	191	<30	<30	<30	<30	<30	<30	<30	<30	mg/kg	TM5/PM8
Phenol#	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	TM26/PM21B
Natural Moisture Content	12.3	26.8	32.9	11.1	14.6	11.4	16.2	19.0	21.0	17.5	<0.1	%	PM4/PM0
Sulphate as SO4 (2:1 Ext)#	0.0275	0.0279	0.0261	0.0389	0.0045	0.0286	0.0112	0.0621	0.0135	0.0411	<0.0015	g/l	TM38/PM20
Total Cyanide#	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	mg/kg	TM89/PM45
Organic Matter	0.8	2.7	6.4	1.0	0.7	0.6	0.7	0.9	0.8	0.6	<0.2	%	TM21/PM24

Client Name: Ground Investigations Ireland
Reference: 11334-12-21
Location: Cappogue Dublin 11 Phase 1A
Contact: James Cashen
EMT Job No: 22/442

Report : **Solid**

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	1-4	5-8	9-12	17-20	21-24	25-28	29-32	33-36	41-44	45-48			
Sample ID	TP01	TP02	TP07	TP10	TP11	TP12	TP13	TP14	TP16	TP18			
Depth	0.50	1.00	1.00	2.00	1.00	0.80	0.50	2.00	2.50	3.00			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	12/01/2022	12/01/2022	12/01/2022	12/01/2022	12/01/2022	12/01/2022	11/01/2022	11/01/2022	11/01/2022	11/01/2022			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1	LOD/LOR	Units	Method No.
Date of Receipt	14/01/2022	14/01/2022	14/01/2022	14/01/2022	14/01/2022	14/01/2022	14/01/2022	14/01/2022	14/01/2022	14/01/2022			
pH #	8.25	7.53	7.39	8.14	8.28	8.33	8.28	8.13	8.14	8.09	<0.01	pH units	TM73/PM11

Please include all sections of this report if it is reproduced
All solid results are expressed on a dry weight basis unless stated otherwise.

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: 11334-12-21
Location: Cappogue Dublin 11 Phase 1A
Contact: James Cashen
EMT Job No: 22/442

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	53-56	57-60	61-64	65-68									
Sample ID	TP19A	TP20	TP21	TP22									
Depth	0.50	1.00	0.50-1.00	0.50									
COC No / misc													
Containers	V J T	V J T	V J T	V J T									
Sample Date	11/01/2022	11/01/2022	11/01/2022	11/01/2022									
Sample Type	Soil	Soil	Soil	Soil									
Batch Number	1	1	1	1									
Date of Receipt	14/01/2022	14/01/2022	14/01/2022	14/01/2022							LOD/LOR	Units	Method No.
Arsenic #	14.9	8.0	9.8	10.2							<0.5	mg/kg	TM30/PM15
Cadmium #	1.7	0.9	1.8	1.0							<0.1	mg/kg	TM30/PM15
Chromium #	38.0	50.4	24.3	28.6							<0.5	mg/kg	TM30/PM15
Copper #	58	29	30	21							<1	mg/kg	TM30/PM15
Lead #	134	24	17	15							<5	mg/kg	TM30/PM15
Mercury #	<0.1	<0.1	<0.1	<0.1							<0.1	mg/kg	TM30/PM15
Nickel #	39.4	22.0	46.1	46.8							<0.7	mg/kg	TM30/PM15
Selenium #	<1	<1	<1	2							<1	mg/kg	TM30/PM15
Water Soluble Boron #	5.0	2.1	0.6	0.6							<0.1	mg/kg	TM74/PM32
Zinc #	371	100	85	90							<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene #	<0.04	<0.04	<0.04	<0.04							<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03	<0.03	<0.03							<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05	<0.05	<0.05	<0.05							<0.05	mg/kg	TM4/PM8
Fluorene #	<0.04	<0.04	<0.04	<0.04							<0.04	mg/kg	TM4/PM8
Phenanthrene #	0.10	<0.03	<0.03	<0.03							<0.03	mg/kg	TM4/PM8
Anthracene #	<0.04	<0.04	<0.04	<0.04							<0.04	mg/kg	TM4/PM8
Fluoranthene #	0.12	<0.03	<0.03	<0.03							<0.03	mg/kg	TM4/PM8
Pyrene #	0.12	<0.03	<0.03	<0.03							<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	0.08	<0.06	<0.06	<0.06							<0.06	mg/kg	TM4/PM8
Chrysene #	0.08	<0.02	<0.02	<0.02							<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	0.14	<0.07	<0.07	<0.07							<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	0.07	<0.04	<0.04	<0.04							<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #	<0.04	<0.04	<0.04	<0.04							<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04	<0.04	<0.04	<0.04							<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	0.07	<0.04	<0.04	<0.04							<0.04	mg/kg	TM4/PM8
Coronene	<0.04	<0.04	<0.04	<0.04							<0.04	mg/kg	TM4/PM8
PAH 17 Total	0.78	<0.64	<0.64	<0.64							<0.64	mg/kg	TM4/PM8
Benzo(b)fluoranthene	0.10	<0.05	<0.05	<0.05							<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.04	<0.02	<0.02	<0.02							<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	84	82	79	96							<0	%	TM4/PM8
EPH (C8-C40) (EH_1D_Total) #	3424	48	<30	<30							<30	mg/kg	TM5/PM8
Phenol #	<0.01	<0.01	<0.01	<0.01							<0.01	mg/kg	TM26/PM21B
Natural Moisture Content	37.3	32.6	15.9	25.6							<0.1	%	PM4/PM0
Sulphate as SO4 (2:1 Ext) #	1.5976	0.0670	0.0071	0.0320							<0.0015	g/l	TM38/PM20
Total Cyanide #	<0.5	<0.5	<0.5	<0.5							<0.5	mg/kg	TM89/PM45
Organic Matter	7.4	3.6	0.7	0.6							<0.2	%	TM21/PM24

Client Name: Ground Investigations Ireland
Reference: 11334-12-21
Location: Cappogue Dublin 11 Phase 1A
Contact: James Cashen
EMT Job No: 22/442

Report : **Solid**

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	53-56	57-60	61-64	65-68									
Sample ID	TP19A	TP20	TP21	TP22									
Depth	0.50	1.00	0.50-1.00	0.50									
COC No / misc													
Containers	V J T	V J T	V J T	V J T									
Sample Date	11/01/2022	11/01/2022	11/01/2022	11/01/2022									
Sample Type	Soil	Soil	Soil	Soil									
Batch Number	1	1	1	1							LOD/LOR	Units	Method No.
Date of Receipt	14/01/2022	14/01/2022	14/01/2022	14/01/2022									
pH #	7.54	7.29	8.17	8.16							<0.01	pH units	TM73/PM11

Please include all sections of this report if it is reproduced
All solid results are expressed on a dry weight basis unless stated otherwise.

Client Name: Ground Investigations Ireland
Reference: 11334-12-21
Location: Cappogue Dublin 11 Phase 1A
Contact: James Cashen

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Asbestos sub-samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level less than 0.1%, lie outside the scope of our UKAS accreditation. Asbestos quantification to 0.001% dry fibre of dry mass of sample is accredited to ISO17025.

Where the sample is not taken by a Element Materials Technology consultant, Element Materials Technology cannot be responsible for inaccurate or unrepresentative sampling.

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Date Of Analysis	Analysis	Result
22/442	1	TP01	0.50	3	20/01/2022	**General Description (Bulk Analysis)**	Soil/Stones
					20/01/2022	**Asbestos Fibres**	NAD
					20/01/2022	**Asbestos ACM**	NAD
					20/01/2022	**Asbestos Type**	NAD
					20/01/2022	**Asbestos Level Screen**	NAD
22/442	1	TP02	1.00	7	21/01/2022	**General Description (Bulk Analysis)**	Soil/Stones
					21/01/2022	**Asbestos Fibres**	NAD
					21/01/2022	**Asbestos ACM**	NAD
					21/01/2022	**Asbestos Type**	NAD
					21/01/2022	**Asbestos Level Screen**	NAD
22/442	1	TP07	1.00	11	21/01/2022	**General Description (Bulk Analysis)**	soil
					21/01/2022	**Asbestos Fibres**	NAD
					21/01/2022	**Asbestos ACM**	NAD
					21/01/2022	**Asbestos Type**	NAD
					21/01/2022	**Asbestos Level Screen**	NAD
22/442	1	TP10	2.00	19	21/01/2022	**General Description (Bulk Analysis)**	soil
					21/01/2022	**Asbestos Fibres**	NAD
					21/01/2022	**Asbestos ACM**	NAD
					21/01/2022	**Asbestos Type**	NAD
					21/01/2022	**Asbestos Level Screen**	NAD
22/442	1	TP11	1.00	23	20/01/2022	**General Description (Bulk Analysis)**	soil
					20/01/2022	**Asbestos Fibres**	NAD
					20/01/2022	**Asbestos ACM**	NAD
					20/01/2022	**Asbestos Type**	NAD
					20/01/2022	**Asbestos Level Screen**	NAD
22/442	1	TP12	0.80	27	21/01/2022	**General Description (Bulk Analysis)**	soil
					21/01/2022	**Asbestos Fibres**	NAD
					21/01/2022	**Asbestos ACM**	NAD
					21/01/2022	**Asbestos Type**	NAD
					21/01/2022	**Asbestos Level Screen**	NAD
22/442	1	TP13	0.50	31	21/01/2022	**General Description (Bulk Analysis)**	soil
					21/01/2022	**Asbestos Fibres**	NAD
					21/01/2022	**Asbestos ACM**	NAD

Client Name: Ground Investigations Ireland
Reference: 11334-12-21
Location: Cappogue Dublin 11 Phase 1A
Contact: James Cashen

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Date Of Analysis	Analysis	Result
22/442	1	TP13	0.50	31	21/01/2022	**Asbestos Type**	NAD
					21/01/2022	**Asbestos Level Screen**	NAD
22/442	1	TP14	2.00	35	21/01/2022	**General Description (Bulk Analysis)**	soil
					21/01/2022	**Asbestos Fibres**	NAD
					21/01/2022	**Asbestos ACM**	NAD
					21/01/2022	**Asbestos Type**	NAD
					21/01/2022	**Asbestos Level Screen**	NAD
22/442	1	TP16	2.50	43	21/01/2022	**General Description (Bulk Analysis)**	soil.stones
					21/01/2022	**Asbestos Fibres**	NAD
					21/01/2022	**Asbestos ACM**	NAD
					21/01/2022	**Asbestos Type**	NAD
					21/01/2022	**Asbestos Level Screen**	NAD
22/442	1	TP18	3.00	47	21/01/2022	**General Description (Bulk Analysis)**	soilstones
					21/01/2022	**Asbestos Fibres**	NAD
					21/01/2022	**Asbestos ACM**	NAD
					21/01/2022	**Asbestos Type**	NAD
					21/01/2022	**Asbestos Level Screen**	NAD
22/442	1	TP19A	0.50	55	21/01/2022	**General Description (Bulk Analysis)**	soil
					21/01/2022	**Asbestos Fibres**	NAD
					21/01/2022	**Asbestos ACM**	NAD
					21/01/2022	**Asbestos Type**	NAD
					21/01/2022	**Asbestos Level Screen**	NAD
22/442	1	TP20	1.00	59	21/01/2022	**General Description (Bulk Analysis)**	soil
					21/01/2022	**Asbestos Fibres**	NAD
					21/01/2022	**Asbestos ACM**	NAD
					21/01/2022	**Asbestos Type**	NAD
					21/01/2022	**Asbestos Level Screen**	NAD
22/442	1	TP21	0.50-1.00	63	21/01/2022	**General Description (Bulk Analysis)**	soil
					21/01/2022	**Asbestos Fibres**	NAD
					21/01/2022	**Asbestos ACM**	NAD
					21/01/2022	**Asbestos Type**	NAD
					21/01/2022	**Asbestos Level Screen**	NAD
22/442	1	TP22	0.50	67	21/01/2022	**General Description (Bulk Analysis)**	soil
					21/01/2022	**Asbestos Fibres**	NAD
					21/01/2022	**Asbestos ACM**	NAD
					21/01/2022	**Asbestos Type**	NAD
					21/01/2022	**Asbestos Level Screen**	NAD

Client Name: Ground Investigations Ireland
Reference: 11334-12-21
Location: Cappogue Dublin 11 Phase 1A
Contact: James Cashen

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
No deviating sample report results for job 22/442						

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

EMT Job No.: 22/442

SOILS and ASH

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. Asbestos samples are retained for 6 months.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C. Ash samples are dried at 37°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

STACK EMISSIONS

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation for Dioxins and Furans and Dioxin like PCBs has been performed on XAD-2 Resin, only samples which use this resin will be within our MCERTS scope.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.
Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

HWOL ACRONYMS AND OPERATORS USED

HS	Headspace Analysis.
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent.
CU	Clean-up - e.g. by florisil, silica gel.
1D	GC - Single coil gas chromatography.
Total	Aliphatics & Aromatics.
AL	Aliphatics only.
AR	Aromatics only.
2D	GC-GC - Double coil gas chromatography.
#1	EH_Total but with humics mathematically subtracted
#2	EU_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +).
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry.

EMT Job No: 22/442

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM21	Modified BS 7755-3:1995, ISO10694:1995 Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.			AD	Yes
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM21B	As Received samples are extracted in Methanol: Water (60:40) by reciprocal shaker.	Yes		AR	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013l	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AD	Yes
TM65	Asbestos Bulk Identification method based on HSG 248 First edition (2006)	PM42	Modified SCA Blue Book V.12 draft 2017 and WM3 1st Edition v1.1:2018. Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No

EMT Job No: 22/442

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM74	Analysis of water soluble boron (20:1 extract) by ICP-OES.	PM32	Hot water soluble boron is extracted from dried and ground samples using a 20:1 ratio.	Yes		AD	Yes
TM89	Modified USEPA method OIA-1667 (1999). Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide, Sulphide and Thiocyanate analysis.	Yes		AR	Yes

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Ground Investigations Ireland
Catherinestown House
Hazelhatch Road
Newcastle
Co. Dublin
Ireland

Attention :	James Cashen
Date :	26th January, 2022
Your reference :	11334-12-21
Our reference :	Test Report 22/442 Batch 2
Location :	Cappogue Dublin 11 Phase 1A
Date samples received :	20th January, 2022
Status :	Final Report
Issue :	1

Seven samples were received for analysis on 20th January, 2022 of which six were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:

Hayley Prowse
Project Manager

Client Name: Ground Investigations Ireland
Reference: 11334-12-21
Location: Cappogue Dublin 11 Phase 1A
Contact: James Cashen
EMT Job No: 22/442

Report : **Solid**

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	73-76	77-80	81-84	85-88	89-92	93-96							
Sample ID	TP04	TP05	TP06	TP08	TP23	TP23							
Depth	1.00	0.50	0.50	0.50	0.50	2.00							
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T							
Sample Date	18/01/2022	18/01/2022	18/01/2022	18/01/2022	18/01/2022	18/01/2022							
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil							
Batch Number	2	2	2	2	2	2							
Date of Receipt	20/01/2022	20/01/2022	20/01/2022	20/01/2022	20/01/2022	20/01/2022					LOD/LOR	Units	Method No.
Arsenic $^{\#}$	15.9	12.3	13.8	24.4	10.9	9.4					<0.5	mg/kg	TM30/PM15
Cadmium $^{\#}$	1.2	1.2	1.6	1.0	0.6	0.9					<0.1	mg/kg	TM30/PM15
Chromium $^{\#}$	29.8	24.4	47.1	38.9	36.6	30.9					<0.5	mg/kg	TM30/PM15
Copper $^{\#}$	26	25	94	27	30	23					<1	mg/kg	TM30/PM15
Lead $^{\#}$	18	20	703	44	36	16					<5	mg/kg	TM30/PM15
Mercury $^{\#}$	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	mg/kg	TM30/PM15
Nickel $^{\#}$	47.7	45.1	31.7	33.7	22.1	40.1					<0.7	mg/kg	TM30/PM15
Selenium $^{\#}$	<1	<1	<1	<1	<1	2					<1	mg/kg	TM30/PM15
Water Soluble Boron $^{\#}$	0.5	0.6	2.1	0.7	1.8	0.5					<0.1	mg/kg	TM74/PM32
Zinc $^{\#}$	82	157	280	89	74	108					<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene $^{\#}$	<0.04^{SV}	<0.04	<0.04	<0.04	<0.04	<0.04					<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03^{SV}	<0.03	<0.03	<0.03	<0.03	<0.03					<0.03	mg/kg	TM4/PM8
Acenaphthene $^{\#}$	<0.05^{SV}	<0.05	<0.05	<0.05	<0.05	<0.05					<0.05	mg/kg	TM4/PM8
Fluorene $^{\#}$	<0.04^{SV}	<0.04	<0.04	<0.04	<0.04	<0.04					<0.04	mg/kg	TM4/PM8
Phenanthrene $^{\#}$	<0.03^{SV}	<0.03	0.13	0.06	0.13	<0.03					<0.03	mg/kg	TM4/PM8
Anthracene $^{\#}$	<0.04^{SV}	<0.04	<0.04	<0.04	<0.04	<0.04					<0.04	mg/kg	TM4/PM8
Fluoranthene $^{\#}$	<0.03^{SV}	<0.03	0.22	0.14	0.24	0.05					<0.03	mg/kg	TM4/PM8
Pyrene $^{\#}$	<0.03^{SV}	<0.03	0.19	0.13	0.20	0.04					<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene $^{\#}$	<0.06^{SV}	<0.06	0.17	0.12	0.17	<0.06					<0.06	mg/kg	TM4/PM8
Chrysene $^{\#}$	<0.02^{SV}	<0.02	0.14	0.13	0.13	0.02					<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene $^{\#}$	<0.07^{SV}	<0.07	0.29	0.23	0.27	<0.07					<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene $^{\#}$	<0.04^{SV}	<0.04	0.17	0.14	0.16	<0.04					<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene $^{\#}$	<0.04^{SV}	<0.04	0.16	0.12	0.12	<0.04					<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene $^{\#}$	<0.04^{SV}	<0.04	<0.04	<0.04	<0.04	<0.04					<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene $^{\#}$	<0.04^{SV}	<0.04	0.16	0.12	0.10	<0.04					<0.04	mg/kg	TM4/PM8
Coronene	<0.04^{SV}	<0.04	<0.04	<0.04	<0.04	<0.04					<0.04	mg/kg	TM4/PM8
PAH 17 Total	<0.64^{SV}	<0.64	1.63	1.19	1.52	<0.64					<0.64	mg/kg	TM4/PM8
Benzo(b)fluoranthene	<0.05	<0.05	0.21	0.17	0.19	<0.05					<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	<0.02	<0.02	0.08	0.06	0.08	<0.02					<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	63^{SV}	73	78	77	78	70					<0	%	TM4/PM8
EPH (C8-C40) (EH_1D_Total) $^{\#}$	<30	<30	650	100	191	<30					<30	mg/kg	TM5/PM8
Phenol $^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	mg/kg	TM26/PM21B
Natural Moisture Content	19.3	17.3	43.5	10.8	12.3	21.3					<0.1	%	PM4/PM0
Sulphate as SO4 (2:1 Ext) $^{\#}$	0.0218	0.0714	0.0394	0.0375	0.2323	0.1703					<0.0015	g/l	TM38/PM20
Total Cyanide $^{\#}$	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5					<0.5	mg/kg	TM89/PM45
Organic Matter	0.7	0.7	6.0	1.2	1.3	0.4					<0.2	%	TM21/PM24

Client Name:	Ground Investigations Ireland	**Report :**	**Solid**
Reference:	11334-12-21		
Location:	Cappogue Dublin 11 Phase 1A	**Solids:**	V=60g VOC jar, J=250g glass jar, T=plastic tub
Contact:	James Cashen		
EMT Job No:	22/442		

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	73-76	77-80	81-84	85-88	89-92	93-96							
Sample ID	TP04	TP05	TP06	TP08	TP23	TP23							
Depth	1.00	0.50	0.50	0.50	0.50	2.00							
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T							
Sample Date	18/01/2022	18/01/2022	18/01/2022	18/01/2022	18/01/2022	18/01/2022							
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil							
Batch Number	2	2	2	2	2	2					LOD/LOR	Units	Method No.
Date of Receipt	20/01/2022	20/01/2022	20/01/2022	20/01/2022	20/01/2022	20/01/2022							
pH #	8.05	8.19	7.62	8.07	10.96	7.83					<0.01	pH units	TM73/PM11

Please include all sections of this report if it is reproduced
All solid results are expressed on a dry weight basis unless stated otherwise.

Client Name: Ground Investigations Ireland
Reference: 11334-12-21
Location: Cappogue Dublin 11 Phase 1A
Contact: James Cashen

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Asbestos sub-samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level less than 0.1%, lie outside the scope of our UKAS accreditation. Asbestos quantification to 0.001% dry fibre of dry mass of sample is accredited to ISO17025.

Where the sample is not taken by a Element Materials Technology consultant, Element Materials Technology cannot be responsible for inaccurate or unrepresentative sampling.

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Date Of Analysis	Analysis	Result
22/442	2	TP04	1.00	75	25/01/2022	**General Description (Bulk Analysis)**	soil
					25/01/2022	**Asbestos Fibres**	NAD
					25/01/2022	**Asbestos ACM**	NAD
					25/01/2022	**Asbestos Type**	NAD
					25/01/2022	**Asbestos Level Screen**	NAD
22/442	2	TP05	0.50	79	21/01/2022	**General Description (Bulk Analysis)**	soil
					21/01/2022	**Asbestos Fibres**	NAD
					21/01/2022	**Asbestos ACM**	NAD
					21/01/2022	**Asbestos Type**	NAD
					21/01/2022	**Asbestos Level Screen**	NAD
22/442	2	TP06	0.50	83	21/01/2022	**General Description (Bulk Analysis)**	soil
					21/01/2022	**Asbestos Fibres**	NAD
					21/01/2022	**Asbestos ACM**	NAD
					21/01/2022	**Asbestos Type**	NAD
					21/01/2022	**Asbestos Level Screen**	NAD
22/442	2	TP08	0.50	87	21/01/2022	**General Description (Bulk Analysis)**	soil
					21/01/2022	**Asbestos Fibres**	NAD
					21/01/2022	**Asbestos ACM**	NAD
					21/01/2022	**Asbestos Type**	NAD
					21/01/2022	**Asbestos Level Screen**	NAD
22/442	2	TP23	0.50	91	21/01/2022	**General Description (Bulk Analysis)**	soil
					21/01/2022	**Asbestos Fibres**	NAD
					21/01/2022	**Asbestos ACM**	NAD
					21/01/2022	**Asbestos Type**	NAD
					21/01/2022	**Asbestos Level Screen**	NAD
22/442	2	TP23	2.00	95	21/01/2022	**General Description (Bulk Analysis)**	soil.stones
					21/01/2022	**Asbestos Fibres**	NAD
					21/01/2022	**Asbestos ACM**	NAD
					21/01/2022	**Asbestos Type**	NAD
					21/01/2022	**Asbestos Level Screen**	NAD

Client Name: Ground Investigations Ireland
Reference: 11334-12-21
Location: Cappogue Dublin 11 Phase 1A
Contact: James Cashen

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
No deviating sample report results for job 22/442						

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.
Only analyses which are accredited are recorded as deviating if set criteria are not met.

SOILS and ASH

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. Asbestos samples are retained for 6 months.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C. Ash samples are dried at 37°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

STACK EMISSIONS

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation for Dioxins and Furans and Dioxin like PCBs has been performed on XAD-2 Resin, only samples which use this resin will be within our MCERTS scope.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.
Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

HWOL ACRONYMS AND OPERATORS USED

HS	Headspace Analysis.
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent.
CU	Clean-up - e.g. by florisil, silica gel.
1D	GC - Single coil gas chromatography.
Total	Aliphatics & Aromatics.
AL	Aliphatics only.
AR	Aromatics only.
2D	GC-GC - Double coil gas chromatography.
#1	EH_Total but with humics mathematically subtracted
#2	EU_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +).
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry.

EMT Job No: 22/442

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM21	Modified BS 7755-3:1995, ISO10694:1995 Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.			AD	Yes
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM21B	As Received samples are extracted in Methanol: Water (60:40) by reciprocal shaker.	Yes		AR	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013l	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AD	Yes
TM65	Asbestos Bulk Identification method based on HSG 248 First edition (2006)	PM42	Modified SCA Blue Book V.12 draft 2017 and WM3 1st Edition v1.1:2018. Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No

EMT Job No: 22/442

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM74	Analysis of water soluble boron (20:1 extract) by ICP-OES.	PM32	Hot water soluble boron is extracted from dried and ground samples using a 20:1 ratio.	Yes		AD	Yes
TM89	Modified USEPA method OIA-1667 (1999). Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide, Sulphide and Thiocyanate analysis.	Yes		AR	Yes

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Ground Investigations Ireland
Catherinestown House
Hazelhatch Road
Newcastle
Co. Dublin
Ireland

Attention :	James Cashen
Date :	13th June, 2022
Your reference :	11334-12-21
Our reference :	Test Report 22/8371 Batch 1
Location :	Cappogue
Date samples received :	23rd May, 2022
Status :	Final Report
Issue :	1

Two samples were received for analysis on 23rd May, 2022 of which two were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:

Bruce Leslie
Project Manager

Client Name: Ground Investigations Ireland
Reference: 11334-12-21
Location: Cappogue
Contact: James Cashen
EMT Job No: 22/8371

Report : **Liquid**

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
H=H_2SO_4, Z=ZnAc, N=NaOH, HN=$HN0_3$

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	1-6	7-12										
Sample ID	BH08	BH09										
Depth												
COC No / misc												
Containers	V H HNUF P G	V H HNUF P G										
Sample Date	18/05/2022 14:20	18/05/2022 15:00										
Sample Type	Ground Water	Ground Water										
Batch Number	1	1									LOD/LOR	Units	Method No.
Date of Receipt	23/05/2022	23/05/2022											
Dissolved Arsenic #	<0.9	1.3									<0.9	ug/l	TM170/PM14
Dissolved Boron #	69	68									<12	ug/l	TM170/PM14
Dissolved Cadmium #	<0.03	<0.03									<0.03	ug/l	TM170/PM14
Total Dissolved Chromium #	<0.2	<0.2									<0.2	ug/l	TM170/PM14
Dissolved Copper #	3	<1									<1	ug/l	TM170/PM14
Total Dissolved Iron #	0.0305	0.0059									<0.0047	mg/l	TM170/PM14
Dissolved Lead #	<0.4	<0.4									<0.4	ug/l	TM170/PM14
Dissolved Manganese #	79.4	84.5									<1.5	ug/l	TM170/PM14
Dissolved Nickel #	42.4	11.2									<0.2	ug/l	TM170/PM14
Dissolved Selenium #	<1.2	<1.2									<1.2	ug/l	TM170/PM14
Dissolved Zinc #	35.4	5.2									<1.5	ug/l	TM170/PM14
Dissolved Calcium #	196.3	157.5									<0.2	mg/l	TM30/PM14
Dissolved Magnesium #	42.4	14.9									<0.1	mg/l	TM30/PM14
Dissolved Potassium #	2.0	3.4									<0.1	mg/l	TM30/PM14
Dissolved Sodium #	23.9	28.0									<0.1	mg/l	TM30/PM14
Total Phosphorus	280	1258									<5	ug/l	TM30/PM14
Mercury Dissolved by CVAF #	<0.01	<0.01									<0.01	ug/l	TM61/PM0
Total Hardness Dissolved (as CaCO3)	669	456									<1	mg/l	TM30/PM14
PAH MS													
Naphthalene #	<0.3$_{AA}$	<0.3$_{AA}$									<0.1	ug/l	TM4/PM30
Acenaphthylene #	<0.015$_{AA}$	<0.015$_{AA}$									<0.005	ug/l	TM4/PM30
Acenaphthene #	<0.015$_{AA}$	<0.015$_{AA}$									<0.005	ug/l	TM4/PM30
Fluorene #	<0.015$_{AA}$	<0.015$_{AA}$									<0.005	ug/l	TM4/PM30
Phenanthrene #	<0.015$_{AA}$	<0.015$_{AA}$									<0.005	ug/l	TM4/PM30
Anthracene #	<0.015$_{AA}$	<0.015$_{AA}$									<0.005	ug/l	TM4/PM30
Fluoranthene #	<0.015$_{AA}$	<0.015$_{AA}$									<0.005	ug/l	TM4/PM30
Pyrene #	<0.015$_{AA}$	<0.015$_{AA}$									<0.005	ug/l	TM4/PM30
Benzo(a)anthracene #	<0.015$_{AA}$	<0.015$_{AA}$									<0.005	ug/l	TM4/PM30
Chrysene #	<0.015$_{AA}$	<0.015$_{AA}$									<0.005	ug/l	TM4/PM30
Benzo(bk)fluoranthene #	<0.024$_{AA}$	<0.024$_{AA}$									<0.008	ug/l	TM4/PM30
Benzo(a)pyrene #	<0.015$_{AA}$	<0.015$_{AA}$									<0.005	ug/l	TM4/PM30
Indeno(123cd)pyrene #	<0.015$_{AA}$	<0.015$_{AA}$									<0.005	ug/l	TM4/PM30
Dibenzo(ah)anthracene #	<0.015$_{AA}$	<0.015$_{AA}$									<0.005	ug/l	TM4/PM30
Benzo(ghi)perylene #	<0.015$_{AA}$	<0.015$_{AA}$									<0.005	ug/l	TM4/PM30
PAH 16 Total #	<0.519$_{AA}$	<0.519$_{AA}$									<0.173	ug/l	TM4/PM30
Benzo(b)fluoranthene	<0.024$_{AA}$	<0.024$_{AA}$									<0.008	ug/l	TM4/PM30
Benzo(k)fluoranthene	<0.024$_{AA}$	<0.024$_{AA}$									<0.008	ug/l	TM4/PM30
PAH Surrogate % Recovery	82$_{AA}$	81$_{AA}$									<0	%	TM4/PM30
Methyl Tertiary Butyl Ether #	<0.1	<0.1									<0.1	ug/l	TM15/PM10
Benzene #	<0.5	<0.5									<0.5	ug/l	TM15/PM10
Toluene #	<5	<5									<5	ug/l	TM15/PM10

Please include all sections of this report if it is reproduced
All solid results are expressed on a dry weight basis unless stated otherwise.

Client Name: Ground Investigations Ireland
Reference: 11334-12-21
Location: Cappogue
Contact: James Cashen
EMT Job No: 22/8371

Report : **Liquid**

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
H=H_2SO_4, Z=ZnAc, N=NaOH, HN=$HN0_3$

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	1-6	7-12									LOD/LOR	Units	Method No.
Sample ID	BH08	BH09											
Depth													
COC No / misc													
Containers	V H HNUF P G	V H HNUF P G											
Sample Date	18/05/2022 14:20	18/05/2022 15:00											
Sample Type	Ground Water	Ground Water											
Batch Number	1	1											
Date of Receipt	23/05/2022	23/05/2022											
Ethylbenzene #	<1	<1									<1	ug/l	TM15/PM10
m/p-Xylene #	<2	<2									<2	ug/l	TM15/PM10
o-Xylene #	<1	<1									<1	ug/l	TM15/PM10
Surrogate Recovery Toluene D8	102	101									<0	%	TM15/PM10
Surrogate Recovery 4-Bromofluorobenzene	109	106									<0	%	TM15/PM10
Pesticides													
Organochlorine Pesticides													
Aldrin	<0.03$_{AA}$	<0.03$_{AA}$									<0.01	ug/l	TM149/PM30
Alpha-HCH (BHC)	<0.03$_{AA}$	<0.03$_{AA}$									<0.01	ug/l	TM149/PM30
Beta-HCH (BHC)	<0.03$_{AA}$	<0.03$_{AA}$									<0.01	ug/l	TM149/PM30
Delta-HCH (BHC)	<0.03$_{AA}$	<0.03$_{AA}$									<0.01	ug/l	TM149/PM30
Dieldrin	<0.03$_{AA}$	<0.03$_{AA}$									<0.01	ug/l	TM149/PM30
Endosulphan I	<0.03$_{AA}$	<0.03$_{AA}$									<0.01	ug/l	TM149/PM30
Endosulphan II	<0.03$_{AA}$	<0.03$_{AA}$									<0.01	ug/l	TM149/PM30
Endosulphan sulphate	<0.06$_{AB}$	<0.06$_{AB}$									<0.01	ug/l	TM149/PM30
Endrin	<0.03$_{AA}$	<0.03$_{AA}$									<0.01	ug/l	TM149/PM30
Gamma-HCH (BHC)	<0.03$_{AA}$	<0.03$_{AA}$									<0.01	ug/l	TM149/PM30
Heptachlor	<0.06$_{AB}$	<0.06$_{AB}$									<0.01	ug/l	TM149/PM30
Heptachlor Epoxide	<0.03$_{AA}$	<0.03$_{AA}$									<0.01	ug/l	TM149/PM30
o,p'-Methoxychlor	<0.15$_{AC}$	<0.15$_{AC}$									<0.01	ug/l	TM149/PM30
p,p'-DDE	<0.03$_{AA}$	<0.03$_{AA}$									<0.01	ug/l	TM149/PM30
p,p'-DDT	<0.15$_{AC}$	<0.15$_{AC}$									<0.01	ug/l	TM149/PM30
p,p'-Methoxychlor	<0.15$_{AC}$	<0.15$_{AC}$									<0.01	ug/l	TM149/PM30
p,p'-TDE	<0.03$_{AA}$	<0.03$_{AA}$									<0.01	ug/l	TM149/PM30
Organophosphorus Pesticides													
Azinphos methyl	<0.50$_{AD}$	<0.50$_{AD}$									<0.01	ug/l	TM149/PM30
Diazinon	<0.03$_{AA}$	<0.03$_{AA}$									<0.01	ug/l	TM149/PM30
Dichlorvos	<0.06$_{AB}$	<0.06$_{AB}$									<0.01	ug/l	TM149/PM30
Disulfoton	<0.03$_{AA}$	<0.03$_{AA}$									<0.01	ug/l	TM149/PM30
Ethion	<0.03$_{AA}$	<0.03$_{AA}$									<0.01	ug/l	TM149/PM30
Ethyl Parathion (Parathion)	<0.03$_{AA}$	<0.03$_{AA}$									<0.01	ug/l	TM149/PM30
Fenitrothion	<0.06$_{AB}$	<0.06$_{AB}$									<0.01	ug/l	TM149/PM30
Malathion	<0.06$_{AB}$	<0.06$_{AB}$									<0.01	ug/l	TM149/PM30
Methyl Parathion	<0.06$_{AB}$	<0.06$_{AB}$									<0.01	ug/l	TM149/PM30
Mevinphos	<0.15$_{AC}$	<0.15$_{AC}$									<0.01	ug/l	TM149/PM30

Element Materials Technology

Client Name:	Ground Investigations Ireland
Reference:	11334-12-21
Location:	Cappogue
Contact:	James Cashen
EMT Job No:	22/8371

Report : **Liquid**

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
H=H_2SO_4, Z=ZnAc, N=NaOH, HN=$HN0_3$

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	1-6	7-12											
Sample ID	BH08	BH09											
Depth													
COC No / misc													
Containers	V H HNUF P G	V H HNUF P G											
Sample Date	18/05/2022 14:20	18/05/2022 15:00											
Sample Type	Ground Water	Ground Water											
Batch Number	1	1									LOD/LOR	Units	Method No.
Date of Receipt	23/05/2022	23/05/2022											
Acid Herbicides													
Benazolin	<0.1	<0.1									<0.1	ug/l	TM42/PM30
Bentazone	<0.1	<0.1									<0.1	ug/l	TM42/PM30
Bromoxynil	<0.1	<0.1									<0.1	ug/l	TM42/PM30
Clopyralid	<0.1	<0.1									<0.1	ug/l	TM42/PM30
4-CPA	<0.1	<0.1									<0.1	ug/l	TM42/PM30
2,4-D	<0.1	<0.1									<0.1	ug/l	TM42/PM30
2,4-DB	<0.1	<0.1									<0.1	ug/l	TM42/PM30
Dicamba	<0.1	<0.1									<0.1	ug/l	TM42/PM30
Dichloroprop	<0.1	<0.1									<0.1	ug/l	TM42/PM30
Diclofop	<0.1	<0.1									<0.1	ug/l	TM42/PM30
Fenoprop	<0.1	<0.1									<0.1	ug/l	TM42/PM30
Flamprop	<0.1	<0.1									<0.1	ug/l	TM42/PM30
Flamprop-isopropyl	<0.1	<0.1									<0.1	ug/l	TM42/PM30
Ioxynil	<0.1	<0.1									<0.1	ug/l	TM42/PM30
MCPA	<0.1	<0.1									<0.1	ug/l	TM42/PM30
MCPB	<0.1	<0.1									<0.1	ug/l	TM42/PM30
Mecoprop	<0.1	<0.1									<0.1	ug/l	TM42/PM30
Picloram	<0.1	<0.1									<0.1	ug/l	TM42/PM30
Pentachlorophenol	<0.1	<0.1									<0.1	ug/l	TM42/PM30
2,4,5-T	<0.1	<0.1									<0.1	ug/l	TM42/PM30
2,3,6-TBA	<0.1	<0.1									<0.1	ug/l	TM42/PM30
Triclopyr	<0.1	<0.1									<0.1	ug/l	TM42/PM30
EPH (C8-C40)$^{\#}$	<10	<10^{SV}									<10	ug/l	TM5/PM30
TPH CWG													
Aliphatics													
>C5-C6$^{\#}$	<10	<10									<10	ug/l	TM36/PM12
>C6-C8$^{\#}$	<10	<10									<10	ug/l	TM36/PM12
>C8-C10$^{\#}$	<10	<10									<10	ug/l	TM36/PM12
>C10-C12$^{\#}$	<5	<5									<5	ug/l	TM5/PM16/PM30
>C12-C16$^{\#}$	<10	<10									<10	ug/l	TM5/PM16/PM30
>C16-C21$^{\#}$	<10	<10									<10	ug/l	TM5/PM16/PM30
>C21-C35$^{\#}$	<10	<10									<10	ug/l	TM5/PM16/PM30
Total aliphatics C5-35$^{\#}$	<10	<10									<10	ug/l	TM5/TM36/PM12/PM16/PM30

Client Name: Ground Investigations Ireland
Reference: 11334-12-21
Location: Cappogue
Contact: James Cashen
EMT Job No: 22/8371

Report : **Liquid**

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
H=H_2SO_4, Z=ZnAc, N=NaOH, HN=$HN0_3$

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	1-6	7-12									LOD/LOR	Units	Method No.
Sample ID	BH08	BH09											
Depth													
COC No / misc													
Containers	V H HNUF P G	V H HNUF P G											
Sample Date	18/05/2022 14:20	18/05/2022 15:00											
Sample Type	Ground Water	Ground Water											
Batch Number	1	1											
Date of Receipt	23/05/2022	23/05/2022											
TPH CWG													
Aromatics													
>C5-EC7 $^{\#}$	<10	<10									<10	ug/l	TM36/PM12
>EC7-EC8 $^{\#}$	<10	<10									<10	ug/l	TM36/PM12
>EC8-EC10 $^{\#}$	<10	<10									<10	ug/l	TM36/PM12
>EC10-EC12 $^{\#}$	<5	<5									<5	ug/l	TM5/PM16/PM30
>EC12-EC16 $^{\#}$	<10	<10									<10	ug/l	TM5/PM16/PM30
>EC16-EC21 $^{\#}$	<10	<10									<10	ug/l	TM5/PM16/PM30
>EC21-EC35 $^{\#}$	<10	<10									<10	ug/l	TM5/PM16/PM30
Total aromatics C5-35 $^{\#}$	<10	<10									<10	ug/l	TM5/TM36/PM12/PM16/PM30
Total aliphatics and aromatics(C5-35) $^{\#}$	<10	<10									<10	ug/l	TM5/TM36/PM12/PM16/PM30
Phenol	<0.5	<0.5									<0.5	ug/l	TM26/PM0
Fluoride	0.5	<0.3									<0.3	mg/l	TM173/PM0
Sulphate as SO4 $^{\#}$	356.8	96.4									<0.5	mg/l	TM38/PM0
Chloride $^{\#}$	35.5	33.7									<0.3	mg/l	TM38/PM0
Nitrate as NO3 $^{\#}$	<0.2	4.7									<0.2	mg/l	TM38/PM0
Nitrite as NO2 $^{\#}$	<0.02	0.77									<0.02	mg/l	TM38/PM0
Ortho Phosphate as PO4 $^{\#}$	<0.06	0.06									<0.06	mg/l	TM38/PM0
Total Oxidised Nitrogen as N $^{\#}$	<0.2	1.3									<0.2	mg/l	TM38/PM0
Total Cyanide	<1	<1									<1	ug/l	TM89/PM0
Ammoniacal Nitrogen as N $^{\#}$	0.11	0.12									<0.03	mg/l	TM38/PM0
Ammoniacal Nitrogen as NH3 $^{\#}$	0.13	0.15									<0.03	mg/l	TM38/PM0
Ammoniacal Nitrogen as NH4 $^{\#}$	0.14	0.16									<0.03	mg/l	TM38/PM0
Hexavalent Chromium	<2	<2									<2	ug/l	TM38/PM0
Total Alkalinity as CaCO3 $^{\#}$	350	1256									<1	mg/l	TM75/PM0
Sulphide	<0.01	<0.01									<0.01	mg/l	TM107/PM0
Electrical Conductivity @25C $^{\#}$	1219	899									<2	uS/cm	TM76/PM0
pH $^{\#}$	7.64	7.42									<0.01	pH units	TM73/PM0
Redox	274.41	274.85										mV	TM72/PM0
Salinity	<0.1	<0.1									<0.1	%	TM64W/PM0
Total Organic Carbon $^{\#}$	<2	<2									<2	mg/l	TM60/PM0
Total Dissolved Solids $^{\#}$	985	619									<35	mg/l	TM20/PM0

Please include all sections of this report if it is reproduced
All solid results are expressed on a dry weight basis unless stated otherwise.

Client Name: Ground Investigations Ireland
Reference: 11334-12-21
Location: Cappogue
Contact: James Cashen
EMT Job No: 22/8371

SVOC Report : **Liquid**

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	1-6	7-12											
Sample ID	BH08	BH09											
Depth													
COC No / misc													
Containers	V H HNUF P G	V H HNUF P G											
Sample Date	18/05/2022 14:20	18/05/2022 15:00											
Sample Type	Ground Water	Ground Water											
Batch Number	1	1											
Date of Receipt	23/05/2022	23/05/2022									LOD/LOR	Units	Method No.
SVOC MS													
Phenols													
2-Chlorophenol #	<1	<1									<1	ug/l	TM16/PM30
2-Methylphenol #	<0.5	<0.5									<0.5	ug/l	TM16/PM30
2-Nitrophenol	<0.5	<0.5									<0.5	ug/l	TM16/PM30
2,4-Dichlorophenol #	<0.5	<0.5									<0.5	ug/l	TM16/PM30
2,4-Dimethylphenol	<1	<1									<1	ug/l	TM16/PM30
2,4,5-Trichlorophenol #	<0.5	<0.5									<0.5	ug/l	TM16/PM30
2,4,6-Trichlorophenol	<1	<1									<1	ug/l	TM16/PM30
4-Chloro-3-methylphenol #	<0.5	<0.5									<0.5	ug/l	TM16/PM30
4-Methylphenol	<1	<1									<1	ug/l	TM16/PM30
4-Nitrophenol	<10	<10									<10	ug/l	TM16/PM30
Pentachlorophenol	<1	<1									<1	ug/l	TM16/PM30
Phenol	<1	<1									<1	ug/l	TM16/PM30
PAHs													
2-Chloronaphthalene #	<1	<1									<1	ug/l	TM16/PM30
2-Methylnaphthalene #	<1	<1									<1	ug/l	TM16/PM30
Phthalates													
Bis(2-ethylhexyl) phthalate	<5	<5									<5	ug/l	TM16/PM30
Butylbenzyl phthalate	<1	<1									<1	ug/l	TM16/PM30
Di-n-butyl phthalate #	<1.5	<1.5									<1.5	ug/l	TM16/PM30
Di-n-Octyl phthalate	<1	<1									<1	ug/l	TM16/PM30
Diethyl phthalate #	<1	<1									<1	ug/l	TM16/PM30
Dimethyl phthalate	<1	<1									<1	ug/l	TM16/PM30
Other SVOCs													
1,2-Dichlorobenzene #	<1	<1									<1	ug/l	TM16/PM30
1,2,4-Trichlorobenzene #	<1	<1									<1	ug/l	TM16/PM30
1,3-Dichlorobenzene #	<1	<1									<1	ug/l	TM16/PM30
1,4-Dichlorobenzene #	<1	<1									<1	ug/l	TM16/PM30
2-Nitroaniline	<1	<1									<1	ug/l	TM16/PM30
2,4-Dinitrotoluene #	<0.5	<0.5									<0.5	ug/l	TM16/PM30
2,6-Dinitrotoluene	<1	<1									<1	ug/l	TM16/PM30
3-Nitroaniline	<1	<1									<1	ug/l	TM16/PM30
4-Bromophenylphenylether #	<1	<1									<1	ug/l	TM16/PM30
4-Chloroaniline	<1	<1									<1	ug/l	TM16/PM30
4-Chlorophenylphenylether #	<1	<1									<1	ug/l	TM16/PM30
4-Nitroaniline	<0.5	<0.5									<0.5	ug/l	TM16/PM30
Azobenzene #	<0.5	<0.5									<0.5	ug/l	TM16/PM30
Bis(2-chloroethoxy)methane #	<0.5	<0.5									<0.5	ug/l	TM16/PM30
Bis(2-chloroethyl)ether #	<1	<1									<1	ug/l	TM16/PM30
Carbazole #	<0.5	<0.5									<0.5	ug/l	TM16/PM30
Dibenzofuran #	<0.5	<0.5									<0.5	ug/l	TM16/PM30
Hexachlorobenzene #	<1	<1									<1	ug/l	TM16/PM30
Hexachlorobutadiene #	<1	<1									<1	ug/l	TM16/PM30
Hexachlorocyclopentadiene	<1	<1									<1	ug/l	TM16/PM30
Hexachloroethane #	<1	<1									<1	ug/l	TM16/PM30
Isophorone #	<0.5	<0.5									<0.5	ug/l	TM16/PM30
N-nitrosodi-n-propylamine #	<0.5	<0.5									<0.5	ug/l	TM16/PM30
Nitrobenzene #	<1	<1									<1	ug/l	TM16/PM30
Surrogate Recovery 2-Fluorobiphenyl	109	103									<0	%	TM16/PM30
Surrogate Recovery p-Terphenyl-d14	114	103									<0	%	TM16/PM30

Client Name: Ground Investigations Ireland
Reference: 11334-12-21
Location: Cappogue
Contact: James Cashen
EMT Job No: 22/8371

VOC Report : **Liquid**

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	1-6	7-12											
Sample ID	BH08	BH09											
Depth													
COC No / misc													
Containers	V H HNUF P G	V H HNUF P G											
Sample Date	18/05/2022 14:20	18/05/2022 15:00											
Sample Type	Ground Water	Ground Water											
Batch Number	1	1											
Date of Receipt	23/05/2022	23/05/2022									LOD/LOR	Units	Method No.
VOC MS													
Dichlorodifluoromethane	<2	<2									<2	ug/l	TM15/PM10
Methyl Tertiary Butyl Ether #	<0.1	<0.1									<0.1	ug/l	TM15/PM10
Chloromethane #	<3	<3									<3	ug/l	TM15/PM10
Vinyl Chloride #	<0.1	<0.1									<0.1	ug/l	TM15/PM10
Bromomethane	<1	<1									<1	ug/l	TM15/PM10
Chloroethane #	<3	<3									<3	ug/l	TM15/PM10
Trichlorofluoromethane #	<3	<3									<3	ug/l	TM15/PM10
1,1-Dichloroethene (1,1 DCE) #	<3	<3									<3	ug/l	TM15/PM10
Dichloromethane (DCM) #	<3	<3									<3	ug/l	TM15/PM10
trans-1-2-Dichloroethene #	<3	<3									<3	ug/l	TM15/PM10
1,1-Dichloroethane #	<3	<3									<3	ug/l	TM15/PM10
cis-1-2-Dichloroethene #	<3	<3									<3	ug/l	TM15/PM10
2,2-Dichloropropane	<1	<1									<1	ug/l	TM15/PM10
Bromochloromethane #	<2	<2									<2	ug/l	TM15/PM10
Chloroform #	<2	<2									<2	ug/l	TM15/PM10
1,1,1-Trichloroethane #	<2	<2									<2	ug/l	TM15/PM10
1,1-Dichloropropene #	<3	<3									<3	ug/l	TM15/PM10
Carbon tetrachloride #	<2	<2									<2	ug/l	TM15/PM10
1,2-Dichloroethane #	<2	<2									<2	ug/l	TM15/PM10
Benzene #	<0.5	<0.5									<0.5	ug/l	TM15/PM10
Trichloroethene (TCE) #	<3	<3									<3	ug/l	TM15/PM10
1,2-Dichloropropane #	<2	<2									<2	ug/l	TM15/PM10
Dibromomethane #	<3	<3									<3	ug/l	TM15/PM10
Bromodichloromethane #	<2	<2									<2	ug/l	TM15/PM10
cis-1-3-Dichloropropene	<2	<2									<2	ug/l	TM15/PM10
Toluene #	<5	<5									<5	ug/l	TM15/PM10
trans-1-3-Dichloropropene	<2	<2									<2	ug/l	TM15/PM10
1,1,2-Trichloroethane #	<2	<2									<2	ug/l	TM15/PM10
Tetrachloroethene (PCE) #	<3	<3									<3	ug/l	TM15/PM10
1,3-Dichloropropane #	<2	<2									<2	ug/l	TM15/PM10
Dibromochloromethane #	<2	<2									<2	ug/l	TM15/PM10
1,2-Dibromoethane #	<2	<2									<2	ug/l	TM15/PM10
Chlorobenzene #	<2	<2									<2	ug/l	TM15/PM10
1,1,1,2-Tetrachloroethane #	<2	<2									<2	ug/l	TM15/PM10
Ethylbenzene #	<1	<1									<1	ug/l	TM15/PM10
m/p-Xylene #	<2	<2									<2	ug/l	TM15/PM10
o-Xylene #	<1	<1									<1	ug/l	TM15/PM10
Styrene	<2	<2									<2	ug/l	TM15/PM10
Bromoform #	<2	<2									<2	ug/l	TM15/PM10
Isopropylbenzene #	<3	<3									<3	ug/l	TM15/PM10
1,1,2,2-Tetrachloroethane	<4	<4									<4	ug/l	TM15/PM10
Bromobenzene #	<2	<2									<2	ug/l	TM15/PM10
1,2,3-Trichloropropane #	<3	<3									<3	ug/l	TM15/PM10
Propylbenzene #	<3	<3									<3	ug/l	TM15/PM10
2-Chlorotoluene #	<3	<3									<3	ug/l	TM15/PM10
1,3,5-Trimethylbenzene #	<3	<3									<3	ug/l	TM15/PM10
4-Chlorotoluene #	<3	<3									<3	ug/l	TM15/PM10
tert-Butylbenzene #	<3	<3									<3	ug/l	TM15/PM10
1,2,4-Trimethylbenzene #	<3	<3									<3	ug/l	TM15/PM10
sec-Butylbenzene #	<3	<3									<3	ug/l	TM15/PM10
4-Isopropyltoluene #	<3	<3									<3	ug/l	TM15/PM10
1,3-Dichlorobenzene #	<3	<3									<3	ug/l	TM15/PM10
1,4-Dichlorobenzene #	<3	<3									<3	ug/l	TM15/PM10
n-Butylbenzene #	<3	<3									<3	ug/l	TM15/PM10
1,2-Dichlorobenzene #	<3	<3									<3	ug/l	TM15/PM10
1,2-Dibromo-3-chloropropane	<2	<2									<2	ug/l	TM15/PM10
1,2,4-Trichlorobenzene	<3	<3									<3	ug/l	TM15/PM10
Hexachlorobutadiene	<3	<3									<3	ug/l	TM15/PM10
Naphthalene	<2	<2									<2	ug/l	TM15/PM10
1,2,3-Trichlorobenzene	<3	<3									<3	ug/l	TM15/PM10
Surrogate Recovery Toluene D8	102	101									<0	%	TM15/PM10
Surrogate Recovery 4-Bromofluorobenzene	109	106									<0	%	TM15/PM10

Client Name: Ground Investigations Ireland
Reference: 11334-12-21
Location: Cappogue
Contact: James Cashen

Matrix : Liquid

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
22/8371	1	BH08		1-6	Boron MS, Fe MS	Sample holding time exceeded
22/8371	1	BH09		7-12	Boron MS, Fe MS	Sample holding time exceeded

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.
Only analyses which are accredited are recorded as deviating if set criteria are not met.

EMT Job No.: 22/8371

SOILS and ASH

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. Asbestos samples are retained for 6 months.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C. Ash samples are dried at 37°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

STACK EMISSIONS

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation for Dioxins and Furans and Dioxin like PCBs has been performed on XAD-2 Resin, only samples which use this resin will be within our MCERTS scope.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.
Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.
Laboratory records are kept for a period of no less than 6 years.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

Customer Provided Information

Sample ID and depth is information provided by the customer.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range
AA	x3 Dilution
AB	x6 Dilution
AC	x15 Dilution
AD	x50 Dilution

Please include all sections of this report if it is reproduced
All solid results are expressed on a dry weight basis unless stated otherwise.

HWOL ACRONYMS AND OPERATORS USED

HS	Headspace Analysis.
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent.
CU	Clean-up - e.g. by florisil, silica gel.
1D	GC - Single coil gas chromatography.
Total	Aliphatics & Aromatics.
AL	Aliphatics only.
AR	Aromatics only.
2D	GC-GC - Double coil gas chromatography.
#1	EH_Total but with humics mathematically subtracted
#2	EU_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +).
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry.

EMT Job No: 22/8371

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM16/PM30	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE/Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM5/TM36	please refer to TM5 and TM36 for method details	PM12/PM16/PM30	please refer to PM16/PM30 and PM12 for method details	Yes			
TM15	Modified USEPA 8260B v2:1996. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.				
TM15	Modified USEPA 8260B v2:1996. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes			
TM16	Modified USEPA 8270D v5:2014. Quantitative determination of Semi-Volatile Organic compounds (SVOCs) by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM16	Modified USEPA 8270D v5:2014. Quantitative determination of Semi-Volatile Organic compounds (SVOCs) by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM20	Modified BS 1377-3:1990/USEPA 160.1/3 (TDS/TS: 1971) Gravimetric determination of Total Dissolved Solids/Total Solids	PM0	No preparation is required.	Yes			

EMT Job No: 22/8371

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM0	No preparation is required.				
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM14	Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified				
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM14	Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified	Yes			
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes			
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013l	PM0	No preparation is required.				
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013l	PM0	No preparation is required.	Yes			
TM42	Modified US EPA method 8270D v5:2014. Pesticides and herbicides by GC-MS	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM60	TC/TOC analysis of Waters by High Temperature Combustion followed by NDIR detection. Based on the following modified standard methods: USEPA 9060A (2002), APHA SMEWW 5310B:1999 22nd Edition, ASTM D 7573, and USEPA 415.1.	PM0	No preparation is required.	Yes			
TM61	Determination of Mercury by Cold Vapour Atomic Fluorescence - WATERS: Modified USEPA Method 245.7, Rev 2, Feb 2005. SOILS: Modified USEPA Method 7471B, Rev.2, Feb 2007	PM0	No preparation is required.	Yes			
TM72	Redox Potential is measured by HI98120 redox meter.	PM0	No preparation is required.				

EMT Job No: 22/8371

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM0	No preparation is required.	Yes			
TM75	Modified US EPA method 310.1 (1978). Determination of Alkalinity by Metrohm automated titration analyser.	PM0	No preparation is required.	Yes			
TM76	Modified US EPA method 120.1 (1982). Determination of Specific Conductance by Metrohm automated probe analyser.	PM0	No preparation is required.	Yes			
TM89	Modified USEPA method OIA-1667 (1999). Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM0	No preparation is required.				
TM107	Determination of Sulphide/Thiocyanate by Skalar Continuous Flow Analyser	PM0	No preparation is required.				
TM149	Determination of Pesticides by Large Volume Injection on GC Triple Quad MS, based upon USEPA method 8270D v5:2014	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM170	Determination of Trace Metals by ICP-MS (Inductively Coupled Plasma – Mass Spectrometry): Modified USEPA Method 200.8, Rev. 5.4, 1994; Modified EPA Method 6020A, Rev.1, Feb 2007; Modified BS EN ISO 17294-2:2016	PM14	Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified	Yes			
TM173	Analysis of fluoride by ISE (Ion Selective Electrode) using modified ISE method 9214 - 340.2 (EPA 1998)	PM0	No preparation is required.				
TM64W	Determination of the salinity of liquid samples using a salinity conductivity meter.	PM0	No preparation is required.				

PSL
Professional Soils Laboratory

LABORATORY REPORT

4043

Contract Number: PSL22/1253

Report Date:	22 March 2022
Client's Reference:	11334-12-21
Client Name:	Ground Investigations Ireland Ltd Catherinestown House Hazelhatch Road Newcastle Co Dublin D22 YD52
For the attention of:	**James Cashen**
Contract Title:	Cappouge Dublin 11 Phase 1A
Date Received:	17/2/2022
Date Commenced:	17/2/2022
Date Completed:	22/3/2022
Notes:	**Opinions and Interpretations are outside the UKAS Accreditation**

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

A Watkins (Director)	R Berriman (Quality Manager)	S Royle (Laboratory Manager)
L Knight (Assistant Laboratory Manager)	S Eyre (Senior Technician)	T Watkins (Senior Technician)

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Doncaster DN4 0AR
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awatkins@prosoils.co.uk

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
TP01		-	2.00		Brown slightly sandy slightly gravelly CLAY.
TP02		-	1.50		Brown slightly sandy slightly gravelly CLAY.
TP04		-	1.00		Brown slightly sandy slightly gravelly CLAY.
TP05		-	0.50		Brown slightly sandy slightly gravelly CLAY.
TP06		-	1.00		Brown slightly sandy gravelly CLAY.
TP08		-	1.50		Brown slightly sandy slightly gravelly CLAY.
TP09		-	0.50		Brown slightly sandy slightly gravelly CLAY.
TP10		-	1.00		Brown slightly sandy gravelly CLAY.
TP11		-	2.00		Brown slightly sandy gravelly CLAY.
TP12		-	1.50		Brown slightly sandy gravelly CLAY.
TP13		-	0.50		Brown slightly sandy gravelly CLAY.
TP13		-	2.00		Brown slightly sandy gravelly CLAY with cobbles.
TP14		-	1.00		Brown slightly sandy gravelly CLAY.
TP15		-	1.50		Brown slightly sandy gravelly CLAY.
TP16		-	1.50		Brown slightly gravelly sandy CLAY.
TP19		-	1.00		Brown slightly sandy slightly gravelly CLAY.
TP20		-	1.00		Brown slightly sandy slightly gravelly CLAY.
TP20		-	2.00		Brown slightly sandy slightly gravelly CLAY.
TP22		-	0.50		Brown slightly sandy slightly gravelly CLAY.

UKAS TESTING
4043

PSL
Professional Soils Laboratory

Cappouge Dublin 11 Phase 1A

Contract No:	PSL22/1253
Client Ref:	11334-12-21

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
TP23		-	2.00		Brown slightly sandy slightly gravelly CLAY.

SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Moisture Content % Clause 3.2	Linear Shrinkage % Clause 6.5	Particle Density Mg/m^3 Clause 8.2	Liquid Limit % Clause 4.3/4	Plastic Limit % Clause 5.3	Plasticity Index % Clause 5.4	Passing .425mm %	Remarks
TP01		-	2.00		18			34	17	17	57	Low Plasticity CL
TP02		-	1.50		23			46	23	23	67	Intermediate Plasticity CI
TP04		-	1.00		15			36	18	18	65	Intermediate Plasticity CI
TP05		-	0.50		22			40	19	21	77	Intermediate Plasticity CI
TP06		-	1.00		19			42	21	21	54	Intermediate Plasticity CI
TP08		-	1.50		14			32	16	16	55	Low Plasticity CL
TP09		-	0.50		13			28	14	14	55	Low Plasticity CL
TP10		-	1.00		18			39	19	20	52	Intermediate Plasticity CI
TP11		-	2.00		14			29	15	14	37	Low Plasticity CL
TP12		-	1.50		14			28	15	13	46	Low Plasticity CL
TP13		-	0.50		23			41	20	21	54	Intermediate Plasticity CI
TP13		-	2.00		13			29	15	14	28	Low Plasticity CL
TP14		-	1.00		16			38	19	19	48	Intermediate Plasticity CI
TP15		-	1.50		18			35	18	17	48	Intermediate Plasticity CI
TP16		-	1.50		18			32	16	16	80	Low Plasticity CL
TP19		-	1.00		19			42	20	22	71	Intermediate Plasticity CI
TP20		-	1.00		32			69	29	40	90	High Plasticity CH
TP20		-	2.00		21			37	18	19	62	Intermediate Plasticity CI
TP22		-	0.50		25			52	24	28	87	High Plasticity CH

SYMBOLS : NP : Non Plastic * : Liquid Limit and Plastic Limit Wet Sieved.

UKAS TESTING
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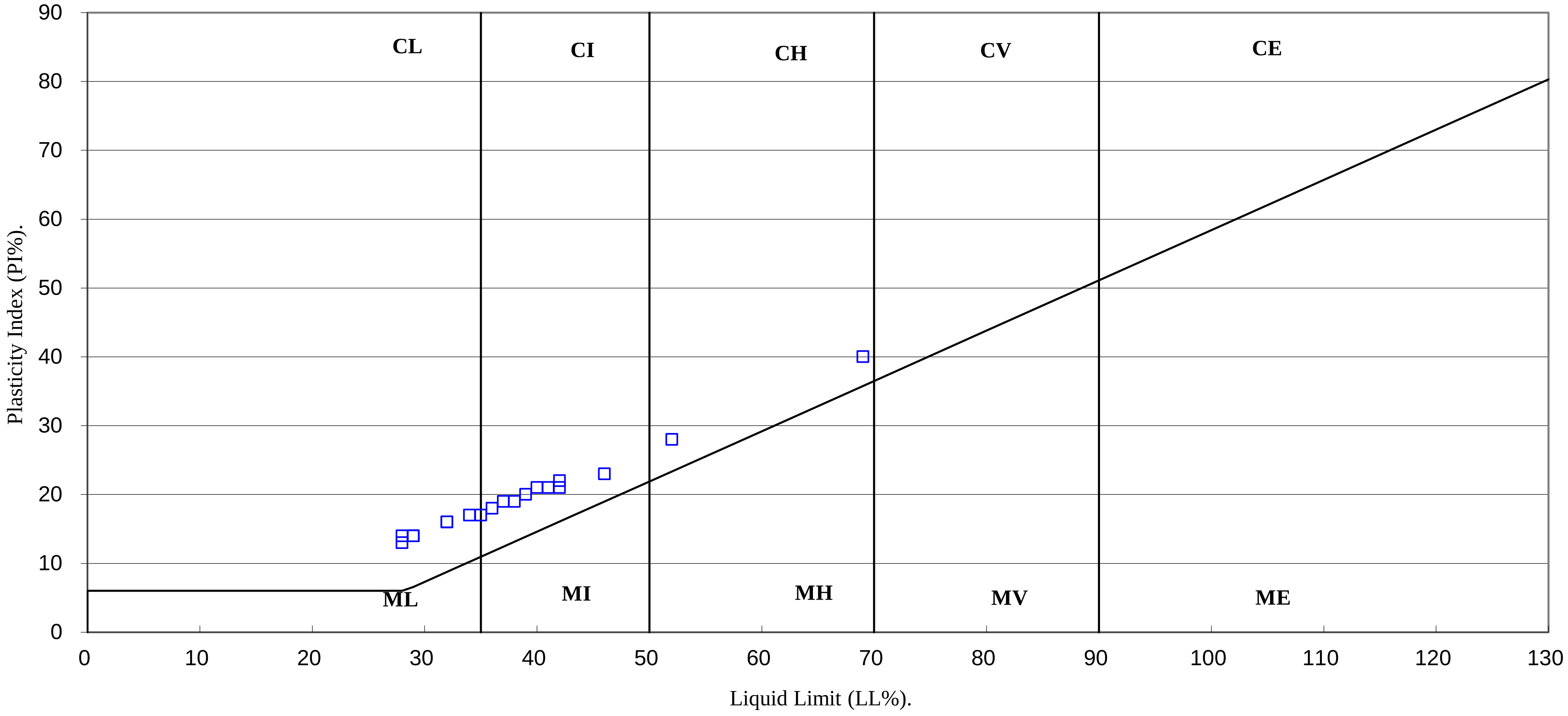
Cappouge Dublin 11 Phase 1A

Contract No:
PSL22/1253
Client Ref:
11334-12-21

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.



UKAS TESTING 4043	PSL Professional Soils Laboratory	Cappouge Dublin 11 Phase 1A	**Contract No:** **PSL22/1253** **Client Ref:** **11334-12-21**

SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Moisture Content % Clause 3.2	Linear Shrinkage % Clause 6.5	Particle Density Mg/m^3 Clause 8.2	Liquid Limit % Clause 4.3/4	Plastic Limit % Clause 5.3	Plasticity Index % Clause 5.4	Passing .425mm %	Remarks
TP23		-	2.00		24			41	20	21	84	Intermediate Plasticity CI

SYMBOLS : NP : Non Plastic

*** : Liquid Limit and Plastic Limit Wet Sieved.**

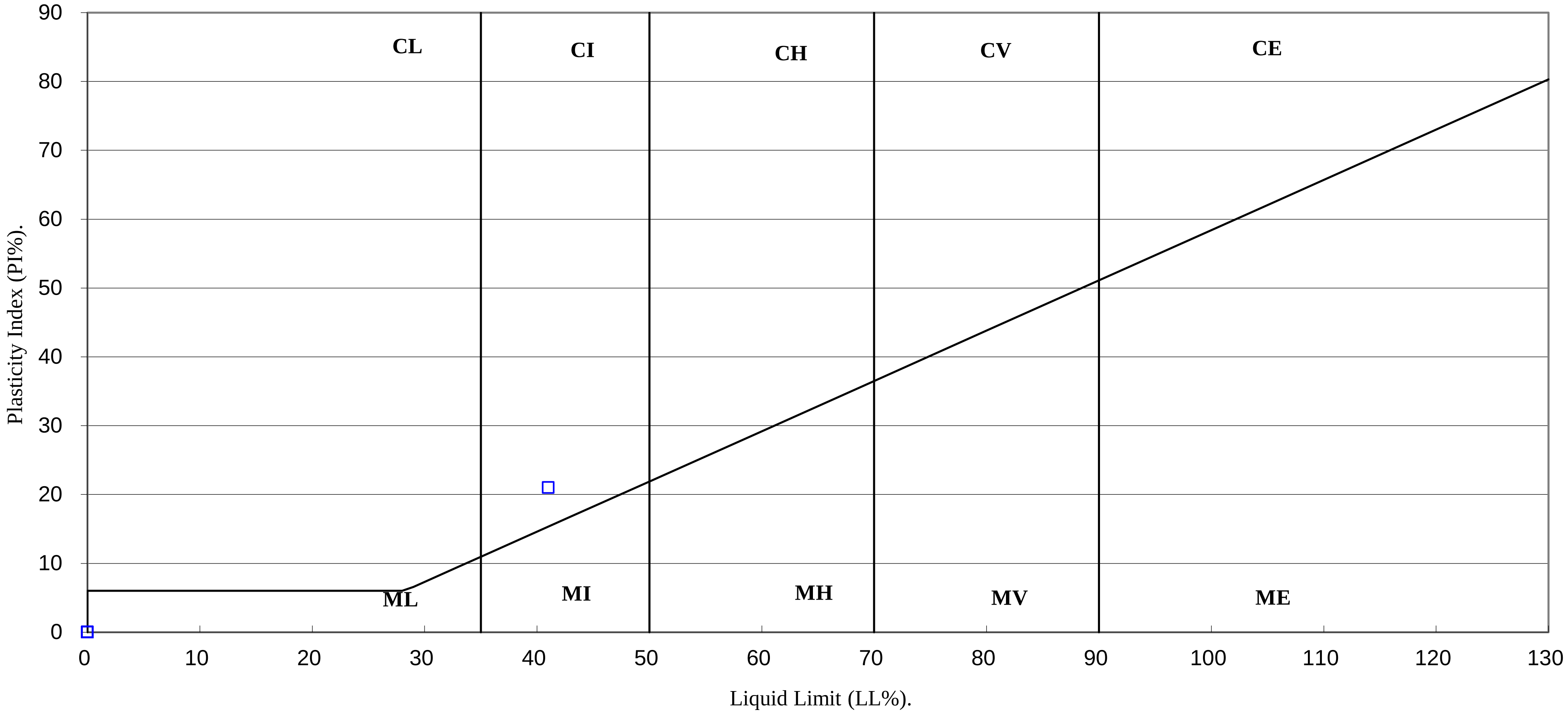
UKAS TESTING
4043

PSL
Professional Soils Laboratory

Cappouge Dublin 11 Phase 1A

Contract No:
PSL22/1253
Client Ref:
11334-12-21

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.



UKAS TESTING 4043	Professional Soils Laboratory	**Cappouge Dublin 11 Phase 1A**	**Contract No:** **PSL22/1253** **Client Ref:** **11334-12-21**

PARTICLE SIZE DISTRIBUTION TEST

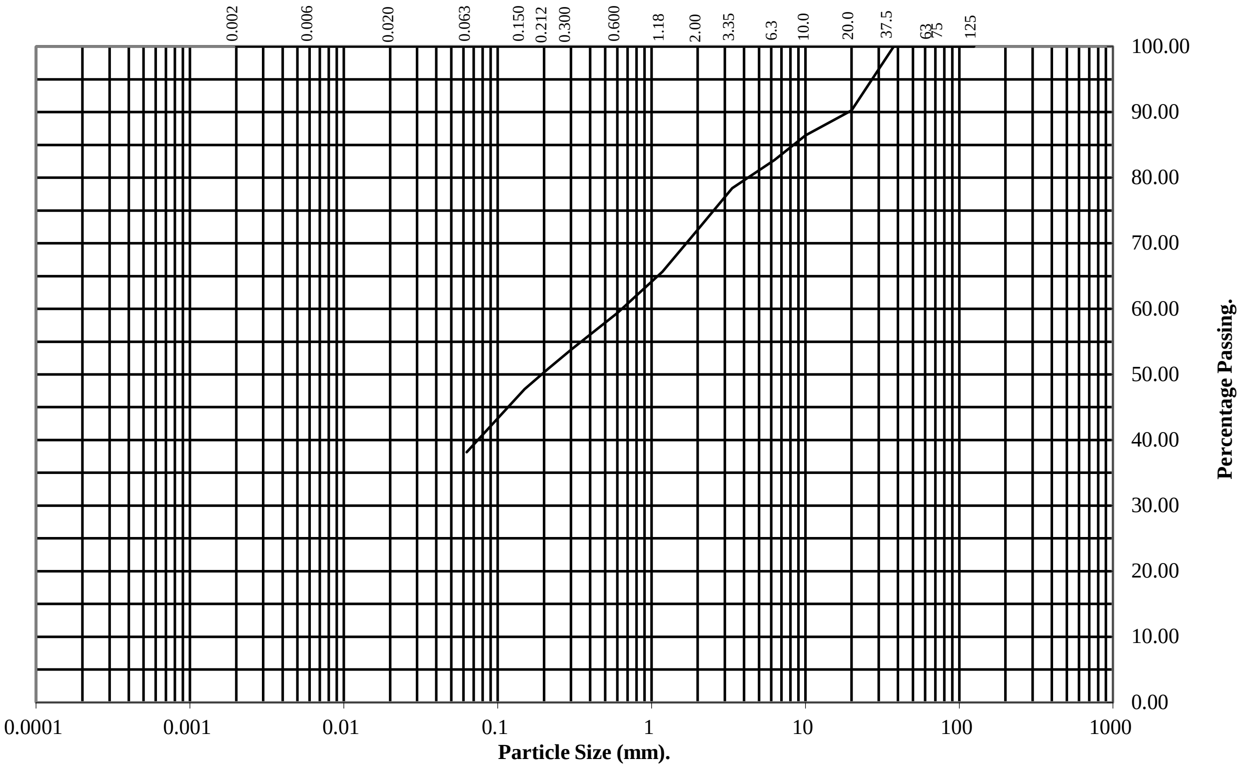
BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: TP01 **Top Depth (m):** 2.00

Sample Number: **Base Depth(m):**

Sample Type: -



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	90
10	86
6.3	83
3.35	78
2	72
1.18	66
0.6	59
0.3	54
0.212	51
0.15	48
0.063	38

Soil Fraction	Total Percentage
Cobbles	0
Gravel	28
Sand	34
Silt/Clay	38

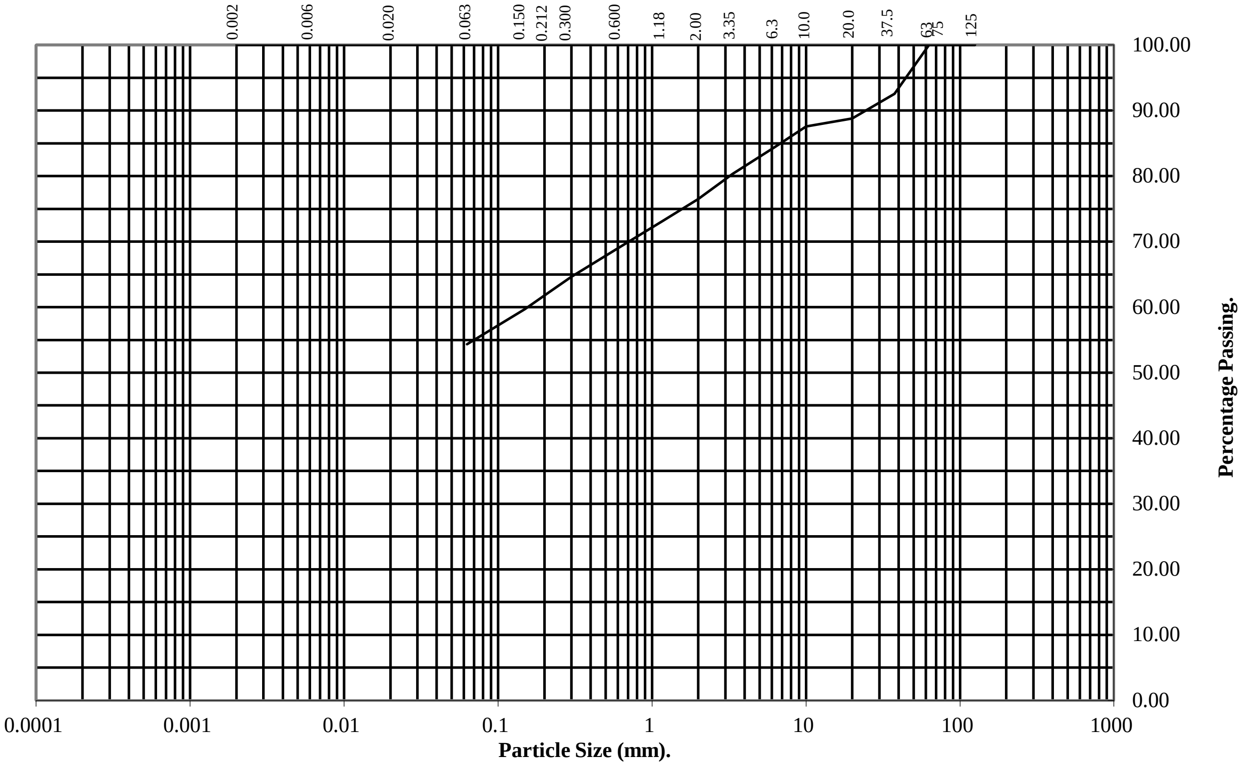
Remarks:
See Summary of Soil Descriptions

PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number:	**TP02**	**Top Depth (m):**	**1.50**
Sample Number:		**Base Depth(m):**	
Sample Type:	**-**		



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	93
20	89
10	88
6.3	84
3.35	80
2	77
1.18	73
0.6	69
0.3	65
0.212	62
0.15	60
0.063	54

Soil Fraction	Total Percentage
Cobbles	0
Gravel	23
Sand	23
Silt/Clay	54

Remarks:
See Summary of Soil Descriptions

4043

Professional Soils Laboratory

Cappouge Dublin 11 Phase 1A

Contract No:
PSL22/1253
Client Ref:
11334-12-21

PARTICLE SIZE DISTRIBUTION TEST

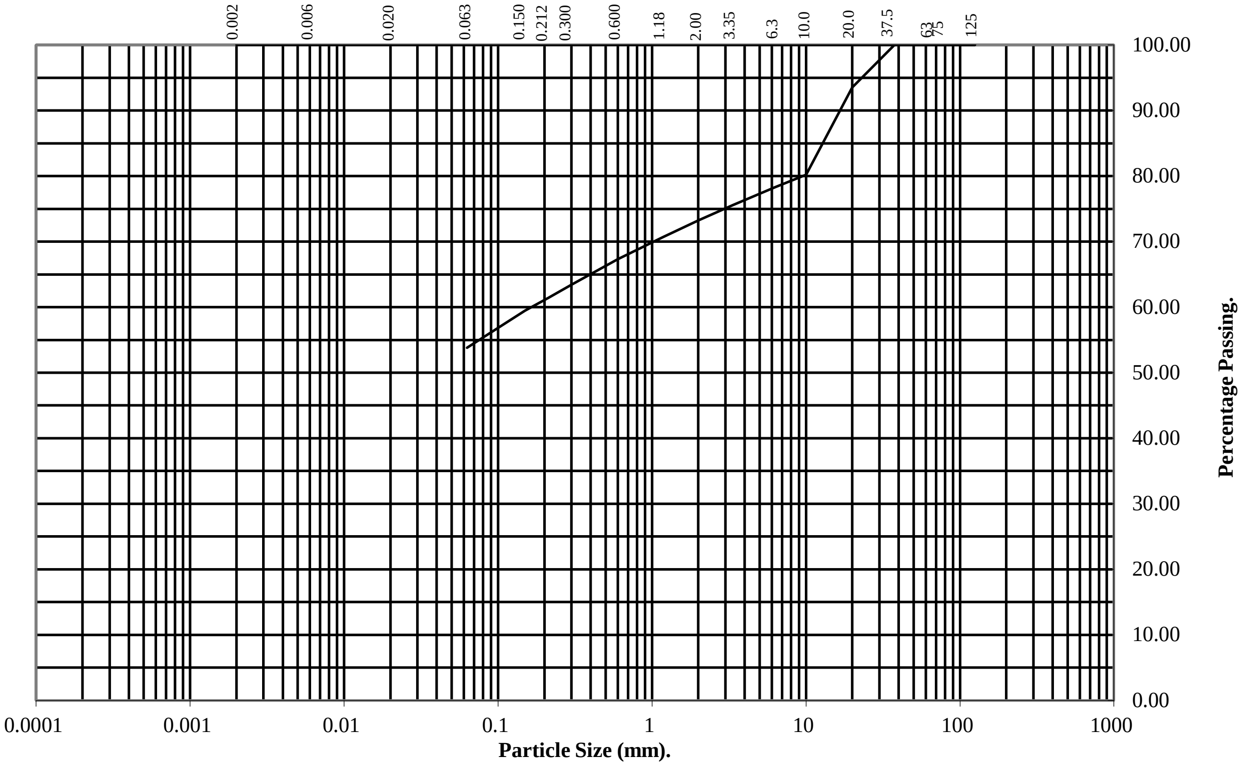
BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: **TP04** **Top Depth (m):** **1.00**

Sample Number: **Base Depth(m):**

Sample Type: **-**



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	94
10	80
6.3	78
3.35	76
2	73
1.18	71
0.6	67
0.3	63
0.212	61
0.15	59
0.063	54

Soil Fraction	Total Percentage
Cobbles	0
Gravel	27
Sand	19
Silt/Clay	54

Remarks:
See Summary of Soil Descriptions

4043

Professional Soils Laboratory

Cappouge Dublin 11 Phase 1A

Contract No: **PSL22/1253**
Client Ref: **11334-12-21**

PARTICLE SIZE DISTRIBUTION TEST

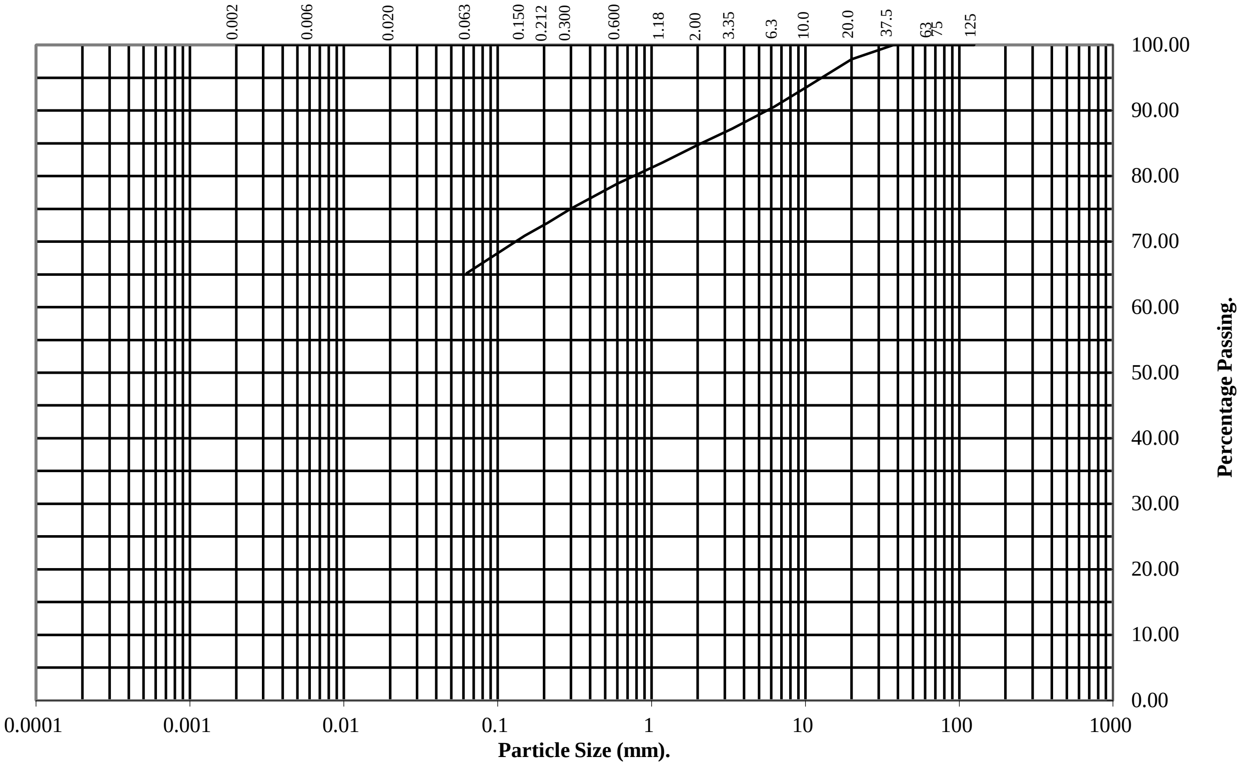
BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: TP05 **Top Depth (m):** 0.50

Sample Number: **Base Depth(m):**

Sample Type: -



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	98
10	93
6.3	91
3.35	87
2	85
1.18	82
0.6	79
0.3	75
0.212	73
0.15	71
0.063	65

Soil Fraction	Total Percentage
Cobbles	0
Gravel	15
Sand	20
Silt/Clay	65

Remarks:
See Summary of Soil Descriptions

PARTICLE SIZE DISTRIBUTION TEST

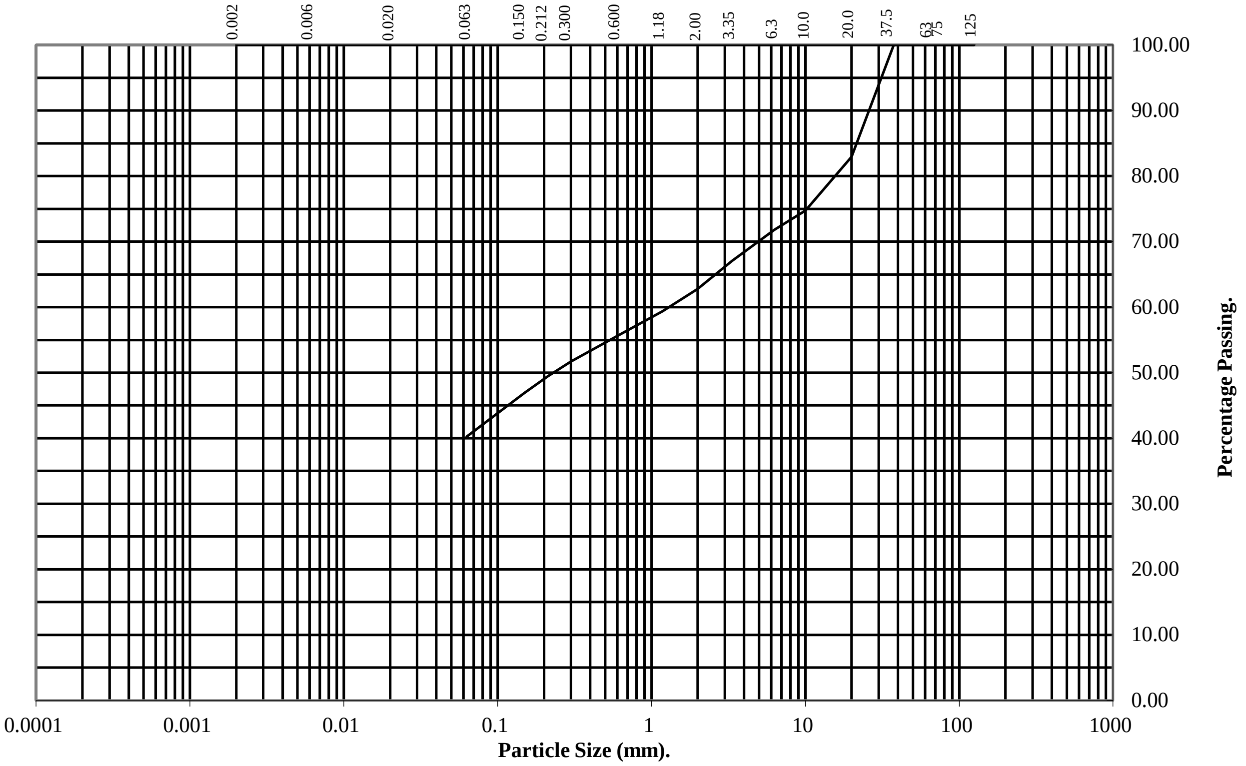
BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: TP06 **Top Depth (m):** 1.00

Sample Number: **Base Depth(m):**

Sample Type: -



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	83
10	75
6.3	72
3.35	67
2	63
1.18	59
0.6	56
0.3	52
0.212	49
0.15	47
0.063	40

Soil Fraction	Total Percentage
Cobbles	0
Gravel	37
Sand	23
Silt/Clay	40

Remarks:
See Summary of Soil Descriptions

4043

Professional Soils Laboratory

Cappouge Dublin 11 Phase 1A

Contract No:
PSL22/1253
Client Ref:
11334-12-21

PARTICLE SIZE DISTRIBUTION TEST

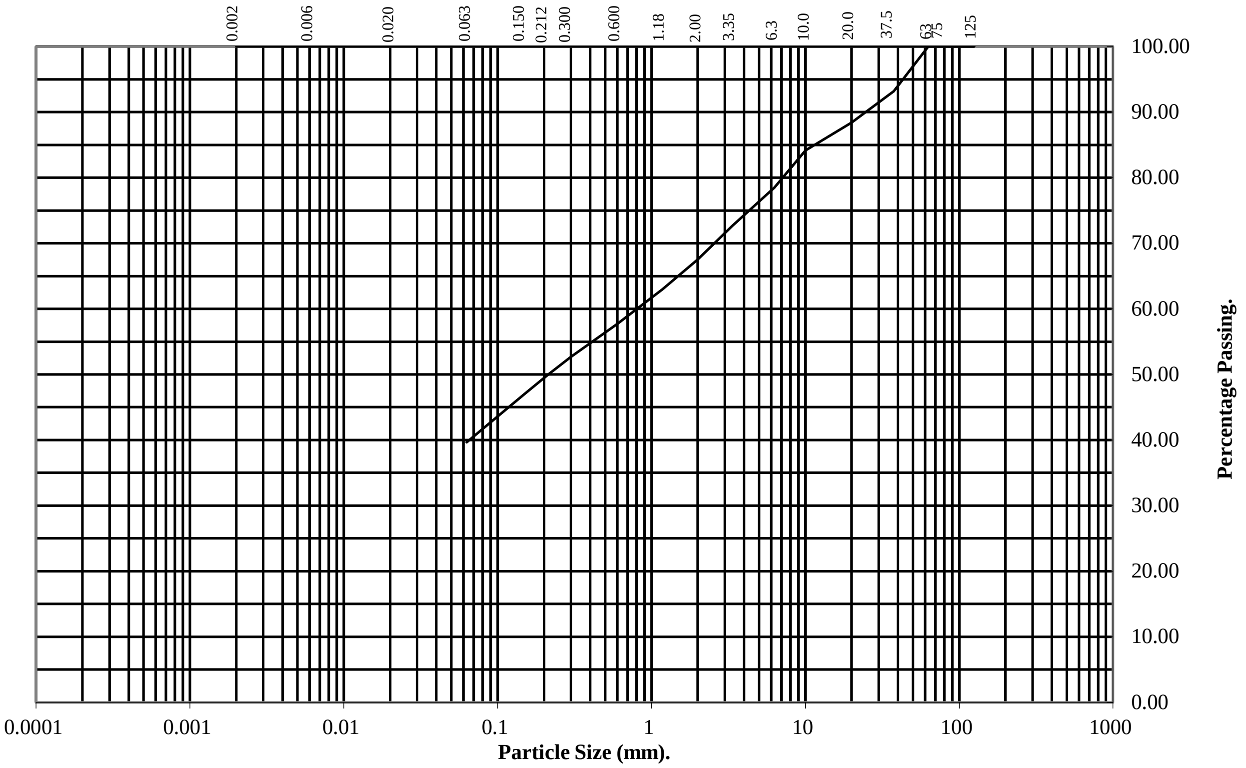
BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: TP08 **Top Depth (m):** 1.50

Sample Number: **Base Depth(m):**

Sample Type: -



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	93
20	88
10	84
6.3	79
3.35	73
2	67
1.18	63
0.6	58
0.3	53
0.212	50
0.15	47
0.063	40

Soil Fraction	Total Percentage
Cobbles	0
Gravel	33
Sand	27
Silt/Clay	40

Remarks:
See Summary of Soil Descriptions

4043

Cappouge Dublin 11 Phase 1A

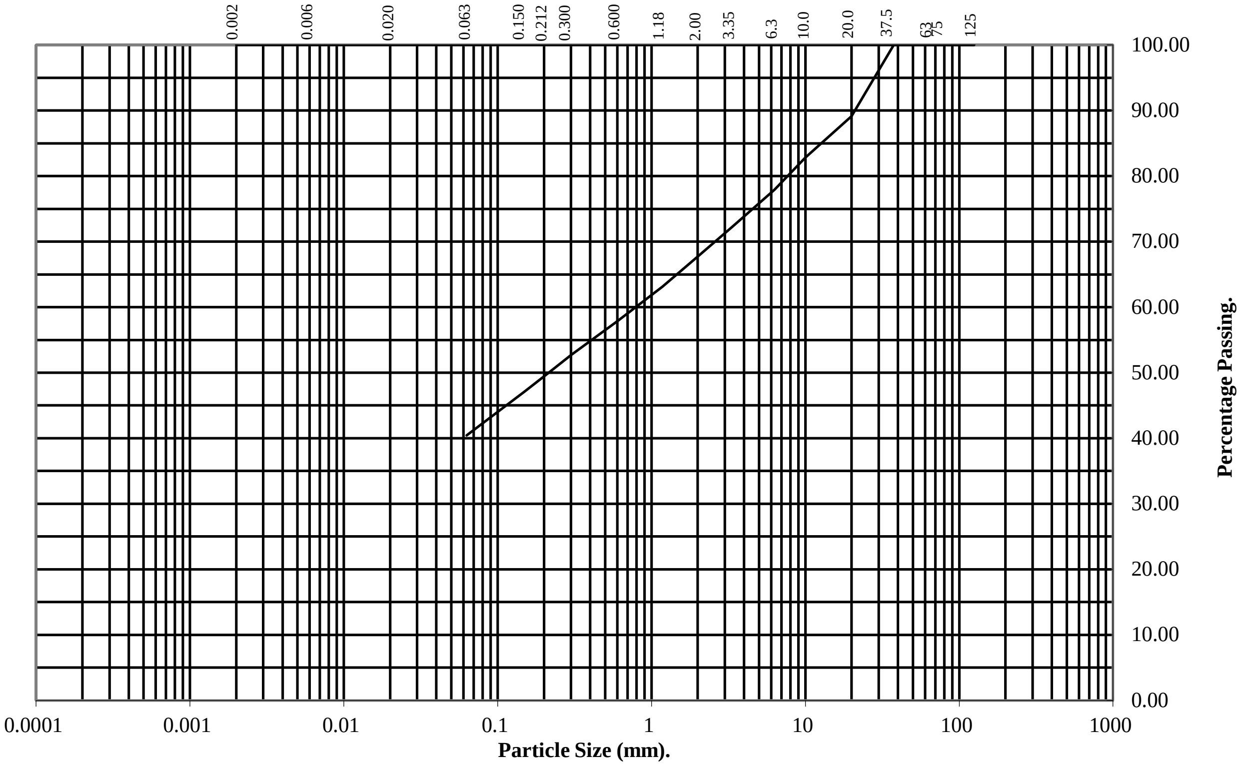
Contract No:
PSL22/1253
Client Ref:
11334-12-21

PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number:	**TP09**	**Top Depth (m):**	**0.50**
Sample Number:		**Base Depth(m):**	
Sample Type:	**-**		



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	89
10	83
6.3	78
3.35	72
2	68
1.18	63
0.6	58
0.3	53
0.212	50
0.15	47
0.063	40

Soil Fraction	Total Percentage
Cobbles	0
Gravel	32
Sand	28
Silt/Clay	40

Remarks:
See Summary of Soil Descriptions

4043	Professional Soils Laboratory	**Cappouge Dublin 11 Phase 1A**	**Contract No:** **PSL22/1253** **Client Ref:** **11334-12-21**

PARTICLE SIZE DISTRIBUTION TEST

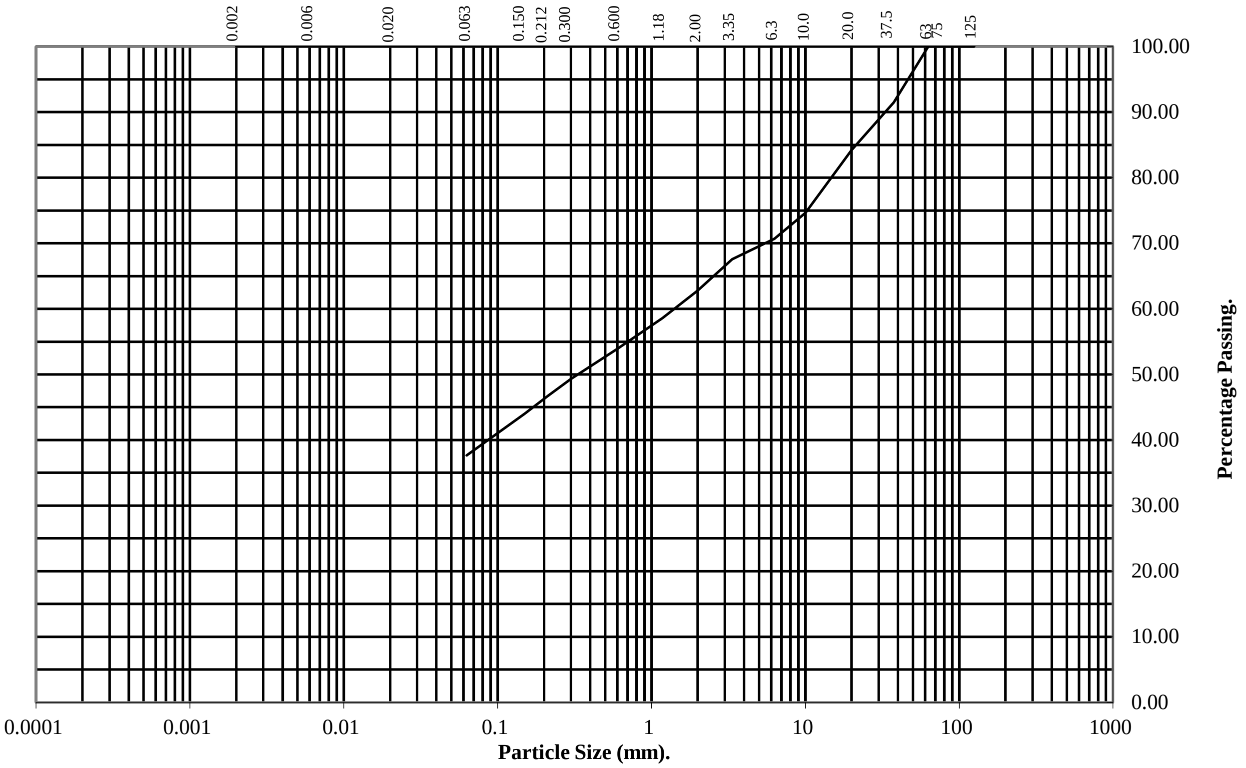
BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: TP10 **Top Depth (m):** 1.00

Sample Number: **Base Depth(m):**

Sample Type: -



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	91
20	84
10	75
6.3	71
3.35	68
2	63
1.18	59
0.6	54
0.3	49
0.212	47
0.15	44
0.063	38

Soil Fraction	Total Percentage
Cobbles	0
Gravel	37
Sand	25
Silt/Clay	38

Remarks:
See Summary of Soil Descriptions

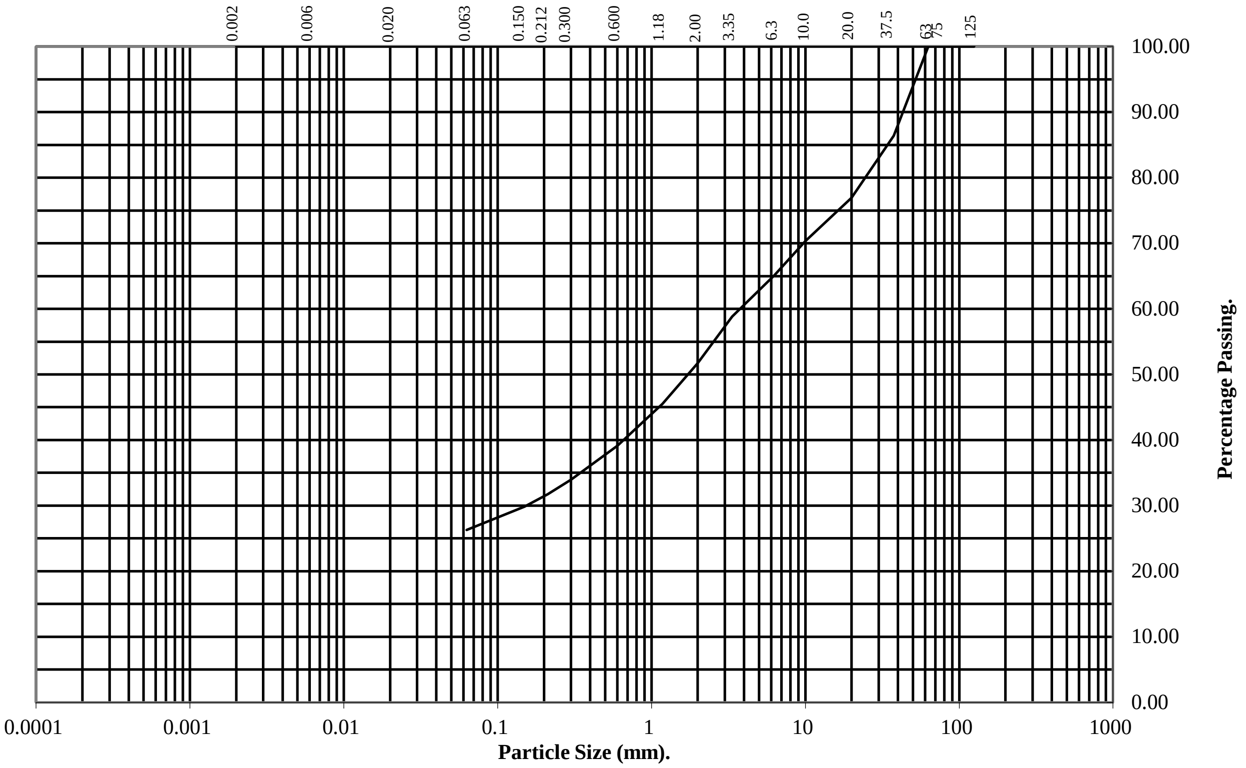
UKAS TESTING 4043	Professional Soils Laboratory	**Cappouge Dublin 11 Phase 1A**	**Contract No:** **PSL22/1253** **Client Ref:** **11334-12-21**

PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number:	**TP11**	**Top Depth (m):**	**2.00**
Sample Number:		**Base Depth(m):**	
Sample Type:	**-**		



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	86
20	77
10	70
6.3	65
3.35	59
2	52
1.18	46
0.6	39
0.3	34
0.212	32
0.15	30
0.063	26

Soil Fraction	Total Percentage
Cobbles	0
Gravel	48
Sand	26
Silt/Clay	26

Remarks:

See Summary of Soil Descriptions

UKAS TESTING 4043	Professional Soils Laboratory	**Cappouge Dublin 11 Phase 1A**	**Contract No:** **PSL22/1253** **Client Ref:** **11334-12-21**

PARTICLE SIZE DISTRIBUTION TEST

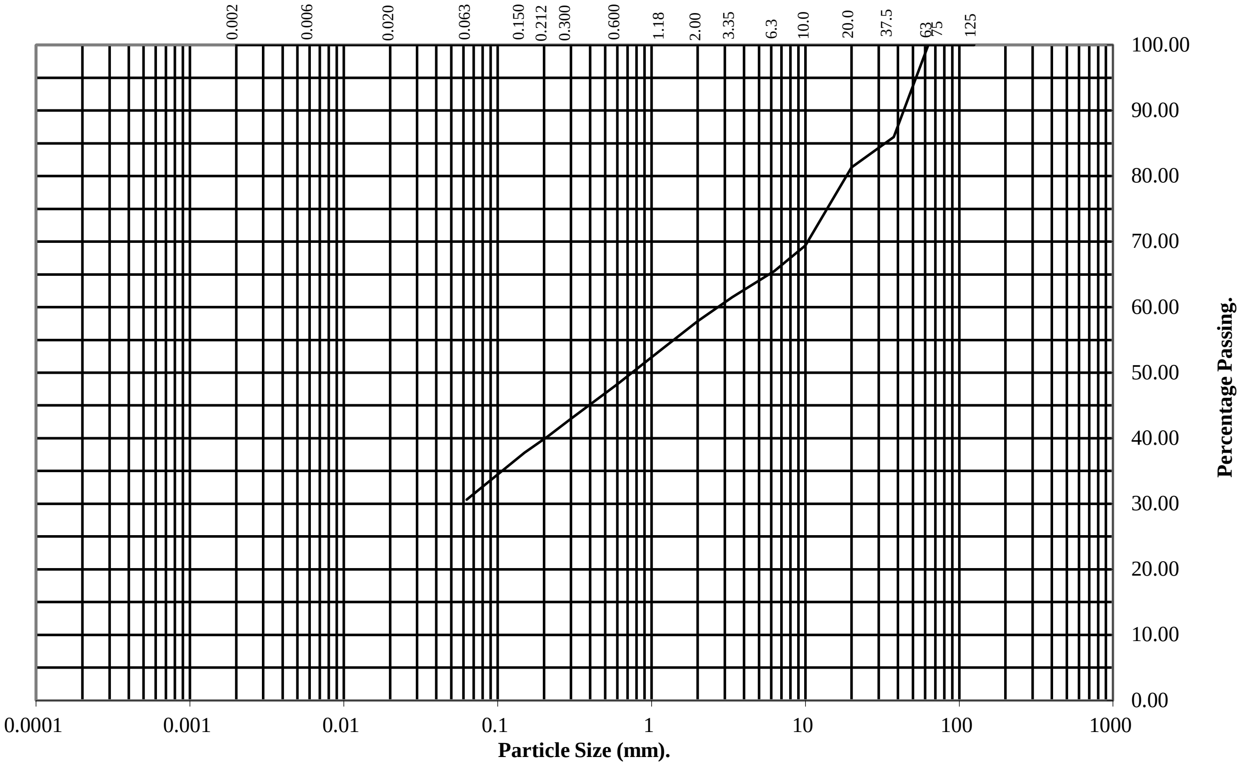
BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: TP12 **Top Depth (m):** 1.50

Sample Number: **Base Depth(m):**

Sample Type: -



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	86
20	81
10	69
6.3	66
3.35	62
2	58
1.18	54
0.6	48
0.3	43
0.212	40
0.15	38
0.063	31

Soil Fraction	Total Percentage
Cobbles	0
Gravel	42
Sand	27
Silt/Clay	31

Remarks:

See Summary of Soil Descriptions

UKAS TESTING 4043	PSL Professional Soils Laboratory	**Cappouge Dublin 11 Phase 1A**	**Contract No:** **PSL22/1253** **Client Ref:** **11334-12-21**

PARTICLE SIZE DISTRIBUTION TEST

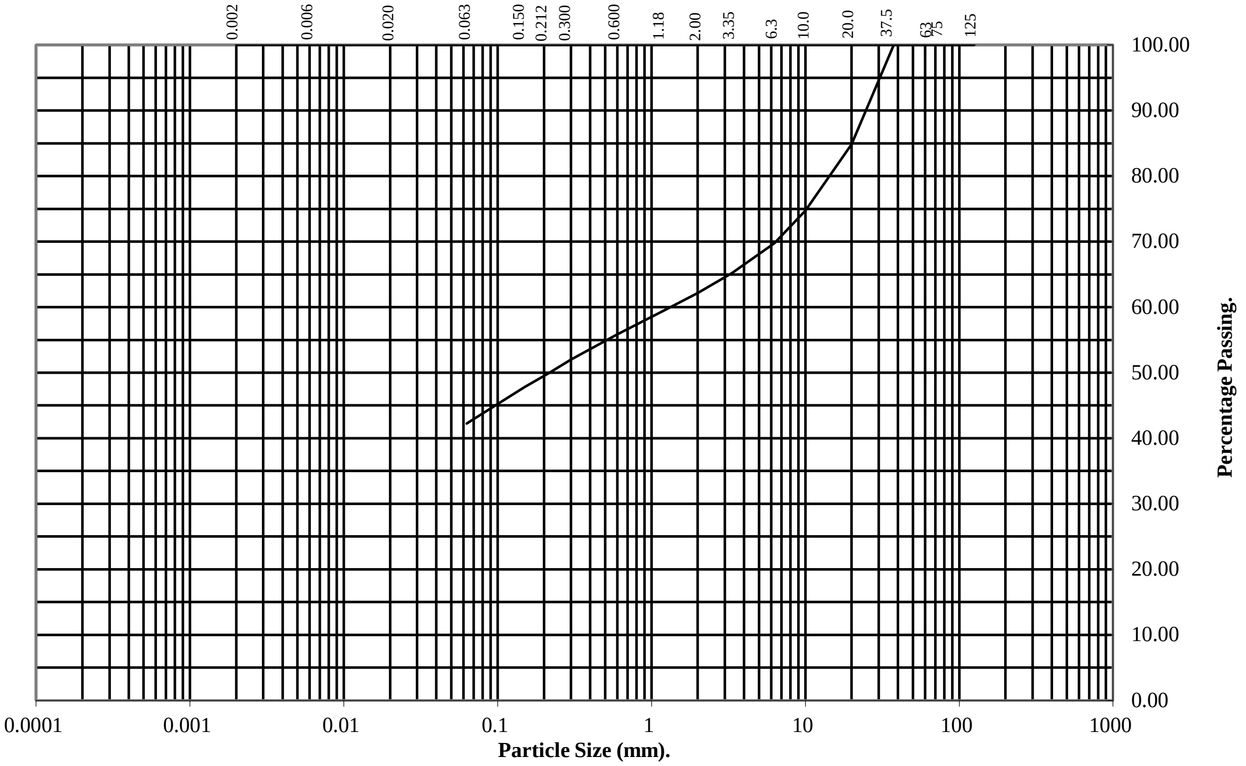
BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: TP13 **Top Depth (m):** 0.50

Sample Number: **Base Depth(m):**

Sample Type: -



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	85
10	75
6.3	70
3.35	65
2	62
1.18	59
0.6	56
0.3	52
0.212	50
0.15	48
0.063	42

Soil Fraction	Total Percentage
Cobbles	0
Gravel	38
Sand	20
Silt/Clay	42

Remarks:
See Summary of Soil Descriptions

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Professional Soils Laboratory

Cappouge Dublin 11 Phase 1A

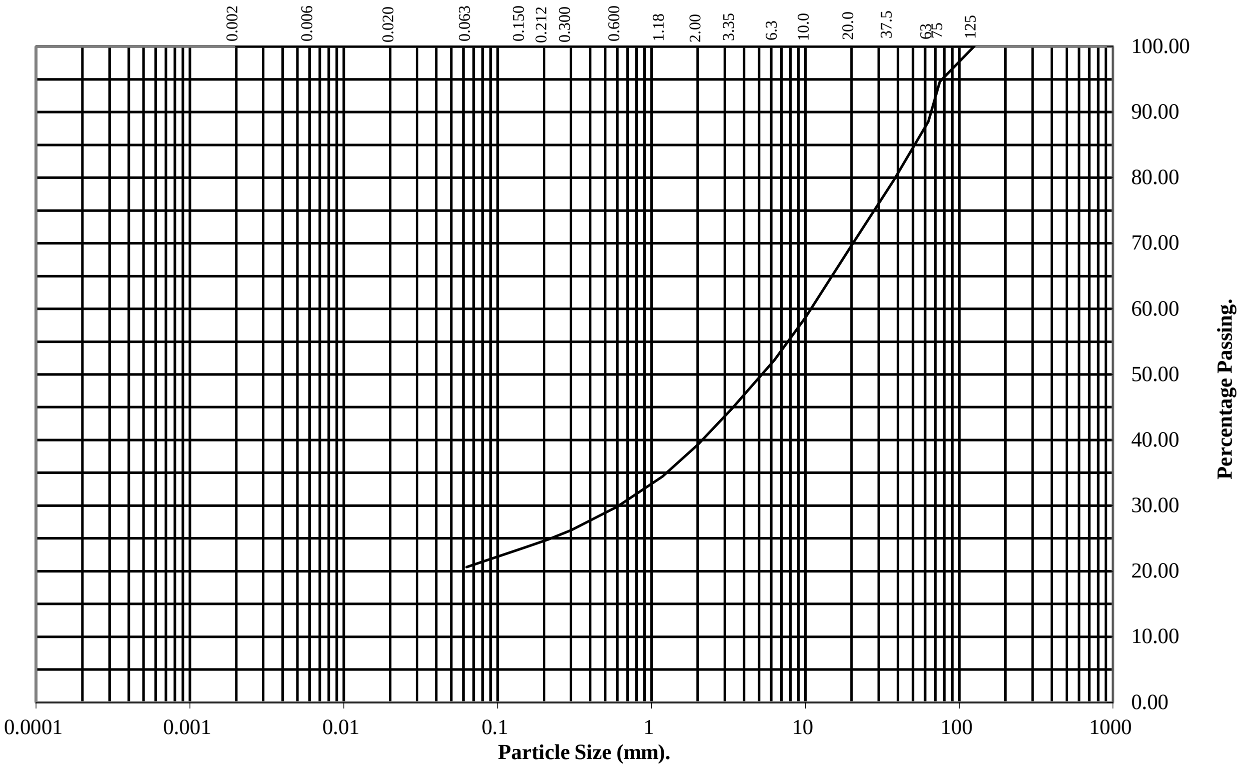
Contract No:	**PSL22/1253**
Client Ref:	**11334-12-21**

PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number:	**TP13**	**Top Depth (m):**	**2.00**
Sample Number:		**Base Depth(m):**	
Sample Type:	**-**		



BS Test Sieve (mm)	Percentage Passing
125	100
75	95
63	89
37.5	80
20	70
10	59
6.3	52
3.35	45
2	39
1.18	34
0.6	30
0.3	26
0.212	25
0.15	24
0.063	21

Soil Fraction	Total Percentage
Cobbles	11
Gravel	50
Sand	18
Silt/Clay	21

Remarks:

See Summary of Soil Descriptions

4043	Professional Soils Laboratory	**Cappouge Dublin 11 Phase 1A**	**Contract No:** **PSL22/1253** **Client Ref:** **11334-12-21**

PARTICLE SIZE DISTRIBUTION TEST

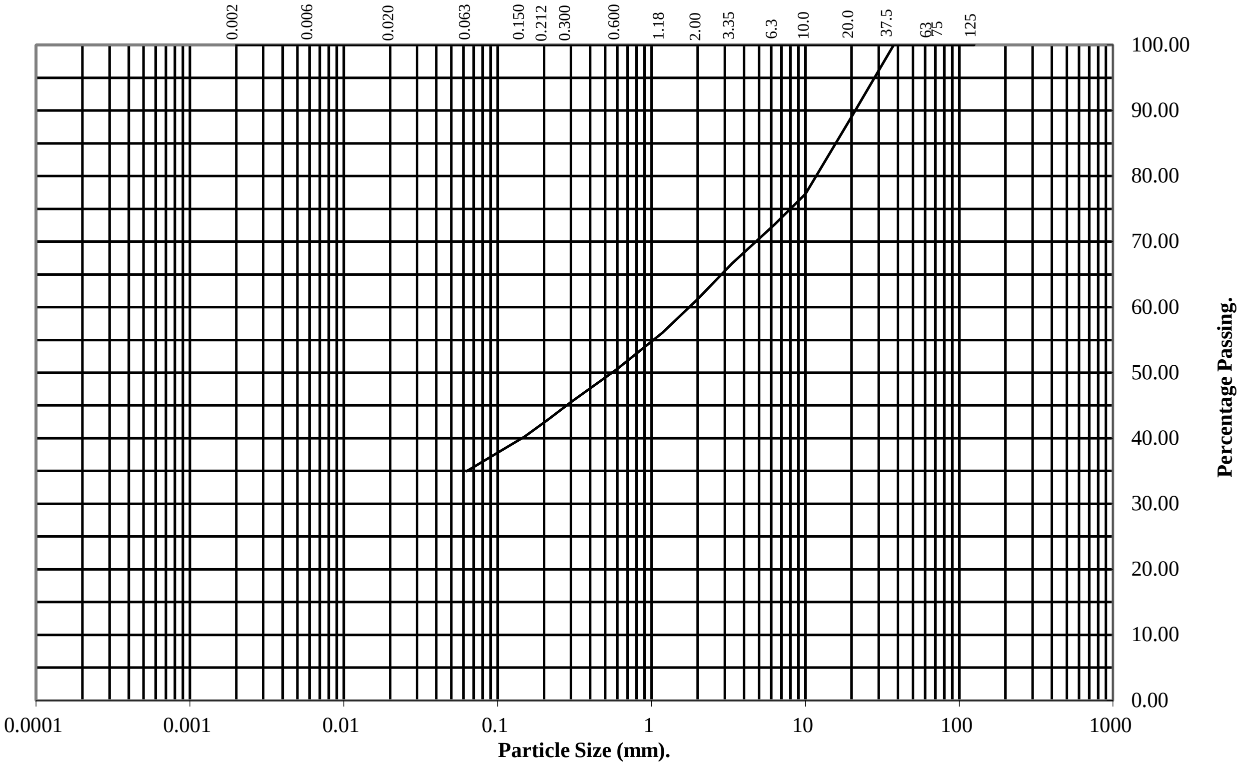
BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: **TP14** **Top Depth (m):** **1.00**

Sample Number: **Base Depth(m):**

Sample Type: **-**



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	89
10	77
6.3	73
3.35	67
2	61
1.18	56
0.6	51
0.3	46
0.212	43
0.15	40
0.063	35

Soil Fraction	Total Percentage
Cobbles	0
Gravel	39
Sand	26
Silt/Clay	35

Remarks:
See Summary of Soil Descriptions

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Professional Soils Laboratory

Cappouge Dublin 11 Phase 1A

Contract No: **PSL22/1253**

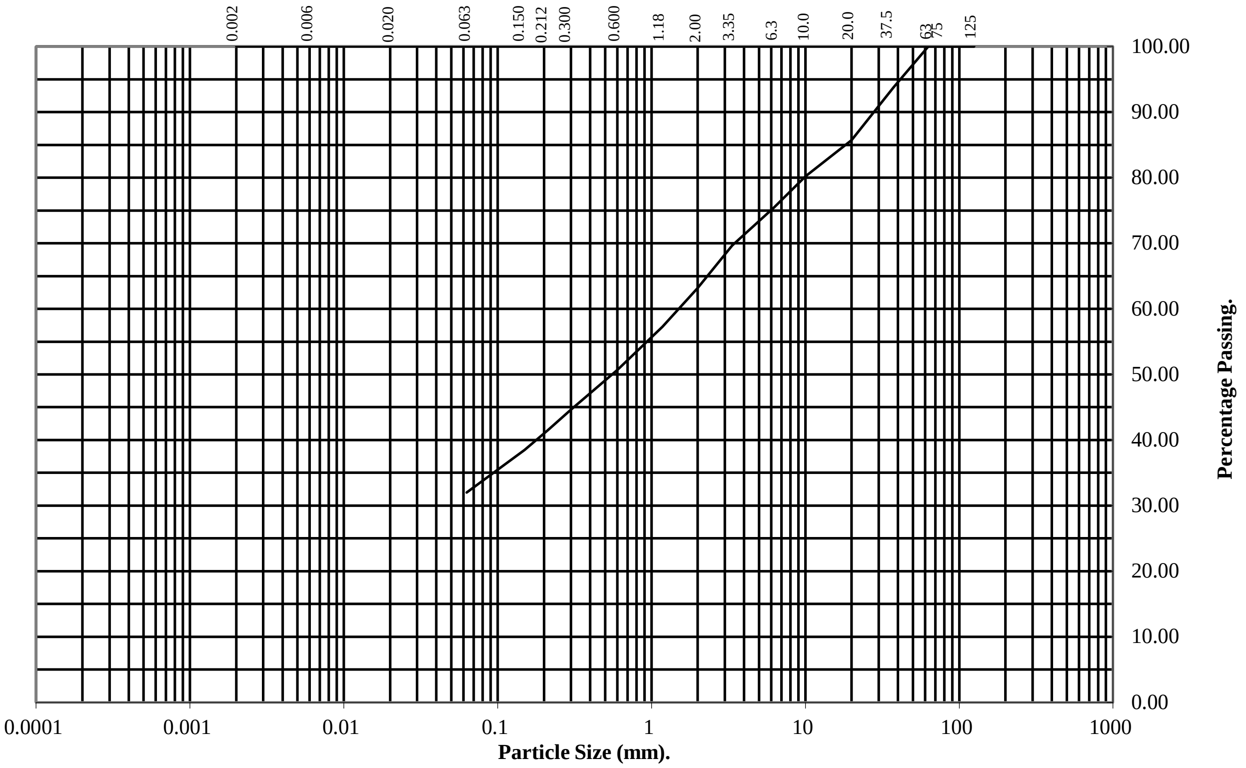
Client Ref: **11334-12-21**

PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number:	**TP15**	**Top Depth (m):**	**1.50**
Sample Number:		**Base Depth(m):**	
Sample Type:	**-**		



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	94
20	86
10	80
6.3	76
3.35	70
2	63
1.18	57
0.6	51
0.3	45
0.212	42
0.15	38
0.063	32

Soil Fraction	Total Percentage
Cobbles	0
Gravel	37
Sand	31
Silt/Clay	32

Remarks:
See Summary of Soil Descriptions

PARTICLE SIZE DISTRIBUTION TEST

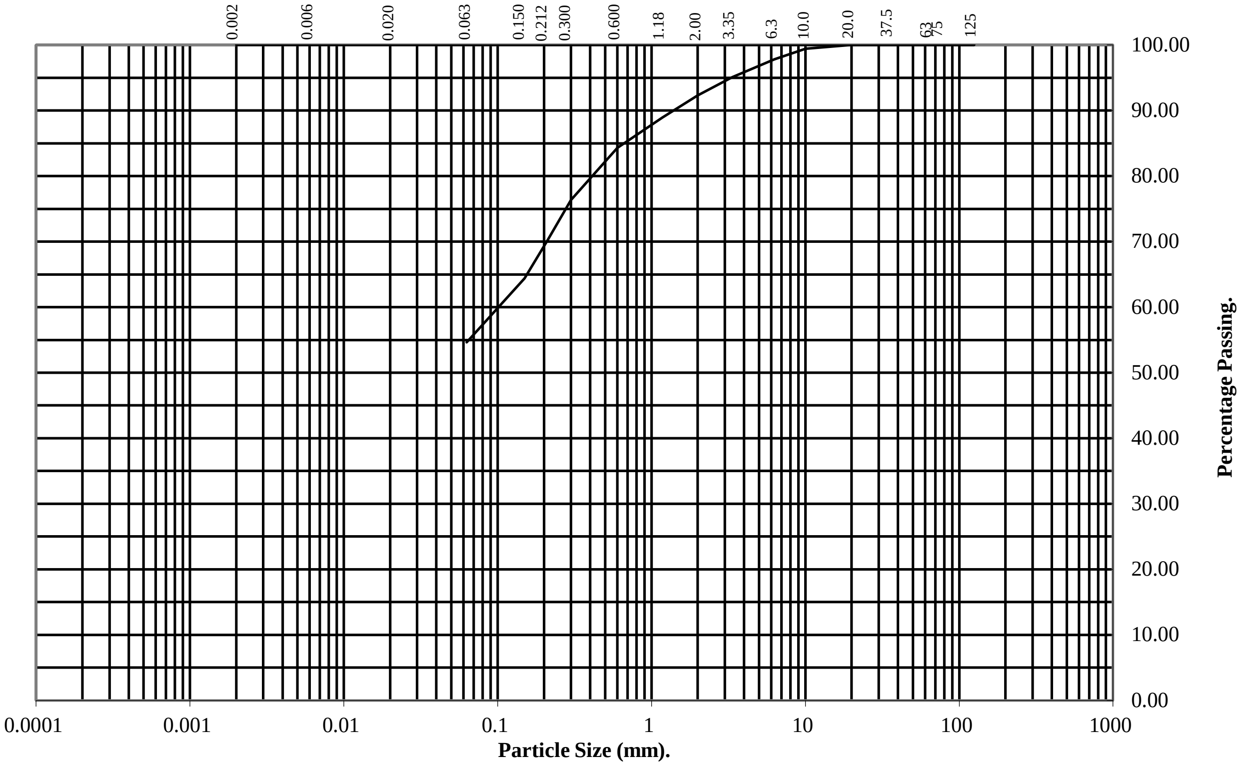
BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: TP16 **Top Depth (m):** 1.50

Sample Number: **Base Depth(m):**

Sample Type: -



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	99
6.3	98
3.35	95
2	92
1.18	89
0.6	84
0.3	76
0.212	70
0.15	64
0.063	55

Soil Fraction	Total Percentage
Cobbles	0
Gravel	8
Sand	37
Silt/Clay	55

Remarks:
See Summary of Soil Descriptions

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Professional Soils Laboratory

Cappouge Dublin 11 Phase 1A

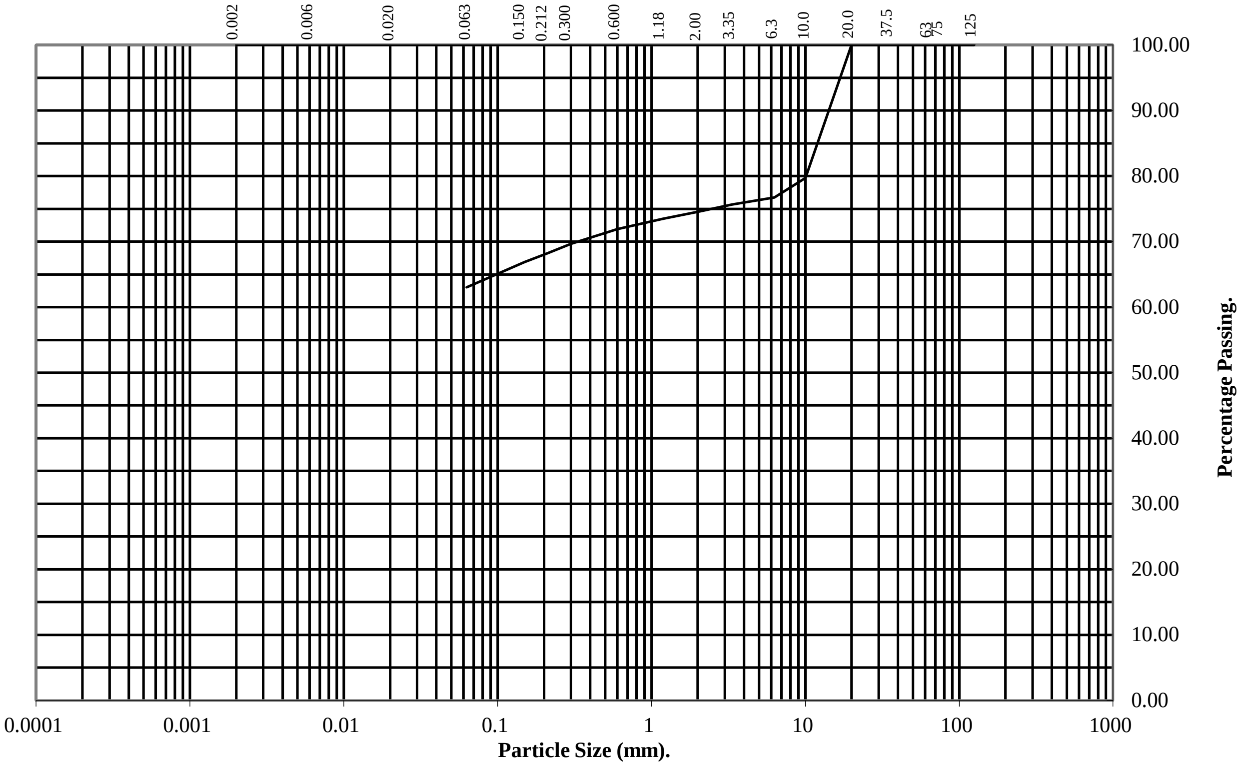
Contract No:
PSL22/1253
Client Ref:
11334-12-21

PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number:	**TP19**	**Top Depth (m):**	**1.00**
Sample Number:		**Base Depth(m):**	
Sample Type:	**-**		



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	80
6.3	77
3.35	76
2	75
1.18	73
0.6	72
0.3	70
0.212	68
0.15	67
0.063	63

Soil Fraction	Total Percentage
Cobbles	0
Gravel	25
Sand	12
Silt/Clay	63

Remarks:
See Summary of Soil Descriptions

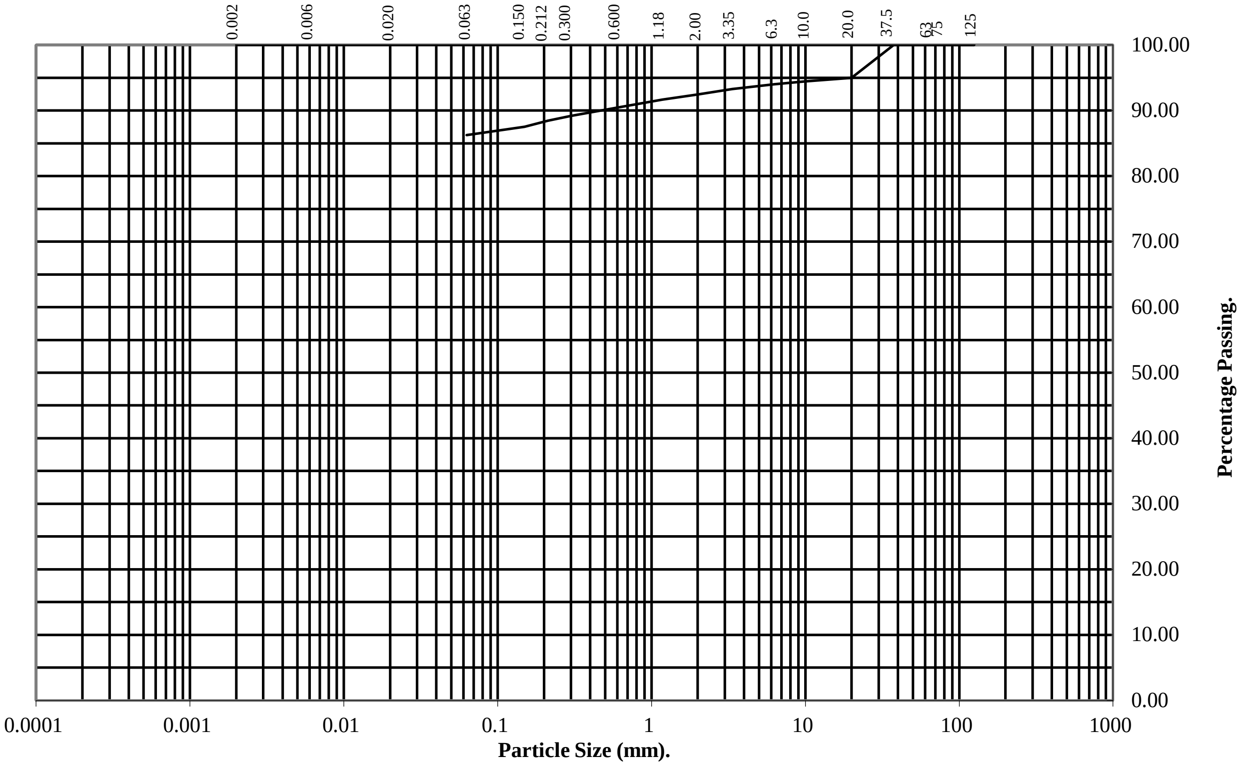
UKAS TESTING 4043	PSL Professional Soils Laboratory	**Cappouge Dublin 11 Phase 1A**	**Contract No:** **PSL22/1253** **Client Ref:** **11334-12-21**

PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number:	**TP20**	**Top Depth (m):**	**1.00**
Sample Number:		**Base Depth(m):**	
Sample Type:	**-**		



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	95
10	94
6.3	94
3.35	93
2	92
1.18	92
0.6	90
0.3	89
0.212	88
0.15	88
0.063	86

Soil Fraction	Total Percentage
Cobbles	0
Gravel	8
Sand	6
Silt/Clay	86

Remarks:
See Summary of Soil Descriptions

4043	Professional Soils Laboratory	**Cappouge Dublin 11 Phase 1A**	**Contract No:** **PSL22/1253** **Client Ref:** **11334-12-21**

PARTICLE SIZE DISTRIBUTION TEST

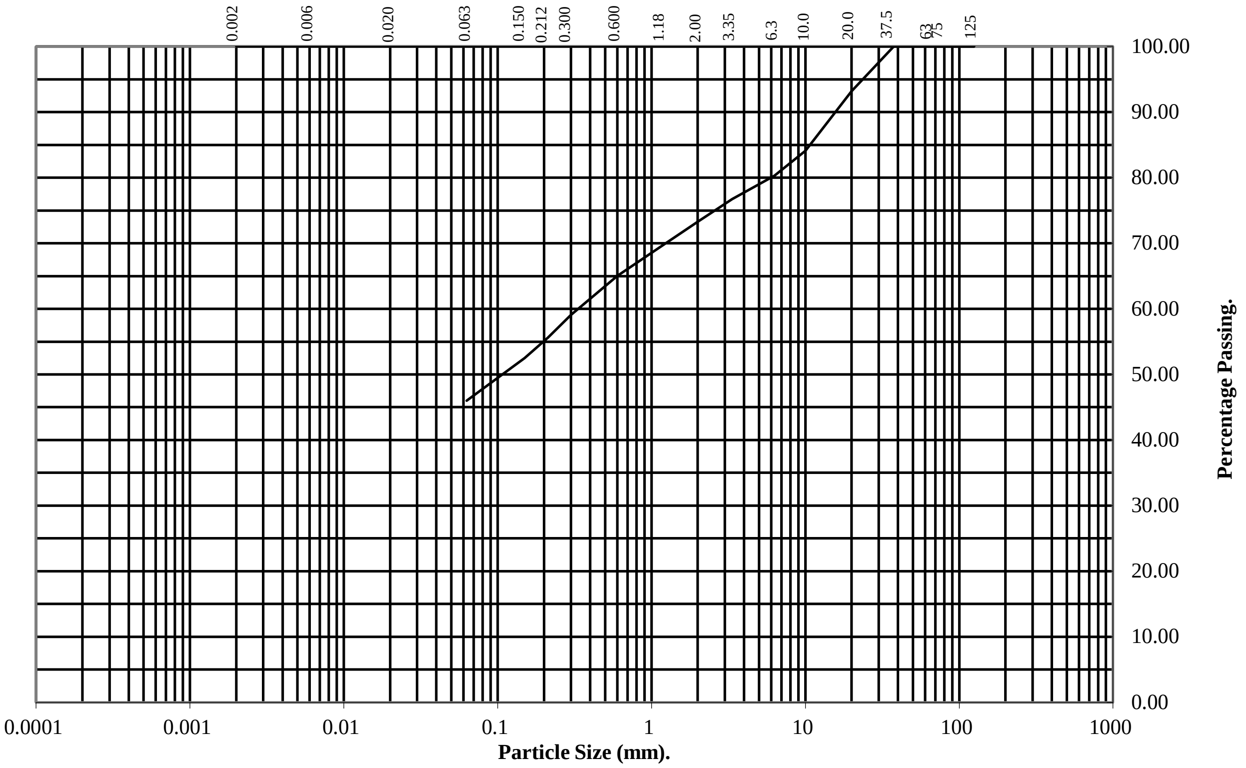
BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: TP20 **Top Depth (m):** 2.00

Sample Number: **Base Depth(m):**

Sample Type: -



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	93
10	84
6.3	80
3.35	77
2	73
1.18	70
0.6	65
0.3	59
0.212	56
0.15	52
0.063	46

Soil Fraction	Total Percentage
Cobbles	0
Gravel	27
Sand	27
Silt/Clay	46

Remarks:

See Summary of Soil Descriptions

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Professional Soils Laboratory

Cappouge Dublin 11 Phase 1A

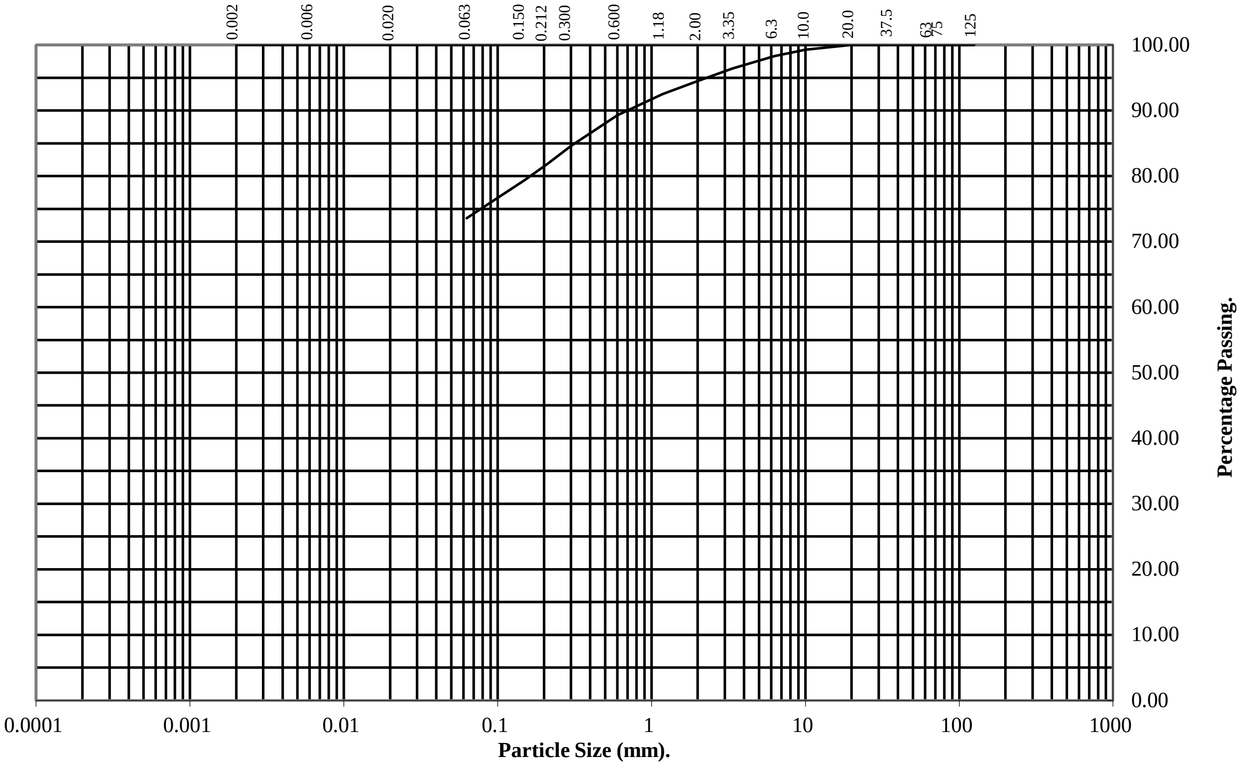
Contract No:
PSL22/1253
Client Ref:
11334-12-21

PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number:	**TP22**	**Top Depth (m):**	**0.50**
Sample Number:		**Base Depth(m):**	
Sample Type:	**-**		



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	99
6.3	98
3.35	96
2	95
1.18	92
0.6	89
0.3	85
0.212	82
0.15	79
0.063	74

Soil Fraction	Total Percentage
Cobbles	0
Gravel	5
Sand	21
Silt/Clay	74

Remarks:
See Summary of Soil Descriptions

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Professional Soils Laboratory

Cappouge Dublin 11 Phase 1A

Contract No:
PSL22/1253
Client Ref:
11334-12-21

PARTICLE SIZE DISTRIBUTION TEST

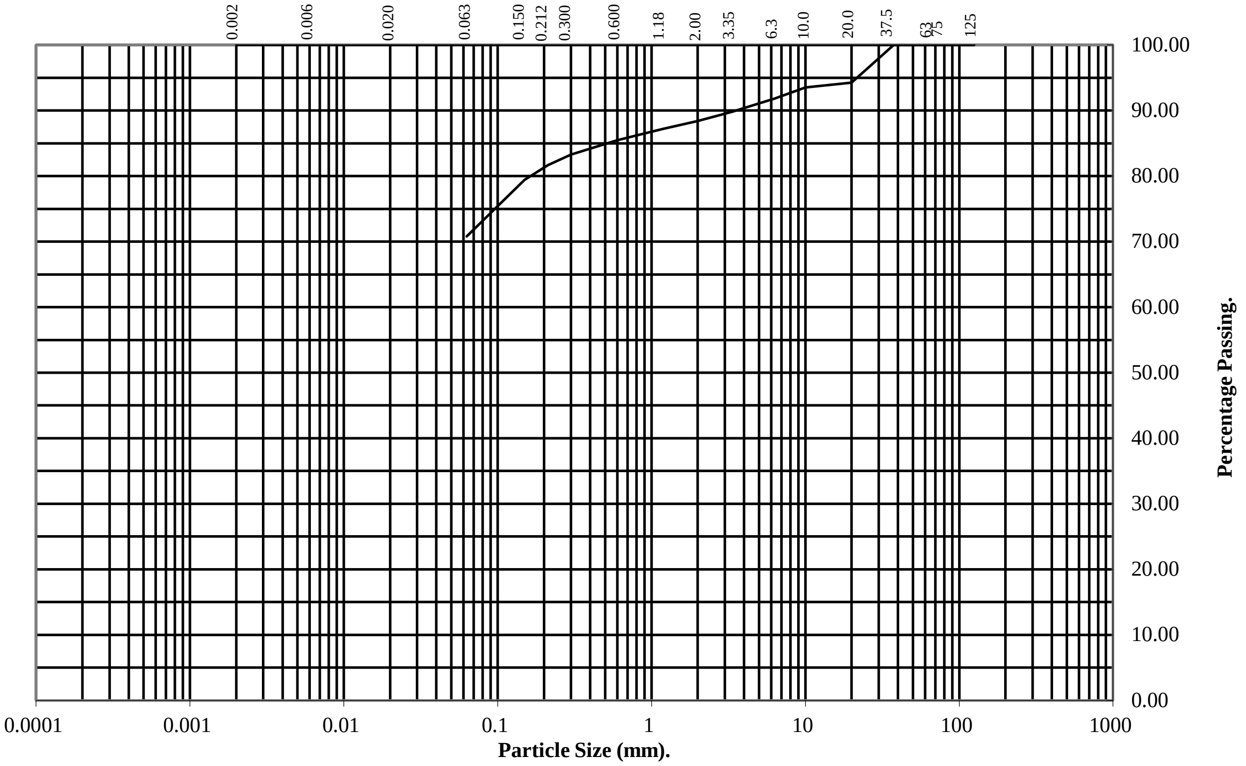
BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: TP23
Top Depth (m): 2.00

Sample Number:
Base Depth(m):

Sample Type: -



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	94
10	94
6.3	92
3.35	90
2	88
1.18	87
0.6	85
0.3	83
0.212	82
0.15	79
0.063	71

Soil Fraction	Total Percentage
Cobbles	0
Gravel	12
Sand	17
Silt/Clay	71

Remarks:
See Summary of Soil Descriptions

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Professional Soils Laboratory

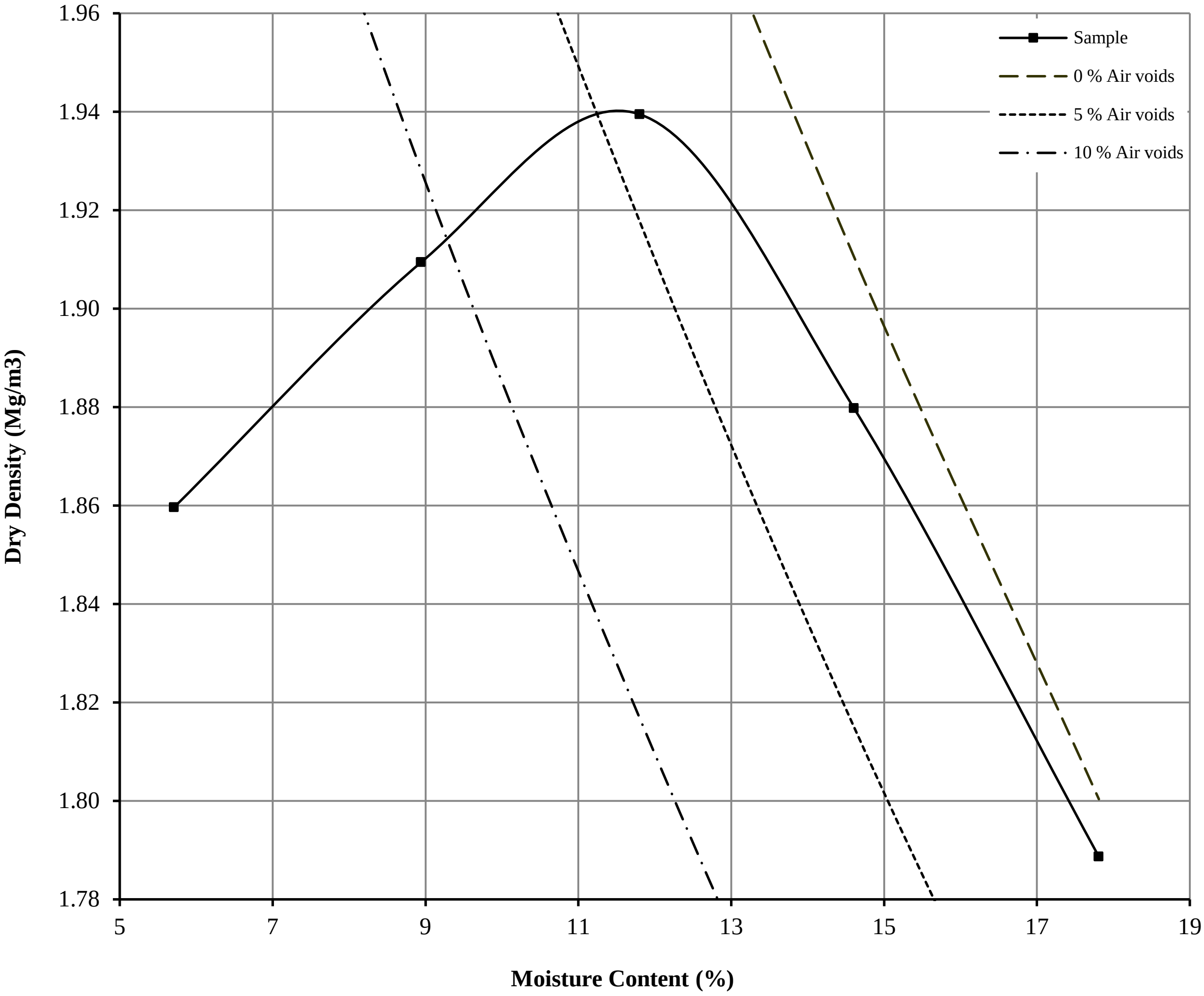
Cappouge Dublin 11 Phase 1A

Contract No: PSL22/1253
Client Ref: 11334-12-21

DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

BS 1377 : Part 4 : Clause 3.4 : 1990

Hole Number:	**TP01**	**Top Depth (m) :**	**2.00**
Sample Number:		**Base Depth (m) :**	
Sample Type:	**-**		



Initial Moisture Content:		18	Method of Compaction:	2.5kg	Separate Samples
Particle Density (Mg/m3):	2.65	Assumed	Material Retained on 37.5 mm Test Sieve (%):		0
Maximum Dry Density (Mg/m3):		1.94	Material Retained on 20.0 mm Test Sieve (%):		10
Optimum Moisture Content (%):		12			
Remarks	See summary of soil descriptions				

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PSL

Professional Soils Laboratory

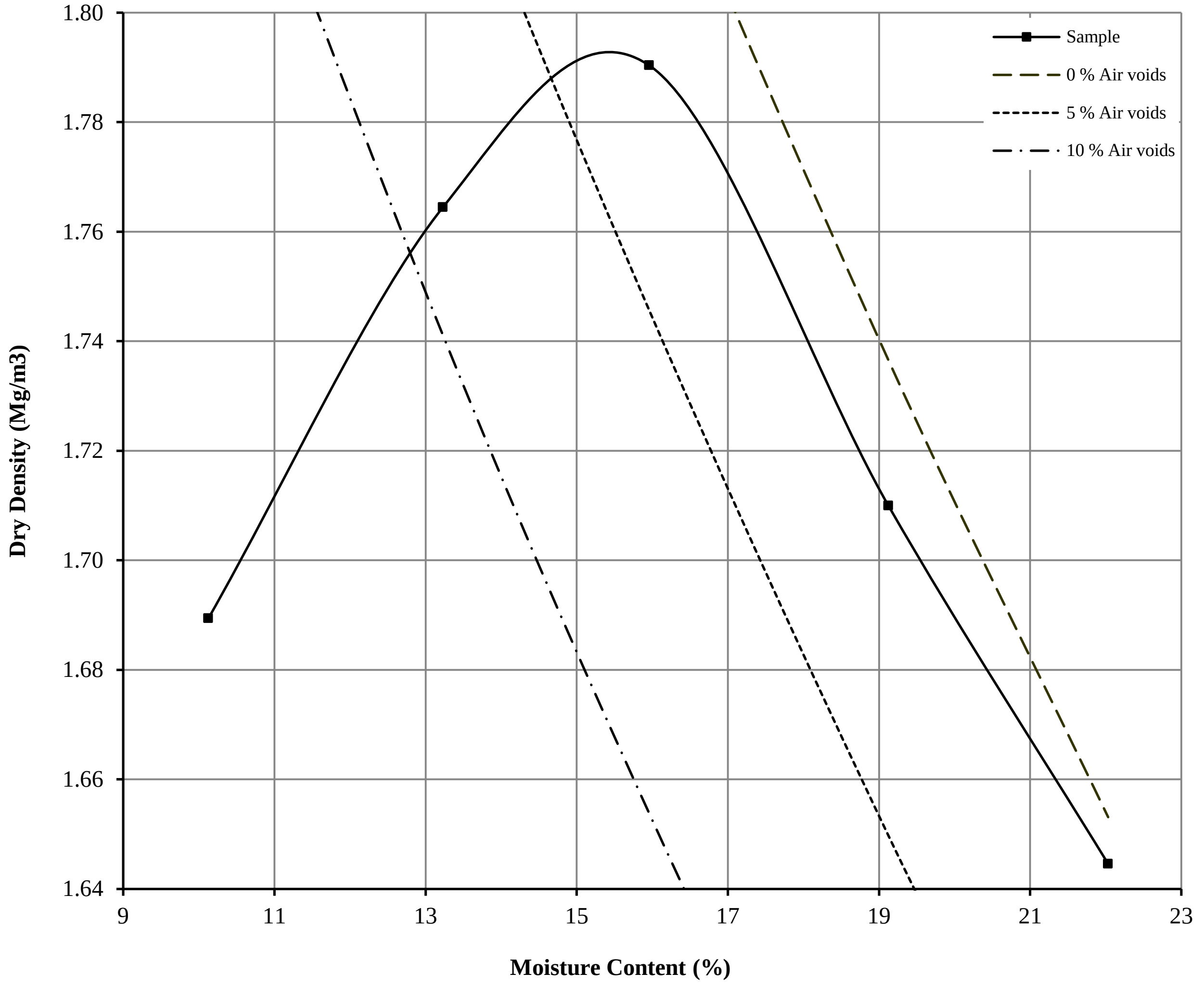
Cappouge Dublin 11 Phase 1A

Contract
PSL22/1253
Client Ref
11334-12-21

DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

BS 1377 : Part 4 : Clause 3.4 : 1990

Hole Number:	**TP06**	**Top Depth (m) :**	**1.00**
Sample Number:		**Base Depth (m) :**	
Sample Type:	**-**		



Initial Moisture Content:		19	Method of Compaction:	2.5kg	Separate Samples
Particle Density (Mg/m3):	2.6	Assumed	Material Retained on 37.5 mm Test Sieve (%):		0
Maximum Dry Density (Mg/m3):		1.79	Material Retained on 20.0 mm Test Sieve (%):		17
Optimum Moisture Content (%):		16			
Remarks	See summary of soil descriptions				

UKAS TESTING 4043

PSL Professional Soils Laboratory

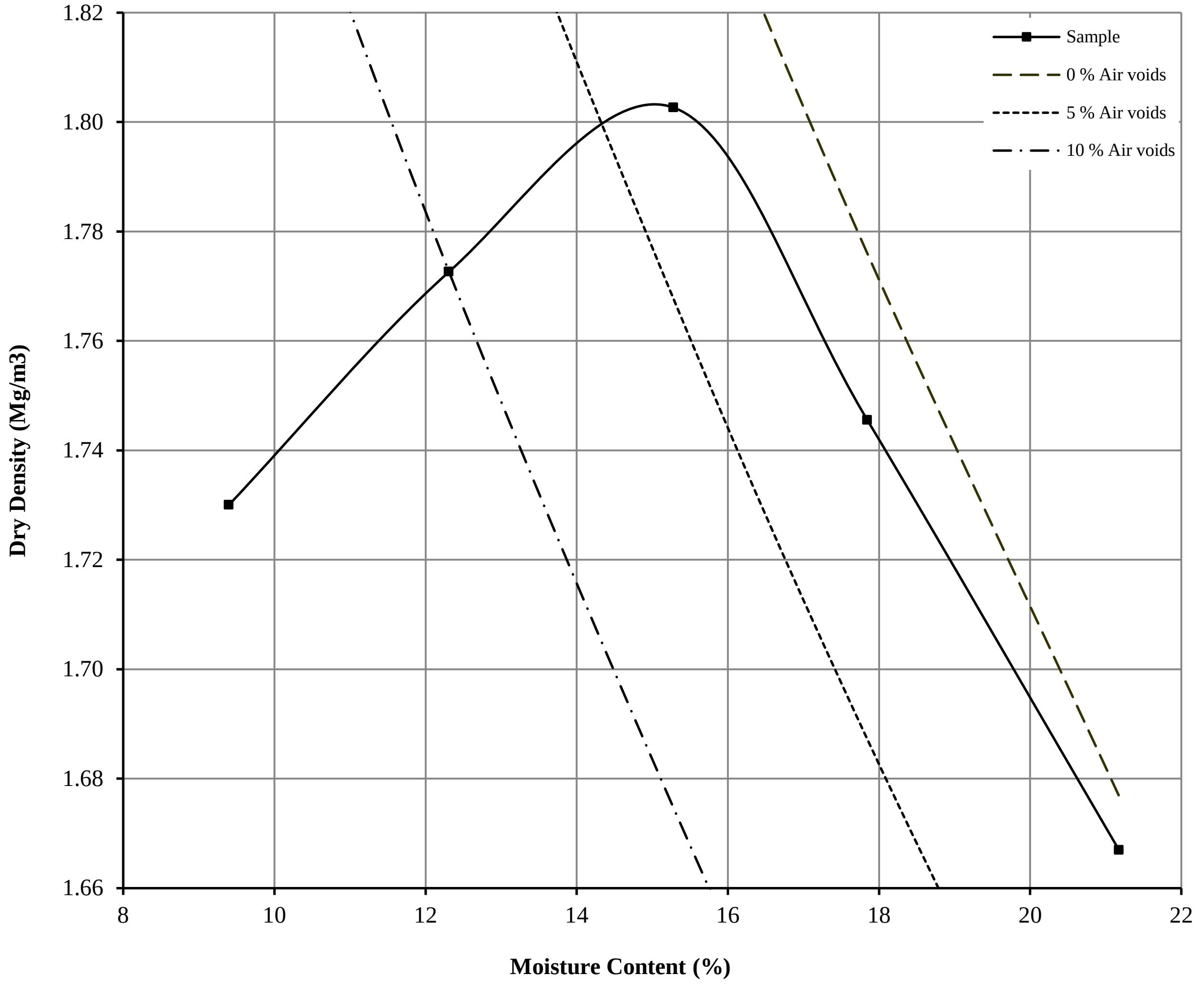
Cappouge Dublin 11 Phase 1A

Contract
PSL22/1253
Client Ref
11334-12-21

DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

BS 1377 : Part 4 : Clause 3.4 : 1990

Hole Number:	**TP13**	**Top Depth (m) :**	**0.50**
Sample Number:		**Base Depth (m) :**	
Sample Type:	**-**		



Initial Moisture Content:		23	Method of Compaction:	2.5kg	Separate Samples
Particle Density (Mg/m3):	2.6	Assumed	Material Retained on 37.5 mm Test Sieve (%):		0
Maximum Dry Density (Mg/m3):		1.80	Material Retained on 20.0 mm Test Sieve (%):		15
Optimum Moisture Content (%):		15			
Remarks	See summary of soil descriptions				

UKAS TESTING 4043

Professional Soils Laboratory

Cappouge Dublin 11 Phase 1A

Contract
PSL22/1253
Client Ref
11334-12-21

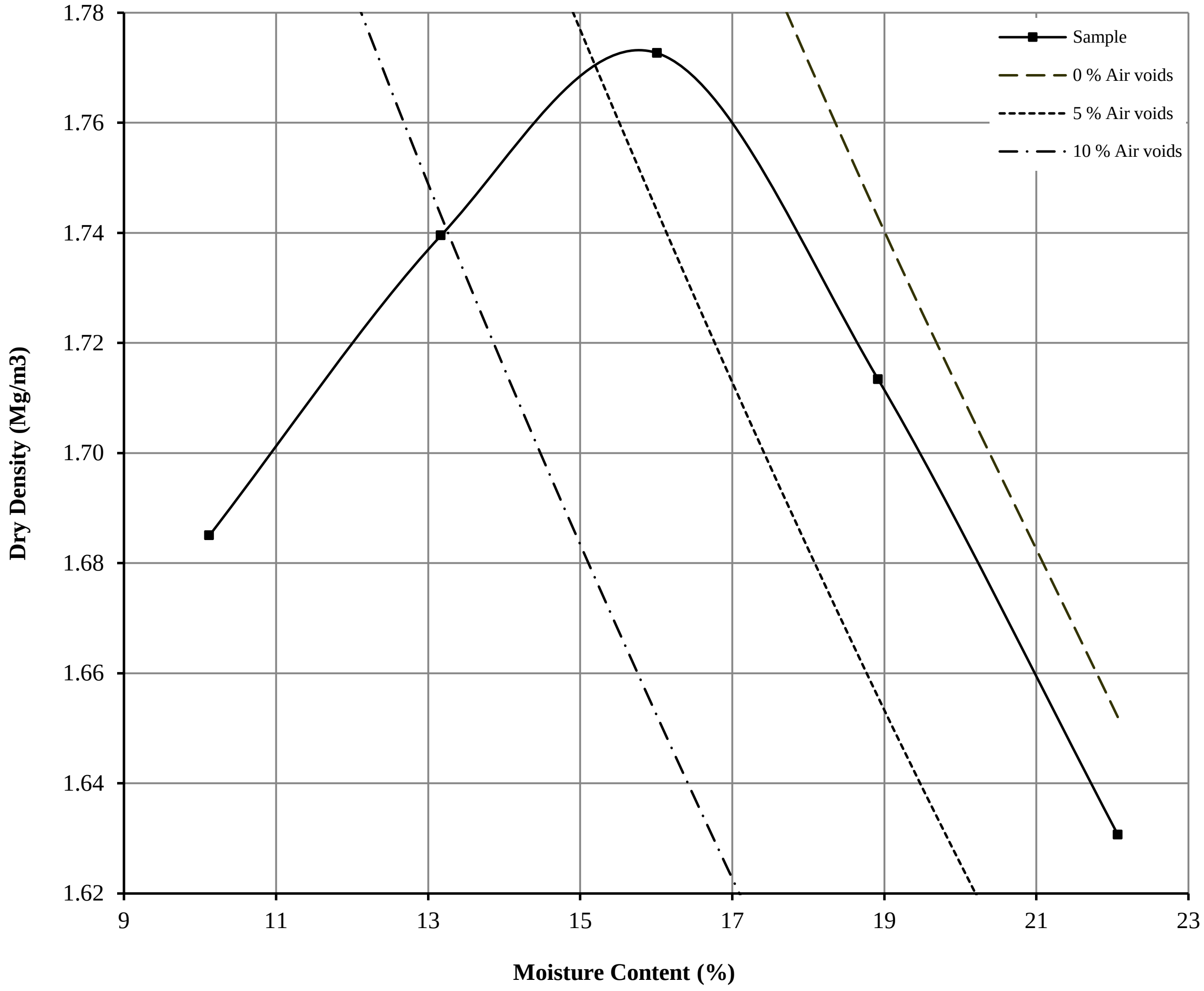
DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

BS 1377 : Part 4 : Clause 3.3 : 1990

Hole Number: **TP19** **Top Depth (m) :** **1.00**

Sample Number: **Base Depth (m) :**

Sample Type: **-**



Initial Moisture Content:		19	Method of Compaction:	2.5kg	Separate Samples
Particle Density (Mg/m3):	2.6	Assumed	Material Retained on 37.5 mm Test Sieve (%):		0
Maximum Dry Density (Mg/m3):		1.77	Material Retained on 20.0 mm Test Sieve (%):		0
Optimum Moisture Content (%):		16			
Remarks	See summary of soil descriptions				

UKAS TESTING 4043

PSL Professional Soils Laboratory

Cappouge Dublin 11 Phase 1A

Contract
PSL22/1253
Client Ref
11334-12-21

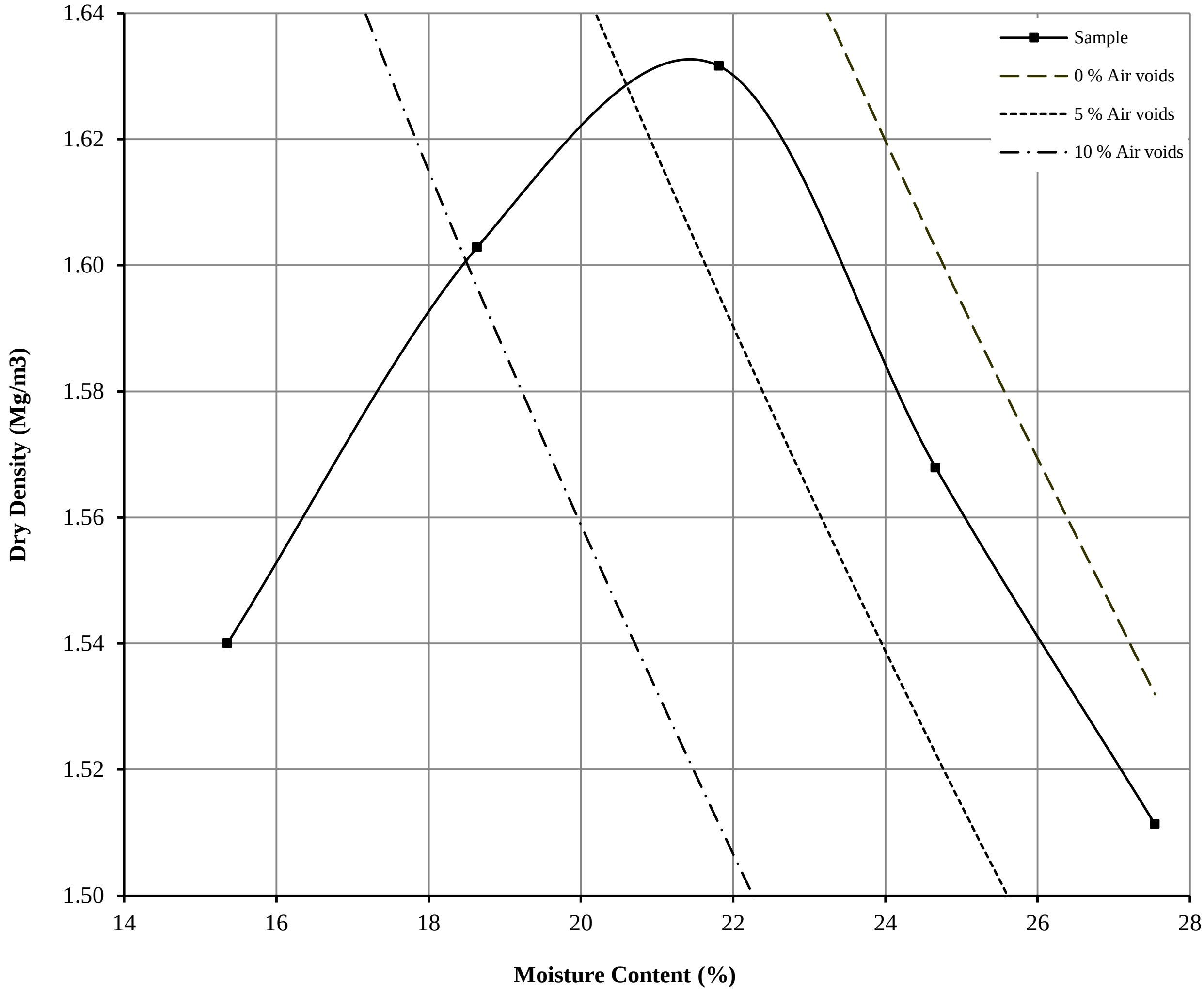
DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

BS 1377 : Part 4 : Clause 3.3 : 1990

Hole Number: TP22 **Top Depth (m) :** 0.50

Sample Number: **Base Depth (m) :**

Sample Type: -



Initial Moisture Content:		25	Method of Compaction:	2.5kg	Separate Samples
Particle Density (Mg/m3):	2.65	Assumed	Material Retained on 37.5 mm Test Sieve (%):		0
Maximum Dry Density (Mg/m3):		1.63	Material Retained on 20.0 mm Test Sieve (%):		0
Optimum Moisture Content (%):		22			
Remarks See summary of soil descriptions					

UKAS TESTING 4043

Professional Soils Laboratory

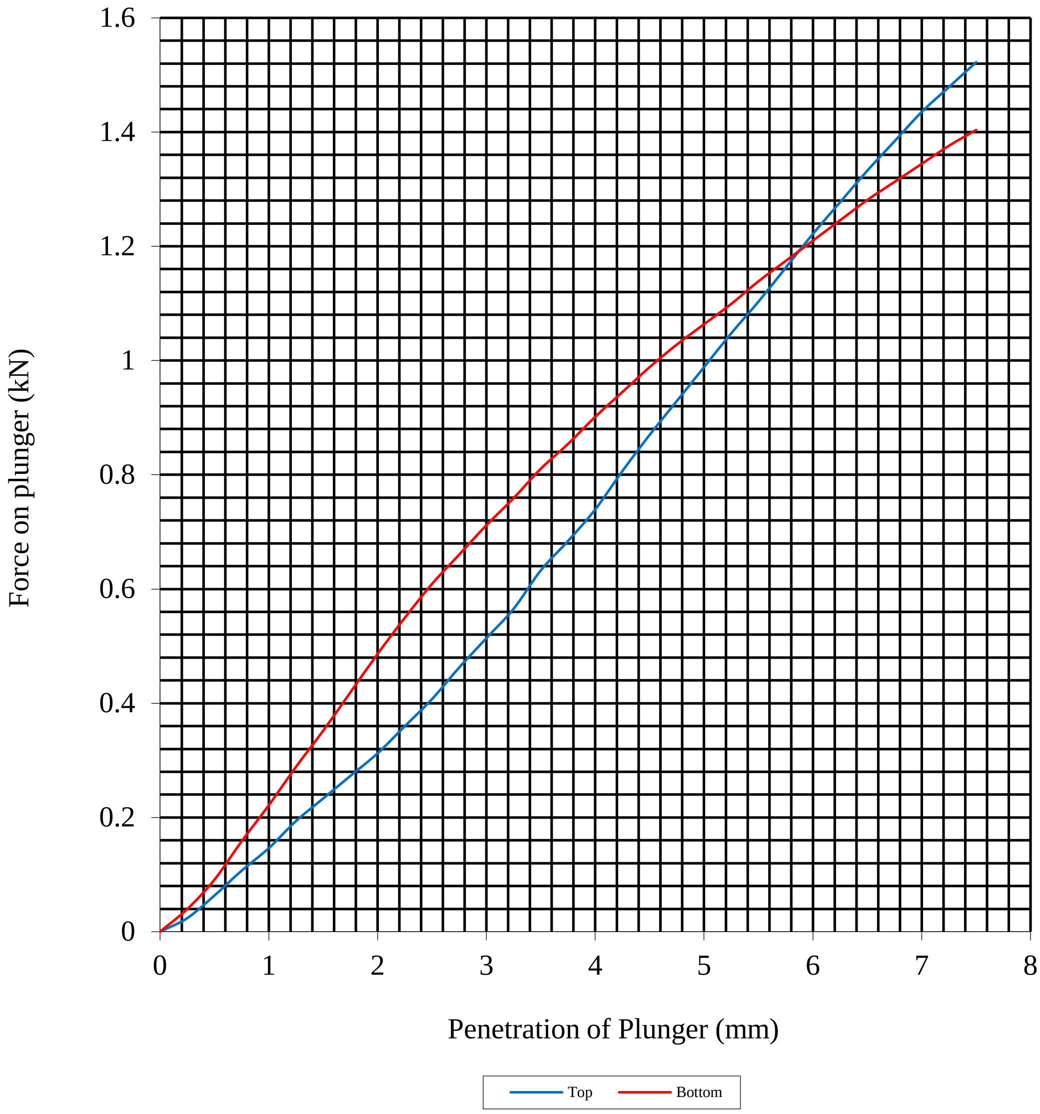
Cappouge Dublin 11 Phase 1A

Contract	
PSL22/1253	
Client Ref	
11334-12-21	

CALIFORNIA BEARING RATIO TEST

BS 1377 : Part 4 : 1990

Hole Number:	**TP02**	**Top Depth (m):**	**1.50**
Sample Number:		**Base Depth (m):**	
Sample Type:	**-**		



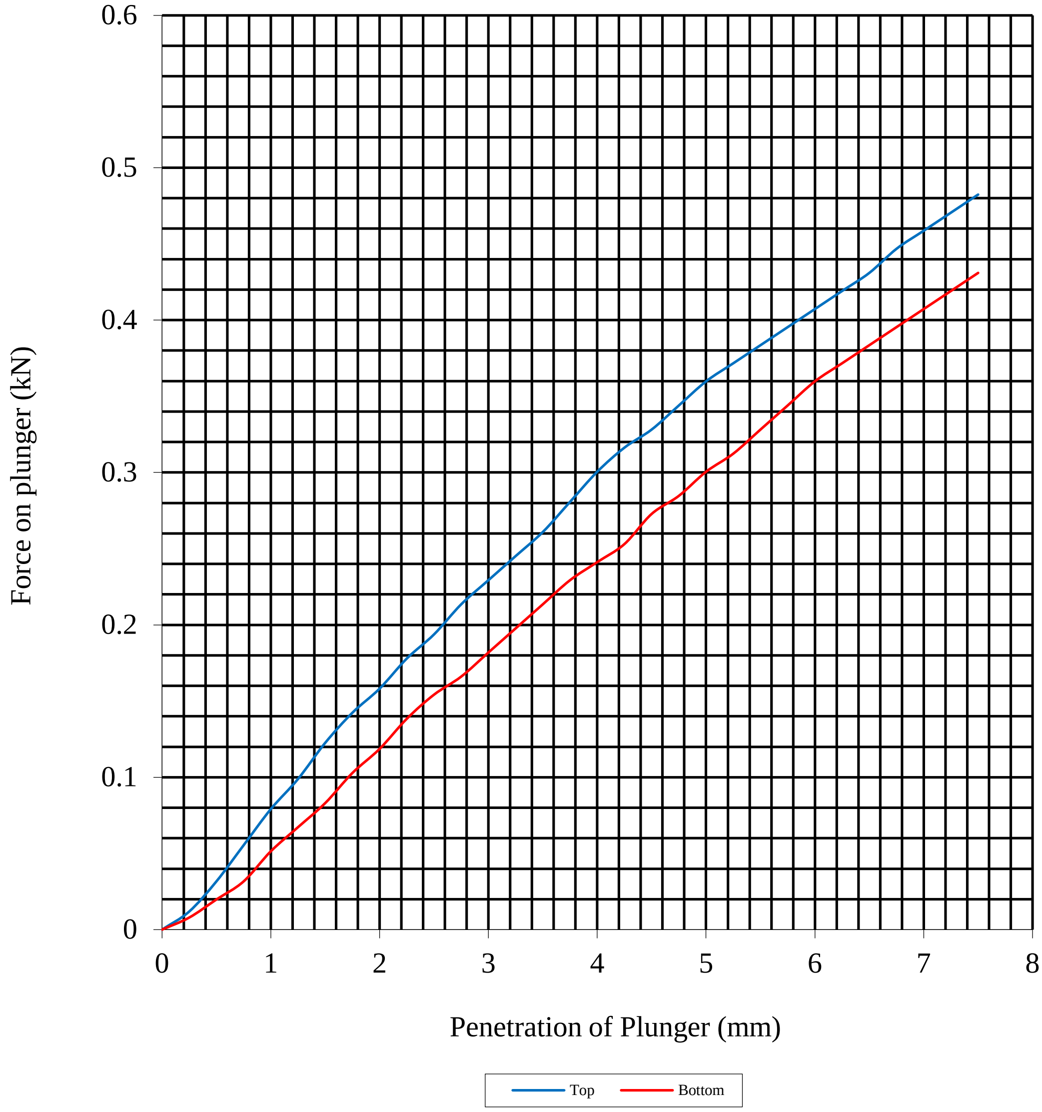
Initial Sample Conditions		**Sample Preparation**		**Final Moisture Content %**		**C.B.R. Value %**	
Moisture Content:	23	Surcharge Kg:	4.20	Sample Top	23	Sample Top	4.9
Bulk Density Mg/m3:	1.95	Soaking Time hrs	0	Sample Bottom	23	Sample Bottom	5.3
Dry Density Mg/m3:	1.58	Swelling mm:	0.00	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:			11				
Compaction Conditions		2.5kg					

UKAS TESTING 4043	PSL Professional Soils Laboratory	**Cappouge Dublin 11 Phase 1A**	**Contract No:** **PSL22/1253** **Client Ref:** **11334-12-21**

CALIFORNIA BEARING RATIO TEST

BS 1377 : Part 4 : 1990

Hole Number:	**TP05**	**Top Depth (m):**	**0.50**
Sample Number:		**Base Depth (m):**	
Sample Type:	**-**		



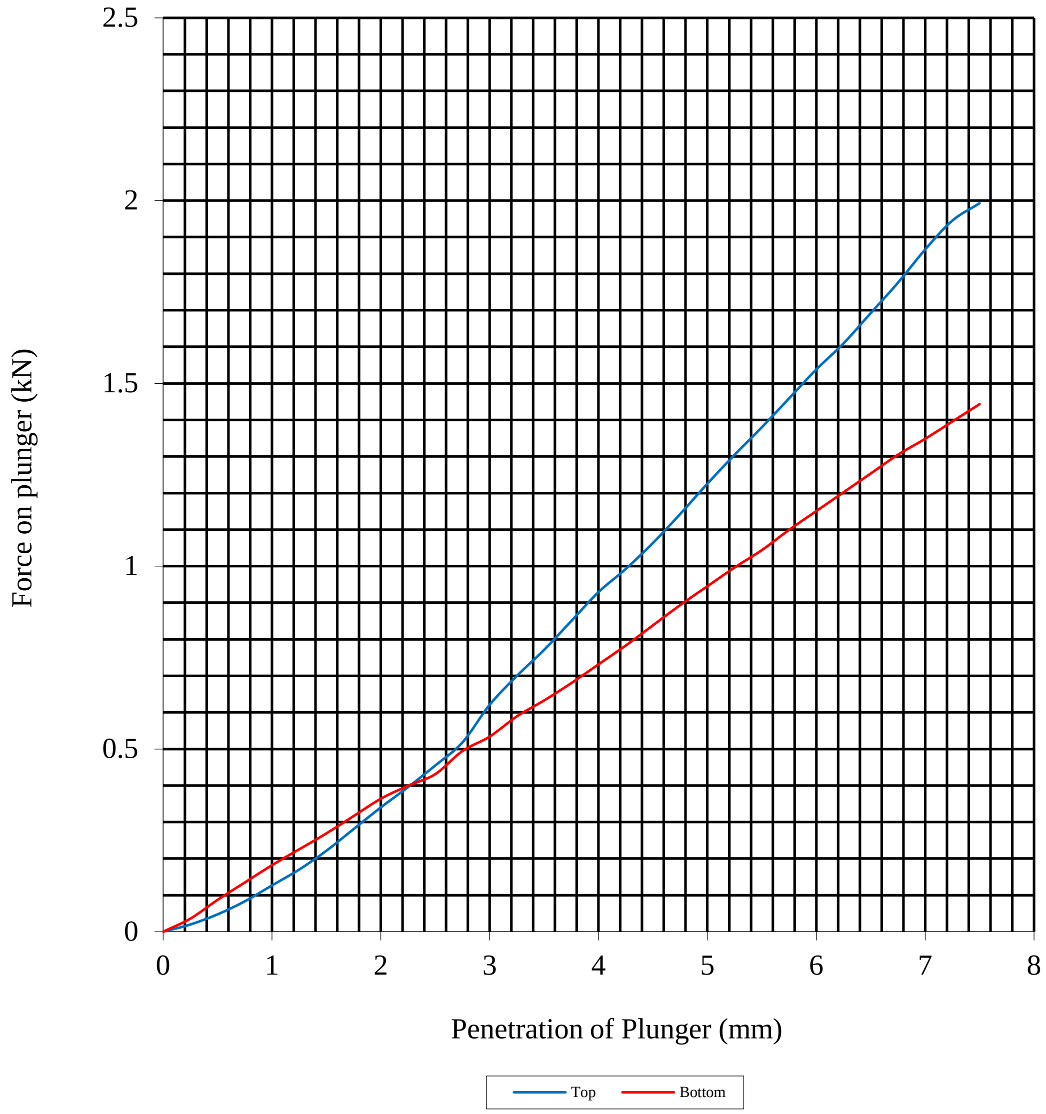
Initial Sample Conditions		**Sample Preparation**		**Final Moisture Content %**		**C.B.R. Value %**	
Moisture Content:	22	Surcharge Kg:	4.20	Sample Top	22	Sample Top	1.8
Bulk Density Mg/m3:	1.99	Soaking Time hrs	0	Sample Bottom	22	Sample Bottom	1.5
Dry Density Mg/m3:	1.64	Swelling mm:	0.00	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:			2				
Compaction Conditions		2.5kg					

UKAS TESTING 4043	PSL Professional Soils Laboratory	**Cappouge Dublin 11 Phase 1A**	**Contract No:** **PSL22/1253** **Client Ref:** **11334-12-21**

CALIFORNIA BEARING RATIO TEST

BS 1377 : Part 4 : 1990

Hole Number:	**TP09**	**Top Depth (m):**	**0.50**
Sample Number:		**Base Depth (m):**	
Sample Type:	**-**		



Initial Sample Conditions		**Sample Preparation**		**Final Moisture Content %**		**C.B.R. Value %**	
Moisture Content:	13	Surcharge Kg:	4.20	Sample Top	13	Sample Top	6.1
Bulk Density Mg/m3:	2.16	Soaking Time hrs	0	Sample Bottom	13	Sample Bottom	4.7
Dry Density Mg/m3:	1.92	Swelling mm:	0.00	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:			11				
Compaction Conditions		2.5kg					

UKAS TESTING 4043

PSL Professional Soils Laboratory

Cappouge Dublin 11 Phase 1A

Contract No:
PSL22/1253
Client Ref:
11334-12-21

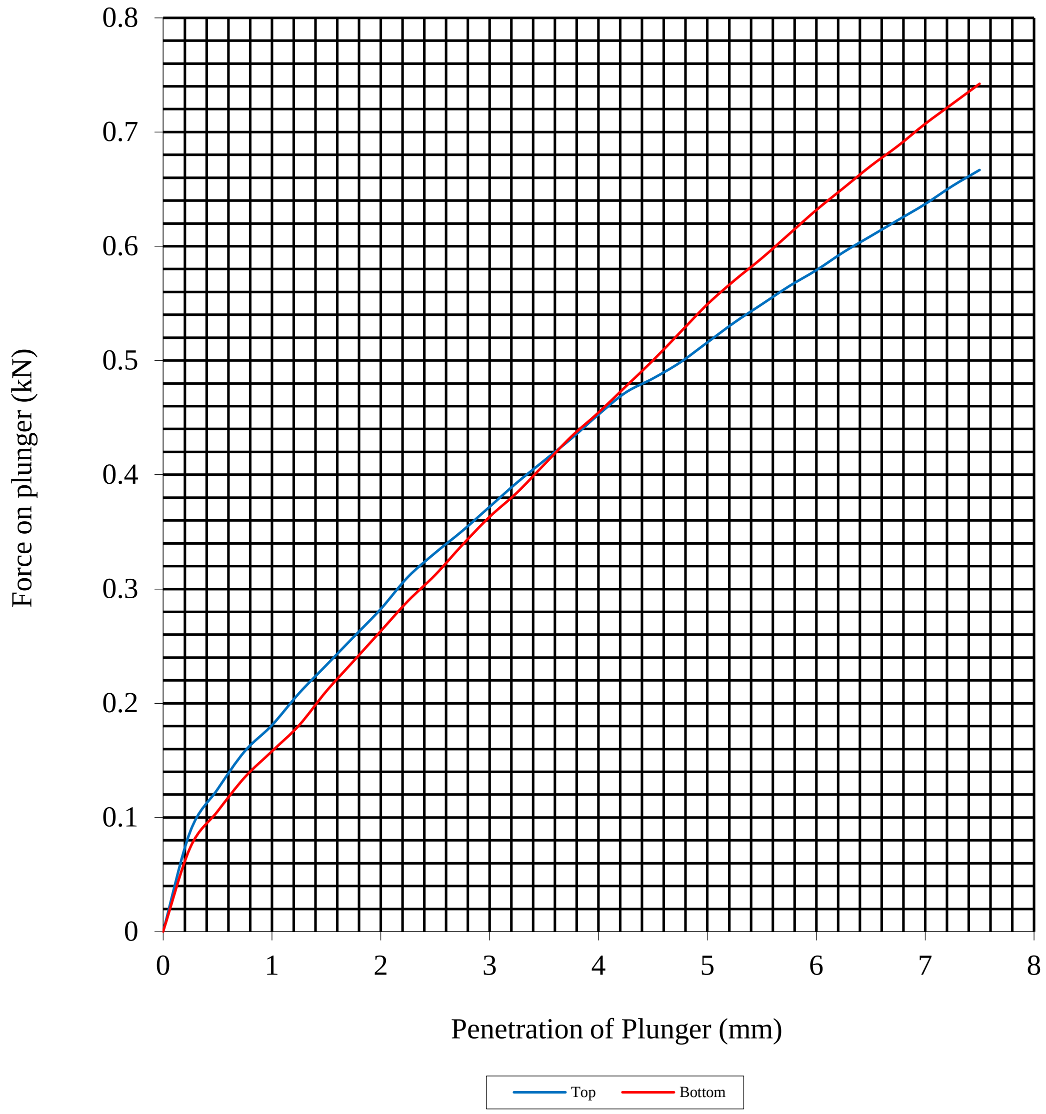
CALIFORNIA BEARING RATIO TEST

BS 1377 : Part 4 : 1990

Hole Number: **TP10** **Top Depth (m):** **1.00**

Sample Number: **Base Depth (m):**

Sample Type: **-**



Initial Sample Conditions		**Sample Preparation**		**Final Moisture Content %**		**C.B.R. Value %**	
Moisture Content:	18	Surcharge Kg:	4.20	Sample Top	19	Sample Top	2.6
Bulk Density Mg/m3:	2.11	Soaking Time hrs	0	Sample Bottom	18	Sample Bottom	2.7
Dry Density Mg/m3:	1.78	Swelling mm:	0.00	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:			16				
Compaction Conditions		2.5kg					

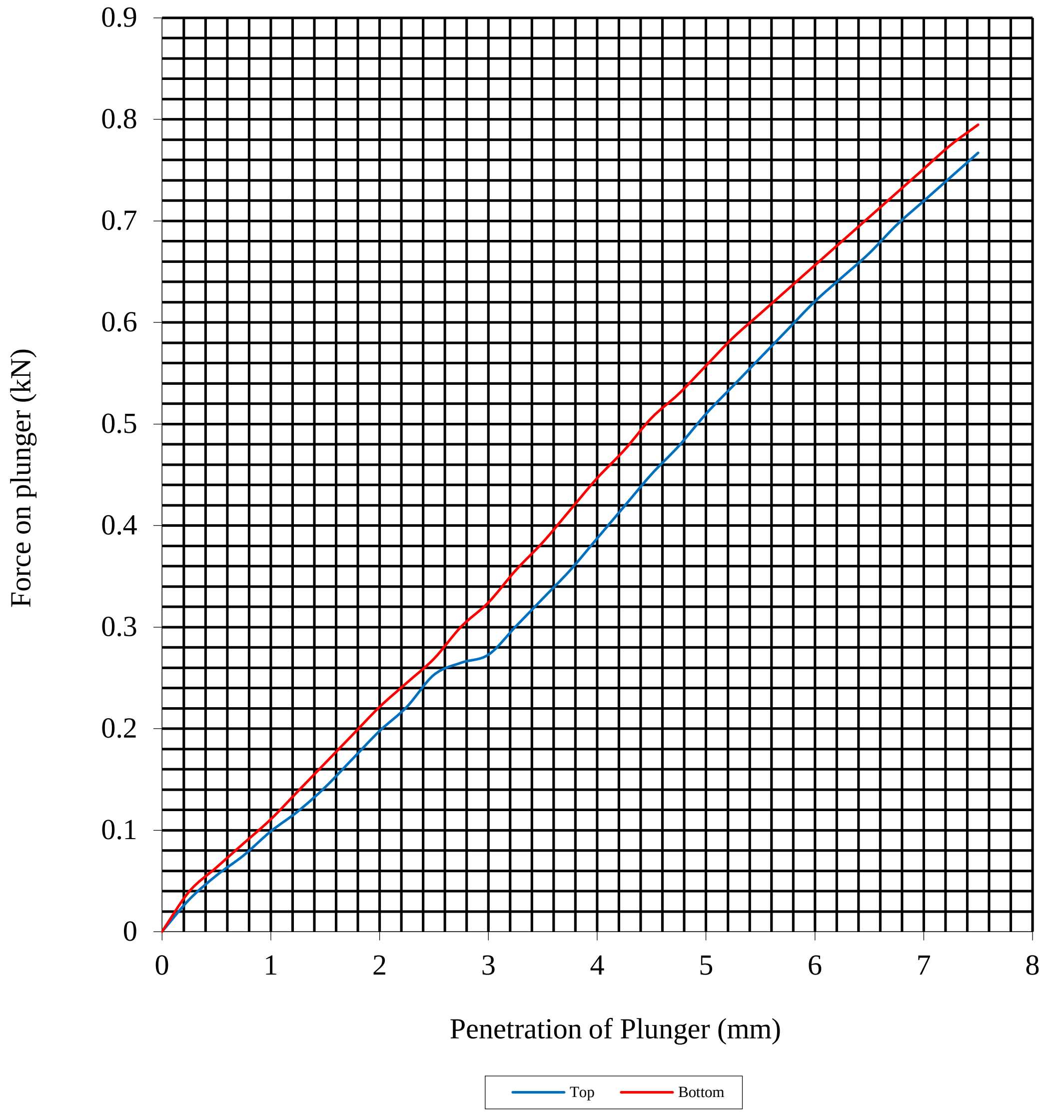
CALIFORNIA BEARING RATIO TEST

BS 1377 : Part 4 : 1990

Hole Number: **TP14** **Top Depth (m):** **1.00**

Sample Number: **Base Depth (m):**

Sample Type: **-**



Initial Sample Conditions		**Sample Preparation**		**Final Moisture Content %**		**C.B.R. Value %**	
Moisture Content:	16	Surcharge Kg:	4.20	Sample Top	16	Sample Top	2.6
Bulk Density Mg/m3:	2.16	Soaking Time hrs	0	Sample Bottom	16	Sample Bottom	2.8
Dry Density Mg/m3:	1.86	Swelling mm:	0.00	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:			11				
Compaction Conditions		2.5kg					

UKAS TESTING 4043

PSL Professional Soils Laboratory

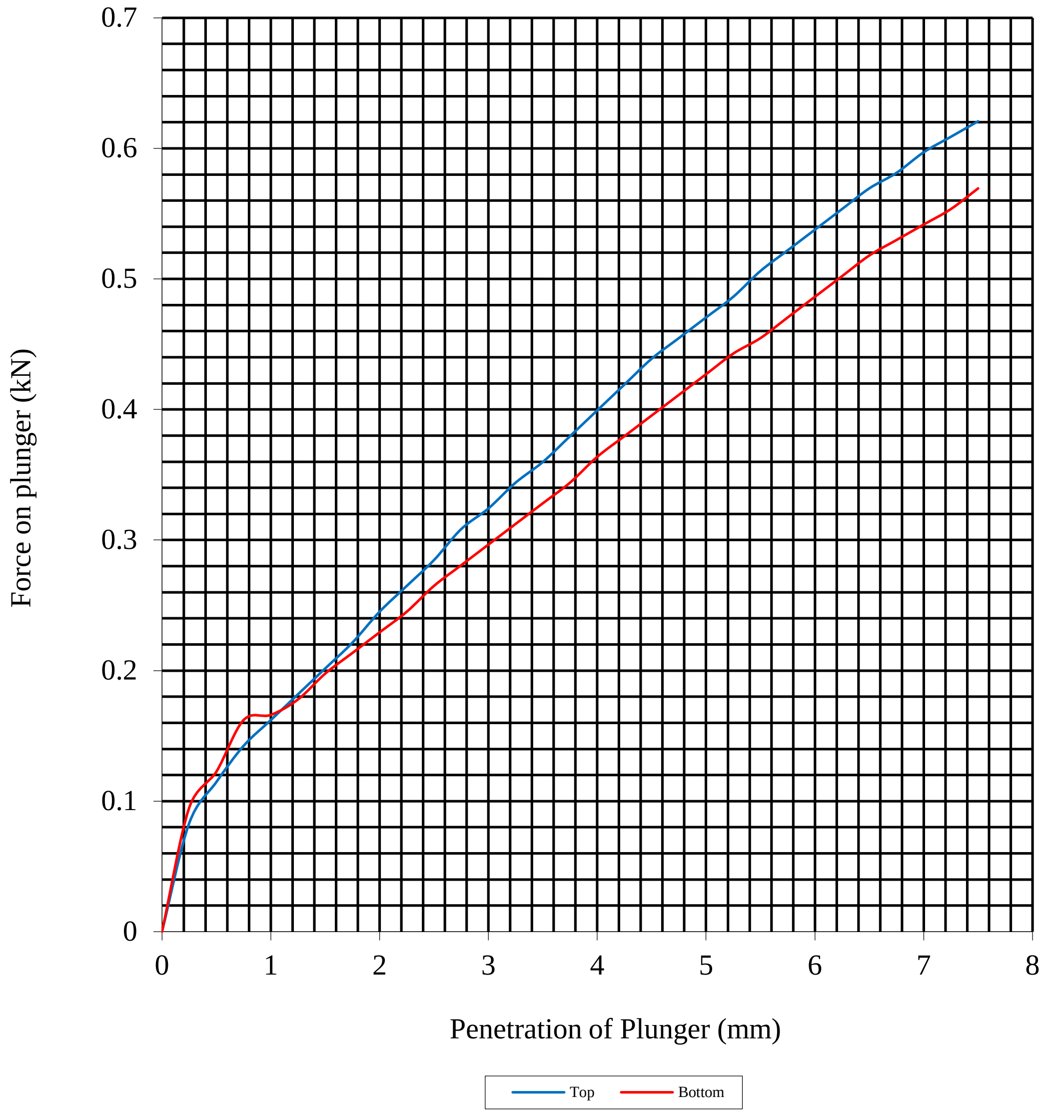
Cappouge Dublin 11 Phase 1A

Contract No:
PSL22/1253
Client Ref:
11334-12-21

CALIFORNIA BEARING RATIO TEST

BS 1377 : Part 4 : 1990

Hole Number:	**TP16**	**Top Depth (m):**	**1.50**
Sample Number:		**Base Depth (m):**	
Sample Type:	**-**		



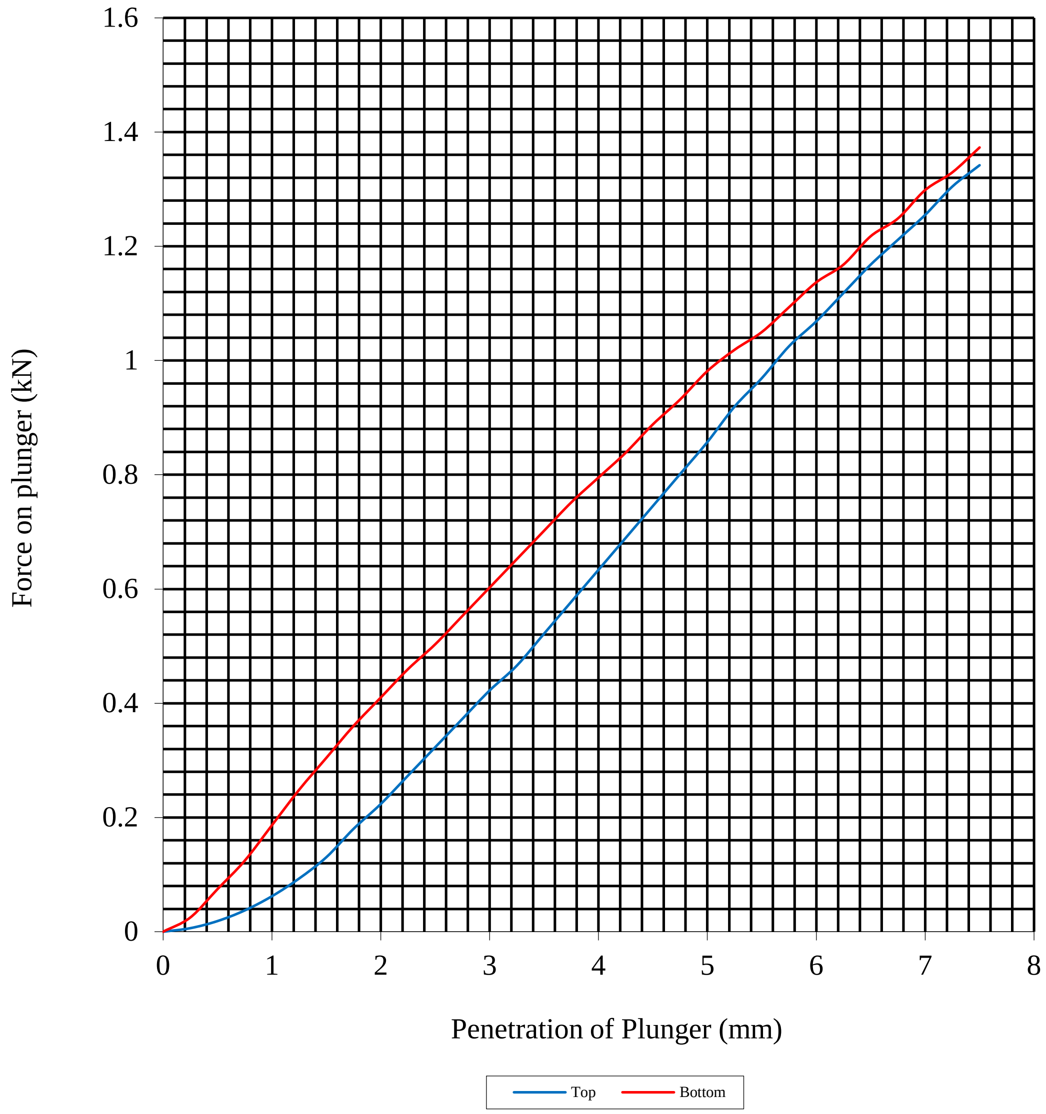
Initial Sample Conditions		**Sample Preparation**		**Final Moisture Content %**		**C.B.R. Value %**	
Moisture Content:	18	Surcharge Kg:	4.20	Sample Top	18	Sample Top	2.4
Bulk Density Mg/m3:	2.12	Soaking Time hrs	0	Sample Bottom	18	Sample Bottom	2.1
Dry Density Mg/m3:	1.79	Swelling mm:	0.00	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:			0				
Compaction Conditions		2.5kg					

UKAS TESTING 4043	PSL Professional Soils Laboratory	**Cappouge Dublin 11 Phase 1A**	**Contract No:** **PSL22/1253** **Client Ref:** **11334-12-21**

CALIFORNIA BEARING RATIO TEST

BS 1377 : Part 4 : 1990

Hole Number:	**TP19**	**Top Depth (m):**	**1.00**
Sample Number:		**Base Depth (m):**	
Sample Type:	**-**		



Initial Sample Conditions		**Sample Preparation**		**Final Moisture Content %**		**C.B.R. Value %**	
Moisture Content:	19	Surcharge Kg:	4.20	Sample Top	19	Sample Top	4.3
Bulk Density Mg/m3:	2.04	Soaking Time hrs	0	Sample Bottom	18	Sample Bottom	4.9
Dry Density Mg/m3:	1.71	Swelling mm:	0.00	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:			0				
Compaction Conditions		2.5kg					

UKAS TESTING 4043	PSL Professional Soils Laboratory	**Cappouge Dublin 11 Phase 1A**	**Contract No:** **PSL22/1253** **Client Ref:** **11334-12-21**

CALIFORNIA BEARING RATIO TEST

BS 1377 : Part 4 : 1990

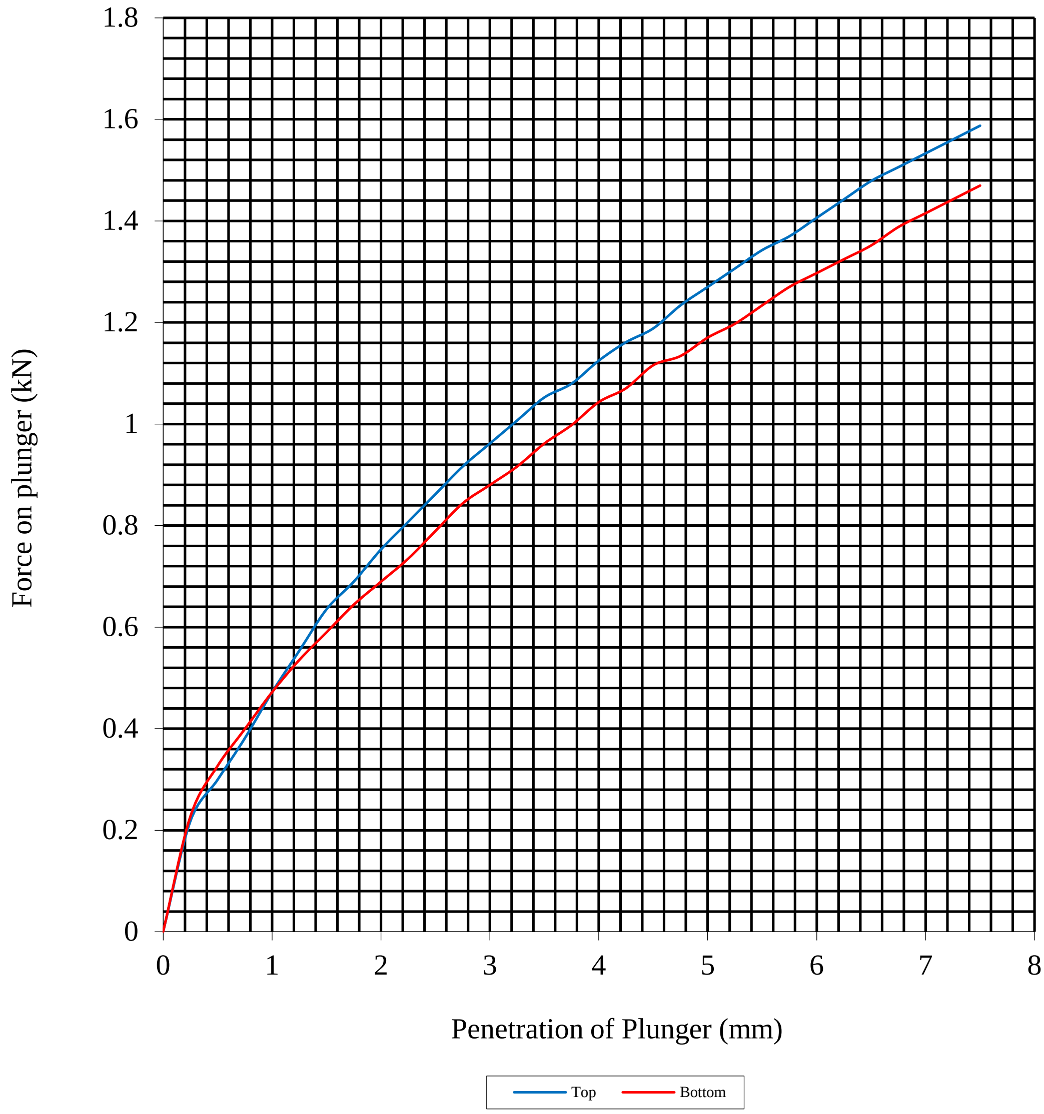
Hole Number: TP20

Top Depth (m): 1.00

Sample Number:

Base Depth (m):

Sample Type: -



Initial Sample Conditions		**Sample Preparation**		**Final Moisture Content %**		**C.B.R. Value %**	
Moisture Content:	32	Surcharge Kg:	4.20	Sample Top	32	Sample Top	6.5
Bulk Density Mg/m3:	1.76	Soaking Time hrs	0	Sample Bottom	33	Sample Bottom	6.0
Dry Density Mg/m3:	1.33	Swelling mm:	0.00	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:			5				
Compaction Conditions		2.5kg					

UKAS TESTING 4043

PSL Professional Soils Laboratory

Cappouge Dublin 11 Phase 1A

Contract No: PSL22/1253

Client Ref: 11334-12-21

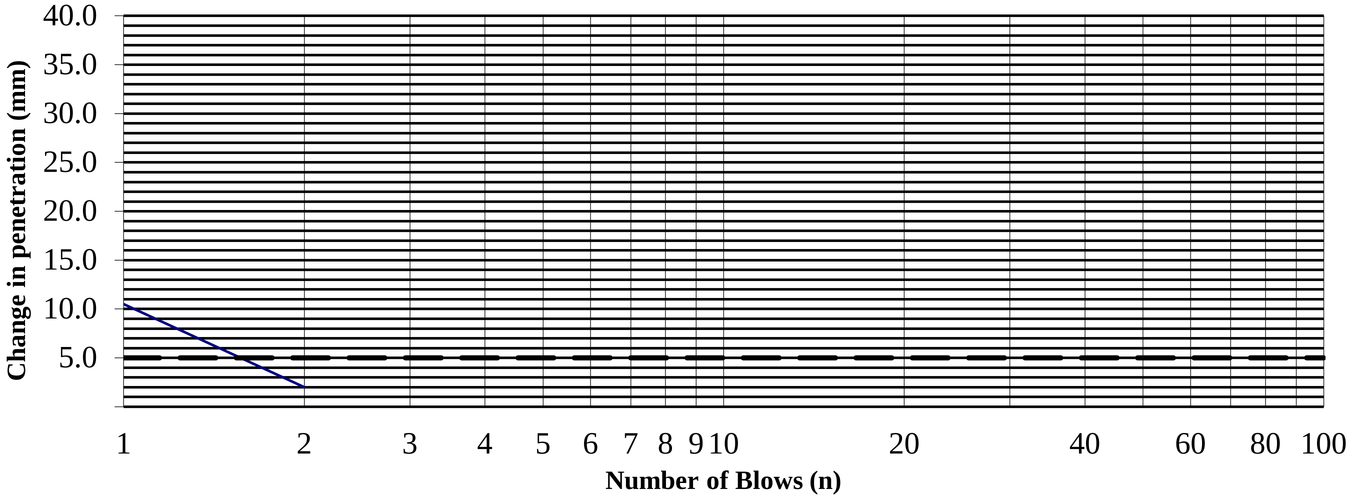
MOISTURE CONDITION VALUE

BS1377 : Part 4 : 1990 Clause 5.4

Hole Number:	**TP01**	**Top Depth (m):**	**2.00**
Sample Number:		**Base Depth (m):**	
Sample Type:	**-**		

Material Retained on the 20mm BS Test Sieve (%):	10
Interpretation based on steepest straight line intercept with 5mm change in penetration.	

MCV Determination



Blows (N)	Penetration (mm)	n to 4n (mm)
1	51.7	10.5
2	42.8	2.0
3	41.4	
4	41.2	
6	41.0	
8	40.8	
12		
16		
24		
32		
48		
64		
96		
128		
192		
256		

Test Results.

Moisture Content (%)	18
MCV	2.1

UKAS TESTING 4043	Professional Soils Laboratory	**Cappouge Dublin 11 Phase 1A**	**Contract No:** **PSL22/1253** **Client Ref:** **11334-12-21**

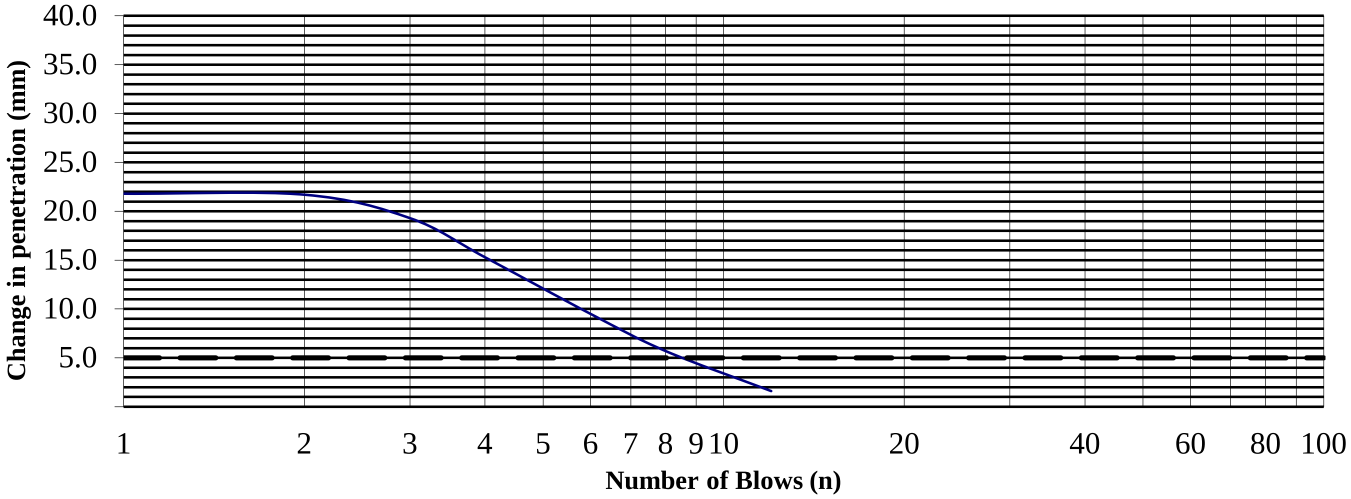
MOISTURE CONDITION VALUE

BS1377 : Part 4 : 1990 Clause 5.4

Hole Number:	**TP02**	**Top Depth (m):**	**1.50**
Sample Number:		**Base Depth (m):**	
Sample Type:	**-**		

Material Retained on the 20mm BS Test Sieve (%):	11
Interpretation based on steepest straight line intercept with 5mm change in penetration.	

MCV Determination



Blows (N)	Penetration (mm)	n to 4n (mm)
1	85.9	21.8
2	75.7	21.7
3	69.1	19.3
4	64.1	15.3
6	57.9	9.5
8	54.0	5.7
12	49.8	1.6
16	48.8	
24	48.4	
32	48.3	
48	48.2	
64		
96		
128		
192		
256		

Test Results.

Moisture Content (%)	23
MCV	9.2

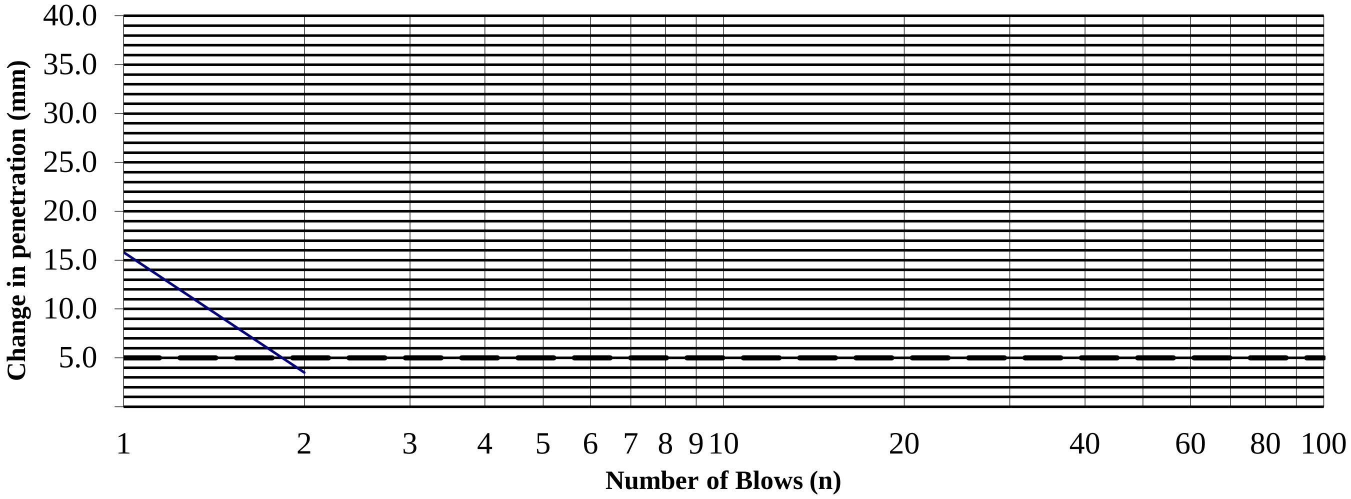
MOISTURE CONDITION VALUE

BS1377 : Part 4 : 1990 Clause 5.4

Hole Number:	**TP05**	**Top Depth (m):**	**0.50**
Sample Number:		**Base Depth (m):**	
Sample Type:	**-**		

Material Retained on the 20mm BS Test Sieve (%):	2
Interpretation based on steepest straight line intercept with 5mm change in penetration.	

MCV Determination



Blows (N)	Penetration (mm)	n to 4n (mm)
1	60.2	15.8
2	47.6	3.5
3	44.9	
4	44.4	
6	44.3	
8	44.1	
12		
16		
24		
32		
48		
64		
96		
128		
192		
256		

Test Results.

Moisture Content (%)	22
MCV	2.7

UKAS TESTING 4043

PSL Professional Soils Laboratory

Cappouge Dublin 11 Phase 1A

Contract No:
PSL22/1253
Client Ref:
11334-12-21

MOISTURE CONDITION VALUE

BS1377 : Part 4 : 1990 Clause 5.4

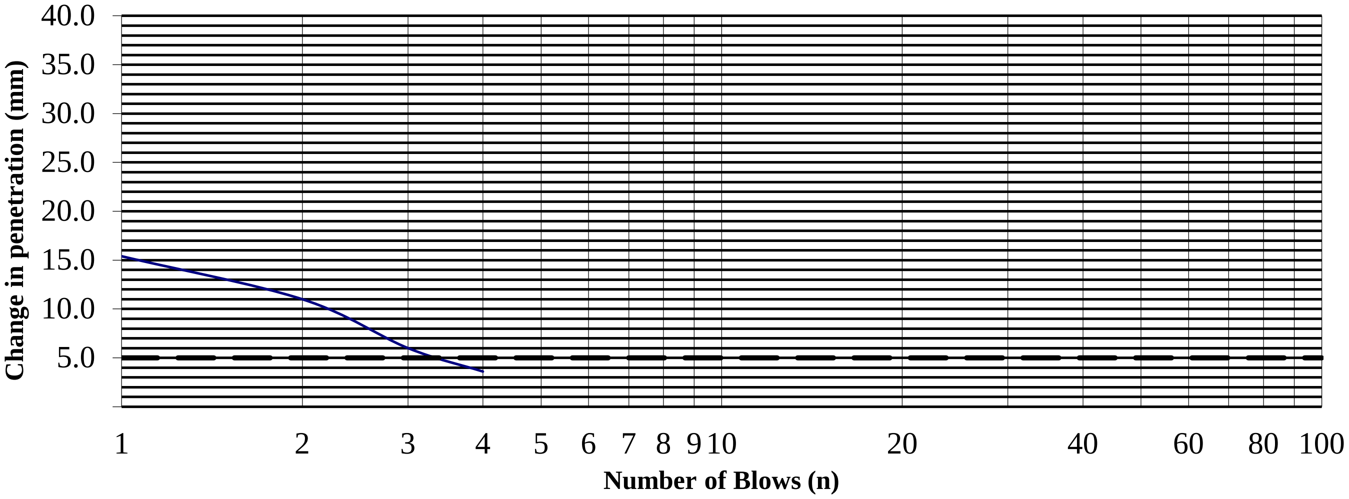
Hole Number: TP06 **Top Depth (m):** 1.00

Sample Number: **Base Depth (m):**

Sample Type: -

Material Retained on the 20mm BS Test Sieve (%):	17
Interpretation based on steepest straight line intercept with 5mm change in penetration.	

MCV Determination



Blows (N)	Penetration (mm)	n to 4n (mm)
1	61.9	15.4
2	54.6	11.0
3	49.1	6.0
4	46.5	3.6
6	43.9	
8	43.6	
12	43.1	
16	42.9	
24		
32		
48		
64		
96		
128		
192		
256		

Test Results.

Moisture Content (%)	19
MCV	5.1

UKAS TESTING 4043	PSL Professional Soils Laboratory	**Cappouge Dublin 11 Phase 1A**	**Contract No:** **PSL22/1253** **Client Ref:** **11334-12-21**

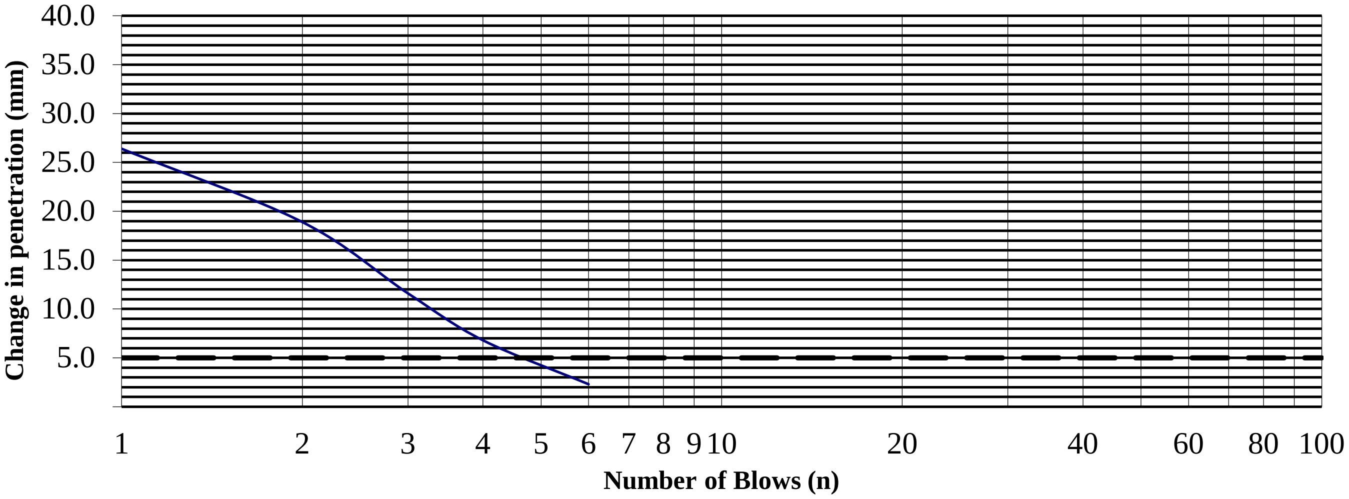
MOISTURE CONDITION VALUE

BS1377 : Part 4 : 1990 Clause 5.4

Hole Number:	**TP09**	**Top Depth (m):**	**0.50**
Sample Number:		**Base Depth (m):**	
Sample Type:	**-**		

Material Retained on the 20mm BS Test Sieve (%):	11
Interpretation based on steepest straight line intercept with 5mm change in penetration.	

MCV Determination



Blows (N)	Penetration (mm)	n to 4n (mm)
1	70.2	26.4
2	56.4	18.9
3	48.8	11.6
4	43.8	6.8
6	39.2	2.3
8	37.5	
12	37.2	
16	37.0	
24	36.9	
32		
48		
64		
96		
128		
192		
256		

Test Results.

Moisture Content (%)	13
MCV	6.4

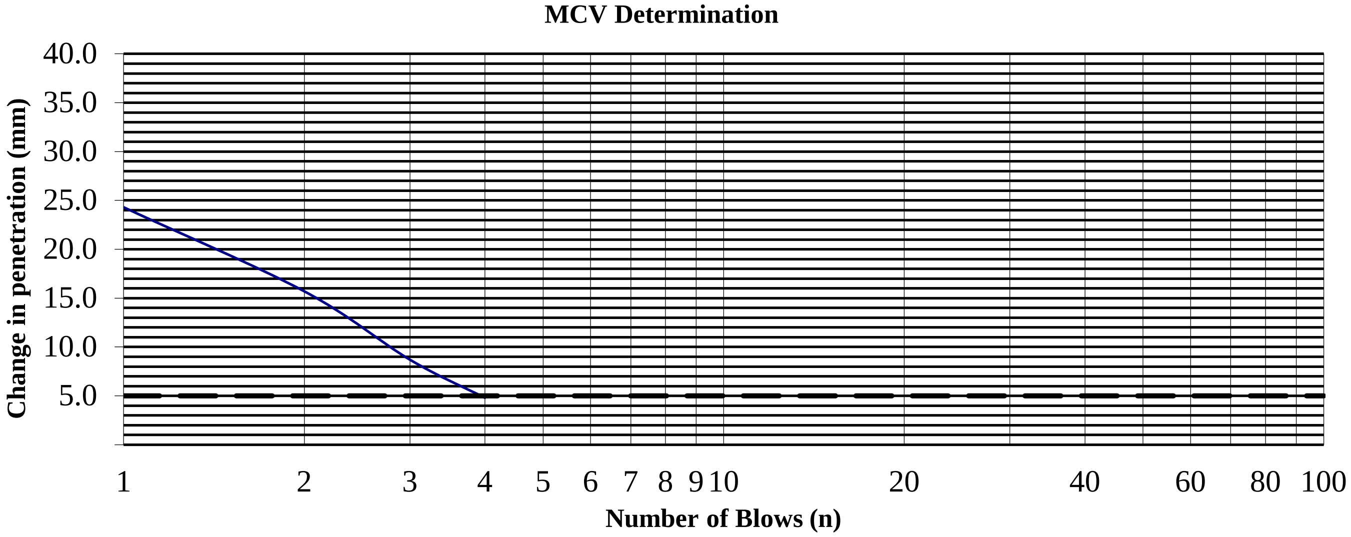
UKAS TESTING 4043	PSL Professional Soils Laboratory	**Cappouge Dublin 11 Phase 1A**	**Contract No:** **PSL22/1253** **Client Ref:** **11334-12-21**

MOISTURE CONDITION VALUE

BS1377 : Part 4 : 1990 Clause 5.4

Hole Number:	**TP10**	**Top Depth (m):**	**1.00**
Sample Number:		**Base Depth (m):**	
Sample Type:	**-**		

Material Retained on the 20mm BS Test Sieve (%):	16
Interpretation based on steepest straight line intercept with 5mm change in penetration.	



Blows (N)	Penetration (mm)	n to 4n (mm)
1	69.7	24.3
2	56.6	15.7
3	49.4	8.7
4	45.4	4.8
6	41.7	
8	40.9	
12	40.7	
16	40.6	
24		
32		
48		
64		
96		
128		
192		
256		

Test Results.

Moisture Content (%)	18
MCV	5.5

UKAS TESTING 4043	Professional Soils Laboratory	**Cappouge Dublin 11 Phase 1A**	**Contract No:** **PSL22/1253** **Client Ref:** **11334-12-21**

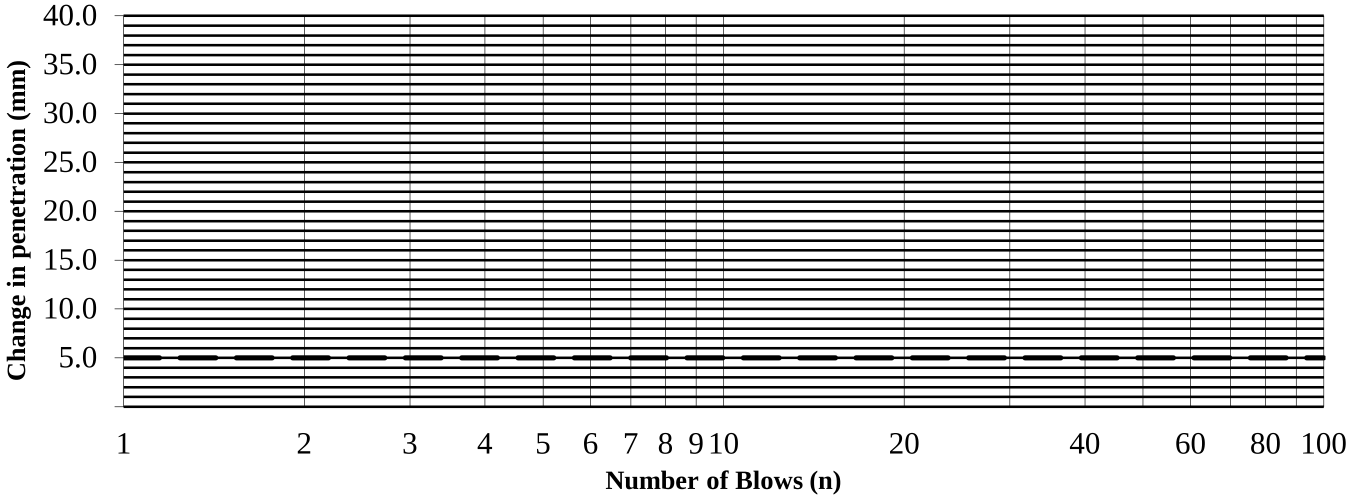
MOISTURE CONDITION VALUE

BS1377 : Part 4 : 1990 Clause 5.4

Hole Number:	**TP13**	**Top Depth (m):**	**0.50**
Sample Number:		**Base Depth (m):**	
Sample Type:	**-**		

Material Retained on the 20mm BS Test Sieve (%):	15
Interpretation based on steepest straight line intercept with 5mm change in penetration.	

MCV Determination



Blows (N)	Penetration (mm)	n to 4n (mm)
1	46.2	0.5
2	46.1	
3	45.9	
4	45.7	
6		
8		
12		
16		
24		
32		
48		
64		
96		
128		
192		
256		

Test Results.

Moisture Content (%)	23
MCV	<1.0

4043

Professional Soils Laboratory

Cappouge Dublin 11 Phase 1A

Contract No:
PSL22/1253
Client Ref:
11334-12-21

MOISTURE CONDITION VALUE

BS1377 : Part 4 : 1990 Clause 5.4

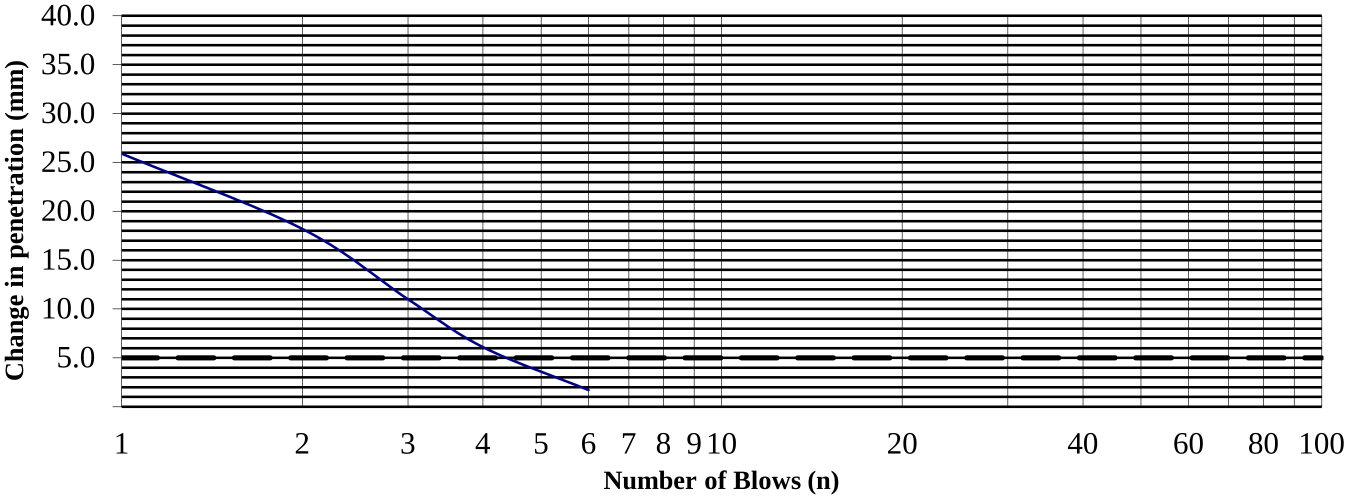
Hole Number: **TP14** **Top Depth (m):** **1.00**

Sample Number: **Base Depth (m):**

Sample Type: **-**

Material Retained on the 20mm BS Test Sieve (%):	11
Interpretation based on steepest straight line intercept with 5mm change in penetration.	

MCV Determination



Blows (N)	Penetration (mm)	n to 4n (mm)
1	70.8	25.9
2	57.3	18.2
3	49.9	11.0
4	44.9	6.1
6	40.4	1.7
8	39.1	
12	38.9	
16	38.8	
24	38.7	
32		
48		
64		
96		
128		
192		
256		

Test Results.

Moisture Content (%)	16
MCV	6.2

UKAS TESTING 4043	PSL Professional Soils Laboratory	**Cappouge Dublin 11 Phase 1A**	**Contract No:** **PSL22/1253** **Client Ref:** **11334-12-21**

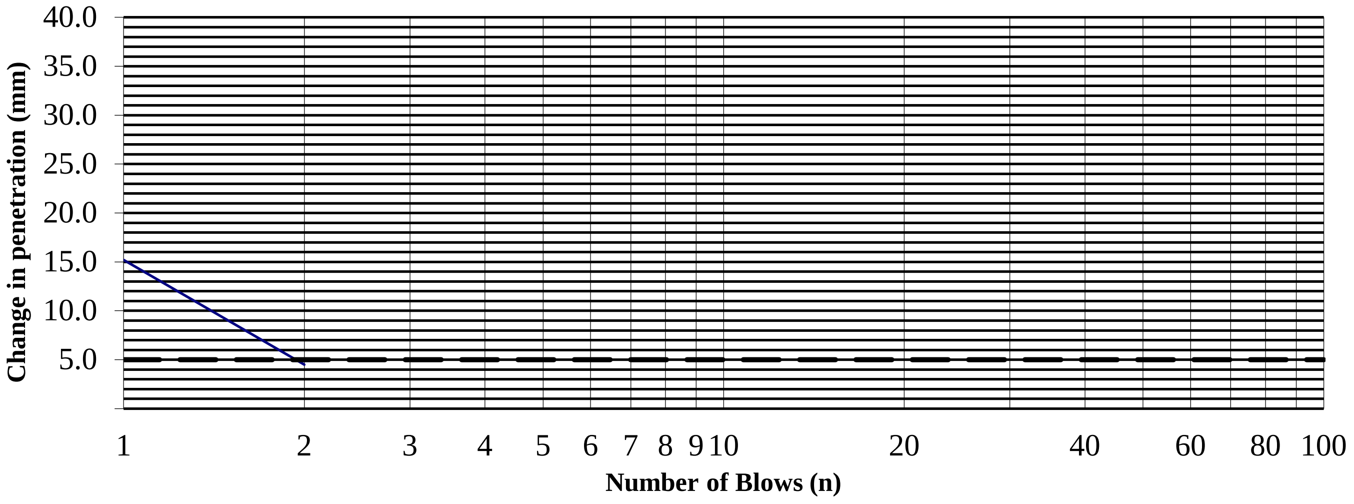
MOISTURE CONDITION VALUE

BS1377 : Part 4 : 1990 Clause 5.4

Hole Number:	**TP16**	**Top Depth (m):**	**1.50**
Sample Number:		**Base Depth (m):**	
Sample Type:	**-**		

Material Retained on the 20mm BS Test Sieve (%):	0
Interpretation based on steepest straight line intercept with 5mm change in penetration.	

MCV Determination



Blows (N)	Penetration (mm)	n to 4n (mm)
1	58.5	15.2
2	47.5	4.5
3	43.7	
4	43.3	
6	43.2	
8	43.0	
12		
16		
24		
32		
48		
64		
96		
128		
192		
256		

Test Results.

Moisture Content (%)	18
MCV	3.0

UKAS TESTING 4043	**Cappouge Dublin 11 Phase 1A**	**Contract No:**
PSL Professional Soils Laboratory		**PSL22/1253**
		Client Ref:
		11334-12-21

MOISTURE CONDITION VALUE

BS1377 : Part 4 : 1990 Clause 5.4

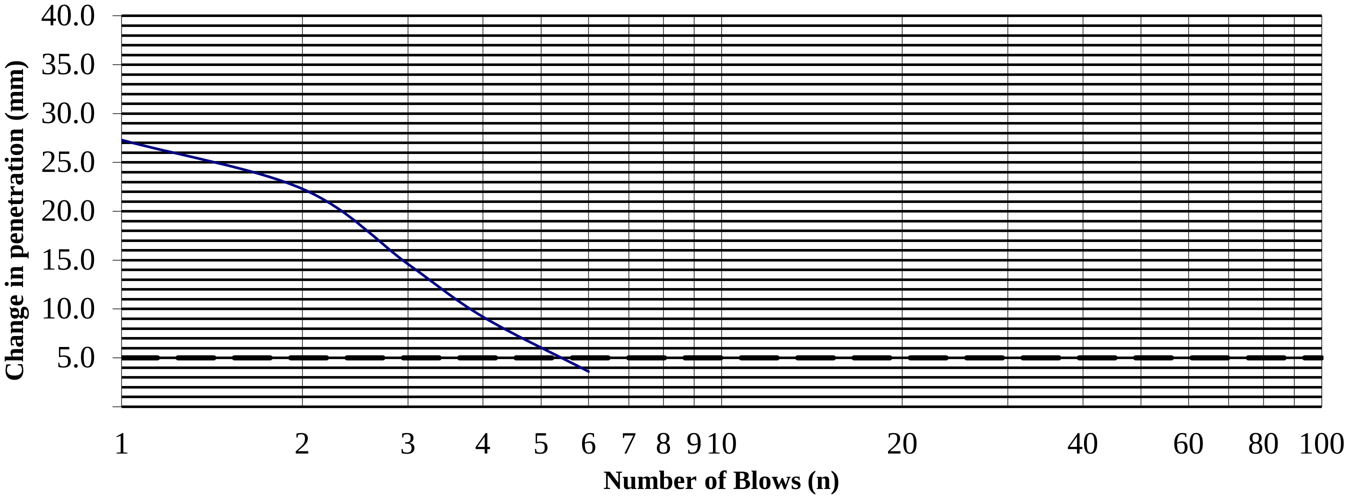
Hole Number: TP19 **Top Depth (m):** 1.00

Sample Number: **Base Depth (m):**

Sample Type: -

Material Retained on the 20mm BS Test Sieve (%):	0
Interpretation based on steepest straight line intercept with 5mm change in penetration.	

MCV Determination



Blows (N)	Penetration (mm)	n to 4n (mm)
1	79.7	27.3
2	66.5	22.3
3	57.9	14.6
4	52.4	9.2
6	46.5	3.6
8	44.2	
12	43.3	
16	43.2	
24	42.9	
32		
48		
64		
96		
128		
192		
256		

Test Results.

Moisture Content (%)	19
MCV	7.1

UKAS TESTING 4043	PSL Professional Soils Laboratory	**Cappouge Dublin 11 Phase 1A**	**Contract No:** **PSL22/1253** **Client Ref:** **11334-12-21**

MOISTURE CONDITION VALUE

BS1377 : Part 4 : 1990 Clause 5.4

Hole Number:	**TP20**	**Top Depth (m):**	**1.00**
Sample Number:		**Base Depth (m):**	
Sample Type:	**-**		

Material Retained on the 20mm BS Test Sieve (%):	5
Interpretation based on steepest straight line intercept with 5mm change in penetration.	

MCV Determination

Blows (N)	Penetration (mm)	n to 4n (mm)
1	97.3	18.1
2	88.1	17.6
3	82.8	16.6
4	79.2	14.2
6	74.0	9.5
8	70.5	6.5
12	66.2	2.4
16	65.0	
24	64.5	
32	64.0	
48	63.8	
64		
96		
128		
192		
256		

Test Results.

Moisture Content (%)	32
MCV	8.4

UKAS TESTING 4043 — PSL Professional Soils Laboratory	**Cappouge Dublin 11 Phase 1A**	**Contract No:** **PSL22/1253** **Client Ref:** **11334-12-21**

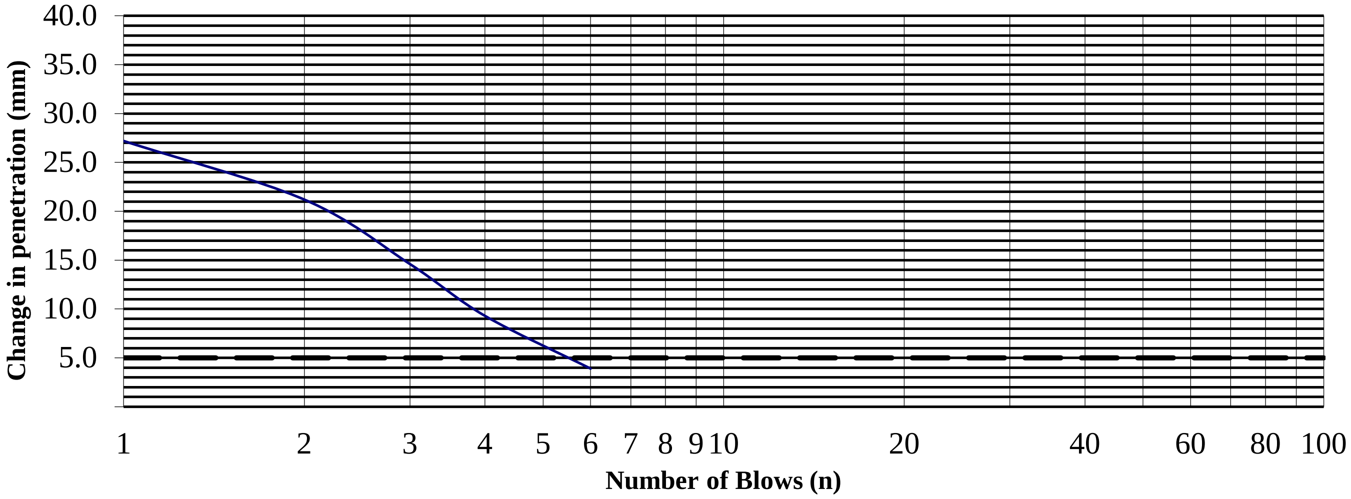
MOISTURE CONDITION VALUE

BS1377 : Part 4 : 1990 Clause 5.4

Hole Number:	**TP22**	**Top Depth (m):**	**0.50**
Sample Number:		**Base Depth (m):**	
Sample Type:	**-**		

Material Retained on the 20mm BS Test Sieve (%):	0
Interpretation based on steepest straight line intercept with 5mm change in penetration.	

MCV Determination



Blows (N)	Penetration (mm)	n to 4n (mm)
1	84.7	27.2
2	70.8	21.2
3	62.9	14.6
4	57.5	9.3
6	51.9	3.9
8	49.6	
12	48.3	
16	48.2	
24	48.0	
32		
48		
64		
96		
128		
192		
256		

Test Results.

Moisture Content (%)	25
MCV	7.3

UKAS TESTING 4043

PSL Professional Soils Laboratory

Cappouge Dublin 11 Phase 1A

Contract No:
PSL22/1253
Client Ref:
11334-12-21

LABORATORY REPORT

4043

Contract Number: PSL22/4003

Report Date:	22 June 2022
Client's Reference:	11334-12-21
Client Name:	Ground Investigations Ireland Ltd Catherinestown House Hazelhatch Road Newcastle Co Dublin D22 YD52
For the attention of:	**James Cashen**
Contract Title:	Cappouge Dublin 11 Phase 1A
Date Received:	9/6/2022
Date Commenced:	9/6/2022
Date Completed:	22/6/2022
Notes:	**Opinions and Interpretations are outside the UKAS Accreditation**

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

A Watkins (Director)	R Berriman (Quality Manager)	S Royle (Laboratory Manager)
L Knight (Assistant Laboratory Manager)	S Eyre (Senior Technician)	T Watkins (Senior Technician)

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awatkins@prosoils.co.uk

SUMMARY OF POINT LOAD TEST RESULTS

ISRM Suggested Methods : 2007

Borehole Number	Depth (m)	Sample Ref	Test Type	Orientation	Dimensions (mm)		Area	D_e^2	D_e	Failure Load (P)		I_s	Corr Fac	I_{s50}	Failure Type	Remarks
				Par / Perp	W	D	(mm2)		(mm)	(Mpa)	(kN)	(MPa)	F	(MPa)		
BH01	4.50		A	Perp	65	43	2795	3558.70	59.65	-	10.17	2.86	1.083	3.09	Valid	
BH01	6.80		A	Perp	65	37	2405	3062.14	55.34	-	7.06	2.31	1.047	2.41	Valid	
BH02	4.45		A	Perp	65	46	2990	3806.99	61.70	-	7.37	1.94	1.099	2.13	Valid	
BH02	7.00		A	Perp	65	28	1820	2317.30	48.14	-	13.21	5.70	0.983	5.60	Valid	
BH08	3.35		A	Perp	65	45	2925	3724.23	61.03	-	19.30	5.18	1.094	5.67	Valid	
BH08	4.40		A	Perp	65	47	3055	3889.75	62.37	-	9.88	2.54	1.105	2.81	Valid	
BH08	5.40		A	Perp	65	47	3055	3889.75	62.37	-	10.44	2.68	1.105	2.96	Valid	
BH09	3.40		A	Perp	65	43	2795	3558.70	59.65	-	14.35	4.03	1.083	4.37	Valid	
BH09	5.33		A	Perp	65	46	2990	3806.99	61.70	-	7.76	2.04	1.099	2.24	Valid	

Note All testing carried out on samples at as received water content Par = parallel, Perp = perpendicular, U = Random A = Axial, D = Diametral, I = Irregular

UKAS TESTING 4043

PSL Professional Soils Laboratory

Cappouge Dublin 11 Phase 1A

Contract No:
PSL22/4003
Client Ref:
11334-12-21

SUMMARY OF POINT LOAD TEST RESULTS

ISRM Suggested Methods : 2007

Borehole Number	Depth (m)	Sample Ref	Test Type	Orientation	Dimensions (mm)		D_e^2	D_e	Failure Load		I_s	Corr Fac	I_{s50}	Failure Type	Remarks
				Par / Perp	L	D		(mm)	(Mpa)	(kN)	(MPa)	F	(MPa)		
BH01	**4.50**		**D**	**Par**	**-**	**65**	**4225**	**65.00**	**-**	**2.24**	**0.530**	**1.125**	**0.60**	**Valid**	
BH01	**6.80**		**D**	**Par**	**-**	**65**	**4225**	**65.00**	**-**	**12.12**	**2.869**	**1.125**	**3.23**	**Valid**	
BH02	**4.45**		**D**	**Par**	**-**	**65**	**4225**	**65.00**	**-**	**4.24**	**1.004**	**1.125**	**1.13**	**Valid**	
BH02	**7.00**		**D**	**Par**	**-**	**65**	**4225**	**65.00**	**-**	**4.80**	**1.136**	**1.125**	**1.28**	**Valid**	
BH08	**3.35**		**D**	**Par**	**-**	**65**	**4225**	**65.00**	**-**	**17.30**	**4.095**	**1.125**	**4.61**	**Valid**	
BH08	**4.40**		**D**	**Par**	**-**	**65**	**4225**	**65.00**	**-**	**10.99**	**2.601**	**1.125**	**2.93**	**Valid**	
BH08	**5.40**		**D**	**Par**	**-**	**65**	**4225**	**65.00**	**-**	**11.46**	**2.712**	**1.125**	**3.05**	**Valid**	
BH09	**3.40**		**D**	**Par**	**-**	**65**	**4225**	**65.00**	**-**	**10.96**	**2.594**	**1.125**	**2.92**	**Valid**	
BH09	**5.33**		**D**	**Par**	**-**	**65**	**4225**	**65.00**	**-**	**9.72**	**2.301**	**1.125**	**2.59**	**Valid**	

Note All testing carried out on samples at as received water content

Par = parallel, Perp = perpendicular, U = Random

UKAS TESTING 4043	Professional Soils Laboratory	**Cappouge Dublin 11 Phase 1A**	**Contract No:** **PSL22/4003** **Client Ref:** **11334-12-21**

DETERMINATION OF UNCONFINED COMPRESSIVE STRENGTH

ISRM Suggested Methods, pp 111 –116, 1981.

Hole Number	Sample Number	Sample Type	Top Depth (m)	Base Depth (m)	Sample Diameter (mm)	Sample Length (mm)	Height Ratio	Initial Mass (g)	Bulk Density (Mg/m)	Moisture Content (%)	Dry Density (Mg/m)	Load Failure (kN)	UCS (MPa)	Failure Mode	Date Tested	Remarks
BH01		C	5.30	5.50	65	135	2.1	1164	2.60	1.2	2.57	137.6	41.5	Brittle	21/06/22	
BH02		C	5.32	5.50	65	135	2.1	1128	2.52	0.3	2.51	132.8	40.0	Brittle	21/06/22	
BH09		C	4.40	4.55	65	135	2.1	1175	2.62	0.1	2.62	147.6	44.5	Brittle	21/06/22	

PSL
Professional Soils Laboratory

Cappouge Dublin 11 Phase 1A

Contract No:
PSL22/4003
Client Ref:
11334-12-21

APPENDIX 6 – Groundwater Monitoring

GROUNDWATER MONITORING

Cappogue Dublin 11

BOREHOLE	DATE	TIME	GROUNDWATER (m BGL)	Comments
BH-08	11/05/2022	10.15	3.07	Stick up - 0.30m
BH-09	11/05/2022	10.05	2.22	Stick up - 0.33m
BH-08	07/06/2022	9.45	3.03	Stick up - 0.30m
BH-09	07/06/2022	9.40	2.19	Stick up - 0.33m

FEHILY
TIMONEY

CONSULTANTS IN ENGINEERING,
ENVIRONMENTAL SCIENCE
& PLANNING

APPENDIX 9.2

Groundwater Quality Monitoring Certificates of Analysis

FITZ SCIENTIFIC
MONITORING & TESTING

Unit 35,
Boyne Business Park,
Drogheda,
Co. Louth
Ireland

Tel: +353 41 9845440
Fax: +353 41 9846171
Web: www.fitzsci.ie
email info@fitzsci.ie

A copy of this certificate is available on www.fitzsci.ie

Customer	**Lorraine Walsh** **Thorntons Recycling Ltd.** **Unit S3B** **Henry Rd** **Parkwest Business Park** **Dublin 12**	***Lab Report Ref. No.***	**1159/848/01**
		Date of Receipt	**02/03/2021**
		Sampled On	**02/03/2021**
		Date Testing Commenced	**02/03/2021**
		Received or Collected	**By Fitz: Noel R**
		Condition on Receipt	**Acceptable**
Customer PO	**57440**	***Date of Report***	**23/03/2021**
Customer Ref	**GW1 Cappagh Dublin**	***Sample Type***	**Groundwater**
Ref 2	**02/03/21 13:00**		
Ref 3			

CERTIFICATE OF ANALYSIS - Supplementary

Test Parameter	SOP	Analytical Technique	Result	Units	Acc.
Alkalinity (Ground Water)	102	Colorimetry	173	mg/L CaCO3	UKAS
Aluminium (Ground Water)	177	ICPMS	937	ug/L	UKAS
Ammonia (Ground Water)	114	Colorimetry	0.12	mg/L as N	UKAS
Antimony (Ground Water)	177	ICPMS	<4	ug/L	UKAS
Arsenic (Ground Water)	177	ICPMS	9	ug/L	UKAS
Barium (Ground Water)	177	ICPMS	137	ug/L	UKAS
Beryllium (Ground Water)	177	ICPMS	<1	ug/L	UKAS
Boron (Ground Water)	177	ICPMS	75	ug/L	UKAS
Cadmium (Ground Water)	177	ICPMS	<1	ug/L	UKAS
Calcium (Ground Water)	184	ICPMS	305.6	mg/L	UKAS
Chloride (Ground Water)	100	Colorimetry	33	mg/L	UKAS
Chromium (Ground Water)	177	ICPMS	6	ug/L	UKAS
Cobalt (Ground Water)	177	ICPMS	2	ug/L	UKAS
Coliforms (Faecal)	140	Filtration/Incubation	<10	cfu/100ml	
Coliforms (Total)	157	Filtration/Incubation	10	cfu/100ml	
Colour Apparent (Ground Water)	108	Colorimetry	160	PtCo Units	UKAS
Conductivity (Ground Water at 20C)	112	Electrometry	1135.0	µscm -1@20C	UKAS
Copper (Ground Water)	177	ICPMS	4	ug/L	UKAS
Dissolved oxygen (mg/l)	715	DO Meter	3.32	mg/L	
Fluoride (Ground Water)	115	Colorimetry	0.31	mg/L	UKAS
Hardness Total (Ground Water)	111	Colorimetry	541.0	mg/L CaCO3	UKAS
Iron (Ground Water)	177	ICPMS	3342	ug/L	UKAS

Signed : A Harmon

Date : 23/03/2021

Aoife Harmon - Laboratory Supervisor

Acc. : Accredited Parameters by ISO 17025:2017
PVL - Parametric Value Limit as per EU (Drinking water) Regulations (SI 122 2014)
For bacterial analysis a result of 0 means none detected in volume examined
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Results contained in this report relate only to the samples tested (P) : Presumptive Results

2802

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Final results will be issued without any estimated uncertainty of measurement being applied. This can be supplied on request.
Fitz Scientific maintain all customer information in the strictest confidence which is legally enforceable.

Note - report reissued to amend address

A copy of this certificate is available on www.fitzsci.ie

Customer	**Lorraine Walsh**	*Lab Report Ref. No.*	**1159/848/01**
	Thorntons Recycling Ltd.	*Date of Receipt*	**02/03/2021**
	Unit S3B	*Sampled On*	**02/03/2021**
	Henry Rd	*Date Testing Commenced*	**02/03/2021**
	Parkwest Business Park	*Received or Collected*	**By Fitz: Noel R**
	Dublin 12	*Condition on Receipt*	**Acceptable**
Customer PO	**57440**	*Date of Report*	**23/03/2021**
Customer Ref	**GW1 Cappagh Dublin**	*Sample Type*	**Groundwater**
Ref 2	**02/03/21 13:00**		
Ref 3			

CERTIFICATE OF ANALYSIS - Supplementary

Test Parameter	SOP	Analytical Technique	Result	Units	Acc.
Lead (Ground Water)	177	ICPMS	31	ug/L	UKAS
Magnesium (Ground Water)	184	ICPMS	19.1	mg/L	UKAS
Manganese (Ground Water)	177	ICPMS	1138	ug/L	UKAS
Mercury (Ground water)	178	ICPMS	0.10	ug/L	UKAS
Molybdenum	226	ICPMS	<5	ug/L	
Nickel (Ground Water)	177	ICPMS	15	ug/L	UKAS
Nitrate (Ground Water)	103	Colorimetry	<0.47	mg/L as N	UKAS
Nitrite (Ground Water)	118	Colorimetry	<0.01	mg/L as N	UKAS
pH (Ground Water)	110	Electrometry	7.75	pH Units	UKAS
Phosphate (Ortho) Ground Water	117	Colorimetry	<0.01	mg/L as P	UKAS
Phosphate (Total) Ground Water	166	Colorimetry	0.05	mg/L as P	UKAS
Potassium (Ground Water)	184	ICPMS	4.1	mg/L	UKAS
Silver (Ground water)	177	ICPMS	<0.6	ug/L	UKAS
Sodium (Ground water)	184	ICPMS	49.0	mg/L	UKAS
Strontium (Ground Water)	177	ICPMS	1035	ug/L	UKAS
Sulphate (Ground Water)	119	Colorimetry	486	mg/L as SO4	UKAS
Temperature (On site)	120	Thermometer	8.6	degree C	
TOC (Groundwater)	316	TOC Analyser	10.3	mg/L	UKAS
Uranium (Ground Water)	177	ICPMS	1	ug/L	UKAS
Zinc (Ground Water)	177	ICPMS	36	ug/L	UKAS

Signed :

Date : 23/03/2021

Aoife Harmon - Laboratory Supervisor

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ilac-MRA UKAS TESTING 2802

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Note - report reissued to amend address

FITZ SCIENTIFIC
MONITORING & TESTING

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Web: www.fitzsci.ie
email info@fitzsci.ie

Customer **Lorraine Walsh**
Thorntons Recycling Ltd.
Unit S3B
Henry Rd
Parkwest Business Park
Dublin 12
Customer PO **57440**
Customer Ref **GW2 Cappagh Dublin**
Ref 2 **02/03/21 13:00**
Ref 3

Lab Report Ref. No. **1159/848/02**
Date of Receipt **02/03/2021**
Sampled On **02/03/2021**
Date Testing Commenced **02/03/2021**
Received or Collected **By Fitz: Noel R**
Condition on Receipt **Acceptable**
Date of Report **23/03/2021**
Sample Type **Groundwater**

CERTIFICATE OF ANALYSIS - Supplementary

Test Parameter	SOP	Analytical Technique	Result	Units	Acc.
Alkalinity (Ground Water)	102	Colorimetry	184	mg/L CaCO3	UKAS
Aluminium (Ground Water)	177	ICPMS	1375	ug/L	UKAS
Ammonia (Ground Water)	114	Colorimetry	5.29	mg/L as N	UKAS
Antimony (Ground Water)	177	ICPMS	<4	ug/L	UKAS
Arsenic (Ground Water)	177	ICPMS	4	ug/L	UKAS
Barium (Ground Water)	177	ICPMS	116	ug/L	UKAS
Beryllium (Ground Water)	177	ICPMS	<1	ug/L	UKAS
Boron (Ground Water)	177	ICPMS	110	ug/L	UKAS
Cadmium (Ground Water)	177	ICPMS	1	ug/L	UKAS
Calcium (Ground Water)	184	ICPMS	153.5	mg/L	UKAS
Chloride (Ground Water)	100	Colorimetry	29	mg/L	UKAS
Chromium (Ground Water)	177	ICPMS	4	ug/L	UKAS
Cobalt (Ground Water)	177	ICPMS	4	ug/L	UKAS
Coliforms (Faecal)	140	Filtration/Incubation	300	cfu/100ml	
Coliforms (Total)	157	Filtration/Incubation	2400	cfu/100ml	
Colour Apparent (Ground Water)	108	Colorimetry	25	PtCo Units	UKAS
Conductivity (Ground Water at 20C)	112	Electrometry	736.0	µscm -1@20C	UKAS
Copper (Ground Water)	177	ICPMS	19	ug/L	UKAS
Dissolved oxygen (mg/l)	715	DO Meter	5.84	mg/L	
Fluoride (Ground Water)	115	Colorimetry	0.18	mg/L	UKAS
Hardness Total (Ground Water)	111	Colorimetry	355.0	mg/L CaCO3	UKAS
Iron (Ground Water)	177	ICPMS	4448	ug/L	UKAS

Signed : A Harmon

Date : 23/03/2021

Aoife Harmon - Laboratory Supervisor

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Customer	**Lorraine Walsh** **Thorntons Recycling Ltd.** **Unit S3B** **Henry Rd** **Parkwest Business Park** **Dublin 12**	***Lab Report Ref. No.***	**1159/848/02**
		Date of Receipt	**02/03/2021**
		Sampled On	**02/03/2021**
		Date Testing Commenced	**02/03/2021**
		Received or Collected	**By Fitz: Noel R**
		Condition on Receipt	**Acceptable**
Customer PO	**57440**	***Date of Report***	**23/03/2021**
Customer Ref	**GW2 Cappagh Dublin**	***Sample Type***	**Groundwater**
Ref 2	**02/03/21 13:00**		
Ref 3			

CERTIFICATE OF ANALYSIS - Supplementary

Test Parameter	SOP	Analytical Technique	Result	Units	Acc.
Lead (Ground Water)	177	ICPMS	27	ug/L	UKAS
Magnesium (Ground Water)	184	ICPMS	9.5	mg/L	UKAS
Manganese (Ground Water)	177	ICPMS	581	ug/L	UKAS
Mercury (Ground water)	178	ICPMS	<0.08	ug/L	UKAS
Molybdenum	226	ICPMS	<5	ug/L	
Nickel (Ground Water)	177	ICPMS	12	ug/L	UKAS
Nitrate (Ground Water)	103	Colorimetry	1.15	mg/L as N	UKAS
Nitrite (Ground Water)	118	Colorimetry	0.01	mg/L as N	UKAS
pH (Ground Water)	110	Electrometry	7.51	pH Units	UKAS
Phosphate (Ortho) Ground Water	117	Colorimetry	0.02	mg/L as P	UKAS
Phosphate (Total) Ground Water	166	Colorimetry	0.08	mg/L as P	UKAS
Potassium (Ground Water)	184	ICPMS	6.2	mg/L	UKAS
Silver (Ground water)	177	ICPMS	<0.6	ug/L	UKAS
Sodium (Ground water)	184	ICPMS	20.8	mg/L	UKAS
Strontium (Ground Water)	177	ICPMS	504	ug/L	UKAS
Sulphate (Ground Water)	119	Colorimetry	204	mg/L as SO4	UKAS
Temperature (On site)	120	Thermometer	8.4	degree C	
TOC (Groundwater)	316	TOC Analyser	4.5	mg/L	UKAS
Uranium (Ground Water)	177	ICPMS	1	ug/L	UKAS
Zinc (Ground Water)	177	ICPMS	73	ug/L	UKAS

Signed :

Date : 23/03/2021

Aoife Harmon - Laboratory Supervisor

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email: info@fitzsci.ie

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Customer	**David Duff** **Thorntons Recycling Ltd.** **Unit S3B, Henry Road** **Park West Business Park** **Dublin 12** **Dublin**	***Lab Report Ref. No.***	**1159/875/01**
		Date of Receipt	**11/06/2021**
		Sampled On	**11/06/2021**
		Date Testing Commenced	**11/06/2021**
		Received or Collected	**By Fitz: Noel R**
		Condition on Receipt	**Acceptable**
Customer PO	**57854**	***Date of Report***	**22/06/2021**
Customer Ref	**GW-QT-GW1 Cappagh**	***Sample Type***	**Groundwater**
Ref 2	**Dublin**		
Ref 3			

CERTIFICATE OF ANALYSIS

Test Parameter	SOP	Analytical Technique	Result	Units	Acc.
1,1,1,2-Tetrachloroethane (Ground W	154	GCMS	<0.5	ug/L	UKAS
1,1,1-Trichloroethane (Ground Water	154	GCMS	<1	ug/L	UKAS
1,1,2,2-Tetrachloroethane (Ground W	154	GCMS	<5.0	ug/L	
1,1,2-Trichloroethane (Ground Water	154	GCMS	<2	ug/L	UKAS
1,1-Dichloroethane (Ground Water)	154	GCMS	<1	ug/L	UKAS
1,1-Dichloroethene (Ground Water)	154	GCMS	<1	ug/L	UKAS
1,1-Dichloropropene (Ground Water)	154	GCMS	<1	ug/L	UKAS
1,2,3-Trichlorobenzene (Ground Wat	154	GCMS	<1	ug/L	UKAS
1,2,3-Trichloropropane (Ground Wate	154	GCMS	<0.9	ug/L	UKAS
1,2,4-Trichlorobenzene (Ground Wat	154	GCMS	<1	ug/L	UKAS
1,2,4-Trimethylbenzene (Ground Wat	154	GCMS	<1	ug/L	UKAS
1,2-Dibromo-3-chloropropane (Groun	154	GCMS	<1.0	ug/L	UKAS
1,2-Dibromoethane (Ground Water)	154	GCMS	<1	ug/L	UKAS
1,2-Dichlorobenzene (Ground Water)	154	GCMS	<1	ug/L	UKAS
1,2-Dichloroethane (Ground Water)	154	GCMS	<1	ug/L	UKAS
1,2-Dichloropropane (Ground Water)	154	GCMS	<1	ug/L	UKAS
1,3,5-Trimethylbenzene (Ground Wat	154	GCMS	<1	ug/L	UKAS
1,3-Dichlorobenzene (Ground Water)	154	GCMS	<0.5	ug/L	UKAS
1,3-Dichloropropane (Ground Water)	154	GCMS	<1	ug/L	UKAS

Signed : Katherine McQuillan

Date : 22/06/2021

Katherine McQuillan - Technical Manager

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UKAS TESTING 2802

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Customer	**David Duff**	*Lab Report Ref. No.*	**1159/875/01**
	Thorntons Recycling Ltd.	*Date of Receipt*	**11/06/2021**
	Unit S3B, Henry Road	*Sampled On*	**11/06/2021**
	Park West Business Park	*Date Testing Commenced*	**11/06/2021**
	Dublin 12	*Received or Collected*	**By Fitz: Noel R**
	Dublin	*Condition on Receipt*	**Acceptable**
Customer PO	**57854**	*Date of Report*	**22/06/2021**
Customer Ref	**GW-QT-GW1 Cappagh**	*Sample Type*	**Groundwater**
Ref 2	**Dublin**		
Ref 3			

CERTIFICATE OF ANALYSIS

Test Parameter	SOP	Analytical Technique	Result	Units	Acc.
1,4-Dichlorobenzene (Ground Water)	154	GCMS	<2	ug/L	UKAS
2,2-Dichloropropane (Ground Water)	154	GCMS	<5.0	ug/L	
2-Chlorotoluene (Ground Water)	154	GCMS	<1	ug/L	UKAS
4-Chlorotoluene (Ground Water)	154	GCMS	<1	ug/L	UKAS
Ammonia (Ground Water)	114	Colorimetry	<0.02	mg/L as N	UKAS
Benzene (Ground Water)	154	GCMS	<1	ug/L	UKAS
Bromobenzene (Ground Water)	154	GCMS	<1	ug/L	UKAS
Bromochloromethane (Ground Water	154	GCMS	<1	ug/L	UKAS
Bromodichloromethane (Ground Wat	154	GCMS	<1	ug/L	UKAS
Bromoform (Ground Water)	154	GCMS	<2	ug/L	UKAS
Bromomethane (Ground Water.)	154	GCMS	<5.0	ug/L	
Carbon tetrachloride (Ground Water)	154	GCMS	<1	ug/L	UKAS
Chloride (Ground Water)	100	Colorimetry	23	mg/L	UKAS
Chlorobenzene (Ground Water)	154	GCMS	<1	ug/L	UKAS
Chloroethane (Ground Water)	154	GCMS	<5.0	ug/L	
Chloroform (Ground Water)	154	GCMS	<1	ug/L	UKAS
Chloromethane (Ground Water)	154	GCMS	<5.0	ug/L	
cis-1,2-Dichloroethene (Ground Wate	154	GCMS	<1	ug/L	UKAS
cis-1,3-Dichloropropene (Ground Wat	154	GCMS	<1	ug/L	UKAS

Signed : Katherine McQuillan

Date : 22/06/2021

Katherine McQuillan - Technical Manager

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Customer	**David Duff** **Thorntons Recycling Ltd.** **Unit S3B, Henry Road** **Park West Business Park** **Dublin 12** **Dublin**	***Lab Report Ref. No.***	**1159/875/01**
		Date of Receipt	**11/06/2021**
		Sampled On	**11/06/2021**
		Date Testing Commenced	**11/06/2021**
		Received or Collected	**By Fitz: Noel R**
		Condition on Receipt	**Acceptable**
Customer PO	**57854**	***Date of Report***	**22/06/2021**
Customer Ref	**GW-QT-GW1 Cappagh**	***Sample Type***	**Groundwater**
Ref 2	**Dublin**		
Ref 3			

CERTIFICATE OF ANALYSIS

Test Parameter	SOP	Analytical Technique	Result	Units	Acc.
Conductivity (Ground Water at 20C)	112	Electrometry	609.0	µscm -1@20C	UKAS
Dibromochloromethane (Ground Wat	154	GCMS	<1	ug/L	UKAS
Dibromomethane (Ground Water)	154	GCMS	<1	ug/L	UKAS
Dichlorodifluoromethane (Ground Wa	154	GCMS	<5.0	ug/L	
Dichloromethane (Ground Water)	154	GCMS	<5.0	ug/L	
Ethylbenzene (Ground Water)	154	GCMS	<1	ug/L	UKAS
Hexachlorobutadiene (Ground Water)	154	GCMS	<1	ug/L	UKAS
Isopropylbenzene (Ground Water)	154	GCMS	<1	ug/L	UKAS
m- & p-Xylene (Ground Water)	154	GCMS	<1	ug/L	UKAS
Naphthalene (Ground Water)	154	GCMS	<1	ug/L	UKAS
n-Butylbenzene (Ground Water)	154	GCMS	<1	ug/L	UKAS
Nitrogen (Total Oxidised) (Ground W	151	Colorimetry	<0.29	mg/L as N	UKAS
n-Propylbenzene (Ground Water)	154	GCMS	<1	ug/L	UKAS
o-Xylene (Ground Water)	154	GCMS	<1	ug/L	UKAS
pH (Ground Water)	110	Electrometry	7.68	pH Units	UKAS
p-Isopropyltoluene (Ground Water)	154	GCMS	<1	ug/L	UKAS
sec-Butylbenzene (Ground Water)	154	GCMS	<1	ug/L	UKAS
Solids (Total Dissolved)	105	Filtration/ Evaporation @ 180C	443	mg/L	
Styrene (Ground Water)	154	GCMS	<1	ug/L	UKAS

Signed : Katherine McQuillan

Date : 22/06/2021

Katherine McQuillan - Technical Manager

Acc. : Accredited Parameters by ISO/IEC 17025:2017
PVL - Parametric Value Limit as per EU (Drinking water) Regulations (SI 122 2014)
For bacterial analysis a result of 0 means none detected in volume examined
All organic results are analysed as received and all results are corrected for dry weight at 104 C
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email: info@fitzsci.ie

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Customer **David Duff**
Thorntons Recycling Ltd.
Unit S3B, Henry Road
Park West Business Park
Dublin 12
Dublin
Customer PO **57854**
Customer Ref **GW-QT-GW1 Cappagh**
Ref 2 **Dublin**
Ref 3

Lab Report Ref. No. **1159/875/01**
Date of Receipt **11/06/2021**
Sampled On **11/06/2021**
Date Testing Commenced **11/06/2021**
Received or Collected **By Fitz: Noel R**
Condition on Receipt **Acceptable**
Date of Report **22/06/2021**
Sample Type **Groundwater**

CERTIFICATE OF ANALYSIS

Test Parameter	SOP	Analytical Technique	Result	Units	Acc.
Sulphate (Ground Water)	119	Colorimetry	17	mg/L as SO4	UKAS
tert-Butylbenzene (Ground Water)	154	GCMS	<1	ug/L	UKAS
Tetrachloroethene (Ground Water)	154	GCMS	<1	ug/L	UKAS
Toluene (Ground Water)	154	GCMS	<1	ug/L	UKAS
TPH (>C10-40)	188	GC-FID	<1	ug/L	
trans-1,2-Dichloroethene (Ground W	154	GCMS	<1	ug/L	UKAS
trans-1,3-Dichloropropene (Ground	154	GCMS	<2	ug/L	UKAS
Trichloroethene (Ground Water)	154	GCMS	<1.0	ug/L	UKAS
Trichlorofluoromethane (Ground Wat	154	GCMS	<1	ug/L	UKAS
Vinyl chloride (Ground Water)	154	GCMS	<1	ug/L	UKAS
Volatile Organic Compounds	154	GCMS	0.0	ug/L	
Water Level	0	Depth Meter	2.1	m	
Xylene Total (Ground Water)	154	GCMS	0	ug/L	UKAS

Signed : Katherine McQuillan

Date : 22/06/2021

Katherine McQuillan - Technical Manager

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ilac-MRA UKAS TESTING 2802

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Customer	**David Duff**	***Lab Report Ref. No.***	**1159/875/02**
	Thorntons Recycling Ltd.	***Date of Receipt***	**11/06/2021**
	Unit S3B, Henry Road	***Sampled On***	**11/06/2021**
	Park West Business Park	***Date Testing Commenced***	**11/06/2021**
	Dublin 12	***Received or Collected***	**By Fitz: Noel R**
	Dublin	***Condition on Receipt***	**Acceptable**
Customer PO	**57854**	***Date of Report***	**22/06/2021**
Customer Ref	**GW-QT-GW2 Cappagh**	***Sample Type***	**Groundwater**
Ref 2	**Dublin**		
Ref 3			

CERTIFICATE OF ANALYSIS

Test Parameter	SOP	Analytical Technique	Result	Units	Acc.
1,1,1,2-Tetrachloroethane (Ground W	154	GCMS	<0.5	ug/L	UKAS
1,1,1-Trichloroethane (Ground Water	154	GCMS	<1	ug/L	UKAS
1,1,2,2-Tetrachloroethane (Ground W	154	GCMS	<5.0	ug/L	
1,1,2-Trichloroethane (Ground Water	154	GCMS	<2	ug/L	UKAS
1,1-Dichloroethane (Ground Water)	154	GCMS	<1	ug/L	UKAS
1,1-Dichloroethene (Ground Water)	154	GCMS	<1	ug/L	UKAS
1,1-Dichloropropene (Ground Water)	154	GCMS	<1	ug/L	UKAS
1,2,3-Trichlorobenzene (Ground Wat	154	GCMS	<1	ug/L	UKAS
1,2,3-Trichloropropane (Ground Wate	154	GCMS	<0.9	ug/L	UKAS
1,2,4-Trichlorobenzene (Ground Wat	154	GCMS	<1	ug/L	UKAS
1,2,4-Trimethylbenzene (Ground Wat	154	GCMS	<1	ug/L	UKAS
1,2-Dibromo-3-chloropropane (Groun	154	GCMS	<1.0	ug/L	UKAS
1,2-Dibromoethane (Ground Water)	154	GCMS	<1	ug/L	UKAS
1,2-Dichlorobenzene (Ground Water)	154	GCMS	<1	ug/L	UKAS
1,2-Dichloroethane (Ground Water)	154	GCMS	<1	ug/L	UKAS
1,2-Dichloropropane (Ground Water)	154	GCMS	<1	ug/L	UKAS
1,3,5-Trimethylbenzene (Ground Wat	154	GCMS	<1	ug/L	UKAS
1,3-Dichlorobenzene (Ground Water)	154	GCMS	<0.5	ug/L	UKAS
1,3-Dichloropropane (Ground Water)	154	GCMS	<1	ug/L	UKAS

Signed : Katherine McQuillan ***Date : 22/06/2021***

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	Thorntons Recycling Ltd.	***Date of Receipt***	**11/06/2021**
	Unit S3B, Henry Road	***Sampled On***	**11/06/2021**
	Park West Business Park	***Date Testing Commenced***	**11/06/2021**
	Dublin 12	***Received or Collected***	**By Fitz: Noel R**
	Dublin	***Condition on Receipt***	**Acceptable**
Customer PO	**57854**	***Date of Report***	**22/06/2021**
Customer Ref	**GW-QT-GW2 Cappagh**	***Sample Type***	**Groundwater**
Ref 2	**Dublin**		
Ref 3			

CERTIFICATE OF ANALYSIS

Test Parameter	SOP	Analytical Technique	Result	Units	Acc.
1,4-Dichlorobenzene (Ground Water)	154	GCMS	<2	ug/L	UKAS
2,2-Dichloropropane (Ground Water)	154	GCMS	<5.0	ug/L	
2-Chlorotoluene (Ground Water)	154	GCMS	<1	ug/L	UKAS
4-Chlorotoluene (Ground Water)	154	GCMS	<1	ug/L	UKAS
Ammonia (Ground Water)	114	Colorimetry	11.02	mg/L as N	UKAS
Benzene (Ground Water)	154	GCMS	<1	ug/L	UKAS
Bromobenzene (Ground Water)	154	GCMS	<1	ug/L	UKAS
Bromochloromethane (Ground Water	154	GCMS	<1	ug/L	UKAS
Bromodichloromethane (Ground Wat	154	GCMS	<1	ug/L	UKAS
Bromoform (Ground Water)	154	GCMS	<2	ug/L	UKAS
Bromomethane (Ground Water.)	154	GCMS	<5.0	ug/L	
Carbon tetrachloride (Ground Water)	154	GCMS	<1	ug/L	UKAS
Chloride (Ground Water)	100	Colorimetry	50	mg/L	UKAS
Chlorobenzene (Ground Water)	154	GCMS	<1	ug/L	UKAS
Chloroethane (Ground Water)	154	GCMS	<5.0	ug/L	
Chloroform (Ground Water)	154	GCMS	<1	ug/L	UKAS
Chloromethane (Ground Water)	154	GCMS	<5.0	ug/L	
cis-1,2-Dichloroethene (Ground Wate	154	GCMS	<1	ug/L	UKAS
cis-1,3-Dichloropropene (Ground Wat	154	GCMS	<1	ug/L	UKAS

Signed : Katherine McQuillan

Date : 22/06/2021

Katherine McQuillan - Technical Manager

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ilac-MRA UKAS TESTING 2802

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Customer	**David Duff** **Thorntons Recycling Ltd.** **Unit S3B, Henry Road** **Park West Business Park** **Dublin 12** **Dublin**	***Lab Report Ref. No.***	**1159/875/02**
		Date of Receipt	**11/06/2021**
		Sampled On	**11/06/2021**
		Date Testing Commenced	**11/06/2021**
		Received or Collected	**By Fitz: Noel R**
		Condition on Receipt	**Acceptable**
Customer PO	**57854**	***Date of Report***	**22/06/2021**
Customer Ref	**GW-QT-GW2 Cappagh**	***Sample Type***	**Groundwater**
Ref 2	**Dublin**		
Ref 3			

CERTIFICATE OF ANALYSIS

Test Parameter	SOP	Analytical Technique	Result	Units	Acc.
Conductivity (Ground Water at 20C)	112	Electrometry	1064.0	µscm -1@20C	UKAS
Dibromochloromethane (Ground Wat	154	GCMS	<1	ug/L	UKAS
Dibromomethane (Ground Water)	154	GCMS	<1	ug/L	UKAS
Dichlorodifluoromethane (Ground Wa	154	GCMS	<5.0	ug/L	
Dichloromethane (Ground Water)	154	GCMS	<5.0	ug/L	
Ethylbenzene (Ground Water)	154	GCMS	<1	ug/L	UKAS
Hexachlorobutadiene (Ground Water)	154	GCMS	<1	ug/L	UKAS
Isopropylbenzene (Ground Water)	154	GCMS	<1	ug/L	UKAS
m- & p-Xylene (Ground Water)	154	GCMS	<1	ug/L	UKAS
Naphthalene (Ground Water)	154	GCMS	<1	ug/L	UKAS
n-Butylbenzene (Ground Water)	154	GCMS	<1	ug/L	UKAS
Nitrogen (Total Oxidised) (Ground W	151	Colorimetry	1.37	mg/L as N	UKAS
n-Propylbenzene (Ground Water)	154	GCMS	<1	ug/L	UKAS
o-Xylene (Ground Water)	154	GCMS	<1	ug/L	UKAS
pH (Ground Water)	110	Electrometry	7.29	pH Units	UKAS
p-Isopropyltoluene (Ground Water)	154	GCMS	<1	ug/L	UKAS
sec-Butylbenzene (Ground Water)	154	GCMS	<1	ug/L	UKAS
Solids (Total Dissolved)	105	Filtration/ Evaporation @ 180C	782	mg/L	
Styrene (Ground Water)	154	GCMS	<1	ug/L	UKAS

Signed : Katherine McQuillan ***Date : 22/06/2021***

Katherine McQuillan - Technical Manager

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Customer **David Duff**
Thorntons Recycling Ltd.
Unit S3B, Henry Road
Park West Business Park
Dublin 12
Dublin
Customer PO **57854**
Customer Ref **GW-QT-GW2 Cappagh**
Ref 2 **Dublin**
Ref 3

Lab Report Ref. No. **1159/875/02**
Date of Receipt **11/06/2021**
Sampled On **11/06/2021**
Date Testing Commenced **11/06/2021**
Received or Collected **By Fitz: Noel R**
Condition on Receipt **Acceptable**
Date of Report **22/06/2021**
Sample Type **Groundwater**

CERTIFICATE OF ANALYSIS

Test Parameter	SOP	Analytical Technique	Result	Units	Acc.
Sulphate (Ground Water)	119	Colorimetry	263	mg/L as SO4	UKAS
tert-Butylbenzene (Ground Water)	154	GCMS	<1	ug/L	UKAS
Tetrachloroethene (Ground Water)	154	GCMS	<1	ug/L	UKAS
Toluene (Ground Water)	154	GCMS	<1	ug/L	UKAS
TPH (>C10-40)	188	GC-FID	<1	ug/L	
trans-1,2-Dichloroethene (Ground W	154	GCMS	<1	ug/L	UKAS
trans-1,3-Dichloropropene (Ground	154	GCMS	<2	ug/L	UKAS
Trichloroethene (Ground Water)	154	GCMS	<1.0	ug/L	UKAS
Trichlorofluoromethane (Ground Wat	154	GCMS	<1	ug/L	UKAS
Vinyl chloride (Ground Water)	154	GCMS	<1	ug/L	UKAS
Volatile Organic Compounds	154	GCMS	0.0	ug/L	
Water Level	0	Depth Meter	3.4	m	
Xylene Total (Ground Water)	154	GCMS	0	ug/L	UKAS

Signed : Katherine McQuillen

Date : 22/06/2021

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Customer	**Lorraine Walsh**	***Lab Report Ref. No.***	**0634/064/01**
	Thorntons Balbriggan	***Date of Receipt***	**13/09/2021**
	Killeen Road	***Sampled On***	**13/09/2021**
	Ballyfermot	***Date Testing Commenced***	**14/09/2021**
		Received or Collected	**By Fitz: Noel R**
	Dublin 10	***Condition on Receipt***	**Acceptable**
Customer PO		***Date of Report***	**29/09/2021**
Customer Ref	**GW-QT-GW1 Cappagh Dublin**	***Sample Type***	**Groundwater**
Ref 2			
Ref 3			

CERTIFICATE OF ANALYSIS

Test Parameter	SOP	Analytical Technique	Result	Units	Acc.
1,1,1,2-Tetrachloroethane (Ground W	154	GCMS	<0.5	ug/L	INAB
1,1,1-Trichloroethane (Ground Water	154	GCMS	<1	ug/L	INAB
1,1,2,2-Tetrachloroethane (Ground W	154	GCMS	<5.0	ug/L	
1,1,2-Trichloroethane (Ground Water	154	GCMS	<2	ug/L	INAB
1,1-Dichloroethane (Ground Water)	154	GCMS	<1	ug/L	INAB
1,1-Dichloroethene (Ground Water)	154	GCMS	<1	ug/L	INAB
1,1-Dichloropropene (Ground Water)	154	GCMS	<1	ug/L	INAB
1,2,3-Trichlorobenzene (Ground Wat	154	GCMS	<1	ug/L	INAB
1,2,3-Trichloropropane (Ground Wate	154	GCMS	<0.9	ug/L	INAB
1,2,4-Trichlorobenzene (Ground Wat	154	GCMS	<1	ug/L	INAB
1,2,4-Trimethylbenzene (Ground Wat	154	GCMS	<1	ug/L	INAB
1,2-Dibromo-3-chloropropane (Groun	154	GCMS	<1.0	ug/L	INAB
1,2-Dibromoethane (Ground Water)	154	GCMS	<1	ug/L	INAB
1,2-Dichlorobenzene (Ground Water)	154	GCMS	<1	ug/L	INAB
1,2-Dichloroethane (Ground Water)	154	GCMS	<1	ug/L	INAB
1,2-Dichloropropane (Ground Water)	154	GCMS	<1	ug/L	INAB
1,3,5-Trimethylbenzene (Ground Wat	154	GCMS	<1	ug/L	INAB
1,3-Dichlorobenzene (Ground Water)	154	GCMS	<0.5	ug/L	INAB
1,3-Dichloropropane (Ground Water)	154	GCMS	<1	ug/L	INAB

Signed : A Harmon

Date : 29/09/2021

Aoife Harmon - Laboratory Supervisor

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Customer	**Lorraine Walsh**	***Lab Report Ref. No.***	**0634/064/01**
	Thorntons Balbriggan	***Date of Receipt***	**13/09/2021**
	Killeen Road	***Sampled On***	**13/09/2021**
	Ballyfermot	***Date Testing Commenced***	**14/09/2021**
		Received or Collected	**By Fitz: Noel R**
	Dublin 10	***Condition on Receipt***	**Acceptable**
Customer PO		***Date of Report***	**29/09/2021**
Customer Ref	**GW-QT-GW1 Cappagh Dublin**	***Sample Type***	**Groundwater**
Ref 2			
Ref 3			

CERTIFICATE OF ANALYSIS

Test Parameter	SOP	Analytical Technique	Result	Units	Acc.
1,4-Dichlorobenzene (Ground Water)	154	GCMS	<2	ug/L	INAB
2,2-Dichloropropane (Ground Water)	154	GCMS	<5.0	ug/L	
2-Chlorotoluene (Ground Water)	154	GCMS	<1	ug/L	INAB
4-Chlorotoluene (Ground Water)	154	GCMS	<1	ug/L	INAB
Ammonia (Ground Water)	114	Colorimetry	0.12	mg/L as N	INAB
Benzene (Ground Water)	154	GCMS	<1	ug/L	INAB
Bromobenzene (Ground Water)	154	GCMS	<1	ug/L	INAB
Bromochloromethane (Ground Water	154	GCMS	<1	ug/L	INAB
Bromodichloromethane (Ground Wat	154	GCMS	<1	ug/L	INAB
Bromoform (Ground Water)	154	GCMS	<2	ug/L	INAB
Bromomethane (Ground Water.)	154	GCMS	<5.0	ug/L	
Carbon tetrachloride (Ground Water)	154	GCMS	<1	ug/L	INAB
Chloride (Ground Water)	100	Colorimetry	37	mg/L	INAB
Chlorobenzene (Ground Water)	154	GCMS	<1	ug/L	INAB
Chloroethane (Ground Water)	154	GCMS	<5.0	ug/L	
Chloroform (Ground Water)	154	GCMS	<1	ug/L	INAB
Chloromethane (Ground Water)	154	GCMS	<5.0	ug/L	
cis-1,2-Dichloroethene (Ground Wate	154	GCMS	<1	ug/L	INAB
cis-1,3-Dichloropropene (Ground Wat	154	GCMS	<1	ug/L	INAB

Signed :

Date : 29/09/2021

Aoife Harmon - Laboratory Supervisor

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Customer	**Lorraine Walsh**	***Lab Report Ref. No.***	**0634/064/01**
	Thorntons Balbriggan	***Date of Receipt***	**13/09/2021**
	Killeen Road	***Sampled On***	**13/09/2021**
	Ballyfermot	***Date Testing Commenced***	**14/09/2021**
		Received or Collected	**By Fitz: Noel R**
	Dublin 10	***Condition on Receipt***	**Acceptable**
Customer PO		***Date of Report***	**29/09/2021**
Customer Ref	**GW-QT-GW1 Cappagh Dublin**	***Sample Type***	**Groundwater**
Ref 2			
Ref 3			

CERTIFICATE OF ANALYSIS

Test Parameter	SOP	Analytical Technique	Result	Units	Acc.
Conductivity (Ground Water at 20C)	112	Electrometry	664.0	µscm -1@20C	INAB
Dibromochloromethane (Ground Wat	154	GCMS	<1	ug/L	INAB
Dibromomethane (Ground Water)	154	GCMS	<1	ug/L	INAB
Dichlorodifluoromethane (Ground Wa	154	GCMS	<5.0	ug/L	
Dichloromethane (Ground Water)	154	GCMS	<5.0	ug/L	
Ethylbenzene (Ground Water)	154	GCMS	<1	ug/L	INAB
Hexachlorobutadiene (Ground Water)	154	GCMS	<1	ug/L	INAB
Isopropylbenzene (Ground Water)	154	GCMS	<1	ug/L	INAB
m- & p-Xylene (Ground Water)	154	GCMS	<1	ug/L	INAB
Naphthalene (Ground Water)	154	GCMS	<1	ug/L	INAB
n-Butylbenzene (Ground Water)	154	GCMS	<1	ug/L	INAB
Nitrogen (Total Oxidised) (Ground W	151	Colorimetry	<0.29	mg/L as N	INAB
n-Propylbenzene (Ground Water)	154	GCMS	<1	ug/L	INAB
o-Xylene (Ground Water)	154	GCMS	<1	ug/L	INAB
pH (Ground Water)	110	Electrometry	7.37	pH Units	INAB
p-Isopropyltoluene (Ground Water)	154	GCMS	<1	ug/L	INAB
sec-Butylbenzene (Ground Water)	154	GCMS	<1	ug/L	INAB
Solids (Total Dissolved)	105	Filtration/ Evaporation @ 180C	454	mg/L	
Styrene (Ground Water)	154	GCMS	<1	ug/L	INAB

Signed :

Date : 29/09/2021

Aoife Harmon - Laboratory Supervisor

Acc. : Accredited Parameters by ISO/IEC 17025:2017
PVL - Parametric Value Limit as per EU (Drinking water) Regulations (SI 122 2014)
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ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO.389T

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Customer	**Lorraine Walsh**	***Lab Report Ref. No.***	**0634/064/01**
	Thorntons Balbriggan	***Date of Receipt***	**13/09/2021**
	Killeen Road	***Sampled On***	**13/09/2021**
	Ballyfermot	***Date Testing Commenced***	**14/09/2021**
		Received or Collected	**By Fitz: Noel R**
	Dublin 10	***Condition on Receipt***	**Acceptable**
Customer PO		***Date of Report***	**29/09/2021**
Customer Ref	**GW-QT-GW1 Cappagh Dublin**	***Sample Type***	**Groundwater**
Ref 2			
Ref 3			

CERTIFICATE OF ANALYSIS

Test Parameter	SOP	Analytical Technique	Result	Units	Acc.
Sulphate (Ground Water)	119	Colorimetry	2	mg/L as SO4	INAB
tert-Butylbenzene (Ground Water)	154	GCMS	<1	ug/L	INAB
Tetrachloroethene (Ground Water)	154	GCMS	<1	ug/L	INAB
Toluene (Ground Water)	154	GCMS	<1	ug/L	INAB
TPH (>C10-40)	188	GC-FID	549	ug/L	
trans-1,2-Dichloroethene (Ground W	154	GCMS	<1	ug/L	INAB
trans-1,3-Dichloropropene (Ground	154	GCMS	<2	ug/L	INAB
Trichloroethene (Ground Water)	154	GCMS	<1.0	ug/L	INAB
Trichlorofluoromethane (Ground Wat	154	GCMS	<1	ug/L	INAB
Vinyl chloride (Ground Water)	154	GCMS	<1	ug/L	INAB
Volatile Organic Compounds	154	GCMS	0.0	ug/L	
Water Level	0	Depth Meter	9.4	m	
Xylene Total (Ground Water)	154	GCMS	0	ug/L	INAB

Signed :

Aoife Harmon - Laboratory Supervisor

Date : 29/09/2021

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Customer **Lorraine Walsh**
Thorntons Balbriggan
Killeen Road
Ballyfermot

Dublin 10
Customer PO
Customer Ref **GW-QT-GW2 Cappagh Dublin**
Ref 2
Ref 3

Lab Report Ref. No. **0634/064/02**
Date of Receipt **13/09/2021**
Sampled On **13/09/2021**
Date Testing Commenced **14/09/2021**
Received or Collected **By Fitz: Noel R**
Condition on Receipt **Acceptable**
Date of Report **29/09/2021**
Sample Type **Groundwater**

CERTIFICATE OF ANALYSIS

Test Parameter	SOP	Analytical Technique	Result	Units	Acc.
1,1,1,2-Tetrachloroethane (Ground W	154	GCMS	<0.5	ug/L	INAB
1,1,1-Trichloroethane (Ground Water	154	GCMS	<1	ug/L	INAB
1,1,2,2-Tetrachloroethane (Ground W	154	GCMS	<5.0	ug/L	
1,1,2-Trichloroethane (Ground Water	154	GCMS	<2	ug/L	INAB
1,1-Dichloroethane (Ground Water)	154	GCMS	<1	ug/L	INAB
1,1-Dichloroethene (Ground Water)	154	GCMS	<1	ug/L	INAB
1,1-Dichloropropene (Ground Water)	154	GCMS	<1	ug/L	INAB
1,2,3-Trichlorobenzene (Ground Wat	154	GCMS	<1	ug/L	INAB
1,2,3-Trichloropropane (Ground Wate	154	GCMS	<0.9	ug/L	INAB
1,2,4-Trichlorobenzene (Ground Wat	154	GCMS	<1	ug/L	INAB
1,2,4-Trimethylbenzene (Ground Wat	154	GCMS	<1	ug/L	INAB
1,2-Dibromo-3-chloropropane (Groun	154	GCMS	<1.0	ug/L	INAB
1,2-Dibromoethane (Ground Water)	154	GCMS	<1	ug/L	INAB
1,2-Dichlorobenzene (Ground Water)	154	GCMS	<1	ug/L	INAB
1,2-Dichloroethane (Ground Water)	154	GCMS	<1	ug/L	INAB
1,2-Dichloropropane (Ground Water)	154	GCMS	<1	ug/L	INAB
1,3,5-Trimethylbenzene (Ground Wat	154	GCMS	<1	ug/L	INAB
1,3-Dichlorobenzene (Ground Water)	154	GCMS	<0.5	ug/L	INAB
1,3-Dichloropropane (Ground Water)	154	GCMS	<1	ug/L	INAB

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Date : 29/09/2021

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Customer	**Lorraine Walsh** **Thorntons Balbriggan** **Killeen Road** **Ballyfermot** **Dublin 10**	***Lab Report Ref. No.***	**0634/064/02**
		Date of Receipt	**13/09/2021**
		Sampled On	**13/09/2021**
		Date Testing Commenced	**14/09/2021**
		Received or Collected	**By Fitz: Noel R**
		Condition on Receipt	**Acceptable**
Customer PO		***Date of Report***	**29/09/2021**
Customer Ref	**GW-QT-GW2 Cappagh Dublin**	***Sample Type***	**Groundwater**
Ref 2			
Ref 3			

CERTIFICATE OF ANALYSIS

Test Parameter	SOP	Analytical Technique	Result	Units	Acc.
1,4-Dichlorobenzene (Ground Water)	154	GCMS	<2	ug/L	INAB
2,2-Dichloropropane (Ground Water)	154	GCMS	<5.0	ug/L	
2-Chlorotoluene (Ground Water)	154	GCMS	<1	ug/L	INAB
4-Chlorotoluene (Ground Water)	154	GCMS	<1	ug/L	INAB
Ammonia (Ground Water)	114	Colorimetry	12.25	mg/L as N	INAB
Benzene (Ground Water)	154	GCMS	<1	ug/L	INAB
Bromobenzene (Ground Water)	154	GCMS	<1	ug/L	INAB
Bromochloromethane (Ground Water	154	GCMS	<1	ug/L	INAB
Bromodichloromethane (Ground Wat	154	GCMS	<1	ug/L	INAB
Bromoform (Ground Water)	154	GCMS	<2	ug/L	INAB
Bromomethane (Ground Water.)	154	GCMS	<5.0	ug/L	
Carbon tetrachloride (Ground Water)	154	GCMS	<1	ug/L	INAB
Chloride (Ground Water)	100	Colorimetry	42	mg/L	INAB
Chlorobenzene (Ground Water)	154	GCMS	<1	ug/L	INAB
Chloroethane (Ground Water)	154	GCMS	<5.0	ug/L	
Chloroform (Ground Water)	154	GCMS	<1	ug/L	INAB
Chloromethane (Ground Water)	154	GCMS	<5.0	ug/L	
cis-1,2-Dichloroethene (Ground Wate	154	GCMS	<1	ug/L	INAB
cis-1,3-Dichloropropene (Ground Wat	154	GCMS	<1	ug/L	INAB

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Date : 29/09/2021

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Customer	**Lorraine Walsh**	*Lab Report Ref. No.*	**0634/064/02**
	Thorntons Balbriggan	*Date of Receipt*	**13/09/2021**
	Killeen Road	*Sampled On*	**13/09/2021**
	Ballyfermot	*Date Testing Commenced*	**14/09/2021**
		Received or Collected	**By Fitz: Noel R**
	Dublin 10	*Condition on Receipt*	**Acceptable**
Customer PO		*Date of Report*	**29/09/2021**
Customer Ref	**GW-QT-GW2 Cappagh Dublin**	*Sample Type*	**Groundwater**
Ref 2			
Ref 3			

CERTIFICATE OF ANALYSIS

Test Parameter	SOP	Analytical Technique	Result	Units	Acc.
Conductivity (Ground Water at 20C)	112	Electrometry	924.0	µscm -1@20C	INAB
Dibromochloromethane (Ground Wat	154	GCMS	<1	ug/L	INAB
Dibromomethane (Ground Water)	154	GCMS	<1	ug/L	INAB
Dichlorodifluoromethane (Ground Wa	154	GCMS	<5.0	ug/L	
Dichloromethane (Ground Water)	154	GCMS	<5.0	ug/L	
Ethylbenzene (Ground Water)	154	GCMS	<1	ug/L	INAB
Hexachlorobutadiene (Ground Water)	154	GCMS	<1	ug/L	INAB
Isopropylbenzene (Ground Water)	154	GCMS	<1	ug/L	INAB
m- & p-Xylene (Ground Water)	154	GCMS	<1	ug/L	INAB
Naphthalene (Ground Water)	154	GCMS	<1	ug/L	INAB
n-Butylbenzene (Ground Water)	154	GCMS	<1	ug/L	INAB
Nitrogen (Total Oxidised) (Ground W	151	Colorimetry	<0.29	mg/L as N	INAB
n-Propylbenzene (Ground Water)	154	GCMS	<1	ug/L	INAB
o-Xylene (Ground Water)	154	GCMS	<1	ug/L	INAB
pH (Ground Water)	110	Electrometry	7.25	pH Units	INAB
p-Isopropyltoluene (Ground Water)	154	GCMS	<1	ug/L	INAB
sec-Butylbenzene (Ground Water)	154	GCMS	<1	ug/L	INAB
Solids (Total Dissolved)	105	Filtration/ Evaporation @ 180C	790	mg/L	
Styrene (Ground Water)	154	GCMS	<1	ug/L	INAB

Signed :

Date : 29/09/2021

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Customer	**Lorraine Walsh** **Thorntons Balbriggan** **Killeen Road** **Ballyfermot** **Dublin 10**	*Lab Report Ref. No.*	**0634/064/02**
		Date of Receipt	**13/09/2021**
		Sampled On	**13/09/2021**
		Date Testing Commenced	**14/09/2021**
		Received or Collected	**By Fitz: Noel R**
		Condition on Receipt	**Acceptable**
Customer PO		*Date of Report*	**29/09/2021**
Customer Ref	**GW-QT-GW2 Cappagh Dublin**	*Sample Type*	**Groundwater**
Ref 2			
Ref 3			

CERTIFICATE OF ANALYSIS

Test Parameter	SOP	Analytical Technique	Result	Units	Acc.
Sulphate (Ground Water)	119	Colorimetry	147	mg/L as SO4	INAB
tert-Butylbenzene (Ground Water)	154	GCMS	<1	ug/L	INAB
Tetrachloroethene (Ground Water)	154	GCMS	<1	ug/L	INAB
Toluene (Ground Water)	154	GCMS	<1	ug/L	INAB
TPH (>C10-40)	188	GC-FID	<1	ug/L	
trans-1,2-Dichloroethene (Ground W	154	GCMS	<1	ug/L	INAB
trans-1,3-Dichloropropene (Ground	154	GCMS	<2	ug/L	INAB
Trichloroethene (Ground Water)	154	GCMS	<1.0	ug/L	INAB
Trichlorofluoromethane (Ground Wat	154	GCMS	<1	ug/L	INAB
Vinyl chloride (Ground Water)	154	GCMS	<1	ug/L	INAB
Volatile Organic Compounds	154	GCMS	0.0	ug/L	
Water Level	0	Depth Meter	2.8	m	
Xylene Total (Ground Water)	154	GCMS	0	ug/L	INAB

Signed :

Date : 29/09/2021

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Customer	**David Duff** **Thorntons Recycling Ltd.** **Unit S3B, Henry Road** **Park West Business Park** **Dublin 12** **Dublin**	***Lab Report Ref. No.***	**1159/902/01**
		Date of Receipt	**17/11/2021**
		Sampled On	**17/11/2021**
		Date Testing Commenced	**17/11/2021**
		Received or Collected	**By Fitz: Noel R**
		Condition on Receipt	**Acceptable**
Customer PO	**58663**	***Date of Report***	**29/11/2021**
Customer Ref	**GW-QT-GW1 Cappagh**	***Sample Type***	**Groundwater**
Ref 2	**Dublin**		
Ref 3			

CERTIFICATE OF ANALYSIS

Test Parameter	SOP	Analytical Technique	Result	Units	Acc.
1,1,1,2-Tetrachloroethane (Ground W	154	GCMS	<0.5	ug/L	INAB
1,1,1-Trichloroethane (Ground Water	154	GCMS	<1	ug/L	INAB
1,1,2,2-Tetrachloroethane (Ground W	154	GCMS	<5.0	ug/L	
1,1,2-Trichloroethane (Ground Water	154	GCMS	<2	ug/L	INAB
1,1-Dichloroethane (Ground Water)	154	GCMS	<1	ug/L	INAB
1,1-Dichloroethene (Ground Water)	154	GCMS	<1	ug/L	INAB
1,1-Dichloropropene (Ground Water)	154	GCMS	<1	ug/L	INAB
1,2,3-Trichlorobenzene (Ground Wat	154	GCMS	<1	ug/L	INAB
1,2,3-Trichloropropane (Ground Wate	154	GCMS	<0.9	ug/L	INAB
1,2,4-Trichlorobenzene (Ground Wat	154	GCMS	<1	ug/L	INAB
1,2,4-Trimethylbenzene (Ground Wat	154	GCMS	<1	ug/L	INAB
1,2-Dibromo-3-chloropropane (Groun	154	GCMS	<1.0	ug/L	INAB
1,2-Dibromoethane (Ground Water)	154	GCMS	<1	ug/L	INAB
1,2-Dichlorobenzene (Ground Water)	154	GCMS	<1	ug/L	INAB
1,2-Dichloroethane (Ground Water)	154	GCMS	<1	ug/L	INAB
1,2-Dichloropropane (Ground Water)	154	GCMS	<1	ug/L	INAB
1,3,5-Trimethylbenzene (Ground Wat	154	GCMS	<1	ug/L	INAB
1,3-Dichlorobenzene (Ground Water)	154	GCMS	<0.5	ug/L	INAB
1,3-Dichloropropane (Ground Water)	154	GCMS	<1	ug/L	INAB

Signed : A Harmon

Date : 29/11/2021

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		Date of Receipt	**17/11/2021**
		Sampled On	**17/11/2021**
		Date Testing Commenced	**17/11/2021**
		Received or Collected	**By Fitz: Noel R**
		Condition on Receipt	**Acceptable**
Customer PO	**58663**	***Date of Report***	**29/11/2021**
Customer Ref	**GW-QT-GW1 Cappagh**	***Sample Type***	**Groundwater**
Ref 2	**Dublin**		
Ref 3			

CERTIFICATE OF ANALYSIS

Test Parameter	SOP	Analytical Technique	Result	Units	Acc.
1,4-Dichlorobenzene (Ground Water)	154	GCMS	<2	ug/L	INAB
2,2-Dichloropropane (Ground Water)	154	GCMS	<5.0	ug/L	
2-Chlorotoluene (Ground Water)	154	GCMS	<1	ug/L	INAB
4-Chlorotoluene (Ground Water)	154	GCMS	<1	ug/L	INAB
Ammonia (Ground Water)	114	Colorimetry	0.05	mg/L as N	INAB
Benzene (Ground Water)	154	GCMS	<1	ug/L	INAB
Bromobenzene (Ground Water)	154	GCMS	<1	ug/L	INAB
Bromochloromethane (Ground Water	154	GCMS	<1	ug/L	INAB
Bromodichloromethane (Ground Wat	154	GCMS	<1	ug/L	INAB
Bromoform (Ground Water)	154	GCMS	<2	ug/L	INAB
Bromomethane (Ground Water.)	154	GCMS	<5.0	ug/L	
Carbon tetrachloride (Ground Water)	154	GCMS	<1	ug/L	INAB
Chloride (Ground Water)	100	Colorimetry	43	mg/L	INAB
Chlorobenzene (Ground Water)	154	GCMS	<1	ug/L	INAB
Chloroethane (Ground Water)	154	GCMS	<5.0	ug/L	
Chloroform (Ground Water)	154	GCMS	<1	ug/L	INAB
Chloromethane (Ground Water)	154	GCMS	<5.0	ug/L	
cis-1,2-Dichloroethene (Ground Wate	154	GCMS	<1	ug/L	INAB
cis-1,3-Dichloropropene (Ground Wat	154	GCMS	<1	ug/L	INAB

Signed : A Harmon

Date : 29/11/2021

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A copy of this certificate is available on www.fitzsci.ie

Customer **David Duff**
Thorntons Recycling Ltd.
Unit S3B, Henry Road
Park West Business Park
Dublin 12
Dublin
Customer PO **58663**
Customer Ref **GW-QT-GW1 Cappagh**
Ref 2 **Dublin**
Ref 3

Lab Report Ref. No. **1159/902/01**
Date of Receipt **17/11/2021**
Sampled On **17/11/2021**
Date Testing Commenced **17/11/2021**
Received or Collected **By Fitz: Noel R**
Condition on Receipt **Acceptable**
Date of Report **29/11/2021**
Sample Type **Groundwater**

CERTIFICATE OF ANALYSIS

Test Parameter	SOP	Analytical Technique	Result	Units	Acc.
Conductivity (Ground Water at 20C)	112	Electrometry	856.0	µscm -1@20C	INAB
Dibromochloromethane (Ground Wat	154	GCMS	<1	ug/L	INAB
Dibromomethane (Ground Water)	154	GCMS	<1	ug/L	INAB
Dichlorodifluoromethane (Ground Wa	154	GCMS	<5.0	ug/L	
Dichloromethane (Ground Water)	154	GCMS	<5.0	ug/L	
Ethylbenzene (Ground Water)	154	GCMS	<1	ug/L	INAB
Hexachlorobutadiene (Ground Water)	154	GCMS	<1	ug/L	INAB
Isopropylbenzene (Ground Water)	154	GCMS	<1	ug/L	INAB
m- & p-Xylene (Ground Water)	154	GCMS	<1	ug/L	INAB
Naphthalene (Ground Water)	154	GCMS	<1	ug/L	INAB
n-Butylbenzene (Ground Water)	154	GCMS	<1	ug/L	INAB
Nitrogen (Total Oxidised) (Ground W	151	Colorimetry	<0.29	mg/L as N	INAB
n-Propylbenzene (Ground Water)	154	GCMS	<1	ug/L	INAB
o-Xylene (Ground Water)	154	GCMS	<1	ug/L	INAB
pH (Ground Water)	110	Electrometry	7.23	pH Units	INAB
p-Isopropyltoluene (Ground Water)	154	GCMS	<1	ug/L	INAB
sec-Butylbenzene (Ground Water)	154	GCMS	<1	ug/L	INAB
Solids (Total Dissolved)	105	Filtration/ Evaporation @ 180C	674	mg/L	
Styrene (Ground Water)	154	GCMS	<1	ug/L	INAB

Signed : A Harmon

Date : 29/11/2021

Aoife Harmon - Laboratory Supervisor

Acc. : Accredited Parameters by ISO/IEC 17025:2017
PVL - Parametric Value Limit as per EU (Drinking water) Regulations (SI 122 2014)
For bacterial analysis a result of 0 means none detected in volume examined
All organic results are analysed as received and all results are corrected for dry weight at 104 C
Results shall not be reproduced, except in full, without the approval of Fitz Scientific
Results contained in this report relate only to the samples tested (P) : Presumptive Results

ilac-MRA
INAB ISO 17025 ACCREDITED TESTING DETAILED IN SCOPE REG NO.389T

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Customer **David Duff**
Thorntons Recycling Ltd.
Unit S3B, Henry Road
Park West Business Park
Dublin 12
Dublin
Customer PO **58663**
Customer Ref **GW-QT-GW1 Cappagh**
Ref 2 **Dublin**
Ref 3

Lab Report Ref. No. **1159/902/01**
Date of Receipt **17/11/2021**
Sampled On **17/11/2021**
Date Testing Commenced **17/11/2021**
Received or Collected **By Fitz: Noel R**
Condition on Receipt **Acceptable**
Date of Report **29/11/2021**
Sample Type **Groundwater**

CERTIFICATE OF ANALYSIS

Test Parameter	SOP	Analytical Technique	Result	Units	Acc.
Sulphate (Ground Water)	119	Colorimetry	152	mg/L as SO4	INAB
tert-Butylbenzene (Ground Water)	154	GCMS	<1	ug/L	INAB
Tetrachloroethene (Ground Water)	154	GCMS	<1	ug/L	INAB
Toluene (Ground Water)	154	GCMS	<1	ug/L	INAB
TPH (>C10-40)	188	GC-FID	<1	ug/L	
trans-1,2-Dichloroethene (Ground W	154	GCMS	<1	ug/L	INAB
trans-1,3-Dichloropropene (Ground	154	GCMS	<2	ug/L	INAB
Trichloroethene (Ground Water)	154	GCMS	<1.0	ug/L	INAB
Trichlorofluoromethane (Ground Wat	154	GCMS	<1	ug/L	INAB
Vinyl chloride (Ground Water)	154	GCMS	<1	ug/L	INAB
Volatile Organic Compounds	154	GCMS	0.0	ug/L	
Water Level	0	Depth Meter	3.0	m	
Xylene Total (Ground Water)	154	GCMS	0	ug/L	INAB

Signed :

Date : 29/11/2021

Aoife Harmon - Laboratory Supervisor

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PVL - Parametric Value Limit as per EU (Drinking water) Regulations (SI 122 2014)
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Unit 35,
Boyne Business Park,
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A copy of this certificate is available on www.fitzsci.ie

Customer	**David Duff**	***Lab Report Ref. No.***	**1159/902/02**
	Thorntons Recycling Ltd.	***Date of Receipt***	**17/11/2021**
	Unit S3B, Henry Road	***Sampled On***	**17/11/2021**
	Park West Business Park	***Date Testing Commenced***	**17/11/2021**
	Dublin 12	***Received or Collected***	**By Fitz: Noel R**
	Dublin	***Condition on Receipt***	**Acceptable**
Customer PO	**58663**	***Date of Report***	**29/11/2021**
Customer Ref	**GW-QT-GW2 Cappagh**	***Sample Type***	**Groundwater**
Ref 2	**Dublin**		
Ref 3			

CERTIFICATE OF ANALYSIS

Test Parameter	SOP	Analytical Technique	Result	Units	Acc.
1,1,1,2-Tetrachloroethane (Ground W	154	GCMS	<0.5	ug/L	INAB
1,1,1-Trichloroethane (Ground Water	154	GCMS	<1	ug/L	INAB
1,1,2,2-Tetrachloroethane (Ground W	154	GCMS	<5.0	ug/L	
1,1,2-Trichloroethane (Ground Water	154	GCMS	<2	ug/L	INAB
1,1-Dichloroethane (Ground Water)	154	GCMS	<1	ug/L	INAB
1,1-Dichloroethene (Ground Water)	154	GCMS	<1	ug/L	INAB
1,1-Dichloropropene (Ground Water)	154	GCMS	<1	ug/L	INAB
1,2,3-Trichlorobenzene (Ground Wat	154	GCMS	<1	ug/L	INAB
1,2,3-Trichloropropane (Ground Wate	154	GCMS	<0.9	ug/L	INAB
1,2,4-Trichlorobenzene (Ground Wat	154	GCMS	<1	ug/L	INAB
1,2,4-Trimethylbenzene (Ground Wat	154	GCMS	<1	ug/L	INAB
1,2-Dibromo-3-chloropropane (Groun	154	GCMS	<1.0	ug/L	INAB
1,2-Dibromoethane (Ground Water)	154	GCMS	<1	ug/L	INAB
1,2-Dichlorobenzene (Ground Water)	154	GCMS	<1	ug/L	INAB
1,2-Dichloroethane (Ground Water)	154	GCMS	<1	ug/L	INAB
1,2-Dichloropropane (Ground Water)	154	GCMS	<1	ug/L	INAB
1,3,5-Trimethylbenzene (Ground Wat	154	GCMS	<1	ug/L	INAB
1,3-Dichlorobenzene (Ground Water)	154	GCMS	<0.5	ug/L	INAB
1,3-Dichloropropane (Ground Water)	154	GCMS	<1	ug/L	INAB

Signed :

Date : 29/11/2021

Aoife Harmon - Laboratory Supervisor

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FITZ SCIENTIFIC
MONITORING & TESTING

Unit 35,
Boyne Business Park,
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Tel: +353 41 9845440
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email: info@fitzsci.ie

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Customer	**David Duff** **Thorntons Recycling Ltd.** **Unit S3B, Henry Road** **Park West Business Park** **Dublin 12** **Dublin**	***Lab Report Ref. No.***	**1159/902/02**
		Date of Receipt	**17/11/2021**
		Sampled On	**17/11/2021**
		Date Testing Commenced	**17/11/2021**
		Received or Collected	**By Fitz: Noel R**
		Condition on Receipt	**Acceptable**
Customer PO	**58663**	***Date of Report***	**29/11/2021**
Customer Ref	**GW-QT-GW2 Cappagh**	***Sample Type***	**Groundwater**
Ref 2	**Dublin**		
Ref 3			

CERTIFICATE OF ANALYSIS

Test Parameter	SOP	Analytical Technique	Result	Units	Acc.
1,4-Dichlorobenzene (Ground Water)	154	GCMS	<2	ug/L	INAB
2,2-Dichloropropane (Ground Water)	154	GCMS	<5.0	ug/L	
2-Chlorotoluene (Ground Water)	154	GCMS	<1	ug/L	INAB
4-Chlorotoluene (Ground Water)	154	GCMS	<1	ug/L	INAB
Ammonia (Ground Water)	114	Colorimetry	6.65	mg/L as N	INAB
Benzene (Ground Water)	154	GCMS	<1	ug/L	INAB
Bromobenzene (Ground Water)	154	GCMS	<1	ug/L	INAB
Bromochloromethane (Ground Water	154	GCMS	<1	ug/L	INAB
Bromodichloromethane (Ground Wat	154	GCMS	<1	ug/L	INAB
Bromoform (Ground Water)	154	GCMS	<2	ug/L	INAB
Bromomethane (Ground Water.)	154	GCMS	<5.0	ug/L	
Carbon tetrachloride (Ground Water)	154	GCMS	<1	ug/L	INAB
Chloride (Ground Water)	100	Colorimetry	48	mg/L	INAB
Chlorobenzene (Ground Water)	154	GCMS	<1	ug/L	INAB
Chloroethane (Ground Water)	154	GCMS	<5.0	ug/L	
Chloroform (Ground Water)	154	GCMS	<1	ug/L	INAB
Chloromethane (Ground Water)	154	GCMS	<5.0	ug/L	
cis-1,2-Dichloroethene (Ground Wate	154	GCMS	<1	ug/L	INAB
cis-1,3-Dichloropropene (Ground Wat	154	GCMS	<1	ug/L	INAB

Signed :

Date : 29/11/2021

Aoife Harmon - Laboratory Supervisor

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ilac-MRA
INAB ISO 17025 ACCREDITED TESTING DETAILED IN SCOPE REG NO.389T

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Customer	**David Duff**	***Lab Report Ref. No.***	**1159/902/02**
	Thorntons Recycling Ltd.	***Date of Receipt***	**17/11/2021**
	Unit S3B, Henry Road	***Sampled On***	**17/11/2021**
	Park West Business Park	***Date Testing Commenced***	**17/11/2021**
	Dublin 12	***Received or Collected***	**By Fitz: Noel R**
	Dublin	***Condition on Receipt***	**Acceptable**
Customer PO	**58663**	***Date of Report***	**29/11/2021**
Customer Ref	**GW-QT-GW2 Cappagh**	***Sample Type***	**Groundwater**
Ref 2	**Dublin**		
Ref 3			

CERTIFICATE OF ANALYSIS

Test Parameter	SOP	Analytical Technique	Result	Units	Acc.
Conductivity (Ground Water at 20C)	112	Electrometry	947.0	µscm -1@20C	INAB
Dibromochloromethane (Ground Wat	154	GCMS	<1	ug/L	INAB
Dibromomethane (Ground Water)	154	GCMS	<1	ug/L	INAB
Dichlorodifluoromethane (Ground Wa	154	GCMS	<5.0	ug/L	
Dichloromethane (Ground Water)	154	GCMS	<5.0	ug/L	
Ethylbenzene (Ground Water)	154	GCMS	<1	ug/L	INAB
Hexachlorobutadiene (Ground Water)	154	GCMS	<1	ug/L	INAB
Isopropylbenzene (Ground Water)	154	GCMS	<1	ug/L	INAB
m- & p-Xylene (Ground Water)	154	GCMS	<1	ug/L	INAB
Naphthalene (Ground Water)	154	GCMS	<1	ug/L	INAB
n-Butylbenzene (Ground Water)	154	GCMS	<1	ug/L	INAB
Nitrogen (Total Oxidised) (Ground W	151	Colorimetry	<0.29	mg/L as N	INAB
n-Propylbenzene (Ground Water)	154	GCMS	<1	ug/L	INAB
o-Xylene (Ground Water)	154	GCMS	<1	ug/L	INAB
pH (Ground Water)	110	Electrometry	7.12	pH Units	INAB
p-Isopropyltoluene (Ground Water)	154	GCMS	<1	ug/L	INAB
sec-Butylbenzene (Ground Water)	154	GCMS	<1	ug/L	INAB
Solids (Total Dissolved)	105	Filtration/ Evaporation @ 180C	677	mg/L	
Styrene (Ground Water)	154	GCMS	<1	ug/L	INAB

Signed :

Date : 29/11/2021

Aoife Harmon - Laboratory Supervisor

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ilac-MRA
ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO.389T

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Customer	**David Duff**	*Lab Report Ref. No.*	**1159/902/02**
	Thorntons Recycling Ltd.	*Date of Receipt*	**17/11/2021**
	Unit S3B, Henry Road	*Sampled On*	**17/11/2021**
	Park West Business Park	*Date Testing Commenced*	**17/11/2021**
	Dublin 12	*Received or Collected*	**By Fitz: Noel R**
	Dublin	*Condition on Receipt*	**Acceptable**
Customer PO	**58663**	*Date of Report*	**29/11/2021**
Customer Ref	**GW-QT-GW2 Cappagh**	*Sample Type*	**Groundwater**
Ref 2	**Dublin**		
Ref 3			

CERTIFICATE OF ANALYSIS

Test Parameter	SOP	Analytical Technique	Result	Units	Acc.
Sulphate (Ground Water)	119	Colorimetry	173	mg/L as SO4	INAB
tert-Butylbenzene (Ground Water)	154	GCMS	<1	ug/L	INAB
Tetrachloroethene (Ground Water)	154	GCMS	<1	ug/L	INAB
Toluene (Ground Water)	154	GCMS	<1	ug/L	INAB
TPH (>C10-40)	188	GC-FID	<1	ug/L	
trans-1,2-Dichloroethene (Ground W	154	GCMS	<1	ug/L	INAB
trans-1,3-Dichloropropene (Ground	154	GCMS	<2	ug/L	INAB
Trichloroethene (Ground Water)	154	GCMS	<1.0	ug/L	INAB
Trichlorofluoromethane (Ground Wat	154	GCMS	<1	ug/L	INAB
Vinyl chloride (Ground Water)	154	GCMS	<1	ug/L	INAB
Volatile Organic Compounds	154	GCMS	0.0	ug/L	
Water Level	0	Depth Meter	2.1	m	
Xylene Total (Ground Water)	154	GCMS	0	ug/L	INAB

Signed : A Harmon

Aoife Harmon - Laboratory Supervisor

Date : 29/11/2021

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PVL - Parametric Value Limit as per EU (Drinking water) Regulations (SI 122 2014)
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DETAILED IN SCOPE REG NO.389T

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FEHILY
TIMONEY

CONSULTANTS IN ENGINEERING,
ENVIRONMENTAL SCIENCE
& PLANNING

APPENDIX 9.3

Open Hole Core Logs

GEOTECHNICAL CORE LOG RECORD

REPORT NUMBER 22943

CONTRACT	Thornton Recycling Wells	**DRILLHOLE NO**	**RC01**
		SHEET	Sheet 1 of 2
CO-ORDINATES		**DATE COMMENCED**	02/11/2020
GROUND LEVEL (mOD)		**DATE COMPLETED**	03/11/2020
CLIENT	Thornton's Recycling	**DRILLED BY**	IGSL
ENGINEER		**LOGGED BY**	D.O'Shea
RIG TYPE	Geo205		
FLUSH	Air/Mist		
INCLINATION (deg)	-90		
CORE DIAMETER (mm)	78		

Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%
0.00–1.50	0	0	0
1.50–3.00	0	0	0
3.00–4.50	0	0	0
4.50–6.00	0	0	0
6.00–7.50	0	0	0
7.50–9.00	0	0	0
9.00–	0	0	0

Legend	Description	Depth (m)
▩	SYMMETRIX DRILLING: No recovery, observed by driller as returns of MADE GROUND consisting of grey brown sandy gravelly clay with fragments of red brick, concrete & plastic.	1.30
	SYMMETRIX DRILLING: No recovery, observed by driller as returns of grey brown sandy gravelly CLAY	2.30
	SYMMETRIX DRILLING: No recovery, observed by driller as returns of BOULDER	2.70
	SYMMETRIX DRILLING: No recovery, observed by driller as returns of probable ROCK	3.00
	SYMMETRIX DRILLING: No recovery, observed by driller as returns of ROCK	

Downhole Depth (m): 0 – 9 | Fracture Spacing Log (mm): 0 250 500 | Non-intact Zone | Elevation | Standpipe Details | SPT (N Value)

REMARKS

Hole cased 0.00-3.00m. Erect Covid 19 Safe Zone - 1hr.

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
					No water strike recorded

GROUNDWATER DETAILS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type
02-11-20	10.30	2.00	10.30	50mm SP

GEOTECHNICAL CORE LOG RECORD

REPORT NUMBER 22943

CONTRACT Thornton Recycling Wells

DRILLHOLE NO **RC01**
SHEET Sheet 2 of 2

CO-ORDINATES

GROUND LEVEL (mOD)

RIG TYPE Geo205
FLUSH Air/Mist
INCLINATION (deg) -90
CORE DIAMETER (mm) 78

DATE COMMENCED 02/11/2020
DATE COMPLETED 03/11/2020

CLIENT Thornton's Recycling
ENGINEER

DRILLED BY IGSL
LOGGED BY D.O'Shea

Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing Log (mm) 0 250 500	Non-intact Zone	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
10	10.30								10.30			
								End of Borehole at 10.30 m				
11												
12												
13												
14												
15												
16												
17												
18												
19												

REMARKS

Hole cased 0.00-3.00m. Erect Covid 19 Safe Zone - 1hr.

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
					No water strike recorded

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type
02-11-20	10.30	2.00	10.30	50mm SP

GROUNDWATER DETAILS

Date	Hole Depth	Casing Depth	Depth to Water	Comments
02-11-20	10.30	3.00	DRY	Water level recorded at end of drilling.

GEOTECHNICAL CORE LOG RECORD

REPORT NUMBER 22943

CONTRACT Thornton Recycling Wells

DRILLHOLE NO **RC02**
SHEET Sheet 1 of 2

CO-ORDINATES

GROUND LEVEL (mOD)

RIG TYPE Geo205
FLUSH Air/Mist
INCLINATION (deg) -90
CORE DIAMETER (mm) 78

DATE COMMENCED 03/11/2020
DATE COMPLETED 04/11/2020

CLIENT Thornton's Recycling
ENGINEER

DRILLED BY IGSL
LOGGED BY D.O'Shea

Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%
1.50	0	0	0
3.00	0	0	0
4.50	0	0	0
6.00	0	0	0
7.50	0	0	0
9.00	0	0	0
	0	0	0

Description	Depth (m)
SYMMETRIX DRILLING: No recovery, observed by driller as returns of MADE GROUND consisting of CONCRETE	0.30
SYMMETRIX DRILLING: No recovery, observed by driller as returns of MADE GROUND consisting of grey brown black sandy gravelly clay with fragments of red brick, timber & plastic.	1.60
SYMMETRIX DRILLING: No recovery, observed by driller as returns of dark grey clayey sandy gravelly SILT	2.80
SYMMETRIX DRILLING: No recovery, observed by driller as returns of grey black clayey silty sandy GRAVEL	4.20
SYMMETRIX DRILLING: No recovery, observed by driller as returns of probable ROCK	4.60
SYMMETRIX DRILLING: No recovery, observed by driller as returns of ROCK	

Fracture Spacing Log (mm): 0 250 500

REMARKS

Hole cased 0.00-4.60m. Erect Covid 19 Safe Zone - 1hr.

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
0.60	0.60	1.20			Slow
4.00	4.00	N/S			Slow

GROUNDWATER DETAILS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type
04-11-20	10.30	2.00	10.30	50mm SP

GEOTECHNICAL CORE LOG RECORD

REPORT NUMBER	22943
CONTRACT	Thornton Recycling Wells
DRILLHOLE NO	**RC02**
SHEET	Sheet 2 of 2
CO-ORDINATES	
GROUND LEVEL (mOD)	
RIG TYPE	Geo205
FLUSH	Air/Mist
INCLINATION (deg)	-90
CORE DIAMETER (mm)	78
DATE COMMENCED	03/11/2020
DATE COMPLETED	04/11/2020
CLIENT	Thornton's Recycling
ENGINEER	
DRILLED BY	IGSL
LOGGED BY	D.O'Shea

Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing Log (mm) 0 250 500	Non-intact Zone	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
10	10.30								10.30			
								End of Borehole at 10.30 m				
11												
12												
13												
14												
15												
16												
17												
18												
19												

REMARKS

Hole cased 0.00-4.60m. Erect Covid 19 Safe Zone - 1hr.

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
0.60	0.60	1.20			Slow
4.00	4.00	N/S			Slow

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type
04-11-20	10.30	2.00	10.30	50mm SP

GROUNDWATER DETAILS

Date	Hole Depth	Casing Depth	Depth to Water	Comments
04-11-20	10.30	4.60	4.40	Water level recorded at end of drilling.

FEHILY
TIMONEY

CONSULTANTS IN ENGINEERING,
ENVIRONMENTAL SCIENCE
& PLANNING

APPENDIX 10.1

EPA Water Quality Monitoring Results

WaterbodyName	WaterbodyCode	Waterbod	MonitoringStationCode	MonitoringStationName	MonitoringStatior	MonitoringStationLocalAuthor	SampleCode	SampleDate	SampleMe	ParameterName	Parameter	ParameterUnitNar	Result	TextResult	ResultStrir	LimitOfDe	ReportRes	ReportTex	ReportRes	ReportLimit
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1257703	22/02/2017 11:00	Grab	Alkalinity-total (as CaCO3)	mg/l	milligrams per litre	268				268			
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1257703	22/02/2017 11:00	Grab	Ammonia-Total (as N)	mg/l	milligrams per litre	0.09				0.09			
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1257703	22/02/2017 11:00	Grab	BOD - 5 days (Total)	mg/l	milligrams per litre	3				3			
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1257703	22/02/2017 11:00	Grab	Chloride	mg/l	milligrams per litre	47				47			
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1257703	22/02/2017 11:00	Grab	Conductivity @20°C	µS/cm	Micro siemens pe	679				679			
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1257703	22/02/2017 11:00	Grab	Dissolved Oxygen	mg/l	milligrams per litre	11.1				11.1			
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1257703	22/02/2017 11:00	Grab	Nitrate (as N)	mg/l	milligrams per litre	1.63				1.63			
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1257703	22/02/2017 11:00	Grab	Nitrite (as N)	mg/l	milligrams per litre	0.017				0.017			
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1257703	22/02/2017 11:00	Grab	ortho-Phosphate (as P) - unspecified	mg/l	milligrams per litre	0.06				0.06			
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1257703	22/02/2017 11:00	Grab	pH	pH units	pH Units	8.3				8.3			
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1257703	22/02/2017 11:00	Grab	Total Oxidised Nitrogen (as N)	mg/l	milligrams per litre	1.65				1.65			
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1257703	22/02/2017 11:00	Grab	Total Hardness (as CaCO3)	mg/l	milligrams per litre	346				346			
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1257703	22/02/2017 11:00	Grab	Dissolved Oxygen	% Saturati	Percentage Satura	98				98			
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1257703	22/02/2017 11:00	Grab	Sulphate	mg/l	milligrams per litre	63				63			
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1257703	22/02/2017 11:00	Grab	Temperature	°C	Degrees centrigra	9.9				9.9			
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1257703	22/02/2017 11:00	Grab	True Colour	Hazen	Hazen	11				11			
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1257941	22/02/2017 12:20	Grab	Alkalinity-total (as CaCO3)	mg/l	milligrams per litre	317				317			
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1257941	22/02/2017 12:20	Grab	Ammonia-Total (as N)	mg/l	milligrams per litre	0.02				0.02			
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1257941	22/02/2017 12:20	Grab	Chloride	mg/l	milligrams per litre	33				33			
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1257941	22/02/2017 12:20	Grab	Nitrite (as N)	mg/l	milligrams per litre	0.012				0.012			
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1257941	22/02/2017 12:20	Grab	Dissolved Oxygen	% Saturati	Percentage Satura	90				90			
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1257941	22/02/2017 12:20	Grab	Nitrate (as N)	mg/l	milligrams per litre	1.6				1.6			
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1257941	22/02/2017 12:20	Grab	ortho-Phosphate (as P) - unspecified	mg/l	milligrams per litre	0.07				0.07			
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1257941	22/02/2017 12:20	Grab	Temperature	°C	Degrees centrigra	9.7				9.7			
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1257941	22/02/2017 12:20	Grab	pH	pH units	pH Units	8.3				8.3			
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1257941	22/02/2017 12:20	Grab	Total Oxidised Nitrogen (as N)	mg/l	milligrams per litre	1.61				1.61			
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1257941	22/02/2017 12:20	Grab	True Colour	Hazen	Hazen	14				14			
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1257941	22/02/2017 12:20	Grab	BOD - 5 days (Total)	mg/l	milligrams per litre	1				1			
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1257941	22/02/2017 12:20	Grab	Conductivity @20°C	µS/cm	Micro siemens pe	662				662			
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1257941	22/02/2017 12:20	Grab	Sulphate	mg/l	milligrams per litre	43				43			
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1257941	22/02/2017 12:20	Grab	Total Hardness (as CaCO3)	mg/l	milligrams per litre	354				354			
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1257942	22/02/2017 12:40	Grab	Alkalinity-total (as CaCO3)	mg/l	milligrams per litre	298				298			
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1257942	22/02/2017 12:40	Grab	Ammonia-Total (as N)	mg/l	milligrams per litre	0.16				0.16			
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1257942	22/02/2017 12:40	Grab	BOD - 5 days (Total)	mg/l	milligrams per litre	7				7			
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1257942	22/02/2017 12:40	Grab	Chloride	mg/l	milligrams per litre	47				47			
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1257942	22/02/2017 12:40	Grab	Conductivity @20°C	µS/cm	Micro siemens pe	711				711			
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1257942	22/02/2017 12:40	Grab	Dissolved Oxygen	mg/l	milligrams per litre	11.1				11.1			
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1257942	22/02/2017 12:40	Grab	Nitrite (as N)	mg/l	milligrams per litre	0.037				0.037			
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1257942	22/02/2017 12:40	Grab	ortho-Phosphate (as P) - unspecified	mg/l	milligrams per litre	0.1				0.1			
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1257942	22/02/2017 12:40	Grab	Temperature	°C	Degrees centrigra	9.8				9.8			
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1257942	22/02/2017 12:40	Grab	pH	pH units	pH Units	8.3				8.3			
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1257942	22/02/2017 12:40	Grab	Total Oxidised Nitrogen (as N)	mg/l	milligrams per litre	1.5				1.5			
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1257942	22/02/2017 12:40	Grab	Dissolved Oxygen	% Saturati	Percentage Satura	91				91			
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1257942	22/02/2017 12:40	Grab	Nitrate (as N)	mg/l	milligrams per litre	1.47				1.47			
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1257942	22/02/2017 12:40	Grab	Sulphate	mg/l	milligrams per litre	49				49			
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1257942	22/02/2017 12:40	Grab	Total Hardness (as CaCO3)	mg/l	milligrams per litre	360				360			
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1257942	22/02/2017 12:40	Grab	True Colour	Hazen	Hazen	14				14			
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1278316	19/04/2017 10:05	Grab	Alkalinity-total (as CaCO3)	mg/l	milligrams per litre	274				274			
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1278316	19/04/2017 10:05	Grab	Ammonia-Total (as N)	mg/l	milligrams per litre	0.05				0.05			
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1278316	19/04/2017 10:05	Grab	BOD - 5 days (Total)	mg/l	milligrams per litre	1				1			
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1278316	19/04/2017 10:05	Grab	Chloride	mg/l	milligrams per litre	39				39			
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1278316	19/04/2017 10:05	Grab	Dissolved Oxygen	% Saturati	Percentage Satura	105				105			
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1278316	19/04/2017 10:05	Grab	Nitrate (as N)	mg/l	milligrams per litre	1.44				1.44			
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1278316	19/04/2017 10:05	Grab	Temperature	°C	Degrees centrigra	10.5				10.5			
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1278316	19/04/2017 10:05	Grab	Nitrite (as N)	mg/l	milligrams per litre	0.045				0.045			
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1278316	19/04/2017 10:05	Grab	Sulphate	mg/l	milligrams per litre	71				71			
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1278316	19/04/2017 10:05	Grab	ortho-Phosphate (as P) - unspecified	mg/l	milligrams per litre	0.02				0.02			
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1278316	19/04/2017 10:05	Grab	Total Oxidised Nitrogen (as N)	mg/l	milligrams per litre	1.49				1.49			
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1278316	19/04/2017 10:05	Grab	Conductivity @20°C	µS/cm	Micro siemens pe	687				687			
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1278316	19/04/2017 10:05	Grab	Dissolved Oxygen	mg/l	milligrams per litre	12				12			
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1278316	19/04/2017 10:05	Grab	pH	pH units	pH Units	8.3				8.3			
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1278316	19/04/2017 10:05	Grab	Total Hardness (as CaCO3)	mg/l	milligrams per litre	353				353			
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1278316	19/04/2017 10:05	Grab	True Colour	Hazen	Hazen	9				9			
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1278570	19/04/2017 13:15	Grab	Alkalinity-total (as CaCO3)	mg/l	milligrams per litre	294				294			
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1278570	19/04/2017 13:15	Grab	Ammonia-Total (as N)	mg/l	milligrams per litre	0.22				0.22			
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1278570	19/04/2017 13:15	Grab	BOD - 5 days (Total)	mg/l	milligrams per litre	3				3			
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1278570	19/04/2017 13:15	Grab	Dissolved Oxygen	% Saturati	Percentage Satura	102				102			
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1278570	19/04/2017 13:15	Grab	Dissolved Oxygen	mg/l	milligrams per litre	11.5				11.5			
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1278570	19/04/2017 13:15	Grab	Nitrite (as N)	mg/l	milligrams per litre	0.022				0.022			
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1278570	19/04/2017 13:15	Grab	pH	pH units	pH Units	8.2				8.2			
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1278570	19/04/2017 13:15	Grab	Nitrate (as N)	mg/l	milligrams per litre	1.06				1.06			
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1278570	19/04/2017 13:15	Grab	Temperature	°C	Degrees centrigra	10.7				10.7			
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1278570	19/04/2017 13:15	Grab	True Colour	Hazen	Hazen	12				12			
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1278570	19/04/2017 13:15	Grab	Chloride	mg/l	milligrams per litre	28				28			
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1278570	19/04/2017 13:15	Grab	Conductivity @20°C	µS/cm	Micro siemens pe	642				642			
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1278570	19/04/2017 13:15	Grab	ortho-Phosphate (as P) - unspecified	mg/l	milligrams per litre	0.06				0.06			
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1278570	19/04/2017 13:15	Grab	Sulphate	mg/l	milligrams per litre	52				52			
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1278570	19/04/2017 13:15	Grab	Total Hardness (as CaCO3)	mg/l	milligrams per litre	356				356			
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1278570	19/04/2017 13:15	Grab	Total Oxidised Nitrogen (as N)	mg/l	milligrams per litre	1.08				1.08			
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1278571	19/04/2017 13:40	Grab	Ammonia-Total (as N)	mg/l	milligrams per litre	0.76				0.76			
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1278571	19/04/2017 13:40	Grab	BOD - 5 days (Total)	mg/l	milligrams per litre	6				6			
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1278571	19/04/2017 13:40	Grab	Chloride	mg/l	milligrams per litre	39				39			
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1278571	19/04/2017 13:40	Grab	Dissolved Oxygen	mg/l	milligrams per litre	11.4				11.4			
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1278571	19/04/2017 13:40	Grab	Nitrate (as N)	mg/l	milligrams per litre	1.17				1.17			
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1278571	19/04/2017 13:40	Grab	ortho-Phosphate (as P) - unspecified	mg/l	milligrams per litre	0.15				0.15			
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1278571	19/04/2017 13:40	Grab	Nitrite (as N)	mg/l	milligrams per litre	0.026				0.026			
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1278571	19/04/2017 13:40	Grab	pH	pH units	pH Units	8.3				8.3			
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1278571	19/04/2017 13:40	Grab	Sulphate	mg/l	milligrams per litre	58				58			
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1278571	19/04/2017 13:40	Grab	Alkalinity-total (as CaCO3)	mg/l	milligrams per litre	290				290			
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1278571	19/04/2017 13:40	Grab	Conductivity @20°C	µS/cm	Micro siemens pe	693				693			
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1278571	19/04/2017 13:40	Grab	Dissolved Oxygen	% Saturati	Percentage Satura	101				101			
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1278571	19/04/2017 13:40	Grab	Temperature	°C	Degrees centrigra	10.9				10.9			
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1278571	19/04/2017 13:40	Grab	Total Hardness (as CaCO3)	mg/l	milligrams per litre	364				364			
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1278571	19/04/2017 13:40	Grab	Total Oxidised Nitrogen (as N)	mg/l	milligrams per litre	1.2				1.2			
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1278571	19/04/2017 13:40	Grab	True Colour	Hazen	Hazen	13				13			
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1301673	14/06/2017 08:30	Grab	Alkalinity-total (as CaCO3)	mg/l	milligrams per litre	304				304			
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1301673	14/06/2017 08:30	Grab	Ammonia-Total (as N)	mg/l	milligrams per litre	0.1				0.1			
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1301673	14/06/2017 08:30	Grab	Conductivity @20°C	µS/cm	Micro siemens pe	725				725			
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1301673	14/06/2017 08:30	Grab	Dissolved Oxygen	mg/l	milligrams per litre	9.6				9.6			
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1301673	14/06/2017 08:30	Grab	Dissolved Oxygen	% Saturati	Percentage Satura	93				93			
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1301673	14/06/2017 08:30	Grab	ortho-Phosphate (as P) - unspecified	mg/l	milligrams per litre	0.17				0.17			
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1301673	14/06/2017 08:30	Grab	pH	pH units	pH Units	8.2				8.2			
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1301673	14/06/2017 08:30	Grab	Nitrite (as N)	mg/l	milligrams per litre	0.036				0.036			
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1301673	14/06/2017 08:30	Grab	Sulphate	mg/l	milligrams per litre	71				71			
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1301673	14/06/2017 08:30	Grab	Total Oxidised Nitrogen (as N)	mg/l	milligrams per litre	1.37				1.37			
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1301673	14/06/2017 08:30	Grab	Total Hardness (as CaCO3)	mg/l	milligrams per litre	384				384			
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1301673	14/06/2017 08:30	Grab	True Colour	Hazen	Hazen	21				21			
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1301673	14/06/2017 08:30	Grab	BOD - 5 days (Total)	mg/l	milligrams per litre	2				2			
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1301673	14/06/2017 08:30	Grab	Chloride	mg/l	milligrams per litre	36				36			
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1301673	14/06/2017 08:30	Grab	Nitrate (as N)	mg/l	milligrams per litre	1.34				1.34			
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1301673	14/06/2017 08:30	Grab	Temperature	°C	Degrees centrigra	14				14			
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1301672	14/06/2017 09:10	Grab	Alkalinity-total (as CaCO3)	mg/l	milligrams per litre	317				317			
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1301672	14/06/2017 09:10	Grab	Ammonia-Total (as N)	mg/l	milligrams per litre	0.05				0.05			

2017		**Average**		
	Unit	**Mulhuddart Br**	**Abbotstown Br**	**Violet Hill Drive Finglas**
Alkalinity-total (as CaCO3)	mg/l	311	298.8	234.8
Ammonia-Total (as N)	mg/l	0.098	0.23	0.074
BOD - 5 days (Total)	mg/l	1.2	3.4	3.8
Chloride	mg/l	29.6	42.8	36
Conductivity @20°C	µS/cm	682.4	729.6	602.2
Dissolved Oxygen	mg/l	11	10.9	56.61
Nitrate (as N)	mg/l	1.45	1.446	1.384
Nitrite (as N)	mg/l	0.0152	0.032	0.0248
ortho-Phosphate (as P) - unspecified	mg/l	0.088	0.134	0.076
pH	pH units	8.2	8.26	8.26
Total Oxidised Nitrogen (as N)	mg/l	1.466	1.476	1.412
Sulphate	mg/l	56.6	64	64
Dissolved Oxygen (%)	%	96	98	102.2
2018		**Average**		
	Unit	**Mulhuddart Br**	**Abbotstown Br**	**Violet Hill Drive Finglas**
Alkalinity-total (as CaCO3)	mg/l	248.2	243	223.4
Ammonia-Total (as N)	mg/l	0.108	0.056	0.082
BOD - 5 days (Total)	mg/l	2.1	1.1	1.8
Chloride	mg/l	50.4	61.2	35.83
Conductivity @20°C	µS/cm	669.8	698.8	661.4
Dissolved Oxygen	mg/l	9.78	10.72	11.58
Nitrate (as N)	mg/l	1.276	1.468	1.558
Nitrite (as N)	mg/l	0.0246	0.0198	0.0286
ortho-Phosphate (as P) - unspecified	mg/l	0.09	0.096	0.062
pH	pH units	8	8.14	8.26
Total Oxidised Nitrogen (as N)	mg/l	1.3	1.49	1.588
Sulphate	mg/l	64.4	61.8	77.4
Dissolved Oxygen (%)	%	86.4	96.4	107.6

TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1301672	14/06/2017 09:10	Grab	BOD - 5 days (Total)	mg/l	milligrams per litre		<1	0.5	<1	1
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1301672	14/06/2017 09:10	Grab	Conductivity @20°C	µS/cm	Micro siemens per	690		690		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1301672	14/06/2017 09:10	Grab	Chloride	mg/l	milligrams per litre	24		24		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1301672	14/06/2017 09:10	Grab	Dissolved Oxygen	% Saturati	Percentage Satura	94		94		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1301672	14/06/2017 09:10	Grab	Dissolved Oxygen	mg/l	milligrams per litre	9.6		9.6		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1301672	14/06/2017 09:10	Grab	Nitrite (as N)	mg/l	milligrams per litre	0.01		0.01		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1301672	14/06/2017 09:10	Grab	Nitrate (as N)	mg/l	milligrams per litre	1.05		1.05		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1301672	14/06/2017 09:10	Grab	pH	pH units	pH Units	8.2		8.2		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1301672	14/06/2017 09:10	Grab	Sulphate	mg/l	milligrams per litre	69		69		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1301672	14/06/2017 09:10	Grab	Total Hardness (as CaCO3)	mg/l	milligrams per litre	387		387		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1301672	14/06/2017 09:10	Grab	ortho-Phosphate (as P) - unspecified	mg/l	milligrams per litre	0.11		0.11		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1301672	14/06/2017 09:10	Grab	Total Oxidised Nitrogen (as N)	mg/l	milligrams per litre	1.06		1.06		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1301672	14/06/2017 09:10	Grab	Temperature	°C	Degrees centigra	14		14		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1301672	14/06/2017 09:10	Grab	True Colour	Hazen	Hazen	21		21		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1301443	14/06/2017 11:05	Grab	Alkalinity-total (as CaCO3)	mg/l	milligrams per litre	282		282		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1301443	14/06/2017 11:05	Grab	Ammonia-Total (as N)	mg/l	milligrams per litre	0.07		0.07		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1301443	14/06/2017 11:05	Grab	BOD - 5 days (Total)	mg/l	milligrams per litre	1		1		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1301443	14/06/2017 11:05	Grab	Conductivity @20°C	µS/cm	Micro siemens per	691		691		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1301443	14/06/2017 11:05	Grab	Chloride	mg/l	milligrams per litre	35		35		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1301443	14/06/2017 11:05	Grab	Dissolved Oxygen	mg/l	milligrams per litre	11.2		11.2		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1301443	14/06/2017 11:05	Grab	Nitrate (as N)	mg/l	milligrams per litre	1.45		1.45		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1301443	14/06/2017 11:05	Grab	Nitrite (as N)	mg/l	milligrams per litre	0.033		0.033		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1301443	14/06/2017 11:05	Grab	Dissolved Oxygen	% Saturati	Percentage Satura	111		111		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1301443	14/06/2017 11:05	Grab	Sulphate	mg/l	milligrams per litre	80		80		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1301443	14/06/2017 11:05	Grab	ortho-Phosphate (as P) - unspecified	mg/l	milligrams per litre	0.1		0.1		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1301443	14/06/2017 11:05	Grab	pH	pH units	pH Units	8.4		8.4		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1301443	14/06/2017 11:05	Grab	True Colour	Hazen	Hazen	17		17		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1301443	14/06/2017 11:05	Grab	Total Hardness (as CaCO3)	mg/l	milligrams per litre	371		371		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1301443	14/06/2017 11:05	Grab	Total Oxidised Nitrogen (as N)	mg/l	milligrams per litre	1.48		1.48		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1301443	14/06/2017 11:05	Grab	Temperature	°C	Degrees centigra	15.3		15.3		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1341962	20/09/2017 10:35	Grab	Alkalinity-total (as CaCO3)	mg/l	milligrams per litre	258		258		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1341962	20/09/2017 10:35	Grab	Ammonia-Total (as N)	mg/l	milligrams per litre	0.06		0.06		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1341962	20/09/2017 10:35	Grab	Chloride	mg/l	milligrams per litre	43		43		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1341962	20/09/2017 10:35	Grab	Conductivity @20°C	µS/cm	Micro siemens per	703		703		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1341962	20/09/2017 10:35	Grab	Dissolved Oxygen	% Saturati	Percentage Satura	103		103		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1341962	20/09/2017 10:35	Grab	Dissolved Oxygen	mg/l	milligrams per litre	10.6		10.6		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1341962	20/09/2017 10:35	Grab	Nitrate (as N)	mg/l	milligrams per litre	1.22		1.22		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1341962	20/09/2017 10:35	Grab	pH	pH units	pH Units	8.3		8.3		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1341962	20/09/2017 10:35	Grab	Nitrite (as N)	mg/l	milligrams per litre	0.016		0.016		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1341962	20/09/2017 10:35	Grab	Total Hardness (as CaCO3)	mg/l	milligrams per litre	355		355		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1341962	20/09/2017 10:35	Grab	ortho-Phosphate (as P) - unspecified	mg/l	milligrams per litre	0.09		0.09		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1341962	20/09/2017 10:35	Grab	Temperature	°C	Degrees centigra	13.7		13.7		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1341962	20/09/2017 10:35	Grab	Total Oxidised Nitrogen (as N)	mg/l	milligrams per litre	1.24		1.24		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1341962	20/09/2017 10:35	Grab	True Colour	Hazen	Hazen	11		11		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1341962	20/09/2017 10:35	Grab	BOD - 5 days (Total)	mg/l	milligrams per litre	1		1		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1341962	20/09/2017 10:35	Grab	Sulphate	mg/l	milligrams per litre	85		85		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1342252	20/09/2017 11:35	Grab	Ammonia-Total (as N)	mg/l	milligrams per litre	0.09		0.09		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1342252	20/09/2017 11:35	Grab	Conductivity @20°C	µS/cm	Micro siemens per	790		790		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1342252	20/09/2017 11:35	Grab	Dissolved Oxygen	% Saturati	Percentage Satura	101		101		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1342252	20/09/2017 11:35	Grab	ortho-Phosphate (as P) - unspecified	mg/l	milligrams per litre	0.13		0.13		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1342252	20/09/2017 11:35	Grab	Nitrite (as N)	mg/l	milligrams per litre	0.046		0.046		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1342252	20/09/2017 11:35	Grab	Total Hardness (as CaCO3)	mg/l	milligrams per litre	380		380		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1342252	20/09/2017 11:35	Grab	Temperature	°C	Degrees centigra	14		14		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1342252	20/09/2017 11:35	Grab	pH	pH units	pH Units	8.2		8.2		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1342252	20/09/2017 11:35	Grab	Total Oxidised Nitrogen (as N)	mg/l	milligrams per litre	1.3		1.3		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1342252	20/09/2017 11:35	Grab	Alkalinity-total (as CaCO3)	mg/l	milligrams per litre	280		280		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1342252	20/09/2017 11:35	Grab	BOD - 5 days (Total)	mg/l	milligrams per litre	1		1		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1342252	20/09/2017 11:35	Grab	Chloride	mg/l	milligrams per litre	58		58		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1342252	20/09/2017 11:35	Grab	Dissolved Oxygen	mg/l	milligrams per litre	10.4		10.4		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1342252	20/09/2017 11:35	Grab	Nitrate (as N)	mg/l	milligrams per litre	1.26		1.26		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1342252	20/09/2017 11:35	Grab	Sulphate	mg/l	milligrams per litre	86		86		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1342252	20/09/2017 11:35	Grab	True Colour	Hazen	Hazen	13		13		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1342251	20/09/2017 11:55	Grab	Alkalinity-total (as CaCO3)	mg/l	milligrams per litre	298		298		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1342251	20/09/2017 11:55	Grab	Ammonia-Total (as N)	mg/l	milligrams per litre	0.16		0.16		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1342251	20/09/2017 11:55	Grab	Chloride	mg/l	milligrams per litre	34		34		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1342251	20/09/2017 11:55	Grab	Conductivity @20°C	µS/cm	Micro siemens per	708		708		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1342251	20/09/2017 11:55	Grab	Dissolved Oxygen	% Saturati	Percentage Satura	92		92		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1342251	20/09/2017 11:55	Grab	Nitrate (as N)	mg/l	milligrams per litre	1.51		1.51		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1342251	20/09/2017 11:55	Grab	Dissolved Oxygen	mg/l	milligrams per litre	9.4		9.4		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1342251	20/09/2017 11:55	Grab	ortho-Phosphate (as P) - unspecified	mg/l	milligrams per litre	0.13		0.13		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1342251	20/09/2017 11:55	Grab	Nitrite (as N)	mg/l	milligrams per litre	0.019		0.019		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1342251	20/09/2017 11:55	Grab	Sulphate	mg/l	milligrams per litre	72		72		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1342251	20/09/2017 11:55	Grab	Temperature	°C	Degrees centigra	13.8		13.8		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1342251	20/09/2017 11:55	Grab	Total Hardness (as CaCO3)	mg/l	milligrams per litre	378		378		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1342251	20/09/2017 11:55	Grab	Total Oxidised Nitrogen (as N)	mg/l	milligrams per litre	1.53		1.53		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1342251	20/09/2017 11:55	Grab	True Colour	Hazen	Hazen	17		17		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1342251	20/09/2017 11:55	Grab	BOD - 5 days (Total)	mg/l	milligrams per litre	1		1		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1342251	20/09/2017 11:55	Grab	pH	pH units	pH Units	8.1		8.1		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1366920	22/11/2017 09:14	Grab	Alkalinity-total (as CaCO3)	mg/l	milligrams per litre	92		92		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1366920	22/11/2017 09:14	Grab	Ammonia-Total (as N)	mg/l	milligrams per litre	0.1		0.1		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1366920	22/11/2017 09:14	Grab	Chloride	mg/l	milligrams per litre	16		16		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1366920	22/11/2017 09:14	Grab	Conductivity @20°C	µS/cm	Micro siemens per	251		251		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1366920	22/11/2017 09:14	Grab	Dissolved Oxygen	% Saturati	Percentage Satura	94		94		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1366920	22/11/2017 09:14	Grab	Nitrite (as N)	mg/l	milligrams per litre	0.013		0.013		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1366920	22/11/2017 09:14	Grab	Temperature	°C	Degrees centigra	10.8		10.8		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1366920	22/11/2017 09:14	Grab	pH	pH units	pH Units	8		8		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1366920	22/11/2017 09:14	Grab	Total Oxidised Nitrogen (as N)	mg/l	milligrams per litre	1.2		1.2		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1366920	22/11/2017 09:14	Grab	Total Hardness (as CaCO3)	mg/l	milligrams per litre	126		126		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1366920	22/11/2017 09:14	Grab	True Colour	Hazen	Hazen	23		23		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1366920	22/11/2017 09:14	Grab	BOD - 5 days (Total)	mg/l	milligrams per litre	13		13		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1366920	22/11/2017 09:14	Grab	Dissolved Oxygen	mg/l	milligrams per litre	10.2		10.2		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1366920	22/11/2017 09:14	Grab	Nitrate (as N)	mg/l	milligrams per litre	1.18		1.18		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1366920	22/11/2017 09:14	Grab	ortho-Phosphate (as P) - unspecified	mg/l	milligrams per litre	0.11		0.11		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1366920	22/11/2017 09:14	Grab	Sulphate	mg/l	milligrams per litre	21		21		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1373007	06/12/2017 10:55	Grab	Ammonia-Total (as N)	mg/l	milligrams per litre	0.04		0.04		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1373007	06/12/2017 10:55	Grab	BOD - 5 days (Total)	mg/l	milligrams per litre		<1	0.5	<1	1
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1373007	06/12/2017 10:55	Grab	Conductivity @20°C	µS/cm	Micro siemens per	710		710		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1373007	06/12/2017 10:55	Grab	Dissolved Oxygen	% Saturati	Percentage Satura	102		102		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1373007	06/12/2017 10:55	Grab	Dissolved Oxygen	mg/l	milligrams per litre	11.9		11.9		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1373007	06/12/2017 10:55	Grab	Nitrate (as N)	mg/l	milligrams per litre	2.03		2.03		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1373007	06/12/2017 10:55	Grab	pH	pH units	pH Units	8.2		8.2		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1373007	06/12/2017 10:55	Grab	Sulphate	mg/l	milligrams per litre	47		47		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1373007	06/12/2017 10:55	Grab	Total Hardness (as CaCO3)	mg/l	milligrams per litre	378		378		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1373007	06/12/2017 10:55	Grab	ortho-Phosphate (as P) - unspecified	mg/l	milligrams per litre	0.07		0.07		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1373007	06/12/2017 10:55	Grab	Temperature	°C	Degrees centigra	8.5		8.5		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1373007	06/12/2017 10:55	Grab	Total Oxidised Nitrogen (as N)	mg/l	milligrams per litre	2.05		2.05		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1373007	06/12/2017 10:55	Grab	True Colour	Hazen	Hazen	10		10		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1373007	06/12/2017 10:55	Grab	Alkalinity-total (as CaCO3)	mg/l	milligrams per litre	329		329		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1373007	06/12/2017 10:55	Grab	Chloride	mg/l	milligrams per litre	29		29		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1373007	06/12/2017 10:55	Grab	Nitrite (as N)	mg/l	milligrams per litre	0.013		0.013		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1373008	06/12/2017 11:55	Grab	Ammonia-Total (as N)	mg/l	milligrams per litre	0.04		0.04		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1373008	06/12/2017 11:55	Grab	Chloride	mg/l	milligrams per litre	34		34		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1373008	06/12/2017 11:55	Grab	BOD - 5 days (Total)	mg/l	milligrams per litre	1		1		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1373008	06/12/2017 11:55	Grab	Dissolved Oxygen	% Saturati	Percentage Satura	104		104		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1373008	06/12/2017 11:55	Grab	Dissolved Oxygen	mg/l	milligrams per litre	12		12		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1373008	06/12/2017 11:55	Grab	Conductivity @20°C	µS/cm	Micro siemens per	729		729		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1373008	06/12/2017 11:55	Grab	Nitrate (as N)	mg/l	milligrams per litre	1.99		1.99		

TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1373008	06/12/2017 11:55	Grab	pH	pH units	pH Units	8.3		8.3		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1373008	06/12/2017 11:55	Grab	ortho-Phosphate (as P) - unspecified	mg/l	milligrams per litre	0.12		0.12		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1373008	06/12/2017 11:55	Grab	Nitrite (as N)	mg/l	milligrams per litre	0.015		0.015		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1373008	06/12/2017 11:55	Grab	Sulphate	mg/l	milligrams per litre	56		56		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1373008	06/12/2017 11:55	Grab	True Colour	Hazen	Hazen	9		9		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1373008	06/12/2017 11:55	Grab	Temperature	°C	Degrees centigra	8.8		8.8		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1373008	06/12/2017 11:55	Grab	Total Oxidised Nitrogen (as N)	mg/l	milligrams per litre	2.01		2.01		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1373008	06/12/2017 11:55	Grab	Alkalinity-total (as CaCO3)	mg/l	milligrams per litre	322		322		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1373008	06/12/2017 11:55	Grab	Total Hardness (as CaCO3)	mg/l	milligrams per litre	379		379		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1400861	21/02/2018 10:15	Grab	BOD - 5 days (Total)	mg/l	milligrams per litre		<1	0.5	<1	1
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1400861	21/02/2018 10:15	Grab	Ammonia-Total (as N)	mg/l	milligrams per litre	0.05		0.05		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1400861	21/02/2018 10:15	Grab	Chloride	mg/l	milligrams per litre	50		50		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1400861	21/02/2018 10:15	Grab	Conductivity @20°C	µS/cm	Micro siemens pe	764		764		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1400861	21/02/2018 10:15	Grab	Dissolved Oxygen	% Saturati	Percentage Satura	99		99		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1400861	21/02/2018 10:15	Grab	ortho-Phosphate (as P) - unspecified	mg/l	milligrams per litre	0.11		0.11		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1400861	21/02/2018 10:15	Grab	pH	pH units	pH Units	8.3		8.3		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1400861	21/02/2018 10:15	Grab	Nitrite (as N)	mg/l	milligrams per litre	0.011		0.011		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1400861	21/02/2018 10:15	Grab	Sulphate	mg/l	milligrams per litre	45		45		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1400861	21/02/2018 10:15	Grab	Temperature	°C	Degrees centigra	5.6		5.6		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1400861	21/02/2018 10:15	Grab	True Colour	Hazen	Hazen	8		8		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1400861	21/02/2018 10:15	Grab	Total Oxidised Nitrogen (as N)	mg/l	milligrams per litre	2.5		2.5		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1400861	21/02/2018 10:15	Grab	Alkalinity-total (as CaCO3)	mg/l	milligrams per litre	339		339		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1400861	21/02/2018 10:15	Grab	Dissolved Oxygen	mg/l	milligrams per litre	12.5		12.5		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1400861	21/02/2018 10:15	Grab	Nitrate (as N)	mg/l	milligrams per litre	2.49		2.49		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1400861	21/02/2018 10:15	Grab	Total Hardness (as CaCO3)	mg/l	milligrams per litre	386		386		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1400860	21/02/2018 10:30	Grab	Alkalinity-total (as CaCO3)	mg/l	milligrams per litre	348		348		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1400860	21/02/2018 10:30	Grab	Ammonia-Total (as N)	mg/l	milligrams per litre	0.05		0.05		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1400860	21/02/2018 10:30	Grab	BOD - 5 days (Total)	mg/l	milligrams per litre		<1	0.5	<1	1
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1400860	21/02/2018 10:30	Grab	Chloride	mg/l	milligrams per litre	40		40		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1400860	21/02/2018 10:30	Grab	Conductivity @20°C	µS/cm	Micro siemens pe	728		728		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1400860	21/02/2018 10:30	Grab	Dissolved Oxygen	mg/l	milligrams per litre	12.4		12.4		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1400860	21/02/2018 10:30	Grab	Nitrite (as N)	mg/l	milligrams per litre	0.019		0.019		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1400860	21/02/2018 10:30	Grab	Sulphate	mg/l	milligrams per litre	37		37		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1400860	21/02/2018 10:30	Grab	Nitrate (as N)	mg/l	milligrams per litre	2.06		2.06		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1400860	21/02/2018 10:30	Grab	ortho-Phosphate (as P) - unspecified	mg/l	milligrams per litre	0.17		0.17		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1400860	21/02/2018 10:30	Grab	pH	pH units	pH Units	8.2		8.2		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1400860	21/02/2018 10:30	Grab	True Colour	Hazen	Hazen	9		9		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1400860	21/02/2018 10:30	Grab	Dissolved Oxygen	% Saturati	Percentage Satura	98		98		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1400860	21/02/2018 10:30	Grab	Temperature	°C	Degrees centigra	5.6		5.6		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1400860	21/02/2018 10:30	Grab	Total Hardness (as CaCO3)	mg/l	milligrams per litre	381		381		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1400860	21/02/2018 10:30	Grab	Total Oxidised Nitrogen (as N)	mg/l	milligrams per litre	2.08		2.08		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1400797	21/02/2018 12:20	Grab	Alkalinity-total (as CaCO3)	mg/l	milligrams per litre	302		302		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1400797	21/02/2018 12:20	Grab	Conductivity @20°C	µS/cm	Micro siemens pe	756		756		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1400797	21/02/2018 12:20	Grab	Nitrite (as N)	mg/l	milligrams per litre	0.02		0.02		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1400797	21/02/2018 12:20	Grab	Dissolved Oxygen	% Saturati	Percentage Satura	105		105		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1400797	21/02/2018 12:20	Grab	Dissolved Oxygen	mg/l	milligrams per litre	12.9		12.9		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1400797	21/02/2018 12:20	Grab	pH	pH units	pH Units	8.3		8.3		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1400797	21/02/2018 12:20	Grab	ortho-Phosphate (as P) - unspecified	mg/l	milligrams per litre	0.06		0.06		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1400797	21/02/2018 12:20	Grab	Sulphate	mg/l	milligrams per litre	72		72		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1400797	21/02/2018 12:20	Grab	Total Oxidised Nitrogen (as N)	mg/l	milligrams per litre	2.02		2.02		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1400797	21/02/2018 12:20	Grab	True Colour	Hazen	Hazen	5		5		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1400797	21/02/2018 12:20	Grab	Total Hardness (as CaCO3)	mg/l	milligrams per litre	390		390		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1400797	21/02/2018 12:20	Grab	Ammonia-Total (as N)	mg/l	milligrams per litre	0.13		0.13		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1400797	21/02/2018 12:20	Grab	BOD - 5 days (Total)	mg/l	milligrams per litre	1		1		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1400797	21/02/2018 12:20	Grab	Chloride	mg/l	milligrams per litre	53		53		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1400797	21/02/2018 12:20	Grab	Nitrate (as N)	mg/l	milligrams per litre	2		2		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1400797	21/02/2018 12:20	Grab	Temperature	°C	Degrees centigra	6.5		6.5		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1424203	25/04/2018 11:00	Grab	Alkalinity-total (as CaCO3)	mg/l	milligrams per litre	257		257		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1424203	25/04/2018 11:00	Grab	BOD - 5 days (Total)	mg/l	milligrams per litre	2		2		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1424203	25/04/2018 11:00	Grab	Chloride	mg/l	milligrams per litre	68		68		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1424203	25/04/2018 11:00	Grab	Dissolved Oxygen	% Saturati	Percentage Satura	107		107		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1424203	25/04/2018 11:00	Grab	Conductivity @20°C	µS/cm	Micro siemens pe	717		717		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1424203	25/04/2018 11:00	Grab	Dissolved Oxygen	mg/l	milligrams per litre	11.9		11.9		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1424203	25/04/2018 11:00	Grab	pH	pH units	pH Units	8.4		8.4		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1424203	25/04/2018 11:00	Grab	ortho-Phosphate (as P) - unspecified	mg/l	milligrams per litre	0.03		0.03		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1424203	25/04/2018 11:00	Grab	Sulphate	mg/l	milligrams per litre	84		84		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1424203	25/04/2018 11:00	Grab	Total Hardness (as CaCO3)	mg/l	milligrams per litre	362		362		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1424203	25/04/2018 11:00	Grab	True Colour	Hazen	Hazen	12		12		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1424203	25/04/2018 11:00	Grab	Temperature	°C	Degrees centigra	10.1		10.1		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1424203	25/04/2018 11:00	Grab	Total Oxidised Nitrogen (as N)	mg/l	milligrams per litre	1.86		1.86		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1424203	25/04/2018 11:00	Grab	Ammonia-Total (as N)	mg/l	milligrams per litre	0.08		0.08		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1424203	25/04/2018 11:00	Grab	Nitrate (as N)	mg/l	milligrams per litre	1.84		1.84		
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1424203	25/04/2018 11:00	Grab	Nitrite (as N)	mg/l	milligrams per litre	0.028		0.028		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1424314	25/04/2018 12:10	Grab	Alkalinity-total (as CaCO3)	mg/l	milligrams per litre	293		293		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1424314	25/04/2018 12:10	Grab	BOD - 5 days (Total)	mg/l	milligrams per litre	1		1		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1424314	25/04/2018 12:10	Grab	Chloride	mg/l	milligrams per litre	54		54		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1424314	25/04/2018 12:10	Grab	Conductivity @20°C	µS/cm	Micro siemens pe	731		731		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1424314	25/04/2018 12:10	Grab	Nitrite (as N)	mg/l	milligrams per litre	0.024		0.024		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1424314	25/04/2018 12:10	Grab	Dissolved Oxygen	% Saturati	Percentage Satura	119		119		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1424314	25/04/2018 12:10	Grab	Dissolved Oxygen	mg/l	milligrams per litre	13.3		13.3		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1424314	25/04/2018 12:10	Grab	Nitrate (as N)	mg/l	milligrams per litre	1.79		1.79		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1424314	25/04/2018 12:10	Grab	Sulphate	mg/l	milligrams per litre	55		55		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1424314	25/04/2018 12:10	Grab	ortho-Phosphate (as P) - unspecified	mg/l	milligrams per litre	0.04		0.04		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1424314	25/04/2018 12:10	Grab	True Colour	Hazen	Hazen	16		16		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1424314	25/04/2018 12:10	Grab	Total Oxidised Nitrogen (as N)	mg/l	milligrams per litre	1.81		1.81		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1424314	25/04/2018 12:10	Grab	Temperature	°C	Degrees centigra	10		10		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1424314	25/04/2018 12:10	Grab	Ammonia-Total (as N)	mg/l	milligrams per litre	0.01		0.01		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1424314	25/04/2018 12:10	Grab	pH	pH units	pH Units	8.4		8.4		
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1424314	25/04/2018 12:10	Grab	Total Hardness (as CaCO3)	mg/l	milligrams per litre	370		370		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1424315	25/04/2018 12:20	Grab	Ammonia-Total (as N)	mg/l	milligrams per litre	0.02		0.02		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1424315	25/04/2018 12:20	Grab	BOD - 5 days (Total)	mg/l	milligrams per litre	1		1		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1424315	25/04/2018 12:20	Grab	Chloride	mg/l	milligrams per litre	55		55		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1424315	25/04/2018 12:20	Grab	Conductivity @20°C	µS/cm	Micro siemens pe	733		733		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1424315	25/04/2018 12:20	Grab	Nitrate (as N)	mg/l	milligrams per litre	1.77		1.77		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1424315	25/04/2018 12:20	Grab	Dissolved Oxygen	% Saturati	Percentage Satura	121		121		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1424315	25/04/2018 12:20	Grab	Nitrite (as N)	mg/l	milligrams per litre	0.024		0.024		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1424315	25/04/2018 12:20	Grab	pH	pH units	pH Units	8.4		8.4		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1424315	25/04/2018 12:20	Grab	Total Oxidised Nitrogen (as N)	mg/l	milligrams per litre	1.8		1.8		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1424315	25/04/2018 12:20	Grab	Sulphate	mg/l	milligrams per litre	53		53		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1424315	25/04/2018 12:20	Grab	Temperature	°C	Degrees centigra	10		10		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1424315	25/04/2018 12:20	Grab	True Colour	Hazen	Hazen	15		15		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1424315	25/04/2018 12:20	Grab	Total Hardness (as CaCO3)	mg/l	milligrams per litre	370		370		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1424315	25/04/2018 12:20	Grab	Alkalinity-total (as CaCO3)	mg/l	milligrams per litre	293		293		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1424315	25/04/2018 12:20	Grab	Dissolved Oxygen	mg/l	milligrams per litre	13.6		13.6		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1424315	25/04/2018 12:20	Grab	ortho-Phosphate (as P) - unspecified	mg/l	milligrams per litre	0.04		0.04		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1451398	27/06/2018 08:30	Grab	Ammonia-Total (as N)	mg/l	milligrams per litre	0.06		0.06		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1451398	27/06/2018 08:30	Grab	BOD - 5 days (Total)	mg/l	milligrams per litre	1		1		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1451398	27/06/2018 08:30	Grab	Dissolved Oxygen	mg/l	milligrams per litre	8.2		8.2		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1451398	27/06/2018 08:30	Grab	Nitrite (as N)	mg/l	milligrams per litre	0.033		0.033		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1451398	27/06/2018 08:30	Grab	Dissolved Oxygen	% Saturati	Percentage Satura	83		83		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1451398	27/06/2018 08:30	Grab	ortho-Phosphate (as P) - unspecified	mg/l	milligrams per litre	0.11		0.11		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1451398	27/06/2018 08:30	Grab	Temperature	°C	Degrees centigra	16.5		16.5		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1451398	27/06/2018 08:30	Grab	Nitrate (as N)	mg/l	milligrams per litre	1.02		1.02		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1451398	27/06/2018 08:30	Grab	Total Hardness (as CaCO3)	mg/l	milligrams per litre	343		343		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1451398	27/06/2018 08:30	Grab	True Colour	Hazen	Hazen	13		13		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1451398	27/06/2018 08:30	Grab	Total Oxidised Nitrogen (as N)	mg/l	milligrams per litre	1.06		1.06		
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1451398	27/06/2018 08:30	Grab	Alkalinity-total (as CaCO3)	mg/l	milligrams per litre	244		244		

TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1451398	27/06/2018 08:30	Grab	Chloride	mg/l	milligrams per litre	93	93
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1451398	27/06/2018 08:30	Grab	Conductivity @20°C	µS/cm	Micro siemens per	833	833
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1451398	27/06/2018 08:30	Grab	pH	pH units	pH Units	8.1	8.1
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1451398	27/06/2018 08:30	Grab	Sulphate	mg/l	milligrams per litre	75	75
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1451397	27/06/2018 09:05	Grab	Ammonia-Total (as N)	mg/l	milligrams per litre	0.21	0.21
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1451397	27/06/2018 09:05	Grab	BOD - 5 days (Total)	mg/l	milligrams per litre	4	4
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1451397	27/06/2018 09:05	Grab	Dissolved Oxygen	mg/l	milligrams per litre	6.2	6.2
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1451397	27/06/2018 09:05	Grab	Conductivity @20°C	µS/cm	Micro siemens per	704	704
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1451397	27/06/2018 09:05	Grab	Dissolved Oxygen	% Saturati	Percentage Satura	63	63
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1451397	27/06/2018 09:05	Grab	pH	pH units	pH Units	7.8	7.8
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1451397	27/06/2018 09:05	Grab	Nitrate (as N)	mg/l	milligrams per litre	0.35	0.35
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1451397	27/06/2018 09:05	Grab	Nitrite (as N)	mg/l	milligrams per litre	0.036	0.036
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1451397	27/06/2018 09:05	Grab	ortho-Phosphate (as P) - unspecified	mg/l	milligrams per litre	0.08	0.08
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1451397	27/06/2018 09:05	Grab	Total Hardness (as CaCO3)	mg/l	milligrams per litre	309	309
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1451397	27/06/2018 09:05	Grab	Sulphate	mg/l	milligrams per litre	67	67
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1451397	27/06/2018 09:05	Grab	Total Oxidised Nitrogen (as N)	mg/l	milligrams per litre	0.39	0.39
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1451397	27/06/2018 09:05	Grab	Alkalinity-total (as CaCO3)	mg/l	milligrams per litre	237	237
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1451397	27/06/2018 09:05	Grab	Chloride	mg/l	milligrams per litre	59	59
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1451397	27/06/2018 09:05	Grab	Temperature	°C	Degrees centigrad	16.7	16.7
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1451397	27/06/2018 09:05	Grab	True Colour	Hazen	Hazen	17	17
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1451344	27/06/2018 10:55	Grab	Alkalinity-total (as CaCO3)	mg/l	milligrams per litre	226	226
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1451344	27/06/2018 10:55	Grab	Ammonia-Total (as N)	mg/l	milligrams per litre	0.05	0.05
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1451344	27/06/2018 10:55	Grab	Chloride	mg/l	milligrams per litre	58	58
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1451344	27/06/2018 10:55	Grab	Conductivity @20°C	µS/cm	Micro siemens per	729	729
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1451344	27/06/2018 10:55	Grab	Nitrate (as N)	mg/l	milligrams per litre	0.91	0.91
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1451344	27/06/2018 10:55	Grab	Nitrite (as N)	mg/l	milligrams per litre	0.041	0.041
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1451344	27/06/2018 10:55	Grab	Dissolved Oxygen	% Saturati	Percentage Satura	114	114
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1451344	27/06/2018 10:55	Grab	Dissolved Oxygen	mg/l	milligrams per litre	10.2	10.2
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1451344	27/06/2018 10:55	Grab	Total Hardness (as CaCO3)	mg/l	milligrams per litre	345	345
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1451344	27/06/2018 10:55	Grab	ortho-Phosphate (as P) - unspecified	mg/l	milligrams per litre	0.07	0.07
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1451344	27/06/2018 10:55	Grab	pH	pH units	pH Units	8.3	8.3
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1451344	27/06/2018 10:55	Grab	True Colour	Hazen	Hazen	11	11
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1451344	27/06/2018 10:55	Grab	Temperature	°C	Degrees centigrad	18.5	18.5
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1451344	27/06/2018 10:55	Grab	BOD - 5 days (Total)	mg/l	milligrams per litre	3	3
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1451344	27/06/2018 10:55	Grab	Sulphate	mg/l	milligrams per litre	93	93
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1451344	27/06/2018 10:55	Grab	Total Oxidised Nitrogen (as N)	mg/l	milligrams per litre	0.96	0.96
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1480675	05/09/2018 08:55	Grab	BOD - 5 days (Total)	mg/l	milligrams per litre	1	1
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1480675	05/09/2018 08:55	Grab	Ammonia-Total (as N)	mg/l	milligrams per litre	0.09	0.09
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1480675	05/09/2018 08:55	Grab	Chloride	mg/l	milligrams per litre	78	78
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1480675	05/09/2018 08:55	Grab	Dissolved Oxygen	mg/l	milligrams per litre	8.3	8.3
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1480675	05/09/2018 08:55	Grab	ortho-Phosphate (as P) - unspecified	mg/l	milligrams per litre	0.15	0.15
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1480675	05/09/2018 08:55	Grab	pH	pH units	pH Units	8	8
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1480675	05/09/2018 08:55	Grab	Nitrate (as N)	mg/l	milligrams per litre	1.1	1.1
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1480675	05/09/2018 08:55	Grab	Sulphate	mg/l	milligrams per litre	75	75
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1480675	05/09/2018 08:55	Grab	Total Oxidised Nitrogen (as N)	mg/l	milligrams per litre	1.12	1.12
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1480675	05/09/2018 08:55	Grab	Total Hardness (as CaCO3)	mg/l	milligrams per litre	330	330
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1480675	05/09/2018 08:55	Grab	True Colour	Hazen	Hazen	8	8
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1480675	05/09/2018 08:55	Grab	Alkalinity-total (as CaCO3)	mg/l	milligrams per litre	221	221
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1480675	05/09/2018 08:55	Grab	Conductivity @20°C	µS/cm	Micro siemens per	774	774
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1480675	05/09/2018 08:55	Grab	Dissolved Oxygen	% Saturati	Percentage Satura	84	84
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1480675	05/09/2018 08:55	Grab	Nitrite (as N)	mg/l	milligrams per litre	0.019	0.019
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1480675	05/09/2018 08:55	Grab	Temperature	°C	Degrees centigrad	13.6	13.6
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1480674	05/09/2018 09:20	Grab	BOD - 5 days (Total)	mg/l	milligrams per litre	2	2
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1480674	05/09/2018 09:20	Grab	Ammonia-Total (as N)	mg/l	milligrams per litre	0.22	0.22
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1480674	05/09/2018 09:20	Grab	Chloride	mg/l	milligrams per litre	54	54
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1480674	05/09/2018 09:20	Grab	Conductivity @20°C	µS/cm	Micro siemens per	694	694
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1480674	05/09/2018 09:20	Grab	Dissolved Oxygen	% Saturati	Percentage Satura	65	65
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1480674	05/09/2018 09:20	Grab	Nitrite (as N)	mg/l	milligrams per litre	0.033	0.033
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1480674	05/09/2018 09:20	Grab	ortho-Phosphate (as P) - unspecified	mg/l	milligrams per litre	0.09	0.09
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1480674	05/09/2018 09:20	Grab	Temperature	°C	Degrees centigrad	13.6	13.6
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1480674	05/09/2018 09:20	Grab	pH	pH units	pH Units	7.8	7.8
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1480674	05/09/2018 09:20	Grab	True Colour	Hazen	Hazen	11	11
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1480674	05/09/2018 09:20	Grab	Total Hardness (as CaCO3)	mg/l	milligrams per litre	321	321
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1480674	05/09/2018 09:20	Grab	Alkalinity-total (as CaCO3)	mg/l	milligrams per litre	224	224
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1480674	05/09/2018 09:20	Grab	Dissolved Oxygen	mg/l	milligrams per litre	6.8	6.8
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1480674	05/09/2018 09:20	Grab	Nitrate (as N)	mg/l	milligrams per litre	0.83	0.83
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1480674	05/09/2018 09:20	Grab	Sulphate	mg/l	milligrams per litre	75	75
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1480674	05/09/2018 09:20	Grab	Total Oxidised Nitrogen (as N)	mg/l	milligrams per litre	0.86	0.86
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1480649	05/09/2018 13:45	Grab	Alkalinity-total (as CaCO3)	mg/l	milligrams per litre	196	196
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1480649	05/09/2018 13:45	Grab	BOD - 5 days (Total)	mg/l	milligrams per litre	1	1
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1480649	05/09/2018 13:45	Grab	Dissolved Oxygen	mg/l	milligrams per litre	10.4	10.4
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1480649	05/09/2018 13:45	Grab	Conductivity @20°C	µS/cm	Micro siemens per	610	610
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1480649	05/09/2018 13:45	Grab	Nitrate (as N)	mg/l	milligrams per litre	1.28	1.28
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1480649	05/09/2018 13:45	Grab	ortho-Phosphate (as P) - unspecified	mg/l	milligrams per litre	0.1	0.1
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1480649	05/09/2018 13:45	Grab	Temperature	°C	Degrees centigrad	15.5	15.5
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1480649	05/09/2018 13:45	Grab	Total Hardness (as CaCO3)	mg/l	milligrams per litre	275	275
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1480649	05/09/2018 13:45	Grab	Sulphate	mg/l	milligrams per litre	58	58
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1480649	05/09/2018 13:45	Grab	Ammonia-Total (as N)	mg/l	milligrams per litre	0.09	0.09
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1480649	05/09/2018 13:45	Grab	Chloride	mg/l	milligrams per litre	51	51
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1480649	05/09/2018 13:45	Grab	Dissolved Oxygen	% Saturati	Percentage Satura	104	104
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1480649	05/09/2018 13:45	Grab	Nitrite (as N)	mg/l	milligrams per litre	0.039	0.039
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1480649	05/09/2018 13:45	Grab	pH	pH units	pH Units	8.3	8.3
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1480649	05/09/2018 13:45	Grab	Total Oxidised Nitrogen (as N)	mg/l	milligrams per litre	1.32	1.32
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1480649	05/09/2018 13:45	Grab	True Colour	Hazen	Hazen	8	8
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1511260	21/11/2018 12:15	Grab	Alkalinity-total (as CaCO3)	mg/l	milligrams per litre	139	139
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1511260	21/11/2018 12:15	Grab	Ammonia-Total (as N)	mg/l	milligrams per litre	0.05	0.05
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1511260	21/11/2018 12:15	Grab	BOD - 5 days (Total)	mg/l	milligrams per litre	3	3
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1511260	21/11/2018 12:15	Grab	Conductivity @20°C	µS/cm	Micro siemens per	492	492
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1511260	21/11/2018 12:15	Grab	Chloride	mg/l	milligrams per litre	45	45
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1511260	21/11/2018 12:15	Grab	Dissolved Oxygen	mg/l	milligrams per litre	10.2	10.2
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1511260	21/11/2018 12:15	Grab	Dissolved Oxygen	% Saturati	Percentage Satura	87	87
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1511260	21/11/2018 12:15	Grab	ortho-Phosphate (as P) - unspecified	mg/l	milligrams per litre	0.07	0.07
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1511260	21/11/2018 12:15	Grab	Nitrite (as N)	mg/l	milligrams per litre	0.011	0.011
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1511260	21/11/2018 12:15	Grab	pH	pH units	pH Units	7.8	7.8
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1511260	21/11/2018 12:15	Grab	Total Hardness (as CaCO3)	mg/l	milligrams per litre	242	242
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1511260	21/11/2018 12:15	Grab	Temperature	°C	Degrees centigrad	7.8	7.8
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1511260	21/11/2018 12:15	Grab	Sulphate	mg/l	milligrams per litre	88	88
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1511260	21/11/2018 12:15	Grab	True Colour	Hazen	Hazen	17	17
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1511260	21/11/2018 12:15	Grab	Nitrate (as N)	mg/l	milligrams per litre	1.35	1.35
TOLKA_030	IE_EA_09T010800	River	RS09T010800	Mulhuddart Br	Operational	Fingal County Council	1511260	21/11/2018 12:15	Grab	Total Oxidised Nitrogen (as N)	mg/l	milligrams per litre	1.36	1.36
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1511261	21/11/2018 12:30	Grab	Alkalinity-total (as CaCO3)	mg/l	milligrams per litre	109	109
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1511261	21/11/2018 12:30	Grab	BOD - 5 days (Total)	mg/l	milligrams per litre	2	2
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1511261	21/11/2018 12:30	Grab	Conductivity @20°C	µS/cm	Micro siemens per	390	390
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1511261	21/11/2018 12:30	Grab	Chloride	mg/l	milligrams per litre	30	30
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1511261	21/11/2018 12:30	Grab	Nitrate (as N)	mg/l	milligrams per litre	0.96	0.96
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1511261	21/11/2018 12:30	Grab	Dissolved Oxygen	mg/l	milligrams per litre	11	11
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1511261	21/11/2018 12:30	Grab	pH	pH units	pH Units	7.9	7.9
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1511261	21/11/2018 12:30	Grab	Sulphate	mg/l	milligrams per litre	61	61
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1511261	21/11/2018 12:30	Grab	Temperature	°C	Degrees centigrad	8.1	8.1
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1511261	21/11/2018 12:30	Grab	True Colour	Hazen	Hazen	19	19
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1511261	21/11/2018 12:30	Grab	Total Hardness (as CaCO3)	mg/l	milligrams per litre	177	177
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1511261	21/11/2018 12:30	Grab	Ammonia-Total (as N)	mg/l	milligrams per litre	0.06	0.06
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1511261	21/11/2018 12:30	Grab	Dissolved Oxygen	% Saturati	Percentage Satura	95	95
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1511261	21/11/2018 12:30	Grab	Nitrite (as N)	mg/l	milligrams per litre	0.012	0.012
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1511261	21/11/2018 12:30	Grab	ortho-Phosphate (as P) - unspecified	mg/l	milligrams per litre	0.07	0.07
TOLKA_040	IE_EA_09T011000	River	RS09T011000	Abbotstown Br	Operational	Fingal County Council	1511261	21/11/2018 12:30	Grab	Total Oxidised Nitrogen (as N)	mg/l	milligrams per litre	0.97	0.97
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1511420	21/11/2018 17:40	Grab	Alkalinity-total (as CaCO3)	mg/l	milligrams per litre	136	136

TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1511420	21/11/2018 17:40	Grab	BOD - 5 days (Total)	mg/l	milligrams per litr	2	2
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1511420	21/11/2018 17:40	Grab	Dissolved Oxygen	% Saturati	Percentage Satura	108	108
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1511420	21/11/2018 17:40	Grab	Dissolved Oxygen	mg/l	milligrams per litr	12.5	12.5
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1511420	21/11/2018 17:40	Grab	ortho-Phosphate (as P) - unspecified	mg/l	milligrams per litr	0.05	0.05
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1511420	21/11/2018 17:40	Grab	Nitrite (as N)	mg/l	milligrams per litr	0.015	0.015
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1511420	21/11/2018 17:40	Grab	pH	pH units	pH Units	8	8
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1511420	21/11/2018 17:40	Grab	Sulphate	mg/l	milligrams per litr	80	80
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1511420	21/11/2018 17:40	Grab	Total Hardness (as CaCO3)	mg/l	milligrams per litr	231	231
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1511420	21/11/2018 17:40	Grab	Total Oxidised Nitrogen (as N)	mg/l	milligrams per litr	1.78	1.78
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1511420	21/11/2018 17:40	Grab	Ammonia-Total (as N)	mg/l	milligrams per litr	0.06	0.06
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1511420	21/11/2018 17:40	Grab	Chloride	mg/l	milligrams per litr	32	32
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1511420	21/11/2018 17:40	Grab	Conductivity @20°C	µS/cm	Micro siemens pe	495	495
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1511420	21/11/2018 17:40	Grab	Nitrate (as N)	mg/l	milligrams per litr	1.76	1.76
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1511420	21/11/2018 17:40	Grab	Temperature	°C	Degrees centrigra	8.6	8.6
TOLKA_050	IE_EA_09T011100	River	RS09T011100	Violet Hill Drive Finglas	Operational	Dublin City Council	1511420	21/11/2018 17:40	Grab	True Colour	Hazen	Hazen	10	10

FEHILY
TIMONEY

CONSULTANTS IN ENGINEERING,
ENVIRONMENTAL SCIENCE
& PLANNING

APPENDIX 10.2

Certificate of Analysis for Baseline Surface Water Quality Monitoring

Unit 7-8 Hawarden Business Park
Manor Road (off Manor Lane)
Hawarden
Deeside
CH5 3US
Tel: (01244) 528700
Fax: (01244) 528701
email: hawardencustomerservices@alsglobal.com
Website: www.alsenvironmental.co.uk

Fehily Timoney
3rd Floor
North Park Offices
North Park Business Park
North Road
Dublin
Dublin 11

Attention: Daniel Hayden

CERTIFICATE OF ANALYSIS

Date of report Generation:	20 March 2022
Customer:	Fehily Timoney
Sample Delivery Group (SDG):	220314-7
Your Reference:	P21-150
Location:	Thorntons Cappogue
Report No:	638266
Order Number:	Z3211

This report has been revised and directly supersedes 637962 in its entirety.

We received 2 samples on Thursday March 10, 2022 and 2 of these samples were scheduled for analysis which was completed on Sunday March 20, 2022. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden.

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.
Incorrect sampling dates and/or sample information will affect the validity of results.
The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan
Operations Manager

Version: 3.2 Version Issued: 20/03/2022

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
25964285	Stream A		0.00 - 0.00	09/03/2022
25964307	Stream B		0.00 - 0.00	09/03/2022

Only received samples which have had analysis scheduled will be shown on the following pages.

Validated

CERTIFICATE OF ANALYSIS

SDG: 220314-7
Client Ref.: P21-150
Report Number: 638266
Location: Thorntons Cappogue
Superseded Report: 637962

Results Legend

X Test

N No Determination Possible

Sample Types -

S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Lab Sample No(s)			25964285						25964307					
Customer Sample Reference			Stream A						Stream B					
AGS Reference														
Depth (m)			0.00 - 0.00						0.00 - 0.00					
Container			0.5l glass bottle (ALE227)	250ml BOD (ALE212)	500ml Plastic (ALE208)	H2SO4 (ALE244)	HNO3 Filtered (ALE204)	Vial (ALE297)	0.5l glass bottle (ALE227)	250ml BOD (ALE212)	500ml Plastic (ALE208)	H2SO4 (ALE244)	HNO3 Filtered (ALE204)	Vial (ALE297)
Sample Type			SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW
Ammonium Low	All	NDPs: 0 Tests: 2				X						X		
Anions by Kone (w)	All	NDPs: 0 Tests: 2			X						X			
BOD True Total	All	NDPs: 0 Tests: 2		X						X				
COD Unfiltered	All	NDPs: 0 Tests: 2		X						X				
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 2					X						X	
Dissolved Oxygen by Probe	All	NDPs: 0 Tests: 2			X						X			
EPH CWG (Aliphatic) Aqueous GC (W)	All	NDPs: 0 Tests: 2	X						X					
EPH CWG (Aromatic) Aqueous GC (W)	All	NDPs: 0 Tests: 2	X						X					
GRO by GC-FID (W)	All	NDPs: 0 Tests: 2						X						X
Mercury Dissolved	All	NDPs: 0 Tests: 2					X						X	
Methylene blue active substances	All	NDPs: 0 Tests: 2			X						X			
pH Value	All	NDPs: 0 Tests: 2			X						X			
Phosphate by Kone (w)	All	NDPs: 0 Tests: 2			X						X			
Suspended Solids	All	NDPs: 0 Tests: 2	X						X					
SVOC MS (W) - Aqueous	All	NDPs: 0 Tests: 2	X						X					

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Validated

CERTIFICATE OF ANALYSIS

SDG: 220314-7
Client Ref.: P21-150
Report Number: 638266
Location: Thorntons Cappogue
Superseded Report: 637962

Results Legend

X **Test**

N **No Determination Possible**

Sample Types -
- S - Soil/Solid
- UNS - Unspecified Solid
- GW - Ground Water
- SW - Surface Water
- LE - Land Leachate
- PL - Prepared Leachate
- PR - Process Water
- SA - Saline Water
- TE - Trade Effluent
- TS - Treated Sewage
- US - Untreated Sewage
- RE - Recreational Water
- DW - Drinking Water Non-regulatory
- UNL - Unspecified Liquid
- SL - Sludge
- G - Gas
- OTH - Other

Lab Sample No(s)			25964285						25964307					
Customer Sample Reference			Stream A						Stream B					
AGS Reference														
Depth (m)			0.00 - 0.00						0.00 - 0.00					
Container			0.5l glass bottle (ALE227)	250ml BOD (ALE212)	500ml Plastic (ALE208)	H2SO4 (ALE244)	HNO3 Filtered (ALE204)	Vial (ALE297)	0.5l glass bottle (ALE227)	250ml BOD (ALE212)	500ml Plastic (ALE208)	H2SO4 (ALE244)	HNO3 Filtered (ALE204)	Vial (ALE297)
Sample Type			SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW
Total Dissolved Solids (Grav)	All	NDPs: 0 Tests: 2			X						X			
Total Metals by ICP-MS	All	NDPs: 0 Tests: 2			X						X			
TPH CWG (W)	All	NDPs: 0 Tests: 2	X						X					
VOC MS (W)	All	NDPs: 0 Tests: 2						X						X

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Results Legend

#	ISO17025 accredited.
M	mCERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted - refer to subcontractor report for accreditation status.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed
1-4♦§@	Sample deviation (see appendix)

Customer Sample Ref.	Stream A	Stream B
Depth (m)	0.00 - 0.00	0.00 - 0.00
Sample Type	Surface Water (SW)	Surface Water (SW)
Date Sampled	09/03/2022	09/03/2022
Sample Time	.	.
Date Received	10/03/2022	10/03/2022
SDG Ref	220314-7	220314-7
Lab Sample No.(s)	25964285	25964307
AGS Reference		

Component	LOD/Units	Method	Stream A	Stream B
Dissolved solids, Total (gravimetric)	<40 mg/l	TM021	420 #	347 #
Suspended solids, Total	<2 mg/l	TM022	9.55 #	14 #
BOD, unfiltered	<1 mg/l	TM045	16.9 ♦ #	>47.8 ♦ #
Oxygen, dissolved	<0.3 mg/l	TM046	2.13	3.89
Ammoniacal Nitrogen Low as NH4	<0.01 mg/l	TM099	5.24 #	1.18 #
COD, unfiltered	<7 mg/l	TM107	26.9 #	129 #
Arsenic (diss.filt)	<0.5 µg/l	TM152	0.67 #	0.723 #
Barium (diss.filt)	<0.2 µg/l	TM152	46.6 #	46 #
Beryllium (diss.filt)	<0.1 µg/l	TM152	<0.1 #	<0.1 #
Boron (diss.filt)	<10 µg/l	TM152	23.1 #	18.3 #
Cadmium (diss.filt)	<0.08 µg/l	TM152	<0.08 #	<0.08 #
Chromium (diss.filt)	<1 µg/l	TM152	<1 #	<1 #
Copper (diss.filt)	<0.3 µg/l	TM152	7.93 #	<0.3 #
Lead (diss.filt)	<0.2 µg/l	TM152	<0.2 #	0.753 #
Nickel (diss.filt)	<0.4 µg/l	TM152	2.46 #	3.96 #
Selenium (diss.filt)	<1 µg/l	TM152	<1 #	2.1 #
Vanadium (diss.filt)	<1 µg/l	TM152	<1 #	1.34 #
Zinc (diss.filt)	<1 µg/l	TM152	17.3 #	10.7 #
Sodium (Dis.Filt)	<0.076 mg/l	TM152	21 #	22.4 #
Potassium (Dis.Filt)	<0.2 mg/l	TM152	4.68 #	5.09 #
Total Phosphorus as PO4	<62 µg/l	TM152	2560 2	332 2
Mercury (diss.filt)	<0.01 µg/l	TM183	<0.01	<0.01
Chloride	<2 mg/l	TM184	35.5 #	36.2 #
Phosphate (Ortho as P)	<0.02 mg/l	TM184	0.675 #	0.0206 #
Sulphate (soluble) as S	<1 mg/l	TM184	29.4 #	17.8 #
Surfactants, Anionic (MBAS)	<0.05 mg/l	TM249	0.6	0.46
pH	<1 pH Units	TM256	7.38 #	7.36 #
Conductivity @ 20 deg.C	<0.02 mS/cm	TM256	0.635 #	0.511 #

SVOC MS (W) - Aqueous

Results Legend

#	ISO17025 accredited.
M	mCERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted - refer to subcontractor report for accreditation status.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed
1-4♦§@	Sample deviation (see appendix)

Customer Sample Ref.	Stream A	Stream B
Depth (m)	0.00 - 0.00	0.00 - 0.00
Sample Type	Surface Water (SW)	Surface Water (SW)
Date Sampled	09/03/2022	09/03/2022
Sample Time	.	.
Date Received	10/03/2022	10/03/2022
SDG Ref	220314-7	220314-7
Lab Sample No.(s)	25964285	25964307
AGS Reference		

Component	LOD/Units	Method	Stream A	Stream B
1,2,4-Trichlorobenzene (aq)	<1 µg/l	TM176	<1 #	<1 #
1,2-Dichlorobenzene (aq)	<1 µg/l	TM176	<1 #	<1 #
1,3-Dichlorobenzene (aq)	<1 µg/l	TM176	<1 #	<1 #
1,4-Dichlorobenzene (aq)	<1 µg/l	TM176	<1 #	<1 #
2,4,5-Trichlorophenol (aq)	<1 µg/l	TM176	<1 #	<1 #
2,4,6-Trichlorophenol (aq)	<1 µg/l	TM176	<1 #	<1 #
2,4-Dichlorophenol (aq)	<1 µg/l	TM176	<1 #	<1 #
2,4-Dimethylphenol (aq)	<1 µg/l	TM176	<1 #	<1 #
2,4-Dinitrotoluene (aq)	<1 µg/l	TM176	<1 #	<1 #
2,6-Dinitrotoluene (aq)	<1 µg/l	TM176	<1 #	<1 #
2-Chloronaphthalene (aq)	<1 µg/l	TM176	<1 #	<1 #
2-Chlorophenol (aq)	<1 µg/l	TM176	<1 #	<1 #
2-Methylnaphthalene (aq)	<1 µg/l	TM176	<1 #	<1 #
2-Methylphenol (aq)	<1 µg/l	TM176	<1 #	<1 #
2-Nitroaniline (aq)	<1 µg/l	TM176	<1 #	<1 #
2-Nitrophenol (aq)	<1 µg/l	TM176	<1 #	<1 #
3-Nitroaniline (aq)	<1 µg/l	TM176	<1	<1
4-Bromophenylphenylether (aq)	<1 µg/l	TM176	<1 #	<1 #
4-Chloro-3-methylphenol (aq)	<1 µg/l	TM176	<1 #	<1 #
4-Chloroaniline (aq)	<1 µg/l	TM176	<1	<1
4-Chlorophenylphenylether (aq)	<1 µg/l	TM176	<1 #	<1 #
4-Methylphenol (aq)	<1 µg/l	TM176	35.8 #	11.4 #
4-Nitroaniline (aq)	<1 µg/l	TM176	<1 #	<1 #
4-Nitrophenol (aq)	<1 µg/l	TM176	<1	<1
Azobenzene (aq)	<1 µg/l	TM176	<1 #	<1 #
Acenaphthylene (aq)	<1 µg/l	TM176	<1 #	<1 #
Acenaphthene (aq)	<1 µg/l	TM176	<1 #	<1 #
Anthracene (aq)	<1 µg/l	TM176	<1 #	<1 #
bis(2-Chloroethyl)ether (aq)	<1 µg/l	TM176	<1 #	<1 #
bis(2-Chloroethoxy)methane (aq)	<1 µg/l	TM176	<1 #	<1 #
bis(2-Ethylhexyl) phthalate (aq)	<2 µg/l	TM176	<2 #	<2 #
Butylbenzyl phthalate (aq)	<1 µg/l	TM176	<1 #	<1 #
Benzo(a)anthracene (aq)	<1 µg/l	TM176	<1 #	<1 #

Validated

CERTIFICATE OF ANALYSIS

SDG: 220314-7 **Report Number:** 638266 **Superseded Report:** 637962
Client Ref.: P21-150 **Location:** Thorntons Cappogue

SVOC MS (W) - Aqueous

Results Legend

#	ISO17025 accredited.
M	mCERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted - refer to subcontractor report for accreditation status.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed
1-4♦§@	Sample deviation (see appendix)

Customer Sample Ref.	Stream A	Stream B				
Depth (m)	0.00 - 0.00	0.00 - 0.00				
Sample Type	Surface Water (SW)	Surface Water (SW)				
Date Sampled	09/03/2022	09/03/2022				
Sample Time	.	.				
Date Received	10/03/2022	10/03/2022				
SDG Ref	220314-7	220314-7				
Lab Sample No.(s)	25964285	25964307				
AGS Reference						

Component	LOD/Units	Method						
Benzo(b)fluoranthene (aq)	<1 µg/l	TM176	<1 #	<1 #				
Benzo(k)fluoranthene (aq)	<1 µg/l	TM176	<1 #	<1 #				
Benzo(a)pyrene (aq)	<1 µg/l	TM176	<1 #	<1 #				
Benzo(g,h,i)perylene (aq)	<1 µg/l	TM176	<1 #	<1 #				
Carbazole (aq)	<1 µg/l	TM176	<1 #	<1 #				
Chrysene (aq)	<1 µg/l	TM176	<1 #	<1 #				
Dibenzofuran (aq)	<1 µg/l	TM176	<1 #	<1 #				
n-Dibutyl phthalate (aq)	<1 µg/l	TM176	<1 #	<1 #				
Diethyl phthalate (aq)	<1 µg/l	TM176	<1 #	<1 #				
Dibenzo(a,h)anthracene (aq)	<1 µg/l	TM176	<1 #	<1 #				
Dimethyl phthalate (aq)	<1 µg/l	TM176	<1 #	<1 #				
n-Dioctyl phthalate (aq)	<5 µg/l	TM176	<5 #	<5 #				
Fluoranthene (aq)	<1 µg/l	TM176	<1 #	<1 #				
Fluorene (aq)	<1 µg/l	TM176	<1 #	<1 #				
Hexachlorobenzene (aq)	<1 µg/l	TM176	<1 #	<1 #				
Hexachlorobutadiene (aq)	<1 µg/l	TM176	<1 #	<1 #				
Pentachlorophenol (aq)	<1 µg/l	TM176	<1	<1				
Phenol (aq)	<1 µg/l	TM176	8.24	<1				
n-Nitroso-n-dipropylamine (aq)	<1 µg/l	TM176	<1 #	<1 #				
Hexachloroethane (aq)	<1 µg/l	TM176	<1 #	<1 #				
Nitrobenzene (aq)	<1 µg/l	TM176	<1 #	<1 #				
Naphthalene (aq)	<1 µg/l	TM176	<1 #	<1 #				
Isophorone (aq)	<1 µg/l	TM176	<1 #	<1 #				
Hexachlorocyclopentadiene (aq)	<1 µg/l	TM176	<1	<1				
Phenanthrene (aq)	<1 µg/l	TM176	<1 #	<1 #				
Indeno(1,2,3-cd)pyrene (aq)	<1 µg/l	TM176	<1 #	<1 #				
Pyrene (aq)	<1 µg/l	TM176	<1 #	<1 #				

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CERTIFICATE OF ANALYSIS

SDG: 220314-7
Client Ref.: P21-150
Report Number: 638266
Location: Thorntons Cappogue
Superseded Report: 637962

TPH CWG (W)

Results Legend	
#	ISO17025 accredited.
M	mCERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted - refer to subcontractor report for accreditation status.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed
1-4♦§@	Sample deviation (see appendix)

Customer Sample Ref.	Stream A	Stream B
Depth (m)	0.00 - 0.00	0.00 - 0.00
Sample Type	Surface Water (SW)	Surface Water (SW)
Date Sampled	09/03/2022	09/03/2022
Sample Time	.	.
Date Received	10/03/2022	10/03/2022
SDG Ref	220314-7	220314-7
Lab Sample No.(s)	25964285	25964307
AGS Reference		

Component	LOD/Units	Method	Stream A	Stream B
GRO Surrogate % recovery**	%	TM245	94	100
GRO >C5-C12	<50 µg/l	TM245	<50 #	<50 #
Aliphatics >C5-C6	<10 µg/l	TM245	<10	12
Aliphatics >C6-C8	<10 µg/l	TM245	<10	<10
Aliphatics >C8-C10	<10 µg/l	TM245	<10	<10
Aliphatics >C10-C12	<10 µg/l	TM245	<10	<10
Aliphatics >C12-C16 (aq)	<10 µg/l	TM174	<10	10
Aliphatics >C16-C21 (aq)	<10 µg/l	TM174	<10	16
Aliphatics >C21-C35 (aq)	<10 µg/l	TM174	12	84
Total Aliphatics >C12-C35 (aq)	<10 µg/l	TM174	12	110
Aromatics >EC5-EC7	<10 µg/l	TM245	<10	<10
Aromatics >EC7-EC8	<10 µg/l	TM245	<10	<10
Aromatics >EC8-EC10	<10 µg/l	TM245	<10	<10
Aromatics >EC10-EC12	<10 µg/l	TM245	<10	<10
Aromatics >EC12-EC16 (aq)	<10 µg/l	TM174	<10	22
Aromatics >EC16-EC21 (aq)	<10 µg/l	TM174	<10	19
Aromatics >EC21-EC35 (aq)	<10 µg/l	TM174	39	46
Total Aromatics >EC12-EC35 (aq)	<10 µg/l	TM174	39	87
Total Aliphatics & Aromatics >C5-35 (aq)	<10 µg/l	TM174	52	246
Aliphatics >C16-C35 Aqueous	<10 µg/l	TM174	12	100

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Validated

CERTIFICATE OF ANALYSIS

SDG: 220314-7
Client Ref.: P21-150
Report Number: 638266
Location: Thorntons Cappogue
Superseded Report: 637962

VOC MS (W)

Results Legend

#	ISO17025 accredited.
M	mCERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
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**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed
1-4♦§@	Sample deviation (see appendix)

		Customer Sample Ref.	Stream A	Stream B
		Depth (m)	0.00 - 0.00	0.00 - 0.00
		Sample Type	Surface Water (SW)	Surface Water (SW)
		Date Sampled	09/03/2022	09/03/2022
		Sample Time	.	.
		Date Received	10/03/2022	10/03/2022
		SDG Ref	220314-7	220314-7
		Lab Sample No.(s)	25964285	25964307
		AGS Reference		
Component	**LOD/Units**	**Method**		
Dibromofluoromethane**	%	TM208	99.6	101
Toluene-d8**	%	TM208	99.3	99.2
4-Bromofluorobenzene**	%	TM208	97.9	97.9
Dichlorodifluoromethane	<1 µg/l	TM208	<1 #	<1 #
Chloromethane	<1 µg/l	TM208	<1 #	<1 #
Vinyl chloride	<1 µg/l	TM208	<1 #	<1 #
Bromomethane	<1 µg/l	TM208	<1 #	<1 #
Chloroethane	<1 µg/l	TM208	<1 #	<1 #
Trichlorofluoromethane	<1 µg/l	TM208	<1 #	<1 #
1,1-Dichloroethene	<1 µg/l	TM208	<1 #	<1 #
Carbon disulphide	<1 µg/l	TM208	<1 #	<1 #
Dichloromethane	<3 µg/l	TM208	<3 #	<3 #
Methyl tertiary butyl ether (MTBE)	<1 µg/l	TM208	<1 #	<1 #
trans-1,2-Dichloroethene	<1 µg/l	TM208	<1 #	<1 #
1,1-Dichloroethane	<1 µg/l	TM208	<1 #	<1 #
cis-1,2-Dichloroethene	<1 µg/l	TM208	<1 #	<1 #
2,2-Dichloropropane	<1 µg/l	TM208	<1	<1
Bromochloromethane	<1 µg/l	TM208	<1 #	<1 #
Chloroform	<1 µg/l	TM208	5.17 #	2.88 #
1,1,1-Trichloroethane	<1 µg/l	TM208	<1 #	<1 #
1,1-Dichloropropene	<1 µg/l	TM208	<1 #	<1 #
Carbontetrachloride	<1 µg/l	TM208	<1 #	<1 #
1,2-Dichloroethane	<1 µg/l	TM208	<1 #	<1 #
Benzene	<1 µg/l	TM208	<1 #	<1 #
Trichloroethene	<1 µg/l	TM208	<1 #	<1 #
1,2-Dichloropropane	<1 µg/l	TM208	<1 #	<1 #
Dibromomethane	<1 µg/l	TM208	<1 #	<1 #
Bromodichloromethane	<1 µg/l	TM208	<1 #	<1 #
cis-1,3-Dichloropropene	<1 µg/l	TM208	<1 #	<1 #
Toluene	<1 µg/l	TM208	<1 #	3.48 #
trans-1,3-Dichloropropene	<1 µg/l	TM208	<1 #	<1 #
1,1,2-Trichloroethane	<1 µg/l	TM208	<1 #	<1 #
1,3-Dichloropropane	<1 µg/l	TM208	<1 #	<1 #

Validated

CERTIFICATE OF ANALYSIS

SDG: 220314-7
Client Ref.: P21-150
Report Number: 638266
Location: Thorntons Cappogue
Superseded Report: 637962

VOC MS (W)

Results Legend	
#	ISO17025 accredited.
M	mCERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
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**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed
1-4♦§@	Sample deviation (see appendix)

Customer Sample Ref.	Stream A	Stream B				
Depth (m)	0.00 - 0.00	0.00 - 0.00				
Sample Type	Surface Water (SW)	Surface Water (SW)				
Date Sampled	09/03/2022	09/03/2022				
Sample Time	.	.				
Date Received	10/03/2022	10/03/2022				
SDG Ref	220314-7	220314-7				
Lab Sample No.(s)	25964285	25964307				
AGS Reference						

Component	LOD/Units	Method						
Tetrachloroethene	<1 µg/l	TM208	<1 #	<1 #				
Dibromochloromethane	<1 µg/l	TM208	<1 #	<1 #				
1,2-Dibromoethane	<1 µg/l	TM208	<1 #	<1 #				
Chlorobenzene	<1 µg/l	TM208	<1 #	<1 #				
1,1,1,2-Tetrachloroethane	<1 µg/l	TM208	<1 #	<1 #				
Ethylbenzene	<1 µg/l	TM208	<1 #	<1 #				
m,p-Xylene	<1 µg/l	TM208	<1 #	1.04 #				
o-Xylene	<1 µg/l	TM208	<1 #	<1 #				
Styrene	<1 µg/l	TM208	<1 #	<1 #				
Bromoform	<1 µg/l	TM208	<1 #	<1 #				
Isopropylbenzene	<1 µg/l	TM208	<1 #	<1 #				
1,1,2,2-Tetrachloroethane	<1 µg/l	TM208	<1 #	<1 #				
1,2,3-Trichloropropane	<1 µg/l	TM208	<1 #	<1 #				
Bromobenzene	<1 µg/l	TM208	<1 #	<1 #				
Propylbenzene	<1 µg/l	TM208	<1 #	<1 #				
2-Chlorotoluene	<1 µg/l	TM208	<1 #	<1 #				
1,3,5-Trimethylbenzene	<1 µg/l	TM208	<1 #	<1 #				
4-Chlorotoluene	<1 µg/l	TM208	<1 #	<1 #				
tert-Butylbenzene	<1 µg/l	TM208	<1 #	<1 #				
1,2,4-Trimethylbenzene	<1 µg/l	TM208	<1 #	<1 #				
sec-Butylbenzene	<1 µg/l	TM208	<1 #	<1 #				
4-iso-Propyltoluene	<1 µg/l	TM208	<1 #	<1 #				
1,3-Dichlorobenzene	<1 µg/l	TM208	<1 #	<1 #				
1,4-Dichlorobenzene	<1 µg/l	TM208	<1 #	<1 #				
n-Butylbenzene	<1 µg/l	TM208	<1 #	<1 #				
1,2-Dichlorobenzene	<1 µg/l	TM208	<1 #	<1 #				
1,2-Dibromo-3-chloropropane	<1 µg/l	TM208	<1	<1				
1,2,4-Trichlorobenzene	<1 µg/l	TM208	<1 #	<1 #				
Hexachlorobutadiene	<1 µg/l	TM208	<1 #	<1 #				
tert-Amyl methyl ether (TAME)	<1 µg/l	TM208	<1 #	<1 #				
Naphthalene	<1 µg/l	TM208	<1 #	<1 #				
1,2,3-Trichlorobenzene	<1 µg/l	TM208	<1 #	<1 #				
1,3,5-Trichlorobenzene	<1 µg/l	TM208	<1	<1				

Validated

CERTIFICATE OF ANALYSIS

SDG: 220314-7
Client Ref.: P21-150
Report Number: 638266
Location: Thorntons Cappogue
Superseded Report: 637962

VOC MS (W)

Results Legend	
#	ISO17025 accredited.
M	mCERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted - refer to subcontractor report for accreditation status.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed
1-4♦§@	Sample deviation (see appendix)

Customer Sample Ref.	Stream A	Stream B				
Depth (m)	0.00 - 0.00	0.00 - 0.00				
Sample Type	Surface Water (SW)	Surface Water (SW)				
Date Sampled	09/03/2022	09/03/2022				
Sample Time	.	.				
Date Received	10/03/2022	10/03/2022				
SDG Ref	220314-7	220314-7				
Lab Sample No.(s)	25964285	25964307				
AGS Reference						

Component	LOD/Units	Method	Stream A	Stream B				
Sum of detected Xylenes	<2 µg/l	TM208	<2	<2				
Sum of BTEX	<5 µg/l	TM208	<5	<5				

Table of Results - Appendix

Method No	Reference	Description
TM021	Method 2540C, AWWA/APHA, 20th Ed., 1999	Determination of total dissolved solids in waters by gravimetry.
TM022	Method 2540D, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part120 1981;BS EN 872	Determination of total suspended solids in waters
TM045	MEWAM BOD5 2nd Ed.HMSO 1988 / Method 5210B, AWWA/APHA, 20th Ed., 1999; SCA Blue Book 130	Determination of BOD5 (ATU) Filtered by Oxygen Meter on liquids
TM046	Method 4500G, AWWA/APHA, 20th Ed., 1999	Measurement of Dissolved Oxygen by Oxygen Meter
TM099	BS 2690: Part 7:1968 / BS 6068: Part2.11:1984	Determination of Ammonium in Water Samples using the Kone Analyser
TM107	ISO 6060-1989	Determination of Chemical Oxygen Demand using COD Dr Lange Kit
TM152	ISO 17294-2:2016 Water quality - Application of inductively coupled plasma mass spectrometry (ICP-MS)	Analysis of Aqueous Samples by ICP-MS
TM174	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	Determination of Speciated Extractable Petroleum Hydrocarbons in Waters by GC-FID
TM176	EPA 8270D Semi-Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)	Determination of SVOCs in Water by GCMS
TM183	BS EN 23506:2002, (BS 6068-2.74:2002) ISBN 0 580 38924 3	Determination of Trace Level Mercury in Waters and Leachates by PSA Cold Vapour Atomic Fluorescence Spectrometry
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers
TM208	Modified: US EPA Method 8260b & 624	Determination of Volatile Organic Compounds by Headspace / GC-MS in Waters
TM245	By GC-FID	Determination of GRO by Headspace in waters
TM249	Standard Methods for the Examination of Water and Wastewater. 20th Edition. 1998	The Determination of Methylene Blue Active Substances in Waters
TM256	The measurement of Electrical Conductivity and the Laboratory determination of pH Value of Natural, Treated and Wastewaters. HMSO, 1978. ISBN 011 751428 4, Standard Methods for the examination of waters and wastewaters 20th Edition, PHA, Washington DC, USA. ISBN 0-87553-235-7 and The Determination of Alkalinity and Acidity in water HMSO, 1981, ISBN 0 11 751601 5.	Determination of pH, EC, TDS and Alkalinity in Aqueous samples

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden.

Test Completion Dates

Lab Sample No(s)	25964285	25964307
Customer Sample Ref.	Stream A	Stream B
AGS Ref.		
Depth	0.00 - 0.00	0.00 - 0.00
Type	Surface Water	Surface Water
Ammonium Low	17-Mar-2022	17-Mar-2022
Anions by Kone (w)	16-Mar-2022	16-Mar-2022
BOD True Total	20-Mar-2022	20-Mar-2022
COD Unfiltered	17-Mar-2022	17-Mar-2022
Dissolved Metals by ICP-MS	17-Mar-2022	17-Mar-2022
Dissolved Oxygen by Probe	15-Mar-2022	15-Mar-2022
EPH CWG (Aliphatic) Aqueous GC (W)	17-Mar-2022	17-Mar-2022
EPH CWG (Aromatic) Aqueous GC (W)	17-Mar-2022	17-Mar-2022
GRO by GC-FID (W)	17-Mar-2022	17-Mar-2022
Mercury Dissolved	17-Mar-2022	17-Mar-2022
Methylene blue active substances	15-Mar-2022	15-Mar-2022
pH Value	15-Mar-2022	15-Mar-2022
Phosphate by Kone (w)	17-Mar-2022	17-Mar-2022
Suspended Solids	17-Mar-2022	17-Mar-2022
SVOC MS (W) - Aqueous	16-Mar-2022	16-Mar-2022
Total Dissolved Solids (Grav)	17-Mar-2022	17-Mar-2022
Total Metals by ICP-MS	17-Mar-2022	17-Mar-2022
TPH CWG (W)	17-Mar-2022	17-Mar-2022
VOC MS (W)	17-Mar-2022	17-Mar-2022

Appendix

General

1. Results are expressed on a dry weight basis (dried at 35ºC) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH4 by the BRE method, VOC TICs and SVOC TICs.

2. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

3. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

4. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

10. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

12. For dried and crushed preparations of soils volatile loss may occur e.g volatile mercury.

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

17 Data retention. All records, communications and reports pertaining to the analysis are archived for seven years from the date of issue of the final report.

18. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as “mixed hydrocarbons”. Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

19. **Sample Deviations**

If a sample is classed as deviated then the associated results may be compromised.

1	**Container with Headspace provided for volatiles analysis**
2	**Incorrect container received**
3	**Deviation from method**
4	**Matrix interference**
♦	**Sample holding time exceeded in laboratory**
@	**Sample holding time exceeded due to late arrival of instructions or samples**
§	**Sampled on date not provided**

20. **Asbestos**

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2021), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as “Not detected”. If no asbestos fibre types are found all will be reported as “Not detected” and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

<u>Identification of Asbestos in Bulk Materials & Soils</u>

The results for identification of asbestos in bulk materials and soils are obtained from supplied bulk materials andd soils which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2021).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

<u>Visual Estimation Of Fibre Content</u>

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

<u>Respirable Fibres</u>

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.

FEHILY
TIMONEY

CONSULTANTS IN ENGINEERING,
ENVIRONMENTAL SCIENCE
& PLANNING

APPENDIX 10.3

Surface Water Drainage Calculations

<u>Drainage Calculations for the Expansion of a Materials Recovery Facility at Cappogue and Dunsink, Ballycoolin Road, Dublin 11.</u>

Introduction

Calculations of greenfield runoff rates and attenuation volumes for waste facility in Cappagh, Co. Dublin.

Purpose

The purpose of this calculation is to estimate the greenfield runoff rate and attenuation volumes for the proposed waste facility in Cappagh, Co. Dublin. It is proposed to have three attenuation tanks: greywater attenuation (roof water), paved runoff attenuation (concrete paved areas) and an attenuation for stone surfacing area in the southern end of the site.

Greenfield Rate Calculations

Design Steps

1. Measurements of Drain Areas
2. Calculation of Greenfield Runoff Rates
3. Estimation of Attenuation Volumes

Calculations

Measurement of Drain Areas

Drain areas measured from drawing P21-150-INFO-0005. These areas are applied an impermeability factor. Calculations are presented in Appendix A.

Calculated drain areas are the following:

- Greywater Attenuation - 10,667 m2 (1.1 ha)

- Paved Area Attenuation - 7,600 m2 (0.8 ha)

- Stone Surface Attenuation - 3,921 m2 (0.4ha)

Calculations of Greenfield Runoff Rate

Calculations were carried out in accordance to Volume 2 of the GDSDS. The process consists in calculating the soil type of the site and QBAR value, which is multiplied this by a growth factor.

Calculations are presented in Appendix B for greywater attenuation, Appendix C for paved runoff attenuation and Appendix D for Stone Surface attenuation.

The results obtained are:

- Greywater Attenuation - 8.72 l/s
- Paved Area Attenuation - 6.35 l/s
- Stone Surface Attenuation - 3.17 l/s

Estimation of Attenuation Volumes

Attenuation volumes are estimated based on Rainfall Return Period tables obtained from Met Eireann and applying a 20% Climate Change factor.

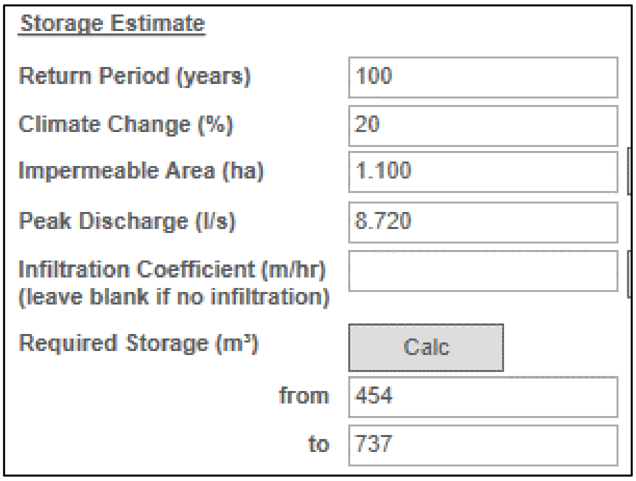
Calculations are presented in Appendix E for greywater attenuation, Appendix F for paved runoff attenuation and Appendix G for Stone Surface Attenuation.

The results obtained are:

- Greywater Attenuation - 408 m3
- Paved Area Attenuation - 288 m3
- Stone Surface Attenuation - 150 m3

Using Causeway Flow Storage Estimate tool the following range of attenuation volumes were estimated (these vary depending on the outflow control used):

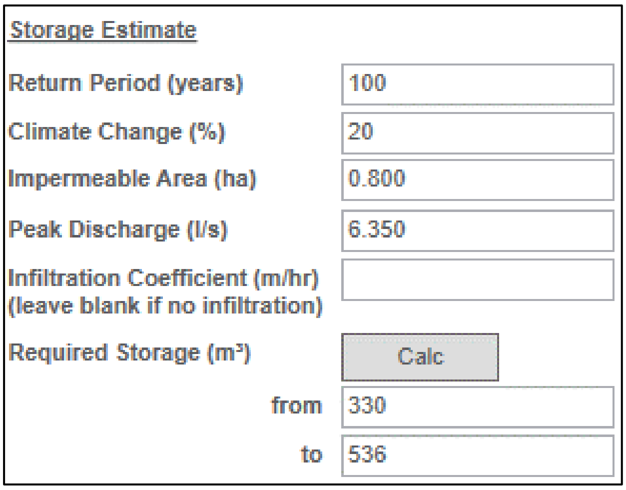
Greywater Attenuation



Storage Estimate

Return Period (years)	100
Climate Change (%)	20
Impermeable Area (ha)	1.100
Peak Discharge (l/s)	8.720
Infiltration Coefficient (m/hr) (leave blank if no infiltration)	
Required Storage (m³)	
from	454
to	737

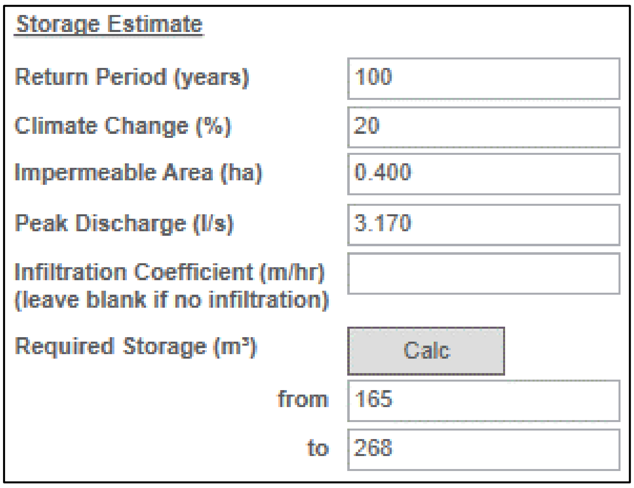
Paved Area Attenuation



Storage Estimate

Return Period (years)	100
Climate Change (%)	20
Impermeable Area (ha)	0.800
Peak Discharge (l/s)	6.350
Infiltration Coefficient (m/hr) (leave blank if no infiltration)	
Required Storage (m³)	
from	330
to	536

Stone Surface Attenuation



Storage Estimate

Return Period (years)	100
Climate Change (%)	20
Impermeable Area (ha)	0.400
Peak Discharge (l/s)	3.170
Infiltration Coefficient (m/hr) (leave blank if no infiltration)	
Required Storage (m³)	
from	165
to	268

It is noted that a full drainage model has to be developed in Causeway Flow to calculate an exact attenuation volume.

Appendix A - Measurement of Drain Area

Description	**Impermeability Factor**	**Area (m2)**	**Notes**
Roof Area			
Within Red Boundary	1	10,667	
Within Area 1	1	3,402	
Within Area 2	1	4,115	
Concrete Slab (only within red boundary)			
Concrete Slab	1	7,600	
Stone Surfacing (only within red boundary)			
Stone Surfacing	0.25	3,921.25	
Greenfield			
Area 1	0.15	1,341.45	
Area 2	0.15	479.25	
Area 3	0.15	860.55	
Total (excl. greenfield)		29,705.25	m2
		3.0	ha
Total (incl. greenfield)		32,386.5	m2
		3.2	ha
Grey Water Attenuation		10,667	m2
		1.1	ha
Paved Runoff Attenuation		7,600	m2
		0.8	ha

Stone Surface Attenuation		3,921	m2
		0.4	ha

Appendix B - Calculation of Greenfield Run-off Rate for Greywater Attenuation

Maximum Allowable Greenfield Discharge Rate - Based on GDSDS Vol 2				
1	Area (for calculations)	Area=	50	ha
	Drained Site Area	Area=	1.100	ha
2	Standard Average Annual Rainfall	SAAR=	812	mm
3	Percentage of each Soil Type	G1=	0	%
		G2=	0	%
		G3=	100	%
		G4=	0	%
		G5=	0	%
4	Soil Index of Site			
	$SOIL = \frac{(0.15S_1 + 0.30S_2 + 0.40S_3 + 0.45S_4 + 0.5S_5)}{(S_1 + S_2 + S_3 + S_4 + S_5)}$	SOIL=	0.4	
5	Mean Annual Flow (l/s)			
			0.202	m3/s
	$Q_a = 0.00108\ AREA^{0.89}\ SAAR^{1.17}\ SOIL^{2.17}$	Qbar,rural=	202	l/s
			4.05	l/s/ha
6	Maximum Allowable Discharge			
	Max Allowable Discharge (l/s/ha)		4.05	l/s/ha
	GDSDS (l/s/ha)		2	l/s/ha
	Qbar Discharge (l/s)		4.45	l/s
7	Comment			
	Greenfield rate = 4.45 l/s * 1.96 (1:100 Years Growth Curve Factor) = 8.72 l/s			
Ref:				
	Report No. 126 Hydrology of Soil Types: a Hydrologically-Based Classification of the Soils of the United Kingdom			
	Greater Dublin Stratigic Drainage Study - Volume 2			
	TII Guideline- Design of Earthworks Drainage, Network Drainage, Atetnation & Pollution Control			

Appendix C - Calculation of Greenfield Run-off Rate for Paved Run-off

	Maximum Allowable Greenfield Discharge Rate - Based on GDSDS Vol 2			
1	Area (for calculations)	Area=	50	ha
	Drained Site Area	Area=	0.800	ha
2	Standard Average Annual Rainfall	SAAR=	812	mm
3	Percentage of each Soil Type	G1=	0	%
		G2=	0	%
		G3=	100	%
		G4=	0	%
		G5=	0	%
4	Soil Index of Site			
	$SOIL=\frac{(0.15S_1+0.30S_2+0.40S_3+0.45S_4+0.5S_5)}{(S_1+S_2+S_3+S_4+S_5)}$	SOIL=	0.4	
5	Mean Annual Flow (l/s)			
			0.202	m3/s
	$Q_a = 0.00108\ AREA^{0.89}\ SAAR^{1.17}\ SOIL^{2.17}$	Qbar,rural=	202	l/s
			4.05	l/s/ha
6	Maximum Allowable Discharge			
	Max Allowable Discharge (l/s/ha)		4.05	l/s/ha
	GDSDS (l/s/ha)		2	l/s/ha
	Qbar Discharge (l/s)		3.24	l/s
7	Comment			
	Greenfield rate = 3.24 l/s * 1.96 (1:100 Years Growth Curve Factor) = 6.35 l/s			
Ref:				
	Report No. 126 Hydrology of Soil Types: a Hydrologically-Based Classification of the Soils of the United Kingdom			
	Greater Dublin Stratigic Drainage Study - Volume 2			
	TII Guideline- Design of Earthworks Drainage, Network Drainage, Atetnation & Pollution Control			

Appendix D - Calculation of Greenfield Run-off Rate for Stone Surface Attenuation

	Maximum Allowable Greenfield Discharge Rate - Based on GDSDS Vol 2			
1	Area (for calculations)	Area=	50	ha
	Drained Site Area	Area=	0.400	ha
2	Standard Average Annual Rainfall	SAAR=	812	mm
3	Percentage of each Soil Type	G1=	0	%
		G2=	0	%
		G3=	100	%
		G4=	0	%
		G5=	0	%
4	Soil Index of Site			
	$SOIL=\frac{(0.15S_1+0.30S_2+0.40S_3+0.45S_4+0.5S_5)}{(S_1+S_2+S_3+S_4+S_5)}$	SOIL=	0.4	
5	Mean Annual Flow (l/s)			
			0.202	m3/s
	$Q_a = 0.00108\ AREA^{0.89}\ SAAR^{1.17}\ SOIL^{2.17}$	Qbar,rural=	202	l/s
			4.05	l/s/ha
6	Maximum Allowable Discharge			
	Max Allowable Discharge (l/s/ha)		4.05	l/s/ha
	GDSDS (l/s/ha)		2	l/s/ha
	Qbar Discharge (l/s)		1.62	l/s
7	Comment			
	Greenfield rate = 1.62 l/s * 1.96 (1:100 Years Growth Curve Factor) = 3.17 l/s			
Ref:				
	Report No. 126 Hydrology of Soil Types: a Hydrologically-Based Classification of the Soils of the United Kingdom			
	Greater Dublin Stratigic Drainage Study - Volume 2			
	TII Guideline- Design of Earthworks Drainage, Network Drainage, Atetnation & Pollution Control			

Appendix E - Estimation of Attenuation Volume for Greywater Attenuation

Proposed Development Area data	**Area**	**Impermeability**	**Effective area**
Roof Area	10667	100%	10,667
Size of Area Draining to Attenuation Tank (m^2)			**10,667** m^2

Estimated Storage Requirements 1:1 Year Return

Rain fall (sec)	Rainfall depth (R1)	Rainfall depth*1.2	Inflow (m3)	Inflow (m3/s)	Outflow from attenuation tank (m3/s)	Outflow from attenuation tank (m3)	Required storage (m3)	Retention time (hrs)
900	5.9	7.08	75.5	0.084	0.00872	7.85	67.7	0.224020939
1800	7.7	9.24	98.6	0.055	0.00872	15.70	82.9	0.420375865
3600	10.1	12.12	129.3	0.036	0.00872	31.39	97.9	0.757185806
7200	13.1	15.72	167.7	0.023	0.00872	62.78	104.9	1.251168439
14400	17.1	20.52	218.9	0.015	0.00872	125.57	93.3	1.705334866
21600	20	24	256.0	0.012	0.00872	188.35	67.7	1.585637949
43200	26.1	31.32	334.1	0.008	0.00872	376.70	-42.6	-1.530611651
86400	34	40.8	435.2	0.005	0.00872	753.41	-318.2	-17.54693695
172800	41.3	49.56	528.7	0.003	0.00872	1506.82	-978.2	-88.813158

Max Storage Requirement 1-yr Event (Max) **104.9** m^3

Estimated Storage Requirements 1:30 Year Return

Rain fall (sec)	Rainfall depth (R30)	Rainfall depth*1.2	Inflow (m3)	Inflow (m3/s)	Outflow from attenuation tank (m3/s)	Outflow from attenuation tank (m3)	Required storage (m3)	Retention time (hrs)
900	17.4	13.8	147.2	0.164	0.00872	7.85	139.4	0.236671612
1800	21.8	16.92	180.5	0.100	0.00872	15.70	164.8	0.456517316
3600	27.2	20.52	218.9	0.061	0.00872	31.39	187.5	0.856583429
7200	34.1	25.2	268.8	0.037	0.00872	62.78	206.0	1.532871741
14400	42.7	30.72	327.7	0.023	0.00872	125.57	202.1	2.467235399
21600	48.7	34.44	367.4	0.017	0.00872	188.35	179.0	2.923789511
43200	61	41.88	446.7	0.010	0.00872	376.70	70.0	1.881118507
86400	76.4	50.88	542.7	0.006	0.00872	753.41	-210.7	-9.315940009
172800	87.4	55.32	590.1	0.003	0.00872	1506.82	-916.7	-74.56797018

Max Storage Requirement 30-yr Event (Max) **206.0** m^3

Estimated Storage Requirements 1:100 Year Return

Rain fall (sec)	Rainfall depth (R100)	Rainfall depth*1.2	Inflow (m3)	Inflow (m3/s)	Outflow from attenuation tank (m3/s)	Outflow from attenuation tank (m3)	Required storage (m3)	Retention time (hrs)
900	24.4	8.4	89.6	0.100	0.00872	7.85	81.8	0.228103363
1800	30.1	9.96	106.2	0.059	0.00872	15.70	90.5	0.426131826
3600	37.2	12	128.0	0.036	0.00872	31.39	96.6	0.754757664
7200	46	14.28	152.3	0.021	0.00872	62.78	89.5	1.175656013
14400	56.9	17.04	181.8	0.013	0.00872	125.57	56.2	1.236706071
21600	64.4	18.84	201.0	0.009	0.00872	188.35	12.6	0.376608852
43200	79.7	22.44	239.4	0.006	0.00872	376.70	-137.3	-6.884971342
86400	98.5	26.52	282.9	0.003	0.00872	753.41	-470.5	-39.91836454
172800	110.6	27.84	297.0	0.002	0.00872	1506.82	-1209.8	-195.5510097

Storage Requirement 100-yr Event (Max) **96.6** m^3

RT(Years)	1	30	100	Total(R30)	Total(R100)
Required Attenuation Vol (m^3)	104.9	206.0	96.6	310.9	408

Estimated Attentuation Tank Capacity For 1:100 Event **408** m^3

Appendix F - Estimation of Attenuation Volume for Paved Run-off

Proposed Development Area data	**Area**	**Impermeability**	**Effective area**
Concrete Slab	7600	100%	7,600

Size of Area Draining to Attenuation Tank (m^2) **7,600** m^2

Estimated Storage Requirements 1:1 Year Return

Rain fall (sec)	Rainfall depth (R1)	Rainfall depth*1.2	Inflow (m3)	Inflow (m3/s)	Outflow from attenuation tank (m3/s)	Outflow from attenuation tank (m3)	Required storage (m3)	Retention time (hrs)
900	5.9	7.08	53.8	0.060	0.00635	5.72	48.1	0.223447257
1800	7.7	9.24	70.2	0.039	0.00635	11.43	58.8	0.418617567
3600	10.1	12.12	92.1	0.026	0.00635	22.86	69.3	0.751823867
7200	13.1	15.72	119.5	0.017	0.00635	45.72	73.8	1.234632382
14400	17.1	20.52	156.0	0.011	0.00635	91.44	64.5	1.654662973
21600	20	24	182.4	0.008	0.00635	137.16	45.2	1.488157895
43200	26.1	31.32	238.0	0.006	0.00635	274.32	-36.3	-1.829401089
86400	34	40.8	310.1	0.004	0.00635	548.64	-238.6	-18.46439628
172800	41.3	49.56	376.7	0.002	0.00635	1097.28	-720.6	-91.83433159

Max Storage Requirement 1-yr Event (Max) **73.8** m^3

Estimated Storage Requirements 1:30 Year Return

Rain fall (sec)	Rainfall depth (R30)	Rainfall depth*1.2	Inflow (m3)	Inflow (m3/s)	Outflow from attenuation tank (m3/s)	Outflow from attenuation tank (m3)	Required storage (m3)	Retention time (hrs)
900	17.4	13.8	104.9	0.117	0.00635	5.72	99.2	0.236377288
1800	21.8	16.92	128.6	0.071	0.00635	11.43	117.2	0.455557111
3600	27.2	20.52	156.0	0.043	0.00635	22.86	133.1	0.853416436
7200	34.1	25.2	191.5	0.027	0.00635	45.72	145.8	1.522556391
14400	42.7	30.72	233.5	0.016	0.00635	91.44	142.0	2.433388158
21600	48.7	34.44	261.7	0.012	0.00635	137.16	124.6	2.85585916
43200	61	41.88	318.3	0.007	0.00635	274.32	44.0	1.657668527
86400	76.4	50.88	386.7	0.004	0.00635	548.64	-162.0	-10.05163853
172800	87.4	55.32	420.4	0.002	0.00635	1097.28	-676.8	-77.27457472

Max Storage Requirement 30-yr Event (Max) **145.8** m^3

Estimated Storage Requirements 1:100 Year Return

Rain fall (sec)	Rainfall depth (R100)	Rainfall depth*1.2	Inflow (m3)	Inflow (m3/s)	Outflow from attenuation tank (m3/s)	Outflow from attenuation tank (m3)	Required storage (m3)	Retention time (hrs)
900	24.4	8.4	63.8	0.071	0.00635	5.72	58.1	0.227619831
1800	30.1	9.96	75.7	0.042	0.00635	11.43	64.3	0.424500634
3600	37.2	12	91.2	0.025	0.00635	22.86	68.3	0.749342105
7200	46	14.28	108.5	0.015	0.00635	45.72	62.8	1.157452455
14400	56.9	17.04	129.5	0.009	0.00635	91.44	38.1	1.175685693
21600	64.4	18.84	143.2	0.007	0.00635	137.16	6.0	0.252430439
43200	79.7	22.44	170.5	0.004	0.00635	274.32	-103.8	-7.301998311
86400	98.5	26.52	201.6	0.002	0.00635	548.64	-347.1	-41.32984044
172800	110.6	27.84	211.6	0.001	0.00635	1097.28	-885.7	-200.9292196

Storage Requirement 100-yr Event (Max) **68.3** m^3

RT(Years)	1	30	100	Total(R30)	Total(R100)
Required Attenuation Vol (m^3)	73.8	145.8	68.3	219.6	288

Estimated Attentuation Tank Capacity For 1:100 Event **288** m^3

Appendix G - Estimation of Attenuation Volume for Stone Surface Attenuation

Proposed Development Area data	**Area**	**Impermeability**	**Effective area**	
Stone Surface	15685	25%	3,921	
Size of Area Draining to Attenuation Tank (m^2)			**3,921**	**m^2**

Estimated Storage Requirements 1:1 Year Return

Rain fall (sec)	Rainfall depth (R1)	Rainfall depth*1.2	Inflow (m3)	Inflow (m3/s)	Outflow from attenuation tank (m3/s)	Outflow from attenuation tank (m3)	Required storage (m3)	Retention time (hrs)
900	5.9	7.08	27.8	0.031	0.00317	2.85	24.9	0.224308824
1800	7.7	9.24	36.2	0.020	0.00317	5.71	30.5	0.421258213
3600	10.1	12.12	47.5	0.013	0.00317	11.41	36.1	0.75987653
7200	13.1	15.72	61.6	0.009	0.00317	22.82	38.8	1.259466549
14400	17.1	20.52	80.5	0.006	0.00317	45.65	34.8	1.730762993
21600	20	24	94.1	0.004	0.00317	68.47	25.6	1.634555308
43200	26.1	31.32	122.8	0.003	0.00317	136.94	-14.1	-1.380673387
86400	34	40.8	160.0	0.002	0.00317	273.89	-113.9	-17.08653828
172800	41.3	49.56	194.3	0.001	0.00317	547.78	-353.4	-87.29707521

Max Storage Requirement 1-yr Event (Max) **38.8** **m^3**

Estimated Storage Requirements 1:30 Year Return

Rain fall (sec)	Rainfall depth (R30)	Rainfall depth*1.2	Inflow (m3)	Inflow (m3/s)	Outflow from attenuation tank (m3/s)	Outflow from attenuation tank (m3)	Required storage (m3)	Retention time (hrs)
900	17.4	13.8	54.1	0.060	0.00317	2.85	51.3	0.23681931
1800	21.8	16.92	66.3	0.037	0.00317	5.71	60.6	0.456999166
3600	27.2	20.52	80.5	0.022	0.00317	11.41	69.1	0.858172687
7200	34.1	25.2	98.8	0.014	0.00317	22.82	76.0	1.538048181
14400	42.7	30.72	120.5	0.008	0.00317	45.65	74.8	2.484220593
21600	48.7	34.44	135.0	0.006	0.00317	68.47	66.6	2.957878263
43200	61	41.88	164.2	0.004	0.00317	136.94	27.3	1.993249989
86400	76.4	50.88	199.5	0.002	0.00317	273.89	-74.4	-8.946752395
172800	87.4	55.32	216.9	0.001	0.00317	547.78	-330.9	-73.20974417

Max Storage Requirement 30-yr Event (Max) **76.0** **m^3**

Estimated Storage Requirements 1:100 Year Return

Rain fall (sec)	Rainfall depth (R100)	Rainfall depth*1.2	Inflow (m3)	Inflow (m3/s)	Outflow from attenuation tank (m3/s)	Outflow from attenuation tank (m3)	Required storage (m3)	Retention time (hrs)
900	24.4	8.4	32.9	0.037	0.00317	2.85	30.1	0.228346008
1800	30.1	9.96	39.1	0.022	0.00317	5.71	33.3	0.42695039
3600	37.2	12	47.1	0.013	0.00317	11.41	35.6	0.757475295
7200	46	14.28	56.0	0.008	0.00317	22.82	33.2	1.184790907
14400	56.9	17.04	66.8	0.005	0.00317	45.65	21.2	1.267327266
21600	64.4	18.84	73.9	0.003	0.00317	68.47	5.4	0.438923959
43200	79.7	22.44	88.0	0.002	0.00317	136.94	-49.0	-6.675699219
86400	98.5	26.52	104.0	0.001	0.00317	273.89	-169.9	-39.21005889
172800	110.6	27.84	109.2	0.001	0.00317	547.78	-438.6	-192.852121

Storage Requirement 100-yr Event (Max) **35.6** **m^3**

RT(Years)	1	30	100	Total(R30)	Total(R100)
Required Attenuation Vol (m^3)	38.8	76.0	35.6	114.8	150

Estimated Attentuation Tank Capacity For 1:100 Event **150** **m^3**

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APPENDIX 11.1

Description of the AERMOD Model

APPENDIX 11.1 Description of the AERMOD Model

The AERMOD dispersion model has been developed in part by the U.S. Environmental Protection Agency (USEPA) (USEPA 2005, 2019). The model is a steady-state Gaussian model used to assess pollutant concentrations associated with industrial sources. The model is an enhancement on the Industrial Source Complex-Short Term 3 (ISCST3) model which has been widely used for emissions from industrial sources.

Improvements over the ISCST3 model include the treatment of the vertical distribution of concentration within the plume. ISCST3 assumes a Gaussian distribution in both the horizontal and vertical direction under all weather conditions. AERMOD with PRIME, however, treats the vertical distribution as non-Gaussian under convective (unstable) conditions while maintaining a Gaussian distribution in both the horizontal and vertical direction during stable conditions. This treatment reflects the fact that the plume is skewed upwards under convective conditions due to the greater intensity of turbulence above the plume than below. The result is a more accurate portrayal of actual conditions using the AERMOD model. AERMOD also enhances the turbulence of night-time urban boundary layers thus simulating the influence of the urban heat island.

In contrast to ISCST3, AERMOD is widely applicable in all types of terrain. Differentiation of the simple versus complex terrain is unnecessary with AERMOD. In complex terrain, AERMOD employs the dividing-streamline concept in a simplified simulation of the effects of plume-terrain interactions. In the dividing-streamline concept, flow below this height remains horizontal, and flow above this height tends to rise up and over terrain. Extensive validation studies have found that AERMOD (precursor to AERMOD with PRIME) performs better than ISCST3 for many applications and as well or better than CTDMPLUS for several complex terrain data sets (USEPA 1995).

Due to the proximity to surrounding buildings, the PRIME (Plume Rise Model Enhancements) building downwash algorithm has been incorporated into the model to determine the influence (wake effects) of these buildings on dispersion in each direction considered. The PRIME algorithm takes into account the position of the stack relative to the building in calculating building downwash. In the absence of the building, the plume from the stack will rise due to momentum and/or buoyancy forces. Wind streamlines act on the plume leads to the bending over of the plume as it disperses. However, due to the presence of the building, wind streamlines are disrupted leading to a lowering of the plume centreline.

When there are multiple buildings, the building tier leading to the largest cavity height is used to determine building downwash. The cavity height calculation is an empirical formula based on building height, the length scale (which is a factor of building height & width) and the cavity length (which is based on building width, length and height). As the direction of the wind will lead to the identification of differing dominant tiers, calculations are carried out in intervals of 10 degrees.

In PRIME, the nature of the wind streamline disruption as it passes over the dominant building tier is a function of the exact dimensions of the building and the angle at which the wind approaches the building. Once the streamline encounters the zone of influence of the building, two forces act on the plume. Firstly, the disruption caused by the building leads to increased turbulence and enhances horizontal and vertical dispersion. Secondly, the streamline descends in the lee of the building due to the reduced pressure and drags the plume (or part of) nearer to the ground, leading to higher ground level concentrations. The model calculates the descent of the plume as a function of the building shape and, using a numerical plume rise model, calculates the change in the plume centreline location with distance downwind.

The immediate zone in the lee of the building is termed the cavity or near wake and is characterised by high intensity turbulence and an area of uniform low pressure. Plume mass captured by the cavity region is re-emitted to the far wake as a ground-level volume source. The volume source is located at the base of the lee wall of the building, but is only evaluated near the end of the near wake and beyond. In this region, the disruption caused by the building downwash gradually fades with distance to ambient values downwind of the building.

AERMOD has made substantial improvements in the area of plume growth rates in comparison to ISCST3 (USEPA 1995, 2000). ISCST3 approximates turbulence using six Pasquill-Gifford-Turner Stability Classes and bases the resulting dispersion curves upon surface release experiments. This treatment, however, cannot explicitly account for turbulence in the formulation. AERMOD is based on the more realistic modern planetary boundary layer (PBL) theory which allows turbulence to vary with height. This use of turbulence-based plume growth with height leads to a substantial advancement over the ISCST3 treatment.

Improvements have also been made in relation to mixing height (USEPA 2019, 2020). The treatment of mixing height by ISCST3 is based on a single morning upper air sounding each day. AERMOD, however, calculates mixing height on an hourly basis based on the morning upper air sounding and the surface energy balance, accounting for the solar radiation, cloud cover, reflectivity of the ground and the latent heat due to evaporation from the ground cover. This more advanced formulation provides a more realistic sequence of the diurnal mixing height changes.

AERMOD also has the capability of modelling both unstable (convective) conditions and stable (inversion) conditions. The stability of the atmosphere is defined by the sign of the sensible heat flux. Where the sensible heat flux is positive, the atmosphere is unstable whereas when the sensible heat flux is negative the atmosphere is defined as stable. The sensible heat flux is dependent on the net radiation and the available surface moisture (Bowen Ratio). Under stable (inversion) conditions, AERMOD has specific algorithms to account for plume rise under stable conditions, mechanical mixing heights under stable conditions and vertical and lateral dispersion in the stable boundary layer.

AERMOD also contains improved algorithms for dealing with low wind speed (near calm) conditions. As a result, AERMOD can produce model estimates for conditions when the wind speed may be less than 1 m/s, but still greater than the instrument threshold.

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APPENDIX 11.2

Meteorological Data – AERMET

APPENDIX 11.2 Meteorological Data - AERMET

AERMOD incorporates a meteorological pre-processor AERMET (version 21112) (USEPA 2018a). AERMET allows AERMOD to account for changes in the plume behaviour with height. AERMET calculates hourly boundary layer parameters for use by AERMOD, including friction velocity, Monin-Obukhov length, convective velocity scale, convective (CBL) and stable boundary layer (SBL) height and surface heat flux. AERMOD uses this information to calculate concentrations in a manner that accounts for changes in dispersion rate with height, allows for a non-Gaussian plume in convective conditions, and accounts for a dispersion rate that is a continuous function of meteorology.

The AERMET meteorological preprocessor requires the input of surface characteristics, including surface roughness (z0), Bowen Ratio and albedo by sector and season, as well as hourly observations of wind speed, wind direction, cloud cover, and temperature. A morning sounding from a representative upper air station, latitude, longitude, time zone, and wind speed threshold are also required.

Two files are produced by AERMET for input to the AERMOD dispersion model. The surface file contains observed and calculated surface variables, one record per hour. The profile file contains the observations made at each level of a meteorological tower, if available, or the one-level observations taken from other representative data, one record level per hour.

From the surface characteristics (i.e. surface roughness, albedo and amount of moisture available (Bowen Ratio)) AERMET calculates several boundary layer parameters that are important in the evolution of the boundary layer, which, in turn, influences the dispersion of pollutants. These parameters include the surface friction velocity, which is a measure of the vertical transport of horizontal momentum; the sensible heat flux, which is the vertical transport of heat to/from the surface; the Monin-Obukhov length which is a stability parameter relating the surface friction velocity to the sensible heat flux; the daytime mixed layer height; the nocturnal surface layer height and the convective velocity scale which combines the daytime mixed layer height and the sensible heat flux. These parameters all depend on the underlying surface.

The values of albedo, Bowen Ratio and surface roughness depend on land-use type (e.g., urban, cultivated land etc) and vary with seasons and wind direction. The assessment of appropriate land-use types was carried out in line with USEPA recommendations (USEPA 2019) and using the detailed methodology outlined by the Alaska Department of Environmental Conservation (Alaska Department of Environmental Conservation 2008). AERMET has also been updated to allow for an adjustment of the surface friction velocity (u*) for low wind speed stable conditions based on the work of Qian and Venkatram (BLM, 2011). Previously, the model had a tendency to over-predict concentrations produced by near-ground sources in stable conditions.

Surface roughness

Surface roughness length is the height above the ground at which the wind speed goes to zero. Surface roughness length is defined by the individual elements on the landscape such as trees and buildings. In order to determine surface roughness length, the USEPA recommends that a representative length be defined for each sector, based on an upwind area-weighted average of the land use within the sector, by using the eight land use categories outlined by the USEPA. The inverse-distance weighted surface roughness length derived from the land use classification within a radius of 1km from Dublin Airport Meteorological Station is shown in Table A11.1.

Table A11.1 Surface Roughness based on an inverse distance weighted average of the land use within a 1km radius of Dublin Airport Meteorological Station.

Sector	Area Weighted Land Use Classification	Spring	Summer	Autumn	Winter$^{\text{Note 1}}$
0-360	100% Grassland	0.050	0.100	0.010	0.010

Note 1: Winter defined as periods when surfaces covered permanently by snow whereas autumn is defined as periods when freezing conditions are common, deciduous trees are leafless and no snow is present (Iqbal, 1983). Thus for the current location autumn more accurately defines "winter" conditions at the facility.

Albedo

Noon-time albedo is the fraction of the incoming solar radiation that is reflected from the ground when the sun is directly overhead. Albedo is used in calculating the hourly net heat balance at the surface for calculating hourly values of Monin-Obuklov length. A 10km x 10km square area is drawn around the meteorological station to determine the albedo based on a simple average for the land use types within the area independent of both distance from the station and the near-field sector. The classification within 10km from Dublin Airport Meteorological Station is shown in Table A11.2.

Table A11.2 Albedo based on a simple average of the land use within a 10km × 10km grid centred on Dublin Airport Meteorological Station.

Area-weighted Land Use Classification	Spring	Summer	Autumn	Winter[1]
0.5% Water, 30% Urban, 0.5% Coniferous Forest 38% Grassland, 19% Cultivated Land	0.155	0.180	0.187	0.187

(1) For the current location autumn more accurately defines "winter" conditions in Ireland.

Bowen Ratio

The Bowen ratio is a measure of the amount of moisture at the surface of the earth. The presence of moisture affects the heat balance resulting from evaporative cooling which, in turn, affects the Monin-Obukhov length which is used in the formulation of the boundary layer. A 10km x 10km square area is drawn around the meteorological station to determine the Bowen Ratio based on geometric mean of the land use types within the area independent of both distance from the station and the near-field sector. The classification within 10km from Dublin Airport Meteorological Station is shown in Table A11.3.

Table A11.3 Bowen Ratio based on a geometric mean of the land use within a 10km × 10km grid centred on Dublin Airport Meteorological Station.

Geometric Mean Land Use Classification	Spring	Summer	Autumn	Winter[1]
0.5% Water, 30% Urban, 0.5% Coniferous Forest 38% Grassland, 19% Cultivated Land	0.549	1.06	1.202	1.202

(1) For the current location autumn more accurately defines "winter" conditions in Ireland.

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APPENDIX 11.3

Dust Minimisation Plan

APPENDIX 11.3 Dust Minimisation Plan

The objective of dust control at the site is to ensure that no significant nuisance occurs at nearby sensitive receptors. In order to develop a workable and transparent dust control strategy, the following management plan has been formulated by drawing on best practice guidance from Ireland and the UK (IAQM, 2014).

Site Management

The aim is to ensure good site management by avoiding dust becoming airborne at source. This will be done through good design and effective control strategies.

Good site management will include the ability to respond to adverse weather conditions by either restricting operations on-site or quickly implementing effective control measures before the potential for nuisance occurs. When rainfall is greater than 0.2mm/day, dust generation is generally suppressed (UK Office of Deputy Prime Minister (2002), BRE (2003)). The potential for significant dust generation is also reliant on threshold wind speeds of greater than 10 m/s (19.4 knots) (at 7m above ground) to release loose material from storage piles and other exposed materials (USEPA, 1986). Particular care should be taken during periods of high winds (gales) as these are periods where the potential for significant dust emissions are highest. The prevailing meteorological conditions in the vicinity of the site are favourable in general for the suppression of dust for a significant period of the year. Nevertheless, there will be infrequent periods where care will be needed to ensure that dust nuisance does not occur. The following measures shall be taken in order to avoid dust nuisance occurring under unfavourable meteorological conditions:

- The Principal Contractor or equivalent must monitor the contractors' performance to ensure that the proposed mitigation measures are implemented and that dust impacts and nuisance are minimised;
- During working hours, dust control methods will be monitored as appropriate, depending on the prevailing meteorological conditions;
- The name and contact details of a person to contact regarding air quality and dust issues shall be displayed on the site boundary, this notice board will also include head/regional office contact details;
- It is recommended that community engagement be undertaken before works commence on site explaining the nature and duration of the works to local residents and businesses;
- A complaints register will be kept on site detailing all telephone calls and letters of complaint received in connection with dust nuisance or air quality concerns, together with details of any remedial actions carried out;
- It is the responsibility of the contractor at all times to demonstrate full compliance with the dust control conditions herein;
- At all times, the procedures put in place will be strictly monitored and assessed.

The dust minimisation measures shall be reviewed at regular intervals during the works to ensure the effectiveness of the procedures in place and to maintain the goal of minimisation of dust through the use of best practice and procedures. In the event of dust nuisance occurring outside the site boundary, site activities will be reviewed and satisfactory procedures implemented to rectify the problem. Specific dust control measures to be employed are described below.

Demolition

- During the demolition process, water suppression will be used, preferably with a hand-held spray. Only the use of cutting, grinding or sawing equipment fitted or used in conjunction with a suitable dust suppression technique such as water sprays/local extraction will be used.
- Drop heights from conveyors, loading shovels, hoppers and other loading equipment will be minimised, if necessary fine water sprays will be employed.

Site Roads / Haulage Routes

Movement of construction trucks along site roads (particularly unpaved roads) can be a significant source of fugitive dust if control measures are not in place. The most effective means of suppressing dust emissions from unpaved roads is to apply speed restrictions. Studies show that these measures can have a control efficiency ranging from 25 to 80% (UK Office of Deputy Prime Minister, 2002).

- A speed restriction of 20 km/hr will be applied as an effective control measure for dust for on-site vehicles using unpaved site roads;
- Any hard surface roads will be swept to remove mud and aggregate materials from their surface while any unsurfaced roads shall be restricted to essential site traffic only.

Storage Piles

The location and moisture content of storage piles are important factors which determine their potential for dust emissions.

- Where feasible, hoarding will be erected around site boundaries to reduce visual impact. This will also have an added benefit of preventing larger particles from impacting on nearby sensitive receptors.

Site Traffic on Public Roads

Spillage and blow-off of debris, aggregates and fine material onto public roads will be reduced to a minimum by employing the following measures:

- Vehicles delivering or collecting material with potential for dust emissions shall be enclosed or covered with tarpaulin at all times to restrict the escape of dust;
- At the main site traffic exits, a wheel wash facility shall be installed if feasible. All trucks leaving the site must pass through the wheel wash. In addition, public roads outside the site shall be regularly inspected for cleanliness, as a minimum on a daily basis, and cleaned as necessary.

Summary of Dust Mitigation Measures

The pro-active control of fugitive dust will ensure that the prevention of significant emissions, rather than an inefficient attempt to control them once they have been released, will contribute towards the satisfactory performance of the contractor. The key features with respect to control of dust will be:

- The specification of a site policy on dust and the identification of the site management responsibilities for dust issues;
- The development of a documented system for managing site practices with regard to dust control;
- The development of a means by which the performance of the dust minimisation plan can be regularly monitored and assessed; and
- The specification of effective measures to deal with any complaints received.

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APPENDIX 12.1

Noise Monitoring and Noise Sensitive Location Details

Path: R:\Map Production\2021\P21-150\Workspaces\EIAR\P21_150_GIS_Fig_NoiseMonitoringLocations_A3.mxd

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community
Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community
Mapping Reproduced Under Licence from the Ordnance Survey Ireland Licence No. EN 0001220 © Government of Ireland

TITLE:
Noise Monitoring Locations

PROJECT:
SID Application, EIAR and IE Licence
Application for Thorntons

FIGURE NO: 12.1

CLIENT: Thorntons Recycling

SCALE: 1:2500 **REVISION:** 0

DATE: 26/10/2022 **PAGE SIZE:** A3

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Table 12.1-1: Noise Sensitive Location Details

Receptor ID	Description	Easting	Northing
R1	Residential and Commercial	710195	739631
R2	Residential	710189	739619
R3	Residential	710188	739613
R4	Residential and Commercial	710170	739596
R5	Residential	710153	739457
R6	Residential	710167	739444
R7	Residential	710134	739445
R8	Residential	710144	739425
R9	Residential	710117	739420
R10	Residential	710132	739406
R11	Residential	710114	739402
R12	Residential	710107	739383
R13	Residential	710101	739365
R14	Residential	710094	739346
R15	Residential	710137	739845
R16	Residential	710145	739862
R17	Residential	710102	739855
R18	Residential	710061	739874
R19	Residential	710051	739870
R20	Residential	710038	739899
R21	Residential and Commercial	709919	739850

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APPENDIX 12.2

Sound Level Meter Calibration Certificate

SONITUS SYSTEMS

Statement of Calibration

Issued to:	Calibration Reference
Fehily Timoney	SLM200095

Fehily Timoney
J5 Plaza
North Park Business Park
North Road
Dublin 11

Test Date: 03/06/2020
Procedure: TP-SLM-1

Equipment

Item Calibrated:	Sound Level Meter	**Model**	977
Make:	Svantek	**Serial Number:**	69552

Calibration Procedure

The sound level meter was allowed to stabilize for a suitable period, as described in the manufacturer's instruction manual, in laboratory conditions. The sound level meter was calibrated by carrying out the verification tests detailed in IEC 61672-3 (2006), Periodic tests, specification of sound level meters. Tolerances for verification procedures are specified in IEC 61672-1 (2003).

Calibration Standards

Description	Serial Number
National Instruments PXI-4461	19C91D2
Stanford Research DS360	123803

The standards used in this calibration are traceable to NIST and/or other National Measurement Institutes (NMI's) that are signatories of the International Committee of Weights and Measures (CIPM) mutual recognition agreement (MRA).

Signed on behalf of Sonitus Systems:

Calibration Report

Equipment Description

Model:	Svantek	**Serial Number:**	69552
Model:	977	**Microphone Model:**	ACO 7052E

Ambient Conditions

Measurement conditions were within the tolerances defined in IEC 61672-1 and IEC 60942.

Barometric Pressure:	1030 hPa
Temperature:	21.6 °C
Relative Humidity:	45 %

Results Summary

IEC 61672 Test #	Test Description	Result
10	Self-generated noise	-
11	Frequency weighting (acoustical)	PASS
12	Frequency weighting (electrical)	PASS
13	Frequency and time weighting (1kHz)	PASS
14	Level linearity on reference level range	PASS
15	Level linearity with level range control	-
16	Toneburst response	PASS
17	Peak C sound level	PASS
18	Overload indication	PASS

As public evidence was available, from a testing organization responsible for approving the results of pattern evaluation tests, to demonstrate that the model of sound level meter fully conformed to the requirements for pattern evaluation described in IEC 61672:2003, the sound level meter tested is considered to conform to all the Class 1 requirements of IEC 61672:2003.

The manufacturer's guidelines concerning appropriate set up for measurement under various conditions should be observed during usage.

Prior to carrying out the verification tests the sound level meter was adjusted to read correctly using the acoustic calibrator held by the testing lab (Cirrus CR511ES, Serial number: 60871). The calibration procedure is described in the manufacturer's instruction manual.

Self-generated noise - IEC 61672-3 Test #10
SLM Measuring Mode: Leq

SLM Configuration	Freq. Weighting Network	SLM Reading
Microphone Installed	A	18.6
Microphone replaced by electrical input device fitted with short circuit	A	7.3
	C	7.3
	Z	12.6

Acoustical signal test of a frequency weighting - IEC 61672-3 Test #11
Range: reference level range
Frequency Weighting: C
Time Weighting: Slow

Input	Freq	Expected Level	Deviation	Tol +/-
94 dB	1000 Hz	94.0	0.0	1.0
	125 Hz	93.7	0.2	1.0
	4000 Hz	92.3	0.5	1.0

The frequency response was tested using an electrostatic actuator. Appropriate correction factors were applied where available from the manufacturer's instruction manual.

Electrical tests of frequency weighting - IEC 61672-3 Test #12
Range: reference level range

A-weighting

Freq	Expected Level	SLM Reading	Deviation	Tol +	Tol -
63	95.0	95.1	0.1	1.5	-1.5
125	95.0	95.0	0.0	1.5	-1.5
250	95.0	94.9	-0.1	1.4	-1.4
500	95.0	95.0	0.0	1.4	-1.4
1000	95.0	95.0	0.0	1.1	-1.1
2000	95.0	95.1	0.1	1.6	-1.6
4000	95.0	95.1	0.1	1.6	-1.6
8000	95.0	95.2	0.2	2.1	-3.1
16000	95.0	94.8	-0.2	3.5	-17.0

C-weighting

Freq	Expected Level	SLM Reading	Deviation	Tol +	Tol -
63	95.0	95.0	0.0	1.5	-1.5
125	95.0	95.4	0.4	1.5	-1.5
250	95.0	95.0	0.0	1.4	-1.4
500	95.0	95.0	0.0	1.4	-1.4
1000	95.0	95.0	0.0	1.1	-1.1
2000	95.0	95.1	0.1	1.6	-1.6
4000	95.0	95.1	0.1	1.6	-1.6
8000	95.0	95.2	0.2	2.1	-3.1
16000	95.0	94.7	-0.3	3.5	-17.0

Linear

Freq	Expected Level	SLM Reading	Deviation	Tol +	Tol -
63	95.0	95.1	0.1	1.5	-1.5
125	95.0	95.1	0.1	1.5	-1.5
250	95.0	95.0	0.0	1.4	-1.4
500	95.0	95.0	0.0	1.4	-1.4
1000	95.0	95.0	0.0	1.1	-1.1
2000	95.0	95.0	0.0	1.6	-1.6
4000	95.0	95.1	0.1	1.6	-1.6
8000	95.0	95.1	0.1	2.1	-3.1
16000	95.0	95.1	0.1	3.5	-17.0

Frequency and Time Weightings at 1 kHz IEC 61672-3 Test #13
Range: reference level range

Time Weighting	Freq. Weighting	Expected Level	Deviation	Tol +/-
Fast	A	94.0	ref	
	C	94.0	0.0	0.2
Slow	A	94.0	0.0	0.2
LEQ	A	94.0	0.0	0.2

Linearity level on reference range - IEC 61672-3 Test #14
Input frequency: 8 kHz
SLM Measuring Mode: SPL

Range	Expected Level	SLM Reading	Deviation	Tol +/-
123 dB	94.0	94.0	0.0	1.1
	99.0	99.0	0.0	1.1
	104.0	104.0	0.0	1.1
	109.0	109.0	0.0	1.1
	114.0	114.0	0.0	1.1
	119.0	119.0	0.0	1.1
	124.0	124.0	0.0	1.1
	129.0	129.0	0.0	1.1
	134.0	134.0	0.0	1.1
	135.0	135.0	0.0	1.1
	136.0	136.0	0.0	1.1
	137.0	137.0	0.0	1.1
	89.0	89.0	0.0	1.1
	84.0	84.0	0.0	1.1
	79.0	79.0	0.0	1.1
	74.0	74.0	0.0	1.1
	69.0	69.0	0.0	1.1
	64.0	64.0	0.0	1.1
	59.0	59.0	0.0	1.1
	54.0	54.0	0.0	1.1
	49.0	49.0	0.0	1.1
	44.0	44.0	0.0	1.1
	39.0	39.0	0.0	1.1
	38.0	38.0	0.0	1.1
	37.0	37.0	0.0	1.1
	36.0	36.0	0.0	1.1
	35.0	35.0	0.0	1.1

Toneburst response - IEC 61672-3 Test #16
Range: reference level range

Burst Type	Response	Expected Level	SLM Reading	Deviation	Tol +	Tol -
0.25 ms	LAFMAX	111.0	110.9	-0.1	0.8	-0.8
2.0 ms	LAFMAX	120.0	119.9	-0.1	1.3	-1.3
200 ms	LAFMAX	137.0	137.0	0.0	1.3	-3.3
2.0 ms	LASMAX	111.0	111.3	0.3	0.8	-0.8
200 ms	LASMAX	130.6	130.6	0.0	1.3	-3.3

Peak C sound level - IEC 61672-3 Test #17
Range: reference level range

Pulse Type	Freq	Expected Level	SLM Reading	Deviation	Tol +/-
1 cycle	8 kHz	135.4	135.3	-0.1	2.4
Pos ½ cycle	500 Hz	137.4	137.3	-0.1	1.4
Neg ½ cycle	500 Hz	137.4	137.3	-0.1	1.4

Overload indication IEC 61672-3 Test #18

Test Description	Overload at	Meas. Diff. (Pos – Neg)	Tol +/-
Pos. ½ cycle at 4 kHz	140.0		
Neg. ½ cycle at 4 kHz	140.0		
Level difference		0.0	1.8

Calibration Notes

1. The manufacturer's instruction manual was accessed through the manufacturer's website.
2. The sound level meter was powered by a regulated 9V power supply provided by the testing laboratory.

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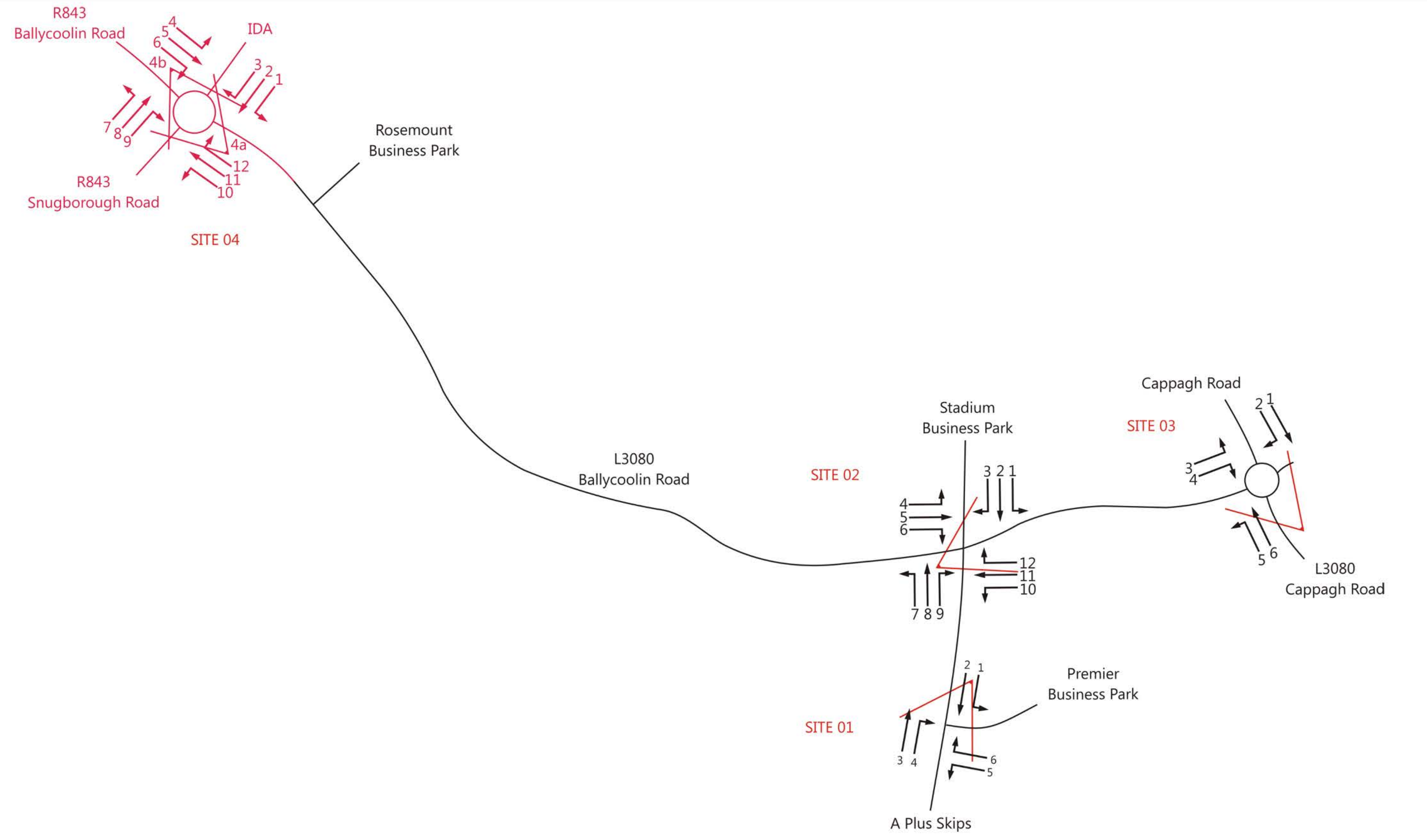
APPENDIX 13.1

Traffic Survey Data

Appendix 13-1 Traffic Survey Data

Survey Location Mapping

Site/Movement Numbering



Job number: TRA/21/217	Job date: 16th November 2021	Drawing No: TRA/21/217-02	traffinomics.ie
Client: Trafficwise Consulting Engineers	Job day Tuesday	Author: SPW	

Traffic Survey Site 01 – Premier Business Park Internal Junction

TRAFFINOMICS LIMITED

BALLYCOOLIN TRAFFIC COUNTS **NOVEMBER 2021**
MANUAL CLASSIFIED JUNCTION TURNING COUNTS **TRA/21/217**

SITE: 01

DATE: 16th November 2021

LOCATION: Premier Business Park/A Plus Skips

DAY: Tuesday

	MOVEMENT 1							MOVEMENT 2							MOVEMENT 3						
TIME	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**
07:00	4	2	0	0	0	6	6	1	0	0	1	0	2	3	0	0	0	0	0	0	0
07:15	3	1	1	0	0	5	6	0	1	0	0	0	1	1	0	0	2	1	0	3	5
07:30	1	5	0	0	0	6	6	1	0	2	0	0	3	4	0	0	2	0	0	2	3
07:45	4	0	0	0	0	4	4	0	0	5	0	0	5	8	0	0	3	0	0	3	5
H/TOT	12	8	1	0	0	21	22	2	1	7	1	0	11	16	0	0	7	1	0	8	13
08:00	0	0	1	0	0	1	2	1	0	0	0	0	1	1	0	0	4	0	0	4	6
08:15	1	1	0	0	0	2	2	0	0	2	0	0	2	3	0	0	2	0	0	2	3
08:30	1	1	0	0	0	2	2	0	0	5	2	0	7	12	0	0	1	0	0	1	2
08:45	6	1	0	0	0	7	7	0	0	3	1	0	4	7	0	0	4	0	0	4	6
H/TOT	8	3	1	0	0	12	13	1	0	10	3	0	14	23	0	0	11	0	0	11	17
09:00	4	1	0	0	0	5	5	0	0	1	0	0	1	2	0	0	2	2	0	4	8
09:15	3	2	0	0	0	5	5	0	0	1	2	0	3	6	0	0	1	1	0	2	4
09:30	4	1	2	0	0	7	8	0	0	1	2	0	3	6	0	0	2	1	0	3	5
09:45	3	1	1	0	0	5	6	0	0	1	1	0	2	4	0	0	0	1	0	1	2
H/TOT	14	5	3	0	0	22	24	0	0	4	5	0	9	18	0	0	5	5	0	10	19
10:00	3	1	1	1	0	6	8	0	0	2	1	0	3	5	0	0	0	1	0	1	2
10:15	0	3	0	0	0	3	3	0	0	2	2	0	4	8	0	0	4	2	0	6	11
10:30	3	0	0	0	0	3	3	0	0	2	2	0	4	8	0	0	2	1	0	3	5
10:45	2	1	1	0	0	4	5	0	0	3	3	0	6	11	0	0	1	2	0	3	6
H/TOT	8	5	2	1	0	16	18	0	0	9	8	0	17	32	0	0	7	6	0	13	24
11:00	2	1	0	0	0	3	3	0	0	2	0	0	2	3	0	0	2	2	0	4	8
11:15	1	2	0	0	0	3	3	0	0	6	1	0	7	11	0	0	3	0	0	3	5
11:30	2	0	1	0	0	3	4	0	0	0	0	0	0	0	0	0	3	1	0	4	7
11:45	0	3	0	0	0	3	3	0	0	3	1	0	4	7	0	0	3	0	0	3	5
H/TOT	5	6	1	0	0	12	13	0	0	11	2	0	13	21	0	0	11	3	0	14	23
12:00	1	1	2	0	0	4	5	0	0	0	2	0	2	5	0	0	2	1	0	3	5
12:15	0	2	0	0	0	2	2	0	0	2	1	0	3	5	0	0	0	1	0	1	2
12:30	1	2	2	0	0	5	6	0	0	2	1	0	3	5	0	0	2	0	0	2	3
12:45	1	2	1	0	0	4	5	0	0	1	1	0	2	4	1	0	0	1	0	2	3
H/TOT	3	7	5	0	0	15	18	0	0	5	5	0	10	19	1	0	4	3	0	8	14

TRAFFINOMICS LIMITED

BALLYCOOLIN TRAFFIC COUNTS **NOVEMBER 2021**

MANUAL CLASSIFIED JUNCTION TURNING COUNTS **TRA/21/217**

SITE: 01

DATE: 16th November 2021

LOCATION: Premier Business Park/A Plus Skips

DAY: Tuesday

	MOVEMENT 4							MOVEMENT 5							MOVEMENT 6						
TIME	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**
07:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	2	2
07:15	0	1	0	0	0	1	1	0	0	0	0	0	0	0	1	3	0	0	0	4	4
07:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	0	0	0	4	4
07:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	2	3
H/TOT	0	1	0	0	0	1	1	0	0	0	0	0	0	0	3	8	1	0	0	12	13
08:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1
08:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	2	2
08:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1
H/TOT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	0	0	0	4	4
09:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	2	2
09:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	2	2
09:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	1	0	0	5	6
09:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	3	4
H/TOT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	3	3	0	0	12	14
10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	2	2
10:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	1	0	0	5	6
10:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2	2
10:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	0	0	0	4	4
H/TOT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	4	1	0	0	13	14
11:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	1	0	4	6
11:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	3	4
11:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	3	4
11:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	2	2
H/TOT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	4	4	1	0	12	15
12:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	1	0	0	4	5
12:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	1	0	0	6	7
12:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1
12:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	3
H/TOT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	4	4	0	0	13	15

Traffic Survey Site 02 – Ballycoolin Road Traffic Signal Junction

TRAFFINOMICS LIMITED

BALLYCOOLIN TRAFFIC COUNTS **NOVEMBER 2021**

MANUAL CLASSIFIED JUNCTION TURNING COUNTS **TRA/21/217**

SITE: 02

DATE: 16th November 2021

LOCATION: Stadium Business Park/Ballycoolin Road/Premier Business Park

DAY: Tuesday

	MOVEMENT 1							**MOVEMENT 2**							**MOVEMENT 3**						
TIME	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**
07:00	1	4	0	0	0	5	5	0	0	0	0	0	0	0	1	0	0	3	0	4	8
07:15	0	0	1	0	0	1	2	0	0	0	0	0	0	0	3	3	0	4	0	10	15
07:30	2	3	4	1	0	10	13	0	0	0	0	0	0	0	2	2	3	1	0	8	11
07:45	3	3	0	0	0	6	6	0	0	0	0	0	0	0	1	3	3	2	0	9	13
H/TOT	6	10	5	1	0	22	26	0	0	0	0	0	0	0	7	8	6	10	0	31	47
08:00	1	3	2	1	0	7	9	0	0	0	0	0	0	0	5	1	2	0	0	8	9
08:15	2	1	2	0	0	5	6	0	0	0	0	0	0	0	2	7	0	1	0	10	11
08:30	1	3	0	0	0	4	4	0	1	0	0	0	1	1	2	2	1	0	0	5	6
08:45	0	2	1	0	0	3	4	0	0	0	0	0	0	0	5	6	1	2	0	14	17
H/TOT	4	9	5	1	0	19	23	0	1	0	0	0	1	1	14	16	4	3	0	37	43
09:00	3	3	0	0	0	6	6	0	0	0	0	0	0	0	2	3	1	1	0	7	9
09:15	5	3	1	1	0	10	12	0	0	0	0	0	0	0	3	3	4	1	0	11	14
09:30	0	8	3	0	0	11	13	0	1	0	0	0	1	1	4	4	2	3	0	13	18
09:45	5	3	3	1	0	12	15	0	0	0	0	0	0	0	3	5	2	0	0	10	11
H/TOT	13	17	7	2	0	39	45	0	1	0	0	0	1	1	12	15	9	5	0	41	52
10:00	7	1	0	0	0	8	8	0	0	0	0	0	0	0	16	5	3	2	0	26	30
10:15	3	6	2	0	0	11	12	0	0	0	0	0	0	0	7	1	3	2	0	13	17
10:30	4	4	0	0	0	8	8	0	0	0	0	0	0	0	7	1	0	4	0	12	17
10:45	3	2	1	1	0	7	9	0	0	0	0	0	0	0	4	1	3	1	0	9	12
H/TOT	17	13	3	1	0	34	37	0	0	0	0	0	0	0	34	8	9	9	0	60	76
11:00	2	9	3	1	0	15	18	0	0	0	0	0	0	0	3	6	3	3	0	15	20
11:15	1	4	1	1	0	7	9	0	0	0	0	0	0	0	5	2	1	3	0	11	15
11:30	6	3	0	1	0	10	11	0	0	0	0	0	0	0	8	2	2	3	0	15	20
11:45	3	7	0	0	0	10	10	0	0	0	0	0	0	0	5	3	0	1	0	9	10
H/TOT	12	23	4	3	0	42	48	0	0	0	0	0	0	0	21	13	6	10	0	50	66
12:00	4	4	0	0	1	9	10	0	0	0	0	0	0	0	6	6	2	1	0	15	17
12:15	3	3	1	1	0	8	10	0	0	0	0	0	0	0	5	2	1	1	0	9	11
12:30	5	2	1	1	0	9	11	0	0	0	0	0	0	0	9	3	3	2	0	17	21
12:45	6	1	2	0	0	9	10	0	0	1	0	0	1	2	8	1	1	1	0	11	13
H/TOT	18	10	4	2	1	35	41	0	0	1	0	0	1	2	28	12	7	5	0	52	62

TRAFFINOMICS LIMITED

BALLYCOOLIN TRAFFIC COUNTS **NOVEMBER 2021**

MANUAL CLASSIFIED JUNCTION TURNING COUNTS **TRA/21/217**

SITE: 02 DATE: 16th November 2021

LOCATION: Stadium Business Park/Ballycoolin Road/Premier Business Park DAY: Tuesday

	MOVEMENT 4							MOVEMENT 5							MOVEMENT 6						
TIME	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**
07:00	13	4	2	0	0	19	20	84	20	2	4	4	114	124	3	1	0	1	0	5	6
07:15	3	5	0	2	0	10	13	97	25	4	5	1	132	142	1	2	0	0	0	3	3
07:30	17	4	1	1	0	23	25	98	15	3	2	4	122	130	1	2	1	0	0	4	5
07:45	15	5	0	0	0	20	20	98	17	2	2	3	122	129	2	0	3	0	0	5	7
H/TOT	48	18	3	3	0	72	77	377	77	11	13	12	490	524	7	5	4	1	0	17	20
08:00	17	5	1	0	0	23	24	92	16	3	4	5	120	132	1	0	1	0	0	2	3
08:15	15	7	1	2	0	25	28	73	11	3	2	5	94	103	0	1	0	0	0	1	1
08:30	17	6	1	1	0	25	27	75	9	0	2	4	90	97	0	0	2	1	0	3	5
08:45	19	2	2	0	0	23	24	78	10	8	5	2	103	116	3	0	0	0	0	3	3
H/TOT	68	20	5	3	0	96	102	318	46	14	13	16	407	447	4	1	3	1	0	9	12
09:00	12	4	3	2	0	21	25	66	15	2	4	4	91	101	2	0	0	0	0	2	2
09:15	8	5	1	2	0	16	19	58	18	2	7	2	87	99	1	1	1	1	0	4	6
09:30	10	7	0	0	0	17	17	49	9	5	5	1	69	79	3	0	3	0	0	6	8
09:45	13	4	1	6	0	24	32	34	13	0	3	2	52	58	2	1	1	1	0	5	7
H/TOT	43	20	5	10	0	78	94	207	55	9	19	9	299	337	8	2	5	2	0	17	22
10:00	10	4	3	4	0	21	28	44	17	6	6	1	74	86	2	0	0	1	0	3	4
10:15	5	4	0	2	0	11	14	32	11	6	4	4	57	69	0	1	0	0	0	1	1
10:30	9	7	0	5	0	21	28	46	11	5	4	2	68	78	1	0	0	2	0	3	6
10:45	10	5	0	1	0	16	17	55	10	3	5	2	75	85	2	1	1	1	0	5	7
H/TOT	34	20	3	12	0	69	86	177	49	20	19	9	274	318	5	2	1	4	0	12	18
11:00	3	0	2	0	0	5	6	41	8	7	4	0	60	69	2	1	1	0	0	4	5
11:15	2	2	2	0	0	6	7	38	13	12	5	6	74	93	0	1	4	0	0	5	7
11:30	5	9	1	3	0	18	22	39	12	7	9	1	68	84	1	0	1	0	0	2	3
11:45	7	7	0	2	1	17	21	35	11	5	6	1	58	69	0	1	1	0	0	2	3
H/TOT	17	18	5	5	1	46	56	153	44	31	24	8	260	315	3	3	7	0	0	13	17
12:00	2	6	0	0	0	8	8	40	6	12	4	2	64	77	1	0	1	1	0	3	5
12:15	7	3	2	0	0	12	13	53	11	2	8	3	77	91	0	1	0	1	0	2	3
12:30	4	2	1	1	0	8	10	51	11	5	6	1	74	85	1	2	3	1	0	7	10
12:45	7	0	4	2	0	13	18	43	5	4	6	1	59	70	1	2	1	1	0	5	7
H/TOT	20	11	7	3	0	41	48	187	33	23	24	7	274	324	3	5	5	4	0	17	25

TRAFFINOMICS LIMITED

BALLYCOOLIN TRAFFIC COUNTS **NOVEMBER 2021**

MANUAL CLASSIFIED JUNCTION TURNING COUNTS **TRA/21/217**

SITE: 02 DATE: 16th November 2021

LOCATION: Stadium Business Park/Ballycoolin Road/Premier Business Park DAY: Tuesday

	MOVEMENT 7							MOVEMENT 8							MOVEMENT 9						
TIME	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**
07:00	0	1	0	0	0	1	1	1	0	0	0	0	1	1	0	0	0	0	0	0	0
07:15	0	1	1	1	0	3	5	0	1	0	0	0	1	1	1	1	1	0	0	3	4
07:30	0	0	1	0	0	1	2	1	0	0	0	0	1	1	0	3	1	0	0	4	5
07:45	0	0	2	0	0	2	3	0	0	0	0	0	0	0	0	1	2	0	0	3	4
H/TOT	0	2	4	1	0	7	10	2	1	0	0	0	3	3	1	5	4	0	0	10	12
08:00	1	0	1	0	0	2	3	0	0	0	0	0	0	0	0	0	3	0	0	3	5
08:15	0	0	2	0	0	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30	0	0	1	0	0	1	2	0	0	0	0	0	0	0	1	1	0	0	0	2	2
08:45	0	0	2	0	0	2	3	0	0	0	0	0	0	0	1	0	2	0	0	3	4
H/TOT	1	0	6	0	0	7	10	0	0	0	0	0	0	0	2	1	5	0	0	8	11
09:00	1	1	1	2	0	5	8	0	0	0	0	0	0	0	0	0	1	0	0	1	2
09:15	1	1	0	0	0	2	2	0	0	0	0	0	0	0	0	0	1	1	0	2	4
09:30	2	1	1	1	0	5	7	0	0	0	0	0	0	0	1	0	2	0	0	3	4
09:45	1	0	0	0	0	1	1	0	0	1	0	0	1	2	0	0	1	1	0	2	4
H/TOT	5	3	2	3	0	13	18	0	0	1	0	0	1	2	1	0	5	2	0	8	13
10:00	1	0	0	1	0	2	3	0	0	0	0	0	0	0	0	1	0	0	0	1	1
10:15	1	0	2	2	0	5	9	0	1	0	0	0	1	1	1	1	3	0	0	5	7
10:30	2	0	0	1	0	3	4	0	0	0	0	0	0	0	0	0	2	0	0	2	3
10:45	2	0	1	1	0	4	6	0	1	0	0	0	1	1	1	0	0	1	0	2	3
H/TOT	6	0	3	5	0	14	22	0	2	0	0	0	2	2	2	2	5	1	0	10	14
11:00	2	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	3	3	0	6	11
11:15	0	2	3	0	0	5	7	0	0	0	0	0	0	0	0	0	1	0	0	1	2
11:30	0	0	3	1	0	4	7	0	0	0	0	0	0	0	0	1	2	0	0	3	4
11:45	0	1	1	0	0	2	3	0	0	0	0	0	0	0	1	0	2	0	0	3	4
H/TOT	2	3	7	1	0	13	18	0	0	0	0	0	0	0	1	1	8	3	0	13	21
12:00	1	0	3	0	0	4	6	0	0	0	0	0	0	0	1	1	0	1	0	3	4
12:15	1	2	0	0	0	3	3	0	0	0	0	0	0	0	1	1	1	1	0	4	6
12:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	3	4
12:45	1	0	2	1	0	4	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	3	2	5	1	0	11	15	0	0	0	0	0	0	0	3	2	3	2	0	10	14

TRAFFINOMICS LIMITED

BALLYCOOLIN TRAFFIC COUNTS **NOVEMBER 2021**

MANUAL CLASSIFIED JUNCTION TURNING COUNTS **TRA/21/217**

SITE: 02

DATE: 16th November 2021

LOCATION: Stadium Business Park/Ballycoolin Road/Premier Business Park

DAY: Tuesday

	MOVEMENT 10							**MOVEMENT 11**							**MOVEMENT 12**						
TIME	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**
07:00	2	1	0	0	0	3	3	46	11	6	5	2	70	82	5	0	1	1	0	7	9
07:15	2	0	1	0	0	3	4	56	8	6	4	3	77	88	15	1	1	0	0	17	18
07:30	1	3	1	0	0	5	6	64	9	2	6	2	83	94	6	3	2	1	0	12	14
07:45	2	0	2	0	0	4	5	103	9	2	0	4	118	123	9	1	2	1	0	13	15
H/TOT	7	4	4	0	0	15	17	269	37	16	15	11	348	387	35	5	6	3	0	49	56
08:00	0	0	0	0	0	0	0	101	11	3	6	3	124	136	10	4	1	0	0	15	16
08:15	1	0	2	0	0	3	4	102	10	5	3	2	122	130	4	1	0	2	0	7	10
08:30	1	0	3	1	0	5	8	82	13	1	3	4	103	111	18	3	1	0	0	22	23
08:45	3	1	3	1	0	8	11	102	9	3	1	2	117	122	13	2	1	1	0	17	19
H/TOT	5	1	8	2	0	16	23	387	43	12	13	11	466	500	45	10	3	3	0	61	66
09:00	2	1	1	0	0	4	5	83	14	5	3	2	107	115	11	3	0	1	0	15	16
09:15	2	1	0	1	0	4	5	77	13	4	2	3	99	107	12	4	3	0	0	19	21
09:30	1	0	0	2	0	3	6	73	12	1	8	2	96	109	8	2	2	1	0	13	15
09:45	1	0	1	0	0	2	3	62	7	7	0	2	78	84	5	4	1	0	0	10	11
H/TOT	6	2	2	3	0	13	18	295	46	17	13	9	380	414	36	13	6	2	0	57	63
10:00	1	1	3	1	0	6	9	52	8	5	4	2	71	81	2	4	2	0	0	8	9
10:15	0	2	2	2	0	6	10	41	8	4	6	2	61	73	7	5	0	1	0	13	14
10:30	2	0	2	0	0	4	5	52	9	6	6	3	76	90	4	1	2	1	0	8	10
10:45	0	0	3	2	0	5	9	42	6	3	4	1	56	64	5	3	1	1	0	10	12
H/TOT	3	3	10	5	0	21	33	187	31	18	20	8	264	307	18	13	5	3	0	39	45
11:00	0	0	1	0	0	1	2	41	4	2	7	1	55	66	4	4	1	1	0	10	12
11:15	1	1	2	1	0	5	7	46	9	4	7	3	69	83	5	2	0	0	0	7	7
11:30	1	0	0	0	0	1	1	32	9	6	2	1	50	57	2	2	3	0	0	7	9
11:45	0	2	2	1	0	5	7	53	9	3	4	2	71	80	5	5	0	0	0	10	10
H/TOT	2	3	5	2	0	12	17	172	31	15	20	7	245	286	16	13	4	1	0	34	37
12:00	0	1	1	1	0	3	5	40	12	5	2	3	62	70	2	2	2	0	0	6	7
12:15	0	1	2	0	0	3	4	41	7	5	5	2	60	71	4	3	2	1	0	10	12
12:30	0	0	1	0	0	1	2	46	7	7	4	0	64	73	5	1	2	0	0	8	9
12:45	0	0	0	0	0	0	0	55	13	5	5	5	83	97	5	3	2	0	0	10	11
H/TOT	0	2	4	1	0	7	10	182	39	22	16	10	269	311	16	9	8	1	0	34	39

BALLYCOOLIN TRAFFIC COUNTS **NOVEMBER 2021**

MANUAL CLASSIFIED JUNCTION TURNING COUNTS **TRA/21/217**

SITE: 02 DATE: 16th November 2021

LOCATION: Stadium Business Park/Ballycoolin Road/Premier Business Park DAY: Tuesday

	MOVEMENT 1							**MOVEMENT 2**							**MOVEMENT 3**						
TIME	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**
13:00	13	2	1	1	0	17	19	1	0	0	0	0	1	1	16	2	1	3	0	22	26
13:15	3	2	0	0	0	5	5	0	0	0	0	0	0	0	8	2	2	1	0	13	15
13:30	3	1	1	1	0	6	8	0	0	0	0	0	0	0	9	4	0	2	0	15	18
13:45	7	1	0	0	0	8	8	0	1	1	0	0	2	3	9	4	1	1	0	15	17
H/TOT	26	6	2	2	0	36	40	1	1	1	0	0	3	4	42	12	4	7	0	65	76
14:00	4	4	1	0	0	9	10	0	0	1	0	0	1	2	4	8	5	2	0	19	24
14:15	9	0	0	0	0	9	9	0	0	0	0	0	0	0	2	6	0	3	0	11	15
14:30	4	0	4	1	0	9	12	0	0	0	0	0	0	0	5	4	0	1	0	10	11
14:45	3	3	2	0	0	8	9	0	0	1	0	0	1	2	5	3	0	1	0	9	10
H/TOT	20	7	7	1	0	35	40	0	0	2	0	0	2	3	16	21	5	7	0	49	61
15:00	7	2	1	2	0	12	15	0	0	0	0	0	0	0	10	4	3	2	0	19	23
15:15	10	3	0	0	0	13	13	0	0	0	0	0	0	0	5	7	2	2	0	16	20
15:30	8	1	2	0	0	11	12	0	0	0	0	0	0	0	4	5	2	2	0	13	17
15:45	10	3	3	1	0	17	20	0	0	0	0	0	0	0	6	4	2	3	0	15	20
H/TOT	35	9	6	3	0	53	60	0	0	0	0	0	0	0	25	20	9	9	0	63	79
16:00	7	2	1	0	0	10	11	0	1	0	0	0	1	1	12	7	1	1	0	21	23
16:15	7	2	2	0	0	11	12	0	0	0	0	0	0	0	9	1	0	4	0	14	19
16:30	10	1	1	0	0	12	13	0	0	0	0	0	0	0	15	3	0	1	0	19	20
16:45	13	2	1	0	0	16	17	0	1	0	0	0	1	1	8	2	0	0	0	10	10
H/TOT	37	7	5	0	0	49	52	0	2	0	0	0	2	2	44	13	1	6	0	64	72
17:00	19	4	1	0	0	24	25	0	0	0	0	0	0	0	33	6	0	0	0	39	39
17:15	5	4	1	0	0	10	11	0	0	0	0	0	0	0	11	3	3	0	0	17	19
17:30	9	2	0	0	0	11	11	0	0	0	0	0	0	0	17	0	0	0	0	17	17
17:45	3	0	0	0	0	3	3	0	0	0	0	0	0	0	11	0	0	0	0	11	11
H/TOT	36	10	2	0	0	48	49	0	0	0	0	0	0	0	72	9	3	0	0	84	86
18:00	10	2	1	0	0	13	14	0	0	0	0	0	0	0	16	2	0	1	0	19	20
18:15	12	0	2	0	0	14	15	0	0	0	0	0	0	0	10	1	0	1	0	12	13
18:30	3	0	0	0	0	3	3	0	0	0	0	0	0	0	2	0	1	3	0	6	10
18:45	6	0	0	2	0	8	11	0	0	0	0	0	0	0	2	1	0	0	0	3	3
H/TOT	31	2	3	2	0	38	42	0	0	0	0	0	0	0	30	4	1	5	0	40	47
P/TOT	255	123	53	18	1	450	501	1	5	4	0	0	10	12	345	151	64	76	0	636	767

TRAFFINOMICS LIMITED

BALLYCOOLIN TRAFFIC COUNTS **NOVEMBER 2021**

MANUAL CLASSIFIED JUNCTION TURNING COUNTS **TRA/21/217**

SITE: 02 DATE: 16th November 2021

LOCATION: Stadium Business Park/Ballycoolin Road/Premier Business Park DAY: Tuesday

	MOVEMENT 4							**MOVEMENT 5**							**MOVEMENT 6**						
TIME	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**
13:00	3	3	2	1	0	9	11	53	9	3	9	7	81	101	0	1	0	0	0	1	1
13:15	5	3	2	1	0	11	13	57	7	10	8	3	85	103	4	0	1	0	0	5	6
13:30	11	3	1	1	0	16	18	48	4	5	6	2	65	77	3	1	0	1	0	5	6
13:45	8	2	3	2	0	15	19	53	6	5	3	2	69	77	2	1	0	0	0	3	3
H/TOT	27	11	8	5	0	51	62	211	26	23	26	14	300	359	9	3	1	1	0	14	16
14:00	12	6	0	2	0	20	23	64	14	2	5	2	87	97	3	1	1	1	0	6	8
14:15	7	3	4	3	0	17	23	46	9	6	6	2	69	82	3	1	1	0	0	5	6
14:30	9	6	2	4	0	21	27	54	17	1	2	0	74	77	1	0	0	0	0	1	1
14:45	5	4	0	3	0	12	16	56	7	2	6	3	74	86	0	0	0	1	0	1	2
H/TOT	33	19	6	12	0	70	89	220	47	11	19	7	304	341	7	2	2	2	0	13	17
15:00	7	5	2	0	0	14	15	60	6	2	4	3	75	84	1	0	2	0	0	3	4
15:15	3	4	1	2	0	10	13	48	9	4	7	2	70	83	0	0	0	0	0	0	0
15:30	6	3	0	1	0	10	11	70	15	6	2	3	96	105	0	0	0	0	0	0	0
15:45	4	5	2	2	0	13	17	75	9	0	2	3	89	95	1	1	1	0	1	4	6
H/TOT	20	17	5	5	0	47	56	253	39	12	15	11	330	367	2	1	3	0	1	7	10
16:00	1	1	2	0	0	4	5	69	10	5	2	2	88	95	0	0	0	0	0	0	0
16:15	1	1	1	0	0	3	4	64	10	4	3	2	83	91	1	0	1	0	0	2	3
16:30	0	1	1	0	0	2	3	70	12	5	2	2	91	98	0	0	0	0	0	0	0
16:45	4	1	2	2	0	9	13	74	11	2	5	1	93	102	1	0	0	0	0	1	1
H/TOT	6	4	6	2	0	18	24	277	43	16	12	7	355	386	2	0	1	0	0	3	4
17:00	4	3	2	0	0	9	10	94	9	2	2	3	110	117	2	1	1	0	0	4	5
17:15	5	1	4	3	0	13	19	70	9	3	2	4	88	96	0	0	0	0	0	0	0
17:30	5	1	0	2	0	8	11	67	7	1	2	2	79	84	0	0	2	0	0	2	3
17:45	7	2	0	3	0	12	16	65	5	5	2	1	78	84	0	0	1	0	0	1	2
H/TOT	21	7	6	8	0	42	55	296	30	11	8	10	355	381	2	1	4	0	0	7	9
18:00	3	1	0	0	0	4	4	65	5	1	3	2	76	82	0	0	0	0	0	0	0
18:15	2	1	0	2	0	5	8	59	2	1	1	2	65	69	0	0	0	0	0	0	0
18:30	1	0	1	2	0	4	7	58	4	1	3	3	69	76	1	0	0	0	0	1	1
18:45	0	1	1	1	0	3	5	49	0	1	0	0	50	51	1	1	0	0	0	2	2
H/TOT	6	3	2	5	0	16	24	231	11	4	7	7	260	278	2	1	0	0	0	3	3
P/TOT	343	168	61	73	1	646	772	2907	500	185	199	117	3908	4376	54	26	36	15	1	132	171

TRAFFINOMICS LIMITED

BALLYCOOLIN TRAFFIC COUNTS **NOVEMBER 2021**

MANUAL CLASSIFIED JUNCTION TURNING COUNTS **TRA/21/217**

SITE: 02

DATE: 16th November 2021

LOCATION: Stadium Business Park/Ballycoolin Road/Premier Business Park

DAY: Tuesday

	MOVEMENT 7							MOVEMENT 8							MOVEMENT 9						
TIME	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**
13:00	1	1	0	1	0	3	4	0	0	0	0	0	0	0	2	0	2	0	0	4	5
13:15	1	0	1	1	0	3	5	0	0	0	0	0	0	0	0	2	2	0	0	4	5
13:30	3	0	1	2	0	6	9	0	0	0	0	0	0	0	1	1	0	0	0	2	2
13:45	1	1	1	0	0	3	4	0	0	0	0	0	0	0	2	1	0	0	0	3	3
H/TOT	6	2	3	4	0	15	22	0	0	0	0	0	0	0	5	4	4	0	0	13	15
14:00	0	1	1	1	0	3	5	0	0	0	0	0	0	0	0	0	2	1	0	3	5
14:15	3	1	2	1	0	7	9	0	0	0	0	0	0	0	0	1	2	0	0	3	4
14:30	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	3	0	0	4	6
14:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	0	0	4	5
H/TOT	4	2	3	2	0	11	15	0	0	0	0	0	0	0	2	2	9	1	0	14	20
15:00	2	0	0	1	0	3	4	0	0	0	0	0	0	0	0	0	3	0	0	3	5
15:15	0	4	1	0	0	5	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:30	1	1	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:45	2	2	0	0	0	4	4	0	0	0	0	0	0	0	3	0	0	0	0	3	3
H/TOT	5	7	1	1	0	14	16	0	0	0	0	0	0	0	3	0	3	0	0	6	8
16:00	4	0	0	0	0	4	4	0	0	0	0	0	0	0	4	0	1	0	0	5	6
16:15	1	2	0	0	0	3	3	0	0	0	0	0	0	0	3	1	2	0	0	6	7
16:30	2	1	1	0	0	4	5	0	0	0	0	0	0	0	4	0	0	0	0	4	4
16:45	3	2	0	0	0	5	5	0	0	0	0	0	0	0	1	1	0	0	0	2	2
H/TOT	10	5	1	0	0	16	17	0	0	0	0	0	0	0	12	2	3	0	0	17	19
17:00	8	2	0	0	0	10	10	0	0	0	0	0	0	0	4	1	1	0	0	6	7
17:15	1	1	0	0	0	2	2	0	0	0	0	0	0	0	1	0	0	0	0	1	1
17:30	3	1	0	0	0	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	12	4	0	0	0	16	16	0	0	0	0	0	0	0	5	1	1	0	0	7	8
18:00	6	0	0	0	0	6	6	0	0	0	0	0	0	0	1	0	1	0	0	2	3
18:15	2	1	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:45	1	0	0	0	0	1	1	0	0	0	0	0	0	0	2	0	0	0	0	2	2
H/TOT	9	1	0	0	0	10	10	0	0	0	0	0	0	0	3	0	1	0	0	4	5
P/TOT	63	31	35	18	0	147	188	2	3	1	0	0	6	7	40	20	51	9	0	120	157

TRAFFINOMICS LIMITED

BALLYCOOLIN TRAFFIC COUNTS **NOVEMBER 2021**

MANUAL CLASSIFIED JUNCTION TURNING COUNTS **TRA/21/217**

SITE: 02

DATE: 16th November 2021

LOCATION: Stadium Business Park/Ballycoolin Road/Premier Business Park

DAY: Tuesday

	MOVEMENT 10							MOVEMENT 11							MOVEMENT 12						
TIME	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**
13:00	0	2	2	0	0	4	5	54	18	5	7	2	86	100	10	3	0	2	0	15	18
13:15	1	1	1	1	0	4	6	54	8	8	4	2	76	87	6	0	0	1	0	7	8
13:30	0	0	2	0	0	2	3	54	9	6	3	2	74	83	7	5	1	0	0	13	14
13:45	1	0	1	0	0	2	3	60	6	6	4	2	78	88	7	2	1	1	0	11	13
H/TOT	2	3	6	1	0	12	16	222	41	25	18	8	314	358	30	10	2	4	0	46	52
14:00	4	2	1	0	0	7	8	52	18	5	8	1	84	98	5	5	0	0	0	10	10
14:15	0	0	2	1	0	3	5	77	17	4	9	2	109	125	4	0	1	0	0	5	6
14:30	2	1	2	0	0	5	6	55	7	2	4	2	70	78	7	1	1	0	0	9	10
14:45	0	1	0	0	0	1	1	55	8	3	4	4	74	85	5	1	0	1	0	7	8
H/TOT	6	4	5	1	0	16	20	239	50	14	25	9	337	386	21	7	2	1	0	31	33
15:00	0	1	1	0	0	2	3	77	9	3	11	1	101	118	5	2	3	0	0	10	12
15:15	0	2	0	0	0	2	2	50	11	4	5	4	74	87	6	3	1	1	0	11	13
15:30	0	0	0	0	0	0	0	40	14	2	6	4	66	79	5	5	0	0	0	10	10
15:45	1	1	2	0	0	4	5	68	11	2	6	1	88	98	3	0	1	0	0	4	5
H/TOT	1	4	3	0	0	8	10	235	45	11	28	10	329	381	19	10	5	1	0	35	39
16:00	0	0	1	0	0	1	2	97	21	2	5	4	129	141	2	3	3	0	0	8	10
16:15	1	2	0	0	0	3	3	92	19	3	6	2	122	133	6	2	0	0	0	8	8
16:30	0	1	0	0	0	1	1	109	18	3	1	2	133	138	2	3	0	0	0	5	5
16:45	1	0	0	1	0	2	3	78	12	3	5	2	100	110	2	2	3	0	0	7	9
H/TOT	2	3	1	1	0	7	9	376	70	11	17	10	484	522	12	10	6	0	0	28	31
17:00	0	0	1	1	0	2	4	153	25	1	3	2	184	190	0	2	1	0	0	3	4
17:15	1	0	0	0	0	1	1	95	15	2	2	3	117	124	1	0	0	0	0	1	1
17:30	0	0	1	0	0	1	2	115	16	3	2	2	138	144	0	1	2	0	0	3	4
17:45	0	0	0	0	0	0	0	90	18	2	0	2	112	115	3	0	0	0	0	3	3
H/TOT	1	0	2	1	0	4	6	453	74	8	7	9	551	573	4	3	3	0	0	10	12
18:00	0	0	0	0	0	0	0	97	15	1	2	3	118	124	1	1	2	1	0	5	7
18:15	1	0	0	0	0	1	1	85	15	3	1	2	106	111	1	0	0	1	0	2	3
18:30	0	0	0	0	0	0	0	82	21	1	2	3	109	115	0	0	0	0	0	0	0
18:45	0	0	0	0	0	0	0	65	1	0	1	2	69	72	2	1	0	0	0	3	3
H/TOT	1	0	0	0	0	1	1	329	52	5	6	10	402	422	4	2	2	2	0	10	14
P/TOT	36	29	50	17	0	132	179	3346	559	174	198	112	4389	4845	256	105	52	21	0	434	487

Traffic Survey Site 03 – Cappagh Road/Ballycoolin Road Roundabout

TRAFFINOMICS LIMITED

BALLYCOOLIN TRAFFIC COUNTS **NOVEMBER 2021**

MANUAL CLASSIFIED JUNCTION TURNING COUNTS **TRA/21/217**

SITE: 03 DATE: 16th November 2021

LOCATION: Cappagh Road/Ballycoolin Road Roundabout DAY: Tuesday

	MOVEMENT 1							MOVEMENT 2							MOVEMENT 3						
TIME	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**
07:00	27	9	3	0	0	39	41	8	0	5	6	0	19	29	2	2	1	3	0	8	12
07:15	39	9	5	1	0	54	58	13	3	5	3	0	24	30	4	2	2	3	0	11	16
07:30	34	8	5	0	0	47	50	2	3	4	6	0	15	25	2	5	3	3	0	13	18
07:45	36	14	3	2	2	57	63	8	0	2	1	0	11	13	7	3	3	1	0	14	17
H/TOT	136	40	16	3	2	197	211	31	6	16	16	0	69	98	15	12	9	10	0	46	64
08:00	36	8	5	1	1	51	56	6	5	3	5	0	19	27	5	1	5	5	0	16	25
08:15	37	9	4	1	1	52	56	8	5	4	5	0	22	31	1	4	0	2	0	7	10
08:30	37	6	3	1	0	47	50	11	5	1	4	0	21	27	2	1	0	1	0	4	5
08:45	27	7	2	1	2	39	43	14	1	3	3	0	21	26	4	4	6	4	0	18	26
H/TOT	137	30	14	4	4	189	205	39	16	11	17	0	83	111	12	10	11	12	0	45	66
09:00	34	13	3	1	0	51	54	6	3	3	3	0	15	20	9	5	2	4	0	20	26
09:15	22	8	4	5	1	40	50	10	8	3	3	0	24	29	7	5	1	8	0	21	32
09:30	29	14	6	1	1	51	56	7	3	1	8	0	19	30	3	4	4	5	0	16	25
09:45	10	8	4	3	0	25	31	4	4	8	0	0	16	20	9	5	3	4	0	21	28
H/TOT	95	43	17	10	2	167	191	27	18	15	14	0	74	100	28	19	10	21	0	78	110
10:00	14	10	4	1	1	30	34	5	6	5	5	0	21	30	5	6	6	6	0	23	34
10:15	17	11	3	4	0	35	42	9	6	3	3	0	21	26	3	1	3	3	0	10	15
10:30	19	9	2	1	1	32	35	6	0	7	6	0	19	30	8	6	3	3	0	20	25
10:45	10	8	4	2	0	24	29	4	3	3	5	0	15	23	5	4	3	7	0	19	30
H/TOT	60	38	13	8	2	121	140	24	15	18	19	0	76	110	21	17	15	19	0	72	104
11:00	23	6	2	1	1	33	36	6	5	4	6	0	21	31	8	5	13	8	0	34	51
11:15	12	11	3	2	0	28	32	3	4	4	6	0	17	27	4	6	9	6	0	25	37
11:30	14	6	6	3	1	30	38	1	2	3	2	0	8	12	5	4	3	10	0	22	37
11:45	9	4	4	3	0	20	26	4	4	4	5	0	17	26	7	3	4	6	0	20	30
H/TOT	58	27	15	9	2	111	132	14	15	15	19	0	63	95	24	18	29	30	0	101	155
12:00	14	4	1	0	1	20	22	2	4	5	3	0	14	20	9	3	9	5	0	26	37
12:15	15	5	3	1	1	25	29	2	3	5	5	0	15	24	2	3	4	8	0	17	29
12:30	17	3	3	1	2	26	31	4	3	4	3	0	14	20	5	6	5	7	0	23	35
12:45	10	9	1	3	0	23	27	9	3	7	5	0	24	34	15	1	5	3	0	24	30
H/TOT	56	21	8	5	4	94	109	17	13	21	16	0	67	98	31	13	23	23	0	90	131

BALLYCOOLIN TRAFFIC COUNTS **NOVEMBER 2021**

MANUAL CLASSIFIED JUNCTION TURNING COUNTS **TRA/21/217**

SITE: 03 DATE: 16th November 2021

LOCATION: Cappagh Road/Ballycoolin Road Roundabout DAY: Tuesday

	MOVEMENT 4							**MOVEMENT 5**							**MOVEMENT 6**						
TIME	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**
07:00	83	22	1	1	4	111	117	45	12	2	0	2	61	64	20	9	2	0	1	32	34
07:15	94	24	4	2	1	125	131	60	6	3	1	3	73	79	21	7	2	1	0	31	33
07:30	98	16	5	0	4	123	130	69	12	1	1	2	85	89	31	4	2	2	1	40	45
07:45	94	18	1	1	3	117	122	106	10	4	0	4	124	130	55	14	2	1	0	72	74
H/TOT	369	80	11	4	12	476	499	280	40	10	2	11	343	362	127	34	8	4	2	175	186
08:00	88	18	3	0	5	114	121	105	10	1	1	3	120	125	44	8	2	4	2	60	68
08:15	74	8	5	0	5	92	100	99	6	3	0	2	110	114	42	11	2	2	0	57	61
08:30	75	12	0	1	4	92	97	90	11	4	0	4	109	115	38	9	0	1	0	48	49
08:45	75	8	5	1	2	91	97	104	11	4	0	2	121	125	51	5	0	1	1	58	60
H/TOT	312	46	13	2	16	389	414	398	38	12	1	11	460	478	175	33	4	8	3	223	238
09:00	60	13	1	0	4	78	83	90	15	3	1	2	111	116	45	7	4	0	1	57	60
09:15	56	16	3	1	2	78	83	81	10	4	0	3	98	103	31	7	6	1	1	46	51
09:30	47	13	6	0	1	67	71	75	11	2	3	2	93	100	19	7	3	5	1	35	44
09:45	30	11	1	1	2	45	49	64	7	1	0	2	74	77	14	8	1	0	0	23	24
H/TOT	193	53	11	2	9	268	285	310	43	10	4	9	376	395	109	29	14	6	3	161	179
10:00	46	13	0	0	1	60	61	50	7	5	0	2	64	69	17	4	4	1	1	27	31
10:15	33	17	8	1	4	63	72	39	9	3	6	2	59	70	12	7	4	4	0	27	34
10:30	42	9	4	1	2	58	63	52	10	3	1	3	69	75	18	5	8	2	1	34	42
10:45	54	8	1	0	2	65	68	43	6	4	2	1	56	62	19	11	8	1	0	39	44
H/TOT	175	47	13	2	9	246	264	184	32	15	9	8	248	275	66	27	24	8	2	127	151
11:00	35	12	0	0	0	47	47	39	3	0	2	1	45	49	13	9	7	4	0	33	42
11:15	35	11	5	0	6	57	66	49	8	2	2	3	64	71	10	9	5	0	1	25	29
11:30	40	12	6	0	1	59	63	34	9	6	0	1	50	54	17	3	2	1	1	24	27
11:45	32	15	3	0	1	51	54	54	12	1	0	2	69	72	15	9	5	5	0	34	43
H/TOT	142	50	14	0	8	214	229	176	32	9	4	7	228	245	55	30	19	10	2	116	141
12:00	36	8	3	0	3	50	55	40	11	3	0	3	57	62	19	3	3	3	1	29	35
12:15	55	12	0	2	3	72	78	43	8	4	1	2	58	63	13	7	5	2	0	27	32
12:30	52	7	3	0	1	63	66	47	5	6	1	0	59	63	20	8	2	1	0	31	33
12:45	34	5	1	3	1	44	49	51	13	0	0	5	69	74	18	6	2	1	1	28	31
H/TOT	177	32	7	5	8	229	247	181	37	13	2	10	243	262	70	24	12	7	2	115	132

BALLYCOOLIN TRAFFIC COUNTS **NOVEMBER 2021**

MANUAL CLASSIFIED JUNCTION TURNING COUNTS **TRA/21/217**

SITE: 03

DATE: 16th November 2021

LOCATION: Cappagh Road/Ballycoolin Road Roundabout

DAY: Tuesday

	MOVEMENT 1							**MOVEMENT 2**							**MOVEMENT 3**						
TIME	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**
13:00	33	7	2	0	1	43	45	6	3	5	6	0	20	30	11	6	0	9	0	26	38
13:15	15	7	2	1	0	25	27	4	6	6	5	0	21	31	5	2	7	7	0	21	34
13:30	10	6	1	1	1	19	22	7	4	6	3	0	20	27	3	2	2	7	0	14	24
13:45	17	9	1	2	0	29	32	3	4	3	5	0	15	23	7	5	2	3	0	17	22
H/TOT	75	29	6	4	2	116	126	20	17	20	19	0	76	111	26	15	11	26	0	78	117
14:00	25	6	0	1	1	33	35	7	6	6	5	0	24	34	3	5	4	5	0	17	26
14:15	17	8	3	2	1	31	36	8	0	4	9	0	21	35	5	5	7	6	0	23	34
14:30	12	8	3	0	0	23	25	6	2	3	4	0	15	22	6	5	3	3	0	17	22
14:45	25	5	1	0	1	32	34	6	4	2	5	0	17	25	7	2	6	5	0	20	30
H/TOT	79	27	7	3	3	119	129	27	12	15	23	0	77	114	21	17	20	19	0	77	112
15:00	20	4	0	1	1	26	28	6	7	3	10	0	26	41	7	3	4	6	0	20	30
15:15	13	5	1	1	1	21	24	6	2	2	4	0	14	20	9	7	4	4	0	24	31
15:30	23	10	0	2	1	36	40	5	6	2	6	0	19	28	5	7	6	2	0	20	26
15:45	19	4	1	2	0	26	29	4	1	5	4	0	14	22	5	1	3	3	0	12	17
H/TOT	75	23	2	6	3	109	121	21	16	12	24	0	73	110	26	18	17	15	0	76	104
16:00	37	9	4	1	1	52	56	12	5	2	5	0	24	32	16	0	6	2	0	24	30
16:15	29	4	0	0	0	33	33	9	2	1	2	0	14	17	11	2	7	2	0	22	28
16:30	45	7	3	1	0	56	59	10	4	3	1	0	18	21	14	3	2	1	0	20	22
16:45	35	9	2	2	0	48	52	3	1	3	4	0	11	18	11	2	3	5	0	21	29
H/TOT	146	29	9	4	1	189	200	34	12	9	12	0	67	87	52	7	18	10	0	87	109
17:00	66	9	2	3	1	81	87	7	1	0	4	0	12	17	8	1	0	2	0	11	14
17:15	56	5	1	2	0	64	67	6	0	2	1	0	9	11	7	2	0	1	0	10	11
17:30	53	7	0	0	1	61	62	5	3	1	2	0	11	14	3	1	1	2	0	7	10
17:45	21	6	2	0	0	29	30	5	0	0	0	0	5	5	8	2	3	2	0	15	19
H/TOT	196	27	5	5	2	235	246	23	4	3	7	0	37	48	26	6	4	7	0	43	54
18:00	28	2	0	0	1	31	32	8	2	2	2	0	14	18	8	3	1	3	0	15	19
18:15	25	5	0	1	0	31	32	10	0	1	2	0	13	16	10	0	2	1	0	13	15
18:30	14	1	0	0	1	16	17	1	3	0	1	0	5	6	10	0	1	1	0	12	14
18:45	9	2	0	0	0	11	11	4	0	0	1	0	5	6	6	0	0	2	0	8	11
H/TOT	76	10	0	1	2	89	92	23	5	3	6	0	37	46	34	3	4	7	0	48	59
P/TOT	1189	344	112	62	29	1736	1902	300	149	158	192	0	799	1128	316	155	171	199	0	841	1185

TRAFFINOMICS LIMITED

BALLYCOOLIN TRAFFIC COUNTS — **NOVEMBER 2021**

MANUAL CLASSIFIED JUNCTION TURNING COUNTS — **TRA/21/217**

SITE: 03

DATE: 16th November 2021

LOCATION: Cappagh Road/Ballycoolin Road Roundabout

DAY: Tuesday

	MOVEMENT 4							**MOVEMENT 5**							**MOVEMENT 6**						
TIME	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**
13:00	57	5	6	1	7	76	87	58	20	2	3	2	85	92	16	10	3	2	0	31	35
13:15	55	9	5	1	3	73	80	57	3	3	1	2	66	71	18	5	3	1	1	28	32
13:30	49	4	4	0	2	59	63	54	10	3	0	2	69	73	21	10	5	0	1	37	41
13:45	55	3	3	0	2	63	67	65	4	5	0	2	76	81	18	2	2	2	0	24	28
H/TOT	216	21	18	2	14	271	297	234	37	13	4	8	296	316	73	27	13	5	2	120	135
14:00	65	13	1	1	2	82	86	54	19	0	3	1	77	82	20	15	3	2	0	40	44
14:15	50	5	1	0	2	58	61	73	17	3	1	2	96	101	16	7	5	0	2	30	35
14:30	53	12	5	0	0	70	73	58	7	2	0	2	69	72	25	10	3	1	0	39	42
14:45	53	9	0	1	3	66	70	54	6	1	0	4	65	70	15	6	1	0	1	23	25
H/TOT	221	39	7	2	7	276	289	239	49	6	4	9	307	324	76	38	12	3	3	132	145
15:00	60	5	2	0	3	70	74	76	5	4	1	1	87	91	24	16	4	2	1	47	53
15:15	49	5	0	3	2	59	65	50	14	3	2	4	73	81	15	10	2	1	1	29	32
15:30	73	9	2	0	3	87	91	40	13	0	0	4	57	61	21	10	2	0	0	33	34
15:45	83	11	0	0	3	97	100	68	11	0	2	1	82	86	31	14	2	1	1	49	52
H/TOT	265	30	4	3	11	313	330	234	43	7	5	10	299	319	91	50	10	4	3	158	171
16:00	64	12	1	0	2	79	82	87	19	4	0	4	114	120	54	10	5	1	0	70	74
16:15	63	11	1	1	2	78	82	90	21	2	4	2	119	127	47	16	3	1	2	69	74
16:30	70	10	4	1	2	87	92	101	18	0	0	2	121	123	59	16	0	0	0	75	75
16:45	77	12	0	0	1	90	91	78	13	3	2	2	98	104	47	13	0	1	1	62	64
H/TOT	274	45	6	2	7	334	347	356	71	9	6	10	452	474	207	55	8	3	3	276	287
17:00	109	13	4	0	3	129	134	146	26	3	0	2	177	181	53	7	1	3	0	64	68
17:15	69	11	4	1	4	89	96	91	15	0	1	3	110	114	45	11	1	3	1	61	66
17:30	73	8	0	0	2	83	85	110	14	5	0	2	131	136	50	11	4	2	0	67	72
17:45	60	3	2	0	1	66	68	88	18	2	0	2	110	113	32	4	0	0	1	37	38
H/TOT	311	35	10	1	10	367	383	435	73	10	1	9	528	543	180	33	6	8	2	229	244
18:00	68	4	2	0	2	76	79	90	14	1	1	3	109	114	28	4	0	1	0	33	34
18:15	61	2	1	0	2	66	69	77	15	2	0	2	96	99	27	5	0	0	1	33	34
18:30	51	4	0	2	3	60	66	81	18	1	1	3	104	109	21	2	0	2	0	25	28
18:45	51	0	1	0	0	52	53	63	2	0	0	2	67	69	8	2	0	2	1	13	17
H/TOT	231	10	4	2	7	254	266	311	49	4	2	10	376	391	84	13	0	5	2	104	113
P/TOT	2886	488	118	27	118	3637	3849	3338	544	118	44	112	4156	4384	1313	393	130	71	29	1936	2122

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APPENDIX 13.2

Traffic Survey Data Graphs

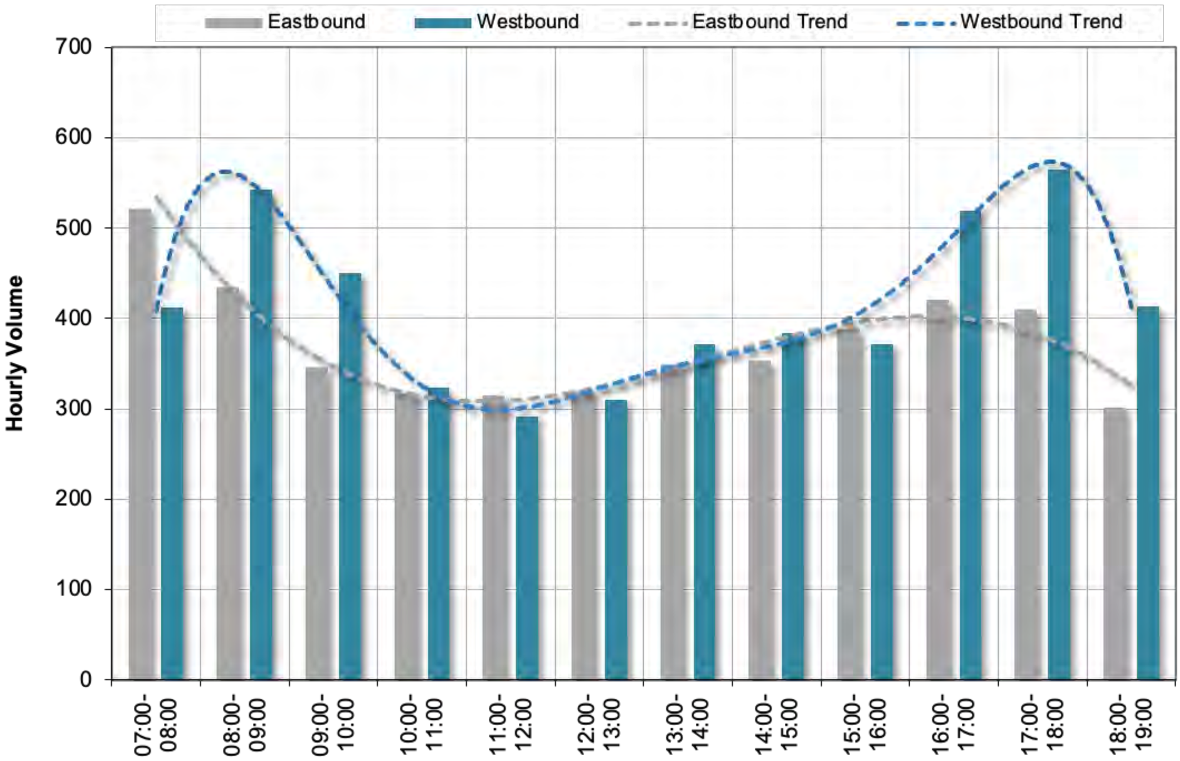

Figure 1 Daily Total Traffic Flow Ballycoolin Road (East)

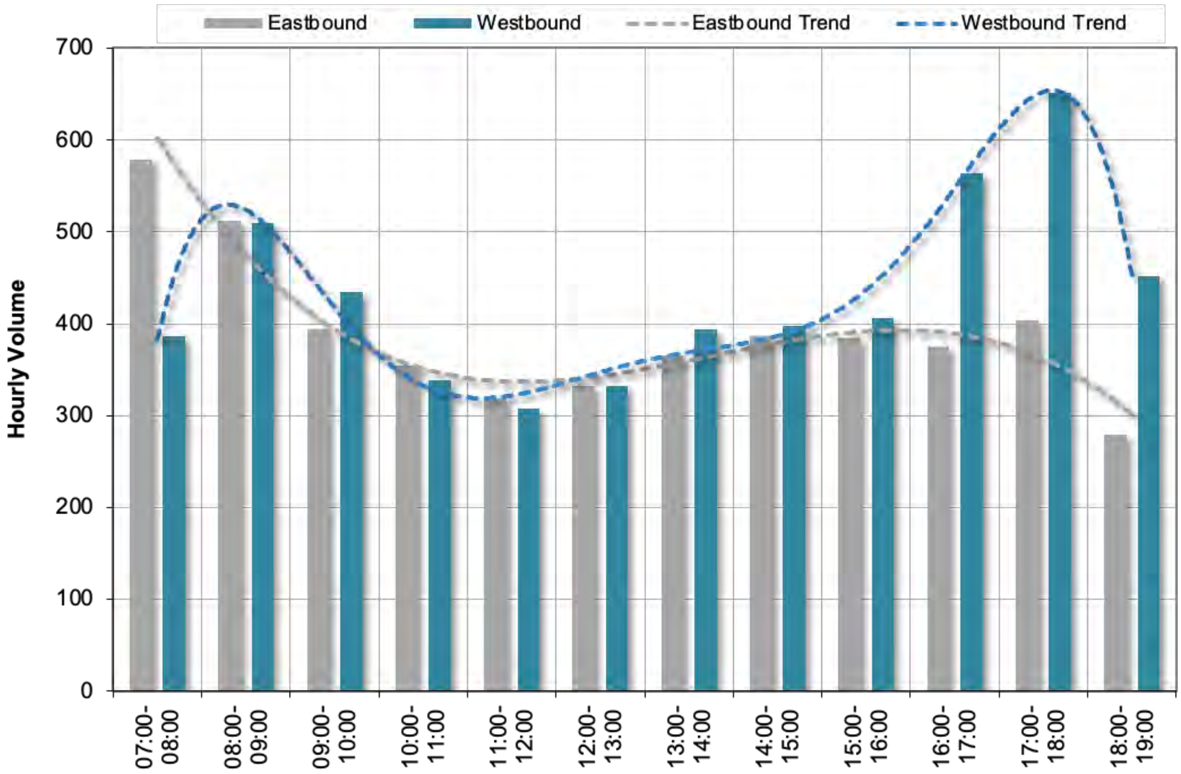

Figure 2 Daily Total Traffic Flow Ballycoolin Road (West)

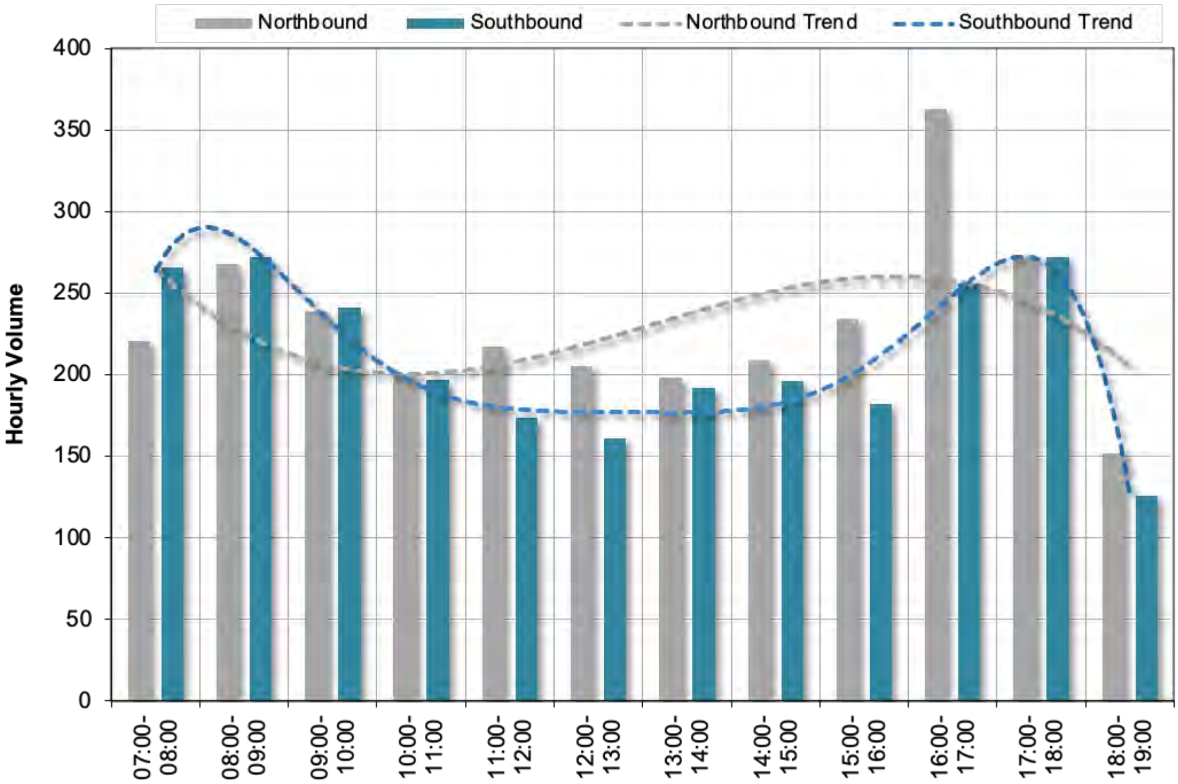

Figure 3 Daily Total Traffic Flow Cappagh Road (North)

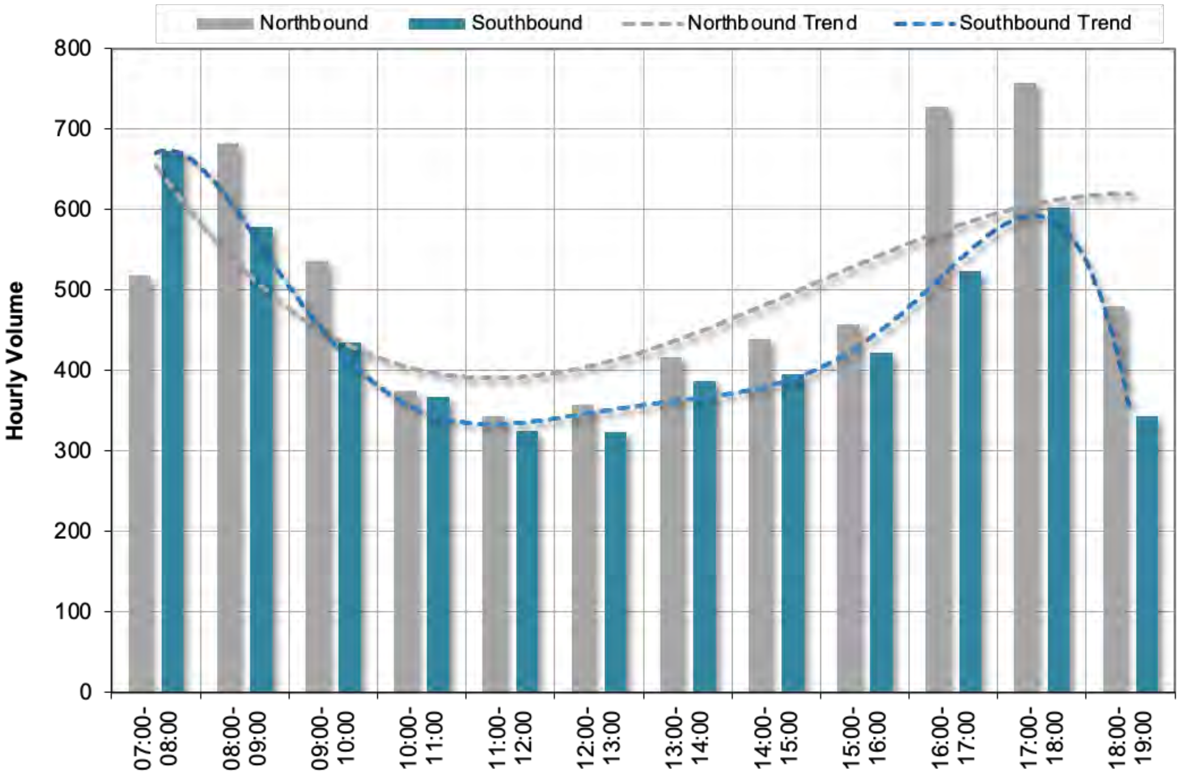

Figure 4 Daily Total Traffic Flow Cappagh Road (South)

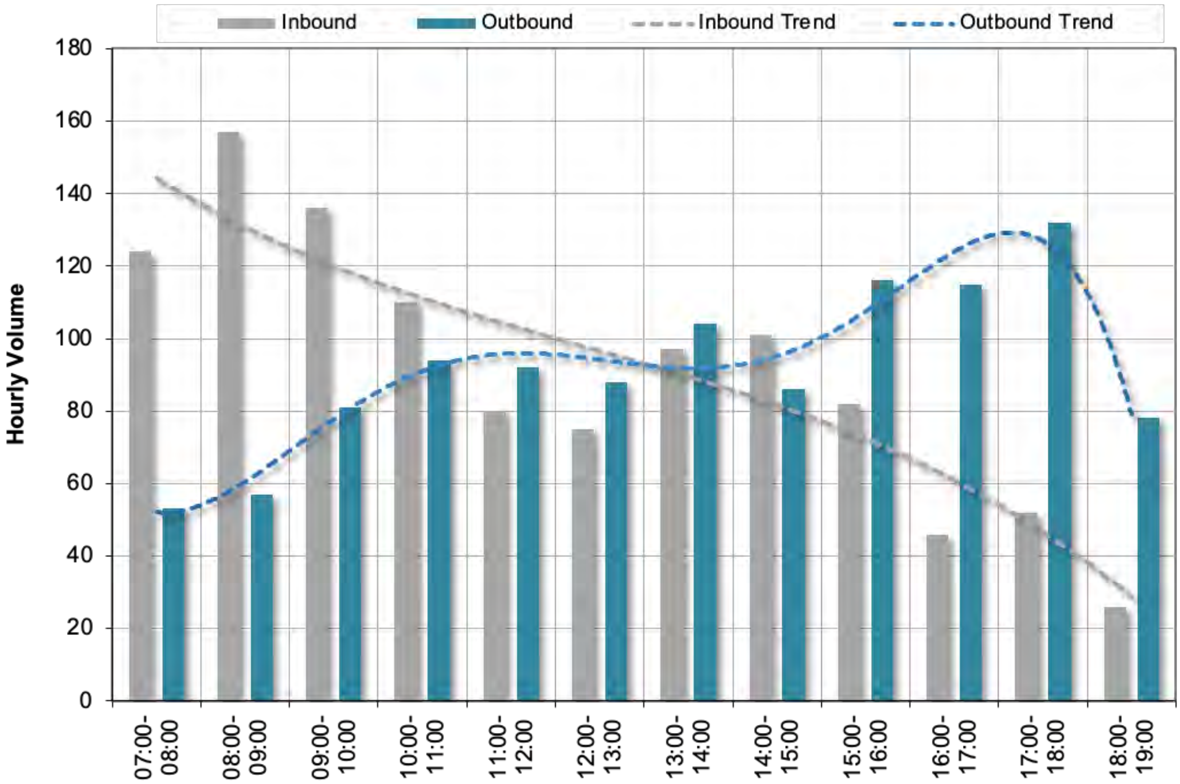

Figure 5 Daily Total Traffic Flow Stadium Business Park

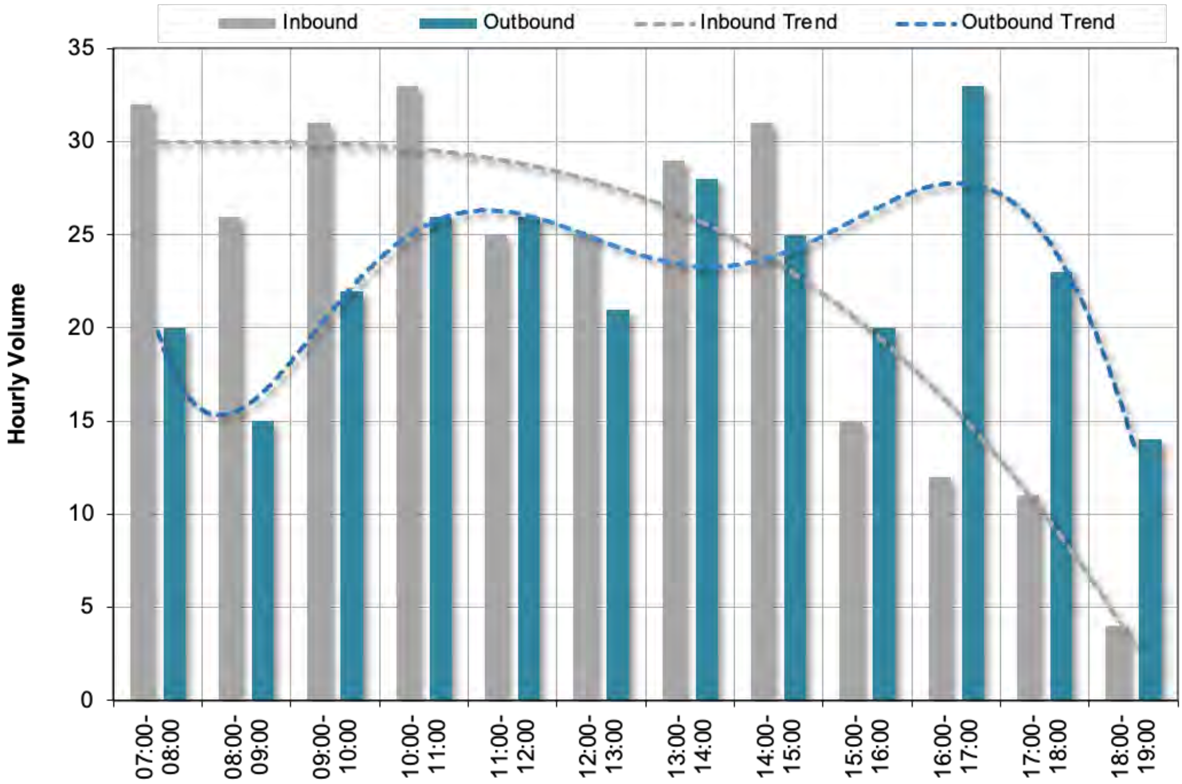

Figure 6 Daily Total Traffic Flow Cappogue Industrial Park

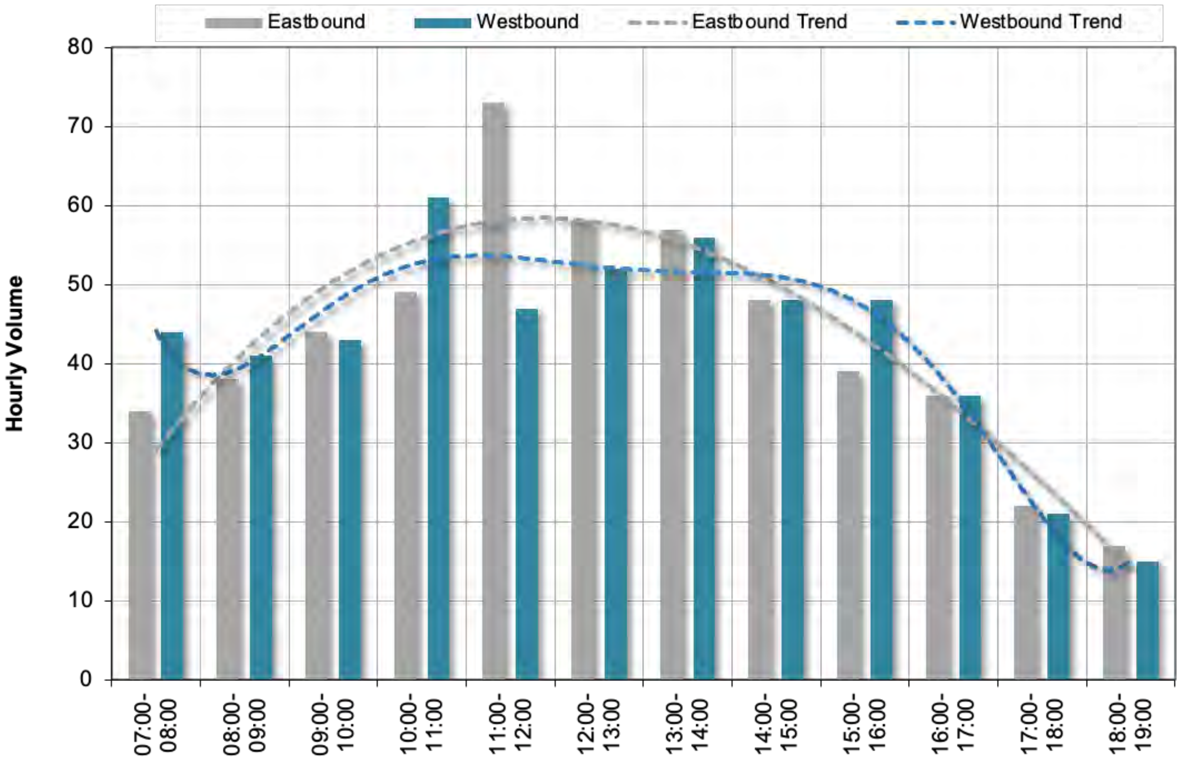

Figure 7 Daily HGV Traffic Flow Ballycoolin Road (East)

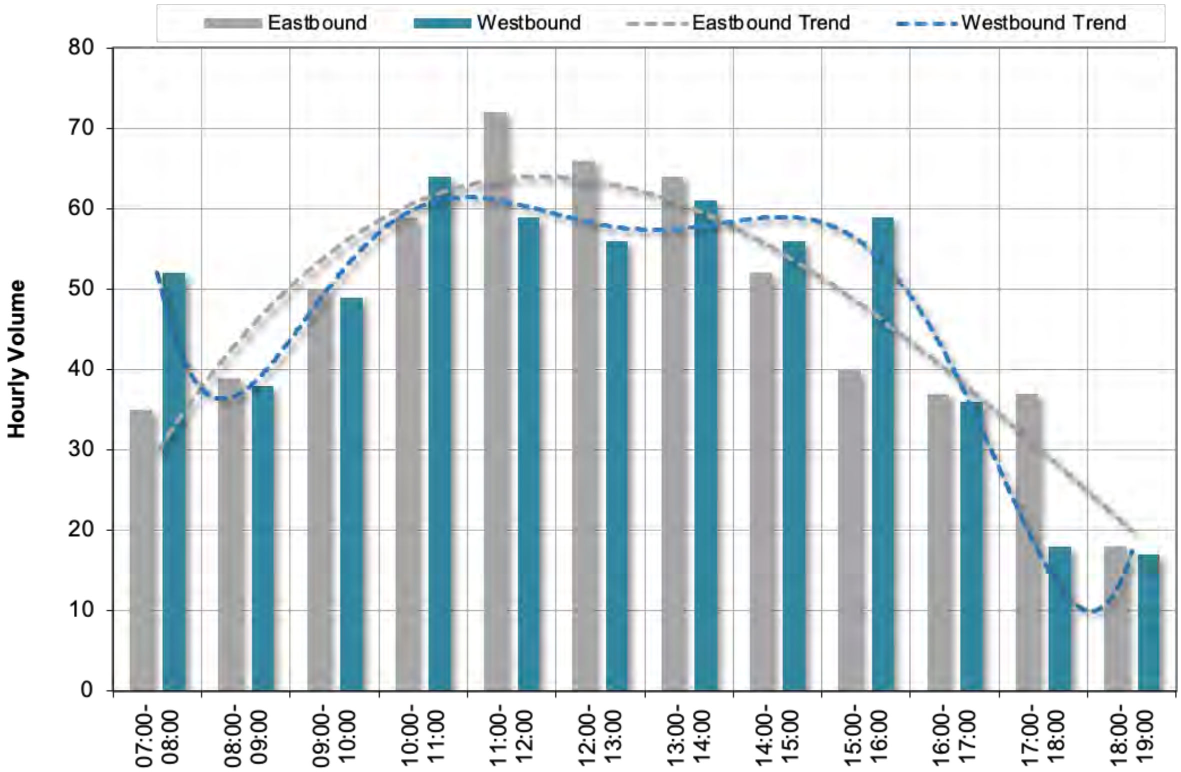

Figure 8 Daily HGV Traffic Flow Ballycoolin Road (West)

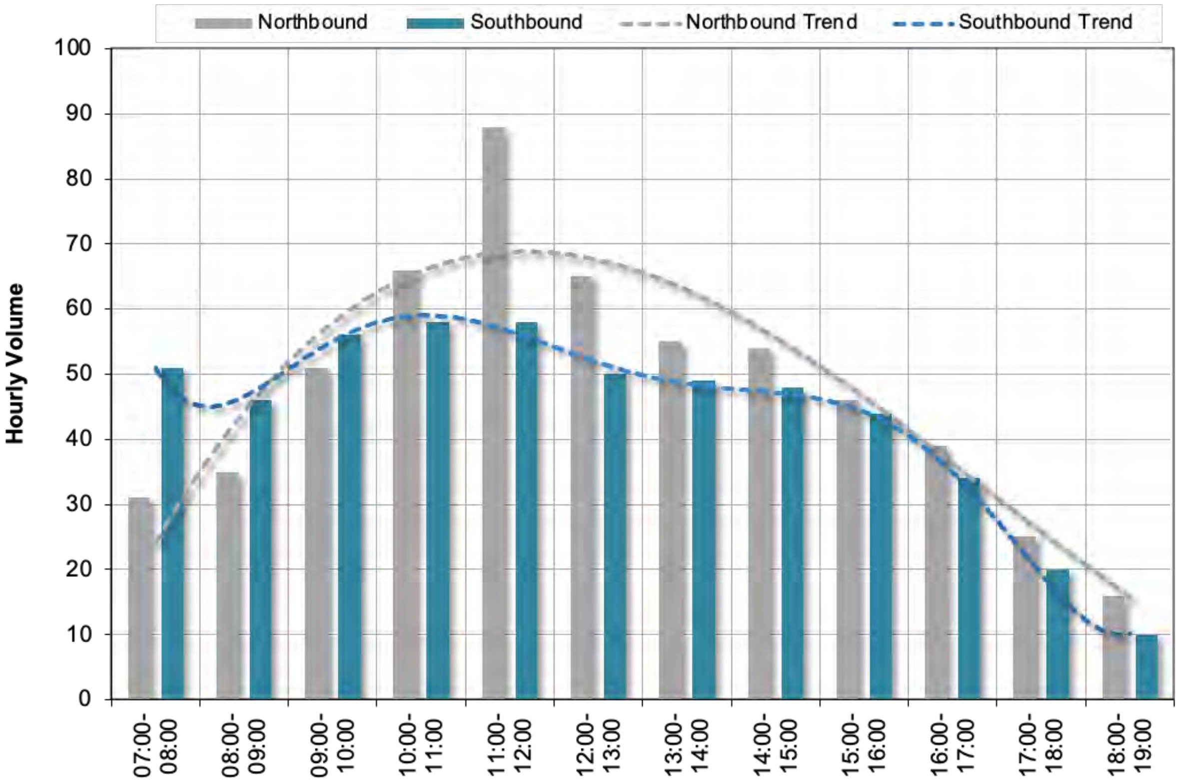

Figure 9 Daily HGV Traffic Flow Cappagh Road (North)

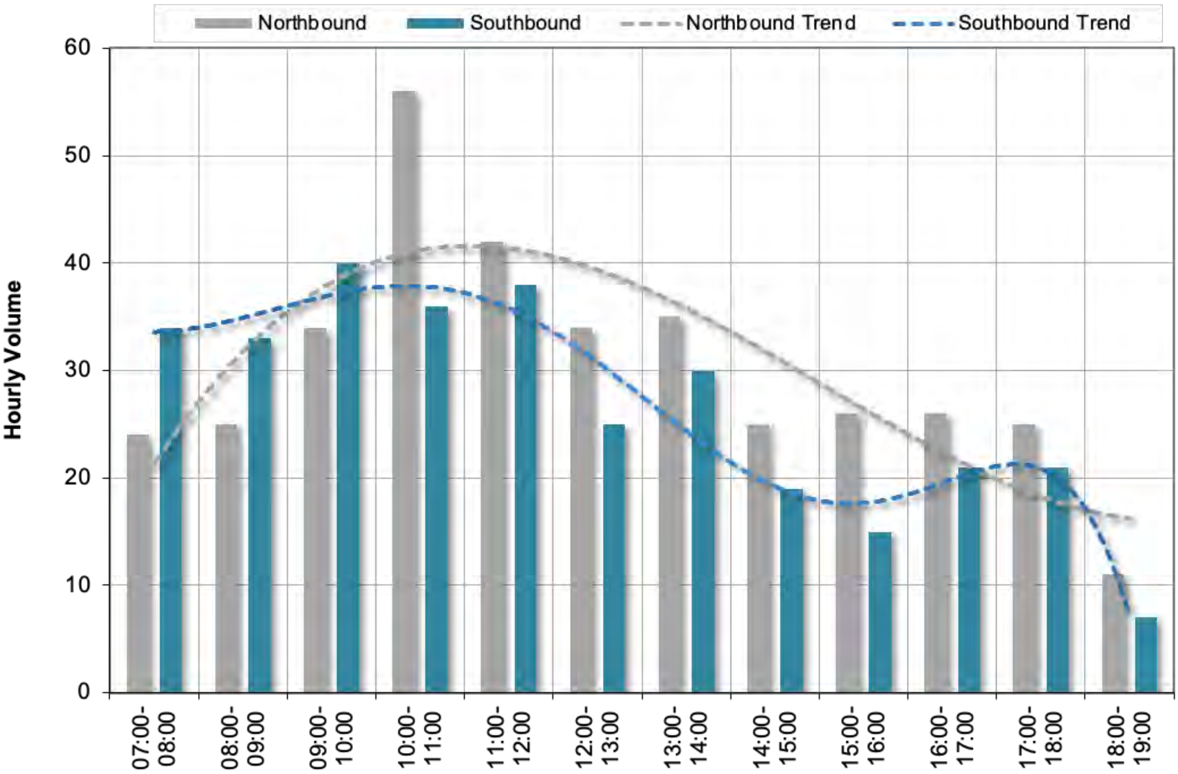

Figure 10 Daily HGV Traffic Flow Cappagh Road (South)

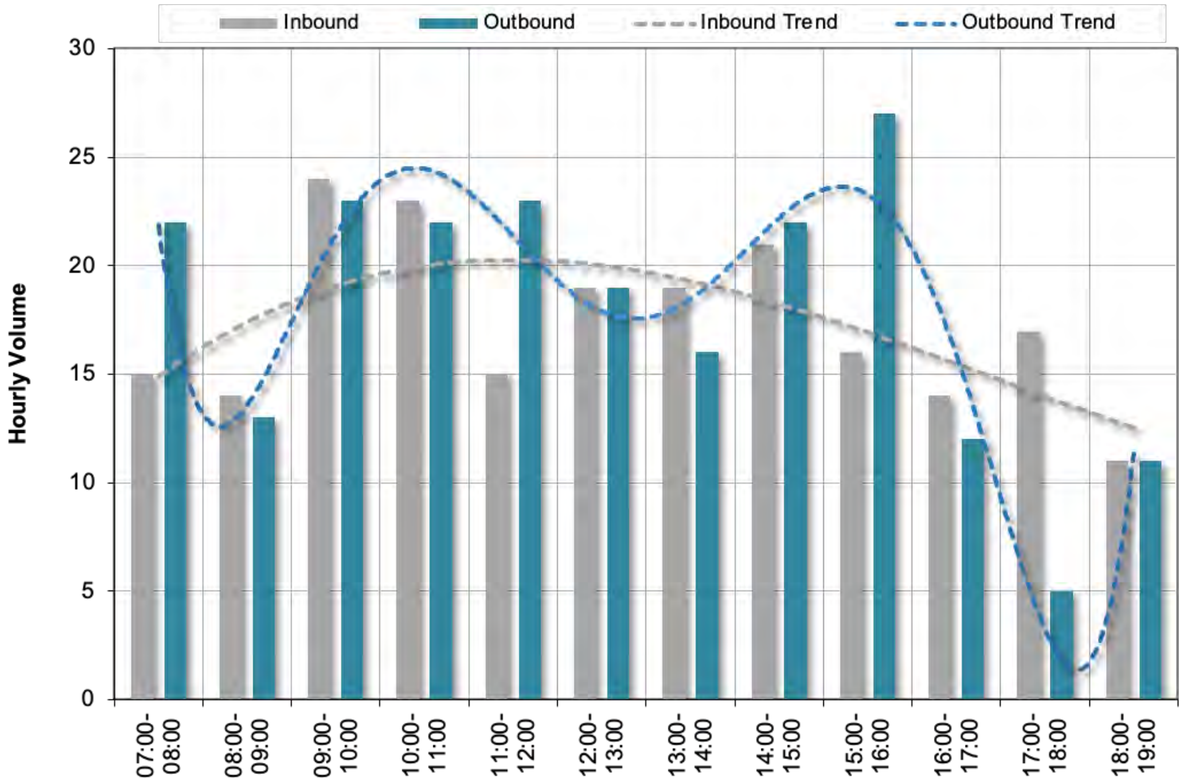

Figure 11 Daily HGV Traffic Flow Stadium Business Park

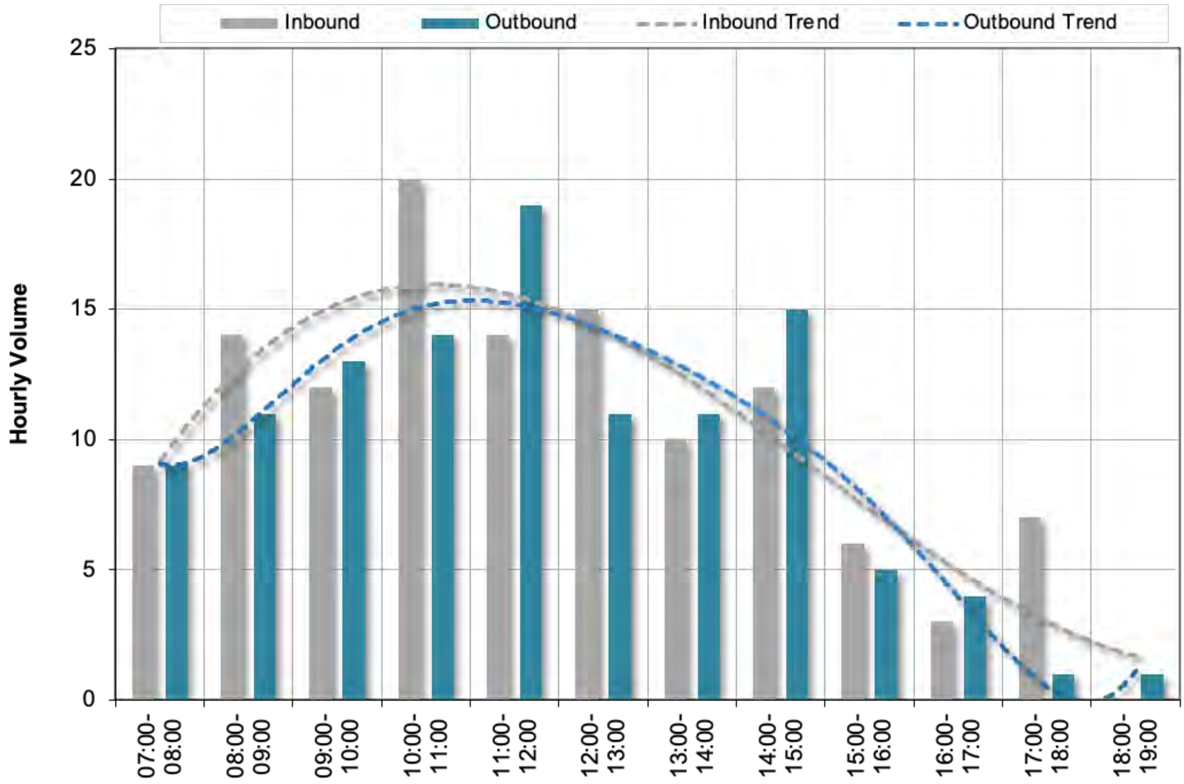

Figure 12 Daily HGV Traffic Flow Cappogue Industrial Park

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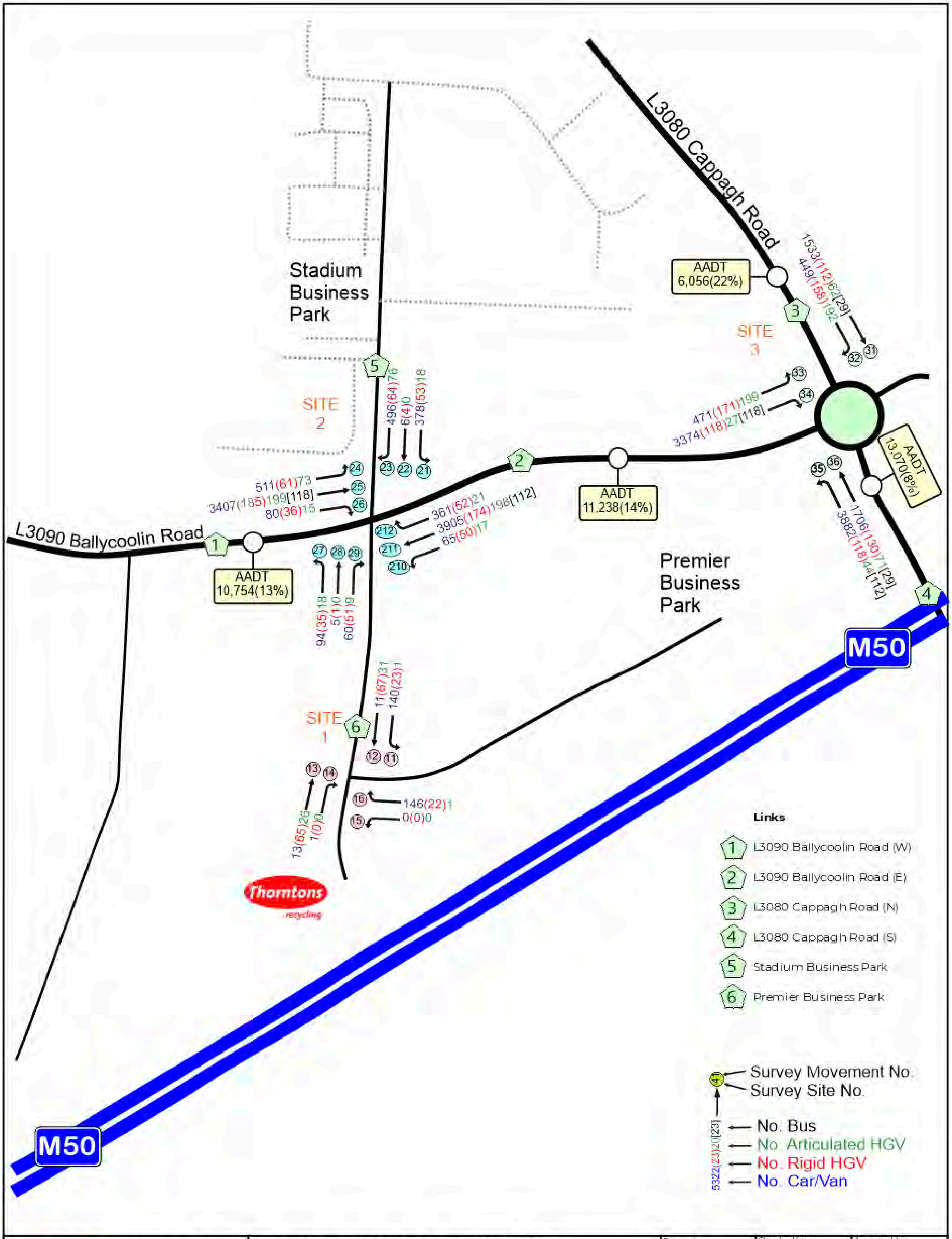
APPENDIX 13.3

Network Traffic Flow Diagrams



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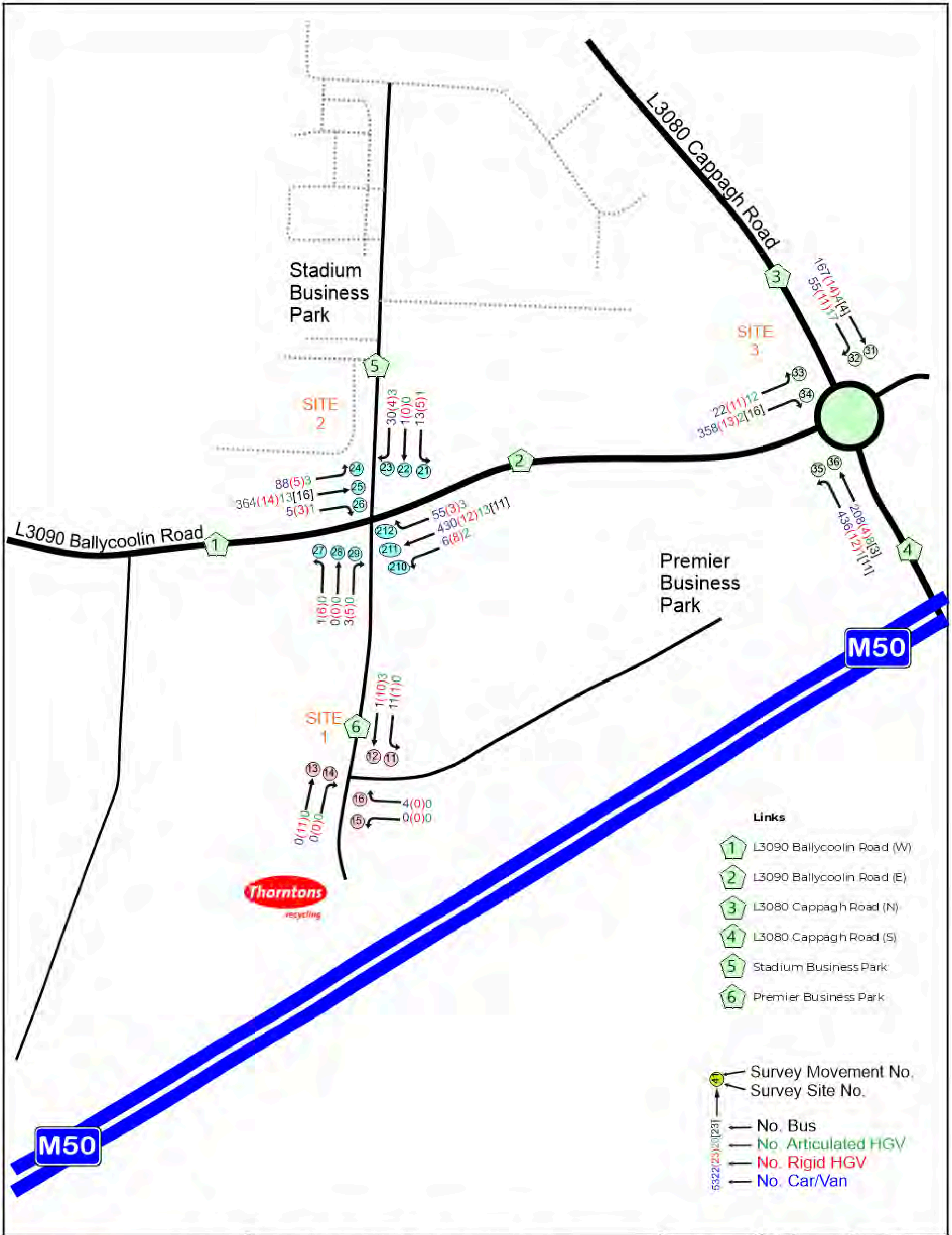
Thorntons Recycling Proposed MRF

Surveyed Traffic Flows - November 2021
Weekday Daily Traffic Flows
(07:00-19:00hrs)

Drawn by: TWL	Checked by: JMK	Approved by: JMK
Date: June 2022	Date: June 2022	Date: June 2022

Scenario: Surveys
Job No. 03088
Appendix 13-3
Figure 1



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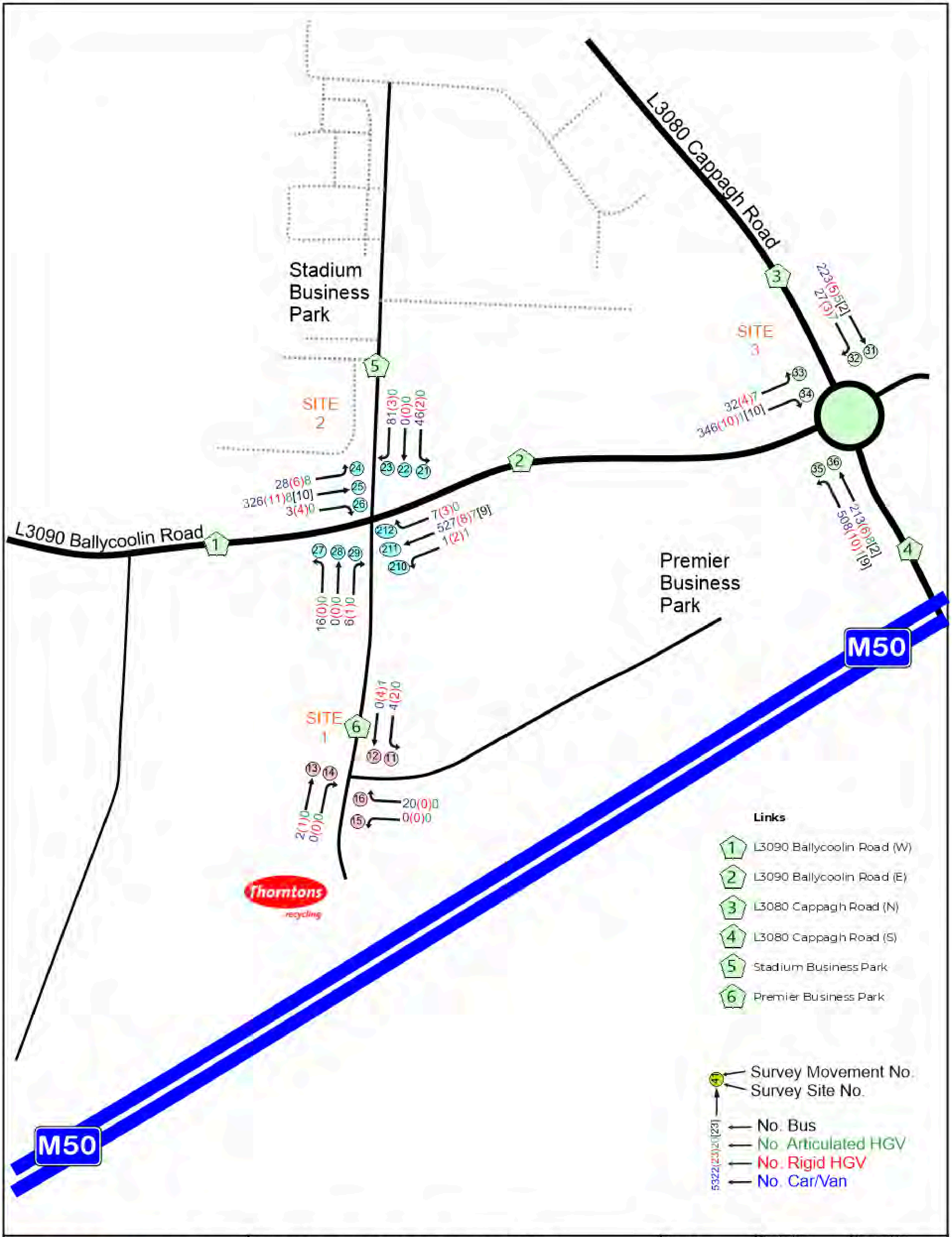
D15 R59T

Thorntons Recycling Proposed MRF

Surveyed Traffic Flows - November 2021
AM Peak Hour Traffic Flows
(08:00-09:00hrs)

Drawn by:	Checked by:	Approved by:
TWL	JMK	JMK
Date: June 2022	Date: June 2022	Date: June 2022

Scenario: Surveys
Job No. 03088
Appendix 13-3
Figure 2



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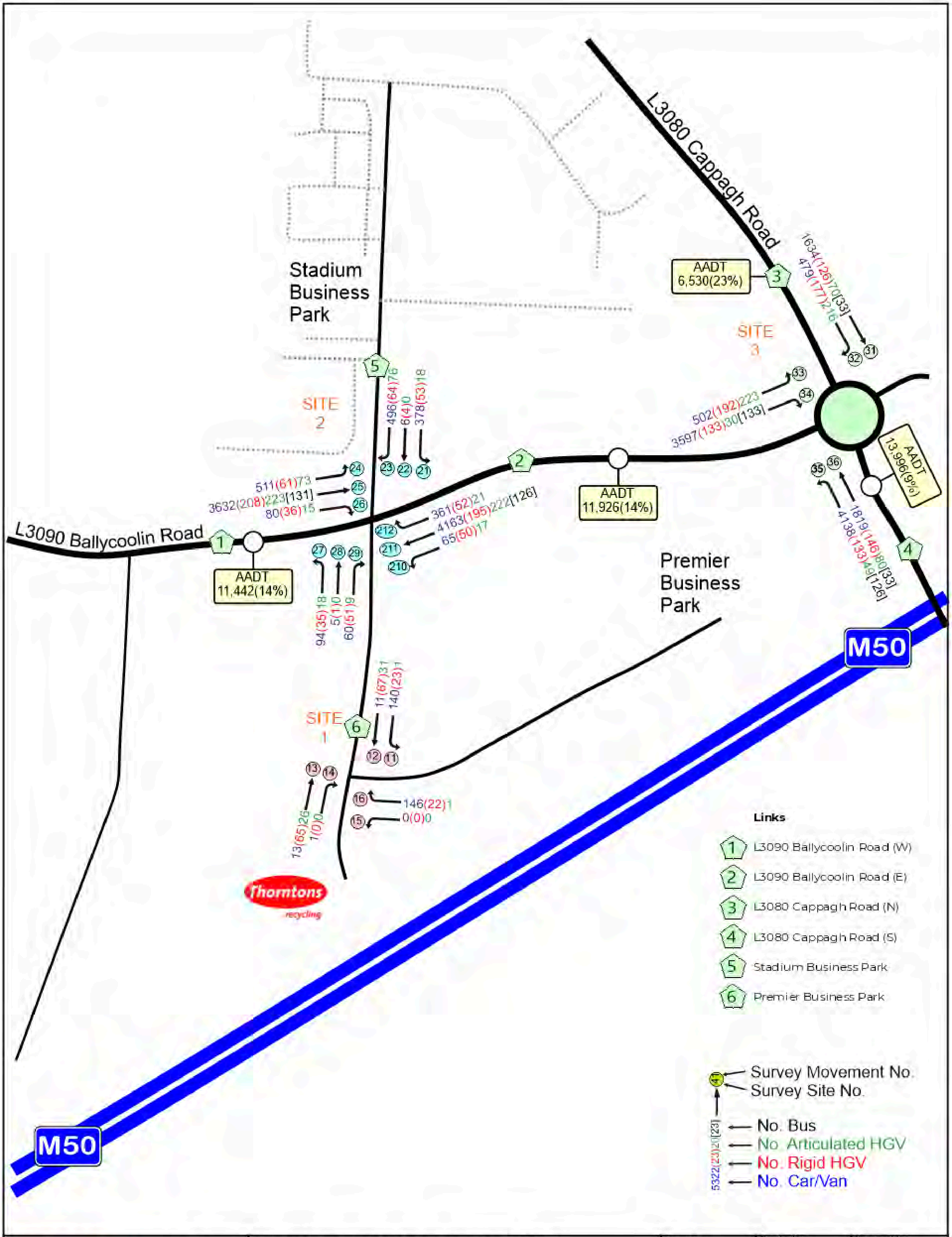
Thorntons Recycling Proposed MRF

Surveyed Traffic Flows - November 2021
PM Peak Hour Traffic Flows
(17:00-18:00hrs)

Drawn by: TWL
Checked by: JMK
Approved by: JMK
Date: June 2022
Date: June 2022
Date: June 2022
Scenario: Surveys
Job No: 03088
Appendix 13-3
Figure 3



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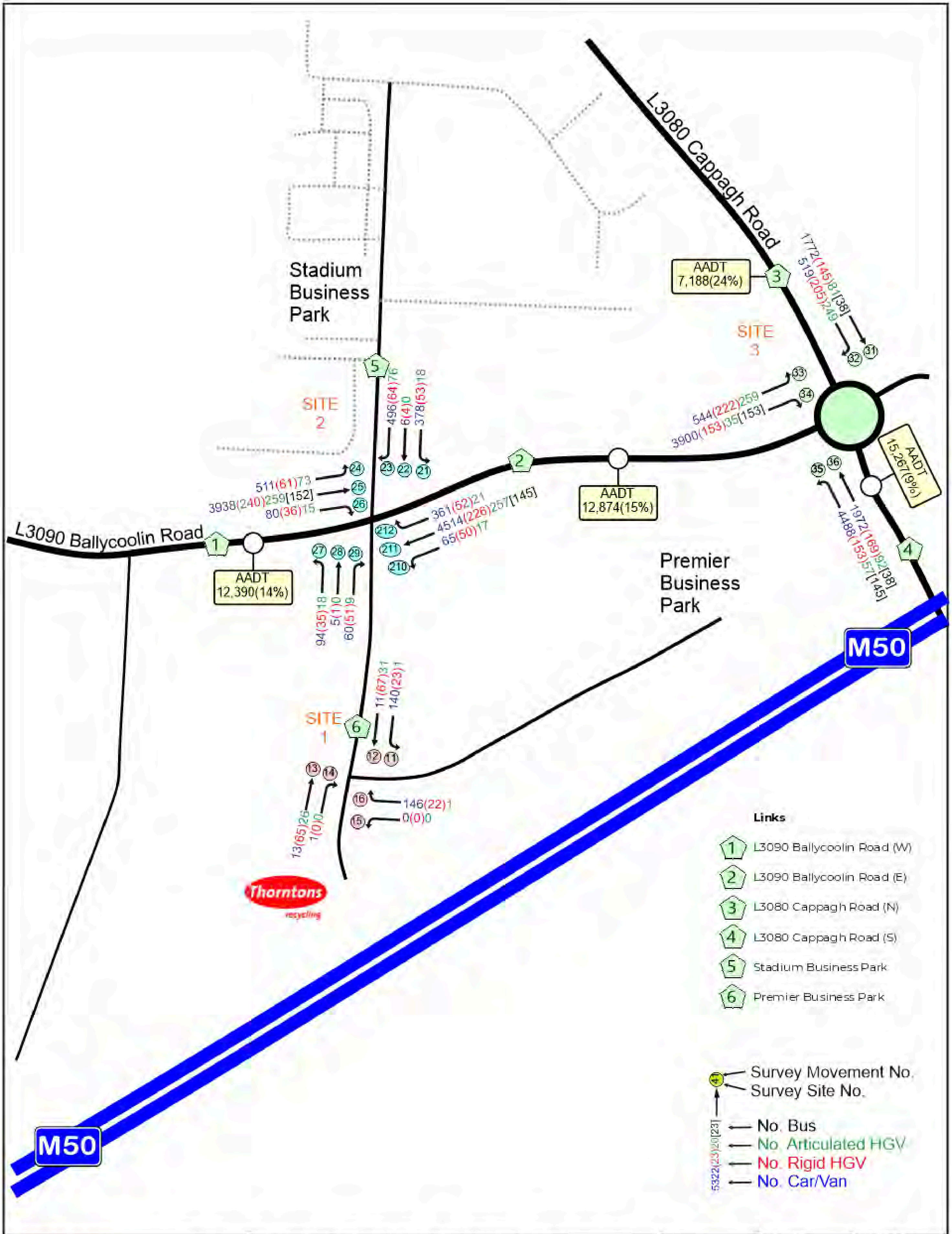
D15 R58T

Thorntons Recycling Proposed MRF

Forecast Baseline 2025 Year of Opening
Weekday Daily Traffic Flows ('Do-Nothing')
(07:00-19:00hrs)

Drawn by: TWL	Checked by: JMK	Approved by: JMK
Date: June 2022	Date: June 2022	Date: June 2022

Scenario: Surveys
Job No. 03088
Appendix 13-3
Figure 4



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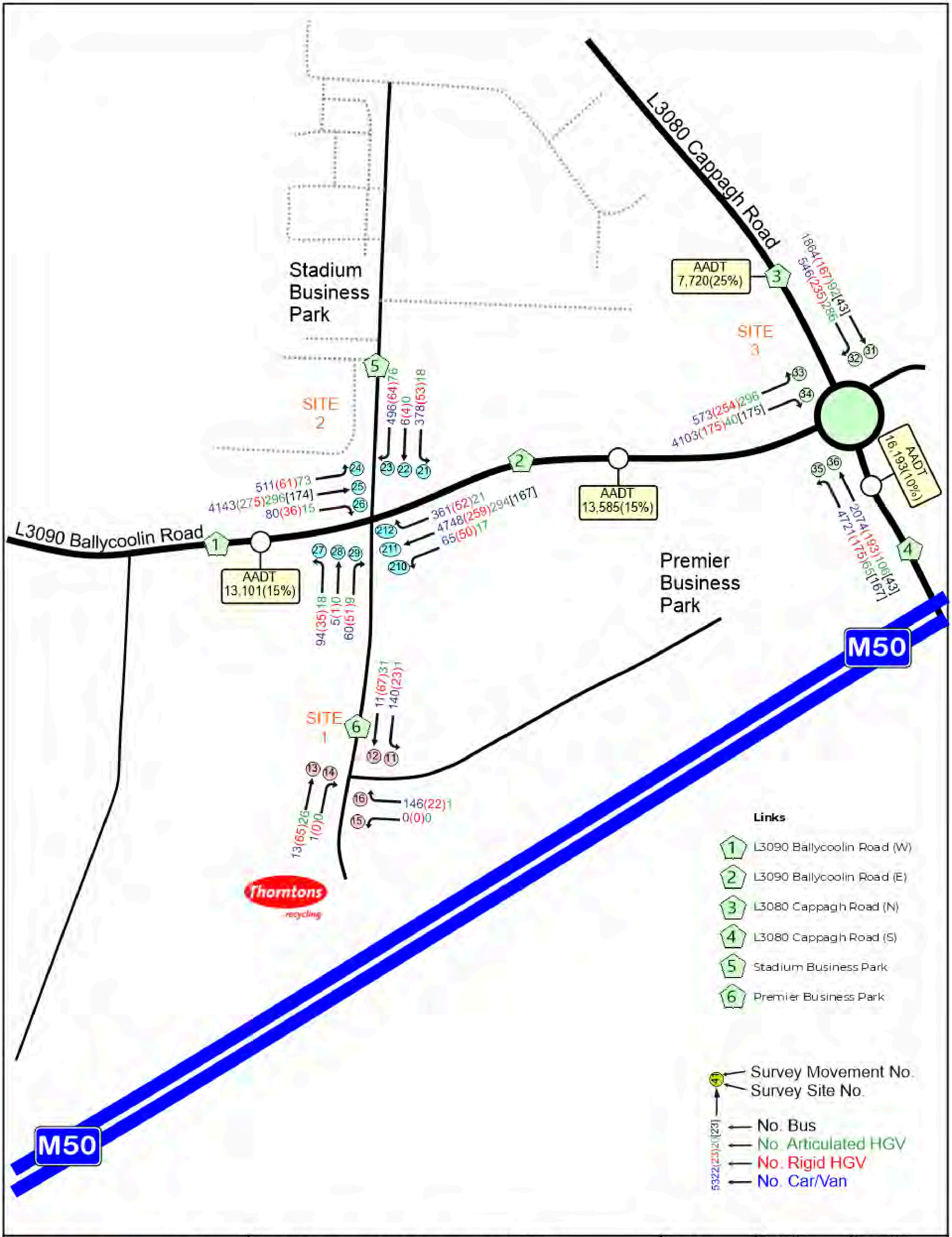
Thorntons Recycling Proposed MRF

Forecast Baseline 2030 Year of Opening +5yrs
Weekday Daily Traffic Flows ('Do-Nothing')
(07:00-19:00hrs)

Drawn by: TWL	Checked by: JMK	Approved by: JMK
Date: June 2022	Date: June 2022	Date: June 2022

Scenario: Surveys
Job No. 03088
Appendix 13-3
Figure 5



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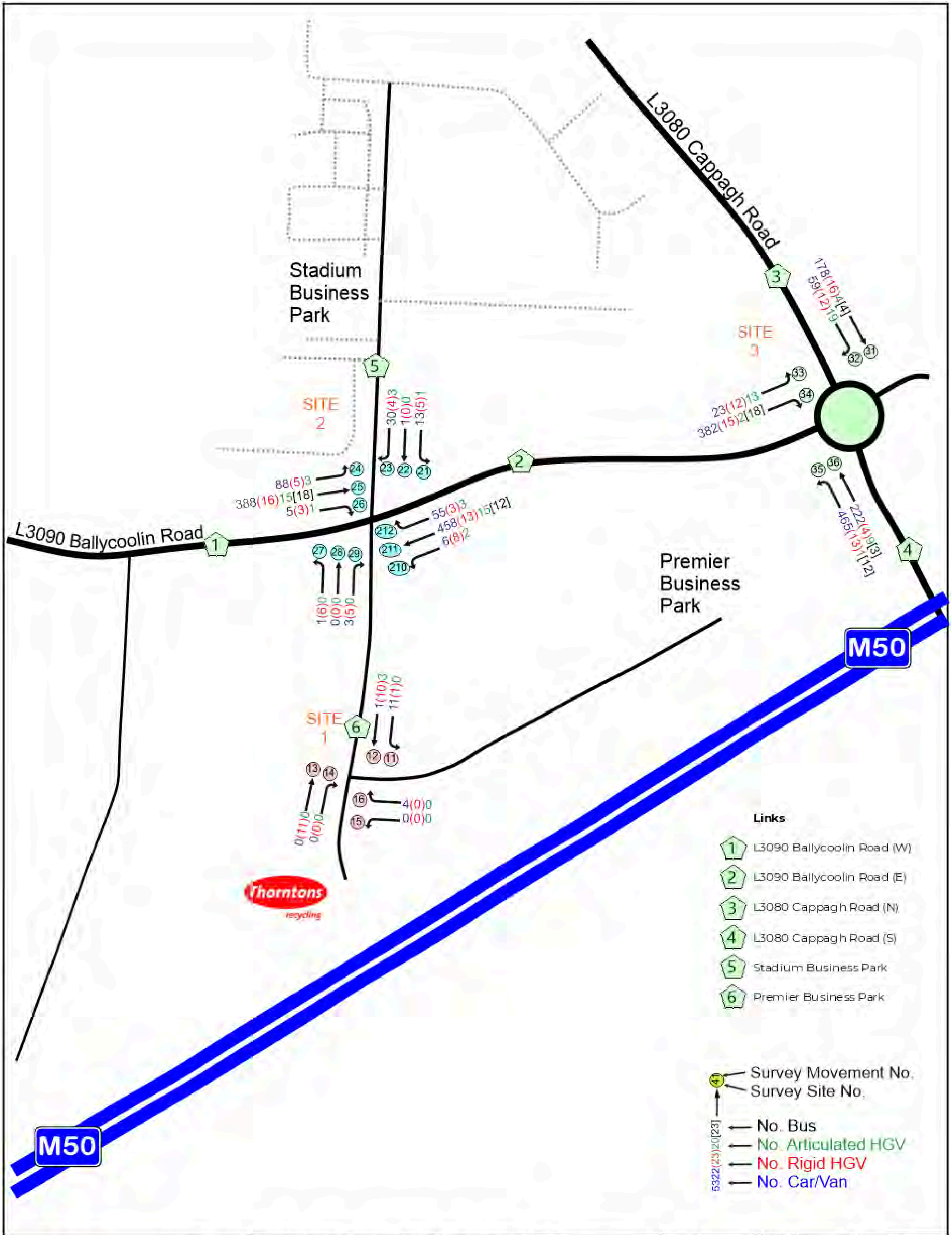
D15 R58T

Thorntons Recycling Proposed MRF

Forecast Baseline 2040 Year of Opening +15yrs
Weekday Daily Traffic Flows ('Do-Nothing')
(07:00-19:00hrs)

Drawn by: TWL	Checked by: JMK	Approved by: JMK
Date: June 2022	Date: June 2022	Date: June 2022

Scenario: Surveys
Job No. 03088
Appendix 13-3
Figure 6



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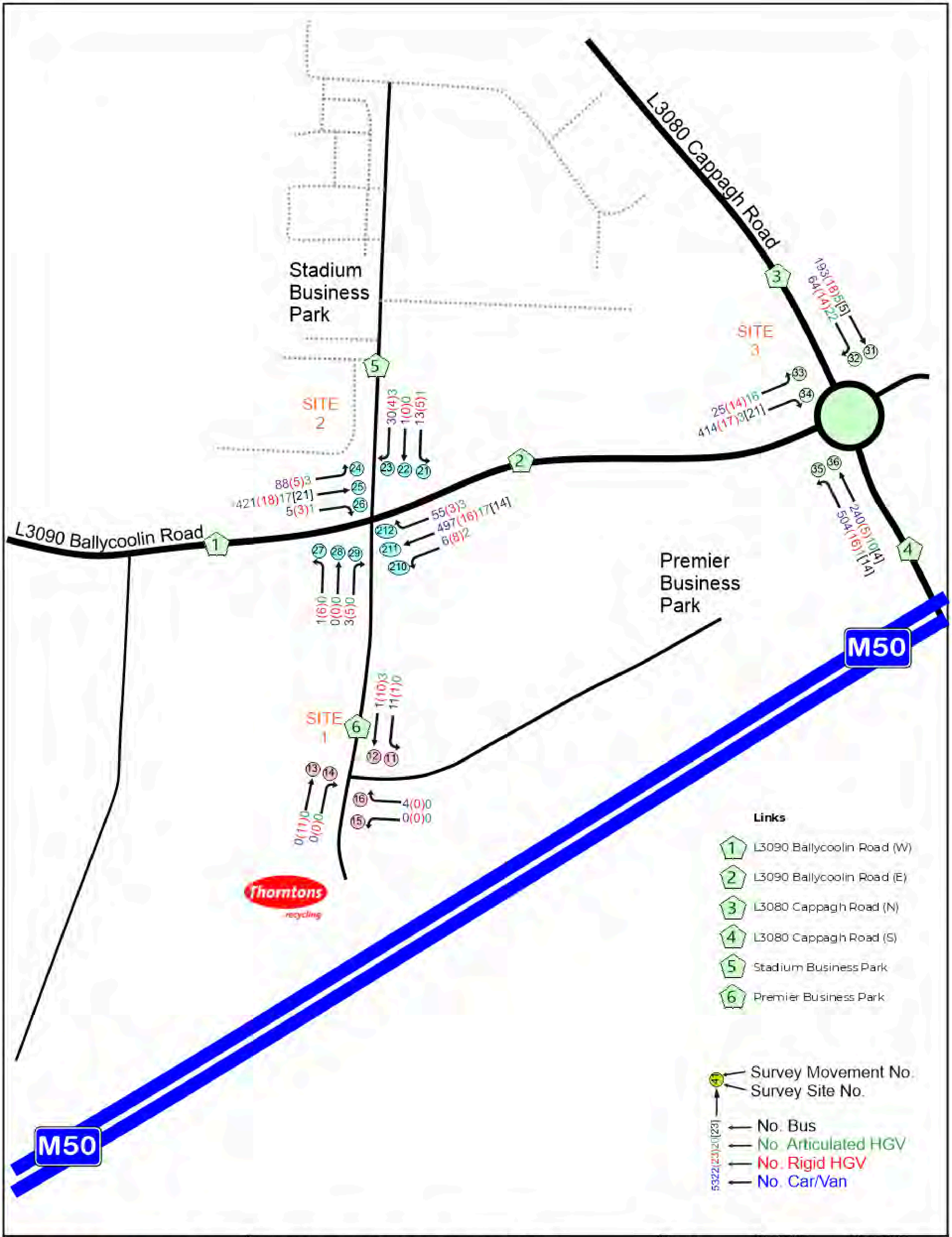
Thorntons Recycling Proposed MRF

Forecast Baseline 2025 Year of Opening
AM Peak Hour Traffic Flows ('Do-Nothing')
(08:00-09:00hrs)

Drawn by: TWL	Checked by: JMK	Approved by: JMK
Date: June 2022	Date: June 2022	Date: June 2022
Scenario: Surveys	Job No 03088	Figure 7
Appendix 13-3		



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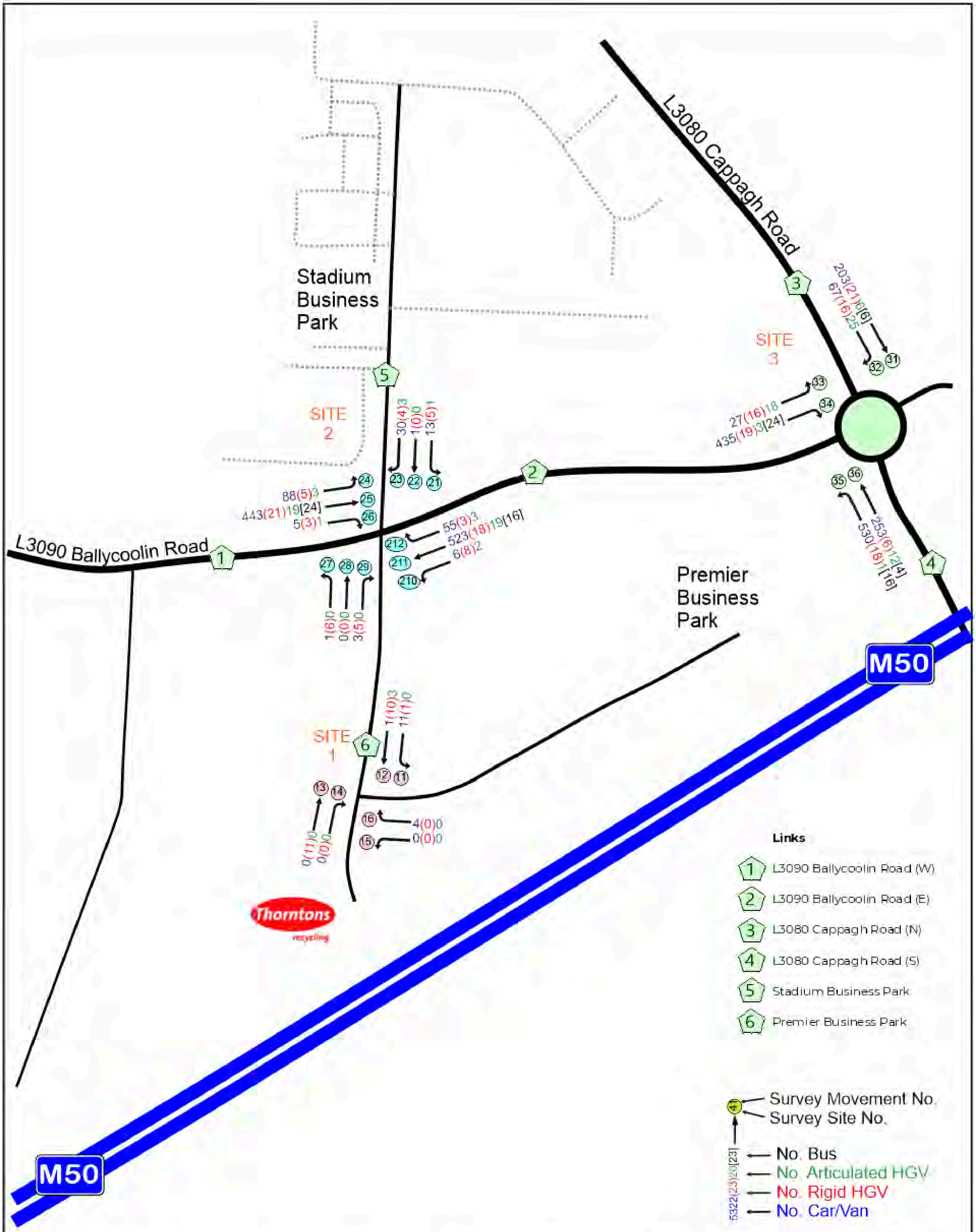
Thorntons Recycling Proposed MRF	Drawn by: TWL
Forecast Baseline 2030 Year of Opening +5yrs AM Peak Hour Traffic Flows ('Do-Nothing') (08:00-09:00hrs)	Checked by: JMK
	Approved by: JMK
	Date: June 2022
	Date: June 2022
	Date: June 2022
	Scenario: Surveys
	Job No. 03088
	Appendix 13-3
	Figure 8



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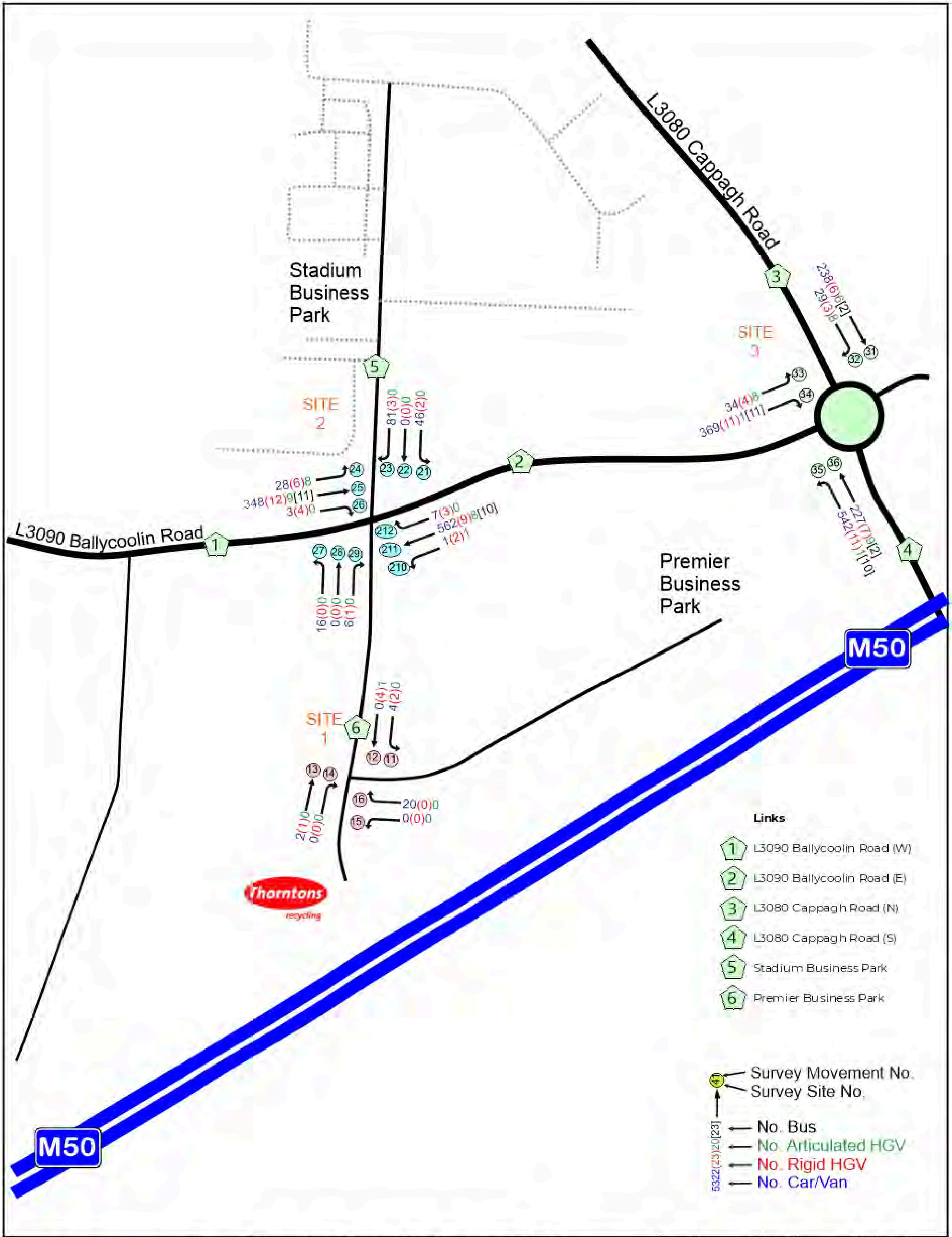
Thorntons Recycling Proposed MRF

Forecast Baseline 2040 Year of Opening +15yrs
AM Peak Hour Traffic Flows ('Do-Nothing')
(08:00-09:00hrs)

Drawn by: TWL	Checked by: JMK	Approved by: JMK
Date: June 2022	Date: June 2022	Date: June 2022
Scenario: Surveys	Job No. 03088	Figure 9
Appendix 13-3		



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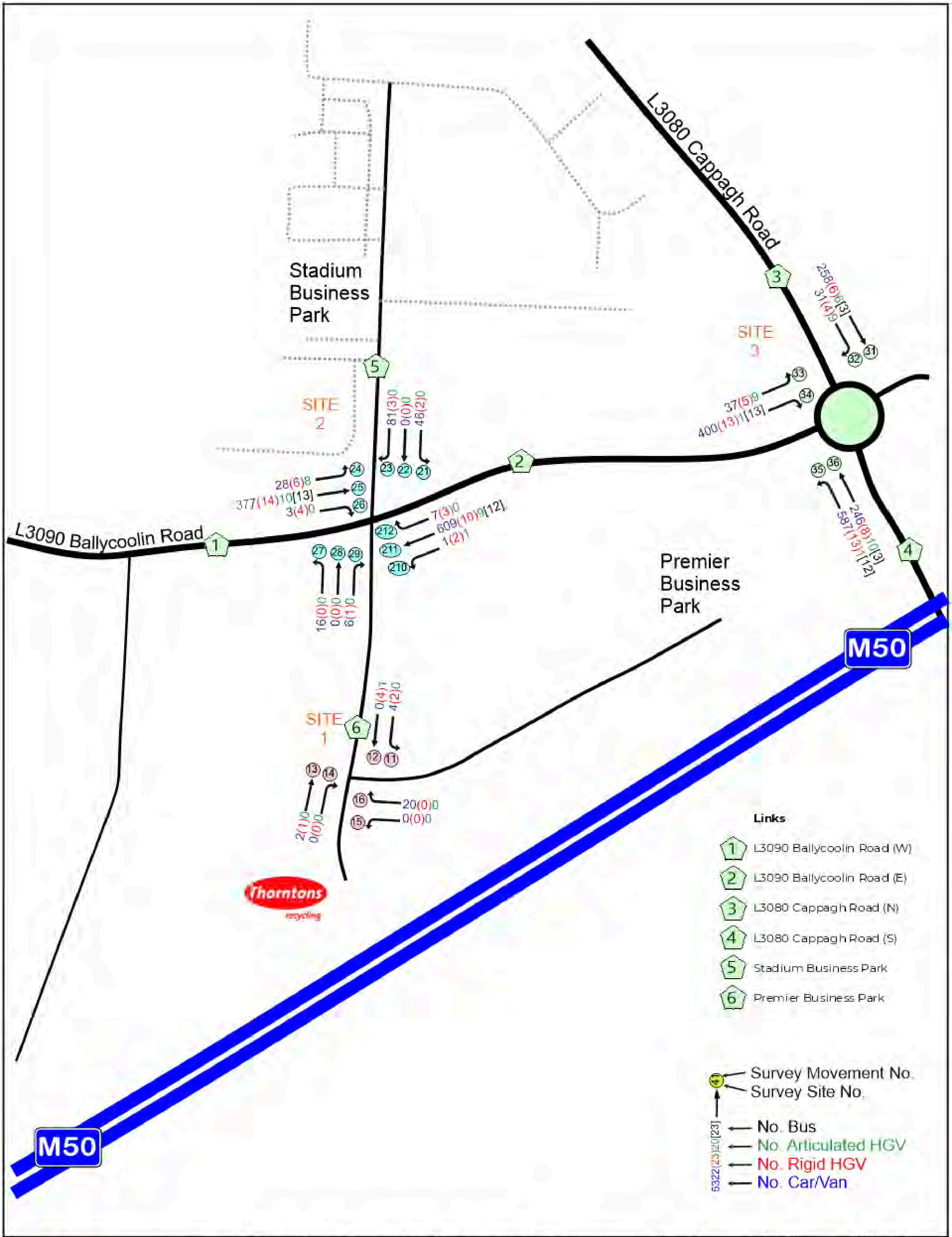
Thorntons Recycling Proposed MRF

Forecast Baseline 2025 Year of Opening
PM Peak Hour Traffic Flows ('Do-Nothing')
(17:00-18:00hrs)

Drawn by: TWL	Checked by: JMK	Approved by: JMK
Date: June 2022	Date: June 2022	Date: June 2022
Scenario: Surveys	Job No. 03088	Figure 10
Appendix 13-3		



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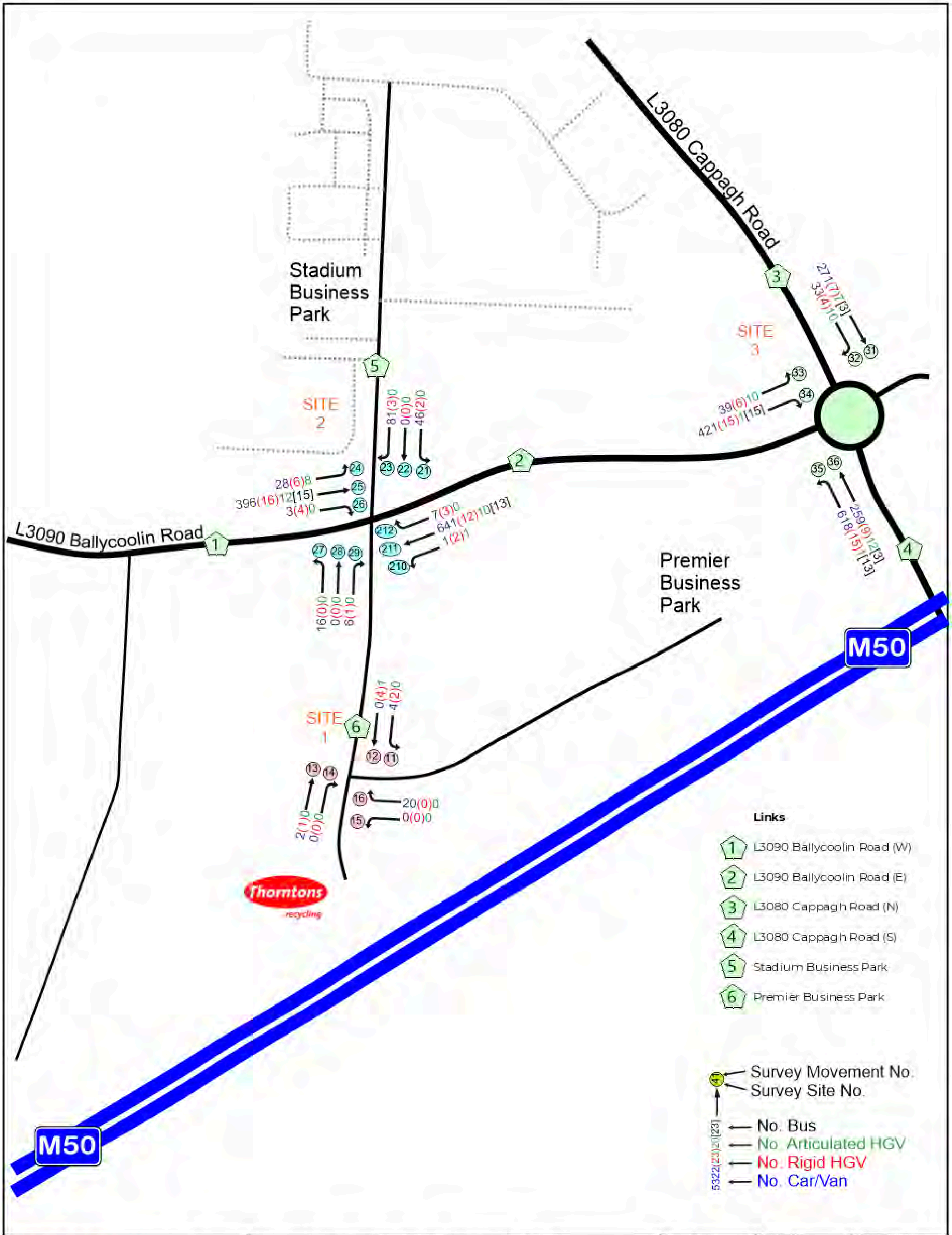
Thorntons Recycling Proposed MRF

Forecast Baseline 2030 Year of Opening +5yrs
PM Peak Hour Traffic Flows ('Do-Nothing')
(17:00-18:00hrs)

Drawn by: TWL	Checked by: JMK	Approved by: JMK
Date: June 2022	Date: June 2022	Date: June 2022
Scenario: Surveys	Job No. 03088	Figure 11
Appendix 13-3		



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Suite 5 Covent Plaza
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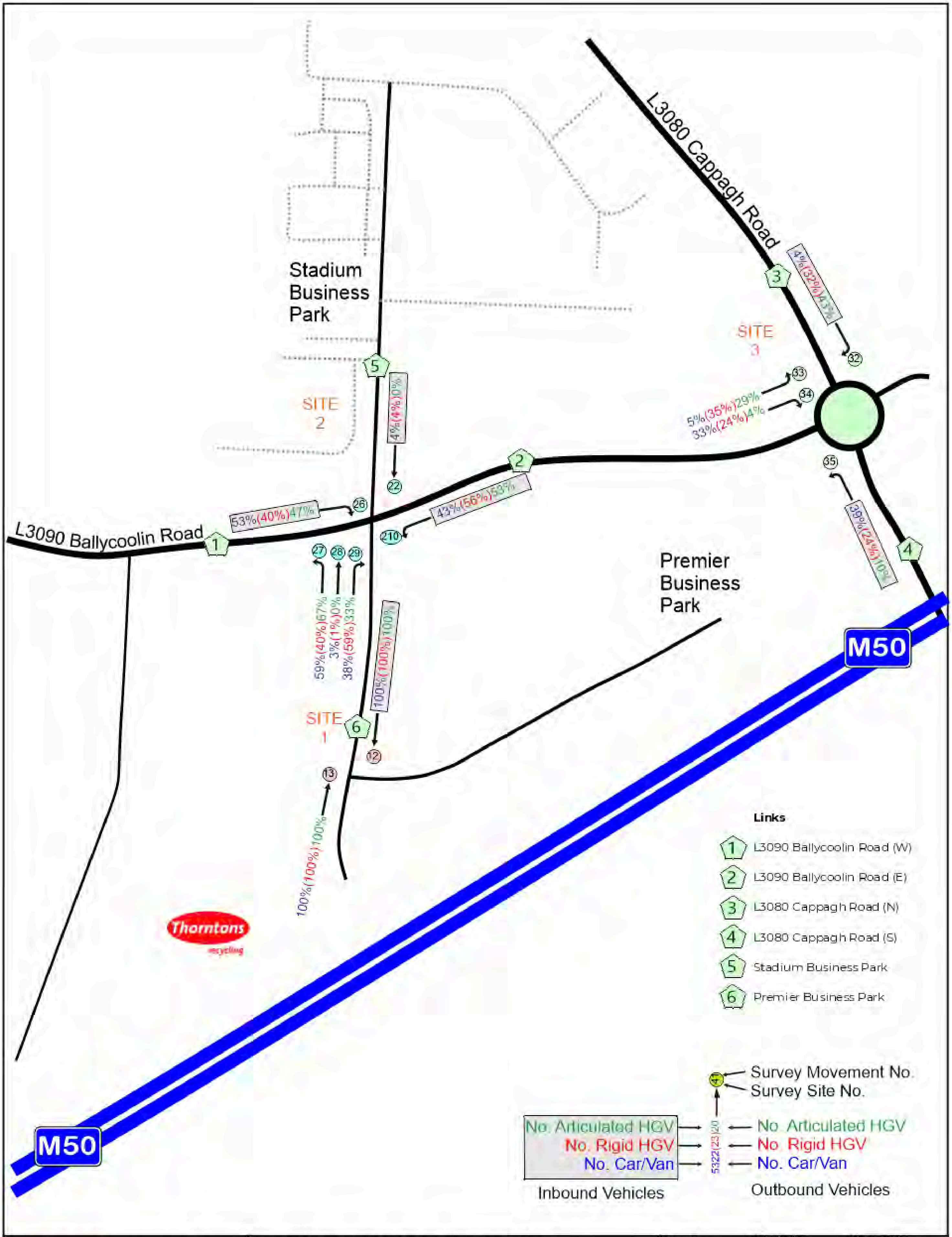
D15 R59T

Telephone: [illegible]
Website: [illegible]
Email: [illegible]

Thorntons Recycling Proposed MRF

Forecast Baseline 2040 Year of Opening +15yrs
PM Peak Hour Traffic Flows ('Do-Nothing')
(17:00-18:00hrs)

Drawn by: TWL	Checked by: JMK	Approved by: JMK
Date: June 2022	Date: June 2022	Date: June 2022
Scenario: Surveys	Job No. 03088	Figure 12
Appendix 13-3		



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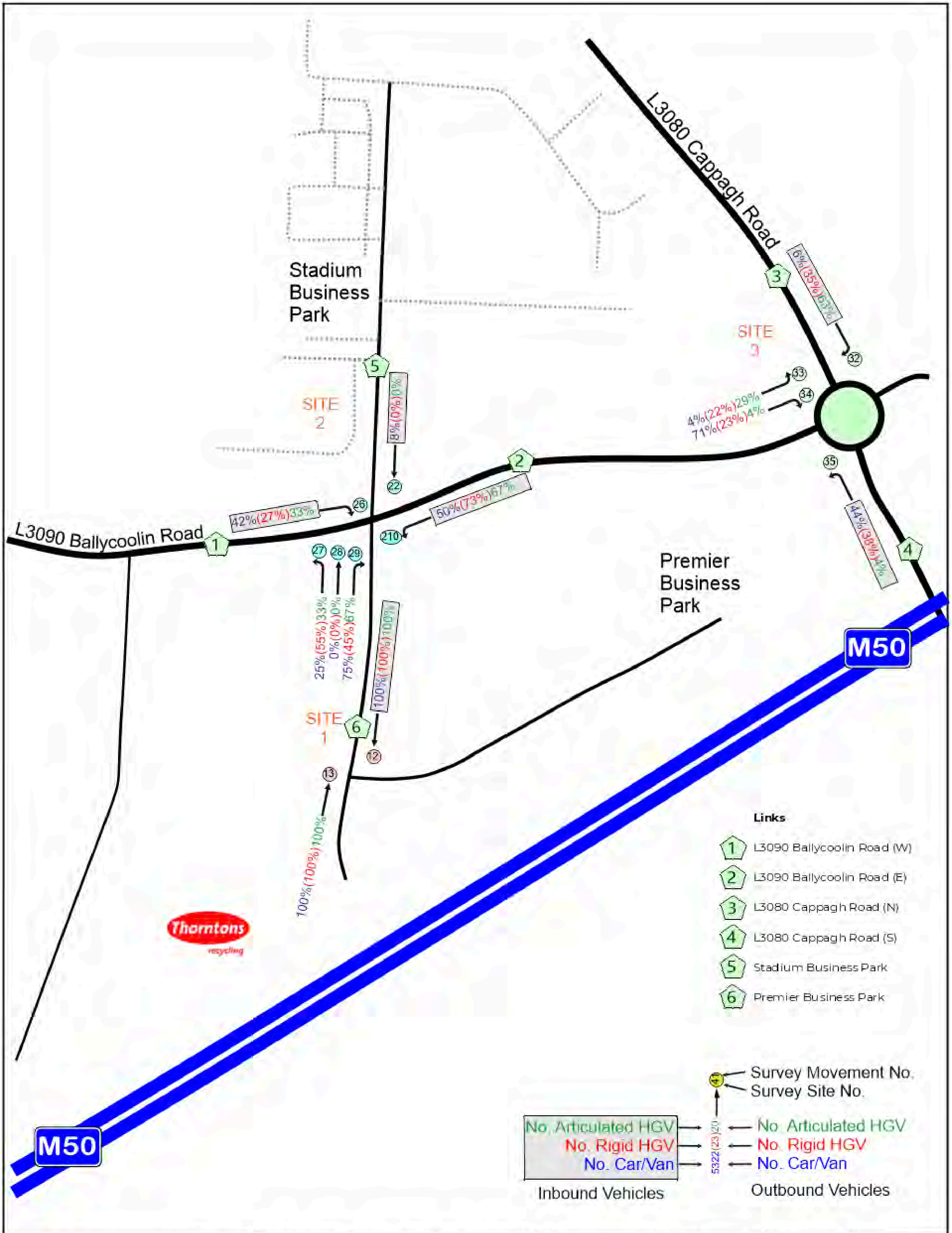
D15 R59T

Thorntons Recycling Proposed MRF

Development Traffic Distribution
Weekday Daily Traffic Flows
(07:00-19:00hrs)

Drawn by: TWL	Checked by: JMK	Approved by: JMK
Date: June 2022	Date: June 2022	Date: June 2022

Scenario: Surveys
Job No. 03088
Appendix 13-3
Figure 13



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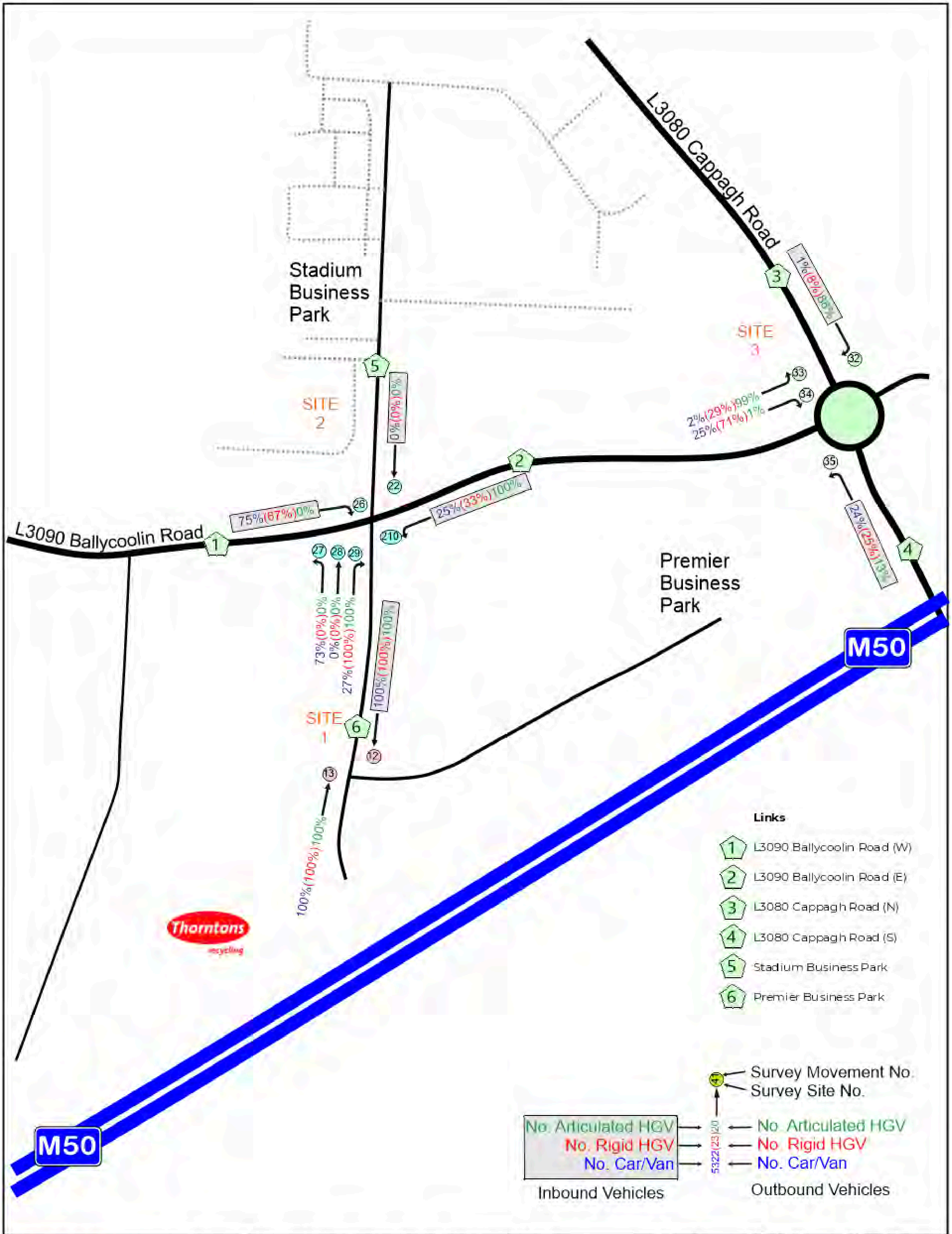
Suite 5 Gowna Plaza
Bracetown Business Park
D15 R5BT

Thorntons Recycling Proposed MRF

Development Traffic Distribution
AM Peak Hour Traffic Flows
(08:00-09:00hrs)

Drawn by: TWL	Checked by: JMK	Approved by: JMK
Date: June 2022	Date: June 2022	Date: June 2022

Scenario: Surveys
Job No: 03088
Appendix 13-3
Figure 14



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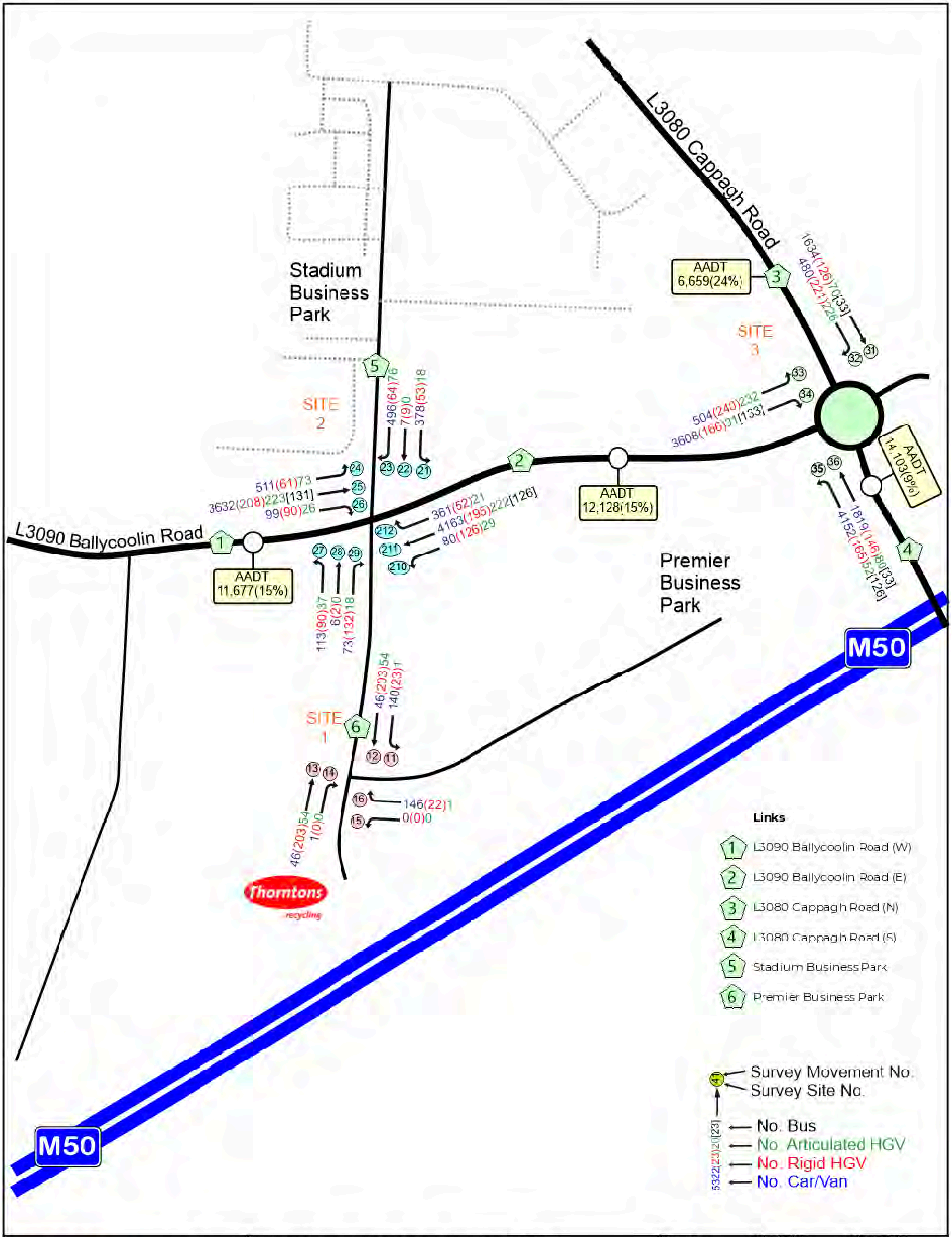
Thorntons Recycling Proposed MRF

Development Traffic Distribution
PM Peak Hour Traffic Flows
(17:00-18:00hrs)

Drawn by: TWL	Checked by: JMK	Approved by: JMK
Date: June 2022	Date: June 2022	Date: June 2022

Scenario: Surveys
Job No. 03088
Appendix 13-3
Figure 15



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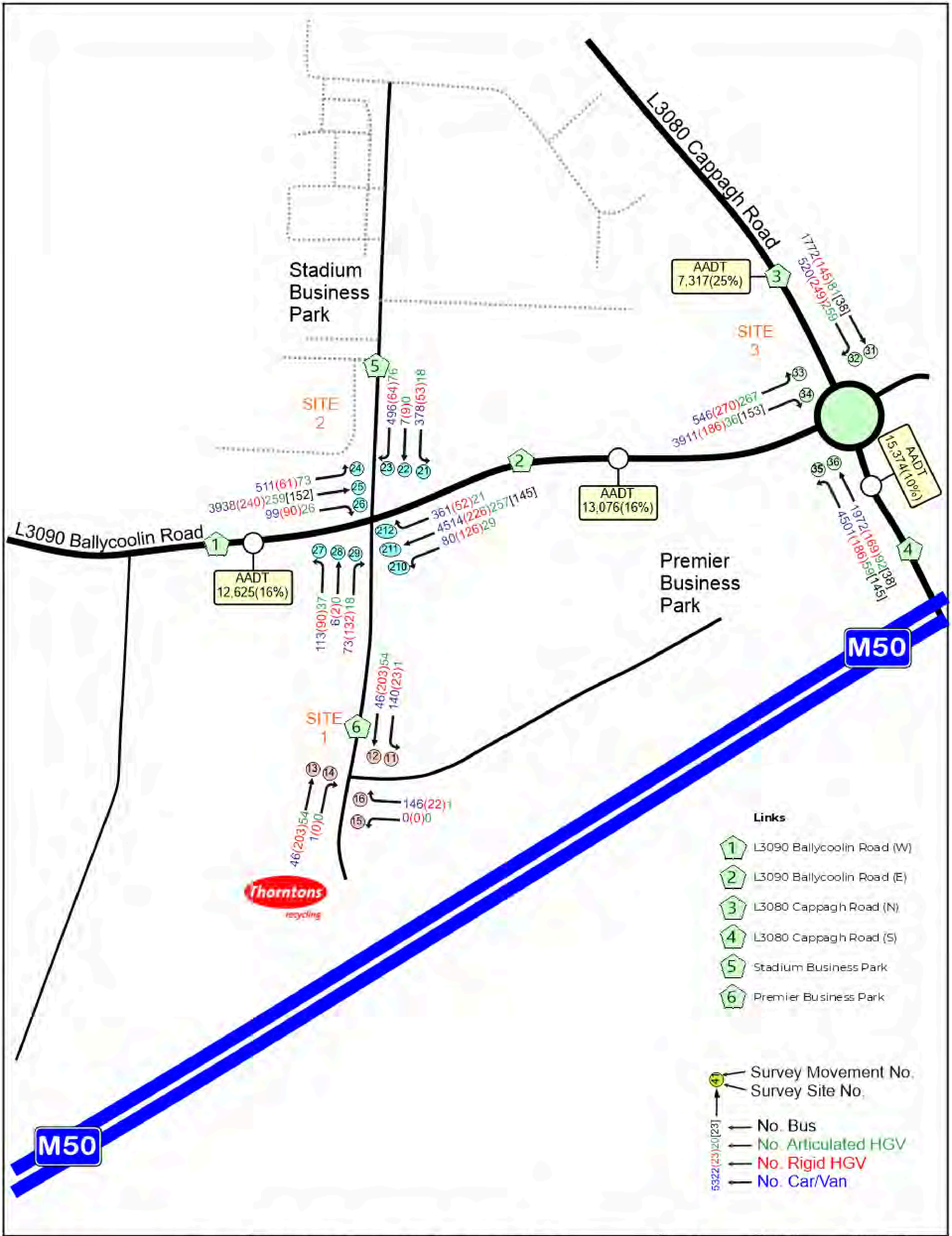
Bracetown Business Park
D15 R58T

Thorntons Recycling Proposed MRF

Forecast 2025 Year of Opening
Weekday Daily Traffic Flows ('Do-Something')
(07:00-19:00hrs)

Drawn by: TWL	Checked by: JMK	Approved by: JMK
Date: June 2022	Date: June 2022	Date: June 2022
Scenario: Surveys	Job No. 03088	Figure 16
Appendix 13-3		



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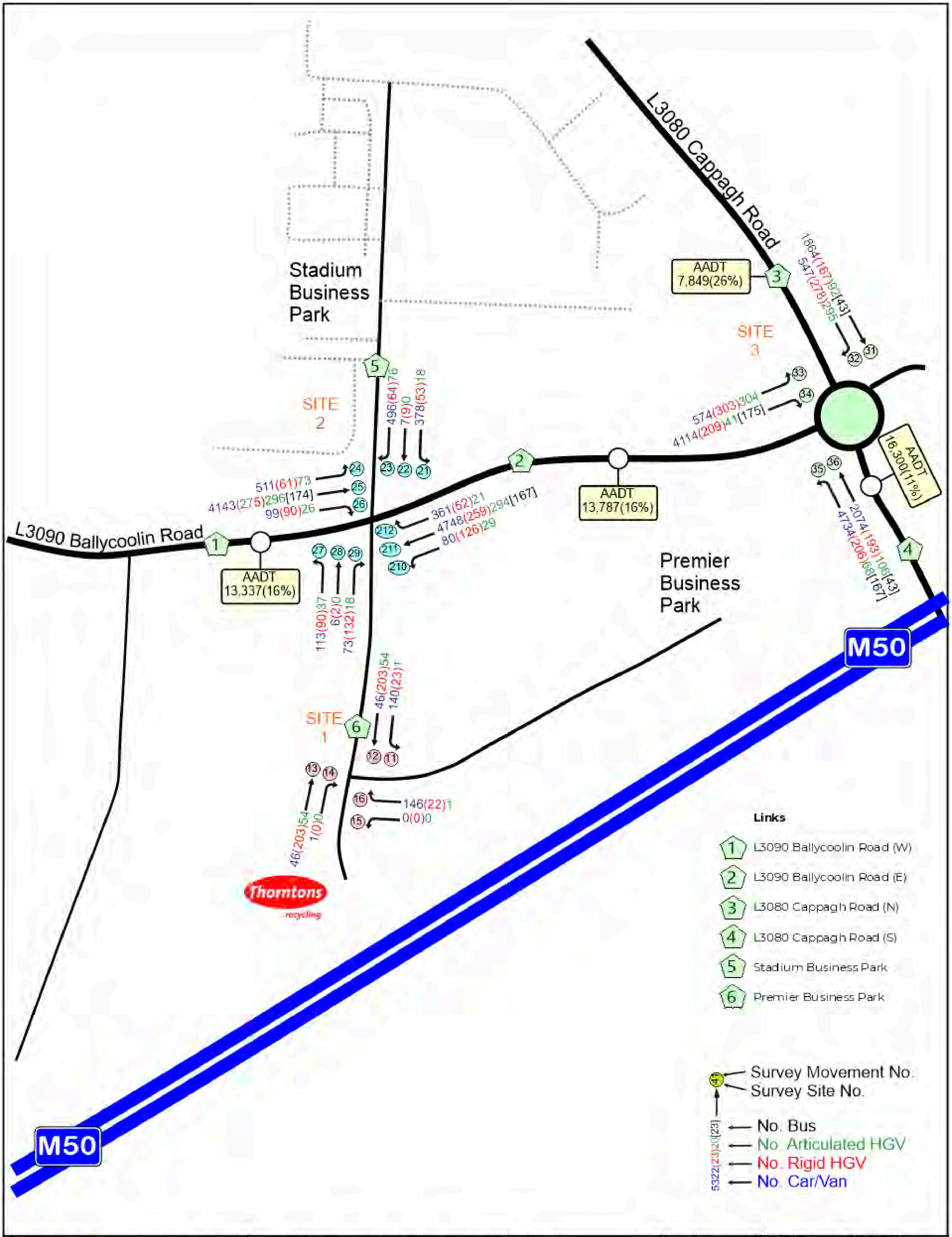
Blacetown Business Park
D15 R5BT

Thorntons Recycling Proposed MRF

Forecast 2030 Year of Opening +5yrs
Weekday Daily Traffic Flows ('Do-Something')
(07:00-19:00hrs)

Drawn by: TWL	Checked by: JMK	Approved by: JMK
Date: June 2022	Date: June 2022	Date: June 2022
Scenario: Surveys	Job No. 03088	Figure 17
Appendix 13-3		



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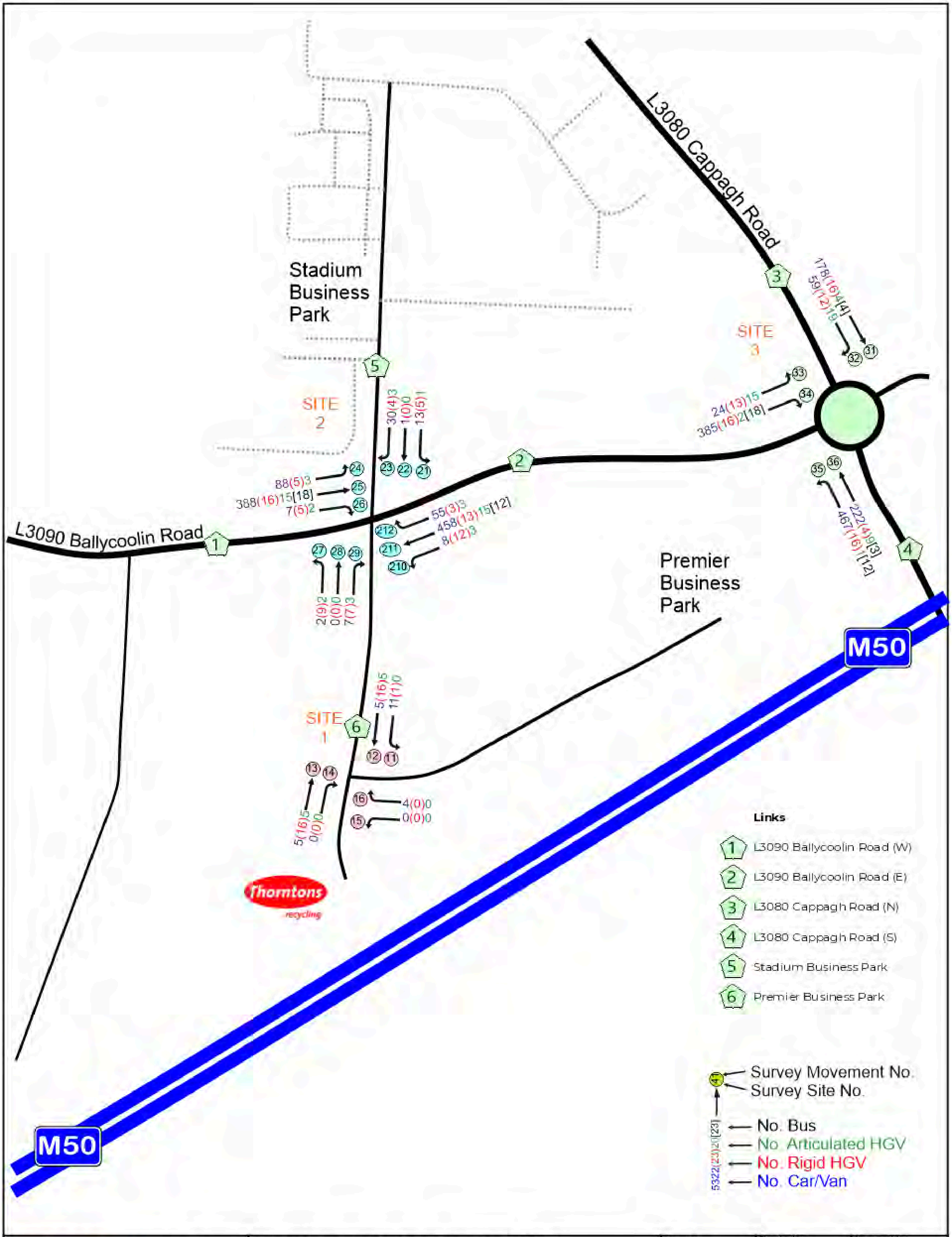
Bracetown Business Park,
D15 R59T

Thorntons Recycling Proposed MRF

Forecast 2040 Year of Opening +15yrs
Weekday Daily Traffic Flows ('Do-Something')
(07:00-19:00hrs)

Drawn by: TWL	Checked by: JMK	Approved by: JMK
Date: June 2022	Date: June 2022	Date: June 2022
Scenario: Surveys	Job No. 03088	Figure 18
Appendix 13-3		



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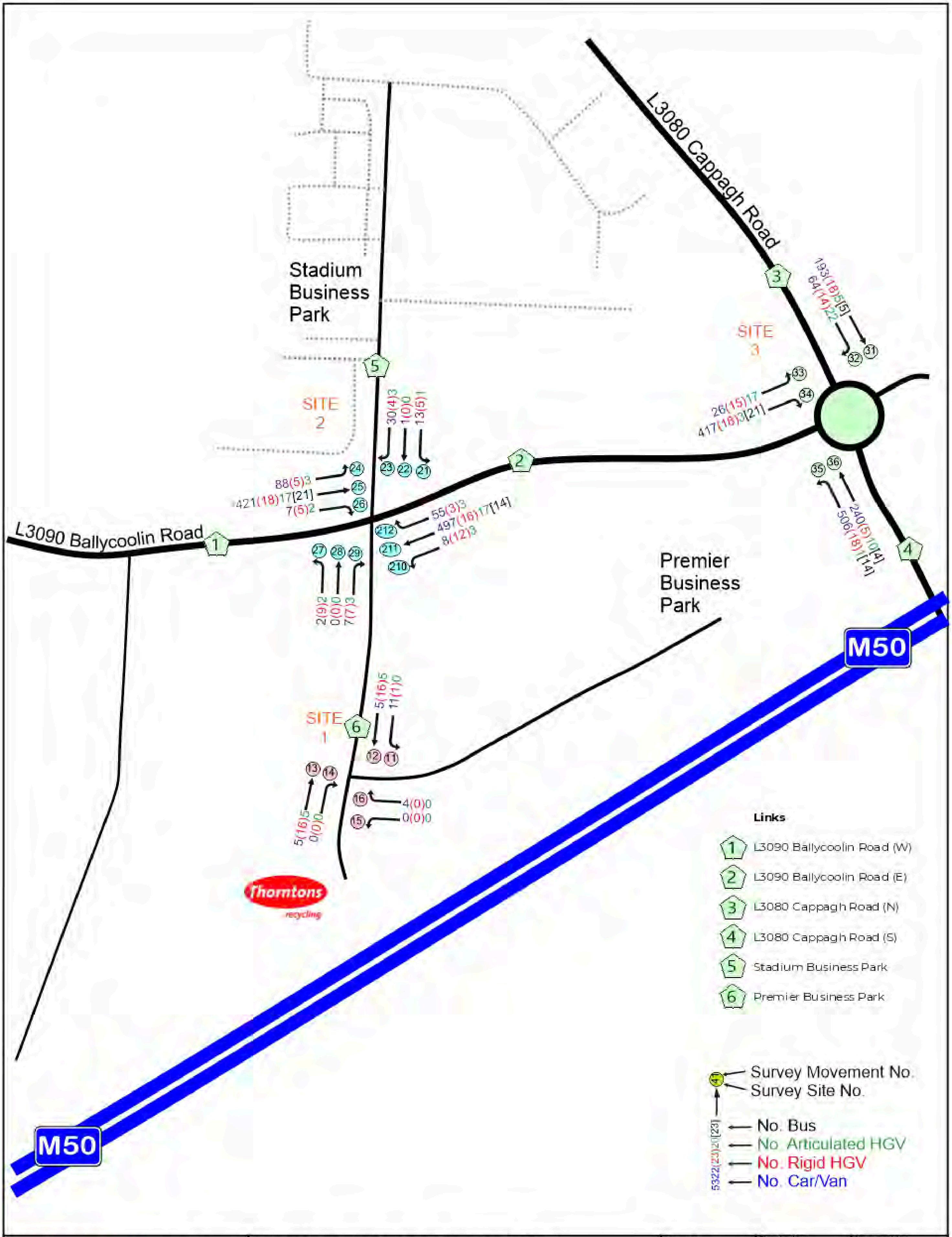
Suite 5 Cowna Plaza
Bracetown Business Park
D15 R59T

Telephone: [illegible]
Website: [illegible]
Email: [illegible]

Thorntons Recycling Proposed MRF

Forecast 2025 Year of Opening
AM Peak Hour Traffic Flows ('Do-Something')
(08:00-09:00hrs)

Drawn by: TWL	Checked by: JMK	Approved by: JMK
Date: June 2022	Date: June 2022	Date: June 2022
Scenario: Surveys	Job No. 03088	Figure 19
Appendix 13-3		



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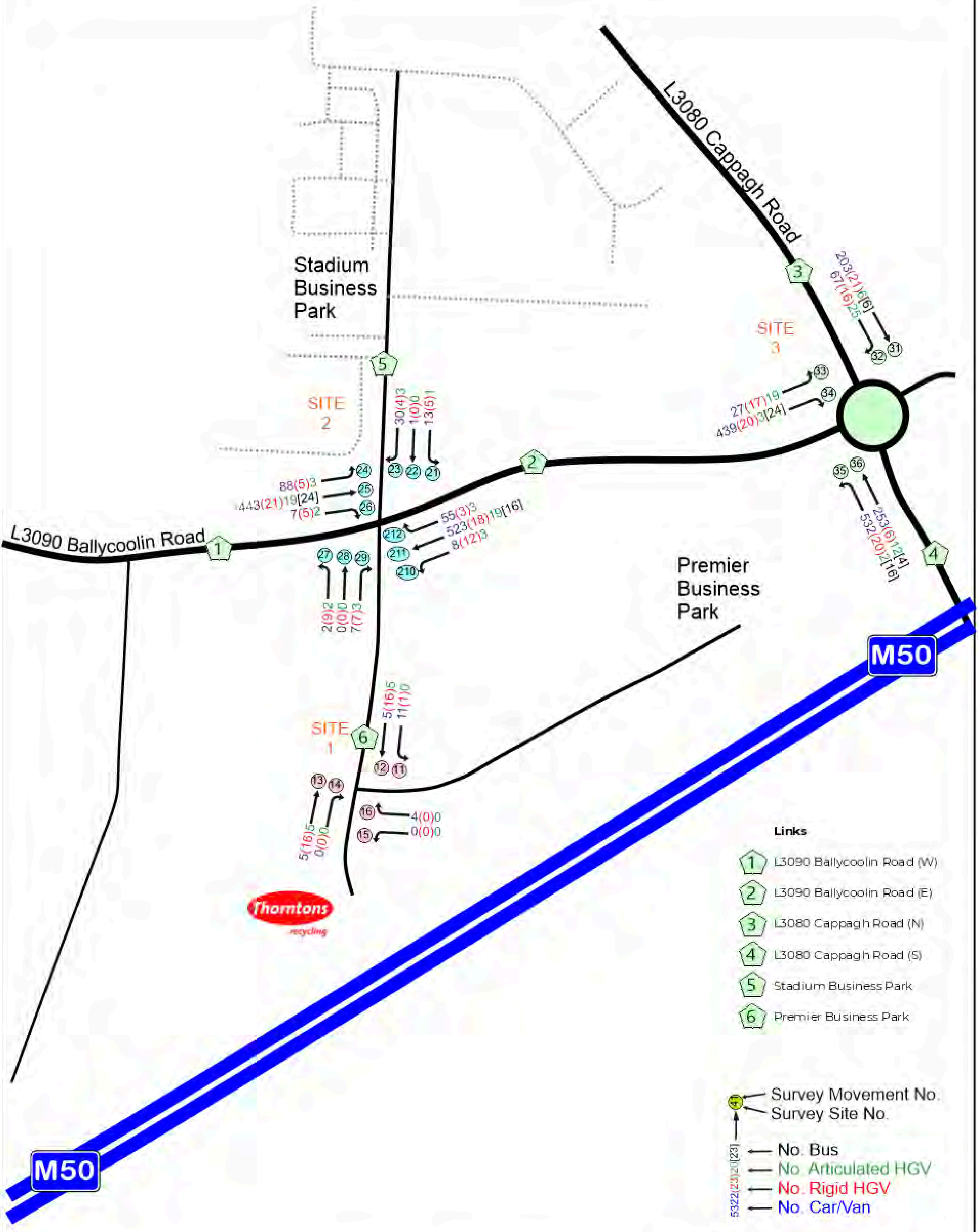
Thorntons Recycling Proposed MRF

Forecast 2030 Year of Opening +5yrs
AM Peak Hour Traffic Flows ('Do-Something')
(08:00-09:00hrs)

Drawn by: TWL	Checked by: JMK	Approved by: JMK
Date: June 2022	Date: June 2022	Date: June 2022
Scenario: Surveys	Job No: 03088	Figure 20
Appendix 13-3		



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Thorntons Recycling Proposed MRF

Forecast 2040 Year of Opening +15yrs
AM Peak Hour Traffic Flows ('Do-Something')
(08:00-09:00hrs)

Drawn by: TWL	Checked by: JMK	Approved by: JMK
Date: June 2022	Date: June 2022	Date: June 2022

Scenario: Surveys
Job No: 03088
Appendix 13-3
Figure
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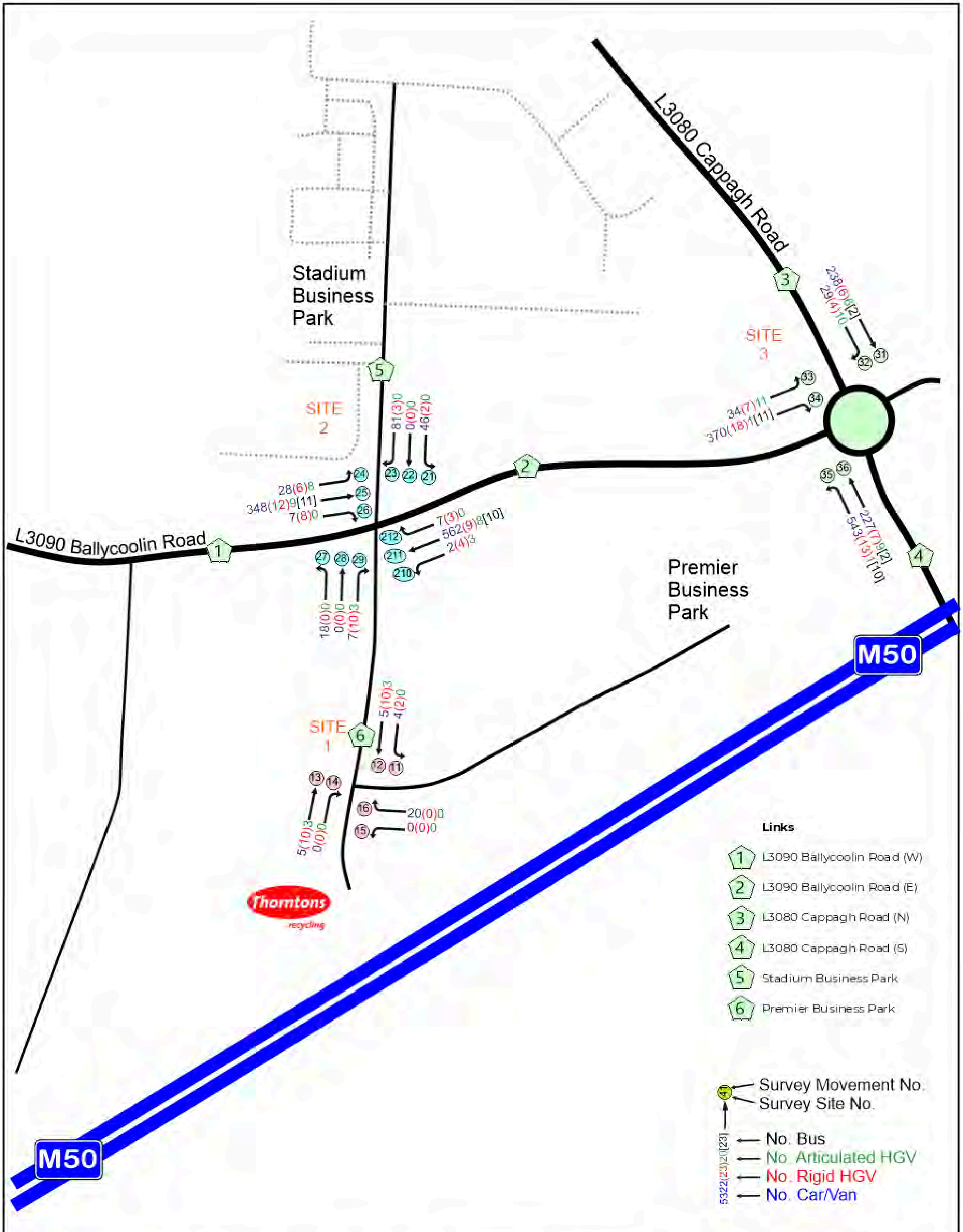

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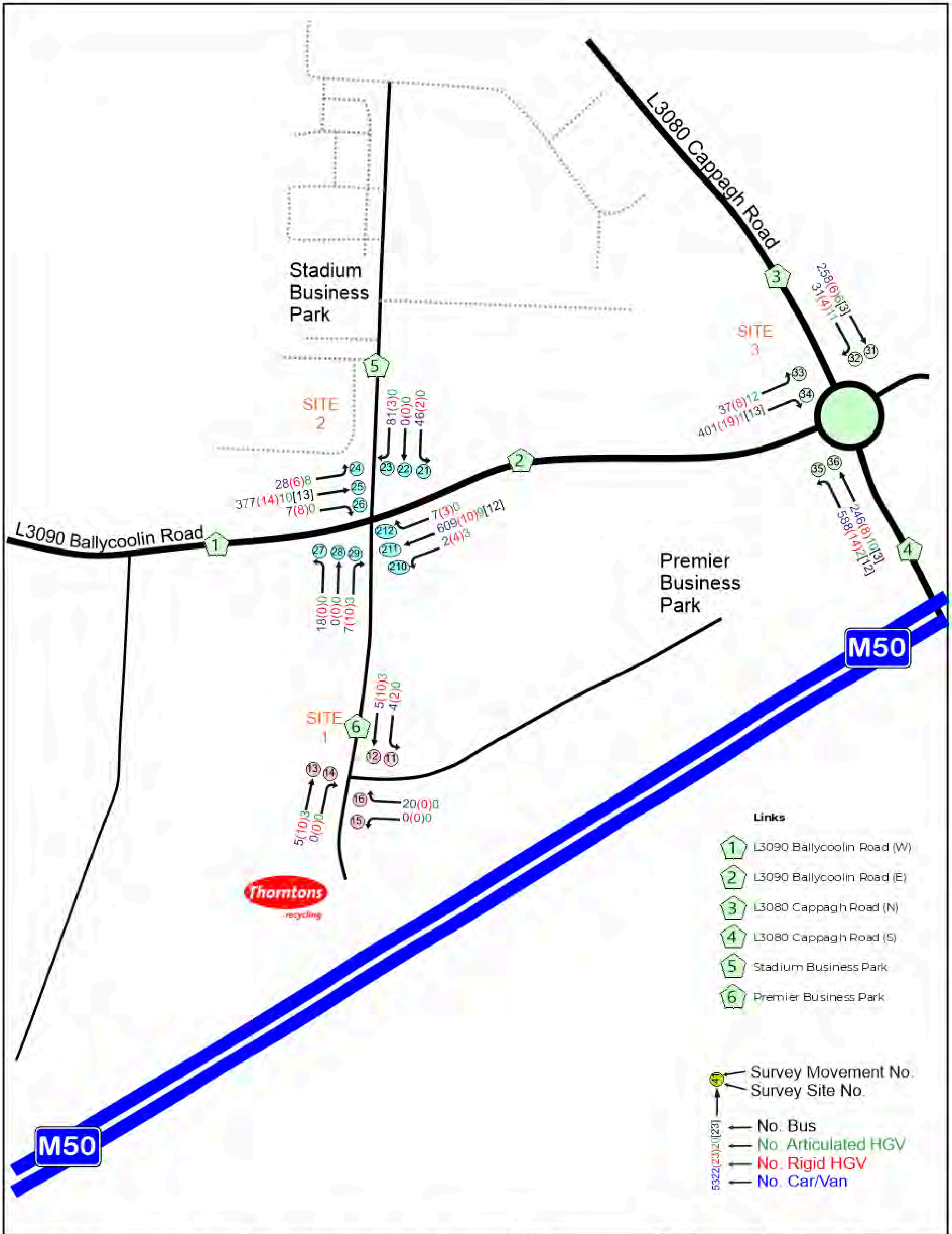
Thorntons Recycling Proposed MRF

Forecast 2025 Year of Opening
PM Peak Hour Traffic Flows ('Do-Something')
(17:00-18:00hrs)

Drawn by: TWL	Checked by: JMK	Approved by: JMK
Date: June 2022	Date: June 2022	Date: June 2022

Scenario: Surveys
Job No: 03088
Appendix 13-3
Figure 22



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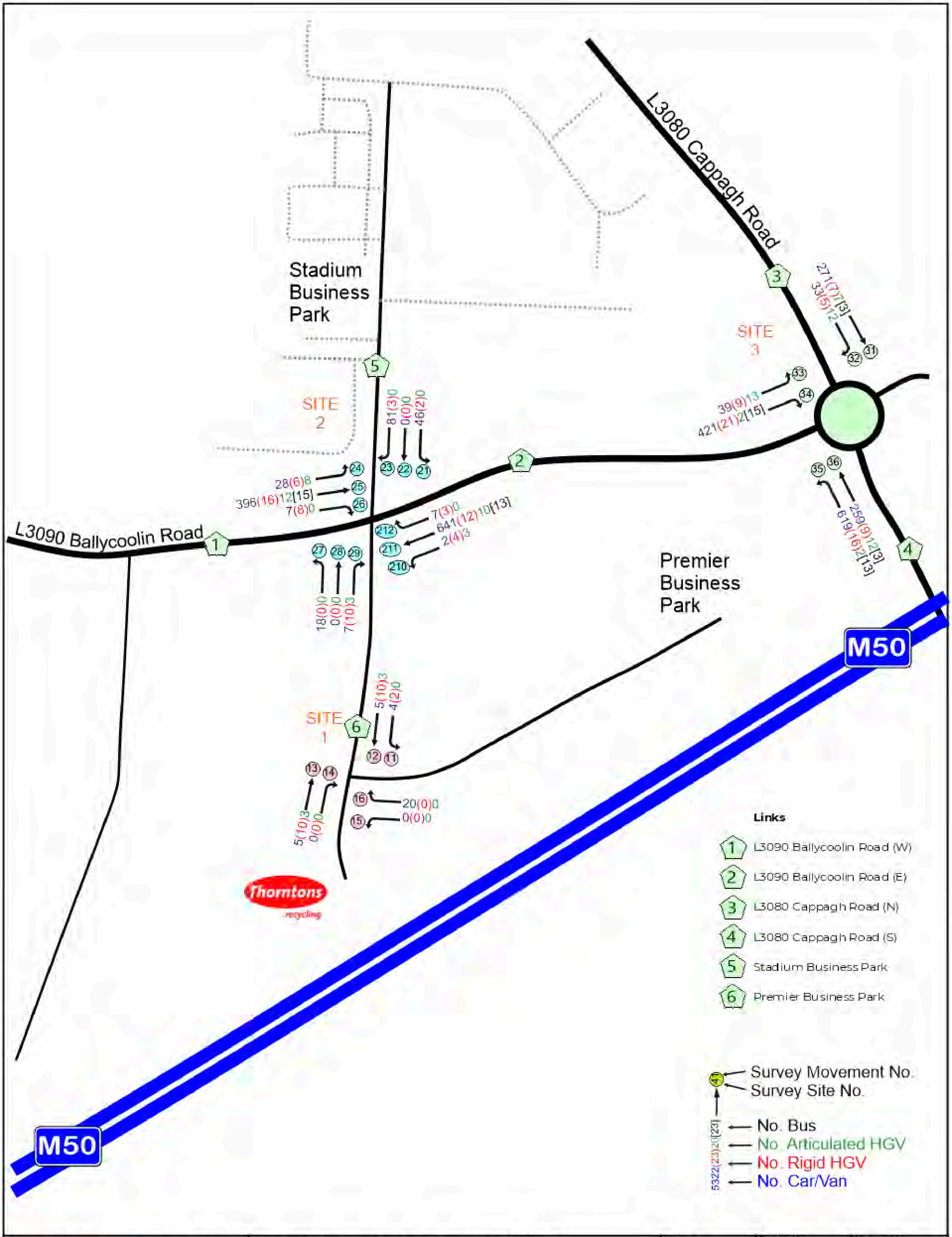
Thorntons Recycling Proposed MRF

Forecast 2030 Year of Opening +5yrs
PM Peak Hour Traffic Flows ('Do-Something')
(17:00-18:00hrs)

Drawn by: TWL	Checked by: JMK	Approved by: JMK
Date: June 2022	Date: June 2022	Date: June 2022

Scenario: Surveys
Job No. 03088
Appendix 13-3

Figure 23



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Thorntons Recycling Proposed MRF

Forecast 2040 Year of Opening +15yrs
PM Peak Hour Traffic Flows ('Do-Something')
(17:00-18:00hrs)

Drawn by: TWL	Checked by: JMK	Approved by: JMK
Date: June 2022	Date: June 2022	Date: June 2022
Scenario: Surveys	Job No: 03088	Figure 24
Appendix 13-3		

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APPENDIX 13.4

Haul Routes

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Telephone: +353 (0)18253015
Website: www.trafficwise.ie
E-mail: info@trafficwise.ie

Thorntons Recycling Proposed MRF - General Haul Routes

Existing and Future Principal Haul Routes
Routes to and from N2 National Primary Road ··········
Routes to and from N3 National Primary Road ··········
Finglas and East ··········

Drawn by: TWL	Checked by: JMK	Approved by: JMK
Date: August 2022	Date: August 2022	Date: August 2022
Scenario: Haul Routes	Job No: 03165	Figure 1
Appendix 13-4		

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& PLANNING

APPENDIX 14.1

Receiving Environment

APPENDIX 14.1: RECEIVING ENVIRONMENT

General Archaeological and Historical Background

The proposed development will be located in Cappogue and Dunsink townland, in the parish of Castleknock, and the barony of Castleknock. Both Cappogue and Dunsink townlands are in the administrative district of Fingal County Council.

Fingal features over 2500 known and legally protected archaeological sites contained in the Record of Monuments and Places (RMP). The Record of Protected Structures (RPS) for Fingal County Council contains 800 entries for structures that are protected under the Planning and Development Act 2002.

The known archaeological sites provide evidence of human activity in Fingal spanning over 10000 years. Fingal shares boundaries with counties Meath, Kildare, Dublin City, and South Dublin County Council. It measures approximately 456 km2 (or 112,680 acres, or 45,560 hectares) and is primarily a flat and gently undulating county. The highest point in Fingal is Knockbrack Hill (176m OD), in the Man-O-War Hills near Naul. Fingal includes parts of five civil baronies; Balrothery West, Balrothery East, Nethercross, Castleknock and Coolock. The majority of the land of Fingal is used in agricultural. The Irish Sea forms the natural boundary to the east.

During the Mesolithic period (*c*. 7,000-4,000 BC) people existed as hunters/gatherers, living on the coastline, along rivers and lakesides. They used flint and other stones to manufacture sharp tools, and locating scatters of discarded stone tools and debris from their manufacture can sometimes identify settlements. The earliest evidence of settlement in Fingal dates to this period and is represented by Mesolithic sites identified by G. D. Liversage at Dalkey Island in 1968, and a midden site at Sutton identified by Michael Ryan. Several Mesolithic flint and other stone tools are documented from the Malahide estuary and at Loughshinny.

In the Neolithic period (*c*. 4,000-2,400 BC) the population became more settled with a subsistence economy based on crop growing and stock-raising. This period also saw changes in burial practices, and a tradition of burying the dead collectively and carrying out of cremations emerged. The tombs called megaliths (from the Greek *mega*; meaning giant, and *lithos*; meaning stone) are generally divided into four distinct groups, identified on the basis of their architecture, distribution, date range and associated architecture: portal tombs, passage tombs, wedge tombs and court tombs. Fingal features a number of Neolithic burial tombs including five passage tombs at Bremore, north of Balbriggan, and one passage tomb at Rush, and one portal tomb is known at Howth (www.archaeology.ie). Evidence for domestic activity and habitations dating to the Neolithic period has been found during infrastructure and development projects in Fingal. A Neolithic habitation site (RMP DU014-028) was identified in Cappogue townland 350m east of the proposed development at Unit 1, Cappogue Industrial Park. This archaeological site was identified during the construction of the Northeast Gas Pipeline in 1984 and is evidence of human activity in the area during the Neolithic period.

The Bronze Age (*c*. 2,400-700 BC) in Ireland is synonymous with the arrival of metal working technology. Bronze Age monuments from Fingal include standing stones, stone circles, cist burials, barrows, cairns and *fulachta fiadh* which are one of the most numerous monument types in Ireland with over 4,500 examples recorded (Waddell 2005, 174). The Bronze Age populations of Fingal used fire to extract metal resources for rock, and fabricated tools and jewellery in bronze and gold. Burial practices changed during the Bronze Age with a move away from the large megaliths to cremations and inhumations in simple earth-cut or stone-lined graves, sometimes within funerary pottery vessels. Archaeological excavations (Licence no. 06E0288) were carried out at the site of Premier Business Park, Ballycoolin, 0.6km to the northeast of the proposed development at Cappogue. This excavation resulted in the identification of a Bronze Age structure, that may have been a dwelling. Also recovered were three flint artefacts from a number of pits. A sample of hazel charcoal from the fill of one of the pits was radiocarbon dated to the Middle Bronze Age (1385-1123 cal. BC, 2 sigma calibration), (McQuade, 2009).

The Iron Age (700 BC – AD 400) saw changes in material culture and settlement modes in Ireland. New influences came into Ireland which gradually introduced the knowledge and use of iron, although for several centuries bronze continued to be widely used. The Iron Age in Ireland however is problematic for archaeologists as few artefacts dating exclusively to this period have been found, and without extensive excavation it cannot be determined whether several monument types, such as ring-barrows or standing stones, date to the Bronze Age or Iron Age. Like much of Ireland, the inhabitants of Iron Age Fingal have left less evidence of their settlements in the landscape. Fingal has a number of coastal archaeological sites identified as promontory forts. These sites date to the Iron Age, are found at near Loughshinny, Howth and Lambay Island. Ring ditches often mark the location of burials such as individual deposits in pits often called barrows. These ring ditches and barrows often date to the Iron Age. A ring ditch (RMP DU014-026) is situated in Dunsink townland 30m of the south of the proposed development.

The Early Medieval period (*c.* 400-1100 AD) is depicted in the surviving sources as entirely rural, characterised by the basic territorial unit known as *túath.* Walsh (2000, 30) estimates that there were at least 100, and perhaps as many as 150, kings in Ireland at any given time during this period, each ruling over his own *túath.* During this turbulent period roughly circular defensive enclosures known as ringforts were constructed to protect farmsteads. They were enclosed by an earthen bank and exterior ditch, and ranged from approximately 25 m to 50 m in diameter. The smaller sized and single banked type (univallate) was more than likely home to the lower ranks of society, while larger examples with more than one bank (bivallate/trivallate) housed the more powerful kings and lords. They are regarded as defended family homesteads, and the extant dating evidence suggests they were primarily built between the 7th and 9th centuries AD (Stout 1997, 22-31). Ringforts are considered to be the most common indicator of settlement during the Early Medieval period. The most recent detailed study (*ibid.*, 53) has suggested that there is an approximate total of 45,119 potential ringforts or enclosure sites throughout Ireland. In the archaeological record, many sites have not sufficient elements to positively identify them as ringforts, and consequently they are classified more broadly as enclosures. Most of the ringforts and enclosures in Fingal are likely to date to the early medieval period. An early medieval enclosure (RMP DU014-118) was identified at Cappogue, during the excavations (licence 06E0288) for the development of Premier Business Park, 0.6km east of the proposed development site. Another enclosure site (RMP DU014-127) is situated in Cappogue townland 1.5km east of the proposed development.

During the early medieval period (400-1100 AD) the western part of modern-day Fingal including Cappogue and Dunsink were in the Gaelic Kingdom of Míde (Meath), and the eastern part of modern-day Fingal was part of the southern Uí Neill kingdom of Brega, with the neighbouring kingdom of Laigin to the south. The Kingdom of Meath included the modern counties of Meath, much of Westmeath, and some of Kildare and Offaly. The Kingdom of Brega extended from Carlingford in the north, to the of the River Tolka in the south, and bordered the Kingdom of Mídhe (Meath) to the west. Although the size and ownership of Brega was fluid according to the Annals of Tigernach and the Annals of Ulster, Brega was held by the southern Uí Néill dynasty in early Irish history.

The arrival of Christianity in the mid fifth century saw the establishment of new ecclesiastical sites in Fingal. Surviving round towers at Rush, Swords, and on the island of Ireland's Eye, are evidence of the foundations of the Christian communities in Fingal, during the early medieval period.

The excavations (licence 06E0288) at Cappogue for Premier Business Park, that were previously mentioned, resulted in the identification and archaeological recording of a previously unknown early medieval graveyard. The remains of at least 16 individuals were identified in this graveyard. The burials were orientated east-west with the heads facing eastwards. A radiocarbon date from one of the burials (AD 419-556, 2 sigma calibration) (McQuade, 2009).

The arrival of the Vikings in the late eight and early nineth centuries caused significant change to areas of Ireland near the coast and along river routes, and Fingal experienced much of this upheaval. The name Fingal is an Anglicization of the Irish 'Fionn ghall' meaning 'fair foreigner' and relates to the settlement of the area by Norse immigrants in the ninth and tenth centuries. Interestingly the area of Baldoyle takes its name from the Gaelic 'Baile Dubh Gaill' meaning 'town of the dark foreigner'. This distinction between 'fair' and 'dark' foreigners is seen as indicative of the differences of appearances of the Vikings groups from Norway (dark) and Sweden and Denmark (fair).

The medieval period (1169-1550AD) in Ireland is associated with the arrival of the Anglo-Normans in 1169. In reality, the reforms to the Irish Church that commenced in the early twelfth century more properly herald the arrival of the medieval period. With the arrival of the Anglo-Normans in the twelfth century, the suppression of Gaelic society and the re-ordering of civic administration in Ireland required new Anglo-Norman settlements and places of worship. In some instances, existing Gaelic churches were altered and adapted to suit the needs and fashions of the Anglo-Normans. The Irish church was reformed with the introduction of a church structure based on dioceses and bishoprics, within which parishes were subordinate to their relevant bishops. This curbed the power and influence of the existing Gaelic monasteries and allowed for the establishment of religious centres under the newly arrived Anglo-Norman religious orders including the Augustinians, Cistercians, Dominicans, Franciscans, and Carmelites. By the end of the thirteenth century most of the bishops in Ireland were Anglo-Norman. Following the successful conquering of Leinster by the Anglo-Normans, the Gaelic Kingdom of Meath was granted by Henry II to Hugh de Lacy, who had financed much of the invasion of Ireland. The Gaelic Kingdom of Meath was refashioned by the Anglo-Normans as the Lordship of Meath and was divided into administrative districts called baronies. Many of these baronies followed pre-existing Gaelic tribal boundaries. De Lacy proceeded to issue grants of land to his subordinates. Hugh Tyrell was granted the barony of Castleknock, including Cappogue and Dunsink.

The Anglo-Normans constructed motte and bailey castles, ringwork castles, and stone castles, to defend their settlements, and areas of strategic importance. A castle (RMP DU014-027) known as Cappogue Castle, 350m to the east of the proposed development, may originally have been an Anglo-Norman construction. Although a diagram and description of Cappogue Castle that dates to the eighteenth century indicates that it ultimately was reconstructed in the fifteenth century as a tower-house type castle. Tower houses are regarded as a late type of castle and were erected from the 14th to early 17th centuries. Their primary function was defensive, with narrow windows and a tower often surrounded by a high stone wall (bawn). An Act of Parliament of 1429 gave a subsidy of £10 to "*liege*" men to build castles of a minimum size of 20 ft in length, 16 ft in breadth and 40 ft in height (6 m x 5 m x 12 m). By 1449 so many of these £10 castles had been built that a limit had to be placed on the number of grants being made available. The later tower houses were often smaller, with less bulky walls and no vaulting. There are 18 tower houses recorded in Fingal (www.archaeology.ie). The Bailiff (later called Sheriff) of Dublin John Woodlock is associated with Cappogue Castle in the thirteenth century, although it is unclear if he was responsible for its construction.

The excavation (licence 06E0288) at Cappogue for Premier Business Park identified a phase of domestic activity comprising pits, drains, ditches, and metalled surfaces, that all dated to the medieval period. The artefacts found from this phase of the excavation dated to the 12th to 14th centuries. It is unclear if an earlier iteration of Cappogue Castle (RMP DU014-027) was present when this domestic activity took place.

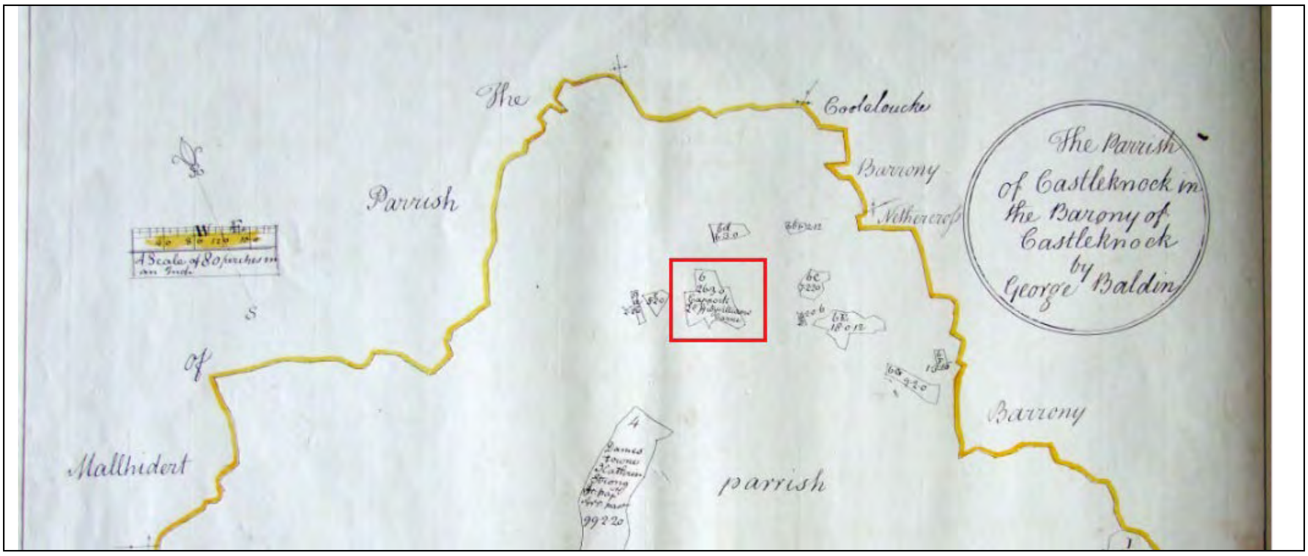
The 14th century throughout northwest Europe is generally regarded as having been a time of crisis, and Ireland was no exception. Although the Irish economy had been growing in the late 13th century it was not growing quickly enough to support the rapidly expanding population, especially when Edward I was using the trade of Irish goods to finance his campaigns in Scotland and Wales. When the Great European Famine of 1315-1317 arrived in Ireland, brought about by lengthy periods of severe weather and climate change, its effects were exacerbated by the Bruce Invasion of 1315-1318. Manorial records which date to the early 14th century show that there was a noticeable decline in agricultural production. This economic instability and decline was further worsened with the onset of the Bubonic Plague in 1348. As a result of the tumultuous events of the fourteenth century, Ireland experienced a contraction in the influence of the crown and its administration in Dublin. In the absence of Anglo-Norman control rural Ireland saw a Gaelic Resurgence in the late fourteenth and fifteenth century. It is during the fourteenth century that several surviving written references to Cappogue appear. A reference to Cappogue as 'Keppagh' appears in 1326 in the Calendar of Archbishop Alen's Register (McNeill, 1950, 173). Cappogue appears as 'Keppoke' in 1360 in the same register (ibid, 213).

Before the Tudors came to the throne the kings of England were also the kings of western France and so, during the 14th and 15th centuries, the various lords who ruled in Ireland were largely left to themselves. The Tudors however took more of an interest in the affairs of Ireland, and they wanted to put a stop to the raids of the Gaelic Irish on areas under English rule. To do this, they ruthlessly put down any rebellions and even quashed inter-tribal feuds. English settlers were then brought in to settle their lands. The first of these plantations occurred in the mid-16th century in what is now Laois and Offaly. After the Desmond rising in Munster in 1585 came another plantation, and parts of southwestern Tipperary were planted at that time. From 1593 until 1603 there was a countrywide war between the Gaelic Irish, who were supported by the French, and the Elizabethan English. The Irish were finally defeated and with the "*Flight of the Earls*" from Rathmullan, County Donegal, in 1607 Ulster, which had previously been independent of English rule, was planted.

The first surviving written reference to Dunsink appears in 1539 in an Inquisition following the death of a landowner (source https://www.logainm.ie/en/17229?s=Dunsink).

The religious wars of the seventeenth century resulted in significant upheaval of populations and land distribution to the victors. Cromwell's campaign in Ireland (1649-51) culminated with large tracts of land being granted to soldiers and financial supporters of his New Model Army. The mid seventeenth-century Civil Survey records that the townlands of Cappogue and Dunsink were in the parish of Castleknock, and in the barony of the same name. The Civil Survey outlines that in 1641 the townlands of Cappogue and Dunsink were owned by protestants, and therefore not subject to seizure and redistribution. The Census of 1659 records the population of the townland of Cappogue as 26 families, comprising 22 Irish (Catholic) and 4 English (Protestant) families. The Census of 1659 records the population of the townland of Dunsink as 26 families, although no details are given regarding these families. The Down Survey of 1658-9 depicts Cappogue as 'Cappock' and identifies the owner as 'Fitzwilliam', who is described as 'farmer'. No castle is depicted at Cappogue. This does not necessarily mean that the castle had been destroyed but could indicate that it was not habitable. Dunsink is not recorded on the Down Survey map.

Figure 14-2: Extract from Down Survey Map of Parish of Castleknock dating to 1656-8, showing location of 'Cappock' (Cappogue)



In Fingal the eighteenth and nineteenth centuries witnessed the effects of the industrial revolution, with resulting improvements in farming, manufacturing, travel and commerce. Influential land-owners consolidated their estates, sometimes establishing estate villages for their workers, and improving land quality through drainage works, irrigation, and improved farming practices. Quarries were opened throughout the landscape to facilitate a boom in construction activity for roads, canals, buildings, and later for rail. Historical references relating to Cappogue Castle indicate that the ruined castle was quarried for stone in the eighteenth and nineteenth centuries.

The first edition 6" to a mile scale Ordnance Survey map of the area dates to 1839. This map depicts the proposed development area at Cappogue and Dunsink as agricultural fields used for pasture. A stream that is also the townland boundary between Cappogue and Dunsink, is depicted within the development location. This townland boundary is also delineated by a hedgerow. A field boundary is depicted on this map at the northern end of the proposed development. No archaeological, architectural, or cultural heritage assets are depicted on this map.

Record of Monuments and Places

The National Monuments Service (NMS) of the Department of Housing, Local Government and Heritage maintain the Record of Monuments and Places (RMP). By inclusion in the RMP an archaeological site is protected by law under the National Monuments Acts (1930-2014). These Acts define national monuments as archaeological sites of national significance or importance. There are no National Monuments in State Ownership recorded by the NMS within the proposed development site or the wider 5 km study areas. There are no National Monuments in Guardianship of the State recorded by the NMS within the proposed development site or the wider 5 km study areas. There are no archaeological sites subject to Preservation Order recorded by the NMS within the proposed development sites or the wider 5 km study areas.

The closest archaeological site (RMP DU014-026) to the proposed development site is in Dunsink townland, 30m south of the development. This archaeological site is identified as a ring-barrow in the archaeological record. It was identified following an examination of aerial photography by the Geological Survey of Ireland in June 1973 (File No: 0.148/9). The site appeared as a crop mark, 15m in diameter, but no surface evidence survives. Aerial images from 1995 and 2000 of the location of this archaeological site indicate that it was destroyed by the groundworks for a landfill in Dunsink.

Toponyms

Townland names are an important source in understanding the archaeology, geology, land-use, ownership and cultural heritage of an area.

Table 14-4: Translation or Explanation of Townland Names from within the Proposed Development Area

Townland	***Derivation / Meaning***
Cappoge	This name is an Anglicization of the Gaelic *'Ceapach'* which translates as *'plot of land'* or *'tillage plot'* (https://www.logainm.ie/en/17226).
Dunsink	This name is an Anglicization of the Gaelic *'Dún Sineach'* which translates as 'the of Sineach' (https://www.logainm.ie/en/17229?s=Dunsink).

Summary of Previous Fieldwork in the Study Area

Reference to Summary Accounts of Archaeological Excavations in Ireland (www.excavations.ie) has shown that seven archaeological fieldwork programs have been carried out in Cappogue townland and four in Dunsink townland. The archaeological excavations at Cappogue townland comprise two excavations of identified archaeological sites (archaeological licence numbers 06E0228 and 08E0032), three involved preconstruction stage archaeological test trenching in advance of development works (archaeological licence numbers 19E0636, 19E0142 and 99E0724), and two comprised archaeological monitoring of construction works (archaeological licence numbers 10E0410 and 19E0069). All four of excavations in Dunsink were carried out in advance of development. Only two of these works were carried out under archaeological licence (archaeological licence numbers 94E0061 and 05E0064). A number of pits with heat fractured stone were identified during works for the Northern Cross Route Motorway (archaeological licence numbers 94E0061).

A large-scale archaeological excavation was undertaken at the site of Cappogue Castle (archaeological licence 06E0228ext) in advance of an industrial development. Cappogue Castle is a known and legally protected archaeological site (RMP DU014-027) and is 350m east of the proposed development examined in this report. The excavation at Cappogue Castle identified four phases of archaeology dating from the Bronze Age to the post medieval period, and prehistoric pits, a cemetery that included at least 16 inhumation burials, evidence of a medieval settlement, and a post medieval isolated burial.

Topographical Files of the National Museum of Ireland

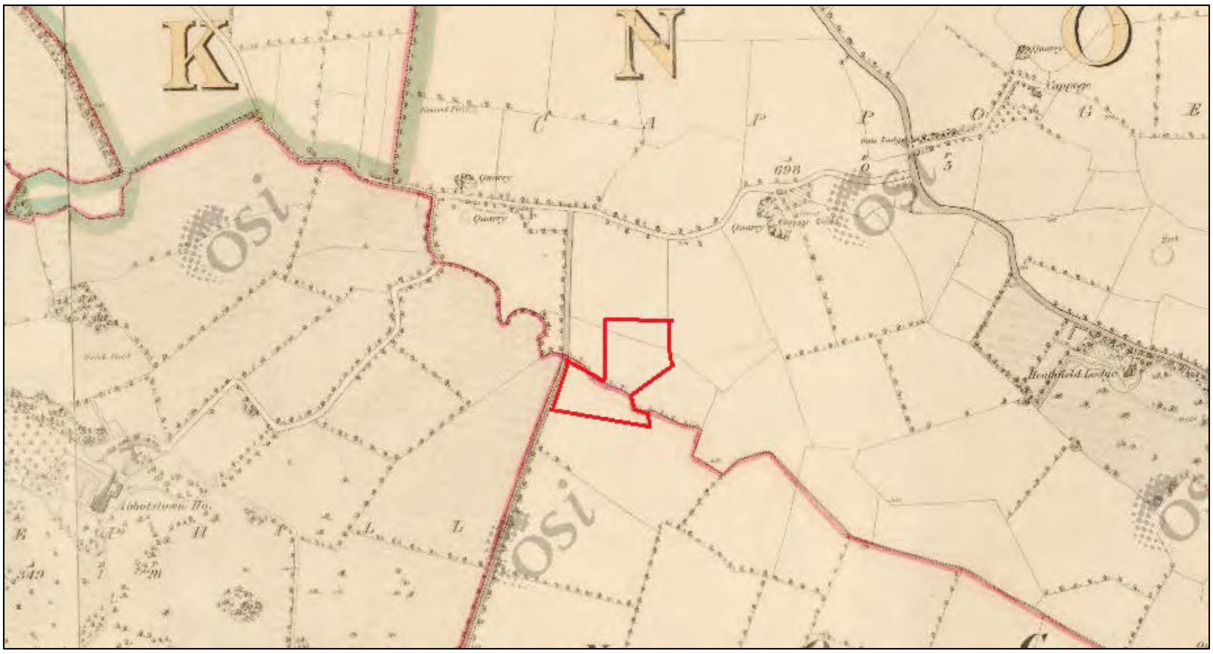
Information on artefact finds and excavations from County Dublin is recorded by the National Museum of Ireland. Location information relating to such finds is important in establishing prehistoric and historic activity within the study area and surrounding landscape.

There is one known artefact from Cappogue townland recorded in the Topographical Files of the National Museum of Ireland (File No: 1969:836). This artefact has been identified as a polished stone adze head. There are two known artefacts in the townland of Dunsink, although the exact findspot of these artefacts is not recorded. One of the artefacts found in Dunsink is a copper coin identified as being Roman featuring Constantinus Magnus (NMI Reference 1930:534). Constantinus Magnus, also known as Constantine the Great was a fourth century Roman Emperor who fought in Britain in 305 AD. The second artefact from Dunsink is a glazed pottery jug rim and handle that dates to the medieval period (NMI Reference 1998:90).

Cartographic Analysis

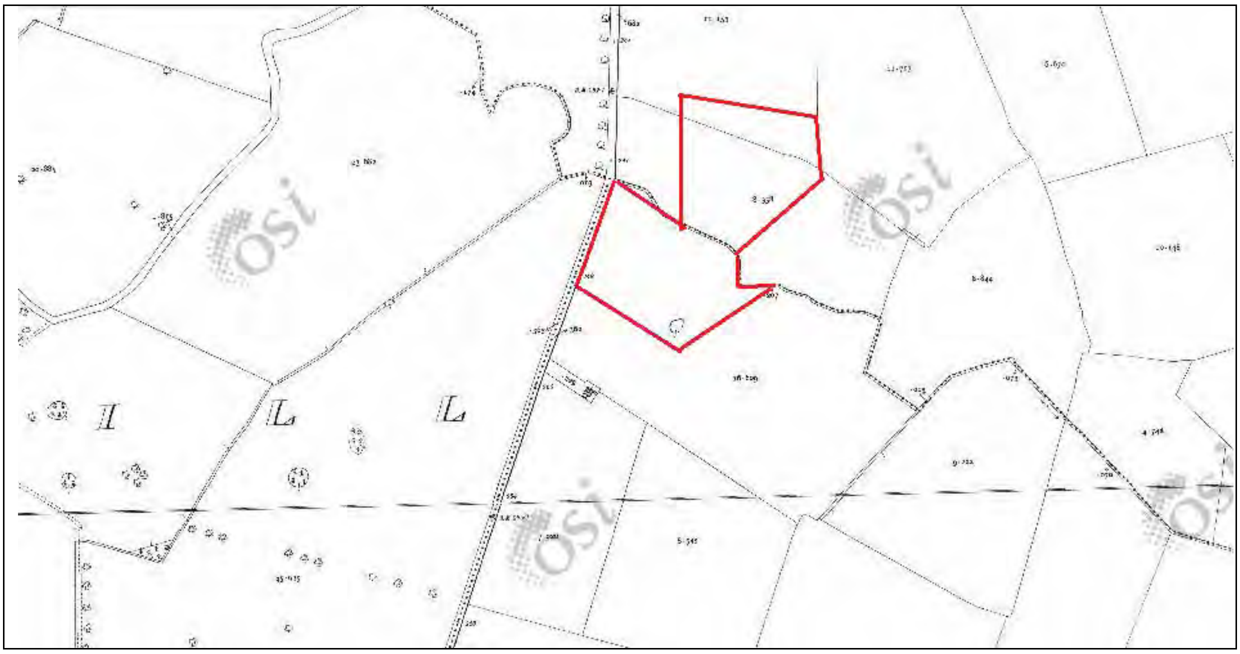
The first edition 6” to a mile scale Ordnance Survey map of the area dates to 1839-40. This map depicts the proposed development area at Cappogue and Dunsink as agricultural fields used for pasture. A stream that is also the townland boundary between Cappogue and Dunsink, is depicted within the development location. This townland boundary is also delineated by a hedgerow. A field boundary is depicted on this map at the northern end of the proposed development. No archaeological, architectural, or cultural heritage assets are depicted on this map.

Figure 14-3: Extract from 1st edition 6” to a mile scale Ordnance Survey map of the area, showing location of proposed development at Cappogue and Dunsink.



The first edition 25” to a mile scale Ordnance Survey map of the area dates to circa 1900. This map depicts the proposed location of the proposed development as pasture fields. A stream that is also the townland boundary between Cappogue and Dunsink, is depicted within the development location. This townland boundary is also delineated by a hedgerow. A field boundary is depicted on this map at the northern end of the proposed development. A small pond is depicted in the southern extent of the proposed development location. This feature is not depicted on the earlier map. This pond may have been seasonal and was recorded in the 25” map due to the mapping taking place during wetter weather.

Figure 14-4: Extract from 1st edition 25” to a mile scale Ordnance Survey map of the area, showing location of proposed development at Cappogue and Dunsink.



Aerial Photography

Aerial photographs held by Ordnance Survey Ireland (www.map.geohive.ie) and Bing aerial photography (www.bing.com/maps) were consulted to look for the presence of archaeological or architectural remains within the proposed development area.

The 1995 black and white and 2000 colour aerial photographs record the proposed development site at Cappogue and Dunsink townlands as agricultural lands. The 2000 colour aerial photograph depicts a heavily ploughed and planted field system in the development area. The M50 Motorway is not depicted on the 1995 black and white aerial photograph but is depicted on the 2000 colour photograph. The landfill is depicted In Dunsink townland, to the south of the proposed development, on both the 1995 and 2000 aerial photographs.

There was no evidence of any archaeological, architectural or cultural heritage features recorded on aerial photographs within the proposed development area or the surrounding landscape.

LIDAR Survey

Transport Infrastructure Ireland (TII, formerly National Road Authority) have commissioned LIDAR (Light Detection and Ranging) surveys along the M50 Motorway. The LIDAR images were consulted for this report. No archaeological, architectural or cultural heritage assets were identified on the LIDAR images of the proposed development area at Cappogue and Dunsink.

County Development Plan

Fingal County Development Plan 2017-2023

It is the stated policy (CH03) of the Fingal Development Plant 2017-2023 to:

> "*Protect all archaeological sites and monuments, underwater archaeology, and archaeological objects, which are listed in the Record of Monuments and Places and all sites and features of archaeological and historic interest discovered subsequent to the publication of the Record of Monuments and Places, and to seek their preservation in situ (or at a minimum, preservation by record) through the planning process." (Fingal County Council 2017, 346).*

It is also a stated policy (CH05) of the Fingal Development Plant 2017-2023 that in relation to developments the council will:

> "*Ensure archaeological remains are identified and fully considered at the very earliest stages of the development process, that schemes are designed to avoid impacting on the archaeological heritage"* (*ibid*, 347).

The stated Demand Management Strategy (DMS153) of Fingal Development Plan 2017-2023 is as follows:

> "All development proposals that may (due to their location, size, or nature) have implications for archaeological heritage shall be accompanied by an Archaeological Impact Assessment and Method Statement" (ibid, 469).

The Fingal Development Plan 2017-2023 lists Archaeological and Historical Landscapes within Fingal. There are no Archaeological & Historical Landscapes recorded in the Fingal Development Plan 2017-2023 within the proposed development sites or the wider 5 km study areas. The Fingal Development Plan 2017-2023 contains a list of *Zones of Archaeological Potential* within the county. There are no Zones of Archaeological Potential recorded in the Fingal Development Plan 2017-2023 within the proposed development sites or the wider 5 km study areas.

Architectural Heritage

It is an Objective (CH25) of Fingal Development Plan 2017-2023 to:

> *"Ensure that proposals for large scale developments and infrastructure projects consider the impacts on the architectural heritage and seek to avoid them. The extent, route, services and signage for such projects should be sited at a distance from Protected Structures, outside the boundaries Fin historic designed landscapes, and not interrupt specifically designed vistas. Where this is not possible the visual impact must be minimised through appropriate mitigation measures such as high-quality design and/or use of screen planting." (ibid., 351).*

The Fingal Development Plan 2017-2023 contains the Record of Protected Structures for the county. There are no Protected Structures recorded in the Fingal Development Plan 2017-2023 within the proposed development site. There are two Protected Structure within the 1 km study area of the proposed development site. These sites are Dunsink Observatory House (RPS 0687), Dunsink, and the South Dome of Dunsink Observatory (RPS 0688). Dunsink Observatory House (RPS 0687) is a late eighteenth century house with outbuildings. The South Dome (RPS 0688) is a mid-nineteenth century rotunda with copper dome that houses a nineteenth century telescope. The Fingal Development Plan 2017-2023 lists areas Architectural Conservation Areas. There are no Architectural Conservation Areas recorded in the Fingal Development Plan 2017-2023 within the proposed development site or the wider 1 km study area.

Table 14-5: Protected Structure within the 1 km Study Area of the Proposed Development

RPS Number	Name	Status	Distance
0687	Dunsink Observatory House is a late eighteenth century house with outbuildings.	National	*c.* 700 m south
0688	South Dome of Dunsink Observatory is a mid-nineteenth century rotunda with copper dome that houses a nineteenth century telescope.	National	*c.* 700 m south

Cultural Heritage

The Fingal Development Plant 2017-2023 does not contain any designated lists or sites of cultural heritage importance or significance within the development area, or the wide 5 km study area.

National Inventory of Architectural Heritage

There are no entries recorded on the NIAH building survey within the proposed development site. There are two entries recorded on the NIAH building survey within the 1 km study area of the proposed development site. One of these entries is Dunsink Observatory (NIAH 11354008), described below. The other is the domed rotunda (NIAH 11354009) at Dunsink Observatory, also described below.

Table 14-6: NIAH Structure within the 1 km Study Area of the Proposed Development

NIAH Number	Name	Description	Rating	Distance
11354008	Dunsink Observatory, Dunsink townland	Dunsink Observatory House is a late eighteenth century house with outbuildings. Detached seven-bay two-storey house, built 1783, with three central projecting bays having domed observatory above. Return to rear. Projecting porch added to south elevation, c.1840. Extension to north elevation, c.1970, linking house and outbuildings. Entrance gates, gate lodge and farmyard complex to site. Associated with Sir William Rowan Hamilton, the noted mathematician, appointed Astronomer Royal of Ireland in 1827, a position he held for thirty eight years. ROOF: Hipped slate roof, tall nap rendered chimney stacks with clay pots; cast-iron rainwater goods; copper dome roof. WALLS: Rough cast rendered on a nap rendered plinth course with a	National	*c.* 700 m south

NIAH Number	Name	Description	Rating	Distance
		moulded granite cornice and parapet wall; granite string course to canted bay.OPENINGS: Projecting nap rendered porch with doric pilasters, fluted console brackets and pilasters, fluted console brackets and flat panelled timber door, c.1840; within porch is an ionic doorcase with quarter engaged columns, fluted cornice and a flat timber and glazed door, c.1783; square headed window openings; round headed to canted bay; having granite architraves, cills and cill course to canted bay; timber sash windows; Gothic headed timber sash window to canted bay. INTERIOR: Terrazzo floor to entrance porch; original joinery and stairs.		
11354009	South Dome at Dunsink Observatory, Dunsink townland	Snecked limestone rotunda housing telescope, built 1868, with copper-roofed dome and projecting entrance porch. Retaining original fenestration. The shaft of the telescope has a foundation independent of the walls to prevent transmission of external vibrations caused by wind. Architect - Henry Ussher. ROOF: Domed; recovered with copper, c.1999; original timber mechanisms beneath which allow dome to open and rotate. WALLS: Snecked limestone; limestone plinth. OPENINGS: Square headed window openings; limestone reveals and cills; 8/8 sash windows; square headed door; timber panelled timber paned windows to side elevations of porch. INTERIOR: Timber floorboards; panelled shutters; timbers panelled roof; cast-iron telescope , c.1863 with 12 inch lens; manufacturers mark - 'Thomas Grubb'	National	*c.* 700 m south

NIAH also maintains a non-statutory register of historic gardens and designed landscapes recorded on a county basis. There are no such features recorded on the NIAH within the proposed development site or the 1 km study areas.

Field Inspection Results

Field inspection is necessary to determine the extent, character and condition of archaeological, architectural and cultural heritage remains, and can also lead to the identification of previously unrecorded or suspected sites and portable finds through topographical observation and local information. The site visit took place on 28th March 2022 and weather at the time of the visit was dry and bright.

The location of the proposed development includes an existing waste facility, and some greenfield and brownfield lands. The proposed development area is irregular in plan and measures 180m (max) east x west and 160m (max) north x south. The existing topography of the greenfield and brownfield area slopes slightly downwards to the south. The M50 Motorway is situated to the south.

The development site is access via a cul-de-sac south off the Ballycoolin Road. The existing waste facility is situated at the north end of the proposed development. The existing facility comprises a large modern industrial building, tarmac and concrete yards, and ancillary buildings and structures, including underground services, tanks, and foundations. A narrow, overgrown pasture strip of ground north of the existing recycling facility is part of the proposed development site. The greenfield area of the proposed development is to the south of the existing recycling facility. This greenfield area comprises pasture lands that are used for horse grazing and silage. A stream and hedgerow earthen bank that forms the townland boundary between Cappogue and Dunsink townlands, traverses this part of the proposed development. The development will see the construction of a new access road, entrance, weighbridge and hut, new recycling building and waste reception area, in this part of the proposed development.

The brownfield land that is included in the proposed development is the south and west part of the development, and is mostly in the townland of Dunsink, south of the townland boundary. This area has been subject to significant ground disturbance. There is evidence of regrading of ground levels, and also of excavation and burial of imported materials. A small residential estate and scrapyard are situated to the south-west/west of this area. It is proposed to construct concrete yards and truck parking bays, workshop, administration and welfare facilities, skip storage area, and stillage storage area, in the brownfield lands within the proposed development.

No archaeological, architectural or cultural heritage features were revealed within the proposed development site or the surrounding landscape as a result of carrying out the field inspection.

Plate 14-1: Showing existing waste facility and concrete yard at Cappogue, looking east.

Plate 14-2: Location of proposed new access road, entrance, weighbridge and hut, new recycling building and waste reception area, for development, looking north.

Plate 14-3: Showing earthen bank and hedgerow forming townland boundary between Cappogue and Dunsink, within development, looking northwest.

Plate 12-4: Showing brownfield area where it is proposed to construct concrete yards and truck parking bays, workshop, administration and welfare facilities, skip storage area, and stillage storage area, looking west.

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APPENDIX 14.2

Mitigation Measures and the Archaeological Resource

APPENDIX 14.2: MITIGATION MEASURES AND THE ARCHAEOLOGICAL RESOURCE

Mitigation is defined as features of the design or other measures of the proposed development that can be adopted to avoid, prevent, reduce or offset negative effects.

The best opportunities for avoiding damage to archaeological remains or intrusion on their setting and amenity arise when the site options for the development are being considered. Damage to the archaeological resource immediately adjacent to developments may be prevented by the selection of appropriate construction methods. Reducing adverse effects can be achieved by good design, for example by screening historic buildings or upstanding archaeological monuments or by burying archaeological sites undisturbed rather than destroying them. Offsetting adverse effects is probably best illustrated by the full investigation and recording of archaeological sites that cannot be preserved *in situ*.

Definition of Mitigation Strategies

The ideal mitigation for all archaeological sites is preservation *in situ*. This however is not always a practical solution, and a series of recommendations are therefore offered to provide ameliorative measures where avoidance and preservation *in situ* are not possible.

Archaeological excavation involves the scientific removal and recording of all archaeological features, deposits and objects to the level of geological strata or the base level of a given development. Full archaeological excavation is recommended where initial investigation has uncovered evidence of archaeologically significant material and where avoidance of the site is not possible.

Archaeological test trenching is defined as:

> *"that form of excavation where the purpose is to establish the nature and extent of archaeological deposits and features present in a location which it is proposed to develop (though not normally to fully investigate those deposits or features) and allow an assessment to be made of the archaeological impact of the proposed development"* (DAHGI 1999a, 27).

Archaeological monitoring:

> *"involves an archaeologist being present in the course of the carrying out of development works (which may include conservation works), so as to identify and protect archaeological deposits, features or objects which may be uncovered or otherwise affected by the works"* (*ibid*., 28).

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APPENDIX 15.1

Photomontages

Thornton’s Waste Recycling

LVIA Photomontages

This book contains imagery for the
viewpoints chosen for the LVIA study

August 2022

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INDEX

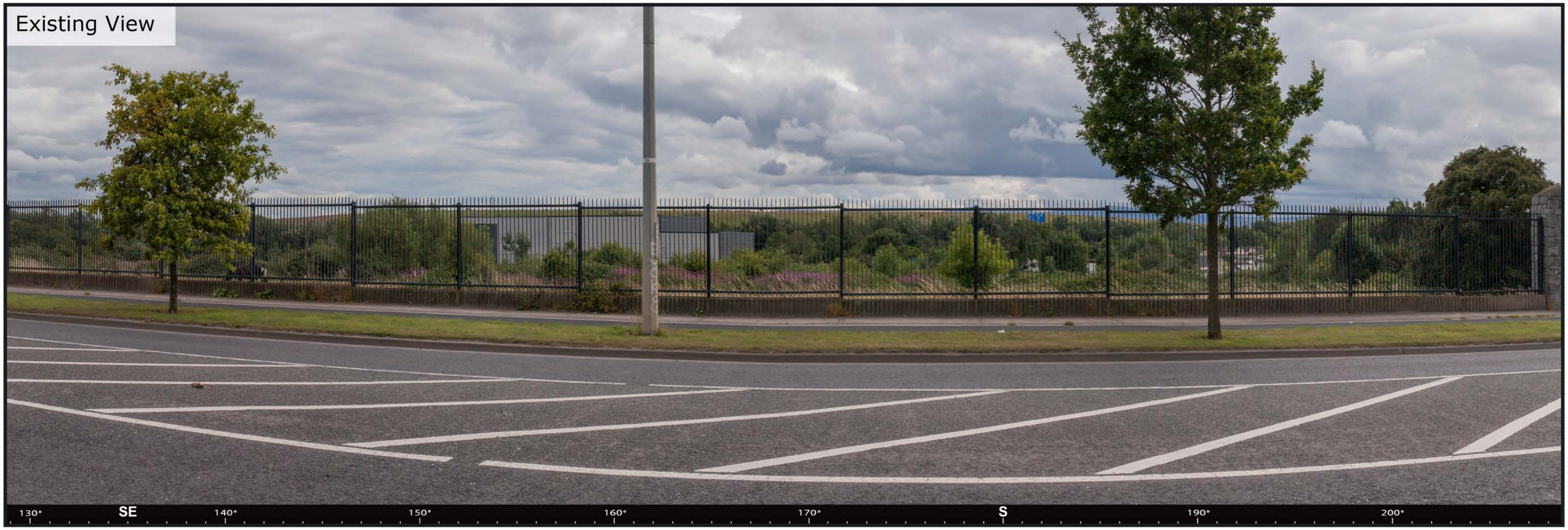
LVIA viewpoint locations selected for the Thorntons Waste Recycling project

Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Thornton's Waste Recycling

Imagery depicting the view towards the site (Existing and Outline)

L3080 Ballycoolin Road, Cappoge VP1 Page 1 of 2



Existing View

Outline View
indicating physical position and scale of the proposed development irrespective of screening

These are 80° panoramic montages captured and presented in accordance with the guidance set by the British Landscape Institute 2011 - Advice Note 01/11.

To view these panoramas on a flat surface one must move from left to right along its length whilst maintaining a perpendicular viewing direction and the specified correct viewing distance of 30cm. To see this entire panoramic scene in reality would necessitate turning one's head through 40°.

Easting (ITM):	710213
Northing (ITM):	739840
Direction of View 169°	E of Grid North
Angle of View:	80°
Lens:	50mm / Full Frame Sensor
Camera:	Canon 1-D Mark II digital SLR
Camera Height:	1.7m Above Ground Level
Date:	03/08/2022
Time:	16:39

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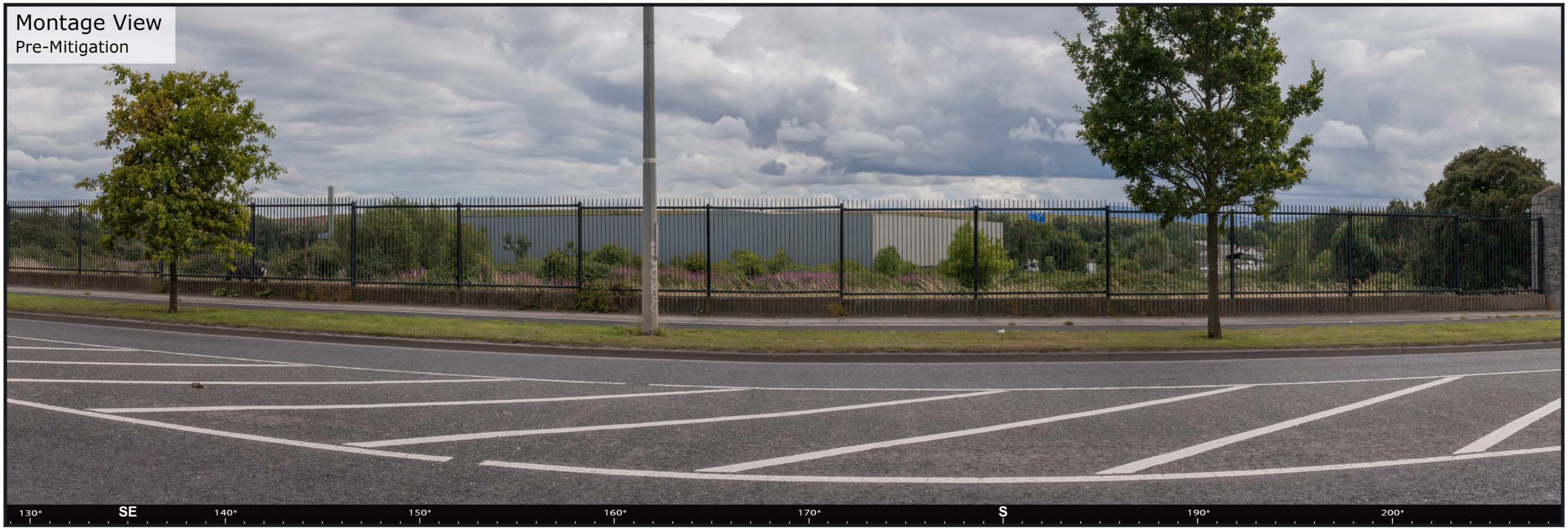
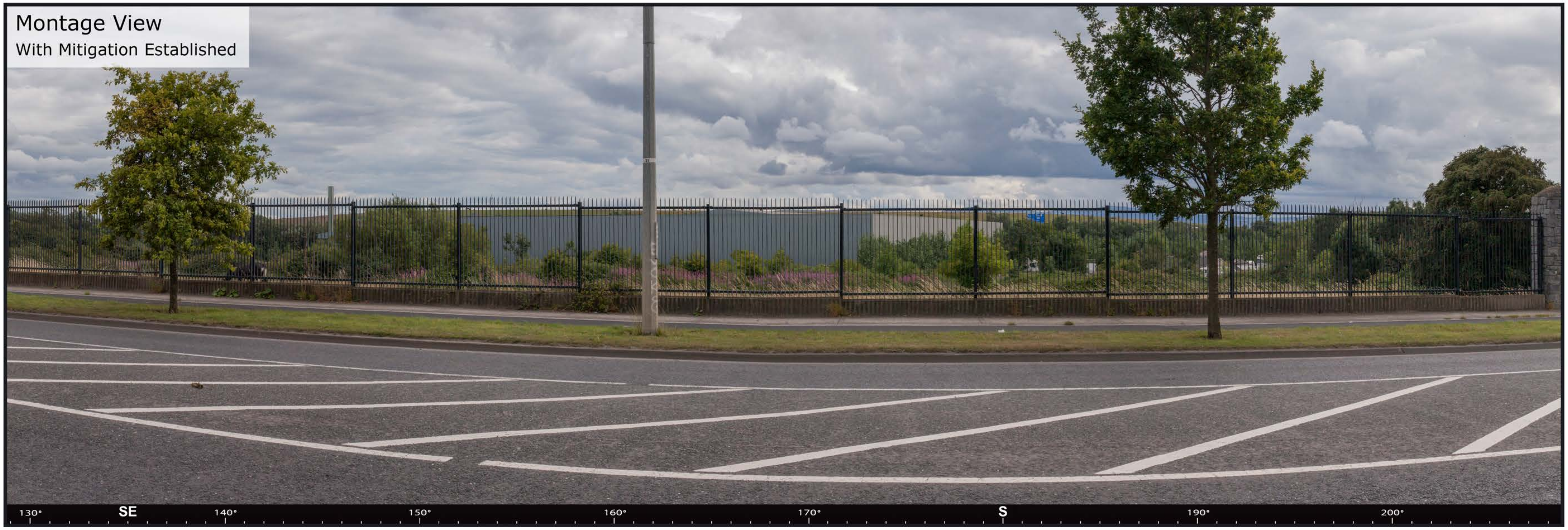
Thornton's Waste Recycling

Imagery depicting the view towards the site (Montage pre- and post-mitigation establishment)

L3080 Ballycoolin Road, Cappoge

VP1





These are 80° panoramic montages captured and presented in accordance with the guidance set by the British Landscape Institute 2011 - Advice Note 01/11.

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Easting (ITM):	710213
Northing (ITM):	739840
Direction of View 169°	E of Grid North
Angle of View:	80°

Lens:	50mm / Full Frame Sensor
Camera:	Canon 1-D Mark II digital SLR
Camera Height:	1.7m Above Ground Level

Date:	03/08/2022
Time:	16:39

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Thornton's Waste Recycling
Imagery depicting the view towards the site (Existing and Outline)

Barnlodge Grove, Cappoge

VP2

Existing View

Outline View
indicating physical position and scale of the
proposed development irrespective of screening

Thornton's Waste Recycling (Proposed)

These are 120° panoramic montages captured and presented in accordance with the guidance set by the British Landscape Institute 2011 - Advice Note 01/11.

To view these panoramas on a flat surface one must move from left to right along its length whilst maintaining a perpendicular viewing direction and the specified correct viewing distance of 30cm. To see this entire panoramic scene in reality would necessitate turning one's head through 80°.

Easting (ITM): 710164
Northing (ITM): 739655
Direction of View 141° E of Grid North
Angle of View: 120°

Lens: 50mm / Full Frame Sensor
Camera: Canon 1-D Mark II digital SLR
Camera Height: 1.7m Above Ground Level

Date: 03/08/2022
Time: 16:27

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Thornton’s Waste Recycling

Imagery depicting the view towards the site (Montage pre- and post-mitigation establishment)

Barnlodge Grove, Cappoge

VP2

These are 120° panoramic montages captured and presented in accordance with the guidance set by the British Landscape Institute 2011 - Advice Note 01/11.

To view these panoramas on a flat surface one must move from left to right along its length whilst maintaining a perpendicular viewing direction and the specified correct viewing distance of 30cm. To see this entire panoramic scene in reality would necessitate turning one’s head through 80 °.

Easting (ITM):	710164	Lens:	50mm / Full Frame Sensor	Date:	03/08/2022
Northing (ITM):	739655	Camera:	Canon 1-D Mark II digital SLR	Time:	16:27
Direction of View	141° E of Grid North	Camera Height:	1.7m Above Ground Level		
Angle of View:	120°				

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Thornton's Waste Recycling

Imagery depicting the view towards the site (Existing and Outline)

Premier Business Park, Cappoge VP3

These are 80° panoramic montages captured and presented in accordance with the guidance set by the British Landscape Institute 2011 - Advice Note 01/11.

To view these panoramas on a flat surface one must move from left to right along its length whilst maintaining a perpendicular viewing direction and the specified correct viewing distance of 30cm. To see this entire panoramic scene in reality would necessitate turning one's head through 40°.

Easting (ITM):	710411
Northing (ITM):	739705
Direction of View 129° W of Grid North	
Angle of View:	80°
Lens:	50mm / Full Frame Sensor
Camera:	Canon 1-D Mark II digital SLR
Camera Height:	1.7m Above Ground Level
Date:	03/08/2022
Time:	15:59

Thornton's Waste Recycling

Imagery depicting the view towards the site (Montage pre- and post-mitigation establishment)

Premier Business Park, Cappoge

VP3

Montage View
Pre-Mitigation

Montage View
With Mitigation Established

These are 80° panoramic montages captured and presented in accordance with the guidance set by the British Landscape Institute 2011 - Advice Note 01/11.

To view these panoramas on a flat surface one must move from left to right along its length whilst maintaining a perpendicular viewing direction and the specified correct viewing distance of 30cm. To see this entire panoramic scene in reality would necessitate turning one's head through 40°.

Easting (ITM):	710411	Lens:	50mm / Full Frame Sensor	Date:	03/08/2022
Northing (ITM):	739705	Camera:	Canon 1-D Mark II digital SLR	Time:	15:59
Direction of View 129° W of Grid North		Camera Height:	1.7m Above Ground Level		
Angle of View:	80°				

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Thornton's Waste Recycling

Imagery depicting the view towards the site (Existing and Outline)

Barnlodge Grove, Dunsink VP4

Existing View

Outline View
indicating physical position and scale of the proposed development irrespective of screening

▨ Thornton's Waste Recycling (Proposed)

These are 120° panoramic montages captured and presented in accordance with the guidance set by the British Landscape Institute 2011 - Advice Note 01/11.

To view these panoramas on a flat surface one must move from left to right along its length whilst maintaining a perpendicular viewing direction and the specified correct viewing distance of 30cm. To see this entire panoramic scene in reality would necessitate turning one's head through 80°.

Easting (ITM):	710117	Lens:	50mm / Full Frame Sensor	Date:	03/08/2022
Northing (ITM):	739453	Camera:	Canon 1-D Mark II digital SLR	Time:	16:21
Direction of View	66° E of Grid North	Camera Height:	1.7m Above Ground Level		
Angle of View:	120°				

Thornton's Waste Recycling

Imagery depicting the view towards the site (Montage pre- and post-mitigation establishment)

Barnlodge Grove, Dunsink VP4

These are 120° panoramic montages captured and presented in accordance with the guidance set by the British Landscape Institute 2011 - Advice Note 01/11.

To view these panoramas on a flat surface one must move from left to right along its length whilst maintaining a perpendicular viewing direction and the specified correct viewing distance of 30cm. To see this entire panoramic scene in reality would necessitate turning one's head through 80°.

Easting (ITM):	710117	Lens:	50mm / Full Frame Sensor	Date:	03/08/2022
Northing (ITM):	739453	Camera:	Canon 1-D Mark II digital SLR	Time:	16:21
Direction of View	66° E of Grid North	Camera Height:	1.7m Above Ground Level		
Angle of View:	120°				

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APPENDIX 15.2

Landscape Masterplan


PROPOSED HEDGEROW

Typical section of proposed hedgerow (at implementation)

Figure LMP1 - Typical section of proposed mitigation screen planting of advanced nursery stock.

Registered Landscape Architect

LEGEND:

●	EXISTING VEGETATION TO BE RETAINED
✱	EXISTING VEGETATION TO BE REMOVED
▨	PROPOSED HEDGING
■	FOOTPRINT OF PROPOSED BUILDINGS AND STRUCTURES
□	PROPOSED HARDSTANDING
🟥	SITE BOUNDARY

NOTES:

The function of the proposed mitigation planting is primarily for screening and softening of the proposed development, but it will also enhance the ecological corridors within the surrounding area.

Hedgerows

Mitigation screen planting shall consist of a mixture of native species that are prevalent in the immediate area. Hedgerow planting to consist of feathered whips (of various sizes) and advanced nursery stock (standard trees) in double staggered rows at a spacing of 600mm.

All native hedgerow species will be planted as whips, with the primary and secondary structure species to be of a minimum height of 90cm and the other shrubs species to be of a minimum height of 60cm.

Species mix to be finalised in conjunction with the project ecologist. All species to be from certified native stock and preferably from an approved supplier of the Green, Low-Carbon, Agri Environment Scheme (GLAS).

NATIVE HEDGEROW SPECIES:

Botanical name	Common name	Size	%
Primary structureḀ			
Crataegus monogyna	Hawthorn	90-120cm / 8-10cm girth 3m br standard trees	60%
Secondary structureḀ			
Prunus spinosa	Blackthorn	90-120cm	15%
Ilex aquifolium	Holly	90-120cm	15%
Shrub species structureḀ			
Rubus fruticosus	Bramble	60-90cm	2.5%
Corylus avellana	Hazel	60-90cm	2.5%
Rosa canina	Dog-rose	60-90cm	2.5%
Euonymus europaeus	Spindle	60-90cm	2.5%

REVISIONS:

1.
2.
3.
4.
5.
6.

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Site location:
COUNTY DUBLIN

Drawing Title:
LANDSCAPE MASTERPLAN

Project:
MATERIAL RECOVERY FACILITY

Drawn by: RC
Checked by: CD

Drawing Ref:
LD-THRNTNS-1-0 LANDSCAPE MASTERPLAN

Scale: 1:500 @ A1
Date: SEPTEMBER 2022

DRAFT