



## **APPENDIX 4-4**

### **IGSL FACTUAL REPORT – GRID CONNECTION**

**IGSL Ltd**

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**Seven Hills  
Midlands 110kV Cable**

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**Site Investigation Report  
FACTUAL**

**Project No. 23297**

**August 2021**



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## FOREWORD

The following conditions and notes on the geotechnical site investigation procedures should be read in conjunction with this report.

## Standards

The ground investigation works for this project (**Seven Hills Midlands 11kV Cable**) have been carried out by IGSL Limited in accordance with Eurocode 7 - Part 2: Ground Investigation & Testing (EN 1997-2:2007). This has been used together with complementary documents such as BS 5930 (2015) and BS 1377 (Parts 1 to 9) and the following European Norms:

- EN 1997-2 Eurocode 7: 2007 – Geotechnical Design – Part 2: Ground Investigation & Testing
- EN ISO 22475-1:2006 Geotechnical Investigation and Sampling – Sampling Methods & Groundwater Measurements
- EN ISO 14688-1:2017 Geotechnical Investigation and Testing – Identification and Classification of Soil, Part 1: Identification and Description
- EN ISO 14688-2:2017 Geotechnical Investigation and Testing – Identification and Classification of Soil, Part 2: Principles for a classification
- EN ISO 14689-1:2017 Geotechnical Investigation and Testing – Identification, description & classification of rock

## Reporting

No responsibility can be held by IGSL Ltd for ground conditions between exploratory hole locations. The engineering logs provide ground profiles and configuration of strata relevant to the investigation depths achieved and caution should be taken when extrapolating between exploratory points. No liability is accepted for ground conditions extraneous to the investigation points. Unless specifically stated, no account has been taken of possible subsidence due to mineral extraction, mining works or karstification below or close to the site.

This report has been prepared for Aecom and Energia Renewables and the information should not be used without their prior written permission. IGSL Ltd accepts no responsibility or liability for this document being used other than for the purposes for which it was intended.

## Boring Procedures

Unless otherwise stated, 'shell and auger' or cable percussive boring technique has been employed as defined by Section 6.3 of IS EN ISO 22475-1:2006. The boring operations, sampling and in-situ testing complies with the recommendations of IS EN 1997-2:2007 and BS 1377:1990 and EN ISO 22476-3:2005. The shell and auger boring technique allows for continuous sampling in clay and silt above the water table and sand and gravel below the water table (Table 2 of IS EN ISO 22475-1:2006).

It is highlighted that some disturbance and variation is unavoidable in particular ground (e.g. blowing sands, gravel / cobble dominant glacial deposits etc). Attention is drawn to this condition, whenever it is suspected. Where cobbles and boulders are recorded, no conclusion should be drawn concerning the size, presence, lithological nature, or numbers per unit volume of ground.

## In-Situ Testing

Standard penetration tests were conducted strictly in accordance with Section 4.6 of IS EN 1997-2:2007. The SPT equipment (hammer energy test) has been calibrated in accordance with EN ISO 22476-3:2005 and the Energy Ratio ( $E_r$ ). A calibration certificate is available upon request. The  $E_r$  is defined as the ratio of the actual energy  $E_{meas}$  (measured energy during calibration) delivered to the drive weight assembly into the drive rod below the anvil, to the theoretical energy ( $E_{theor}$ ) as calculated from the drive weight assembly. The measured number of blows ( $N$ ) reported on the

engineering logs are uncorrected. In sands, the energy losses due to rod length and the effect of the overburden pressure should be taken into account (see IS EN ISO 22476-3:2005).

### Soil Sampling

Three categories of sampling methods are outlined in EN ISO 22475-1:2006. The categories are referenced A, B and C for any given ground conditions and are shown in Tables 1 and 2 of EN ISO 22475-1:2006. Reference should be made to EN 1997-2:2002 for guidelines on sample class and quality for strength and compressibility testing. Samples of quality classes 1 or 2 can only be obtained by using Category A sampling methods.

Class 1 thin wall undisturbed tube samples (UT100) were obtained in fine grained soils and strictly meet the requirements of EN 1997-2:2002 and EN ISO 22475-1:2006. Soil samples for laboratory tests are divided into five classes with respect to the soil properties that are assumed to remain unchanged during sampling, handling transport and storage. The minimum sample quality required for testing purposes to Eurocode 7 compatibility (EN 1997-2:2002) is shown in Table A.

**Table A – Details of Sample Quality Requirements**

EN 1997 Clause	Test	Minimum Sample Quality Class
5.5.3	Water Content	3
5.5.4	Bulk Density	2
5.5.5	Particle Density	N/S
5.5.6	Particle Size Analysis	N/S
5.5.7	Consistency Limits	4
5.5.8	Density Index	N/S
5.5.9	Soil Dispersivity	N/S
5.5.10	Frost Susceptibility	N/S
5.6.2	Organic Content	4
5.6.3	Carbonate Content	3
5.6.4	Sulphate Content	3
5.6.5	pH	3
5.6.6	Chloride Content	3
5.7	Strength Index	1
5.8	Strength Tests	1
5.9	Compressibility Tests	1
5.10	Compaction Tests	N/S
5.11	Permeability	2

N/S – not stated. Presume a representative sample of appropriate size.

Samples recovered from trial pits or trenches meet the requirements of IS EN ISO 22475-1. It is highlighted that unforeseen circumstances such as variations in geological strata may lead to lower quality sample classes being obtained.

### Groundwater

The depth of entry of any influx of groundwater is recorded during the course of boring operations. However, the normal rate of boring does not usually permit the recording of an equilibrium level for any one water strike. Where possible, drilling is suspended for a period of twenty minutes to monitor the subsequent rise in water level. Groundwater conditions observed in the borings or pits are those appertaining to the period of investigation. It should be noted however, that groundwater levels are subject to diurnal, seasonal and climatic variations and can also be affected by drainage conditions, tidal variations etc.

**Engineering Logging**

Soil and rock identification has been based on the examination of the samples recovered and conforms with IS EN ISO 14688-1:2002 and IS EN ISO 14689-1:2004. Rock weathering classification conforms to IS EN ISO 14689-1:2003 while discontinuities (bedding planes, joints, cleavages, faults etc) are classified in accordance with 4.3.3 of IS EN ISO 14689-1:2003. Rock mechanical indices (TCR, SCR, RQD) are defined in accordance with IS EN ISO 22475-1:2006.

Where peat has been encountered, samples have been logged in accordance with the Von Post Classification (ref. Von Post, L. 1992. Sveriges Gologiska Undersoknings torvinventering och nogra av dess hittils vunna resultat (SGU peat inventory and some preliminary results) Svenska Mosskulturforeningens Tidskrift, Jonkoping, Swedden, 36, 1-37 and Hobbs N. B. Mire morphology and the properties of some British and foreign peats. QJEG, Vol. 19, 1986.

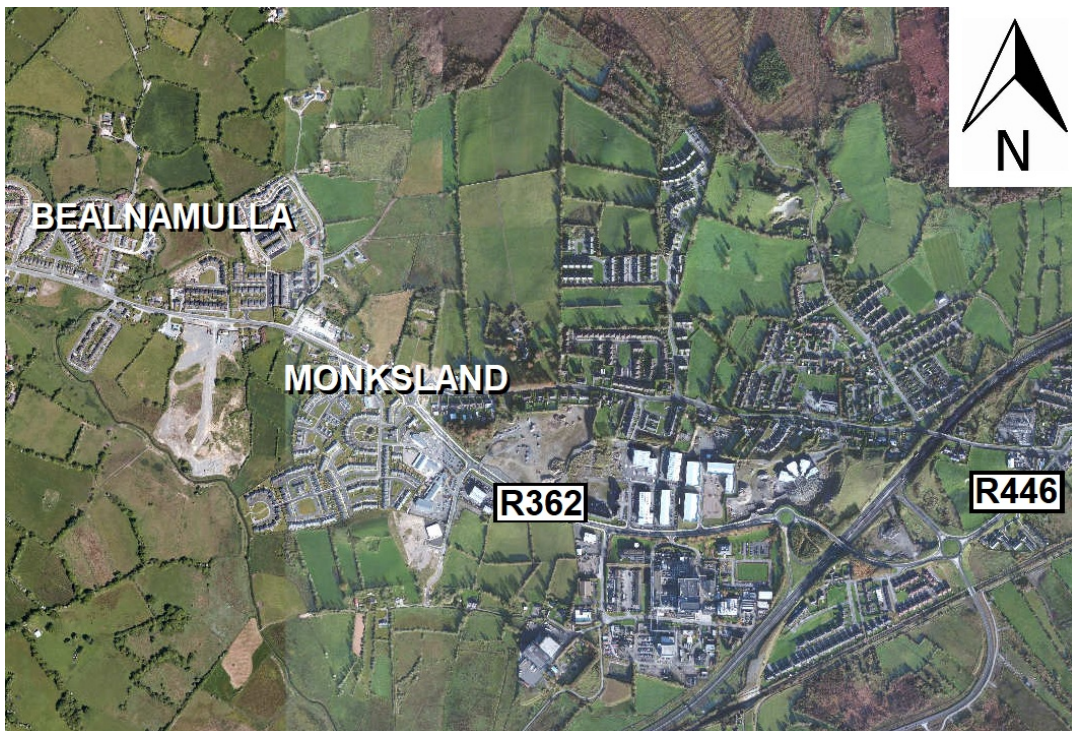
**Retention of Samples**

After satisfactory completion of all the scheduled laboratory tests on any sample, the remaining material will be discarded. Unless a period of retention of samples is agreed, it is our normal practice to discard all soil samples one month after submission of our final report.

## 1. INTRODUCTION

IGSL has undertaken a programme of geotechnical site investigation works for the proposed Seven Hills Wind Farm project for Energia Renewables. This phase of investigation involved intrusive works along the proposed route of a new 110kV HV cable which will connect a proposed substation located on a rural greenfield site adjacent to the R363 Regional Road west of Athlone, to an existing substation adjacent to the R446 Regional Road in Monksland, Athlone. The investigation area runs along a largely urban section of the R362 Regional Road from Bealnamulla through to Monksland (Figure 1). This route is situated primarily along an unclassified urban route ('Old Tuam Road') to the Athlone substation and is approximately 1.6 kilometres in length. The investigation works crossed a combination of roadways, footways and grass verges. As well as being sited along this route, outlying borehole works were also located west of the village of Brideswell, County Roscommon, 8 kilometres northwest of Athlone Town (Figure 2).

**Figure 1 – Site Location Plan – 1.6km Route**



Figures 1 & 2 retrieved from Ordnance Survey of Ireland Licence No. EN 0070021  
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**Figure 2 –Borehole Location Plan at  
Brideswell**

The investigation comprised cable percussion boring, rotary drilling and slit trenching. The investigations were executed in accordance with BS 5930, Code of Practice for Site Investigations (2015) and EN 1997-2 Eurocode 7 Part 2 Ground Investigation & Testing and supervised by an IGSL geotechnical engineer.

Geotechnical and chemical laboratory testing was scheduled on a range of soil samples. The geotechnical testing included moisture contents, Atterberg Limits and particle size distribution [PSD] testing. Chemical testing to BRESD1 (Suite D) and organic matter testing was completed on selected soil samples. This report presents the factual geotechnical data acquired from the 2021 investigation.



## 2. FIELDWORK

### 2.1 General

The IGSL Limited fieldworks were undertaken in May, June and July 2021. The works which form this report comprise the following:

- Cable Percussion Boreholes (3 No.)
- Rotary Open-Hole Drillholes (3 No.)
- Slit Trenches (10 No.)
- Groundwater Monitoring
- Surveying of Exploratory Hole Locations

### 2.2 Cable Percussion Boreholes

Cable percussive boring (200mm diameter) was undertaken at three locations using a Dando 2000 rig. The locations included an additional borehole drilled after encountering an obstruction at 4.20m depth below ground level in BH03. The re-bore was called BH03A. The boreholes extended to depths of between 4.20m and 9.60m. At all locations, boring commenced through hand-dug service inspection pits. Disturbed bulk samples were recovered at 1m intervals or change of strata during boring and these are denoted 'B' on the engineering logs. Thin-walled undisturbed driven samples were recovered where soil properties permitted. These are annotated 'U' on the logs.

Standard Penetration Tests (SPT's) were performed in the boreholes and given the nature of the soils, a solid cone was used. It is noted that the SPT N-Values reported are the number of blows for 300mm increment penetration (e.g. BH01 at 2.0m where N=8). These exclude the seating blow values, which represent the initial 150mm depth of penetration. Where partial penetration was achieved during testing, the number of blows is shown for the actual penetration depth achieved (e.g. BH01 at 4.0m where N=50/150mm). In accordance with Eurocode 7, the SPT hammer has been calibrated and the energy ratio (Er) value is incorporated on the engineering logs. It is highlighted that the SPT N-Values reported on the engineering logs are uncorrected for energy ratio.

Descriptions of the soils encountered, in-situ tests undertaken and samples recovered are presented on the borehole records in Appendix 1. Details of groundwater strikes and hard strata boring (i.e. chiselling) are also presented on the aforementioned records.

### 2.3 Rotary Open-Hole Drillholes

Rotary Open-Hole drilling was carried out at three locations on site. The drillholes are denoted by the prefix 'RC\_'. These holes (RC04, RC05 & RC06) were carried out using a tracked Knebel top-drive drill rig and extended to a maximum depth of 16.0m bgl. Symmetrex openhole drilling was utilised within the overlying superficial deposits. Groundwater monitoring standpipes were installed in two of the three drillholes. The standpipes installed consisted of 50mm diameter HDPE pipework with proprietary 1mm slots and incorporated a pea gravel filter pack and cement / bentonite grout seal. Headwork covers were concreted in place. The drilling records are presented in Appendix 2.

### 2.4 Slit Trenching

Slit trenching was undertaken along the unclassified urban route known locally as the 'Old Tuam Road' at Monksland. Each of the ten trenches was excavated using machine-assisted hand digging methods using a rubber tracked mini-excavator and dug to a maximum depth of 1.50m bgl. Trenching was undertaken in accordance with the specific conditions of the road opening licence [ROL] issued by Roscommon County Council [RCC].

IGSL were responsible for ensuring implementation and maintenance of Traffic Management for the duration of the works in accordance with Chapter 8 of the Traffic Signs Manual and as per the specific Traffic Management plan featured in the IGSL Project Health & Safety Plan. The slit trench was reinstated in accordance with the "Guidelines for Managing Openings in Public Roads" (Purple Book), published by the DTTAS ("The Guidelines") Second Edition Rev 1 April 2017.

A detailed record of the depth, diameter and type of each service encountered within the ten trenches is detailed in Appendix 3. The soil profile provided on the slit trench logs describes the majority of the soils across the transverse trench. The location of trench extremities (X and Y) were surveyed to ITM using GPS techniques. Photographs taken during excavation are also presented in Appendix 3. Samples were also taken during the excavation of the trenches and these are listed on the individual logs.

### **2.5 Groundwater Monitoring**

Groundwater monitoring was undertaken manually once following the fieldworks period. Levels were measured using an electric dipmeter. The recordings feature in Appendix 4.

### **2.6 Surveying of Exploratory Hole Locations**

Following completion of the exploratory works, surveying was carried out using GPS techniques. Co-ordinates (x, y) were measured to Irish Transverse Mercator and ground levels (z) established to Malin Head. The co-ordinates and ground levels are shown on the exploratory hole logs with locations shown on the exploratory hole plan in Appendix 7.

### 3. LABORATORY TESTING

Geotechnical laboratory testing was performed at IGSL's INAB-accredited laboratory in accordance with the methods set out in BS1377; British Standard Methods of Test for Soils for Civil Engineering Purposes; British Standards Institute:1990. The geotechnical testing included moisture contents, Atterberg Limits and particle size distribution [PSD] testing. The results from geotechnical testing on selected soils are presented in Appendix 5.

Chemical analysis incorporating pH levels, analysis to BRE SD1 (Suite D) in addition to organic matter contents were also undertaken on recovered soils. The chemical results are presented in Appendix 6.

## REFERENCES

- 1.0** BS 5930 (1999 + A2:2010) Code of Practice for Site Investigation, British Standards Institution (BSI).
- 2.0** BS 1377 (1990) Methods of Testing of Soils for Civil Engineering Purposes, BSI.
- 3.0** Eurocode 7, Part 2: Ground Investigation & Testing (EN 1997-2:2007)
- 4.0** Site Investigation Practice: Assessing BS 5930 (1986), Geological Society Special Publication, No. 2.

## **Appendix 1**

### **Cable Percussion Borehole Logs**



# GEOTECHNICAL BORING RECORD

REPORT NUMBER

23297

**CONTRACT** Seven Hills Midlands 110kV Cable

**BOREHOLE NO.** BH01

**CO-ORDINATES** 594,335.21 E  
744,307.12 N  
**GROUND LEVEL (m AOD)** 56.43

**RIG TYPE** Dando 2000  
**BOREHOLE DIAMETER (mm)** 200  
**BOREHOLE DEPTH (m)** 4.50

**SHEET** Sheet 1 of 1

**DATE COMMENCED** 06/06/2021  
**DATE COMPLETED** 06/06/2021

**CLIENT** Energia Renewables  
**ENGINEER** Aecom

**SPT HAMMER REF. NO.**  
**ENERGY RATIO (%)**

**BORED BY** P.Allan  
**PROCESSED BY** F.C

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples				Field Test Results	Standpipe Details
					Ref. Number	Sample Type	Depth (m)	Recovery		
0	TOPSOIL		56.33	0.10						
	Soft dark brown PEAT				AA165967	B	0.50			
1	Soft grey sandy SILT		55.43	1.00	AA165968	B	1.00		N = 5 (1, 0, 1, 1, 1, 2)	
2	Medium dense to dense grey sandy silty GRAVEL with cobbles		54.53	1.90					N = 8 (1, 1, 2, 2, 2, 2)	
					Fail	U	2.50	0%rec		
3					AA165969	B	3.00		N = 27 (3, 4, 5, 6, 8, 8)	
4					AA165970	B	4.00		N = 50/150 mm (10, 10, 25, 25)	
	Obstruction End of Borehole at 4.50 m		51.93	4.50					N = 50/75 mm (25, 50)	
5										
6										
7										
8										
9										

## HARD STRATA BORING/CHISELLING

## WATER STRIKE DETAILS

From (m)	To (m)	Time (h)	Comments	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
2.1	2.4	1		3.00	3.00	No	1.50	20	Moderate
4.3	4.5	1.5							

## GROUNDWATER PROGRESS

INSTALLATION DETAILS					Date	Hole Depth	Casing Depth	Depth to Water	Comments
Date	Tip Depth	RZ Top	RZ Base	Type					

**REMARKS** 1hr erecting Covid 19 Safe Working Area. CAT scanned location and hand dug inspection pit carried out.

## Sample Legend

D - Small Disturbed (tub)  
B - Bulk Disturbed  
LB - Large Bulk Disturbed  
Env - Environmental Sample (Jar + Vial + Tub)

UT - Undisturbed 100mm Diameter Sample  
P - Undisturbed Piston Sample  
W - Water Sample



# GEOTECHNICAL BORING RECORD

**REPORT NUMBER**
**23297**
**CONTRACT** Seven Hills Midlands 110kV Cable

**BOREHOLE NO.** BH03

**CO-ORDINATES** 599,346.05 E  
741,782.60 N  
**GROUND LEVEL (m AOD)** 41.09

**RIG TYPE** Dando 2000  
**BOREHOLE DIAMETER (mm)** 200  
**BOREHOLE DEPTH (m)** 4.20

**SHEET** Sheet 1 of 1

**DATE COMMENCED** 04/06/2021  
**DATE COMPLETED** 04/06/2021

**CLIENT** Energia Renewables  
**ENGINEER** Aecom

**SPT HAMMER REF. NO.**  
**ENERGY RATIO (%)**
**BORED BY** P.Allan  
**PROCESSED BY** F.C

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples				Field Test Results	Standpipe Details
					Ref. Number	Sample Type	Depth (m)	Recovery		
0	TARMACADAM (MADE GROUND)		40.99	0.10						
	FILL comprised of gravel hardcore / aggregate		40.69	0.40						
	Soft grey/brown sandy slightly gravelly SILT/CLAY. Gravel is fine.				AA165964	B	0.50		N = 6 (1, 0, 1, 1, 2, 2)	
1					AA165965	B	1.00			
2	Stiff grey sandy gravelly CLAY with some cobbles and occasional boulders		39.09	2.00	AA165966	B	2.00		N = 21 (2, 3, 4, 5, 6, 6)	
3					AA161709	B	3.00		N = 22 (10, 15, 4, 4, 6, 8)	
4	Obstruction End of Borehole at 4.20 m		36.89	4.20	AA1651710	B	4.00		N = 50/75 mm (25, 50)	
5										
6										
7										
8										
9										

**HARD STRATA BORING/CHISELLING**
**WATER STRIKE DETAILS**

From (m)	To (m)	Time (h)	Comments	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
2.8	3	1		3.00	3.00	No	2.00	20	Moderate
3.8	4.2	2							

**GROUNDWATER PROGRESS**
**INSTALLATION DETAILS**

Date	Tip Depth	RZ Top	RZ Base	Type	Date	Hole Depth	Casing Depth	Depth to Water	Comments

**REMARKS** 1hr erecting Covid 19 Safe Working Area. CAT scanned location and hand dug inspection pit carried out. Relocated to BH03A and attempted rebore.

**Sample Legend**

D - Small Disturbed (tub)  
B - Bulk Disturbed  
LB - Large Bulk Disturbed  
Env - Environmental Sample (Jar + Vial + Tub)  
UT - Undisturbed 100mm Diameter Sample  
P - Undisturbed Piston Sample  
W - Water Sample



# GEOTECHNICAL BORING RECORD

REPORT NUMBER

23297

CONTRACT Seven Hills Midlands 110kV Cable

BOREHOLE NO. BH03A

CO-ORDINATES 599,346.05 E  
741,782.60 N  
GROUND LEVEL (m AOD) 41.09RIG TYPE Dando 2000  
BOREHOLE DIAMETER (mm) 200  
BOREHOLE DEPTH (m) 9.60

SHEET Sheet 1 of 1

DATE COMMENCED 04/06/2021  
DATE COMPLETED 06/06/2021CLIENT Energia Renewables  
ENGINEER AecomSPT HAMMER REF. NO.  
ENERGY RATIO (%)BORED BY P.Allan  
PROCESSED BY F.C

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples				Field Test Results	Standpipe Details
					Ref. Number	Sample Type	Depth (m)	Recovery		
0	TARMACADAM (MADE GROUND)		40.99	0.10						
	FILL comprised of gravel hardcore / aggregate		40.69	0.40						
	Soft grey/brown sandy slightly gravelly SILT/CLAY. Gravel is fine.				AA165954	B	0.50		N = 6 (1, 0, 1, 1, 2, 2)	
1					AA165955	B	1.00			
			39.29	1.80						
2	Firm brown sandy gravelly SILT/CLAY				AA165956	B	2.00		N = 14 (2, 3, 3, 4, 4, 3)	
					AA165957	B	3.00			
3			37.69	3.40					N = 11 (10, 8, 2, 3, 3, 3)	
					AA165958	B	4.00			
4	Stiff brown sandy gravelly CLAY with occasional cobbles								N = 25 (2, 3, 4, 8, 9, 4)	
					AA165959	B	5.00			
5										
					AA165960	B	6.00		N = 17 (5, 6, 4, 4, 5, 4)	
6										
					AA165961	B	7.00			
7									N = 17 (3, 4, 4, 5, 4, 4)	
					AA165962	B	8.00			
8									N = 17 (2, 3, 4, 4, 5, 4)	
					AA165963	B	9.00			
9			31.49	9.60					N = 38 (6, 6, 4, 4, 15, 15)	
	Obstruction End of Borehole at 9.60 m								N = 50/75 mm (25, 50)	

## HARD STRATA BORING/CHISELLING

## WATER STRIKE DETAILS

From (m)	To (m)	Time (h)	Comments	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
2.8	3	1		3.00	3.00	No	2.00	2	Moderate
9.5	9.6	2							

## GROUNDWATER PROGRESS

INSTALLATION DETAILS					Date	Hole Depth	Casing Depth	Depth to Water	Comments
Date	Tip Depth	RZ Top	RZ Base	Type					

REMARKS 1hr erecting Covid 19 Safe Working Area. CAT scanned location and hand dug inspection pit carried out.

## Sample Legend

D - Small Disturbed (tub)  
B - Bulk Disturbed  
LB - Large Bulk Disturbed  
Env - Environmental Sample (Jar + Vial + Tub)UT - Undisturbed 100mm Diameter Sample  
P - Undisturbed Piston Sample  
W - Water Sample



## **Appendix 2**

### **Rotary Open-Hole Logs**



# OPEN HOLE DRILLING RECORD

REPORT NUMBER

23297

CONTRACT Seven Hills Midlands 110kV Cable

DRILLHOLE NO RC04

SHEET Sheet 1 of 1

CO-ORDINATES 599,532.41 E  
741,706.33 N

GROUND LEVEL (mOD) 44.73

RIG TYPE Knebel

DATE DRILLED 12/07/2021

DATE LOGGED 12/07/2021

CLIENT Energia Renewables

INCLINATION (deg) -90

ENGINEER Aecom

HOLE DIAMETER (mm)

DRILLED BY IGSL

Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Zones (m)	Fracture Spacing Min Avg Max (mm)	Fracture Spacing Log (mm)	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
0							0 250 500		SYMMETRIX DRILLING: No recovery, observed by driller as returns of cobbly GRAVEL				
1													
2										2.50	42.23		N = 50/15 mm (25, 50)
3									SYMMETRIX DRILLING: No recovery, observed by driller as returns of sandy GRAVEL	3.00			
4									SYMMETRIX DRILLING: No recovery, observed by driller as returns of GRAVEL		41.73		N = 50/50 mm (11, 14, 50)
5									SYMMETRIX DRILLING: No recovery, observed by driller as returns of BOULDER	4.70			
6									SYMMETRIX DRILLING: No recovery, observed by driller as returns of GRAVEL	5.00	40.03		N = 110/130 mm (12, 13, 60, 50)
7											39.73		
8										7.40			N = 50/75 mm (22, 3, 38, 12)
9											37.33		
10									End of Borehole at 10.00 m	10.00	34.73		N = 50/75 mm (21, 4, 46, 4)
													N = 50/75 mm (25, 65, 40, 10)

## REMARKS

Rock and soil descriptions are based on examination of drilling returns. These samples can be heavily disturbed and fragmented, with a loss of fines. Typical fragments of 2 to 3 mm are recovered. Accurate descriptions are not, therefore, possible. Similarly, it is not possible to accurately assess soil stratification or rock condition/structure.

Hole cased 0.0-10.0m. 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

## INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type	Date	Hole Depth	Casing Depth	Depth to Water	Comments
12-07-21	10.00	3.00	10.00	50mm SP					

IGSL RC OPEN HOLE 23297.GPJ IGSL GDT 31/8/21



# OPEN HOLE DRILLING RECORD

REPORT NUMBER

23297

CONTRACT Seven Hills Midlands 110kV Cable

DRILLHOLE NO RC05

SHEET Sheet 1 of 2

CO-ORDINATES 601,411.15 E  
741,438.50 N

GROUND LEVEL (mOD) 49.18

RIG TYPE Knebel

DATE DRILLED 08/07/2021

DATE LOGGED 08/07/2021

CLIENT Energia Renewables

INCLINATION (deg) -90

ENGINEER Aecom

HOLE DIAMETER (mm)

DRILLED BY IGSL

Downhole Depth (m)	Core Run Depth (m)	T.C.R. %	S.C.R. %	R.Q.D. %	Fracture Zones (m)	Fracture Spacing Min Avg Max (mm)	Fracture Spacing Log (mm)	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
0							0 250 500		SYMMETRIX DRILLING: No recovery, observed by driller as returns of MADE GROUND consisting of concrete & gravel	0.60	48.58		
1									SYMMETRIX DRILLING: No recovery, observed by driller as returns of GRAVEL				
2													N = 50/70 mm (18, 7, 50)
3													N = 58/225 mm (7, 8, 8, 16, 27, 7)
4									SYMMETRIX DRILLING: No recovery, observed by driller as returns of BOULDER	3.60	45.58		
5									SYMMETRIX DRILLING: No recovery, observed by driller as returns of SAND	4.50	44.68		N = 50/150 mm (11, 12, 21, 26, 3)
6													N = 45 (5, 5, 7, 9, 14, 15)
7									SYMMETRIX DRILLING: No recovery, observed by driller as returns of GRAVEL	6.30	42.88		N = 50/180 mm (10, 11, 14, 17, 19)
8													
9									SYMMETRIX DRILLING: No recovery, observed by driller as returns of sandy GRAVEL	9.00	40.18		N = 50/235 mm (14, 11, 18, 8, 16, 8)
10									SYMMETRIX DRILLING: No recovery, observed by driller as returns of GRAVEL	10.00	39.18		

## REMARKS

Rock and soil descriptions are based on examination of drilling returns. These samples can be heavily disturbed and fragmented, with a loss of fines. Typical fragments of 2 to 3 mm are recovered. Accurate descriptions are not, therefore, possible. Similarly, it is not possible to accurately assess soil stratification or rock condition/structure.

Hole cased 0.0-16.0m. Erect Covid 19 Safe Zone - 1hr.

## WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
10.40	10.40	N/S			Seepage

## GROUNDWATER DETAILS

## INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type	Date	Hole Depth	Casing Depth	Depth to Water	Comments
08-07-21	16.00	9.00	16.00	50mm SP					

IGSL RC OPEN HOLE 23297.GPJ IGSL GDT 31/8/21



# OPEN HOLE DRILLING RECORD

REPORT NUMBER

23297

CONTRACT Seven Hills Midlands 110kV Cable

DRILLHOLE NO RC05

SHEET Sheet 2 of 2

CO-ORDINATES 601,411.15 E  
741,438.50 N

GROUND LEVEL (mOD) 49.18

RIG TYPE Knebel

DATE DRILLED 08/07/2021

DATE LOGGED 08/07/2021

CLIENT Energia Renewables

INCLINATION (deg) -90

ENGINEER Aecom

HOLE DIAMETER (mm)

DRILLED BY IGSL

Downhole Depth (m)	Core Run Depth (m)	T.C.R. %	S.C.R. %	R.Q.D. %	Fracture Zones (m)	Fracture Spacing Min Avg Max (mm)	Fracture Spacing Log (mm)	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
11									SYMMETRIX DRILLING: No recovery, observed by driller as returns of GRAVEL ( <i>continued</i> )	12.00	37.18		N = 50/170 mm (13, 12, 16, 17, 17)
12									SYMMETRIX DRILLING: No recovery, observed by driller as returns of sandy GRAVEL	14.00	35.18		N = 65 (10, 13, 17, 17, 16, 15)
13									SYMMETRIX DRILLING: No recovery, observed by driller as returns of SAND	14.60	34.58		N = 50/160 mm (12, 12, 18, 18, 14)
14									SYMMETRIX DRILLING: No recovery, observed by driller as returns of sandy GRAVEL	16.00	33.18		N = 50/160 mm (18, 7, 17, 18, 15)
15									End of Borehole at 16.00 m				
16													
17													
18													
19													
20													

## REMARKS

Rock and soil descriptions are based on examination of drilling returns. These samples can be heavily disturbed and fragmented, with a loss of fines. Typical fragments of 2 to 3 mm are recovered. Accurate descriptions are not, therefore, possible. Similarly, it is not possible to accurately assess soil stratification or rock condition/structure.

Hole cased 0.0-16.0m. Erect Covid 19 Safe Zone - 1hr.

## WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
10.40	10.40	N/S			Seepage

## GROUNDWATER DETAILS

## INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type	Date	Hole Depth	Casing Depth	Depth to Water	Comments
08-07-21	16.00	9.00	16.00	50mm SP	08-07-21	16.00	16.00	11.25	Water level recorded at end of drilling.



# OPEN HOLE DRILLING RECORD

REPORT NUMBER

23297

CONTRACT Seven Hills Midlands 110kV Cable

DRILLHOLE NO RC06

SHEET Sheet 1 of 2

CO-ORDINATES 601,586.81 E  
741,438.11 N

GROUND LEVEL (mOD) 46.99

RIG TYPE Knebel

DATE DRILLED 09/07/2021

DATE LOGGED 09/07/2021

CLIENT Energia Renewables

INCLINATION (deg) -90

ENGINEER Aecom

HOLE DIAMETER (mm)

DRILLED BY IGSL

Downhole Depth (m)	Core Run Depth (m)	T.C.R. %	S.C.R. %	R.Q.D. %	Fracture Zones (m)	Fracture Spacing Min Avg Max (mm)	Fracture Spacing Log (mm)	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
0							0 250 500		SYMMETRIX DRILLING: No recovery, observed by driller as returns of sandy GRAVEL	0.80	46.19		N = 50/170 mm (9, 9, 16, 16, 18)
1									SYMMETRIX DRILLING: No recovery, observed by driller as returns of GRAVEL				
2													
3									SYMMETRIX DRILLING: No recovery, observed by driller as returns of sandy GRAVEL	3.00	43.99		N = 50/225 mm (8, 7, 14, 14, 16, 6)
4										4.30			
5									SYMMETRIX DRILLING: No recovery, observed by driller as returns of BOULDER	4.60	42.69		N = 50/0 mm (25, 50)
6									SYMMETRIX DRILLING: No recovery, observed by driller as returns of sandy GRAVEL		42.39		N = 41 (3, 7, 9, 9, 10, 13)
7													
8													N = 40 (4, 6, 9, 9, 11, 11)
9													N = 50/285 mm (2, 10, 16, 12, 12, 10)
10										10.00			
									SYMMETRIX DRILLING: No recovery, observed by driller as returns of black SAND	10.50	36.99		

## REMARKS

Rock and soil descriptions are based on examination of drilling returns. These samples can be heavily disturbed and fragmented, with a loss of fines. Typical fragments of 2 to 3 mm are recovered. Accurate descriptions are not, therefore, possible. Similarly, it is not possible to accurately assess soil stratification or rock condition/structure.

Hole cased 0.0-16.0m. Erect Covid 19 Safe Zone - 1hr.

## WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
9.00	9.00	N/S			Seepage

## GROUNDWATER DETAILS

## INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type	Date	Hole Depth	Casing Depth	Depth to Water	Comments

IGSL RC OPEN HOLE 23297.GPJ IGSL GDT 31/8/21



# OPEN HOLE DRILLING RECORD

REPORT NUMBER

23297

CONTRACT Seven Hills Midlands 110kV Cable

DRILLHOLE NO RC06

SHEET Sheet 2 of 2

CO-ORDINATES 601,586.81 E  
741,438.11 N

GROUND LEVEL (mOD) 46.99

RIG TYPE Knebel

DATE DRILLED 09/07/2021

DATE LOGGED 09/07/2021

CLIENT Energia Renewables  
ENGINEER Aecom

INCLINATION (deg) -90

HOLE DIAMETER (mm)

DRILLED BY IGSL

Downhole Depth (m)	Core Run Depth (m)	T.C.R. %	S.C.R. %	R.Q.D. %	Fracture Zones (m)	Fracture Spacing Min Avg Max (mm)	Fracture Spacing Log (mm)	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
11									SYMMETRIX DRILLING: No recovery, observed by driller as returns of sandy GRAVEL		36.49		N = 50/140 mm (2, 3, 9, 41)
12										12.50			N = 54/235 mm (2, 4, 4, 17, 19, 14)
13									SYMMETRIX DRILLING: No recovery, observed by driller as returns of GRAVEL	12.80	34.49		
14									SYMMETRIX DRILLING: No recovery, observed by driller as returns of SAND		34.19		N = 55/235 mm (2, 6, 5, 16, 18, 16)
15										14.30			
16									SYMMETRIX DRILLING: No recovery, observed by driller as returns of sandy GRAVEL		32.69		N = 50/225 mm (9, 12, 12, 13, 17, 8)
17										16.00			
18									End of Borehole at 16.00 m		30.99		
19													
20													

## REMARKS

Rock and soil descriptions are based on examination of drilling returns. These samples can be heavily disturbed and fragmented, with a loss of fines. Typical fragments of 2 to 3 mm are recovered. Accurate descriptions are not, therefore, possible. Similarly, it is not possible to accurately assess soil stratification or rock condition/structure.

Hole cased 0.0-16.0m. Erect Covid 19 Safe Zone - 1hr.

## WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
9.00	9.00	N/S			Seepage

## GROUNDWATER DETAILS

## INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type	Date	Hole Depth	Casing Depth	Depth to Water	Comments
					09-07-21	16.00	16.00	11.65	Water level recorded at end of drilling.

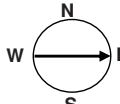


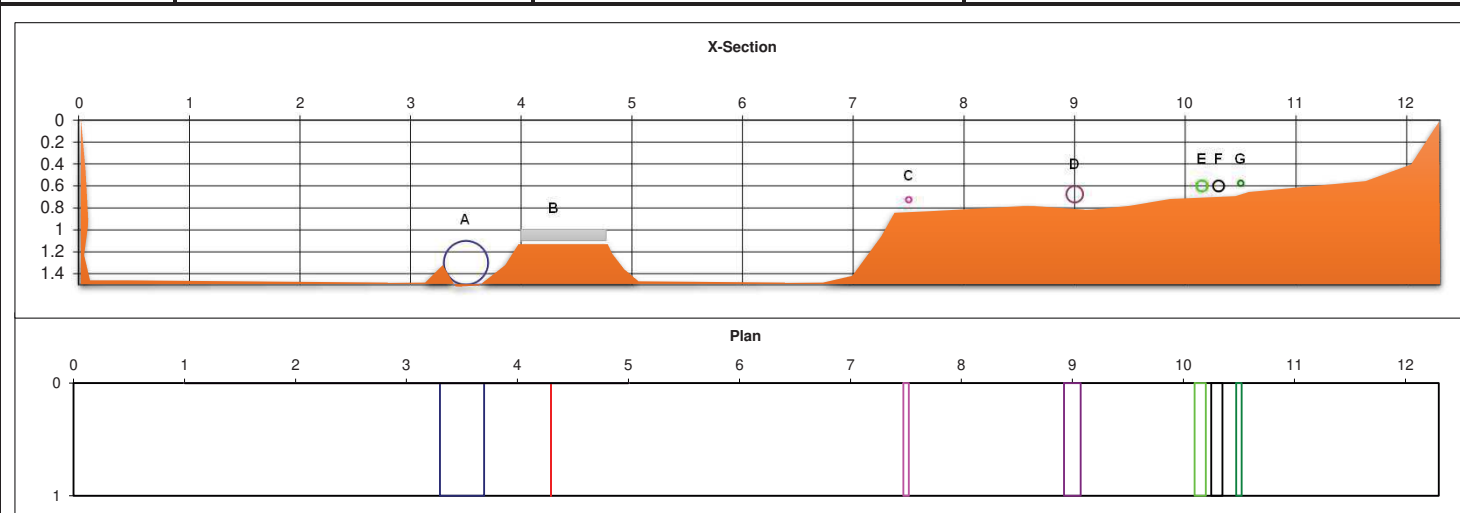
IGSL RC OPEN HOLE 23297.GPJ IGSL GDT 31/8/21



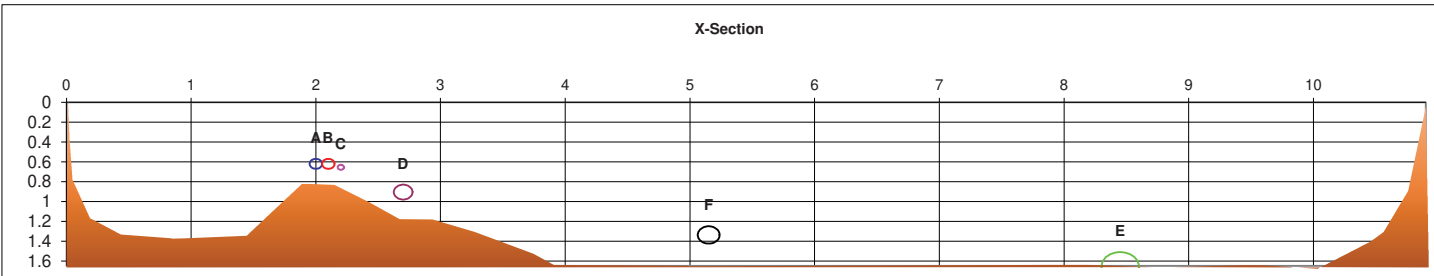
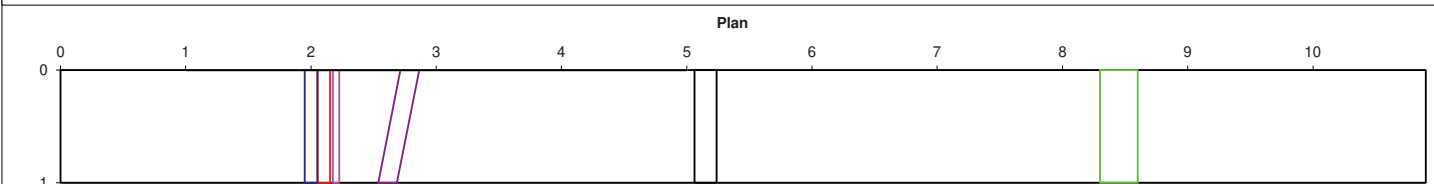
## **Appendix 3**

### **Slit Trench Records & Photographs**

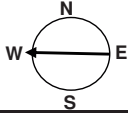


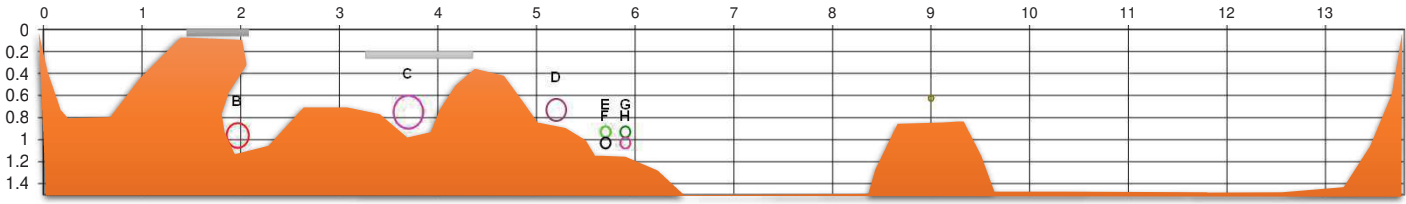
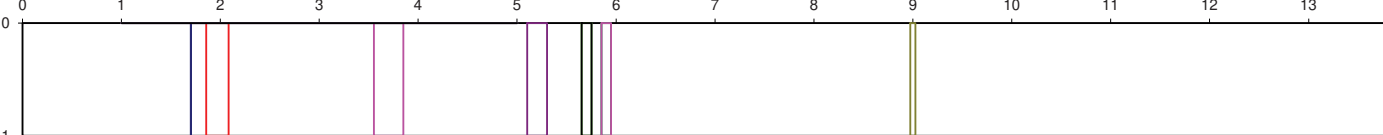
Report No. 23297	SLIT TRENCH RECORD			FACING DIRECTION:		
Project: Seven Hills Midlands 110kV Cable		Survey			Slit Trench No. 1	
Client: Energia Renewables		Easting (m)	Northing (m)	Elevation (mOD)	Sheet 1 of 1	
Engineer: Aecom		599733.239	741707.551	44.876	Date Commenced 21/05/2021	
Crew: JC/FDVL		599731.573	741693.535	44.657	Date Completed 21/05/2021	
Start of Trench						
End of Trench						
Ground Conditions						
From (m)	To (m)	Soil Description			Photograph	
0	0.15	Tarmacadam (MADE GROUND)				
0.15	0.4	(Dense) Angular Gravel				
0.4	1.5	(Medium Dense) Fine to coarse sandy GRAVEL with cobbles				
Trench Dimensions		Location		Excavation Quantities		
LHS of Trench (m)	0.0			Surface	Length (m)	Material
RHS of Trench (m)	14.4			Road	10.2	
Trench Depth (m)	1.5			Path (LHS)	1.7	
Trench Width (m)	1.0			Path (RHS)		
				Grass Verge (LHS)		
				Grass Verge (RHS)	2.5	
				Other		
Facing Direction		SAMPLES		Total Length	14.4	
Facing Features	Athlone	BAG at 0.800m 137115		Zero Metres Taken As: LHS Wall		
Groundwater						
X-Section						
Plan						
	Diameter (mm)	Material	Description	Distance (m)	Depth to crown (m)	Angle (deg.)
Service A	250	Wavin	Watermain	2.7	1.15	90
Service B	150	Cast Iron	Watermain	10	1.15	90
Service C	100	Wavin	ESB	10.5	0.55	90
Service D	100	Wavin	ESB	10.7	0.55	90
Service E	100	Wavin	Virgin Media	12.5	0.27	90
Service F	100	Wavin	Virgin Media	12.7	0.27	90
Service G		Leanmix	Trench	12.2	0.1	90
Service H						
Service I						
Service J						
Service K						
Service L						
Service M						

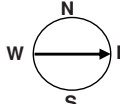


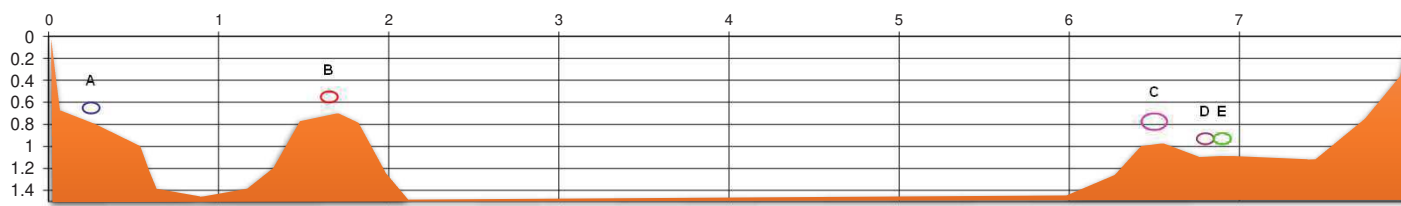
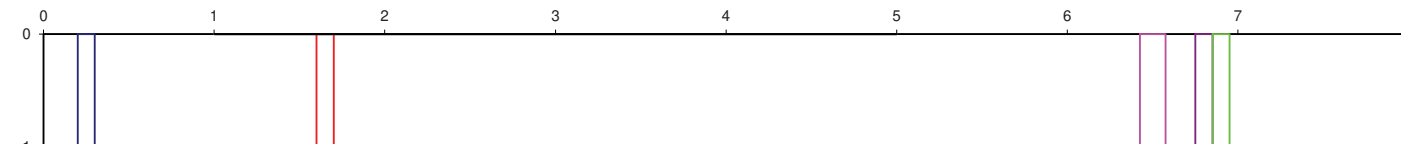



Report No. 23297		SLIT TRENCH RECORD			FACING DIRECTION: 			
Project: Seven Hills Midlands 110kV Cable				Survey		Slit Trench No. 2		
Client: Energia Renewables				Easting (m)	Northing (m)	Elevation (mOD)	Sheet 1 of 1	
Engineer: Aecom				Start of Trench	600274.576	741523.251	44.449	Date Commenced 25/05/2021
Crew: JC/FDVL				End of Trench	600274.481	741511.286	44.601	Date Completed 25/05/2021
Ground Conditions								
From (m)		To (m)		Soil Description			Photograph	
0		0.2		Tarmacadam (MADE GROUND)				
0.2		0.4		(Dense) Angular Gravel				
0.4		1.5		Fine to medium silty SAND with occasional fine gravel				
Trench Dimensions				Location		Excavation Quantities		
LHS of Trench (m)	0.0					Surface	Length (m)	Material
RHS of Trench (m)	12.3					Road	6.7	
Trench Depth (m)	1.5					Path (LHS)		
Trench Width (m)	1.0					Path (RHS)	5.6	
						Grass Verge (LHS)		
					Grass Verge (RHS)			
Facing Direction	East			SAMPLES		Other		
Facing Features	Athlone			BAG at 1.0m		Total Length	12.3	
Groundwater						Zero Metres Taken As: LHS KERB		
								
	Diameter (mm)	Material	Description	Distance (m)	Depth to crown (m)	Angle (deg.)		
Service A	400	Wavin	Gravity Sewer	3.5	1.1	90		
Service B		Leanmix	Possible watermain	4.3	1	90		
Service C	50	Wavin	ESB	7.5	0.7	90		
Service D	150	Wavin	Sewer/Surface Water	9	0.6	90		
Service E	100	Wavin	Eircom	10.15	0.55	90		
Service F	100	Wavin	Eircom	10.3	0.55	90		
Service G	50	Wavin	Eircom	10.5	0.55	90		
Service H								
Service I								
Service J								
Service K								
Service L								
Service M								


Report No. <b>23297</b>		<b>SLIT TRENCH RECORD</b>		FACING DIRECTION:		<div style="text-align: center;">N W ——— E S</div>		<div style="text-align: center;"></div>	
Project: Seven Hills Midlands 110kV Cable				Survey		Slit Trench No.		3	
Client: Energia Renewables				Easting (m)	Northing (m)	Elevation (mOD)	Sheet	1 of 1	
Engineer: Aecom		Start of Trench		600526.493	741530.911	49.853	Date Commenced	26/05/2021	
Crew: JC/FDVL		End of Trench		600525.765	741543.527	51.191	Date Completed	26/05/2021	
<b>Ground Conditions</b>									
From (m)		To (m)	Soil Description				Photograph		
0		0.25	Tarmacadam (MADE GROUND)						
0.25		0.5	(Dense) Angular Gravel						
0.5		1.5	Fine to medium silty SAND with occasional fine gravel						
Trench Dimensions			Location			Excavation Quantities			
LHS of Trench (m)	0.0					Surface	Length (m)	Material	
RHS of Trench (m)	10.9					Road	7.2		
Trench Depth (m)	1.7					Path (LHS)	3.8		
Trench Width (m)	1.0					Path (RHS)			
						Grass Verge (LHS)			
						Grass Verge (RHS)			
Facing Direction	East		<b>SAMPLES</b>			Other			
Facing Features	Athlone		BAG at 0.80m			Total Length	10.9		
Groundwater			Shear Vane @ 0.80m 5Kpa			Zero Metres Taken As: LHS KERB			
<b>X-Section</b>									
									
<b>Plan</b>									
									
	Diameter (mm)	Material	Description	Distance (m)	Depth to crown (m)	Angle (deg.)			
Service A	100	Wavin	EIR	2	0.57	90			
Service B	100	Wavin	EIR	2.1	0.57	90			
Service C	50	Wavin	ESB	2.2	0.63	90			
Service D	150	Wavin	SEWER	2.7	0.83	80			
Service E	300	Wavin	Gravity Sewer	8.45	1.51	90			
Service F	175	Wavin	Watermain	5.15	1.25	90			
Service G									
Service H									
Service I									
Service J									
Service K									
Service L									
Service M									

Report No. <b>23297</b>		<b>SLIT TRENCH RECORD</b>			FACING DIRECTION:		 N W ———→ E S				
Project: Seven Hills Midlands 110kV Cable Client: Energia Renewables Engineer: Aecom Crew: JC/FDVL						Survey			Slit Trench No. <b>4</b>		
						Easting (m)	Northing (m)	Elevation (mOD)	Sheet <b>1 of 1</b>		
			Start of Trench			600732.354	741513.801	55.217	Date Commenced <b>27/05/2021</b>		
			End of Trench			600729.377	741500.723	55.254	Date Completed <b>27/05/2021</b>		
<b>Ground Conditions</b>											
From (m)		To (m)	Soil Description					Photograph			
0		0.25	Tarmacadam (MADE GROUND)								
0.25		0.5	(Dense) Angular Gravel								
0.5		1.5	Fine to medium silty SAND with occasional fine gravel								
<b>Trench Dimensions</b>			<b>Location</b>			<b>Excavation Quantities</b>					
LHS of Trench (m)	0.0					<b>Surface</b>		<b>Length (m)</b>	<b>Material</b>		
RHS of Trench (m)	13.5					Road	7.5				
Trench Depth (m)	1.5					Path (LHS)	2.3				
Trench Width (m)	1.0					Path (RHS)					
						Grass Verge (LHS)					
						Grass Verge (RHS)	3.7				
Facing Direction	East		<b>SAMPLES</b>			Other					
Facing Features	Athlone		BAG at 0.80m			Total Length	13.5				
Groundwater			Shear Vane @ 0.80m 5Kpa			Zero Metres Taken As: LHS WALL					
<b>X-Section</b>											
<b>Plan</b>											
	Diameter (mm)	Material	Description	Distance (m)	Depth to crown (m)	Angle (deg.)					
Service A	200	Wavin	Watermain	2.65	1.15	90					
Service B	250	HDPE	GAS	5.6	1.1	90					
Service C	150	Wavin	Watermain	8.2	1.1	90					
Service D	100	Wavin	EIR	9.1	0.73	80					
Service E	100	Wavin	EIR	9.3	0.73	90					
Service F	50	Wavin	ESB	13	0.8	90					
Service G											
Service H											
Service I											
Service J											
Service K											
Service L											
Service M											

Report No. 23297	SLIT TRENCH RECORD			FACING DIRECTION: 			
Project: Seven Hills Midlands 110kV Cable Client: Energia Renewables Engineer: Aecom Crew: JC/FDVL		Start of Trench End of Trench	Survey			Slit Trench No. 5	
			Easting (m)	Northing (m)	Elevation (mOD)	Sheet 1 of 1	
			600951.137	741463.579	48.472	Date Commenced 31/05/2021	
			600955.552	741476.405	47.694	Date Completed 31/05/2021	
Ground Conditions							
From (m)		To (m)	Soil Description		Photograph		
0		0.25	Tarmacadam (MADE GROUND)				
0.25		0.5	(Dense) Angular Gravel				
0.5		1.5	Fine to medium silty SAND with occasional fine gravel				
Trench Dimensions			Location		Excavation Quantities		
LHS of Trench (m)	0.0				Surface	Length (m)	Material
RHS of Trench (m)	13.8				Road	6.3	
Trench Depth (m)	1.5				Path (LHS)		
Trench Width (m)	1.0				Path (RHS)	2.1	
					Grass Verge (LHS)		
					Grass Verge (RHS)	5.4	
					Other		
Facing Direction	West		SAMPLES		Total Length	13.8	
Facing Features	Monksland		BAG at 0.800m				
Groundwater			Sheer Vane @ 0.800m 5Kpa		Zero Metres Taken As: LHS Kerb		
X-Section							
							
Plan							
							
	Diameter (mm)	Material	Description	Distance (m)	Depth to crown (m)	Angle (deg.)	
Service A		Leanmix	ESB	1.7	0.34	90	
Service B	225	HDPE	GAS	1.97	0.85	90	
Service C	300	Wavin	Gravity Sewer	3.7	0.6	90	
Service D	200	Wavin	?????	5.2	0.63	90	
Service E	100	Wavin	EIR/BT	5.7	0.88	90	
Service F	100	Wavin	EIR/BT	5.7	0.98	90	
Service G	100	Wavin	EIR/BT	5.9	0.88	90	
Service H	100	Wavin	EIR/BT	5.9	0.98	90	
Service I	50	Wavin	ESB	9	0.6	90	
Service J							
Service K							
Service L							
Service M							

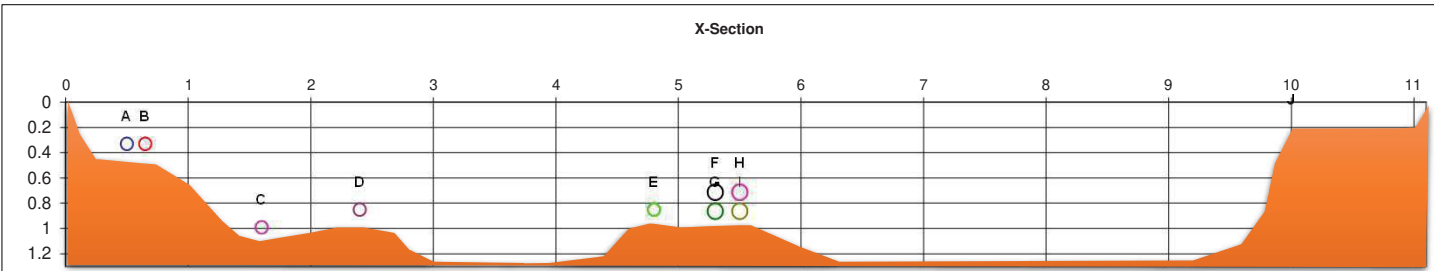
Report No. 23297		SLIT TRENCH RECORD		FACING DIRECTION: 					
Project: Seven Hills Midlands 110kV Cable		Survey		Slit Trench No. 6		Sheet 1 of 1			
Client: Energia Renewables				Easting (m)		Northing (m)		Elevation (mOD)	
Engineer: Aecom				601111.46		741473.247		47.029	
Crew: JC/FDVL				601111.102		741465.347		46.87	
Start of Trench		End of Trench		Date Commenced 28/05/2021		Date Completed 28/05/2021			
Ground Conditions		Soil Description		Photograph					
From (m)		To (m)							
0		0.25							
0.25		0.5							
0.5		1.5							
Trench Dimensions		Location		Excavation Quantities					
LHS of Trench (m)	0.0			Surface					
RHS of Trench (m)	8.0			Road					
Trench Depth (m)	1.5			Path (LHS)					
Trench Width (m)	1.0			Path (RHS)					
				Grass Verge (LHS)					
Facing Direction		East		Grass Verge (RHS)					
Facing Features		Athlone		Other					
Groundwater		BAG at 0.800m		Total Length					
		Sheer Vane @ 0.800m 5Kpa		8.0					
				Zero Metres Taken As: LHS WALL					
X-Section									
									
Plan									
									
	Diameter (mm)	Material	Description	Distance (m)	Depth to crown (m)	Angle (deg.)			
Service A	100	Wavin	EIR	0.25	0.6	90			
Service B	100	Wavin	ESB	1.65	0.5	90			
Service C	150	Wavin	ESB	6.5	0.7	90			
Service D	100	Wavin	ESB	6.8	0.88	90			
Service E	100	Wavin	ESB	6.9	0.88	90			
Service F									
Service G									
Service H									
Service I									
Service J									
Service K									
Service L									
Service M									

<b>Report No.</b>	<b>23297</b>	<b>SLIT TRENCH RECORD</b>			<b>FACING DIRECTION:</b> <div style="text-align: center;"> N W ○ E S </div>		
Project: Seven Hills Midlands 110kV Cable				Survey		Slit Trench No. 7	
Client: Energia Renewables				Easting (m)	Northing (m)	Elevation (mOD)	Sheet 1 of 1
Engineer: Aecom		Start of Trench					Date Commenced 21/05/2021
Crew: JC/FDVL		End of Trench					Date Completed 21/05/2021

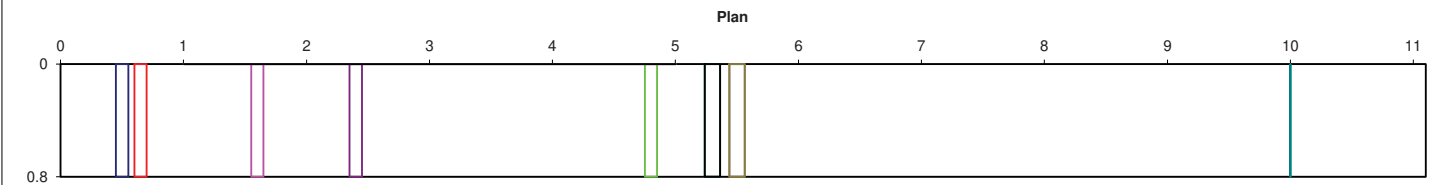
From (m)	To (m)	Soil Description	Photograph
0	0.1	TOPSOIL	
0.1	0.4	Firm brown sandy gravelly CLAY	
0.4	1.3	(Dense) Fine to coarse sandy GRAVEL with cobbles	
		Trench collapsing, terminated at 1.30m	

Trench Dimensions		Location	Excavation Quantities		
LHS of Trench (m)	0.0		Surface	Length (m)	Material
RHS of Trench (m)	11.1		Road		
Trench Depth (m)	1.3		Path (LHS)	2.0	
Trench Width (m)	0.8		Path (RHS)	1.7	
			Grass Verge (LHS)	6.0	
			Grass Verge (RHS)	1.4	
Facing Direction		<b>SAMPLES</b>	Other		
Facing Features	Athlone		Total Length	11.1	
Groundwater			Zero Metres Taken As: LHS Wall		

**X-Section**



**Plan**



	Diameter (mm)	Material	Description	Distance (m)	Depth to crown (m)	Angle (deg.)
Service A	100	Wavin	ESB	0.5	0.28	90
Service B	100	Wavin	ESB	0.65	0.28	90
Service C	100	Wavin	EIR/BT	1.6	0.94	90
Service D	100	Wavin	EIR/BT	2.4	0.8	90
Service E	100	Wavin	????	4.8	0.8	90
Service F	125	Wavin	ESB	5.3	0.65	90
Service G	125	Wavin	ESB	5.3	0.8	90
Service H	125	Wavin	ESB	5.5	0.65	90
Service I	125	Wavin	ESB	5.5	0.8	90
Service J		Concrete	Street Lighting	10	0.15	90
Service K						
Service L						
Service M						



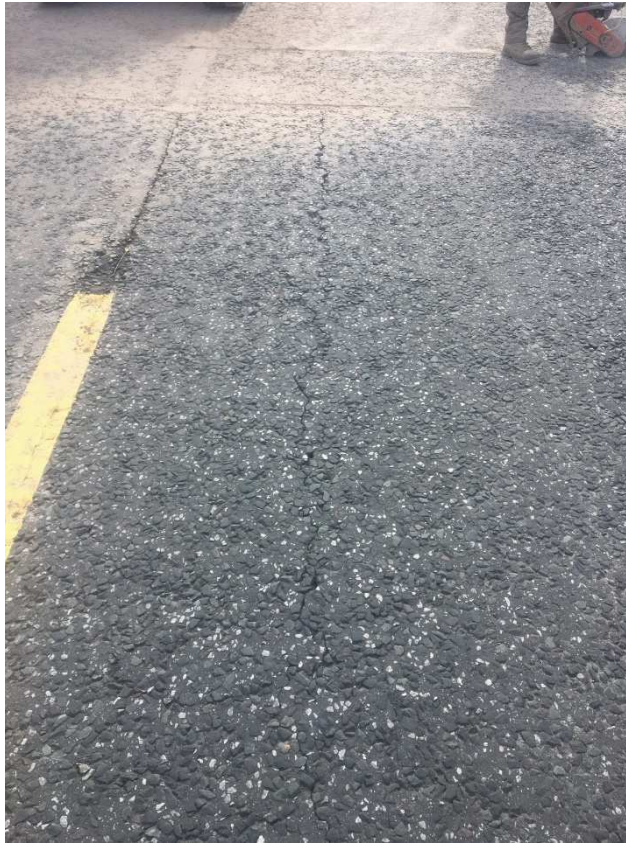
<b>Report No.</b>	<b>23297</b>	<b>SLIT TRENCH RECORD</b>			<b>FACING DIRECTION:</b>					
Project: Seven Hills Midlands 110kV Cable Client: Energia Renewables Engineer: Aecom Crew: JC/FDVL					Survey		Slit Trench No.		8	
					Easting (m)	Northing (m)	Elevation (mOD)	Sheet	1 of 1	
Start of Trench			601305.011		741424.397		48.509		Date Commenced	01/06/2021
End of Trench			601306.7		741434.282		48.576		Date Completed	01/06/2021
<b>Ground Conditions</b>										
<b>From (m)</b>		<b>To (m)</b>		<b>Soil Description</b>				<b>Photograph</b>		
0		0.25		Tarmacadam (MADE GROUND)						
0.25		0.5		(Dense) Angular Gravel						
0.5		1.5		(Medium dense) Fine to coarse sandy GRAVEL with cobbles						
<b>Trench Dimensions</b>				<b>Location</b>				<b>Excavation Quantities</b>		
LHS of Trench (m)	0.0							<b>Surface</b>	<b>Length (m)</b>	<b>Material</b>
RHS of Trench (m)	10.0							Road	8.0	
Trench Depth (m)	1.5							Path (LHS)		
Trench Width (m)	1.0							Path (RHS)	2.0	
			Grass Verge (LHS)							
			Grass Verge (RHS)							
Facing Direction	West			<b>SAMPLES</b>				Other		
Facing Features	Monksland			BAG at 1.0m				Total Length	10.0	
Groundwater								Zero Metres Taken As: LHS Kerb		
<b>X-Section</b>										
<b>Plan</b>										
	Diameter (mm)	Material	Description	Distance (m)	Depth to crown (m)	Angle (deg.)				
Service A	100	WAVIN	ESB	2.5	0.65	90				
Service B	100	WAVIN	ESB	2	1	165				
Service C	200	WAVIN	Watermain	6.97	0.75	90				
Service D	225	HDPE	GAS	7.7	0.75	90				
Service E	100	WAVIN	ESB	9.6	0.4	90				
Service F										
Service G										
Service H										
Service I										
Service J										
Service K										
Service L										
Service M										

Report No. 23297	SLIT TRENCH RECORD			FACING DIRECTION:			
Project: Seven Hills Midlands 110kV Cable		Start of Trench End of Trench	Survey			Slit Trench No. 9	
Client: Energia Renewables			Easting (m)	Northing (m)	Elevation (mOD)	Sheet 1 of 1	
Engineer: Aecom			601409.262	741424.916	48.905	Date Commenced 02/06/2021	
Crew: JC/FDVL			601409.868	741433.427	49.247	Date Completed 02/06/2021	
Ground Conditions							
From (m)		To (m)	Soil Description		Photograph		
0		0.25	Tarmacadam (MADE GROUND)				
0.25		0.5	(Dense) Angular Gravel				
0.5		1.3	(Medium dense) Fine to coarse sandy GRAVEL with cobbles				
Trench Dimensions			Location		Excavation Quantities		
LHS of Trench (m)	0.0				Surface	Length (m)	Material
RHS of Trench (m)	12.2				Road	3.7	
Trench Depth (m)	1.3				Path (LHS)		
Trench Width (m)	1.0				Path (RHS)	2.0	
					Grass Verge (LHS)		
					Grass Verge (RHS)	6.5	
					Other		
Facing Direction	West		SAMPLES		Total Length 12.2		
Facing Features	Monksland		BAG at 1.000m				
Groundwater					Zero Metres Taken As: LHS Kerb		
X-Section							
Plan							
	Diameter (mm)	Material	Description	Distance (m)	Depth to crown (m)	Angle (deg.)	
Service A	100	WAVIN	????	1.9	0.39	120	
Service B		Leanmix trench	ESB	3	0.27	90	
Service C	100	WAVIN	ESB	5.1	0.38	90	
Service D	100	WAVIN	ESB	5.3	0.38	90	
Service E	100	WAVIN	ENET/BT	7.3	0.4	90	
Service F	100	WAVIN	EIR	8	0.64	90	
Service G	100	WAVIN	EIR	8	0.74	90	
Service H	100	WAVIN	EIR	8.2	0.64	90	
Service I	100	WAVIN	EIR	8.2	0.74	90	
Service J							
Service K							
Service L							
Service M							



Report No. 23297		SLIT TRENCH RECORD			FACING DIRECTION:				
Project: Seven Hills Midlands 110kV Cable		Survey			Slit Trench No. 10				
Client: Energia Renewables					Sheet 1 of 1				
Engineer: Aecom					Date Commenced 02/06/2021				
Crew: JC/FDVL					Date Completed 02/06/2021				
Start of Trench		End of Trench		Easting (m)		Northing (m)		Elevation (mOD)	
Ground Conditions									
From (m)		To (m)		Soil Description			Photograph		
0		0.25		Tarmacadam (MADE GROUND)					
0.25		0.5		(Dense) Angular Gravel					
0.5		1.3		(Medium dense) Fine to coarse sandy GRAVEL with cobbles					
Trench Dimensions				Location			Excavation Quantities		
LHS of Trench (m)	0.0					Surface			
RHS of Trench (m)	3.0					Road			
Trench Depth (m)	1.0					Path (LHS)			
Trench Width (m)	1.0					Path (RHS)			
							Grass Verge (LHS)		
							Grass Verge (RHS)		
Facing Direction East				SAMPLES			Other		
Facing Features Athlone							Total Length 3.0		
Groundwater							Zero Metres Taken As: LHS Gate pier		
X-Section									
Plan									
	Diameter (mm)	Material	Description	Distance (m)	Depth to crown (m)	Angle (deg.)			
Service A	50	WAVIN	Watermain ????	1.6	0.4	120			
Service B	100	WAVIN	ESB	2.2	0.8	90			
Service C									
Service D									
Service E									
Service F									
Service G									
Service H									
Service I									
Service J									
Service K									
Service L									
Service M									

Slit Trench ST01 – 1 of 9



Slit Trench ST01 – 2 of 9





Slit Trench ST01 – 3 of 9



Slit Trench ST01 – 4 of 9





Slit Trench ST01 – 5 of 9



Slit Trench ST01 – 6 of 9





Slit Trench ST01 – 7 of 9



Slit Trench ST01 – 8 of 9

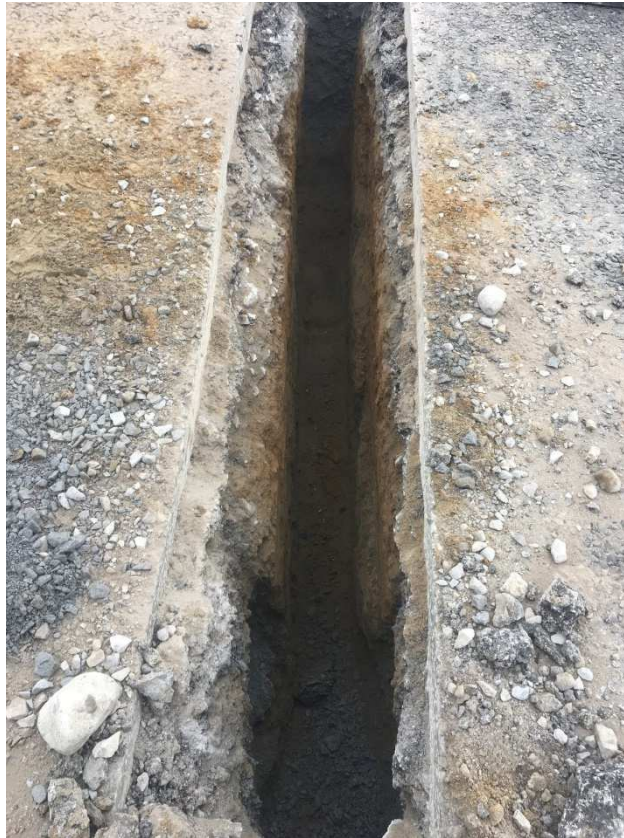


Slit Trench ST01 – 9 of 9





Slit Trench ST02 – 1 of 9



Slit Trench ST02 – 2 of 9





Slit Trench ST02 – 3 of 9



Slit Trench ST02 – 4 of 9





Slit Trench ST02 – 5 of 9



Slit Trench ST02 – 6 of 9



Slit Trench ST02 – 7 of 9



Slit Trench ST02 – 8 of 9





Slit Trench ST02 – 9 of 9



Slit Trench ST03 – 1 of 6



Slit Trench ST03 – 2 of 6





Slit Trench ST03 – 3 of 6



Slit Trench ST03 – 4 of 6





Slit Trench ST03 – 5 of 6



Slit Trench ST03 – 6 of 6





Slit Trench ST04 – 1 of 7



Slit Trench ST04 – 2 of 7





Slit Trench ST04 – 3 of 7



Slit Trench ST04 – 4 of 7





Slit Trench ST04 – 5 of 7



Slit Trench ST04 – 6 of 7



Slit Trench ST04 – 7 of 7





Slit Trench ST05 – 1 of 10



Slit Trench ST05 – 2 of 10





Slit Trench ST05 – 3 of 10



Slit Trench ST05 – 4 of 10





Slit Trench ST05 – 5 of 10



Slit Trench ST05 – 6 of 10





Slit Trench ST05 – 7 of 10



Slit Trench ST05 – 8 of 10





Slit Trench ST05 – 9 of 10

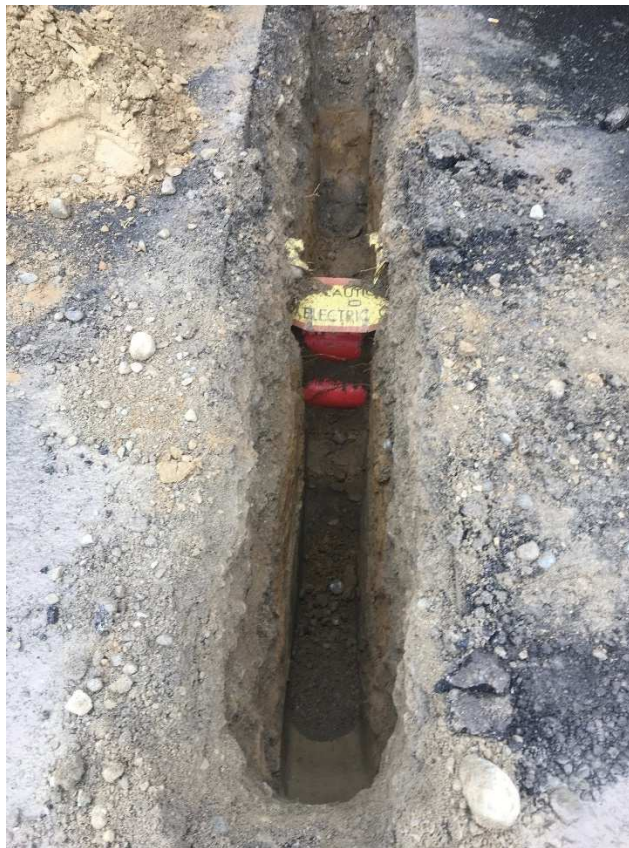


Slit Trench ST05 – 10 of 10





Slit Trench ST06 – 1 of 3



Slit Trench ST06 – 2 of 3





Slit Trench ST06 – 3 of 3



Slit Trench ST07 – 1 of 10



Slit Trench ST07 – 2 of 10





Slit Trench ST07 – 3 of 10



Slit Trench ST07 – 4 of 10





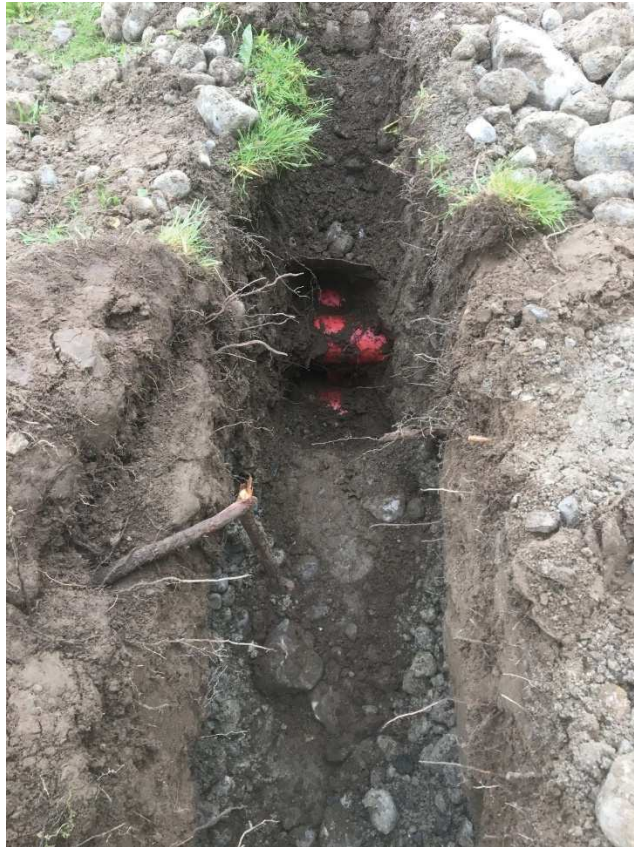
Slit Trench ST07 – 5 of 10



Slit Trench ST07 – 6 of 10



Slit Trench ST07 – 7 of 10



Slit Trench ST07 – 8 of 10





Slit Trench ST07 – 9 of 10



Slit Trench ST07 – 10 of 10





Slit Trench ST08 – 1 of 5



Slit Trench ST08 – 2 of 5





Slit Trench ST08 – 3 of 5



Slit Trench ST08 – 4 of 5





Slit Trench ST08 – 5 of 5



Slit Trench ST09 – 1 of 7



Slit Trench ST09 – 2 of 7





Slit Trench ST09 – 3 of 7



Slit Trench ST09 – 4 of 7





Slit Trench ST09 – 5 of 7



Slit Trench ST09 – 6 of 7





Slit Trench ST09 – 7 of 7





Slit Trench ST10 – 1 of 3



Slit Trench ST10 – 2 of 3



Slit Trench ST10 – 3 of 3



## **Appendix 4**



### **Groundwater Monitoring**





Groundwater Monitoring							
Site Location		Seven Hills Midlands 110kV Cable					
Project No.		23297					
Client		Energia Renewables					
Engineer		Aecom					
	Elevation (m OD)	Date of Reading					
		10/08/2021					
		m bgl	m OD	m bgl	m OD	m bgl	m OD
RC04	44.726	5.71	39.016				
RC06	46.989	9.48	37.509				
NOTES							

## **Appendix 5**

### **Geotechnical Laboratory Test Results - Soil**

IGSL Ltd Materials Laboratory Unit J5, M7 Business Park Newhall, Naas Co. Kildare 045 846176				Test Report									 <small>ISO 17025 ACCREDITED TESTING DETAILED IN SCOPE REG NO.1331</small>		
				Determination of Moisture Content, Liquid & Plastic Limits  Tested in accordance with BS1377:Part 2:1990, clauses 3.2, 4.3, 4.4 & 5.3**											
Report No. <b>R125587</b>				Contract No.      23297				Contract Name:      7 Hills Windfarm Pipeline Athlone							
Customer    Aecom															
Samples Received:      10/08/21				Date Tested:      10/08/21											
BH/TP*	Sample No.	Depth* (m)	Lab. Ref	Sample Type*	Moisture Content %	Liquid Limit %	Plastic Limit %	Plasticity Index	% <425µm	Preparation	Liquid Limit Clause	Classification (BS5930)	Description		
BH01	AA165967	0.5	A21/3814	B	225	167	NP	NP	N/A	AR	4.4		Brown fibrous PEAT		
BH01	AA165968	1.0	A21/3815	B	36	41	NP	NP	98	WS	4.4		Grey/Brown slightly sandy, gravelly, SILT with some cobbles		
BH01	AA165969	3.0	A21/3816	B	3.0								Brown sandy gravelly SILT/CLAY		
BH01	AA165970	4.0	A21/3817	B	15	35	20	15	59	WS	4.4	C L	Brown slightly sandy, gravelly, CLAY		
BH03	AA165964	0.5	A21/3818	B	17								Brown sandy gravelly SILT/CLAY		
BH03	AA165965	1.0	A21/3819	B	24	33	19	14	59	WS	4.4	C L	Brown sandy gravelly CLAY		
BH03	AA165966	2.0	A21/3820	B	14								Grey sandy gravelly SILT/CLAY		
BH03	AA1651709	3.0	A21/3821	B	12								Grey sandy gravelly SILT/CLAY		
BH03	AA1651710	4.0	A21/3822	B	12								Grey sandy gravelly SILT/CLAY		
BH03A	AA165954	0.5	A21/3823	B	15								Brown slightly sandy, gravelly, SILT/CLAY		
BH03A	AA165955	1.0	A21/3824	B	17	31	18	13	60	WS	4.4	C L	Brown sandy gravelly CLAY		
BH03A	AA165956	2.0	A21/3825	B	16								Brown sandy gravelly SILT/CLAY		
BH03A	AA165957	3.0	A21/3826	B	6.4	21	NP	NP	47	WS	4.4		Brown slightly sandy, gravelly, SILT		
BH03A	AA165958	4.0	A21/3827	B	8.7								Brown sandy gravelly SILT/CLAY		
BH03A	AA165959	5.0	A21/3828	B	4.6	22	NP	NP	33	WS	4.4		Brown silty, sandy, GRAVEL		
Preparation:    WS - Wet sieved AR - As received NP - Non plastic  Liquid Limit    4.3 Cone Penetrometer definitive method Clause:          4.4 Cone Penetrometer one point method				Sample Type: B - Bulk Disturbed U - Undisturbed				Remarks: Results relate only to the specimen tested, in as received condition unless otherwise noted. NOTE: **These clauses have been superceded by EN 17892-1 and EN17892-12. Opinions and interpretations are outside the scope of accreditation. * denotes Customer supplied information. This report shall not be reproduced except in full without written approval from the Laboratory.							
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												20/08/21		1 of 1	



IGSL Ltd Materials Laboratory Unit J5, M7 Business Park Newhall, Naas Co. Kildare 045 846176		Test Report											
		Determination of Moisture Content, Liquid & Plastic Limits  Tested in accordance with BS1377:Part 2:1990, clauses 3.2, 4.3, 4.4 & 5.3**											
<div style="display: flex; justify-content: space-between; padding: 5px;"> <span>Report No. <b>R125588</b></span> <span>Contract No. 23297</span> <span>Contract Name: 7 Hills Windfarm Pipeline Athlone</span> </div> <div style="display: flex; justify-content: space-between; padding: 5px;"> <span>Customer Aecom</span> </div> <div style="display: flex; justify-content: space-between; padding: 5px;"> <span>Samples Received: 10/08/21</span> <span>Date Tested: 10/08/21</span> </div>													
BH/TP*	Sample No.	Depth* (m)	Lab. Ref	Sample Type*	Moisture Content %	Liquid Limit %	Plastic Limit %	Plasticity Index	% <425µm	Preparation	Liquid Limit Clause	Classification (BS5930)	Description
BH03A	AA165960	6.0	A21/3829	B	17								Brown sandy gravelly SILT/CLAY
BH03A	AA165961	7.0	A21/3830	B	19								Brown slightly sandy, slightly gravelly, SILT/CLAY
BH03A	AA165962	8.0	A21/3831	B	18								Brown sandy gravelly SILT/CLAY
BH03A	AA165963	9.0	A21/3832	B	18	25	NP	NP	97	WS	4.4		Brown slightly sandy, slightly gravelly, SILT
ST02	N/A	1.0	A21/3834	B	10								Brown sandy, slightly gravelly, SILT/CLAY
ST03	N/A	0.8	A21/3835	B	5.9								Brown silty/clayey sandy GRAVEL
ST04	N/A	0.8	A21/3836	B	7.0								Brown slightly clayey/silty, very gravelly, SAND
ST05	N/A	0.8	A21/3837	B	9.4								Brown sandy gravelly SILT/CLAY
ST06	N/A	0.8	A21/3838	B	5.3								Brown clayey/silty, very sandy, GRAVEL
ST09	N/A	1.00	A21/3840	B	5.0								Brown clayey/silty, very sandy, GRAVEL
Preparation: WS - Wet sieved AR - As received NP - Non plastic  Liquid Limit 4.3 Cone Penetrometer definitive method Clause: 4.4 Cone Penetrometer one point method					Sample Type: B - Bulk Disturbed U - Undisturbed					Remarks: Results relate only to the specimen tested, in as received condition unless otherwise noted. NOTE: **These clauses have been superceded by EN 17892-1 and EN17892-12. Opinions and interpretations are outside the scope of accreditation. * denotes Customer supplied information. This report shall not be reproduced except in full without written approval from the Laboratory.			
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												20/08/21	1 of 1

# TEST REPORT

## Determination of Particle Size Distribution

Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5\*\*  
(note: Sedimentation stage not accredited)

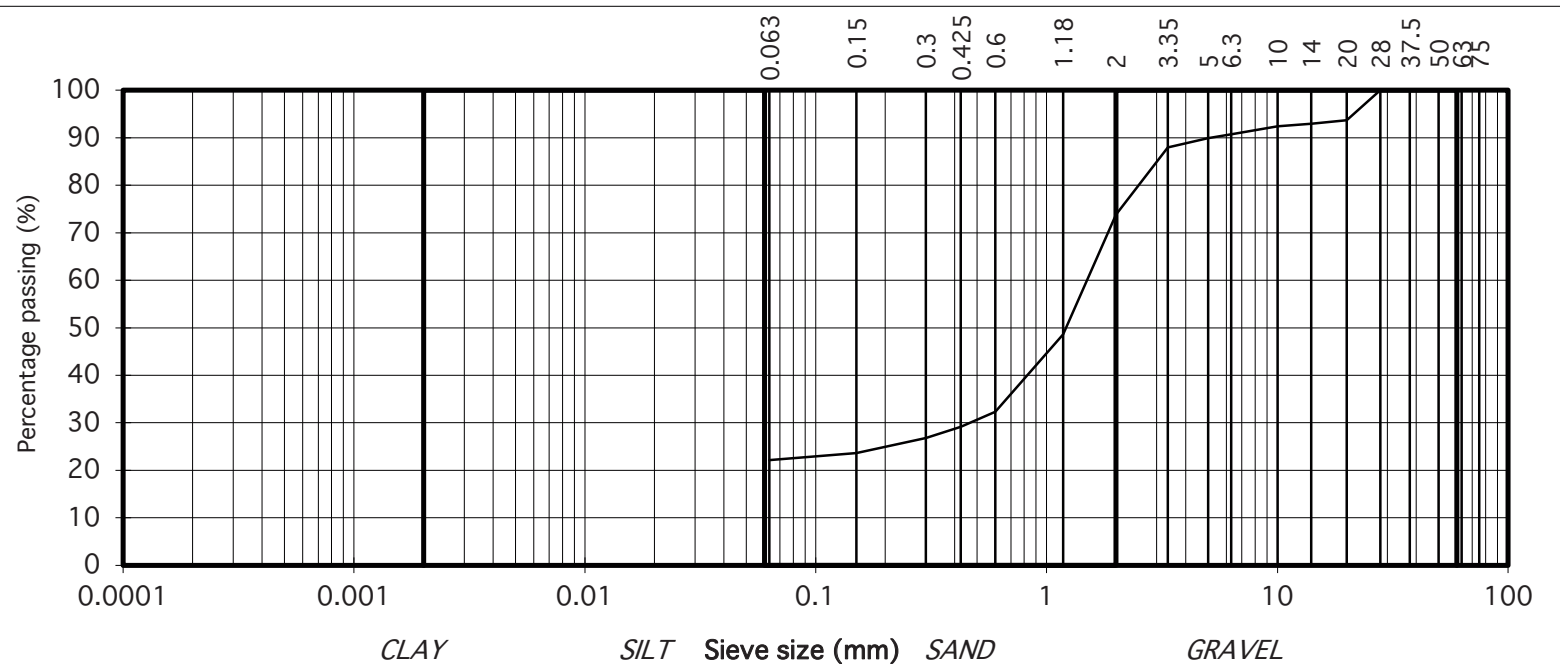


Contract No. 23297 Report No. R125589  
Contract Name: 7 Hills Windfarm Pipeline Athlone  
BH/TP\* : BH01  
Sample No.\* AA165967 Lab. Sample No. A21/3814  
Sample Type: B  
Depth\* (m) 0.50 Customer: Aecom  
Date Received 10/08/2021 Date Testing started 10/08/2021  
Description: Brown sandy, slightly gravelly, SILT

Results relate only to the specimen tested in as received condition unless otherwise noted. \* denotes Customer supplied information. Opinions and interpretations are outside the scope of accreditation.  
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Remarks

Note: \*\*Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2 Peat in sample



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*H Byrne*

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23/08/21

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# TEST REPORT

## Determination of Particle Size Distribution

Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5\*\*  
(note: Sedimentation stage not accredited)

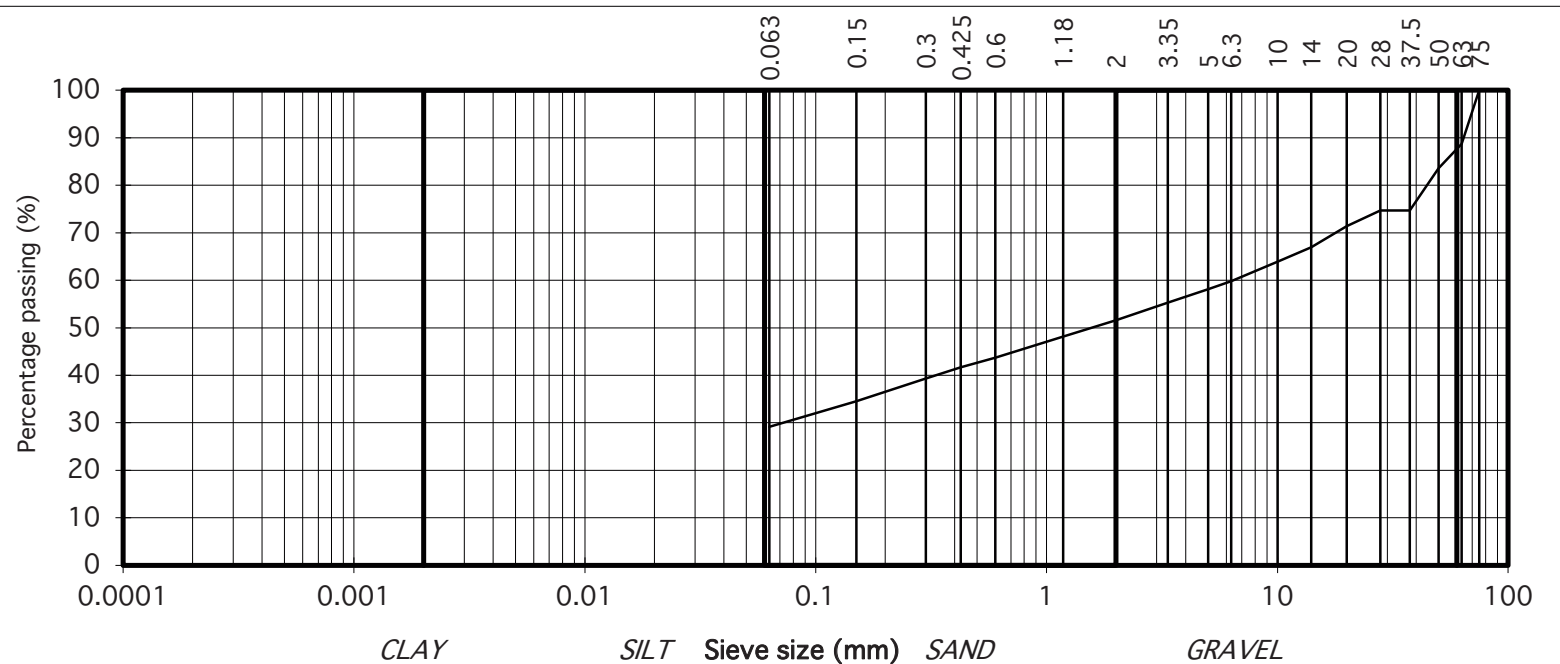


Contract No. 23297 Report No. R125590  
Contract Name: 7 Hills Windfarm Pipeline Athlone  
BH/TP\* : BH01  
Sample No.\* AA165970 Lab. Sample No. A21/3817  
Sample Type: B  
Depth\* (m) 4.00 Customer: Aecom  
Date Received 10/08/2021 Date Testing started 10/08/2021  
Description: Brown slightly sandy, gravelly, SILT with some cobbles

Results relate only to the specimen tested in as received condition unless otherwise noted. \* denotes Customer supplied information. Opinions and interpretations are outside the scope of accreditation.  
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Remarks

Note: \*\*Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2 Sample size did not meet the requirements of BS1377



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23/08/21

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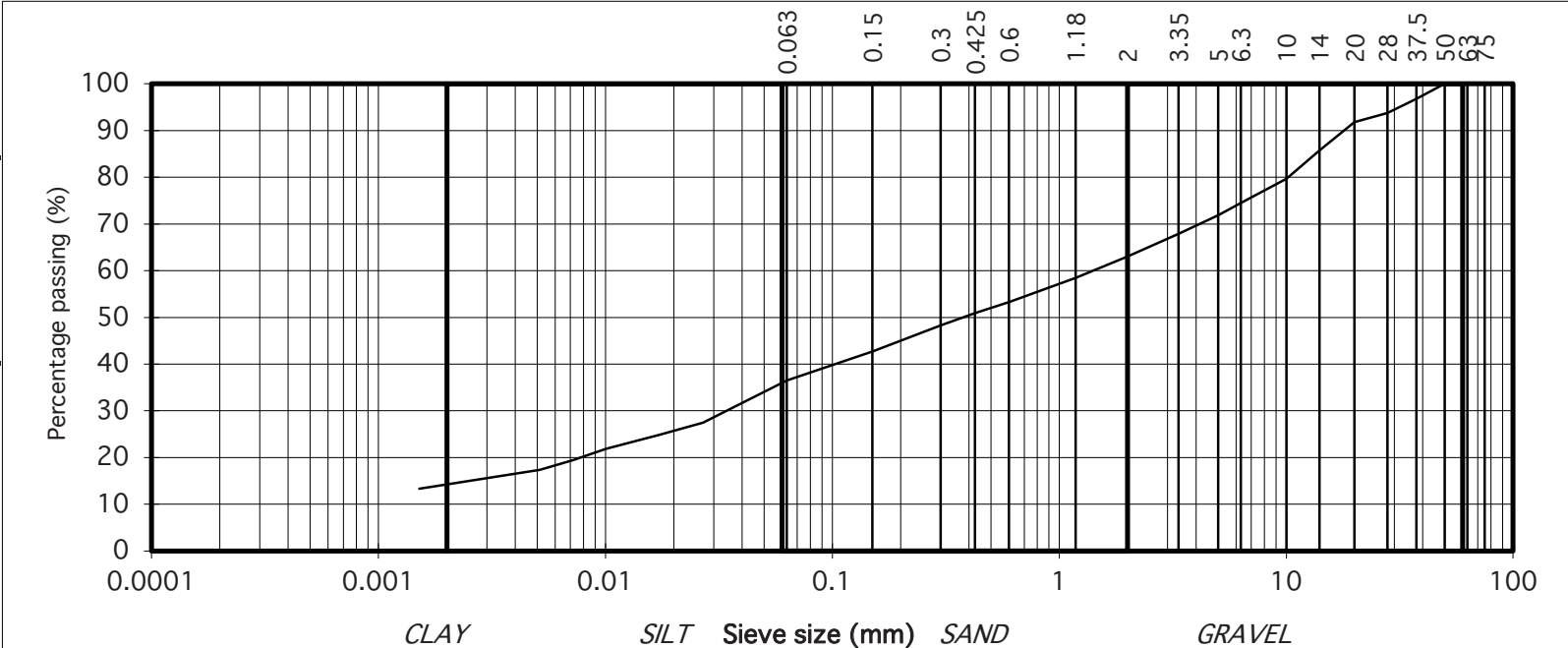


# TEST REPORT

## Determination of Particle Size Distribution

Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5\*\*  
(note: Sedimentation stage not accredited)



particle size	% passing		Contract No.	23297	Report No.	R125591	<div>Results relate only to the specimen tested in as received condition unless otherwise noted. * denotes Customer supplied information. Opinions and interpretations are outside the scope of accreditation.</div> <div>This report shall not be reproduced except in full without the written approval of the Laboratory.</div>
			Contract Name:	7 Hills Windfarm Pipeline Athlone			
			BH/TP* :	BH03			
			Sample No.*	AA165965	Lab. Sample No.	A21/3819	
			Sample Type:	B			
			Depth* (m)	1.00	Customer:	Aecom	
			Date Received	10/08/2021	Date Testing started	12/08/2021	
			Description:	Brown slightly sandy, gravelly, CLAY			
75	100	COBBLES	Remarks	Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2 Sample size did not meet the requirements of BS1377			
63	100						
50	100						
37.5	97						
28	94						
20	92						
14	86						
10	80						
6.3	75	GRAVEL					
5	72						
3.35	68						
2	63						
1.18	58						
0.6	53						
0.425	51						
0.3	48						
0.15	43	SAND					
0.063	37						
0.037	31						
0.027	27						
0.017	25						
0.010	22						
0.007	19						
0.005	17						
0.002	13	SILT/CLAY					

Results relate only to the specimen tested in as received condition unless otherwise noted. \* denotes Customer supplied information. Opinions and interpretations are outside the scope of accreditation.  
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# TEST REPORT

## Determination of Particle Size Distribution

Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5\*\*  
(note: Sedimentation stage not accredited)

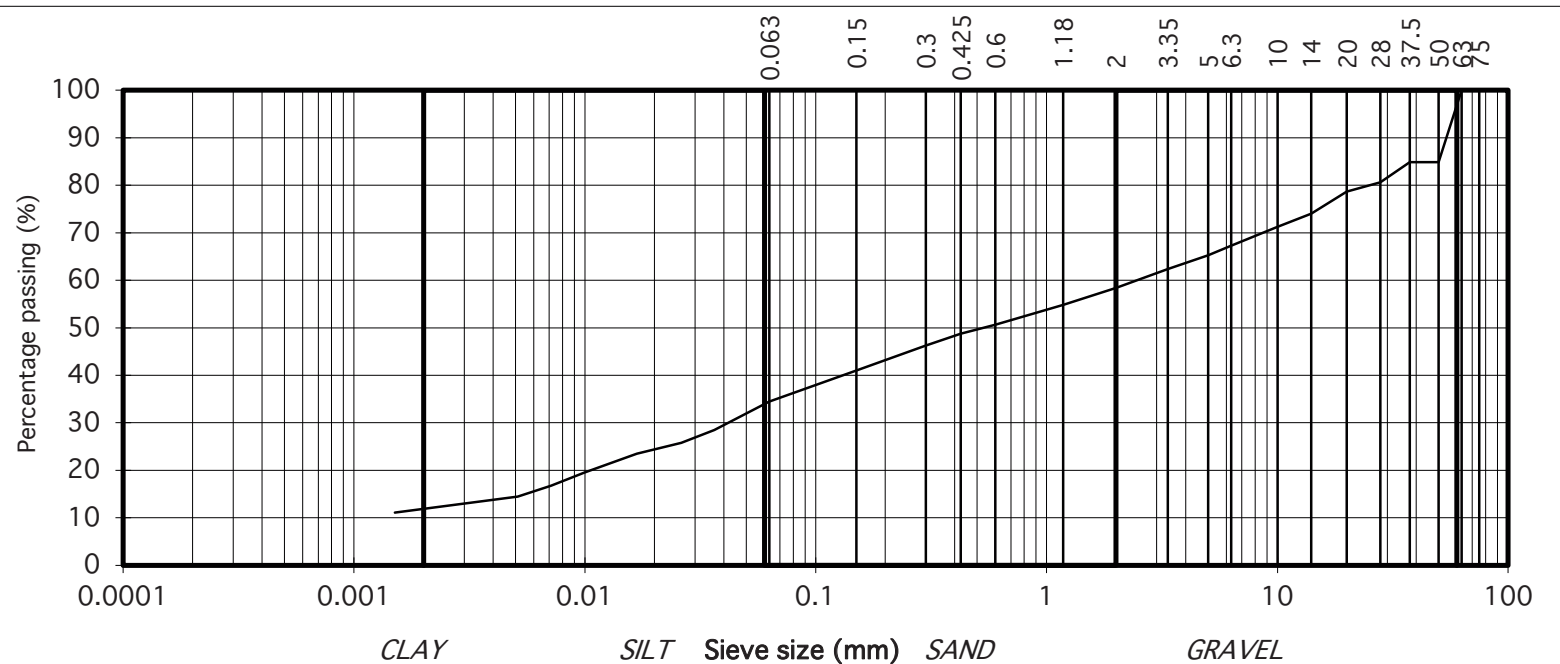


Contract No. 23297 Report No. R125592  
Contract Name: 7 Hills Windfarm Pipeline Athlone  
BH/TP\* : BH03A  
Sample No.\* AA165954 Lab. Sample No. A21/3823  
Sample Type: B  
Depth\* (m) 0.50 Customer: Aecom  
Date Received 10/08/2021 Date Testing started 12/08/2021  
Description: Brown slightly sandy, gravelly, CLAY

Results relate only to the specimen tested in as received condition unless otherwise noted. \* denotes Customer supplied information. Opinions and interpretations are outside the scope of accreditation.  
This report shall not be reproduced except in full without the written approval of the Laboratory.

Remarks

Note: \*\*Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2 Sample size did not meet the requirements of BS1377



IGSL Ltd Materials Laboratory

Approved by:

*H Byrne*

Date:

23/08/21

Page no:

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Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

# TEST REPORT

## Determination of Particle Size Distribution

Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5\*\*  
(note: Sedimentation stage not accredited)

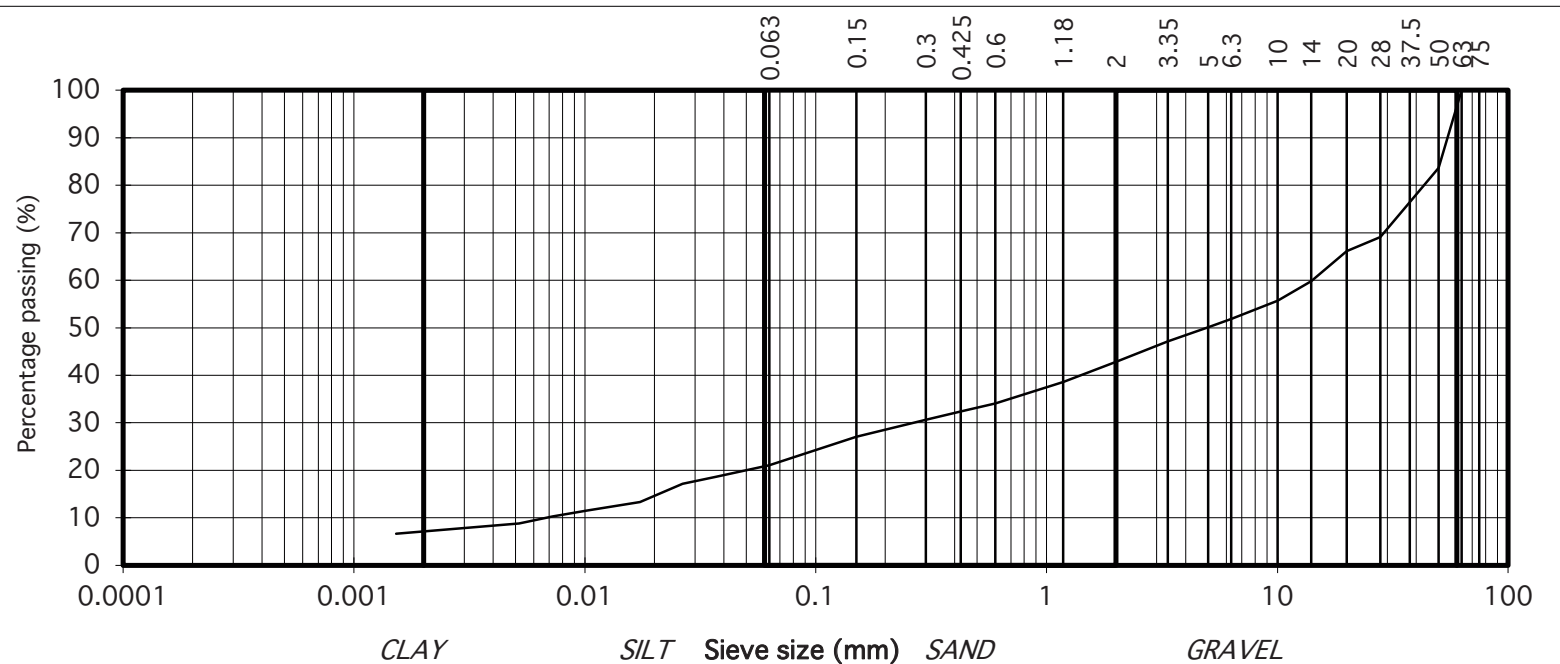


Contract No. 23297 Report No. R125593  
Contract Name: 7 Hills Windfarm Pipeline Athlone  
BH/TP\* : BH03A  
Sample No.\* AA165957 Lab. Sample No. A21/3826  
Sample Type: B  
Depth\* (m) 3.00 Customer: Aecom  
Date Received 10/08/2021 Date Testing started 10/08/2021  
Description: Brown slightly sandy, gravelly, SILT

Results relate only to the specimen tested in as received condition unless otherwise noted. \* denotes Customer supplied information. Opinions and interpretations are outside the scope of accreditation.  
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Remarks

Note: \*\*Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2 Sample size did not meet the requirements of BS1377



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# TEST REPORT

## Determination of Particle Size Distribution

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(note: Sedimentation stage not accredited)

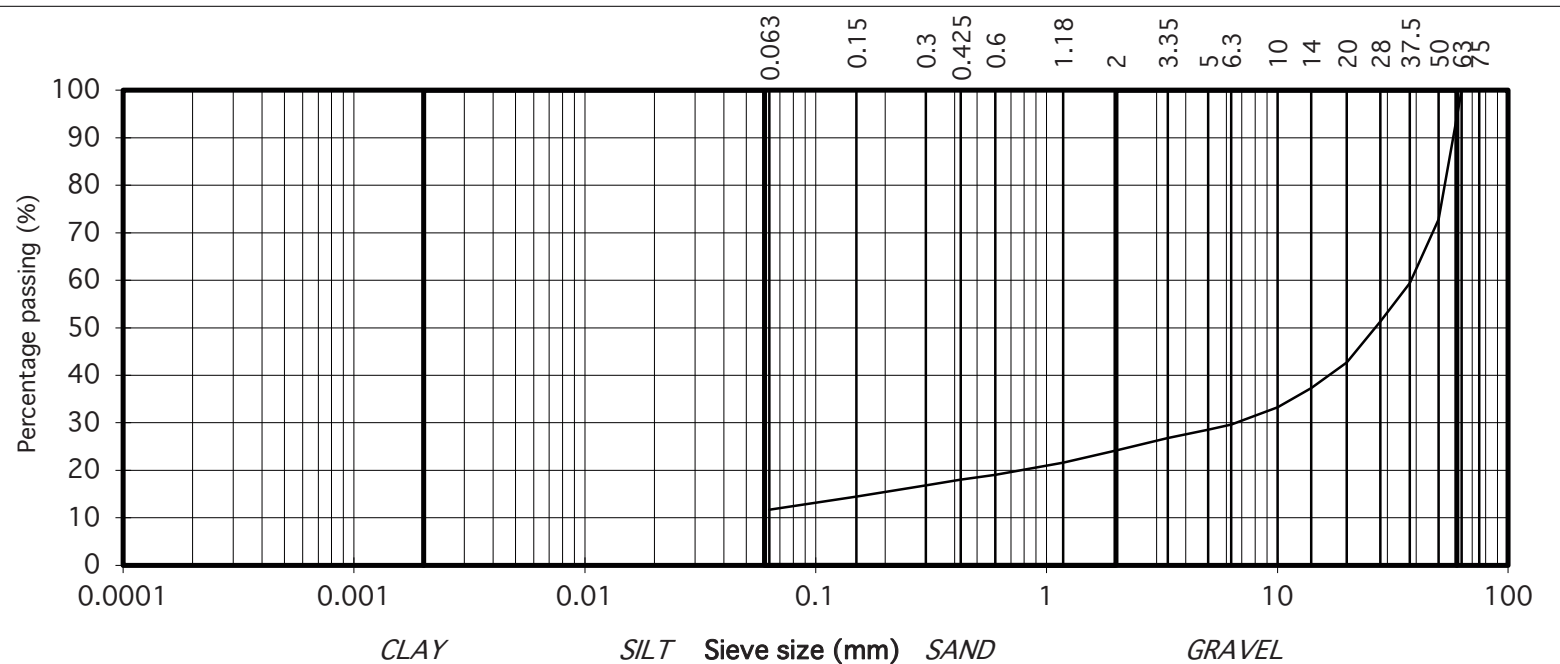


Contract No. 23297 Report No. R125594  
Contract Name: 7 Hills Windfarm Pipeline Athlone  
BH/TP\* : BH03A  
Sample No.\* AA165959 Lab. Sample No. A21/3828  
Sample Type: B  
Depth\* (m) 5.00 Customer: Aecom  
Date Received 10/08/2021 Date Testing started 10/08/2021  
Description: Brown silty, sandy, GRAVEL

Results relate only to the specimen tested in as received condition unless otherwise noted. \* denotes Customer supplied information. Opinions and interpretations are outside the scope of accreditation.  
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Remarks

Note: \*\*Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2 Sample size did not meet the requirements of BS1377



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# TEST REPORT

## Determination of Particle Size Distribution

Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5\*\*  
(note: Sedimentation stage not accredited)

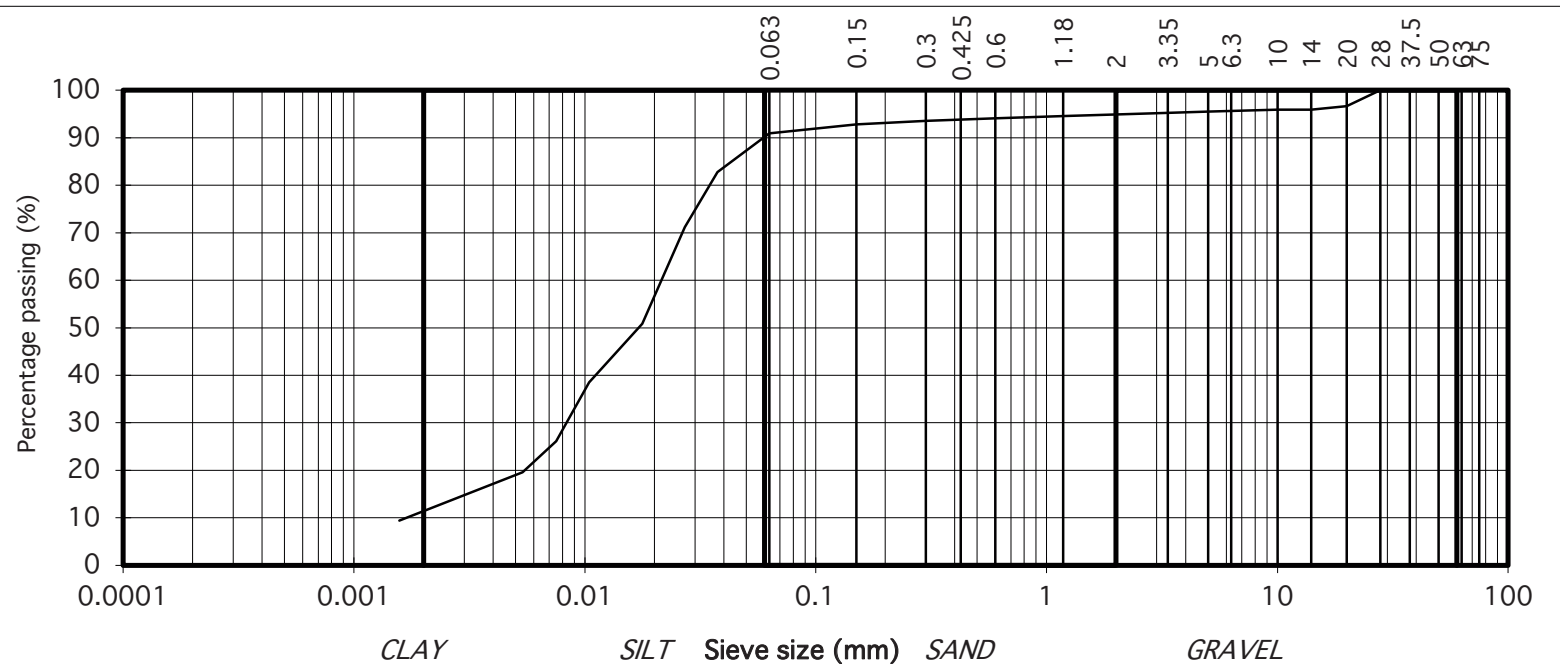


Contract No. 23297 Report No. R125595  
Contract Name: 7 Hills Windfarm Pipeline Athlone  
BH/TP\* : BH03A  
Sample No.\* AA165961 Lab. Sample No. A21/3830  
Sample Type: B  
Depth\* (m) 7.00 Customer: Aecom  
Date Received 10/08/2021 Date Testing started 10/08/2021  
Description: Brown slightly sandy, slightly gravelly, SILT/CLAY

Results relate only to the specimen tested in as received condition unless otherwise noted. \* denotes Customer supplied information. Opinions and interpretations are outside the scope of accreditation.  
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Remarks

Note: \*\*Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 .



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# TEST REPORT

## Determination of Particle Size Distribution

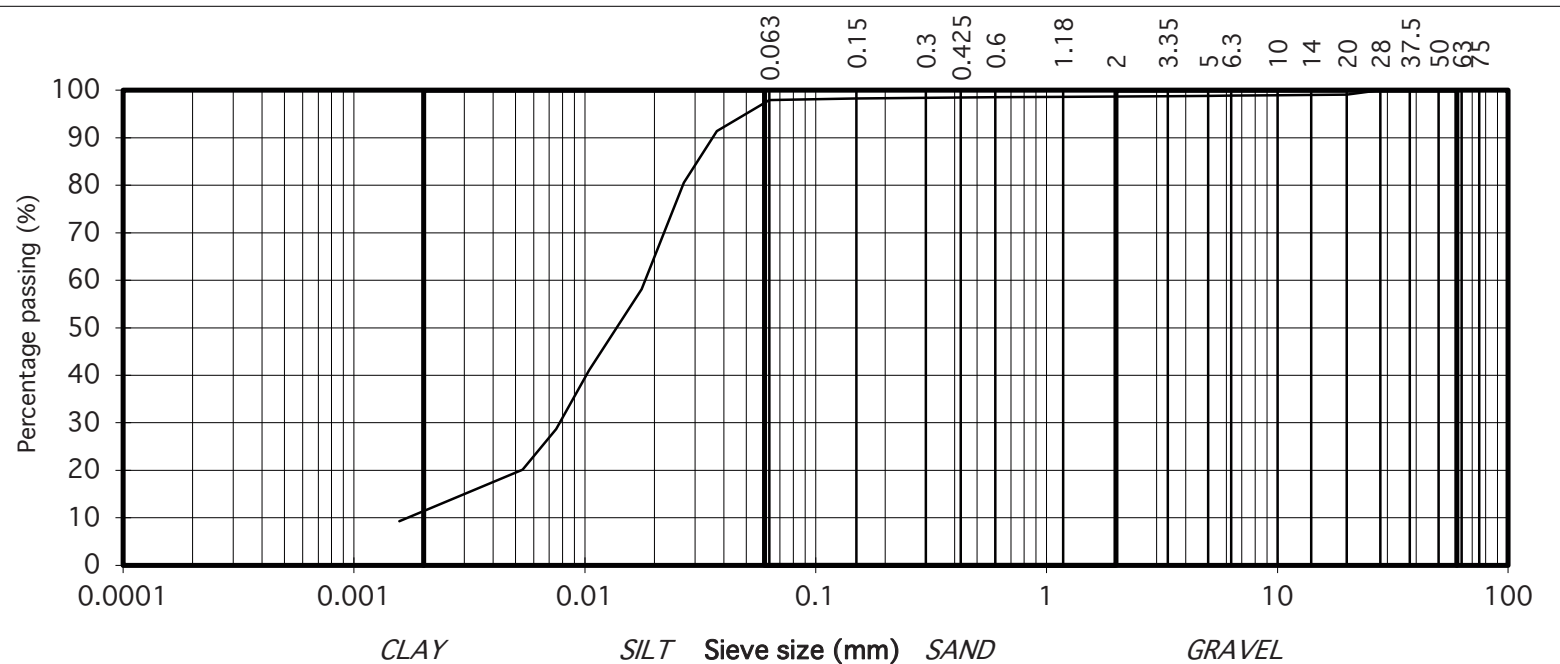
Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5\*\*  
(note: Sedimentation stage not accredited)



Contract No. 23297 Report No. R125596  
Contract Name: 7 Hills Windfarm Pipeline Athlone  
BH/TP\* : BH03A  
Sample No.\* AA165963 Lab. Sample No. A21/3832  
Sample Type: B  
Depth\* (m) 9.00 Customer: Aecom  
Date Received 10/08/2021 Date Testing started 10/08/2021  
Description: Brown slightly sandy, slightly gravelly, SILT

Results relate only to the specimen tested in as received condition unless otherwise noted. \* denotes Customer supplied information. Opinions and interpretations are outside the scope of accreditation.  
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Remarks Note: \*\*Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 .



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# TEST REPORT

## Determination of Particle Size Distribution

Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5\*\*  
(note: Sedimentation stage not accredited)

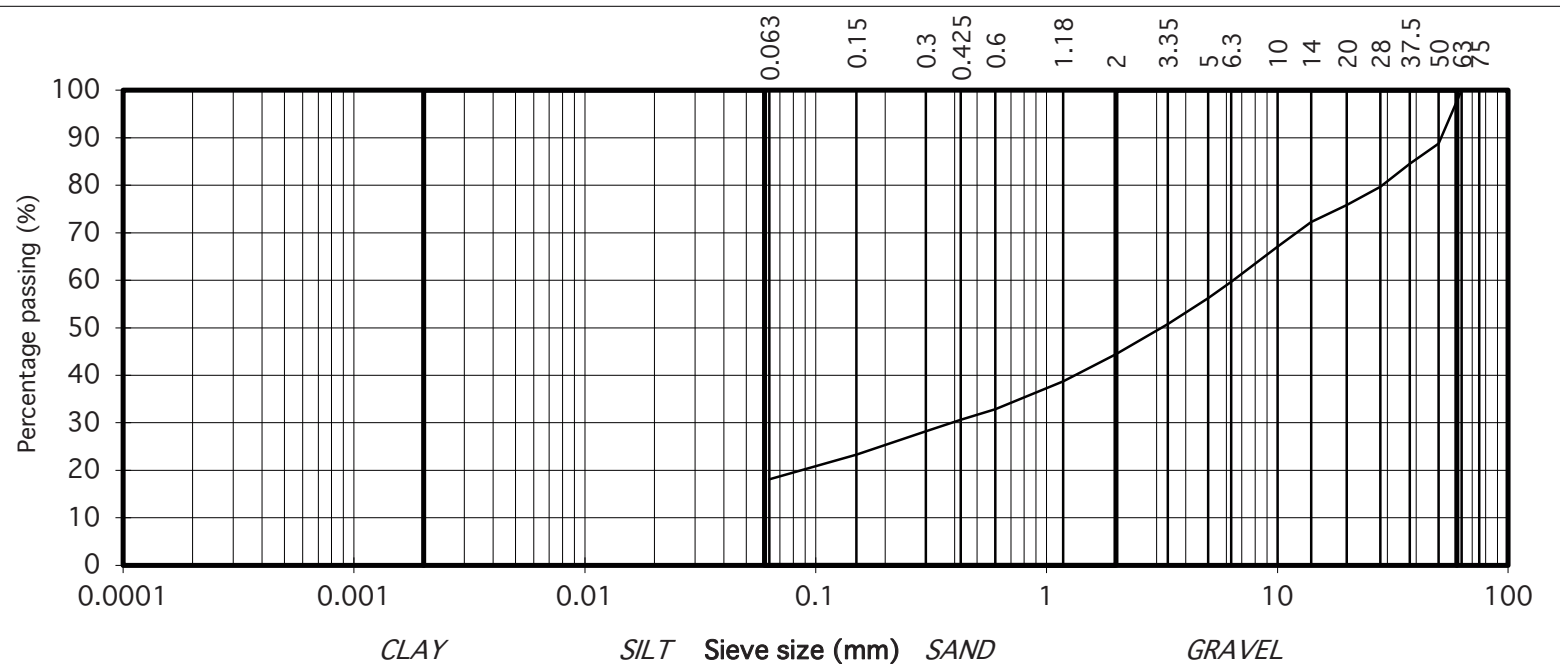


Contract No. 23297 Report No. R125597  
Contract Name: 7 Hills Windfarm Pipeline Athlone  
BH/TP\* : ST1  
Sample No.\* N/A Lab. Sample No. A21/3833  
Sample Type: B  
Depth\* (m) 0.80 Customer: Aecom  
Date Received 10/08/2021 Date Testing started 12/08/2021  
Description: Brown clayey/silty, very sandy, GRAVEL

Results relate only to the specimen tested in as received condition unless otherwise noted. \* denotes Customer supplied information. Opinions and interpretations are outside the scope of accreditation.  
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Remarks

Note: \*\*Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2 Sample size did not meet the requirements of BS1377



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Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5\*\*  
(note: Sedimentation stage not accredited)



particle size	% passing		Contract No.	23297	Report No.	R125598	<div>Results relate only to the specimen tested in as received condition unless otherwise noted. * denotes Customer supplied information. Opinions and interpretations are outside the scope of accreditation.  This report shall not be reproduced except in full without the written approval of the Laboratory.</div>
			Contract Name:	7 Hills Windfarm Pipeline Athlone			
			BH/TP* :	ST2			
			Sample No.*	N/A	Lab. Sample No.	A21/3834	
			Sample Type:	B			
75	100	COBBLES	Depth* (m)	1.00	Customer:	Aecom	
63	100		Date Received	10/08/2021	Date Testing started	10/08/2021	
50	100		Description:	Brown sandy, slightly gravelly, SILT/CLAY			
37.5	85		Remarks	Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2 Sample size did not meet the requirements of BS1377			
28	80						
20	79						
14	78						
10	77						
6.3	76	GRAVEL					
5	75						
3.35	74						
2	73						
1.18	72						
0.6	71						
0.425	70						
0.3	68						
0.15	57	SAND					
0.063	26						
0.038	21						
0.027	20						
0.017	18						
0.010	15						
0.007	13						
0.005	10						
0.002	7	SILT/CLAY					

Sieve size (mm)	Percentage passing (%)
0.075	0
0.15	57
0.3	68
0.6	71
1.18	72
2	73
3.35	74
5	75
6.3	76
10	77
14	78
20	79
28	80
37.5	85
50	100
75	100

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	23/08/21	1 of 1

Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

# TEST REPORT

## Determination of Particle Size Distribution

Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5\*\*  
(note: Sedimentation stage not accredited)



particle size	% passing		Contract No.	23297	Report No.	R125599	<div>Results relate only to the specimen tested in as received condition unless otherwise noted. * denotes Customer supplied information. Opinions and interpretations are outside the scope of accreditation.</div> <div>This report shall not be reproduced except in full without the written approval of the Laboratory.</div>
			Contract Name:	7 Hills Windfarm Pipeline Athlone			
			BH/TP* :	ST4			
			Sample No.*	N/A	Lab. Sample No.	A21/3836	
			Sample Type:	B			
			Depth* (m)	0.80	Customer:	Aecom	
			Date Received	10/08/2021	Date Testing started	10/08/2021	
			Description:	Brown slightly clayey/silty, very gravelly, SAND			
			Remarks	Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2 Sample size did not meet the requirements of BS1377			
75	100	COBBLES					
63	100						
50	100						
37.5	100						
28	94						
20	92						
14	86		GRAVEL				
10	82						
6.3	76						
5	73						
3.35	68						
2	59						
1.18	50	SAND					
0.6	36						
0.425	30						
0.3	23						
0.15	10						
0.063	3	SILT/CLAY					

Sieve size (mm)	Percentage passing (%)
0.063	3
0.15	10
0.3	23
0.425	30
0.6	36
1.18	50
2	59
3.35	68
5	73
6.3	76
10	82
14	86
20	92
28	94
37.5	100
50	100
75	100

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23/08/21

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# TEST REPORT

## Determination of Particle Size Distribution

Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5\*\*  
(note: Sedimentation stage not accredited)



particle size	% passing		Contract No.	23297	Report No.	R125600	<div>Results relate only to the specimen tested in as received condition unless otherwise noted. * denotes Customer supplied information. Opinions and interpretations are outside the scope of accreditation.</div> <div>This report shall not be reproduced except in full without the written approval of the Laboratory.</div>
			Contract Name:	7 Hills Windfarm Pipeline Athlone			
			BH/TP* :	ST6			
			Sample No.*	N/A	Lab. Sample No.	A21/3838	
			Sample Type:	B			
			Depth* (m)	0.80	Customer:	Aecom	
			Date Received	10/08/2021	Date Testing started	10/08/2021	
			Description:	Brown clayey/silty, very sandy, GRAVEL			
75	100	COBBLES	Remarks	Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 .			
63	100						
50	100	GRAVEL					
37.5	97						
28	92						
20	89						
14	82						
10	75						
6.3	67						
5	63						
3.35	57						
2	48						
1.18	38	SAND					
0.6	20						
0.425	14						
0.3	10						
0.15	7	SILT/CLAY					
0.063	5						

Sieve size (mm)	Percentage passing (%)
75	100
63	100
50	100
37.5	97
28	92
20	89
14	82
10	75
6.3	67
5	63
3.35	57
2	48
1.18	38
0.6	20
0.425	14
0.3	10
0.15	7
0.063	5

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## Determination of Particle Size Distribution

Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5\*\*  
(note: Sedimentation stage not accredited)



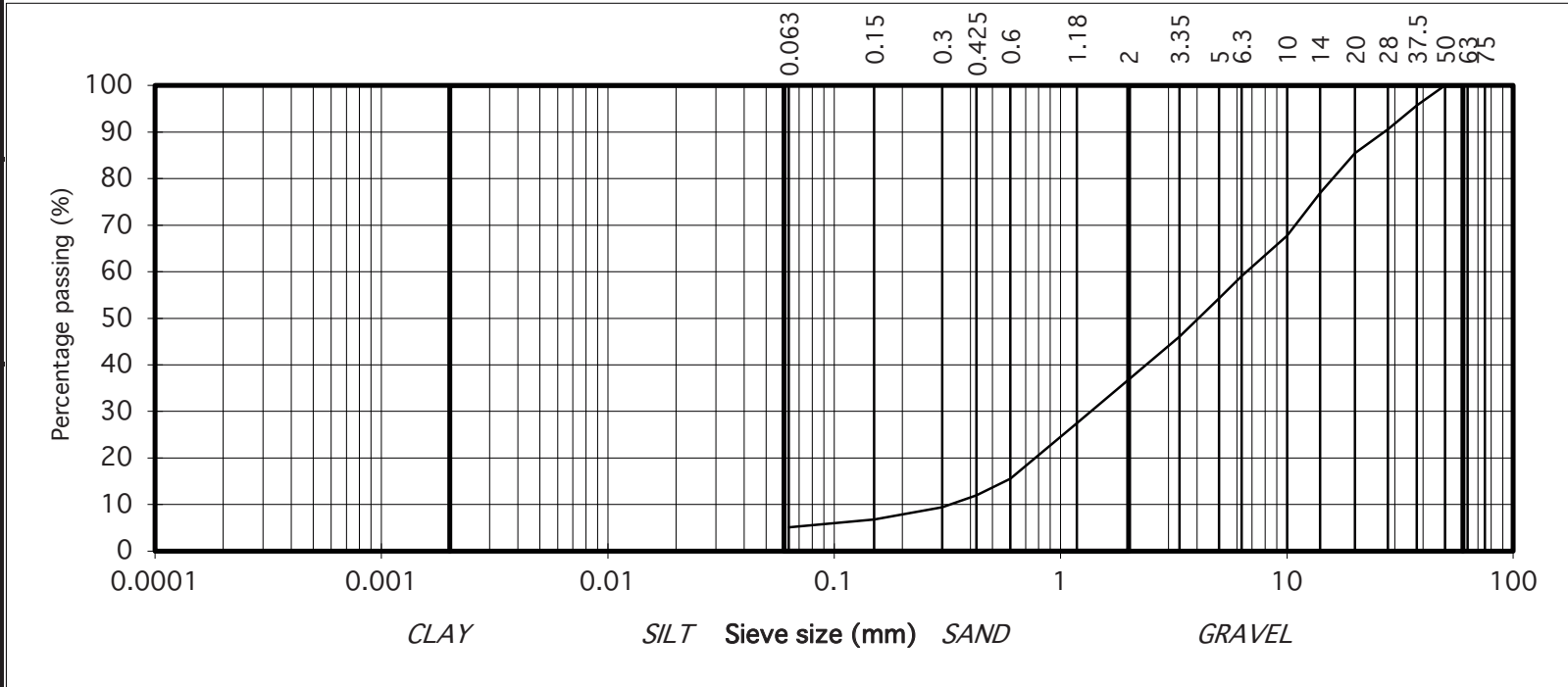
particle size	% passing		Contract No.	23297	Report No.	R125601	<div>Results relate only to the specimen tested in as received condition unless otherwise noted. * denotes Customer supplied information. Opinions and interpretations are outside the scope of accreditation.</div> <div>This report shall not be reproduced except in full without the written approval of the Laboratory.</div>
			Contract Name:	7 Hills Windfarm Pipeline Athlone			
			BH/TP* :	ST8			
			Sample No.*	N/A	Lab. Sample No.	A21/3839	
			Sample Type:	B			
			Depth* (m)	1.00	Customer:	Aecom	
			Date Received	10/08/2021	Date Testing started	10/08/2021	
			Description:	Brown clayey/silty, very sandy, GRAVEL			
			Remarks	Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 .			
75	100	COBBLES					
63	100						
50	100						
37.5	96						
28	91						
20	85						
14	77						
10	68						
6.3	59	GRAVEL					
5	54						
3.35	46						
2	37						
1.18	27						
0.6	16						
0.425	12						
0.3	9						
0.15	7	SAND					
0.063	5						
		SILT/CLAY					

Percentage passing (%)

Sieve size (mm)

CLAY SILT SAND GRAVEL

Sieve size (mm)	Percentage passing (%)
0.063	5
0.15	7
0.3	9
0.425	12
0.6	16
1.18	27
2	37
3.35	46
5	54
6.3	59
10	68
14	77
20	85
28	91
37.5	96
50	100
75	100



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# TEST REPORT

## Determination of Particle Size Distribution

Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5\*\*  
(note: Sedimentation stage not accredited)



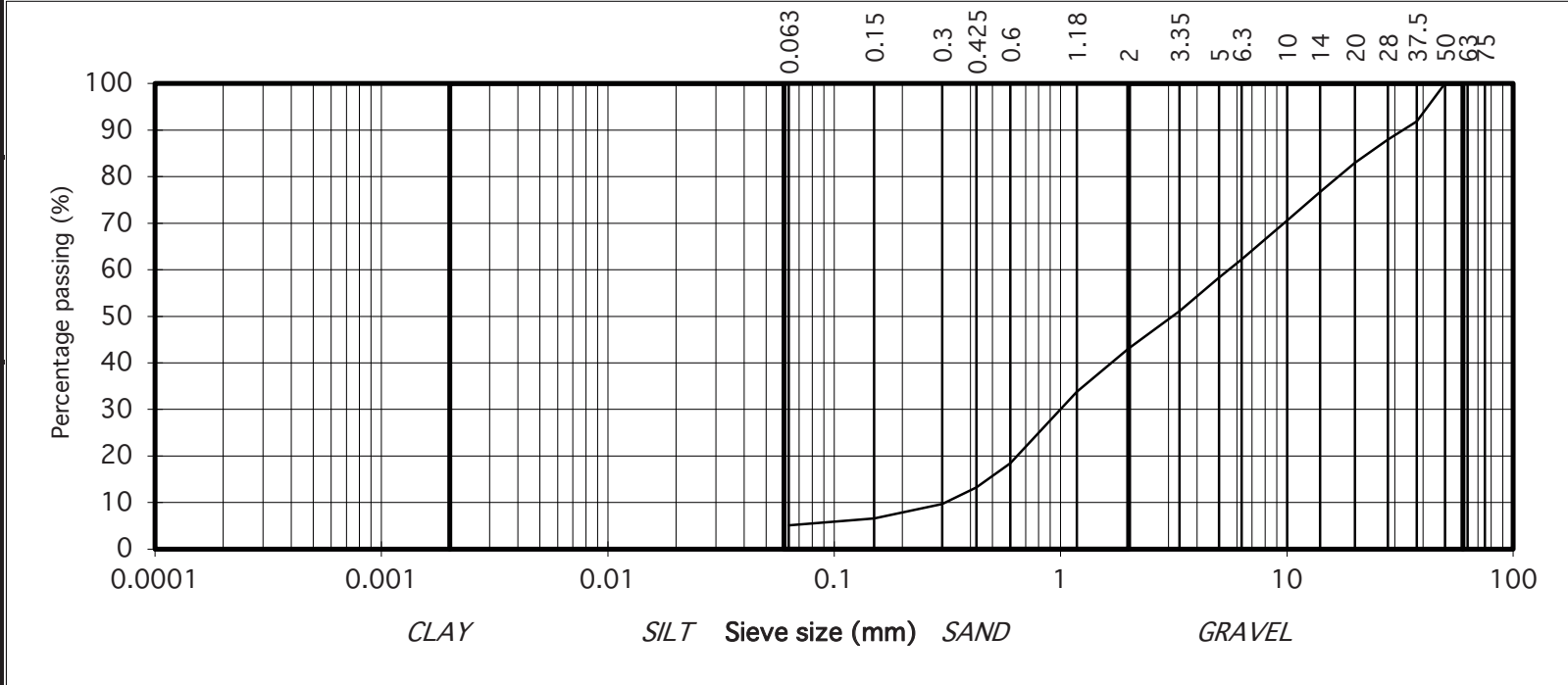
particle size	% passing		Contract No.	23297	Report No.	R125602	<div>Results relate only to the specimen tested in as received condition unless otherwise noted. * denotes Customer supplied information. Opinions and interpretations are outside the scope of accreditation.</div> <div>This report shall not be reproduced except in full without the written approval of the Laboratory.</div>
			Contract Name:	7 Hills Windfarm Pipeline Athlone			
			BH/TP* :	ST9			
			Sample No.*	N/A	Lab. Sample No.	A21/3840	
			Sample Type:	B			
			Depth* (m)	1.00	Customer:	Aecom	
			Date Received	10/08/2021	Date Testing started	12/08/2021	
			Description:	Brown clayey/silty, very sandy, GRAVEL			
			Remarks	Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 .			
75	100	COBBLES					
63	100						
50	100						
37.5	92						
28	88						
20	83						
14	77						
10	71						
6.3	62						
5	58						
3.35	51	GRAVEL					
2	43						
1.18	34						
0.6	18						
0.425	13						
0.3	10						
0.15	7						
0.063	5						
		SAND					
		SILT/CLAY					

Percentage passing (%)

Sieve size (mm)

CLAY SILT SAND GRAVEL

Sieve size (mm)	Percentage passing (%)
0.063	5
0.15	7
0.3	10
0.425	13
0.6	18
1.18	34
2	43
3.35	51
5	58
6.3	62
10	71
14	77
20	83
28	88
37.5	92
50	100
75	100



IGSL Ltd Materials Laboratory	Approved by:	Date:	Page no:
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Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)



## **Appendix 6**

### **Chemical Testing – Soil**

Chemtest Report No.

21-25521

21-25680



# Final Report

---

<b>Report No.:</b>	21-25521-1		
<b>Initial Date of Issue:</b>	30-Jul-2021		
<b>Client</b>	IGSL		
<b>Client Address:</b>	M7 Business Park Naas County Kildare Ireland		
<b>Contact(s):</b>	Darren Keogh		
<b>Project</b>	22751 7 Hills Windfarm Pipeline Athlone ( Aecom )		
<b>Quotation No.:</b>	Q20-21693	<b>Date Received:</b>	26-Jul-2021
<b>Order No.:</b>		<b>Date Instructed:</b>	26-Jul-2021
<b>No. of Samples:</b>	16		
<b>Turnaround (Wkdays):</b>	7	<b>Results Due:</b>	03-Aug-2021
<b>Date Approved:</b>	30-Jul-2021		
<b>Approved By:</b>			
<b>Details:</b>	Glynn Harvey, Technical Manager		

---

## Results - Soil

**Project: 22751 7 Hills Windfarm Pipeline Athlone ( Aecom )**

<b>Client: IGSL</b>	<b>Chemtest Job No.:</b>					21-25521	21-25521	21-25521	21-25521	21-25521	21-25521	21-25521	21-25521	21-25521
Quotation No.: Q20-21693	<b>Chemtest Sample ID.:</b>					1247198	1247199	1247200	1247201	1247202	1247203	1247204	1247205	1247206
Order No.:	<b>Client Sample Ref.:</b>					AA165967	AA165968	AA165969	AA165965	AA165966	AA1651710	AA165955	AA165956	AA165957
	<b>Sample Location:</b>					BH01	BH01	BH01	BH03	BH03	BH03	BH03A	BH03A	BH03A
	<b>Sample Type:</b>					SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	<b>Top Depth (m):</b>					0.50	1.00	3.00	1.00	2.00	4.00	1.00	2.00	3.00
<b>Determinand</b>	<b>Accred.</b>	<b>SOP</b>	<b>Units</b>	<b>LOD</b>										
Moisture	N	2030	%	0.020	57	35	8.2	14	15	6.3	11	15	7.8	6.1
pH	U	2010		4.0		[A] 8.0			[A] 8.1	[A] 8.7			[A] 8.8	
pH (2.5:1)	N	2010		4.0			[A] 8.9				[A] 8.5	[A] 8.2		[A] 8.9
Magnesium (Water Soluble)	N	2120	g/l	0.010			[A] < 0.010				[A] < 0.010	[A] < 0.010		[A] < 0.010
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010			[A] < 0.010				[A] < 0.010	[A] 0.015		[A] < 0.010
Total Sulphur	U	2175	%	0.010			[A] 0.021				[A] 0.026	[A] 0.039		[A] 0.031
Chloride (Water Soluble)	U	2220	g/l	0.010			[A] < 0.010				[A] < 0.010	[A] < 0.010		[A] < 0.010
Nitrate (Water Soluble)	N	2220	g/l	0.010			< 0.010				0.020	< 0.010		< 0.010
Ammonium (Water Soluble)	U	2220	g/l	0.01			< 0.01				< 0.01	< 0.01		< 0.01
Sulphate (Acid Soluble)	U	2430	%	0.010			[A] < 0.010				[A] 0.024	[A] 0.025		[A] < 0.010
Organic Matter	U	2625	%	0.40	[A] 30			[A] 1.6						



## Results - Soil

**Project: 22751 7 Hills Windfarm Pipeline Athlone ( Aecom )**

<b>Client: IGSL</b>	<b>Chemtest Job No.:</b>					21-25521	21-25521	21-25521	21-25521	21-25521	21-25521
Quotation No.: Q20-21693	<b>Chemtest Sample ID.:</b>					1247208	1247209	1247210	1247211	1247212	1247213
Order No.:	Client Sample Ref.:					AA165960	AA165963				
	Sample Location:					BH03A	BH03A	ST1	ST3	ST6	ST9
	Sample Type:					SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):					6.00	9.00	0.80	0.80	0.80	1.00
<b>Determinand</b>	<b>Accred.</b>	<b>SOP</b>	<b>Units</b>	<b>LOD</b>							
Moisture	N	2030	%	0.020	5.6	9.5	5.9	4.5	6.0	4.4	
pH	U	2010		4.0	[A] 8.7	[A] 8.6					
pH (2.5:1)	N	2010		4.0			[A] 8.9	[A] 9.0	[A] 9.0	[A] 9.4	
Magnesium (Water Soluble)	N	2120	g/l	0.010			[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010			[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	
Total Sulphur	U	2175	%	0.010			[A] 0.020	[A] < 0.010	[A] 0.017	[A] 0.022	
Chloride (Water Soluble)	U	2220	g/l	0.010			[A] 0.085	[A] 0.026	[A] 0.027	[A] < 0.010	
Nitrate (Water Soluble)	N	2220	g/l	0.010			0.038	< 0.010	< 0.010	< 0.010	
Ammonium (Water Soluble)	U	2220	g/l	0.01			< 0.01	< 0.01	< 0.01	< 0.01	
Sulphate (Acid Soluble)	U	2430	%	0.010			[A] 0.014	[A] 0.020	[A] 0.015	[A] 0.012	
Organic Matter	U	2625	%	0.40							

## Deviations

In accordance with UKAS Policy on Deviating Samples TPS 63. Chemtest have a procedure to ensure 'upon receipt of each sample a competent laboratory shall assess whether the sample is suitable with regard to the requested test(s)'. This policy and the respective holding times applied, can be supplied upon request. The reason a sample is declared as deviating is detailed below. Where applicable the analysis remains UKAS/MCERTs accredited but the results may be compromised.

Sample:	Sample Ref:	Sample ID:	Sample Location:	Sampled Date:	Deviation Code(s):	Containers Received:
1247198	AA165967		BH01		A	Plastic Tub 500g
1247199	AA165968		BH01		A	Amber Glass 250ml
1247200	AA165969		BH01		A	Amber Glass 250ml
1247201	AA165965		BH03		A	Plastic Tub 500g
1247202	AA165966		BH03		A	Amber Glass 250ml
1247202	AA165966		BH03		A	Plastic Tub 500g
1247203	AA1651710		BH03		A	Amber Glass 250ml
1247203	AA1651710		BH03		A	Plastic Tub 500g
1247204	AA165955		BH03A		A	Amber Glass 250ml
1247204	AA165955		BH03A		A	Plastic Tub 500g
1247205	AA165956		BH03A		A	Amber Glass 250ml
1247205	AA165956		BH03A		A	Plastic Tub 500g
1247206	AA165957		BH03A		A	Amber Glass 250ml
1247207	AA165958		BH03A		A	Amber Glass 250ml
1247207	AA165958		BH03A		A	Plastic Tub 500g
1247208	AA165960		BH03A		A	Amber Glass 250ml
1247209	AA165963		BH03A		A	Amber Glass 250ml
1247209	AA165963		BH03A		A	Plastic Tub 500g
1247210			ST1		A	Amber Glass 250ml
1247210			ST1		A	Plastic Tub 500g
1247211			ST3		A	Amber Glass 250ml
1247211			ST3		A	Plastic Tub 500g

## Deviations

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Sample:	Sample Ref:	Sample ID:	Sample Location:	Sampled Date:	Deviation Code(s):	Containers Received:
1247212			ST6		A	Amber Glass 250ml
1247212			ST6		A	Plastic Tub 500g
1247213			ST9		A	Amber Glass 250ml
1247213			ST9		A	Plastic Tub 500g



## Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2220	Water soluble Chloride in Soils	Chloride	Aqueous extraction and measurement by 'Aquakem 600' Discrete Analyser using ferric nitrate / mercuric thiocyanate.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.

## **Report Information**

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### **Key**

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

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### **Sample Deviation Codes**

- A - Date of sampling not supplied
- B - Sample age exceeds stability time (sampling to extraction)
- C - Sample not received in appropriate containers
- D - Broken Container
- E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

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### **Sample Retention and Disposal**

All soil samples will be retained for a period of 30 days from the date of receipt

All water samples will be retained for 14 days from the date of receipt

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:

[customerservices@chemtest.com](mailto:customerservices@chemtest.com)



# Final Report

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<b>Report No.:</b>	21-25680-1		
<b>Initial Date of Issue:</b>	29-Jul-2021		
<b>Client</b>	IGSL		
<b>Client Address:</b>	M7 Business Park Naas County Kildare Ireland		
<b>Contact(s):</b>	Darren Keogh		
<b>Project</b>	22751 7 Hills Windfarm Pipeline Athlone (Aecom)		
<b>Quotation No.:</b>	Q20-21693	<b>Date Received:</b>	26-Jul-2021
<b>Order No.:</b>		<b>Date Instructed:</b>	26-Jul-2021
<b>No. of Samples:</b>	5		
<b>Turnaround (Wkdays):</b>	7	<b>Results Due:</b>	03-Aug-2021
<b>Date Approved:</b>	29-Jul-2021		
<b>Approved By:</b>			
<b>Details:</b>	Glynn Harvey, Technical Manager		

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## Results - Soil

**Project: 22751 7 Hills Windfarm Pipeline Athlone (Aecom)**

<b>Client: IGSL</b>	<b>Chemtest Job No.:</b>					21-25680	21-25680	21-25680	21-25680	21-25680
Quotation No.: Q20-21693	<b>Chemtest Sample ID.:</b>					1248003	1248004	1248005	1248006	1248007
Order No.:	Client Sample Ref.:					AA165968	AA165969	AA165957	AA165959	AA165960
	Sample Location:					BH01	BH01	BH03A	BH03A	BH03A
	Sample Type:					SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):					1.00	3.00	3.00	5.00	6.00
<b>Determinand</b>	<b>Accred.</b>	<b>SOP</b>	<b>Units</b>	<b>LOD</b>						
Moisture	N	2030	%	0.020	27	9.3	8.1	6.3	5.9	
Soil Colour	N	2040		N/A	Brown	Brown	Brown	Brown	Brown	
Other Material	N	2040		N/A	Stones and Roots	Stones	Stones	Stones	Stones	
Soil Texture	N	2040		N/A	Sand	Sand	Sand	Sand	Sand	
pH	M	2010		4.0	[A] 8.5		[A] 8.6		[A] 8.8	
pH (2.5:1)	N	2010		4.0		[A] 8.7		[A] 8.8		
Magnesium (Water Soluble)	N	2120	g/l	0.010		[A] < 0.010		[A] < 0.010		
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010		[A] < 0.010		[A] < 0.010		
Total Sulphur	M	2175	%	0.010		[A] 0.033		[A] 0.036		
Chloride (Water Soluble)	M	2220	g/l	0.010		[A] < 0.010		[A] 0.012		
Nitrate (Water Soluble)	N	2220	g/l	0.010		< 0.010		< 0.010		
Ammonium (Water Soluble)	M	2220	g/l	0.01		< 0.01		< 0.01		
Sulphate (Acid Soluble)	M	2430	%	0.010		[A] < 0.010		[A] < 0.010		

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1248004	AA165969		BH01		A	Plastic Tub 500g
1248005	AA165957		BH03A		A	Plastic Tub 500g
1248006	AA165959		BH03A		A	Plastic Tub 500g
1248007	AA165960		BH03A		A	Plastic Tub 500g

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## **Appendix 7**

### **Exploratory Hole Location Plan**

#### **KEY PLAN**

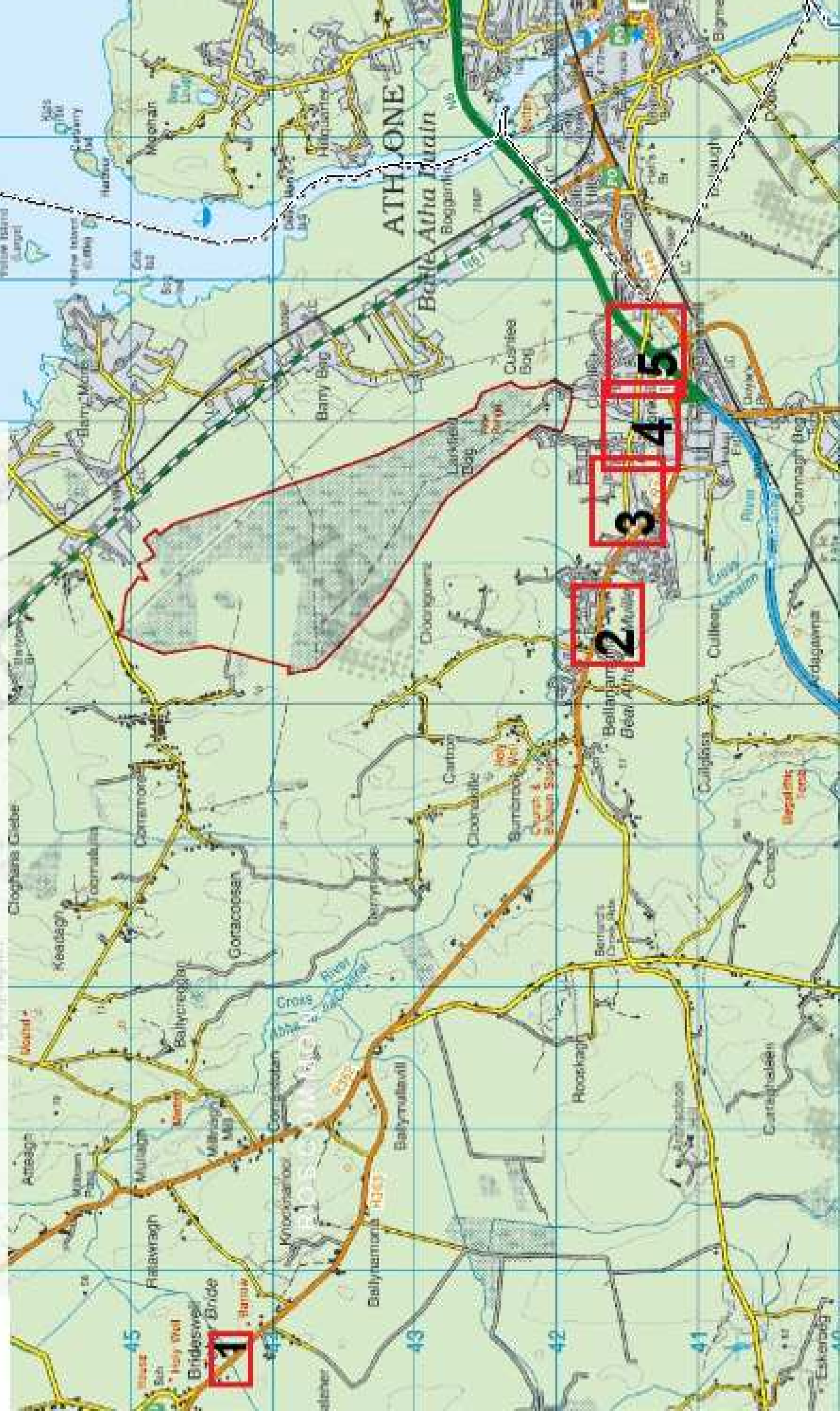
Dwg 1

Dwg 2

Dwg 3

Dwg 4

Dwg 5






# 23297 - Seven Hills Midlands 110kV Cable

Exploratory Hole Location Plan - 1

## Legend

 Cable Percussion Borehole

BH01








# 23297 - Seven Hills Midlands 110kV Cable

Exploratory Hole Location Plan - 2

## Legend

-  Cable Percussion Borehole
-  Rotary Drillhole
-  Slit Trench (x , y)





# 23297 - Seven Hills Midlands 110kV Cable

Exploratory Hole Location Plan - 3

Legend

 Slit Trench (x , y)





# 23297 - Seven Hills Midlands 110kV Cable

Exploratory Hole Location Plan - 4

Legend

 Slit Trench (x , y)






# 23297 - Seven Hills Midlands 110kV Cable

Exploratory Hole Location Plan - 5

Legend

 Slit Trench (x , y)

 Rotary Drillhole

