



# **APPENDIX 4-3**

IGSL FACTUAL REPORT – WIND FARM

# **IGSL Ltd**

**Seven Hills Windfarm** 

**Site Investigation Report** FACTUAL

Project No. 23000

May 2022



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# DOCUMENT ISSUE REGISTER

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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 Windfarm**) 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 Malachy Walsh & Partners and Energia 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	pН	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.

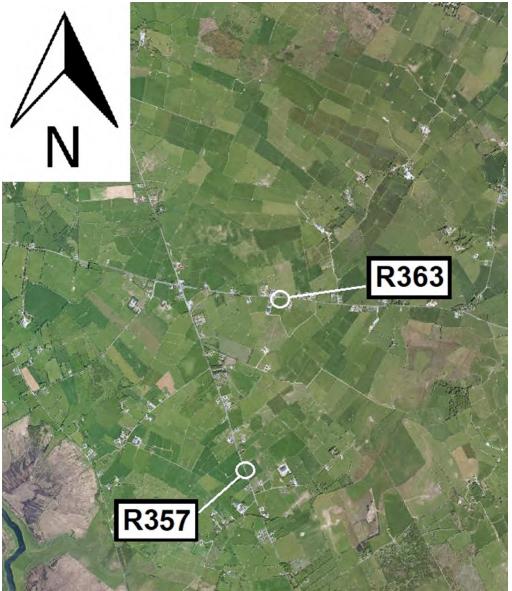
### **Retention of Samples**

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 Windfarm near Dysart, Ballinasloe, County Galway. The works were sited in greenfield lands both to the north and south of the R363 Regional Road and to the east of the R357 Regional Road, both of which meet in Dysart village (Figure 1). It is envisaged that the scheme will consist of some twenty wind turbines together with a substation and meteorological mast. An extensive road network will also be established to link the mast locations.

Figure 1 - Site Location Plan



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The investigation comprised rotary drilling, machine-dug trial pits and dynamic probing. 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. APEX Geophysics conducted a non-intrusive investigation comprising

2D Electrical Resistivity Tomography, 2D P-wave Seismic Refraction profiles as well as a MASW [Multi-channel Analysis of Surface Waves] survey of each turbine / tower location and at the proposed substation location. Additional drillholes and excavations together with non-intrusive geophysical methods were scheduled by Malachy Walsh following a review of the initial survey at both Tower 1 and Tower 11.

Geotechnical and chemical laboratory testing was scheduled on a range of soil samples with chemical testing also undertaken on water samples recovered from three standpipes across the project. Rock testing was also undertaken on a number of selected rock core samples (PLSI & UCS). This report presents the factual geotechnical data acquired from the two phases of investigation.

#### 2. FIELDWORK

#### 2.1 General

The IGSL Limited fieldworks were undertaken in December and September 2020. The works which form this report comprise the following:

- o Rotary Core Drillholes (43 No.)
- o Trial Pits (45 No.)
- Dynamic Probing (67 No.)
- Geophysical Survey
- Groundwater Monitoring
- Surveying of Exploratory Hole Locations

### 2.2 Rotary Core Drillholes

Rotary core [RC] drilling was carried out at forty-three locations on site. This comprised forty-one holes constructed at tower locations and a further two at a proposed Meteorological Mast site. The tower drillholes are denoted by their respective tower number being prefixed 'T\_'. The two mast drillholes are denoted 'Mast'. Of the forty-three drillholes, the bulk were drilled from late November 2020 through to January 2021. Following a review of the drilling records by Malachy Walsh & Partners, a further two drillholes were undertaken in a separate visit made in late February – early March 2021. These holes, T11-RC03 & T11-RC04, as well as all other drillholes were carried out using a tracked Comacchio GEO 405 drill rig. With the exception of T07, at each tower site, one drillhole was undertaken at the tower site with the second at a proposed hardstanding area. Only one hole was constructed at T07.

Symmetrex openhole drilling was utilised within the overlying superficial deposits as well as being deployed in the majority of holes to confirm bedrock in the absence of coring. In the case of six coreholes (T04 – RC01, T05 – RC01, T11 – RC03, T11 – RC04, T15 – RC02 & T18 – RC02) coring techniques were used in the underlying bedrock once encountered. The rotary drilling produced 78mm diameter cores. Where bedrock was recovered, it was described as a strong to very strong, thickly to thinly bedded, dark grey/blueish grey, fine to medium grained LIMESTONE with, in T04 – RC01, rare very thin to thin shaley bands (up to 200mm thick). Intervals of clay were noted within the rock sequence in cores taken from location T11 – RC03.

Standard Penetration Tests (SPT's) were performed in the overburden strata 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. T02 – RC02 at 1.50m where N=21). 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. T10 – RC01 at 4.50m where N=50/20mm). 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.

The cores were placed in 3m capacity timber boxes and logged by an IGSL engineering geologist. This included photography of the cores with a digital camera. Where rock core was recovered, a graphic fracture log is also presented alongside the mechanical indices. This illustrates the fracture state of the rock cores and allows easy identification of highly fractured / non-intact zones and discontinuity spacings. It should be noted that no correction for dip of the joints has been made and that the spacings shown are successive joint / core intersections within the core.

Groundwater monitoring standpipes were installed in five of the coreholes. The standpipes 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 core log records are presented in Appendix 1 and this includes engineering geological descriptions, details of

the bedding / discontinuities and mechanical indices (TCR, SCR and RQD's) for each core run. Core photographs are also presented in Appendix 1 and these illustrate the structure and fracture state of the bedrock.

#### 2.3 Trial Pits

Trial pitting was undertaken at forty-four locations across the site. At each tower site, one pit was excavated at the tower site with the second at an adjoining, proposed hardstanding area. In addition, pits were excavated at the Mast site (2 no.) as well as at the proposed Substation site (2 no.). In all, a total of four pits were positioned at Tower 4. Only one pit was excavated at Tower 11. The trial pits were excavated, logged and sampled under the direction of an IGSL geotechnical engineer in accordance with BS 5930 (1999+A2:2010). Bulk disturbed samples (typically 20 to 30kg) were taken as the pits progressed.

The bulk samples were placed in heavy-duty polyethylene bags and sealed before being transported to Naas for laboratory testing. The trial pits were backfilled with the as-dug arisings and reinstated to the satisfaction of IGSL's site geotechnical engineer. The trial pit logs and photos are presented in Appendix 2 and include descriptions of the soils encountered, groundwater conditions and stability of the pit sidewalls.

### 2.4 Dynamic Probing

In-situ "Heavy" dynamic probing (DPH) was performed at sixty-seven locations using a compact crawler rig. Probes were positioned on the proposed hardstanding at each tower location as well as every 250m along the proposed site track. The tracked Archway probing unit meets the requirements of BS 1377, Part 9 (1990) and IS EN 1997-2:2007.

The probing rig utilized a 50kg drop weight and 500mm drop height with a 60° cone. In accordance with the standards, the number of blows required to drive the cone each 100mm increment into the sub-soil was recorded. Probing is generally terminated when blow counts, N<sub>100</sub> values, exceed 25, in order to avoid damage to equipment. The probe records are presented in Appendix 3 and include blow-counts in both numerical and graphical format.

### 2.5 Geophysical Survey

Geophysical surveying was performed by APEX Geophysics Limited on behalf of IGSL. A combination of techniques comprising Electrical Resistivity Tomography [ERT] and 2D P-wave Seismic Refraction profiling were used to evaluate the ground conditions in terms of stratigraphy and stiffness at the proposed turbine footprint. The seismic and resistivity data was used to produce ground models / profiles while MASW technique was used to derive elastic properties of the superficial deposits and bedrock units. Details of the methodologies employed, cross-sections, data interpretation and small strain stiffness data are presented in the geophysical report (Appendix 4).

### 2.6 Groundwater Monitoring

Groundwater monitoring was undertaken manually once following the fieldworks period. Levels were measured using an electric dipmeter. The recordings feature in Appendix 5.

#### 2.7 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 11.

#### 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 trial pit soils are presented in Appendix 6.

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 7.

The assessment of the redox potential (pE) of a series of soil samples was also undertaken. The results are presented in a Nicholls Colton report featured in Appendix 8.

Chemical testing was conducted on water samples bailed from wells at proposed Towers 04, 18 and 19. Prior to sampling, installations were developed in accordance with ISO 14868 (2003) and then purged of three times well volume (in accordance with BS 6068). The resultant Chemtest reports feature in Appendix 9.

Geotechnical laboratory testing was carried out on selected rock cores. Point load strength index (PLSI) and uniaxial compressive strength (UCS) tests were conducted with the results presented in Appendix 10.

### **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

Rotary Core Drillhole Records & Photographs



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- 1	1.50	0	0	0					as returns	of sandy g	NG: No rec ravelly cob NG: No rec	overy, obs			1.50	90.96		N = 51
2	3.00	0	0	0	_				as returns	of gravelly	NG: No rec	AY			2.70	89.76		(4, 9, 7, 9, 21, 14)
4	4.50	0	0	0														
5	5.00	0	0	0	-				End (	of Borehole	e at 5.00 m				5.00	87.46		
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4	4.00	0	0	0					End (	of Borehole	e at 4.00 m				4.00	86.85		
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Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Frac Spac Lo (mi	cing og m)	Non-intact Zone	Legend			Descrip	tion			Depth (m)	Elevation	Standpipe Details	SPT (N Value)
1	1.50	0	0	0					as returns	RIX DRILLI of sandy (	CLAY				1.50	75.92		
- 2	3.00	0	0	0					SYMMETI as returns	RIX DRILLI of sandy g	NG: No re ravelly CL	covery, ob AY	eserved by	y drille	r			N = 23 (2, 4, 4, 6, 6, 7)
3	4.50	0	0	0											4.50	72.92		N = 31 (4, 5, 6, 7, 9, 9)
5	6.00	0	0	0				0	SYMMETI as returns	RIX DRILLI of gravelly	NG: No re SAND	covery, ob	served by	y drille	r	71.42		N = 29 (3, 5, 6, 6, 8, 9)
7	7.50	0	0	0						RIX DRILLI of sandy g	NG: No re ravelly CC	covery, ob BBLES	served by	y drille	r			N = 63 (5, 11, 21, 14, 17, 11)
8	9.00	0	0	0														N = 76/170 mm (4, 7, 17, 9, 25, 25)
9 72/5/ <b>RE</b>	10.00 <b>MAR</b>		0	0				) (e	End	of Borehole	e at 10.00 r	n				67.42	TRIKE	N = 39 (9, 6, 11, 8, 9, 11)
Hol			0.00-	10.00	m. Covid	l 19 Safe	Zon	e erec		Water Strike	Casing Depth	Sealed At	Rise To		ime	ommen		
IGSL RC FI 10M 23000.GPJ IGSL.GDT 20/5/22										Suike	Берш	AL	10	(11		No wate	er strike	e recorded
230											Hole	Casin	n Damit	, to	GR	OUND	VATER	RDETAILS
SNI 105	Date		Tip D		ILS RZ Top	RZ Base	9	Тур	oe .	Date	Depth	Casing Depth		er (	Comment	ts		
IGSL																		



REPORT NUMBER

000	3/																	
CONTRA	ACT	S	ever	n Hills Wir	nd Farm								LLHC EET	OLE N	0		- <b>RC</b> et 2 of	
CO-ORE				586,89 748,14	6.85 N			RIG TYPE		GEO4	105	DA	TE CO			<b>D</b> 20/0	1/2021	
GROUN					77.42			FLUSH	ON (-1)	Air/Mi					TED	20/0		
CLIENT			nerg lalaci	ny Walsh	and Partr	ers		INCLINATI CORE DIA	ON (deg) METER (mi	-90 <b>m)</b> 78			GGED				SL O'She	а
Downhole Depth (m) Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Frac Spa Lo (m 0 <sup>250</sup>	cing og m)	Non-intact Zone	Legend			Descrip	tion			:	Deptn (m)	Elevation	Standpipe Details	SPT (N Value)
112																		N = 71/170 mm (4, 9, 7, 14, 25, 25)
REMAR	KS						<u> </u>							١	VAT	ER ST	RIKE	DETAILS
Hole cas	sed (	0.00-1	10.00	m. Covid	d 19 Safe	Zon	e erec	tion - 1hr	Water Strike	Casing Depth	Sealed At	Rise To		me nin)	Cor	mmen	ts	
REMARI Hole cas  INSTALI										- 1	-		,	ŕ				e recorded
S										Hole	Casing	1 Donth	to				VATEF	DETAILS
INSTALI					חקה		<del>-</del>		Date	Depth	Depth	Depth Wate	r	Comm	ents	5		
Date		пр D	epth	RZ Top	H∠ Base	9	Тур	oe	_									



REPORT NUMBER

СО	NTR	ACT	S	ever	n Hills Wir	nd Farm							DRIL SHE	LHOLE ET	NO		- <b>RC</b>	
СО	-ORE	DINA	TES		586,90 748,18				RIG TYPE		GEO4	05	DATI	E COMN	/IENCE	<b>D</b> 20/0	1/2021	
	OUN	D LE	VEL	(mO		75.58			FLUSH INCLINATION	ON (dea)	Air/Mis			LED BY			1/2021 SL	
	GINE	ER		_	hy Walsh a	and Partn	ers		CORE DIA	,			1	GED B			O'She	a
Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Frac Spa Lc (m	cing og m)	Non-intact Zone	Legend			Descripti	ion			Depth (m)	Elevation	Standpipe Details	SPT (N Value)
1		0	0	0					SYMMETI as returns	RIX DRILLI of sandy C	NG: No rec CLAY	overy, obs	erved by d	lriller				
2	1.50	0	0	0	_				SYMMETI as returns	RIX DRILLI of sandy g	NG: No rec ravelly CLA	overy, obs Y	erved by d	lriller	1.50	74.08		N = 21 (3, 5, 4, 5, 6, 6)
3	3.00	0	0	0	-					RIX DRILLI of gravelly	NG: No rec SAND	overy, obs	erved by d	Iriller	3.00	72.58		N = 32 (2, 6, 6, 9, 9, 8)
5	4.50	0	0	0					SYMMETI as returns	RIX DRILLI of gravelly	NG: No rec cobbly SAN	overy, obs ND	erved by d	Iriller		71.08		N = 28 (4, 4, 5, 7, 7, 9)
- 6 - 7	7.50	0	0	0					as returns	RIX DRILLI of sandy g	NG: No rec ravelly COE	overy, obs BBLES	erved by d	Iriller	6.00	69.58		N = 38 (3, 7, 11, 8, 9, 10)
8	9.00	0	0	0														N = 25/10 mm (25, 25)
9 	10.00 <b>MAR</b>		0	0				) () () () ()	Fnd (	nf Borehole	at 10.00 m					65.58	BIKE	N = 34 (7, 4, 6, 6, 12, 10)
Hol			0.00-	10.00	m. Covid	l 19 Safe	Zon	e erect		Water	Casing	Sealed	Rise	Time				DETAILS
					33110	54.0	_3.11			Strike	Depth	At	То	(min)	N		r strike	e recorded
1										_	Hole	Casing	Depth to				VATEF	RDETAILS
-	Date		ON D		RZ Top	RZ Base		Тур	oe	Date	Depth	Depth	Water	Con	nment	S		



REPORT NUMBER

10	ලුදු	<u>L</u> /														_	.000	, 0
со	NTR	ACT	S	ever	n Hills Wir	nd Farm							DRILI SHEE	LHOLE	NO		2 - RC et 2 of	
		DINA	TES	(mO	586,90 748,18 <b>D)</b>	6.89 E 0.82 N 75.58			RIG TYPE		GEO4		DATE	COMPL		<b>D</b> 20/0	1/2021	1
	ENT			nerg Ialaci	ia hy Walsh	and Parti	ners		INCLINATI	ION (deg) METER (mn	-90	51	1	LED BY			SL .O'She	a
Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Frac Spa Lo (m 0 <sup>250</sup>	cing og m)	Non-intact Zone	Legend			Descript	ion			Depth (m)	Elevation	Standpipe Details	SPT (N Value)
11 12 13 14 15 16 17 18 19																		N = 73 (4, 20, 19, 17 18, 19)
	MAR e ca		0.00-	10.00	Om. Covid	d 19 Safe	Zon	e erec	ction - 1hr	Water	Casing	Sealed	Rise	Time		TER S		DETAILS
										Strike	Depth	At	То	(min)				e recorded
															GRO	OUND	VATEF	R DETAILS
INS	TAL	LATI	ON D	ETA	ILS					Date	Hole Depth	Casing Depth	Depth to Water	Com	ment			
	Date	-	Гір D	epth	RZ Top	RZ Bas	е	Ту	pe		Борит	Dopui						
										1	1		1					



REPORT NUMBER

RC01 1 of 2 2020 2020 L Shea SD1 (N Value) SP7 (N Value)
2020 L 'Shea
'Shea
Standpipe Details SPT (N Value)
N = 15 (3, 2, 4, 2, 5, 4)
N = 41 (4, 6, 8, 9, 12, 12)
N = 87/135 mm (11, 19, 37, 25, 25)
N = 74 (7, 12, 14, 19, 20, 21)
N = 63 (5, 9, 11, 14, 19, 19)
N = 25/10 mm (25, 25)
IKE DETAILS
strike recorded
ATER DETAILS



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1	(a)	-/																
	NTR			ever	n Hills Wir	nd Farm							DRIL SHE	LHOLE ET	NO		8 - RC et 2 of	
СО	-ORE	)INA	TES		587,111 747,79				DIC TYPE		0504	0.5		E COM	MENCE			
		D LE	VEL	(mO		83.52			RIG TYPE FLUSH		GEO4 Air/Mi			E COMF				)
	ENT GINE	FR		nerg	ia hy Walsh a	and Partn	ere		INCLINATI	ON (deg) METER (mi	-90 <b>m)</b> 78			LED B		_	iSL .O'She	2
				laiaoi	Try Walsin	and r arti	CIS		OOTIL DIA	WE 1 E 11 (1111	11) 70		1200	GLD D	<u>.                                      </u>	<u> </u>	.0 0116	
Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Frac Spa Lc (m 0 <sup>250</sup>	cing og m)	Non-intact Zone	Legend			Descript				Depth (m)	Elevation	Standpipe Details	SPT (N Value)
- 10 -	10.50							000	SYMMET as returns	RIX DRILLI s of sandy c	NG: No red	covery, obs	served by o	driller				
	10.50	0	0	0	1			8000				(						
11	11.00			-	-			ØØ.	End	of Borehole	at 11 00 m	1			11.00	72.52		
13 13 14 15 16 17 18	MAR	we.															PDIVE	DETAILS
Hol			0.00-9	9.00r	m. Covid	19 Safe 2	Zone	erecti	on - 1hr	Water	Casing	Sealed	Rise	Time	Co	mmen		
REI Hol										Strike	Depth	At	То	(min)	N	o wate	er strik	e recorded
INS	TAL	LATI	ON D	ETA	ILS					Date	Hole	Casing	Depth to Water	O Cor	nment		VAIE	I DE I MILO
	Date				RZ Top	RZ Base	9	Тур	ре	- 2.00	Depth	Depth	vvater	331				
3																		



REPORT NUMBER

		_																
	NTR			ever	n Hills Wir									ILLHO EET	DLE NO		<b>- RC</b> et 1 of	
	OUN		TES	(mO	587,102 747,75 <b>D)</b>	2.36 E 7.45 N 83.11			RIG TYPE FLUSH		GEO4 Air/Mi				MMENCE MPLETE			
1	IENT GINE			nerg Ialaci	ia hy Walsh a	and Partn	ers		INCLINATION CORE DIA		-90 <b>m)</b> 78			ILLED GGED			SL O'She	a
Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Frac Spac Lo (mi	cing og m)	Non-intact Zone	Legend			Descrip	ition			Depth (m)	Elevation	Standpipe Details	SPT (N Value)
1	1.50	0	0	0					as returns	RIX DRILLI of gravelly	cobbly CL	AY			1.50	81.61		
2	3.00	0	0	0					SYMMETI as returns	RIX DRILLI of sandy c	NG: No re obbly CLA	covery, ob Y	served by	driller				N = 26 (4, 7, 4, 5, 9, 8)
3	4.50	0	0	0														N = 25/20 mm (25, 25)
5	6.00	0	0	0														N = 76 (5, 9, 14, 23, 20, 19)
7	7.50	0	0	0														N = 25/10 mm (25, 25)
8	9.00	0	0	0														N = 68/105 mm (4, 9, 18, 25, 25)
9 RE	10.00 <b>MAR</b>	0 <b>KS</b>	0	0					End o	of Borehole	e at 10.00 r	n				73.11 TER S	RIKE	N = 64/115 mm (17, 19, 14, 25, 25)
Hol			0.00-	10.00	m. Covid	l 19 Safe	Zon	e erec		Water	Casing	Sealed	Rise		me Co	mmen		
RE Hol					- 1					Strike	Depth	At	То	(m	IIII)	lo wate	er strike	e recorded
1											Hole	Casina	y Demi	to	GR	OUND	VATE	RDETAILS
INS	Date		ON D		ILS RZ Top	RZ Base	9	Тур	oe .	Date	Depth	Casino Depth		er C	Comment	s 		
2																		



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10	<u></u>	5/																
		ACT		ever	n Hills Wir								DRIL	LHOLE ET	NO		- <b>RC</b> et 2 of	
		D LE	TES	(mO	587,10; 747,75; <b>D)</b>	2.36 E 7.45 N 83.11			RIG TYPE FLUSH		GEO4 Air/Mi		<b>I</b>	СОМЫ				
1	ENT			nerg Ialaci	ia ny Walsh a	and Partr	ers		INCLINATI	ON (deg) METER (mn	-90			LED BY GED BY			SL O'She	a
Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Frac Spa Lo (m 0 <sup>250</sup>	cing og m)	Non-intact Zone	Legend			Descript	ion			Depth (m)	Elevation	Standpipe Details	SPT (N Value)
- 11 - 12 - 13 - 14 - 15 - 16 - 17 - 18																		N = 60 (4, 9, 12, 12, 19, 17)
REN			) UU	10.00	m. Covid	1 10 Safa	Zon	e proc	tion - 1hr	Water	Casing	Sealed	Rise	Time				DETAILS
REM Hole	o od:	Jeu (	,.00-	. 0.00	J.111. GOVIC	i io Gale	ZUIII	. <del>616</del> 0	On - 1111	Strike	Depth	At	To	(min)	N		er strike	e recorded
_											Hole	Casing	Donth to				VATER	RDETAILS
INS.			ON D			D7 Dag		Т	20	Date	Depth	Depth	Depth to Water	Com	ment	S		
	Date		ט אוי	epill	RZ Top	na das		Тур	JE									



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1	00	7																
	NTR			ever	n Hills Wir								DRII SHE	LLHOLE ET	NO		- <b>RC</b> et 1 of	
co	-ORI	DINA	TES		587,670 747,670				RIG TYPE		GEO4	.05	DAT	E COM	MENCE	<b>D</b> 04/1	2/2020	0
			VEL	•		72.47			FLUSH		Air/Mi			E COM				0
- 1	IENT GINE			nerg Ialaci	ia hy Walsh a	and Partn	ers		INCLINATION CORE DIAM		-90 <b>n)</b> 78			LLED B			iSL .O'She	ea
Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Frac Spac Lc (mi	ture cing og m)	Non-intact Zone	Legend		·	Descript	ion			Depth (m)	Elevation	Standpipe Details	SPT (N Value)
1	1.50	0	0	0					as returns	RIX DRILLI of sandy C	CLAY				1.50	70.97		
2	3.00	0	0	0					SYMMETI as returns	RIX DRILLI of sandy g	NG: No rec ravelly CLA	covery, obs AY	served by (	driller		69.47		N = 15 (1, 1, 3, 4, 4, 4)
3	4.50	0	0	0					SYMMETI as returns	RIX DRILLI of cobbly (	NG: No rec CLAY	covery, obs	served by (	driller				N = 21 (2, 3, 5, 4, 6, 6)
5	6.00	0	0	0											6.00	66.47		N = 55 (4, 9, 12, 11, 15, 17)
7	7.50	0	0	0					SYMMETI as returns	RIX DRILLI of gravelly	NG: No rec cobbly CL	covery, obs AY	served by o	driller				N = 53 (3, 21, 9, 14, 14, 16)
8	9.00	0	0	0											9.00	63.47		N = 64 (19, 21, 11, 15, 17, 21)
9	9.60	100	0	0					cobbles. S	n slightly sa Sand is fine of various l	. Gravel is	angular to	subrounde	ed fine	9.60	62.87		N = 25/10 mm (25, 25)
RE	MAR		0.00	2 00-	n Could.	10 624-	700-	Oroct!	an the	Water	Casing	Sealed	Rise	Time				DETAILS
RE Hol	ie ca	sed (	J.00-9	9.00r	n. Covid	i 9 Safe 2	∠one	erection	on - 1hr	Strike 9.40	Depth 9.00	At N/S	To	(min)	,   Co	Slow		DETAILS
INS	ΤΔΙ	LATI	ON D	ΕΤΔ	ILS					Date	Hole	Casing	Depth t Water	O Cor	GR0 nment		VAIE	R DETAILS
04	Date -12-2			epth	RZ Top 8.60	RZ Base 14.60	Э	Typ 50m	n SP	Dale	Depth	Depth	Water	.   001	mient	<u>.                                    </u>		
2																		



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CO-ORINATES	100	IST.	4													_		
CO-ORINATES   57,670.78   TAT7,7870.7N   GROUND LEVEL (mOD)   72,47   FLUSH   GEO405   AirAldist   Malachy Walsh and Partners   MoLINATION (deg)   -90   DATE COMPLETED 04/12/2020   DATE COMPLETED	CONT	RAC	т	Seve	n Hills Wi	nd Farm								_	NO			
GROUND LEVEL (mOD)  72.47  CLIENT Energia Energia Malachy Walsh and Partners  CORE DIAMETER (mm)  78  Date CoMPLETED 9.4/12/2020  DRILLED BY  GSL  LOGGED BY  Description  Description  General Spacing Complete Space Spacing Complete Space Sp	CO-O	RDIN	ATES	6								_			ENCE			
ENINEER Malachy Walsh and Partners CORE DIAMETER (mm) 78 LOGGED BY 0.0 Sheat    Example   Fracture   Fracture	GROU	JND I	EVE	L (mC									DATE	COMPL	ETE	04/1	2/2020	)
Strong to very strong, thickly to thinly bedded (to thinly lanimated at shale layers), dark grey/blueish grey, fine to medium grained LMBs/TONE stightly lossiliferous, chert layering, local styfolites), less to locally moderately weather of thin shale layers at 9.86 ± 0.15 m, 10.0 94 93 13.78-13.88m)  100 94 93 15.20				•	•	and Partn	ers						1					a
laminated at shale layers), dark grey/blueish grey. fine to medium grained LIMESTOME (slightly fossillerous, chert layering, local stylollies), resh to locally moderately weathered (at this shale layers at 9,96-10.15m, 10.62-10.66m, 12.49-12.52m, 13.17-13.19m & 13.78-13.88m)  Discontinuities are widely to closely spaced, smooth to locally rough, planar to locally curviplanar. Apertures are tight to locally open, locally calvel-filled (at 13.78-13.88m & 14.15-14.19m, locally calvel-filled (at 13.78-13.88m & 14.15-14.19m, locally calvel-filled (at 13.78-13.88m)  100 85 67  End of Borehole at 14.60 m			- 0		(m 0 250	cing og m)	Non-intact Zone	Legend			Description	on			Depth (m)	Elevation	Standpipe Details	SPT (N Value)
12.00 94 93 13.78-13.88m)  Discontinuities are widely to closely spaced, smooth to locally outly planar to locally curviplanar. Apertures are tight to locally clay/gravel-filled (at 13.78-13.88 m 3.41.51.41.9m, locally calcycravel-miled (at 13.78-13.88 m 3.41.51.41.9m, locall	10.		0 68	3 63			Λ a λ /		laminated medium g layering, l weathered	at shale lay rained LIME ocal stylolite d (at thin sha	ers), dark g STONE (sl s), fresh to ale layers at	rey/blueislightly fossilocally mo 9.96-10.1	h grey, fine iliferous, ch derately 5m,	to				
13.78-13.88m & 14.15-14.19m, locally calcitez-veined (1.5mm thick) tocally signify iron-oxide stained. Dips are 10-15° & very locally 80°. (continued)  13   13.40   14.60   14.60   14.60   57.87    14   100   90   77   15   16   17   17   17   17   17    15   18   19   19   19   19   19   19   19	12.		0 94	1 93	E				13.7813 Discontinu	.88m) uities are wid igh, planar t	dely to close o locally cur	ely spaced viplanar. <i>I</i>	, smooth to Apertures a					
End of Borehole at 14.60 m  14.60  57.87	13		0 8	5 67					13.78-13.8 (1-5mm th	88m & 14.15 nick) locally s	5-14.19m, loslightly iron-	ocally calci oxide stai	tez-veined					
- 16 - 16 - 17 - 18 - 18	ŧ l		0 90	) 77	F									1	14.60	57.87		
Hole cased 0.00-9.00m. Covid 19 Safe Zone erection - 1nr   Strike   Depth   At   To   Comments	- 16											Souled	Bica	Timo	WAN	ER ST	RIKE	DETAILS
NSTALLATION DETAILS   Date   Hole Depth   Depth   Depth   Water	Hole o	cased	0.00	)-9.00	m. Covid	19 Safe 2	Zone	erecti	on - 1hr	Strike	Depth	At			DETAILS			
Date   Tip Depth   RZ Top   RZ Base   Type   04-12-20   14.60   9.00   8.30   Water level recorded 5 mins after end of drilling.   Water level recorded 5 mins after end of drilling.	INSTA	ALLA	TION	DETA	NILS					Date			Depth to	Com			VAIER	PLIMILO
	Da 04-12						9			04-12-20						corded 5	mins afte	er end of



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10	00	7																	
	NTR			ever	Hills Wir	nd Farm								DRILL	HOLE T	NO		- <b>RC</b> et 1 of	
СО	-ORE	DINA	TES		587,702 747,65				RIG TYPE		GEO4	05		DATE	COMN	IENCE	<b>D</b> 04/1	2/2020	)
			VEL			71.53			FLUSH		Air/Mi						04/1		)
	IENT GINE			nerg Ialaci	ia ny Walsh a	and Partn	ers		INCLINATION CORE DIA		-90 <b>m)</b> 78			DRILL	ED BY			SL O'She	ıa.
					1,7 ************************************				00112 217		, 10			1 - 5 - 5 - 5			J.		
Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Frac Spac Lo (mi	cing og m)	Non-intact Zone	Legend			Descript					Depth (m)	Elevation	Standpipe Details	SPT (N Value)
- 0									SYMMETI as returns	RIX DRILLI of gravelly	NG: No red	covery, ob	serve	ed by dri	iller				
Ė		0	0	0															
-1																			
Ē	1.50																		N 00
E																			N = 23 (3, 4, 4, 6, 6, 7)
2		0	0	0															
Ė																			
3	3.00				-				CVMANAET		INC: No vo			ندام برما ام	lla.	3.00	68.53		N = 25
E									as returns	of cobbly	ING: No red CLAY	overy, or	serve	a by an	llier				(5, 6, 6, 7, 7, 5)
E		0	0	0															
4								<u> </u>											
Ė	4.50				-			0_											N = 28
E								<u> </u>											(4, 7, 6, 7, 7, 8)
5		0	0	0				0											
Ė								0_											
6	6.00				-			<u> </u>	CVMMET		INC: No roc	avanı ak	2000110	d by dri	illor	6.00	65.53		N = 25/10 mm
F									as returns	of CLAY	NG: No red	overy, or	serve	a by an	illei				(25, 25)
Ē		0	0	0															
7																			
Ė	7.50				-				QVMMAET	ו ווסח צום	NG: No red	ovory of	200212	d by de	illor	7.50	64.03		N = 55
Ė										of cobbly		overy, or	oei ve	a by ari	ııı <del>c</del> ı				(5, 7, 7, 11, 19, 18)
8		0	0	0															
Ē								<u></u>											
- 9	9.00				-			0_											N = 60
Ė		0	0	0				<del>-</del>											(4, 5, 9, 21, 19, 11)
a, È	10.00							2								10.00	64.50		
77/9/2/S/ <b>RE</b>	10.00 MAR								End (	1	at 10.00 m						61.53 FER ST	RIKE	DETAILS
Hol	le ca	sed (	0.00-	10.00	m. Covid	1 19 Safe	Zon	e erec	tion - 1hr	Water Strike	Casing Depth	Sealed At	Ri T	se o	Time (min)	Со	mmen	ts	
RC FI 10M 23000.GPJ IGSL.GDT 20/5/22																N	o wate	r strike	e recorded
23000.																GRO	DUNDV	VATEF	R DETAILS
NS	STAL	LATI	ON D	ETA	ILS					Date	Hole	Casin	g D	epth to Water	Com	ment			
2 	Date	-	Tip D	epth	RZ Top	RZ Base	9	Тур	ре		Depth	Depth	<del>'   '</del>	* * alCl					
IGSL F																			



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000	5																			
CONTR			ever	n Hills Wir	nd Farm							DRIL SHE	.LHOLI ET	E NO	Sheet 2 of 2  CED 04/12/2020  IGSL D.O'Shea  Standplie Details  (3, 6, 6, 9)					
CO-OR			/O	587,703 747,65	7.59 N			RIG TYPE		GEO4	.05	DAT	E COM		<b>D</b> 04/1	2/2020	)			
GROUN			nerg		71.53			FLUSH INCLINATI	ON (dog)	Air/Mi -90	st		LED B				)			
ENGINE				ny Walsh a	and Partn	ers			METER (mi			l l	GED B				а			
Downhole Depth (m) Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Frac Spa Lo (m 0 <sup>250</sup>	cing og m)	Non-intact Zone	Legend			Descrip	ion			Depth (m)	Elevation	Standpipe Details	SPT (N Value)			
- 10 - 10 - 11 - 11 - 12 - 13 - 14 - 15 - 16 - 17 - 18																	N = 31 (3, 6, 7, 7, 8, 9)			
REMAR	∣ RKS													WA	L TER ST	 	DETAILS			
Hole ca		0.00-	10.00	m. Covid	l 19 Safe	Zon	e erec	tion - 1hr	Water Strike	Casing Depth	Sealed At	Rise To	Time (min	, (	mmen					
REMAF Hole ca									June	Бери	AL	10	(111111)	N			e recorded			
Z Z									_	Hole	Casing	Danth t	0 .			VATEF	RDETAILS			
INSTAL					ח ד ה	. 1	<del>-</del>		Date	Depth	Depth	Depth to Water	Col	mment	S					
Date	<del>)</del>	пр D	eptn	RZ Top	HZ Base	2	Тур	oe	-											



REPORT NUMBER

1	ලප	<u>L</u> /														_	.000	
СО	NTR	ACT	S	ever	n Hills Wir	nd Farm							DRIL	LHOLE ET	NO		<b>5 - RC</b> et 1 of	
	-ORE		TES	(mO	585,75 747,89 <b>D)</b>				RIG TYPE FLUSH		GEO4			E COMP		<b>D</b> 09/1	2/2020	)
	ENT	ER		nerg Ialaci	ia ny Walsh a	and Partn	ers		INCLINATI	ON (deg) METER (mr	-90	51		LED B			SL O'She	a
Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Frac Spa Lo (m 0 <sup>250</sup>	cing og m)	Non-intact Zone	Legend			Descript	tion			Depth (m)	Elevation	Standpipe Details	SPT (N Value)
0	1.50	0	0	0					SYMMETI as returns	RIX DRILLI s of clayey g	NG: No rec gravelly CO	covery, obs BBLES	served by o	driller	1.50	89.33		
2	1.80	0	95	0 85	E				as returns Strong to grey/bluei (slightly fo	RIX DRILLI s of gravelly very strong sh grey, fin- pssiliferous, slightly wea	COBBLES , thickly to t e to mediur chert layer	thinly bedd n grained	ed, dark LIMESTO!	NE		89.03		N = 89/170 mm (4, 9, 9, 30, 25, 25)
3	3.30 4.80	100	94	88			540		locally rou tight to loc scale core calcitez-ve	uities are wi igh, planar cally open, l eloss (at 5.7 eined (1-25 )ips are 10-	to locally cu ocally clay- '4-5.82m & mm thick) l	urviplanar. filled contr 6.56-6.66 ocally sligh	Apertures ributing to make the months in the	are small			0 0	
5	5.80	100	94	94				99999999										
6	6.80	100	63	0	F		k		End (	of Borehole	at 6.80 m				6.80	84.03		
8									Lild	or Editione	at 0.00 III							
	MAR			1.00		10.0-4-	7au -		am 41-::	Water	Casina	Sealed	Rise	Time		TER ST	RIKE	DETAILS
⊣ol	e cas	sed (	J.UU-`	1.80r	n. Covid	19 Sate 2	cone	erecti	on - 1nr	Strike	Casing Depth	At	To	(min)	00	mmen lo wate		e recorded
NC	ΤΔΙΙ	ΔΤΙ	ON D	FΤΛ	II S					Date	Hole	Casing	Depth t	0 (00	GRO		VATEF	RDETAILS
	Date -01-2	-		epth	RZ Top 1.50	RZ Base 3.50	9	Typ 50m	oe ım SP	09-12-20	Depth 6.80	Depth 1.80	Water 5.10	Coi	r level re		mins aft	er end of
													1					



REPORT NUMBER

/102	5																
CONTR	ACT	S	Sever	n Hills Wir	nd Farm							DRIL SHEE	LHOLE	NO		- <b>RC</b> et 1 of	
CO-ORI	DINA	TES		585,780 747,87				RIG TYPE		GEO4	05		COMM	ENCE			
GROUN			-	D)	89.98			FLUSH		Air/Mi			COMP				)
CLIENT ENGINE			nerg (alaci	ia hy Walsh a	and Partn	ers		INCLINATI	ON (deg) METER (mi	-90 <b>n)</b> 78			LED BY GED BY			SL O'She	a
Downhole Depth (m) Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Frac Spac Lo (mi	cing og m)	Non-intact Zone	Legend			Descript	ion			Depth (m)	Elevation	Standpipe Details	SPT (N Value)
1 1.50	0	0	0					as returns	RIX DRILLI s of clayey g RIX DRILLI s of ROCK	ravelly CO	BBLES			1.30	88.68		
3.00	0	0	0	_													
3.50	0	0	0					End (	of Borehole	at 3.50 m				3.50	86.48		
-7 -8 -9																	
REMAR Hole ca:		0 0n <sub>-</sub>	1.30	m. Covid	19 Safe 1	7 <sub>0</sub> ne	erecti	on - 1hr	Water	Casing	Sealed	Rise	Time				DETAILS
i ioie od	seu	0.00-	1.501	ii. Jovid	IJ JAIE I	_0116	GI GOLI	O(1 - 11II	Strike	Depth	At	To	(min)	N		r strike	e recorded
INICTAL	1 4 7	ION F	)ET^	11 C					Data	Hole	Casing	Depth to	)   0			VATEF	RDETAILS
INSTAL Date				RZ Top	RZ Base	9	Тур	ре	Date	Depth	Depth	Depth to Water	Com	ment	>		



REPORT NUMBER

/		7																
	NTR			Sever	n Hills Wir								DRIL SHE	LHOLE Et	NO		<b>- RC</b> et 1 of	
	-ORE		TES	(mO	586,46 747,79 <b>D)</b>	7.14 E 6.12 N 88.80			RIG TYPE FLUSH		GEO4 Air/Mis			E COMP				
	IENT GINE	ER		nerg Ialaci	ia hy Walsh a	and Partn	ers		INCLINATION CORE DIA		-90			LED B'			SL .O'She	ea
Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Frac Spa Lo (m 0 <sup>250</sup>	cing og m)	Non-intact Zone	Legend			Descript	ion			Depth (m)	Elevation	Standpipe Details	SPT (N Value)
1	1.50	0	0	0					as returns	of clayey g	NG: No rec gravelly CO NG: No rec	BBLES				87.30		N = 71/95 mm
2	3.00	0	0	0	_				as returns	of gravelly RIX DRILLI	COBBLES NG: No rec			/	1.80	87.00		(12, 19, 21, 25, 25)
4	4.20	0	0	0	_				End	of Borehole	e at 4.20 m				4.20	84.60		
- 5 - 6 - 7	MAR	ĸs													WA	TER ST	   RIKE	DETAILS
Hol			0.00-	1.80r	m. Covid	19 Safe 2	Zone	erecti	on - 1hr	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)		mmen		DETAILS
REI Hol										Sumo	Dopui	7.11	10	(111111)	N	lo wate	er strike	e recorded
															GRO	OUNDV	VATE	R DETAILS
INS	TAL	LAT	ON D	ETA	ILS					Date	Hole	Casing	Depth to Water	Cor	nment	S		
	Date		Tip D	epth	RZ Top	RZ Base	Э	Тур	ое		Depth	Depth	vvale!					
ــــــــــــــــــــــــــــــــــــــ										1								



REPORT NUMBER

-	NITO	/				ad Fawaa							DRII	LHOLE	: NO	TOG	- PC	00					
	NTR			ever	n Hills Wir								SHEE	_	. 140		- RC et 1 of						
GR		ID LE	TES VEL	(mO					RIG TYPE FLUSH INCLINATI	ON (deg)	GEO4 Air/Mis -90		DATE	COMP	LETE	<b>D</b> 10/1							
EN	GINE	ER	N	lalac	hy Walsh a	and Partn	ers		CORE DIA		<b>m)</b> 78		LOG	GED B	Y	D.	O'She	a					
Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Frac Spa Lc (m	cing og m)	Non-intact Zone	Legend			Descript				Depth (m)	Elevation	Standpipe Details	SPT (N Value)					
0	1.50	0	0	0	_				as returns	s of clayey (	ING: No rec gravelly CO ING: No rec	BBLĒS			1.50	86.47		N = 83					
2	3.00	0	0	0	_				as returns	of gravelly	COBBLES				2.50	85.47		(6, 9, 23, 19, 20, 21)					
4	4.50		0	0	_										4.70								
5	4.70	0	0	0					End (	of Borehole	e at 4.70 m				4.70	83.27							
. 7																							
9 RE	MAR	KS								I					WA	TER S1	RIKE	DETAILS					
			0.00-2	2.50r	m. Covid	19 Safe 2	Zone	erecti	on - 1hr	Water	Casing	Sealed	Rise	Time		mmen		DE I AILU					
										Strike	Depth	At	То	(min)	No water strike records								
10.00	<b>-</b>										Hole	Casing	Denth to				VATER	DETAILS					
	Date		Tip D		ILS RZ Top	RZ Base	9	Тур	De .	Date	Depth	Depth	Depth to Water	Con	nment	S							



REPORT NUMBER

CONTR	_	S	ever	n Hills Wir	nd Farm								LHOLE	NO		- RC	
CO-ORI GROUN CLIENT ENGINE	ID LI	<b>EVEL</b>	nerg		4.65 N 72.32	ers		RIG TYPE FLUSH INCLINATION		GEO4 Air/Mis -90 <b>m)</b> 78		DATE	ET COMM COMP LED BY GED BY	LETEI	D 03/1 D 03/1 IG		)
Downhole Depth (m) Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Frac Spa Lc (m	cing og m)	Non-intact Zone	Legend			Descript	ion			Depth (m)	Elevation	Standpipe Details	SPT (N Value)
1 1.50	0	0	0					as returns	of clayey o	NG: No rec gravelly COI	BBLES			1.50	70.82		N = 78
3.00	0	0	0	-				as returns	of sandy g	ravelly COE	BBLÉS	•		2.40	69.92		(9, 7, 14, 21, 23, 20)
4.40	0	0	0					End (	of Borehole	e at 4.40 m				4.40	67.92		
6																	
8																	
9 REMAR	KS													WAT	TER ST	RIKE	DETAILS
		0.00-2	2.40r	n. Covid	19 Safe Z	one.	erecti	on - 1hr	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Co	mmen	ts	e recorded
INSTAL	LAT	ION D	)ETA	ILS					Date	Hole Depth	Casing Depth	Depth to Water	Com	GRO		VATEF	R DETAILS
Date	)	Tip D	epth	RZ Top	RZ Base		Тур	oe .									



REPORT NUMBER

CO-(						nd Farm								ILLHO	LE NO	T08		
GRO CLIE	DUNI ENT	D LE	V <b>EL</b>	nerg		8.07 N 71.33	ers		RIG TYPE FLUSH INCLINATION		GEO4 Air/Mis -90 <b>m)</b> 78		DA DA			18/0 18/0 18/0		 
hole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Frac Spa Lc (m	ture cing og m)	on-intact Zone	Legend	OOTIL BIA	WE 1 E-1 (1111	Descript	ion	120	<u> </u>	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
	1.50	0	0	0					as returns	s of sandy g	ING: No rec gravelly CLA ING: No rec GRAVEL	·Υ			1.50	69.83		N = 25/10 m (4, 25, 25)
3 3	3.00	0	0	0	_				as returns	of sandy o	ING: No rec cobbly GRA	VEL			3.90	68.33		N = 25 (2, 4, 4, 6, 8
5	4.50 5.20	0	0	0					as retains	, or riedic					6.20	65.13		
-7 -8									End (	of Borehole	e at 6.20 m							
REM Hole			0.00-3	3.90r	m. Covid	19 Safe Z	Zone	erection	on - 1hr	Water Strike	Casing Depth	Sealed At	Rise To	Tir (m	me in) Co	mmen	ts	<b>DETAILS</b> e recorded
	T <b>ALL</b> Date		ON D		ILS RZ Top	RZ Base	е	Тур	oe .	Date	Hole Depth	Casin Depth		to C	GRO		VATEF	RDETAILS



REPORT NUMBER

	NTR	/		ovor	n Hills Wii	nd Farm							DRIL	LHOLE	NO	TOS	- RC	ำกว
				evei									SHE				et 1 of	
GR		D LE	TES VEL	(mO	-				RIG TYPE FLUSH INCLINATI	ON (dea)	GEO4 Air/Mis -90		DATI	E COMP	LETE	<b>D</b> 19/0		
ENC	SINE	ER		_	hy Walsh	and Partn	ers		CORE DIA				LOG	GED B	4	D.	O'She	a
Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Frac Spa Lo (m	cing og m)	Non-intact Zone	Legend			Descript	ion			Depth (m)	Elevation	Standpipe Details	SPT (N Value)
1	1.50	0	0	0					as returns	of sandy (	NG: No rec COBBLES				1.50	71.32		N = 25/10 mr
	3.00	0	0	0					as returns	of sandy g	ravelly COE	BBLES	served by 0	miei				(7, 25, 25)
3	3.50	0	0	0				0										N = 100/170 mm (4, 9, 21, 29
4	4.50	0	0	0														25, 25)
5 -		0	0	0						RIX DRILLI of ROCK	NG: No rec	overy, obs	served by d	Iriller	5.10	67.72		N = 71 (7, 14, 17, 21 14, 19)
6	6.00	0	0	0	_													
7	7.30				_				End (	of Borehole	e at 7.30 m				7.30	65.52		
- 9																		
	WAR		0.00		0	10.0 (	7		4/	Water	Casina	Soalod	Rise	Time	WA	TER ST	RIKE	DETAILS
Hol	e ca	sed	U.UO-{	5.10r	m. Covid	19 Safe 2	cone	erecti	on - 1hr	Strike	Casing Depth	Sealed At	To	Time (min)	N		er strike	e recorded
INS	TAL	LAT	ON D	ETA	ILS					Date	Hole	Casing	Depth to Water	Con	GRO		VATE	RDETAILS
	Date Tip Depth RZ Top RZ Base Type									Jaio	Depth	Depth	vvater	3011				



REPORT NUMBER

10	00	7																	
	NTR			ever	n Hills Wir									DRIL SHE	LHOLE ET	NO		<b>- RC</b> et 1 of	
CO	-ORI	DINA	TES		588,28 742,46				RIG TYPE		GEO <sub>4</sub>	105		DATE	COMM	IENCE	<b>D</b> 15/0	1/2020	)
			VEL			99.81			FLUSH		Air/M				COMP				)
	IENT GINE			nerg Ialaci	ıa hy Walsh a	and Partn	ers		CORE DIA		-90 <b>m)</b> 78				LED B\ GED B\			SL .O'She	a
Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Frac Spac Lc (mi	cing og m)	Non-intact Zone	Legend			Descrip	tion		1		Depth (m)	Elevation	Standpipe Details	SPT (N Value)
- 1	1.50	0	0	0					as returns	of sandy g	ING: No re gravelly CO	BBLÉS				1.50	98.31		
2	3.00	0	0	0					as returns	of sandy o	ING: No re cobbly GRA	VEL				3.00	96.81		N = 44 (4, 11, 14, 10, 11, 9)
3	4.50	0	0	0					as returns	of sandy g	ING: No re gravelly CO	BBLÉS				4.50	95.31		N = 35 (2, 7, 9, 9, 12, 5)
5	6.00	0	0	0					SYMMETI as returns	RIX DRILL of sandy o	ING: No recobbly GRA	covery, ob VEL	oser	ved by d	riller				N = 50/20 mm (41, 25, 25)
7	7.50	0	0	0				80000											N = 53 (5, 19, 17, 20, 7, 9)
8	9.00	0	0	0				000000											N = 61/95 mm (15, 14, 11, 25, 25)
9 5/55	10.00 <b>MAR</b>		0	0					End (	of Borehole	e at 10.00 r	0					89.81		N = 32 (9, 7, 5, 8, 9, 10)
Hol			0.00-	10.00	m. Covid	l 19 Safe	Zon	e erec		Water	Casing	Sealed	T	Rise	Time		mmen		DETAILS
IGSL RC FI 10M 23000.GPJ IGSL.GDT 20/5/22										Strike	Depth	At		То	(min)	N	lo wate	er strike	e recorded
NS INS	STAL	LATI	ON D	ETA	ILS					Date	Hole	Casin		Depth to	Con	nment		WAIE	I DE I MILO
15	Date 5-01-2	-		epth	RZ Top 4.00	RZ Base 10.00	9	Typ 50m	n SP		Depth	Depth	1	Water	3011		-		
85																			



REPORT NUMBER

/IGE	3L/														_	.000				
CONTR	RACT	S	ever	Hills Wir	nd Farm							DRILL	HOLE	NO		- <b>RC</b> et 2 of				
CO-OR			(mO	588,28 742,46 <b>D)</b>	3.77 E 4.21 N 99.81			RIG TYPE		GEO4 Air/Mis		DATE	COMPL		<b>D</b> 15/0	1/2020	)			
CLIEN	Т	Е	nerg			ers		INCLINATI	ON (deg) METER (mm	-90	ы 	DRILL	ED BY		IG	SL O'She				
Downhole Depth (m) Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Frac Spa Lc (m 0 <sup>250</sup>	cing og m)	Non-intact Zone	Legend			Descript	ion			Depth (m)	Elevation	Standpipe Details	SPT (N Value)			
10 111 112 113 114 115 116																	N = 40 (4, 8, 7, 7, 12, 14)			
REMAR Hole ca		0.00-	10.00	)m. Covid	l 19 Safe	Zone	e erec	tion - 1hr	Water	Casing	Sealed	Rise	Time				DETAILS			
				30110		_2.11			Strike	Depth	At	То	(min)		mmen lo wate		e recorded			
																===	DET.:: 0			
INSTAI	I I A T	ION F	ETA	II S					Data	Hole	Casing	Depth to Water	Com			VATEF	RDETAILS			
Dat				RZ Top	RZ Base	9	Ту	oe	Date	Depth	Depth	Water	Com	ment	S					
15-01-		10.0		4.00	10.00			ım SP												



REPORT NUMBER

10	(a)	5/																
	NTR			ever	n Hills Wir									ILLHC EET	DLE NO		- <b>RC</b> et 1 of	
CO	-ORE	DINA	TES		588,277 742,493				RIG TYPE		GEO4	05	DA	TE CO	MMENCE	<b>D</b> 14/0	1/202	1
		D LE	VEL	•		97.99			FLUSH		Air/Mi:				MPLETE			1
	ENT GINE	FR		nerg	ia hy Walsh a	and Partn	ere		INCLINATION CORE DIA		-90 <b>m)</b> 78			ILLED GGED			iSL .O'She	12
					VValsire	and r arti	013	Τ	OONE DIA	IVIL 1 L11 (1111	11) 70		120	GGLD				
Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Frac Spac Lo (mi	cing og m)	Non-intact Zone	Legend			Descript	ion			Depth (m)	Elevation	Standpipe Details	SPT (N Value)
1	1.50	0	0	0					as returns	RIX DRILLI of sandy g	NG: No rec ravelly COI	overy, ob BBLES	served by	driller		96.49		
2		0	0	0				10000000000000000000000000000000000000	SYMMETI as returns	RIX DRILLI of sandy c	NG: No rec obbly GRA	overy, ob VEL	served by	driller		00.10		N = 42 (4, 9, 11, 10, 12, 9)
3	3.00	0	0	0				000000							4.50	00.40		N = 35 (3, 5, 7, 8, 9, 11)
5	6.00	0	0	0					as returns	RIX DRILLI of sandy g	NG: No rec ravelly COI	overy, ob 3BLES	served by	driller		93.49		N = 41 (4, 7, 9, 14, 9, 9)
7	7.50	0	0	0											7 50	90.49		N = 62/95 mm (2, 6, 12, 25, 25)
8		0	0	0					SYMMETI as returns	RIX DRILLI of sandy c	NG: No rec obbly GRA	overy, ob VEL	served by	driller	,			N = 50/20 mm (4, 7, 25, 25)
9	9.00	0	0	0	-				ac raturne		NG: No rec Iravelly COI		served by	driller	,	88.99		N = 37 (6, 6, 11, 9, 10, 7)
REI	MAR						_				at 10.00 m		Dia-	-	WA		RIKE	DETAILS
Hol Hol INS	e cas	sed (	).00- <sup>-</sup>	10.00	0m. Covid	I 19 Safe	Zon	e erec	tion - 1hr	Water Strike	Casing Depth	Sealed At	Rise To		N		er strike	e recorded
NS	TAL	LATI	ON D	ETA	ILS					Date	Hole	Casing		to	Comment			
IGSL RC FI 1	Date				RZ Top	RZ Base	9	Тур	De .		Depth	Depth	vvale					



REPORT NUMBER

100	27																
CONTI	RACT	· s	Sever	n Hills Wir	nd Farm							DRIL SHEE	LHOLE T	NO		<b>- RC</b> et 2 of	
CO-OF			_	588,27 742,49	3.91 N			RIG TYPE		GEO4	.05	DATE	СОММ		<b>ED</b> 14/0	1/2021	
GROU			(mO nerg		97.99			FLUSH INCLINATI	ON (dog)	Air/Mi -90	st		COMPI			1/2021 SL	
ENGIN				ny Walsh a	and Partn	ers			METER (mi			1	GED BY			O'She	a
Downhole Depth (m) Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Frac Spa Lo (m 0 250	cing og m)	Non-intact Zone	Legend			Descript	ion			Depth (m)	Elevation	Standpipe Details	SPT (N Value)
11 11 11 11 11 11 11 11 11 11 11 11 11																	N = 50/20 mm (4, 20, 25, 25)
REMA									\M/=+==	0	011	D:	T:	WA	TER ST	RIKE	DETAILS
Hole c	ased	0.00-	10.00	m. Covid	l 19 Safe	Zon	e erec	tion - 1hr	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Co	mmen	ts	
REMAI HOLE CO. THE CO.																	e recorded
E INSTA	11 ^7	ION F	)ET^	11 6					Dota	Hole	Casing	Depth to	)			VATEF	RDETAILS
Dat				RZ Top	RZ Base	Э	Туј	oe	Date	Depth	Depth	Depth to Water	Com	ment	.5		
165L 18				-													



REPORT NUMBER

1	<u>ල</u> ව	5/														_		
СО	NTR	ACT	S	Sever	n Hills Wii	nd Farm							DRIL SHEI	LHOLE	NO		- RC	
СО	-ORE	OINA	TES		587,88 743,61				RIG TYPE		GEO4	05		COMM	IENCE			
GR	OUN	D LE	EVEL	(mO	D)	72.63			FLUSH		Air/Mi:		DATE	COMP	LETE	D 17/1	2/2020	)
	ENT GINE			nerg Ialac	jia hy Walsh i	and Partn	ers		INCLINATION CORE DIA		-90 <b>m)</b> 78			LED BY GED BY			SL O'She	a
m)	n)																	
Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Spa Lo	eture cing og m)	Non-intact Zone	Legend			Descript				Depth (m)	Elevation	Standpipe Details	SPT (N Value)
0								8	l oc roturno	RIX DRILL of sandy (	ING: No rec gravelly COI	overy, obs BBLES	served by d	riller				
1	1.50	0	0	0							·				1.70	70.00		
									SYMMET	RIX DRILL	ING: No rec	overy, obs	served by d	riller	1.70	70.93		N = 50/20 mm (4, 9, 25, 25)
2		0	0	0				Ħ	as returns	of ROCK					2 50	70.13		
								Ħ	SYMMET as returns		ING: No rec	overy, obs	served by d	riller	2.60	70.13		
3	3.00								SYMMET		ING: No red	overy, obs	served by d	riller				
								H	as returns	OTTOOK								
4		0	0	0				H										
	4.50																	
		0	0	0				$\vdash$										
5	5.50	0	0	0				H							5 50	67.13		
	3.30								End	of Borehole	e at 5.50 m				3.30	07.13		
6																		
7																		
8																		
0																		
9																		
RE	MAR	KS			<u> </u>			<u> </u>							WA	LER ST	RIKE	DETAILS
Hol	e ca	sed	0.00-	1.70	m. Covid	19 Safe 2	Zone	erecti	on - 1hr	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Co	mmen	ts	
															N	lo wate	r strike	e recorded
											Шага	Casina	Danit :	.	GRO	DUNDV	VATEF	RDETAILS
	TAL Date		Tip D		I <b>LS</b> RZ Top	R7 Race	<u>.</u>	Ту	ne.	Date	Hole Depth	Casing Depth	Depth to Water	Com	nment	S		
	<u> </u>		ט קיי	Spul		, ie base		ı y		1								
						1	1			1		1	1					



REPORT NUMBER

1	99	5/																
СО	NTR	ACT	S	ever	n Hills Wir	nd Farm							DRIL SHEE	LHOLE T	NO		- RC et 1 of	
СО	-ORE	INA	TES		587,89 743,64				RIG TYPE		GEO4	05	DATE	COMM	IENCE	<b>D</b> 18/1	2/2020	)
		D LE	VEL	•		71.31			FLUSH		Air/Mis			СОМР				)
- 1	IENT GINE	ER		nerg Ialaci	ia hy Walsh a	and Partn	ers		INCLINATION CORE DIA		-90 <b>m)</b> 78			LED BY GED BY			iSL O'She	а
Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Frac Spa Lc (m	ture cing og m)	Non-intact Zone	Legend			Descript	ion	,		Depth (m)	Elevation	Standpipe Details	SPT (N Value)
- 1	1.50	0	0	0	<u>[[]</u>				as returns	RIX DRILL s of sandy g	ING: No rec gravelly COB	overy, obs 3BLES	erved by di	riller				N = 24
2	3.00	0	0	0	-				as returns SYMMET as returns SYMMET	of ROCK RIX DRILL of CLAY RIX DRILL	NG: No rec	overy, obs	erved by di	riller		69.31 68.81 68.61		(9, 4, 5, 5, 7, 7)
4	4.50	0	0	0	-				SYMMET as returns	of CLAY	NG: No rec	•	-			67.11 66.81		
5	6.00	0	0	0						RIX DRILL s of ROCK	NG: No rec	overy, obs	erved by d	riller				
- 6	6.40	0	0	0					End	of Borehole	e at 6.40 m				6.40	64.91		
8																		
70/2/2 RE	MAR		2.00	0.00	- 0 ::	10.0.1	7 -			Motor	Casina	Sociod	Rico	Time	WA	TER ST	RIKE	DETAILS
RE   100   230000.6PJ   168E.6DJ   2005/22	le cas	sed (	0.00-2	2.00r	n. Covid	19 Safe 2	<b>c</b> one	erecti	on - 1hr	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	N		r strike	e recorded
NS	STAL	LATI	ON D	ETA	ILS					Date	Hole	Casing	Depth to	Com	ment		TAIEF	LIMILO
IGSL RC FI 1	Date				RZ Top	RZ Base		Тур	De .	- 3.00	Depth	Depth	Water	20.1				



REPORT NUMBER

1	তিহ	55/																
CC	NTR	ACT	S	ever	ı Hills Wir	nd Farm							DRIL SHE	LHOLE ET	NO		- RC	
CC	-ORI	DINA	TES		587,88 743,62				RIG TYPE		GEO <sub>4</sub>	105	DAT	E COMM	IENCE	<b>D</b> 01/0	3/2021	
			VEL	•		71.84			FLUSH		Air/M			E COMP				
	GINE			nerg Ialaci	ia ny Walsh a T	and Partn	ers		CORE DIA		-90 <b>m)</b> 78			LED BY			iSL .O'She	a
Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Frac Spa Lc (m	cing og m)	Non-intact Zone	Legend			Descrip	tion			Depth (m)	Elevation	Standpipe Details	SPT (N Value)
3									as returns	s of sandy (	ING: No regravelly CO	covery obs			4.50	67.34		N = 50 (2, 19, 7, 10, 12, 21) N = 46 (4, 5, 7, 9, 11, 19) N = 52 (6, 9, 7, 12, 19, 14)
	6.00				_										6.00	65.84		
7	7.50	67	21	17					Possible F cobbly bo	ROCK with ulders with	clay bands layers of c	s - recovere lay	ed as grave	elly				N = 25/10 mm (25, 25) N = 25/10 mm
8	9.00	87	55	52				96000							9.45	62.39		(25, 25)
Ē		59	14	14											0.10	102.00		
75/25 RE	MAR		14	14				Н-	1						WA	L Ter st	RIKE	DETAILS
Ho			0.00-6	6.00r	n. Covid	19 Safe Z	Zone	erecti	on - 1hr	Water	Casing	Sealed	Rise	Time		mmen		
23000.GPJ IGSL.GDT H										Strike	Depth	At	То	(min)	N	lo wate	er strike	e recorded
	\T 4 ·		011							5 :	Hole	Casing	Denth to	0 6			VATEF	RDETAILS
RC FI TOM	Date		I <b>ON D</b> Tip D		RZ Top	RZ Base	)	Тур	ое	Date	Depth	Depth	Depth to Water	Con	nment	S		
IGSL F																		



REPORT NUMBER

1	<u></u>	-/																
СО	NTR	ACT	S	ever	n Hills Wir	nd Farm							DRII SHE	LLHOLE ET	E NO		- <b>RC</b> et 2 of	
CO	-ORE	DINA	TES		587,88° 743,629				DIO TVDE		0504	0.5	DAT	E COM	MENCE	<b>D</b> 01/0	3/2021	
GR	OUN	D LE	VEL	(mO		71.84			RIG TYPE FLUSH		GEO4 Air/Mi		DAT	E COMP	PLETE	01/0	3/2021	l
-	ENT			nerg		I D			INCLINATION	,	-90			LLED B		_	SL	
	GINE	EK	IV	lalaci	ny waish a	and Partne	ers		CORE DIA	METER (mr	<b>n)</b> 78		LOC	GED B	<u>Y</u>	D.	O'She	a 
Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Frac Spac Lo (mi	cing og m)	Non-intact Zone	Legend			Descript	ion			Depth (m)	Elevation	Standpipe Details	SPT (N Value)
- 10 -	10.70					12	200		grey/bluei: (slightly fo	very strong sh grey, find ssiliferous, slightly wea	e to mediur chert layer	n grained	LIMESTO					
11	11.70	100	87	72		54	19.9999	9999999	locally rou tight to loc 10.83-10.8	uities are wi igh, planar t cally open, l 85m & 12.1	to locally cu ocally clay/ 2-12.30m),	ırviplanar. gravel-fille locally cal	Apertures d (at citez-vein	are ed				
- 12	12.30	100	47	17			\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	0	10-15° & \	nick) locally very locally E KARST II	80°. <i>(contir</i> NFILL - Ret	urns of firr	n to stiff d	ark	12.30	59.54		
13		53	0	0		\. \.			brown sar Gravel is a limestone.	ndy slightly g angular to s	gravelly CL subrounded	AY. Sand fine to me	is fine to dedium of	oarse.				
14	13.80	100	41	41		\(\frac{1}{2}\)			clayey sar	E KARST IN ndy GRAVE subrounde	L. Sand is	fine to coa	rse. Grave			58.04		
15	15.30		71	71		79	90.00000	0000001	grey/blueis (slightly fo	very strong sh grey, fine ssiliferous, slightly wea	e to mediur chert layer	n grained	LIMESTO		14.70	57.14		
- 16	16.40	100	93	93		14	140		locally rou tight to loc 17.88-18.0	uities are wi igh, planar i cally open, l 00m), locall	to locally cu ocally clay/ y calcitez-v	ırviplanar. gravel-fille eined (1-2	Apertures d (at mm thick)	are				
17	17.40		100	100		67	70.00000	0000002	locally slig locally 80°	htly iron-ox	ide stained	. Dips are	10-15° & '	very				
18	18.30	100	93	81											18.30	53.54		
19									End (	of Borehole	at 18.30 m	I						
ĭ <del> </del>	MAR					10.6				\M/atc:	Coolin	Cocled	Dies	T:		TER ST	RIKE	DETAILS
INS	e cas	sed (	D.00-6	3.00r	n. Covid	19 Safe Z	one e	erection	on - 1hr	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	N		r strike	e recorded
INS	TALI	LATI	ON D	ΕΤΔ	ILS					Date	Hole	Casing	Depth t	O Cor	nment		· A I E F	. DE IAILO
	Date					RZ Base		Тур	)e	02-03-21	Depth 18.30	Depth 6.00	15.60		er level re		mins aft	er end of



REPORT NUMBER

(1) व्रह	27														_		
CONTR	ACT	S	ever	Hills Wi	nd Farm							DRI	LLHOL	E NO		- RC	
CO-ORI			(mO	587,88 743,64 <b>D)</b>				RIG TYPE FLUSH		GEO4 Air/Mi		DAT	E COM	MENCE MPLETE	<b>D</b> 25/0	2/2021	I
CLIENT			nerg Ialaci		and Partn	ers		INCLINATION CORE DIA		-90			LLED E			SL O'She	a
Downhole Depth (m) Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Spa Lo (m	oture cing og m)	Non-intact Zone	Legend			Descrip	tion			Depth (m)	Elevation	Standpipe Details	SPT (N Value)
0   1   2   2.20   3   3.70   4   5   5.20   6   6.70   7   8   8.20   9   9.70	100	91 95 88	81 86 95 67			5520		Strong to grey/bluei: (slightly fo to locally su locally rou locally rou tight to loc 4.20-4.24	very strong sh grey, fin ssiliferous slightly wea uities are w gh, planar ally open, m & 5.44-5 illy slightly	g, thickly to gravelly CO to be to mediu, chert laye athered. Additionally clay and control of the control of t	thinly bedd m grained ring, local s sely space urviplanar. /gravel-fille	ed, dark LIMESTO stylolites), d, smooth Apertures d (at -veined (1	NE fresh to s are	2.20	66.93		N = 25/30 mm (25, 25)
REMAF	 RKS													WA	 TER S1	RIKE	DETAILS
Hole ca	sed	0.00-2	2.20r	n. Covid	19 Safe 2	Zone	erecti	on - 1hr	Water Strike	Casing Depth	Sealed At	Rise To	Tim (mir		mmen	ts	
											,		(		lo wate	er strike	e recorded
														GR	OUNDV	VATER	R DETAILS
NSTAL					ID 7 5				Date	Hole Depth	Casing Depth	Depth Wate	to Co	omment	S		
Date	9	Tip D	epth	RZ Top	RZ Base		Тур	oe									



REPORT NUMBER

1995			DDILLUG	N E NO	<b>-</b>		
CONTRACT Seven Hills Wind Farm			DRILLHO SHEET	DLE NO		- <b>RC</b> et 2 of 2	
CO-ORDINATES 587,883.00 E 743,646.00 N  GROUND LEVEL (mOD) 69.13  CLIENT Energia	RIG TYPE  FLUSH INCLINATION (deg)	GEO405 Air/Mist -90	DATE CO		25/0: IG	2/2021 SL	
ENGINEER Malachy Walsh and Partners	CORE DIAMETER (mn	<b>1)</b> 78	LOGGED	BY	D.	O'She	a
Core Run Depth (m)  Core Run Depth (m)  T.C.R.%  S.C.R.%  S.C.R.%  R.Q.D.%  R.Q.D.%  Non-intact Zone		Description		Depth (m)	Elevation	Standpipe Details	SPT (N Value)
100 93 83	Strong to very strong, grey/blueish grey, fine (slightly fossiliferous, to locally slightly weat	e to medium grained L chert layering, local st	IMESTONE	1			
100 100 92 550.0000000000000000000000000000000000	Discontinuities are will locally rough, planar to tight to locally open, led 4.20-4.24m & 5.44-5.  Thick) locally slightly invery locally 80°. (continuity locally 80°.)	o locally curviplanar. A ocally clay/gravel-filled 46m), locally calcitez-v on-oxide stained. Dips inued)	Apertures are I (at veined (1-2mn	n k	56.93		
- 13							
14							
15							
16							
17							
18							
-19							
					ER ST	RIKE	DETAILS
Hole cased 0.00-2.20m. Covid 19 Safe Zone ere	tion - 1hr Water Strike	Casing Sealed Depth At		nin) N		r strike	recorded
INSTALLATION DETAILS	Date	Hole Casing	Depth to	GRO		VAIER	DETAILS
	ype 26-02-21	Depth Depth 12.20 2.20	7.50 V	Vater level redrilling.		mins afte	er end of



REPORT NUMBER

		/																
	NTR			ever	n Hills Wir	nd Farm							DRIL	LHOLE ET	NO		- <b>RC</b> et 1 of	
	-ORE		TES	(mO	588,33 743,47				RIG TYPE		GEO4			COMP				
	IENT	ט בנ		nera	•	07.24			FLUSH	ON (dea)	Air/Mis	t		LED B			2/2020 iSL	)
1	GINE	ER		U	na hy Walsh a	and Partn	ers		CORE DIA	,	-90 <b>m)</b> 78			GED B			o'She	a
			T	-a.ao.	11, 114.6		0.0		OUTLE DIFE		, 70		-55		_		0 0110	
Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Frac Spa Lo (m	cing og m)	Non-intact Zone	Legend			Descripti	on			Depth (m)	Elevation	Standpipe Details	SPT (N Value)
- 0								000	SYMMET as returns	RIX DRILL of sandy (	ING: No rec	overy, obs	erved by d	riller				
1		0	0	0				0.0										
Ē,	1.50							000							1 50	85.74		
Ė	1.50							000	SYMMET	overy, obs	erved by di	riller	1.00	00.74		N = 23 (3, 5, 4, 7, 5,		
								0-0	as returns	of clayey s	sandy GRA\	'EL						7)
<u> </u>		0	0	0														
Ē								00	SAMMET	DIY DDII I	ING: No rec	overy obe	oryod by d	rillor	2.70	84.54		
3	3.00				-					of possible		overy, obs	cived by di	illo				
E																		
Ē		0	0	0					CVMMET	DIV DDILL	ING: No rec	avary aba	aniad by d	rillor	3.80	83.44		
4								00	as returns	of sandy (	GRAVEL	overy, obs	erved by di	riller	4.30	82.94		
Ē	4.50		-					Ĥ		RIX DRILL of ROCK	ING: No rec	overy, obs	erved by di	riller				
Ė									as returns	OI HOOK								
5		0	0	0				H										
Ė								H										
Ē.	6.00							H										
6	0.50	0	0	0				H							6 50	80.74		
E	6.50				-				End	of Borehole	e at 6.50 m				6.50	80.74		
Ę,																		
Ę,																		
Ė																		
F 8																		
Ė																		
E																		
- 9																		
Ė																		
Ē																		
RE	MAR				1				1				5.	_	WA	TER ST	RIKE	DETAILS
Ho	le ca	sed	0.00-2	2.70r	m. Covid	19 Safe 2	Zone	erecti	on - 1hr	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Co	mmen	ts	
												T			N	lo wate	r strike	e recorded
5																		
											Hele	Cooler	Dental		GR	OUNDV	VATER	RDETAILS
INS			ON D							Date	Hole Depth	Casing Depth	Depth to Water	Con	nment	S		
REMARKS Hole cased 0.00-2.70m. Covid 19 Safe Zone erections INSTALLATION DETAILS  Date Tip Depth RZ Top RZ Base Ty								Тур	oe									
<u> </u>						L	1			1		1	1					



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/		7																
	NTR			ever	n Hills Wir								DRI SHE	LLHOL ET	E NO		<b>P - RC</b> et 1 of	
	-ORE		TES	(mO	588,35 743,44 <b>D)</b>				RIG TYPE FLUSH		GEO4 Air/Mis			E COM				
- 1	IENT GINE	ER		nerg Ialaci	ia hy Walsh a	and Partn	ers		INCLINATION CORE DIA		-90			LLED B			SL .O'She	a
Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Frac Spa Lo (m 0 <sup>250</sup>	cing og m)	Non-intact Zone	Legend			Descript	ion			Depth (m)	Elevation	Standpipe Details	SPT (N Value)
- 1	1.50	0	0	0				000000000000000000000000000000000000000	as returns	of sandy (					1.50	88.47		
2	3.00	0	0	0	_				SYMMETI as returns	RIX DRILLI of clayey s	NG: No rec sandy GRA\	overy, ob /EL	served by	driller	3.10	86.87		N = 15 (1, 2, 2, 4, 4, 5)
4	4.50	0	0	0					SYMMETI as returns	RIX DRILLI of ROCK	NG: No rec	overy, ob	served by	driller				N = 25/10 mm (7, 25, 25)
5	5.40	0	0	0	-				End (	of Borehole	e at 5.40 m				5.40	84.57		
7																		
RE	MAR		0.00	2.40	1	1001			41	Mator	Casina	Soalad	Dico	Time		TER ST	TRIKE	DETAILS
RE HO	le cas	sed	0.00-	3.10r	n. Covid	19 Safe 2	<u>cone</u>	erecti	on - 1hr	Water Strike	Casing Depth	Sealed At	Rise To	Time (min	)   00		er strike	e recorded
Ñ <b>∑</b>			1017.								Hole	Casing	I Denth	0 -			VATEF	RDETAILS
ins	Date		Tip D		RZ Top	RZ Base	)	Тур	De	Date	Depth	Depth		∵  Co	mment	S		
<u>5</u>																		



REPORT NUMBER

1	(a)	-/																
СО	NTR	ACT	S	ever	n Hills Wir	nd Farm							DRIL SHEI	LHOLE ET	NO		- <b>RC</b> et 1 of	
co	-ORE	ANIC	TES		588,16 742,94				RIG TYPE		GEO4	05	DATE	COM	MENCE			
		D LE	VEL		D)	79.95			FLUSH		Air/Mi			COMP				)
	ENT GINE	ER		nerg Ialaci	ia hy Walsh a	and Partn	ers		INCLINATION CORE DIA		-90 <b>m)</b> 78		l l	LED B'			SL O'She	а
Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Frac Spac Lc (m	ture cing og m)	n-intact Zone	Legend			Descript	ion			Depth (m)	Elevation	Standpipe Details	SPT (N Value)
1	1.50	0	0	0				0-	as returns	s of clayey s	NG: No rec candy GRA' NG: No rec	/EL			1.30	78.65		
2	3.00	0	0	0														
4	3.50								End	of Borehole	e at 3.50 m				3.50	76.45		
7 8 9																		
75/5/2 <b>REI</b>	MAR				1			1	I	144		0 / . '	D: 1	<b>T</b> '	WA	TER ST	RIKE	DETAILS
CSL RC FI 10M 23000.GPJ   IGSL.GDT 20/5/22	e cas	sed (	).00- <sup>-</sup>	1.30r	n. Covid	19 Safe	Zone	erecti	on - 1hr	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	N		r strike	e recorded
™S INS	TALI	LATI	ON D	ETA	ILS					Date	Hole	Casing	Depth to Water	Con	nment		.AILF	. JETAILO
IGSL RC FI	Date Tip Depth RZ Top RZ Base Typ									-	Depth	Depth	vvaler					



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10	00	-/																
СО	NTR	ACT	S	ever	n Hills Wir	nd Farm							DRII SHE	LHOLI ET	E NO		- <b>RC</b> et 1 of	
СО	-ORE	OINA	TES		588,150 742,980				RIG TYPE		GEO4	05	DAT	E COM	MENCE	<b>D</b> 17/1	2/2020	)
		D LE	VEL	•		80.01			FLUSH		Air/Mis			E COM				)
	IENT GINE	ER		nerg lalaci	ia hy Walsh a	and Partn	ers		CORE DIA		-90 <b>m)</b> 78			LED B			iSL O'She	а
Downhole Depth (m)		T.C.R.%	S.C.R.%	R.Q.D.%	Frac Spac Lc (mi	ture cing og m)	Non-intact Zone	Legend			Descript	ion			Depth (m)	Elevation	Standpipe Details	SPT (N Value)
1	1.50	0	0	0					as returns	s of clayey s	ING: No rec sandy GRA\	/EL			1.50	78.51		N. CC
2	3.00	0	0	0					as returns	of sandy (	ING: No rec GRAVEL				3.00	77.01		N = 26 (2, 4, 5, 5, 9, 7)
4	4.50	0	0	0					as returns	of gravelly	SAND	•	·		4.50	75.51		(3, 3, 9, 5, 5, 3) N = 22
5	6.00	0	0	0	_				as returns	s of sandy g	ING: No rec gravelly COE	BBLËS			6.00	74.01		(2, 4, 7, 5, 6, 4)
7	7.50	0	0	0					as returns	RIX DRILL s of clayey (	ING: No rec gravelly COI	overy, obs 3BLES	served by (	ariller	7.50	72.51		N = 33 (2, 11, 7, 6, 9, 11)
8		0	0	0					as returns	of gravelly	NG: No rec CLAY	·	·		8.70	71.31		N = 47 (4, 7, 9, 12, 12, 14)
9 RE	9.00	0	0	0	-				as returns			1110-		-Duze	DETAILS			
Hol	MAR le cas		3-00.0	3.70r	n. Covid	19 Safe 2	Zone	erection	on - 1hr	Water	Casing	Sealed	Rise	Time		mmen		DETAILS
RC FI 10M   23000.GPJ   IGSL.GDT	. 500			01	. 55110	- 5010 2	0	2.000		Strike	Depth	At	То	(min	) C0	lo wate	r strike	e recorded
NS INS	TAL	LATI	ON D	ETA	ILS					Date	Hole	Casing	Depth t Water	o Coi	mment		-AIL	DETAILS
IGSL RC FI 1	Date				RZ Top	RZ Base	9	Тур	)e		Depth	Depth	vvater	331		-		



REPORT NUMBER

10	<u></u>	5/																
	NTR			ever	n Hills Wir								DRIL SHEE	LHOLE ET	NO		8 - RC et 2 of	
			TES	(mO	588,150 742,980 <b>D)</b>	6.86 E 0.56 N 80.01			RIG TYPE FLUSH		GEO4 Air/Mi		l l	СОМР				
	ENT GINE			nerg Ialaci	ia ny Walsh a	and Partn	ers		INCLINATI CORE DIA	ON (deg) METER (mr	-90		l l	LED BY GED BY			SL O'She	a
Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Frac Spac Lo (mi	cing og m)	Non-intact Zone	Legend			Descript	ion			Depth (m)	Elevation	Standpipe Details	SPT (N Value)
10	10.50								SYMMET as returns	RIX DRILLI of ROCK (	NG: No red (continued)	overy, obs	served by d	riller				
- 11	11.00	0	0	0	-				End	of Borehole	at 11.00 m	1			11.00	69.01		
13 13 14 15 16 17 17 18 18 19 <b>REI</b>	MAR	KS													WAT	FER ST	TRIKE	DETAILS
Hol	e ca	sed (	0.00-8	8.70r	m. Covid	19 Safe 2	Zone	erecti	on - 1hr	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)		mmen		e recorded
			<b></b> -							_	Hole	Casing	Denth to	)   -			VATEF	RDETAILS
	TAL Date		ON D		RZ Top	RZ Base	9	Тур	ре	Date	Depth	Depth	Depth to Water	Com	ıment	S		



REPORT NUMBER

CONTRAC	CT			Hills Wir	nd Form							DRII	LHOLE	NO	T1/	- RC	201
			even									SHE		140		et 1 of	
GROUND CLIENT		<b>VEL (</b> Er	nerg	ia	9.12 N 86.77			RIG TYPE FLUSH INCLINATION	ON (deg)	GEO4 Air/Mi: -90		DATE	COMP	LETEI	D 18/1	2/2020 SL	)
ENGINEE	R	Ma	alach	ny Walsh a I	and Partn	ers		CORE DIA	METER (m	<b>m)</b> 78		LOG	GED B	<u> </u>	D.	O'She	a I
Downho Core Ru	T.C.R.%	S.C.R.%	R.Q.D.%	Frac Spac Lo (mi	cing og m)	Non-intact Zone	Legend			Descript				Depth (m)	Elevation	Standpipe Details	SPT (N Value)
1.50	0	0	0					as returns	s of sandy g	ING: No rec gravelly CLA	XY			1.50	85.27		
3.00	0	0	0				9-00-00 P	SYMMETI as returns	RIX DRILL s of sandy c	ING: No rec cobbly GRA	overy, obs VEL	served by d	riller				N = 12 (1, 2, 3, 2, 4, 3)
3	0	0	0				\$ 8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0							4.50	82.27		N = 35 (5, 3, 7, 9, 11 8)
6.00	0	0	0					SYMMETI as returns	RIX DRILL of ROCK	ING: No red	overy, obs	served by d	riller				N = 25/10 mr (25, 25)
6.70	0	0	0					End (	of Borehole	e at 6.70 m				6.70	80.07		
- 8	0	0	0														
10.00																	
REMARKS		00.4	FO	n Co.:	10 5242 7	7025	oro sti	on the	Water	Casing	Sealed	Rise	Time				DETAILS
Hole case	ea O	.00-4	.5Ur	ii. Covid	IS SATE 2	cone	erecti	on - Inr	Strike	Depth	At	To	(min)	N		r strike	e recorded
INSTALLA	ΔΤΙΛ	ים אכ	FΤΔΙ	II S					Date	Hole	Casing	Depth to Water	Con	GRO		VATEF	RDETAILS
Date				RZ Top	RZ Base	9	Тур	oe .	Date	Depth	Depth	Water	3011	iont			



REPORT NUMBER

	NIT D	/			. 1 1:11 - 147:								DPII	LHOLE	- NO	T4 /	- RC	200
	NTR			ever	n Hills Wir								SHE	_	INO		et 1 of	
GR		D LE	VEL						RIG TYPE FLUSH		GEO4 Air/Mis			E COMP		<b>D</b> 21/1	2/2020	
1	IENT GINE			nerg Ialaci	ia hy Walsh a	and Partn	ers		CORE DIA		-90 <b>m)</b> 78		l	LED B			iSL .O'She	a
Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Frac Spa Lo (m 0 <sup>250</sup>	cing og m)	Non-intact Zone	Legend			Descript	ion			Depth (m)	Elevation	Standpipe Details	SPT (N Value)
1	1.50	0	0	0					as returns	s of sandy g	ING: No rec gravelly CLA	Y			1.50	82.93		
2	3.00	0	0	0				000000000000000000000000000000000000000	as returns	of sandy (					3.00	81.43		N = 12 (2, 4, 2, 3, 3, 4)
4	4.50	0	0	0					as returns	of sandy o	ING: No rec	VEL	79.93		N = 25 (3, 6, 5, 5, 6, 9)			
5	6.00	0	0	0					as returns	RIX DRILL of ROCK	ING: No rec	overy, ob:	served by c	driller				N = 57/95 mm (4, 6, 7, 25, 25)
- 6	6.90	0	0	0	_				End o	of Borehole	e at 6.90 m				6.90	77.53		
8																		
RE Hol	MAR le ca		0.00-	4.50r	m. Covid	19 Safe 2	Zone	erecti	on - 1hr	Water	Casing	Sealed	Rise	Time	Co	TER SI		DETAILS
RE HOLL	_ 54				. 50110	2 2410 2	.5.10			Strike	Depth	At	To	(min)	N	lo wate	er strike	e recorded
Ž										_	Hole	Casing	Danth t	0 .			VATER	RDETAILS
INS	Date		Tip D		RZ Top	RZ Base	Э	Тур	De .	Date	Depth	Depth	Depth t Water	Cor	nment	S		
IGSL																		



REPORT NUMBER

/		7																
	NTR			ever	n Hills Wir									LLHOL EET	E NO		- <b>RC</b> et 1 of	
	OUN		TES	(mO	588,86 744,15 <b>D)</b>				RIG TYPE FLUSH		GEO4 Air/Mis			TE COM				
- 1	IENT GINE			nerg lalaci	ia ny Walsh a	and Partr	ers		CORE DIA	,	-90 <b>m)</b> 78			LLED E			SL O'She	a
Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Frac Spa Lo (m 0 <sup>250</sup>	cing og m)	Non-intact Zone	Legend			Descripti	on			Depth (m)	Elevation	Standpipe Details	SPT (N Value)
- 1	1.50	0	0	0					SYMMETI as returns	RIX DRILLI of sandy g	NG: No rec ravelly CLA	overy, ob Y	served by	driller				N. GA
2	3.00	0	0	0											3.00	69.61		N = 64 (4, 9, 12, 21, 14, 17)
3	3.70	0	0	0				\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	as returns	of sandy g	NG: No rec ravelly COE , thickly to tl	BBLÉS		driller		68.91		N = 79 (7, 11, 15, 17, 24, 23)
4	5.20	100	100	100			920		grey/bluei: (slightly fo to locally s Discontinu	sh grey, fin ssiliferous, slightly wea uities are w	e to mediun chert layeri	n grained ng, local ely space rviplanar	LIMESTO stylolites), ed, smooth . Aperture	fresh				
6	6.70	100	87	87	-		4		5.69-5.78	<ul><li>m) locally c</li></ul>	alcitez-vein	ed (1-2m	m thick) lo	cally				
7	7.70	100	97	97			710											
8	8.90	100	99	99			920		End o	of Borehole	at 8.90 m				8.90	63.71		
RE	MAR									147		0 1 1	5:			TER ST	RIKE	DETAILS
RE HO	le ca:	sed (	0.00-3	3.70r	n. Covid	19 Safe	Zone	erecti	on - 1hr	Water Strike	Casing Depth	Sealed At	Rise To	Time (min	N		er strike	e recorded
3											Hole	Casing	1 Donth	to			VATEF	RDETAILS
ins	Date		ON D		RZ Top	RZ Base	9	Тур	De .	Date	Depth	Depth		r Co	mment	S		
3																		



REPORT NUMBER

CONTRA	СТ	S	ever	n Hills Wir	nd Farm								LHOLE	NO		- RC				
GROUNE CLIENT ENGINEE	) LE	EVEL	nerg		3.62 N 71.83	ers		RIG TYPE FLUSH INCLINATION		GEO4 Air/Mis -90 <b>n)</b> 78		DAT	E COMM E COMP LLED BY	PLETEI Y	ED 30/1 D 30/1		)			
Downhole Depth (m) Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Frac Spac Lc (m)	ture cing og m)	on-intact Zone	Legend			Descripti	ion			Depth (m)	Elevation	Standpipe Details	SPT (N Value)			
1 1.50	0	0	0					as returns	of sandy c	NG: No rec obbly CLAY	,			1.50	70.33		N. FC			
3.00	0	0	0	-			000000000000000000000000000000000000000	as returns	RIX DRILLI of sandy (	NG: No rec GRAVEL	overy, ob	served by o	ariller				N = 56 (7, 14, 17, 12 11, 16) N = 50/20 mn			
4.50	0	0	0				0.0000000000000000000000000000000000000	SYMMETI	RIX DRILLI	NG: No rec	overy, ob	served by o	driller	4.50	67.33		(4, 20, 25, 25) N = 87			
6.00	0	0	0					as returns	of gravelly	COBBLES				6.00	65.83		(6, 17, 21, 20, 22, 24) N = 91			
7 7.50	0	0	0	_					RIX DRILLI	NG: No rec ES NG: No rec				6.50	65.33		(3, 19, 17, 21 25, 28)			
8 8.70	0	0	0	-				End (	of Borehole	at 8.70 m				8.70	63.13					
REMARK Hole cas		0.00-8	3.70r	m. Covid	19 Safe 2	Zone	erecti	on - 1hr	Water Strike	Casing Depth	Sealed At	WATER STRIKE DETAILS  d Rise Time (min) Comments  No water strike record								
INSTALL Date				ILS RZ Top	RZ Base	9	Тур	oe	Date .	Hole Depth	Casing Depth		O Con	GRO		VATEF	R DETAILS			



REPORT NUMBER

1		-/																
СО	NTR	ACT	S	ever	n Hills Wir	nd Farm							DRII SHE	LHOLI ET	E NO		- <b>RC</b> et 1 of	
СО	-ORE	INA	TES		589,36 <sup>3</sup>				RIG TYPE		GEO4	05	DAT	E COM	MENCE			
		D LE	VEL	(mO	D)	78.30			FLUSH		Air/Mi:		DAT	E COM	PLETE			)
- 1	IENT GINE	ER		nerg lalaci	ia hy Walsh a	and Partn	ers		INCLINATION CORE DIA		-90 <b>m)</b> 78		<b>I</b>	LED B			iSL O'She	a
Downhole Depth (m)		T.C.R.%	S.C.R.%	R.Q.D.%	Frac Spac Lo (mi	ture cing og m)	Non-intact Zone	Puegend	OOTIL DIA		Descript	ion	1200		Depth (m)	Elevation	Standpipe Details	SPT (N Value)
1	1.50	0	0	0					as returns	of clayey s	ING: No receandy grave	elly COBBI	LES		1.50	76.80		
2	3.00	0	0	0					as returns	of gravelly	SAND  NG: No rec  gravelly COI	overy, ob:	·		3.00	75.30		
4	4.50	0	0	0							,							
6	6.00	0	0	0	_				SYMMET	RIX DRILLI of ROCK	NG: No red	overy, obs	served by o	driller	5.30	73.00		
7	7.50	0	0	0	_				End (	of Borehole	e at 7.50 m				7.50	70.80		
8 9 9																		
<b>RE</b>	MAR		200	- 70	- O-: ! !	10.0-1	7	- · ·	a.a. 41-:	Water	Casina	Spaled	Rise	Time		TER ST	RIKE	DETAILS
RE   HO   R30000.GPJ   GSC. GD   2005/22	le ca	sed (	J.00-!	5.70r	n. Covid	19 Safe 2	∠one	erecti	on - 1hr	Water Strike	Casing Depth	Sealed At	To	Time (min	) C0		r strike	e recorded
NS	STAL	LATI	ON D	ETA	ILS					Date	Hole	Casing	Depth t Water	O Coi	mment		·AILI	. DETAILU
IGSL RC FI	Date Tip Depth RZ Top RZ Base Type									-	Depth	Depth	vvaler					



REPORT NUMBER

1	(a)	-/																
СО	NTR	ACT	S	ever	n Hills Wir	nd Farm							DRIL SHE	LHOLE ET	NO		- <b>RC</b> et 1 of	
СО	-ORE	DINA	TES		589,399 744,479				RIG TYPE		GEO4	05	DATI	Е СОМ	MENCE	<b>D</b> 22/1	2/2020	)
			VEL	(mO	D)	77.44			FLUSH		Air/Mi:			COMF				)
1	IENT GINE			nerg Ialaci	ia hy Walsh a	and Partn	ers		INCLINATION CORE DIA		-90 <b>m)</b> 78			LED B' GED B			iSL O'She	a a
Downhole Depth (m)		T.C.R.%	S.C.R.%	R.Q.D.%	Frac Spac Lo (m	ture cing og m)	n-intact Zone	Legend			Descript	ion			Depth (m)	Elevation	Standpipe Details	SPT (N Value)
- 1	1.50	0	0	0	0 250		2		as returns	s of clayey (	ING: No rec gravelly CO ING: No rec	BBLES				75.94		N = 28 (4, 7, 5, 9, 7, 7)
3	3.00	0	0	0	_					RIX DRILLI of ROCK	NG: No rec	overy, obs	served by d	riller	2.70	74.74		,
4	4.50	0	0	0	_													
5 5 6 6 7 7 8 8 ZZ/9/0	5.00									of Borehole	e at 5.00 m					72.44	TRIKE	DETAILS
Ho Ho			0.00-2	2.70r	m. Covid	19 Safe 2	Zone	erecti	on - 1hr	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Co	mmen		
IGSL RC FI 10M 23000.GPJ IGSL.GDT 20/5/22										Suike	Depth	At	10	(111111)	N	lo wate	r strike	e recorded
ĕ INS	ΤΔΙΙ	LATI	ON D	EΤΔ	ILS					Date	Hole	Casing	Depth to Water	Cor	nment		VAIE	DETAILS
ISL RC FI1	Date				RZ Top	RZ Base	Э	Тур	De	Date	Depth	Depth	Water	001				
의						l	1			1			1					



REPORT NUMBER

1	(a)	3/																
СО	NTR	ACT	S	ever	n Hills Wir	nd Farm							DRIL SHE	LHOLE ET	NO		' - RC et 1 of	
	-ORE				589,65 744,13				RIG TYPE		GEO4	.05	DAT	E COM	MENCE	<b>D</b> 07/0	1/2021	1
		D LE	VEL			85.93			FLUSH		Air/Mi			E COMP				1
	IENT GINE	ER		nerg Ialacl	ia hy Walsh a	and Partn	ers		INCLINATION CORE DIA		-90 <b>m)</b> 78		I	LED B' GED B			iSL .O'She	a
Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Frac Spac Lo (m	cing og m)	Non-intact Zone	Legend			Descript	ion	'		Depth (m)	Elevation	Standpipe Details	SPT (N Value)
1	1.50	0	0	0					as returns	RIX DRILL s of sandy ς	ING: No rec gravelly CO	covery, obs BBLES	served by o	driller				N = 41
2	3.00	0	0	0														(5, 21, 14, 7, 9, 11)
3	0.00	0	0	0											4.20	81.73		N = 39 (4, 5, 5, 11, 9, 14)
5	4.50	0	0	0	-				SYMMETI as returns	RIX DRILL of ROCK	ING: No red	covery, obs	served by c	driller				
- 6	6.00				-			H										
	6.50	0	0	0	-				End	of Borobole	e at 6.50 m				6.50	79.43		
77 88 99										. 25/3/10/6								
<b>RE</b> I	MAR		2.00	4.00	. Oardel	10.0-4-	7		- 45	Water	Casing	Sealed	Rise	Time				DETAILS
IGSL RC FI 10M 23000.GPJ IGSL.GDT 20/5/22	e cas	sed (	J.UU-4	4.20r	n. Covid	19 Safe 2	∠one	erecti	on - 1hr	Strike	Depth	At At	To	(min)	N		er strike	e recorded
NS	TALI	LATI	ON D	ETA	ILS					Date	Hole	Casing	Depth to	0 Cor	nment		VAIE	I DE IMILO
IGSL RC FI	Date Tip Depth RZ Top RZ Base Type										Depth	Depth	vvater	331	.5			



REPORT NUMBER

10	(a)	7																
	NTR			ever	n Hills Wir	nd Farm							DRIL SHE	LHOLE ET	NO		' - RC et 1 of	
	-ORE		TES	(mO	589,678 744,10°				RIG TYPE FLUSH		GEO4 Air/Mi:			E COMP				
CL	IENT		Е	nerg	ia				INCLINATI		-90	ol.	1	LED B			iSL	
	GINE	ER	I	lalaci	hy Walsh a	and Partn	ers		CORE DIA	METER (m	<b>m)</b> 78		LOG	GED B	Y 	D.	.O'She	a
Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Frac Spac Lo (mi	cing og m)	Non-intact Zone	Legend			Descript				Depth (m)	Elevation	Standpipe Details	SPT (N Value)
1	1.50	0	0	0					as returns	RIX DRILL s of sandy g	ING: No rec gravelly COI	overy, obs 3BLES	served by c	Iriller				
2		0	0	0														N = 41 (7, 12, 9, 7, 11, 14)
3	3.00	0	0	0														N = 25/10 mm (25, 25)
5	6.00	0	0	0					SYMMET	RIX DRILL of ROCK	ING: No rec	overy, obs	served by c	Iriller	4.90	82.67		N = 56/235 mm (4, 5, 5, 9, 17, 25)
7	7.10	0	0	0					End	of Borehole	at 7 10 m				7.10	80.47		
8									LIIU	5. 20101016	, aa 7.10 III							
RE	MAR		n nn	1 00-	n Could	10 Sofo	7022	orost:	on - 1hr	Water	Casing	Sealed	Rise	Time				DETAILS
IGSL RC FI 10M 23000.GPJ IGSL.GDT 20/5/22	ie ca:	sea	J.UU-4	4.9UI	n. Covid	is sate 2	Lone	erecti	un - Inr	Strike	Depth	At	To	(min)	N		er strike	e recorded
S INS	STAI	LAT	ON D	ΕΤΔ	ILS					Date	Hole	Casing	Depth to Water	Con	nment		VAIE	DETAILS
IGSL RC FI 1	Date				RZ Top	RZ Base	9	Тур	De .	Date	Depth	Depth	water	001				



REPORT NUMBER

/		7																
	NTR			ever	n Hills Wir								DRII SHE	LHOLE ET	NO		<b>- RC</b> et 1 of	
GR		D LE	VEL						RIG TYPE FLUSH		GEO4 Air/Mis		DAT	E COMP	PLETE	<b>D</b> 05/0	1/2021	
	IENT GINE			nerg Ialaci	ia hy Walsh a	and Partn	ers		CORE DIA		-90 <b>m)</b> 78			LED B			SL O'She	a
Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Frac Spa Lo (m 0 <sup>250</sup>	cing og m)	Non-intact Zone	Legend			Descripti	ion			Depth (m)	Elevation	Standpipe Details	SPT (N Value)
1	1.50	0	0	0					as returns	RIX DRILL s of sandy g	NG: No rec ravelly COE	overy, ob: BBLES	served by o	driller				N = 23
2	3.00	0	0	0						RIX DRII I	NG: No rec	overv oh	served by	driller	3.00	85.59		(3, 4, 6, 5, 5, 7) N = 23
4	4.50	0	0	0				000000000000000000000000000000000000000	as returns	s of sandy (	BRAVEL	overy, ob.	served by C	Jimei				(2, 3, 3, 5, 7, 8) N = 67/95 mm
5	6.00	0	0	0					SYMMETI as returns	RIX DRILL of ROCK	NG: No rec	overy, ob	served by o	driller	4.80	83.79		(6, 5, 17, 25, 25)
7	7.10	0	0	0					End (	of Borehole	e at 7.10 m				7.10	81.49		
8																		
RE	MAR le cas		0 00-	4 80,	m. Covid	19 Safe 3	70ne	erecti	on - 1hr	Water	Casing	Sealed	Rise	Time				DETAILS
RE	ie Cal	seu I	U.UU-	1.0Uľ	n. Covid	IJ SAIE 2	Lone	erec(l	OH - IIII	Strike	Depth	At	To	(min)	N		er strike	e recorded
IVIC	TAL		ON D	LT A	11 6					Data	Hole	Casing	Depth t	0 0			VATER	RDETAILS
INS	Date				RZ Top	RZ Base	9	Тур	ре	Date	Depth	Depth	Depth t Water	Cor	nment	5		
2												1						



IGSL.GDT

23000.GPJ

10M

RC

GSL

### GEOTECHNICAL CORE LOG RECORD

REPORT NUMBER

23000

**DRILLHOLE NO** CONTRACT Seven Hills Wind Farm T18 - RC02 SHEET Sheet 1 of 1 **CO-ORDINATES** 590,521.18 E **DATE COMMENCED** 05/01/2021 744,202.41 N **RIG TYPE GEO405 GROUND LEVEL (mOD)** DATE COMPLETED 05/01/2021 90.87 **FLUSH** Air/Mist CLIENT INCLINATION (deg) **DRILLED BY** IGSI Energia -90 **ENGINEER CORE DIAMETER (mm) LOGGED BY** Malachy Walsh and Partners D.O'Shea 78 Standpipe Details Downhole Depth Run Depth T.C.R.% S.C.R.% Non-intact Zone Fracture R.Q.D. (N Value) Spacing Description Log  $\Xi$ Elevation (mm) Legend Depth ( Core 250 0 SYMMETRIX DRILLING: No recovery, observed by driller as returns of sandy gravelly COBBLES 8 0 0 0 0 0 ) 0 1.50  $\bigcirc$ 1.50 89.37 SYMMETRIX DRILLING: No recovery, observed by driller N = 17 (1, 3, 3, 4, 5, 000 as returns of sandy GRAVEL 5) 0.0 2 0 0 0 000 3.00 87.87 3.00 3 0 SYMMETRIX DRILLING: No recovery, observed by driller N = 25 (2, 4, 5, 7, 6, 7) as returns of gravelly SAND 0 0 0 4.50 86.37 4.60 N = 50/20 mm Strong to very strong, thickly to thinly bedded, dark (3, 25, 25)grey/blueish grey, fine to medium grained LIMESTONE (slightly fossiliferous, chert layering, local stylolites), fresh to locally slightly weathered. 100 100 0 Discontinuities are widely to closely spaced, smooth to locally rough, planar to locally curviplanar. Apertures are tight to locally open, locally clay/gravel-filled (at 6.10 8.82-8.94m), locally calcitez-veined (1-2mm thick) locally slightly iron-oxide stained. Dips are 10-15° & very locally 100 98 0 1040 7.60 ັ 8 100 91 0 8.60 100 76 0 9.60 9.60 81.27 End of Borehole at 9.60 m **WATER STRIKE DETAILS** Water Casing Sealed Rise Hole cased 0.00-4.60m. Covid 19 Safe Zone erection - 1hr Time Comments Strike Depth Αt То (min) No water strike recorded **GROUNDWATER DETAILS** Hole Casing Depth to Water **INSTALLATION DETAILS** Date Comments Depth Depth Tip Depth RZ Top RZ Base Date 05-01-21 Type 9.60 4 60 7 80 Water level recorded 5 mins after end of 05-01-21 9.60 3.60 9.60 50mm SP



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СО	NTR	ACT	S	ever	n Hills Wir	nd Farm							DRIL SHE	LHOLE ET	NO		- <b>RC</b> et 1 of	
СО	-ORE	OINA	TES		590,47 744,60				RIG TYPE		GEO4	.05	DATE	COMM	MENCE	<b>D</b> 06/0	1/202	1
		D LE	VEL			108.45	5		FLUSH		Air/Mi			COMP				1
	IENT GINE	ER		nerg Ialaci	ia hy Walsh a	and Partn	ers		INCLINATION CORE DIA		-90 <b>m)</b> 78			LED B\ GED B\			iSL .O'She	a
Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Frac Spac Lo (m	eture cing og m)	Non-intact Zone	Legend			Descript	ion	,		Depth (m)	Elevation	Standpipe Details	SPT (N Value)
1	1.50	0	0	0				000000000000000000000000000000000000000	as returns	of sandy (	ING: No red GRAVEL ING: No red				1.50	106.95		N = 25/10 mm
2	3.00	0	0	0					as returns	of sandy g	gravelly COI	BBLES			3.00	105.45		(25, 25) N = 33
4	4.50	0	0	0	_			0000		of sandy (	GRAVEL	overy, obs	served by d	riller	4.50	103.95		(2, 5, 7, 8, 9, 9) N = 25/10 mm
5 6	6.00	0	0	0	-				as returns	of ROCK								(25, 25)
7	6.70	0	0	0	_				End (	of Borehole	e at 6.70 m				6.70	101.75		
8 9																		
REI	MAR		) NO	4 50	m. Covid	19 Səfə 3	7 <sub>0ne</sub>	erecti	on - 1hr	Water	Casing	Sealed	Rise	Time				DETAILS
CSL RC FI 10M 23000.GPJ   GSL.GDT 20/5/22	e cas	seu (	J.UU-4	100.+	n. Covid	i a saie 2	LOTTE	erecti	VII - IIII	Strike	Depth	At	To	(min)	N		er strike	e recorded
NS	TAL	LATI	ON D	ΕΤΔ	ILS					Date	Hole	Casing	Depth to	Con	ment		VAIE	DETAILS
GSL RC FI 1	Date				RZ Top	RZ Base	9	Тур	ре	Date	Depth	Depth	Water	3011				



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CONTRAC		Sever	n Hills Wir	nd Farm							DRIL SHE	LHOLE	NO		- <b>RC</b> et 1 of	
CO-ORDIN GROUND L		(mO	590,45 744,62 <b>D)</b>		3		RIG TYPE FLUSH		GEO <sub>4</sub> Air/Mi		l l	E COMP		<b>D</b> 06/0	1/2021	I
CLIENT ENGINEER	E	nerg	ia	and Partne	ers		INCLINATI		-90	51	DRIL	LED BY	,	IG	SL O'She	
Core Run Depth (m)	S.C.R.%	R.Q.D.%	Space Lo (m	ng m)	Non-intact Zone	Legend			Descrip				Depth (m)	Elevation	Standpipe Details	SPT (N Value)
1.50	0	0	_					RIX DRILL of sandy (	ING: No regravelly CO	covery, obs BBLES	erved by c	driller				N. 67
3.00	0	0											3.00	106.38		N = 27 (6, 11, 7, 6, 7, 7)
4.50	0	0	-			00000	as returns	of sandy (	GRAVEL	covery, obs			4.10	105.28		N = 27 (2, 4, 8, 6, 6, 7)
6.00	0	0														
6.40	0	0					End	of Borehole	e at 6.40 m				6.40	102.98		
8																
REMARKS													WA <sup>-</sup>	TER ST	RIKE	DETAILS
Hole cased	0.00-	4.10r	m. Covid	19 Safe Z	Zone	erecti	on - 1hr	Water	Casing	Sealed	Rise	Time	Co	mmen	ts	
								Strike	Depth	At	То	(min)				e recorded
													GR	OUNDV	VATE	R DETAILS
<b>NSTALLA</b> Date				RZ Base		Тур	ne -	Date	Hole Depth	Casing Depth	Depth to Water	O Com	nment	s		
Dale	ט קוז	Spul	112 10μ	וב טמשפ				-								



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СО	NTR	ACT	S	Sever	Hills Wir	nd Farm								ILLHOL	E NO		- RC	
	-ORE		TES	(mO	591,150 744,399 <b>D)</b>				RIG TYPE FLUSH		GEO4		DA	EET TE COM TE COM		<b>D</b> 09/0		
	ENT GINE	ER		nerg Ialaci	ia ny Walsh a	and Partn	ers		INCLINATION CORE DIAI		-90			ILLED E			SL O'She	a
Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Frac Spac Lo (mi	cing og m)	Non-intact Zone	Legend			Descrip	ition			Depth (m)	Elevation	Standpipe Details	SPT (N Value)
1	1.50	0	0	0					SYMMETE as returns	RIX DRILLI of sandy g	NG: No re ravelly CL	covery, ob AY	served by	driller				
2	3.00	0	0	0											3.00	92.29		N = 28 (3, 5, 9, 6, 6, 7)
-4	4.50	0	0	0					as returns	RIX DRILLI of clayey s	andy GRA	VEL			4.50	90.79		N = 39 (4, 5, 8, 14, 8 9)
5	6.00	0	0	0					as returns	RIX DRILLI of sandy g	ng: No re ravelly CO	covery, ob BBLES	servea by	ariller				N = 41 (2, 5, 6, 9, 12 14) N = 50/40 mi
7	7.50	0	0	0														(12, 8, 25, 25) N = 41
.8	9.00	0	0	0											9.00	86.29		(4, 7, 9, 14, 8 10)
	10.00	0	0	0				000	as returns	RIX DRILLI of sandy G	iRAVEL		served by	driller		85.29		N = 37 (5, 19, 7, 9, 7 14)
	MAR		n nn-	10.00	m. Covid	l 19 Safe	Zone	e erec		f Borehole Water	at 10.00 r	n Sealed	Rise	Time				DETAILS
1 101	o oak	Jeu 1	J.UU-	. 0.00	, OUVIA	i io dale	<u> -UIII</u>	. <del>6</del> 160	1011 <sup>2</sup> 1111	Strike	Depth	At	To	(min	) CC		r strike	e recorded
											Нас	Cooin	N Damette	+0			VATEF	RDETAILS
	<b>TALI</b> Date		Tip D		ILS RZ Top	RZ Base	)	Тур	oe	Date	Hole Depth	Casing Depth		r Co	mment	S		



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CONTRAC	т	Seve	n Hills Wir	nd Farm							DRIL SHEE	LHOLE	NO		<b>- RC</b> et 2 of	
CO-ORDIN			591,15 744,39	5.97 N			RIG TYPE		GEO4	.05	DATE	СОММ		<b>D</b> 09/0	1/2021	1
GROUND	LEVE			95.29			FLUSH		Air/Mi			COMPL				
CLIENT ENGINEER	2	Energ Malac	jia hy Walsh i	and Partn	ers		CORE DIA	ON (deg) METER (mr	-90 <b>n)</b> 78			LED BY GED BY			SL O'She	a
Downhole Depth (m) Core Run Depth (m)	%.T.S.	S.C.R.% R.Q.D.%	Frac Spa Lo (m	cing og m)	Non-intact Zone	Legend			Descript	ion			Depth (m)	Elevation	Standpipe Details	SPT (N Value)
- 10 - 11 - 12 - 13 - 14 - 15 - 16 - 17 - 18																N = 31 (6, 4, 11, 7, 7, 6)
REMARKS													WA	TER ST	RIKE	DETAILS
Hole case	d 0.0	0-10.0	0m. Covid	l 19 Safe	Zone	e erec	tion - 1hr	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Co	mmen	ts	
REMARKS Hole case  INSTALLA  Date																e recorded
NOTAL A	TIO	I DET						D :	Hole	Casing	Denth to				VATER	RDETAILS
INSTALLA Date			I <b>LS</b> RZ Top	R7 Race	١	Тур	ne	Date	Depth	Depth	Depth to Water	Com	ment	S		
Date Date	Jip	Берш	112 ΤΟΡ	i iz Dast												



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(3.3)	/											200		- 110			
CONTI			Sever	n Hills Wir								SHE	LLHOLI ET	= NO		- RC et 1 of	
GROU	ND L		(mO	591,184 744,37 <b>D)</b>			RIG FLU	TYPE JSH		GEO <sup>2</sup> Air/Mi			E COMI		<b>D</b> 08/0	1/2021	
CLIEN			Energ //alac	ia hy Walsh a	and Partn	ers	I .		ON (deg) METER (mr	-90 <b>n)</b> 78			LLED B			SL O'She	a
Downhole Depth (m) Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Frac Spac Lo (mi	cing og m)	Non-intact Zone	Legend			Descrip	tion			Depth (m)	Elevation	Standpipe Details	SPT (N Value)
- 1 - 1.50	0	0	0				SYI as I	MMETF returns	RIX DRILLI of sandy g	NG: No red ravelly CL	covery, ob AY	served by	driller				N = 25
3.00	0	0	0	-													(2, 4, 5, 7, 6, 7)
4.50	0	0	0											4.50	89.61		N = 38 (4, 7, 7, 12, 9, 10)
5 6.00	0	0	0				as 1	returns	RIX DRILLI of sandy g	ravelly CO	BBLES			6.00	88.11		N = 31 (3, 5, 4, 9, 7, 11)
7.50	0	0	0				SYI as I	MMETF returns	RIX DRILLI of gravelly	NG: No red SAND	covery, ob	served by	driller	7 50	86.61		N = 25/10 mm (25, 25)
8	0	0	0				SYI SYI SYI SYI SYI SYI SYI SYI SYI SYI	MMETF returns	RIX DRILLI of clayey s	NG: No red andy COB	covery, ob BLES	served by	driller				N = 31 (4, 9, 7, 5, 8, 11)
9 9.00	0	0	0	-				returns	RIX DRILLI of sandy g	ravelly CO	BBLÉS	served by	driller	10.00	85.11		N = 27 (2, 4, 6, 6, 8, 7)
REMAI		0.00	10.04	lm Covid	I 10 Cof-	700	o orootion		f Borehole Water	at 10.00 n	n Sealed	Rise	Time	.			DETAILS
REMAL Hole ca	ased	0.00-	10.00	um. Covid	ı 19 Safe	∠on	e erection -	- 1hr	Strike	Depth	Sealed At	To	(min)	N		r strike	e recorded
INSTA	ΙΙ Δ٦	ION F	)FT^	II S					Date	Hole	Casing		0 00	nment		-7-1-	
Dat				RZ Top	RZ Base	9	Type		Date	Depth	Depth		.   001	mnent	<b>o</b>		



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COI	NTR	ACT	S	ever	Hills Wir	nd Farm							DRIL SHE	LHOLE	NO		<b>- RC</b> et 2 of	
		OINA.			591,18- 744,37	1.72 N			RIG TYPE		GEO4	05	DATE	СОММ		<b>D</b> 08/0	1/2021	
			VEL		-	94.11			FLUSH		Air/Mi			COMP				
	SINE			nerg lalacl	ıa ny Walsh a	and Partn	ers		INCLINATI CORE DIA	ON (deg) METER (mr	-90 <b>n)</b> 78			LED BY GED BY			SL O'She	a
Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Frac Spa Lo (m 0 <sup>250</sup>	cing og m)	Non-intact Zone	Legend			Descrip	tion			Depth (m)	Elevation	Standpipe Details	SPT (N Value)
112 113 115 116 117 118 119																		N = 36 (7, 19, 11, 6, 9, 10)
REN	MAR				1			<u> </u>	l						WA	TER ST	RIKE	DETAILS
Hole	e ca	sed (	0.00-	10.00	m. Covid	l 19 Safe	Zon	e erec	tion - 1hr	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Co	mmen	ts	
CSS. RC FI 10M 23000.GPJ   IGSL.GDT 2005/22																		e recorded
NIC.	TAI	I ATI	ON D	ET A	II S					Data	Hole	Casing	Depth to	) ( )			VATEF	RDETAILS
	Date				RZ Top	RZ Base	e	Тур	oe .	Date	Depth	Depth	Depth to Water	Com	ment	S		
IGSL R(			.ت در.	ا الاحماد				. 11										



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СО	NTR	ACT	S	ever	n Hills Wir	nd Farm								RILLH	HOLE	NO		- RC et 1 of	
СО	-ORI	DINA	TES		591,42 744,10				RIG TYPE		GEO4	05	DA	ATE C	ОММ	ENCE	<b>D</b> 14/0	1/2021	
			VEL	•		89.95			FLUSH		Air/Mis						14/0		
	IENT GINE			nerg lalaci	ia hy Walsh a	and Partn	ers		INCLINATI		-90 <b>m)</b> 78				ED BY ED BY			SL O'She	а
Downhole Depth (m)		T.C.R.%	S.C.R.%	R.Q.D.%	Frac Spa Lc (m	ture cing og m)	Non-intact Zone	Legend			Descript	ion				Depth (m)	Elevation	Standpipe Details	SPT (N Value)
- 1	1.50	0	0	0	<u> </u>				SYMMETI as returns	RIX DRILLI of sandy g	NG: No rec ravelly CLA	overy, ob	served b	y drill	er				N = 26
2	3.00	0	0	0															(2, 5, 4, 5, 10, 7)
- 4	4.50	0	0	0												4.50	85.45		N = 27 (4, 7, 5, 6, 7, 9)
5	6.00	0	0	0					as returns	s of clayey s	ING: No rec sandy grave	elly COBB	LES			6.00	83.95		N = 27 (3, 4, 4, 7, 9, 7)
7	7.50	0	0	0				000000000000000000000000000000000000000	SYMMETI as returns	RIX DRILLI of sandy (	ING: No rec GRAVEL	overy, ob	served b	y drill		7 50	82.45		N = 31 (2, 5, 9, 6, 7, 9)
8	9.00	0	0	0					as returns	RIX DRILLI of sandy g	NG: No rec gravelly COI	overy, ob BBLES	served b	y drill			3		N = 33 (2, 5, 7, 7, 9, 10)
	10.00		0	0						of Borehole	e at 10.00 m				•		79.95	RIKF	N = 26 (4, 4, 6, 9, 4, 7)
Ho			0.00-	10.00	m. Covid	l 19 Safe	Zon	e erec		Water	Casing	Sealed	Rise		Time		mment		
RE Ho										Strike	Depth	At	То		(min)	N	o wate	r strike	e recorded
NS.	STAL	LATI	ON D	ETA	ILS					Date	Hole	Casing		1 to	Com	ment		VAIE	LUCIAILS
	Date				RZ Top	RZ Base	Э	Тур	ре		Depth	Depth	Wat	er	20111		-		
- ـ							1			1									



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СО	NTR	ACT	S	ever	n Hills Wir	nd Farm							DRIL SHE	LHOLE	NO		- RC et 2 of	
		DINA.		_	591,42 744,10	5.64 N			RIG TYPE		GEO4	105	DATI	СОММ		<b>D</b> 14/0	1/2021	l
	OUN IENT		VEL	(mO nerg	-	89.95			FLUSH INCLINATI	ON (dog)	Air/Mi -90	st		LED BY			1/2021 SL	
	GINE				ny Walsh a	and Partr	ers			METER (mr				GED BY			O'She	a
Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Frac Spa Lo (m 0 250	cing og m)	Non-intact Zone	Legend			Descrip	tion			Depth (m)	Elevation	Standpipe Details	SPT (N Value)
111 111																		N = 33 (3, 12, 9, 7, 9, 8)
RE	MAR								I						WA	TER S	RIKE	DETAILS
Hol	le ca	sed (	0.00-	10.00	m. Covid	l 19 Safe	Zon	e erec	tion - 1hr	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Co	mmen	ts	
GSL RC FI 10M 23000.GPJ   GSL.GDT 20/5/22																		e recorded
NICE S	TAI	I ATI	ON D	ETA	11 6					Data	Hole	Casing	Depth to	Carr			VATEF	RDETAILS
E INS	Date				RZ Top	RZ Base	9	Туј	ре	Date	Depth	Depth	Depth to Water	Com	iment	.5		
IGSL R			•															



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CONTRACT		ven	Hills Wir								DRI SHE	LLHOL EET	E NO		- RC et 1 of	
GROUND L		nOE	591,432 744,073 <b>(</b> )				RIG TYPE FLUSH		GEO4 Air/Mis		l l		MENCE IPLETE			
CLIENT ENGINEER		ergi:	a y Walsh a	and Partn	ers		INCLINATION CORE DIAI		-90	) L	DRI	LLED E	ЗҮ	IG	SSL .O'She	
Downhole Depth (m) Core Run Depth (m)	S.C.R.%	R.Q.D.%	Frac Spac Lo (mi	cing og m)	Non-intact Zone	Legend			Descript	ion			Depth (m)	Elevation	Standpipe Details	SPT (N Value)
- 0 - 1 - 2 - 3 - 4 - 5 - 6							SYMMETI as returns	of sandy g	NG: No rec cobbly CLA	overy, ob	served by	driller	7.50			N = 26 (3, 4, 4, 6, 8, 8) N = 23 (2, 7, 3, 5, 7, 8) N = 47 (3, 5, 12, 17, 8, 10) N = 25/10 mm (12, 25, 25)
REMARKS						<u></u>	End o	f Borehole	at 10.00 m					80.01 TER S		DETAILS
Hole cased	0.00-10	0.00	m. Covid	19 Safe	Zon	e erec	tion - 1hr	Water Strike	Casing Depth	Sealed At	Rise To	Time (min	e Co	mmen		
REMARKS Hole cased  INSTALLAT  Date 13-01-21								Suike	Бериі	Λl	10	(11111	N			e recorded
								_	Hole	Casing	I Depth	to			NATER	RDETAILS
INSTALLAT				D7.5	. 1			Date	Depth	Depth		r Co	mment	s		
Date 13-01-21	Tip De 10.00	-	6.00	10.00	9	Typ 50m	m SP									



# **GEOTECHNICAL CORE LOG RECORD**

REPORT NUMBER

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100	رور	3/																
CON	ITR/	ACT	S	ever	n Hills Wir	nd Farm							DRIL SHE	LHOLE ET	NO		- <b>RC</b> et 2 of	
CO-0					591,43 744,07	3.91 N			RIG TYPE		GEO4	.05	DATE	COM		<b>ED</b> 13/0	1/2021	
GRO		) LE				90.01			FLUSH	ON (-1)	Air/Mi	st		COMF				
CLIE		ER		nerg lalaci	ny Walsh	and Partr	ers		INCLINATI CORE DIA	ON (deg) METER (mi	-90 <b>m)</b>			GED B			SL O'She	а
Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Frac Spa Lo (m 0 <sup>250</sup>	cing og m)	Non-intact Zone	Legend			Descript	ion			Depth (m)	Elevation	Standpipe Details	SPT (N Value)
112																		N = 32 (3, 5, 5, 8, 10, 9)
REM	IARI	(S													WA	 TER S1	 	DETAILS
Hole			.00-	10.00	m. Covid	l 19 Safe	Zone	e erec	tion - 1hr	Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Co	mmen		
NST   NST										Suike	Depth	Al	10	(111111)	Ν			e recorded
33   23   11   24			or: -								Hole	Casing	Denth to	) _			VATER	RDETAILS
∮ INST						D7 D		т	20	Date	Depth	Depth	Depth to Water	Cor	nment	S		
13-0 13-0	ate 01-2		10.0		RZ Top 6.00	10.00	3	Typ 50m	oe ım SP	-								

T04 - RC01 - Box 1 of 2 - 9.00-12.00m



<u>T04 - RC01 - Box 2 of 2 - 12.00-14.60m</u>



<u>T05 - RC01 - Box 1 of 2 - 1.80-4.80m</u>



T05 - RC01 - Box 2 of 2 - 4.80-6.80m



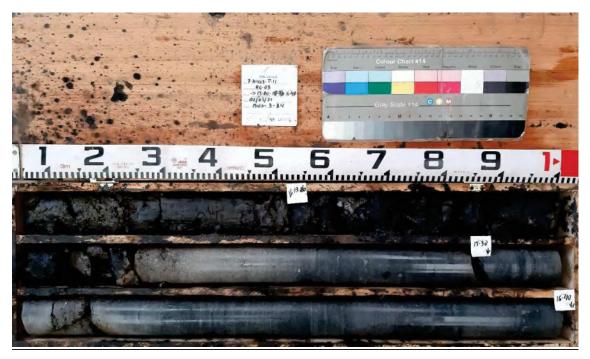
<u>T11 - RC03 - Box 1 of 4 - 6.00-9.70m</u>



T11 - RC03 - Box 2 of 4 - 9.70-12.30m



T11 - RC03 - Box 3 of 4 - 12.30-16.40m



T11 - RC03 - Box 4 of 4 - 16.40-18.30m



T11 - RC04 - Box 1 of 4 - 2.20-5.20m



T11 - RC04 - Box 2 of 4 - 5.20-8.20m



T11 - RC04 - Box 3 of 4 - 8.20-11.20m



T11 - RC04 - Box 4 of 4 - 11.20-12.20m



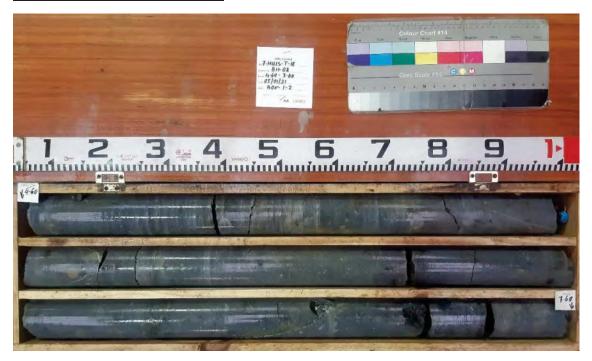
T15 - RC02 - Box 1 of 2 - 3.70-6.70m



T15 - RC02 - Box 2 of 2 - 6.708.90m



<u>T18 - RC02 - Box 1 of 2 - 4.60-7.60m</u>



T18 - RC02 - Box 2 of 2 - 7.60-9.60m



# Appendix 2

# **Trial Pit Records and Photographs**



IG	SL	l	RIAL PIT	RECO	RD					23	000	
CONT	TRACT	Seven Hills Wind Farm						TRIAL P	IT NO.		<b>TP01</b> et 1 of 1	
LOGO	GED BY	JC	CO-ORDINAT		748,30	59.15 E 07.29 N		DATE S		23/1	1/2020 1/2020	
CLIEN		Energia Malachy Walsh and Partners	GROUND LEV	/EL (m)	94.04			EXCAVA METHO		Track	ked digg	er
									Sample	s	<sup>o</sup> a)	meter
		Geotechnical Description		Legend	Depth (m)	Elevation	Water Strike	Sample Ref	Type	Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0	∖subangı	ight brown sandy clayey GRAVEL w content and many boulders. Sand is Gravel is fine to coarse subangular	,		0.20	93.84		145084	В	0.50-0.80		
- - - - - - 2.0	End of	Trial Pit at 2.10m			2.10	91.94		140085	В	1.50-1.80		
3.0												
	ndwater (	Conditions		_	_	_	_		_		_	
Stabil Good												
	ral Rema sal due to	arks b large boulders										



De la	BSL	'	RIAL PIT I	RECO	KD					230	000	
CON	TRACT	Seven Hills Wind Farm						TRIAL P	PIT NO.		<b>TP02</b> t 1 of 1	
CLIE	GED BY NT	JC  Energia  Malachy Walsh and Partners	CO-ORDINAT		586,36 748,34 91.09	61.61 E 45.98 N		DATE S' DATE C' EXCAVA METHOI	OMPLET ATION	23/11 <b>ED</b> 23/11	/2020 /2020 .ed digg	er
									Sample	6	a)	neter
		Geotechnical Description		Legend	Depth (m)	Elevation	Water Strike	Sample Ref	Туре	Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0	∖subangı	dense to dense grey sandy GRAVE cobble content and some boulders to coarse. Gravel is fine to coarse s	/		0.20	90.89		145085	В	0.50-0.80		
2.0	End of 1	Гrial Pit at 1.70m			1.70	89.39		140086	В	1.50-1.70		
3.0												
		Conditions										
Stabi Good	ility											
	eral Rema sal due to	rks I large boulders										



IGSL		IRIAL PII	NECO	עחי					23	000	
CONTRACT	Seven Hills Wind Farm						TRIAL P	IT NO.		<b>TP03</b> et 1 of 1	
LOGGED BY	JC	CO-ORDINAT		586,34 748,37	13.98 E 79.41 N		DATE S		03/02	2/2021 2/2021	
CLIENT ENGINEER	Energia Malachy Walsh and Partners	GROUND LE	VEL (m)				EXCAVA METHOI		Track	ked digg	jer
								Sample	s	'a)	neter
	Geotechnical Description		Legend	Depth (m)	Elevation	Water Strike	Sample Ref	Туре	Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
boulder	n dense light greyish brown slightly of GRAVEL with medium cobble conters. Sand is fine to coarse. Gravel is fullar to angular.	clayey very nt and some fine to coarse,		0.30			145470	В	0.50-0.60		
Possibl End of	le Rockhead Trial Pit at 2.30m			2.30			145471	В	2.20-2.30		
3.0											
Groundwater	Conditions										
<b>Stability</b> Good											
General Rema	arks										



IGSL	IRIAL PIT	RECO	ΚD					230	000	
CONTRACT Seven Hills Wind Farm						TRIAL P	PIT NO.		<b>TP04</b> t 1 of 1	
LOGGED BY JC  CLIENT Energia ENGINEER Malachy Walsh and Partners	CO-ORDINAT		586,38 748,3	59.05 E 77.41 N		DATE S' DATE C' EXCAVA METHO	OMPLE ATION	03/02 TED 03/02	2/2021 2/2021 ked digg	jer
							Sample	es	a)	neter
Geotechnical Description		Legend	Depth (m)	Elevation	Water Strike	Sample Ref	Туре	Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
Medium dense to dense light greyish brown very sandy GRAVEL with medium cobble comments to many boulders. Sand is fine to coaffine to coarse, subangular to angular.  1.0  Possible Rockhead End of Trial Pit at 2.40m	n slightly clayey ontent and urse. Gravel is	1	2.40			145472	В	2.30-2.40		
Groundwater Conditions										
Stability Good										
General Remarks										



IGSL	1	RIAL PIT I	RECO	KD					23	000	
CONTRACT	Seven Hills Wind Farm						TRIAL P	IT NO.		<b>TP01</b> et 1 of 1	
LOGGED BY	JC	CO-ORDINATI	ES		92.28 E 68.78 N		DATE ST		23/1	1/2020 1/2020	
CLIENT ENGINEER	Energia Malachy Walsh and Partners	GROUND LEV	/EL (m)	76.13			EXCAVA METHOD		Track	ked digg	jer
								Sample	s	<b>(a</b> )	neter
	Geotechnical Description		Legend	Depth (m)	Elevation	Water Strike	Sample Ref	Туре	Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
\ cobble	oll: Brown slightly sandy gravelly CLA content. Sand is fine to medium. Grassubrounded to subangular.	AY with low vel is fine to		0.10	76.03						
Soft light to medito suba	nt brown slightly sandy gravelly CLAY um. Gravel is Gravel is fine to coarse ngular.  In dense light brown sandy clayey GR. um to coarse. Gravel is fine to coarse.	e, subrounded  AVEL. Sand		0.30	75.83		145081	В	0.50-0.80		
1.0							140082	В	1.50-1.80		
3.0							145082	В	2.50-3.00		
			0000 0000 0000								
End of	Trial Pit at 3.20m		~~~	3.50	72.63						
Groundwater	Conditions										
Stobility.											
Stability Good											
General Rema	arks										



O.	BEL	'	RIAL PIT	RECO	ΚD					230	000	
CON	TRACT	Seven Hills Wind Farm						TRIAL P	IT NO.		<b>TP02</b> et 1 of 1	
LOG	GED BY	JC	CO-ORDINAT		748,1	98.41 E 22.20 N		DATE ST		23/11	1/2020 1/2020	
CLIE	NT NEER	Energia Malachy Walsh and Partners	GROUND LEV	/EL (m)	78.14			EXCAVA METHOD		Track	ked digg	jer
									Sample	S	<sup>5</sup> a)	meter
		Geotechnical Description		Legend	Depth (m)	Elevation	Water Strike	Sample Ref	Туре	Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0	cobble c coarse,	IL: Brown slightly sandy gravelly CL content. Sand is fine to medium. Gra subrounded to subangular.	avel is fine to	1/ 1/ 1/ 1/ 1/ 1/ 1/ 1/ 1/ 1/ 1/ 1/ 1/ 1	0.40	77.74						
	cobble of medium subangu	ılar.	and is fine to rounded to		0.80	77.34		140083	В	0.50-0.80		
- 1.0 	cobble content and occasional boulders. Sa medium. Gravel is Gravel is fine to coarse, r subangular.  Loose light brown sandy clayey GRAVEL. S medium to coarse. Gravel is fine to coarse, subangular.		and is subrounded to		0.00			145083	В	1.50-1.80		
3.0								140084	В	2.50-3.00		
	End of T	rial Pit at 3.10m		0 7 0 2	3.50	74.64						
Grou	ndwater (	Conditions										
<b>Stabi</b> Good												
Gene	eral Rema	rks										



IGSL	'	INIAL PII I	NECO	טח					230	000	
CONTRACT	Seven Hills Wind Farm						TRIAL P	IT NO.		<b>TP01</b> t 1 of 1	
LOGGED BY  CLIENT ENGINEER	JC  Energia  Malachy Walsh and Partners	CO-ORDINAT			97.65 E 78.40 N		DATE ST DATE CO EXCAVA METHOR	OMPLET	19/11 <b>FED</b> 19/11	/2020 /2020 ked digg	er
								Sample	s	a)	neter
	Geotechnical Description		Legend	Depth (m)	Elevation	Water Strike	Sample Ref	Туре	Depth	Vane Test (KPa)	Hand Penetrometer
Soft bro	OIL: Brown slightly sandy gravelly CL content. Sand is fine to medium. Gra, subrounded to subangular.  Dwn slightly sandy gravelly CLAY with content and occasional to some boun to coarse. Gravel is fine to medium gular.	h medium Ilders. Sand is		0.30	82.99		145073	В	0.50-0.80		
- 2.0							145074	В	1.50-1.80		
medium boulder medium	stiff brown slightly sandy gravelly CL n cobble content and occasional to s rs.Sand is medium to coarse. Gravel n, rounded to subangular. Trial Pit at 3.20m	ome		2.80	80.49		140075	В	2.90-3.20		
Groundwater	Conditions										
<b>Stability</b> Good											
General Rema	arks										



CONTRACT Seven Hills Wind Farm  CO-ORDINATES 587,102.21 E 747,734.12 N  DATE STARTED 19/11/2020  EXCAVATION METHOD  Tracked diggs  ROUND LEVEL (m) 82.99  TOPSOIL: Brown slightly sandy gravelly CLAY with low cobble content. Sand is into to coarse, subrounded to subangular.  Soft to firm brown slightly sandy yary gravelly CLAY with medium to coarse. Gravel is fine to medium, subrounded to subangular.  10  Soft to firm brown slightly sandy very gravelly CLAY with medium to coarse. Gravel is fine to medium, subrounded to subangular.  11  Soft to firm brown slightly sandy very gravelly CLAY with medium to coarse. Gravel is fine to medium subrounded to subangular.  12  Soft to firm brown slightly sandy very gravelly CLAY with medium to coarse. Gravel is fine to medium subrounded to subangular.  12  Soft to firm brown slightly sandy very gravelly CLAY with medium to coarse. Gravel is fine to medium subrounded to subangular.  145076 B 1.50-1.80	GSL/	'	RIAL PIT I	RECO	ΚD					230	000	
CO-ORDINATES 587,102.21 E 747,734.12 N  GROUND LEVEL (m) 82.99  CO-ORDINATES 747,734.12 N  Energia Formula Malachy Walsh and Partners  Geotechnical Description  Geotechnical Description  Geotechnical Description  Tracked diggrams of the partners of the p	NTRACT	Seven Hills Wind Farm							IT NO.			
Geotechnical Description  Geotechnical Description  Geotechnical Description  Geotechnical Description  Geotechnical Description  TOPSOIL: Brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to medium. Gravel is fine to coarse, subrounded to subangular.  Soft brown slightly sandy gravelly CLAY with medium cobble content and occasional to some boulders. Sand is medium to coarse. Gravel is fine to medium, subrounded to rounded.  Soft to firm brown slightly sandy very gravelly CLAY with medium to coarse. Gravel is fine to medium, subrounded to subangular.  1.00  Samples  Geotechnical Description  Samples  O.30  82.69  O.30  82.69  1.45075  B  0.50-0.80					747,73	02.21 E 34.12 N		DATE ST	OMPLET	19/11 <b>ED</b> 19/11	/2020 /2020	er
Geotechnical Description  TOPSOIL: Brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to medium. Gravel is fine to coarse, subrounded to subangular.  Soft brown slightly sandy gravelly CLAY with medium cobble content and occasional to some boulders. Sand is medium to coarse. Gravel is fine to medium, subrounded to rounded.  Soft to firm brown slightly sandy very gravelly CLAY with medium to high cobble content and some boulders. Sand is coarse. Gravel is fine to medium subrounded to subangular.  Soft to firm brown slightly sandy very gravelly CLAY with medium to high cobble content and some boulders. Sand is coarse. Gravel is fine to medium subrounded to subangular.  1.0  Soft to firm brown slightly sandy very gravelly CLAY with medium to high cobble content and some boulders. Sand is coarse. Gravel is fine to medium subrounded to subangular.  1.10										11401	.ou uigg	<u> </u>
TOPSOIL: Brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to medium. Gravel is fine to coarse, subrounded to subangular.  Soft brown slightly sandy gravelly CLAY with medium cobble content and occasional to some boulders. Sand is medium to coarse. Gravel is fine to medium, subrounded to rounded.  Soft to firm brown slightly sandy very gravelly CLAY with medium to high cobble content and some boulders. Sand is coarse. Gravel is fine to medium subrounded to subangular.  1.00  81.99  1.45076  B 1.50-1.80									Samples	3	a)	meter
cobble content. Sand is fine to medium. Gravel is fine to coarse, subrounded to subangular.  Soft brown slightly sandy gravelly CLAY with medium cobble content and occasional to some boulders. Sand is medium to coarse. Gravel is fine to medium, subrounded to rounded.  1.00  Soft to firm brown slightly sandy very gravelly CLAY with medium to high cobble content and some boulders. Sand is coarse. Gravel is fine to medium subrounded to subangular.  1.00  81.99  1.45076  B  1.50-1.80		Geotechnical Description		Legend	Depth (m)	Elevation	Water Strike	Sample Ref	Туре	Depth	Vane Test (KF	Hand Penetrometer (KPa)
Soft to firm brown slightly sandy very gravelly CLAY with medium to high cobble content and some boulders. Sand is coarse. Gravel is fine to medium subrounded to subangular.  145076 B 1.50-1.80	cobble coarse, s	ontent. Sand is fine to medium. Gra subrounded to subangular. wn slightly sandy gravelly CLAY with ontent and occasional to some boul to coarse. Gravel is fine to medium,	n medium					145075	В	0.50-0.80		
140076 B 2.50-3.00	is coarse	<ul> <li>Gravel is fine to medium subround</li> </ul>	ly CLAY with oulders. Sand ded to	47 4 1 4 1 4 1 4 1 4 1 4 1 4 1 4 1 4 1	1.00	81.99		145076	В	1.50-1.80		
3.0 End of Trial Pit at 3.30m	End of T	ivial Dit at 2 20m			3.30	79.69		140076	В	2.50-3.00		
Elid of Thai Fit at 3.50ff	End of 1	nai fii at 3.30iii										
Groundwater Conditions	undwater C	conditions										
Stability Good	<b>bility</b> od											
General Remarks	neral Remar	ks										



REPORT NUMBER

23000

/1331	5/									20	000	
CONTRA	ст	Seven Hills Wind Farm						TRIAL P	IT NO.		<b>TP01</b> et 1 of 1	
LOGGED	ВҮ	JC	CO-ORDINAT	ES		48.10 E 31.57 N		DATE S			1/2020 1/2020	
CLIENT ENGINEE	·R	Energia Malachy Walsh and Partners	GROUND LEV	/EL (m)	72.83			EXCAVA METHO			ked digg	jer
LIVOINEL		watery washard rathers							Samples	3		eter
		Geotechnical Description		Legend	Depth (m)	Elevation	Water Strike	Sample Ref	Туре	Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
me	edium,	L: Brown slightly gravelly CLAY. Gr , subrounded to subangular. t vellowish brown sandy gravelly Cl		0	0.20	72.63						
Loc	ose gi arse. (	rey slightly gravelly SAND. Sand is Gravel is medium to coarse, rounde	medium to		0.50	72.33						
Firm CL both COA	ulder.	it yellowish brown slightly sandy verith medium to high cobble content a Sand is medium to coarse. Gravel rounded to subrounded.	y gravelly ind occasional is medium to		3.50	72.03 69.33		145078	В	0.90-1.20		
Groundw  Stability Good	ater C	Conditions										
	Dorse	de a										
General F	neillai	ins										



										000	
ONTRACT	Seven Hills Wind Farm						TRIAL P	IT NO.		<b>TP02</b> t 1 of 1	
OGGED B	<b>Y</b> JC	CO-ORDINAT		587,69 747,67 70.87	92.75 E 75.56 N		DATE ST		20/11 <b>ED</b> 20/11	/2020 /2020	
LIENT NGINEER	Energia Malachy Walsh and Partners	GROUND LEV	/EL (III)	70.07			METHOE		Track	ed digg	er
							,	Samples		<sup>5</sup> a)	meter
	Geotechnical Description		Legend	Depth (m)	Elevation	Water Strike	Sample Ref	Type	Depth	Vane Test (KPa)	Hand Penetrometer
Soft b	SOIL: Brown slightly sandy gravelly Ce content. Sand is fine to medium. Gum, subrounded to subangular.  Brown very sandy gravelly CLAY with nt. Sand is fine to medium. Gravel is unded to angular.	/		0.20	70.67		140077	В	0.50-0.80		
<sub>2.0</sub>   bould	ight yellowish brown slightly sandy v ' with medium to high cobble content er. Sand is medium to coarse. Grave e, rounded to subrounded.	ery gravelly and occasional el is medium to		1.80	69.07		145077 140079	ВВ	1.50-2.00 1.70-2.00		
End c	of Trial Pit at 3.20m			3.50	67.37		140078	В	2.80-3.20		
iroundwate	er Conditions										
tability lood											
ieneral Rer	marks										



IGSL	1	RIAL PIT F	RECO	RD					230	000	
CONTRACT	Seven Hills Wind Farm						TRIAL P	PIT NO.		<b>TP01</b> t 1 of 1	
LOGGED BY  CLIENT ENGINEER	JC  Energia  Malachy Walsh and Partners	CO-ORDINATE GROUND LEV		585,73 747,88 90.37	32.23 E 39.50 N		DATE S' DATE C' EXCAVA	OMPLET ATION	24/11 <b>TED</b> 24/11	/2020 /2020 ked digg	er
								Sample	s	a)	neter
	Geotechnical Description		Legend	Depth (m)	Elevation	Water Strike	Sample Ref	Туре	Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
Medium GRAVE boulder coarse,	IL: Brown gravelly CLAY. Gravel is find subrounded to subangular and dense light brownish grey slightly classification with medium to high cobble contents. Sand is medium to coarse. Gravel subrounded to angular.	ayey sandy nt and some is fine to		0.10	90.27		140087	В	0.50-0.80		
2.0											
3.0											
Groundwater	Conditions				<u> </u>						<u> </u>
<b>Stability</b> Good											
General Rema Refusal due to	rks I large boulders										



IGSL	1	RIAL PIT R	RECO	RD					23	000	
CONTRACT	Seven Hills Wind Farm						TRIAL P	PIT NO.		<b>TP02</b> et 1 of 1	
LOGGED BY	JC	CO-ORDINATE		747,88	74.15 E 37.80 N		DATE S		24/1	1/2020 1/2020	
CLIENT ENGINEER	Energia Malachy Walsh and Partners	GROUND LEVE	EL (m)	91.04			EXCAVA METHO		Tracl	ked digg	er
								Sample	s	<b>a</b> )	meter
	Geotechnical Description		Legend	Depth (m)	Elevation	Water Strike	Sample Ref	Type	Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
subang Mediun GRAVE boulder	DIL: Brown gravelly CLAY with low to content. Gravel is fine to medium, suular.  In dense light brownish grey slightly cells with medium to high cobble contents. Sand is medium to coarse. Grave subrounded to angular.	layey sandy		0.20	90.84		145086	В	0.50-0.80		
End of	Trial Pit at 1.20m			1.20	09.04						
3.0											
Groundwater	Conditions										
<b>Stability</b> Good											
Stability Good General Rema Refusal due to	arks o large boulders										



IGSL	1	RIAL PIT REC	ORD					23	000	
CONTRACT	Seven Hills Wind Farm					TRIAL P	PIT NO.		<b>TP01</b> et 1 of 1	
LOGGED BY CLIENT ENGINEER	JC  Energia  Malachy Walsh and Partners	CO-ORDINATES GROUND LEVEL (m	747,7	37.53 E 22.61 N		DATE S' DATE C  EXCAVA METHO	OMPLE ATION	24/1 TED 24/1	1/2020 1/2020 ked digg	jer
							Sample	es		əter
	Geotechnical Description	Pegend	Depth (m)	Elevation	Water Strike	Sample Ref	Туре	Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
Mediur	DIL: Brown gravelly CLAY. Gravel is fin, subrounded to subangular.  In dense grey very sandy GRAVEL with the subble content and many boulders. Sate se. Gravel is fine to coarse, subrounder.	th medium to	0.20	85.89		145087	В	0.50-0.80		
-	Trial Pit at 1.30m	000	1.30	84.79						
2.0										
3.0										
Groundwater	Conditions									
<b>Stability</b> Good										
General Rema	arks o large boulders									



00	336	1	RIAL PIT I	RECO	RD					23	000	
CON	TRACT	Seven Hills Wind Farm						TRIAL P	IT NO.		<b>TP02</b> et 1 of 1	
LOG	GED BY	JC	CO-ORDINAT		747,79	50.92 E 90.42 N		DATE S		24/1	1/2020 1/2020	
CLIE	ENT SINEER	Energia Malachy Walsh and Partners	GROUND LEV	/EL (M)	89.29			METHO!		Tracl	ked digg	jer
									Sample	es.	a)	neter
		Geotechnical Description		Legend	Depth (m)	Elevation	Water Strike	Sample Ref	Туре	Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
	Soft brocontent coarse. angular Medium high col	n dense grey very sandy GRAVEL wi bble content and many boulders. Sa se. Gravel is fine to coarse, subround	m cobble dium to to very		0.20	89.09 88.69		140088	В	0.40-0.60		
- - - - - - 2.0	End of	Trial Pit at 2.10m	rounded to		2.10	87.19		145088	В	1.50-2.00		
3.0												
1	undwater	Conditions		1								
Stab Goo												
	<b>eral Rema</b> usal due to	arks o large boulders										



IGSL	1	RIAL PIT I	RECO	RD					230	000	
CONTRACT	Seven Hills Wind Farm						TRIAL P	IT NO.		<b>TP01</b> t 1 of 1	
LOGGED B	Y JC  Energia  Malachy Walsh and Partners	CO-ORDINATI		586,52 747,40 72.62	23.28 E 06.73 N		DATE ST DATE CO EXCAVA METHOD	OMPLET ATION	20/11 TED 20/11	/2020 /2020 xed digg	er
								Sample	s	a)	neter
	Geotechnical Description		Legend	Depth (m)	Elevation	Water Strike	Sample Ref	Туре	Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
Soft I media	n slightly gravelly CLAY. Gravel is fine tunded to subangular.  Ight yellowish brown sandy very gravellum to high cobble content and some boot to coarse. Gravel is fine to medium, star.	y CLAY with		0.30	72.32		145080	В	0.50-0.80		
Mediu high o coars	um dense brownish grey very gravelly Scobble content and some boulders. Sar e. Gravel is fine to coarse, surounded t	SAND with nd is fine to to subangular.	0 6.00 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.90	71.72		140080	В	1.40-1.70		
2.0 End (	of Trial Pit at 1.70m			1.70	70.92						
- 3.0 											
Groundwate	er Conditions				<u> </u>						
<b>Stability</b> Good											
General Rei Rock	marks										



1	BEL	'	IRIAL PII	NECO	עח					230	000	
CON	TRACT	Seven Hills Wind Farm						TRIAL P	IT NO.		<b>TP02</b> t 1 of 1	
LOG	GED BY	JC	CO-ORDINAT		586,52 747,45 73.12	26.30 E 50.71 N		DATE ST	TARTED OMPLET	20/11 <b>ED</b> 20/11	/2020 /2020	
CLIE	NT NEER	Energia Malachy Walsh and Partners	GROOND LL	/ <b>L L</b> (III)	75.12			METHO!		Track	ked digg	er
									Samples	<b>3</b>	a)	meter
		Geotechnical Description		Legend	Depth (m)	Elevation	Water Strike	Sample Ref	Туре	Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0	subroun	lightly gravelly CLAY. Gravel is fine ded to subangular.  brownish grey very gravelly SAND woble content and some to many bou oarse. Gravel is fine to coarse, subular.		5.00 0 0	0.30	72.82		140081	В	0.80-1.20		
1.0	End of 1	rial Pit at 1.20m			1.20	71.92						
- - - 2.0 - -												
- - - - - - -												
- - - -												
-												
Grou	ndwater (	Conditions			<u> </u>		<u> </u>					
Stab Good												
<b>Gene</b> Rock	eral Rema	rks										



003	/				230	000						
CONTRA	ACT	Seven Hills Wind Farm						TRIAL P	PIT NO.		<b>TP01</b> et 1 of 1	
LOGGEI CLIENT ENGINEI		JC  Energia  Malachy Walsh and Partners	GROUND LE		587,54 743,01 71.46	47.74 E 12.28 N		DATE S		02/12 <b>FED</b> 02/12	2/2020 2/2020 ked digg	jer
		,	<u> </u>						Sample	s	(F	neter
		Geotechnical Description		Legend	Depth (m)	Elevation	Water Strike	Sample Ref	Туре	Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
M G Sa	Medium GRAVEL Sand is 1	L: Brown gravelly CLAY with high in to coarse, subrounded to sudense greyish brown slightly sand with high cobble content and making to medium. Gravel is fine to callar to very angular.	dy clayey any boulders.		0.20	71.26		149656	В	0.50-1.00		
1.0 Er	nd of T	rial Pit at 1.00m			1.00	70.46						
- 3.0 - 3.0 												
Groundy	water C	Conditions		1	<u> </u>							
Stability Good	У											
<b>General</b> Refusal		rks large boulders										



IGSL	)	TRIAL PIT I	RECO	RD					23	000	
CONTRACT	Seven Hills Wind Farm						TRIAL P	PIT NO.		<b>TP02</b> et 1 of 1	
LOGGED BY	/ JC	CO-ORDINATI			96.17 E 18.99 N		DATE S'		02/12	2/2020 2/2020	
CLIENT ENGINEER	Energia Malachy Walsh and Partners	GROUND LEV	/EL (m)	71.91			EXCAVA METHO		Tracl	ked digg	jer
								Sample	es .	<b>'</b> a)	meter
	Geotechnical Description		Legend	Depth (m)	Elevation	Water Strike	Sample Ref	Туре	Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
to coa Mediu - GRAV - Sand	SOIL: Brown slightly sandy gravelly CL um cobble content and some boulders arse, subrounded to subangular. um dense to dense greyish brown san /EL with high cobble content and mar is fine to medium. Gravel is fine to co ngular to very angular.	/		0.20	71.71		149656	В	0.50-0.90		
End c	f Trial Pit at 0.90m			0.90	71.01						
2.0											
3.0											
Groundwate	er Conditions										
Stability											
Good											
Stability Good General Rer Refusal due	narks to large boulders										



REPORT NUMBER

23000

	RACT	Seven Hills Wind Farm						TRIAL PI SHEET	IT NO.		<b>TP01</b> et 1 of 1	
_ogg	ED BY	JC	CO-ORDINAT		742,4	81.51 E 38.49 N		DATE ST		01/12	2/2020 2/2020	
CLIEN	NT NEER	Energia Malachy Walsh and Partners	GROUND LE	VEL (m)	99.53			EXCAVA METHOE		Track	ked dig	jer
									Sample	S	Pa)	meter
		Geotechnical Description	1	Legend	Depth (m)	Elevation	Water Strike	Sample Ref	Туре	Depth	Vane Test (KPa)	Hand Penetrometer
	TOPSOIL: Brown slightly sandy gravelly CI medium cobble content. Sand is fine to me fine to coarse, subrounded to subangular.  Medium dense grey very sandy GRAVEL v high cobble content and some to many bot fine to coarse. Gravel is fine to coarse, subangular.		with medium to bulders. Sand is		0.30	99.23		144653 149653	В	0.50-0.80 1.50-1.80 2.50-2.80		
	End of	Trial Pit at 3.70m			3.70	95.83						



1	BSL	1	RIAL PIT I	RECO	KD					23	000	
CON	TRACT	Seven Hills Wind Farm						TRIAL P	IT NO.		<b>TP02</b> et 1 of 1	
LOG	GED BY	JC	CO-ORDINATI		742,47	74.83 E 75.84 N		DATE S			2/2020 2/2020	
CLIE	NT INEER	Energia Malachy Walsh and Partners	GROUND LEV	EL (m)	98.99			EXCAVA METHOI		Track	ked digg	er
									Samples	8	<sup>5</sup> a)	meter
		Geotechnical Description		Legend	Depth (m)	Elevation	Water Strike	Sample Ref	Туре	Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0	fine to c Medium high cob fine to c angular.	IL: Brown slightly sandy gravelly CLA cobble content. Sand is fine to med oarse, subrounded to subangular.  dense grey very sandy GRAVEL with oble content and some to many bould oarse. Gravel is fine to coarse, subangular.  Trial Pit at 3.50m	/		0.20	98.79		149654 144655	В	0.50-0.80 1.50-1.80 2.50-2.80		
Stab	ility											
Good												
	eral Rema sal due to	rks large boulders										

IGSL TP LOG 23000.GPJ IGSL.GDT 23/3/21



IGSL	1	RIAL PIT I	RECO	RD					23	000	
CONTRACT	Seven Hills Wind Farm						TRIAL P	PIT NO.		<b>TP01</b> et 1 of 1	
LOGGED BY  CLIENT ENGINEER	JC  Energia  Malachy Walsh and Partners	CO-ORDINATI		587,87 743,59 73.29	74.20 E 90.07 N		DATE S DATE C EXCAV	OMPLET ATION	30/1 <b>TED</b> 30/1	1/2020 1/2020 ked digg	er
	madery video and various							Sample	s		eter
	Geotechnical Description		Legend	Depth (m)	Elevation	Water Strike	Sample Ref	Туре	Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
fine to d  Medium medium boulder	IL: Brown slightly sandy gravelly CLA cobble content. Sand is fine to med coarse, subrounded to subangular.  In dense grey slightly clayey sandy GF is to high cobble content and some to s. Sand is medium to coarse. Gravel subrounded to angular.	RAVEL with		0.20	73.09		170966	В	0.50		
1.0 - -				1.40	71.89		170967	В	1.00		
2.0	Trial Pit at 1.40m										
-3.0 											
Groundwater	Conditions		I		I	<u> </u>	l	I		I	
Stability											
Good  General Rema	ırks										
Rock	ii no										



IGSL	1	RIAL PIT I	RECO	KD					230	000	
CONTRACT	Seven Hills Wind Farm						TRIAL P	IT NO.		<b>TP01</b> t 1 of 1	
LOGGED BY	JC Energia	CO-ORDINATI		588,35 743,46 88.64	55.23 E 67.46 N		DATE S' DATE C	OMPLETATION	27/11 TED 27/11	/2020 /2020 xed digg	er
ENGINEER	Malachy Walsh and Partners							Sample	0		ē
	Geotechnical Description		Legend	Depth (m)	Elevation	Water Strike	Sample Ref	Type	Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
Medium high col coarse. subang	OIL: Brown slightly sandy gravelly CLAn cobble content and some boulders. Is fine to coarse, subrounded to suban dense grey very sandy GRAVEL with bble content and many boulders. Sar Gravel is fine to coarse, subrounded ular.  Trial Pit at 2.40m	th medium to	1	2.40	88.24		145098	В	0.50-0.80		
Groundwater	Conditions										
Otal iliz											
<b>Stability</b> Good											
<b>General Rema</b> Rock	arks										



DG.	BSL	1	RIAL PIT	RECO	KD					230	000	
CON	TRACT	Seven Hills Wind Farm						TRIAL P	PIT NO.		<b>TP02</b> t 1 of 1	
CLIE	GED BY	JC  Energia  Malachy Walsh and Partners	CO-ORDINAT		588,36 743,4 92.03	60.77 E 19.55 N		DATE S' DATE C  EXCAVA METHOR	OMPLET ATION	27/11 <b>FED</b> 27/11	/2020 /2020 :ed digg	er
									Sample	s	a)	neter
		Geotechnical Description		Legend	Depth (m)	Elevation	Water Strike	Sample Ref	Туре	Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0	medium to mediu angular. Medium high cok	dense grey very sandy GRAVEL woble content and many boulders. Sa Gravel is fine to coarse, subrounder	. Sand is fine nded to ith medium to nd is fine to	600000000000000000000000000000000000000	0.40	91.63		145097	В	0.50-0.80		
- - - - - - 2.0	boulders	dense light brownish grey slightly of L with medium to high cobble contes. Sand is medium to coarse. Grave subrounded to angular.	layey sandy nt and some I is fine to	18 44 4 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	1.70	90.33		140098	В	2.00-2.30		
3.0	End of 1	Γrial Pit at 2.60m		10 m (d)	2.60	89.43						
- - - -												
Grou	indwater (	Conditions		1		<u> </u>			1			
<b>Stab</b> i												
<b>Gene</b> Rock	eral Rema	rks										



Seven Hills Wind Farm										
IC					TRIAL PIT NO.		<b>T13 TP01</b> Sheet 1 of 1			
Energia	CO-ORDINATES  GROUND LEVEL	74	588,166.88 E 742,964.11 N 80.13			DATE STARTE DATE COMPLE EXCAVATION METHOD		<b>D</b> 30/11/2020		er
						Sample		3		eter
Geotechnical Description		Legend	(m)	Elevation	Water Strike	Sample Ref	Туре	Depth	Vane Test (KPa	Hand Penetrometer (KPa)
um. Gravel is fine to medium, subroular.  t brown slightly sandy gravelly CLA content and some boulders. Sand is Gravel is fine to medium, subrour lar.	y with medium as fine to inded to	0.2				145099	В	0.30-0.50		
ble content and some boulders. Sa	and is medium ular to angular.					140100	В	1.50-2.00		
rial Pit at 2.20m			20 7	77.93						
Conditions										
	Geotechnical Description  IL: Brown slightly sandy gravelly CLC cobble content and some boulders and some boulders are the some of the source	Geotechnical Description  IL: Brown slightly sandy gravelly CLAY with cobble content and some boulders. Sand is fine im. Gravel is fine to medium, subrounded to illar.  It brown slightly sandy gravelly CLAY with medium to ontent and some boulders. Sand is fine to . Gravel is fine to medium, subrounded to illar.  dense grey very sandy GRAVEL with medium to oble content and some boulders. Sand is medium e. Gravel is fine to coarse, subangular to angular.	Geotechnical Description  Geotechnical Description  L: Brown slightly sandy gravelly CLAY with cobble content and some boulders. Sand is fine im. Gravel is fine to medium, subrounded to lar.  It brown slightly sandy gravelly CLAY with medium to ontent and some boulders. Sand is fine to. Gravel is fine to medium, subrounded to lar.  Geotechnical Description  5. 2. 2. 2. 2. 2. 2. 2. 2. 2. 2. 2. 2. 2.	Geotechnical Description  Geotechnical Description  L: Brown slightly sandy gravelly CLAY with cobble content and some boulders. Sand is fine im. Gravel is fine to medium, subrounded to ilar.  It brown slightly sandy gravelly CLAY with medium ontent and some boulders. Sand is fine to Gravel is fine to medium, subrounded to ilar.  Idense grey very sandy GRAVEL with medium to ible content and some boulders. Sand is medium e. Gravel is fine to coarse, subangular to angular.  In all Pit at 2.20m	Geotechnical Description  L: Brown slightly sandy gravelly CLAY with cobble content and some boulders. Sand is fine to medium, subrounded to ilar.  It brown slightly sandy gravelly CLAY with medium to ilar.  It compares to medium, subrounded to ilar.  Gravel is fine to medium, subrounded to ilar.  Gravel is fine to coarse, subangular to angular.  Gravel is fine to coarse, subangular to angular.  Gravel is fine to coarse, subangular to angular.	Geotechnical Description  Geotechnical Description  L: Brown slightly sandy gravelly CLAY with cobble content and some boulders. Sand is fine m. Gravel is fine to medium, subrounded to a clar.  Gravel is fine to medium, subrounded to a clar.  Gravel is fine to medium, subrounded to a clar.  Gravel is fine to medium, subrounded to a clar.  Gravel is fine to medium, subrounded to a clar.  Gravel is fine to medium, subrounded to a clar.  Gravel is fine to medium, subrounded to a clar.  Gravel is fine to coarse, subangular to angular.  Final Pit at 2.20m  79.93  79.63  79.63  79.63  79.63  79.63  79.63	Malachy Walsh and Partners  Geotechnical Description  L: Brown slightly sandy gravelly CLAY with cobble content and some boulders. Sand is fine in. Gravel is fine to medium, subrounded to lar.  dense grey very sandy GRAVEL with medium to ble content and some boulders. Sand is fine to gravel is fine to coarse, subangular to angular.  dense grey very sandy GRAVEL with medium to ble content and some boulders. Sand is medium e. Gravel is fine to coarse, subangular to angular.	Malachy Walsh and Partners  Geotechnical Description  L: Brown slightly sandy gravelly CLAY with cobble content and some boulders. Sand is fine to medium, subrounded to liar.  dense grey very sandy GRAVEL with medium to bloe content and some boulders. Sand is medium e. Gravel is fine to coarse, subangular to angular.  and the company of the coarse, subangular to angular.  Trial Pit at 2.20m  Samples  Samp	Malachy Walsh and Partners  Geotechnical Description  Geotechnical Description  Geotechnical Description  Des	Malachy Walsh and Partners  Geotechnical Description  Be a geographic and some boulders. Sand is fine in Gravel is fine to medium, subrounded to late. Gravel is fine to coarse, subangular to angular.  In a geographic and some boulders. Sand is medium by a geographic and some boulders. Sand is fine to coarse, subangular to angular.  In a geographic and some boulders. Sand is fine to gravel is fine to coarse, subangular to angular.  In a geographic angular is a geographic angular in a geographic angular is a geographic angular in a geographic angular



00	BSL	TRIAL PIT RECORD								23000			
CON	TRACT	Seven Hills Wind Farm						TRIAL P	IT NO.	<b>T13 TP02</b> Sheet 1 of 1			
LOGGED BY JC			CO-ORDINATES		588,135.57 E 742,999.12 N			DATE STARTED		D 30/11/2020			
CLIENT Energia ENGINEER Malachy Walsh and Partners			GROUND LEVEL (m)		79.33			EXCAVATION METHOD		Track	Tracked digger		
									Samples	3	<b>'</b> a)	meter	
		Geotechnical Description		medium 34.5.34.5.		Elevation	Water Strike	Sample Ref	Туре	Depth	Vane Test (KPa)	Hand Penetrometer (KPa)	
0.0	<ul> <li>TOPSOIL: Brown slightly sandy GRAVEL with medium cobble content and some boulders. Sand is fine to medium. Gravel is fine to coarse, subrounded to subangular.</li> <li>Loose greyish yellow slightly gravelly clayey SAND. Sand is fine to medium. Gravel fine to medium, subrounded to angular.</li> </ul>				0.30	79.03		149651 B	В	0.50-0.80			
	Medium dense greyish brown very sandy GRAVEL with medium to high cobble content and some boulders. Sand is fine to coarse. Gravel is fine to coarse, subangular to angular.				0.90	78.43		144651	В	1.50-1.80 2.50-2.70			
3.0		rial Pit at 2.70m		200	2.70	76.63							
Grou	indwater (	Conditions		. '									
Stab Good													
	eral Rema sal due to	rks large boulders											

IGSL TP LOG 23000.GPJ IGSL.GDT 23/3/21



REPORT NUMBER

22000

SABELT Sheet 1 of 1 Annual Plant Start Start Sheet 1 of 1 Annual Stability  SABELT Sheet 1 of 1 Annual Start Start Sheet 1 of 1 Annual Stability  SABELT Sheet 1 of 1 Annual Start Start Sheet 1 of 1 Annual Stability  SABELT Sheet 1 of 1 Annual Start Start Sheet 1 of 1 Annual Sheet 1 of 1 Annual Start Sheet 1 of 1 Annual Start Sheet 1 of 1 Annual Sheet 1 of 1 Annual Sheet 1 of 1 Annual Sheet 1 of 1 Annu	IGSL									23000		
ATE COMPLETED 26/11/2020  SECALATION Tracked digger Malachy Walsh and Partners  Geotechnical Description  Geotechnical Description  Geotechnical Description  Geotechnical Description  Geotechnical Description  TOPSOIL: Brown slightly sandy gravely CLAY with medium cobble content and some boulders. Sand is fine to medium. Cravel is fine to coarse, subrounded to angular.  Loose light brown sandy clayey GRAVEL: Sand is fine to coarse, chavel is fine to coarse, subrounded to subangular.  Lense of loose yellow gravelly SAND with medium to high the subangular.  Medium dense light brown sandy clayey GRAVEL. Sand is fine to coarse, subrounded to subangular.  Medium dense light brown sandy clayey GRAVEL. Sand is fine to coarse, subrounded to subangular.  Medium dense light brown sandy clayey GRAVEL. Sand is fine to coarse, subrounded to subangular.  Medium dense light brown sandy clayey GRAVEL. Sand is fine to coarse, subrounded to subangular.  Medium dense light brown sandy clayey GRAVEL. Sand is fine to coarse, subrounded to subangular.  Medium dense light brown sandy clayey GRAVEL. Sand is fine to coarse, subrounded to subangular.  Medium dense light brown sandy clayey GRAVEL. Sand is fine to coarse, subrounded to subangular.  Medium dense light brown sandy clayey GRAVEL. Sand is fine to coarse, subrounded to subangular.  Medium dense light brown sandy clayey GRAVEL. Sand is fine to coarse, subrounded to subangular.  Medium dense light brown sandy clayey GRAVEL. Sand is fine to coarse, subrounded to subangular.  Medium dense light brown sandy clayey GRAVEL. Sand is fine to coarse, subrounded to subangular.  Medium dense light brown sandy clayey GRAVEL. Sand is fine to coarse, subrounded to subangular.  Medium dense light brown sandy clayey GRAVEL. Sand is fine to coarse, subrounded to subangular.  Medium dense light brown sandy clayey GRAVEL. Sand is fine to coarse, subrounded to subangular.  Medium dense light brown sandy clayer GRAVEL. Sand is fine to coarse, subrounded to subangular.  Medium dense light brown sand									IT NO.			
Exception Malachy Walsh and Partners  Geotochnical Description  ToPSOIL: Brown slightly sandy gravelly CLAY with medium cobble content and some boulders. Sand is fine to coarse, Gravel is fine to coarse, subrounded to subangular.  Losse light brown sandy dayey GRAVEL. Sand is fine to coarse, coarse is fine to coarse, subrounded to subangular.  Losse light brown sandy dayey GRAVEL. Sand is fine to coarse, subrounded to subangular.  Losse light brown sandy dayey GRAVEL. Sand is fine to coarse, coarse is fine to coarse, subrounded to subangular.  Losse of losse yellow gravelly SAND with medium to high cobble content. Sand is fine to medium. Gravel is fine to coarse, subrounded to subangular.  Losse of losse yellow gravelly SAND with medium to high sine to coarse. Gravel is fine to rease, subrounded to subangular.  End of Trial Pit at 1.70m  GROUND LEVEL (m) 85.60  Samples  Sa	LOGGED BY JC		CO-ORDINAT	ES				DATE STARTED				
Geotechnical Description  TOPSOIL: Brown slightly sandy gravelly CLAV with medium cobble content and some boulders. Sand is fine to medium. Gravel is fine to coarse, subrounded to angular.  Loss light brown sandy dispey GRAVEL. Sand is fine to coarse, fire the medium. Gravel is fine to coarse, subrounded to subangular.  Lense of lose yellow gravelly SAND with medium to high coarse. Gravel is fine to coarse, subrounded to subangular.  Medium dense light brown sandy clayey GRAVEL. Sand is fine to coarse. Gravel is fine to coarse. Grav	CLIENT ENGINEER	•	GROUND LEV	GROUND LEVEL (m)		85.60			EXCAVATION			
TOPSOIL: Brown slightly sandy gravelly CLAY with medium cobble content and some boulders. Sand is fine to coarse. Gravel is fine to coarse, subrounded to subangular.  Losse light brown sandy clayey GRAVEL. Sand is fine to coarse. Gravel is fine to coarse. Gravel is fine to coarse, subrounded to subangular.  Losse light brown sandy clayey GRAVEL. Sand is fine to coarse. Gravel is fine to coarse. Gravel is fine to coarse. Gravel is fine to coarse, subrounded to subangular.  Medium dense light brown sandy clayey GRAVEL. Sand is fine to coarse. Gravel is fine to coarse, subrounded to subangular.  End of Trial Pit at 1.70m  Trial Pit at 1.70m  Stability  Sood								Samples		;	a)	neter
medium cobble content and some boulders. Sand is fine to medium. Gravel is fine to coarse, subrounded to angular.  Lose light brown sandy clayey GRAVEL. Sand is fine to coarse. Gravel is fine to coarse, subrounded to subangular.  Lense of lose yellow gravelly SAND with medium to high coarse, subrounded to subangular.  Medium dense light brown sandy clayey GRAVEL. Sand is fine to coarse, subrounded to subangular.  End of Trial Pit at 1.70m  Stability  Scord  Stability  Scord  Seneral Remarks		Geotechnical Description		Legend	Depth (m)	Elevation	Water Strike	Sample Ref	Туре	Depth	Vane Test (KP	Hand Penetrometer
Lorse of loose yellow gravelly SAND with medium to high cobble content. Sand is fine to medium. Gravel is fine to coarse, subrounded to subangular.  Medium dense light brown sandy clayey GRAVEL. Sand is fine to coarse. Gravel is fine to coarse, subrounded to subangular.  End of Trial Pit at 1.70m  Basility  Sacuration of the subangular of the subangula	mediu to med angula	medium cobble content and some boulders. Sand is fine to medium. Gravel is fine to coarse, subrounded to angular.  Loose light brown sandy clayey GRAVEL. Sand is fine to coarse. Gravel is fine to coarse, subrounded to subangular.  Lense of loose yellow gravelly SAND with medium to high cobble content. Sand is fine to medium. Gravel is fine to coarse, subrounded to subangular.			0.60 0.80	84.80				0.80-1.00		
End of Trial Pit at 1.70m  1.70 83.90  1.70 83.90  1.70 83.90  1.70 83.90  1.70 83.90  1.70 83.90  1.70 83.90  1.70 83.90  1.50-1.80  1.80 1.50-1.80  1.70 83.90	coarse suban Lense cobble coarse							145095	В			
End of Inal Pit at 1.70m  3.0  Sroundwater Conditions  Stability Sood  Seneral Remarks	is fine	to coarse. Gravel is fine to coarse,	SHAVEL. Sand subrounded to			92.00		140096	В	1.50-1.80		
Groundwater Conditions  Stability Good  General Remarks	2.0	That it at 1.70m										
Stability Good General Remarks	3.0											
Stability Good General Remarks												
Good General Remarks	Groundwate	r Conditions										
Good General Remarks												
	Stability Good											



IGSL	Т	'RIAL PIT I				23	000				
CONTRACT	Seven Hills Wind Farm						TRIAL P	IT NO.		<b>TP02</b> et 1 of 1	
LOGGED BY  CLIENT ENGINEER	JC  Energia  Malachy Walsh and Partners	CO-ORDINATI			11.24 E 93.19 N		DATE S' DATE CO	OMPLETATION	26/1 TED 26/1	1/2020 1/2020 ked digg	jer
	madery material and anti-	l						Sample	es		əter
	Geotechnical Description		Legend	Depth (m)	Elevation	Water Strike	Sample Ref	Туре	Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
Dense o	oll: Brown slightly sandy gravelly CL, cobble content and some boulders, um. Gravel is fine to coarse, subrour grey slightly clayey very sandy GRAN content and many boulders. Sand is Gravel is fine to coarse, subrounded	/EL with high fine to		0.30	83.41		145096	В	0.50-0.80		
-2.0 End of -	Trial Pit at 2.10m		10 10 10 10 10 10 10 10 10 10 10 10 10 1	2.10	81.61		140097	В	1.50-1.80		
Groundwater	Conditions								'		
<b>Stability</b> Good											
<b>General Rema</b> Refusal due to	i <b>rks</b> I large boulders										



IGSL	1	RIAL PIT				230	000				
CONTRACT	Seven Hills Wind Farm						TRIAL P	IT NO.		<b>TP01</b> et 1 of 1	
LOGGED BY CLIENT ENGINEER	JC  Energia  Malachy Walsh and Partners	CO-ORDINAT			52.35 E 70.74 N		DATE ST DATE CO EXCAVA METHOD	OMPLE <sup>T</sup>	26/11 TED 26/11	1/2020 1/2020 ked digg	jer
								Sample	es .		eter
	Geotechnical Description		Legend	Depth (m)	Elevation	Water Strike	Sample Ref	Туре	Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
Loose y to coars angular Medium GRAVE boulder	rellow slightly clayey gravelly SAND. se. Gravel is fine to coarse, subround	Sand is fine ded to very sandy nt and some	STORESTORESTORESTORESTORESTORESTORESTORE	0.30 0.40	72.02 71.92		145094	В	0.50-0.80		
-2.0				2 20	70.12		140094	В	1.50-1.80 2.00-2.20		
End of a	Trial Pit at 2.20m			2.20	70.12						
<b>Stability</b> Good											
General Rema Refusal due to	i <b>rks</b> b large boulders										



00	BSL	1	CO-ORDINATES 588,804.14 E 744,176.77 N 71.90  GROUND LEVEL (m) 71.90  GROUND LEVEL (m) 71.90  EXCAVATION METHOD  Tracked digger METHOD  Samples  Geotechnical Description  In slightly sandy gravelly CLAY with content and some is fine to coarse, subrounded to  Simples  Samples  Fig. 26/11/2020  EXCAVATION METHOD  Tracked digger METHOD  Samples  Fig. 26/11/2020  EXCAVATION METHOD  Tracked digger METHOD  Fig. 26/11/2020  Application of the coarse of												
CON	TRACT	Seven Hills Wind Farm							IT NO.						
LOG	GED BY	JC													
CLIE	NT INEER	Energia Malachy Walsh and Partners	GROUND LE	VEL (m)	71.90					Track	red digg	er			
									Samples	<b>i</b>	'a)	neter			
		Geotechnical Description		1	Depth (m)	Elevation	Water Strike	Sample Ref	Type	Depth	Vane Test (KP	Hand Penetroi (KPa)			
0.0	medium	nedium. Gravel is fine to coarse, sub	lders. Sand is	11 11 11											
- - -	Loose ye coarse. subangu	ellow clayey gravelly SAND. Sand is Gravel is fine to coarse, subrounded ular.	s fine to d to	6				145092	В	0.50-0.90					
1.0	boulders	dense to dense grey slightly clayey L with medium to high cobble conte s. Sand is fine to coarse. Gravel is fi ded to subangular.	very sandy nt and some ne to coarse,		0.90	71.00		145093	В	1.50-1.80					
- - - 2.0 - - -															
- - - - - - 3.0					3.00	68.90		140093	В	2.50-2.80					
3.0 · · · · · · · · · · · · · · · · · · ·	End of T	Гrial Pit at 3.00m													
Grou	indwater (	Conditions		•											
Stab Good															
	eral Rema sible Rock														

IGSL TP LOG 23000.GPJ IGSL.GDT 23/3/21



IGSL		ı	RIAL PIT	RECO	ΚD					230	000	
CONTRAC	T Seven Hills Wi	nd Farm				95.87 N DATE C	IT NO.		<b>TP01</b> et 1 of 1			
LOGGED E	BY JC		CO-ORDINAT		589,38 744,49	35.41 E 95.87 N		DATE S		25/11	1/2020 1/2020	
CLIENT ENGINEER	Energia Malachy Walsh	and Partners	GROUND LEV	/EL (m)	77.84			EXCAVA METHOI		Track	ked digg	jer
									Samples	5	<b>'a</b> )	meter
	Geotech	nnical Description		Legend	Depth (m)	Elevation	Water Strike	Sample Ref	Туре	Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
Med GRA boul	content. Gravel is fine to medium, subrounded to subangular.  Medium dense to dense grey slightly clayey very sand GRAVEL with medium to high cobble content and son boulders. Sand is fine to medium. Gravel is fine to coasubrounded to angular.		very sandy	14-4-18-18-18-18-18-18-18-18-18-18-18-18-18-	0.30				В	0.50-0.80 1.50-1.80		
3.0 End	of Trial Pit at 1.80m				2.50	75.34						
Groundwa	ter Conditions											
<b>Stability</b> Good												
<b>General Re</b> Refusal du	emarks le to large boulders											



Je	3SL	'	RIAL PIT I	RECO	KD					230	000	
CON	TRACT	Seven Hills Wind Farm						TRIAL P	PIT NO.		<b>TP02</b> t 1 of 1	
CLIE	GED BY NT NEER	JC  Energia  Malachy Walsh and Partners	CO-ORDINAT		589,4 <sup>-</sup> 744,46 77.66	19.30 E 62.78 N		DATE S' DATE C  EXCAVA METHOI	OMPLET ATION	25/11 <b>ED</b> 25/11	/2020 /2020 :ed digg	er
		,							Samples	6	(1	eter
		Geotechnical Description		Legend	Depth (m)	Elevation	Water Strike	Sample Ref	Туре	Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0	Medium GRAVE boulders	IL: Brown gravelly CLAY. Gravel is f, subrounded to subangular.  dense to dense grey slightly clayey L with medium to high cobble contes. Sand is fine to medium. Gravel is ided to angular.	very sandy	18 19 19 19 19 19 19 19 19 19 19 19 19 19	0.20	77.46		170968	В	0.50-0.80		
1.0	End of 1	Frial Pit at 1.60m		10000000000000000000000000000000000000	1.60	76.06		170969	В	1.40-1.60		
2.0												
3.0												
Grou	ndwater (	Conditions										
<b>Stabi</b> Good	lity											
	eral Rema sal due to	rks large boulders										



CLIENT Energia ENGINEER Malachy Walsh and Partners  Geotechnical Description  Geotechnical Description  Geotechnical Description  Geotechnical Description  Geotechnical Description  TOPSOIL: Brown slightly sandy gravelly CLAY with medium cobble content and some boulders. Gravel is fine to coarse, subrounded to subangular.  Medium dense to brown sandy clayey GRAVEL with high cobble content and many boulders. Sand is fine to coarse. Gravel is fine to coarse, subangular to angular.  Medium dense brownish grey clayey very sandy GRAVEL with high cobble content and many boulders. Sand is fine to coarse. Gravel is fine to coarse, subangular to angular.  In the coarse of th					23	000					
CONTRACT	Seven Hills Wind Farm  BY JC  Energia R Malachy Walsh and Partners  Geotechnical Description  Geotechnical Description  PSOIL: Brown slightly sandy gravelly CLAY with dium cobble content and some boulders. Gravel is fine carse, subrounded to subangular.  Description  Description  PSOIL: Brown slightly sandy gravelly CLAY with dium cobble content and some boulders. Gravel is fine carse, subrounded to subangular.  Description  Descr		TRIAL P	PIT NO.		<b>TP01</b> et 1 of 1					
CONTRACT Sevil  LOGGED BY JC  CLIENT Ene ENGINEER Mala  O.0 TOPSOIL: Bromedium cobb to coarse, sub Medium dens cobble content coarse. Grave Medium dens with high cobb to coarse. Grave I.0 End of Trial P  Control  Contro	JC			744,1	41.00 N		DATE S'		02/12	2/2020	
		GROUND LEV	/EL (m)	85.60			EXCAVA METHO		Track	ked digg	jer
								Sample	es	<b>'</b> a)	meter
	Geotechnical Description		Legend	Depth (m)	Elevation	Water Strike	Sample Ref	Туре	Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
mediun to coars	se, subrounded to subangular.	,		0.20	85.40						
Mediun cobble coarse. Mediun	n dense to brown sandy clayey GRA content and many boulders. Sand is Gravel is fine to coarse, subangular n dense brownish grey clayey very say to coate a content and many boulders.	VEL with high fine to roangular.	200	1	85.10		144658	В	0.50-0.80		
to coars	in cobble content and many boulders se. Gravel is fine to coarse, subangu	s. Sand is fine ilar to angular.									
							149658	В	1.50-1.80		
-	Trial Pit at 2 20m			2.20	83.40						
Elid of	111d 111 dt 2.2011										
- - - 3.0											
- -											
- - -											
Groundwater	Conditions			,	•		,				,
<b>Stability</b> Good											



IGSL	'	RIAL PIT I	RECO	RD					23	000	
CONTRACT	Seven Hills Wind Farm						TRIAL P	IT NO.		<b>TP02</b> et 1 of 1	
LOGGED BY	JC	CO-ORDINATI		744,1	74.51 E 27.05 N		DATE S		02/12	2/2020 2/2020	
CLIENT ENGINEER	Energia Malachy Walsh and Partners	GROUND LEV	'EL (m)	88.87			METHO!		Tracl	ked digg	jer
								Sample	s	<b>(a</b> )	meter
	Geotechnical Description		Legend	Depth (m)	Elevation	Water Strike	Sample Ref	Туре	Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
to coars  Medium GRAVE Sand is	oll: Brown slightly sandy gravelly CL nobble content and some boulders se, subrounded to subangular. In dense to dense grey slightly clayey it with high cobble content and man fine to coarse. Gravel is fine to coarular to very angular.	/		0.20	88.67		149657	В	0.50-0.80		
2.0							144657	В	1.50-2.00		
3.0	Trial Pit at 2.60m			2.60	86.27						
Groundwater	Conditions										
<b>Stability</b> Good											
<b>General Rema</b> Refusal due to	arks o large boulders										



00	BSL	ı	RIAL PIT I	RECO	KD					230	000	
CON	TRACT	Seven Hills Wind Farm						TRIAL P	PIT NO.		<b>TP01</b> t 1 of 1	
CLIE	GED BY INT INEER	JC  Energia  Malachy Walsh and Partners	CO-ORDINAT		590,53 744,14 87.24	36.15 E 44.73 N		DATE S' DATE C  EXCAVA METHO	OMPLET ATION	03/12 <b>FED</b> 03/12	2/2020 2/2020 sed digg	jer
		,							Sample	s		eter
		Geotechnical Description		Legend	Depth (m)	Elevation	Water Strike	Sample Ref	Туре	Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0	boulders subroun Medium GRAVE Sand is	IL: Brown slightly sandy gravelly CLA to high cobble content and some to s. Sand is fine to coarse. Gravel is finded to subangular.  I dense light greyish brown clayey ve L with high cobble content and many fine to coarse. Gravel is fine to coarsular to angular.	ne to coarse, ery sandy y boulders.	4 4 6 1 5 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	0.20	87.04		144660	В	0.50-0.80		
- - - - - - - 2.0				\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\				149660	В	1.50-1.80		
3.0	End of T	Γrial Pit at 3.00m			3.00	84.24		144661	В	2.50-2.80		
Grou	ındwater (	Conditions										
Stab Good	<b>ility</b> d											
	eral Rema Isal due to	rks I large boulders										



IGSL		TRIAL PIT	RECO	ΚD					230	000	
CONTRACT	Seven Hills Wind Farm						TRIAL P	IT NO.		<b>TP02</b> t 1 of 1	
OGGED BY	JC  Energia  Malachy Walsh and Partners	CO-ORDINAT		590,53 744,18 89.24	37.51 E 38.61 N		DATE ST DATE CO EXCAVA METHOD	OMPLET ATION	03/12 <b>ED</b> 03/12	2/2020 2/2020 xed digg	jer
								Samples	s		eter
	Geotechnical Description		Legend	Depth (m)	Elevation	Water Strike	Sample Ref	Туре	Depth	Vane Test (KPa)	Hand Penetrometer
boulder subrour Medium GRAVE Sand is subrour	DIL: Brown slightly sandy gravelly Cn to high cobble content and some is. Sand is fine to coarse Gravel is inded to subangular.  In dense to dense greyish brown claible. With high cobble content and may fine to coarse. Gravel is fine to conded to angular.	fine to coarse, ayey very sandy any boulders.	0.016 9.40 4.00 0.00 0.00 0.00 0.00 0.00 0.00	0.30	88.94		144659	В	0.50-0.80		
2.0											
Groundwater	Conditions										



IGSL	1	TRIAL PIT R				230	000				
CONTRACT	Seven Hills Wind Farm						TRIAL P	IT NO.		TP01	
LOGGED BY CLIENT ENGINEER	JC  Energia  Malachy Walsh and Partners	CO-ORDINATE GROUND LEVI			74.41 E 21.34 N		DATE CO DATE CO EXCAVA METHOD	OMPLET ATION	03/12 ED 03/12	1 of 1 /2020 /2020 ed digg	jer
ENGINEER	Malachy Walsh and Faithers							Samples	5		ter
	Geotechnical Description		Legend	Depth (m)	Elevation	Water Strike	Sample Ref	Туре	Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
to coars subang Medium GRAVE boulder	OlL: Brown slightly sandy gravelly CL n cobble content and some boulders se. Gravel is fine to coarse, subrounular.  In dense light brownish cream clayey st. with high cobble content and som s. Sand is fine to coarse. Gravel is finded to subangular.	very sandy e to many	100 B 40 B 60 B 60 B 60 B 60 B 60 B 60 B	0.20	108.93		149661	В	0.50-0.80		
2.0		5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5					144662	В	1.50-1.80		
3.0 End of	Trial Pit at 3.00m			3.00	106.13		149662	В	2.50-3.00		
Groundwater  Stability Good  General Rema											



IGSL	7	TRIAL PIT F				230	000				
CONTRACT	Seven Hills Wind Farm						TRIAL PI	T NO.		TP02	
LOGGED BY CLIENT ENGINEER	JC  Energia  Malachy Walsh and Partners	CO-ORDINATE			30.94 E 41.94 N 3		DATE ST DATE CO EXCAVA METHOD	OMPLET	03/12 <b>FED</b> 03/12	t 1 of 1 2/2020 2/2020 xed digg	jer
LINGINEER	Walacity Walait and Faithers							Sample	s		ter
	Geotechnical Description		Legend	Depth (m)	Elevation	Water Strike	Sample Ref	Туре	Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
Medium high cool fine to c angular	n dense light brown clayey sandy GF bble content and some to many boul coarse. Gravel is fine to coarse, subr	AVEL with lders. Sand is	1	2.50	107.33		144663 144664	ВВВ	0.50-0.80 1.50-1.80 2.20-2.50		
3.0											
Groundwater	Conditions										
Stability Good											
<b>General Rema</b> Refusal due to	<b>ırks</b> b large boulders										



IGSL		I RIAL PIT F	1ECO	ΚD					230	000	
CONTRACT	Seven Hills Wind Farm						TRIAL P	IT NO.		<b>TP01</b> t 1 of 1	
LOGGED BY	, JC	CO-ORDINATE		591,17 744,39 94.09	73.25 E 93.81 N		DATE ST	OMPLET	10/12 <b>ED</b> 10/12	2/2020 2/2020	
CLIENT ENGINEER	Energia Malachy Walsh and Partners	GHOOND EEV	LL (III)	34.03	1		METHO!		Track	ked digg	er
								Samples	3	<b>)</b> a)	meter
	Geotechnical Description		Legend	Depth (m)	Elevation	Water Strike	Sample Ref	Туре	Depth	Vane Test (KPa)	Hand Penetrometer
\subrou Mediu hiah c	OIL: Brown slightly sandy gravelly CI m to high cobble content and occasion is fine to medium. Gravel is fine to medium. Gravel is fine to medium ded to subangularangular.  In dense light brown sandy clayey GI obble content and some to many bound to coarse. Gravel is fine to coarse, gular.	RAVEL with	3 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	0.20	93.89		149674	В	0.50-0.80		
- 1.0 - 2.0			16   C   C   C   C   C   C   C   C   C				144675	В	1.50-1.80		
3.0			THE CONTROLL CONTROL CONTROLL CONTROL CONTROL CO	3.50	90.59		149675	В	2.80-3.20		
End of	f Trial Pit at 3.30m			3.30	30.33						
Groundwate	r Conditions										
Stability Good											
General Ren	narks										



IGSL	'	NIAL PIT I	nECO	טח					230	000	
CONTRACT	Seven Hills Wind Farm						TRIAL P	IT NO.		<b>TP02</b> t 1 of 1	
LOGGED BY  CLIENT ENGINEER	Energia GROUND			591,19 744,34 94.30	92.64 E 19.28 N		DATE ST DATE CO EXCAVA METHOD	OMPLET ATION	10/12/2020		er
		1						Sample	s	<del></del>	eter
	Geotechnical Description		Legend	Depth (m)	Elevation	Water Strike	Sample Ref	Туре	Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
- \subrour - Medium - with hig	III.: Brown slightly sandy gravelly CLA to high cobble content and occasion fine to medium. Gravel is fine to mended to angular.  In dense light greyish brown sandy class to content and many boulders are. Gravel is fine to coarse, subround ular.	ayey GRAVEL S. Sand is fine	1	0.20	94.10		149673	В	0.50-0.80		
- 2.0			\$\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\				144673	В	1.50-1.80		
End of 7	Trial Pit at 3.20m		PO PACIO DE A A	3.20	91.10		144674	В	2.80-3.20		
Groundwater (	Conditions										
<b>Stability</b> Good											
General Rema	arks										



133	31	'	IRIAL PII I	RECO	ΚD					230	000	
CONTR	ACT	Seven Hills Wind Farm						TRIAL P	IT NO.		<b>TP01</b> et 1 of 1	
LOGGE		JC Energia	CO-ORDINAT		591,42 744,13 88.83	28.83 E 37.09 N		DATE ST DATE CO EXCAVA METHOD	OMPLET ATION	08/11 <b>FED</b> 08/11	1/2020 1/2020 ked digg	jer
ENGINE	ER	Malachy Walsh and Partners										
									Sample	S	(Pa)	romete
		Geotechnical Description		Legend	Depth (m)	Elevation	Water Strike	Sample Ref	Type	Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
- S - S - N	nedium Sand is ubroun Medium nedium ooulders	L: Brown slightly sandy gravelly CL to high cobble content and occasio fine to medium. Gravel is fine to coded to angular.  dense light brown sandy clayey GF to high cobble content and some to sand is fine to coarse. Gravel is fided to angular.	anal boulders. arse,  RAVEL with o many		0.30	88.53		149671	В	0.50-0.80		
2.0								144672	В	1.50-1.80		
3.0								149672	В	2.50-3.00		
- -	end of T	rial Pit at 3.50m		**** a. [	3.50	85.33						
Ground	lwater C	Conditions		1	l	I		1				I
Stability Good	у											
General	I Remai	rks										



Je	BSL	'	RIAL PIT I	RECO	ΚD					230	000		
CON	TRACT	Seven Hills Wind Farm						TRIAL P	IT NO.		TP02		
CLIE	GED BY NT	JC  Energia  Malachy Walsh and Partners	CO-ORDINAT		591,4 744,08 90.37	18.43 E 38.28 N		DATE ST	SHEET         Sheet 1           DATE STARTED         08/11/20           DATE COMPLETED         08/11/20           EXCAVATION METHOD         Tracked			20 20	
		,							Sample	s	(i	eter	
		Geotechnical Description		Legend	Depth (m)	Elevation	Water Strike	Sample Ref	Туре	Depth	Vane Test (KPa)	Hand Penetrometer (KPa)	
1.0	Sand is subroun Medium medium	IL: Brown slightly sandy gravelly CL to high cobble content and occasio fine to medium. Gravel is fine to content to angular.  I dense light brown sandy clayey GF to high cobble content and many be coarse. Gravel is fine to coarse, such	arse, AVEL with oulders. Sand	19 KY BY G'B B A A B B B B B B B B B B B B B B B B	0.30	90.07		149670 144670	В	0.50-0.80 1.50-1.80 2.50-3.00			
3.0	End of T	Γrial Pit at 3.10m			3.50	86.87							
Grou	ındwater (	Conditions											
Stabi Good													
Gene	eral Rema	rks											



IGSL	ı	NIAL PIT I	nLCO	טח					230	000		
CONTRACT	Seven Hills Wind Farm						TRIAL P	IT NO.		ST TP0	1	
LOGGED BY CLIENT ENGINEER	JC  Energia  Malachy Walsh and Partners	CO-ORDINAT GROUND LEV		585,60 747,93 91.83	00.00 E 71.98 N		DATE ST DATE CO EXCAVA METHOD	OMPLET ATION	25/11 TED 25/11	/2020 /2020 ked digg	)20 )20	
								Sample	s	a)	neter	
	Geotechnical Description		Legend	Depth (m)	Elevation	Water Strike	Sample Ref	Туре	Depth	Vane Test (KPa)	Hand Penetrometer (KPa)	
mediur	DIL: Brown gravelly CLAY with low to content and occasional boulder. Gravn, subrounded to subangular.		1/ 3/1/ 3/1/ 1/ 3/1/ 3/1/	0.30	91.53							
and so subrou	Brown gravelly CLAY with medium to high cobble content and some to many boulders. Gravel is fine to medium, subrounded to angular.			0.60	91.23		140089 B	В	0.40-0.60			
to coar subang	m dense brown slightly clayey gravelly in cobble content and some boulders. se. Gravel is fine to coarse, subrounce gular.  Trial Pit at 2.00m	y SAND with Sand is fine led to	(a) (a) (b) (c) (d) (d) (d) (d) (d) (d) (d) (d) (d) (d	2.00	89.83		145089	В	1.70-2.00			
Groundwater	Conditions						,			,		
Stability Good												
General Remark Refusal due t	arks o large boulders											



IGSL									230	000	
CONTRACT	Seven Hills Wind Farm	CO-ORDINAT	res	585 6	15.04 E		TRIAL P		Shee	ST TP0	12
LOGGED BY	JC	CO-ONDINA	IES	747,9	64.42 N			<b>STARTED</b> 25/11/202 <b>COMPLETED</b> 25/11/202			
CLIENT ENGINEER	Energia Malachy Walsh and Partners	GROUND LE	VEL (m)	91.42			EXCAVATION METHOD		Tracked digger		er
	Samples									a)	neter
	Geotechnical Description		Legend	Depth (m)	Elevation	Water Strike	Sample Ref	Туре	Depth	Vane Test (KPa)	Hand Penetrometer
0.0 TOPSO medium	DIL: Brown gravelly CLAY. Gravel is n, subrounded to subangular.	fine to	11. 11. 11.								
Medium GRAVE Gravel i	n dense greyish brown slightly claye EL with high cobble content and son is fine to medium, subrounded to an	ey very sandy ne boulders. ngular.		0.30	91.12		140090	В	0.50-0.80		
End of	Trial Pit at 0.80m			0.80	90.62						
2.0											
3.0											
Groundwater (	Conditions										
Stability Good											
<b>General Rema</b> Refusal due to	arks o large boulders										



CLIENT Energia GROUND LEVEL (m) 91.87 Samples  Geotechnical Description  Geotechnical Descriptio	23000					עח	NECO	3L	IGSL
COLIENT   Energia   GROUND LEVEL (m)   91.87   Samples   91.87	Substation TP01 Sheet 1 of 1	IT NO.						RACT Seven Hills Wind Farm	ONTRACT
RETHOD    Comparison   Comparis	07/12/2020	OMPLET	DATE C		22.20 E 19.52 N	744,74		ED BY JC GROUND LEV	
Geotechnical Description    ToPSOIL: Brown slightly sandy gravelly CLAY. Sand is fine to medium. Gravel is fine to coarse, subrounded to subangular.    Medium dense light greyish brown clayey very sandy GRAVEL with medium to high coarse. Sand is fine to coarse. Sand is	Tracked digger							ů .	
TOPSOIL: Brown slightly sandy gravelly CLAY. Sand is fine to medium. Gravel is fine to coarse, subrounded to subangular.  Medium dense light greyish brown clayey very sandy GRAVEL with medium to high cobble content and many boulders. Sand is fine to coarse, subrounded to subangular.  1.0  End of Trial Pit at 2.50m  Topsolit: Brown slightly sandy gravelly CLAY. Sand is fine to coarse, subrounded to subangular.  0.30  91.57  144667  B  0.50-1.00  144668  B  1.50-1.80  83.37	a) meter	Sample							
fine to medium. Gravel is fine to coarse, subrounded to subangular.  Medium dense light greyish brown clayey very sandy GRAVEL with medium to high cobble content and many boulders. Sand is fine to coarse. Gravel is fine to coarse subrounded to subangular.  1.0  1.0  End of Trial Pit at 2.50m  The fine to medium. Gravel is fine to coarse, subrounded to subangular.  2.50  89.37  144668  B  0.50-1.00  144668  B  2.20-2.50	Depth Vane Test (KPa) Hand Penetrometer (KPa)	Туре	Sample Ref	Water Strike	Elevation	Depth (m)		Geotechnical Description	
2.0 End of Trial Pit at 2.50m  2.50 89.37	50-1.00	В	144667		91.57	0.30	1. 1.1. 1.1.	subangular.  Medium dense light greyish brown clayey very sandy GRAVEL with medium to high cobble content and many boulders. Sand is fine to coarse. Gravel is fine to coarse.	fine to subang  Mediur GRAVE boulde subrou
End of Trial Pit at 2.50m  2.50 89.37	50-1.80	В	149667				10000000000000000000000000000000000000		2.0
	20-2.50	В	144668		89.37	2.50		End of Trial Pit at 2.50m	End of
									3.0
Groundwater Conditions								dwater Conditions	àroundwater
Stability Good								ty	
General Remarks Refusal due to large boulders								al Remarks al due to large boulders	ieneral Rema Refusal due t



IGSL	INIAL PII	TILOO	מוו					230	000	
CONTRACT Seven Hills Wind Farm						TRIAL P	T NO.		station et 1 of 1	TP02
OGGED BY JC	ED BY JC CO-ORDINA GROUND LE		744,753.65 N			DATE ST	OMPLET	D 07/12/2020 ETED 07/12/2020		
RIGINEER Malachy Walsh and Partners		(,				METHOE		Track	ked digg	ger
						,	Samples	S	a)	neter
Geotechnical Description		Legend	Depth (m)	Elevation	Water Strike	Sample Ref	Туре	Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
TOPSOIL: Brown slightly sandy gravelly CL fine to medium. Gravel is fine to coarse, subsubangular.  Medium dense light brownish grey clayey we GRAVEL with high cobble content and man Sand is fine to coarse. Gravel is fine to coarsubrounded to subangular.		AND PARTON OF THE PARTON OF TH	0.40	90.94		149668	В	0.50-1.00		
2.0		800 800 800 800 800 800 800 800 800 800				144669	В	1.50-1.80		
End of Trial Pit at 2.70m			2.70	88.64						
3.0										
iroundwater Conditions		1	<u> </u>	1	<u> </u>	<u>                                       </u>			<u> </u>	<u>I</u>
tability lood										
ieneral Remarks lefusal due to large boulders										

T1 TP01 – 1 of 3



<u>T1 TP01 – 2 of 3</u>



# <u>T1 TP01 – 3 of 3</u>



<u>T1 TP02 – 1 of 1</u>



<u>T1 TP03 – 1 of 3</u>



<u>T1 TP03 – 2 of 3</u>



<u>T1 TP03 – 3 of 3</u>



<u>T1 TP04 – 1 of 3</u>



<u>T1 TP04 – 2 of 3</u>



<u>T1 TP04 – 3 of 3</u>



## T2 TP01 – 1 of 1



T2 TP02 – 1 of 3



T2 TP02 – 2 of 3



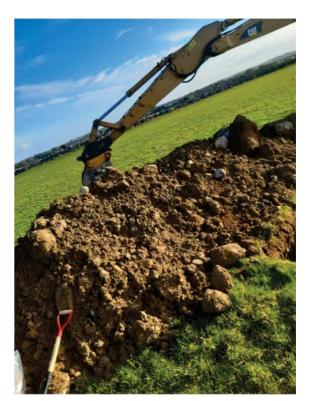
T2 TP02 – 3 of 3



T3 TP01 – 1 of 2



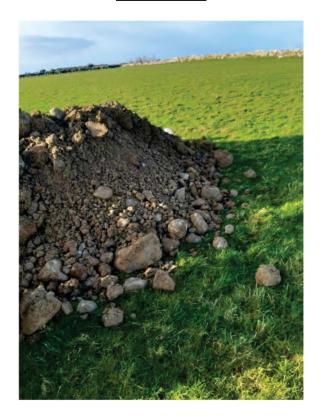
<u>T3 TP01 – 2 of 2</u>



T3 TP02 – 1 of 2



T3 TP02 – 2 of 2



<u>T4 TP01 – 1 of 2</u>



T4 TP01 – 2 of 2



<u>T4 TP02 – 1 of 2</u>



T4 TP02 – 2 of 2



T5 TP01 – 1 of 2



T5 TP01 – 2 of 2



T5 TP02 – 1 of 1



<u>T6 TP01 – 1 of 2</u>



<u>T6 TP01 – 2 of 2</u>



# <u>T6 TP02 – 1 of 2</u>



T6 TP02 – 2 of 2



## T8 TP01 – 1 of 2



T8 TP01 – 2 of 2



T8 TP02 – 1 of 2



T8 TP02 – 2 of 2



T10 TP01 – 1 of 2



<u>T10 TP01 – 2 of 2</u>



# <u>T10 TP02 – 1 of 1</u>



# T12 TP01 – 1 of 2



T12 TP01 – 2 of 2



T12 TP02 – 1 of 1



T13 TP01 – 1 of 2



T13 TP01 – 2 of 2



# T13 TP02 – 1 of 2



T13 TP02 – 2 of 2



T14 TP01 – 1 of 3



T14 TP01 – 2 of 3



# T14 TP01 – 3 of 3



T14 TP02 – 1 of 2



T14 TP02 – 2 of 2



T15 TP01 – 1 of 1



T15 TP02 – 1 of 2



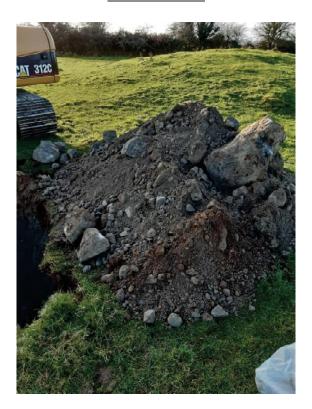
T15 TP02 – 2 of 2



# T16 TP01 – 1 of 2



<u>T16 TP01 – 2 of 2</u>



T16 TP02 – 1 of 2



T16 TP02 – 2 of 2



<u>T17 TP01 – 1 of 2</u>



<u>T17 TP01 – 2 of 2</u>



# T17 TP02 – 1 of 2



<u>T17 TP02 – 2 of 2</u>



T18 TP01 – 1 of 2



<u>T18 TP01 – 2 of 2</u>



T18 TP02 – 1 of 2



<u>T18 TP02 – 2 of 2</u>



T19 TP01 – 1 of 2



T19 TP01 – 2 of 2



# T19 TP02 – 1 of 2



T19 TP02 – 2 of 2



T20 TP01 – 1 of 2



T20 TP01 - 2 of 2



T21 TP01 – 1 of 2



T21 TP01 – 2 of 2



T21 TP02 – 1 of 2



T21 TP02 – 2 of 2



## Mast TP01 – 1 of 2



Mast TP01 – 2 of 2



## Mast TP02 – 1 of 1



# Substation TP01 – 1 of 2



Substation TP01 – 2 of 2



# Substation TP02 – 1 of 2



Substation TP02 – 2 of 2



# Appendix 3

**Dynamic Probe Records** 



REPORT NUMBER

1GSF										20000
CONTRACT	Seve	en Hills Wind Farm						BE NO.		DP01
CO-ORDINAT	TES	585,607.87 E 747,967.66 N					SHE	ET E DRILLI	FD	Sheet 1 of 1 03/12/2020
ROUND LE	VEL (m0	747,967.66 N <b>DD)</b>	HAMMER MASS (kg)		50			E LOGG		03/12/2020
CLIENT	Ener		INCREMENT SIZE (m	m)	100				_	
NGINEER		chy Walsh and Partners	FALL HEIGHT (mm)		500		PRO	BE TYP	E	DPH
						<u> </u>			s (jui	
						]Om)			Iding	Graphia Proba
(E)		Geotechnical Descript	ion	g	(m)	tion (		(E)	Rea s/Inc	Graphic Probe Record
Depth (m)				Legend	Depth (m)	Elevation (mOD)	Water	Depth (m)	Probe Readings (Blows/Increment)	
0.0						ш	>	0.00	0	0 5 10 15 20 2
								0.10 0.20	1 2	
								0.30 0.40	2 4	
								0.50 0.60	5 4	
								0.70 0.80	4 12	
.0								0.90	10 12	
								1.10	18 25	
End o	f Probe	at 1.30 m					•			
2.0										
3.0										
,										
1.0										
.										
HOUNDWA	TER OB	SERVATIONS								
EMARKS										



REPORT NUMBER

133L									20000
CONTRACT	Seven Hills Wind Farm						BE NO.		DP02
CO-ORDINAT	<b>ES</b> 585,741.01 E					SHE			Sheet 1 of 1
	747,894.87 N	HAMMER MASS (kg)		50			E DRILLI E LOGGI		03/12/2020 03/12/2020
GROUND LE\ CLIENT	Energia	INCREMENT SIZE (mr	n)	100					00,12,2020
ENGINEER	Malachy Walsh and Partners	FALL HEIGHT (mm)	,	500		PRO	BE TYP	E	DPH
					(ac			ngs	
ē	Geotechnical Descrip	otion		<u></u>	m) ר		<u></u>	eadi	Graphic Probe Record
Depth (m)	·		pue	Depth (m)	Elevation (mOD)	Ē	Depth (m)	e R ws/li	Record
Dep			Legend	Dep	Elev	Water	Dep	Probe Readings (Blows/Increment)	0 5 10 15 20 2
0.0							0.00	0	
							0.10 0.20	1	
							0.30 0.40	2 11	
							0.50 0.60	12 18	
End of	Probe at 0.80 m					,	0.70	25	
	FIUDE AL U.8U III								
1.0									
									<del></del>
2.0									
3.0									
									<del></del>
4.0									<del></del>
									<u> </u>
ROUNDWA	TER OBSERVATIONS								
REMARKS									



REPORT NUMBER

23000

PROBE NO. CONTRACT Seven Hills Wind Farm DP03 SHEET Sheet 1 of 1 **CO-ORDINATES** 585,966.60 E 747,771.06 N DATE DRILLED 03/12/2020 HAMMER MASS (kg) DATE LOGGED 50 03/12/2020 GROUND LEVEL (mOD) INCREMENT SIZE (mm) 100 CLIENT Energia PROBE TYPE DPH **ENGINEER** FALL HEIGHT (mm) Malachy Walsh and Partners 500 Probe Readings (Blows/Increment) Elevation (mOD) Graphic Probe Record Geotechnical Description Depth (m) Depth (m)  $\widehat{\Xi}$ Legend Depth ( 5 10 15 20 25 0.0 0.00 0.10 0.20 0.30 0.40 0.50 0.60 0 3 8 13 15 25 End of Probe at 0.70 m 1.0 2.0 3.0 4.0 IGSL DP LOG 100MM INCREMENTS 23000.GPJ IGSL GDT 23/3/21

REMARKS

REMARKS **GROUNDWATER OBSERVATIONS** 



REPORT NUMBER

OGSL	/									23000
CONTRAC	T Seve	n Hills Wind Farm					I	BE NO.		DP04
CO ODDIN	ATEC	500 040 74 F					SHE	ET		Sheet 1 of 1
CO-ORDIN GROUND I		586,212.71 E 747,835.55 N <b>DD)</b>	HAMMER MASS (kg)		50			E DRILLE E LOGGE		03/12/2020 03/12/2020
CLIENT	Ener		INCREMENT SIZE (m	m)	100		DDO	DE TVDI	_	DDII
ENGINEER	Malac	chy Walsh and Partners	FALL HEIGHT (mm)		500		PRO	BE TYPI	=	DPH
Depth (m)		Geotechnical Descrip	ition	Legend	Depth (m)	Elevation (mOD)	Water	Depth (m)	Probe Readings (Blows/Increment)	Graphic Probe Record
2.0 End	of Probe	at 0.60 m						0.00 0.10 0.20 0.30 0.40 0.50	0 2 6 9 12 25	
GROUNDV REMARKS		SERVATIONS								



REPORT NUMBER

PROBE NO. SHEET   Sheet 1 of 1
DATE DRILLED   03/12/2020   0
DINCREMENT SIZE (mm)   100   PROBE TYPE   DPH
End of Probe at 0.90 m  INCREMENT SIZE (mm) 100 500  PROBE TYPE DPH  INCREMENT SIZE (mm) 500  PROBE TYPE DPH  INCREMENT SIZE (mm) 500  PROBE TYPE DPH  INCREMENT SIZE (mm) 500  INCREMENT SIZE (mm) 500  FALL HEIGHT (mm) 500  INCREMENT SIZE (mm) 500  FALL HEIGHT (mm) 500  INCREMENT SIZE (mm) 500  I
Malachy Walsh and Partners   FALL HEIGHT (mm)   500   PROBE TYPE   DPH
End of Probe at 0.90 m
NINDWATER ORSERVATIONS
DUNDWATER OBSERVATIONS
DUNDWATER OBSERVATIONS
DUNDWATER OBSERVATIONS
DUNDWATER OBSERVATIONS  MARKS



REPORT NUMBER

23000

PROBE NO. CONTRACT Seven Hills Wind Farm DP06 SHEET Sheet 1 of 1 **CO-ORDINATES** 586,336.28 E 748,179.52 N DATE DRILLED 03/12/2020 HAMMER MASS (kg) DATE LOGGED 50 03/12/2020 GROUND LEVEL (mOD) INCREMENT SIZE (mm) 100 CLIENT Energia PROBE TYPE DPH **ENGINEER** Malachy Walsh and Partners FALL HEIGHT (mm) 500 Probe Readings (Blows/Increment) Elevation (mOD) Graphic Probe Record Geotechnical Description Depth (m) Depth (m)  $\widehat{\Xi}$ Legend Depth ( 5 10 15 20 25 0.0 0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00 0 2 2 5 8 8 10 15 15 1.0 18 25 1.10 End of Probe at 1.20 m 2.0 3.0 4.0 IGSL DP LOG 100MM INCREMENTS 23000.GPJ IGSL GDT 23/3/21

REMARKS

REMARKS **GROUNDWATER OBSERVATIONS** 



REPORT NUMBER

AGST									
CONTRAC						PRO SHE	BE NO. ET		DP07 Sheet 1 of 1
CO-ORDIN	586,348.13 E 748,310.47 N					DATI	E DRILLE		03/12/2020
GROUND	LEVEL (mOD)	HAMMER MASS (kg)		50		DATI	E LOGGE	D	03/12/2020
CLIENT ENGINEER	Energia  Malachy Walsh and Partners	INCREMENT SIZE (m FALL HEIGHT (mm)	m)	100 500		PRO	BE TYPE	<b>=</b>	DPH
		1712211213111 (11111)						<u></u>	
					Elevation (mOD)			Probe Readings (Blows/Increment)	
€ E	Geotechnical Descrip	tion	_	Ξ	on (m		E	Read Incre	Graphic Probe Record
Depth (m)			Legend	Depth (m)	evatic	Water	Depth (m)	obe Flows/	
1 1			Le	De	ă	Š			0 5 10 15 20 25
0.0 .							0.00	0 2 2	
F							0.20 0.30 0.40	8	
- -							0.40 0.50 0.60	10 12	
-							0.70 0.80	18 25	
En	d of Probe at 0.90 m			1		,	0.00	, 25	
- 1.0									
-									
-									
F									
2.0									
-									
-									
-									
-									
3.0									
-									
-									
F									
-									
4.0									
-									
GROUND	WATER OBSERVATIONS		L						
3.1301101									
GROUND	3								



REPORT NUMBER

13.00	/									
CONTR		Seven Hills Wind Farm					PRO SHE	BE NO. ET		DP08 Sheet 1 of 1
CO-OR		747,745.35 N	HAMMER MASS (kg)		50			E DRILLI E LOGGI		03/12/2020 03/12/2020
		EL (mOD)		\			DAII	LOGGI		03/12/2020
CLIENT		Energia	INCREMENT SIZE (m	m)	100		PRO	BE TYP	E	DPH
ENGINE	EEK	Malachy Walsh and Partners	FALL HEIGHT (mm)		500					
Depth (m)		Geotechnical Description	on	Legend	Depth (m)	Elevation (mOD)	Water	Depth (m)	Probe Readings (Blows/Increment)	Graphic Probe Record
	End of	Probe at 0.80 m						0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70	0 2 2 3 10 15 20 25	
1.0										
2.0										
3.0										
4.0										
GROUN	NDWAT	ER OBSERVATIONS								
REMAF	RKS									



REPORT NUMBER

1927								
CONTRACT Seven Hills Wind Farm					PRO SHE	BE NO. ET	'	DP11 Sheet 1 of 1
CO-ORDINATES 586,604.89 E 747,880.97 N GROUND LEVEL (mOD)	HAMMER MASS (kg)		50		DATI	E DRILLE E LOGGE		07/12/2020 07/12/2020
CLIENT Energia ENGINEER Malachy Walsh and Partn	INCREMENT SIZE (mers FALL HEIGHT (mm)	nm)	100 500		PRO	BE TYPE		DPH
Geotechnical	Description	Legend	Depth (m)	Elevation (mOD)	Water		Probe Readings (Blows/Increment)	Graphic Probe Record
End of Probe at 1.50 m  2.0  3.0  4.0						0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00 1.20 1.30 1.40	0 0 2 1 1 3 4 4 4 4 4 6 8 8 8 15 25	
GROUNDWATER OBSERVATIONS  REMARKS								



REPORT NUMBER

23000

PROBE NO. CONTRACT Seven Hills Wind Farm DP12 SHEET Sheet 1 of 1 **CO-ORDINATES** 586,842.02 E 747,971.38 N DATE DRILLED 07/12/2020 DATE LOGGED HAMMER MASS (kg) 50 07/12/2020 GROUND LEVEL (mOD) INCREMENT SIZE (mm) 100 CLIENT Energia PROBE TYPE DPH **ENGINEER** Malachy Walsh and Partners FALL HEIGHT (mm) 500 Probe Readings (Blows/Increment) Elevation (mOD) Graphic Probe Geotechnical Description Depth (m) Depth (m)  $\widehat{\Xi}$ Record Legend Depth ( 5 10 15 20 25 0.0 0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00 0 2 6 8 8 10 9 10 1.0 12 17 1.20 1.30 25 End of Probe at 1.40 m 2.0 3.0 4.0 IGSL DP LOG 100MM INCREMENTS 23000.GPJ IGSL GDT 23/3/21

REMARKS

REMARKS **GROUNDWATER OBSERVATIONS** 



REPORT NUMBER

	195									
	TRACT	Seven Hills Wind Farm					PRO SHE	BE NO. ET		DP13 Sheet 1 of 1
co-o	RDINAT	ES 586,891.20 E 748,132.41 N					DAT	E DRILLI	ΞD	07/12/2020
GROU	UND LE	/EL (mOD)	HAMMER MASS (kg)		50		DAT	E LOGGI	ED	07/12/2020
CLIEN	NT	Energia	INCREMENT SIZE (m	m)	100					
ENGI	NEER	Malachy Walsh and Partners	FALL HEIGHT (mm)	1	500		PRO	BE TYP	E	DPH
Depth (m)		Geotechnical Description	n	Legend	Depth (m)	Elevation (mOD)	Water	Depth (m)	Probe Readings (Blows/Increment)	Graphic Probe Record
1.0	End of	f Probe at 1.10 m						0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90	0 0 2 2 5 7 9 10 15 18 25	
2.0										
3.0										
SC. GDT 23/3/21										
IGSL DP LOG 100MM INCREMENTS 23000.GPJ IGSL, GDT 23,3/27		TER OBSERVATIONS								



REPORT NUMBER

IGSL/										23000
CONTRACT	Seven	Hills Wind Farm						BE NO.		DP14
CO-ORDINA	TES	587,078.93 E					SHE			Sheet 1 of 1
GROUND LE		748,062.78 N	HAMMER MASS (kg)		50		- 1	E DRILLI E LOGGI		07/12/2020 07/12/2020
CLIENT	Energi	a	INCREMENT SIZE (m	m)	100		200	DE T/D	_	DDII
ENGINEER	Malach	y Walsh and Partners	FALL HEIGHT (mm)		500		PRO	BE TYP	<b>E</b>	DPH
Depth (m)		Geotechnical Descrip	tion	Legend	Depth (m)	Elevation (mOD)	Water	Depth (m)	Probe Readings (Blows/Increment)	Graphic Probe Record
1.0 End (	of Probe at	: 1 00 m						0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90	0 2 1 5 10 10 9 12 18 25	
		. 1.00 III								
2.0										
3.0										
4.0										
GROUNDWA	ATER OBS	ERVATIONS								
REMARKS										



REPORT NUMBER

23000

PROBE NO. CONTRACT Seven Hills Wind Farm DP15 SHEET Sheet 1 of 1 **CO-ORDINATES** 587,322.67 E 747,990.01 N DATE DRILLED 07/12/2020 DATE LOGGED HAMMER MASS (kg) 50 07/12/2020 **GROUND LEVEL (mOD)** INCREMENT SIZE (mm) 100 CLIENT Energia PROBE TYPE DPH **ENGINEER** Malachy Walsh and Partners FALL HEIGHT (mm) 500 Probe Readings (Blows/Increment) Elevation (mOD) Graphic Probe Geotechnical Description Depth (m) Depth (m)  $\widehat{\mathbb{E}}$ Record Legend Depth ( 5 10 15 20 25 0.0 0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00 0 2 2 3 3 3 1.0 1.20 1.30 8 8 1.40 1.50 1.60 1.70 1.80 12 11 12 18 1.90 2.0 2.00 25 End of Probe at 2.10 m 3.0 4.0 IGSL DP LOG 100MM INCREMENTS 23000.GPJ IGSL.GDT 23/32/21 **GROUNDWATER OBSERVATIONS** 



REPORT NUMBER

23000

PROBE NO. CONTRACT Seven Hills Wind Farm DP16 SHEET Sheet 1 of 1 **CO-ORDINATES** 587,544.50 E 747,866.09 N DATE DRILLED 07/12/2020 DATE LOGGED HAMMER MASS (kg) 50 07/12/2020 **GROUND LEVEL (mOD)** INCREMENT SIZE (mm) 100 CLIENT Energia PROBE TYPE DPH **ENGINEER** Malachy Walsh and Partners FALL HEIGHT (mm) 500 Probe Readings (Blows/Increment) Elevation (mOD) Graphic Probe Geotechnical Description Depth (m) Depth (m)  $\widehat{\Xi}$ Record Legend Depth ( 5 10 15 20 25 0.0 0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00 0 2 2 2 5 7 8 1.0 8 1.20 1.30 10 12 12 1.40 1.50 15 18 1.60 25 1.70 End of Probe at 1.80 m 2.0 3.0 4.0 IGST DP LOG 1000MM INCREMENTS 23000.GPJ IGST. GDT 23/3/21

REMARKS

REMARKS **GROUNDWATER OBSERVATIONS** 



REPORT NUMBER

23000

PROBE NO. CONTRACT Seven Hills Wind Farm **DP17** SHEET Sheet 1 of 1 **CO-ORDINATES** 587,659.16 E 747,684.08 N DATE DRILLED 07/12/2020 DATE LOGGED HAMMER MASS (kg) 50 07/12/2020 GROUND LEVEL (mOD) INCREMENT SIZE (mm) 100 CLIENT Energia PROBE TYPE DPH **ENGINEER** Malachy Walsh and Partners FALL HEIGHT (mm) 500 Probe Readings (Blows/Increment) Elevation (mOD) Graphic Probe Geotechnical Description Depth (m) Depth (m)  $\widehat{\Xi}$ Record Legend Depth ( 5 10 15 20 25 0.0 0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00 0 2 4 4 4 5 10 1.0 10 1.20 1.30 15 12 17 1.40 1.50 25 End of Probe at 1.60 m 2.0 3.0 4.0 IGST DP LOG 1000MM INCREMENTS 23000.GPJ IGST. GDT 23/3/21

REMARKS

REMARKS **GROUNDWATER OBSERVATIONS** 



REPORT NUMBER

23000

PROBE NO. CONTRACT Seven Hills Wind Farm **DP18** SHEET Sheet 1 of 1 **CO-ORDINATES** 587,097.75 E 747,743.69 N DATE DRILLED 01/12/2020 HAMMER MASS (kg) DATE LOGGED 50 01/12/2020 GROUND LEVEL (mOD) INCREMENT SIZE (mm) 100 CLIENT Energia PROBE TYPE DPH **ENGINEER** Malachy Walsh and Partners FALL HEIGHT (mm) 500 Probe Readings (Blows/Increment) Elevation (mOD) Graphic Probe Geotechnical Description Depth (m) Depth (m)  $\widehat{\mathbb{E}}$ Record Legend Depth ( 5 10 15 20 25 0.0 0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00 2 2 2 2 3 3 1.0 1.20 1.30 1.40 1.50 1.60 1.70 1.80 3 3 2 2 3 4 7 4 5 5 4 3 5 7 1.90 2.00 2.10 2.20 2.0 2.30 2.40 2.50 2.60 2.70 2.80 20 2.90 25 3.0 End of Probe at 3.00 m 4.0 GROUNDW INCREMENTS 23000.GPJ IGSL. GDT 23/32/21

CASH DE LOG 1000MM INCREMENTS 23000.GPJ IGSL. GDT 23/32/21

CASH DE LOG 1000MM INCREMENTS 23/000.CPJ IGSL. GDT 23/32/21 **GROUNDWATER OBSERVATIONS** 



REPORT NUMBER

23000

PROBE NO. CONTRACT Seven Hills Wind Farm **DP19** SHEET Sheet 1 of 1 **CO-ORDINATES** 586,851.88 E 747,736.15 N DATE DRILLED 07/12/2020 HAMMER MASS (kg) DATE LOGGED 50 07/12/2020 GROUND LEVEL (mOD) INCREMENT SIZE (mm) 100 CLIENT Energia PROBE TYPE DPH **ENGINEER** Malachy Walsh and Partners FALL HEIGHT (mm) 500 Probe Readings (Blows/Increment) Elevation (mOD) Graphic Probe Geotechnical Description Depth (m) Depth (m)  $\widehat{\Xi}$ Record Legend Depth ( 5 10 15 20 25 0.0 0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00 0 2 4 3 4 4 6 6 1.0 1.20 1.30 10 8 1.40 10 1.50 1.60 1.70 1.80 12 15 25 End of Probe at 1.90 m 2.0 3.0 4.0 IGST DP LOG 1000MM INCREMENTS 23000.GPJ IGST. GDT 23/3/21

REMARKS

REMARKS **GROUNDWATER OBSERVATIONS** 



REPORT NUMBER

23000

PROBE NO. CONTRACT Seven Hills Wind Farm DP20 SHEET Sheet 1 of 1 **CO-ORDINATES** 587,100.51 E 747,622.11 N DATE DRILLED 01/12/2020 HAMMER MASS (kg) DATE LOGGED 50 01/12/2020 GROUND LEVEL (mOD) INCREMENT SIZE (mm) 100 CLIENT Energia PROBE TYPE DPH **ENGINEER** Malachy Walsh and Partners FALL HEIGHT (mm) 500 Probe Readings (Blows/Increment) Elevation (mOD) Graphic Probe Geotechnical Description Depth (m) Depth (m)  $\widehat{\mathbb{E}}$ Record Legend Depth ( 5 10 15 20 25 0.0 0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00 0 2 2 4 5 5 7 1.0 1.20 1.30 1.40 1.50 1.60 1.70 1.80 4 5 5 4 4 5 7 20 1.90 2.0 2.00 2.10 2.20 End of Probe at 2.30 m 3.0 4.0 IGSL DP LOG 100MM INCREMENTS 23000.GPJ IGSL.GDT 23/32/21 **GROUNDWATER OBSERVATIONS** 



REPORT NUMBER

23000

PROBE NO. CONTRACT Seven Hills Wind Farm DP21 SHEET Sheet 1 of 1 **CO-ORDINATES** 587,323.00 E 747,495.82 N DATE DRILLED 01/12/2020 HAMMER MASS (kg) DATE LOGGED 50 01/12/2020 GROUND LEVEL (mOD) INCREMENT SIZE (mm) 100 CLIENT Energia PROBE TYPE DPH **ENGINEER** Malachy Walsh and Partners FALL HEIGHT (mm) 500 Probe Readings (Blows/Increment) Elevation (mOD) Graphic Probe Geotechnical Description  $\widehat{\Xi}$ Depth (m)  $\widehat{\mathbb{E}}$ Record Legend Depth ( Depth ( 5 10 15 20 25 0.0 0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00 0 2 2 5 3 3 4 2 2 4 3 4 3 3 3 6 6 6 3 3 7 7 7 1.0 1.20 1.30 1.40 1.50 1.60 1.70 1.80 1.90 2.00 2.10 2.20 2.0 2.30 2.40 2.50 2.60 11 14 2.70 2.80 18 End of Probe at 2.90 m 3.0 4.0 IGSL DP LOG 100MM INCREMENTS 23000.GPJ IGSL.GDT 23/32/21 **GROUNDWATER OBSERVATIONS** 



REPORT NUMBER

23000

PROBE NO. CONTRACT Seven Hills Wind Farm DP22 SHEET Sheet 1 of 1 **CO-ORDINATES** 587,408.87 E 747,256.57 N DATE DRILLED 01/12/2020 HAMMER MASS (kg) DATE LOGGED 50 01/12/2020 **GROUND LEVEL (mOD)** INCREMENT SIZE (mm) 100 CLIENT Energia PROBE TYPE DPH **ENGINEER** Malachy Walsh and Partners FALL HEIGHT (mm) 500 Probe Readings (Blows/Increment) Elevation (mOD) Graphic Probe Geotechnical Description Depth (m) Depth (m)  $\widehat{\mathbb{E}}$ Record Legend Depth ( 5 10 15 20 25 0.0 0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00 0 2 4 6 3 6 4 3 5 3 6 6 1.0 1.20 1.30 1.40 1.50 1.60 1.70 1.80 6 1.90 2.00 2.10 2.20 2.0 10 10 18 2.30 25 End of Probe at 2.40 m 3.0 4.0 IGSL DP LOG 100MM INCREMENTS 23000.GPJ IGSL.GDT 23/32/21 **GROUNDWATER OBSERVATIONS** 



REPORT NUMBER

102F								
CONTRACT Seven Hills Wind Farm					PRO SHE	BE NO. ET	'	DP23 Sheet 1 of 1
CO-ORDINATES 587,585.59 E 743,010.27 N  GROUND LEVEL (mOD)	HAMMER MASS (kg)		50		DATE	E DRILLE E LOGGE		30/01/2021 30/01/2021
CLIENT Energia ENGINEER Malachy Walsh and Partners	INCREMENT SIZE (mr FALL HEIGHT (mm)	n)	100 500		PRO	BE TYPE	Ē	DPH
Geotechnical Description		Legend	Depth (m)	Elevation (mOD)	Water	Depth (m)	Probe Readings (Blows/Increment)	Graphic Probe Record
End of Probe at 0.70 m  2.0  4.0						0.00 0.10 0.20 0.30 0.40 0.50 0.60	0 0 3 10 18 25 25	
GROUNDWATER OBSERVATIONS REMARKS								



REPORT NUMBER

Seven Hills Wind Farm  TES 587,848.44 E 742,981.65 N  VEL (mOD)  Energia Malachy Walsh and Partners  Geotechnical Description	HAMMER MASS (kg) INCREMENT SIZE (mi FALL HEIGHT (mm)	F) Puegend	50 100 500		DATE	BE TYPI  (m) the position of t	ED	DP24 Sheet 1 of 1 30/01/2021 30/01/2021  DPH  Graphic Probe Record
742,981.65 N  /EL (mOD)  Energia Malachy Walsh and Partners  Geotechnical Description	INCREMENT SIZE (mi		100 500		PRO	BE TYPI  (m) the definition of the second of	ED E	30/01/2021  DPH  Graphic Probe Record
/EL (mOD) Energia Malachy Walsh and Partners  Geotechnical Description	INCREMENT SIZE (mi		100 500		PRO	Depth (m)	E	DPH  Graphic Probe Record
Malachy Walsh and Partners  Geotechnical Description	FALL HEIGHT (mm)		500			Depth (m)		Graphic Probe Record
Malachy Walsh and Partners  Geotechnical Description		Pegend				Depth (m)		Graphic Probe Record
	n	Pregend	Depth (m)	Elevation (mOD)	Water		Probe Readings (Blows/Increment)	
					`	0.00 0.10 0.20 0.30 0.40 0.50	0 0 18 10 25 25	
								<del></del>
TER OBSERVATIONS								
	TER OBSERVATIONS	TER OBSERVATIONS	TER OBSERVATIONS	TER OBSERVATIONS	TER OBSERVATIONS	TER OBSERVATIONS	TER OBSERVATIONS	TER OBSERVATIONS



REPORT NUMBER

1027									
CONTRACT	Seven Hills Wind Farm					PRO SHE	BE NO. ET		DP26 Sheet 1 of 1
GROUND LEV	742,734.60 N	HAMMER MASS (kg) INCREMENT SIZE (mi	m)	50 100		DATI	E DRILLI E LOGGI		29/01/2021 29/01/2021
ENGINEER	Malachy Walsh and Partners	FALL HEIGHT (mm)	,	500		PRO	BE TYP	E	DPH
O.0 Depth (m)	Geotechnical Descripti	on	Legend	Depth (m)	Elevation (mOD)	Water	0.0 0.0 Depth (m)	Probe Readings (Blows/Increment)	Graphic Probe Record
End of  1.0  2.0  3.0  4.0	Probe at 0.80 m						0.10 0.20 0.30 0.40 0.50 0.60 0.70	3 4 10 18 21 14 25	
GROUNDWAT	ER OBSERVATIONS								



REPORT NUMBER

192F									
CONTRACT Seven Hills Wind Farm					PRO SHE	BE NO. ET		DP27 Sheet 1 of 1	
GITOORD EET EE (IIIOD)	HAMMER MASS (kg)		50		DATI	E DRILLE E LOGGE			
	INCREMENT SIZE (mr FALL HEIGHT (mm)	n)	100 500		PRO	BE TYPE	<b>=</b>	DPH	
Geotechnical Description  Geotechnical Description		Legend	Depth (m)	Elevation (mOD)	Water	Depth (m)	Probe Readings (Blows/Increment)	Graphic Probe Record	
End of Probe at 0.70 m						0.00 0.10 0.20 0.30 0.40 0.50 0.60	0 0 7 12 16 22 25		
GROUNDWATER OBSERVATIONS REMARKS									



REPORT NUMBER

CO-ORDINATES GROUND LEVEL CLIENT	588,000.29 E 743,239.15 N								
GROUND LEVEL	500,000.∠9 E 743,239.15 N					SHE			DP28 Sheet 1 of 1
	(mOD)	HAMMER MASS (kg)		50			E DRILLI E LOGGI		30/01/2021 30/01/2021
ENGINEER N	Energia Malachy Walsh and Partners	INCREMENT SIZE (m FALL HEIGHT (mm)	m)	100 500		PRO	BE TYP	E	DPH
Depth (m)	Geotechnical Descri	ption	Legend	Depth (m)	Elevation (mOD)	Water	Depth (m)	Probe Readings (Blows/Increment)	Graphic Probe Record
0.0							0.00 0.10 0.20 0.30	0 6 10 12	
End of Pr	obe at 0.50 m					`	0.40	25	
1.0									
2.0									
									_
3.0									
4.0									
ROUNDWATER	OBSERVATIONS								



REPORT NUMBER

IGSL									23000
CONTRACT Se	ven Hills Wind Farm						BE NO.		DP29
CO-ORDINATES	E07.010.40 E					SHE	ET	Sheet 1 of 1	
GROUND LEVEL (r	587,910.43 E 743,417.95 N n <b>OD)</b>	HAMMER MASS (kg)		50		I	E DRILLE E LOGGE		30/01/2021 30/01/2021
CLIENT En	ergia	INCREMENT SIZE (mr	n)	100					
ENGINEER Ma	lachy Walsh and Partners	FALL HEIGHT (mm)		500		PRO	BE TYPI	E	DPH
Depth (m)	Geotechnical Descripti	on	Legend	Depth (m)	Elevation (mOD)	Water	O Depth (m)	Probe Readings (Blows/Increment)	Graphic Probe Record
End of Prob  1.0  2.0  4.0	e at 0.80 m						0.10 0.20 0.30 0.40 0.50 0.60 0.70	0 2 7 9 10 16 23 25	
GROUNDWATER C	DESERVATIONS								



REPORT NUMBER

BL/									23000
TRACT	Seven Hills Wind Farm								DP30
RDINATI	<b>ES</b> 597 999 27 E								Sheet 1 of 1
	743,597.80 N	HAMMER MASS (kg)		50					30/01/2021 30/01/2021
			m)						
NEER	Malachy Walsh and Partners	FALL HEIGHT (mm)		500		PRO	BE TYP	E	DPH
		'				'			
	Geotechnical Descrip	tion	Legend	Depth (m)	Elevation (mOD)	Water	Depth (m)		Graphic Probe Record
End of	Probe at 0.80 m					,	0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70	3 10 17 12 10 12 12 25	
UNDWAT ARKS	EN OBSERVA HUNS								
	JND LEV NT NEER  End of	RDINATES 587,888.27 E 743,597.80 N  JND LEVEL (mOD)  IT Energia NEER Malachy Walsh and Partners  Geotechnical Descrip  End of Probe at 0.80 m	RDINATES 587,888,27 E 743,597.80 N JND LEVEL (mOD) NT Energia NeER Malachy Walsh and Partners  Geotechnical Description  FALL HEIGHT (mm)  End of Probe at 0.80 m	RDINATES 587,888.27 E 743,597.80 N HAMMER MASS (kg) INCREMENT SIZE (mm) FALL HEIGHT (mm)  Geotechnical Description  Geotechnical Description  End of Probe at 0.80 m	RDINATES 587,888.27 E 743,597.80 N HAMMER MASS (kg) 100 EVEL (mOD) 100 Soo NIT Energia Malachy Walsh and Partners FALL HEIGHT (mm) 500 Geotechnical Description	TRACT Seven Hills Wind Farm  RDINATES \$87,888.27 E 743,597.80 N HAMMER MASS (kg) 50 IND LEVEL (mOD)  TRACT Pergia INCREMENT SIZE (mm) 100 FALL HEIGHT (mm) 500  Geotechnical Description  Geotechnical Description  Fig. 1	REINATES 597.888.27 E 743,597.80 N HAMMER MASS (kg) 50 INCREMENT SIZE (mm) 500 PRO  TI Energia Malachy Walsh and Partners FALL HEIGHT (mm) 500 PRO  Geotechnical Description Geotechnical Description FALL HEIGHT (mm) 500 PRO  End of Probe at 0.80 m	RROINATES S87,888.27 E 743,597,80 N HAMMER MASS (kg) 50 INCREMENT SIZE (mm) 100 PROBE TVP.  Geotechnical Description  Geotechnical Description  Geotechnical Description  Geotechnical Description  Geotechnical Description  The probe at 0.80 m  Fall Height (mm) 500  Geotechnical Description  Applied of Probe at 0.80 m  Find of Probe at 0.80 m	RROT   Seven Hills Wind Farm   Seven Hills Wind Farm



REPORT NUMBER

IGSL										20000	
CONTRACT	Sever	n Hills Wind Farm						BE NO.		DP31	
CO-ORDINATI	ES	588,200.87 E					SHE			Sheet 1 of 1	
		743,334.53 N	HAMMER MASS (kg)	HAMMER MASS (kg) 50				E DRILLI E LOGGI		30/01/2021 30/01/2021	
GROUND LEV			INCREMENT SIZE (m	m)	100					50/01/2021	
CLIENT ENGINEER	Energ Malac	na hy Walsh and Partners	FALL HEIGHT (mm)	,	500		PRO	BE TYP	E	DPH	
		•	,								
						ОС)			ngs nent		
<u> </u>		Geotechnical Descript	ion			) (m)		<u> </u>	eadir ocrer	Graphic Probe Record	
Depth (m)		0000000a. 2000pt		pu	h (m	atior	_	h (m	e Re vs/lr	Record	
Dept				Legend	Depth (m)	Elevation (mOD)	Water	Depth (m)	Probe Readings (Blows/Increment)	0 5 10 15 20 2	
0.0								0.00	0	0 5 10 15 20 2	
								0.10 0.20	0 4		
								0.30 0.40	4 10		
								0.50	12 18		
								0.60 0.70	20		
End of	Probe a	at 0.90 m			-		,	0.80	25		
.0											
										<u> </u>	
2.0										<del></del>	
										<del></del>	
3.0											
.0											
										<del></del>	
ROUNDWAT	ER OBS	SERVATIONS		I.				I	<u> </u>	<del></del>	
EMARKS											



REPORT NUMBER

23000

PROBE NO. CONTRACT Seven Hills Wind Farm DP32 SHEET Sheet 1 of 1 **CO-ORDINATES** 588,367.54 E 743,433.88 N DATE DRILLED 30/11/2020 HAMMER MASS (kg) DATE LOGGED 50 30/11/2020 GROUND LEVEL (mOD) INCREMENT SIZE (mm) 100 CLIENT Energia PROBE TYPE DPH **ENGINEER** Malachy Walsh and Partners FALL HEIGHT (mm) 500 Probe Readings (Blows/Increment) Elevation (mOD) Graphic Probe Record Geotechnical Description Depth (m) Depth (m)  $\widehat{\Xi}$ Legend Depth ( 10 15 20 25 5 0.0 0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00 0 3 8 6 10 12 12 1.0 15 20 20 1.20 End of Probe at 1.30 m 2.0 3.0 4.0 IGSL DP LOG 100MM INCREMENTS 23000.GPJ IGSL GDT 23/3/21

REMARKS

REMARKS **GROUNDWATER OBSERVATIONS** 



REPORT NUMBER

23000

100	197										
	RACT	Seven Hills Wind Farm					PRO	BE NO. ET		DP33 Sheet 1 of 1	
	RDINATI	ES 588,445.84 E 743,268.32 N EL (mOD)	HAMMER MASS (kg)		50		DATE	DRILLE		30/11/2020 30/11/2020	
CLIEN		Energia	INCREMENT SIZE (mr	n)	100						_
ENGI		Malachy Walsh and Partners	FALL HEIGHT (mm)		500		PRO	BE TYPE		DPH	
O Depth (m)		Geotechnical Description		Legend	Depth (m)	Elevation (mOD)	Water	0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80	B1 51 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Graphic Probe Record	
2.0	End of	Probe at 1.00 m					,	0.90	25		
4.0											
GROU		ER OBSERVATIONS						,			

IGSL DP LOG 100MM INCREMENTS 23000.GPJ IGSL.GDT 23/3/21



REPORT NUMBER

OGSL									23000
CONTRAC	T Seven Hills Wind Farm						BE NO.		DP34
CO-ORDIN	IATES 588,693.71 E					SHE			Sheet 1 of 1
	743,209.48 N	HAMMER MASS (kg)		50			E DRILLI E LOGGI		01/02/2021 01/02/2021
	LEVEL (mOD)	INCREMENT SIZE (m	m)	100		DAII	L LOGG!		01/02/2021
CLIENT ENGINEER	Energia  Malachy Walsh and Partners	FALL HEIGHT (mm)	,	500		PRO	BE TYP	E	DPH
	maderly realist and realistic	1712211214111 (11111)							
Depth (m)	Geotechnical Descrip	tion	Legend	Depth (m)	Elevation (mOD)	Water	Depth (m)	Probe Readings (Blows/Increment)	Graphic Probe Record
	d of Probe at 0.90 m						0.00 0.10 0.20 0.30 0.40 0.50 0.70 0.80	0 0 3 10 10 18 18 25 25	
GROUNDV	VATER OBSERVATIONS		<u> </u>				<u> </u>		
REMARKS	3								



REPORT NUMBER

/03	SL/									23000
CONT	RACT	Seven Hills Wind Farm						BE NO.		DP35
CO-O	RDINAT	<b>ES</b> 588,947.86 E					SHE			Sheet 1 of 1
		743,203.74 N <b>/EL (mOD)</b>	HAMMER MASS (kg)		50			E DRILLI E LOGGI		01/02/2021 01/02/2021
CLIEN		Energia	INCREMENT SIZE (m		100					
ENGIN		Malachy Walsh and Partners	FALL HEIGHT (mm)	,	500		PRO	BE TYP	E	DPH
		•								
Depth (m)		Geotechnical Descri	otion	Legend	Depth (m)	Elevation (mOD)	Water	Depth (m)	Probe Readings (Blows/Increment)	Graphic Probe Record
3.0 	End of	Probe at 0.90 m						0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80	0 0 2 8 10 9 15 15 25	
GROU	JNDWAT	TER OBSERVATIONS							<u> </u>	
REMA	ARKS									



REPORT NUMBER

CONTRA						PRO SHE	BE NO. ET		DP36 Sheet 1 of 1
CO-ORDI	<b>INATES</b> 589,127.30 E 743,382.34 N						E DRILLI		01/02/2021
GROUND	D LEVEL (mOD)	HAMMER MASS (kg)		50		DAT	E LOGGI	ED	01/02/2021
CLIENT	Energia	INCREMENT SIZE (m	m)	100		PRO	BE TYP	F	DPH
ENGINEE	Malachy Walsh and Partners	FALL HEIGHT (mm)		500		FNO	DE ITE	_	
Depth (m)	Geotechnical Descrip	tion	Legend	Depth (m)	Elevation (mOD)	Water	Depth (m)	Probe Readings (Blows/Increment)	Graphic Probe Record
1.0 Ei	nd of Probe at 1.00 m						0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90	0 0 1 4 4 18 12 18 20 25	
3.0									
4.0									
GROUND CASOOOCATO 1 CAST COLOR TO THE MENT IS SECOND TO THE MENT I	OWATER OBSERVATIONS								



REPORT NUMBER

्उटा	<b>L</b> /									23000	
CONTRA	ACT	Seven Hills Wind Farm						BE NO.		DP38	
CO-ORE	JINATE	<b>ES</b> 588,810.26 E					SHE			Sheet 1 of 1	
		743,775.62 N EL (mOD)	HAMMER MASS (kg)	HAMMER MASS (kg) 50				E DRILLE E LOGGE		30/11/2020 30/11/2020	
CLIENT		Energia	INCREMENT SIZE (m	m)	100				_	5511	
ENGINE	ER	Malachy Walsh and Partners	FALL HEIGHT (mm)		500		PRO	BE TYPI	=	DPH	
O Depth (m)		Geotechnical Descrip	tion	Legend	Depth (m)	Elevation (mOD)	Water	O Depth (m)	Probe Readings (Blows/Increment)	Graphic Probe Record	
		Probe at 0.50 m					`	0.10 0.20 0.30 0.40	1 7 15 25		
1.0											
2.0											
3.0											
4.0											
										_	
GROUN	DWAT	ER OBSERVATIONS									
<b>REMAR</b> Toer14	KS										



REPORT NUMBER

23000

PROBE NO. CONTRACT Seven Hills Wind Farm **DP39** SHEET Sheet 1 of 1 **CO-ORDINATES** 588,713.58 E 744,018.28 N DATE DRILLED 30/11/2020 HAMMER MASS (kg) DATE LOGGED 50 30/11/2020 GROUND LEVEL (mOD) INCREMENT SIZE (mm) 100 CLIENT Energia PROBE TYPE DPH **ENGINEER** Malachy Walsh and Partners FALL HEIGHT (mm) 500 Probe Readings (Blows/Increment) Elevation (mOD) Graphic Probe Record Geotechnical Description Depth (m) Depth (m)  $\widehat{\Xi}$ Legend Depth ( 5 10 15 20 25 0.0 0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00 0 2 3 3 7 11 1.0 6 12 1.20 End of Probe at 1.30 m 2.0 3.0 4.0 IGSL DP LOG 100MM INCREMENTS 23000.GPJ IGSL GDT 23/3/21

REMARKS

REMARKS **GROUNDWATER OBSERVATIONS** 



REPORT NUMBER

OG	SL/									23000
CONT	TRACT	Seven Hills Wind Farm						BE NO.		DP40
CO-0	RDINATI	ES 588,580.52 E					SHE			Sheet 1 of 1
		744,234.88 N	HAMMER MASS (kg)		50			E DRILLI E LOGGI		30/11/2020 30/11/2020
		EL (mOD)	INCREMENT SIZE (m		100					00/11/2020
CLIEN		Energia Malachy Walsh and Partners	FALL HEIGHT (mm)	,	500		PRO	BE TYP	E	DPH
Depth (m)		Geotechnical Descrip	otion	Legend	Depth (m)	Elevation (mOD)	Water	Depth (m)	Probe Readings (Blows/Increment)	Graphic Probe Record
1.0	End of	Probe at 0.80 m						0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70	0 0 2 2 8 10 15 25	
GROU										
GRO	JNDWAT	ER OBSERVATIONS								
REMA	ARKS									



REPORT NUMBER

23000

PROBE NO. CONTRACT Seven Hills Wind Farm DP41 SHEET Sheet 1 of 1 **CO-ORDINATES** 588,818.51 E 744,178.06 N DATE DRILLED 30/11/2020 HAMMER MASS (kg) DATE LOGGED 50 30/11/2020 GROUND LEVEL (mOD) INCREMENT SIZE (mm) 100 CLIENT Energia PROBE TYPE DPH **ENGINEER** Malachy Walsh and Partners FALL HEIGHT (mm) 500 Probe Readings (Blows/Increment) Elevation (mOD) Graphic Probe Record Geotechnical Description Depth (m) Depth (m)  $\widehat{\Xi}$ Legend Depth ( 5 10 15 20 25 0.0 0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0 2 12 11 12 25 End of Probe at 0.80 m 1.0 2.0 3.0 4.0 GROUNDW INCREMENTS 23000.6PJ IGSL GDT 23/3/21

GROUNDW TOWN INCREMENTS 23000.6PJ IGSL GDT 23/3/21

GROUNDW TOWN INCREMENTS 23000.6PJ IGSL GDT 23/3/21 **GROUNDWATER OBSERVATIONS** 



REPORT NUMBER

133L									
CONTRACT	Seven Hills Wind Farm						BE NO.		DP42
CO-ORDINATES	744,368.15 N	HAMMER MASS (kg)					ET E DRILLI E LOGGI		Sheet 1 of 1 30/01/2021 30/01/2021
	Energia Malachy Walsh and Partners	INCREMENT SIZE (mn FALL HEIGHT (mm)	n)	100 500		PRO	BE TYP	E	DPH
Depth (m)	Geotechnical Descrip	tion	Legend	Depth (m)	Elevation (mOD)	Water	Depth (m)	Probe Readings (Blows/Increment)	Graphic Probe Record
1.0 End of Pr  2.0  4.0	obe at 1.10 m						0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00	0 0 2 3 3 8 10 18 15 20 25	
GROUNDWATEF	ROBSERVATIONS	,		'					



REPORT NUMBER

23000

PROBE NO. CONTRACT Seven Hills Wind Farm DP43 SHEET Sheet 1 of 1 **CO-ORDINATES** 588,963.00 E 744,562.71 N DATE DRILLED 30/01/2021 HAMMER MASS (kg) DATE LOGGED 30/01/2021 50 GROUND LEVEL (mOD) INCREMENT SIZE (mm) 100 CLIENT Energia PROBE TYPE DPH **ENGINEER** Malachy Walsh and Partners FALL HEIGHT (mm) 500 Probe Readings (Blows/Increment) Elevation (mOD) Graphic Probe Record Geotechnical Description Depth (m) Depth (m)  $\widehat{\Xi}$ Legend Depth ( 5 10 15 20 25 0.0 0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0 0 4 23 25 End of Probe at 0.80 m 1.0 2.0 3.0 4.0 GROUNDW INCREMENTS 23000 GPJ IGSL GDT 23/37/21 **GROUNDWATER OBSERVATIONS** 



REPORT NUMBER

132L									23000
CO-ORDINAT	Seven Hills Wind Farm  FES 589,129.63 E  744,755.99 N					SHE	BE NO. ET E DRILLI		<b>DP44</b> Sheet 1 of 1 08/12/2020
GROUND LEV	744,755.99 N <b>VEL (mOD)</b>	HAMMER MASS (kg)		50			E LOGGI		08/12/2020
CLIENT	Energia	INCREMENT SIZE (mi	m)	100					
ENGINEER	Malachy Walsh and Partners	FALL HEIGHT (mm)		500		PRO	BE TYP	E	DPH
O.O Depth (m)	Geotechnical Descrip	tion	Legend	Depth (m)	Elevation (mOD)	Water	0.0 0.0 Depth (m)	Probe Readings (Blows/Increment)	Graphic Probe Record
	f Probe at 0.90 m						0.10 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80	0 0 2 4 8 10 16 18 25	
4.0									
GROUNDWA' REMARKS	TER OBSERVATIONS								



REPORT NUMBER

23000

PROBE NO. CONTRACT Seven Hills Wind Farm DP45 SHEET Sheet 1 of 1 **CO-ORDINATES** 589,057.34 E 745,002.33 N DATE DRILLED 08/12/2020 HAMMER MASS (kg) DATE LOGGED 50 08/12/2020 GROUND LEVEL (mOD) INCREMENT SIZE (mm) 100 CLIENT Energia PROBE TYPE DPH **ENGINEER** Malachy Walsh and Partners FALL HEIGHT (mm) 500 Probe Readings (Blows/Increment) Elevation (mOD) Graphic Probe Record Geotechnical Description Depth (m) Depth (m)  $\widehat{\Xi}$ Legend Depth ( 5 10 15 20 25 0.0 0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0 3 2 3 3 8 15 0.90 1.0 25 1.00 End of Probe at 1.10 m 2.0 3.0 4.0 IGSL DP LOG 100MM INCREMENTS 23000.GPJ IGSL GDT 23/3/21

REMARKS

REMARKS **GROUNDWATER OBSERVATIONS** 



REPORT NUMBER

23000

PROBE NO. CONTRACT Seven Hills Wind Farm DP46 SHEET Sheet 1 of 1 **CO-ORDINATES** 588,872.02 E 745,398.15 N DATE DRILLED 08/12/2020 DATE LOGGED HAMMER MASS (kg) 50 08/12/2020 GROUND LEVEL (mOD) INCREMENT SIZE (mm) 100 CLIENT Energia PROBE TYPE DPH **ENGINEER** Malachy Walsh and Partners FALL HEIGHT (mm) 500 Probe Readings (Blows/Increment) Elevation (mOD) Graphic Probe Geotechnical Description Depth (m) Depth (m)  $\widehat{\Xi}$ Record Legend Depth ( 5 10 15 20 25 0.0 0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00 0 2 4 4 8 8 10 12 15 1.0 1.20 1.30 15 25 End of Probe at 1.40 m 2.0 3.0 4.0 IGSL DP LOG 100MM INCREMENTS 23000.GPJ IGSL GDT 23/3/21

REMARKS

REMARKS **GROUNDWATER OBSERVATIONS** 



REPORT NUMBER

1937									
CONTRACT	SHEET Sheet 1 of 1								
CO-ORDINATE	744,620.72 N EL (mOD)	HAMMER MASS (kg)				DATI	DATE DRILLED DATE LOGGED		30/01/2021 30/01/2021
CLIENT ENGINEER	Energia Malachy Walsh and Partners	INCREMENT SIZE (mm) 100  FALL HEIGHT (mm) 500			PRO	BE TYPE	<b>E</b>	DPH	
Depth (m)	Geotechnical Description	on	Legend	Depth (m)	Elevation (mOD)	Water	Depth (m)	Probe Readings (Blows/Increment)	Graphic Probe Record
1.0 End of I	Probe at 1.00 m					,	0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90	0 0 2 2 2 9 13 13 14 25	
2.0									
3.0									
4.0									
GROUNDWAT	ER OBSERVATIONS								
GROUNDWATE									



REPORT NUMBER

192F									
CONTRACT Seven Hills Wind Farm PROBE NO. DP49 SHEET Sheet 1 of 1									
GITOORD ELVEE (IIIOD)	HAMMER MASS (kg)				DATE	DATE DRILLED DATE LOGGED			
	INCREMENT SIZE (mm) 100  FALL HEIGHT (mm) 500			PRO	BE TYPE	Ē	DPH		
Geotechnical Description		Legend	Depth (m)	Elevation (mOD)	Water		Probe Readings (Blows/Increment)	Graphic Probe Record	
End of Probe at 0.70 m  2.0  3.0  GROUNDWATER OBSERVATIONS						0.00 0.10 0.20 0.30 0.40 0.50 0.60	0 0 5 8 10 18 25		
REMARKS									



REPORT NUMBER

23000

PROBE NO. CONTRACT Seven Hills Wind Farm DP50 SHEET Sheet 1 of 1 **CO-ORDINATES** 589,645.84 E 744,144.30 N DATE DRILLED 29/01/2021 HAMMER MASS (kg) DATE LOGGED 29/01/2021 50 GROUND LEVEL (mOD) INCREMENT SIZE (mm) 100 CLIENT Energia PROBE TYPE DPH **ENGINEER** Malachy Walsh and Partners FALL HEIGHT (mm) 500 Probe Readings (Blows/Increment) Elevation (mOD) Graphic Probe Record Geotechnical Description Depth (m) Depth (m)  $\widehat{\Xi}$ Legend Depth ( 10 15 20 25 5 0.0 0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0 2 5 18 12 20 20 End of Probe at 0.80 m 1.0 2.0 3.0 4.0 IGSL DP LOG 100MM INCREMENTS 23000.GPJ IGSL GDT 23/3/21

REMARKS

REMARKS **GROUNDWATER OBSERVATIONS** 



REPORT NUMBER

IGSL	/									23000
CONTRAC	T Seve	n Hills Wind Farm					PRO SHE	BE NO. ET		<b>DP51</b> Sheet 1 of 1
CO-ORDIN		589,859.35 E 743,976.20 N DD)	HAMMER MASS (kg)		50		DATI	E DRILLI E LOGGI		29/01/2021 29/01/2021
CLIENT ENGINEER	Ener Mala	gia chy Walsh and Partners	INCREMENT SIZE (m FALL HEIGHT (mm)	m)	100 500		PRO	BE TYP	E	DPH
O.O Depth (m)		Geotechnical Descri	ption	Legend	Depth (m)	Elevation (mOD)	Water	O Depth (m)	Probe Readings (Blows/Increment)	Graphic Probe Record
2.0 -3.0	d of Probe	at 0.70 m						0.10 0.20 0.30 0.40 0.50 0.60	5 7 11 13 18 25	
GROUNDV		SERVATIONS								



REPORT NUMBER

	7									
	PROBE NO.         DP52           SHEET         Sheet 1 of 1           D-ORDINATES         590,514.94 E									
CO-ORD	DINATES	590,514.94 E 743,857.56 N						E DRILLI		29/01/2021
GROUNE	D LEVEL		HAMMER MASS (kg)		50		DAT	E LOGGI	ED	29/01/2021
CLIENT		nergia	INCREMENT SIZE (m	m)	100		PRO	BE TYP	F	DPH
ENGINEE	ER M	lalachy Walsh and Partners	FALL HEIGHT (mm)	1	500		1110		_	
Depth (m)		Geotechnical Descri	otion	Legend	Depth (m)	Elevation (mOD)	Water	Depth (m)	Probe Readings (Blows/Increment)	Graphic Probe Record
0.0 .		be at 1.00 m						0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90	0 0 1 2 2 4 10 12 14 25	
3.0										
4.0										
GROUNE  REMARK		OBSERVATIONS								



REPORT NUMBER

IGSL									23000
CO-ORDINAT	Seven Hills Wind Farm					SHE			DP53 Sheet 1 of 1
GROUND LE	744,154.13 N	HAMMER MASS (kg)		50			E DRILLI E LOGG		29/01/2021 29/01/2021
CLIENT ENGINEER	Energia Malachy Walsh and Partners	INCREMENT SIZE (m FALL HEIGHT (mm)	m)	100 500		PRO	BE TYP	E	DPH
Depth (m)	Geotechnical Descri	ption	Legend	Depth (m)	Elevation (mOD)	Water	Depth (m)	Probe Readings (Blows/Increment)	Graphic Probe Record
0.0							0.00 0.10 0.20 0.30	0 6 18 20	
End o	f Probe at 0.50 m			_			0.40	25	
1.0									
2.0									
3.0									
4.0									
GROUNDWA	TER OBSERVATIONS								
REMARKS									



REPORT NUMBER

132L	4									23000
CONTRAC	T Seve	n Hills Wind Farm						BE NO.		DP56
CO-ORDIN	ATES	590,395.03 E					SHE			Sheet 1 of 1
GROUND L		744,878.02 N	HAMMER MASS (kg)		50		- 1	E DRILLI E LOGGI		08/12/2020 08/12/2020
CLIENT	Energ		INCREMENT SIZE (m	m)	100					
ENGINEER		chy Walsh and Partners	FALL HEIGHT (mm)		500		PRO	BE TYP	E 	DPH
0.0 Depth (m)		Geotechnical Descrip	tion	Legend	Depth (m)	Elevation (mOD)	Water	O Depth (m)	Probe Readings (Blows/Increment)	Graphic Probe Record
-1.0 End	of Probe	at 1.30 m						0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.10 1.20	0 1 6 7 3 1 1 1 2 2 2 12 25 1	
GROUNDW REMARKS	/ATER OB	SERVATIONS								



REPORT NUMBER

CONT		Seven Hills Wind Farm					PRO SHE	BE NO. ET		DP57 Sheet 1 of 1
CO-OI	RDINAT	ES 590,395.03 E 745,129.94 N						E DRILLI		08/12/2020
GROU	JND LEV	EL (mOD)	HAMMER MASS (kg)		50		DAT	E LOGGI	ED	08/12/2020
CLIEN		Energia	INCREMENT SIZE (mi	m)	100		PRO	BE TYP	F	DPH
ENGIN	IEER	Malachy Walsh and Partners	FALL HEIGHT (mm)		500		1110		_	
Depth (m)		Geotechnical Descript	ion	Legend	Depth (m)	Elevation (mOD)	Water	Depth (m)	Probe Readings (Blows/Increment)	Graphic Probe Record
1.0	End of	Probe at 0.70 m					,	0.00 0.10 0.20 0.30 0.40 0.50 0.60	0 0 0 1 9 17 25	
2.0										
3.0										
GROU		ER OBSERVATIONS								



REPORT NUMBER

23000

PROBE NO. CONTRACT Seven Hills Wind Farm DP58 SHEET Sheet 1 of 1 **CO-ORDINATES** 590,423.02 E 745,372.99 N DATE DRILLED 08/12/2020 HAMMER MASS (kg) DATE LOGGED 50 08/12/2020 GROUND LEVEL (mOD) INCREMENT SIZE (mm) 100 CLIENT Energia PROBE TYPE DPH **ENGINEER** Malachy Walsh and Partners FALL HEIGHT (mm) 500 Probe Readings (Blows/Increment) Elevation (mOD) Graphic Probe Record Geotechnical Description Depth (m) Depth (m)  $\widehat{\Xi}$ Legend Depth ( 5 10 15 20 25 0.0 0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0 0 2 2 7 12 17 0.80 0.90 25 1.0 End of Probe at 1.00 m 2.0 3.0 4.0 IGSL DP LOG 100MM INCREMENTS 23000.GPJ IGSL GDT 23/3/21

REMARKS

REMARKS **GROUNDWATER OBSERVATIONS** 



REPORT NUMBER

000										
CONTR		Seven Hills Wind Farm	1				PRO SHE	BE NO. ET		DP59 Sheet 1 of 1
CO-ORI	DINAT	ES 590,634.64 E 744,785.35 N					DAT	E DRILLI	ED	08/12/2020
GROUN	ND LEV	/EL (mOD)	HAMMER MASS (kg)		50		DAT	E LOGGI	ED	08/12/2020
CLIENT		Energia	INCREMENT SIZE (m	m)	100					
ENGINE		Malachy Walsh and Partners	FALL HEIGHT (mm)		500		PRO	BE TYP	E	DPH
Depth (m)		Geotechnical Description	n	Legend	Depth (m)	Elevation (mOD)	Water	Depth (m)	Probe Readings (Blows/Increment)	Graphic Probe Record
- - - -	End of	Probe at 0.70 m						0.00 0.10 0.20 0.30 0.40 0.50 0.60	0 0 2 10 18 20 25	
1.0										
2.0										
3.0										
4.0										
GROUN	NDWAT	TER OBSERVATIONS								
GROUN										



REPORT NUMBER

23000

PROBE NO. CONTRACT Seven Hills Wind Farm DP60 SHEET Sheet 1 of 1 **CO-ORDINATES** 590,898.15 E 744,753.44 N DATE DRILLED 01/02/2021 HAMMER MASS (kg) DATE LOGGED 50 01/02/2021 **GROUND LEVEL (mOD)** INCREMENT SIZE (mm) 100 CLIENT Energia PROBE TYPE DPH **ENGINEER** Malachy Walsh and Partners FALL HEIGHT (mm) 500 Probe Readings (Blows/Increment) Elevation (mOD) Graphic Probe Geotechnical Description Depth (m) Depth (m)  $\widehat{\Xi}$ Record Legend Depth ( 5 10 15 20 25 0.0 0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00 0 5 5 5 8 10 10 8 10 1.0 12 1.20 1.30 12 10 1.40 1.50 1.60 1.70 1.80 15 18 18 15 20 20 1.90 2.0 End of Probe at 2.00 m 3.0 4.0 IGSL DP LOG 100MM INCREMENTS 23000.GPJ IGSL.GDT 23/32/21 **GROUNDWATER OBSERVATIONS** 



REPORT NUMBER

23000

PROBE NO. CONTRACT Seven Hills Wind Farm DP61 SHEET Sheet 1 of 1 **CO-ORDINATES** 591,034.36 E 744,549.97 N DATE DRILLED 01/02/2021 DATE LOGGED HAMMER MASS (kg) 50 01/02/2021 **GROUND LEVEL (mOD)** INCREMENT SIZE (mm) 100 CLIENT Energia PROBE TYPE DPH **ENGINEER** Malachy Walsh and Partners FALL HEIGHT (mm) 500 Probe Readings (Blows/Increment) Elevation (mOD) Graphic Probe Geotechnical Description Depth (m) Depth (m)  $\widehat{\Xi}$ Record Legend Depth ( 5 10 15 20 25 0.0 0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00 0 3 4 6 10 6 15 10 1.0 12 1.20 1.30 10 15 18 1.40 1.50 20 1.60 20 25 1.70 End of Probe at 1.80 m 2.0 3.0 4.0 IGST DP LOG 1000MM INCREMENTS 23000.GPJ IGST. GDT 23/3/21

REMARKS

REMARKS **GROUNDWATER OBSERVATIONS** 



REPORT NUMBER

23000

PROBE NO. CONTRACT Seven Hills Wind Farm DP62 SHEET Sheet 1 of 1 **CO-ORDINATES** 591,193.23 E 744,360.54 N DATE DRILLED 01/02/2021 DATE LOGGED HAMMER MASS (kg) 50 01/02/2021 **GROUND LEVEL (mOD)** INCREMENT SIZE (mm) 100 CLIENT Energia PROBE TYPE DPH **ENGINEER** Malachy Walsh and Partners FALL HEIGHT (mm) 500 Probe Readings (Blows/Increment) Elevation (mOD) Graphic Probe Geotechnical Description Depth (m) Depth (m)  $\widehat{\Xi}$ Record Legend Depth ( 5 10 15 20 25 0.0 0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00 0 5 4 5 8 8 10 12 12 13 1.0 1.20 1.30 13 18 18 1.40 1.50 20 1.60 18 25 1.70 End of Probe at 1.80 m 2.0 3.0 4.0 IGSL DP LOG 100MM INCREMENTS 23000.GPJ IGSL.GDT 23/32/21 **GROUNDWATER OBSERVATIONS** 



REPORT NUMBER

23000

PROBE NO. CONTRACT Seven Hills Wind Farm DP63 SHEET Sheet 1 of 1 **CO-ORDINATES** 591,384.11 E 744,265.30 N DATE DRILLED 01/02/2021 HAMMER MASS (kg) DATE LOGGED 50 01/02/2021 **GROUND LEVEL (mOD)** INCREMENT SIZE (mm) 100 CLIENT Energia PROBE TYPE DPH **ENGINEER** Malachy Walsh and Partners FALL HEIGHT (mm) 500 Probe Readings (Blows/Increment) Elevation (mOD) Graphic Probe Geotechnical Description Depth (m) Depth (m)  $\widehat{\Xi}$ Record Legend Depth ( 5 10 15 20 25 0.0 0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00 0 3 3 5 6 6 8 8 10 1.0 10 1.20 1.30 15 15 15 17 1.40 1.50 15 18 1.60 1.70 1.80 20 25 1.90 2.0 End of Probe at 2.00 m 3.0 4.0 IGSL DP LOG 100MM INCREMENTS 23000.GPJ IGSL.GDT 23/32/21 **GROUNDWATER OBSERVATIONS** 



REPORT NUMBER

IGSL										
CONTRACT	Seven Hills Wind Farm						BE NO.		DP64	
GROUND LEVE	744,120.57 N <b>L (mOD)</b>	HAMMER MASS (kg)	HAMMER MASS (kg) 50 INCREMENT SIZE (mm) 100				E I E DRILLI E LOGGI		Sheet 1 of 1	
	Energia Malachy Walsh and Partners	FALL HEIGHT (mm)		500		PRO	PROBE TYPE		DPH	
Depth (m)	Geotechnical Descrip	tion	Legend	Depth (m)	Elevation (mOD)	Water	Depth (m)	Probe Readings (Blows/Increment)	Graphic Probe Record	
2.0 End of P  3.0	Probe at 2.30 m						0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00 1.120 1.30 1.40 1.50 1.60 1.70 1.80 2.00 2.10 2.20	0 0 0 3 3 4 4 4 6 6 8 10 12 12 12 16 14 14 18 18 20 20 25		
GROUNDWATE REMARKS	R OBSERVATIONS									



REPORT NUMBER

23000

PROBE NO. CONTRACT Seven Hills Wind Farm DP65 SHEET Sheet 1 of 1 **CO-ORDINATES** 590,291.89 E 743,729.39 N DATE DRILLED 29/01/2021 HAMMER MASS (kg) DATE LOGGED 29/01/2021 50 GROUND LEVEL (mOD) INCREMENT SIZE (mm) 100 CLIENT Energia PROBE TYPE DPH **ENGINEER** Malachy Walsh and Partners FALL HEIGHT (mm) 500 Probe Readings (Blows/Increment) Elevation (mOD) Graphic Probe Record Geotechnical Description Depth (m) Depth (m)  $\widehat{\Xi}$ Legend Depth ( 5 10 15 20 25 0.0 0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0 2 4 3 3 6 15 17 0.90 1.0 25 1.00 End of Probe at 1.10 m 2.0 3.0 4.0 IGSL DP LOG 100MM INCREMENTS 23000.GPJ IGSL GDT 23/3/21

REMARKS

REMARKS **GROUNDWATER OBSERVATIONS** 



REPORT NUMBER

23000

PROBE NO. CONTRACT Seven Hills Wind Farm DP66 SHEET Sheet 1 of 1 **CO-ORDINATES** 587,605.00 E 747,078.00 N DATE DRILLED 02/12/2020 HAMMER MASS (kg) DATE LOGGED 50 02/12/2020 GROUND LEVEL (mOD) INCREMENT SIZE (mm) 100 CLIENT Energia PROBE TYPE DPH **ENGINEER** Malachy Walsh and Partners FALL HEIGHT (mm) 500 Probe Readings (Blows/Increment) Elevation (mOD) Graphic Probe Record Geotechnical Description Depth (m) Depth (m)  $\widehat{\Xi}$ Legend Depth ( 5 10 15 20 25 0.0 0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0 2 2 1 6 15 25 End of Probe at 0.80 m 1.0 2.0 3.0 4.0 GROUNDW

GROUNDW

REMARKS

Main access **GROUNDWATER OBSERVATIONS** 



REPORT NUMBER

23000

PROBE NO. CONTRACT Seven Hills Wind Farm **DP67** SHEET Sheet 1 of 1 **CO-ORDINATES** 587,705.00 E 746,919.00 N DATE DRILLED 02/12/2020 HAMMER MASS (kg) DATE LOGGED 50 02/12/2020 GROUND LEVEL (mOD) INCREMENT SIZE (mm) 100 CLIENT Energia PROBE TYPE DPH **ENGINEER** Malachy Walsh and Partners FALL HEIGHT (mm) 500 Probe Readings (Blows/Increment) Elevation (mOD) Graphic Probe Geotechnical Description Depth (m) Depth (m)  $\widehat{\mathbb{E}}$ Record Legend Depth ( 5 10 15 20 25 0.0 0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00 0 2 4 2 3 3 4 1.0 1.20 1.30 9 6 5 5 6 7 1.40 1.50 1.60 1.70 1.80 8 10 1.90 2.00 2.10 2.20 12 15 2.0 18 2.30 25 End of Probe at 2.40 m 3.0 4.0 GROUNDW

GRAL DP LOG 100MM INCREMENTS 23000.GPJ 1GSL. GDT 23/31/21

BENNARKS

Wain access **GROUNDWATER OBSERVATIONS** 



REPORT NUMBER

23000

PROBE NO. CONTRACT Seven Hills Wind Farm DP68 SHEET Sheet 1 of 1 **CO-ORDINATES** 587,819.00 E 746,726.00 N DATE DRILLED 02/12/2020 HAMMER MASS (kg) DATE LOGGED 50 02/12/2020 GROUND LEVEL (mOD) INCREMENT SIZE (mm) 100 CLIENT Energia PROBE TYPE DPH **ENGINEER** Malachy Walsh and Partners FALL HEIGHT (mm) 500 Probe Readings (Blows/Increment) Elevation (mOD) Graphic Probe Geotechnical Description Depth (m) Depth (m)  $\widehat{\mathbb{E}}$ Record Legend Depth ( 5 10 15 20 25 0.0 0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00 0 2 3 2 3 2 2 2 2 2 1 1.0 1.20 1.30 1.40 1.50 1.60 1.70 1.80 6 4 4 8 10 1.90 2.00 2.10 2.20 2.0 12 17 2.30 25 End of Probe at 2.40 m 3.0 4.0 GROUNDW

GRAL DP LOG 100MM INCREMENTS 23000.GPJ 1GSL. GDT 23/31/21

BENNARKS

Wain access **GROUNDWATER OBSERVATIONS** 



REPORT NUMBER

23000

PROBE NO. CONTRACT Seven Hills Wind Farm **DP69** SHEET Sheet 1 of 1 **CO-ORDINATES** 587,819.00 E 746,559.00 N DATE DRILLED 02/12/2020 DATE LOGGED HAMMER MASS (kg) 50 02/12/2020 GROUND LEVEL (mOD) INCREMENT SIZE (mm) 100 CLIENT Energia PROBE TYPE DPH **ENGINEER** Malachy Walsh and Partners FALL HEIGHT (mm) 500 Probe Readings (Blows/Increment) Elevation (mOD) Graphic Probe Record Geotechnical Description Depth (m) Depth (m)  $\widehat{\Xi}$ Legend Depth ( 5 10 15 20 25 0.0 0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00 0 2 9 9 12 15 1.0 20 1.20 End of Probe at 1.30 m 2.0 3.0 4.0 GROUNDW.

GROUNDW.

REMARKS

Main access **GROUNDWATER OBSERVATIONS** 



REPORT NUMBER

23000

PROBE NO. CONTRACT Seven Hills Wind Farm DP70 SHEET Sheet 1 of 1 **CO-ORDINATES** 587,635.00 E 746,459.00 N DATE DRILLED 02/12/2020 HAMMER MASS (kg) DATE LOGGED 50 02/12/2020 GROUND LEVEL (mOD) INCREMENT SIZE (mm) 100 CLIENT Energia PROBE TYPE DPH **ENGINEER** Malachy Walsh and Partners FALL HEIGHT (mm) 500 Probe Readings (Blows/Increment) Elevation (mOD) Graphic Probe Record Geotechnical Description Depth (m) Depth (m)  $\widehat{\Xi}$ Legend Depth ( 5 10 15 20 25 0.0 0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0 2 3 2 2 3 8 15 0.80 End of Probe at 0.90 m 1.0 2.0 3.0 4.0 GROUNDW

GROUNDW

REMARKS

Main access **GROUNDWATER OBSERVATIONS** 



REPORT NUMBER

23000

PROBE NO. CONTRACT Seven Hills Wind Farm DP71 SHEET Sheet 1 of 1 **CO-ORDINATES** 587,542.00 E 746,352.00 N DATE DRILLED 02/12/2020 HAMMER MASS (kg) DATE LOGGED 50 02/12/2020 GROUND LEVEL (mOD) INCREMENT SIZE (mm) 100 CLIENT Energia PROBE TYPE DPH **ENGINEER** Malachy Walsh and Partners FALL HEIGHT (mm) 500 Probe Readings (Blows/Increment) Elevation (mOD) Graphic Probe Record Geotechnical Description Depth (m) Depth (m) Depth (m) Legend 10 15 20 25 0.00 0.10 0.20 0.30 0.40 0.0 2 10 15 25 End of Probe at 0.50 m 1.0 2.0 3.0 4.0 GROUNDW

GROUNDW

REMARKS

Main access **GROUNDWATER OBSERVATIONS** 



REPORT NUMBER

23000

PROBE NO. CONTRACT Seven Hills Wind Farm DP72 SHEET Sheet 1 of 1 **CO-ORDINATES** 587,431.00 E 746,207.00 N DATE DRILLED 02/12/2020 HAMMER MASS (kg) DATE LOGGED 50 02/12/2020 GROUND LEVEL (mOD) INCREMENT SIZE (mm) 100 CLIENT Energia PROBE TYPE DPH **ENGINEER** Malachy Walsh and Partners FALL HEIGHT (mm) 500 Probe Readings (Blows/Increment) Elevation (mOD) Graphic Probe Record Geotechnical Description Depth (m) Depth (m)  $\widehat{\Xi}$ Legend Depth ( 5 10 15 20 25 0.0 0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0 2 12 16 25 End of Probe at 0.80 m 1.0 2.0 3.0 4.0 GROUNDW

GROUNDW

REMARKS

Main access **GROUNDWATER OBSERVATIONS** 



REPORT NUMBER

23000

PROBE NO. CONTRACT Seven Hills Wind Farm **DP73** SHEET Sheet 1 of 1 **CO-ORDINATES** 587,314.00 E 746,051.00 N DATE DRILLED 02/12/2020 HAMMER MASS (kg) DATE LOGGED 50 02/12/2020 GROUND LEVEL (mOD) INCREMENT SIZE (mm) 100 CLIENT Energia PROBE TYPE DPH **ENGINEER** Malachy Walsh and Partners FALL HEIGHT (mm) 500 Probe Readings (Blows/Increment) Elevation (mOD) Graphic Probe Record Geotechnical Description Depth (m) Depth (m)  $\widehat{\Xi}$ Legend Depth ( 5 10 15 20 25 0.0 0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0 2 2 4 10 0.80 End of Probe at 0.90 m 1.0 2.0 3.0 4.0 GROUNDW

GROUNDW

REMARKS

Main access **GROUNDWATER OBSERVATIONS** 



REPORT NUMBER

23000

PROBE NO. CONTRACT Seven Hills Wind Farm DP74 SHEET Sheet 1 of 1 **CO-ORDINATES** 587,274.00 E 745,902.00 N DATE DRILLED 02/12/2020 HAMMER MASS (kg) DATE LOGGED 50 02/12/2020 GROUND LEVEL (mOD) INCREMENT SIZE (mm) 100 CLIENT Energia PROBE TYPE DPH **ENGINEER** Malachy Walsh and Partners FALL HEIGHT (mm) 500 Probe Readings (Blows/Increment) Elevation (mOD) Graphic Probe Record Geotechnical Description Depth (m) Depth (m)  $\widehat{\Xi}$ Legend Depth ( 5 10 15 20 25 0.0 0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0 2 10 15 15 25 End of Probe at 0.80 m 1.0 2.0 3.0 4.0 GROUNDW

GROUNDW

REMARKS

Main access **GROUNDWATER OBSERVATIONS** 

# Appendix 4

# **APEX Geophysical Report**

AGP20192\_03

# AGP20192\_03

REPORT
ON THE
GEOPHYSICAL INVESTIGATION
AT
SEVEN HILLS WIND FARM
CO. ROSCOMMON
FOR
IGSL LIMITED



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# PRIVATE AND CONFIDENTIAL

THE FINDINGS OF THIS REPORT ARE THE RESULT OF A GEOPHYSICAL SURVEY USING NON-INVASIVE SURVEY TECHNIQUES CARRIED OUT AT THE GROUND SURFACE. INTERPRETATIONS CONTAINED IN THIS REPORT ARE DERIVED FROM A KNOWLEDGE OF THE GROUND CONDITIONS, THE GEOPHYSICAL RESPONSES OF GROUND MATERIALS AND THE EXPERIENCE OF THE AUTHOR. APEX GEOPHYSICS LTD. HAS PREPARED THIS REPORT IN LINE WITH BEST CURRENT PRACTICE AND WITH ALL REASONABLE SKILL, CARE AND DILIGENCE IN CONSIDERATION OF THE LIMITS IMPOSED BY THE SURVEY TECHNIQUES USED AND THE RESOURCES DEVOTED TO IT BY AGREEMENT WITH THE CLIENT. THE INTERPRETATIVE BASIS OF THE CONCLUSIONS CONTAINED IN THIS REPORT SHOULD BE TAKEN INTO ACCOUNT IN ANY FUTURE USE OF THIS REPORT.

PROJECT NUMBER	AGP20192		
AUTHOR	CHECKED	REPORT STATUS	DATE
Tony Lombard M.Sc (GEOPHYSICS)	Ian Sharkey (DIP. MIN. Eng.)	V.01	31 <sup>st</sup> March 2021
Tony Lombard M.Sc (GEOPHYSICS)	Ian Sharkey (DIP. MIN. Eng.)	V.02	11 <sup>TH</sup> MARCH 2022
Tony Lombard M.Sc (GEOPHYSICS)	Ian Sharkey (DIP. MIN. Eng.)	V.03	05™ May 2022



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	3 Vulnerability and Aquifer Classification	
	4 Historical Data	
2.3	Survey Rationale	
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#### 1. EXECUTIVE SUMMARY

APEX Geophysics Limited was requested by IGSL Limited to carry out a geophysical survey at the Seven Hills Wind Farm, County Roscommon. The proposed development consists of 20 wind turbines and the geophysical investigation is required to assess the subsoils conditions.

The objectives of the survey to estimate the overburden thickness, type and stiffness, assess the depth to bedrock and the weathering and excavatability of the bedrock and provide information on the type of bedrock and the presence of any faults or fissure zones.

The Geological Survey of Ireland (GSI) Quaternary Sediments map for the area indicates that the site is in an area of till derived from limestone with subcropping/outcropping rock in the northwest of the site, close to T01, T05 and T06. The bedrock geology map indicates that the site is underlain by undifferentiated Visean Limestones. Several karst features, including springs, swallow holes, enclosed depressions and Turloughs are shown on the GSI karst database in the vicinity of the site.

The survey was carried out between the 2<sup>nd</sup> of December 2020 and 5<sup>th</sup> of March 2021 and involved the collection of 45 ERT profiles, 44 seismic refraction profiles and 1D MASW soundings at the centre of each seismic refraction profile and at sections of access roads.

The results of the investigation are shown on the maps, sections and tables and each turbine base is summarised in **Appendix D**.

The geophysical datasets in conjunction with client trial pit and borehole data indicate three main soils layers;

- Sandy gravelly CLAY
- Clayey sandy GRAVEL
- Slightly clayey sandy GRAVEL/BOULDERS

The soil layers overlie rock at depths ranging from < 1.0m to c. 23m below ground level. Three main rock types are interpreted across the site;

- · Completely to highly weathered LIMESTONE
- Highly to moderately weathered LIMESTONE
- Slightly weathered to fresh LIMESTONE

Completely to highly weathered/karstified LIMESTONE is indicated at T11, T13 and the access road to T12. Possible karstified rock is indicated at a number of locations.

Where bedrock excavation is proposed, a detailed assessment of excavatability should be carried out.

The results of the geophysical investigation should be reviewed based on the findings of any further direct investigation.



#### 2. INTRODUCTION

APEX Geophysics Limited was requested by IGSL Limited to carry out a geophysical survey at the Seven Hills Wind Farm, County Roscommon. The proposed development consists of 20 wind turbines and the geophysical investigation is required to assess the subsoils conditions.

#### 2.1 Survey Objectives

The objectives of the survey are as follows:

- estimate the overburden thickness, type and stiffness,
- assess the depth to bedrock and the weathering and excavatability of the bedrock,
- provide information on the type of bedrock and the presence of any faults or fissure zones.

#### 2.2 Site Background

The Seven Hills Wind Farm site is located approximately 12.5 km northwest of Athlone. The proposed development consists of 20 wind turbines. Site topography is undulating and varies between 70 – 112 mOD.

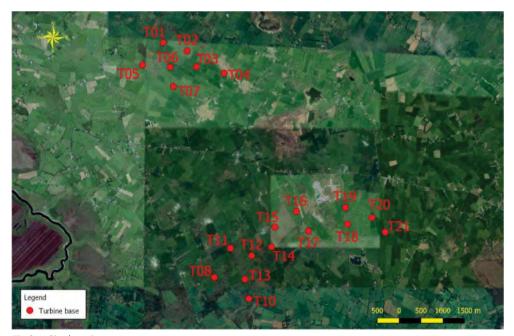


Fig 2.1: Site location.

#### 2.2.1 Soils

The Geological Survey of Ireland (GSI) Quaternary Sediments map for the area (Fig. 2.2) indicates that the site is in an area of till derived from limestone with subcropping/outcropping rock in the northwest of the site, close to T01, T05 and T06.

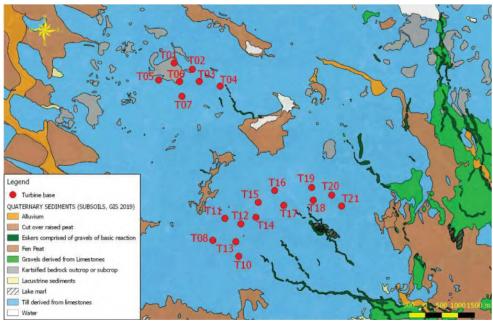


Fig 2.2: Quaternary sediments.

### 2.2.2 Geology and Karst

The GSI 1:100k Bedrock Geology map for the area (Figure 2.3) indicates that the site is underlain by undifferentiated Visean Limestones.

Several karst features, including springs, swallow holes, enclosed depressions and Turloughs are shown on the GSI karst database in the vicinity of the site. The closest karst features are indicated c. 500 m to the south of the site.

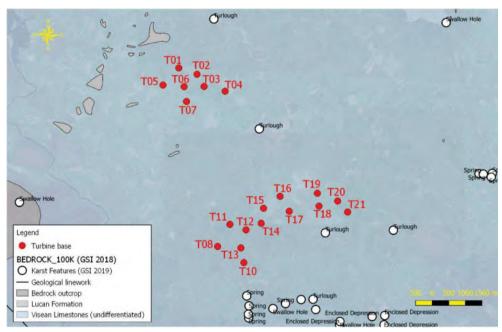


Fig 2.3: Bedrock geology.

### 2.2.3 Vulnerability and Aquifer Classification

The groundwater vulnerability rating for the site (Fig. 2.4) is classified as predominantly high in the southeast (turbines T08 to T21) and extreme to rock at or near surface or karst, in the northwest of the site (T01 to T07).

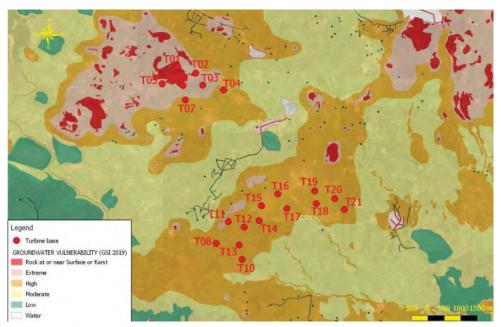


Fig 2.4: Groundwater vulnerability.



The Visean limestone is classified as a 'Regionally Important aquifer - karstified (conduit') (GSI).'

#### 2.2.4 Historical Data

The historical 6 inch sheet for the area (Fig. 2.5) indicates outcropping limestone in the northwest of the survey area.

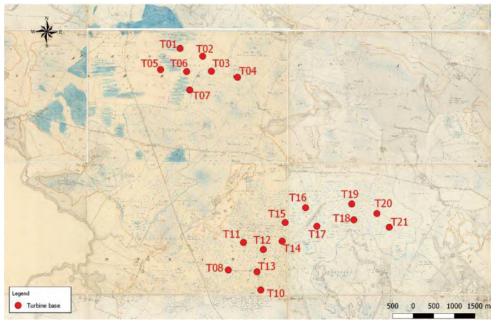


Fig 2.5: The historical 6inch map.

#### 2.2.5 Direct Investigation Data

A suite of trial pits were completed across the site and generally encountered a sequence of of soft-firm gravelly clay and loose to medium dense to dense clayey sandy gravel and cobbles to termination depths of up to 3.5m bgl.

Forty-six boreholes were completed at the site. Two boreholes were drilled at each turbine location, except for turbine T11, where four boreholes were completed. The borehole logs show the following general stratigraphy: overburden (sandy gravelly clay, clayey cobbly gravel, sandy cobbly gravel, clayey sandy cobbly gravel, sandy clay, gravelly sand and gravelly cobbles) over rock.

The depth to rock ranges from 1.3 to 9.6m bgl and the rock is described as strong to very strong, thickly to thinly bedded, dark grey/blueish grey, fine to medium grained limestone.

Rock was not encountered in the following boreholes: T02RC01, T03RC01 & RC02, T04RC02, T07RC01, T09RC01 & RC02, T20RC01 & RC02, T21 RC01 & RC02.

Borehole T11RC03 indicates possible karst infill at 12.3 m and 13.8m described as - returns of firm to stiff dark



brown sandy slightly gravelly clay and returns of very dark brown clayey sandy gravel, respectively.

Relevant borehole and trial pit data have been incorporated into the geophysical interpretation presented in this report. The location of the boreholes and trial pits are shown on the Drawings in Appendix C.

#### 2.3 Survey Rationale

The investigation consisted of Electrical Resistivity Tomography (ERT), Seismic Refraction profiling and MASW:

**ERT** soundings image the resistivity of the materials in the subsurface along a profile to produce a pseudo-section showing the variation in resistivity to depths dependent on the length of the profile. Each pseudo-section is interpreted to determine the material type along the profile based on the typical resistivities returned for Irish ground materials.

Seismic Refraction Profiling measures the P-wave velocity of refracted seismic waves through the overburden and rock material and allows an assessment of the thickness and quality of the materials present to be made. Stiffer and stronger materials usually have higher seismic velocities while soft, loose or fractured materials have lower velocities. This method profiles the depth to the top of the stiff soils and bedrock and provides information on the quality/strength of the bedrock.

The **MASW** method is used to estimate shear-wave velocities (Vs) in the ground material. Overburden material with a Vs <175 m/s is generally classified as soft/loose.

As with all geophysical methods the results are based on indirect readings of the subsurface properties. The effectiveness of the proposed approach will be affected by variations in the ground properties. By combining a number of techniques it is possible to provide a higher quality interpretation and reduce any ambiguities which may otherwise exist. Further information on the detailed methodology of each geophysical method employed in this investigation is given in **APPENDIX A: DETAILED METHODOLOGY**.



#### 3. RESULTS

The survey was carried out between the 2<sup>nd</sup> of December 2020 and 5<sup>th</sup> of March 2021 and involved the collection of 45 ERT profiles, 44 seismic refraction profiles and 1D MASW soundings at the centre of each seismic refraction profile. The geophysical survey locations are indicated on Drawings AGP20192\_01\_T01 to AGP20192\_01\_T12AR (Appendix D).

#### 3.1 ERT

Two orthogonal resistivity profiles were recorded at each turbine location. Additional resistivity profiles (R1, R3, R4, R5) were recorded along sections of the access roads, indicated by the client. The locations are shown on Drawings AGP20192\_01\_T01 to AGP20192\_01\_T12AR (Appendix D).

The modelled resistivity values have been broadly interpreted in conjunction with the trial pit and borehole data on the following basis:

Resistivity (Ohm-m) *	Interpretation
<250	Sandy gravelly CLAY
250 – 500	Clayey sandy GRAVEL
500 – 1,100	Slightly clayey sandy GRAVEL/BOULDERS
300 - 500	Completely to highly weathered/karstified LIMESTONE**
500 – 1,100	Highly to moderately weathered/karstified LIMESTONE**
1,100 – 7,000	Slightly weathered to fresh LIMESTONE **

<sup>\*</sup>While these ranges are a little broader than normal they allow for a good correlation with the client borehole data.

#### 3.2 Seismic refraction profiling

Two seismic refraction spreads were recorded at each of the turbine locations and on the access roads. The profiles have been processed using tomographic inversion techniques to produce 2D P-wave seismic velocity (Vp) distribution profiles (presented in Appendix B) which were also converted into Vp layered models (used in the A4 summary sheets presented in Appendix D).

The range of Vp seismic velocities in the layered models have been interpreted in conjunction with the trial pit and borehole data as follows:

<sup>\*\*</sup> While three rock types are interpreted across the site as a whole not all three types are present at all turbines. Specific interpreted rock types at each turbine are displayed on Drawings AGP20192\_01\_T01 to AGP20192\_01\_T12AR (Appendix D).



Seismic Velocity (m/s) *	Interpretation	Stiffness/ Rock Quality	Excavatability**
276 – 500	Soil	Soft / Loose	Diggable
500 – 1,000	Soil	Firm / Medium Dense	Diggable
1,000 – 1,800	Soil	Stiff/Dense	Diggable
1,800 – 2352	Soil	Very stiff/very dense	Diggable
800 – 1,051	Completely – Highly weathered ROCK	Poor	Rippable
1,051 – 2,480	Highly to moderately weathered ROCK	Fair to Good	Marginally Rippable - Break/Blast
2,480 – 5,786	Slightly weathered to fresh ROCK	Good - Excellent	Break/Blast – Heavy Break/Blast

<sup>\*</sup>While these ranges are broader than normal for soil layers they allow for a good correlation with the client borehole data where the boreholes encountered thick overburden, while the seismic velocity may indicate shallower rock. This is addressed in more detail in Appendix D.

## 3.3 MASW

Two MASW datasets were recorded at the centre of each seismic refraction spread and on the access roads. A 1D shear-wave velocity (Vs) profile of the soil was derived for each MASW dataset. The Vs values are indicative of the soil stiffness and material with a Vs value <175 m/s generally classified as indicating soft/loose material. Vs values and corresponding soil cohesion ranges are shown in Fig. 3.1.



Fig.3.1. Vs velocity and corresponding soil cohesion.

<sup>\*\*</sup> The cut-off velocity for excavatability will be lower where excavation is in trenches.



A 1D Gmax profile was calculated (from the Vs values) for each turbine centre location using a soil density of 2000 kg/m $^3$ . The Vs and Gmax values are presented in Appendix D. The Vs values recorded across the site ranged from 198 - 546 indicating firm to stiff to very stiff cohesive soils or medium dense to dense to very dense granular soil.



## 4. RECOMMEDATIONS

Where bedrock excavation is proposed, a detailed assessment of excavatability should be carried out combining the results of the geophysical survey, rotary core drilling, strength testing, and trial excavation pits down to formation level using a high powered excavator of similar rating to that to be used during construction. A more detailed discussion of velocity and excavatability is contained in Appendix C.

The findings of the geophysical investigation should be reviewed following any further direct investigations.

The normal mitigation measures applying to construction over karstic limestones, such as sealed drainage, and foundations capable of spanning voids that may come to the surface, should therefore be incorporated into any works.

The results of the geophysical investigation should be reviewed based on the findings of any further direct investigation.



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## APPENDIX A: DETAILED GEOPHYSICAL METHODOLOGY

A combination of geophysical techniques was used to provide a high quality interpretation and reduce any ambiguities, which may otherwise exist.

## **Electrical Resistivity Tomography (ERT)**

Electrical Resistivity Tomography was carried out to provide information on lateral variations in the overburden material as well as on the underlying overburden and bedrock.

#### **Principles**

This surveying technique makes use of the Wenner resistivity array. The 2D-resistivity profiling method records a large number of resistivity readings in order to map lateral and vertical changes in material types. This method involves the use of electrodes connected to a resistivity meter, using computer software to control the process of data collection and storage.

#### **Data Collection**

Profiles were recorded using a Tigre resistivity meter, imaging software, two 32 takeout multicore cables and up to 64 stainless steel electrodes. Saline solution was used at the electrode/ground interface in order to gain a good electrical contact required for the technique to work effectively. The recorded data were processed and viewed immediately after surveying.

#### **Data Processing**

The field readings were stored in computer files and inverted using the RES2DINV package (Geotomo Software, 2006) with up to 5 iterations of the measured data carried out for each profile to obtain a 2D-depth model of the resistivities.

The inverted 2D resistivity models and corresponding interpreted geology are displayed on the accompanying drawings alongside the processed seismic sections. Profiles have been contoured using the same contour intervals and colour codes. Distance is indicated along the horizontal axis of the profiles.

## **Seismic Refraction Profiling**

## **Principles**

This method measures the velocity of refracted seismic waves through the overburden and rock material and allows an assessment of the thickness and quality of the materials present to be made. Stiffer and stronger materials usually have higher seismic velocities while soft, loose or fractured materials have lower velocities.

Seismic profiling measures the p-wave velocity (Vp) of refracted seismic waves through the overburden and rock material and allows an assessment of the thickness and quality of the materials present to be made. Stiffer and stronger materials usually have higher Vp velocities while soft, loose or fractured materials have lower Vp velocities. Readings are taken using geophones connected via multi-core cable to a seismograph.



#### **Data Collection**

A Geode high resolution 24 channel digital seismograph, 24 10HZ vertical geophones and a 10 kg hammer were used to provide first break information, with a 24 take-out cable. Equipment was carried and operated by a two-person crew.

Readings are taken using geophones connected via multi-core cable to a seismograph. The depth of resolution of soil/bedrock boundaries is determined by the length of the seismic spread, typically the depth of resolution is about one third the length of the profile. (eg. 69m profile  $\sim$ 23m depth, 33m profile  $\sim$  11m depth).

#### **Data Processing**

First break picking in digital format was carried out using the SeisImager/2D PICKWIN software program from Geometrics to construct p-wave (Vp) traveltime plots for each spread. The processing and interpretation uses the ray-tracing and tomographic inversion methods, to acquire depths to boundaries and the P-wave velocities of these layers, using the SeisImager/2D PLOTREFA program.

SeisImager/2D interprets seismic refraction data as a laterally varying layered earth structure. The program includes three methods for data analysis, time-term inversion, the reciprocal method and tomography.

The tomography method creates an initial velocity model, then traces rays through the model, comparing the calculated and measured traveltimes. The model is then modified and the process repeated to minimise the difference between the calculated and measured times. The data was processed using this method and was then converted to a layer model for display and interpretation.

Approximate errors for Vp velocities are estimated to be +/- 10%. Errors for the calculated layer thicknesses are of the order of +/-20%. Possible errors due to the "hidden layer" and "velocity inversion" effects may also occur (Soske, 1959).

## **Multichannel Analysis of Surface Waves (MASW)**

## **Principles**

The Multi-channel Analysis of Surface Waves (MASW) (Park et al., 1998, 1999) utilizes Surface waves (Rayleigh waves) to determine the elastic properties of the shallow subsurface (<15m). Surface waves carry up to two/thirds of the seismic energy but are usually considered as noise in conventional body wave reflection and refraction seismic surveys. The penetration depth of surface waves changes with wavelength, i.e. longer wavelengths penetrate deeper. When the elastic properties of near surface materials vary with depth, surface waves then become dispersive, i.e. propagation velocity changes with frequency. The propagation (or phase) velocity is determined by the average elastic property of the medium within the penetration depth. Therefore the dispersive nature of surface waves may be used to investigate changes in elastic properties of the shallow subsurface. The MASW method employs multi-channel recording and processing techniques (Sheriff and Geldart, 1982) that have similarities to those used in a seismic reflection survey and which allow better waveform analysis and noise elimination.

To produce a shear wave velocity (Vs) profile and a stiffness profile of the subsurface using Surface waves the following basic procedure is followed:

(i) A point source (eg. a sledgehammer) is used to generate vertical ground motions,



- (ii) The ground motions are measured using low frequency geophones, which are disposed along a straight line directed toward the source,
- (iii) the ground motions are recorded using either a conventional seismograph, oscilloscope or spectrum analyzer,
- (iv) a dispersion curve is produced from a spectral analysis of the data showing the variation of Surface wave velocity with wavelength,
- (iv) the dispersion curve in inverted using a modelling and least squares minimization process to produce a subsurface profile of the variation of Surface wave and shear wave velocity with depth.

## **Data Collection**

The recording equipment consisted of a Geode 24 channel digital seismograph, 24 no. 10HZ vertical geophones, hammer energy source with mounted trigger and a 24 take-out cable.

## **Data Processing**

MASW processing was carried out using the SURFSEIS processing package developed by Kansas Geological Survey (KGS, 2000). SURFSEIS is designed to generate a shear wave (Vs) velocity profile.

SURFSEIS data processing involves three steps:

- (i) Preparation of the acquired multichannel record. This involves converting data file into the processing format.
- (ii) Production of a dispersion curve from a spectral analysis of the data showing the variation of Raleigh wave phase velocity with wavelength. Confidence in the dispersion curve can be estimated through a measure of signal to noise ratio (S/N), which is obtained from a coherency analysis. Noise includes both body waves and higher mode surface waves. To obtain an accurate dispersion curve the spectral content and phase velocity characteristics are examined through an overtone analysis of the data.
- (iii) Inversion of the dispersion curve is then carried out to produce a subsurface profile of the variation of shear wave velocity with depth.
- (iv) The Gmax values are calculated at each S-wave location using an soil density of 2,000Kg/m<sup>3</sup>. The Gmax calculation is:

Gmax (Mpa) =  $Vs^{2*}(\rho / 1000000)$ ,

where; Vs = Shear Wave (S-wave) Velocity (m/s) and  $\rho$  = Density (kg/m<sup>3</sup>).

## **Spatial Relocation**

All the geophysical investigation locations were acquired using a Trimble Geo 7X high-accuracy GNSS handheld system using the settings listed below. This system allows collection of GPS data with c.20mm accuracy.

Coordinate zone:	Irish Transverse Mercator (ITM)		
Datum:	Ordnance		
Coordinate units:	Metres		
Altitude units:	Metres		
Survey altitude reference:	MSL		
Geoid model:	Republic of Ireland		



## APPENDIX B: SEISMIC REFRACTION TOMOGRAPHIC DATA

The seismic refraction tomographic plates used in preparation of the turbine A4 summary sheets are shown below.

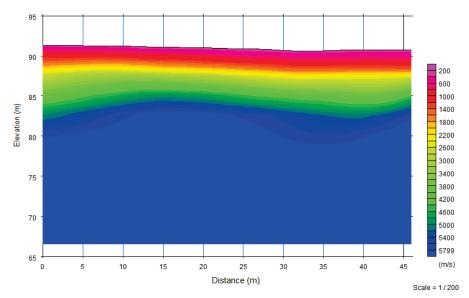


Fig B.1: Turbine T01 tomographic inversion for T01\_S01.

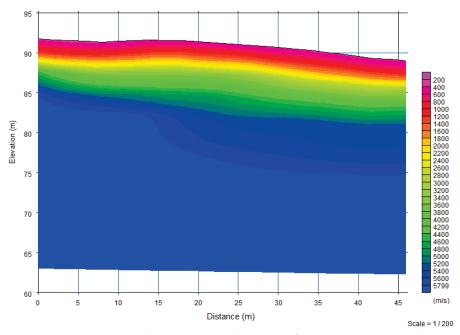


Fig B.2: Turbine T01 tomographic inversion for T01\_S02.

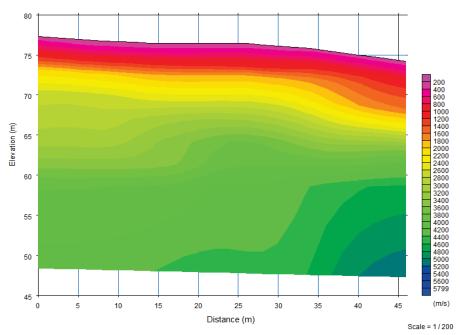


Fig B.3: Turbine T02 tomographic inversion for T02\_S01.

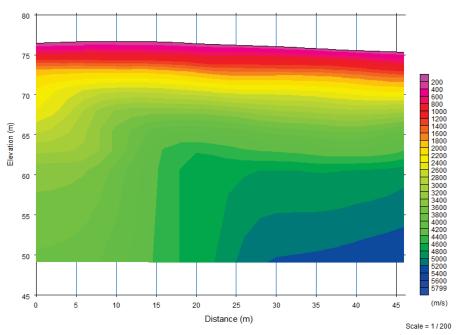


Fig B.4: Turbine T02 tomographic inversion for T02\_S02.

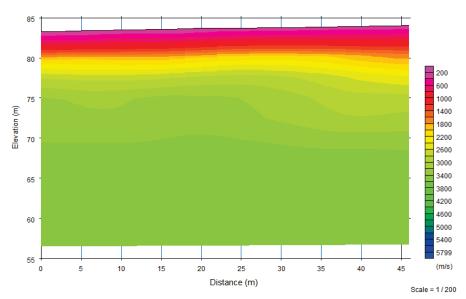


Fig B.5: Turbine T03 tomographic inversion for T03\_S01.

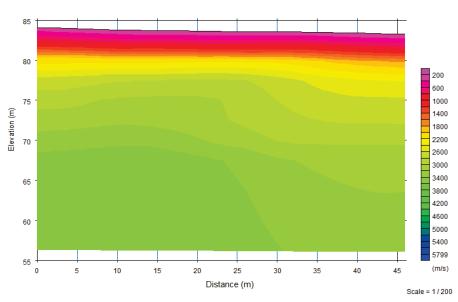


Fig B.6: Turbine T03 tomographic inversion for T03\_S02.

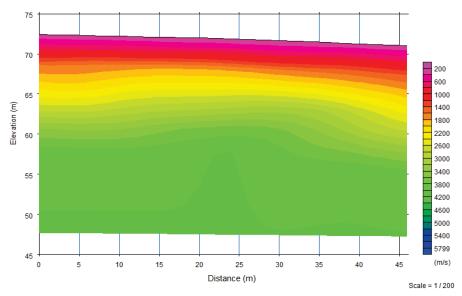


Fig B.7: Turbine T04 tomographic inversion for T04\_S01.

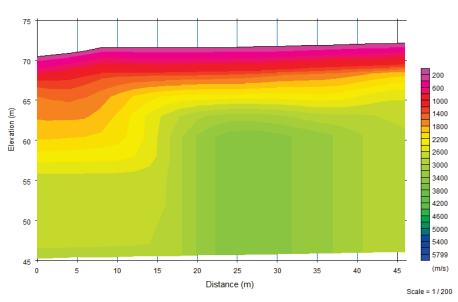


Fig B.8: Turbine T04 tomographic inversion for T04\_S02.

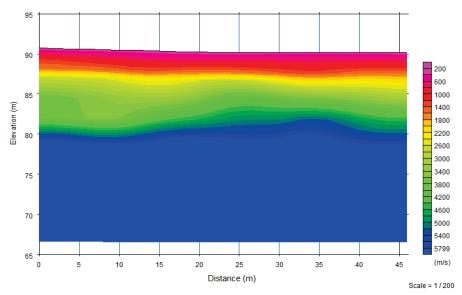


Fig B.9: Turbine T05 tomographic inversion for T05\_S01.

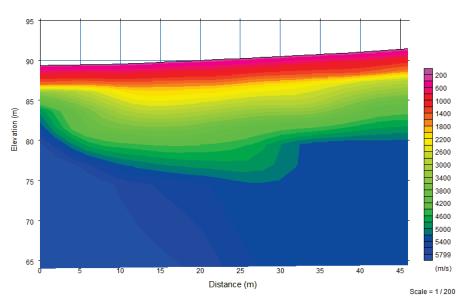


Fig B.10: Turbine T05 tomographic inversion for T05\_S02.

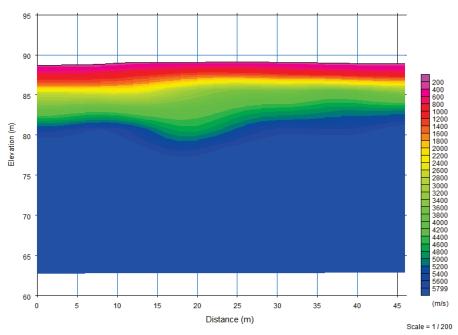


Fig B.11: Turbine T06 tomographic inversion for T06\_S01.

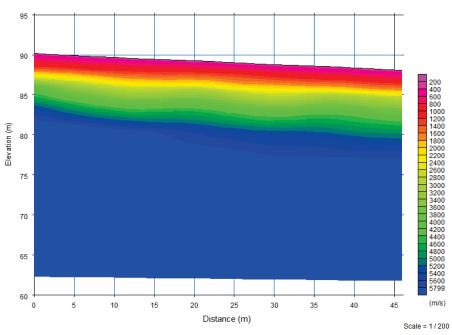


Fig B.12: Turbine T06 tomographic inversion for T06\_S02.

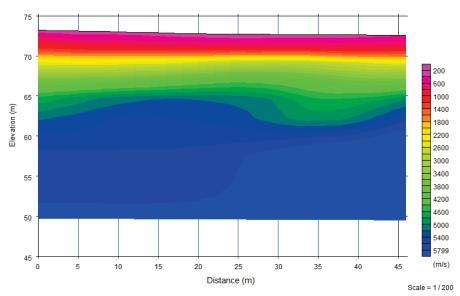


Fig B.13: Turbine T07 tomographic inversion for T07\_S01.

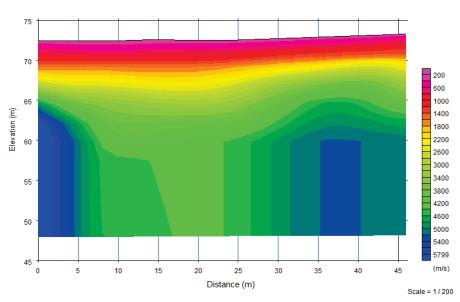


Fig B.14: Turbine T07 tomographic inversion for T07\_S02.

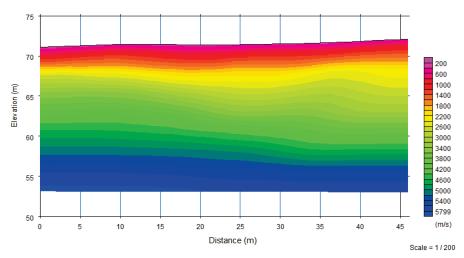


Fig B.15: Turbine T08 tomographic inversion for T08\_S01.

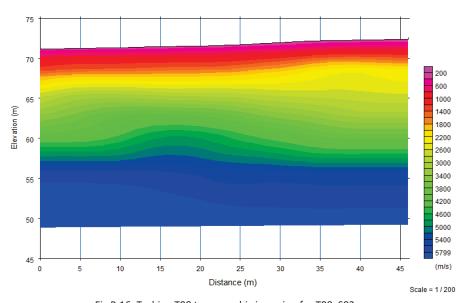


Fig B.16: Turbine T08 tomographic inversion for T08\_S02.

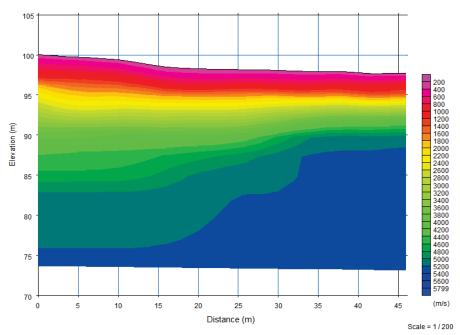


Fig B.17: Turbine T10 tomographic inversion for T10\_S01.

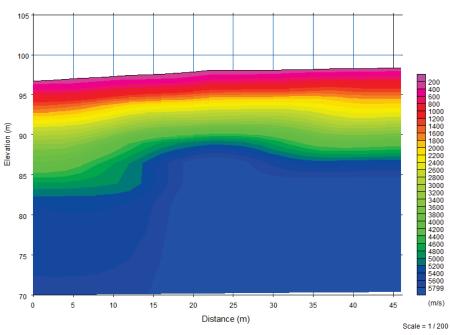


Fig B.18: Turbine T10 tomographic inversion for T10\_S02.

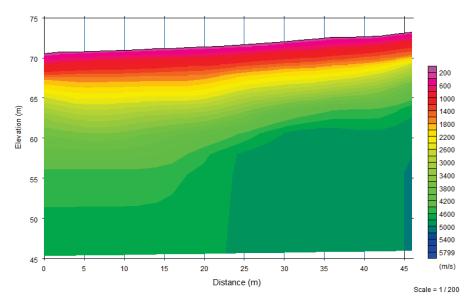


Fig B.19: Turbine T11 tomographic inversion for T11\_S01.

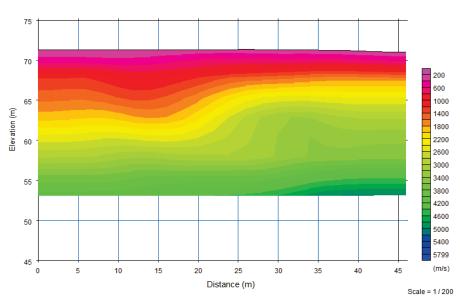


Fig B.20: Turbine T11 tomographic inversion for T11\_S02.

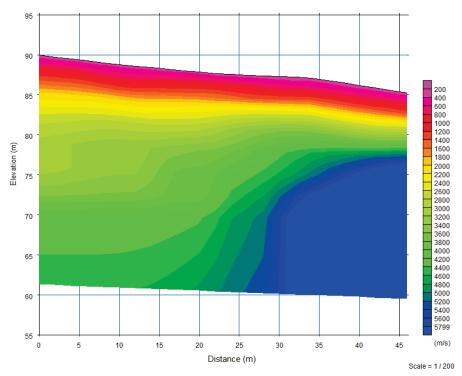


Fig B.21: Turbine T12 tomographic inversion for T12\_S01.

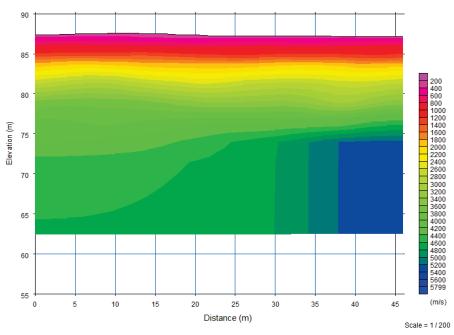


Fig B.22: Turbine T12 tomographic inversion for T12\_S02.

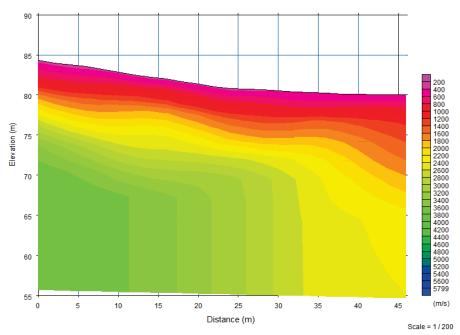


Fig B.23: Turbine T13 tomographic inversion for T13\_S01.

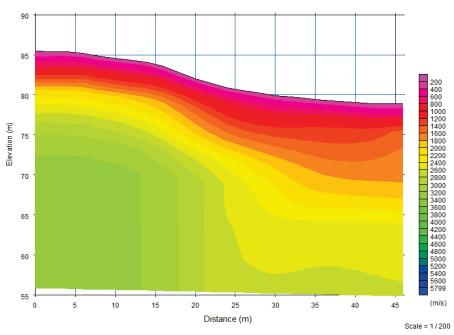


Fig B.24: Turbine T13 tomographic inversion for T13\_S02.

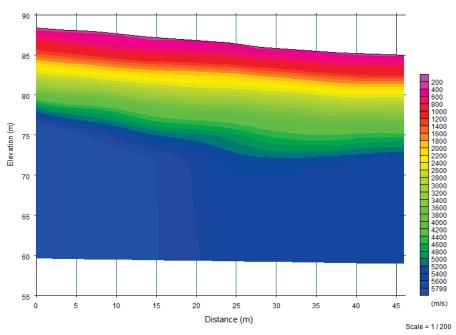


Fig B.25: Turbine T14 tomographic inversion for T14\_S01.

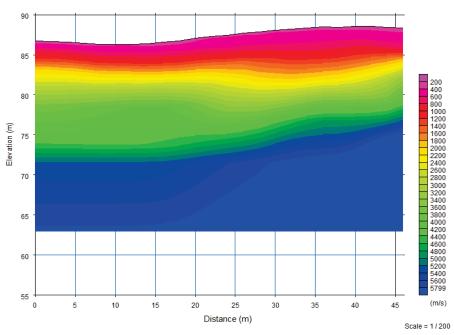


Fig B.26: Turbine T14 tomographic inversion for T14\_S02.

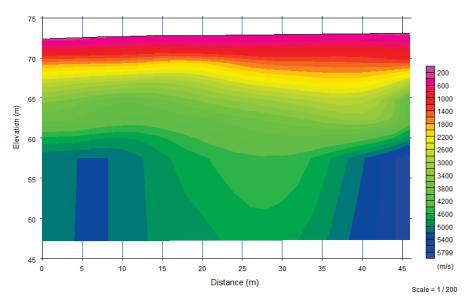


Fig B.27: Turbine T15 tomographic inversion for T15\_S01.

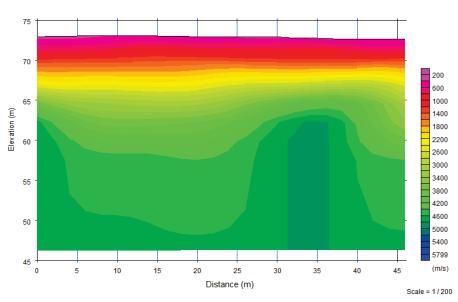


Fig B.28: Turbine T15 tomographic inversion for T15\_S02.

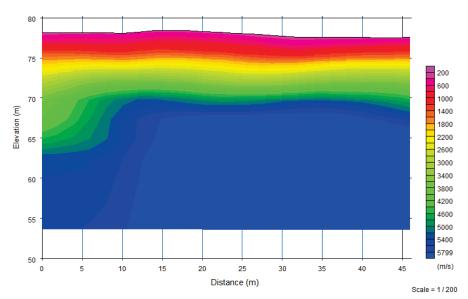


Fig B.29: Turbine T16 tomographic inversion for T16\_S01.

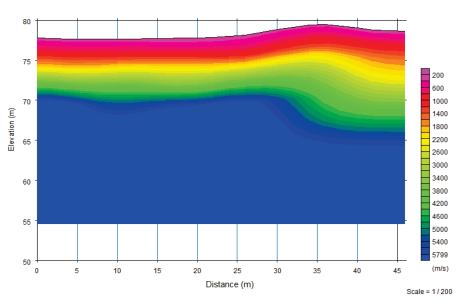


Fig B.30: Turbine T16 tomographic inversion for T16\_S02.

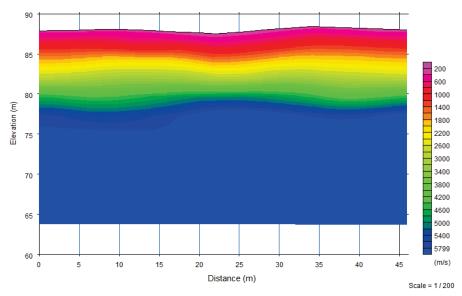


Fig B.31: Turbine T17 tomographic inversion for T17\_S01.

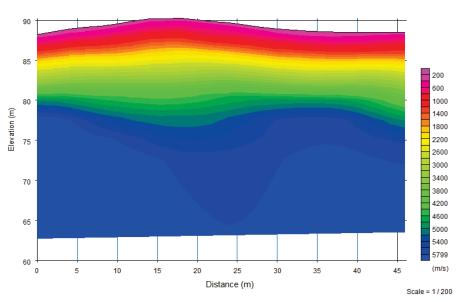


Fig B.32: Turbine T17 tomographic inversion for T17\_S02.

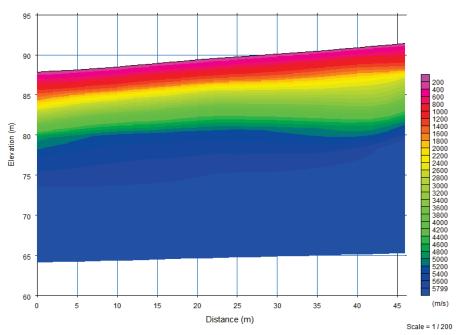


Fig B.33: Turbine T18 tomographic inversion for T18\_S01.

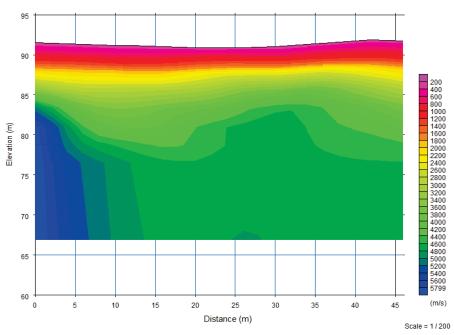


Fig B.34: Turbine T18 tomographic inversion for T18\_S02.

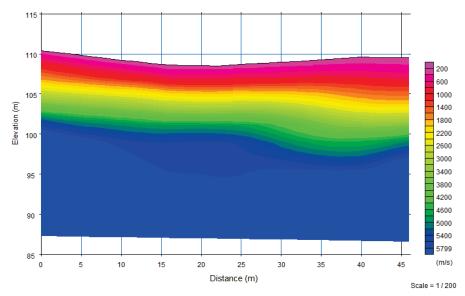


Fig B.35: Turbine T19 tomographic inversion for T19\_S01.

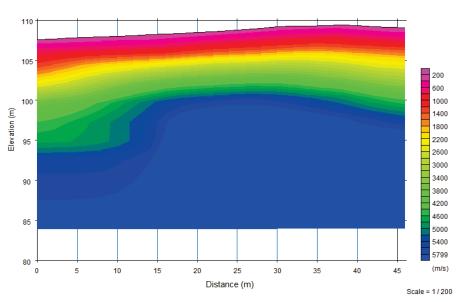


Fig B.36: Turbine T19 tomographic inversion for T19\_S02.

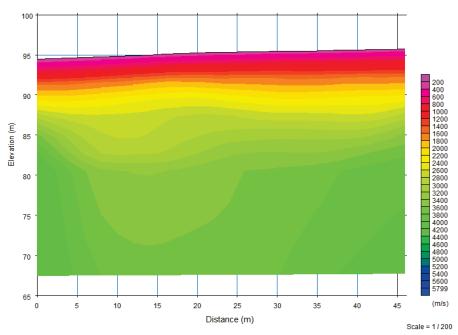


Fig B.37: Turbine T20 tomographic inversion for T20\_S01.

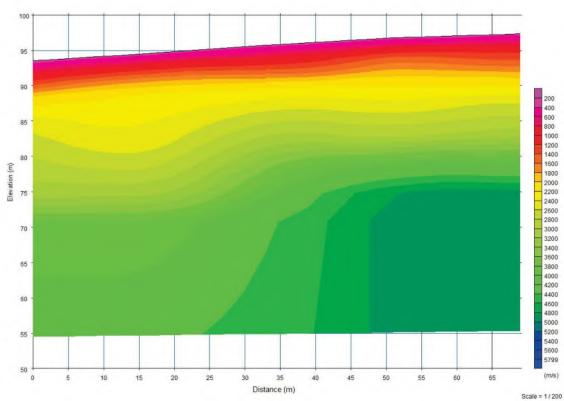


Fig B.38: Turbine T20 tomographic inversion for T20\_S02.

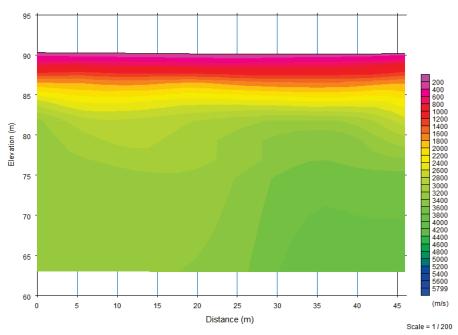


Fig B.39: Turbine T21 tomographic inversion for T21\_S01.

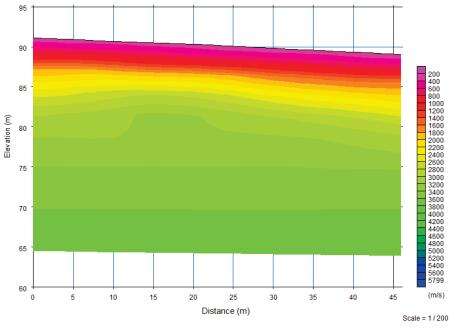


Fig B.40: Turbine T21 tomographic inversion for T21\_S02.

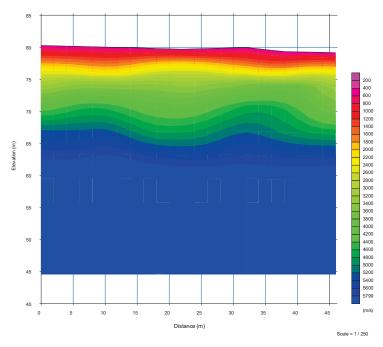


Fig B.41: Tomographic inversion for S01.

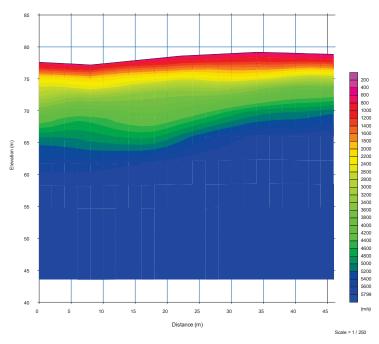


Fig B.42: Tomographic inversion for S02.

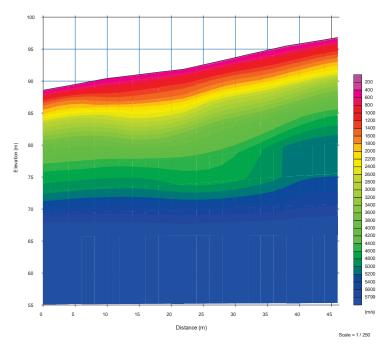


Fig B.43: Tomographic inversion for S03.

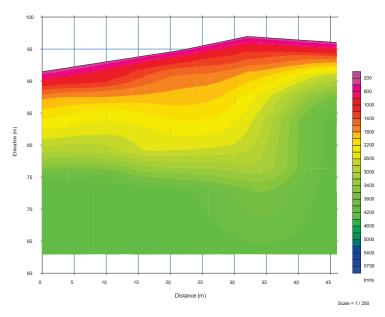


Fig B.44: Tomographic inversion for S04.

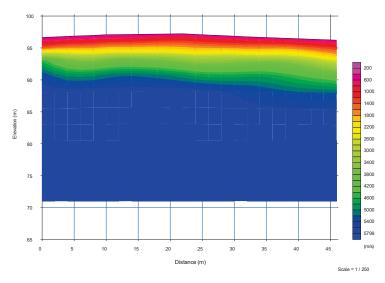


Fig B.45: Tomographic inversion for S05.

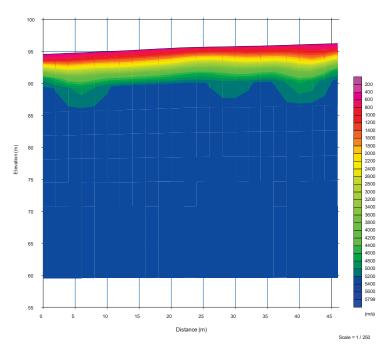


Fig B.46: Tomographic inversion for S06.



## **APPENDIX C: EXCAVATABILITY**

The seismic velocity of a rock formation is related to characteristics of the rock mass which include rock hardness and strength, degree of weathering and discontinuities. Usually the velocity is just one of several parameters used in the assessment of excavatability. The excavatability of a rock formation is favoured by the following factors:

- Open fractures, faults and other planes of weakness of any kind
- Weathering
- Brittleness and crystalline nature
- High degree of stratification or lamination
- Large grain size
- Low compressive strength

Weaver (1975) presented a comprehensive rippability rating chart (Fig.1) in which the p-wave velocity value and the relevant geological factors could be entered and assigned appropriate weightings. The total weighted index was found to correlate very well with actual rippability.

Fig.1 Rippability Rating Chart

Rock class	1	ll .	III	IV	V
Description	Very good rock	Good rock	Fair rock	Poor rock	Very poor rock
Seismic velocity					
(m/s)	>2150	2150-1850	1850-1500	1500-1200	1200-450
Rating	26	24	20	12	5
Rock hardness	Extremely hard rock	Very hard rock	Hard rock	Soft rock	Very soft rock
Rating	10	5	2	1	0
Rock weathering	Unweathered	Slightly weathered	Weathered	Highly weathered	Completely weathered
Rating	9	7	5	3	1
Joint spacing (mm)	>3000	3000-1000	1000-300	300-50	<50
Rating	30	25	20	10	5
Joint continuity	Non continuous	Slightly continuous	Continuous- no gouge	Continuous- some gouge	Continuous- with gouge
Rating	5	5	3	0	0
Joint gouge	No separation	Slight separation	Separation <1mm	Gouge <5mm	Gouge >5mm
Rating	5	5	4	3	1
Strike and dip orientation	Very unfavourable	Unfavourable	Slightly unfavourable	Favourable	Very favourable
Rating	15	13	10	5	3
Total rating	100-90	90-70*	70-50	50-25	<25
Rippability assessment	Blasting	Extremely hard ripping and blasting	Very hard ripping	Hard ripping	Easy ripping
Tractor horsepower		770/385	385/270	270/180	180
Tractor kilowatts		575/290	290/200	200/135	135



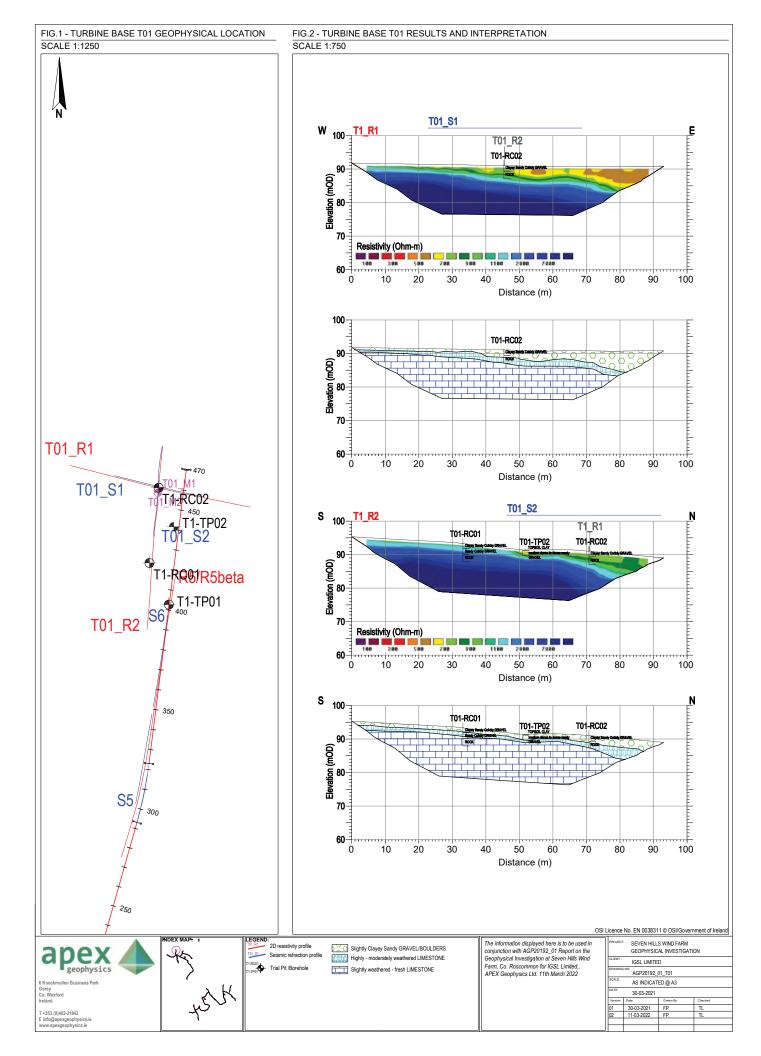
# **APPENDIX D: DRAWINGS**

The information derived from the geophysical investigation as well as correlation with the available direct investigation is presented in the following drawings:

AGP20192_01_T01	Fig.1 Turbine base T01 Geophysical Locations	1:1250	@A3
	Fig.2 Turbine base T01 Results and Interpretation	1:750	@A3
AGP20192_02_T01	Summary Interpretation		
AGP20192_01_T02	Fig.1 Turbine base T02 Geophysical Locations	1:1250	@A3
	Fig.2 Turbine base TO2 Results and Interpretation	1:750	@A3
AGP20192_02_T02	Summary Interpretation		
AGP20192_01_T03	Fig.1 Turbine base T03 Geophysical Locations	1:2000	@A3
	Fig.2 Turbine base T03 Results and Interpretation	1:1000	@A3
AGP20192_02_T03	Summary Interpretation		
AGP20392_01_T04	Fig.1 Turbine base T04 Geophysical Locations	1:1250	@A3
	Fig.2 Turbine base T04 Results and Interpretation	1:750	@A3
AGP20192_02_T04	Summary Interpretation		
AGP20392_01_T05	Fig.1 Turbine base T05 Geophysical Locations	1:1250	@A3
	Fig.2 Turbine base T05 Results and Interpretation	1:750	@A3
AGP20192_02_T05	Summary Interpretation		
AGP20392_01_T06	Fig.1 Turbine base T06 Geophysical Locations	1:1250	@A3
	Fig.2 Turbine base T06 Results and Interpretation	1:750	@A3
AGP20192_02_T06	Summary Interpretation		
AGP20392_01_T07	Fig.1 Turbine base T07 Geophysical Locations	1:1250	@A3
	Fig.2 Turbine base T07 Results and Interpretation	1:750	@A3
AGP20192_02_T07	Summary Interpretation		
AGP20392_01_T08	Fig.1 Turbine base T08 Geophysical Locations	1:1250	@A3
	Fig.2 Turbine base T08 Results and Interpretation	1:750	@A3
AGP20192_02_T08	Summary Interpretation		
AGP20392_01_T10	Fig.1 Turbine base T10 Geophysical Locations	1:1250	@A3
	Fig.2 Turbine base T10 Results and Interpretation	1:750	@A3
AGP20192_02_T10	Summary Interpretation		
AGP20392_01_T11	Fig.1 Turbine base T11 Geophysical Locations	1:1250	@A3
	Fig.2 Turbine base T11 Results and Interpretation	1:750	@A3
AGP20192_02_T11	Summary Interpretation		
AGP20392_01_T12	Fig.1 Turbine base T12 Geophysical Locations	1:1250	@A3
	Fig.2 Turbine base T12 Results and Interpretation	1:750	@A3
AGP20192_02_T12	Summary Interpretation		
AGP20392_01_T13	Fig.1 Turbine base T13 Geophysical Locations	1:1250	@A3
	Fig.2 Turbine base T13 Results and Interpretation	1:750	@A3
AGP20192_02_T13	Summary Interpretation		
AGP20392_01_T14	Fig.1 Turbine base T14 Geophysical Locations	1:1250	@A3
	Fig.2 Turbine base T14 Results and Interpretation	1:750	@A3
AGP20192_02_T14	Summary Interpretation		
AGP20392_01_T15	Fig.1 Turbine base T15 Geophysical Locations	1:1250	@A3
	Fig.2 Turbine base T15 Results and Interpretation	1:750	@A3
AGP20192_02_T15	Summary Interpretation	:	
AGP20392_01_T16	Fig.1 Turbine base T16 Geophysical Locations	1:1250	@A3
	Fig.2 Turbine base T16 Results and Interpretation	1:750	@A3
AGP20192_02_T16	Summary Interpretation		

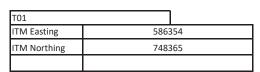


AGP20392_01_T17	Fig.1 Turbine base T17 Geophysical Locations	1:1250	@A3
AGP20192 02 T17	Fig.2 Turbine base T17 Results and Interpretation Summary Interpretation	1:750	@A3
AGP20392_01_T18	Fig.1 Turbine base T18 Geophysical Locations	1:1250	@A3
	Fig.2 Turbine base T18 Results and Interpretation	1:750	@A3
AGP20192_02_T18	Summary Interpretation		
AGP20392_01_T19	Fig.1 Turbine base T19 Geophysical Locations	1:1250	@A3
	Fig.2 Turbine base T19 Results and Interpretation	1:750	@A3
AGP20192_02_T19	Summary Interpretation		
AGP20392_01_T20	Fig.1 Turbine base T20 Geophysical Locations	1:1250	@A3
	Fig.2 Turbine base T20 Results and Interpretation	1:1000	@A3
AGP20192_02_T20	Summary Interpretation		
AGP20392_01_T21	Fig.1 Turbine base T21 Geophysical Locations	1:1250	@A3
	Fig.2 Turbine base T21 Results and Interpretation	1:750	@A3
AGP20192_02_T21	Summary Interpretation		
AGP20392_01_T11AR	Fig.1 T11 Access Road Geophysical Locations	1:1250	@A3
	Fig.2 11 Access Road Results and Interpretation	1:750	@A3
AGP20192_02_S1	Summary Interpretation		
AGP20192_02_S2	Summary Interpretation		
AGP20392_01_T12AR	Fig.1 T11 Access Road Geophysical Locations	1:1250	@A3
	Fig.2 11 Access Road Results and Interpretation	1:750	@A3
AGP20192_02_S3	Summary Interpretation		
AGP20192_02_S4	Summary Interpretation		
AGP20392_01_T01AR	Fig.1 T11 Access Road Geophysical Locations	1:1250	@A3
	Fig.2 11 Access Road Results and Interpretation	1:750	@A3
AGP20192_02_S5	Summary Interpretation		
AGP20192_02_S6	Summary Interpretation		



# Geophysical Investigation Summary MASW/Seismic Refraction Drawing No. AGP20192\_02\_T01







Methodology	
Seismic Refraction	24 ch. @ 2m geophone spacing
MASW	24 ch. @ 1m geophone spacing
ERT	32 el. @ 3m electrode spacing
GPS	GNSS (< 20mm accuracy)

Depth (m)	Depth (m)	Avg. Ve	elocity (m/s)	Assumed Density	Poissons Ratio	Shear Mod	Youngs Mod	Youngs Mod	Interpretation	Estimated Stiffness ** / Rock Quality	Estimated Excavatability
from	to	S Wave	P Wave	kg/m³		MPa Dynamic	GPa Dynamic	MPa Static*			
0.0	0.5	-	356	2000	-	-	-	-	Slightly clayey sandy GRAVEL/BOULDERS	LOOSE	Diggable
0.5	1.5	-	805	2000	-	-	-	-	Slightly clayey sandy GRAVEL/BOULDERS	MEDIUM DENSE	Diggable
1.5	2.2	350	1554	2000	0.47	244.76	0.72	23.33	Slightly clayey sandy GRAVEL/BOULDERS	DENSE-VERY DENSE	Diggable
2.2	4.0	-	1974	2500	-	-	-	-	Moderately Weathered LIMESTONE	VERY POOR	Break / Blast
4.0	6.3	-	3913	2700	-	-	-	ı	Slightly Weathered to Fresh LIMESTONE	EXCELLENT	Heavy Break / Blast
6.3	10.0	-	5578	2700	-	-	-	-	Slightly Weathered to Fresh LIMESTONE	EXCELLENT	Heavy Break / Blast

<sup>\*</sup> converted to static equivalent using empirical correlation from van Heerden, 1987.

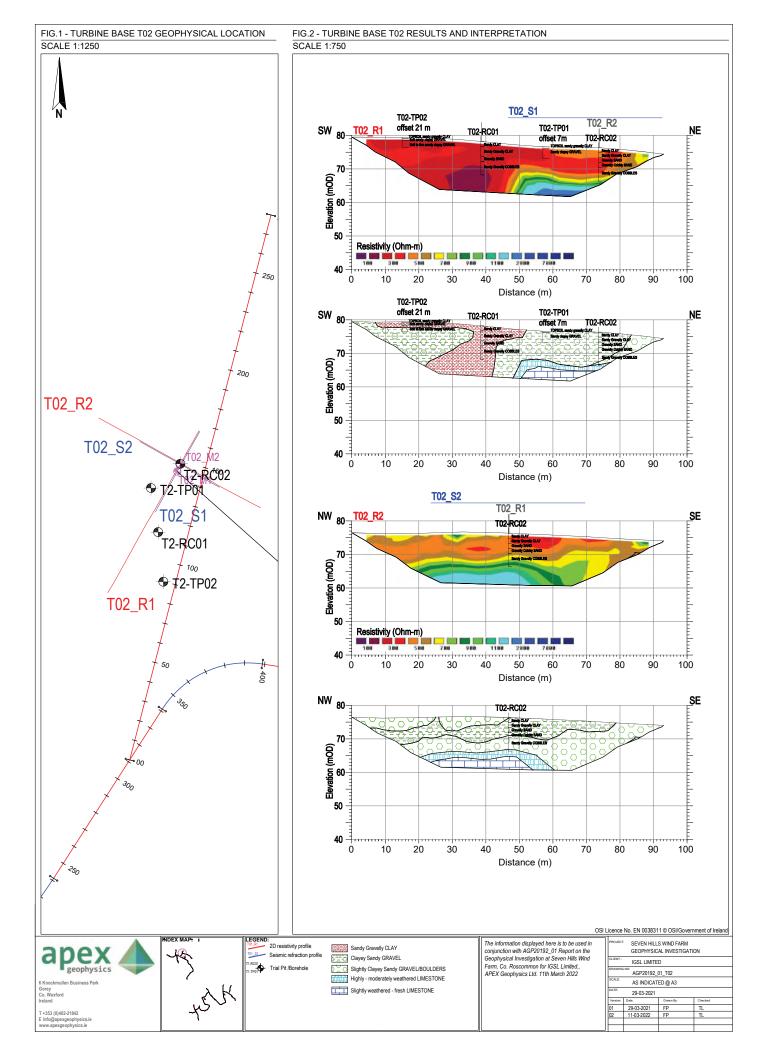
Note: Material type interpretation is based on a combination of field obervations and client supplied borehole information.

## Discussion

The geophysical data indicates the centre of Turbine T01 is characterised by c. 2.2m of loose becoming medium dense to dense slightly clayey sandy GRAVEL/BOULDERS over moderately weathered LIMESTONE over slightly weathered to fresh LIMESTONE at a depth of 4.0m bgl. Depth to LIMESTONE bedrock increases to c 6.0m to the east of the turbine centre.

Vp seismic velocities indicate that any excavation of the moderately weathered and slightly weathered to fresh LIMESTONE will require breaking/blasting. More information on excavatability is provided in Appendix C.

<sup>\*\*</sup> correlation from Imai et al, 1975





T02	
ITM Easting	586907
ITM Northing	748181



Methodology	
Seismic Refraction	24 ch. @ 2m geophone spacing
MASW	24 ch. @ 1m geophone spacing
ERT	32 el. @ 3m electrode spacing
GPS	GNSS (< 20mm accuracy)

Depth (m)	Depth (m)	Avg. Ve	elocity (m/s)	Assumed Density	Poissons Ratio	Shear Mod	Youngs	Youngs Mod	Interpretation	Estimated Stiffness ** / Rock	Estimated Excavatability
from	to	S Wave	P Wave	kg/m <sup>3</sup>		MPa Dynamic	GPa Dynamic	MPa Static*		Quality	Executation in the second seco
0.0	0.5	-	276	2000	-	-	-	-	Clayey sandy GRAVEL	LOOSE	Diggable
0.5	1.6	202	588	2000	0.43	81.93	0.23	3.66	Clayey sandy GRAVEL	MEDIUM DENSE	Diggable
1.6	2.7	198	1007	2000	0.48	78.03	0.23	3.56	Clayey sandy GRAVEL	MEDIUM DENSE	Diggable
2.7	3.8	253	1397	2000	0.48	128.51	0.38	8.14	Clayey sandy GRAVEL	MEDIUM DENSE to DENSE	Diggable
3.8	6.0	332	2097	2000	0.49	220.11	0.65	19.88	Clayey sandy GRAVEL	VERY DENSE	Diggable
6.0	9.5	-	2350	2500	-	-	=	-	Slightly clayey GRAVEL/BOULDERS	VERY DENSE	Diggable
9.5	11.6	-	3716	2700	·	-	-	-	Moderately to slightly weathered LIMESTONE	GOOD	Break / Blast
11.6	14.2	-	4218	2700	-	-	-	-	Slightly weathered to fresh LIMESTONE	EXCELLENT	Break / Blast

st converted to static equivalent using empirical correlation from van Heerden, 1987.

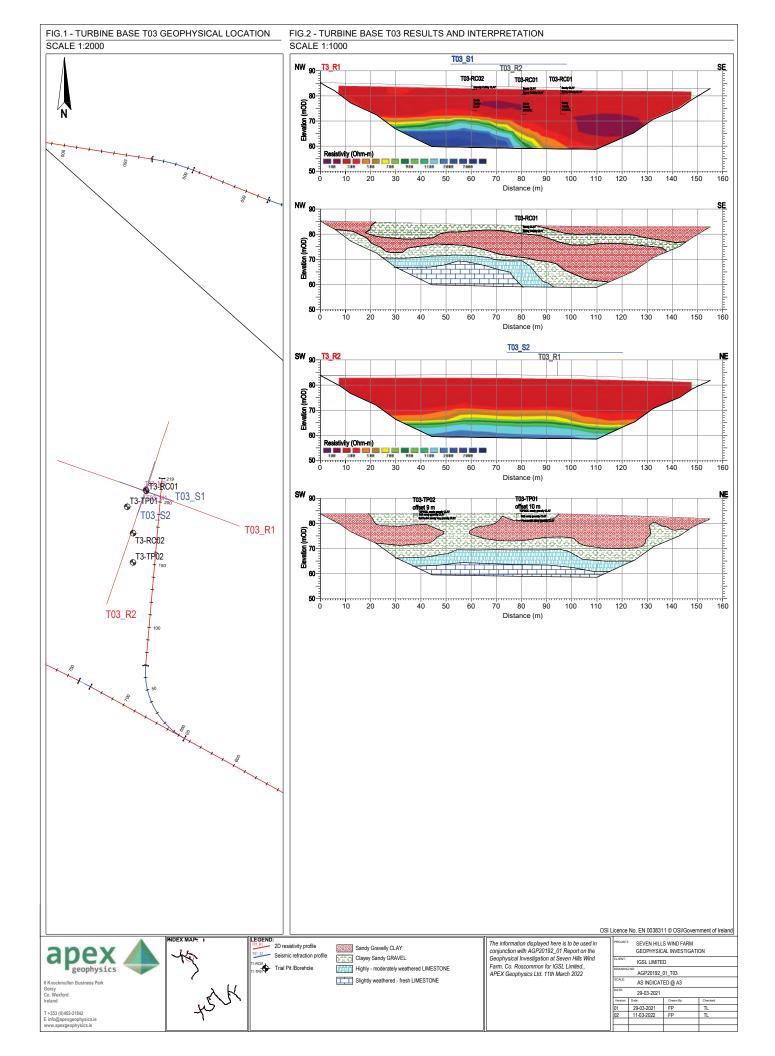
Note: Material type interpretation is based on a combination of field obervations and client supplied borehole information.

#### Discussion

The geophysical data indicates the centre of Turbine T02 is characterised by c. 6.0 m of loose becoming medium dense to dense to very dense clayey sandy GRAVEL over c. 3.5m of slightly clayey GRAVEL/BOULDERS. Depth to moderately to slightly weathered LIMESTONE is 9.5 m bgl and it overlies slightly weathered to fresh LIMESTONE at 11.6m bgl. The data indicates an increase in depth to LIMESTONE bedrock to the south of the turbine centre to more than 14.8m bgl where there is an increase in thickness of slightly clayey sandy GRAVEL/BOULDERS.

Vp seismic velocities indicate that any excavation of the moderately weathered/karstified and slightly weathered to fresh LIMESTONE will require breaking/blasting. More information on excavatability is provided in Appendix C.

<sup>\*\*</sup> correlation from Imai et al, 1975





T03	
ITM Easting	587112
ITM Northing	747791



Methodology	
Seismic Refraction	24 ch. @ 2m geophone spacing
MASW	24 ch. @ 1m geophone spacing
ERT	chacing
GPS	GNSS (< 20mm accuracy)

Depth (m)	Depth (m)	Avg. Ve	elocity (m/s)	Assumed Density	Poissons Ratio	Shear Mod	Mod	Youngs Mod	Interpretation	Estimated Stiffness ** / Rock	Estimated Excavatability
from	to	S Wave	P Wave	kg/m <sup>3</sup>		MPa Dynamic	GPa Dynamic	MPa Static*		Quality	Executationity
0.0	0.5	-	306	2000	-	-	-	-	Clayey sandy GRAVEL	LOOSE	Diggable
0.5	1.6	-	519	2000	-	-	-	-	Clayey sandy GRAVEL	MEDIUM DENSE	Diggable
1.6	2.6	264	1112	2000	0.47	139.40	0.41	9.18	Clayey sandy GRAVEL	DENSE	Diggable
2.6	3.7	274	1612	2000	0.49	149.65	0.44	10.50	Sandy Gravelly CLAY	STIFF	Diggable
3.7	6.1	-	2093	2000	-	-	-	-	Sandy Gravelly CLAY	VERY STIFF	Diggable
6.1	8.2	-	2401	2000	-	-	ı	-	Sandy Gravelly CLAY	VERY STIFF	Diggable
8.2	12.1	-	2491	2000	-	-	-	-	Sandy Gravelly CLAY	VERY STIFF	Diggable
12.1	13.8	-	2491	2000	-	-	-	ı	Clayey sandy GRAVEL	VERY DENSE	Diggable
13.8	16.0	-	2428	2700	-	-	-	=	Moderately to slightly weathered LIMESTONE	POOR	Break / Blast

<sup>\*</sup> converted to static equivalent using empirical correlation from van Heerden, 1987.

Note: Material type interpretation is based on a combination of field obervations and client supplied borehole information.

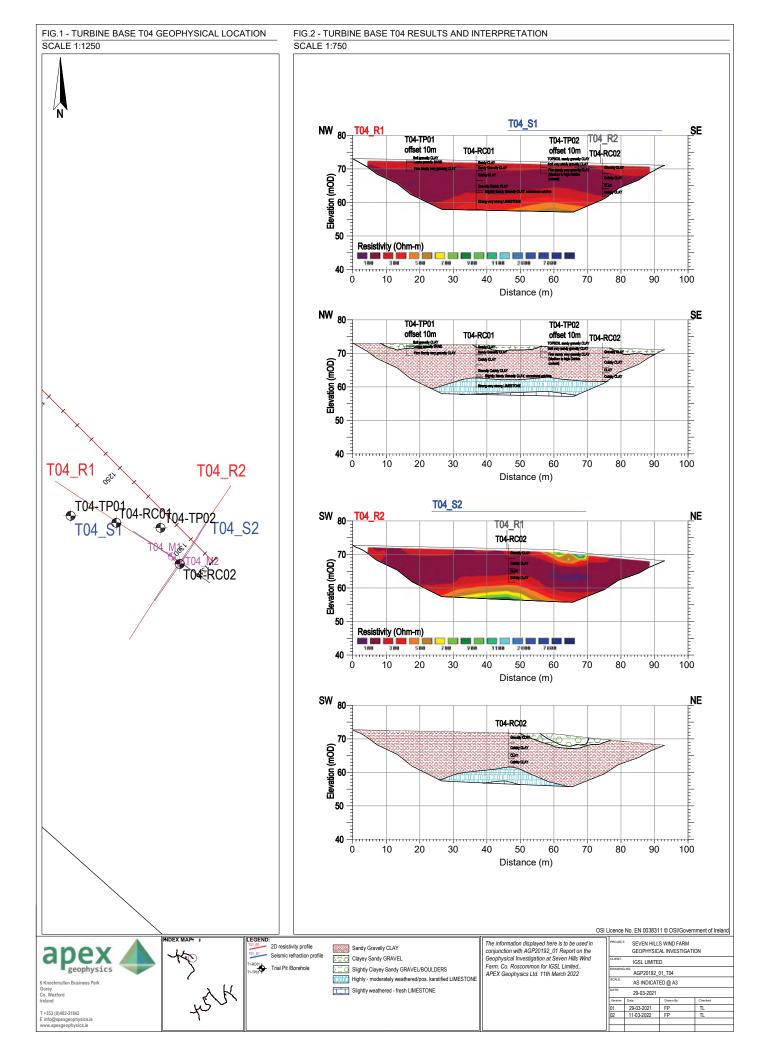
### Discussion

The geophysical data indicates the centre of Turbine T03 is characterised by c.2.6m of loose to medium dense to dense clayey sandy GRAVEL over sandy gravelly CLAY which is stiff becoming very stiff with depth over very dense clayey sandy GRAVEL. Depth to moderately weathered LIMESTONE is 13.8m bgl. Deoth to top of LIMSTONE bedrock increases to the SE of the turbine centre.

While the borehole data did not encounter rock to 11 and 10.0 m bgl in T3-RC01 and T3-RC02 respectively the geophysical data indicates weathered rock may be present from 6.1 mbgl as the seismic Vp velocities of 2401 - 2491m/s at depths of 6.1m to 13.8m are higher than normally expected for sandy gravelly CLAY and clayey sandy GRAVEL.

Vp seismic velocities indicate that any excavation of the moderately weathered LIMESTONE will require breaking/blasting. More information on excavatability is provided in Appendix C.

<sup>\*\*</sup> correlation from Imai et al, 1975





T04	
ITM Easting	587702
ITM Northing	747658



Methodology	
Seismic Refraction	24 ch. @ 2m geophone spacing
MASW	24 ch. @ 1m geophone spacing
ERT	32 el. @ 3m electrode spacing
GPS	GNSS (< 20mm accuracy)

Depth (m)	Depth (m)	Avg. Ve	elocity (m/s)	Assumed Density	Poissons Ratio	Shear Mod	Youngs Mod	Youngs Mod	Interpretation	Estimated Stiffness ** / Rock	Estimated Excavatability
from	to	S Wave	P Wave	kg/m <sup>3</sup>		MPa Dynamic	GPa Dynamic	MPa Static*		Quality	,
0.0	0.5	-	306	2000	-	-	-	-	Sandy gravelly CLAY	SOFT	Diggable
0.5	1.6	-	463	2000	i	-	-	-	Sandy gravelly CLAY	FIRM	Diggable
1.6	2.7	420	924	2000	0.37	352.76	0.97	37.81	Sandy gravelly CLAY	FIRM-STIFF	Diggable
2.7	3.7	391	1084	2000	0.43	305.75	0.87	31.88	Sandy gravelly CLAY	VERY STIFF	Diggable
3.7	6.3	483	1981	2000	0.47	465.77	1.37	67.08	Sandy gravelly CLAY	VERY STIFF	Diggable
6.3	9.9	-	2230	2000	-	-	-	-	Sandy gravelly CLAY	VERY STIFF	Diggable
9.9	11.2	-	3424	2700	-	-	-	-	Moderately weathered/pos. karstified to slightly weaterede LIMESTONE	GOOD	Break / Blast
11.2	13.7	-	3728	2700	ı	-	-	-	Slightly weathered to fresh LIMESTONE	GOOD	Break / Blast

st converted to static equivalent using empirical correlation from van Heerden, 1987.

Note: Material type interpretation is based on a combination of field obervations and client supplied borehole information.

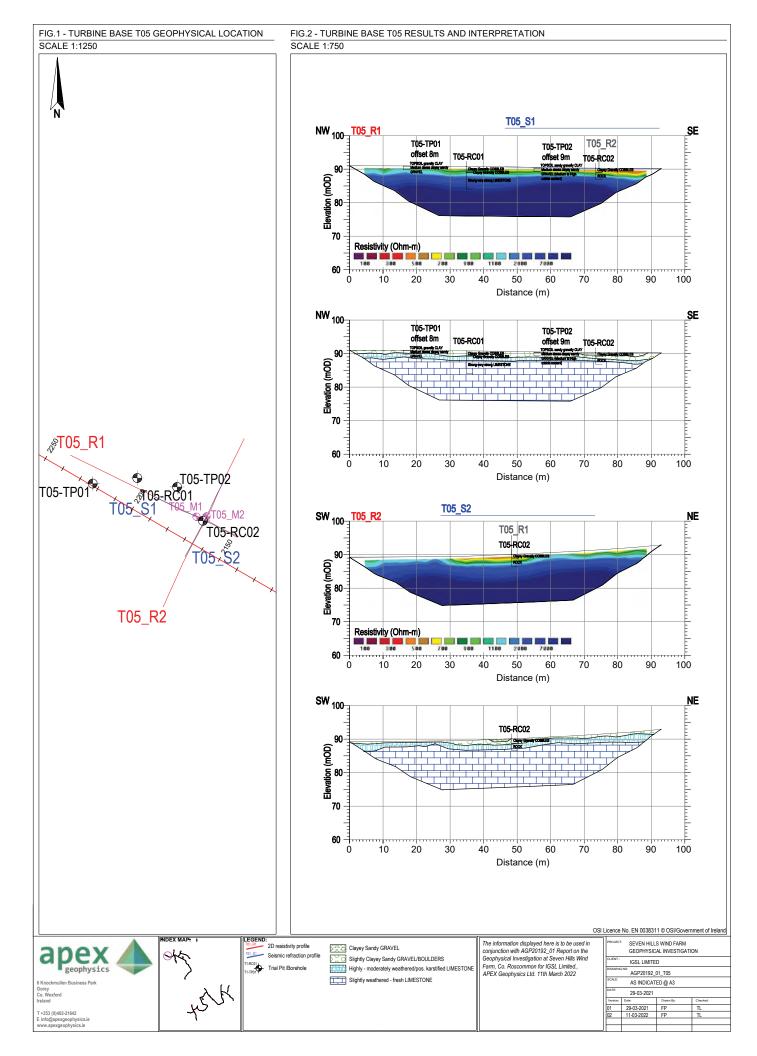
#### Discussion

The geophysical data indicates the centre of Turbine T04 is characterised by c. 9.9m of sandy gravelly CLAY which is soft to firm becoming stiff to very stiff with depth. Depth to moderately weathered/possible karstified LIMSTONE to slightly weathered to fresh LIMESTONE is c.9.9m bgl, this overlies slightly weathered to fresh LIMESTONE at 11.2m bgl.

While the borehole data did not encounter rock to termination depth the geophysical data indicates weathered/possible karstified rock may be present from 6.3 mbgl as the seismic Vp velocities of 2230m/s at depths of 6.3m to 9.9m are high for sandy gravelly CLAY.

Vp seismic velocities indicate that any excavation of the LIMESTONE layers will require breaking/blasting. More information on excavatability is provided in Appendix C.

<sup>\*\*</sup> correlation from Imai et al, 1975





T05	
ITM Easting	585787
ITM Northing	747871



Methodology	
Seismic Refraction	24 ch. @ 2m geophone spacing
MASW	24 ch. @ 1m geophone spacing
ERT	32 el. @ 3m electrode spacing
GPS	GNSS (< 20mm accuracy)

Depth (m)	Depth (m)	Avg. Velocity (m/s)		Avg. Velocity (m/s)		Assumed Density	Poissons Ratio	Shear Mod	Youngs Mod	Youngs Mod	Interpretation	Estimated Stiffness ** / Rock	Estimated
from	to	S Wave	P Wave	kg/m³		MPa Dynamic	GPa Dynamic	MPa Static*	·	Quality	Excavatability		
0.0	1.0	-	588	2000	-	-	=	ī	Slightly clayey sandy GRAVELS/BOULDERS	MEDIUM DENSE	Diggable		
1.0	1.5	257	1007	2000	0.47	132.08	0.39	8.35	Slightly clayey sandy GRAVELS/BOULDERS	DENSE	Diggable		
1.5	2.3	236	1232	2500	0.48	138.92	0.41	9.24	Highly weathered/pos. karstified LIMESTONE	VERY POOR	Rippable		
2.3	3.0	-	1831	2500	-	-	-	-	Moderately weathered/pos. karstified LIMESTONE	POOR-FAIR	Break / Blast		
3.0	5.7	-	2967	2700	-	=	ı	=	Slightly weathered to fresh LIMESTONE	GOOD	Break / Blast		
5.7	8.0	-	3985	2700	-	-	-	-	Slightly weathered to fresh LIMESTONE	EXCELLENT	Heavy Break / Blast		
8.0	10.5	-	4746	2700	-	-	-	-	Slightly weathered to fresh LIMESTONE	EXCELLENT	Break / Blast		

<sup>\*</sup> converted to static equivalent using empirical correlation from van Heerden, 1987.

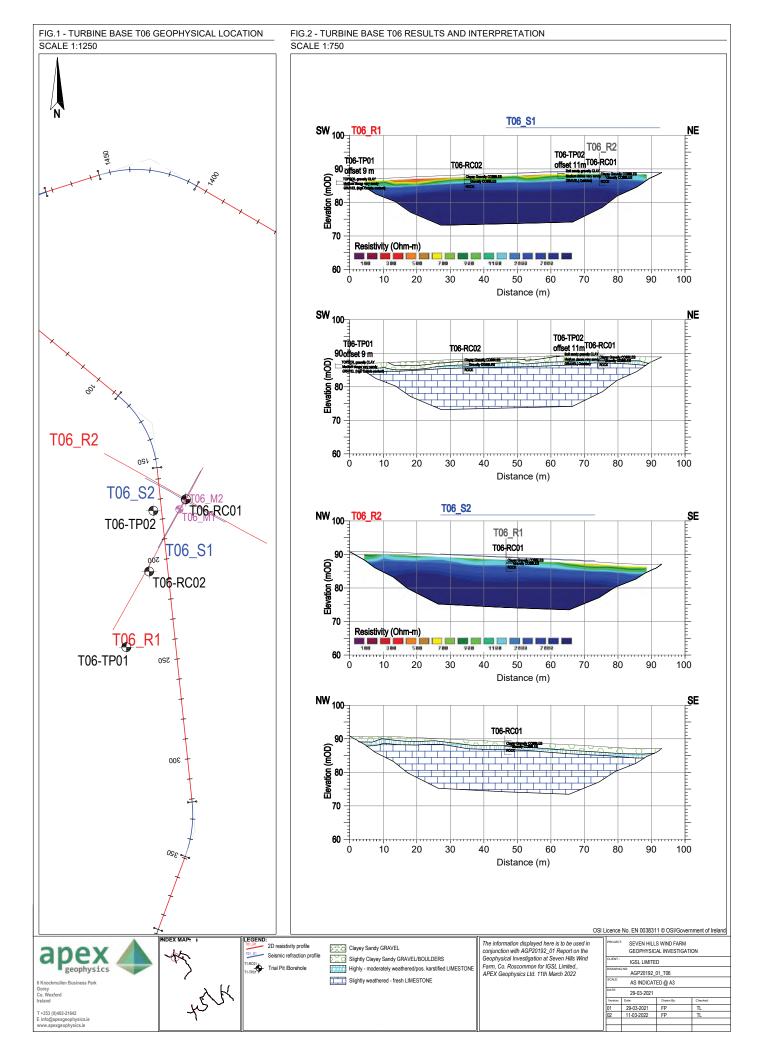
Note: Material type interpretation is based on a combination of field obervations and client supplied borehole information.

#### Discussion

The geophysical data indicates the centre of Turbine T05 is characterised by c. 1.5m of medium dense to dense slightly clayey sandy GRAVEL/BOULDERS over very poor highly weathered/possible karstified LIMESTONE. Depth to slightly weathered to fresh LIMESTONE is 3.0m bgl.

Vp seismic velocities indicate that any excavation of the moderately weathered/possible karstified and slightly weathered to fresh LIMESTONE will require breaking/blasting to heavy breaking/blasting respectively. More information on excavatability is provided in Appendix C.

 $<sup>^{**}</sup>$  correlation from Imai et al, 1975





T06	
ITM Easting	586467
ITM Northing	747796



Methodology	
Seismic Refraction	24 ch. @ 2m geophone spacing
MASW	24 ch. @ 1m geophone spacing
ERT	32 el. @ 3m electrode spacing
GPS	GNSS (< 20mm accuracy)

Depth (m)	Depth (m)		elocity (m/s)	Assumed Density	Poissons Ratio	Shear Mod	Youngs Mod GPa	Youngs Mod MPa	Interpretation	Estimated Stiffness ** / Rock Quality	Estimated Excavatability
from	to	S Wave	P Wave	kg/m³		Dynamic	Dynamic	Static*		Quality	
0.0	0.5	-	312	2000	-	-	-	-	Slightly clayey sandy GRAVEL/BOULDERS	LOOSE	Diggable
0.5	1.2	-	933	2000	-	-	-	-	Slightly clayey sandy GRAVEL/BOULDERS	MEDIUM DENSE	Diggable
1.2	2.4	-	1730	2500	-	-	-	-	Highly-moderately weathered/pos. karstified LIMESTONE	POOR	Rippable
2.4	3.6	-	2621	2700	ı	-	-	-	Slightly weathered to fresh LIMESTONE	FAIR	Break / Blast
3.6	6.1	-	3919	2700	1	-	·	ı	Slightly weathered to fresh LIMESTONE	EXCELLENT	Heavy Break / Blast
6.1	8.6	-	4906	2700	-	-	-	-	Slightly weathered to fresh LIMESTONE	EXCELLENT	Heavy Break / Blast
8.6	11.1	-	5586	2700	-	-	-	-	Slightly weathered to fresh LIMESTONE	EXCELLENT	Break / Blast

 $<sup>^{</sup>st}$  converted to static equivalent using empirical correlation from van Heerden, 1987.

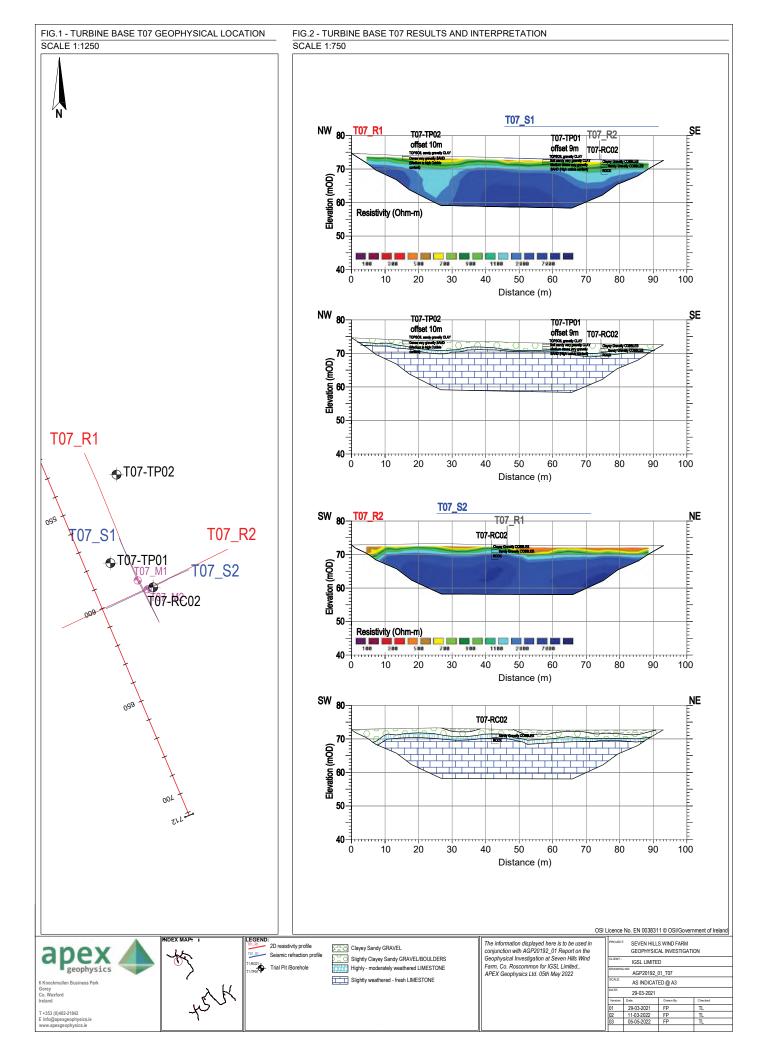
Note: Material type interpretation is based on a combination of field obervations, including soft ground probes, and client supplied borehole information.

### Discussion

The geophysical data indicates the centre of Turbine T06 is characterised by c. 1.2 m of loose to medium dense slightly clayey sandy GRAVEL/BOULDERS over highly to moderately weathered/possible karstified LIMESTONE over slightly weathered to fresh LIMESTONE at 3.6m bgl.

Vp seismic velocities indicate that any excavation of the LIMESTONE will require breaking/blasting to heavy breaking/blasting. More information on excavatability in given in Appendix C.

<sup>\*\*</sup> correlation from Imai et al, 1975





Site	Seven Hills Wind Farm
Turbine Base	T07

T07	
ITM Easting	586540
ITM Northing	747394

Methodology	]
Seismic Refraction	24 ch. @ 2m geophone spacing
MASW	24 ch. @ 1m geophone spacing
ERT	32 el. @ 3m electrode spacing
GPS	GNSS (< 20mm accuracy)

Depth (m)	Depth (m)	Avg. Ve	elocity (m/s)	Assumed Density	Poissons Ratio	Shear Mod	Youngs Mod	Youngs Mod	Interpretation	Estimated Stiffness ** / Rock	Estimated
from	to	S Wave	P Wave	kg/m³		MPa Dynamic	GPa Dynamic	MPa Static*	·	Quality	Excavatability
0.0	0.5	-	335	2000	-	-	-	-	Slightly clayey sandy GRAVEL/BOULDERS	LOOSE	Diggable
0.5	1.5	-	456	2000	-	-	-	-	Slightly clayey sandy GRAVEL/BOULDERS	LOOSE	Diggable
1.5	2.5	284	1051	2500	0.46	201.16	0.59	16.64	Highly weathered LIMESTONE	POOR	Rippable
2.5	3.0	304	1983	2500	0.49	231.44	0.69	21.62	Moderately weathered LIMESTONE	FAIR	Break / Blast
3.0	5.8	-	3393	2700	-	-	-	-	Slightly weathered to fresh LIMESTONE	GOOD	Heavy Break / Blast
5.8	10.5	-	5172	2700	-	-	-	-	Slightly weathered to fresh LIMESTONE	EXCELLENT	Heavy Break / Blast

 $<sup>\</sup>boldsymbol{^*}$  converted to static equivalent using empirical correlation from van Heerden, 1987.

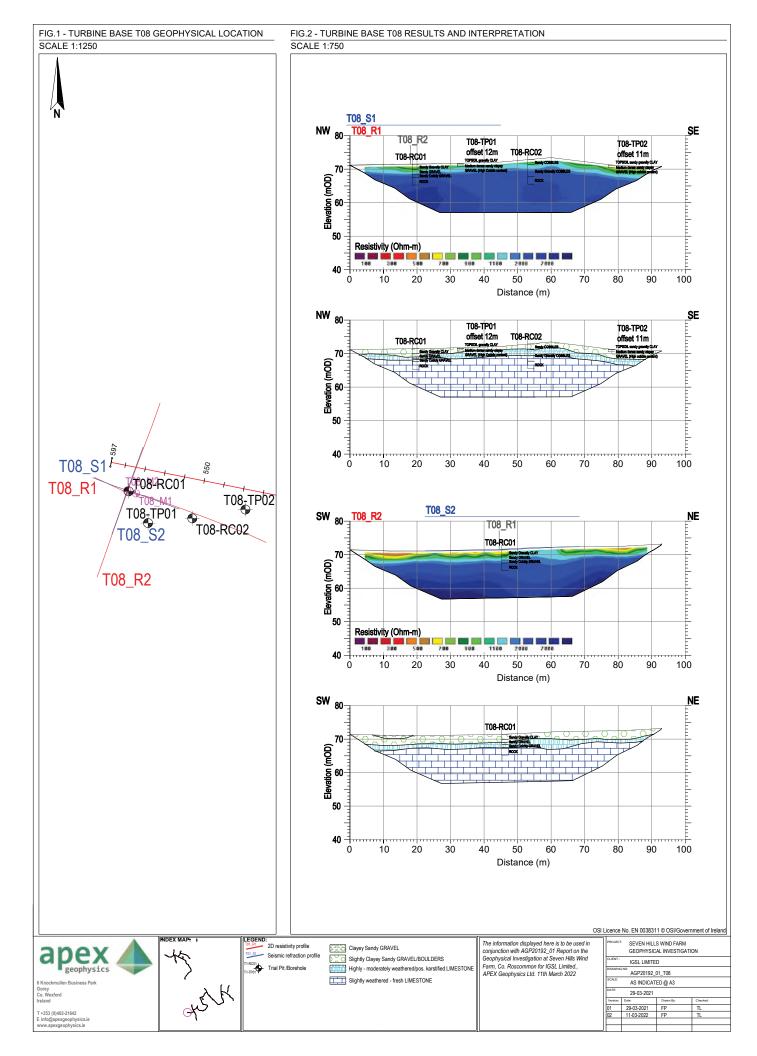
Note: Material type interpretation is based on a combination of field obervations and client supplied borehole information.

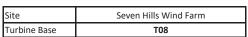
### Discussion

The geophysical data indicates the centre of Turbine T07 is characterised by c. 1.5m of loose slightly clayey sandy GRAVEL/BOULDERS over highly weathered LIMESTONE. Depth to top of slightly weathered to fresh LIMESTONE is 3.0m bgl.

Vp seismic velocities indicate that any excavation of the moderately weathered and slightly weathered to fresh LIMESTONE will require breaking/blasting to heavy breaking/blasting. More information on excavatability is provided in Appendix C.

<sup>\*\*</sup> correlation from Imai et al, 1975





T07	
ITM Easting	587538
ITM Northing	743028



Methodology	
Seismic Refraction	24 ch. @ 2m geophone spacing
MASW	24 ch. @ 1m geophone spacing
ERT	32 el. @ 3m electrode spacing
GPS	GNSS (< 20mm accuracy)

Depth (m)	Depth (m)	Avg. Ve	locity (m/s)	Assumed Density	Poissons Ratio	Shear Mod	Youngs Mod	Youngs Mod	Interpretation	Estimated Stiffness ** / Rock	Estimated Excavatability
from	to	S Wave	P Wave	kg/m <sup>3</sup>		MPa Dynamic	GPa Dynamic	MPa Static*		Quality	Excavatability
0.0	0.5	-	299	2000	-	-	-	-	Slightly clayey sandy GRAVEL/BOULDERS	LOOSE	Diggable
0.5	1.5	234	831	2000	0.46	109.74	0.32	6.10	Slightly clayey sandy GRAVEL/BOULDERS	MEDIUM DENSE	Diggable
1.5	2.5	293	1315	2000	0.47	171.48	0.51	12.98	Slightly clayey sandy GRAVEL/BOULDERS	DENSE to VERY DENSE	Diggable
2.5	3.7	-	1661	2500	-	-	-	-	Highly weathered/pos. karstified LIMESTONE	POOR	Rippable
3.7	6.1	-	2254	2500	-	-	-	-	Moderately weathered/pos. karstified LIMESTONE	FAIR	Break / Blast
6.1	11.0	-	3682	2700	-	-	-	-	Slightly weathered to fresh LIMESTONE	GOOD	Heavy Break / Blast

 $<sup>\</sup>ensuremath{^*}$  converted to static equivalent using empirical correlation from van Heerden, 1987.

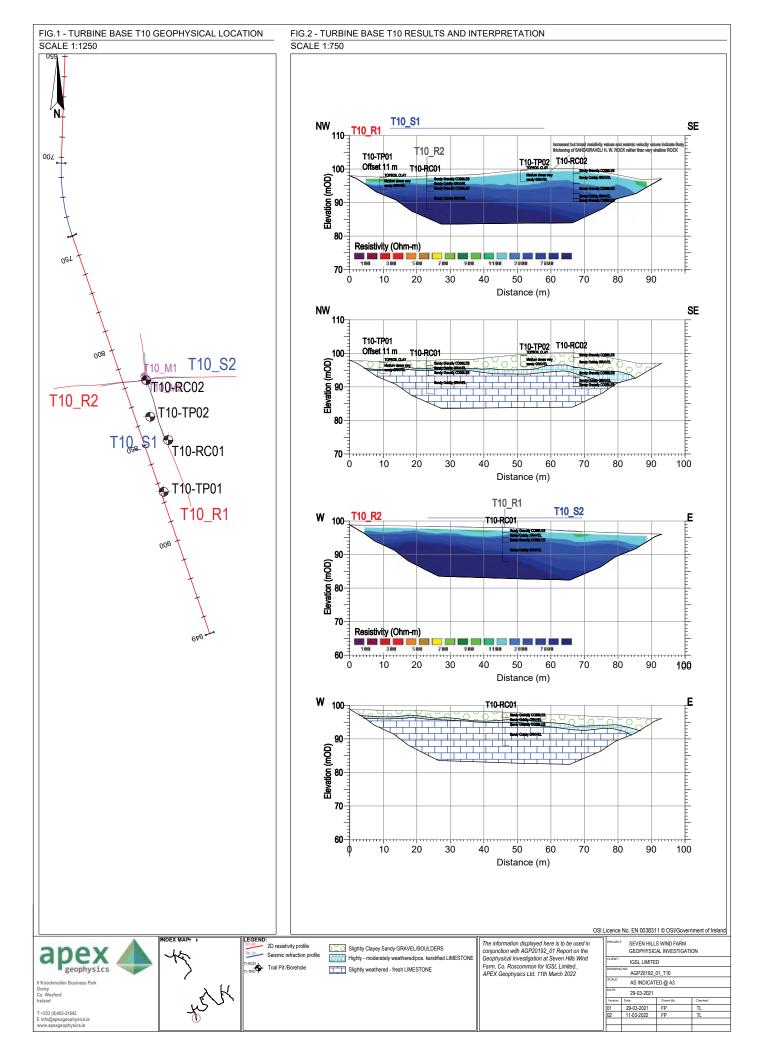
Note: Material type interpretation is based on a combination of field obervations and client supplied borehole information.

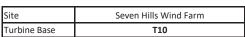
### Discussion

The geophysical data indicates the centre of Turbine T08 1.5m of loose to medium dense slightly clayey sandy GRAVEL/BOULDERS becoming dense to very dense to 2.5m bgl. Highly to moderately weathered/possible karstified LIMESTONE overlies slightly weathered to fresh LIMESTONE at 6.1m bgl.

Vp seismic velocities indicate that any excavation of the moderately weathered/possible karstified and slightly weathered to fresh LIMESTONE will require breaking/blasting to heavy breaking/blasting. More information on excavatability is provided in Appendix C.

<sup>\*\*</sup> correlation from Imai et al, 1975





T07	
ITM Easting	588273
ITM Northing	742496



Methodology	
Seismic Refraction	24 ch. @ 2m geophone spacing
MASW	24 ch. @ 1m geophone spacing
ERT	32 el. @ 3m electrode spacing
GPS	GNSS (< 20mm accuracy)

Depth (m)	Depth (m)	Avg. Ve	elocity (m/s)	Assumed Density kg/m³	Poissons Ratio	Shear Mod	Youngs Mod GPa	Youngs Mod MPa	Interpretation	Estimated Stiffness ** / Rock Quality	Estimated Excavatability
0.0	0.5	-	290	2000	-	Dynamic -	Dynamic -	Static*	Slightly clayey sandy GRAVEL/BOULDERS	LOOSE	Diggable
0.5	1.5	390	485	2000	-0.41	304.08	0.36	7.27	Slightly clayey sandy GRAVEL/BOULDERS	MEDIUM DENSE to DENSE	Diggable
1.5	2.5	372	1005	2000	0.42	276.62	0.79	26.88	Slightly clayey sandy GRAVEL/BOULDERS	VERY DENSE	Diggable
2.5	3.5	362	1495	2500	0.47	328.26	0.96	37.67	Highly - Moderately weathered/pos. karstified LIMESTONE	POOR	Rippable
3.5	6.0	-	2382	2700	-	-	-	-	Slightly weathered to fresh LIMESTONE	GOOD	Break / Blast
6.0	8.6	-	3896	2700	-	-	-	-	Slightly weathered to fresh LIMESTONE	EXCELLENT	Heavy Break / Blast
8.6	11.1	-	5272	2700	-	-	-	-	Slightly weathered to fresh LIMESTONE	EXCELLENT	Break / Blast

 $<sup>^{</sup>st}$  converted to static equivalent using empirical correlation from van Heerden, 1987.

Note: Material type interpretation is based on a combination of field obervations and client supplied borehole information.

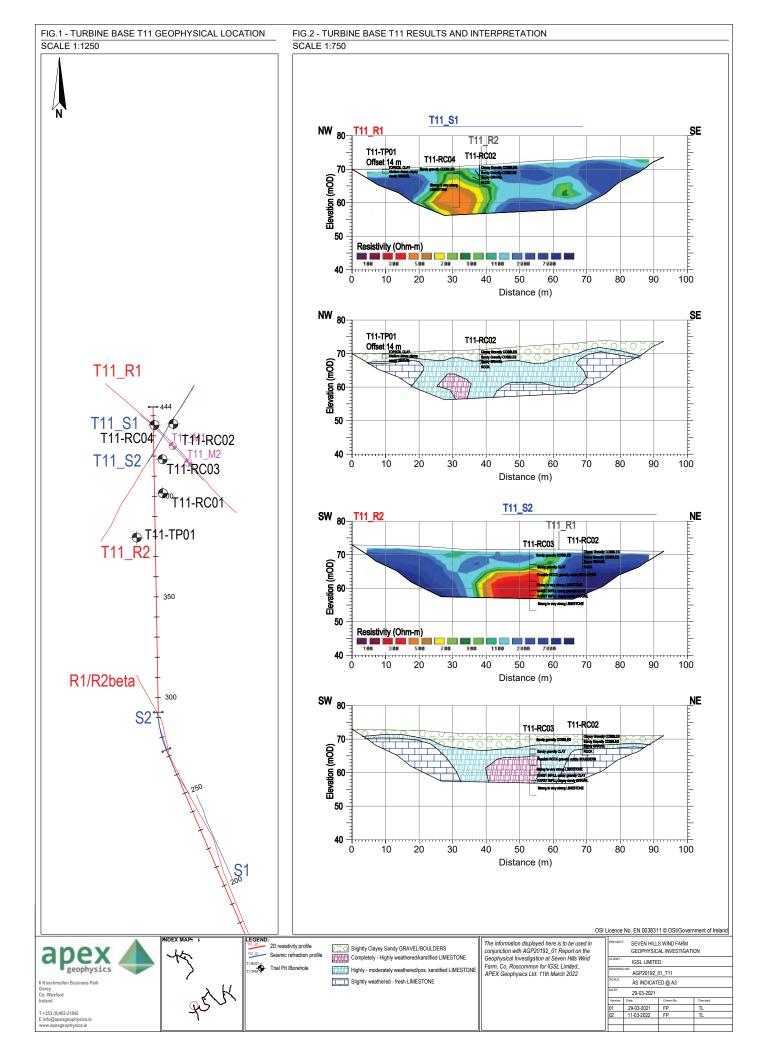
### Discussion

The geophysical data indicates the centre of Turbine T10 is characterised by c.2.5m of loose to medium dense becoming dense to very dense slightly clayey sandy GRAVEL/BOULDERS over highly to moderately weathered/possible karstified LIMESTONE. Depth to top of slightly weathered to fresh LIMESTONE is 3.5m bgl.

Vp seismic velocities indicate that any excavation of the slightly weathered to fresh LIMESTONE will require breaking/blasting to heavy breaking/blasting. More information on excavatability is provided in Appendix C.

While the boreholes did not encountered rock to termination depth of 10.0m bgl the seismic Vp velocities of 1495m/s indicate LIMESTONE at 2.5m bgl.

<sup>\*\*</sup> correlation from Imai et al, 1975





T07	
ITM Easting	587895
ITM Northing	743644



Methodology	
Seismic Refraction	24 ch. @ 2m geophone spacing
MASW	24 ch. @ 1m geophone spacing
ERT	32 el. @ 3m electrode spacing
GPS	GNSS (< 20mm accuracy)

Depth (m)	Depth (m)	Avg. Ve	locity (m/s)	Assumed Density	Poissons Ratio	Shear Mod	Youngs Mod	Youngs Mod	Interpretation	Estimated Stiffness ** / Rock	Estimated
from	to	S Wave	P Wave	kg/m³		MPa Dynamic	GPa Dynamic	MPa Static*	·	Quality	Excavatability
0.0	0.5	-	505	2000	-	-	-	-	Slightly clayey sandy GRAVEL/BOULDERS	MEDIUM DENSE	Diggable
0.5	1.3	-	849	2000	-	-	-	-	Slightly clayey sandy GRAVEL/BOULDERS	MEDIUM DENSE	Diggable
1.3	3.2	207	1407	2000	0.49	85.37	0.25	4.18	Slightly clayey sandy GRAVEL/BOULDERS	DENSE	Diggable
3.2	5.7	349	2092	2500	0.49	303.87	0.90	33.80	Highly to moderately weathered/karstified LIMESTONE	FAIR	Break / Blast
5.7	8.0	-	3045	2500	-	-	1	-	Moderatelyweathered to slightly wathered to fresh LIMESTONE	GOOD	Heavy Break / Blast

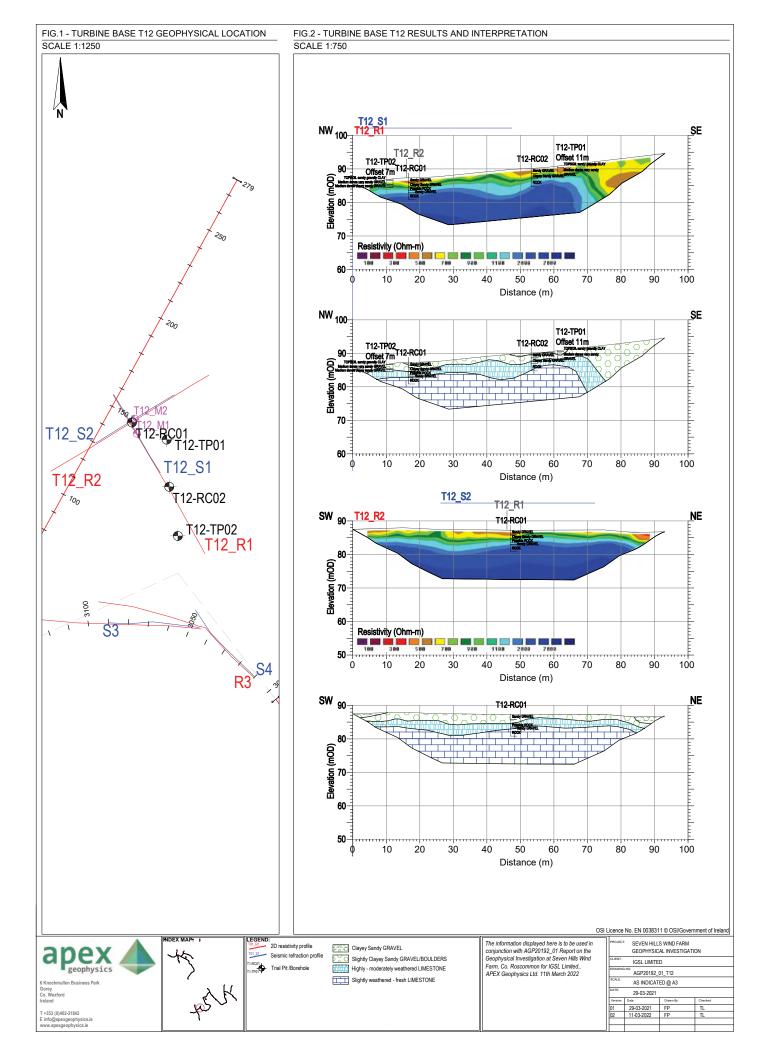
 $<sup>^{</sup>st}$  converted to static equivalent using empirical correlation from van Heerden, 1987.

Note: Material type interpretation is based on a combination of field obervations, including soft ground probes, and client supplied borehole information.

### Discussion

The geophysical data indicates the centre of Turbine T11 is characterised by c. 1.3 m of medium dense to dense slightly clayey sandy GRAVEL/BOULDERS over highly to moderately weathered/karstified LIMESTONE at 3.2m bgl. To the west of the turbine centre the highly to moderately weathered/karstified LIMESTONE overlies completely to highly weathered/karstified LIMESTONE at a depth of 6.6m. This karstified zone is also encountered in borehole T11-RC03.

<sup>\*\*</sup> correlation from Imai et al, 1975





T07	
ITM Easting	588338
ITM Northing	743476
	_



Methodology	
Seismic Refraction	24 ch. @ 2m geophone spacing
MASW	24 ch. @ 1m geophone spacing
ERT	32 el. @ 3m electrode spacing
GPS	GNSS (< 20mm accuracy)

Depth (m)	Depth (m)	Avg. Ve	elocity (m/s)	Assumed Density	Poissons Ratio	Shear Mod	Youngs Mod GPa	Youngs Mod MPa	Interpretation	Estimated Stiffness ** / Rock	Estimated Excavatability
from	to	S Wave	P Wave	kg/m <sup>3</sup>		Dynamic	Dynamic	Static*		Quality	·
0.0	0.5	-	308	2000	-	-	-	-	Slightly clayey sandy GRAVEL/BOULDERS	LOOSE	Diggable
0.5	1.7	321	739	2000	0.38	206.48	0.57	15.88	Slightly clayey sandy GRAVEL/BOULDERS	MEDIUM DENSE	Diggable
1.7	2.6	360	1218	2000	0.45	259.34	0.75	25.06	Slightly clayey sandy GRAVEL/BOULDERS	DENSE	Diggable
2.6	4.3	-	1812	2500	-	-	-	-	Moderately weathered LIMESTONE	FAIR	Break / Blast
4.3	6.9	-	2721	2700	-	-	·	ı	Slightly weathered to fresh LIMESTONE	GOOD	Break / Blast
6.9	9.6	-	3252	2700	-	-	-	-	Slightly weathered to fresh LIMESTONE	GOOD	Heavy Break / Blast
9.6	12.5	-	4192	2700	-	-	-	-	Slightly weathered to fresh LIMESTONE	EXCELLENT	Break / Blast

 $<sup>^{</sup>st}$  converted to static equivalent using empirical correlation from van Heerden, 1987.

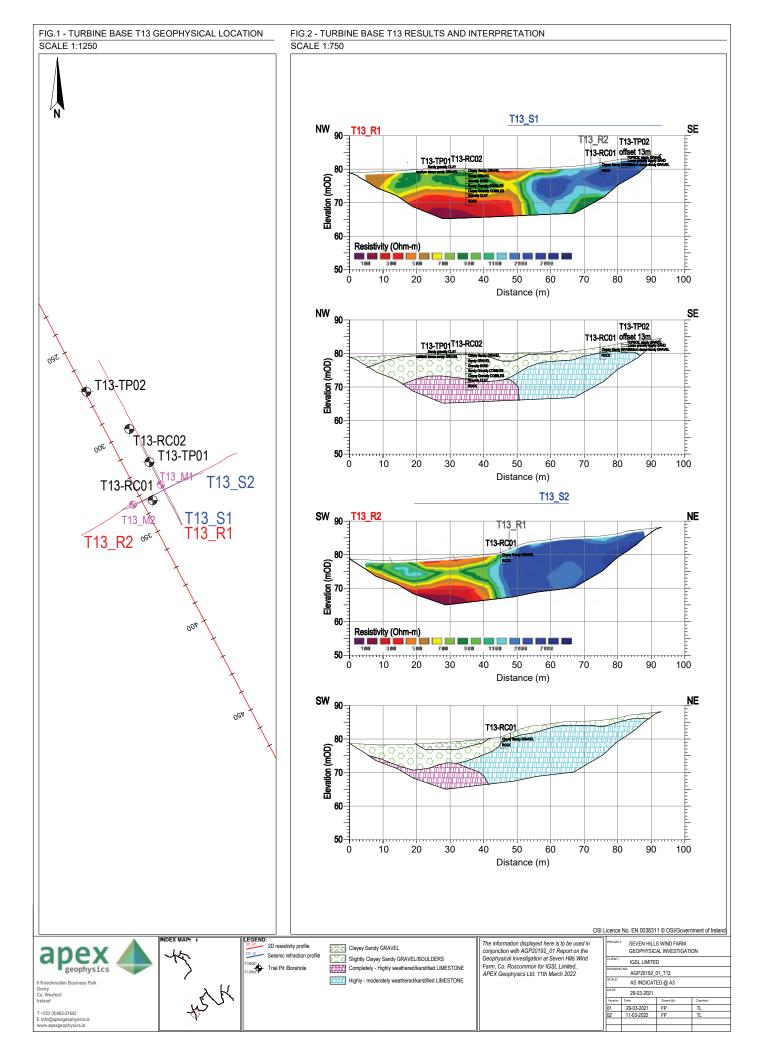
Note: Material type interpretation is based on a combination of field obervations and client supplied borehole information.

### Discussion

The geophysical data indicates the centre of Turbine T12 is characterised by c. 2.6m of loose to medium dense to dense slightly clayey sandy GRAVEL/BOULDERS over moderately weathered LIMESTONE. Depth to slightly weathered to fresh LIMESTONE is 4.3m bgl. Depth to top of LIMESTONE bedrock increases to > 10m to the SE of the turbine centre.

Vp seismic velocities indicate that any excavation of the moderately weathered LIMESTONE and slightly weathered to fresh LIMESTONE will require breaking/blasting to heavy breaking/blasting. More information on excavatability is provided in Appendix C.

<sup>\*\*</sup> correlation from Imai et al, 1975





T07	
ITM Easting	588175
ITM Northing	742949



Methodology	]
Seismic Refraction	24 ch. @ 2m geophone spacing
MASW	24 ch. @ 1m geophone spacing
ERT	32 el. @ 3m electrode spacing
GPS	GNSS (< 20mm accuracy)

Depth (m)	Depth (m)	Res.	Avg. Ve	elocity (m/s)	Assumed Density	Poissons Ratio	Shear Mod	Youngs Mod	Youngs Mod	Interpretation	Estimated Stiffness ** / Rock	Estimated
from	to	Ohm-m	S Wave	P Wave	kg/m³		MPa Dynamic	GPa Dynamic	MPa Static*	·	Quality	Excavatability
0.0	0.5	1	-	351	1300	-	-	=	-	Slightly clayey sandy GRAVEL/BOULDERS	LOOSE	Diggable
0.5	1.4	1625	-	701	2000	-	-	-	-	Slightly clayey sandy GRAVEL/BOULDERS	MEDIUM DENSE	Diggable
1.4	3.5	1700	-	1300	2000	-	-	-	-	Highly to moderately weathered/karstified LIMESTONE	POOR	Rippable
3.5	6.2	1700	-	1770	2000	-	-	-	-	Highly to moderately weathered/karstified LIMESTONE	FAIR	Rippable
6.2	8.8	1600	-	2260	2000	-	-	-	-	Highly to moderately weathered/karstified LIMESTONE	FAIR	Break / Blast

 $<sup>\</sup>ensuremath{^*}$  converted to static equivalent using empirical correlation from van Heerden, 1987.

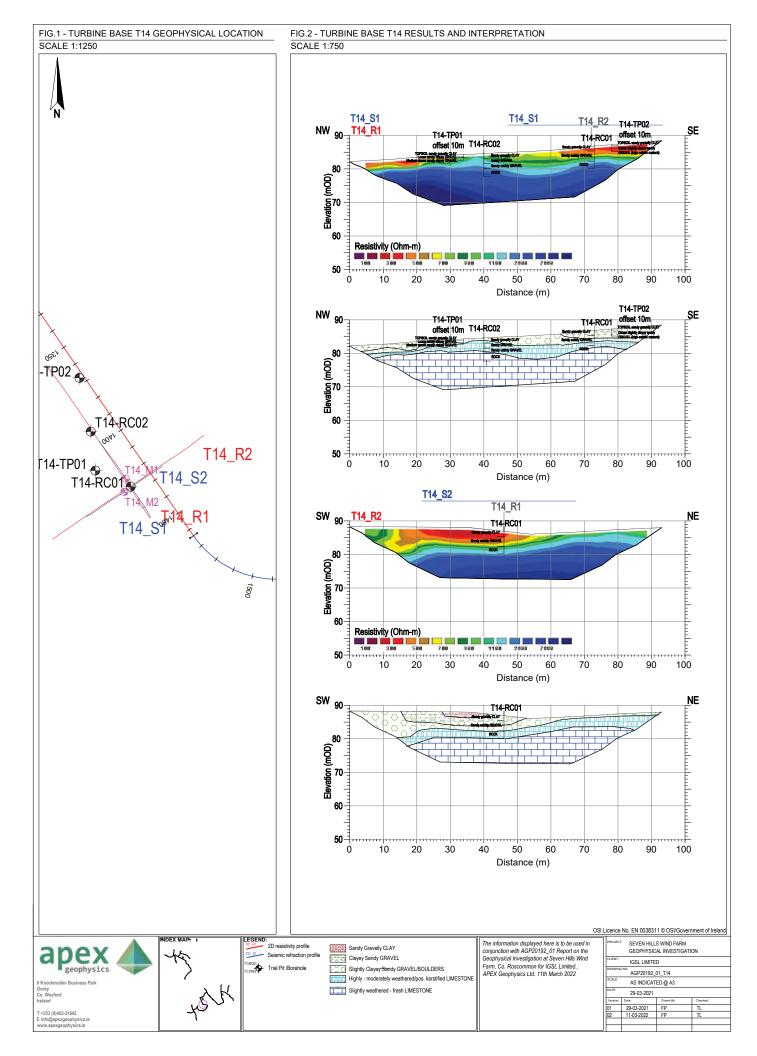
Note: Material type interpretation is based on a combination of field obervations and client supplied borehole information.

### Discussion

The geophysical data indicates the centre of Turbine T13 is characterised by c. 1.4 m of loose to medium dense slightly clayey sandy GRAVEL/BOULDERS over highly to moderately weathered/karstified LIMESTONE at 1.4m bgl. To the west of the turbine centre thickness of the slightly clayey sandy GRAVEL/BOULDERS increases to 8.3m bgl where it overlies completely to highly weathered/karstified LIMESTONE.

No MASW dispersion curve was resolved due to the presence of shallow rock.

<sup>\*\*</sup> correlation from Imai et al, 1975





T07	
ITM Easting	588836
ITM Northing	743739



Methodology	
Seismic Refraction	24 ch. @ 2m geophone spacing
MASW	24 ch. @ 1m geophone spacing
ERT	32 el. @ 3m electrode spacing
GPS	GNSS (< 20mm accuracy)

Depth (m) from	Depth (m)	Avg. Ve	elocity (m/s) P Wave	Assumed Density kg/m³	Poissons Ratio	Shear Mod MPa Dynamic	Youngs Mod GPa Dynamic	Youngs Mod MPa Static*	Interpretation	Estimated Stiffness ** / Rock Quality	Estimated Excavatability
0.0	0.5	-	404	2000	-	-	-	-	Clayey sandy GRAVEL	LOOSE	Diggable
0.5	1.6	313	524	2000	0.22	196.41	0.48	11.91	Clayey sandy GRAVEL	MEDIUM DENSE	Diggable
1.6	2.4	314	828	2000	0.42	197.01	0.56	15.28	Clayey sandy GRAVEL	MEDIUM DENSE	Diggable
2.4	3.3	282	1347	2000	0.48	159.10	0.47	11.51	Slightly clayey sandy GRAVEL/BOULDERS	DENSE	Diggable
3.3	5.2	245	2071	2500	0.49	149.68	0.45	10.59	Moderately weathered/pos. karstified LIMESTONE	FAIR	Break / Blast
5.2	9.9	-	3462	2700	-	-	-	-	Slightly weathered to fresh LIMESTONE	GOOD	Heavy Break / Blast
9.9	12.4	-	4514	2700	-	-	-	-	Slightly weathered to fresh LIMESTONE	EXCELLENT	Heavy Break / Blast

 $<sup>^{</sup>st}$  converted to static equivalent using empirical correlation from van Heerden, 1987.

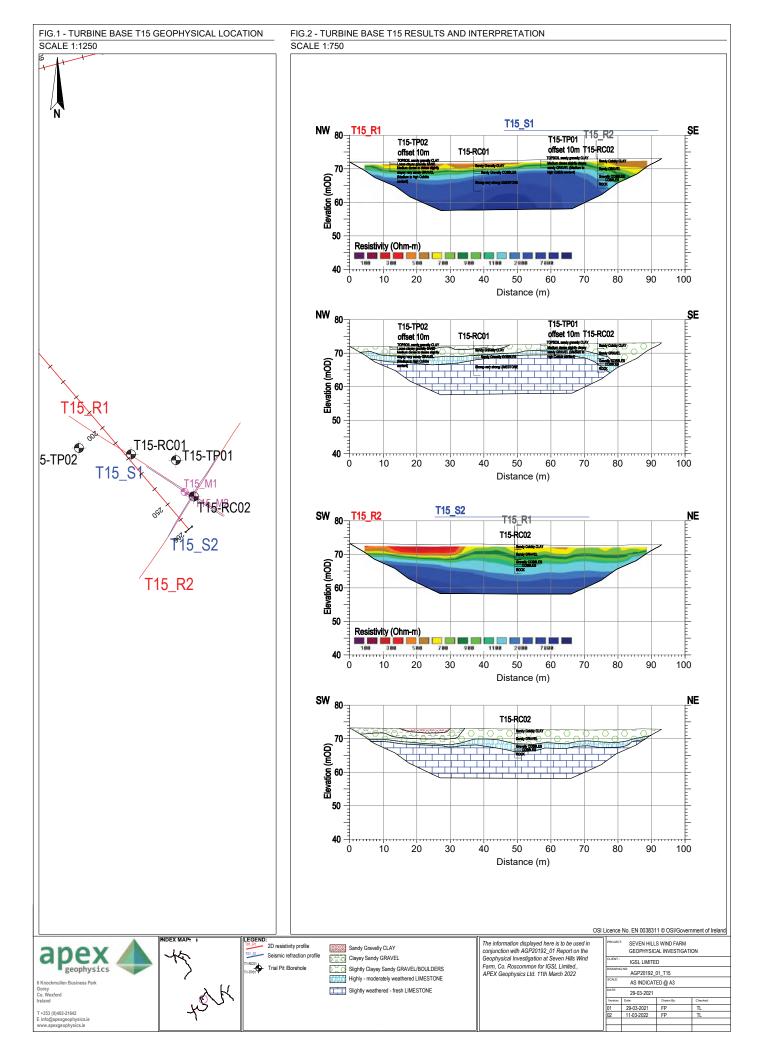
Note: Material type interpretation is based on a combination of field obervations, including soft ground probes, and client supplied borehole information.

#### Discussion

The geophysical data indicates the centre of Turbine T14 is characterised by c. 2.4 m of loose to medium dense clayey sandy GRAVEL over dense slightly clayey sandy GRAVEL/BOULDERS over moderately weathered/possible karstified LIMESTONE at 3.3 m bgl. Depth to slightly weathered to fresh LIMESTONE is 5.2 m bgl.

Vp seismic velocities indicate that any excavation of the moderately weathered/possible karstified LIMESTONE and slightly weathered to fresh LIMESTONE will require breaking/blasting to heavy breaking/blasting. More information on excavatability is provided in Appendix C.

<sup>\*\*</sup> correlation from Imai et al, 1975





T07	
ITM Easting	588861
ITM Northing	744153



Methodology	
Seismic Refraction	24 ch. @ 2m geophone spacing
MASW	24 ch. @ 1m geophone spacing
ERT	32 el. @ 3m electrode spacing
GPS	GNSS (< 20mm accuracy)

Depth (m)	Depth (m)	Avg. Ve	elocity (m/s)	Assumed Density	Poissons Ratio	Shear Mod	Youngs Mod	Youngs Mod	Interpretation	Estimated Stiffness ** / Rock	Estimated
from	to	S Wave	P Wave	kg/m³		MPa Dynamic	GPa Dynamic	MPa Static*	·	Quality	Excavatability
0.0	0.5	-	426	2000	-	-	-	=	Slightly clayey sandy GRAVEL/BOULDERS	LOOSE	Diggable
0.5	1.5	289	593	2000	0.34	166.82	0.45	10.66	Slightly clayey sandy GRAVEL/BOULDERS	MEDIUM DENSE	Diggable
1.5	2.5	382	1020	2000	0.42	292.47	0.83	29.39	Slightly clayey sandy GRAVEL/BOULDERS	DENSE	Diggable
2.5	4.2	546	1349	2000	0.40	595.93	1.67	93.33	Slightly clayey sandy GRAVEL/BOULDERS	DENSE	Diggable
4.2	6.6	-	2094	2500	-	=	=	=	Moderately weathered LIMESTONE	FAIR	Break / Blast
6.6	8.2	-	3002	2700	-	-	-	-	Slightly weathered to fresh LIMESTONE	GOOD	Heavy Break / Blast
8.2	10.5	-	3616	2700	-	-	=	-	Slightly weathered to fresh LIMESTONE	GOOD	Break / Blast
10.5	12.9	-	4246	2700	-	-	-	-	Slightly weathered to fresh LIMESTONE	EXCELLENT	Break / Blast

 $<sup>\</sup>ensuremath{^*}$  converted to static equivalent using empirical correlation from van Heerden, 1987.

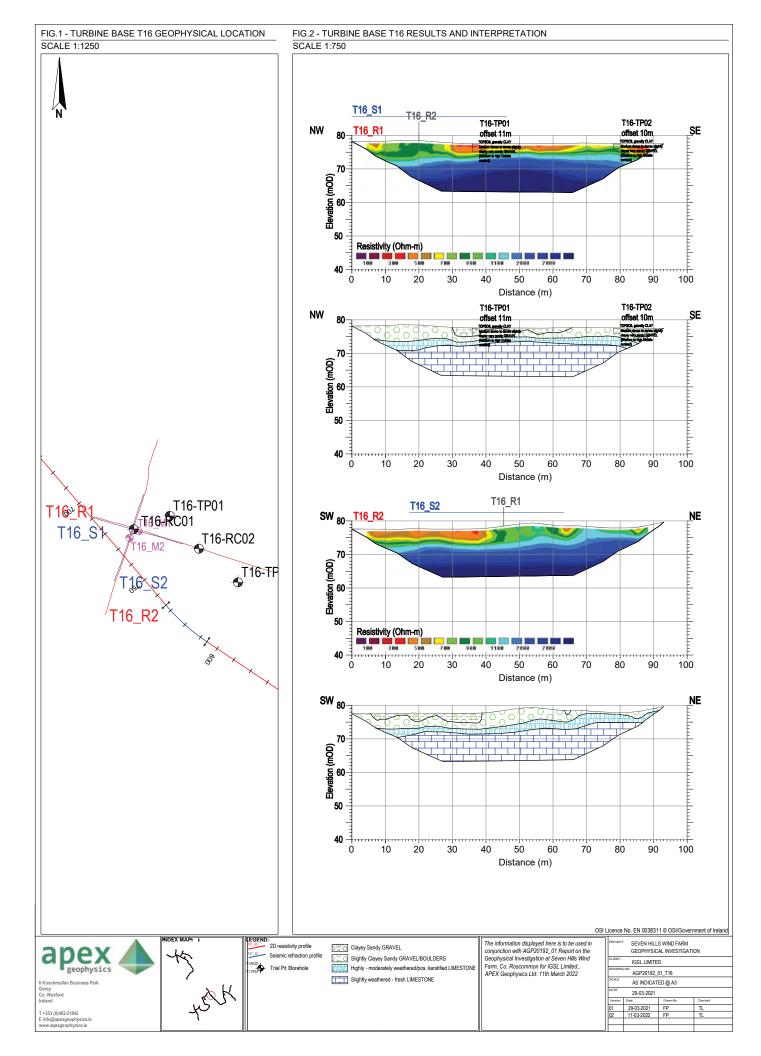
Note: Material type interpretation is based on a combination of field obervations, including soft ground probes, and client supplied borehole information.

Discussion	
Discussion	

The geophysical data indicates the centre of Turbine T15 is characterised by c. 4.2 m of loose to medium dense becoming dense slightly clayey sandy GRAVEL/BOULDERS over moderately weathered LIMESTONE. Depth to top of slightly weathered to fresh LIMESTONE is 6.6m bgl.

Vp seismic velocities indicate that any excavation of the moderately weathered LIMESTONE and slightly weathered to fresh LIMESTONE will require breaking/blasting to heavy breaking/blasting. More information on excavatability is provided in Appendix C.


<sup>\*\*</sup> correlation from Imai et al, 1975





T07	
ITM Easting	589367
ITM Northing	744490



Methodology	
Seismic Refraction	24 ch. @ 2m geophone spacing
MASW	24 ch. @ 1m geophone spacing
ERT	32 el. @ 3m electrode spacing
GPS	GNSS (< 20mm accuracy)

Depth (m)	Depth (m)	Avg. Ve	elocity (m/s)	Assumed Density	Poissons Ratio	Shear Mod	Youngs Mod	Youngs Mod	Interpretation	Estimated Stiffness ** / Rock	Estimated Excavatability
from	to	S Wave	P Wave	kg/m³		MPa Dynamic	GPa Dynamic	MPa Static*		Quality	Lxcavatability
0.0	0.5	-	329	2000	-	-	-	-	Slightly clayey sandy GRAVEL/BOULDERS	LOOSE	Diggable
0.5	1.5	250	603	2000	0.40	125.03	0.35	7.05	Slightly clayey sandy GRAVEL/BOULDERS	MEDIUM DENSE	Diggable
1.5	2.5	353	999	2000	0.43	249.51	0.71	22.88	Slightly clayey sandy GRAVEL/BOULDERS	DENSE	Diggable
2.5	4.7	449	1377	2000	0.44	403.76	1.16	51.33	Slightly clayey sandy GRAVEL/BOULDERS	VERY DENSE	Diggable
4.7	6.9	-	2330	2500	-	-	-	-	Moderately weathered/pos. karstified LIMESTONE	GOOD	Break / Blast
6.9	8.3	-	4517	2700	-	-	-	-	Slightly weathered to fresh LIMESTONE	EXCELLENT	Heavy Break / Blast
8.3	10.7	-	5786	2700	-	-	-	-	Slightly weathered to fresh LIMESTONE	EXCELLENT	Heavy Break / Blast

 $<sup>^{</sup>st}$  converted to static equivalent using empirical correlation from van Heerden, 1987.

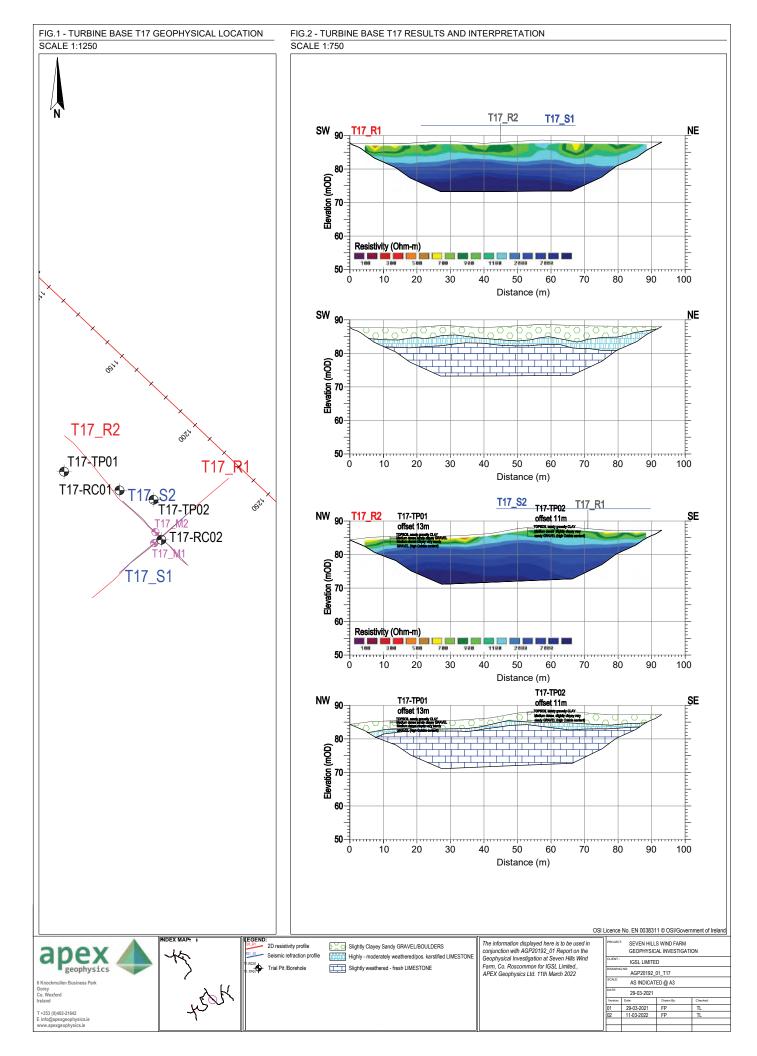
Note: Material type interpretation is based on a combination of field obervations, including soft ground probes, and client supplied borehole information.

#### Discussion

The geophysical data indicates the centre of Turbine T16 is characterised by c. 4.7 m of loose to medium dense becoming dense to very dense slightly clayey sandy GRAVEL/BOULDERS over moderately weathered/possible karstified LIMESTONE. Depth to slightly weathered to fresh LIMESTONE is 6.9 m bgl.

Vp seismic velocities indicate that any excavation of the moderately weathered/possible karstified LIMESTONE and slightly weathered to fresh LIMESTONE will require breaking/blasting to heavy breaking/blasting. More information on excavatability is provided in Appendix C.

<sup>\*\*</sup> correlation from Imai et al, 1975





T07	
ITM Easting	589678
ITM Northing	744107



Methodology	
Seismic Refraction	24 ch. @ 2m geophone spacing
MASW	24 ch. @ 1m geophone spacing
ERT	32 el. @ 3m electrode spacing
GPS	GNSS (< 20mm accuracy)

Depth (m)	Depth (m)	Avg. Ve	elocity (m/s)	Assumed Density	Poissons Ratio	Shear Mod	Youngs Mod	Youngs Mod	Interpretation	Estimated Stiffness ** / Rock	Estimated
from	to	S Wave	P Wave	kg/m <sup>3</sup>		MPa Dynamic	GPa Dynamic	MPa Static*		Quality	Excavatability
0.0	0.5	-	304	2000	-	-	-	-	Slightly clayey sandy GRAVEL/BOULDERS	LOOSE	Diggable
0.5	1.5	242	572	2000	0.39	117.25	0.33	6.30	Slightly clayey sandy GRAVEL/BOULDERS	MEDIUM DENSE to DENSE	Diggable
1.5	2.5	408	937	2000	0.38	332.63	0.92	34.86	Slightly clayey sandy GRAVEL/BOULDERS	VERY DENSE	Diggable
2.5	3.8	423	1413	2000	0.45	357.07	1.04	42.41	Slightly clayey sandy GRAVEL/BOULDERS	VERY DENSE	Diggable
3.8	6.1	-	2221	2500	-	-	=	=	Moderately weathered/pos. karstified LIMESTONE	POOR	Break / Blast
6.1	9.3	-	4007	2700	-	-	-	-	Slightly weathered to fresh LIMESTONE	EXCELLENT	Heavy Break / Blast

 $<sup>\</sup>ensuremath{^*}$  converted to static equivalent using empirical correlation from van Heerden, 1987.

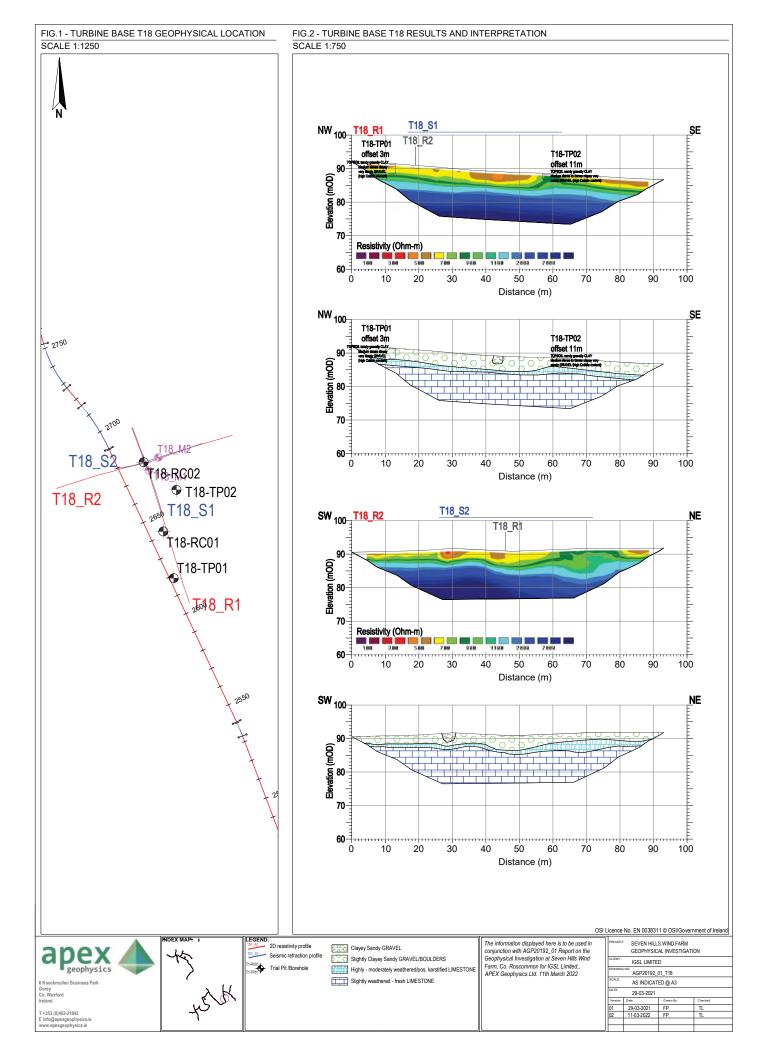
Note: Material type interpretation is based on a combination of field obervations and client supplied borehole information.

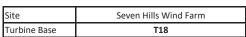
### Discussion

The geophysical data indicates the centre of Turbine T17 is characterised by c. 3.8m of loose to medium dense becoming dense over moderately wethered/possible karstified LIMESTONE. Depth to slightly weathered to fresh LIMESTONE is 6.1m bgl.

Vp seismic velocities indicate that any excavation of the moderately weathered/possible karstified LIMESTONE and slightly weathered to fresh LIMESTONE will require breaking/blasting and heavy breaking/blasting. More information on excavatability is provided in Appendix C.

<sup>\*\*</sup> correlation from Imai et al, 1975





T07	
ITM Easting	590521
ITM Northing	744202



Methodology	
Seismic Refraction	24 ch. @ 2m geophone spacing
MASW	24 ch. @ 1m geophone spacing
ERT	32 el. @ 3m electrode spacing
GPS	GNSS (< 20mm accuracy)

Depth (m)	Depth (m)	Avg. Velocity (m/s)		Avg. Velocity (m/s)		Avg. Velocity (m/s)		Assumed Density	Poissons Ratio	Shear Mod	Youngs Mod	Youngs Mod	Interpretation	Estimated Stiffness ** / Rock	Estimated
from	to	S Wave	P Wave	kg/m³		MPa Dynamic	GPa Dynamic	MPa Static*	τ. γ	Quality	Excavatability				
0.0	0.5	-	284	2000	-	-	-	-	Slightly clayey sandy GRAVEL/BOULDERS	LOOSE	Diggable				
0.5	1.5	486	681	2000	-0.02	472.42	0.93	35.37	Slightly clayey sandy GRAVEL/BOULDERS	MEDIUM DENSE	Diggable				
1.5	2.5	383	1295	2000	0.45	292.79	0.85	30.61	Slightly clayey sandy GRAVEL/BOULDERS	DENSE	Diggable				
2.5	4.5	527	1874	2000	0.46	554.57	1.62	88.32	Slightly clayey sandy GRAVEL/BOULDERS	VERY DENSE	Diggable				
4.5	6.0	-	2064	2500	-	-	=	-	Moderately weathered/pos. karstified LIMESTONE	FAIR	Break / Blast				
6.0	7.7	-	2644	2500	-	-	-	-	Slightly weathered to fresh LIMESTONE	GOOD	Break / Blast				
7.7	9.9	-	4574	2700	-	-	-	-	Slightly weathered to fresh LIMESTONE	EXCELLENT	Break / Blast				

<sup>\*</sup> converted to static equivalent using empirical correlation from van Heerden, 1987.

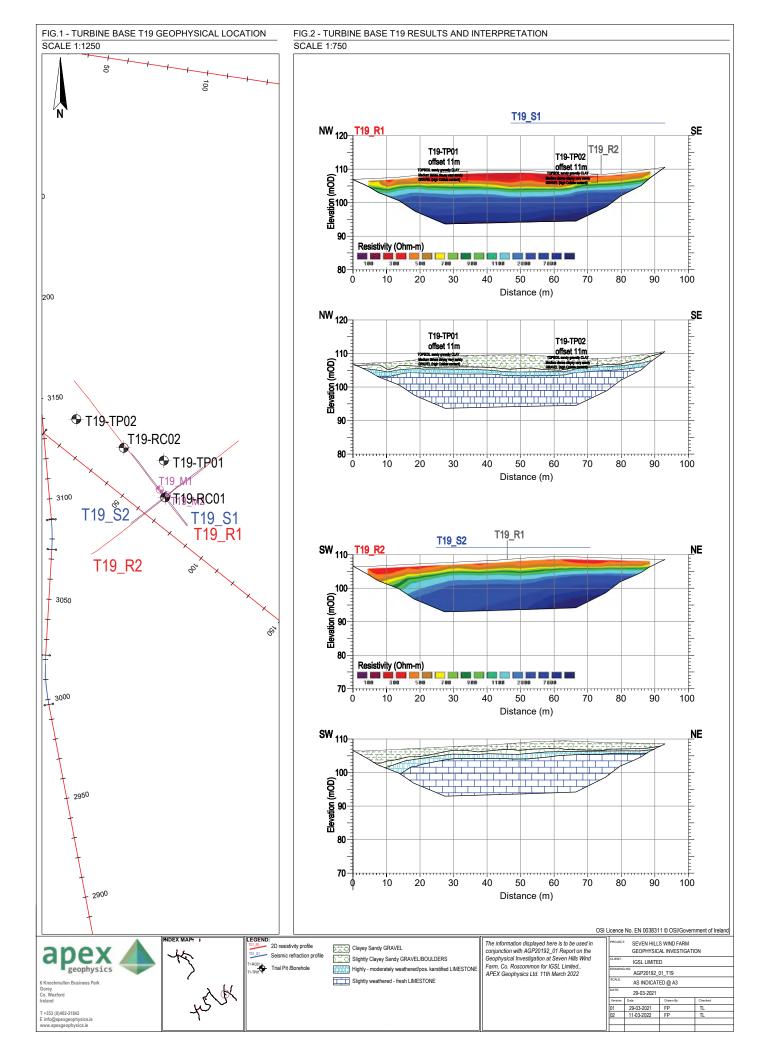
Note: Material type interpretation is based on a combination of field obervations, including soft ground probes, and client supplied borehole information.

#### Discussion

The geophysical data indicates the centre of TurbineT18 is characterised by c. 4.5m of loose to medium dense becoming dense to very dense slightly clayey sandy GRAVEL/BOULDERS over moderately weathered/possible karstified LIMESTONE. Depth to slightly weathered to fresh LIMESTONE is 6.0m bgl.

Vp seismic velocities indicate that any excavation of the moderately weathered/possible karstified LIMESTONE and slightly weathered to fresh LIMESTONE will require breaking/blasting and heavy breaking/blasting. More information on excavatability is provided in Appendix C.

<sup>\*\*</sup> correlation from Imai et al, 1975





T07	
ITM Easting	590475
ITM Northing	744603



Methodology	
Seismic Refraction	24 ch. @ 2m geophone spacing
MASW	24 ch. @ 1m geophone spacing
ERT	32 el. @ 3m electrode spacing
GPS	GNSS (< 20mm accuracy)

Depth (m)	Depth (m)	Avg. Ve	elocity (m/s)	Assumed Density	Poissons Ratio	Shear Mod	Youngs Mod	Youngs Mod	Interpretation	Estimated Stiffness ** / Rock	Estimated
from	to	S Wave	P Wave	kg/m³		MPa Dynamic	GPa Dynamic	MPa Static*	·	Quality	Excavatability
0.0	0.5	-	276	2000	-	-	-	-	Clayey sandy GRAVEL	LOOSE	Diggable
0.5	1.5	315	553	2000	0.26	198.11	0.50	12.71	Clayey sandy GRAVEL	MEDIUM DENSE	Diggable
1.5	2.3	261	984	2000	0.46	136.36	0.40	8.77	Slightly wclayey sandy GRAVEI/ BOULDERS	MEDIUM DENSE	Diggable
2.3	3.0	396	1520	2000	0.46	313.73	0.92	34.76	Slightly wclayey sandy GRAVEI/ BOULDERS	DENSE	Diggable
3.0	5.0	ū	2211	2500	=	-	ı	=	Moderately weathered/pos. karstified LIMESTONE	FAIR-GOOD	Break / Blast
5.0	7.5	-	4042	2700	-	-	-	-	Slightly weathered to fresh LIMESTONE	EXCELLENT	Heavy Break / Blast
7.5	9.7	-	5664	2700	-	-	-	-	Slightly weathered to fresh LIMESTONE	EXCELLENT	Heavy Break / Blast

<sup>\*</sup> converted to static equivalent using empirical correlation from van Heerden, 1987.

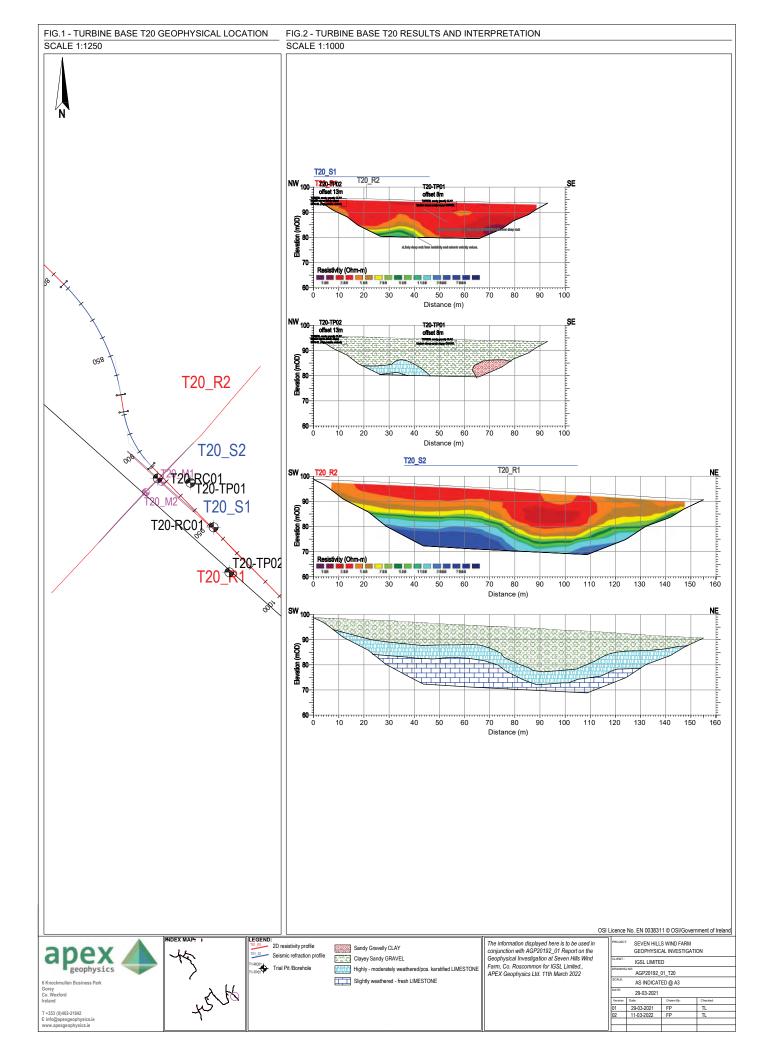
Note: Material type interpretation is based on a combination of field obervations , including soft ground probes, and client supplied borehole information.

#### Discussion

The geophysical data indicates the centre of Turbine T18 is characterised by c. 1.5m of loose to medium dense clayey sandy GRAVEL over 1.5m of medium dense to dense slightly clayey sandy GRAVEL/BOULDERS over moderately weathered/possible karstified LIMESTONE. Depth to slightly weathered to fresh LIMESTONE is 5.0m bgl.

Vp seismic velocities indicate that any excavation of the moderately weathered/possible karstified LIMESTONE and slightly weathered to fresh LIMESTONE will require breaking/blasting and heavy breaking/blasting. More information on excavatability is provided in Appendix C.

<sup>\*\*</sup> correlation from Imai et al, 1975





T07	
ITM Easting	591157
ITM Northing	744396



Methodology	]
Seismic Refraction	24 ch. @ 3m geophone spacing
MASW	24 ch. @ 1.5m geophone spacing
ERT	32 el. @ 5m electrode spacing
GPS	GNSS (< 20mm accuracy)

Depth (m)	Depth (m)	Avg. Ve	P Wave	Assumed Density kg/m <sup>3</sup>	Poissons Ratio	Shear Mod MPa Dynamic	Youngs Mod GPa Dynamic	Youngs Mod MPa Static*	Interpretation	Estimated Stiffness ** / Rock Quality	Estimated Excavatability
0.0	0.5	-	276	2000	-	-	-	-	Clayey sandy GRAVEL	LOOSE	Diggable
0.5	1.4	-	617	2000	-	-	-	-	Clayey sandy GRAVEL	MEDIUM DENSE	Diggable
1.4	2.4	198	1016	2000	0.48	78.45	0.23	3.60	Clayey sandy GRAVEL	MEDIUM DENSE	Diggable
2.4	3.3	227	1343	2000	0.49	103.23	0.31	5.69	Clayey sandy GRAVEL	DENSE	Diggable
3.3	5.6	259	1937	2000	0.49	133.91	0.40	8.79	Clayey sandy GRAVEL	VERY DENSE	Diggable
5.6	7.9	288	2186	2000	0.49	165.76	0.49	12.51	Clayey sandy GRAVEL	VERY DENSE	Diggable
7.9	10.2	-	2349	2000	-	-	-	-	Clayey sandy GRAVEL	VERY DENSE	Diggable

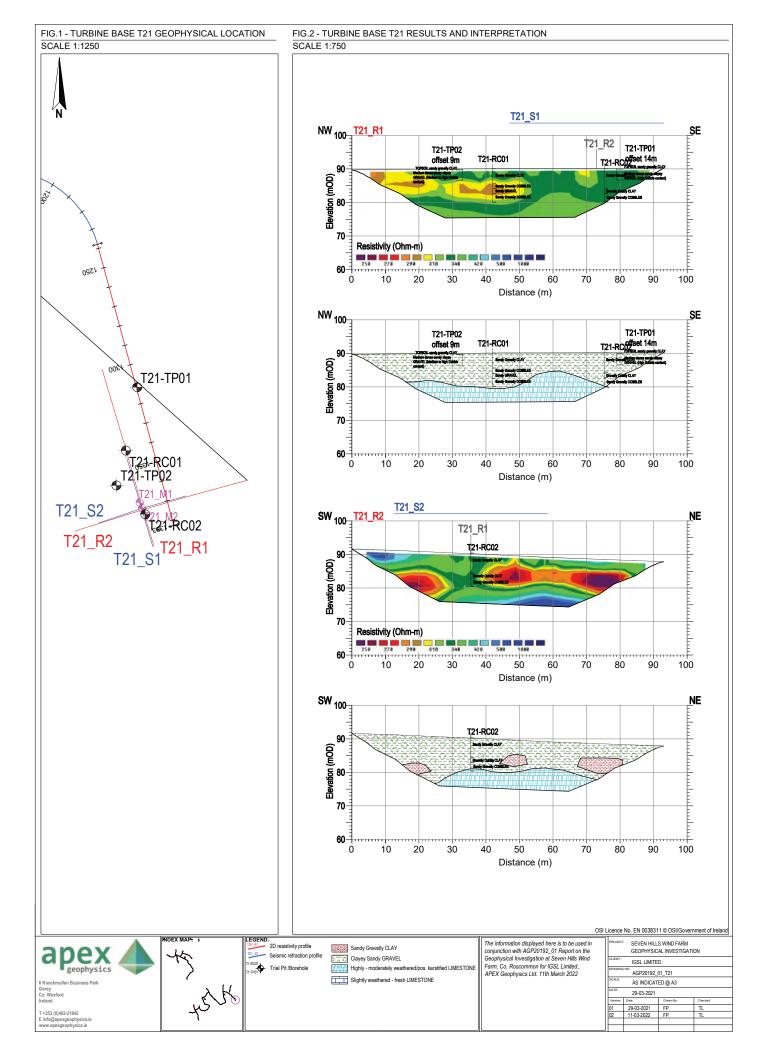
 $<sup>^{</sup>st}$  converted to static equivalent using empirical correlation from van Heerden, 1987.

Note: Material type interpretation is based on a combination of field obervations, including soft ground probes, and client supplied borehole information.

### Discussion

The geophysical data indicates the centre of Turbine T20 is characterised by a thick sequence of loose to medium dense becoming dense to very dense clayey sandy GRAVEL to a depth of of 10.2m bgl. The ERT data indicates depth to top of highly to moderately weatyhered/possible karstified LIMESTONE is 12.4m bgl. To the east of the turbine centre depth to LIMESTONE rock increases to 17.0m bgl.

<sup>\*\*</sup> correlation from Imai et al, 1975



# Geophysical Investigation Summary MASW/Seismic Refraction Drawing No. AGP20192\_01\_T21



T07	
ITM Easting	591432
ITM Northing	744076



Methodology	
Seismic Refraction	24 ch. @ 2m geophone spacing
MASW	24 ch. @ 1m geophone spacing
ERT	32 el. @ 3m electrode spacing
GPS	GNSS (< 20mm accuracy)

Depth (m) from	Depth (m)	Avg. Ve	elocity (m/s)	Assumed Density kg/m³	Poissons Ratio	Shear Mod MPa Dynamic	Youngs Mod GPa Dynamic	Youngs Mod MPa Static*	Interpretation	Estimated Stiffness ** / Rock Quality	Estimated Excavatability
0.0	0.5	-	286	1300	-	-	-	-	Clayey sandy GRAVEL	LOOSE	Diggable
0.5	1.5	-	500	2000	-	-	-	-	Clayey sandy GRAVEL	MEDIUM DENSE	Diggable
1.5	2.5	-	1004	2000	-	-	-	-	Clayey sandy GRAVEL	DENSE	Diggable
2.5	3.5	-	1382	2000	-	-	=	-	Clayey sandy GRAVEL	DENSE	Diggable
3.5	5.9	-	2074	2000	-	-	-	-	Clayey sandy GRAVEL	VERY DENSE	Diggable
5.9	8.3	-	2352	2500	-	-	-	-	Clayey sandy GRAVEL	VERY DENSE	Diggable
8.3	10.8	-	2570	2700	-	-	-	-	Clayey sandy GRAVEL	VERY DENSE	Diggable

 $<sup>^{</sup>st}$  converted to static equivalent using empirical correlation from van Heerden, 1987.

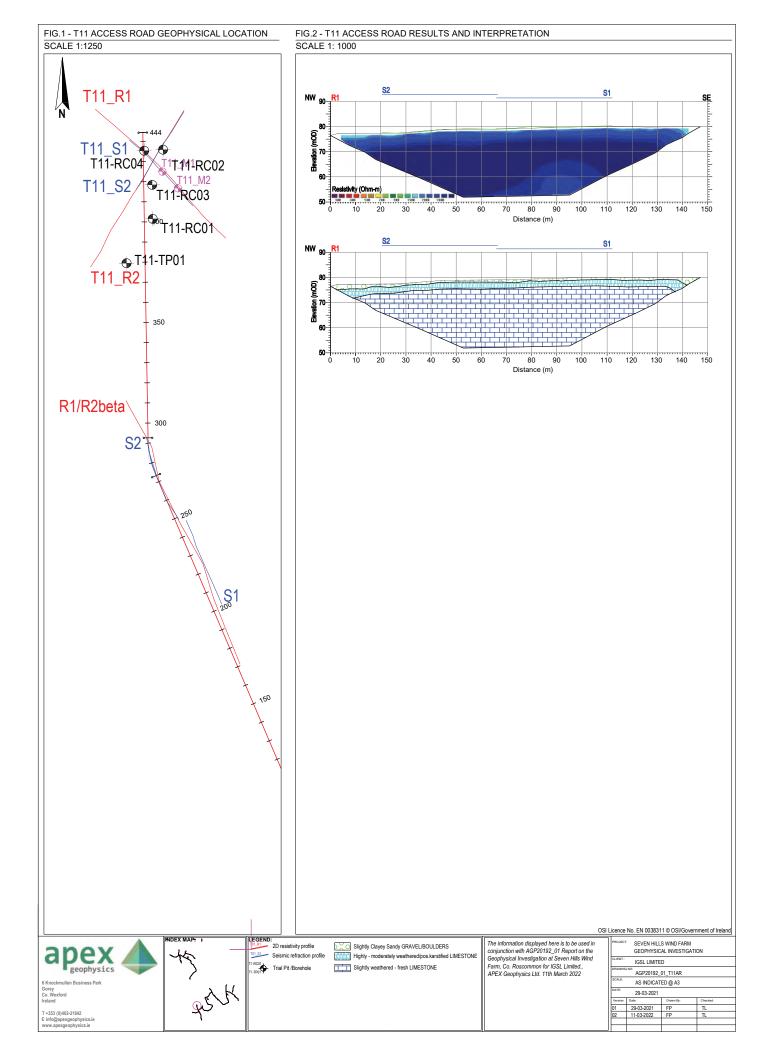
Note: Material type interpretation is based on a combination of field obervations and client supplied borehole information.

#### Discussion

The geophysical data indicates the centre of Turbine T21 is characterised by a thick sequence of loose to medium dense becoming dense to very dense clayey sandy GRAVEL to 10.5m, overlying highly to moderately weathered/possible karstified LIMESTONE (as indicated by the ERT). While the borehole data did not encounter rock seismic velocities of 2570m/s indicate depth to rock may be shallower at 8.3m bgl.0.7 m

A clear dispersion curve was not generated on the MASW data.

<sup>\*\*</sup> correlation from Imai et al, 1975



## Geophysical Investigation Summary MASW/Seismic Refraction Drawing No. AGP20192\_02\_S01



T06	
ITM Easting	587913
ITM Northing	743440



Methodology	
Seismic Refraction	24 ch. @ 2m geophone spacing
MASW	24 ch. @ 1m geophone spacing
ERT	32 el. @ 3m electrode spacing
GPS	GNSS (< 20mm accuracy)

Depth (m)	Depth (m)	Avg. Velocity (m/s)		Assumed Density	Poissons Ratio	Shear Mod	Youngs Mod	Youngs Mod	Interpretation	Estimated Stiffness ** / Rock	Estimated
from	to	S Wave	P Wave	kg/m³		MPa Dynamic	GPa Dynamic	MPa Static*		Quality	Excavatability
0.0	0.8	-	523	2000	-	-	-	-	Slightly clayey GRAVEL/BOULDERS	MEDIUM DENSE	Diggable
0.8	2.3	-	1521	2500	-	-	-	-	Highly weathered/pos. karstified LIMESTONE	VERY POOR	Rippable
2.3	3.8	-	2358	2500	-	-	-	-	Moderately weathered/pos. karstified LIMESTONE	FAIR	Break / Blast
3.8	5.4	-	2952	2700	-	-	-	-	Slightly weathered to fresh LIMESTONE	GOOD	Break / Blast
5.4	9.1	-	3578	2700	-	-	-	-	Slightly weathered to fresh LIMESTONE	GOOD	Heavy Break / Blast
9.1	12.8	-	4662	2700	-	-	=	-	Slightly weathered to fresh LIMESTONE	EXCELLENT	Heavy Break / Blast

 $<sup>\</sup>ensuremath{^*}$  converted to static equivalent using empirical correlation from van Heerden, 1987.

Note: Material type interpretation is based on a combination of field obervations, including soft ground probes, and client supplied borehole information.

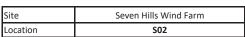
#### Discussion

The geophysical data indicates the centre of location S01 is characterised by c. 0.8m of medium dense slightly clayey sandy GRAVEL/BOULDERS over highly weathered/possible karstified LIMESTONE over moderately weathered/karstified LIMESTONE. Depth to slightly weathered to fresh LIMESTONE is 3.8m bgl.

Vp seismic velocities indicate that any excavation of the moderately weathered/possible karstified LIMESTONE and slightly weathered to fresh LIMESTONE will require breaking/blasting and heavy breaking/blasting. More information on excavatability is provided in Appendix C.

<sup>\*\*</sup> correlation from Imai et al, 1975

#### Geophysical Investigation Summary MASW/Seismic Refraction Drawing No. AGP20192\_01\_S02



T06	
ITM Easting	587889
ITM Northing	743483



Methodology	
Seismic Refraction	24 ch. @ 2m geophone spacing
MASW	24 ch. @ 1m geophone spacing
ERT	32 el. @ 3m electrode spacing
GPS	GNSS (< 20mm accuracy)

Depth (m)	Depth (m)	Avg. Velocity (m/s)		Avg. Velocity (m/s)		Assumed Density	Poissons Ratio	Shear Mod	Youngs Mod	Youngs Mod	Interpretation	Estimated Stiffness ** / Rock	Estimated
from	to	S Wave	P Wave	kg/m³		MPa Dynamic	GPa Dynamic	MPa Static*		Quality	Excavatability		
0.0	0.7	-	576	2000	-	-	-	-	Slightly clayey sandy GRAVEL/BOULDERS	MEDIUM DENSE	Diggable		
0.7	2.2	-	1384	2500	-	-	-	-	Highly weathered/pos. karstified LIMESTONE	VERY POOR	Rippable		
2.2	3.8	-	2325	2500	ı	-	-	-	Moderately weathered/pos. karstified LIMESTONE	POOR	Break / Blast		
3.8	5.4	-	3041	2700	-	-	-	-	Slightly weatherede to fresh LIMESTONE	FAIR	Heavy Break / Blast		
5.4	9.1	-	3744	2700	-	-	-	-	Slightly weatherede to fresh LIMESTONE	GOOD	Heavy Break / Blast		
9.1	12.8	-	4742	2700	-	-	-	-	Slightly weatherede to fresh LIMESTONE	EXCELLENT	Heavy Break / Blast		

 $<sup>\</sup>ensuremath{^*}$  converted to static equivalent using empirical correlation from van Heerden, 1987.

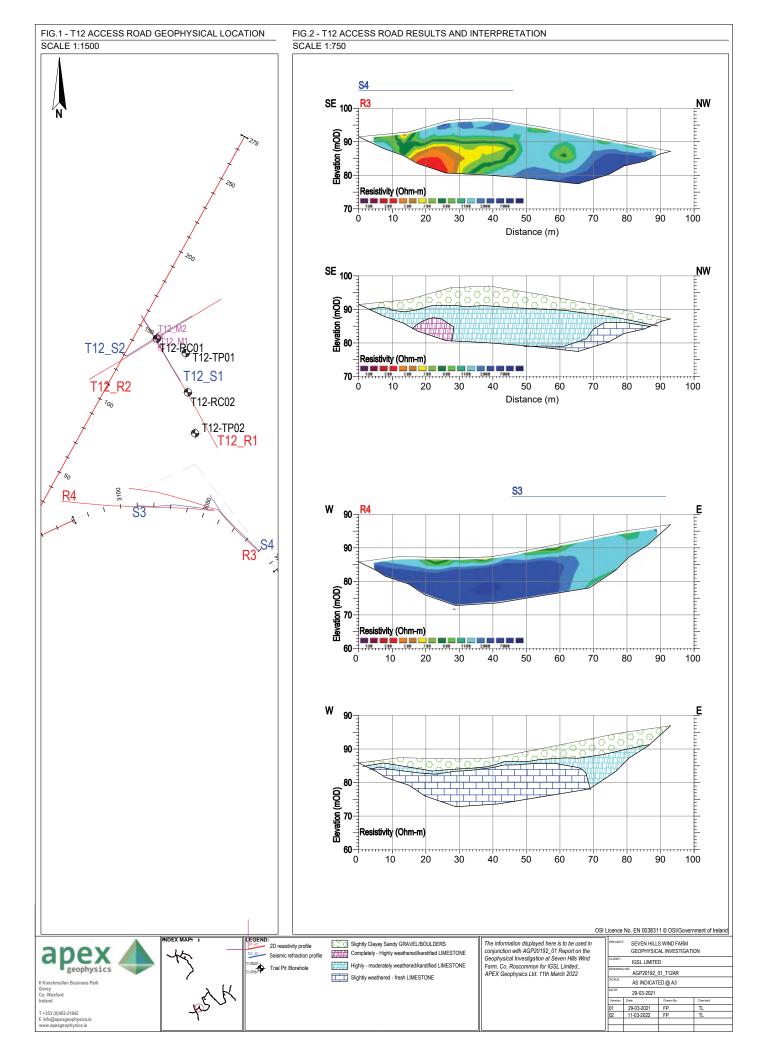
Note: Material type interpretation is based on a combination of field obervations, including soft ground probes, and client supplied borehole information.

#### Discussion

The geophysical data indicates the centre of location S02 is characterised by c. 0.7m of medium dense slightly clayey sandy GRAVEL/BOULDERS over highly weathered/possible karstified LIMESTONE over moderately weathered/karstified LIMESTONE. Depth to slightly weathered to fresh LIMESTONE is 3.8m bgl.

Vp seismic velocities indicate that any excavation of the moderately weathered/possible karstified LIMESTONE and slightly weathered to fresh LIMESTONE will require breaking/blasting and heavy breaking/blasting. More information on excavatability is provided in Appendix C.

<sup>\*\*</sup> correlation from Imai et al, 1975



## Geophysical Investigation Summary MASW/Seismic Refraction Drawing No. AGP20192\_02\_S03



T06	
ITM Easting	588348
ITM Northing	743376



Methodology	
Seismic Refraction	24 ch. @ 2m geophone spacing
MASW	24 ch. @ 1m geophone spacing
ERT	32 el. @ 3m electrode spacing
GPS	GNSS (< 20mm accuracy)

Depth (m)	Depth (m)	Avg. Ve	elocity (m/s)	Assumed Density	Poissons Ratio	Shear Mod	Youngs	Youngs	Interpretation	Estimated Stiffness ** / Rock	Estimated Excavatability
from	to	S Wave	P Wave	kg/m <sup>3</sup>		MPa Dynamic	GPa Dynamic	MPa Static*		Quality	,
0.0	0.8	-	347	2000	-	-	-	-	Slightly clayey sandy GRAVEL/BOULDERS	LOOSE	Diggable
0.8	2.5	-	1128	2000	-	-	-	-	Slightly clayey sandy GRAVEL/BOULDERS	DENSE	Diggable
2.5	4.2	-	1492	2000	-	-	-	-	Slightly clayey sandy GRAVEL/BOULDERS	DENSE	Diggable
4.2	5.8	-	1870	2000	-	-	-	-	Slightly clayey sandy GRAVEL/BOULDERS	VERY DENSE	Diggable
5.8	9.9	-	2404	2500	-	-	-	1	Moderately weathered/karstified LIMESTONE	GOOD	Break / Blast
9.9	14.0	-	4412	2700	-	-	-	-	Slightly weathered to fresh LIMESTONE	EXCELLENT	Heavy Break / Blast

 $<sup>\</sup>ensuremath{^*}$  converted to static equivalent using empirical correlation from van Heerden, 1987.

Note: Material type interpretation is based on a combination of field obervations and client supplied borehole information.

#### Discussion

The geophysical data indicates the centre of location S03 is characterised by c. 5.8m of loose to dense becoming very dense slightly clayey sandy GRAVEL/BOULDERS over moderately weathered/karstified LIMESTONE. Depth to slightly weathered to fresh LIMESTONE is 9.9m bgl.

Vp seismic velocities indicate that any excavation of the moderately weathered/karstified LIMESTONE and slightly weathered to fresh LIMESTONE will require breaking/blasting and heavy breaking/blasting. More information on excavatability is provided in Appendix C.

<sup>\*\*</sup> correlation from Imai et al, 1975

#### Geophysical Investigation Summary MASW/Seismic Refraction Drawing No. AGP20192\_02\_S04



T06	
ITM Easting	588383
ITM Northing	743364



Methodology	
Seismic Refraction	24 ch. @ 2m geophone spacing
MASW	24 ch. @ 1m geophone spacing
ERT	32 el. @ 3m electrode spacing
GPS	GNSS (< 20mm accuracy)

Depth (m)	Depth (m)	Avg. Ve	elocity (m/s)	Assumed Density	Poissons Ratio	Shear Mod	Youngs Mod	Youngs Mod	Interpretation	Estimated Stiffness ** / Rock	Estimated Excavatability
from	to	S Wave	P Wave	kg/m <sup>3</sup>		MPa Dynamic	GPa Dynamic	MPa Static*		Quality	
0.0	0.7	-	291	1300	-	-	-	-	Slightly clayey sandy GRAVEL/BOULDERS	LOOSE	Diggable
0.7	2.1	244	1041	2000	0.47	118.85	0.35	7.06	Slightly clayey sandy GRAVEL/BOULDERS	DENSE	Diggable
2.1	3.5	259	1466	2000	0.48	134.19	0.40	8.76	Slightly clayey sandy GRAVEL/BOULDERS	DENSE	Diggable
3.5	4.0	278	1641	2000	0.49	154.76	0.46	11.10	Slightly clayey sandy GRAVEL/BOULDERS	DENSE	Diggable
4.0	8.0	-	1820	2000	-	-	-	-	Modertely weathered/karstified LIMESTONE	VERY POOR	Break / Blast
8.0	11.9	-	2121	2500	-	-	-	-	Completey to highly weathered/karstified LIMESTONE	FAIR	Break / Blast

 $<sup>^{</sup>st}$  converted to static equivalent using empirical correlation from van Heerden, 1987.

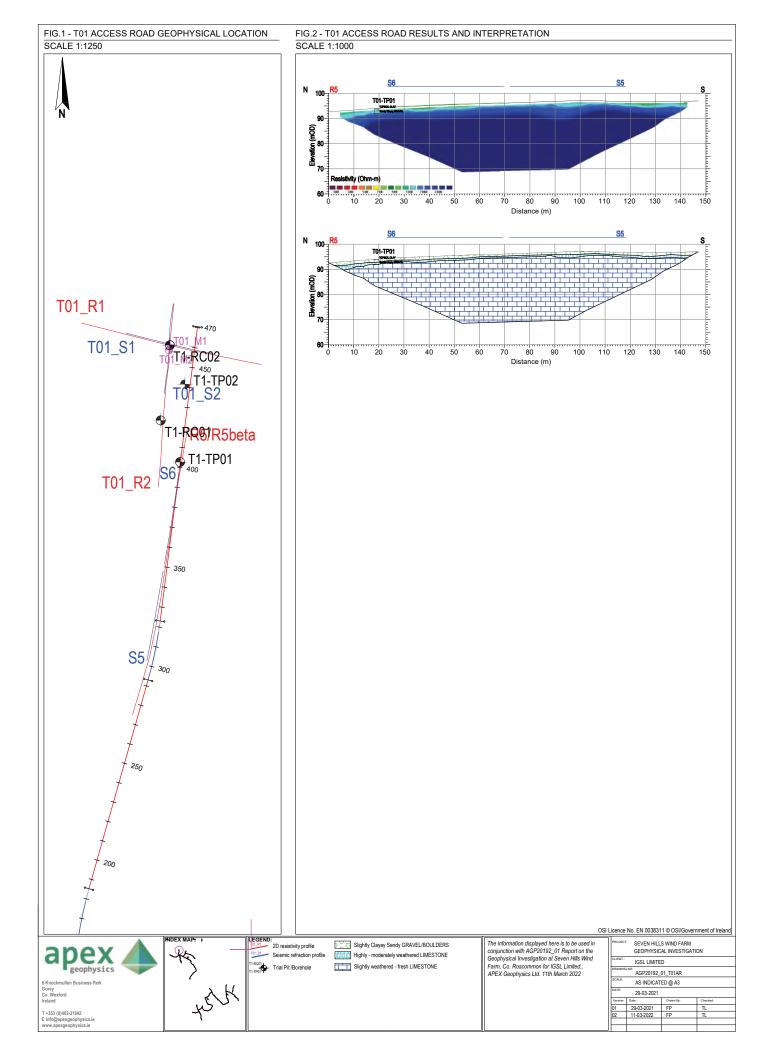
Note: Material type interpretation is based on a combination of field obervations , including soft ground probes, and client supplied borehole information.

#### Discussion

The geophysical data indicates the centre of location S04 is characterised by c. 4.0m of loose to dense slightly clayey sandy GRAVEL/BOULDERS over moderately weathered/karstified LIMESTONE. Depth to highly weathered/karstified LIMESTONE is 8.0m bgl. The interpreted zone of highly weathered/karstified LIMESTONE is indicated by a zone of low resistivity values (<500 Ohm-m) on ERT profile R3 (see Drawing AGP20192\_01\_S04) and relatively low seismic velocities of 2121m/s.

Vp seismic velocities indicate that any excavation of the moderately weathered/karstified LIMESTONE and slightly weathered to fresh LIMESTONE will require breaking/blasting and heavy breaking/blasting. More information on excavatability is provided in Appendix C.

<sup>\*\*</sup> correlation from Imai et al, 1975



#### Geophysical Investigation Summary MASW/Seismic Refraction Drawing No. AGP20192\_01\_S05



T06	
ITM Easting	586346
ITM Northing	748229



Methodology	
Seismic Refraction	24 ch. @ 2m geophone spacing
MASW	24 ch. @ 1m geophone spacing
ERT	32 el. @ 3m electrode spacing
GPS	GNSS (< 20mm accuracy)

Depth (m)	Depth (m)	Avg. Ve	elocity (m/s)	Assumed Density	Poissons Ratio	Shear Mod	Youngs Mod GPa	Youngs Mod MPa	Interpretation	Estimated Stiffness ** / Rock	Estimated Excavatability	
from	to	S Wave	P Wave	kg/m <sup>3</sup>		Dynamic	Dynamic	Static*		Quality	,	
0.0	0.5	-	442	2000	-	-	-	-	Slightly clayey sandy GRAVEL/BOULDERS	LOOSE	Diggable	
0.5	1.1	-	1309	2000	-	-	-	-	Slightly clayey sandy GRAVEL/BOULDERS	DENSE	Diggable	
1.1	2.6	-	1713	2000	-	-	-	-	Highly-moderately weathered LIMESTONE	FAIR	Rippable	
2.6	3.8	-	2546	2000	ı	-	-	1	Slightly weathered to fresh LIMESTONE	GOOD	Break / Blast	
3.8	6.4	-	3721	2000	1	-	·	ı	Slightly weathered to fresh LIMESTONE	GOOD	Heavy Break / Blast	
6.4	8.9	-	5758	2500	-	-	-	-	Slightly weathered to fresh LIMESTONE	EXCELLENT	Heavy Break / Blast	
8.9	11.5	-	5776	2700	-	-	-	-	Slightly weathered to fresh LIMESTONE	EXCELLENT	Heavy Break / Blast	

 $<sup>^{</sup>st}$  converted to static equivalent using empirical correlation from van Heerden, 1987.

Note: Material type interpretation is based on a combination of field obervations and client supplied borehole information.

#### Discussion

The geophysical data indicates the centre of location S05 is characterised by c. 1.1m of loose to dense slightly clayey sandy GRAVEL/BOULDERS over highly to moderately weathered LIMESTONE over slightly weathered to fresh LIMESTONE at 2.5m bgl.

Vp seismic velocities indicate that any excavation of the slightly weathered to fresh LIMESTONE will require breaking/blasting and heavy breaking/blasting. More information on excavatability is provided in Appendix C.

<sup>\*\*</sup> correlation from Imai et al, 1975

#### Geophysical Investigation Summary MASW/Seismic Refraction Drawing No. AGP20192\_01\_S06



Site	Seven Hills Wind Farm
Turbine Base	\$06

T06	
ITM Easting	586355
ITM Northing	748280

Methodology	
Seismic Refraction	24 ch. @ 2m geophone spacing
MASW	24 ch. @ 1m geophone spacing
ERT	32 el. @ 3m electrode spacing
GPS	GNSS (< 20mm accuracy)

Depth (m)	Depth (m)	Avg. Ve	elocity (m/s)	Assumed Density	Poissons Ratio	Shear Mod	Youngs Mod	Youngs Mod	Interpretation	Estimated Stiffness ** / Rock	Estimated	
from	to	S Wave	P Wave	kg/m³		MPa Dynamic	GPa Dynamic	MPa Static*	·	Quality	Excavatability	
0.0	1.0	-	496	2000	-	-	-	-	Slightly clayey sandy GRAVEL/BOULDERS	LOOSE	Diggable	
1.0	2.3	-	2098	2500	-	-	·	ī	Moderately weathered LIMESTONE	POOR	Break / Blast	
2.3	4.0	-	3859	2700	-	-	-	1	Slightly weathered to fresh LIMESTONE	EXCELLENT	Heavy Break / Blast	
4.0	6.0	-	5728	2700	-	-	-	-	Slightly weathered to fresh LIMESTONE	EXCELLENT	Heavy Break / Blast	
6.0	13.3	-	5775	2700	-	-	1	-	Slightly weathered to fresh LIMESTONE	EXCELLENT	Heavy Break / Blast	

<sup>\*</sup> converted to static equivalent using empirical correlation from van Heerden, 1987.

Note: Material type interpretation is based on a combination of field obervations, including soft ground probes, and client supplied borehole information.

#### Discussion

The geophysical data indicates the centre of location S06 is characterised by c. 1.0m of loose slightly clayey sandy GRAVEL/BOULDERS over moderately weathered LIMESTONE over slightly weathered to fresh LIMESTONE at 2.3m bgl.

Vp seismic velocities indicate that any excavation of the moderately weathered LIMESTONE and slightly weathered to fresh LIMESTONE will require breaking/blasting and heavy breaking/blasting. More information on excavatability is provided in Appendix C.

<sup>\*\*</sup> correlation from Imai et al, 1975

#### Appendix 5

#### **Groundwater Monitoring**

## **Groundwater Monitoring - Rotary Drillholes**

Site Location	Seven Hills Windfarm
Project No.	23000
Client	Energia
Engineer	Malachy Walsh & Partners



**Date of Monitoring** 

		Date of Monitoring								
		10/02/2021								
Exploratory Hole No.	Installation Type	m bgl (m OD)	m bgl (m OD)	m bgl (m OD)	m bgl (m OD)					
T04 - RC01	50mm SP	7.20 (65.27)	-	-	-					
T05 - RC01	50mm SP	Dry	-	-	-					
T10 - RC01	50mm SP	Dry	-	-	-					
T18 - RC02	50mm SP	5.73 (85.14)	-	-	-					
T21 - RC02	50mm SP	9.92 (80.09)	-	-	-					
Comments	SP = Standpipe									

#### Appendix 6

**Geotechnical Laboratory Test Results - Soil** 

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



1 of 1

Report No. R119268 Contract No. 23000 Contract Name: 7 Hills Windfarm

Customer Energia / MWP

Samples Received: 18/01/21 Date Tested: 28/01/21

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
T2 TP01	AA145081	0.5	A21/0537	В	14	31	NP	NP	39	WS	4.4		Brown sandy gravelly SILT
T3 TP01	AA145073	0.5	A21/0540	В	17	37	22	15	60	WS	4.4	СІ	Brown slightly sandy, gravelly, CLAY
T3 TP01	AA140075	2.9	A21/0541	В	11	22	NP	NP	54	WS	4.4		Brown sandy gravelly SILT
T3 TP02	AA145076	1.5	A21/0542	В	12	24	13	11	56	WS	4.4	СІ	Brown slightly sandy, slightly gravelly, CLAY
T4 TP02	AA140077	0.5	A21/0543	В	26	43	NP	NP	71	WS	4.4		Brown sandy gravelly SILT
T4 TP02	AA140078	2.8	A21/0544	В	9.4	24	14	10	62	WS	4.4	СІ	Brown slightly sandy, gravelly, CLAY
T4 TP02	AA140079	1.7	A21/0545	В	12	23	NP	NP	56	WS	4.4		Brown sandy gravelly SILT
T6 TP02	AA14008	0.4	A21/0549	В	21	44	NP	NP	54	WS	4.4		Brown sandy gravelly SILT
T7 TP01	AA140080	1.4	A21/0551	В	8.1	20	NP	NP	33	WS	4.4		Brown sandy gravelly SILT
T13 TP01	AA145099	0.3	A21/0564	В	21	37	26	11	89	WS	4.4	СІ	Brown sandy gravelly CLAY

Notes: Preparation: WS - Wet sieved Sample Type: B - Bulk Disturbed Remarks:

AR - As received U - Undisturbed Results apply to the sample as received.

NP - Non plastic NOTE: \*Clause 3.2 of BS1377 is a "withdrawn" standard due to publication of ISO17892-1:2014

Liquid Limit 4.3 Cone Penetrometer definitive method Opinions and interpretations are outside the scope of accreditation.

Clause: 4.4 Cone Penetrometer one point method The results relate to the specimens tested. Any remaining material will be retained for one month.

IGSL Ltd Materials Laboratory

Persons authorized to approve reports

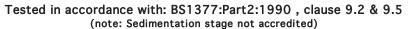
Approved by

Date Page

H Byrne (Laboratory Manager)

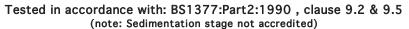
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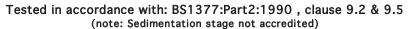


particle	%		С	ontract No.	2300	Report No.	R118578		•	
size	passing		C	ontract Name:	7 Hills Windf	arm				
75	100	COBBLES	В	H/TP:	T1 TP01					
63	91		S	ample No.	AA145084	Lab. Sample	No.	A21/0534		
50	91		S	ample Type:	В					
37.5	85		D	epth (m)	0.50	Customer:	Energia / MWP			
28	80		D			1 Date Testing		28/01/2021		
20	75		D	escription:	Brown clayey	y/silty, very sa	andy, GRAVEL with	some cobbles		
14	71	GRAVEL								
10	65	OIV (VLL	R	emarks	Note: Clause 9.2 and Clause 9.5	5 of BS1377:Part 2:1990 have beer	n superseded by ISO17892-4:2016 . Results a	apply to sample as received.		
6.3	59						0.15	0.3 0.425 0.6 1.18	2 3.35 6.3 10 14	28 37.5 50 <del>6</del> 3
5	56		100				0.063	0.3 0.42 0.6 1.18	2 1 6.5	3 2 3 3 2 3 2 3 2 3 3 3 3 3 3 3 3 3 3 3
3.35	49									
2	41		90							
1.18	35		€ 80							
0.6	27		Percentage passing (%)  30  30  30							
0.425	24	SAND	.isg 60 <del>                                   </del>							
0.3	21		<u>8</u> 50 —							
0.15	16		140 H							
0.063	13		9 30 L							
			20							
			10							
		SILT/CLAY								
			0.000	1 0.00		0.01	0.1	1	10	100
					CLAY	SILT	Sieve size (mm)	SAND	GRAVEL	
							Approved by:		Date:	Page no:
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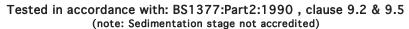


particle	%		(	Contract No.	2300	Report No.	R118579			
size	passing		(	Contract Name:	7 Hills Windfa	arm				
75	100	COBBLES	E	BH/TP:	T1 TP1					
63	100	0055220	9	Sample No.	AA140085	Lab. Sample	No.	A21/0535		
50	100		S	Sample Type:	В					
37.5	91		[	Depth (m)	1.50	Customer:	Energia / MWP			
28	85		[	Date Received		1 Date Testing	-	28/01/2021		
20	78		[	Description:	Brown clayey	//silty, very sa	andy, GRAVEL			
14	71	GRAVEL								
10	65	GIVIVEL	F	Remarks	Note: Clause 9.2 and Clause 9.5	of BS1377:Part 2:1990 have been	n superseded by ISO17892-4:2016 . Resul	ts apply to sample as received.		
6.3	55						0.15	0.3 1.425 0.6 1.18	2 3.35 5.3 6.3 10 14	28 37.5 50 93
5	52		100 -				0.063	0.3 0.425 0.6 1.18	3. 3. 17. 17. 17. 17. 17. 17. 17. 17. 17. 17	28 37 8
3.35	44									
2	36		90							
1.18	30		© 80 <del> </del>						<del>                                       </del>	
0.6	24		Percentage passing (%)						+ + + + + + + + + + + + + + + + + + +	
0.425	22	SAND	iss 60 <del>-</del>							
0.3	20		<del>ω</del> 50 <del>-</del>							
0.15	16		tag 40							
0.063	13		30 L						<u> </u>	
			20							
		SILT/CLAY	10							
			0.000	0.00	I	0.01	0.1	1	10	100
			0.000							100
					CLAY	SILT	Sieve size (mm	) SAND	GRAVEL	
			Lal Materi	الماء الماء			Approved by:		Date:	Page no:
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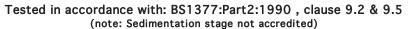


particle	%		С	ontract No.	2300	Report No.	R118580			
size	passing		С	ontract Name:	7 Hills Windf	arm				
75	100	COBBLES	В	H/TP:	T1 TP2					
63	100	0055220	S	ample No.	AA140086	Lab. Sample	No.	A21/0536		
50	100		S	ample Type:	В					
37.5	97		D	epth (m)	1.50	Customer:	Energia / MWF	)		
28	88		D			1 Date Testin	-	28/01/2021		
20	81		D	escription:	Brown clayey	//silty, very sa	andy, GRAVEL			
14	76	GRAVEL								
10	71	GIVAVLL	R	emarks	Note: Clause 9.2 and Clause 9.5	of BS1377:Part 2:1990 have been	n superseded by ISO17892-4:2016 . Resu	Its apply to sample as received.		
6.3	62						0.15	0.3 1.425 0.6 1.18	2 3.35 5.3 6.3 10 14	28 37.5 50 53
5	58		100 -				0.063	0.3 0.425 0.6 1.18	23.33.10	37.8
3.35	49									
2	39		90							<del>∦∥</del> ┼ <b>∦</b> ∭┃ │
1.18	32		⊚ 80 +							
0.6	24		Percentage passing (%)  00 00 00 00 00 00 00 00 00 00 00 00 00							
0.425	21	SAND	iss 60 <del> </del>							
0.3	18		<u>8</u> 50 —						$\mathbf{H} = \mathbf{H} + $	
0.15	15		40 tag							
0.063	14		30 <u>—</u>							
			20							
			10					<b>-</b>		
		SILT/CLAY								
			0.000	1 0.00		0.01	0.1	1	10	100
					CLAY	SILT	Sieve size (mm	) SAND	GRAVEL	
							Approved by:		Date:	Page no:
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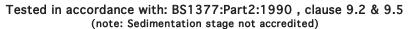


particle	%		Cont	ract No.	2300	Report No.	R119064			
size	passing		Cont	ract Name:	7 Hills Windf	arm				
75	100	COBBLES	BH/	ГР:	T2 TP01					
63	100	0023220	Sam	ple No.	AA145082	Lab. Sample	No.	A21/0538		
50	94		Sam	ple Type:	В					
37.5	90		Dept	th (m)	2.50	Customer:	Energia / MWF			
28	86		Date			1 Date Testino		01/02/2021		
20	82		Desc	cription:	Brown slight	ly sandy, grave	elly, SILT/CLAY			
14	76	GRAVEL								
10	73	OIV WEE	Rem	arks	Note: Clause 9.2 and Clause 9.5	of BS1377:Part 2:1990 have been	n superseded by ISO17892-4:2016 . Resu	ults apply to sample as received.		
6.3	69						0.15	0.3 0.425 0.6 1.18	2 3.35 6.3 10 14	28 37.5 50 75 75
5	67		100 -				0.063	0.3 0.42 0.6 1.18	2. 3	3 2 3 2 3 2 3 2 3 3 3 3 3 3 3 3 3 3 3 3
3.35	62									
2	57		90							
1.18	53		€ 80							
0.6	48		° 70 —							
0.425	46	SAND	i <u>s</u> 60 +							
0.3	42		<u>8</u> 50 —							
0.15	37		40 <del></del>							
0.063	31		Percentage passing (%)  00  00  00  00  00  00  00  00  00							
			20							
			10							
		SILT/CLAY								
			0.0001	0.00		0.01	0.1	1	10	100
					CLAY	SILT	Sieve size (mm	n) SAND	GRAVEL	
							Approved by:		Date:	Page no:
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particle	%			Contract No.	2300	Report No.	R119065			
size	passing			Contract Name:	7 Hills Windfa	arm				
75	100	COBBLES		BH/TP:	T2 TP2					
63	100	CODDLLO		Sample No.	AA145083	Lab. Sample	No.	A21/0539		
50	85			Sample Type:	В					
37.5	66			Depth (m)	1.50	Customer:	Energia / MWP			
28	62			Date Received		Date Testing	-	01/02/2021		
20	56			Description:	Brown clayey	/silty, sandy,	GRAVEL			
14	50	GRAVEL								
10	45	GIVAVEL		Remarks	Note: Clause 9.2 and Clause 9.5	of BS1377:Part 2:1990 have been	n superseded by ISO17892-4:2016 . Results	apply to sample as received.	Sample size did not meet the requirements of BS1377	
6.3	38						0.15	0.3 .425 0.6 1.18	2 3.35 5.3 6.3 10 114	
5	35		100 -				0.063	0.3 0.425 0.6 1.18	23.33.33.33.33.33.33.33.33.33.33.33.33.3	230.7.8 5530.7.8
3.35	25									
2	19		90 -							<del>                                     </del>
1.18	15		© 80 <del>-</del>							╫╫╫
0.6	12		<u>\$</u> 70 -					+ + + + + + + + + + + + + + + + + + + +		╫╫╫
0.425	11	SAND	.is 60 -					<del>                                      </del>		
0.3	10		Percentage passing (%) - 00 - 00 - 00 - 00 - 00 - 00 - 00 -					<del>               </del>		
0.15	9		6e + 40							
0.063	8		30 -							
			ى 20 -							
									1	
		SILT/CLAY	10 -							
			0.00	0.00	)1	0.01	0.1	1	10	100
					CLAY	SILT	Sieve size (mm)	SAND	GRAVEL	
							Approved by:		Date:	Page no:
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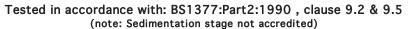


particle	%		Contract No.	2300	Report No.	R118581			
size	passing		Contract Name	7 Hills Windf	arm				
75	100	COBBLES	BH/TP:	T3 TP1					
63	100	CODDLLO	Sample No.	AA145073	Lab. Sample	No.	A21/0540		
50	100		Sample Type:	В					
37.5	94		Depth (m)	0.50	Customer:	Energia / MWF	•		
28	86		Date Received		1 Date Testino		29/01/2021		
20	83		Description:	Brown slight	ly sandy, grave	elly, CLAY			
14	80	GRAVEL							
10	76	GIVAVEL	Remarks	Note: Clause 9.2 and Clause 9.5	of BS1377:Part 2:1990 have beer	n superseded by ISO17892-4:2016 . Resu	its apply to sample as received.		
6.3	72					0.15	0.3 .425 0.6 1.18	2 3.35 6.3 10 20	28 37.5 50 93
5	69		100			0.063	0.3 0.425 0.6 1.18	3.3	28 37 8 7 8 7 8 7 8 7 8 8 7 8 8 7 8 8 8 8
3.35	64		100						
2	58		90						
1.18	54		© 80 <del>                                     </del>						
0.6	49		Dercentage passing (%)  00  00  00  00  00  00  00  00  00						
0.425	46	SAND	iss 60						
0.3	43		<u>8</u> 50						
0.15	35		149 trage						
0.063	28		30						
0.038	24		Per 30						
0.027	21		20						
0.017	19	SILT/CLAY	10						
0.010	17	0.2.7, 02	0 1	2.001	0.01	0.1		10	100
0.007	14		0.0001	0.001	0.01		ı	10	100
0.005	13			CLAY	SILT	Sieve size (mm	) SAND	<i>GRAVEL</i>	
0.002	10					1.		In .	- In
		IGSL L1	d Materials Labora	torv		Approved by:		Date:	Page no:
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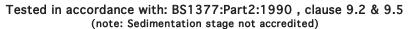


		1							
particle	%		Contract No.	2300	Report No.	R119066			
size	passing		Contract Name	e: 7 Hills Windf	arm				
75	100	COBBLES	BH/TP:	T3 TP2					
63	100	0023220	Sample No.	AA145076	Lab. Sample	No.	A21/0542		
50	100		Sample Type:	В					
37.5	100		Depth (m)	1.50	Customer:	Energia / MWP	)		
28	97		Date Received		1 Date Testing	-	29/01/2021		
20	93		Description:	Brown slight	ly sandy, slight	tly gravelly, CLAY	,		
14	89	GRAVEL							
10	85	OIV WEE	Remarks	Note: Clause 9.2 and Clause 9.5	of BS1377:Part 2:1990 have beer	n superseded by ISO17892-4:2016 . Resul	its apply to sample as received.		
6.3	79					0.15	0.3 1.425 0.6 1.18	2 3.35 5.3 6.3 10 20	
5	76		100 -			0.063	0.3 0.425 0.6 1.18	2 3.3 5.3 6.3 10 14 20	28 37. 53 53
3.35	70								
2	66		90						
1.18	62		© 80 <del>                                     </del>						
0.6	58		∞ 70 <del>                                     </del>				<del>-                                     </del>		
0.425	56	SAND	Dercentage passing (%)  00  00  00  00  00  00  00  00  00					1	
0.3	53		8 50 H						
0.15	46		t 40						
0.063	37		30						
0.039	31		Per 30						
0.027	29		20						
0.018	26	SILT/CLAY	10	1111					
0.010	22	5.2.7, 52. (1	0 1	0.001	0.01	0.1		10	100
0.007	19		0.0001	0.001	0.01	0.1	I	10	100
0.005	17			CLAY	SILT	Sieve size (mm	) SAND	<i>GRAVEL</i>	
0.002	11							T-	
		ICCI 14	td Materials Labora	atory		Approved by:		Date:	Page no:
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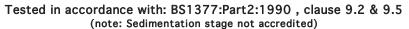


particle	%		Contract	No. 2300	Report No.	R118582			
size	passing		Contract	Name: 7 Hills Win	dfarm				
75	100	COBBLES	BH/TP:	T4 TP2					
63	100	CODDLLO	Sample N	o. AA14007	B Lab. Sample	No.	A21/0544		
50	100		Sample T	ype: B					
37.5	100		Depth (m	2.80	Customer:	Energia / MW	P		
28	96		Date Rece		21 Date Testin	-	29/01/2021		
20	94		Description	on: Brown slig	ntly sandy, grav	elly, CLAY			
14	88	GRAVEL							
10	84	GIVAVEL	Remarks	Note: Clause 9.2 and Clause	e 9.5 of BS1377:Part 2:1990 have bee	n superseded by ISO17892-4:2016 . Res	sults apply to sample as received.		
6.3	79					0.15	0.3 0.425 0.6 1.18	35	5.020
5	76		100			0.063	0.3 0.42 0.6 1.18	2 3.3! 5.3 6.3 10 14 20	23.0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .
3.35	69								
2	64		90						
1.18	60		© 80						
0.6	56		° 70						
0.425	54	SAND	ig 60 +					<del>1                                      </del>	
0.3	51		<u>8</u> 50						
0.15	44		40 Lag						
0.063	38		Percentage passing (%)  00  00  00  00  00  00  00  00  00						
0.037	35		20						
0.027	32		10		TTII				
0.017	27	SILT/CLAY							
0.010	22		0.0001	0.001	0.01	0.1	1	10	100
0.007	19								
0.005 0.002	18 11			CLAY	SILT	Sieve size (mn	n) SANU	GRAVEL	
0.002	1.1					Approved by:		Date:	Page no:
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					Persons aut			Quality Manager) H Byrne	(Laboratory Manager



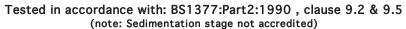


particle	%		(	Contract No.	2300	Report No.	R118583			
size	passing		(	Contract Name:	7 Hills Windfa	arm				
75	100	COBBLES	ļ	BH/TP:	T5 TP02					
63	100	CODDLLO	;	Sample No.	AA145086	Lab. Sample	No.	A21/0547		
50	100		;	Sample Type:	В					
37.5	84		1	Depth (m)	0.50	Customer:	Energia / MWP			
28	76		1	Date Received		Date Testing	-	28/01/2021		
20	71		1	Description:	Brown clayey	//silty, very sa	indy, GRAVEL			
14	64	GRAVEL								
10	59	OIV WEE	ļ	Remarks	Note: Clause 9.2 and Clause 9.5	of BS1377:Part 2:1990 have been	superseded by ISO17892-4:2016 . Result	s apply to sample as received.	Sample size did not meet the requirements of BS1377	
6.3	52						0.063	0.3 0.425 0.6 1.18	2 3.35 5 6.3 10 14	2.020
5	48		100 -				0.0	0.4	2 .6 .6.	28 27. 550. 5530.
3.35	40									
2	32		90							
1.18	27		§ 80 <del>-</del>							
0.6	23		°) 70 +							
0.425	21	SAND	issi 60 +							
0.3	18		<u>ğ</u> 50 —							
0.15	14		Percentage passing (%)							
0.063	12		30 -						$L \sqcup \sqcup \sqcup \sqcup \sqcup$	
			20							
			10					<u> </u>		
		SILT/CLAY								
			0.000	0.00	1	0.01	0.1	1	10	100
					CLAY	SILT	Sieve size (mm	) SAND	GRAVEL	
							Approved by:		Date:	Page no:
		IGSL Lt	td Materia	als Laboratoi	y		A Byen	-	15/02/21	1 of 1
						Persons aut	horised to approve r	report: J Barrett (	Quality Manager) H Byrne	(Laboratory Manager



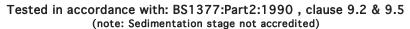


particle	%		C	ontract No.	2300	Report No.	R119067		•	
size	passing		C	ontract Name:	7 Hills Windf	arm				
75	100	COBBLES	В	H/TP:	T5 TP1					
63	100	0055220	S	ample No.	AA140087	Lab. Sample	No.	A21/0546		
50	100		S	ample Type:	В					
37.5	93		D	epth (m)	0.50	Customer:	Energia / MW	P		
28	78		D	ate Received		1 Date Testing	-	29/01/2021		
20	70		D	escription:	Brown clayey	y/silty, very sa	andy, GRAVEL			
14	63	GRAVEL								
10	55	GIVAVLL	R	emarks	Note: Clause 9.2 and Clause 9.5	5 of BS1377:Part 2:1990 have beer	n superseded by ISO17892-4:2016 . Res	sults apply to sample as received.		
6.3	47						0.15	0.3 1.425 0.6 1.18	2 3.35 6.3 10 14	28 37.5 530 63
5	44		100 _				0.063	0.3 0.425 0.6 1.18	3.3	37.28
3.35	35									
2	28		90							
1.18	24		\$ 80 ←						<del>                                     </del>	<del>/                                      </del>
0.6	19		Percentage passing (%)  00						$+ \cdots + $	
0.425	17	SAND	i <u>s</u> 60 —						+ + + + + + + + + + + + + + + + + + +	
0.3	15		<u>ω</u> 50 —							
0.15	11		tag 40 —							
0.063	8		30 —							
			20						1	
		SILT/CLAY	10							
			0.000	1 0.00	1	0.01	0.1	1	10	100
			3.000		CLAY	SILT	Sieve size (mn	n) <i>SAND</i>	GRAVEL	
							Approved by:		Date:	Page no:
		IGSL L	td Materia	ls Laborator	y		A Ryen		15/02/21	1 of 1
						Persons aut			Quality Manager) H Byrne	(Laboratory Manage



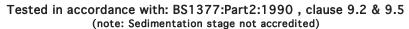


particle	%		Co	ontract No.	2300	Report No.	R118584			
size	passing		Co	ontract Name:	7 Hills Windfa	arm				
75	100	COBBLES	BH	H/TP:	T6 TP01					
63	100	CODDLLO	Sa	mple No.	AA145087	Lab. Sample	No.	A21/0548		
50	88		Sa	mple Type:	В					
37.5	88		De	epth (m)	0.50	Customer:	Energia / MWP			
28	88		Da			Date Testing		29/01/2021		
20	85		De	escription:	Brown slightly	y sandy, grave	elly, SILT/CLAY			
14	82	GRAVEL								
10	77	OIV WEE	Re	emarks	Note: Clause 9.2 and Clause 9.5	of BS1377:Part 2:1990 have been	superseded by ISO17892-4:2016 . Result	s apply to sample as received.	Sample size did not meet the requirements of BS1377	
6.3	72						0.063	0.3 0.425 0.6 1.18	2 3.35 5.3 6.3 10 14	2.020
5	69		100				0.0	0.4	2, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,	28 37. 530.
3.35	61		90							
2	54									
1.18	49		80 <del>-</del>							
0.6	43		°) 70 —							
0.425	40	SAND	issii 60 <del></del>							
0.3	38		စ္ဆိ 50 —						1	
0.15	34		Percentage passing (%)  00  00  00  00  00  00  00  00  00							
0.063	30		30							
			20							
			10							
		SILT/CLAY	0							
			0.0001	0.00		0.01	0.1	1	10	100
					CLAY	SILT	Sieve size (mm	) SAND	GRAVEL	
				1.1.			Approved by:		Date:	Page no:
		IGSL Lt	d Material	s Laborator	У		A Rejan	-	15/02/21	1 of 1
						Persons aut	horised to approve r	eport: J Barrett (0	Quality Manager) H Byrne	(Laboratory Manager



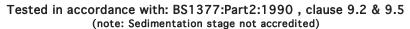


particle	%			Contract No.	23000	Report No.	R118585		•	
size	passing			Contract Name:	7 Hills Windf	arm				
75	100	COBBLES		BH/TP:	T6 TP02					
63	100	0055220		Sample No.	AA145088	Lab. Sample	No.	A21/0550		
50	91			Sample Type:	В					
37.5	82			Depth (m)	1.50	Customer:	Energia / MWP			
28	76			Date Received		1 Date Testing	-	28/01/2021		
20	67			Description:	Brown clayey	y/silty, sandy,	GRAVEL			
14	57	GRAVEL								
10	50	OIV (VLL		Remarks	Note: Clause 9.2 and Clause 9.5	of BS1377:Part 2:1990 have been	n superseded by ISO17892-4:2016 . Result:	s apply to sample as received.		
6.3	41						0.063	0.3 0.425 0.6 1.18	2 3.35 6.3 10 14 20	28 37.5 550 553
5	38		100 -				0.0	0.3 0.42 0.6 1.18	2. 3. 9. 17. 17. 17. 17. 17. 17. 17. 17. 17. 17	7600
3.35	30		90							
2	24									
1.18	20		§ 80 +							
0.6	15		Percentage passing (%)						<del>                                     </del>	
0.425	14	SAND	. 60 <del>-</del>						<del>            /  </del>	
0.3	12		<u>a</u> 50 +						+ + + + + + + + + + + + + + + + + + +	
0.15	10		19 40 H							
0.063	9		<u>8</u> 30 -							
			20 -						<u> </u>	
			10							
		SILT/CLAY	0							
			0.00	01 0.00	1	0.01	0.1	1	10	100
					CLAY	SILT	Sieve size (mm)	) SAND	<i>GRAVEL</i>	
				1 1 1 .			Approved by:		Date:	Page no:
		IGSL L	td Materi	als Laborato	У		A Byen	-	15/02/21	1 of 1
						Persons aut			Quality Manager) H Byrne	(Laboratory Manage



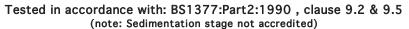


particle	%		Cont	ract No.	23000	Report No.	R118586		•	
size	passing		Cont	ract Name:	7 Hills Windf	arm				
75	100	COBBLES	BH/	ΓP:	T7 TP1					
63	100	0055220	Sam	ple No.	AA145080	Lab. Sample	No.	A21/0552		
50	94		Sam	ple Type:	В					
37.5	94		Dept	:h (m)	0.50	Customer:	Energia / MWP	•		
28	91		Date			1 Date Testing		28/01/2021		
20	88		Desc	cription:	Brown slight	ly sandy, grave	elly, SILT/CLAY			
14	83	GRAVEL								
10	79	OIV (VLL	Rem	arks	Note: Clause 9.2 and Clause 9.5	5 of BS1377:Part 2:1990 have beer	n superseded by ISO17892-4:2016 . Resul	its apply to sample as received.		
6.3	73						0.15	0.3 0.425 0.6 1.18	2 3.35 5.3 6.3 10 20	28 37.5 50 93
5	70		100				0.063	0.3 0.42 0.6 1.18	2 3. 3. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7.	37.8
3.35	62									
2	55		90							<u> </u>
1.18	50		€ 80							
0.6	44		Percentage passing (%)  00  00  00  00  00  00  00  00  00							
0.425	41	SAND	igg 60 +							
0.3	38		<u>8</u> 50 —						1	
0.15	33		40 tag							
0.063	29		30					1		
			20							
			10							
		SILT/CLAY								
			0.0001	0.001	•	0.01	0.1	1	10	100
					CLAY	SILT	Sieve size (mm	) SAND	GRAVEL	
		1001					Approved by:		Date:	Page no:
		IGSL L	td Materials	Laborator	<u> </u>		A Bejon	-	15/02/21	1 of 1
						Persons aut	horised to approve	report: J Barrett (	Quality Manager) H Byrne	(Laboratory Manager



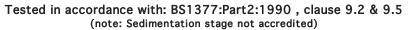


particle	%		(	Contract No.	23000	Report No.	R118587			
size	passing		(	Contract Name:	7 Hills Windf	farm				
75	100	COBBLES	E	BH/TP:	T7 TP2					
63	92	0055220		Sample No.	AA140081	Lab. Sample	No.	A21/0553		
50	88			Sample Type:	В					
37.5	88		[	Depth (m)	0.80	Customer:	Energia / MWP			
28	77		[	Date Received		1 Date Testing		28/01/2021		
20	71		[	Description:	Brown claye	y/silty, very sa	andy, GRAVEL with	some cobbles		
14	64	GRAVEL								
10	60	OIV (VLL	F	Remarks	Note: Clause 9.2 and Clause 9.	.5 of BS1377:Part 2:1990 have beer	n superseded by ISO17892-4:2016 . Results a	pply to sample as received.		
6.3	53						0.063	0.425 0.6 1.18	2 3.35 6.3 10 20	28 37.5 50 63
5	50		100 -				0.0	0.4	2	20.00.00.00
3.35	41		90							
2	34									
1.18	29		80 <del>-</del>							<del>                                      </del>
0.6	23	CANID	°) 70 +							
0.425	20	SAND	assii 60							
0.3	18		g 50 +							
0.15	14 12		40 <u>-</u>							
0.063	12		Percentage passing (%)						1	
			20							
			10					<u> </u>		
		SILT/CLAY	0							
			0.000	0.00	1	0.01	0.1	1	10	100
					CLAY	SILT	Sieve size (mm)	SAND	GRA VEL	
			Lal Materi	ala I ala cocat			Approved by:		Date:	Page no:
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			-			Persons aut			Quality Manager) H Byrne	(Laboratory Manager



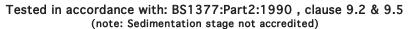


particle	%			Contract No.	2300	Report No.	R119068			
size	passing			Contract Name:	7 Hills Windf	arm				
75	80	COBBLES		BH/TP:	T8 TP1					
63	80			Sample No.	AA144656	Lab. Sample	No.	A21/0554		
50	80			Sample Type:	В					
37.5	68			Depth (m)	0.50	Customer:	Energia / MWP			
28	54			Date Received		1 Date Testino	-	29/01/2021		
20	46			Description:	Brown clayey	y/silty, sandy,	GRAVEL with man	y cobbles		
14	41	GRAVEL								
10	37	0.0.0		Remarks	Note: Clause 9.2 and Clause 9.5	of BS1377:Part 2:1990 have been	n superseded by ISO17892-4:2016 . Results a	pply to sample as received.	Sample size did not meet the requirements of BS1377	
6.3	33						0.063	0.3 0.425 0.6 1.18	2 3.35 5.3 6.3 10 14	2.020
5	31		100 -				0.0	0.3 0.42 0.6 1.18	2 2 3 3 3 7 7 7 9 7 9 9 9 9 9 9 9 9 9 9 9 9	783 783 793 793
3.35	28									
2	25		90							
1.18	23		€ 80							╫ <i>╫╆</i> ╫╫╏
0.6	21		S 70 +							╫╫╫╢
0.425	20	SAND	.isg 60 +					<del>               </del>		<del> /∥   ∦</del>
0.3	19		Percentage passing (%) - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 -						+ + + + + + + + + + + + + + + + + + +	<del>                                     </del>
0.15	16		66 to 40 to							
0.063	12		<u>9</u> 30 -							
			و 20 –						+	
			10							
		SILT/CLAY								
			0.00	01 0.00	1	0.01	0.1	1	10	100
					CLAY	SILT	Sieve size (mm)	SAND	GRAVEL	
							Approved by:		Date:	Page no:
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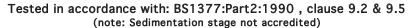


particle	%		(	Contract No.	2300	Report No.	R119069				
size	passing		(	Contract Name:	7 Hills Windfa	arm					
75	100	COBBLES	E	BH/TP:	T8 TP2						
63	100		9	Sample No.	AA149656	Lab. Sample	No.	A21/0555			
50	100			Sample Type:	В						
37.5	91		[	Depth (m)	0.50	Customer:	Energia / MW	/P			
28	81		I	Date Received		l Date Testing	-	29/01/2021			
20	74		I	Description:	Brown slightl	y sandy, grave	elly, SILT/CLAY				
14	66	GRAVEL									
10	61	GIV (VLL	F	Remarks	Note: Clause 9.2 and Clause 9.5	of BS1377:Part 2:1990 have been	superseded by ISO17892-4:2016 . Re	esults apply to sample as received.			
6.3	55						0.15	0.3 1.425 0.6 1.18	2 3.35 6.3 10 14	7.	
5	52		100 -				0.063	0.3 0.425 0.6 1.18	2 3.3 5.3 6.3 10 14 20	28 37. 53 53	
3.35	46										
2	40		90								
1.18	36		© 80 <del> </del>							<del>1                                      </del>	
0.6	32		<u>\$</u> 70 +						<del>                                     </del>		
0.425	31	SAND	iss 60								
0.3	30		<u>α</u> 50 –								
0.15	26		Percentage passing (%)								
0.063	24		30 —								
			20								
		SILT/CLAY	10								
			0.000	0.00	<u> </u>	0.01	0.1	1	10	100	
			0.000							100	
					CLAY	SILT	Sieve size (mi	m) <i>SAND</i>	GRAVEL		
							Approved by	:	Date:	Page no:	
		IGSL L	td Materia	als Laborator	У		A Byen	-	15/02/21	1 of 1	
	Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)										

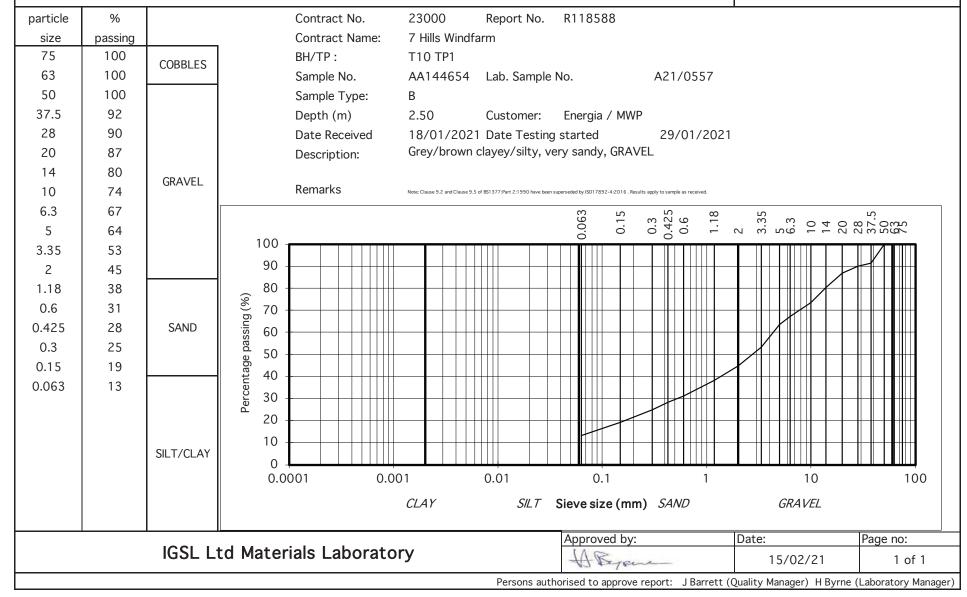


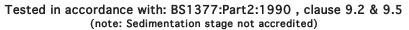


particle	%		C	ontract No.	2300	Report No.	R119070			
size	passing		Co	ontract Name:	7 Hills Windfa	arm				
75	100	COBBLES	BI	H/TP:	T10 TP1					
63	100	CODDLLO	Sa	ample No.	AA144653	Lab. Sample	No.	A21/0556		
50	100		Sa	ample Type:	В					
37.5	100		D	epth (m)	0.50	Customer:	Energia / MWF	)		
28	99		D	ate Received		Date Testing	•	29/01/2021		
20	90		D	escription:	Brown clayey	//silty, very sa	ndy, GRAVEL			
14	81	GRAVEL								
10	71	GIVAVEL	Re	emarks	Note: Clause 9.2 and Clause 9.5	of BS1377:Part 2:1990 have been	superseded by ISO17892-4:2016 . Resu	Its apply to sample as received.		
6.3	60						0.15	0.3 .425 0.6 1.18	2 3.35 5.3 6.3 10 14	28 37.5 550 53 63
5	55		100				0.063	0.3 0.425 0.6 1.18	2 2 3 3 3 5 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	3 2 2 3 2 3 2 3 2 3 2 3 2 3 2 3 2 3 2 3
3.35	47									
2	40		90							
1.18	35		© 80 <del>-</del>						<del>              /   </del>	
0.6	30		Percentage passing (%)  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0						+ + + + + + + + + + + + + + + + + + +	
0.425	28	SAND	issin 60 <del></del>							
0.3	25		<del>ω</del> 50 —					+		
0.15	18		40 —							
0.063	11		30 —							
			20 <del>-</del>					<del>                                     </del>		
		SILT/CLAY	10							
			0.000	1 0.00	1	0.01	0.1	1	10	100
					CLAY	SILT	Sieve size (mm	) SAND	GRAVEL	
		<u> </u>					Approved by:		Date:	Page no:
		IGSL L1	d Material	ls Laborator	y 		A Byen	-	15/02/21	1 of 1
						Persons aut	horised to approve	report: J Barrett (	Quality Manager) H Byrne	(Laboratory Manager



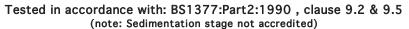






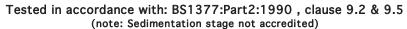


particle	%		С	ontract No.	2300	Report No.	R119072			
size	passing		С	ontract Name:	7 Hills Windf	arm				
75	100	COBBLES	В	H/TP:	T10 TP2					
63	100	0055220	S	ample No.	AA144655	Lab. Sample	No.	A21/0558		
50	96		S	ample Type:	В					
37.5	89		D	epth (m)	1.50	Customer:	Energia / MWF	)		
28	85		D			1 Date Testing	-	29/01/2021		
20	80		D	escription:	Brown clayey	y/silty, very sa	andy, GRAVEL			
14	75	GRAVEL								
10	68	GIVIVEL	R	emarks	Note: Clause 9.2 and Clause 9.5	of BS1377:Part 2:1990 have been	n superseded by ISO17892-4:2016 . Resu	Its apply to sample as received.		
6.3	61						0.15	0.3 1.425 0.6 1.18	2 3.35 6.3 10 20	28 37.5 50 93
5	58		100 -				0.063	0.3 0.425 0.6 1.18	23. 3. 3. 7. 17. 17. 17. 17. 17. 17. 17. 17. 17.	28 37 8
3.35	48									
2	39		90							
1.18	32		⊚ 80 —							
0.6	24		Percentage passing (%)  30  30  30							
0.425	21	SAND	.isg 60 <del>                                   </del>							
0.3	18		<u>ω</u> 50 —					+		
0.15	13		140 H							
0.063	11		9 30 L						1	
			20							
			10							
		SILT/CLAY								
			0.000	1 0.00		0.01	0.1	1	10	100
					CLAY	SILT	Sieve size (mm	) SAND	GRAVEL	
							Approved by:		Date:	Page no:
		IGSL L	td Materia	ls Laborator	y		A Byen	-	15/02/21	1 of 1
						Persons aut			Quality Manager) H Byrne	(Laboratory Manager



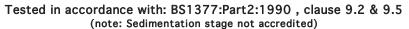


particle	%		C	ontract No.	2300	Report No.	R119071			
size	passing		C	ontract Name:	7 Hills Windfa	arm				
75	100	COBBLES	В	H/TP:	T11 TP01					
63	100	CODDLLO	S	ample No.	AA170966	Lab. Sample	No.	A21/0559		
50	86		S	ample Type:	В					
37.5	84		D	epth (m)	0.50	Customer:	Energia / MWP			
28	77		D	ate Received		l Date Testing	-	01/02/2021		
20	71		D	escription:	Brown clayey	//silty, very sa	ındy, GRAVEL			
14	66	GRAVEL								
10	61	OIV WEE	R	emarks	Note: Clause 9.2 and Clause 9.5	of BS1377:Part 2:1990 have been	superseded by ISO17892-4:2016 . Result	s apply to sample as received.	Sample size did not meet the requirements of BS1377	
6.3	54						0.15	0.3 0.425 0.6 1.18	2 3.35 5 6.3 10 14	7. 0.2.0
5	51		100 —				0.063	0.4.0	2.3.3.3.3.3.4 10 10 20 20 20 20 20 20 20 20 20 20 20 20 20	25.0 25.0 25.0 25.0 25.0
3.35	43									
2	37		90 —							
1.18	33		€ 80						1 11 1 1 1 1 /	<del> /  -      </del>
0.6	28		°) 70 —							
0.425	26	SAND	issi 60 <del> </del>							
0.3	23		<u>8</u> 50 —							
0.15	18		Percentage passing (%)  00 00 00 00 00 00 00 00 00 00 00 00 00							
0.063	13		<u>9</u> 30 —						1	
			20 —							
			10							
		SILT/CLAY								
			0.000	1 0.00	1	0.01	0.1	1	10	100
					CLAY	SILT	Sieve size (mm	) SAND	GRAVEL	
							Approved by:		Date:	Page no:
		IGSL L1	td Materia	ls Laborator	У		A Bejon	-	15/02/21	1 of 1
						Persons aut	horised to approve i	report: J Barrett (	Quality Manager) H Byrne	(Laboratory Manager



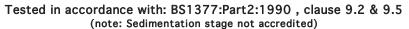


particle	%			Contract No.	2300	Report No.	R119073			
size	passing			Contract Name:	7 Hills Windfa	arm				
75	100	COBBLES		BH/TP:	T12 TP1					
63	100	CODDLLO		Sample No.	AA140099	Lab. Sample	No.	A21/0560		
50	100			Sample Type:	В					
37.5	89			Depth (m)	1.50	Customer:	Energia / MWP			
28	81			Date Received		Date Testing	-	01/02/2021		
20	78			Description:	Brown clayey	//silty, very sa	andy, GRAVEL			
14	73	GRAVEL								
10	68	OIV (VLL		Remarks	Note: Clause 9.2 and Clause 9.5	of BS1377:Part 2:1990 have been	n superseded by ISO17892-4:2016 . Result	s apply to sample as received.	Sample size did not meet the requirements of BS1377	
6.3	63						0.063	0.3 0.425 0.6 1.18	2 3.35 5.3 6.3 10 14	2.080
5	60		100 -				0.0	0.4	3. 3. 1. 0.0	23.0.55
3.35	52		90							
2	46									
1.18	41		<u>§</u> 80 +							<del>1                </del>
0.6	35		S) 70 +							
0.425	32	SAND	iss 60							
0.3	29		<u>ğ</u> 50 +							
0.15	21		Percentage passing (%)						1	
0.063	15		<u>9</u> 30							
			20					1		
			10							
		SILT/CLAY								
			0.00	0.00	1	0.01	0.1	1	10	100
					CLAY	SILT	Sieve size (mm	) SAND	GRAVEL	
							Approved by:		Date:	Page no:
		IGSL L	td Materia	als Laboratoi	ý		A Byen	_	15/02/21	1 of 1
						Persons aut	horised to approve i	report: J Barrett (	Quality Manager) H Byrne	(Laboratory Manager



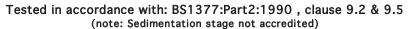


particle	%		ı	Contract No.	23000	Report No.	R118589		•	
size	passing			Contract Name:	7 Hills Windf	arm				
75	100	COBBLES		BH/TP:	T12 TP2					
63	100	0055220		Sample No.	AA145097	Lab. Sample	No.	A21/0561		
50	96			Sample Type:	В					
37.5	86			Depth (m)	0.50	Customer:	Energia / MW	Р		
28	81			Date Received		1 Date Testin	-	29/01/2021		
20	75			Description:	Brown claye	y/silty, very sa	andy, GRAVEL			
14	71	GRAVEL								
10	64	GIVAVLL		Remarks	Note: Clause 9.2 and Clause 9.	5 of BS1377:Part 2:1990 have beer	n superseded by ISO17892-4:2016 . Res	sults apply to sample as received.		
6.3	56						0.15	0.3 1.425 0.6 1.18	2 3.35 5.3 6.3 10 14	28 37.5 50 63 75
5	53		100 -				0.063	0.3 0.425 0.6 1.18	3.3	28 37 8 96 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9
3.35	42									
2	33		90							
1.18	26		€ 80							<del>/             </del>
0.6	18		Percentage passing (%)							
0.425	15	SAND	iss 60 +							
0.3	11		<u>o</u> 50							
0.15	8		66 40 H							
0.063	7		9 30 H						$X \sqcup \sqcup \sqcup \sqcup \sqcup$	
			20							
			10							
		SILT/CLAY								
			0.00	01 0.00	1	0.01	0.1	1	10	100
					CLAY	SILT	Sieve size (mn	n) <i>SAND</i>	GRAVEL	
							Approved by:		Date:	Page no:
		IGSL L	td Materia	als Laborator	<b>y</b>		A Byen	~	15/02/21	1 of 1
						Persons aut			Quality Manager) H Byrne	(Laboratory Manage



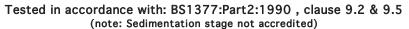


particle	%		(	Contract No.	2300	Report No.	R119074			
size	passing		(	Contract Name:	7 Hills Windfa	arm				
75	100	COBBLES	I	BH/TP:	T12 TP2					
63	100	CODDLLO	;	Sample No.	AA140098	Lab. Sample	No.	A21/0562		
50	93		;	Sample Type:	В					
37.5	81		1	Depth (m)	2.00	Customer:	Energia / MWP			
28	80			Date Received		Date Testing		29/01/2021		
20	74			Description:	Brown clayey	/silty, very sa	indy, GRAVEL			
14	67	GRAVEL								
10	62	OIV (VLL		Remarks	Note: Clause 9.2 and Clause 9.5	of BS1377:Part 2:1990 have been	superseded by ISO17892-4:2016 . Result	s apply to sample as received.		
6.3	56						0.063	0.3 0.425 0.6 1.18	2 3.35 5 6.3 10 14	28 37.5 530 53 63
5	53		100 -				0.0	0.4 0.1	2 2 3 3 5 7 7 6 9 7 9 7 9 7 9 9 9 9 9 9 9 9 9 9 9	7600 37
3.35	46		90							ППИШ
2	40									
1.18	36		80							
0.6	32	CAND	Percentage passing (%)							
0.425	30	SAND	assii 60 +							
0.3	28		° 50 +							
0.15	24 20		40 <del>-</del>							
0.063	20		<u>ਨੂੰ</u> 30 –							
			20							
			10							
		SILT/CLAY	0							
			0.00	0.00	1	0.01	0.1	1	10	100
					CLAY	SILT	Sieve size (mm	) SAND	GRAVEL	
							Approved by:		Date:	Page no:
		IGSL L	td Materia	als Laborato	<b>΄</b>		A Byen	_	15/02/21	1 of 1
						Persons aut	horised to approve r	eport: J Barrett (	Quality Manager) H Byrne	(Laboratory Manager)



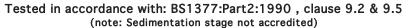


particle	%		C	ontract No.	2300	Report No.	R119075		•	
size	passing		C	ontract Name:	7 Hills Windf	arm				
75	100	COBBLES	В	H/TP:	T13 TP01					
63	100	0055220	S	ample No.	AA140100	Lab. Sample	No.	A21/0565		
50	100		S	ample Type:	В					
37.5	90		D	epth (m)	1.50	Customer:	Energia / MWP	•		
28	86		D	ate Received		1 Date Testing	-	29/01/2021		
20	78		D	escription:	Brown clayey	//silty, very sa	andy, GRAVEL			
14	71	GRAVEL								
10	65	OIV (VLL	R	emarks	Note: Clause 9.2 and Clause 9.5	of BS1377:Part 2:1990 have been	n superseded by ISO17892-4:2016 . Resul	ts apply to sample as received.		
6.3	57						0.15	0.3 0.425 0.6 1.18	2 3.35 6.3 10 14	28 37.5 50 53 75
5	52		100 —				0.063	0.3 0.42 0.6 1.18	3.3.7	75.00
3.35	42									
2	34		90							
1.18	27		€ 80							
0.6	21		Percentage passing (%)  00 00 00 00 00 00 00 00 00 00 00 00 00							
0.425	18	SAND	iss 60 <del> </del>							
0.3	15		<u>8</u> 50 —							
0.15	12		40 L							
0.063	10		9 30 —							
			20							
			10							
		SILT/CLAY								
			0.000	1 0.00		0.01	0.1	1	10	100
					CLAY	SILT	Sieve size (mm	) SAND	GRAVEL	
							Approved by:		Date:	Page no:
		IGSL L	td Materia	ls Laborator	<b>y</b>		A Bejon	-	15/02/21	1 of 1
						Persons aut			Quality Manager) H Byrne	(Laboratory Manage

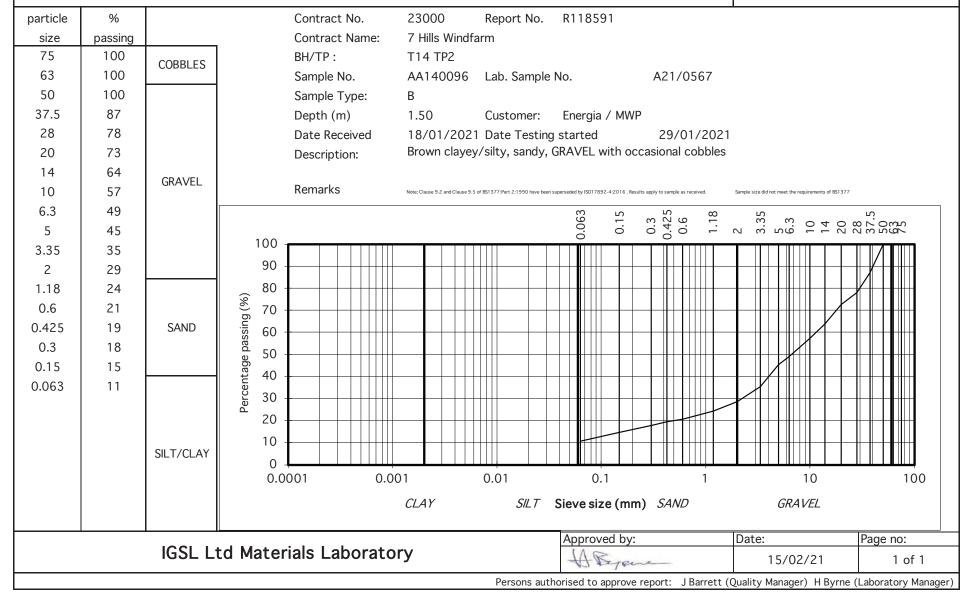


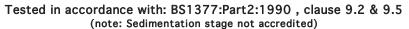


particle	%		С	ontract No.	23000	Report No.	R118590		•	
size	passing		C	ontract Name:	7 Hills Windf	arm				
75	83	COBBLES	В	H/TP:	T13 TP2					
63	83	CODDLLO	S	ample No.	AA144651	Lab. Sample	No.	A21/0563		
50	83		S	ample Type:	В					
37.5	83		D	epth (m)	1.50	Customer:	Energia / MWP			
28	80		D	ate Received		1 Date Testing	-	28/01/2021		
20	76		D	escription:	Brown slight	ly sandy, grave	elly, SILT/CLAY w	ith some cobbles	3	
14	71	GRAVEL								
10	66	GIVAVEL	R	emarks	Note: Clause 9.2 and Clause 9.5	5 of BS1377:Part 2:1990 have beer	n superseded by ISO17892-4:2016 . Result	s apply to sample as received.	Sample size did not meet the requirements of BS1377	
6.3	61						0.15	0.3 .425 0.6	2 3.35 5.3 6.3 10 14	7. 02.0
5	59		100 -				0.063	0.3 0.425 0.6 1.18	23.33.3	23.0 53.0 53.0
3.35	53									
2	48		90							
1.18	43		⊚ 80 —							
0.6	38		Percentage passing (%) 00 00 00 00 00 00 00 00 00 00 00 00 00							
0.425	35	SAND	iss 60 <del>-</del>							
0.3	32		<u>ω</u> 50 —							
0.15	27		tag 40						1	
0.063	22		9 30 —							
			20							
		SILT/CLAY	10 —							
			0.000	1 0.00	1	0.01	0.1	1	10	100
			3.300	. 0.00	CLAY	SILT	Sieve size (mm	) SAND	GRAVEL	
							Approved by:		Date:	Page no:
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						Persons aut	_		Quality Manager) H Byrne	



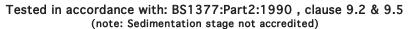






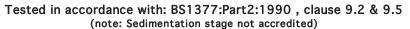


particle	%			Contract No.	23000	Report No.	R119076			
size	passing			Contract Name:	7 Hills Windfa	arm				
75	80	COBBLES		BH/TP:	T14 TP1					
63	80	CODDLLO		Sample No.	AA140097	Lab. Sample	No.	A21/0566		
50	80			Sample Type:	В					
37.5	75			Depth (m)	1.50	Customer:	Energia / MWP			
28	62			Date Received		l Date Testing	-	29/01/2021		
20	51			Description:	Brown clayey	//silty, sandy,	GRAVEL with son	ne cobbles		
14	48	GRAVEL								
10	44	OIV (VLL		Remarks	Note: Clause 9.2 and Clause 9.5	of BS1377:Part 2:1990 have been	n superseded by ISO17892-4:2016 . Result	s apply to sample as received.	Sample size did not meet the requirements of BS1377	
6.3	40						0.063	0.3 0.425 0.6 1.18	2 3.35 5 6.3 10 14	7. 0.2.0
5	38		100 -				0.0	0.4	7	7830.7.8
3.35	35									
2	32		90 -							
1.18	30		80 <del>-</del>							
0.6	27		<u>်</u> ) 70 +							<del>  /          </del>
0.425	26	SAND	assir 60						<del>                                     </del>	<del>┨╢╫</del> ╫╫
0.3	24		<u>ğ</u> 50 +						$lackbox{ } lackbox{ } lac$	
0.15	19		Percentage passing (%) - 00 - 00 - 00 - 00 - 00 - 00 - 00 -							
0.063	14		<u>9</u> 30 -							
			20 -							
			10							
		SILT/CLAY	0							
			0.00	0.00	)1	0.01	0.1	1	10	100
					CLAY	SILT	Sieve size (mm	) SAND	GRAVEL	
				-1-1-1			Approved by:		Date:	Page no:
		IGSL Li	ta Materi	als Laborato	ry		A Bejon	-	15/02/21	1 of 1
						Persons aut	horised to approve r	eport: J Barrett (	Quality Manager) H Byrne	(Laboratory Manager



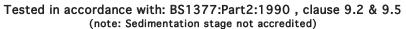


particle	%		Cor	ntract No.	23000	Report No.	R118592			
size	passing		Cor	ntract Name:	7 Hills Windf	arm				
75	100	COBBLES	BHA	/TP:	T15 TP2					
63	100	CODDLLO	Sar	mple No.	AA145093	Lab. Sample	No.	A21/0568		
50	100		Sar	mple Type:	В					
37.5	97		Dep	pth (m)	1.50	Customer:	Energia / MWP			
28	96		Dat			1 Date Testino	•	29/01/2021		
20	90		Des	scription:	Brown clayey	//silty, very sa	ndy, GRAVEL wit	h occasional cob	bles	
14	87	GRAVEL								
10	81	GIVAVEL	Rer	marks	Note: Clause 9.2 and Clause 9.5	of BS1377:Part 2:1990 have been	superseded by ISO17892-4:2016 . Result	s apply to sample as received.		
6.3	72						0.15	0.3 .425 0.6	2 3.35 5.3 6.3 10 14	7. 02.
5	69		100				0.063	0.3 0.425 0.6 1.18	2 2 3 3 3 7 7 7 7 9 7 9 7 9 7 9 9 9 9 9 9 9	28 37.1 63 63
3.35	61									
2	53		90							
1.18	47		© 80 <del></del>							
0.6	39		<u>ိ</u> ရ 70 —						<del>                                     </del>	
0.425	35	SAND	iss 60							
0.3	30		Percentage passing (%)  00						<del>                                     </del>	
0.15	20		40 —							
0.063	14		30							
			20					1		
		SILT/CLAY	10							
			0.0001	0.001		0.01	0.1	1	10	100
					CLAY	SILT	Sieve size (mm	) SAND	GRA VEL	
							Approved by:		Date:	Page no:
		IGSL Lt	d Materials	Laborator	<b>y</b>		A Bejon	_	15/02/21	1 of 1
1						Persons aut	horised to approve r	eport: J Barrett (	Quality Manager) H Byrne	(Laboratory Manager

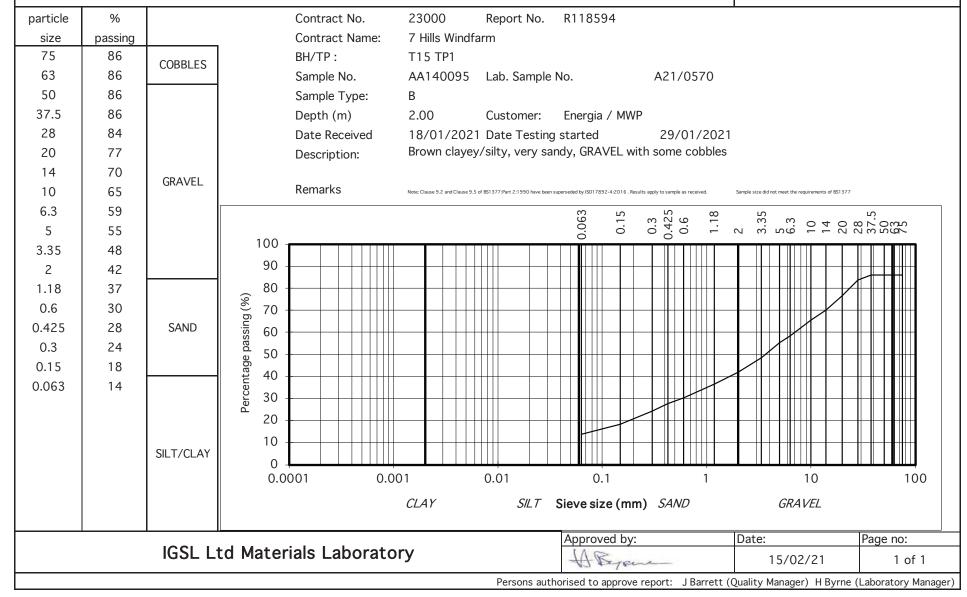


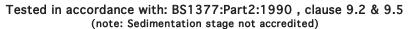


particle	%		(	Contract No.	23000	Report No.	R118593			
size	passing		(	Contract Name:	7 Hills Windfa	arm				
75	100	COBBLES	l	BH/TP:	T15 TP1					
63	100	CODDLLO	;	Sample No.	AA145094	Lab. Sample	No.	A21/0569		
50	100		;	Sample Type:	В					
37.5	100		1	Depth (m)	0.50	Customer:	Energia / MWP			
28	92		1	Date Received		l Date Testing	-	27/01/2021		
20	84		1	Description:	Brown clayey	//silty, very sa	ındy, GRAVEL witl	n occasional cob	bles	
14	78	GRAVEL								
10	70	GIVAVEL	1	Remarks	Note: Clause 9.2 and Clause 9.5	of BS1377:Part 2:1990 have been	superseded by ISO17892-4:2016 . Results	s apply to sample as received.		
6.3	61						0.15	0.3 .425 0.6 1.18	2 3.35 5.3 6.3 10 14	7. 0.2.
5	57		100 -				0.063	0.3 0.425 0.6 1.18	200.00	7830 27 37 37 37 37 37 37 37 37 37 37 37 37 37
3.35	45									
2	37		90						<b>1</b>	
1.18	30		© 80 <del> </del>							
0.6	23		<u>\$</u> 70 +						$lackbox{1}{\hspace{-0.1cm}} \hspace{0.1cm} 0.1$	
0.425	21	SAND	iss 60 +							
0.3	18		Percentage passing (%)						$+ \parallel / \parallel \parallel \parallel \perp \perp$	
0.15	15		tag 40 +							
0.063	13		30 <del>-</del>						1	
			20							
		SILT/CLAY	10							
			0.000	0.00	1	0.01	0.1	1	10	100
					CLAY	SILT	Sieve size (mm)	) SAND	GRAVEL	
							Approved by:		Date:	Page no:
		IGSL L1	td Materia	als Laborator	<b>У</b>		A Bejon	_	15/02/21	1 of 1
						Persons aut	horised to approve r	eport: J Barrett (	Quality Manager) H Byrne	(Laboratory Manager)



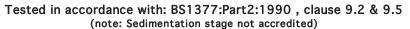






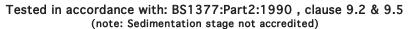


particle	%			Contract No.	23000	Report No.	R119077			
size	passing			Contract Name:	7 Hills Windfa	arm				
75	84	COBBLES		BH/TP:	T16 TP1					
63	84	CODDLLO		Sample No.	AA145090	Lab. Sample	No.	A21/0571		
50	79			Sample Type:	В					
37.5	68			Depth (m)	0.50	Customer:	Energia / MWP			
28	67			Date Received	18/01/202	1 Date Testino	g started	29/01/2021		
20	62			Description:	Brown clayey	//silty, sandy,	GRAVEL with som	e cobbles		
14	57	GRAVEL								
10	52	GIVAVLL		Remarks	Note: Clause 9.2 and Clause 9.5	of BS1377:Part 2:1990 have been	n superseded by ISO17892-4:2016 . Results a	apply to sample as received.	Sample size did not meet the requirements of BS1377	
6.3	46						0.15	0.3 .425 0.6 1.18	2 3.35 5.3 6.3 10 14	ν. Ω
5	43		100				0.063	0.3 0.425 0.6 1.18	23.33.33.33.33.33.33.33.33.33.33.33.33.3	28 37.8 530.8
3.35	37		100							
2	31		90							
1.18	28		© 80 +							
0.6	25		<u>\$</u> 70 +							<del>┊</del> ╃╫╢
0.425	23	SAND	iss 60 +						$lackbox{ } \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \$	
0.3	22		Percentage passing (%) - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 -							
0.15	18		tag +0 +							
0.063	14		30 -							
			a 20							
		SILT/CLAY	10 -							
			0.00	01 0.00	<u> </u>	0.01	0.1	1	10	100
			0.00	0.00						100
					CLAY	SILT	Sieve size (mm)	SAND	GRAVEL	
				-l- l -l			Approved by:		Date:	Page no:
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						Persons aut	horised to approve re	eport: J Barrett (	Quality Manager) H Byrne	(Laboratory Manager



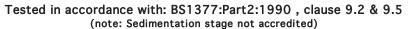


particle	%		(	Contract No.	23000	Report No.	R118595		•	
size	passing		(	Contract Name:	7 Hills Windf	arm				
75	100	COBBLES	E	BH/TP:	T16 TP2					
63	100	0055220	S	Sample No.	AA140093	Lab. Sample	No.	A21/0572		
50	100		S	Sample Type:	В					
37.5	94			Depth (m)	1.40	Customer:	Energia / MWP			
28	86			Date Received		1 Date Testin		29/01/2021		
20	81		Г	Description:	Brown claye	y/silty, very sa	andy, GRAVEL with	n occasional cob	bles	
14	75	GRAVEL								
10	68	GIVAVLL	F	Remarks	Note: Clause 9.2 and Clause 9.	5 of BS1377:Part 2:1990 have beer	n superseded by ISO17892-4:2016 . Results	apply to sample as received.		
6.3	60						63	0.3 1.425 0.6 1.18	2 3.35 5.3 6.3 10 20	28 37.5 550 63
5	55		100				0.063	0.3 0.425 0.6 1.18	2 3.3 3.3 4 10 10 20	28 37 55 53 53
3.35	47		100							
2	38		90							<del> /       </del>
1.18	31		80							
0.6	23		Percentage passing (%)						<del>                </del>	
0.425	20	SAND	.ig 60 —							
0.3	18		50							
0.15	15		40 t							
0.063	12		30						1	
			Per 30							
			20							
		SILT/CLAY	10					<del>                                      </del>		
		OIL 17 OL7 (1	0 -	1 000					10	100
			0.000	0.00		0.01	0.1	1	10	100
					CLAY	SILT	Sieve size (mm)	SAND	GRAVEL	
				la Labanat			Approved by:		Date:	Page no:
		IGSL Li	ta Materia	ıls Laborator	y 		A Ryan	_	15/02/21	1 of 1
						Persons aut	horised to approve re	eport: J Barrett (	Quality Manager) H Byrne	(Laboratory Manage



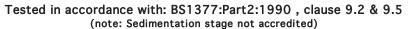


particle	%		C	ontract No.	23000	Report No.	R119079		•	
size	passing		Co	ontract Name:	7 Hills Windf	arm				
75	100	COBBLES	BI	H/TP:	T17 TP1					
63	100	0055220	Sa	ample No.	AA149658	Lab. Sample	No.	A21/0574		
50	100		Sa	ample Type:	В					
37.5	98		D	epth (m)	1.50	Customer:	Energia / MWF	<b>)</b>		
28	91		D			1 Date Testing	-	29/01/2021		
20	78		D	escription:	Brown claye	y/silty, very sa	andy, GRAVEL			
14	71	GRAVEL								
10	62	OIV (VLL	Re	emarks	Note: Clause 9.2 and Clause 9.	5 of BS1377:Part 2:1990 have been	n superseded by ISO17892-4:2016 . Resu	ults apply to sample as received.		
6.3	54						0.15	0.3 1.425 0.6 1.18	2 3.35 6.3 10 14	28 37.5 50 53
5	49		100				0.063	0.3 0.425 0.6 1.18	3.3.3.7	75.00
3.35	44									
2	37		90							<u> </u>
1.18	30		⊚ 80 —						<del>                                     </del>	
0.6	24		Percentage passing (%)  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0						+ + + + + + + + + + + + + + + + + + +	
0.425	21	SAND	issi 60 <del></del>							
0.3	18		<u>ω</u> 50 —					+		
0.15	14		tag 40 —							
0.063	11		<u>9</u> 30						1	
			20							
			10							
		SILT/CLAY								
			0.000	1 0.00		0.01	0.1	1	10	100
					CLAY	SILT	Sieve size (mm	n) SAND	GRAVEL	
							Approved by:		Date:	Page no:
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						Persons aut			Quality Manager) H Byrne	(Laboratory Manage



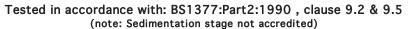


particle	%		(	Contract No.	23000	Report No.	R119078		•	
size	passing		(	Contract Name:	7 Hills Windf	arm				
75	100	COBBLES	E	BH/TP:	T17 TP2					
63	100	0055220	9	Sample No.	AA144657	Lab. Sample	No.	A21/0573		
50	93		S	Sample Type:	В					
37.5	83		[	Depth (m)	1.50	Customer:	Energia / MWP			
28	70		[	Date Received		1 Date Testing	-	29/01/2021		
20	63		[	Description:	Brown clayey	y/silty, sandy,	GRAVEL			
14	56	GRAVEL								
10	49	OIV (VLL	F	Remarks	Note: Clause 9.2 and Clause 9.5	of BS1377:Part 2:1990 have been	n superseded by ISO17892-4:2016 . Results	apply to sample as received.		
6.3	42						0.15	0.3 0.425 0.6 1.18	2 3.35 6.3 10 14	28 37.5 550 553
5	39		100 -				0.063	0.3 0.42 0.6 1.18	2 3. 5 6. 7 7	32.2
3.35	34									
2	29		90							
1.18	25		€ 80							<del>  /         </del>
0.6	21		Percentage passing (%)							<del>∦╫╂</del> ╫╫
0.425	20	SAND	.iss 60 +							
0.3	18		<u>8</u> 50 —							
0.15	14		96° 40 —							
0.063	9		9 30 L							
			20						1	
			10					111111111		
		SILT/CLAY								
			0.000	0.00	1	0.01	0.1	1	10	100
					CLAY	SILT	Sieve size (mm)	) SAND	GRA VEL	
		1001					Approved by:		Date:	Page no:
		IGSL L	td Materia	als Laborator	у 		A Bypen	_	15/02/21	1 of 1
						Persons aut	horised to approve r	eport: J Barrett (	Quality Manager) H Byrne	(Laboratory Manage



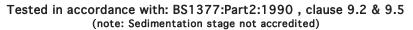


particle	%		(	Contract No.	23000	Report No.	R118596		•	
size	passing		(	Contract Name:	7 Hills Windf	arm				
75	100	COBBLES	E	BH/TP:	T18 TP1					
63	100	0055220		Sample No.	AA144600	Lab. Sample	No.	A21/0575		
50	100		Ç	Sample Type:	В					
37.5	95		1	Depth (m)	0.50	Customer:	Energia / MWP			
28	87		1	Date Received		1 Date Testing		29/01/2021		
20	80		1	Description:	Brown claye	y/silty, very sa	andy, GRAVEL with	n occasional cob	bles	
14	72	GRAVEL								
10	65	OIV (VLL	F	Remarks	Note: Clause 9.2 and Clause 9.5	5 of BS1377:Part 2:1990 have beer	n superseded by ISO17892-4:2016 . Results	apply to sample as received.		
6.3	55						0.15	0.3 0.425 0.6 1.18	2 3.35 6.3 10 14	28 37.5 53 63
5	52		100 -				0.063	0.3 0.42 0.6 1.18	2 3. 5. 6. 7.	3 2 3 3 5
3.35	44									
2	37		90							
1.18	32		<u></u> 80 +							
0.6	27		Percentage passing (%)					<del>                                      </del>	1	
0.425	25	SAND	issi 60 +							
0.3	23		<u>ğ</u> 50 —							
0.15	19		10 H							
0.063	16		30 <del>-</del>						1	
			20							
			10							
		SILT/CLAY								
			0.000	0.00	1	0.01	0.1	1	10	100
					CLAY	SILT	Sieve size (mm)	) SAND	GRA VEL	
		1001					Approved by:		Date:	Page no:
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						Persons aut			Quality Manager) H Byrne	(Laboratory Manager





particle	%			Contract No.	23000	Report No.	R119081		•	
size	passing			Contract Name:	7 Hills Windf	arm				
75	100	COBBLES		BH/TP:	T18 TP1					
63	100			Sample No.	AA144661	Lab. Sample	No.	A21/0577		
50	100			Sample Type:	В					
37.5	88			Depth (m)	2.50	Customer:	Energia / MWP			
28	81			Date Received		1 Date Testing		29/01/2021		
20	77			Description:	Brown claye	y/silty, sandy,	GRAVEL			
14	69	GRAVEL								
10	63	GIVAVLL		Remarks	Note: Clause 9.2 and Clause 9.	5 of B\$1377:Part 2:1990 have beer	n superseded by ISO17892-4:2016 . Resul	ts apply to sample as received.	Sample size did not meet the requirements of BS1 377	
6.3	54						0.15	0.3 .425 0.6 1.18	2 3.35 6.3 10 14	ν
5	50		100 -				0.063	0.3 0.425 0.6 1.18	2 3.3 3.3 5 6.3 10 10 20	28 37. 53 53 53
3.35	41									
2	33		90 +							
1.18	29		© 80 +					+	<del>                                     </del>	<del>1              </del>
0.6	26		Percentage passing (%)						+ + + + + + + + + + + + + + + + + + +	
0.425	25	SAND	.is 60 +						+ + + + + + + + + + + + + + + + + + +	
0.3	24		<u>α</u> 50 +							
0.15	21		6 tag							
0.063	16		30 +							
			Per							
			20 -							
		SILT/CLAY	10 -							
			0 1	01 0.00	1	0.01	0.1		10	100
			0.00	0.00				ı		100
					CLAY	SILT	Sieve size (mm	) SAND	GRAVEL	
		1001					Approved by:		Date:	Page no:
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						Persons aut			Quality Manager) H Byrne	(Laboratory Manage

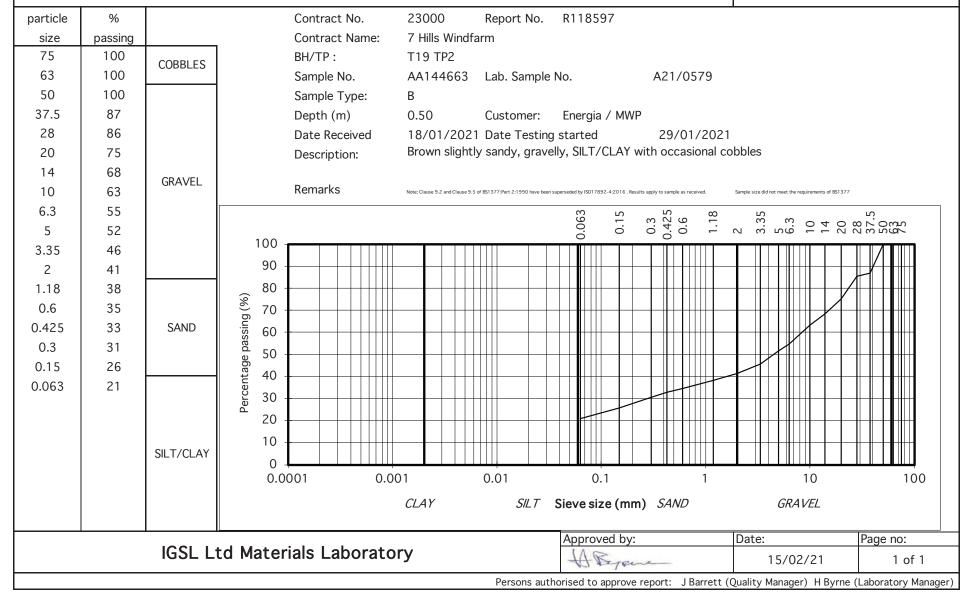


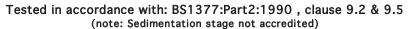


particle	%		C	Contract No.	23000	Report No.	R119080			
size	passing		C	Contract Name:	7 Hills Windf	arm				
75	100	COBBLES	В	BH/TP:	T18 TP2					
63	100		S	Sample No.	AA149659	Lab. Sample	No.	A21/0576		
50	100		S	Sample Type:	В					
37.5	91		С	epth (m)	1.50	Customer:	Energia / M	IWP		
28	89		С			1 Date Testing	-	01/02/2021		
20	82		С	escription:	Brown slight	ly sandy, grave	elly, SILT/CLA	Y		
14	77	GRAVEL								
10	71	OIV (VLL	R	lemarks	Note: Clause 9.2 and Clause 9.5	of BS1377:Part 2:1990 have been	n superseded by ISO17892-4:201	6 . Results apply to sample as received.		
6.3	64						0.15	0.3 1.425 0.6	2 3.35 5.3 6.3 10 14	ν
5	60		100 _				0.063	0.3 0.425 0.6 1.18	2 3.3 5.3 6.3 10 14 20	28 37. 53 53
3.35	54									
2	49		90							
1.18	45		80 <del> </del>						<del>                                     </del>	
0.6	40		8 70 <del>-</del>						+ + + + + + + + + + + + + + + + + + +	
0.425	38	SAND	iss 60 —							
0.3	36		<u>8</u> 50 —							
0.15	31		Percentage passing (%)  00 00 00 00 00 00 00 00 00 00 00 00 00							
0.063	24		30 L							
			Per 30							
			20							
		SILT/CLAY	10							
			0.000	0.001		0.01	0.1	1	10	100
			0.000					1		100
					CLAY	SILT	Sieve size (r	nm) SAND	GRAVEL	
							Approved k	by:	Date:	Page no:
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						Persons aut			Quality Manager) H Byrne	(Laboratory Manager



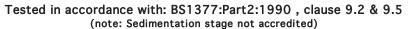






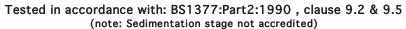


particle	%			Contract No.	23000	Report No.	R119082			
size	passing			Contract Name:	7 Hills Windfa	•	KITTOOL			
75	100	0000150		BH/TP:	T19 TP1					
63	100	COBBLES		Sample No.	AA144662	Lab. Sample	No.	A21/0578		
50	100			Sample Type:	В					
37.5	87			Depth (m)	1.50	Customer:	Energia / MWI	P		
28	82			Date Received	18/01/202	Date Testing	g started	29/01/2021		
20	74			Description:	Brown slightl	y sandy, grave	elly, SILT/CLAY			
14	68	GRAVEL								
10	62	GIVAVLL		Remarks	Note: Clause 9.2 and Clause 9.5	of BS1377:Part 2:1990 have been	n superseded by ISO17892-4:2016 . Res	ults apply to sample as received.	Sample size did not meet the requirements of BS1377	
6.3	55						0.15	0.3 1.425 0.6 1.18	2 3.35 5.3 6.3 10 14	ω
5	52		100 -				0.063	0.3 0.425 0.6 1.18	2 3.3 3.3 6.3 10 14 20	28 37. 53 53
3.35	44									
2	40		90							
1.18	36		<u>§</u> 80 +							<del>1                </del>
0.6	33		<u>စ</u> ် 70 +							
0.425	32	SAND	.iss 60 +							
0.3	31		Percentage passing (%) - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 -							
0.15	27 22		± 40 +							<del>                                     </del>
0.063	22		<u>8</u> 30 +							
			20 -							
			10							
		SILT/CLAY	0							
			0.00	0.00	1	0.01	0.1	1	10	100
					CLAY	SILT	Sieve size (mn	n) SAND	GRAVEL	
				1 1 1 .			Approved by:		Date:	Page no:
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						Persons aut	horised to approve	report: J Barrett (	Quality Manager) H Byrne	(Laboratory Mana



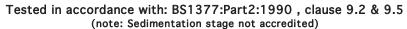


particle	%		Со	ntract No.	23000	Report No.	R119084		•	
size	passing		Со	ntract Name:	7 Hills Windf	arm				
75	100	COBBLES	ВН	I/TP:	T20 TP2					
63	100	CODDLLO	Sa	mple No.	AA144673	Lab. Sample	No.	A21/0581		
50	100		Sa	mple Type:	В					
37.5	95		De	epth (m)	1.50	Customer:	Energia / MWP			
28	91		Da			1 Date Testino	-	01/02/2021		
20	91		De	escription:	Brown slight	ly sandy, slight	tly gravelly, SILT/0	CLAY		
14	87	GRAVEL								
10	83	OIV (VLL	Re	marks	Note: Clause 9.2 and Clause 9.5	of BS1377:Part 2:1990 have been	superseded by ISO17892-4:2016 . Results	apply to sample as received.		
6.3	78						0.15	0.3 0.425 0.6 1.18	2 3.35 5.3 6.3 10 14	28 37.5 50 63
5	76		100				0.063	0.3 0.42 0.6 1.18	2 3. 3. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7.	26.50
3.35	70									
2	65		90							
1.18	60		§ 80 <del>−</del>							
0.6	54		Percentage passing (%)  00  00  00  00  00  00  00  00  00					<del>                                      </del>		
0.425	51	SAND	issi 60							
0.3	47		<u>ğ</u> 50 —							
0.15	41		90° 40 +							
0.063	36		<u>9</u> 30 —							
			20							
			10							
		SILT/CLAY								
			0.0001	0.001		0.01	0.1	1	10	100
					CLAY	SILT	Sieve size (mm)	SAND	GRAVEL	
							Approved by:		Date:	Page no:
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						Persons aut			Quality Manager) H Byrne	(Laboratory Manager



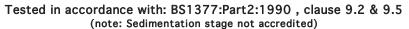


particle	%		(	Contract No.	23000	Report No.	R119083		•	
size	passing		(	Contract Name:	7 Hills Windf	arm				
75	100	COBBLES	E	BH/TP:	T19 TP2					
63	100	0055220		Sample No.	AA149663	Lab. Sample	No.	A21/0580		
50	100			Sample Type:	В					
37.5	100		[	Depth (m)	2.20	Customer:	Energia / MWP			
28	97		[	Date Received		1 Date Testing	-	29/01/2021		
20	87		[	Description:	Brown clayey	y/silty, very sa	andy, GRAVEL			
14	78	GRAVEL								
10	71	OIV (VLL	F	Remarks	Note: Clause 9.2 and Clause 9.5	of BS1377:Part 2:1990 have been	n superseded by ISO17892-4:2016 . Resu	Its apply to sample as received.		
6.3	62						0.15	0.3 0.425 0.6 1.18	2 3.35 6.3 10 14	28 37.5 50 53 75
5	57		100 -				0.063	0.3 0.42 0.6 1.18	2 3. 5 6. 7 7	32.6
3.35	46									
2	39		90							
1.18	35		€ 80 +							
0.6	31		Percentage passing (%)							
0.425	29	SAND	.iss 60 +							
0.3	27		<u>8</u> 50 —						$+ \parallel / \parallel \parallel \parallel \parallel \perp \parallel$	
0.15	23		96° 40 —							
0.063	19		30 <del>-</del>							
			20							
			10							
		SILT/CLAY								
			0.000	0.00	1	0.01	0.1	1	10	100
					CLAY	SILT	Sieve size (mm	) SAND	<i>GRAVEL</i>	
							Approved by:		Date:	Page no:
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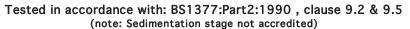


particle	%		Сс	ontract No.	23000	Report No.	R118598			
size	passing		Co	ontract Name:	7 Hills Windfa	arm				
75	100	COBBLES	BH	I/TP:	T20 TP1					
63	100	CODDLLO	Sa	mple No.	AA149674	Lab. Sample	No.	A21/0582		
50	94		Sa	mple Type:	В					
37.5	90		De	epth (m)	0.50	Customer:	Energia / MWP			
28	87		Da	ite Received		Date Testing		29/01/2021		
20	81		De	escription:	Brown slightl	y sandy, grave	elly, SILT/CLAY wi	th occasional co	bbles	
14	76	GRAVEL								
10	73	GIVAVEL	Re	marks	Note: Clause 9.2 and Clause 9.5	of BS1377:Part 2:1990 have been	superseded by ISO17892-4:2016 . Results	apply to sample as received.		
6.3	68						0.15	0.3 .425 0.6 1.18	2 3.35 5.3 6.3 10 14	2, O22
5	66		100 -				0.063	0.3 0.425 0.6 1.18	23.33.10	28 37.1 53 63 63
3.35	60									
2	55		90							
1.18	51		⊚ 80 —							
0.6	45		Percentage passing (%)  00  00  00  00  00  00  00  00  00							
0.425	42	SAND	iss 60 +							
0.3	39		<u>ω</u> 50 —						1	
0.15	34		t 40 +							
0.063	30		30 L							
			20							
		SILT/CLAY	10							
			0.0001	0.00		0.01	0.1	1	10	100
					CLAY		Sieve size (mm)	SAND	GRAVEL	
							Approved by:		Date:	Page no:
		IGSL L	td Material	s Laborator	<b>y</b>		A Byen		15/02/21	1 of 1
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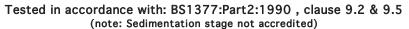


particle	%			Contract No.	23000	Report No.	R119085			
size	passing			Contract Name:	7 Hills Wind	farm				
75	100	COBBLES		BH/TP:	T20 TP1					
63	100	COBBLEO		Sample No.	A149675	Lab. Sample	No.	A21/0583		
50	96			Sample Type:	В					
37.5	89			Depth (m)	2.80	Customer:	Energia / MW	P		
28	82			Date Received	18/01/202	21 Date Testing	g started	01/02/2021		
20	78			Description:	Brown slight	tly sandy, grave	elly, SILT/CLAY			
14	74	GRAVEL								
10	71	GIVAVLL		Remarks	Note: Clause 9.2 and Clause 9	0.5 of BS1377:Part 2:1990 have been	superseded by ISO17892-4:2016 . Re	esults apply to sample as received.		
6.3	67						63	0.3 .425 0.6	3 35	r¿.
5	65		100				0.063	0.3 0.42! 0.6 1.18	2 3.35 5.3 6.3 10 14	28 37.5 50 63 75
3.35	58		100 -							
2	53		90 -							
1.18	49		80 -							<del>1                                     </del>
0.6	45		% 70 -							
0.425	43	SAND	ssinis 60 -							
0.3	40		Percentage passing (%)  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0							
0.15	35		14age							
0.063	32		30 -							
			Per 0.5							
			20 -						<del>1              </del>	
		SILT/CLAY	10 -							
		SIL 17 CLA1	0 -							
			0.00	0.00	)1	0.01	0.1	1	10	100
					CLAY	SILT	Sieve size (mi	m) SAND	GRAVEL	
	<u> </u>						Approved by	:	Date:	Page no:
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_						Persons aut			Quality Manager) H Byrne	(Laboratory Manager



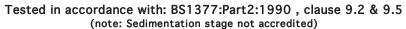


particle	%		Co	ontract No.	23000	Report No.	R118599			
size	passing		Co	ontract Name:	7 Hills Windf	arm				
75	100	COBBLES	BH	H/TP:	T21 TP1					
63	100	CODDLLO	Sa	imple No.	AA144672	Lab. Sample	No.	A21/0584		
50	90		Sa	imple Type:	В					
37.5	90		De	epth (m)	1.50	Customer:	Energia / MWP			
28	88		Da	ate Received	18/01/202	1 Date Testino	g started	29/01/2021		
20	84		De	escription:	Brown slightl	y sandy, grave	elly, SILT/CLAY wi	th occasional co	bbles	
14	81	GRAVEL								
10	77	GIVAVEL	Re	emarks	Note: Clause 9.2 and Clause 9.5	of BS1377:Part 2:1990 have been	superseded by ISO17892-4:2016 . Results	apply to sample as received.		
6.3	70						0.15	0.3 .425 0.6 1.18	2 3.35 5.3 6.3 10 14	ν. 
5	68		100				0.063	0.3 0.425 0.6 1.18	2020	28 37.1 530.1
3.35	63		100							
2	57		90							<del>┦</del> ╫╢
1.18	52		€ 80 —					<del>                                     </del>		
0.6	46		<u>ိ</u> စ် 70 —							
0.425	43	SAND	.iss 60 +							
0.3	40		Percentage passing (%)  00  00  00  00  00  00  00  00  00						1	
0.15	34		ge + 40 +							
0.063	29		30 —							
			20 E							
		SILT/CLAY	10							
			0.0001	0.00	1	0.01	0.1	1	10	100
			0.0001							100
					CLAY	S/LT	Sieve size (mm)	SAND	GRAVEL	
		1001 1	-1 14-1 1	. 1			Approved by:		Date:	Page no:
		IGSL Li	ta Material	s Laborator	У		A Bejan	_	15/02/21	1 of 1
						Persons aut	horised to approve re	eport: J Barrett (	Quality Manager) H Byrne	(Laboratory Manager)





particle	%		C	Contract No.	23000	Report No.	R119086			
size	passing		C	ontract Name:	7 Hills Windf	arm				
75	100	COBBLES	В	H/TP:	T21 TP2					
63	100	CODDLLO	S	ample No.	AA149670	Lab. Sample	No.	A21/0585		
50	100		S	ample Type:	В					
37.5	98		D	epth (m)	0.50	Customer:	Energia / MWF	)		
28	92		D	ate Received		l Date Testino		29/01/2021		
20	90		D	escription:	Brown slightl	y sandy, grave	elly, SILT/CLAY			
14	85	GRAVEL								
10	79	OIV (VLL	R	emarks	Note: Clause 9.2 and Clause 9.5	of BS1377:Part 2:1990 have been	superseded by ISO17892-4:2016 . Resu	ults apply to sample as received.		
6.3	73						0.063	0.3 0.425 0.6 1.18	2 3.35 6.3 10 14	28 37.5 50 93
5	70		100 -				0.0	0.3 0.42 0.6 1.18	2. 3	2002
3.35	62		90							
2	57									
1.18	53		§ 80 <del>-</del>							
0.6	49	CAND	ို့ 70 <del>-</del>							
0.425	47	SAND	assir 60							
0.3	45		g 50 —							
0.15 0.063	39 31		140 —					1		
0.063	31		Percentage passing (%)  00							
			20							
			10							
		SILT/CLAY	0							
			0.000	1 0.00	1	0.01	0.1	1	10	100
					CLAY	SILT	Sieve size (mm	n) SAND	GRAVEL	
							Approved by:		Date:	Page no:
		IGSL Li	to Materia	ls Laborator	y 		A Bejon		15/02/21	1 of 1
						Persons aut			Quality Manager) H Byrne	(Laboratory Manager



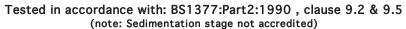


particle	%		С	ontract No.	23000	Report No.	R119087			
size	passing		C	ontract Name:	7 Hills Windfa	arm				
75	100	COBBLES	ВІ	H/TP:	T21 TP2					
63	100	CODDLLO	Sa	ample No.	AA144671	Lab. Sample	No.	A21/0586		
50	95		Sa	ample Type:	В					
37.5	91		D	epth (m)	2.50	Customer:	Energia / MWF	)		
28	87		D	ate Received		Date Testing		29/01/2021		
20	86		D	escription:	Brown slightly	y sandy, grave	elly, SILT/CLAY			
14	83	GRAVEL								
10	78	GIVAVEL	Re	emarks	Note: Clause 9.2 and Clause 9.5	of BS1377:Part 2:1990 have been	superseded by ISO17892-4:2016 . Resu	Its apply to sample as received.		
6.3	72						0.15	0.3 .425 0.6 1.18	2 3.35 5.3 6.3 10 14	2, O20
5	69		100				0.063	0.3 0.425 0.6 1.18	3.3.1	37.1
3.35	61									
2	55		90							
1.18	52		⊚ 80 —							
0.6	47		Percentage passing (%)							
0.425	45	SAND	issi 60 —							
0.3	42		<u>8</u> 50 —						1	
0.15	36		140 —					<del>                                      </del>		
0.063	32		<u>9</u> 30							
			20							
			10							
		SILT/CLAY								
			0.000	1 0.00	1	0.01	0.1	1	10	100
					CLAY	SILT	Sieve size (mm	) SAND	GRAVEL	
							Approved by:		Date:	Page no:
		IGSL L1	td Materia	ls Laborator	у 		A Byen	-	12/02/21	1 of 1
						Persons aut	horised to approve	report: J Barrett (0	Quality Manager) H Byrne	(Laboratory Manager



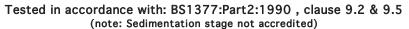


particle	%			Contract No.	23000	Report No.	R119088		•	
size	passing			Contract Name:	7 Hills Windf	arm				
75	83	COBBLES		BH/TP:	Mast TP1					
63	83			Sample No.	AA140089	Lab. Sample	No.	A21/0587		
50	83			Sample Type:	В					
37.5	83			Depth (m)	0.40	Customer:	Energia / M	WP		
28	80			Date Received		1 Date Testing	-	29/01/2021		
20	80			Description:	Brown slight	ly sandy, slight	tly gravelly, SI	LT/CLAY with some	cobbles	
14	79	GRAVEL								
10	77	GIVIVEE		Remarks	Note: Clause 9.2 and Clause 9.	5 of B\$1377:Part 2:1990 have beer	n superseded by ISO17892-4:2010	5 . Results apply to sample as received.	Sample size did not meet the requirements of BS1377	
6.3	76						.063	0.3 .425 0.6	2 3.35 6.3 10 20	28 37.5 50 95
5	75		100 -				0.063	0.3 0.425 0.6	2 .6 .9 .7 .7 .9 .9 .9 .9 .9 .9 .9 .9 .9 .9 .9 .9 .9	32 32 32 32 32 32 32 32 32 32 32 32 32 3
3.35	73									
2	71		90 -							
1.18	70		© 80 -						<del>                                     </del>	
0.6	67		<u>©</u> 70 -						<del>                                     </del>	
0.425	65	SAND	iss 60 -							
0.3	61		eg 50 -					1		
0.15	53		Percentage passing (%) 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0							
0.063	43		30 -							
			Per							
			20 -							
		SILT/CLAY	10 -							
		0.2.7 02.11	0 -	201		0.01	0.1		10	100
			0.00	0.00	)	0.01	0.1	ı	10	100
					CLAY	SILT	Sieve size (r	nm) SAND	GRAVEL	
							Approved b	by:	Date:	Page no:
		IGSL L	td Mater	ials Laborato	ry		HBy.	gue-	15/02/21	1 of 1
						Persons aut	horised to appro	ove report: J Barrett (	Quality Manager) H Byrne	(Laboratory Manager



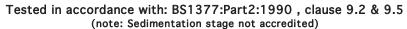


particle	%		Со	ntract No.	23000	Report No.	R118600			
size	passing		Со	ntract Name:	7 Hills Windfa	arm				
75	100	COBBLES	ВН	/TP:	Mast TP1					
63	100	CODDLLO	Sa	mple No.	AA145089	Lab. Sample	No.	A21/0588		
50	96		Sa	mple Type:	В					
37.5	94		De	pth (m)	1.70	Customer:	Energia / MWP			
28	89		Da			Date Testing	•	28/01/2021		
20	82		De	scription:	Brown clayey	/silty, very sa	ndy, GRAVEL wit	h occasional cob	bles	
14	76	GRAVEL								
10	72	OIV WEE	Re	marks	Note: Clause 9.2 and Clause 9.5	of BS1377:Part 2:1990 have been	superseded by ISO17892-4:2016 . Result:	s apply to sample as received.		
6.3	67						0.063	0.3 0.425 0.6 1.18	2 3.35 5.3 6.3 10 14	. 0 20 . 5
5	64		100				0.0	0.4	2. 3	250 250 250 250 250
3.35	59									
2	53		90							
1.18	47		§ 80 <del>-</del>							
0.6	40		°) 70 —							
0.425	37	SAND	assir 60							
0.3	33		Percentage passing (%)  00  00  00  00  00  00  00  00  00						<del>1                                      </del>	
0.15	26		04 rtag							
0.063	19		<u>9</u> 30							
			20							
			10							
		SILT/CLAY								
			0.0001	0.00	1	0.01	0.1	1	10	100
					CLAY	SILT	Sieve size (mm)	) SAND	<i>GRAVEL</i>	
							Approved by:		Date:	Page no:
		IGSL Lt	d Materials	s Laborator	y 		A Rejan	_	15/02/21	1 of 1
						Persons autl	horised to approve r	eport: J Barrett (	Quality Manager) H Byrne	(Laboratory Manager)



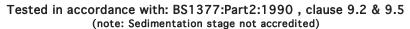


particle	%			Contract No.	23000	Report No.	R118601		•	
size	passing			Contract Name:	7 Hills Windf	farm				
75	100	COBBLES		BH/TP:	Mast TP2					
63	100			Sample No.	AA140090	Lab. Sample	No.	A21/0589		
50	100			Sample Type:	В					
37.5	96			Depth (m)	0.50	Customer:	Energia / MWP			
28	88			Date Received		1 Date Testing	-	29/01/2021		
20	74			Description:	Brown claye	y/silty, sandy,	GRAVEL with occa	asional cobbles		
14	65	GRAVEL								
10	59	GIVIVEL		Remarks	Note: Clause 9.2 and Clause 9.	.5 of B\$1377:Part 2:1990 have been	n superseded by ISO17892-4:2016 . Results	apply to sample as received.		
6.3	50						0.15	0.3 1.425 0.6 1.18	2 3.35 6.3 10 20	28 37.5 50 63 75
5	46		100 -				0.063	0.3 0.425 0.6 1.18	23.33.10.10.10.10.10.10.10.10.10.10.10.10.10.	37.28
3.35	37									
2	29		90 +							<del>//                                     </del>
1.18	23		© 80 +						<del>                                     </del>	
0.6	19		<u>\$</u> 70 +						<del>            /</del>	
0.425	17	SAND	.is 60 +						1	
0.3	16		Percentage passing (%)							
0.15	13		6 tag							
0.063	10		30 +							
			20						1	
								1-11-11		
		SILT/CLAY	10 +							
			0.00	01 0.00	1	0.01	0.1	1	10	100
			0.00	0.00						100
					CLAY	SILT	Sieve size (mm)	SAND	GRAVEL	
l							Approved by:		Date:	Page no:
		IGSL L	td Materi	als Laboratoi	У		A Bejan	-	15/02/21	1 of 1
						Persons aut			Quality Manager) H Byrne	(Laboratory Manage



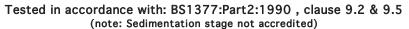


particle	%		Contra	act No.	23000	Report No.	R119089		•	
size	passing		Contra	act Name:	7 Hills Wind	farm				
75	100	COBBLES	BH/TF	?:	Sub Station	TP1				
63	100	0023220	Sampl	e No.	AA144667	Lab. Sample	No.	A21/0590		
50	100		Sampl	e Type:	В					
37.5	100		Depth	(m)	0.50	Customer:	Energia / MWF			
28	94		Date I			21 Date Testino		29/01/2021		
20	92		Descr	iption:	Brown slight	tly sandy, grave	elly, SILT/CLAY			
14	87	GRAVEL								
10	83	OIV WEE	Remai	rks	Note: Clause 9.2 and Clause 9	1.5 of BS1377:Part 2:1990 have been	superseded by ISO17892-4:2016 . Resu	Its apply to sample as received.		
6.3	77						0.063	0.3 0.425 0.6 1.18	2 3.35 5.3 6.3 10 20	28 37.5 50 93
5	75		100				0.0	0.3 0.42 0.6 1.18	2 3. 3. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7.	32 32 32
3.35	67									
2	60		90							
1.18	54		<u>\$</u> 80							
0.6	47		°) 70							
0.425	44	SAND	issii 60						$H \parallel \parallel$	
0.3	41		g 50 -							
0.15	37		04 tag					<del>                                     </del>		
0.063	34		Dercentage passing (%)  00  00  00  00  00  00  00  00  00							
			20							
			10							
		SILT/CLAY	0							
			0.0001	0.001		0.01	0.1	1	10	100
					CLAY	SILT	Sieve size (mm	) SAND	GRAVEL	
							Approved by:		Date:	Page no:
		IGSL Li	d Materials L	_aborator <u>y</u>	<b>/</b>		A Bejon	-	15/02/21	1 of 1
						Persons aut			Quality Manager) H Byrne	(Laboratory Manager





particle	%		Contract No.	23000	Report No.	R119267		L			
size	passing		Contract Nam	ne: 7 Hills Wind	lfarm						
75	100	COBBLES	BH/TP:	Sub Station	n TP01						
63	96	COBBLEG	Sample No.	AA144668	Lab. Sample	No.	A21/0592				
50	88		Sample Type:	В							
37.5	86		Depth (m)	2.20	Customer:	Energia / MWP					
28	76		Date Received		21 Date Testing	-	29/01/2021				
20	68		Description:	Brown clay	ey/silty, very sa	andy, GRAVEL with	occasional cob	bles			
14	64	GRAVEL									
10	56	GIVIVEE	Remarks	Note: Clause 9.2 and Clause	9.5 of BS1377:Part 2:1990 have been	n superseded by ISO17892-4:2016 . Results a	apply to sample as received.	Sample size did not meet the requirements of BS1377			
6.3	49					0.063	0.3 0.425 0.6 1.18	35.3	2.020		
5	46		100			0.0	0.4	2 3.33 6.3 10 14 20	7830		
3.35	41		90								
2	35										
1.18	31		80						<del>/     <b>   </b>                              </del>		
0.6	26		°) 70				<del>                                      </del>				
0.425	25	SAND	isse 60								
0.3	23		<u>a</u> 50								
0.15	19 15		Dercentage passing (%)  60  40  30								
0.063	15		30					1			
			20								
			10								
		SILT/CLAY	0								
			0.0001	0.001	0.01	0.1	1	10	100		
				CLAY	S/LT	Sieve size (mm)	SAND	GRAVEL			
						Approved by:		Date:	Page no:		
		IGSL L	td Materials Labor	atory		A Byen	_	15/02/21	1 of 1		
	Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)										





particle	%		Cor	ntract No.	23000	Report No.	R119043			
size	passing		Cor	ntract Name:	7 Hills Windt	farm				
75	100	COBBLES	BH/	TP:	Sub Station	TP02				
63	92		Sar	nple No.	AA144669	Lab. Sample	No.	A21/0593		
50	92		San	nple Type:	В					
37.5	92		Dep	oth (m)	1.50	Customer:	Energia / MWP			
28	85		Dat			1 Date Testing	-	29/01/2021		
20	80		Des	scription:	Brown claye	y/silty, very sa	andy, GRAVEL with	some cobbles		
14	73	GRAVEL								
10	69	OIV (VLL	Rer	narks	Note: Clause 9.2 and Clause 9	.5 of BS1377:Part 2:1990 have beer	n superseded by ISO17892-4:2016 . Results	apply to sample as received.		
6.3	62						0.15	0.3 0.425 0.6 1.18	2 3.35 5.3 6.3 10 14	. 020
5	58		100				0.063	0.3 0.42 0.6 1.18	2 7 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	37.1
3.35	50									
2	42		90							
1.18	34		€ 80							
0.6	25		Dercentage passing (%)  00						+ + + + + + + + + + + + + + + + + + +	
0.425	22	SAND	issi 60 <del></del>							
0.3	19		<u>ω</u> 50 —							
0.15	15		40 tr						$\mathcal{L}$	
0.063	14		30							
			20							
			10					T		
		SILT/CLAY								
			0.0001	0.001		0.01	0.1	1	10	100
					CLAY	SILT	Sieve size (mm)	SAND	GRAVEL	
				1 -1	_		Approved by:		Date:	Page no:
		IGSL Li	to Materials	Laboratory	/		A Byan	_	15/02/21	1 of 1
· · · · · ·						Persons aut			Quality Manager) H Byrne	(Laboratory Manager

#### Appendix 7

#### Chemical Testing - Soil

#### **Chemtest Report**

Standard Report\_21-02643-20210203 072257



eurofins Chemtest

Eurofins Chemtest Ltd Depot Road Newmarket CB8 0AL Tel: 01638 606070

Email: info@chemtest.com

# **Final Report**

**Report No.:** 21-02643-1

Initial Date of Issue: 03-Feb-2021

Client IGSL

Client Address: M7 Business Park

Naas

County Kildare

Ireland

Contact(s): Darren Keogh

Project 23000 7 Hills Windfarm Energia (MWP)

Quotation No.: Q20-21693 Date Received: 29-Jan-2021

Order No.: Date Instructed: 29-Jan-2021

No. of Samples: 24

Turnaround (Wkdays): 7 Results Due: 08-Feb-2021

Date Approved: 03-Feb-2021

Approved By:

**Details:** Glynn Harvey, Technical Manager

# Results - Soil

#### Project: 23000 7 Hills Windfarm Energia (MWP)

Client: IGSL		Che	mtest J	ob No.:	21-02643	21-02643	21-02643	21-02643	21-02643	21-02643	21-02643	21-02643	21-02643	21-02643
Quotation No.: Q20-21693	(	Chemte	st Sam	ple ID.:	1132825	1132827	1132828	1132829	1132830	1132831	1132832	1132833	1132834	1132836
		Client Sample ID.:			145084	145073	145075	145076	140077	140078	140087	145087	140080	144653
		Sample Location:			T1 TP01	T3 TP01	T3 TP02	T3 TP02	T4 TP02	T4 TP02	T5 TP01	T6 TP01	T7 TP01	T10 TP01
			Sampl	е Туре:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top De	pth (m):	0.50	0.50	0.50	1.50	0.50	2.80	0.50	0.50	1.40	0.50
		Bot	tom De	pth (m):	0.80	0.80	0.80	1.80	0.80	3.20	0.80	0.80	1.70	0.80
Determinand	Accred.	SOP	Units	LOD										
Moisture	N	2030	%	0.020	10	12	13	9.3	18	8.3	9.1	10	6.2	8.2
рН	U	2010		4.0	[A] 8.8		[A] 8.6		[A] 8.4		[A] 8.7	[A] 8.9	[A] 9.0	[A] 9.1
pH (2.5:1)	N	2010		4.0	[A] 8.8		[A] 8.6		[A] 8.5		[A] 8.8	[A] 9.1	[A] 9.0	[A] 9.3
Magnesium (Water Soluble)	N	2120	g/l	0.010	[A] < 0.010		[A] < 0.010		[A] < 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	[A] < 0.010	[A] < 0.010	[A] < 0.010
Total Sulphur	U	2175	%	0.010	[A] 0.032		[A] 0.036		[A] 0.041		[A] 0.025	[A] 0.028	[A] 0.019	[A] 0.016
Chloride (Water Soluble)	U	2220	g/l	0.010	[A] 0.011		[A] < 0.010		[A] < 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		< 0.010		0.013		0.011	< 0.010	< 0.010	< 0.010
Ammonium (Water Soluble)	U	2120	g/l	0.01	< 0.01		< 0.01		< 0.01		< 0.01	< 0.01	< 0.01	< 0.01
Sulphate (Acid Soluble)	U	2430	%	0.010	[A] 0.018		[A] 0.046		[A] 0.057		[A] 0.016	[A] 0.010	[A] < 0.010	[A] < 0.010
Organic Matter	U	2625	%	0.40		[A] 0.66		[A] < 0.40		[A] < 0.40				

# Results - Soil

#### Project: 23000 7 Hills Windfarm Energia (MWP)

	, , , , ,													
Client: IGSL		Che	mtest J	ob No.:	21-02643	21-02643	21-02643	21-02643	21-02643	21-02643	21-02643	21-02643	21-02643	21-02643
Quotation No.: Q20-21693		Chemtest Sample ID.:			1132837	1132838	1132839	1132840	1132841	1132842	1132843	1132844	1132845	1132846
		Client Sample ID.:				140098	145099	140097	145094	145090	144657	144660	144662	144673
		Sample Location:				T12 TP02	T13 TP01	T14 TP02	T15 TP01	T16 TP01	T17 TP02	T18 TP01	T19 TP01	T20 TP02
		Sample Type:				SOIL								
			Top De	pth (m):	0.50	2.00	0.30	1.50	0.50	0.50	1.50	0.50	1.50	1.50
		Bottom Depth (m):			1.00	2.30	0.50	1.80	0.80	0.80	2.00	0.80	1.80	1.80
Determinand	Accred.	SOP	Units	LOD										
Moisture	N	2030	%	0.020	17	7.9	18	8.4	6.4	5.3	7.6	6.3	12	7.6
рН	U	2010		4.0	[A] 8.5	[A] 8.8	[A] 8.5	[A] 8.9	[A] 9.0	[A] 9.1	[A] 8.9	[A] 9.0	[A] 8.7	[A] 9.0
pH (2.5:1)	N	2010		4.0	[A] 8.5	[A] 9.0	[A] 8.6	[A] 9.0	[A] 9.1	[A] 9.1	[A] 9.0	[A] 9.1	[A] 8.9	[A] 9.1
Magnesium (Water Soluble)	N	2120	g/l	0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 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	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010
Total Sulphur	U	2175	%	0.010	[A] 0.034	[A] 0.028	[A] 0.028	[A] 0.018	[A] 0.021	[A] 0.016	[A] 0.017	[A] 0.018	[A] 0.018	[A] 0.016
Chloride (Water Soluble)	U	2220	g/l	0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010
Nitrate (Water Soluble)	N	2220	g/l	0.010	0.012	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Ammonium (Water Soluble)	U	2120	g/l	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Sulphate (Acid Soluble)	U	2430	%	0.010	[A] 0.052	[A] 0.015	[A] 0.027	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] 0.013	[A] < 0.010	[A] 0.015	[A] < 0.010
Organic Matter	U	2625	%	0.40										

# Results - Soil

#### Project: 23000 7 Hills Windfarm Energia (MWP)

Client: IGSL		Chemtest Job No.:				21-02643	21-02643	21-02643
Quotation No.: Q20-21693	(	Chemtest Sample ID.:		1132847	1132848	1132849	1132850	
		Cli	ent Sam	ple ID.:	149670	140089	144667	144669
		Sa	ample Lo	ocation:	T21 TP02	Mast TP01	Substation TP01	Substation TP02
			Sampl	е Туре:	SOIL	SOIL	SOIL	SOIL
			Top Dep	oth (m):	0.50	0.40	0.50	1.50
		Bot	tom Dep	oth (m):	0.80	0.60	1.00	1.80
Determinand	Accred.	SOP	Units	LOD				
Moisture	N	2030	%	0.020	8.2	17	8.1	8.9
рН	U	2010		4.0	[A] 8.8	[A] 8.5	[A] 8.9	[A] 9.1
pH (2.5:1)	N	2010		4.0	[A] 8.9	[A] 8.6	[A] 8.9	
Magnesium (Water Soluble)	N	2120	g/l	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	
Total Sulphur	U	2175	%	0.010	[A] 0.019	[A] 0.031	[A] 0.015	
Chloride (Water Soluble)	U	2220	g/l	0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	
Nitrate (Water Soluble)	N	2220	g/l	0.010	< 0.010	< 0.010	< 0.010	
Ammonium (Water Soluble)	U	2120	g/l	0.01	< 0.01	< 0.01	< 0.01	
Sulphate (Acid Soluble)	U	2430	%	0.010	[A] 0.015	[A] 0.030	[A] 0.011	
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:
1132825		145084	T1 TP01		А	Amber Glass 250ml
1132825		145084	T1 TP01		А	Plastic Tub 500g
1132827		145073	T3 TP01		А	Amber Glass 250ml
1132827		145073	T3 TP01		А	Plastic Tub 500g
1132828		145075	T3 TP02		А	Amber Glass 250ml
1132828		145075	T3 TP02		А	Plastic Tub 500g
1132829		145076	T3 TP02		А	Amber Glass 250ml
1132829		145076	T3 TP02		А	Plastic Tub 500g
1132830		140077	T4 TP02		А	Amber Glass 250ml
1132830		140077	T4 TP02		А	Plastic Tub 500g
1132831		140078	T4 TP02		А	Amber Glass 250ml
1132831		140078	T4 TP02		А	Plastic Tub 500g
1132832		140087	T5 TP01		А	Amber Glass 250ml
1132832		140087	T5 TP01		А	Plastic Tub 500g
1132833		145087	T6 TP01		А	Amber Glass 250ml
1132833		145087	T6 TP01		А	Plastic Tub 500g
1132834		140080	T7 TP01		А	Amber Glass 250ml
1132834		140080	T7 TP01		А	Plastic Tub 500g
1132836		144653	T10 TP01		А	Amber Glass 250ml
1132836		144653	T10 TP01		А	Plastic Tub 500g
1132837		170966	T11 TP01		А	Amber Glass 250ml
1132837		170966	T11 TP01		А	Plastic Tub 500g

## **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:
1132838		140098	T12 TP02		А	Amber Glass 250ml
1132838		140098	T12 TP02		А	Plastic Tub 500g
1132839		145099	T13 TP01		А	Amber Glass 250ml
1132839		145099	T13 TP01		А	Plastic Tub 500g
1132840		140097	T14 TP02		А	Amber Glass 250ml
1132840		140097	T14 TP02		А	Plastic Tub 500g
1132841		145094	T15 TP01		А	Amber Glass 250ml
1132841		145094	T15 TP01		А	Plastic Tub 500g
1132842		145090	T16 TP01		А	Amber Glass 250ml
1132842		145090	T16 TP01		А	Plastic Tub 500g
1132843		144657	T17 TP02		А	Amber Glass 250ml
1132843		144657	T17 TP02		А	Plastic Tub 500g
1132844		144660	T18 TP01		А	Amber Glass 250ml
1132844		144660	T18 TP01		А	Plastic Tub 500g
1132845		144662	T19 TP01		А	Amber Glass 250ml
1132845		144662	T19 TP01		А	Plastic Tub 500g
1132846		144673	T20 TP02		А	Amber Glass 250ml
1132846		144673	T20 TP02		А	Plastic Tub 500g
1132847		149670	T21 TP02		А	Amber Glass 250ml
1132847		149670	T21 TP02		А	Plastic Tub 500g
1132848		140089	Mast TP01		А	Amber Glass 250ml
1132848		140089	Mast TP01		А	Plastic Tub 500g

## **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:
1132849		144667	Substation TP01		А	Amber Glass 250ml
1132849		144667	Substation TP01		А	Plastic Tub 500g
1132850		144669	Substation TP02		А	Amber Glass 250ml
1132850		144669	Substation TP02		А	Plastic Tub 500g

# **Test Methods**

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	рН	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 measuremernt 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

Key	
U	UKAS accredited
М	MCERTS and UKAS accredited
Ν	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
Т	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 operation 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

### **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)

#### Sample Retention and Disposal

All soil samples will be retained for a period of 45 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

# Appendix 8

# **Soil Redox Potential**

# **Nicholls Colton Report**

L21-0576-IGS-001



IGSL Unit F M7 Business Park Naas

Analytical Test Report: L21/0576/IGS/001

Your Project Reference: **7 Hills Windfarm Energia** Samples Received on: 22/02/2021

Your Order Number: 18877 Testing Instruction Received: 22/02/2021

Report Issue Number: 1 Sample Tested: 22/02 to 02/03/2021

Samples Analysed: 9 soil samples Report issued: 02/03/2021

Signed

Peter Swanston

**Environmental Laboratories Manager** 

Nicholls Colton Group

Notes:

General

Please refer to Methodologies tab for details pertaining to the analytical methods undertaken.

Samples will be retained for 14 days after issue of this report unless otherwise requested.

Samples were supplied by customer, results apply to the samples as received.

Where specification limits are included these are for guidance only. Where a measured value has been highlighted this is not implying acceptance or failure and certainty of measurement values have not been taken into account.

Uncertainty of measurement values are available on request.

Accreditation Key

UKAS = UKAS Accreditation, u = Unaccredited

Date of Issue 10/12/2020 Owned by Emily Blissett - Customer Services Supervisor



NC Reference			143518	143519	143520	143521
Client Sample Reference			A21/0709	A21/0711	A21/0714	A21/0720
Material			Soil	Soil	Soil	Soil
Source/Client Ref			TP02	TP01	TP02	TP02
Source/Client Rei			T1	Т3	Т6	T13
Sample Description			Greyish brown clayey sandy crushed rock	Brown slightly silty very gravelly sandy clay	Greyish brown clayey sandy crushed rock	Orangish brown slightly sandy very gravelly silty clay
In House Determinations	Units	Accreditation				
Redox (pE)	(mV)	u	160	181	190	198



NC Reference			143522	143523	143524	143525
Client Sample Reference			A21/0722	A21/0723	A21/0726	A21/0727
Material			Soil	Soil	Soil	Soil
Source/Client Ref		TP02	TP02	TP02	TP01	
Source/ chefit Net			T15	T16	T19	T20
Sample Description			Brownish grey slightly clayey very gravelly silty sand	Brownish grey slightly clayey very gravelly silty sand	Light brown very gravelly sandy clay	Greyish brown slightly silty very gravelly sandy clay
In House Determinations	Units	Accreditation				
Redox (pE)	(mV)	u	186	189	196	189



NC Reference			143526 143569		143570	143571	
Client Sample Reference			A21/0728	A21/0710	A21/0712	A21/0713	
Material			Soil	Soil	Soil	Soil	
Source/Client Ref		TP01	TP02	TP02	TP02		
Source/Client Nei			T21	T2	T4	T5	
Sample Description			Light brown slightly silty very gravelly sandy clay	Brown slightly silty very gravelly sandy clay	Brown slightly silty very gravelly sandy clay	Dark greyish brown slightly clayey sandy crushed rock with rare rootlets	
	Units	Accreditation					
In House Determinations							
Redox (pE)	(mV)	u	184	196	195	209	



NC Reference			143572	143573	143574	143575
Client Sample Reference			A21/0715	A21/0717	A21/0718	A21/0719
Material			Soil	Soil	Soil	Soil
Course /Client Def		TP02	TP02	TP01	TP01	
Source/Client Ref			Т7	T10	T11	T12
Sample Description			Dark brown slightly silty very gravelly sandy clay	Brownish grey clayey slightly sandy gravel	Dark greyish brown slightly clayey sandy crushed rock	Brownish grey slightly clayey sandy crushed rock
	Units	Accreditation				
In House Determinations						
Redox (pE)	(mV)	u	214	203	203	199



NC Reference			143576	143577	143578	143579
Client Sample Reference			A21/0721	A21/0724	A21/0725	A21/0729
Material			Soil	Soil	Soil	Soil
Causes (Client Def			TP01	TP01	TP02	TP02
Source/Client Ref			T14	T17	T18	Mast
Sample Description			Dark orangish brown slightly silty very gravelly sandy clay	Dark brownish grey slightly clayey very gravelly silty sand	Dark brown slightly silty very gravelly sandy clay with rare rootlets	Orangish brown slightly sandy slightly gravelly silty clay with rare rootlets
	Units	Accreditation				
In House Determinations						
Redox (pE)	(mV)	u	203	206	207	222



### L21/0576/IGS/001

NC Reference			143580	143582
Client Sample Reference			A21/0730	A21/0716
Material			Soil	Soil
Source/Client Ref			TP02	TP01
Jource, cheme ner			Substation	Т8
Sample Description			Dark brownish grey slightly clayey sandy crushed rock	Dark brown slightly silty very gravelly sandy clay
	Units	Accreditation		
In House Determinations				
Redox (pE)	(mV)	u	209	217



### L21/0576/IGS/001

Project Reference - 7 Hills Windfarm Energia

**Analysis Methodologies and Notes** 

Determinant	Test method and notes
Redox	Testing was in accordance with In-house method statement - MS - CL - Redox Reading measured with Silver/Silver Chloride Reference Probe with no correction applied

# Appendix 9

# **Chemical Testing – Water**

# **Chemtest Report**

Standard Report\_21-05411-20210223 160908





Eurofins Chemtest Ltd Depot Road Newmarket CB8 0AL Tel: 01638 606070

Email: info@chemtest.com

# **Final Report**

**Report No.:** 21-05411-1

Initial Date of Issue: 23-Feb-2021

Client IGSL

Client Address: M7 Business Park

Naas

County Kildare

Ireland

Contact(s): Darren Keogh

**Project** 23000 7 Hills Wind Farm (MWP)

Quotation No.: Date Received: 22-Feb-2021

Order No.: Date Instructed: 22-Feb-2021

No. of Samples: 3

Turnaround (Wkdays): 7 Results Due: 02-Mar-2021

Date Approved: 23-Feb-2021

Approved By:

**Details:** Glynn Harvey, Technical Manager

# **Results - Water**

#### Project: 23000 7 Hills Wind Farm (MWP)

Client: IGSL		Ch	emtest Jo	b No.:	21-05411	21-05411	21-05411
Quotation No.:		Chem	test Samp	le ID.:	1146278	1146279	1146280
Order No.:		Cli	ent Sample	Ref.:	AA144627	AA144629	AA144631
		Sample Location:				Tower 19	Tower 4
		Sample Type:				WATER	WATER
	Top Depth (m):			5.70	9.75	7.20	
Determinand	Accred.	SOP	Units	LOD			
рН	U	1010		N/A	[A] 7.4	[A] 7.4	[A] 7.4
Alkalinity (Carbonate)	U	1220	mg CaCO3/I	10	[A] < 10	[A] < 10	[A] < 10
Chloride	U	1220 mg/l 1.0			[A] 46	[A] 50	[A] 78
Sulphate	U	1220	mg/l	1.0	[A] 110	[A] 440	[A] 300

## **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:
1146278	AA144627		Tower 18		А	Coloured Winchester 1000ml
1146279	AA144629		Tower 19		А	Plastic Bottle 1000ml
1146280	AA144631		Tower 4		А	Coloured Winchester 1000ml

# **Test Methods**

SOP	Title	Parameters included	Method summary		
1010	pH Value of Waters	рН	pH Meter		
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.		

### Report Information

Key				
U	UKAS accredited			
M	MCERTS and UKAS accredited			
Ν	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			
Т	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 bound the sagns of LIKAS appreditation			

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

#### 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)

#### Sample Retention and Disposal

All soil samples will be retained for a period of 45 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

# Appendix 10

Geotechnical Laboratory Test Records – Rock

## (Diametrial) POINT LOAD STRENGTH INDEX TEST DATA

Contract: Seven Hills Windfarm

Sample Type: Core

Contract no. 23000 Date of test: 22/3/21

Date of test: 22/3/21									
RC No.	Depth	D (Diameter)	P (failure load)	F	Is (index strength)	ls(50) (index	*UCS		
	m	mm	kN		Мра	strength) Mpa	MPa	Type	Orienation
T04 - RC01	9.7	78	28.0	1.222	4.60	5.62	112	d	//
	12.2	78	31.0	1.222	5.10	6.22	124	d	//
T05 - RC01	1.9	78	22.0	1.222	3.62	4.42	88	d	//
	4.9	78	30.0	1.222	4.93	6.02	120	d	//
T11 - RC03	9.3	78	34.0	1.222	5.59	6.83	137	d	//
	15.4	78	28.0	1.222	4.60	5.62	112	d	//
T11 - RC04	3.3	78	32.0	1.222	5.26	6.42	128	d	//
	5.3	78	34.0	1.222	5.59	6.83	137	d	//
T15 - RC02	3.8	78	29.0	1.222	4.77	5.82	116	d	//
	8.8	78	24.0	1.222	3.94	4.82	96	d	//
T18 - RC02	7.5	78	30.0	1.222	4.93	6.02	120	d	//
	9.5	78	34.0	1.222	5.59	6.83	137	d	//
C			1 (50)	11004	4110C N	D:			
Statistical Summary Data			ls(50)	UCS*		Distribution Cur	ve		breviations
Number of Samples Tested			4.42	12 88	0.35			i	irregular axial
Minimum					0.5	$\wedge$		a	
Average		5.96	119	0.25	/ \	_	b	block	
Maximum Standard Dev.		6.83	137	0.2			d	diametral	
			0.15						
Upper 95% Confidence Limit 7.46 149.21			0.1   ap				ox. orientation		
Lower 95% Confidence Limit			4.45 89.0	89.05	0.05				planes of
C					1 1 11				ness/bedding
Comments:			0 10	0 200	300		unknown		
*UCS taken as k x Point Load Is(50): k=				20	0 10	0 200	300		perpendicular
I					1			//	parallel

## **Uniaxial Compression Test Report Sheet** I.G.S.L. Sample Identification Contract Name: Seven Hills Windfarm Job Number: 23000 Hole No: T04 - RC01 9.80m Depth (m): Sample Description Colour: Light blueish grey Grain size: Fine-grained Weathering Grade: Fresh LIMESTONE Rock Type: Weathering Grade Criteria I. Fresh: Unchanged from original state Slight discolouration, slight weakening II. Slightly weathered: III. Moderately weathered: Considerable weakening, penetrative discolouration IV. Highly weathered: Considerable weakening, penetrative discolouration, breaks in hand Sketch of Failure Surfaces Sample Measurements Length 202 Diameter (Ø) 78.1 mm Testing Load Rate 4.3 kN/min 498 kN Load at Failure (P) Strength Calculations Uniaxial Compressive Strength = 498000 4788.19385 1000 x P $\prod x (\emptyset/2)^2$ 103.95 (Mpa) $(Mg/m^3)$ 2.68 **Bulk Density** Notes:

## **Uniaxial Compression Test Report Sheet** I.G.S.L. Sample Identification Contract Name: Seven Hills Windfarm Job Number: 23000 Hole No: T05 - RC01 Depth (m): 3.90m Sample Description Colour: Light blueish grey Grain size: Fine-grained Weathering Grade: Fresh LIMESTONE Rock Type: Weathering Grade Criteria I. Fresh: Unchanged from original state II. Slightly weathered: Slight discolouration, slight weakening III. Moderately weathered: Considerable weakening, penetrative discolouration IV. Highly weathered: Considerable weakening, penetrative discolouration, breaks in hand Sample Measurements Sketch of Failure Surfaces Length 204 Diameter (Ø) 78 mm Testing Load Rate 4.3 kN/min kN Load at Failure (P) 465 Strength Calculations Uniaxial Compressive Strength = 465000 4775.94 1000 x P $\prod x (\emptyset/2)^2$ 97.31 (Mpa) $(Mg/m^3)$ 2.68 **Bulk Density** Notes:

## **Uniaxial Compression Test Report Sheet** I.G.S.L. Sample Identification Contract Name: Seven Hills Windfarm Job Number: 23000 Hole No: T11 - RC03 Depth (m): 16.70m Sample Description Colour: Light blueish grey Grain size: Fine-grained Weathering Grade: Fresh LIMESTONE Rock Type: Weathering Grade Criteria I. Fresh: Unchanged from original state II. Slightly weathered: Slight discolouration, slight weakening III. Moderately weathered: Considerable weakening, penetrative discolouration IV. Highly weathered: Considerable weakening, penetrative discolouration, breaks in hand Sample Measurements Sketch of Failure Surfaces Length 211 Diameter (Ø) 78.1 mm Testing Load Rate 4.3 kN/min kN Load at Failure (P) 532 Strength Calculations Uniaxial Compressive Strength = 532000 4788.19385 1000 x P $\prod x (\emptyset/2)^2$ 111.05 (Mpa) $(Mg/m^3)$ 2.69 **Bulk Density** Notes:

## **Uniaxial Compression Test Report Sheet** I.G.S.L. Sample Identification Contract Name: Seven Hills Windfarm Job Number: 23000 Hole No: T11 - RC04 Depth (m): 2.30m Sample Description Colour: Light blueish grey Grain size: Fine-grained Weathering Grade: Fresh LIMESTONE Rock Type: Weathering Grade Criteria I. Fresh: Unchanged from original state II. Slightly weathered: Slight discolouration, slight weakening III. Moderately weathered: Considerable weakening, penetrative discolouration IV. Highly weathered: Considerable weakening, penetrative discolouration, breaks in hand Sample Measurements Sketch of Failure Surfaces Length 199 Diameter (Ø) 78 mm Testing Load Rate 4.3 kN/min kN Load at Failure (P) 446 Strength Calculations Uniaxial Compressive Strength = 446000 4775.94 1000 x P $\prod x (\emptyset/2)^2$ 93.34 (Mpa) $(Mg/m^3)$ 2.67 **Bulk Density** Notes:

## **Uniaxial Compression Test Report Sheet** I.G.S.L. Sample Identification Contract Name: Seven Hills Windfarm Job Number: 23000 Hole No: T15 - RC02 Depth (m): 6.10m Sample Description Colour: Light blueish grey Grain size: Fine-grained Weathering Grade: Fresh LIMESTONE Rock Type: Weathering Grade Criteria I. Fresh: Unchanged from original state II. Slightly weathered: Slight discolouration, slight weakening III. Moderately weathered: Considerable weakening, penetrative discolouration IV. Highly weathered: Considerable weakening, penetrative discolouration, breaks in hand Sample Measurements Sketch of Failure Surfaces Length 206 Diameter (Ø) 78.1 mm Testing Load Rate 4.3 kN/min kN Load at Failure (P) 588 Strength Calculations Uniaxial Compressive Strength = 588000 4788.19385 1000 x P $\prod x (\emptyset/2)^2$ 122.74 (Mpa) $(Mg/m^3)$ 2.68 **Bulk Density** Notes:

## **Uniaxial Compression Test Report Sheet** I.G.S.L. Sample Identification Contract Name: Seven Hills Windfarm Job Number: 23000 Hole No: T18 - RC02 4.70m Depth (m): Sample Description Colour: Light blueish grey Grain size: Fine-grained Weathering Grade: Fresh LIMESTONE Rock Type: Weathering Grade Criteria I. Fresh: Unchanged from original state Slight discolouration, slight weakening II. Slightly weathered: III. Moderately weathered: Considerable weakening, penetrative discolouration IV. Highly weathered: Considerable weakening, penetrative discolouration, breaks in hand Sample Measurements Sketch of Failure Surfaces Length 211 Diameter (Ø) 78.1 mm Testing Load Rate 4.3 kN/min 396 kN Load at Failure (P) Strength Calculations Uniaxial Compressive Strength = 396000 4788.19385 1000 x P $\prod x (\emptyset/2)^2$ 82.66 (Mpa) $(Mg/m^3)$ 2.67 **Bulk Density** Notes:

# Appendix 11

# **Exploratory Hole Location Plan**

