

## Chapter 8

## Land and Soils

### 8.1 Introduction

This chapter describes the natural characteristics of the site of the proposed development and its immediate surroundings in terms of soils and geology. This chapter also assesses the likely significant impacts of the construction and operation of the proposed development on these resources and where required, mitigation measures are proposed to avoid, reduce or minimise the impact on soils and geology due to the proposed development.

The existing ground conditions are outlined in this chapter, with the predicted impacts assessed on the basis of the relevant construction methodology and particular ground characteristics.

The mitigation measures and the residual impacts are provided in Sections 8.5 and 8.6 of this chapter respectively.

In addition to the cable car and the visitor centre, the proposed development also includes upgrades to the approach road, the R572, from the junction with the R575 to the mainland side cable car. These road improvement work will include the construction of 10 no. passing bays and 1 no. visibility splay at Bealbarnish gap and completion of a number of local improvements to improve visibility. A full description of the proposed development is detailed in Chapter 4 of this EIAR.

### 8.2 Methodology

This chapter is prepared having regard to the Environmental Impact Assessment (EIA) Directive 2014/52/EU and the following guidance documents:

- Environmental Protection Agency (EPA 2017) Draft Guidelines on the Information to be contained in Environmental Impact Assessment Reports;
- Environmental Protection Agency (EPA 2015) Draft Advice Notes for Preparing Environmental Impact Statements;
- Advice notes on Current Practice in the Preparation of Environmental Impact Statements, published by the Environmental Protection Agency (EPA) (2003);
- Guidelines on the information to be contained in environmental impact statements, published by the EPA (2002);
- National Roads Authority (NRA 2008) Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes; and
- Institute of Geologists of Ireland (IGI) (2013) Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements.

#### 8.2.1 Summary of Available Information

##### Walkover surveys

ROD's chartered civil engineers have surveyed the area of the proposed development on several occasions throughout 2018 and 2019. Observations were made and ample photographic evidence was taken during these site visits.

## **Mapping and Aerial Photography**

Geological mapping from the Geological Survey of Ireland, covering the subsoils and solid geology of the location of the proposed development was reviewed. Digital mapping, available at [www.gsi.ie/mapping](http://www.gsi.ie/mapping), also shows the quaternary geology along with aquifer vulnerability, known groundwater wells and existing ground investigation information.

Open source (Google Earth, Bing Maps) and Ordnance Survey Ireland (OSI) aerial photography was analysed in order to identify large scale ground characteristics.

## **Ground Investigations**

Ground investigation works specific to this project were tendered by Cork County Council and were carried out by Priority Geotechnical Limited between the 4<sup>th</sup> and 18<sup>th</sup> of April 2019. The ground investigation consisted of:

- Mainland: three rotary core boreholes including one for trial well, two trial pits and slit trenches, three pavement cores and four geophysical profiles; and
- Island side: three rotary core boreholes including one for trial well, two slit trenches and two pavement cores.

Pumping tests, falling head permeability tests and percolation tests were carried out in the boreholes. Samples taken from the rock cores were analysed in a laboratory in order to determine the geotechnical parameters and contamination/aggressivity levels. The findings from the laboratory analyses were reported in a Factual Report.

## **Contaminated Land**

The development area is largely greenfield, with the exception of the existing station footprint and the access road and parking area. A sample for environmental ground contamination testing was taken next to the existing station. No noticeable signs of contamination were noted by the specialised contractor during sampling. Laboratory testing confirmed that there is no ground contamination present, and that the soil material is non-hazardous and inert.

## **8.3 Receiving Environment**

The description of existing conditions is based on desk study information, site walkovers, mapping and ground investigations undertaken in the development area.

### **Topography**

On the mainland, the topography of the area rises steeply from the coastline with minor cliffs up to 7m height, after which it turns onto a gentler slope of approximately 20°. The topography steepens up again approximately 300m behind the coastline as it approaches the local hill. The island side follows the similar outline, with locally higher cliffs. The surface is typically uneven with many smaller rock outcrops scattered across the area.

### **Bedrock Geology**

GSI 1:100,000 Bedrock Geology mapping indicates that the entire area (mainland and Dursey island) is underlain by the Caha Mountain Formation, comprised of purple and green sandstones and siltstones. The bedrock geology is presented in Figure 8.1 of Volume 3 of this EIAR. The quaternary sediment map shows the bedrock to outcrop and subcrop in the wider area, which was confirmed during the walkover survey where

only a very thin layer of topsoil and some weathered colluvium (up to 1.0m thick) was found to overlie the bedrock.

A geological fault with northwest-southeast direction is shown in GSI 1:100,00 Bedrock Geology map, passing in the immediate vicinity of the proposed locations on both mainland and Dursey Island.

The photographic evidence of outcrops of limited size and the borehole logs suggest that the rock is very thinly bedded to laminated, with bedding planes nearly vertical and the orientation of the bedding planes towards northwest-southeast. The discontinuities in the predominant discontinuity set (bedding) are generally undulated to stepped, rough, closed, slightly weathered and very closely spaced. Borehole logs indicate medium strong to very strong grey to purple siltstone with minimal non-intact zones and very little weathering. Unconfined strength of the rock from the laboratory testing was typically 10 to 30 MPa, with several samples exceeding 100 MPa. Groundwater level was observed approximately 1m below ground level.

### **Soils and Subsoils**

Subsoil depths across the site are typically low (up to 1.0m) with bedrock being exposed throughout the development area. Bedrock outcrop is recorded in the GSI Quaternary and Teagasc subsoil mapping, as presented in Figure 8.2 of Volume 3 of this EIAR. The "Rock – Bedrock at surface" in GSI classification and "Shallow rocky Peaty/Non-peaty mineral Complexes" in Teagasc classification is the recorded subsoil classifications present across the site. The site walkover and ground investigation show that the overburden is typically composed of very thin peaty topsoil and gravelly/cobbly colluvium overlying shallow bedrock.

### **Geologic heritage and geohazards**

There are no Geologic Heritage features, quarries or commercial mineral deposits within the boundaries of the site or impacted by the proposed development.

No historical landslides are recorded within or in the vicinity of the site extent. This is anticipated, as the ground cover is rock outcrop and the slope angle is too mild to enable the detachment and sliding of rock blocks. The national Landslide Susceptibility Map shows the area to fall within the moderately low to moderately high landslide susceptibility area. The Landslide Susceptibility Map is developed primarily for landslides in mineral soils and peat and is known to overpredict the susceptibility category in rock slopes.

## **8.4 Predicted Impacts**

All structural elements will be founded on pad foundations placed onto the fresh unweathered bedrock. Loading, stresses and deformations applied to the bedrock will be well within the capacity of the rock mass and tolerance of structural elements. Negligible settlements are expected due to the high stiffness of the rock. Foundation of the structural elements will, therefore, have a negligible impact on the existing rock conditions.

Approximately 6,500m<sup>3</sup> of overburden and bedrock will be excavated from the foundation footprint and from a part of the parking area on the mainland side. The rock will be reused on-site as fill to structures as described in the mitigation measures.

There are no predicted impacts in the operation phase.

## 8.5 Mitigation Measures and Monitoring

In general, the temporary and permanent impacts on land and soils are considered minimal and will be managed by the following best practice control measures.

The bedrock excavated on site will be reused as fill to structures, below the structures' floor slab where the slab is above the existing ground level, and to level the parking area. The laboratory tests carried out on rock samples confirm that the rock won on site can be used for structures' fill purposes in accordance to Specifications for Road Works. The majority of the excavated bedrock will be reused on site and there will be very limited and/or no need for off-site disposal. The design also ensures that the cut and the fill requirements are balanced, so that only small volumes of imported fill will be required.

Stripped topsoil will be temporarily stored and reused throughout the development area, for instance over the currently paved area next to the existing station.

A geotextile screen and boom with oil barrier will be required around the perimeter of the construction works to prevent the runoff of silt, oil or other deposits generated by construction activities.

## 8.6 Residual Impacts

There are no residual impacts on land and soils as a result of this proposed development.

## 8.7 Conclusions

The development area is situated in the geological context of outcropping sandstones and siltstones of Cahahua formation. A detailed project-specific ground investigation campaign has been planned and undertaken, with the results of satisfactory density and quality for the project requirements. The bedrock is proven to be medium strong to very strong and suitable as a structural foundation medium. No impacts are thus expected from the construction to the land and soils. Furthermore, the excavated rock will be able to be reused on site as fill to structures. No ground contamination was encountered. Potential impacts to land and soils arising from the potential need to dispose of the surplus excavated material or importing large quantities of fill, were mitigated by design as an earthwork balance has been achieved, with only very minor quantities of soil for off-site disposal and/or importation. The best practice control measures for impact mitigation will be employed to ensure no residual impacts on land and soils.

## 8.8 References

Priority Geotechnics Ltd (2019). *Dursey Cable Car Ground Investigation Draft Factual Report*.

Environmental Protection Agency (EPA) (2017). *Draft Guidelines on the Information to be contained in Environmental Impact Assessment Reports*.

EPA (2015). *Draft Advice Notes for Preparing Environmental Impact Statements*.

EPA (2003). *Advice notes on Current Practice in the Preparation of Environmental Impact Statements*.

EPA (2002). *Guidelines on the information to be contained in environmental impact statements.*

TII (formerly NRA) (2008). *Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes*

Institute of Geologists of Ireland (IGI) (2013). *Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements.*



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# Appendix 8.1 Factual Report

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Our Ref: JMS/Rp/P19033 (\*.pdf)

24<sup>th</sup> June, 2019

**Messrs.** Roughan O'Donovan

Arena House,

Arena Road,

Sandyford,

Dublin 18.

**Re: Dursey Island Cable Car & Visitor Centre Development, Co. Cork, Ground Investigation – Factual report.**

### **Introduction**

In February 2019, Priority Geotechnical were requested by Roughan O'Donovan on behalf of the client Cork County Council to undertake a ground investigation (GI) as part of the proposed Dursey Island Cable Car & Visitor Centre Development, Co. Cork.

The proposed GI works are located adjacent to the existing cableway which is also the site of the proposed Dursey Island Cableway and Visitor Centre Development, and is located at the southwestern tip of the Beara Peninsula (Lambs Head) in the west of County Cork. The cable car connects the mainland at Ballaghboy to a point on the eastern coast of Dursey Island over a narrow stretch of water known as the Dursey Sound.

Ground investigation works are required on both the mainland and on the island adjacent to the existing cableway infrastructure. A new support tower and a new station are proposed approximately 30m southeast from the existing towers and stations.



The investigation works required for the Dursey Island Cable Car and Visitor Centre Development will be undertaken at a number of locations on the mainland and island including Greenfield lands, a combination of natural grasslands and agricultural pasture land with rock outcrops throughout. Some locations may require access via steeply sloping ground. Areas in the vicinity of the existing cable car mainland and island stations which are paved in bituminous surfacing.

### **Objectives**

The project involves the gathering, manipulation and compilation of ground investigation data to enable the preliminary detailed planning and design of the proposed cableway and visitor centre.

### **Scope**

The scope of the ground investigation, which was specified by Roughan O'Donovan, comprised of the following:

- Rotary boreholes;
- Trial pits;
- Slit trenches;
- *In situ* tests;
- Standpipe installations;
- All associated sampling;
- Laboratory testing and
- All associated reporting.

This report presents a summary of the factual records, data obtained with regard to the ground investigation for the proposed Dursey Island Cable Car and Visitor Centre Development. This report should be read in conjunction with the accompanying exploratory logs and laboratory test data.

### **Site Works**

This investigation was carried out in accordance with the contract specification: Specification and Related Documents for Ground Investigation in Ireland (Engineers Ireland, October 2006), Eurocode 7- Geotechnical Design Part 2, ground investigation and testing (BS EN 1997-2: 2007) and the relevant British Standards (BS 5930 (1999) Code of Practice for Site Investigation +A2:2010 and BS 1377, Method of Tests for Soil for Civil Engineering Purposes, *in situ* Tests.

The investigation fieldworks were undertaken between the 05<sup>th</sup> April and the 14<sup>th</sup> April, 2019 under the supervision of PGL, Engineering Geologist(s). Details of the plant and equipment used are detailed on the relevant exploratory records, accompanying this factual report.

Metroscan Utility Locating (MUL) carried out a Ground Penetrating Radar (GPR) survey to locate underground services at the site of the existing station on the mainland. The findings are accompanying this factual report.

### **Rotary Boreholes**

Six (6) rotary boreholes were advanced to depths 7.0m below existing ground level (bgl) to 25.5m bgl using PGL's Deltabase 520 rig and Symmetrex casing system. The exploratory records are attached, herein.

<b>Location</b>	<b>Final Depth (m bgl)</b>	<b>Date Start (dd/mm/yyyy)</b>
RC01	18.6	14/04/2019
RC02	16.15	10/04/2019
RC03	13.65	08/04/2019
RC04	7.0	09/04/2019
RCTW01	25.5	12/04/2019
RCTW02	25.5	05/04/2019

### **Trial Pits**

Two (2) trial pit excavations were dug to depths 0.3m bgl to 1.0m bgl using an 8t tracked excavator. The exploratory records are attached, herein.

<b>Location</b>	<b>Final Depth (m bgl)</b>	<b>Date Start (dd/mm/yyyy)</b>
TP01	0.3	11/04/2019
TP02	1.0	12/04/2019

### **Slit Trenches**

Four (4) slit trench excavations were dug to depths between 0.4m bgl and 1.3m bgl using a 3t tracked excavator. The exploratory records and associated cross sectional drawings are presented, herein.

<b>Location</b>	<b>Final Depth (m bgl)</b>	<b>Date Start (dd/mm/yyyy)</b>
ST01	1.3	11/04/2019
ST03	0.6	09/04/2019
ST04	0.6	09/04/2019
ST04A	0.4	09/04/2019

### **Sampling**

Four (4) bulk disturbed samples (B), four (4) small disturbed samples (D), four (4) pavement cores and 51.0lin.m of rock core were taken from exploratory locations in general accordance with the preparation for and methods of taking samples, together with their size, preservation and handling was in accordance with British Standard BS 5930: 1981 - Code of Practice for Site investigation, the contract documents and the Association of Geotechnical and Geo-environmental Specialists (AGS) guide to environmental sampling, September 2010.

A single (1) environmental sample (ES) was taken at 0.25m bgl at location TP02. The sample was placed immediately in air-tight containers, which were filled to the top of the sample container. The sample suite consisted of: 2No. small disturbed samples (D) not less than 1.0kg, 2No. 250g amber glass sample containers and 2No. 60g amber glass sample containers. Additionally seven (07) environmental water samples were taken in litre glass and plastic bottles.

The preparation for and methods of taking environmental samples, together with their size, preservation and handling was in accordance with British Standard BS 5930: 1981 - Code of Practice for Site investigation, the contract documents and the Association of Geotechnical and Geo-environmental Specialists (AGS) guide to environmental sampling, September 2010.

## **In-Situ Testing**

### **Standard Penetration Test**

Six (6) Standard Penetration Tests, N values, were carried out in the boreholes using the 60° solid cone in place of the standard split barrel sampler in accordance with Geotechnical Investigation and Testing, Part 3 Standard penetration test, BS EN ISO 22476-3:2005+A1:2011. Standard penetration tests were carried out in the rotary boreholes with values  $N_{spt} > 50$ .

### **Permeability Testing**

*In situ* variable head (falling) permeability tests was carried out in rotary borehole RC01. *In-situ* permeability tests were carried out in accordance with BS5930: 1999, Section 4: Cl. 25.4, within the superficial deposits over duration of one (1) hour. The processed test data is presented on the relevant borehole log presented herein of this factual report. The shape or intake factor,  $f$  was derived from the condition at the base of the borehole at the test depth and test geometry as per Hvorslev (1951).

$$k = \frac{A \log_e (H_o / H_i)}{fd \quad t}$$

Generally for all tests the specific depth range of the test was the ground conditions below the casing. A mean  $k$  measured ( $k_H = k_V$ ), permeability in the soil was assumed equal in both horizontal and vertical direction, ( $k_H / k_V = 1$ ). The test geometry provided a shape factor,  $f$  of 20 for the test undertaken.

### **Infiltration Pits**

A single (1) infiltration test was carried out in general accordance with the BRE Digest 365, 2007 Soakaway Design Standards. A single (1) cycle of infiltration/ drainage was undertaken at a depth of 1.5m bgl. A summary of the testing is shown below and presented accompanying the relevant exploratory records attached, herein.

## Percolation Tests

Percolation tests to assess the hydraulic assimilation capacity of the soils encountered were carried out using the P-test and T-test method. Three test holes per percolation test were dug. Tests were carried out in accordance with Section 6.3 of I.S CEN/TR 12566-2:2005. The results are accompanying this factual report.

## Pump Tests

*In situ* pump tests were carried out in 125mm diameter standpipe wells at RCTW01 and RCTW02. Groundwater was monitored during pumping tests using Rugged Troll 100 level loggers. Continuous, absolute pressure (hydrostatic and barometric pressure) was measured *in situ* to determine continual groundwater levels. Levels were obtained prior to the pump test, during pumping and during the recharge phase. Accuracy was within 0.05% in water depths up to 30m. The data logs are presented as digital spreadsheet data (\*.xls) accompanying this factual report.

Continuous monitoring of groundwater levels at the station well was undertaken using a Rugged Troll 100 data logger. The readings are presented as digital (.xls) files and accompany this factual report. Continuous monitoring was being undertaken at the time of reporting with results to be issued separately at a later date.

## SUMMARY OF IN-SITU TESTS

Test	Quantity	Comment
Standard penetration test	06Nr.	Nspt=>50
Soakaway Test	01Nr.	$1.13 \times 10^{-5}$
Falling Head Test	01Nr.	$3.93 \times 10^{-3}$
Percolation Tests	-	P-Tests and T-Tests. See attached results
Pump Tests	02Nr.	RCTW01 & RCTW02. See accompanying .xls files.

## Survey and Drawings

The 'as built' exploration locations were subsequently surveyed using Trimble 5700/5800 GPS equipment to the Ordinance Survey Irish Transverse Mercator system of coordinates (ITM) and elevations to Malin Head datum. The location layout (P19033\_SI\_A, P19033\_SI\_01 & P19033\_SI\_02) is attached.

Location	Easting	Northing	Ground Level (mOD)	Final Depth (m bgl)	Date Start (dd/mm/yyyy)
RC01	50809.84	41858.34	21.30	18.60	14/04/2019
RC02	50737.83	41854.34	13.70	16.15	10/04/2019
RC03	50543.98	41651.52	18.05	13.65	08/04/2019
RC04	50520.07	41619.36	20.90	7.00	09/04/2019
RCTW01	50777.83	41902.35	23.70	25.50	12/04/2019
RCTW02	50497.58	41564.08	23.27	25.50	05/04/2019
ST01	50811.84	41855.34	20.80	1.30	11/04/2019
ST03	50550.02	41648.35	17.47	0.60	09/04/2019
ST04	50523.15	41624.58	20.36	0.60	09/04/2019
ST04A	50528.73	41615.59	20.50	0.40	09/04/2019
TP01	50825.85	41875.34	25.30	1.00	11/04/2019
TP02	50792.84	41886.35	23.30	0.30	12/04/2019

### Laboratory Testing

Laboratory testing was scheduled by PGL on behalf of Roughan O'Donovan and carried out by PGL. Specialist chemical testing was undertaken by Chemtest Ltd. (UK) on behalf of PGL in accordance with BS1377 (1990), Methods of test for soils for civil engineering purposes and the ISRM suggested methods for rock characterisation, testing and monitoring.

*Please note that all samples shall be retained for a period no longer than 28 days from the date of this report. Thereafter all remaining samples shall be appropriately disposed of unless a written instruction to the contrary is received by PGL prior to the date of this reporting and within the 28 day period outlined above. Laboratory testing will result in a reduction of sample quantity and in some cases the use of the full sample mass. Samples already tested may not be suitable or available for further testing.*

The laboratory data is attached and summarised as follows;

### SUMMARY OF LABORATORY TESTING

Type	Nr.	Remarks
Natural Moisture Content	05	12% to 22%
Atterberg Limits	06	Liquid Limit, LL 37% to 52% Plastic Limit, PL 37% to 52% Plasticity Index, PI 8 to 18
Particle Size Distribution	04	No hydrometer analysis on fine soils
pH	05	7.9 to 9.5

Type	Nr.	Remarks
Sulphate (water soluble as SO <sub>4</sub> )	05	<0.010g/l
Sulphate (acid soluble)	05	0.010% to 0.021%
Organic matter	01	0.91
Magnesium (water soluble)	04	<0.010g/l
Total Sulphur	04	<0.010%
Environmental Water	07	See attached results
Environmental Soil	01	See attached results
Point load IS50	23	0.2MPa to 7.1MPa
Unconfined compressive strength (UCS)	09	9.67MPa to 44.97MPa
Slake durability	04	See attached results
Los Angeles abrasion Value	04	See attached results
Magnesium sulphate soundness	04	See attached results

### Published Geology

The geology of the study area (GSI 1:100,000 mapping Sheet 24) is characterised by the Caha Mountain Formation (CH), described as purple and green Sandstone and Siltstone. Outcropping bedrock is shown extensively in the study area. The national groundwater mapping indicates extreme vulnerability with rock at or near the surface.

Teagasc subsoil mapping indicates that the area is underlain by exposed bedrock and Glacial till deposits derived from Devonian Sandstones.

### Ground Conditions

The full details of the ground conditions encountered are provided for on the exploratory records accompanying this report. The records provide descriptions, in accordance with BS 5930 (1999) +A2: 2010 and Eurocode 7, Geotechnical Investigation and Testing, Identification and classification of soils, Part 1, Identification and description (EN ISO 14688-1: 2002)– Identification and Classification of Soil, Part 2: Classification Principles (EN ISO 14688-2:2004) and Identification and Classification of Rock, Part 1: Identification & Description (EN ISO 14689-1:2004) of the materials encountered, *in situ* testing and details of the samples taken, together with any observations made during the site investigation.



## Groundwater Conditions

Groundwater is recorded when encountered during boring over a period of 20 minutes, noting any changes that may occur.

Groundwater conditions observed in the excavations are those appertaining to the period of the investigation. Groundwater levels may be subject to diurnal, seasonal and climatic variations and can also be affected by drainage conditions or tidal variations etc.

Groundwater was encountered between 0.2m bgl and 9.0m bgl during the period of works. Four (4) 50mm diameter HDPE standpipes were installed as per the scope of works. The groundwater regime should be assessed from monitoring standpipes where available.

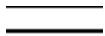
## SUMMARY OF STANDPIPE INSTALLATIONS

Location	Depth Top (m bgl)	Depth Base (m bgl)	Diameter (mm)	Pipe Type
RC01	0.0	2.0	50	PLAIN
	2.0	10.5	50	SLOTTED
RC03	0.0	1.65	50	PLAIN
	1.65	13.65	50	SLOTTED
RCTW01	0.0	9.0	125	PLAIN
	9.0	25.5	125	SLOTTED
RCTW02	0.0	10.0	125	PLAIN
	10.0	20.5	125	SLOTTED

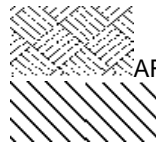
Exploratory locations were backfilled with gravel, bentonite and arisings.



GRAVEL Backfill to installation/ borehole



uPVC slotted pipe



ARISINGS Backfill

borehole

BENTONITE Backfill to installation/

Should you have any queries in relation to the data presented, please do not hesitate to contact our office.

Yours sincerely,  
For **Priority Geotechnical**,

A handwritten signature in blue ink that reads "J McSweeney". The signature is written in a cursive style with a large, sweeping flourish at the end.

**James McSweeney BSc**  
**Engineering Geologist**

*No responsibility can be held by PGL for ground conditions between exploratory locations. The exploratory logs provide for ground profiles and configuration of strata relevant to the investigation depths achieved during the fieldworks. Caution shall be taken when extrapolating between such exploratory locations. No liability is accepted for ground conditions extraneous to the exploratory locations. Where additional information becomes available any assessment may be subject to review and change.*

*This report has been prepared for the employer Ireland and their Representative(s) as outline, herein. The information should not be used without their prior written permission. PGL accepts no responsibility or liability for this document being used other than for the purposes for which it was intended.*

# KEY TO SYMBOLS ON EXPLORATORY HOLE RECORDS

All linear dimensions are in metres or millimetres

## DESCRIPTIONS

\*\* Drillers Description  
Friable Easily crumbled

## SAMPLES

U( ) Undisturbed 102mm diameter sample, ( ) denotes number of blows to drive sampler  
U( )F, U( )P F- not recovered, P-partially recovered  
U38 Undisturbed 38mm diameter sample  
P(F), (P) Piston sample - disturbed  
B Bulk sample - disturbed  
D Jar Sample - disturbed  
W Water Sample  
CBR California Bearing Ratio mould sample  
ES Chemical Sample for Contamination Analysis  
SPTLS Standard Penetration Test S lump sample from split sampler

## CORE RECOVERY AND ROCK QUALITY

TCR Total Core Recovery (% of Core Run)  
SCR Solid Core Recovery (length of core having at least one full diameter as % of core run)  
RQD Rock Quality Designation (length of solid core greater than 100mm as % of core run)  
Where there is insufficient space for the TCR, SCR and RQD, the results may be found in the remarks column  
lf Fracture Spacing in mm (Minimum/Average/Maximum) NI - non intact, NR - no recovery  
AZCL Assumed Zone of Core Loss  
NI Non intact

## GROUNDWATER

▽ Groundwater strike  
▼ Groundwater level after standing period  
Date/Water Date of shift (day/month)/Depth to water at end of previous shift shown above the date and depth to water at beginning of shift given below the date

## INSITU TESTING

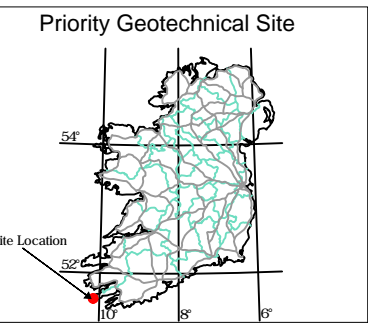
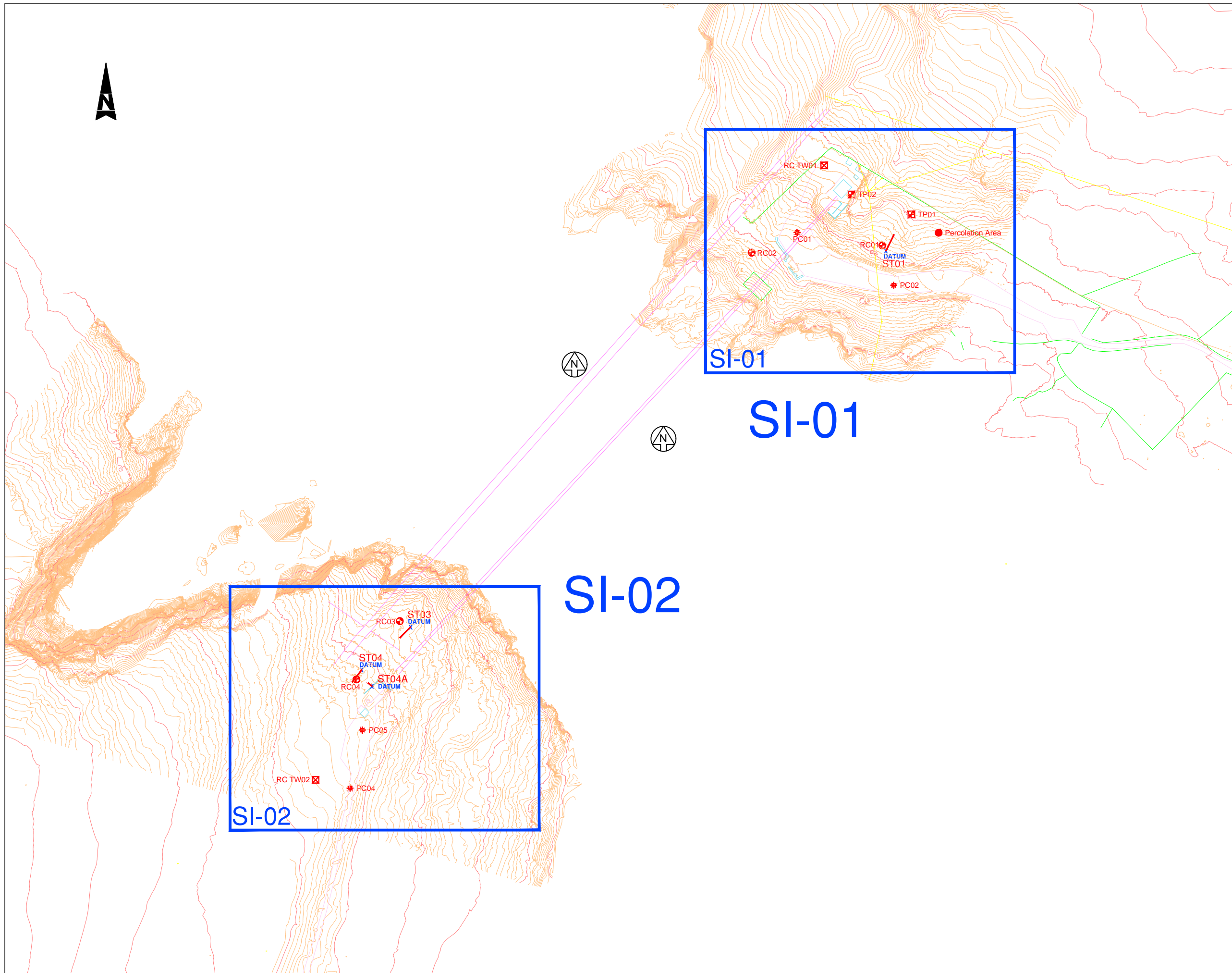
S Standard Penetration Test - split barrel sampler  
C Standard Penetration Test - solid 60° cone  
SW Self Weight Penetration  
Ivp, HVp (R) In Situ Vane Test, Hand Vane Test (R) demonstrates remoulded strength  
K(F), (C), (R), (P) Permeability Test  
HP Hand Penetrometer Test

## MEASURED PROPERTIES

N Standard Penetration Test - blows required to drive 300mm after seating drive  
x/y Denotes x blows for y mm within the Standard Penetration Test  
x\*/y Denotes x blows for y mm within the seating drive  
 $c_u$  Undrained Shear Strength (kN/m<sup>2</sup>)  
CBR California Bearing Ratio

## ROTARY DRILLING SIZES

Index Letter	Nominal Diameter (mm)	
	Borehole	Core
N	75	54
H	99	76
P	120	92
S	146	113



JOB NAME:  
**Durey Island Cable Car & Visitor Centre Development**

Sheet Title:  
**EXPLORATORY LOCATION LAYOUT**

JOB NUMBER:  
**P19033**

DRAWING NUMBER:  
**P19033-SI-A**

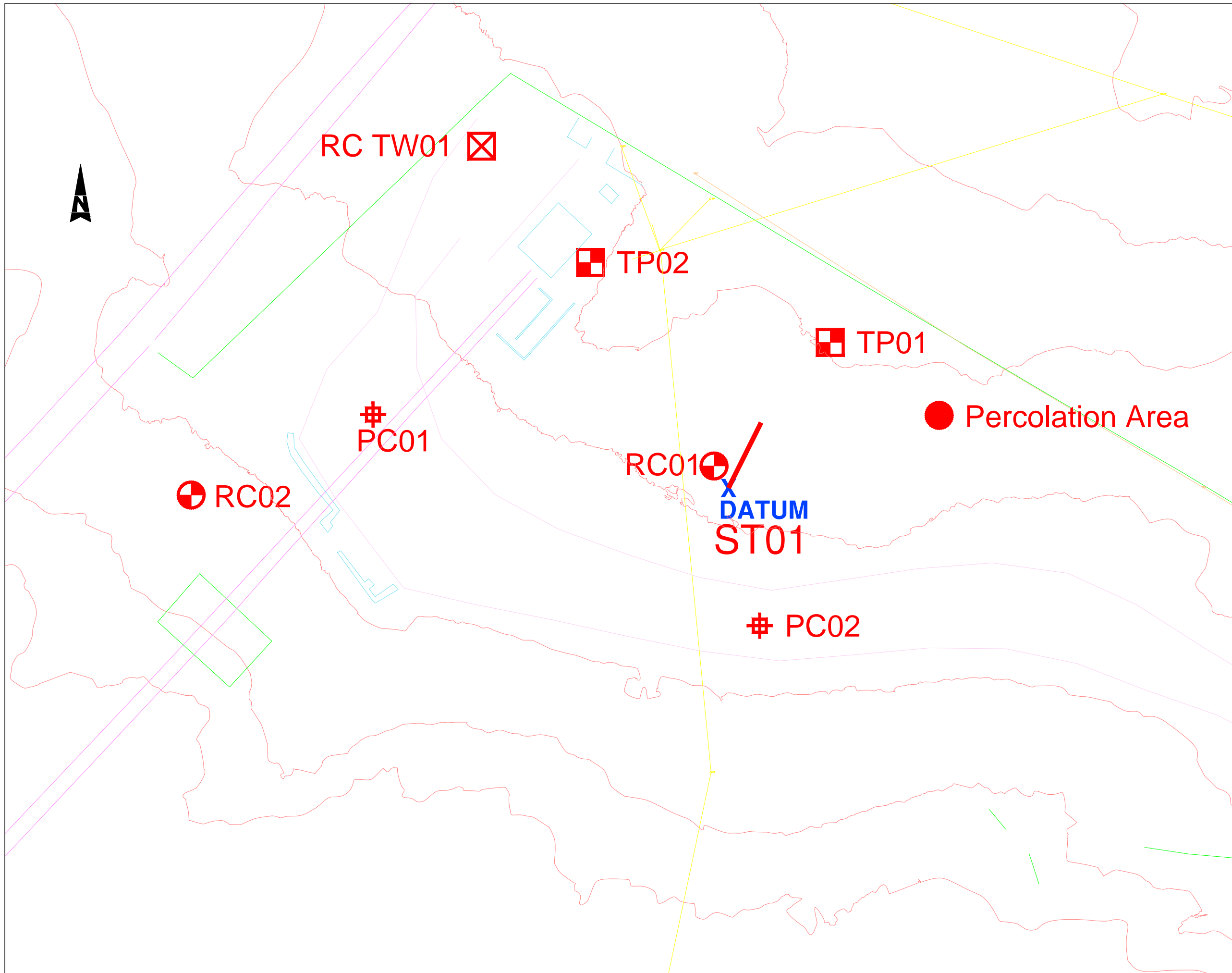
DRAWN BY:  
**Gary Curtin**

DATE:  
**15/04/2019**

SCALE: 1:2000 ON A3	APPROVED: GH
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REVISION:  
**D01**





- KEY:
- ST00 Denotes Slit Trench and Datum location
  - RC00 Denotes Rotary Core location
  - PC00 Denotes Pavement Core location
  - RCTW0 Denotes Trial Well location
  - TP00 Denotes Trial Pit location
  - Denotes Percolation area

JOB NAME:  
Durseley Island Cable Car & Visitor Centre Development

Sheet Title:  
LOCATION PLAN

JOB NUMBER:  
P19033

DRAWING NUMBER:  
P19033-SI-01

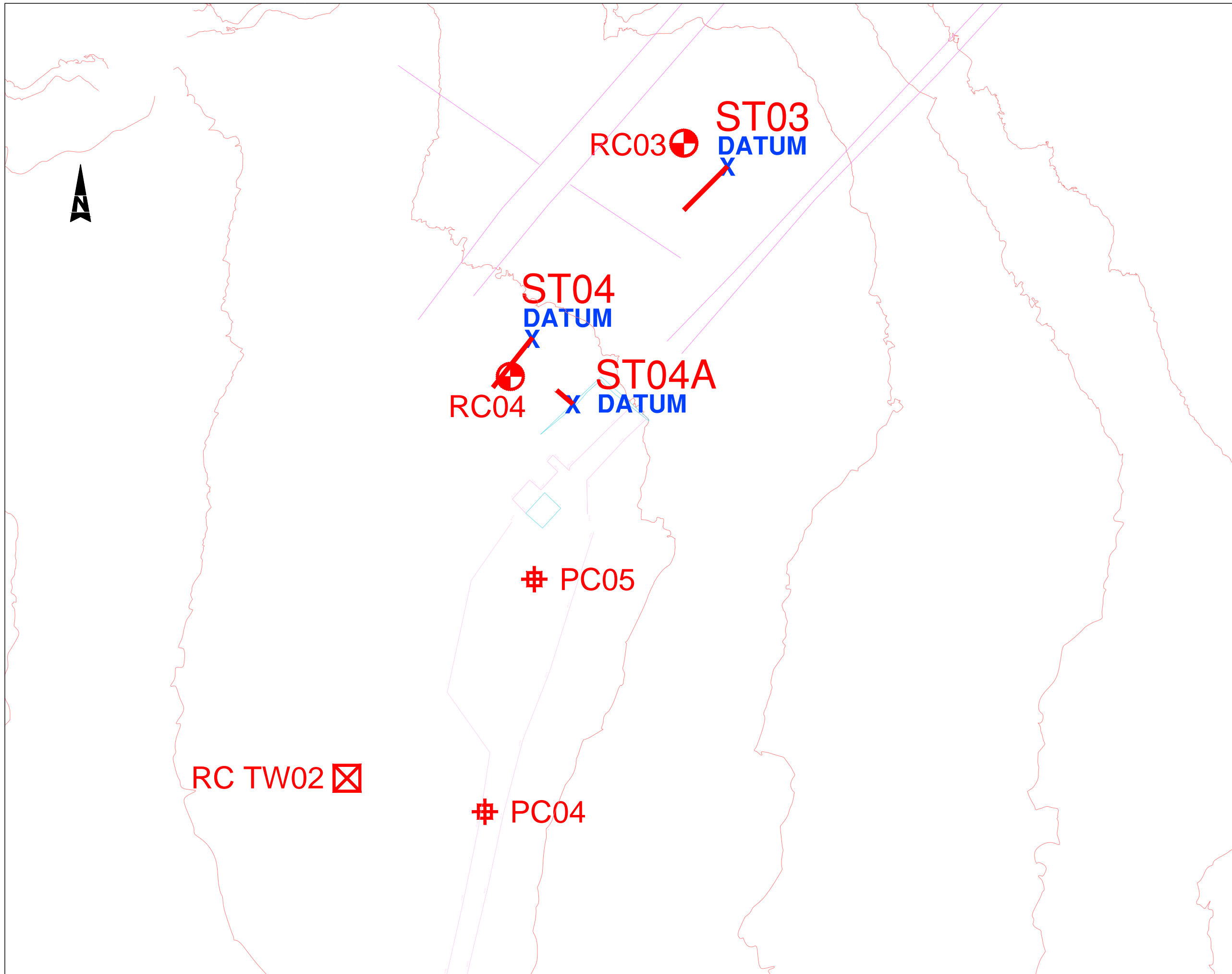
DRAWN BY:  
Gary Curtin

DATE:  
15/04/2019

SCALE: 1:500 ON A3	APPROVED: GH
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REVISION:  
D01





KEY:

ST00 DATUM X	Denotes Slit Trench and Datum location
RC00	Denotes Rotary Core location
PC00	Denotes Pavement Core location
RCTW0	Denotes Trial Well location
TP00	Denotes Trial Pit location

JOB NAME:  
Durseley Island Cable Car & Visitor Centre Development

Sheet Title:  
LOCATION PLAN

JOB NUMBER:  
P19033

DRAWING NUMBER:  
P19033-SI-02

DRAWN BY:  
Gary Curtin

DATE:  
15/04/2019

SCALE: 1:500 ON A3	APPROVED: GH
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REVISION:  
D01





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<b>Drilled By:</b>	Borehole No.
AK	<b>RC01</b>
<b>Logged By:</b>	
SR	
Sheet 1 of 3	

<b>Project Name:</b> Dursley Island Cable Car & Visitor Centre	<b>Project No.:</b> P19033	<b>Co-ords:</b> 50810E - 41858N	<b>Hole Type:</b> Rotary cored
<b>Location:</b> Dursley Island, Co. Cork.	<b>Level:</b> 21.30m OD	<b>Scale:</b> 1:50	
<b>Client:</b> Cork County Council	<b>Dates:</b> 14/04/2019		15/04/2019

Well	Water Strike (m)	Depth (m)	Type /Fs (min, max, avg)	Coring (%)			Depth (m) / Fl (/m)	Level (mOD)	Legend	Stratum Description	
				TCR	SCR	RQD					
		74 (19,22/74 for 225mm) (C)					1.00	20.30		Open hole boring. Driller described: Peat with boulder content.	1
		1.00 - 2.50		40	10	6				Core run attempted. Poor recovery. Assumed Boulders.	2
		N=89 (12,19/20,20,24,25) (C)					2.50	18.80		Core run attempted. Poor recovery. Weathered SILTSTONE.	3
		2.50 - 4.00		36	8	0					
		0 (25,25/0 for 0mm) (C)					4.00	17.30		Lithology: Weak to medium strong, purple SILTSTONE.	4
		4.00 - 4.85		82	47	0				Weathering: Slightly weathered.	5
	4.85 - 6.35	10mm 330mm 160mm	100	100	27	6/m			Fractures: Set 1 dipping 60 to 80 degrees, undulated to stepped rough fracture surfaces. Set 2 dipping 10 to 25 degrees, wide spacing, stepped rough to undulated rough.	6	
	6.35 - 7.80	40mm 450mm 280mm	100	100	38	5/m			Detail: Not intact from 4.00m to 4.20m and 12.40m to 12.50m.	7	
	7.80 - 9.40	40mm 500mm 220mm	38	38	31	3/m				8	
										9	

<b>Groundwater:</b>	<b>Hole Information:</b>			<b>Equipment:</b>	Deltabase 520
Struck (m bgl)    Rose to    After (min)    Sealed    Comment	Hole Depth (m bgl)	Hole Dia (mm)	Casing Dia (mm)	<b>Method:</b>	Compressed air mist
	18.60	76	131		

<b>Remarks:</b> Borehole terminated at 18.60m bgl. 50mm standpipe installed. Depth response from 2.00m o 10.50m. Falling head permeability test carried out for 1 hour.	<b>Shift Data:</b>		<b>Groundwater (m bgl)</b>	<b>Shift</b>	<b>Hole Depth (m bgl)</b>	<b>Remarks</b>
			3.4	14/04/2019 08:00	0.00	Start of shift.
			3.4	14/04/2019 18:00	12.40	End of shift.
			3.4	15/04/2019 08:00	12.40	Start of shift.
			3.4	15/04/2019 18:00	18.60	End of borehole.



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<b>Drilled By:</b>	Borehole No.
AK	<b>RC01</b>
<b>Logged By:</b>	
SR	
Sheet 2 of 3	

<b>Project Name:</b> Dursley Island Cable Car & Visitor Centre	<b>Project No.:</b> P19033	<b>Co-ords:</b> 50810E - 41858N	<b>Hole Type:</b> Rotary cored
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<b>Location:</b> Dursley Island, Co. Cork.	<b>Level:</b> 21.30m OD	<b>Scale:</b> 1:50
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<b>Client:</b> Cork County Council	<b>Dates:</b> 14/04/2019 - 15/04/2019
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Well	Water Strike (m)	Depth (m)	Type /Fs (min, max, avg)	Coring (%)			Depth (m) / Fl (/m)	Level (mOD)	Legend	Stratum Description	
				TCR	SCR	RQD					
		9.40 - 10.90	30mm 500mm 350mm	100	100	100	10/m		Lithology: Weak to medium strong, purple SILTSTONE.  Weathering: Slightly weathered.  Fractures: Set 1 dipping 60 to 80 degrees, undulated to stepped rough fracture surfaces. Set 2 dipping 10 to 25 degrees, wide spacing, stepped rough to undulated rough.  Detail: Not intact from 4.00m to 4.20m and 12.40m to 12.50m.	10	
		10.90 - 12.40	10mm 500mm 200mm	100	100	100	6/m			11	
		12.40 - 14.00	50mm 650mm 380mm	88	88	47	4/m			12	
		14.00 - 15.50	30mm 660mm 280mm	100	100	47	7/m			13	
		15.50 - 17.05	90mm 460mm 310mm	100	100	74	6/m			14	
		17.05 - 18.60	150mm 750mm 550mm	100	100	68	3/m			15	

<b>Groundwater:</b>	<b>Hole Information:</b>			<b>Equipment:</b> Deltabase 520
Struck (m bgl)    Rose to    After (min)    Sealed    Comment	Hole Depth (m bgl)	Hole Dia (mm)	Casing Dia (mm)	<b>Method:</b> Compressed air mist
See shift data.	18.60	76	131	

<b>Remarks:</b> Borehole terminated at 18.60m bgl. 50mm standpipe installed. Depth response from 2.00m o 10.50m. Falling head permeability test carried out for 1 hour.	<b>Shift Data:</b>	<b>Groundwater (m bgl)</b>	<b>Shift</b>	<b>Hole Depth (m bgl)</b>	<b>Remarks</b>
		3.4	14/04/2019 08:00	0.00	Start of shift.
		3.4	14/04/2019 18:00	12.40	End of shift.
		3.4	15/04/2019 08:00	12.40	Start of shift.
			15/04/2019 18:00	18.60	End of borehole.





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**Drilled By:**  
AK  
**Logged By:**  
SR

Borehole No.  
**RC01**  
 Sheet 3 of 3

**Project Name:** Dursey Island Cable Car & Visitor Centre **Project No.:** P19033 **Co-ords:** 50810E - 41858N **Hole Type:** Rotary cored

**Location:** Dursey Island, Co. Cork. **Level:** 21.30m OD **Scale:** 1:50

**Client:** Cork County Council **Dates:** 14/04/2019 15/04/2019

Well	Water Strike (m)	Depth (m)	Type /Fs (min, max, avg)	Coring (%)			Depth (m) / Fl (/m)	Level (mOD)	Legend	Stratum Description	
				TCR	SCR	RQD					
							18.60	2.70	XXXXXXXXXX XXXXXXXXXX XXXXXXXXXX XXXXXXXXXX XXXXXXXXXX XXXXXXXXXX XXXXXXXXXX XXXXXXXXXX XXXXXXXXXX XXXXXXXXXX	Lithology: Weak to medium strong, purple SILTSTONE.  Weathering: Slightly weathered.  Fractures: Set 1 dipping 60 to 80 degrees, undulated to stepped rough fracture surfaces. Set 2 dipping 10 to 25 degrees, wide spacing, stepped rough to undulated rough.  Detail: Not intact from 4.00m to 4.20m and 12.40m to 12.50m. End of Borehole at 18.600m	19 20 21 22 23 24 25 26 27

<b>Groundwater:</b>				<b>Hole Information:</b>			<b>Equipment:</b>	
Struck (m bgl)	Rose to	After (min)	Sealed	Comment	Hole Depth (m bgl)	Hole Dia (mm)	Casing Dia (mm)	Deltabase 520
				See shift data.	18.60	76	131	<b>Method:</b> Compressed air mist

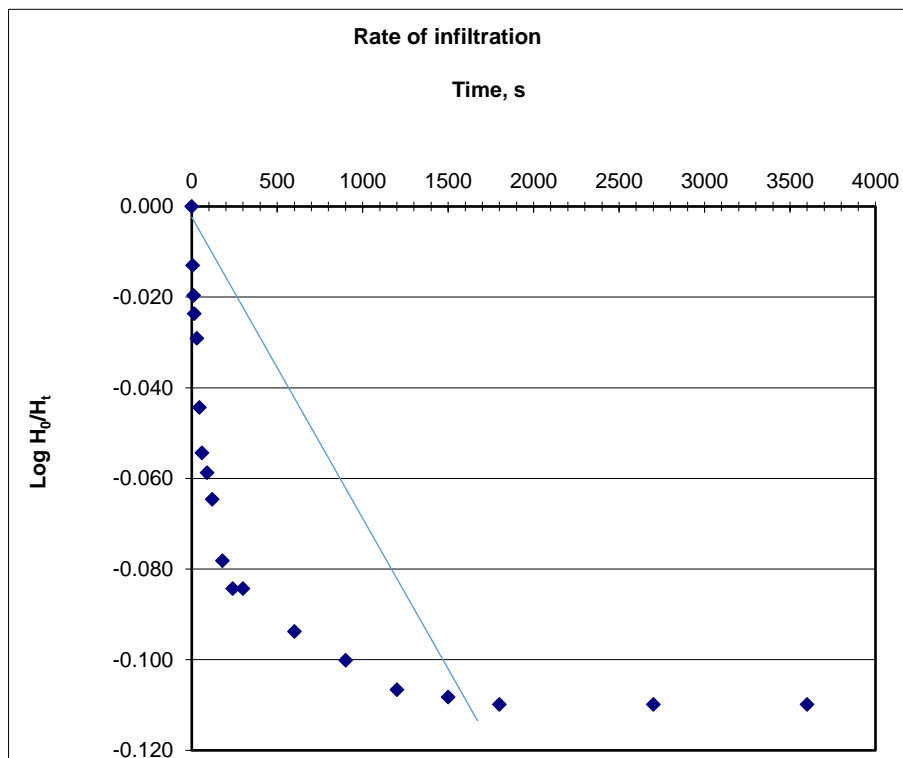
<b>Remarks:</b> Borehole terminated at 18.60m bgl. 50mm standpipe installed. Depth response from 2.00m o 10.50m. Falling head permeability test carried out for 1 hour.	<b>Shift Data:</b>		<b>Groundwater (m bgl)</b>	<b>Shift</b>	<b>Hole Depth (m bgl)</b>	<b>Remarks</b>
			3.4	14/04/2019 08:00	0.00	Start of shift.
			3.4	14/04/2019 18:00	12.40	End of shift.
			3.4	15/04/2019 08:00	12.40	Start of shift.
			3.4	15/04/2019 18:00	18.60	End of borehole.

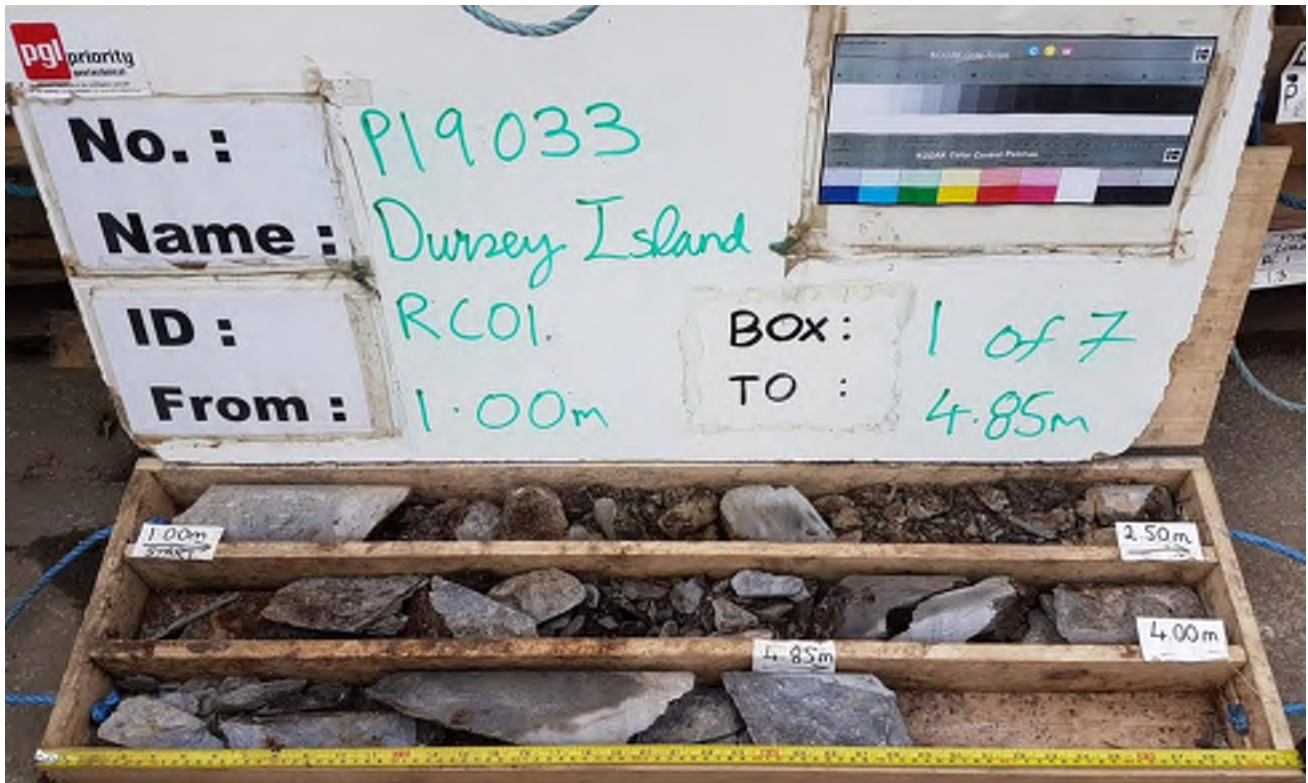
**P19033 Falling head permeability test**

Location **Dursey Island**  
 BH ID **RC01**  $H_w/H_o$  **3.40**  
 Test **1**  
 Casing diameter **100** mm  
 Casing depth **4** m  
 Borehole depth **6.35** m  
 Groundwater level **3.40** m bgl  
 Date **14/04/2019**

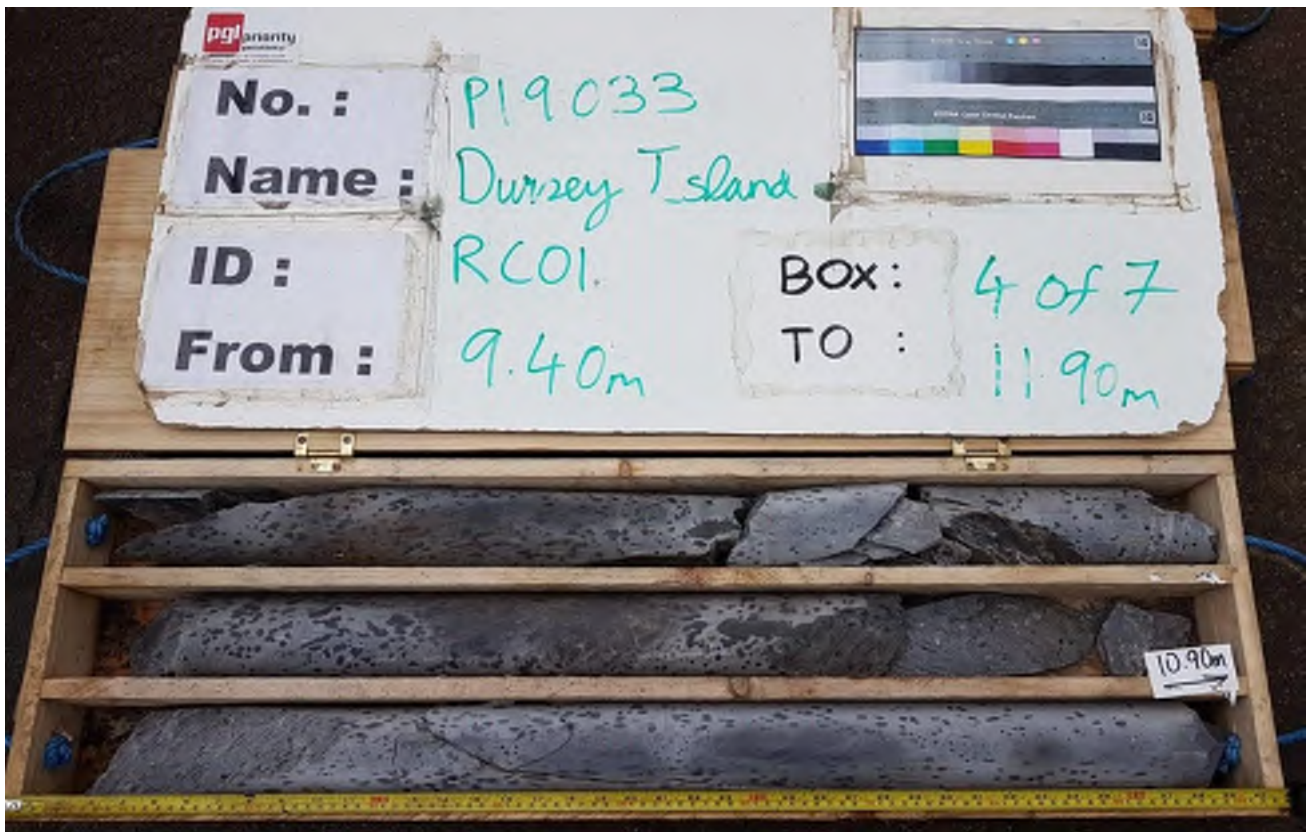
Min	Sec	depth, m bgl	vol, cu.m	$H_t$	$\log H_o/H_t$
0	0	0.000	0.00000	3.400	0.000
0.08	5	0.100	0.00079	3.300	-0.013
0.17	10	0.150	0.00118	3.250	-0.020
0.25	15	0.180	0.00141	3.220	-0.024
0.50	30	0.220	0.00173	3.180	-0.029
0.75	45	0.330	0.00259	3.070	-0.044
1	60	0.400	0.00314	3.000	-0.054
1.5	90	0.430	0.00338	2.970	-0.059
2	120	0.470	0.00369	2.930	-0.065
3	180	0.560	0.00440	2.840	-0.078
4	240	0.600	0.00471	2.800	-0.084
5	300	0.600	0.00471	2.800	-0.084
10	600	0.660	0.00518	2.740	-0.094
15	900	0.700	0.00550	2.700	-0.100
20	1200	0.740	0.00581	2.660	-0.107
25	1500	0.750	0.00589	2.650	-0.108
30	1800	0.760	0.00597	2.640	-0.110
45	2700	0.760	0.00597	2.640	-0.110
60	3600	0.760	0.00597	2.640	-0.110

$k_{mean} = 3.93E-03 \text{ ms}^{-1}$   
 $k_H = k_V$

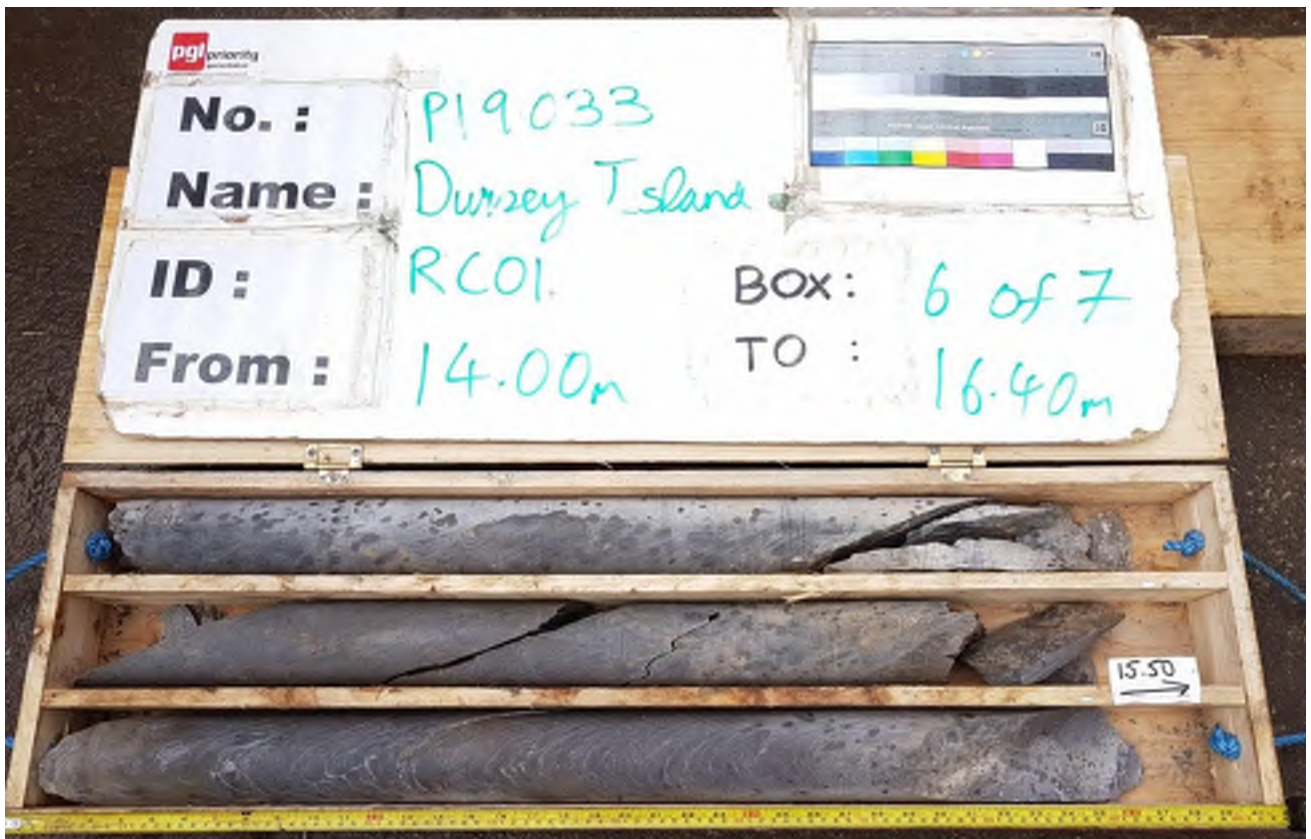




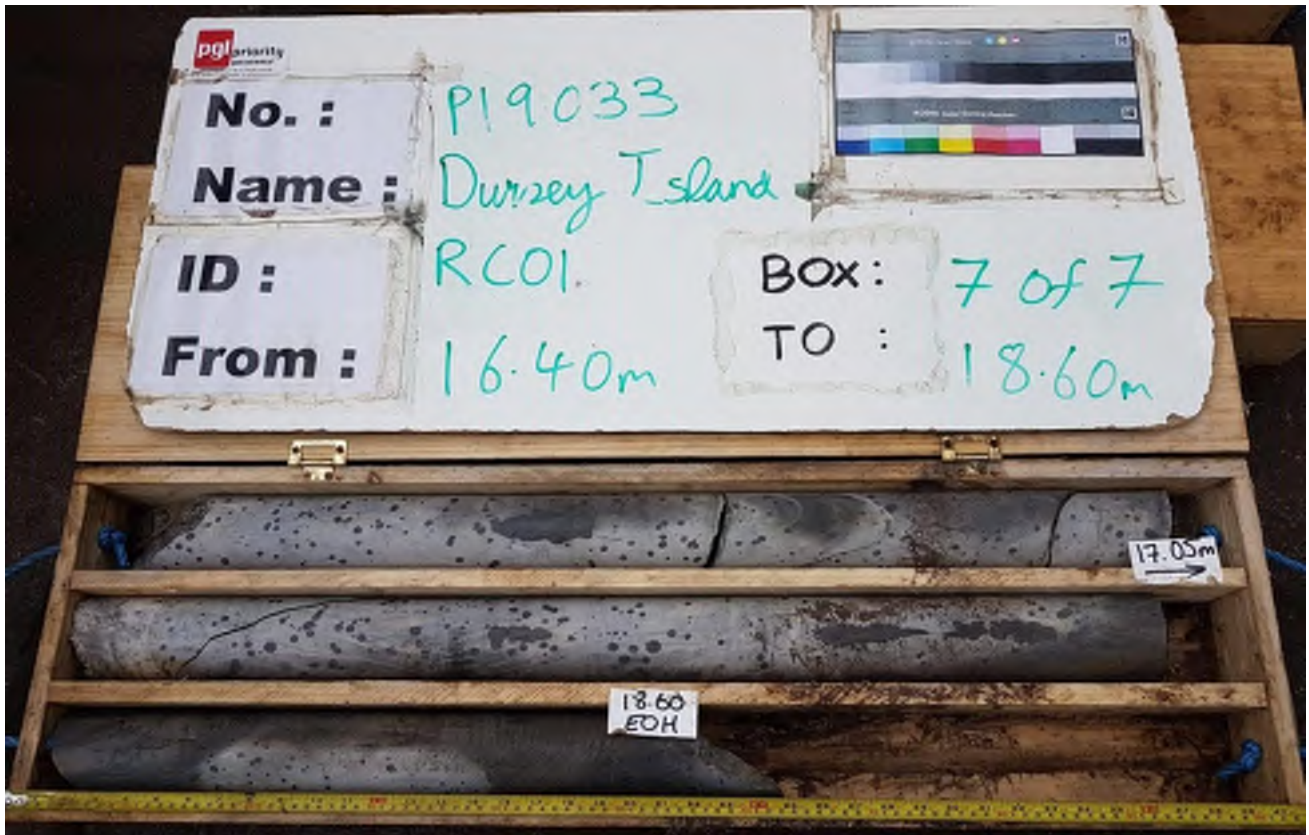
<p>Number: RC01</p>	<p>Project: Dursey Island                  Project No: P19033                  Engineer: Roughan &amp; O'Donovan</p>	
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<p>Number: RC01</p>	<p>Project Dursey Island Project No P19033 Engineer Roughan &amp; O'Donovan</p>	
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Number: RC01	Project: Dursey Island Project No: P19033 Engineer: Roughan & O'Donovan	
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Number:

RC01

Project  
Project No  
Engineer

Dursey Island  
P19033  
Roughan & O'Donovan



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<b>Drilled By:</b>	Borehole No.
AK	<b>RC02</b>
<b>Logged By:</b>	
OD	
Sheet 1 of 2	

<b>Project Name:</b> Dursey Island Cable Car & Visitor Centre	<b>Project No.:</b> P19033	<b>Co-ords:</b> 50738E - 41854N	<b>Hole Type:</b> Rotary cored
<b>Location:</b> Dursey Island, Co. Cork.	<b>Level:</b> 13.70m OD	<b>Scale:</b> 1:50	
<b>Client:</b> Cork County Council	<b>Dates:</b> 10/04/2019 - 12/04/2019		

Well	Water Strike (m)	Depth (m)	Type /Fs (min, max, avg)	Coring (%)			Depth (m) / Fl (/m)	Level (mOD)	Legend	Stratum Description	
				TCR	SCR	RQD					
		0 (50 for 5mm/0 for 0mm) (C)								Open hole boring. Driller described: Peat with weathered rock.	1
		2.25 - 3.75	120mm 450mm 300mm	100	100	30	2.25	11.45		Lithology: Medium weak, purple SILTSTONE.	2
		3.75 - 5.00	100mm 450mm 310mm	100	100	12	6/m			Weathering: Slightly weathered, with light clay smearing and oxidation colouration discoloration.	3
		5.00 - 6.50	100mm 340mm 150mm	100	100	12	7/m			Fractures: Main set dips 60 to 70 degrees, close to medium, undulate to planar smooth. Minor set dips sub-horizontal, wide, stepped rough.	4
		6.50 - 7.15	100mm 550mm 500mm	100	100	49	3/m				5
		7.15 - 8.70	150mm 800mm 300mm	100	100	36	6/m				6
							2/m				7
							5/m				8
										9	

<b>Groundwater:</b>	<b>Hole Information:</b>			<b>Equipment:</b>	Deltabase 520.
Struck (m bgl)    Rose to    After (min)    Sealed    Comment	Hole Depth (m bgl)	Hole Dia (mm)	Casing Dia (mm)	<b>Method:</b>	Compressed air mist.
7.00	16.15	76	131		

<b>Remarks:</b> Borehole terminated at 16.15m bgl.	<b>Shift Data:</b>	<b>Groundwater (m bgl)</b>	<b>Shift</b>	<b>Hole Depth (m bgl)</b>	<b>Remarks</b>
		Dry.	10/04/2019 08:00	2.25	Start of shift.
		7.00	10/04/2019 18:00	7.15	End of shift.
		8.00	11/04/2019 08:00	7.15	Start of shift.
		8.00	11/04/2019 18:00	11.30	End of shift.
		8.00	12/04/2019 08:00	11.30	Start of shift.
		8.00	12/04/2019 18:00	16.15	End of borehole.



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<b>Drilled By:</b>	Borehole No.
AK	<b>RC02</b>
<b>Logged By:</b>	
OD	
Sheet 2 of 2	

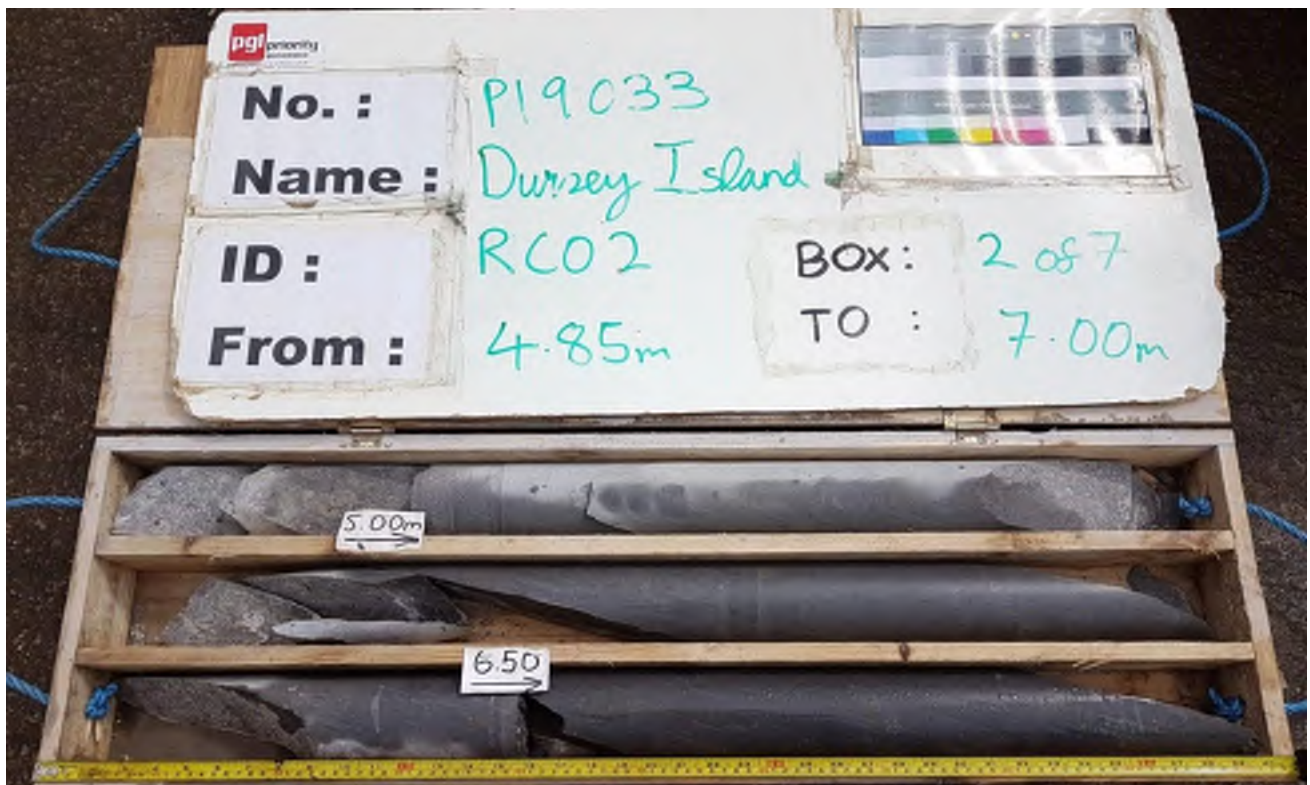
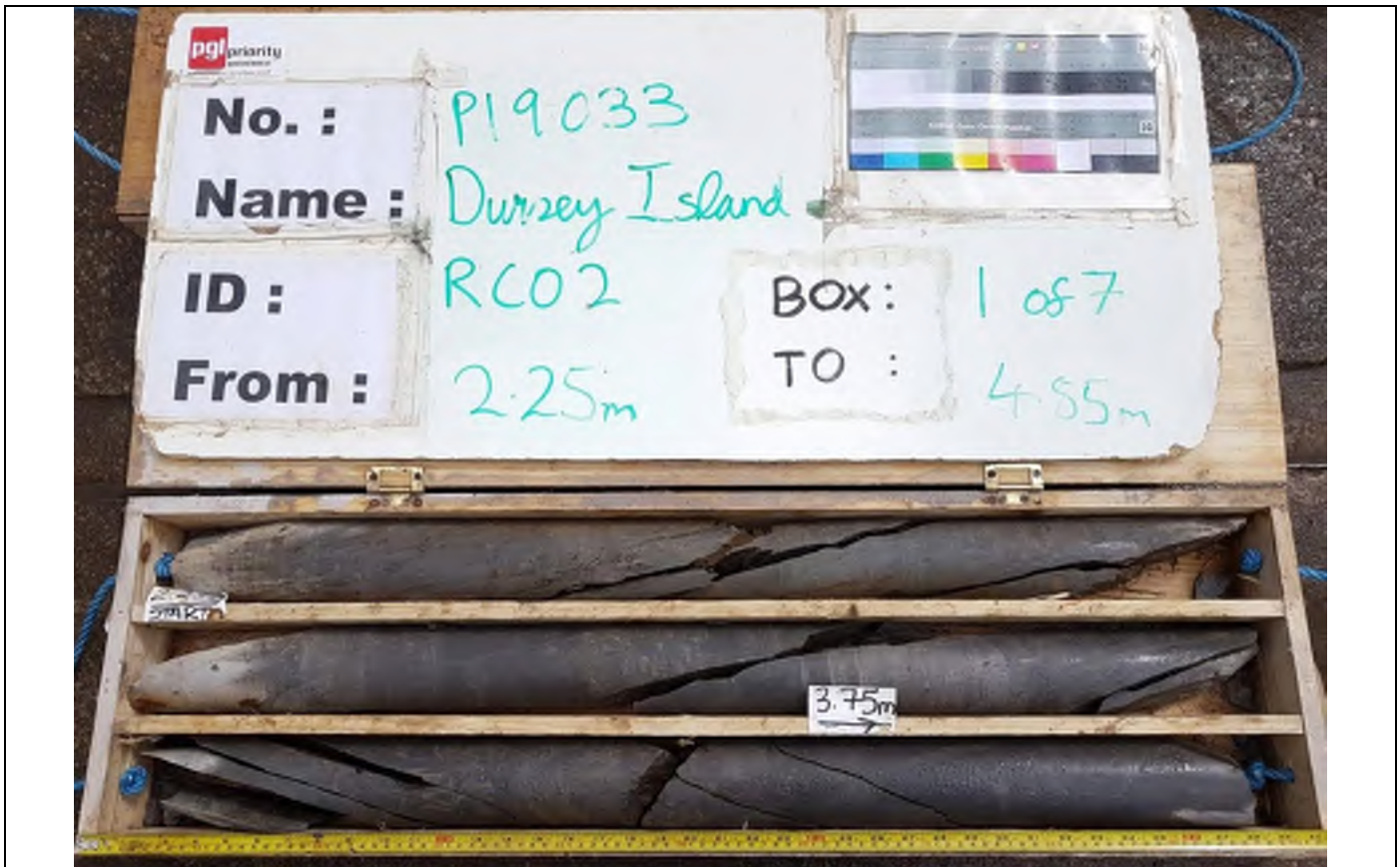
<b>Project Name:</b> Dursey Island Cable Car & Visitor Centre	<b>Project No.:</b> P19033	<b>Co-ords:</b> 50738E - 41854N	<b>Hole Type:</b> Rotary cored
<b>Location:</b> Dursey Island, Co. Cork.	<b>Level:</b> 13.70m OD	<b>Scale:</b> 1:50	
<b>Client:</b> Cork County Council	<b>Dates:</b> 10/04/2019 - 12/04/2019		

Well	Water Strike (m)	Depth (m)	Type /Fs (min, max, avg)	Coring (%)			Depth (m) / Fl (/m)	Level (mOD)	Legend	Stratum Description	
				TCR	SCR	RQD					
		8.70 - 9.75	100mm 380mm 200mm	100	100	24	7/m		Lithology: Medium weak, purple SILTSTONE.  Weathering: Slightly weathered, with light clay smearing and oxidation colouration discoloration.  Fractures: Main set dips 60 to 70 degrees, close to medium, undulate to planar smooth. Minor set dips sub-horizontal, wide, stepped rough.		
		9.75 - 11.30	180mm 700mm 400mm	100	100	32	5/m			10	
		11.30 - 12.70	200mm 660mm 400mm	100	100	43	5/m			11	
		12.70 - 14.20	650mm 650mm 650mm	100	100	67	2/m			12	
		14.20 - 15.25	50mm 700mm 150mm	100	100	95	3/m			13	
		15.25 - 16.10	525mm 550mm 500mm	100	100	88	2/m			14	
		16.15	350mm 580mm 270mm	100	100	88	2/m			15	
						16.15	-2.45		16	End of Borehole at 16.150m	
									17		
									18		

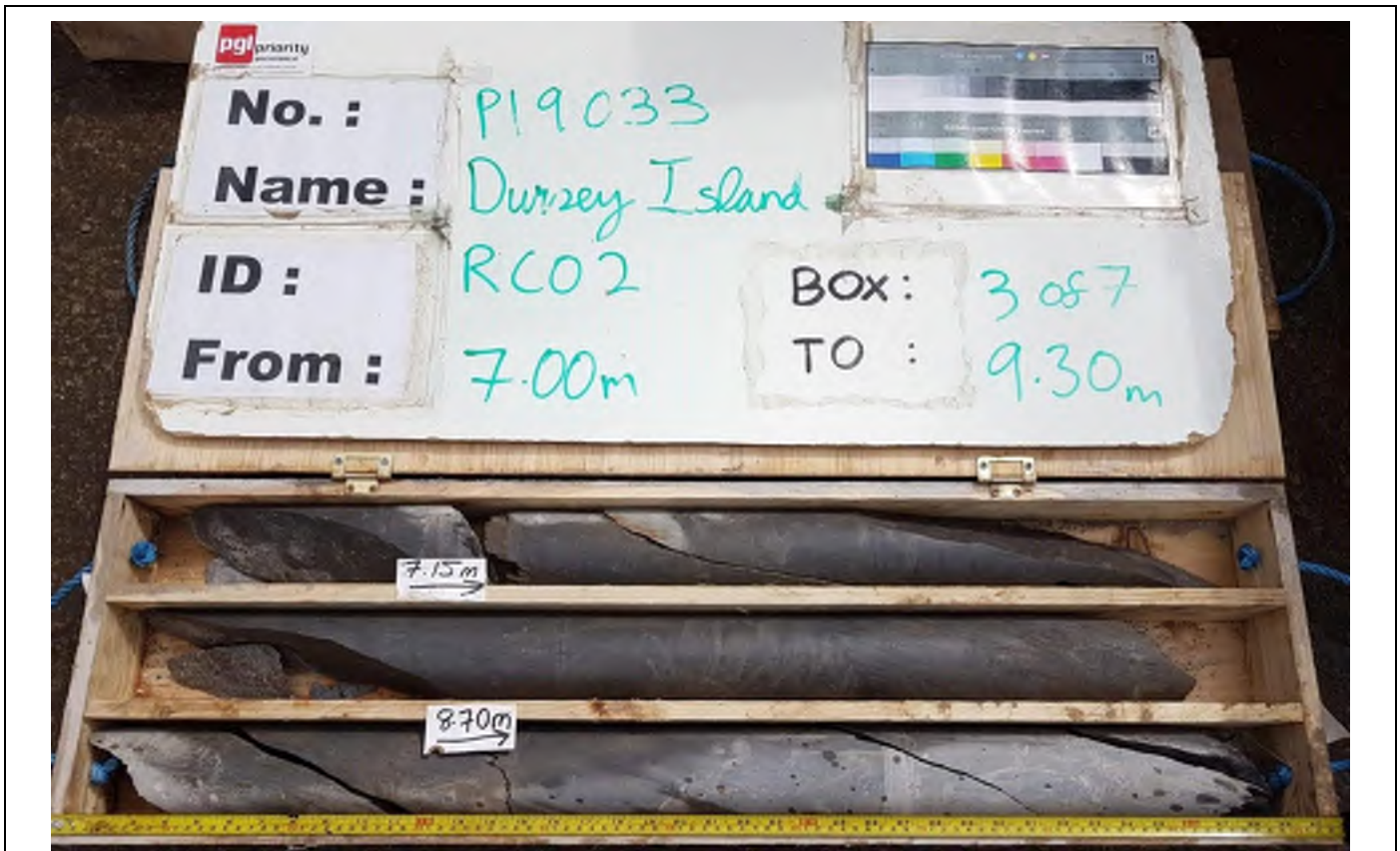
<b>Groundwater:</b>	<b>Hole Information:</b>			<b>Equipment:</b>	Deltabase 520.
Struck (m bgl)    Rose to    After (min)    Sealed    Comment	Hole Depth (m bgl)	Hole Dia (mm)	Casing Dia (mm)	<b>Method:</b>	Compressed air mist.
7.00	16.15	76	131		

<b>Remarks:</b> Borehole terminated at 16.15m bgl.	<b>Shift Data:</b>	<b>Groundwater (m bgl)</b>	<b>Shift</b>	<b>Hole Depth (m bgl)</b>	<b>Remarks</b>
		Dry.	10/04/2019 08:00	2.25	Start of shift.
		7.00	10/04/2019 18:00	7.15	End of shift.
		8.00	11/04/2019 08:00	7.15	Start of shift.
		8.00	11/04/2019 18:00	11.30	End of shift.
		8.00	12/04/2019 08:00	11.30	Start of shift.
	8.00	12/04/2019 18:00	16.15	End of borehole.	

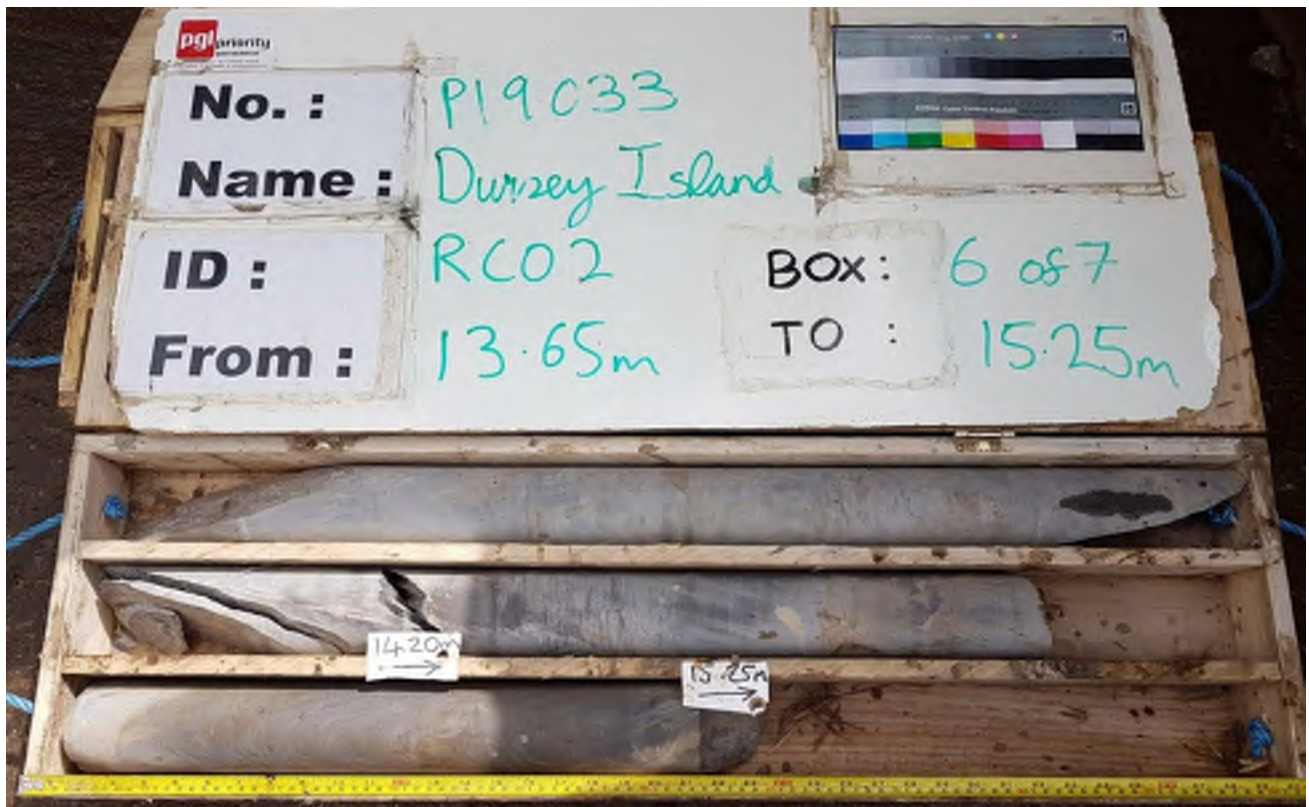




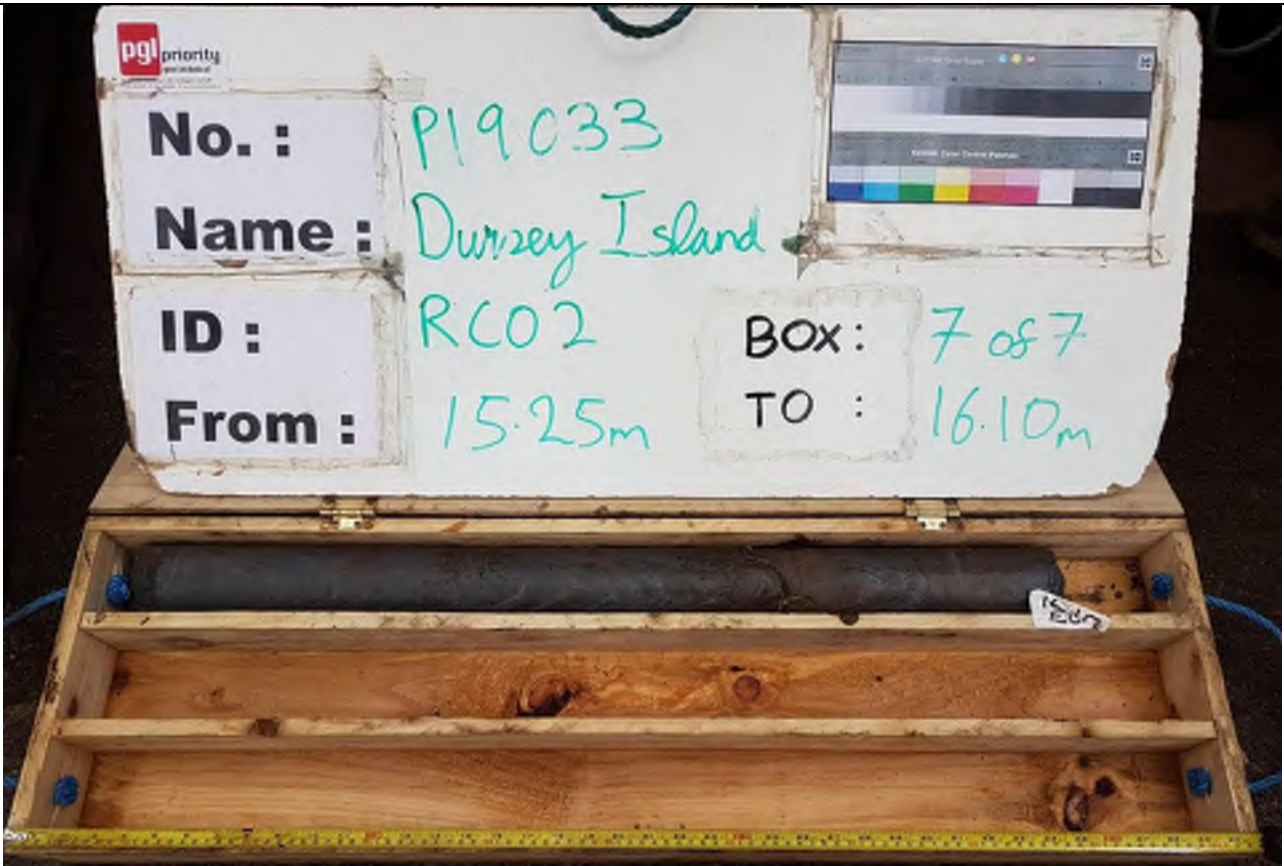
<b>Number:</b> RC02	<b>Project</b> Dursey Island <b>Project No</b> P19033 <b>Engineer</b> Roughan & O'Donovan	
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Number:	RC02	Project Project No Engineer	Durnsey Island P19033 Roughan & O'Donovan
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<p>Number: RC02</p>	<p>Project Durrsey Island Project No P19033 Engineer Roughan &amp; O'Donovan</p>	
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Number:

RC02

Project  
Project No  
Engineer

Dursey Island  
P19033  
Roughan & O'Donovan



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<b>Drilled By:</b>	Borehole No.
AK	<b>RC03</b>
<b>Logged By:</b>	
OD	
Sheet 1 of 2	

<b>Project Name:</b> Durseys Island Cable Car & Visitor Centre	<b>Project No.:</b> P19033	<b>Co-ords:</b> 50544E - 41652N	<b>Hole Type:</b> Rotary cored
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<b>Location:</b> Durseys Island, Co. Cork.	<b>Level:</b> 18.05m OD	<b>Scale:</b> 1:50
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<b>Client:</b> Cork County Council	<b>Dates:</b> 08/04/2019 - 09/04/2019
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Well	Water Strike (m)	Depth (m)	Type /Fs (min, max, avg)	Coring (%)			Depth (m) / Fl (/m)	Level (mOD)	Legend	Stratum Description	
				TCR	SCR	RQD					
		0 (50 for 0mm/0 for 0mm) (C) 0.70 - 1.50					0.70	17.35		Open hole boring. Driller described: Peat with weathered rock.	
				94	94	44	2/m			Lithology: Weak to medium strong, purple, SILTSTONE.  Weathering: Slightly weathered with minor clay infill and oxidation discoloration.	1
		1.50 - 3.00	130mm 700mm 400mm	100	100	20	5/m			Fractures: Main set dips 70 to 80 degrees, close to medium, planar to undulate smooth. Minor set dips 45 degrees, medium to wide, stepped rough.	2
		3.00 - 4.60		100	100	49	4/m				3
		4.60 - 6.15	320mm 800mm 420mm	100	100	55	2/m				4
		6.15 - 7.45	280mm 460mm 300mm	100	100	50	4/m				5
		7.45 - 9.05	170mm 750mm 400mm	100	100	28	6/m				6
											7
											8
											9

<b>Groundwater:</b>				<b>Hole Information:</b>			<b>Equipment:</b> Deltabase 520.
Struck (m bgl)	Rose to	After (min)	Sealed	Comment	Hole Depth (m bgl)	Hole Dia (mm)	Casing Dia (mm)
9.00				See shift data.	13.65	76	131
							<b>Method:</b> Compressed air mist.

<b>Remarks:</b> Borehole terminated at 13.65m bgl. Standpipe (50mm dia) installed from GL to 13.65m bgl. Response zone from 1.50m to 13.65m bgl.	<b>Shift Data:</b>		<b>Groundwater (m bgl)</b>	<b>Shift</b>	<b>Hole Depth (m bgl)</b>	<b>Remarks</b>
			Dry.	08/04/2019 08:00	0.70	Start of shift.
			9.00	08/04/2019 18:00	11.10	End of shift.
			9.00	09/04/2019 08:00	11.10	Start of shift.
			9.00	09/04/2019 18:00	13.65	End of borehole.



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<b>Drilled By:</b>	<b>RC03</b>
AK	
<b>Logged By:</b>	
OD	

Borehole No. Sheet 2 of 2

<b>Project Name:</b> Dursley Island Cable Car & Visitor Centre	<b>Project No.:</b> P19033	<b>Co-ords:</b> 50544E - 41652N	<b>Hole Type:</b> Rotary cored
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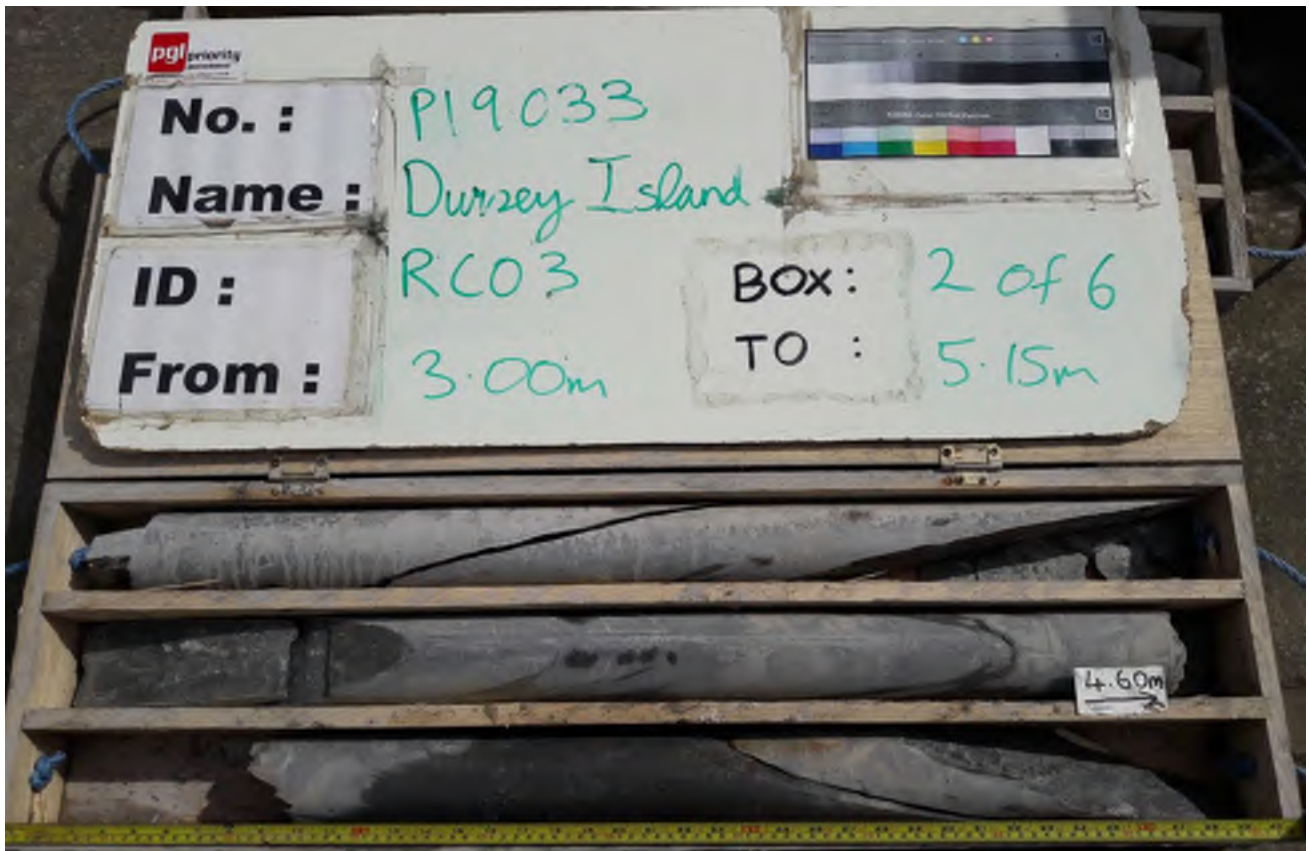
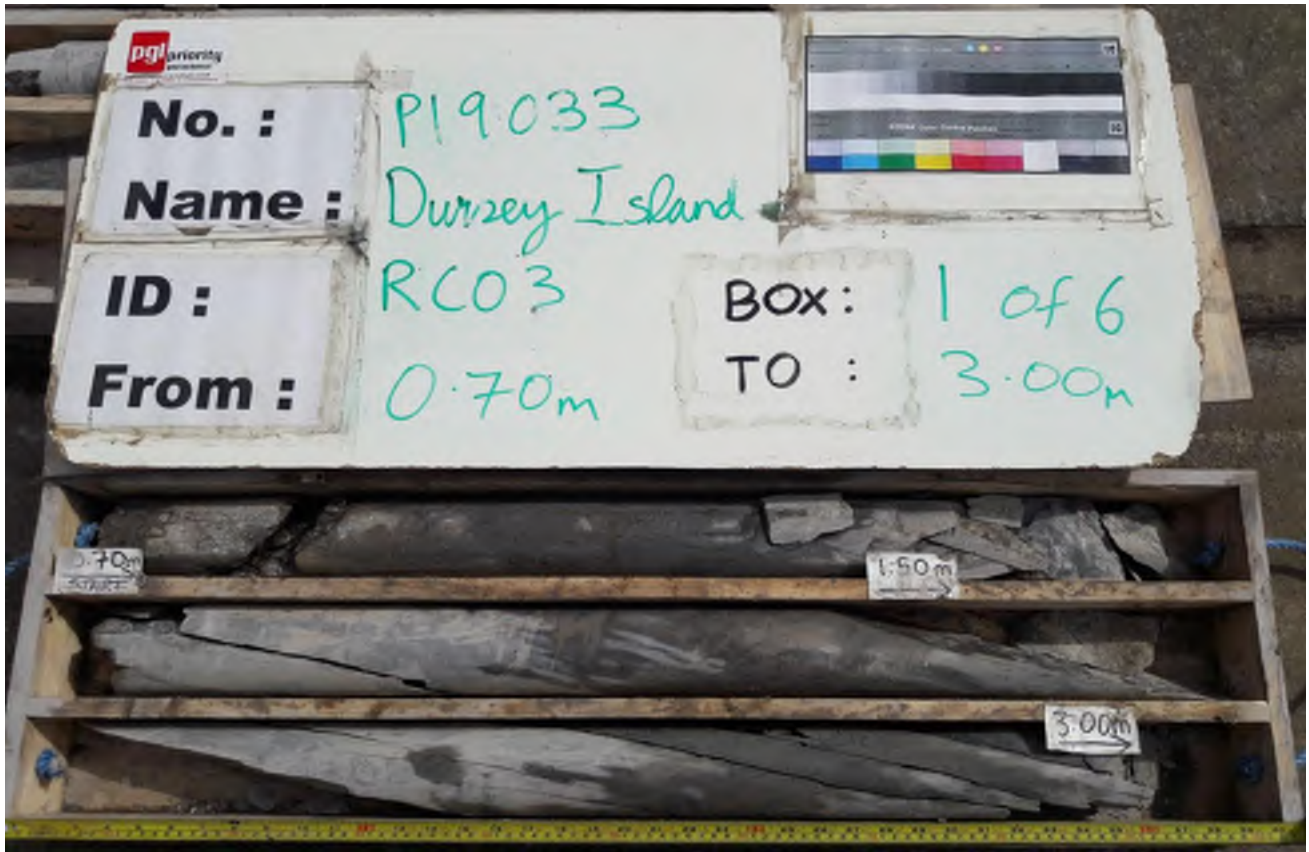
<b>Location:</b> Dursley Island, Co. Cork.	<b>Level:</b> 18.05m OD	<b>Scale:</b> 1:50
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<b>Client:</b> Cork County Council	<b>Dates:</b> 08/04/2019 - 09/04/2019
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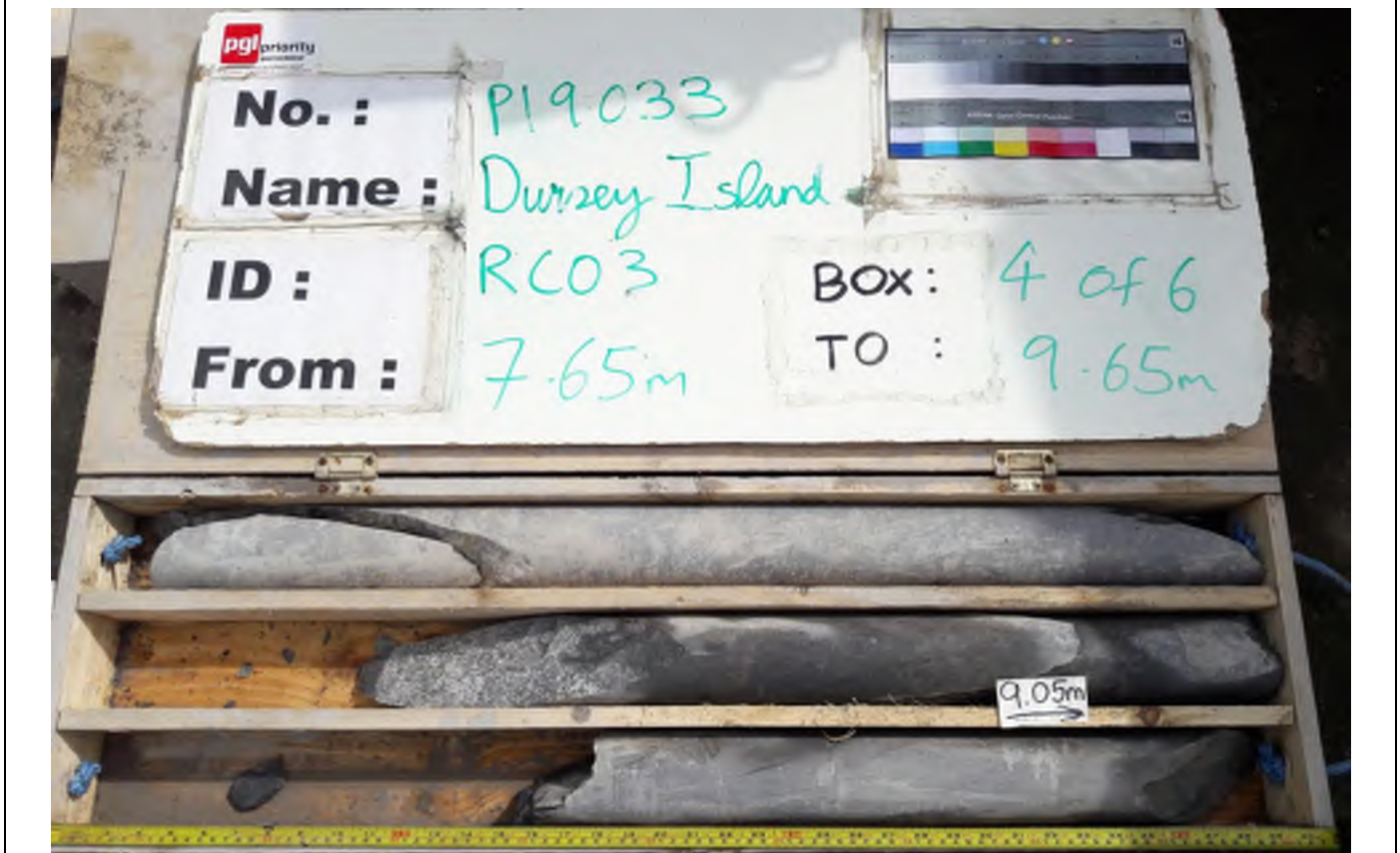
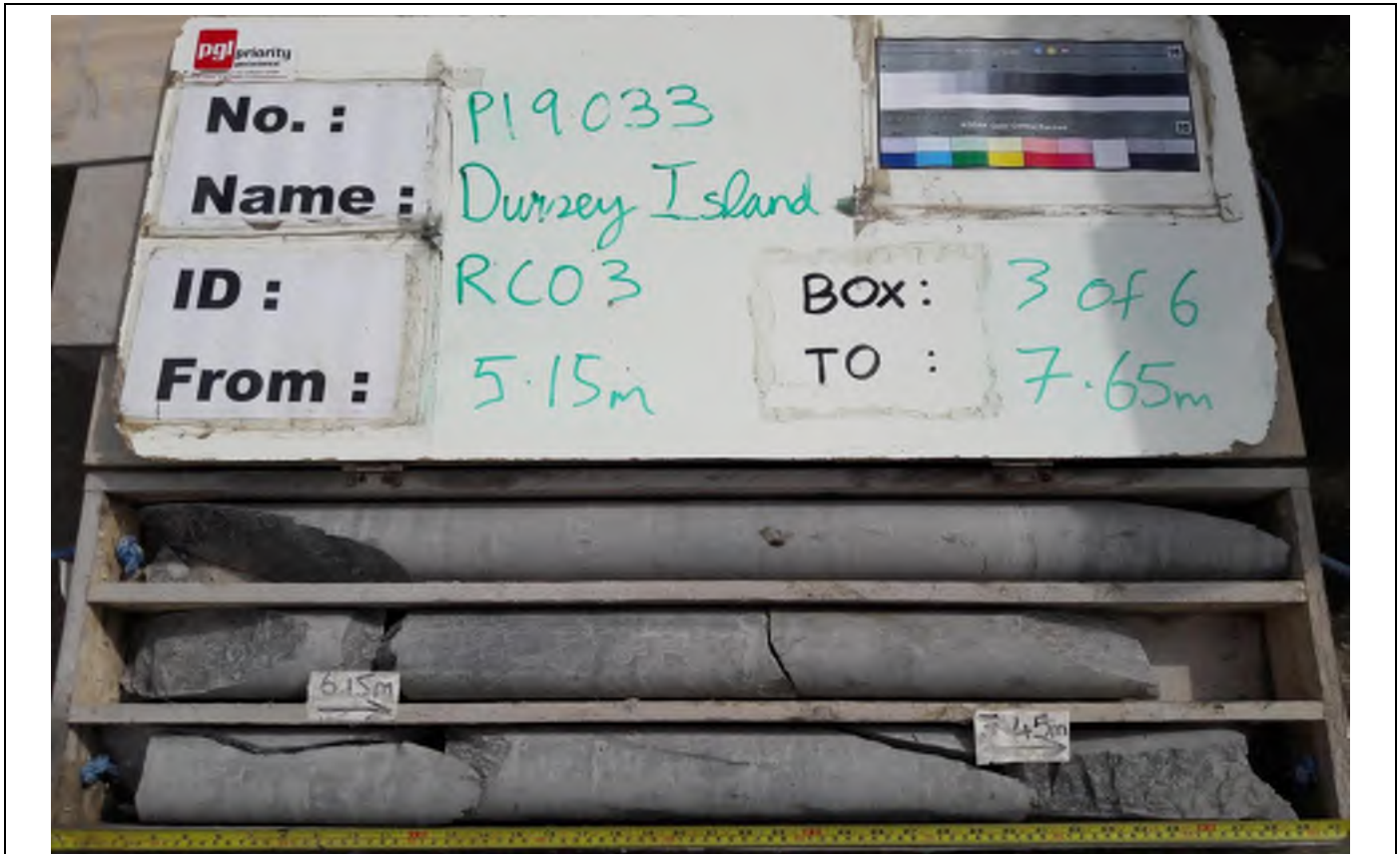
Well	Water Strike (m)	Depth (m)	Type /Fs (min, max, avg)	Coring (%)			Depth (m) / Fl (/m)	Level (mOD)	Legend	Stratum Description
				TCR	SCR	RQD				
		9.05 - 10.55	150mm 600mm 300mm	100	100	28	5/m	Lithology: Weak to medium strong, purple, SILTSTONE.  Weathering: Slightly weathered with minor clay infill and oxidation discoloration.  Fractures: Main set dips 70 to 80 degrees, close to medium, planar to undulate smooth. Minor set dips 45 degrees, medium to wide, stepped rough.	10	
		10.55 - 11.10		100	100	91	1/m		11	
		11.10 - 12.70	200mm 400mm 250mm	100	100	28	7/m		12	
		12.70 - 13.65	120mm 480mm 450mm	100	100	25	3/m		13	
							13.65	4.40	End of Borehole at 13.650m	14
										15
										16
										17
										18

<b>Groundwater:</b>				<b>Hole Information:</b>			<b>Equipment:</b>	Deltabase 520.	
Struck (m bgl)	Rose to	After (min)	Sealed	Comment	Hole Depth (m bgl)	Hole Dia (mm)	Casing Dia (mm)	<b>Method:</b>	Compressed air mist.
9.00				See shift data.	13.65	76	131		

<b>Remarks:</b> Borehole terminated at 13.65m bgl. Standpipe (50mm dia) installed from GL to 13.65m bgl. Response zone from 1.50m to 13.65m bgl.	<b>Shift Data:</b>	Groundwater (m bgl)	Shift	Hole Depth (m bgl)	Remarks
		Dry.	08/04/2019 08:00	0.70	Start of shift.
		9.00	08/04/2019 18:00	11.10	End of shift.
		9.00	09/04/2019 08:00	11.10	Start of shift.
		9.00	09/04/2019 18:00	13.65	End of borehole.

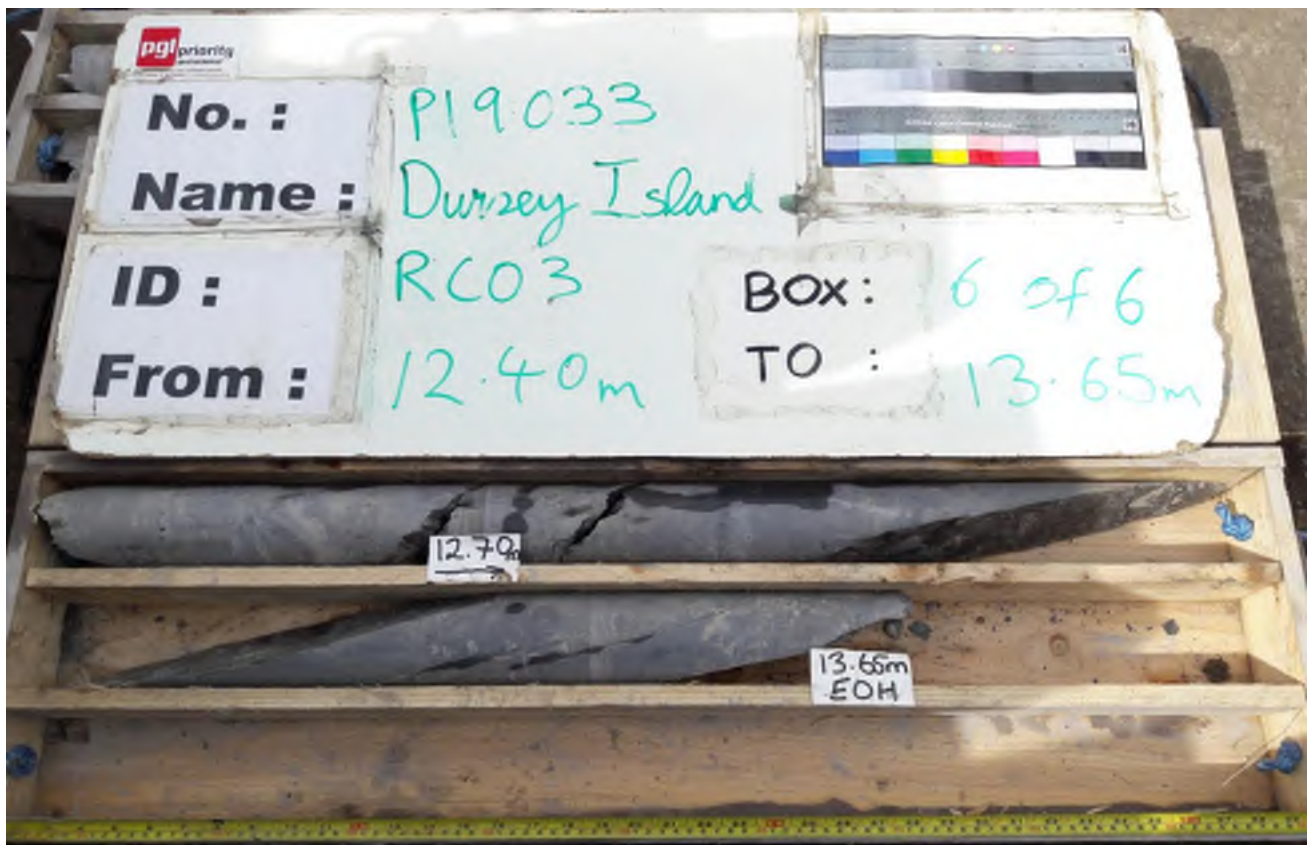
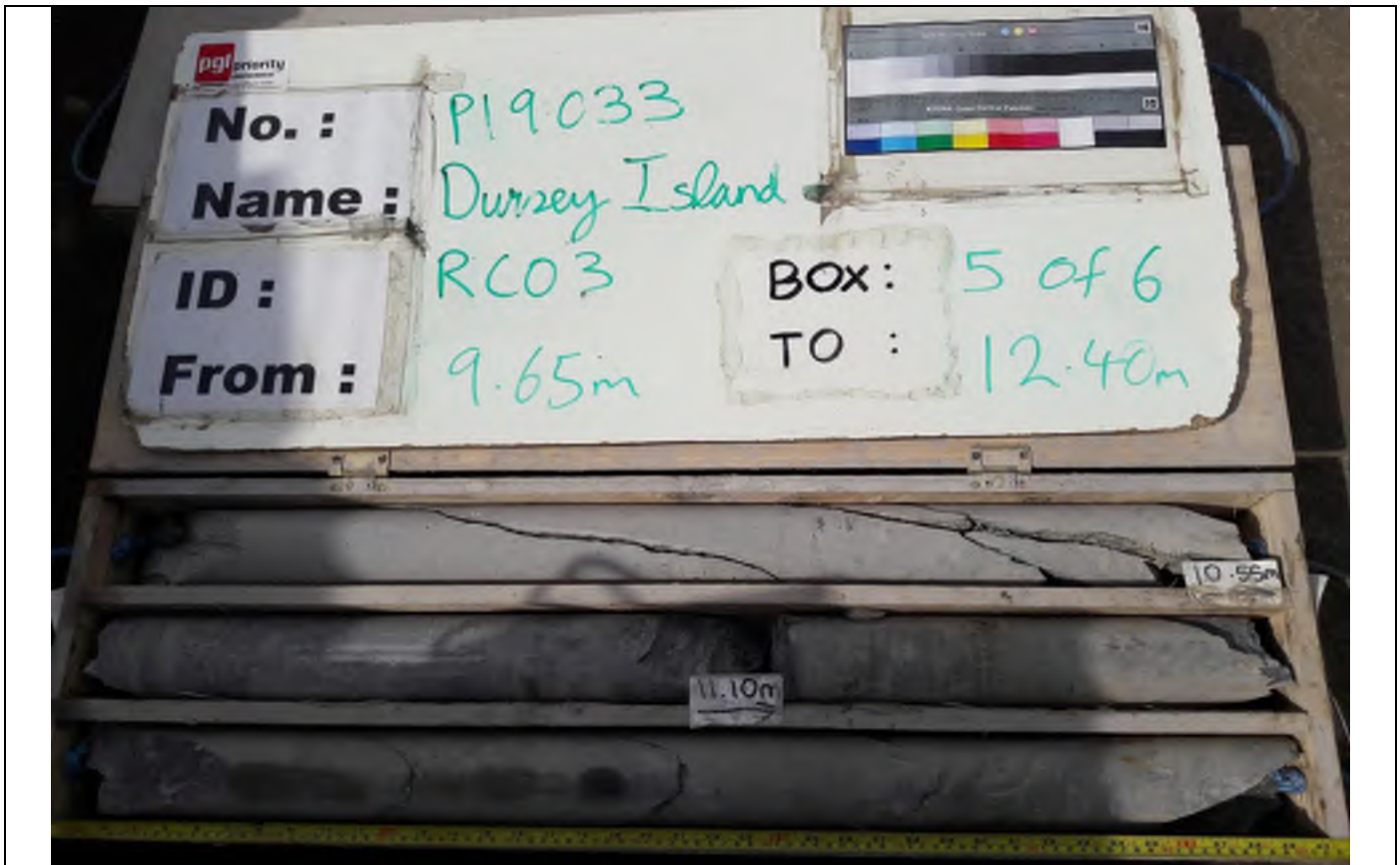


<p>Number: RC03</p>	<p>Project Durrsey Island                  Project No P19033                  Engineer Roughan &amp; O'Donovan</p>	
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<p>Number: RC03</p>	<p>Project Durrsey Island Project No P19033 Engineer Roughan &amp; O'Donovan</p>	
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<p>Number: RC03</p>	<p>Project Durszey Island                  Project No P19033                  Engineer Roughan &amp; O'Donovan</p>	
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**Drilled By:**  
AK  
**Logged By:**  
OD

Borehole No.  
**RC04**  
 Sheet 1 of 1

**Project Name:** Dursley Island Cable Car & Visitor Centre **Project No.:** P19033 **Co-ords:** 50520E - 41619N **Hole Type:** Rotary cored

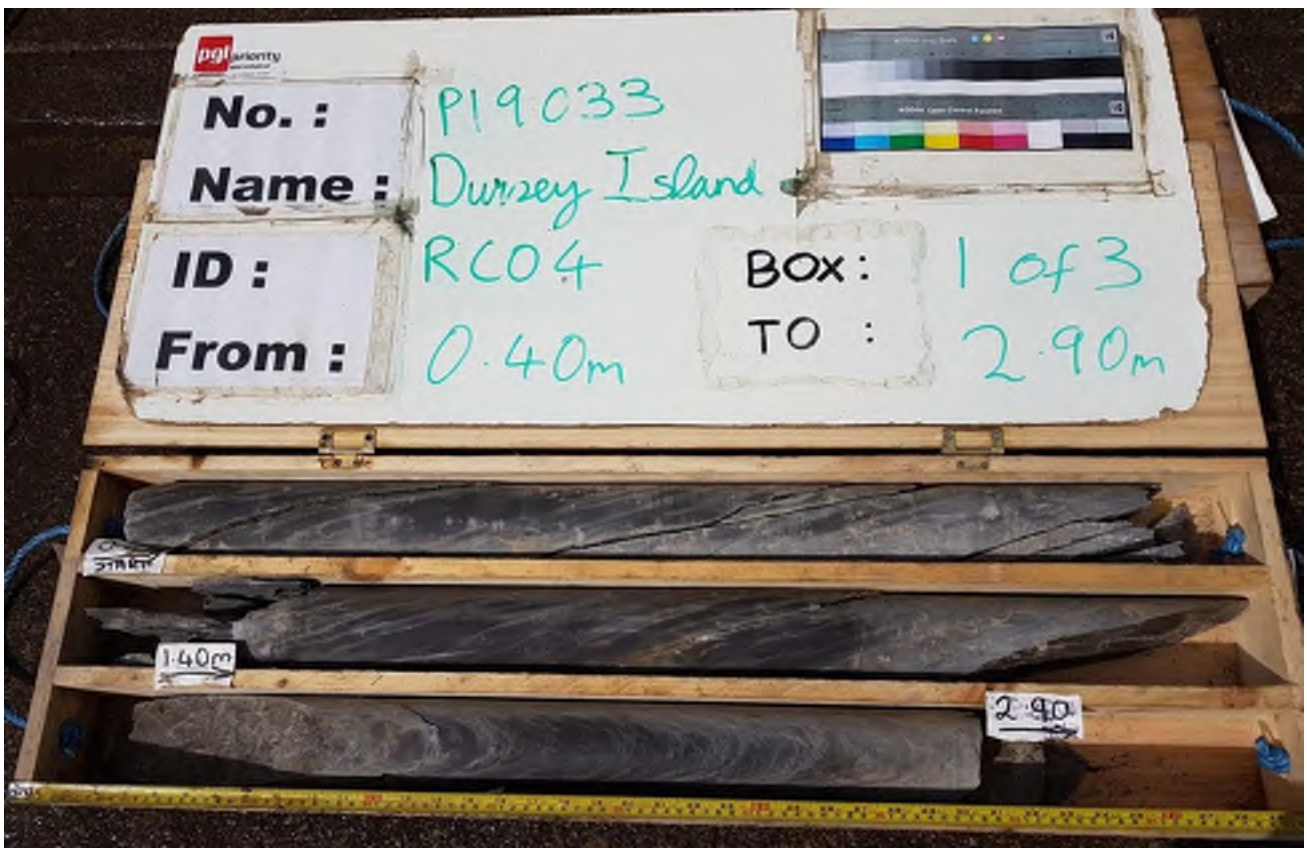
**Location:** Dursley Island, Co. Cork. **Level:** 20.90m OD **Scale:** 1:50

**Client:** Cork County Council **Dates:** 09/04/2019 09/04/2019

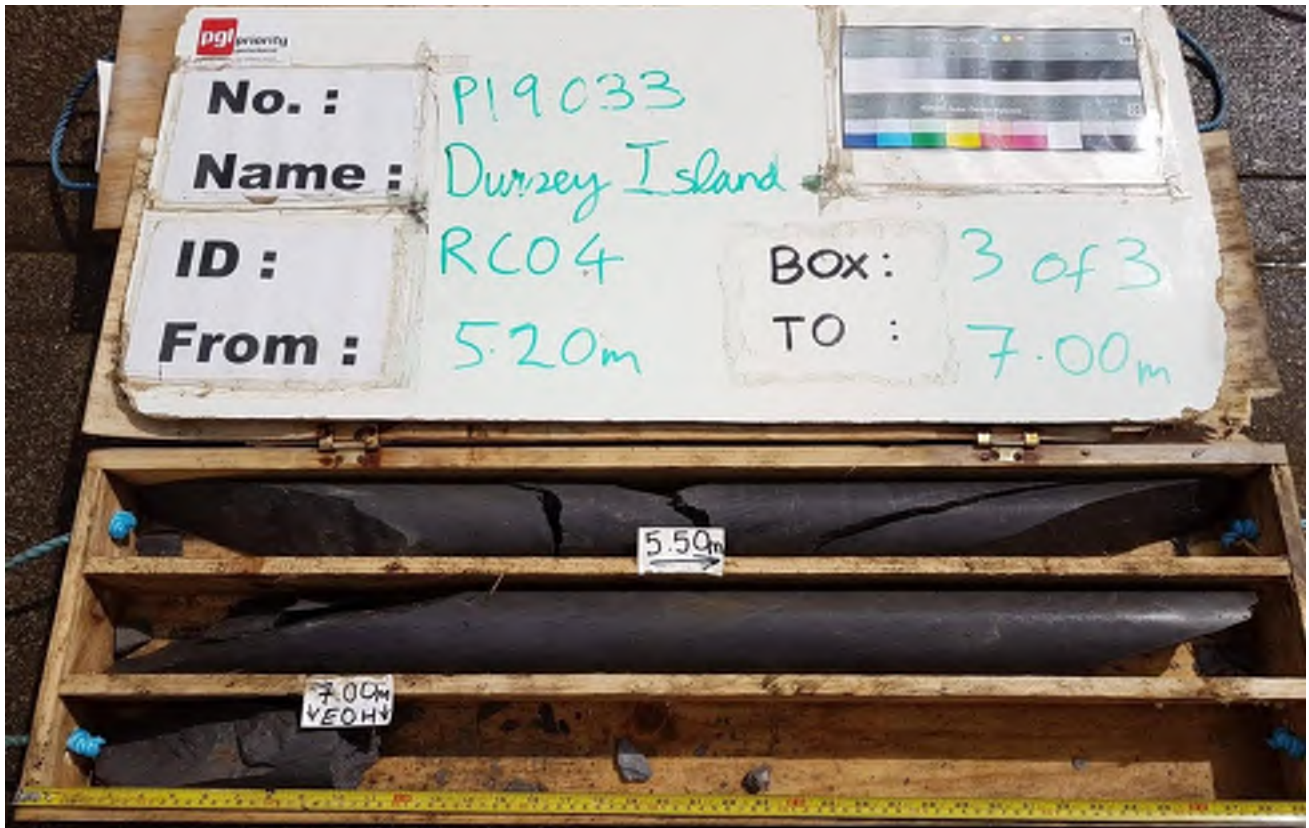
Well	Water Strike (m)	Depth (m)	Type /Fs (min, max, avg)	Coring (%)			Depth (m) / Fl (/m)	Level (mOD)	Legend	Stratum Description	
				TCR	SCR	RQD					
		0 (50 for 5mm/0 for 0mm) (C)					0.40	20.50		Driller described: PEAT.	
		0.40 - 1.40	100mm 450mm 200mm	100	100	0	7/m			Lithology; Medium strong, purple green, SILTSTONE.	1
		1.40 - 2.90	140mm 550mm 370mm	100	100	19	4/m			Weathering: Slightly weathered with light oxidation discoloration.	2
		2.90 - 3.90	160mm 350mm 270mm	100	100	10	6/m			Fractures: 1 set observed. Main set dips 70 to 80 degrees, close, planar to undulate smooth.	3
		3.90 - 5.50		100	100	22	5/m				4
		5.50 - 7.00	200mm 760mm 300mm	100	100	30	4/m				5
							7.00	13.90		End of Borehole at 7.000m	6
											7
											8
											9

<b>Groundwater:</b>				<b>Hole Information:</b>			<b>Equipment:</b>	Deltabase 520.	
Struck (m bgl)	Rose to	After (min)	Sealed	Comment	Hole Depth (m bgl)	Hole Dia (mm)	Casing Dia (mm)	<b>Method:</b>	Compressed air mist.
				None encountered.	7.00	76	131		

<b>Remarks:</b> Borehole terminated at 7.00m bgl.	<b>Shift Data:</b>	Groundwater (m bgl)	Shift	Hole Depth (m bgl)	Remarks
		0.0	09/04/2019 08:00 09/04/2019 18:00	0.40 7.00	Start of shift. End of borehole.



<p>Number: RC04</p>	<p>Project Durssey Island Project No P19033 Engineer Roughan &amp; O'Donovan</p>	
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<p>Number: RC04</p>	<p>Project Dursey Island Project No P19033 Engineer Roughan &amp; O'Donovan</p>	
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**Drilled By:**

AK

**Logged By:**

N/A

Borehole No.

**RCTW01**

Sheet 1 of 3

**Project Name:** Dursey Island Cable Car & Visitor Centre      **Project No.:** P19033      **Co-ords:** 50778E - 41902N      **Hole Type:** Rotary open hole

**Location:** Dursey Island, Co. Cork.      **Level:** 23.70m OD      **Scale:** 1:50

**Client:** Cork County Council      **Dates:** 12/04/2019      13/04/2019

Well	Water Strike (m)	Depth (m)	Type /Fs (min, max, avg)	Coring (%)			Depth (m) / Fl (/m)	Level (mOD)	Legend	Stratum Description
				TCR	SCR	RQD				
										Open hole boring. Driller described: Bedrock. Assumed SILTSTONE lithology.

<b>Groundwater:</b>				<b>Hole Information:</b>			<b>Equipment:</b>	Deltabase 520	
Struck (m bgl)	Rose to	After (min)	Sealed	Comment	Hole Depth (m bgl)	Hole Dia (mm)	Casing Dia (mm)	<b>Method:</b>	Compressed air mist.
				See shift data.	25.50	140	140		

<b>Remarks:</b> Borehole terminated at 25.50m bgl. Standpipe (50mm dia) installed from 0.0m to 25.50m bgl. Response zone from 9.00m to 25.50m bgl.	<b>Shift Data:</b>		<b>Groundwater (m bgl)</b>	<b>Shift</b>	<b>Hole Depth (m bgl)</b>	<b>Remarks</b>
			Dry.	12/04/2019 08:00	0.00	Start of shift.
			4.0	12/04/2019 18:00	5.00	End of shift.
			0.0	13/04/2019 08:00	5.00	Start of shift.
			0.0	13/04/2019 18:00	25.50	End of borehole.



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Drilled By: AK  
Logged By: N/A

Borehole No. RCTW01  
Sheet 2 of 3

Project Name: Dursley Island Cable Car & Visitor Centre  
Project No. P19033  
Co-ords: 50778E - 41902N  
Hole Type: Rotary open hole

Location: Dursley Island, Co. Cork.  
Level: 23.70m OD  
Scale: 1:50

Client: Cork County Council  
Dates: 12/04/2019 - 13/04/2019

Well	Water Strike (m)	Depth (m)	Type /Fs (min, max, avg)	Coring (%)			Depth (m) / Fl (/m)	Level (mOD)	Legend	Stratum Description
				TCR	SCR	RQD				
									Open hole boring. Driller described: Bedrock. Assumed SILTSTONE lithology.	
										10
										11
										12
										13
										14
										15
										16
										17
										18

<b>Groundwater:</b>				<b>Hole Information:</b>			<b>Equipment:</b>	Deltabase 520
Struck (m bgl)	Rose to	After (min)	Sealed	Comment	Hole Depth (m bgl)	Hole Dia (mm)	Casing Dia (mm)	<b>Method:</b>
				See shift data.	25.50	140	140	Compressed air mist.

<b>Remarks:</b> Borehole terminated at 25.50m bgl. Standpipe (50mm dia) installed from 0.0m to 25.50m bgl. Response zone from 9.00m to 25.50m bgl.	<b>Shift Data:</b>	Groundwater (m bgl)	Shift	Hole Depth (m bgl)	Remarks		
			12/04/2019 08:00			0.00	Start of shift.
			12/04/2019 18:00			5.00	End of shift.
			13/04/2019 08:00			5.00	Start of shift.
			13/04/2019 18:00			25.50	End of borehole.





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**Drilled By:**  
AK  
**Logged By:**  
N/A

Borehole No.  
**RCTW02**  
 Sheet 1 of 3

**Project Name:** Dursey Island Cable Car & Visitor Centre  
**Project No.:** P19033  
**Co-ords:** 50498E - 41564N  
**Hole Type:** Rotary cored

**Location:** Dursey Island, Co. Cork.  
**Level:** 23.27m OD  
**Scale:** 1:50

**Client:** Cork County Council  
**Dates:** 05/04/2019 07/04/2019

Well	Water Strike (m)	Depth (m)	Type /Fs (min, max, avg)	Coring (%)			Depth (m) / Fl (/m)	Level (mOD)	Legend	Stratum Description	
				TCR	SCR	RQD					
							1.20	22.07		Open hole boring. Driller described: Peat.	1
										Open hole boring. Driller described: Bedrock. Assumed Siltstone.	2
											3
											4
											5
											6
											7
											8
											9

<b>Groundwater:</b>				<b>Hole Information:</b>			<b>Equipment:</b>	
Struck (m bgl)	Rose to	After (min)	Sealed	Comment	Hole Depth (m bgl)	Hole Dia (mm)	Casing Dia (mm)	Deltabase 520
4.50				See shift data.	25.50	140	140	Compressed air

<b>Remarks:</b> Borehole terminated at 25.5m bgl. 50mm dia. standpipe installed. Response zone from 10.0m to 20.5m bgl.	<b>Shift Data:</b>		<b>Groundwater (m bgl)</b>	<b>Shift</b>	<b>Hole Depth (m bgl)</b>	<b>Remarks</b>
			Dry	05/04/2019 08:00	0.00	Start of shift.
			Dry	05/04/2019 18:00	1.00	End of shift.
			4.5	06/04/2019 08:00	1.00	Start of shift.
			4.5	06/04/2019 18:00	13.00	End of shift.
			0	07/04/2019 08:00	13.00	Start of shift.
			07/04/2019 18:00	25.50	End of borehole.	





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Drilled By:

AK

Logged By:

N/A

Borehole No.

**RCTW02**

Sheet 2 of 3

<b>Project Name:</b> Dursey Island Cable Car & Visitor Centre	<b>Project No.:</b> P19033	<b>Co-ords:</b> 50498E - 41564N	<b>Hole Type:</b> Rotary cored
<b>Location:</b> Dursey Island, Co. Cork.	<b>Level:</b> 23.27m OD	<b>Scale:</b> 1:50	
<b>Client:</b> Cork County Council	<b>Dates:</b> 05/04/2019		07/04/2019

Well	Water Strike (m)	Depth (m)	Type /Fs (min, max, avg)	Coring (%)			Depth (m) / Fl (/m)	Level (mOD)	Legend	Stratum Description
				TCR	SCR	RQD				
										Open hole boring. Driller described: Bedrock. Assumed Siltstone.

<b>Groundwater:</b>					<b>Hole Information:</b>			<b>Equipment:</b>						
Struck (m bgl)	Rose to	After (min)	Sealed	Comment	Hole Depth (m bgl)	Hole Dia (mm)	Casing Dia (mm)	Deltabase 520						
4.50				See shift data.	25.50	140	140	Compressed air						
<b>Remarks:</b> Borehole terminated at 25.5m bgl. 50mm dia. standpipe installed. Response zone from 10.0m to 20.5m bgl.					<b>Shift Data:</b>									
					Groundwater (m bgl)				Shift		Hole Depth (m bgl)		Remarks	
					Dry				05/04/2019 08:00		0.00		Start of shift.	
					Dry				05/04/2019 18:00		1.00		End of shift.	
					4.5				06/04/2019 08:00		1.00		Start of shift.	
					4.5				06/04/2019 18:00		13.00		End of shift.	
0				07/04/2019 08:00		13.00		Start of shift.						
				07/04/2019 18:00		25.50		End of borehole.						



<b>Project Name:</b> Dursey Island Cable Car & Visitor Centre	<b>Project No.:</b> P19033	<b>Co-ords:</b> 50498E - 41564N	<b>Hole Type:</b> Rotary cored
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<b>Location:</b> Dursey Island, Co. Cork.	<b>Level:</b> 23.27m OD	<b>Scale:</b> 1:50
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<b>Client:</b> Cork County Council	<b>Dates:</b> 05/04/2019 07/04/2019
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Well	Water Strike (m)	Depth (m)	Type /Fs (min, max, avg)	Coring (%)			Depth (m) / Fl (/m)	Level (mOD)	Legend	Stratum Description	
				TCR	SCR	RQD					
										Open hole boring. Driller described: Bedrock. Assumed Siltstone.	
											19
											20
											21
											22
											23
											24
							25.50	-2.23			25
										End of Borehole at 25.500m	26
											27

<b>Groundwater:</b>	<b>Hole Information:</b>		<b>Equipment:</b>	Deltabase 520
Struck (m bgl)   Rose to   After (min)   Sealed   Comment	Hole Depth (m bgl)	Hole Dia (mm)   Casing Dia (mm)	<b>Method:</b>	Compressed air
4.50	25.50	140   140		
See shift data.				

<b>Remarks:</b> Borehole terminated at 25.5m bgl. 50mm dia. standpipe installed. Response zone from 10.0m to 20.5m bgl.	<b>Shift Data:</b>	<b>Groundwater (m bgl)</b>	<b>Shift</b>	<b>Hole Depth (m bgl)</b>	<b>Remarks</b>
		Dry	05/04/2019 08:00	0.00	Start of shift.
		Dry	05/04/2019 18:00	1.00	End of shift.
		4.5	06/04/2019 08:00	1.00	Start of shift.
		4.5	06/04/2019 18:00	13.00	End of shift.
		0	07/04/2019 08:00	13.00	Start of shift.
			07/04/2019 18:00	25.50	End of borehole.

Project Id: P19033

Project Title: Dursey Island Cable Car & Visitor Centre

Location: Dursey Island, Co. Cork.

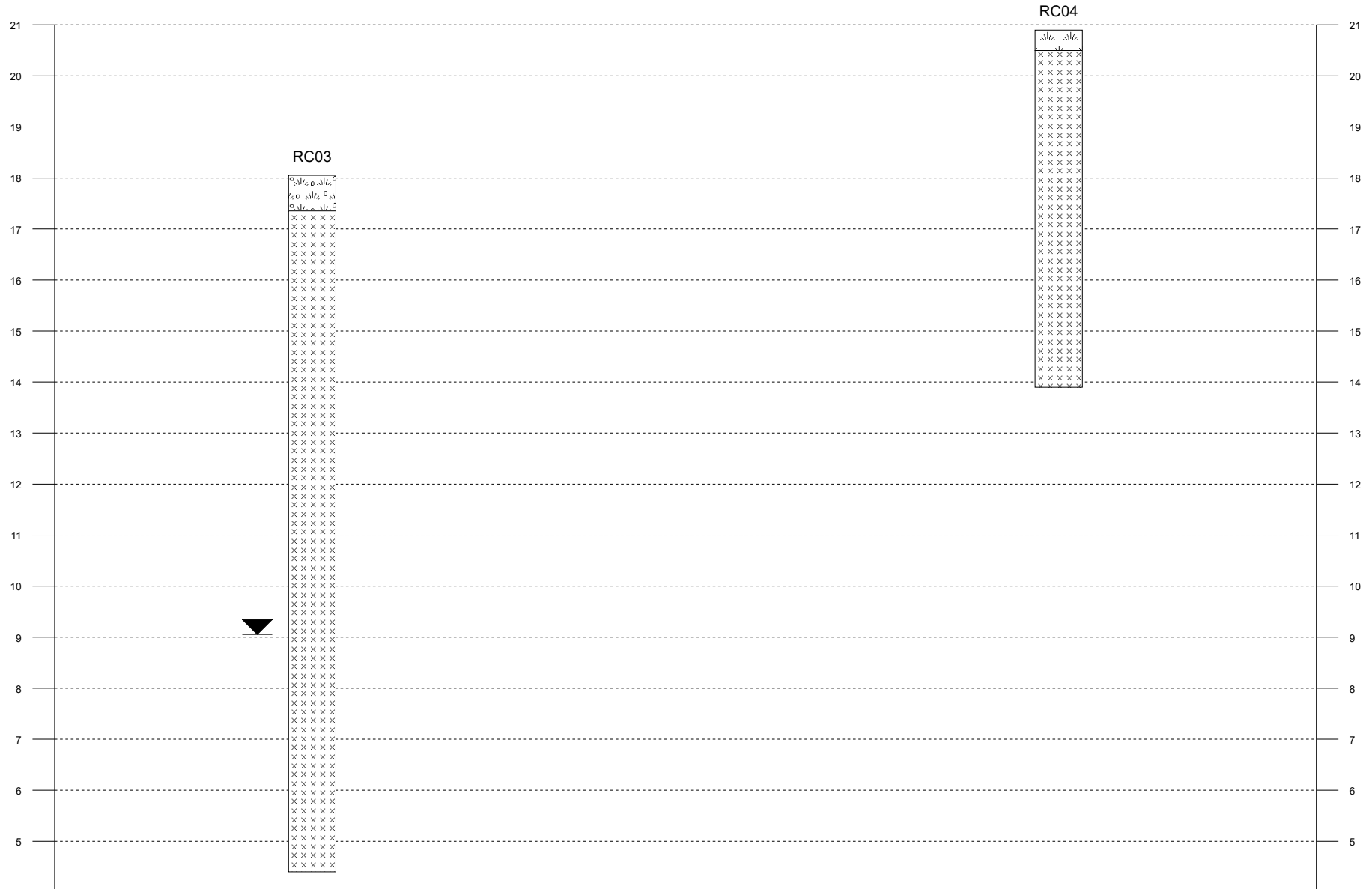
Client: Cork County Council

Title: Section line 2




Vertical Scale: 1:111

Horizontal Scale: Not to scale

Engineer: Roughan & O'Donovan



Legend Key

-  PEAT
-  SILTSTONE
-  Cobbly PEAT

4.00

Chainage (m)	0.00	0.00	0.00
Elevation (mAOD)	18.05	20.36	20.90

Project Id: P19033

Project Title: Dursey Island Cable Car & Visitor Centre

Location: Dursey Island, Co. Cork.

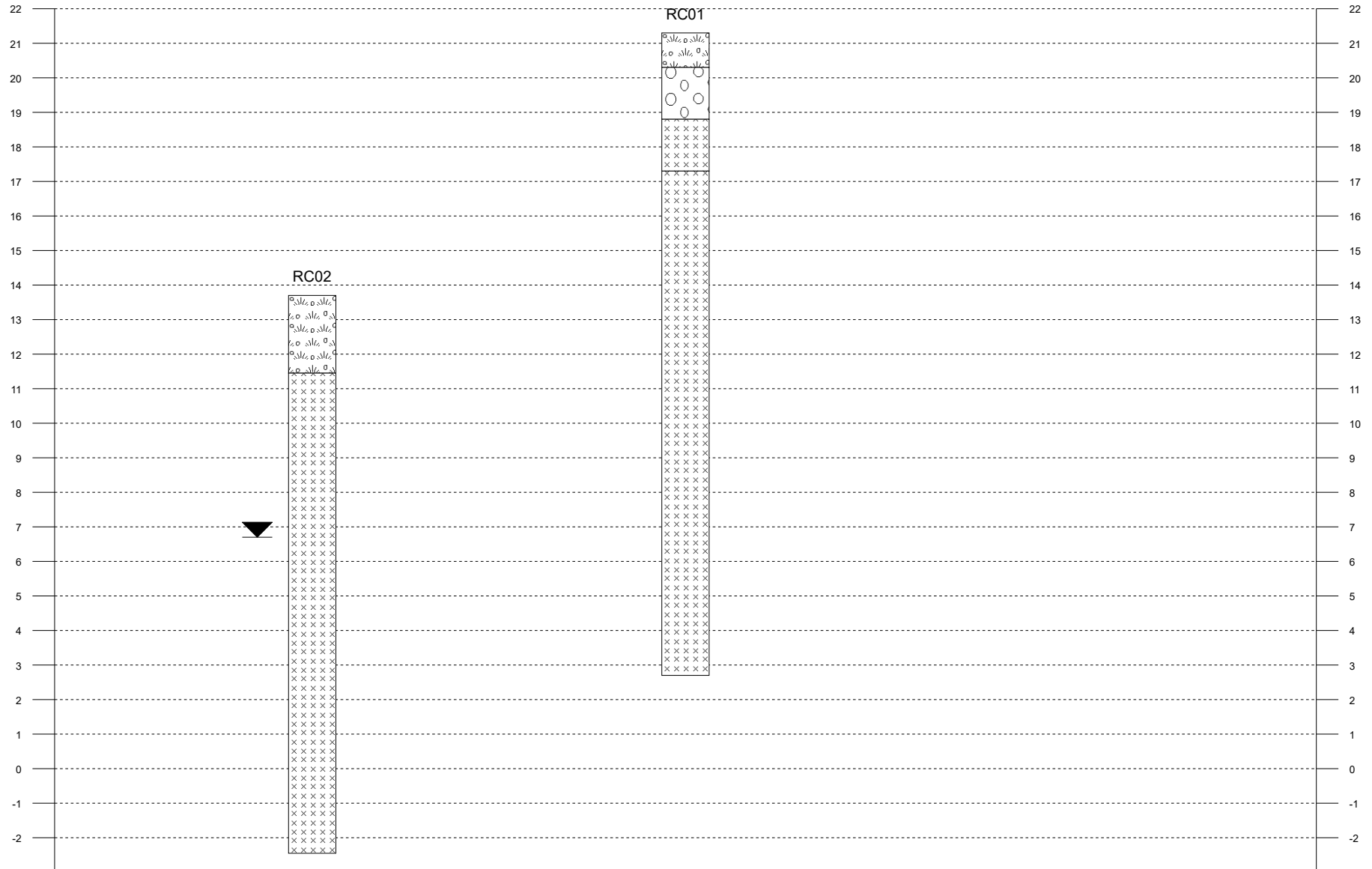
Client: Cork County Council




Title: Section line 1

Vertical Scale: 1:164

Horizontal Scale: Not to scale

Engineer: Roughan & O'Donovan



- Legend Key**
-  Cobblely PEAT
  -  BOULDERS
  -  SILTSTONE

Chainage (m)	82.71	82.71	82.71
Elevation (mAOD)	13.70	21.30	20.80

Job Name:	Durseley Island
Job Number:	P19033
Test Carried Out By:	AO
Date:	10/04/19 to 12/04/19



Percolation "T" Test	T1	T2	T3
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Depth from GL to top of hole (mm)	400	300	300
Depth from GL to base of hole (mm)	800	700	700
Depth of Hole (mm)	400	400	400
Dimensions			
Length (mm)	300	300	300
Width (mm)	300	300	300

Date/time Presoaked	10/04/2019	10/04/2019	10/04/2019
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Tests			
Date	11/04/2019	11/04/2019	11/04/2019
Time filled to 400mm	12:35	15:00	13:00
Time water level 300mm	13:30	17:45	14:55
Time to drop 100mm (min)	55	165	115

Average	111.67
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Standard Method	T1			T2			T3		
Fill no	Time at 300m	Time at 200mm	Δt	Time at 300m	Time at 200mm	Δt	Time at 300m	Time at 200mm	Δt
1	13:30	14:10	40	17:45	08:00	855	14:55	19:15	260
2	14:10	15:05	55	08:10	didn't reach		08:10	12:45	275
3	15:05	16:10	65				12:45	18:30	345
Average			53.33						293.33

Percolation "P" Tests	P1	P2	P3
Depth from GL to top of hole (mm)	0	0	0
Depth from GL to base of hole (mm)	400	400	400
Depth of Hole (mm)	400	400	400
Dimensions			
Length (mm)	300	300	300
Width (mm)	300	300	300

Date/time Presoaked	10/04/2019	10/04/2019	10/04/2019
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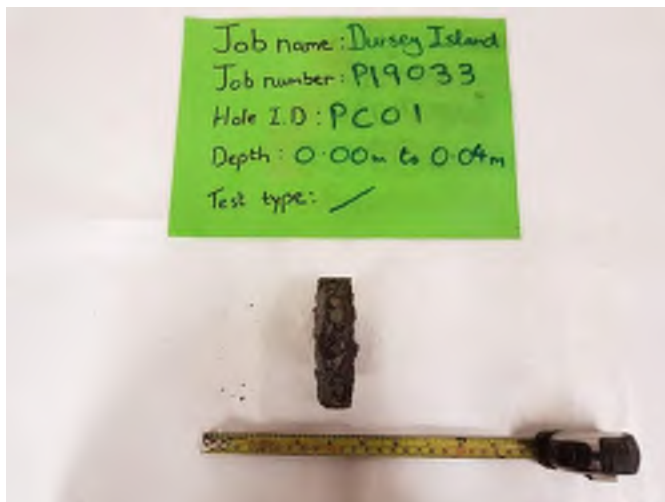
Date	11/04/2019	11/04/2019	11/04/2019
Time filled to 400mm	17:50	17:54	18:04
Time water level 300mm	18:05	18:06	18:19
Time to drop 100mm (min)	15	12	15

Average	14
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Standard Method	P1			P2			P3		
Fill no	Time at 300m	Time at 200mm	Δt	Time at 300m	Time at 200mm	Δt	Time at 300m	Time at 200mm	Δt
1	18:05	17:00	55	18:06	18:49	43	18:19	18:45	26
2	08:46	09:42	56	09:05	10:00	55	09:00	09:38	38
3	09:45	10:45	60	10:10	11:15	65	09:40	10:28	48
Average			57.00			54.33			37.33

# Pavement Core Photographic Record and Log

Layer No.	Depth		Thickness, mm	Material Description **	Binder	Aggregate	
	From	To				Agg'	Type
1	0.00	0.04	40	Bitumen with crushed rock and gravel. Gravel is varied lithology. Max clast size 20mm.	B	20	CR & G



\*\* Layer descriptions based on assumed function within the pavement structure. Based on visual inspection only.

**Nominal diameter:** mm

**Binder:**  
**B** = Bitumen  
**T** = Tar  
**C** = Cement  
**N** = None


**Aggregate:**

**40** = 40mm max' aggregate size  
**28** = 28mm  
**20** = 20mm  
**14** = 10mm to 14mm  
**6** = 3m to 6mm

**Aggregate Type (Type):**

**CR** = Crushed Rock  
**G** = Gravel  
**S** = Slag  
**O** = Other

**E:** 50762.88  
**N:** 41865.42  
**Mod:** 17.0

<b>Pavement Core Number: PC01</b>	<b>Project</b> Dursey Island <b>Project No</b> P19033 <b>Engineer</b> OD	
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# Pavement Core Photographic Record and Log

Layer No.	Depth		Thickness, mm	Material Description **	Binder	Aggregate	
	From	To				Agg'	Type
1	0.00	0.04	40	Bitumen with gravel. Gravel is varied lithology. Max clast size is 40mm.	B	40	CR



\*\* Layer descriptions based on assumed function within the pavement structure. Based on visual inspection only.

**Nominal diameter:** mm

**Binder:**  
**B** = Bitumen  
**T** = Tar  
**C** = Cement  
**N** = None


**Aggregate:**

**40** = 40mm max' aggregate size  
**28** = 28mm  
**20** = 20mm  
**14** = 10mm to 14mm  
**6** = 3m to 6mm

**Aggregate Type (Type):**

**CR** = Crushed Rock  
**G** = Gravel  
**S** = Slag  
**O** = Other

**E:** 50816.14  
**N:** 41865.42  
**mOD:** 16.4

<b>Pavement Core Number: PC02</b>	<b>Project</b> Dursey Island <b>Project No</b> P19033 <b>Engineer</b> OD	
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# Pavement Core Photographic Record and Log

Layer No.	Depth		Thickness, mm	Material Description **	Binder	Aggregate	
	From	To				Agg'	Type
1	0.00	0.02	20	Bitumen with gravel. Gravel is varied lithology. Max clast size is 20mm.	B	20	GR



\*\* Layer descriptions based on assumed function within the pavement structure. Based on visual inspection only.

**Nominal diameter:** mm

**Binder:**  
**B** = Bitumen  
**T** = Tar  
**C** = Cement  
**N** = None

**Aggregate:**

**40** = 40mm max' aggregate size  
**28** = 28mm  
**20** = 20mm  
**14** = 10mm to 14mm  
**6** = 3m to 6mm

**Aggregate Type (Type):**

**CR** = Crushed Rock  
**G** = Gravel  
**S** = Slag  
**O** = Other

**E:** 50516.64  
**N:** 41559.519  
**mOD:** 22.37

<b>Pavement Core Number: PC04</b>	<b>Project</b> Dursey Island <b>Project No</b> P19033 <b>Engineer</b> OD	
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# Pavement Core Photographic Record and Log

Layer No.	Depth		Thickness, mm	Material Description **	Binder	Aggregate	
	From	To				Agg'	Type
1	0.00	0.02	20	Bitumen with gravel. Max clast size is 20mm.	B	20	GR



\*\* Layer descriptions based on assumed function within the pavement structure. Based on visual inspection only.

**Nominal diameter:** mm

**Binder:**  
**B** = Bitumen  
**T** = Tar  
**C** = Cement  
**N** = None


**Aggregate:**

**40** = 40mm max' aggregate size  
**28** = 28mm  
**20** = 20mm  
**14** = 10mm to 14mm  
**6** = 3m to 6mm

**Aggregate Type (Type):**

**CR** = Crushed Rock  
**G** = Gravel  
**S** = Slag  
**O** = Other

**E:** 50523.449  
**N:** 41591.488  
**mOD:** 21.327

<b>Pavement Core Number: PC05</b>	<b>Project</b> Dursey Island <b>Project No</b> P19033 <b>Engineer</b> OD	
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Trial Pit No  
**ST01**  
 Sheet 1 of 1

<b>Project Name:</b> Dursey Island Cable Car & Visitor Centre	<b>Project No.:</b> P19033	<b>Co-ords:</b> 50812E - 41855N <b>Level:</b> 20.80m OD	<b>Date:</b> 11/04/2019
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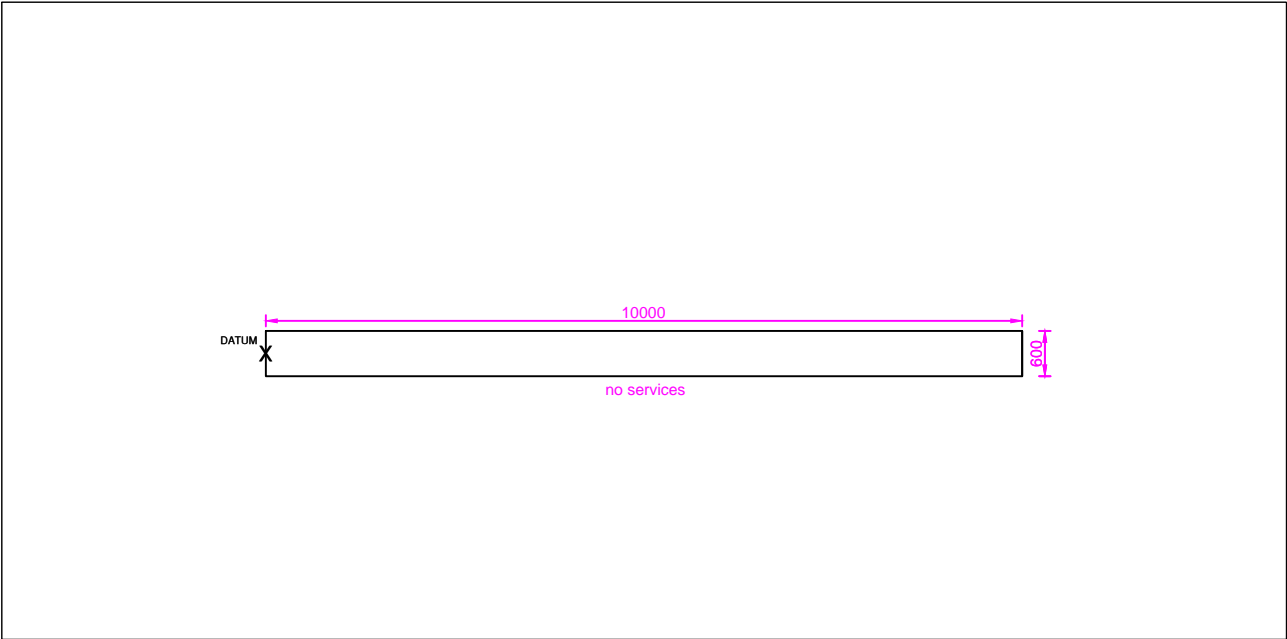
<b>Location:</b> Dursey Island, Co. Cork.	<b>Dimensions (m):</b> <span style="border: 1px solid black; padding: 2px 10px;">10.00</span>	<b>Scale:</b> 1:25
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<b>Client:</b> Cork County Council	<b>Depth:</b> 1.30m BGL	<b>Logged:</b> AO.
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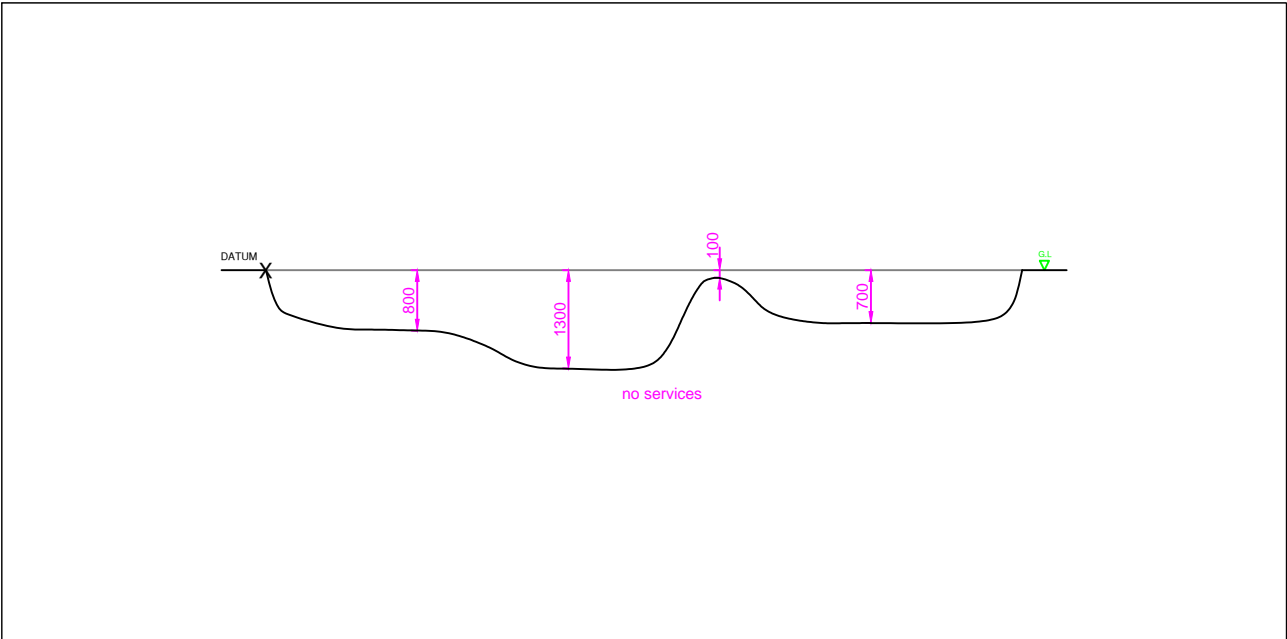
Water Strike & Backfill	Samples & In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
				0.15	20.65		(TOPSOIL) Black, organic clayey SAND.
	0.50 - 1.00	B					Brown grey, silty very sandy GRAVEL with high cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to sub-angular, Siltstone. Cobbles are angular to sub-angular, Siltstone.
	1.00	D					
				1.30	19.50		SILTSTONE bedrock. End of Pit at 1.300m

<b>Stability:</b> Moderate.	<b>Groundwater:</b> 1.30m: Seepage flow rate.
<b>Plant:</b> 8T track machine.	
<b>Backfill:</b> Arisings.	

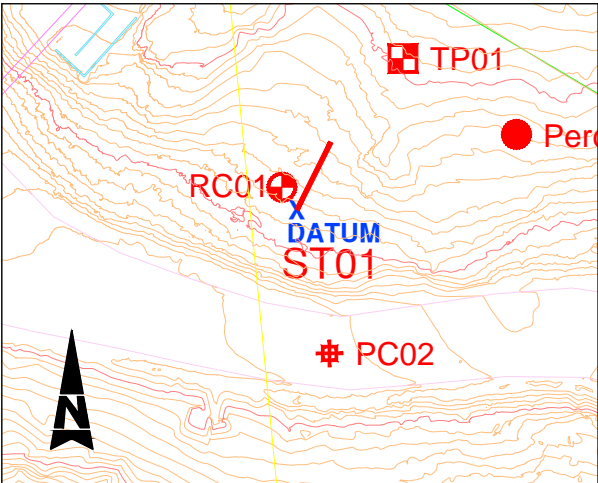
**Remarks:** Slit trench terminated at 1.30m bgl. Refer to DWG P19033 ST01 for cross sectional detail.




SLIT TRENCH PLAN, 1:100 ON A4



SLIT TRENCH SECTION, 1:100 ON A4



SLIT TRENCH LOCATION PLAN, 1:1000 ON A4

DATUM COORDINATES: EASTING: 50811.8 NORTHING: 41855.3 LEVEL: 20.8mAOD		SLIT TRENCH NUMBER: <b>ST01</b>
KEY: DATUM: X		JOB NAME: Dursey Island Cable Car & Visitor Centre Development
SLIT TRENCH DIMENSIONS: LENGTH: 10.0m WIDTH: 0.60m DEPTH: 1.30m		JOB NUMBER: P19033
STRATA SHOWN ON DETAILED LOG		
DRAWN BY: Gary Curtin	DATE: 17/04/2019	DRAWING NUMBER: P19033-ST01
LOGGED BY: A.O.	DATE: 11/04/2019	
SCALE: AS STATED	APPROVED: GH	



<p><b>Number:</b> ST01</p>	<p><b>Project</b> Dursey Island <b>Project No</b> P19033 <b>Engineer</b> Roughan &amp; O'Donovan</p>	
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**Number:**

**ST01**

**Project  
Project No  
Engineer**

Dursey Island  
P19033  
Roughan & O'Donovan



Number:

ST01

Project  
Project No  
Engineer

Dursey Island  
P19033  
Roughan & O'Donovan



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Trial Pit No  
**ST03**  
 Sheet 1 of 1

<b>Project Name:</b> Dursey Island Cable Car & Visitor Centre	<b>Project No.:</b> P19033	<b>Co-ords:</b> 50550E - 41648N <b>Level:</b> 17.47m OD	<b>Date:</b> 09/04/2019
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<b>Location:</b> Dursey Island, Co. Cork.	<b>Dimensions (m):</b> 9.00	<b>Scale:</b> 1:25
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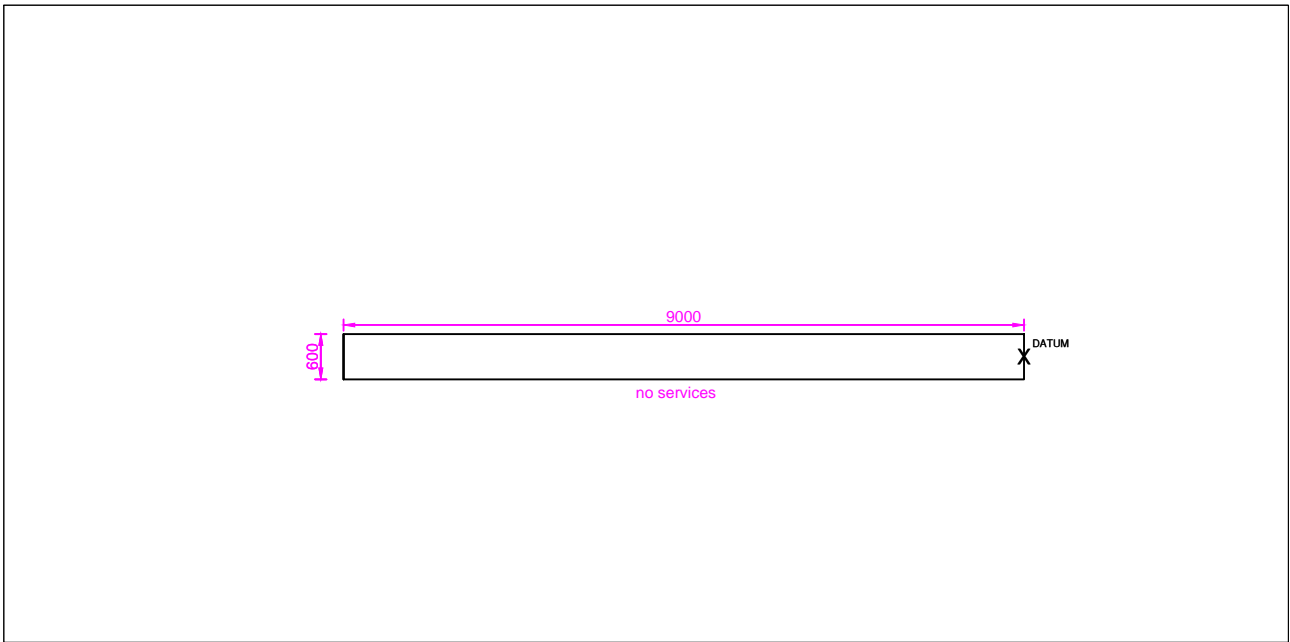
<b>Client:</b> Cork County Council	<b>Depth:</b> 0.60m BGL	<b>Logged:</b> AO.
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Water Strike & Backfill	Samples & In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.10 - 0.60	B		0.10	17.37		(TOPSOIL) Dark brown, organic sandy CLAY.
	0.50	D		0.60	16.87		Grey brown, slightly sandy GRAVEL with high cobble content. Sand is fine to coarse. Gravel is angular, Siltstone, fine to coarse. Cobbles are angular, Siltstone lithology.
							SILTSTONE bedrock. End of Pit at 0.600m

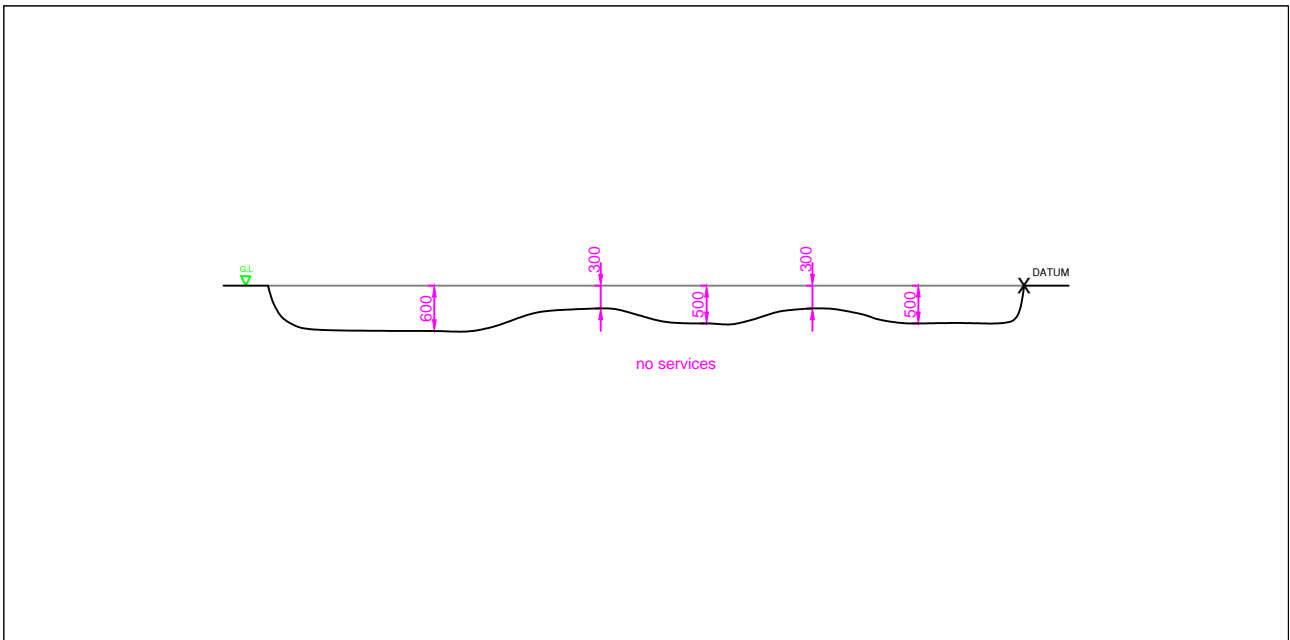
**Stability:** Moderate.  
**Plant:** 3T mini digger.  
**Backfill:** Arisings.

**Groundwater:** 0.60m: Seepage flow rate.

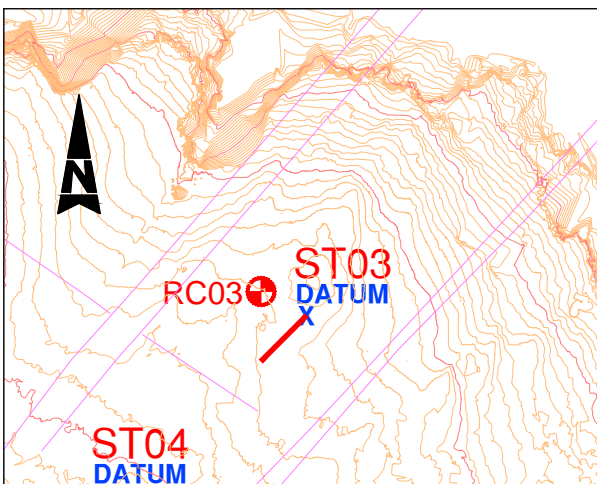
**Remarks:** Slit trench terminated at 0.60m bgl. Refer to DWG P19033 ST03 for cross sectional detail.



SLIT TRENCH PLAN, 1:100 ON A4



SLIT TRENCH SECTION, 1:100 ON A4



SLIT TRENCH LOCATION PLAN, 1:1000 ON A4

DATUM COORDINATES: EASTING: 50550.0 NORTHING: 41648.3 LEVEL: 17.467mAOD		SLIT TRENCH NUMBER: <b>ST03</b>
KEY: DATUM: X		JOB NAME: Dursey Island Cable Car & Visitor Centre Development
SLIT TRENCH DIMENSIONS: LENGTH: 9.00m WIDTH: 0.60m DEPTH: 0.60m		JOB NUMBER: P19033
STRATA SHOWN ON DETAILED LOG		
DRAWN BY: Gary Curtin	DATE: 17/04/2019	DRAWING NUMBER: P19033-ST03
LOGGED BY: A.O.	DATE: 09/04/2019	
SCALE: AS STATED	APPROVED: GH	





**Number:**

**ST03**

**Project  
Project No  
Engineer**

Dursey Island  
P19033  
Roughan & O'Donovan



Number:

ST03

Project  
Project No  
Engineer

Dursey Island  
P19033  
Roughan & O'Donovan



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Trial Pit No  
**ST04**  
 Sheet 1 of 1

<b>Project Name:</b> Dursey Island Cable Car & Visitor Centre	<b>Project No.:</b> P19033	<b>Co-ords:</b> 50523E - 41625N <b>Level:</b> 20.36m OD	<b>Date:</b> 09/04/2019
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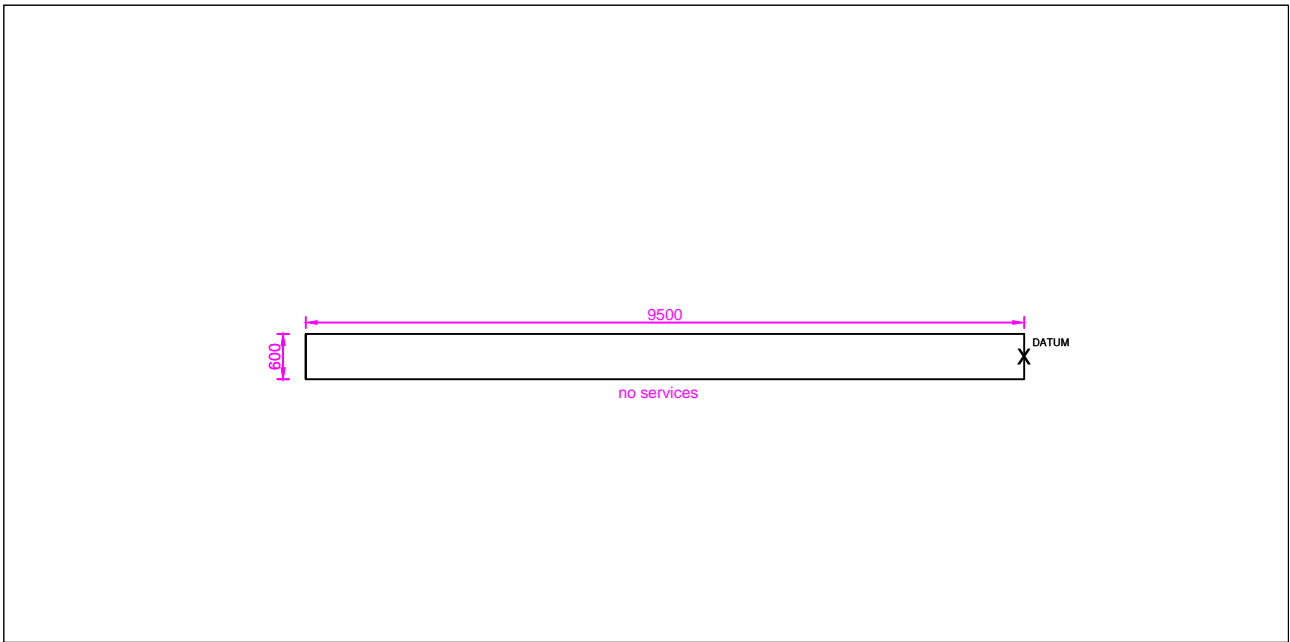
<b>Location:</b> Dursey Island, Co. Cork.	<b>Dimensions (m):</b> <span style="float:right; margin-right: 20px;">9.50</span>	<b>Scale:</b> 1:25
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<b>Client:</b> Cork County Council	<b>Depth:</b> 0.60m BGL	<b>Logged:</b> AO
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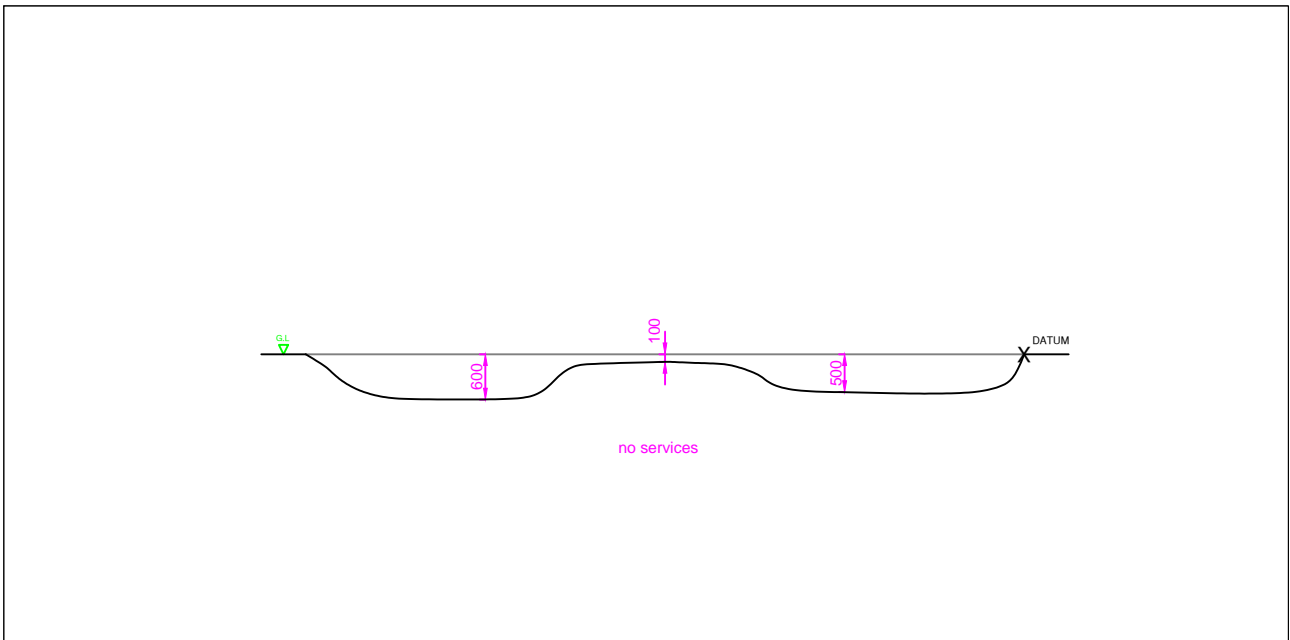
Water Strike & Backfill	Samples & In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
▼	0.20 - 0.60	B		0.20	20.16		(TOPSOIL) Black, slightly sandy slightly gravelly PEAT.
	0.50	D		0.60	19.76		Brown, slightly gravelly sandy SILT with high cobble content. Gravel is fine to coarse, angular, Siltstone lithology. Cobbles are angular, Siltstone lithology.
							SILTSTONE bedrock. End of Pit at 0.600m

<b>Stability:</b> Moderate. <b>Plant:</b> 3T mini digger. <b>Backfill:</b> Arisings.	<b>Groundwater:</b> 0.20m: Seepage flow rate.
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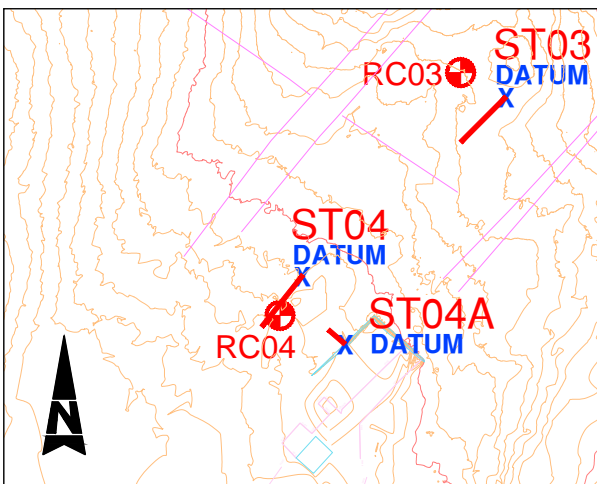
**Remarks:** Slit trench terminated at 0.60m bgl. Refer to DWG P19033 ST04 for cross sectional detail.



SLIT TRENCH PLAN, 1:100 ON A4



SLIT TRENCH SECTION, 1:100 ON A4



SLIT TRENCH LOCATION PLAN, 1:1000 ON A4

DATUM COORDINATES: EASTING: 50523.1 NORTHING: 41624.6 LEVEL: 20.362mAOD		SLIT TRENCH NUMBER: <b>ST04</b>
KEY: DATUM: X		JOB NAME: Dursey Island Cable Car & Visitor Centre Development
SLIT TRENCH DIMENSIONS: LENGTH: 9.50m WIDTH: 0.60m DEPTH: 1.20m		JOB NUMBER: P19033
STRATA SHOWN ON DETAILED LOG		
DRAWN BY: Gary Curtin	DATE: XX/XX/2019	DRAWING NUMBER: P19033-ST04
LOGGED BY: A.O.	DATE: YY/YY/2019	
SCALE: AS STATED	APPROVED: GH	



<p><b>Number:</b> ST04</p>	<p><b>Project</b> Dursey Island <b>Project No</b> P19033 <b>Engineer</b> Roughan &amp; O'Donovan</p>	
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<b>Number:</b> ST04	<b>Project</b> Dursey Island <b>Project No</b> P19033 <b>Engineer</b> Roughan & O'Donovan	
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Trial Pit No  
**ST04A**  
 Sheet 1 of 1

<b>Project Name:</b> Durse Island Cable Car & Visitor Centre	<b>Project No.:</b> P19033	<b>Co-ords:</b> 50529E - 41616N <b>Level:</b> 20.50m OD	<b>Date:</b> 09/04/2019
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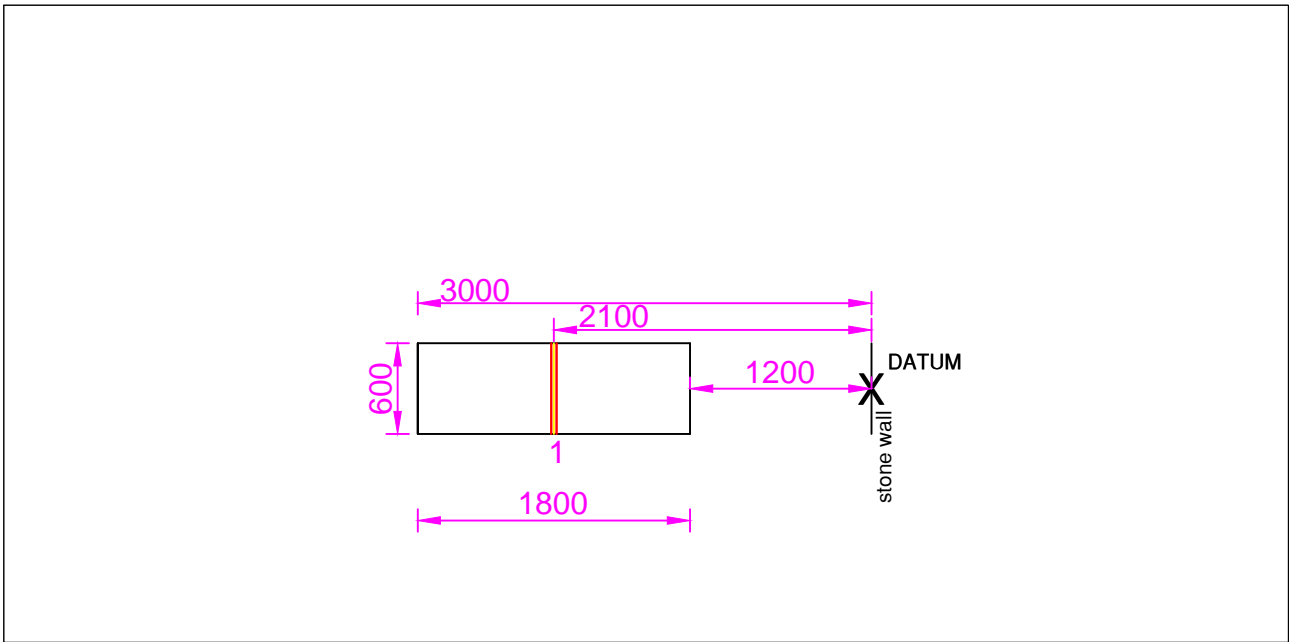
<b>Location:</b> Durse Island, Co. Cork.	<b>Dimensions (m):</b> <span style="float:right; margin-right: 20px;">1.80</span> <div style="border: 1px solid black; width: 100px; height: 20px; margin: 5px auto;"></div>	<b>Scale:</b> 1:25
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<b>Client:</b> Cork County Council	<b>Depth:</b> 0.40m BGL	<b>Logged:</b> AO.
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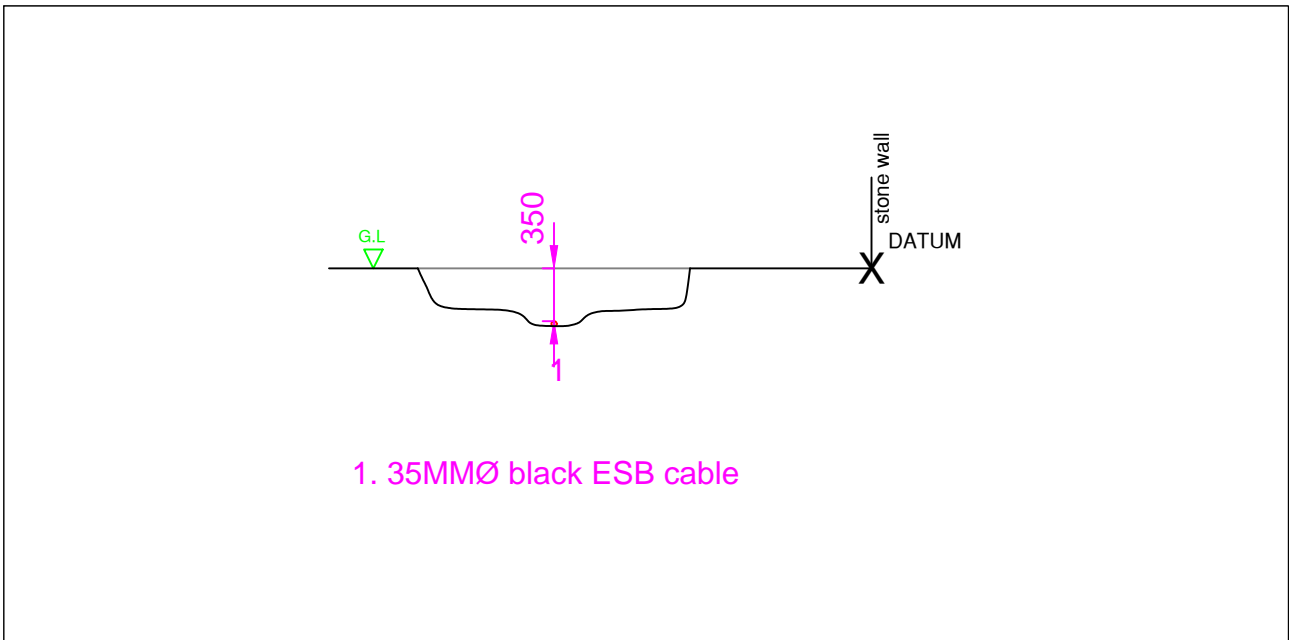
Water Strike & Backfill	Samples & In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
  				0.40	20.10		(MADE GROUND) Black, slightly sandy slightly gravelly PEAT with high cobble content.  <div style="text-align: right; margin-top: 10px;">End of Pit at 0.400m</div>
							1
							2
							3
							4
							5

<b>Stability:</b> Moderate.	<b>Groundwater:</b> 0.40m: Seepage flow rate.
<b>Plant:</b> 3T mini digger.	
<b>Backfill:</b> Arisings.	

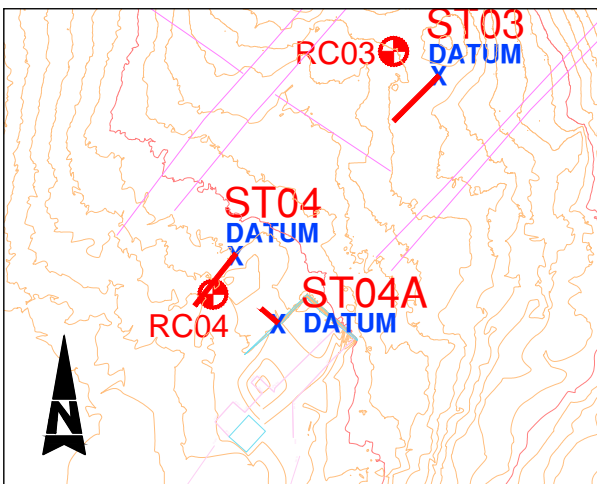
**Remarks:** Slit trench terminated at 0.40m bgl. Refer to DWG P19033 ST04A for cross sectional detail.



SLIT TRENCH PLAN, 1:100 ON A4



SLIT TRENCH SECTION, 1:100 ON A4



SLIT TRENCH LOCATION PLAN, 1:1000 ON A4

DATUM COORDINATES: EASTING: 50528.7 NORTHING: 41615.6 LEVEL: 20.502mAOD		SLIT TRENCH NUMBER: <b>ST04A</b>
KEY: DATUM: X		JOB NAME: Dursey Island Cable Car & Visitor Centre Development
SLIT TRENCH DIMENSIONS: LENGTH: 1.80m WIDTH: 0.60m DEPTH: 0.35m		JOB NUMBER: P19033
STRATA SHOWN ON DETAILED LOG		
DRAWN BY: Gary Curtin	DATE: 17/04/2019	DRAWING NUMBER: P19033-ST04A
LOGGED BY: A.O.	DATE: 09/04/2019	
SCALE: AS STATED	APPROVED: GH	





<b>Number:</b> ST04A	<b>Project</b> Dursey Island <b>Project No</b> P19033 <b>Engineer</b> Roughan & O'Donovan	
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**Number:**

**ST04A**

**Project  
Project No  
Engineer**

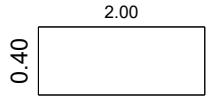
Dursey Island  
P19033  
Roughan & O'Donovan



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Trial Pit No  
**TP01**  
 Sheet 1 of 1

<b>Project Name:</b> Dursey Island Cable Car & Visitor Centre	<b>Project No.:</b> P19033	<b>Co-ords:</b> 50826E - 41875N <b>Level:</b> 25.30m OD	<b>Date:</b> 11/04/2019
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<b>Location:</b> Dursey Island, Co. Cork.	<b>Dimensions (m):</b> 	<b>Scale:</b> 1:25
<b>Client:</b> Cork County Council		<b>Logged:</b> AO

Water Strike & Backfill	Samples & In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.50 0.50 - 1.00	D B		0.25	25.05		(TOPSOIL) Dark brown, organic slightly sandy CLAY. Sand is fine to coarse.
				1.00	24.30		Grey, silty very sandy GRAVEL with high cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to sub-angular, Siltstone.
							SILTSTONE bedrock. End of Pit at 1.000m

<b>Stability:</b> Moderate. <b>Plant:</b> 8T track machine. <b>Backfill:</b> Arisings.	<b>Groundwater:</b> None encountered.
--	---------------------------------------

**Remarks:** Trial pit terminated at 1.00m bgl due to bedrock.

P19033

Durseley Island

11/04/2019

Test 1

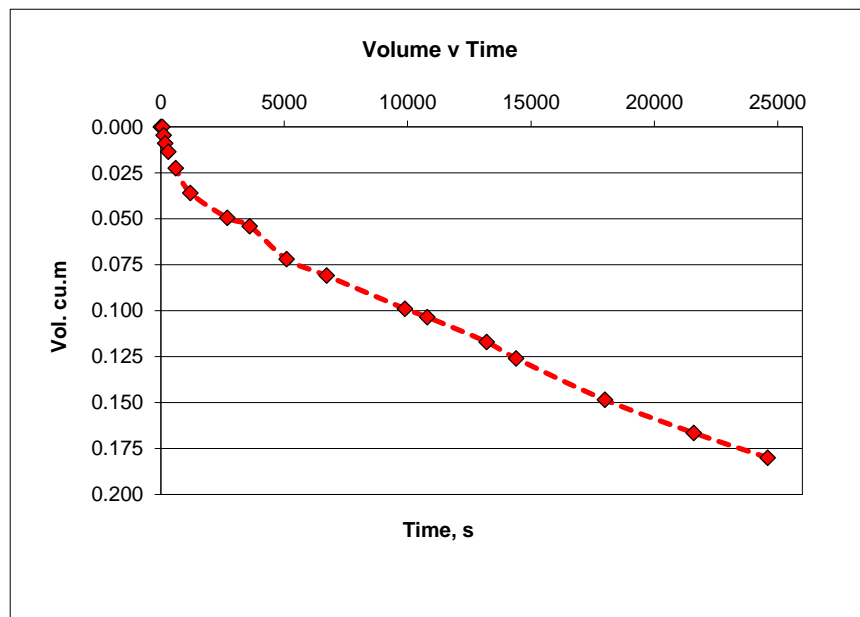
TP01

l, m 1.5 b, m 0.3 d, m 0.8  
 l\_base, m 1.5 d\_eff, m 0.50  
 l\_eff, m 1.5

Time, min	Measure, m bgl	Time, sec	Depth water, m	Fall, m	Volume
0	0.30	0	0.50	0.00	0.000
1	0.30	60	0.50	0.00	0.000
2	0.31	120	0.49	0.01	0.004
3	0.32	180	0.48	0.02	0.009
5	0.33	300	0.47	0.03	0.014
10	0.35	600	0.45	0.05	0.023
20	0.38	1200	0.42	0.08	0.036
45	0.41	2700	0.39	0.11	0.050
60	0.42	3600	0.38	0.12	0.054
85	0.46	5100	0.34	0.16	0.072
112	0.48	6720	0.32	0.18	0.081
165	0.52	9900	0.28	0.22	0.099
180	0.53	10800	0.27	0.23	0.104
220	0.56	13200	0.24	0.26	0.117
240	0.58	14400	0.22	0.28	0.126
300	0.63	18000	0.17	0.33	0.149
360	0.67	21600	0.13	0.37	0.167
410	0.70	24600	0.10	0.40	0.180

Area 0.45 m<sup>2</sup>  $V_{p75-25 \text{ theory}}$  volume 0.1125 m<sup>3</sup>  
 50% Area\_eff,  $a_{p50}$  1.35 m<sup>2</sup>  $V_{p75-25 \text{ actual}}$  volume 0.18 m<sup>3</sup>  
 50% Area\_act,  $a_{p50}$  1.17 m<sup>2</sup>  $t_{p75-25 \text{ actual}}$  time 13590.00 s

Infiltration Coefficient  $f$  1.13E-05 ms<sup>-1</sup>

**NOTES:**

See TP01 log for detailed soil description.

No waterstrike encountered. Pit assumed unsaturated.



**Number:**

**TP01**

**Project  
Project No  
Engineer**

Dursey Island  
P19033  
Roughan & O'Donovan



Number:

TP01

Project  
Project No  
Engineer

Dursey Island  
P19033  
Roughan & O'Donovan



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Trial Pit No  
**TP02**  
 Sheet 1 of 1

**Project Name:** Dursey Island Cable Car & Visitor Centre

**Project No.:** P19033

**Co-ords:** 50793E - 41886N  
**Level:** 23.30m OD

**Date:** 12/04/2019

**Location:** Dursey Island, Co. Cork.

**Dimensions (m):** 0.35

**Scale:** 1:25

**Client:** Cork County Council

**Depth:** 0.30m BGL

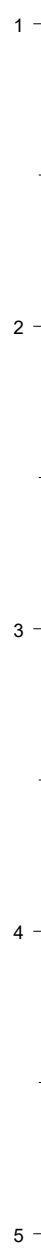
**Logged:** AO

Water Strike & Backfill	Samples & In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.25	ES		0.17	23.13		CONCRETE.
				0.30	23.00		(MADE GROUND) Brown, clayey sandy GRAVEL. Gravel is fine to coarse, angular, Siltstone lithology. End of Pit at 0.300m

**Stability:** Moderate.  
**Plant:** 8T track machine.  
**Backfill:** Concrete.

**Groundwater:** None encountered.

**Remarks:** Trial pit terminated at 0.30m bgl due to bedrock.





**Number:**

**TP02**

**Project**  
**Project No**  
**Engineer**

Dursey Island  
P19033  
Roughan & O'Donovan





<b>Number:</b> TP02	<b>Project</b> Dursey Island <b>Project No</b> P19033 <b>Engineer</b> Roughan & O'Donovan	
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## KEY TO SYMBOLS - LABORATORY TEST RESULT

U	Undisturbed Sample	
P	Piston Sample	
TWS	Thin Wall Sample	
B	Bulk Sample - Disturbed	
D	Jar Sample - Disturbed	
W	Water Sample	
pH	Acidity/Alkalinity Index	
SO <sub>3</sub>	% - Total Sulphate Content (acid soluble)	
SO <sub>3</sub>	g/ltr - Water Soluble Sulphate (Water or 2:1 Aqueous Soil Extract)	
+	Calcareous Reaction	
Cl	Chloride Content	
PI	Plasticity Index	
<425	% of material in sample passing 425 micron sieve	
LL	Liquid Limit	
PL	Plastic Limit	
MC	Water Content	
NP	Non Plastic	
Y <sub>b</sub>	Bulk Density	
Y <sub>d</sub>	Dry Density	
Ps	Particle Density	
U/D	Undrained/Drained Triaxial	
U/C	Unconsolidated/Consolidated Triaxial	
T/M	Single Stage/Multistage Triaxial	
100/38	Sample Diameter (mm)	
REM	Remoulded Triaxial Test Specimen	
TST	Triaxial Suction Test	
V	Vane Test	
DSB	Drained Shear Box	
RSB	Residual Shear Box	
RS	Ring Shear	
σ <sub>3</sub>	Cell Pressure	
σ <sub>1</sub> -σ <sub>3</sub>	Deviator Stress	
c	Cohesion	
c <sub>e</sub>	Effective Cohesion Intercept	
φ	Angle of Shearing Resistance - Degrees	
φ <sub>e</sub>	Effective Angle of Shearing Resistance	
ε <sub>f</sub>	Strain at Failure	
*	Failed under 1 <sup>st</sup> Load	
**	Failed under 2 <sup>nd</sup> Load	
#	Unstable	
##	Excessive Strain	
p <sub>o</sub>	Effective Overburden Pressure	
m <sub>v</sub>	Coefficient of Volume Decrease	
c <sub>v</sub>	Coefficient of Consolidation	
Opt	Optimum	
Nat	Natural	
Std	Standard Compaction - 2.5kg Rammer	(¶ CBR)
Hvy	Heavy Compaction - 4.5kg Rammer	(§ CBR)
Vib	Vibratory Compaction	
CBR	California Bearing Ratio	
Sat m.c.	Saturation Moisture Content	
MCV	Moisture Condition Value	





# PARTICLE SIZE DISTRIBUTION

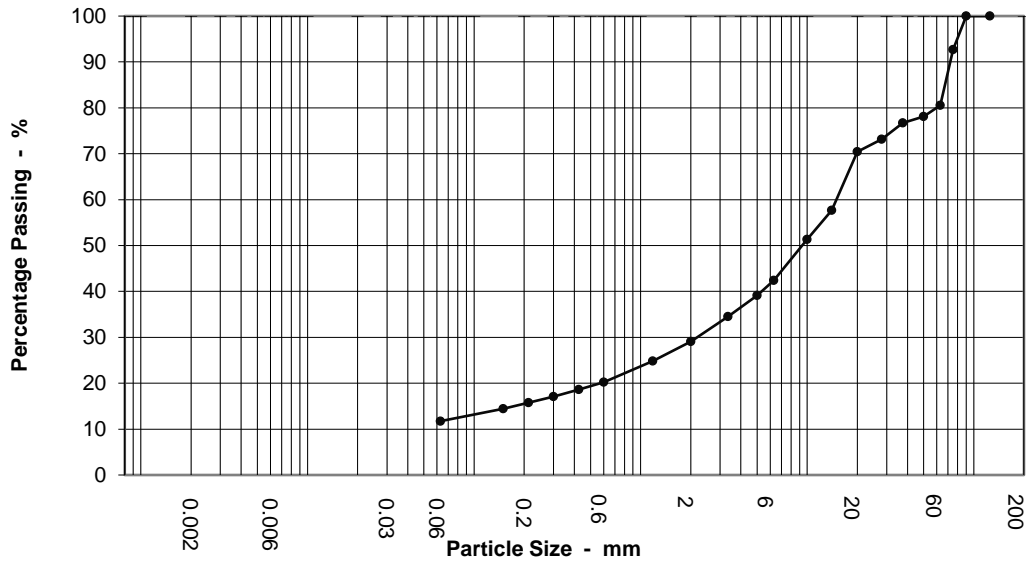
**BS 1377 : Part 2 : 1990 : Clause 9**

<b>Job Ref</b>	<b>P19033</b>
Borehole / Pit No	ST01
Sample No	1
Depth	0.50 m
Sample type	B

**Location**      **Dursey Island Cable Car & Visitor Centre**

**Soil Description**      **Silty very sandy GRAVEL with medium cobble content**

<b>CLAY</b>	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	<b>COBBLES</b>
	<b>SILT</b>			<b>SAND</b>			<b>GRAVEL</b>			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	93		
63	81		
50	78		
37.5	77		
28	73		
20	70		
14	58		
10	51		
6.3	42		
5	39		
3.35	34		
2	29		
1.18	25		
0.6	20		
0.425	19		
0.3	17		
0.212	16		
0.15	14		
0.063	12		

Test Method	
BS 1377 : Part 2 : 1990	
Sieving	Clause 9.3
Sedimentation	N/A

Sample Proportions	
Cobbles	19.0
Gravel	51.0
Sand	17.0
Silt & Clay	12.0

Grading Analysis	
D100	90.00
D60	14.90
D10	
Uniformity Coefficient	



# PARTICLE SIZE DISTRIBUTION

BS 1377 : Part 2 : 1990 : Clause 9

Job Ref

P19033

Borehole / Pit No

ST03

Location

Durseley Island Cable Car & Visitor Centre

Sample No

2

Depth

0.50 m

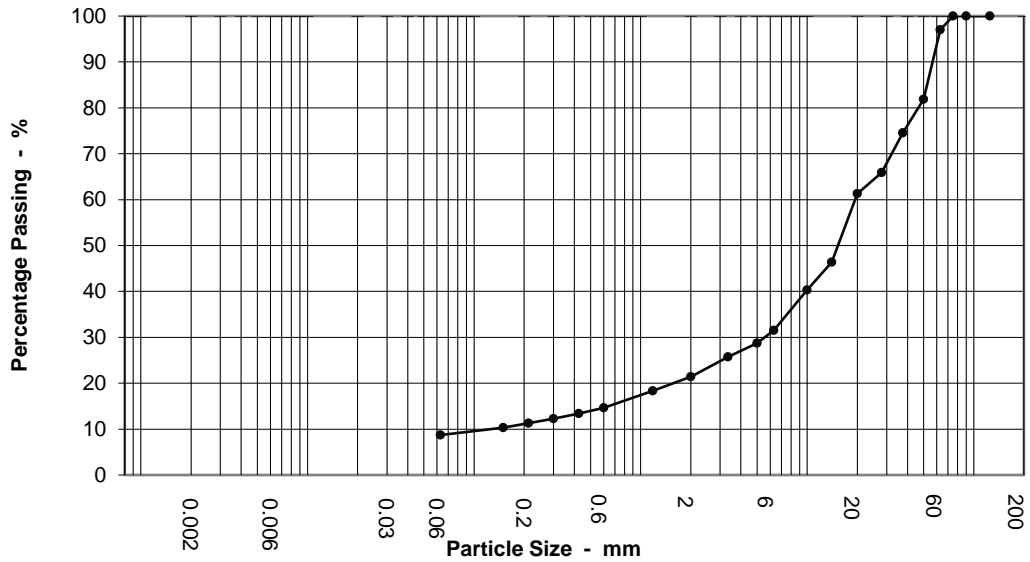
Soil Description

Silty sandy GRAVEL with low cobble content

Sample type

D

CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	SILT			SAND			GRAVEL			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	97		
50	82		
37.5	75		
28	66		
20	61		
14	46		
10	40		
6.3	32		
5	29		
3.35	26		
2	21		
1.18	18		
0.6	15		
0.425	13		
0.3	12		
0.212	11		
0.15	10		
0.063	9		

Test Method	
BS 1377 : Part 2 : 1990	
Sieving	Clause 9.3
Sedimentation	N/A

Sample Proportions	
Cobbles	3.0
Gravel	76.0
Sand	13.0
Silt & Clay	9.0

Grading Analysis	
D100	75.00
D60	19.40
D10	0.13
Uniformity Coefficient	150.00



# PARTICLE SIZE DISTRIBUTION

BS 1377 : Part 2 : 1990 : Clause 9

Job Ref

P19033

Borehole / Pit No

ST04

Location

Durseley Island Cable Car & Visitor Centre

Sample No

2

Depth

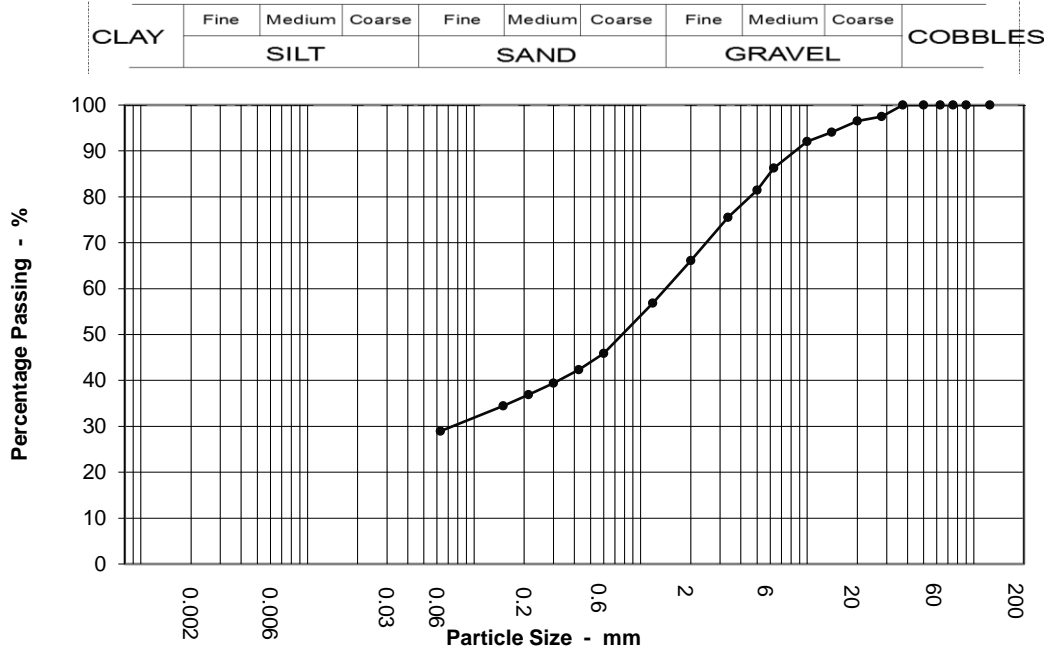
0.50 m

Soil Description

Slightly gravelly sandy SILT

Sample type

D



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	98		
20	97		
14	94		
10	92		
6.3	86		
5	81		
3.35	76		
2	66		
1.18	57		
0.6	46		
0.425	42		
0.3	39		
0.212	37		
0.15	34		
0.063	29		

Test Method	
BS 1377 : Part 2 : 1990	
Sieving	
Sedimentation	N/A

Sample Proportions	
Cobbles	0.0
Gravel	34.0
Sand	37.0
Silt & Clay	29.0

Grading Analysis	
D100	37.50
D60	1.41
D10	
Uniformity Coefficient	



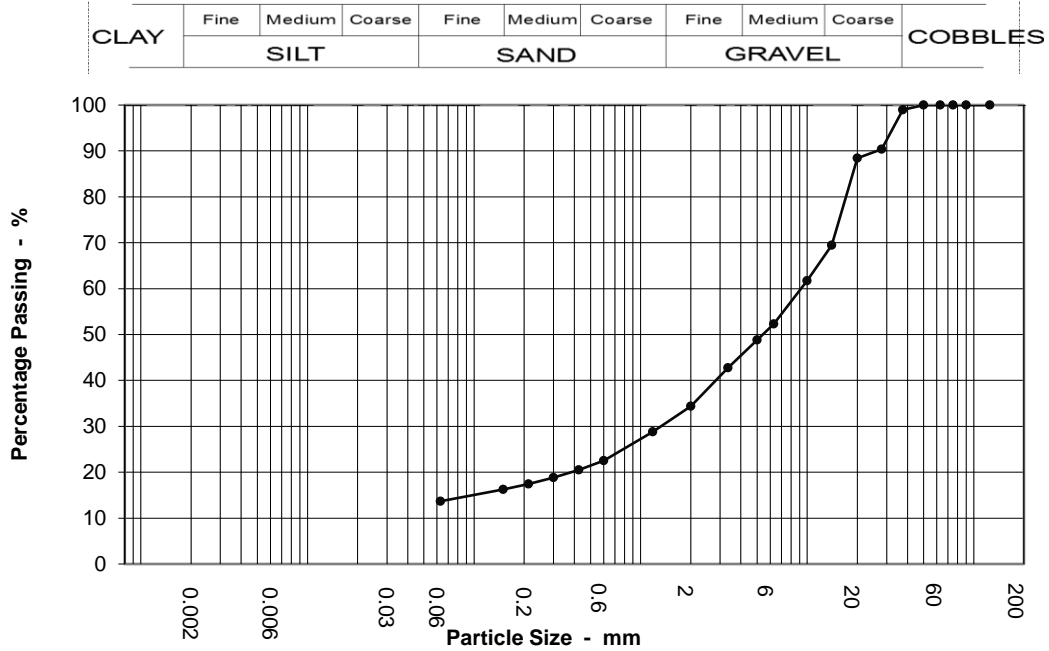
# PARTICLE SIZE DISTRIBUTION

**BS 1377 : Part 2 : 1990 : Clause 9**

<b>Job Ref</b>	<b>P19033</b>
Borehole / Pit No	TP01
Sample No	1
Depth	0.50 m
Sample type	B

**Location: Durseley Island Cable Car & Visitor Centre**

**Soil Description: Silty very sandy GRAVEL**



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	99		
28	90		
20	88		
14	69		
10	62		
6.3	52		
5	49		
3.35	43		
2	34		
1.18	29		
0.6	23		
0.425	21		
0.3	19		
0.212	17		
0.15	16		
0.063	14		

Test Method	
BS 1377 : Part 2 : 1990	
Sieving	
Sedimentation	N/A

Sample Proportions	
Cobbles	0.0
Gravel	66.0
Sand	21.0
Silt & Clay	14.0

Grading Analysis	
D100	50.00
D60	9.19
D10	
Uniformity Coefficient	



# Final Report

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**Report No.:** 19-15525-1

**Initial Date of Issue:** 14-May-2019

**Client:** Priority Geotechnical Ltd

**Client Address:** Unit 12  
Owenacurra Business Park  
Midleton  
County Cork  
Ireland

**Contact(s):** Colette Kelly

**Project:** P19033 Dursey

<b>Quotation No.:</b>		<b>Date Received:</b>	08-May-2019
<b>Order No.:</b>	11696	<b>Date Instructed:</b>	08-May-2019
<b>No. of Samples:</b>	2		
<b>Turnaround (Wkdays):</b>	7	<b>Results Due:</b>	16-May-2019

**Date Approved:** 14-May-2019

**Approved By:**



**Details:** Robert Monk, Technical Manager

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**Project: P19033 Dursey**

<b>Client: Priority Geotechnical Ltd</b>	<b>Chemtest Job No.:</b>				19-15525	19-15525
Quotation No.:	<b>Chemtest Sample ID.:</b>				822348	822349
	Sample Location:				TP01	TP01
	Sample Type:				SOIL	SOIL
	Top Depth (m):				0.50	0.50
	Date Sampled:				02-May-2019	02-May-2019
<b>Determinand</b>	<b>Accred.</b>	<b>SOP</b>	<b>Units</b>	<b>LOD</b>		
Moisture	N	2030	%	0.020	11	10
pH	U	2010		N/A		7.9
Sulphate (2:1 Water Soluble) as SO <sub>4</sub>	U	2120	g/l	0.010		< 0.010
Sulphate (Acid Soluble)	U	2430	%	0.010		0.021
Organic Matter	U	2625	%	0.40	0.91	



# Final Report

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**Report No.:** 19-16234-1

**Initial Date of Issue:** 21-May-2019

**Client:** Priority Geotechnical Ltd

**Client Address:** Unit 12  
Owenacurra Business Park  
Midleton  
County Cork  
Ireland

**Contact(s):** Colette Kelly

**Project:** P19033 Dursey Island

**Quotation No.:** **Date Received:** 14-May-2019

**Order No.:** 11696 **Date Instructed:** 14-May-2019

**No. of Samples:** 4

**Turnaround (Wkdays):** 7 **Results Due:** 22-May-2019

**Date Approved:** 21-May-2019

**Approved By:**  


**Details:** Martin Dyer, Laboratory Manager

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**Project: P19033 Dursey Island**

Client: Priority Geotechnical Ltd		Chemtest Job No.:				19-16234	19-16234	19-16234	19-16234
Quotation No.:		Chemtest Sample ID.:				825698	825699	825700	825701
		Sample Location:				RC01	RC02	RC03	RC04
		Sample Type:				SOIL	SOIL	SOIL	SOIL
		Top Depth (m):				1.10	2.95	1.80	0.40
		Date Sampled:				10-May-2019	10-May-2019	10-May-2019	10-May-2019
Determinand	Accred.	SOP	Units	LOD					
Moisture	N	2030	%	0.020	0.096	0.22	0.35	0.057	
Stones and Removed Materials	N	2030	%	0.020	< 0.020	< 0.020	< 0.020	< 0.020	
pH	U	2010		N/A	9.2	9.4	9.2	9.5	
Magnesium (Water Soluble)	N	2120	g/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	
Total Sulphur	U	2175	%	0.010	< 0.010	< 0.010	< 0.010	< 0.010	
Sulphate (Acid Soluble)	U	2430	%	0.010	< 0.010	< 0.010	< 0.010	< 0.010	

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
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.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.

## Report Information

### Key

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

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

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- 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

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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](mailto:customerservices@chemtest.com)

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
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

---

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

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



## Final Report

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**Report No.:** 19-13471-1

**Initial Date of Issue:** 02-May-2019

**Client:** Priority Geotechnical Ltd

**Client Address:** Unit 12  
Owenacurra Business Park  
Midleton  
County Cork  
Ireland

**Contact(s):** Colette Kelly

**Project:** P19033 Dursey Island

**Quotation No.:** Q17-09116                      **Date Received:** 18-Apr-2019


**Order No.:** 11696                                  **Date Instructed:** 24-Apr-2019

**No. of Samples:** 1

**Turnaround (Wkdays):** 7                          **Results Due:** 02-May-2019

**Date Approved:** 02-May-2019

**Approved By:**



**Details:** Robert Monk, Technical Manager

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Client: Priority Geotechnical Ltd		Chemtest Job No.:		19-13471	
Quotation No.: Q17-09116		Chemtest Sample ID.:		813542	
		Sample Location:		TP02	
		Sample Type:		SOIL	
		Top Depth (m):		0.25	
		Date Sampled:		12-Apr-2019	
		Asbestos Lab:		COVENTRY	
Determinand	Accred.	SOP	Units	LOD	
ACM Type	U	2192		N/A	-
Asbestos Identification	U	2192	%	0.001	No Asbestos Detected
ACM Detection Stage	U	2192		N/A	-
Moisture	N	2030	%	0.020	8.5
Arsenic	U	2450	mg/kg	1.0	1.4
Barium	U	2450	mg/kg	10	13
Cadmium	U	2450	mg/kg	0.10	< 0.10
Chromium	U	2450	mg/kg	1.0	22
Molybdenum	U	2450	mg/kg	2.0	< 2.0
Copper	U	2450	mg/kg	0.50	6.4
Mercury	U	2450	mg/kg	0.10	0.47
Nickel	U	2450	mg/kg	0.50	31
Lead	U	2450	mg/kg	0.50	4.9
Selenium	U	2450	mg/kg	0.20	0.36
Zinc	U	2450	mg/kg	0.50	43
Chromium (Trivalent)	N	2490	mg/kg	1.0	22
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	< 10
Benzene	U	2760	µg/kg	1.0	< 1.0
Toluene	U	2760	µg/kg	1.0	< 1.0

**Project: P19033 Dursey Island**

Client: Priority Geotechnical Ltd		Chemtest Job No.:		19-13471	
Quotation No.: Q17-09116		Chemtest Sample ID.:		813542	
		Sample Location:		TP02	
		Sample Type:		SOIL	
		Top Depth (m):		0.25	
		Date Sampled:		12-Apr-2019	
		Asbestos Lab:		COVENTRY	
Determinand	Accred.	SOP	Units	LOD	
Ethylbenzene	U	2760	µg/kg	1.0	< 1.0
m & p-Xylene	U	2760	µg/kg	1.0	< 1.0
o-Xylene	U	2760	µg/kg	1.0	< 1.0
Methyl Tert-Butyl Ether	U	2760	µg/kg	1.0	< 1.0
Naphthalene	U	2800	mg/kg	0.10	< 0.10
Acenaphthylene	N	2800	mg/kg	0.10	< 0.10
Acenaphthene	U	2800	mg/kg	0.10	< 0.10
Fluorene	U	2800	mg/kg	0.10	< 0.10
Phenanthrene	U	2800	mg/kg	0.10	< 0.10
Anthracene	U	2800	mg/kg	0.10	< 0.10
Fluoranthene	U	2800	mg/kg	0.10	< 0.10
Pyrene	U	2800	mg/kg	0.10	< 0.10
Benzo[a]anthracene	U	2800	mg/kg	0.10	< 0.10
Chrysene	U	2800	mg/kg	0.10	< 0.10
Benzo[b]fluoranthene	U	2800	mg/kg	0.10	< 0.10
Benzo[k]fluoranthene	U	2800	mg/kg	0.10	< 0.10
Benzo[a]pyrene	U	2800	mg/kg	0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	2800	mg/kg	0.10	< 0.10
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.10	< 0.10
Benzo[g,h,i]perylene	U	2800	mg/kg	0.10	< 0.10
Coronene	N	2800	mg/kg	0.10	< 0.10
Total Of 17 PAH's	N	2800	mg/kg	2.0	< 2.0
PCB 28	U	2815	mg/kg	0.010	< 0.010
PCB 52	U	2815	mg/kg	0.010	< 0.010
PCB 90+101	U	2815	mg/kg	0.010	< 0.010
PCB 118	U	2815	mg/kg	0.010	< 0.010
PCB 153	U	2815	mg/kg	0.010	< 0.010
PCB 138	U	2815	mg/kg	0.010	< 0.010
PCB 180	U	2815	mg/kg	0.010	< 0.010
Total PCBs (7 Congeners)	N	2815	mg/kg	0.10	< 0.10

## Results - Single Stage WAC

Project: P19033 Dursey Island

Chemtest Job No: 19-13471 Chemtest Sample ID: 813542 Sample Ref: Sample ID: Sample Location: TP02 Top Depth(m): 0.25 Bottom Depth(m): Sampling Date: 12-Apr-2019				Landfill Waste Acceptance Criteria Limits			
				Inert Waste Landfill	Stable, Non-reactive hazardous waste in non-hazardous Landfill	Hazardous Waste Landfill	
Determinand	SOP	Accred.	Units				
Total Organic Carbon	2625	U	%	< 0.20	3	5	
Loss On Ignition	2610	U	%	1.3	--	10	
Total BTEX	2760	U	mg/kg	< 0.010	6	--	
Total PCBs (7 Congeners)	2815	U	mg/kg	< 0.10	1	--	
TPH Total WAC (Mineral Oil)	2670	U	mg/kg	< 10	500	--	
Total (Of 17) PAH's	2800	N	mg/kg	< 2.0	100	--	
pH	2010	U		9.3	--	>6	
Acid Neutralisation Capacity	2015	N	mol/kg	0.022	--	To evaluate	
<b>Eluate Analysis</b>			<b>10:1 Eluate mg/l</b>	<b>10:1 Eluate mg/kg</b>	<b>Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg</b>		
Arsenic	1450	U	0.0012	< 0.050	0.5	2	
Barium	1450	U	0.0024	< 0.50	20	100	
Cadmium	1450	U	< 0.00010	< 0.010	0.04	1	
Chromium	1450	U	< 0.0010	< 0.050	0.5	10	
Copper	1450	U	< 0.0010	< 0.050	2	50	
Mercury	1450	U	< 0.00050	< 0.0050	0.01	0.2	
Molybdenum	1450	U	< 0.0010	< 0.050	0.5	10	
Nickel	1450	U	< 0.0010	< 0.050	0.4	10	
Lead	1450	U	< 0.0010	< 0.010	0.5	10	
Antimony	1450	U	< 0.0010	< 0.010	0.06	0.7	
Selenium	1450	U	< 0.0010	< 0.010	0.1	0.5	
Zinc	1450	U	0.0018	< 0.50	4	50	
Chloride	1220	U	3.7	37	800	15000	
Fluoride	1220	U	0.16	1.6	10	150	
Sulphate	1220	U	4.6	46	1000	20000	
Total Dissolved Solids	1020	N	49	490	4000	60000	
Phenol Index	1920	U	< 0.030	< 0.30	1	-	
Dissolved Organic Carbon	1610	U	10	100	500	800	

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	8.5

### Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

SOP	Title	Parameters included	Method summary
1020	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Conductivity 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.
1450	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.
2010	pH Value of Soils	pH	pH Meter
2015	Acid Neutralisation Capacity	Acid Reserve	Titration
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.
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2610	Loss on Ignition	loss on ignition (LOI)	Determination of the proportion by mass that is lost from a soil by ignition at 550°C.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / GCxGC FID detection
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-MS	Acenaphthene*; Acenaphthylene; Anthracene*; Benzo[a]Anthracene*; Benzo[a]Pyrene*; Benzo[b]Fluoranthene*; Benzo[ghi]Perylene*; Benzo[k]Fluoranthene; Chrysene*; Dibenz[ah]Anthracene; Fluoranthene*; Fluorene*; Indeno[123cd]Pyrene*; Naphthalene*; Phenanthrene*; Pyrene*	Dichloromethane extraction / GC-MS

<b>SOP</b>	<b>Title</b>	<b>Parameters included</b>	<b>Method summary</b>
2815	Polychlorinated Biphenyls (PCB) ICES7 Congeners in Soils by GC-MS	ICES7 PCB congeners	Acetone/Hexane extraction / GC-MS
640	Characterisation of Waste (Leaching)	Waste material including soil, sludges and granular waste	Compliance Test for Leaching of Granular Waste Material and Sludge

## **Report Information**

### **Key**

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- U UKAS accredited
- M MCERTS and UKAS accredited
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- S This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
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- I/S Insufficient Sample
- U/S Unsuitable Sample
- N/E not evaluated
- < "less than"
- > "greater than"

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**

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- 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**

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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](mailto:customerservices@chemtest.com)



## Final Report

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**Report No.:** 19-13422-1

**Initial Date of Issue:** 30-Apr-2019

**Client:** Priority Geotechnical Ltd

**Client Address:** Unit 12  
Owenacurra Business Park  
Midleton  
County Cork  
Ireland

**Contact(s):** Colette Kelly

**Project:** P19033 Dursey Island

<b>Quotation No.:</b>		<b>Date Received:</b>	18-Apr-2019
<b>Order No.:</b>	11696	<b>Date Instructed:</b>	18-Apr-2019
<b>No. of Samples:</b>	7		
<b>Turnaround (Wkdays):</b>	7	<b>Results Due:</b>	30-Apr-2019
<b>Date Approved:</b>	30-Apr-2019	<b>Subcon Results Due:</b>	14-May-2019

**Approved By:**



**Details:** Martin Dyer, Laboratory Manager

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**Project: P19033 Dursey Island**

Client: Priority Geotechnical Ltd		Chemtest Job No.:		19-13422	19-13422	19-13422	19-13422	19-13422	19-13422	19-13422
Quotation No.:		Chemtest Sample ID.:		813437	813438	813439	813440	813441	813442	813443
		Sample Location:		Island Well	Station Well	TW01ES01	TW01ES02	TW02ES01	TW02ES02	TW02ES03
		Sample Type:		WATER	WATER	WATER	WATER	WATER	WATER	WATER
		Date Sampled:		16-Apr-2019	16-Apr-2019	16-Apr-2019	16-Apr-2019	16-Apr-2019	16-Apr-2019	16-Apr-2019
Determinand	Accred.	SOP	Units	LOD						
E. coli (Subcon)	S		cfu/100ml	N/A	0	0		5		0
Total Coliforms (Subcon)	S		cfu/100ml	N/A	3	0		5		0
pH	U	1010		N/A	8.0	8.3	7.7	7.5	7.6	7.9
Electrical Conductivity	U	1020	µS/cm	1.0	410	980	680	690	570	530
Ammonia (Free) as N	U	1220	mg/l	0.050	0.21	0.28		0.074		0.11
Nitrite as N	U	1220	mg/l	0.010	0.012	0.011		0.011		0.010
Nitrate as N	U	1220	mg/l	0.50	< 0.50	< 0.50		< 0.50		< 0.50
Phosphorus (Total)	N	1220	mg/l	0.020	< 0.020	< 0.020		< 0.020		< 0.020
Phosphorus (Dissolved)	U	1220	mg/l	0.020	< 0.020	< 0.020		< 0.020		< 0.020
Nitrogen (Total Dissolved)	N	1340	mg/l	1.0	2.4	< 1.0		2.1		< 1.0
Total Hardness as CaCO3	U	1270	mg/l	15	71	270		81		120
Copper (Dissolved)	U	1450	µg/l	1.0	< 1.0	< 1.0		< 1.0		2.4
Iron (Dissolved)	N	1450	µg/l	20	< 20	77		140		510
Manganese (Dissolved)	U	1450	µg/l	1.0	9.4	230		120		2100
Zinc (Dissolved)	U	1450	µg/l	1.0	4.7	< 1.0		85		8.2
Total Organic Carbon	U	1610	mg/l	2.0	5.0	3.7		4.1		5.7
TPH >C6-C10	N	1670	µg/l	0.10	< 0.10	< 0.10		< 0.10		< 0.10
TPH >C10-C21	N	1670	µg/l	0.10	< 0.10	< 0.10		< 0.10		< 0.10
TPH >C21-C40	N	1670	µg/l	0.10	< 0.10	< 0.10		< 0.10		< 0.10
Total TPH >C6-C40	U	1670	µg/l	10	< 10	< 10		< 10		< 10



SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH Meter
1020	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Conductivity 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.
1270	Total Hardness of Waters	Total hardness	Calculation applied to calcium and magnesium results, expressed as mg l <sup>-1</sup> CaCO <sub>3</sub> equivalent.
1340	Total Nitrogen in Waters	Total Nitrogen and organic Nitrogen	Persulphate digestion followed by colorimetry.
1415	Cations in Waters by ICP-MS	Sodium; Potassium; Calcium; Magnesium	Direct determination by inductively coupled plasma - mass spectrometry (ICP-MS).
1450	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1670	Total Petroleum Hydrocarbons (TPH) in Waters by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO	Pentane extraction / GC FID detection

## Report Information

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# Laboratory Report



GEO Site & Testing Services Ltd

## Contract Number: 44299

Client Ref: **P19033**

Report Date: **06-06-2019**

Client PO: **11779**

Client **Priority Geotechnical Limited**  
**Unit 12**  
**Owenacurra Business Park**  
**Midleton**  
**Co. Cork.**

Contract Title: **Dursey Island**  
For the attention of: **Colette Kelly**

Date Received: **20-05-2019**  
Date Commenced: **20-05-2019**  
Date Completed: **06-06-2019**

Test Description	Qty
<b>Determination of the slake durability index, two cycles.</b> ISRM Suggested Method For Determining Slake Durability - @ Non Accredited Test	4
<b>Los Angeles Abrasion Value</b> BS EN 1097-2 - * UKAS	4
<b>Magnesium sulfate test soundness value.</b> BS EN 1367-2 - * UKAS	4
<b>Disposal of samples for job</b>	1

**Notes:** Observations and Interpretations are outside the UKAS Accreditation  
\* - denotes test included in laboratory scope of accreditation  
# - denotes test carried out by approved contractor  
@ - denotes non accredited tests

This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

**Approved Signatories:**

Emma Sharp (Office Manager) - Paul Evans (Quality/Technical Manager) - Richard John (Advanced Testing Manager)  
Sean Penn (Administrative/Accounts Assistant) - Shaun Jones (Laboratory manager) - Wayne Honey (Administrative/Quality Assistant)



**Determination of Resistance to Fragmentation by the Los Angeles  
Test Method  
BS EN 1097-2:2010 CI 5**


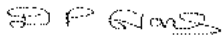
Contract Number	44299
Site Name	Dursey Island
Sample Preparation	Crushed Down Core Sample
Date Tested	20/05/2019

Hole Reference	Depth (m)		Size Fraction (Max)	Size Fraction (Min)	LA Value					Target Specification
RC01	7.80	17.10	14	10	20					N/A
RC02	4.00	16.10	14	10	21					N/A
RC03	7.65	12.70	14	10	20					N/A
RC04	0.80	5.00	14	10	20					N/A

**Key                      Reported As**

Size Fraction Max	mm
Size Fraction Min	mm

Method of Sampling in accordance with  
BS932-1 General Requirements and Sample  
Preparation

Operators	Checked	05/06/2019	Ben Sharp	
JD	Approved	06/06/2019	Paul Evans	



### Determination of Slake Durability Index

#### ISRM Part 2.2

Contract Number	44299
Site Name	Dursey Island
Nature of Slaking Fluid	Water at 20°C
Date Tested	24/05/2019

Hole Reference	Depth (m)			Slake First Cycle	Slake Second Cycle	Appearance Of Material Retained In The Drum	Appearance Of Material Passing Through The Drum
		-					
RC01	7.80	-	17.10	98.69	98.41	10 Pieces of Subangular aggregate material with some pieces with ground corners and edges	Sub-angular to <2mm fragments to a sand/silt.
RC02	4.00	-	16.10	98.95	98.43	10 Pieces of Subangular aggregate material with some pieces with ground corners and edges	Sub-angular to <2mm fragments to a sand/silt.
RC03	7.65		12.70	99.37	98.75	11 Pieces of Subangular aggregate material with some pieces with ground corners and edges	Sub-angular to <2mm fragments to a sand/silt.
RC04	0.80		5.00	98.62	97.98	10 Pieces of Subangular aggregate material with some pieces with ground corners and edges	Sub-angular to <2mm fragments to a sand/silt.

**Key**                      **Reported As**

Slake First Cycle	%
Slake Second Cycle	%



Operators	Checked	05/06/2019	Wayne Honey	
JD	Approved	06/06/2019	Ben Sharp	



Determination of Thermal Weathering Properties of Aggregates  
Magnesium Sulfate Test  
BS EN 1367-2:1998

Contract Number	44299
Site Name	Dursey Island
Sample Preparation	Crushed rock core
Date Tested	20/05/2019

Hole Reference	Depth (m)		Size Fraction (Max)	Size Fraction (Min)	Mass of test portions	Magnesium Sulfate Value					Target Specification
RC01	7.80	17.10	14	10	420-430	25					N/A
RC02	4.00	16.10	14	10	420-430	23					N/A
RC03	7.65	12.70	14	10	420-430	19					N/A
RC04	0.80	5.00	14	10	420-430	23					N/A

Key	Reported As
Size Fraction Max	mm
Size Fraction Min	mm
Mass of test portions	g
Magnesium Sulfate Value	%

Method of Sampling in accordance with BS932-1 General Requirements and Sample Preparation

Operators	Checked	05/06/2019	Wayne Honey	<i>W. Honey</i>
JD	Approved	06/06/2019	Ben Sharp	<i>[Signature]</i>

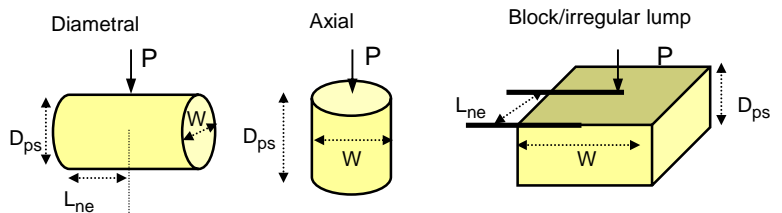


## Point Load Strength Index Tests Summary of Results

Project No. P19033	Project Name Dursley Island Cable Car & Visitor Centre
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Borehole No.	Sample			Specimen		Rock Type and Test condition	Test Type see ISRM		Failure Valid (Y/N)	Dimensions				Force P kN	Equivalent diameter, De mm	Point Load Strength Index		Remarks (including water content if measured)
	Depth m	Ref.	Type	Ref.	Depth m		Type (D, A, I, B)	Direction (L, P or U)		Lne mm	W mm	Dps mm	Dps' mm			Is MPa	Is(50) MPa	
RC01	1.10	RC	C			SILTSTONE	D	P	YES	100.0	76.0	76.0	66.0	6.8	70.8	1.4	1.6	Undulating Smooth
RC01	4.65	RC	C			SILTSTONE	D	L	YES	100.0	76.0	55.0	68.0	3.4	71.9	0.7	0.8	Undulating Smooth
RC01	8.00	RC	C			SILTSTONE	D	L	YES	35.0	76.0	76.0	65.0	3.3	70.3	0.7	0.8	Undulating Smooth
RC02	2.95	RC	C			SILTSTONE	D	P	YES	140.0	76.0	76.0	35.0	18.6	51.6	7.0	7.1	Planar Smooth
RC02	3.20	RC	C			SILTSTONE	D	P	YES	110.0	76.0	76.0	64.0	3.2	69.7	0.7	0.8	Undulating Smooth
RC02	4.45	RC	C			SILTSTONE	D	P	YES	78.0	76.0	76.0	45.0	5.6	58.5	1.6	1.8	Undulating Smooth
RC02	4.90	RC	C			SILTSTONE	D	P	YES	50.0	76.0	76.0	36.0	4.6	52.3	1.7	1.7	Undulating Rough
RC02	6.40	RC	C			SILTSTONE	D	P	YES	83.0	76.0	76.0	45.0	2.7	58.5	0.8	0.9	Undulating Rough
RC02	7.15	RC	C			SILTSTONE	D	P	YES	43.0	76.0	76.0	48.0	3.5	60.4	1.0	1.1	Undulating Smooth
RC02	9.70	RC	C			SILTSTONE	D	P	YES	0.0	76.0	76.0	6.2	4.3	21.7	9.1	6.2	Undulating Smooth
RC02	11.20	RC	C			SILTSTONE	D	L	YES	25.0	76.0	76.0	59.0	2.8	67.0	0.6	0.7	Undulating Smooth
RC02	11.35	RC	C			SILTSTONE	D	P	YES	100.0	76.0	76.0	44.0	4.5	57.8	1.4	1.4	Undulating Smooth
RC03	1.40	RC	C			SILTSTONE	D	P	YES	155.0	76.0	76.0	44.0	0.8	57.8	0.2	0.2	Undulating Rough
RC03	1.80	RC	C			SILTSTONE	D	L	YES	100.0	76.0	76.0	69.0	2.0	72.4	0.4	0.4	Planar Smooth
RC03	2.90	RC	C			SILTSTONE	D	P	YES	82.0	76.0	76.0	53.0	2.1	63.5	0.5	0.6	Planar Smooth
RC03	5.05	RC	C			SILTSTONE	D	P	YES	30.0	76.0	76.0	41.0	4.1	55.8	1.3	1.4	Planar Smooth
RC03	6.55	RC	C			SILTSTONE	D	L	YES	140.0	76.0	76.0	69.0	3.2	72.4	0.6	0.7	Undulating Smooth
RC03	10.75	RC	C			SILTSTONE	D	L	YES	140.0	76.0	76.0	68.0	4.8	71.9	0.9	1.1	Planar Smooth
RC04	0.45	RC	C			SILTSTONE	D	P	YES	65.0	76.0	76.0	45.0	20.0	58.5	5.9	6.3	Undulating Smooth
RC04	2.70	RC	C			SILTSTONE	D	P	YES	110.0	76.0	76.0	43.0	4.2	57.2	1.3	1.4	Undulating Smooth

Test Type  
D - Diametral, A - Axial, I - Irregular Lump, B - Block  
Direction  
L - parallel to planes of weakness  
P - perpendicular to planes of weakness  
U - unknown or random  
Dimensions  
Dps - Distance between platens ( platen separation )  
Dps' - at failure ( see ISRM note 6 )  
Lne - Length from platens to nearest free end  
W - Width of shortest dimension perpendicular to load, P



Test performed in accordance with ISRM Suggested Methods : 2007, unless noted otherwise Detailed legend for test and dimensions, based on ISRM, is shown above. Size factor, F = (De/50)0.45 for all tests.	Date Printed 06/04/2019 00:00	Approved By  Cilla	Table  sheet 1 1
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## Point Load Strength Index Tests Summary of Results

Project No. <b>P19033</b>	Project Name <b>Dursey Island Cable Car &amp; Visitor Centre</b>
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Borehole No.	Sample			Specimen		Rock Type and Test condition	Test Type see ISRM		Failure Valid (Y/N)	Dimensions				Force P kN	Equivalent diameter, De mm	Point Load Strength Index		Remarks (including water content if measured)
	Depth m	Ref.	Type	Ref.	Depth m		Type (D, A, I, B)	Direction (L, P or U)		Ln	W	Dps	Dps'			Is MPa	Is(50) MPa	
RC04	3.00	RC	C			SILTSTONE	D	P	YES	59.0	76.0	76.0	49.0	1.6	61.0	0.4	0.5	Undulating Smooth
RC04	3.80	RC	C			SILTSTONE	D	L	YES	125.0	76.0	76.0	70.0	1.8	72.9	0.3	0.4	
RC04	5.45	RC	C			SILTSTONE	D	P	YES	33.0	76.0	76.0	53.0	2.7	63.5	0.7	0.8	

**Test Type**  
 D - Diametral, A - Axial, I - Irregular Lump, B - Block  
**Direction**  
 L - parallel to planes of weakness  
 P - perpendicular to planes of weakness  
 U - unknown or random  
**Dimensions**  
 Dps - Distance between platens ( platen separation )  
 Dps' - at failure ( see ISRM note 6 )  
 Ln - Length from platens to nearest free end  
 W - Width of shortest dimension perpendicular to load, P

Diametral

Axial

Block/irregular lump

Test performed in accordance with ISRM Suggested Methods : 2007, unless noted otherwise Detailed legend for test and dimensions, based on ISRM, is shown above. Size factor, F = (De/50)0.45 for all tests.	Date Printed 06/04/2019 00:00	Approved By  Cilla	Table  sheet 1 2
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# Unconfined Compressive Strength, UCS

Job Name **Dursey Island Cable Car & Visitor Centre**  
Job Number **P19033**

Borehole: **RC01**  
Depth: **5.55** m  
Rock Type **SILTSTONE**

Bulk Density **2.81** Mg/m<sup>3</sup>  
Load at Failure, P **198.5** kN

Stress at Failure **44.97** MPa



# Unconfined Compressive Strength, UCS

Job Name	<b>Dursey Island Cable Car &amp; Visitor Centre</b>
Job Number	<b>P19033</b>
Borehole:	<b>RC01</b>
Depth:	<b>7.1 m</b>
Rock Type	<b>SILTSTONE</b>
Bulk Density	<b>2.74 Mg/m<sup>3</sup></b>
Load at Failure, P	<b>68.2 kN</b>
Stress at Failure	<b>15.07 MPa</b>



# Unconfined Compressive Strength, UCS

Job Name **Dursey Island Cable Car & Visitor Centre**  
Job Number **P19033**

Borehole: **RC01**  
Depth: **12.05** m  
Rock Type **SILTSTONE**

Bulk Density **2.78** Mg/m<sup>3</sup>  
Load at Failure, P **91.6** kN

Stress at Failure **20.77** MPa



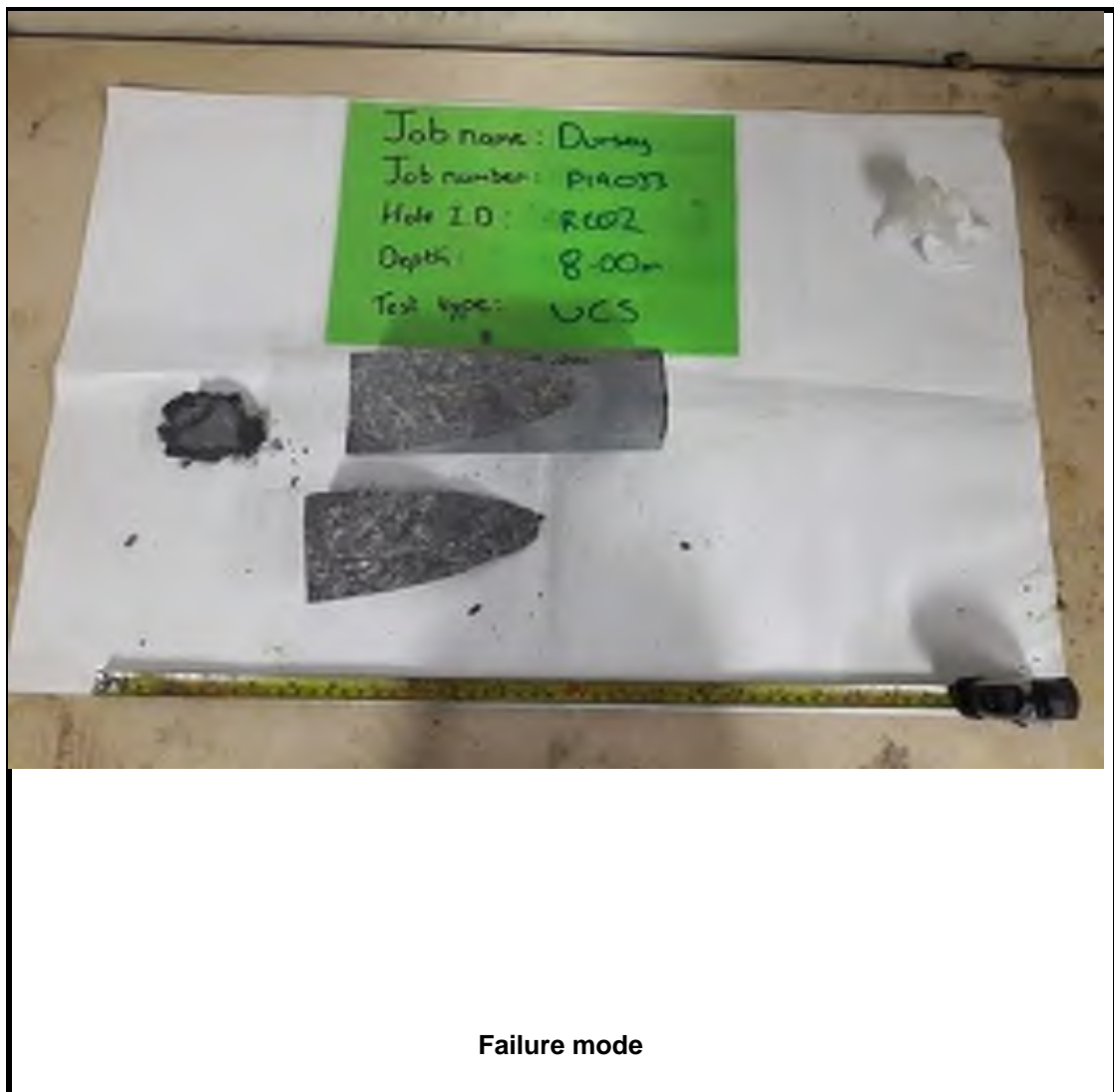
# Unconfined Compressive Strength, UCS

Job Name **Dursey Island Cable Car & Visitor Centre**  
Job Number **P19033**  
Borehole: **RC02**  
Depth: **5.35** m  
Rock Type **SILTSTONE**  
Bulk Density **2.78** Mg/m<sup>3</sup>  
Load at Failure, P **51** kN  
Stress at Failure **11.57** MPa



# Unconfined Compressive Strength, UCS

Job Name	<b>Dursey Island Cable Car &amp; Visitor Centre</b>
Job Number	<b>P19033</b>
Borehole:	<b>RC02</b>
Depth:	<b>8 m</b>
Rock Type	<b>SILTSTONE</b>
Bulk Density	<b>2.78 Mg/m<sup>3</sup></b>
Load at Failure, P	<b>61.9 kN</b>
Stress at Failure	<b>14.07 MPa</b>



# Unconfined Compressive Strength, UCS

Job Name	<b>Dursey Island Cable Car &amp; Visitor Centre</b>
Job Number	<b>P19033</b>
Borehole:	<b>RC03</b>
Depth:	<b>4.4 m</b>
Rock Type	<b>SILTSTONE</b>
Bulk Density	<b>2.80 Mg/m<sup>3</sup></b>
Load at Failure, P	<b>60.7 kN</b>
Stress at Failure	<b>13.77 MPa</b>



# Unconfined Compressive Strength, UCS

Job Name **Dursey Island Cable Car & Visitor Centre**  
Job Number **P19033**

Borehole: **RC03**  
Depth: **4.8** m  
Rock Type **SILTSTONE**

Bulk Density **2.81** Mg/m<sup>3</sup>  
Load at Failure, P **42.6** kN

Stress at Failure **9.67** MPa



# Unconfined Compressive Strength, UCS

Job Name	<b>Dursey Island Cable Car &amp; Visitor Centre</b>
Job Number	<b>P19033</b>
Borehole:	<b>RC04</b>
Depth:	<b>4.85</b> m
Rock Type	<b>SILTSTONE</b>
Bulk Density	<b>2.78</b> Mg/m <sup>3</sup>
Load at Failure, P	<b>62.7</b> kN
Stress at Failure	<b>14.27</b> MPa





# Unconfined Compressive Strength, UCS

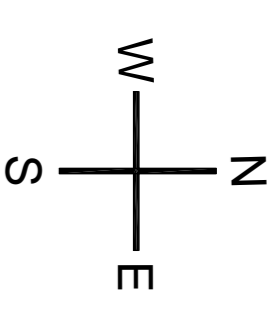
Job Name **Dursey Island Cable Car & Visitor Centre**  
Job Number **P19033**

Borehole: **RC04**  
Depth: **6.1** m  
Rock Type **SILTSTONE**

Bulk Density **2.79** Mg/m<sup>3</sup>  
Load at Failure, P **43.4** kN

Stress at Failure **13.77** MPa





### SERVICES LEGEND

	FUEL GAS		FUEL GAS
	FOWL SEWER		FOWL SEWER
	STORM SEWER		STORM SEWER
	STORM SEWER MANHOLE		STORM SEWER MANHOLE
	ROAD GULLY		ROAD GULLY
	WATER MAIN		WATER MAIN
	WATER VALVE		WATER VALVE
	FIRE HYDRANT		FIRE HYDRANT
	WATER METER		WATER METER
	SEWER VALVE		SEWER VALVE
	SEWER RELEASE VALVE		SEWER RELEASE VALVE
	AIR VALVE		AIR VALVE
	MANHOLE		MANHOLE
	MANHOLE COVER		MANHOLE COVER
	CABLE DUCT		CABLE DUCT
	EARTH LINE AND DENS		EARTH LINE AND DENS
	GAS SV		GAS SV
	GAS LINE		GAS LINE
	SERVICE AREA		SERVICE AREA
	OUTER SHEET AREA		OUTER SHEET AREA

Please note that the above services are shown on this drawing in accordance with the information provided by the client. The client is responsible for the accuracy of the information provided. The client is also responsible for the accuracy of the information provided. The client is also responsible for the accuracy of the information provided.

**Notes**

1. GPR scanning frequency 250 and 700 mhz
2. Depth of investigation 2.5m, self calibrating
3. Vixar Metrotech Products / RDT7000
4. GPR scanning limited to smooth surfaces only no obstruction.
5. Survey area marked on drawing
6. All depths stated are a indication of depth
7. Accurate requires more scanning
8. All Utilities are displayed 0m - 5m unless noted otherwise.

Symbol	Utility Name	Depth (m)	Notes
	FUEL GAS	0.9	0.9m
	FOWL SEWER	0.9	0.9m
	STORM SEWER	0.9	0.9m
	ROAD GULLY	0.9	0.9m
	WATER MAIN	0.9	0.9m
	WATER VALVE	0.9	0.9m
	FIRE HYDRANT	0.9	0.9m
	WATER METER	0.9	0.9m
	SEWER VALVE	0.9	0.9m
	SEWER RELEASE VALVE	0.9	0.9m
	AIR VALVE	0.9	0.9m
	MANHOLE	0.9	0.9m
	MANHOLE COVER	0.9	0.9m
	CABLE DUCT	0.9	0.9m
	EARTH LINE AND DENS	0.9	0.9m
	GAS SV	0.9	0.9m
	GAS LINE	0.9	0.9m
	SERVICE AREA	0.9	0.9m
	OUTER SHEET AREA	0.9	0.9m

Underground Utility Surveying

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<b>Client Name:</b> Priority Geotechnical	<b>Site Address:</b> Dursley Island Cable Car
<b>Drawing Title:</b> Underground Services Plan	<b>Drawing No.:</b> 1
<b>Date:</b> 21st March 2019	<b>Sheet No.:</b> 1
<b>Scale:</b> 1:250 @ A1 (ITM Coordinates)	<b>Revision No.:</b>

