

CONSULTANTS IN ENGINEERING, ENVIRONMENTAL SCIENCE & PLANNING

Appendix 9.1

Geotechnical & Peat Stability Assessment Report





CONSULTANTS IN ENGINEERING, ENVIRONMENTAL SCIENCE & PLANNING

ENVIRONMENTAL IMPACT ASSESSMENT REPORT (EIAR) FOR THE PROPOSED BALLINAGREE WIND FARM

GEOTECHNICAL & PEAT STABILITY ASSESSMENT REPORT

Prepared for: Ballinagree Wind DAC



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1. NON-TECHNCIAL SUMMARY

Fehily Timoney and Company (FT) was engaged by Coillte and Ørsted to undertake a geotechnical and peat stability assessment of the proposed Ballinagree Wind Farm site. In accordance with planning guidelines compiled by the Department of the Environment, Heritage and Local Government (DoEHLG), where peat is present on a proposed wind farm development, a peat stability assessment is required.

A walkover including intrusive peat depth probing, desk study, stability analysis and risk assessment was carried out to assess the susceptibility of the site to peat failure following the principles in Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments (PLHRAG, 2nd Edition, 2017).

The findings show that the proposed development has an acceptable margin of safety and is suitable for the proposed wind farm development. Based on the findings, recommendations and control measures for construction work in peat lands are suggested to ensure that all works adhere to an acceptable standard of safety.

The proposed development comprises 20 no. wind turbines and associated infrastructure. The site comprises flat to steep sloped agricultural land with areas of peat bog in the north.

Slope inclinations at the main infrastructure locations range from 4 to 16 degrees. Ground conditions comprised mainly of peaty topsoil or peat overlying silt overlying bedrock.

Peat depth recorded during the site walkovers from over 124 probes ranged from 0 to 3m with an average peat depth of 0.6m. 86% of the probes recorded peat depths of less than 1.0m with 95% of peat depth probes recorded peat depths of less than 2.0m. A number of localised readings recorded peat depths from 2.0 to 3m. Peat probing was focused on areas of the site where peat was identified during the site walkover and desk study (the northern area of the site). Average peat depth is given for the probes carried out, which may be higher than the actual average peat depth for the site.

The purpose of the stability analysis was to determine the stability i.e. Factor of Safety (FoS), of the slopes across the site. The FoS provides a direct measure of the degree of stability of a slope. A FoS of less than 1.0 indicates that a slope is unstable; a FoS of greater than 1.0 indicates a stable slope. An acceptable FoS for slopes is generally taken as a minimum of 1.3. The stability analysis for this project, which analysed the turbine locations, access roads and borrow pits, resulted in FoS above the minimum acceptable value of 1.3 and hence the site has a satisfactory margin of safety.

The risk assessment uses the results of the stability analysis in combination with qualitative factors, which cannot be reasonably included in a stability calculation but nevertheless may affect the occurrence of peat instability, to assess the risk of peat failure at the site. The results of the risk assessment are given in Appendix A.

In summary, the proposed development site has an acceptable margin of safety and is considered to be at **low** risk of peat failure.

2. INTRODUCTION

2.1 Fehily Timoney and Company

Fehily Timoney and Company (FT) is an Irish engineering, environmental science and planning consultancy with offices in Cork, Dublin and Carlow. The practice was established in 1990 and currently has about 70 members of staff, including engineers, scientists, planners and technical support staff. FT deliver projects in Ireland and internationally in our core competency areas of Waste Management, Environment and Energy, Civils Infrastructure, Planning and GIS and Data Management.

2.2 Project Description

FT was engaged by Coillte to undertake an Environmental Impact Assessment of the proposed Ballinagree Wind Farm. As part of this assessment a geotechnical & peat stability assessment was required to be carried out.

The proposed Ballinagree Wind Farm is located approximately 10km south-east of Millstreet, Co. Cork.

The Ballinagree Wind Farm site, which comprises agricultural land, forestry and blanket peat which extends to an area of approximately 380 hectares contained to the north and north-east of the site. The site is located in the west of Co. Cork, between Millstreet and Macroom. The surrounding landscape comprises gently undulating to steep topography with land-use comprising forestry, agricultural land and peatland.

The development comprises the following:

- (1) 20 no. wind turbines with a maximum overall blade tip height of up to 185m and all associated hardstanding areas
- (2) 2 no. permanent meteorological masts up to 100m in height
- (3) Provision of new site access tracks and associated drainage
- (4) Temporary construction compound
- (5) All works associated with the connection of the proposed wind farm to the national electricity grid, including the construction of an electricity substation
- (6) New access junctions, improvements and temporary modifications to existing public road infrastructure to facilitate delivery of abnormal loads and construction access
- (7) All associated site development works

2.3 Ground Investigation

Intrusive investigations were undertaken by Irish Drilling Limited at the proposed borrow pit locations, all proposed turbine locations and along the proposed access tracks. The purpose of the intrusive works was to confirm the geological succession underlying the site. The site investigations comprised the excavation of 64 no. trial pits to a maximum depth of 4.8m BGL and 5 no. rotary boreholes to a maximum depth of 15m BGL. The boreholes were carried out at each of the proposed borrow pit locations to assess the suitability of the material to be used as site-won material during construction.



2.4 Peat Stability Assessment Methodology

FT undertook the assessment following the principles in Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments, 2nd Edition (PLHRAG, 2017). The Peat Landslide Hazard and Risk Assessment Guide (PLHRAG) is used in this report as it provides best practice methods to identify, mitigate and manage peat slide hazards and associated risks in respect of consent applications for electricity generation projects.

The best practice guide was produced following peat failures in the Shetland Islands, Scotland in September 2003 but more pertinently following the peat failure in October 2003, during the construction of a wind farm at Derrybrien, County Galway, Ireland.

The geotechnical and peat stability assessment at the site included the following activities:

- (1) Desk study
- (2) Site reconnaissance including shear strength and peat depth measurements
- (3) Peat stability assessment of the peat slopes on site using a deterministic and qualitative approach
- (4) Factor of safety plan compiled for the short-term critical condition (undrained) for points analysed along the proposed infrastructure envelope on site
- (5) A risk register was compiled to assess the potential design/construction risks at the infrastructure locations and determine adequate mitigation/control measures for each location to minimise the potential risks and ensure they are kept within an acceptable range, where necessary

A flow diagram showing the general methodology for peat stability assessment is shown in Figure 2.1. The methodology illustrates the optimisation of the wind farm layout based on the findings from the site reconnaissance and stability analysis and subsequent feedback.



Figure 2-1: Methodology for Peat Stability Assessment

2.5 Peat Failure Definition

Peat failure in this report refers to a significant mass movement of a body of peat that would have an adverse impact on the proposed development and the surrounding environment. Peat failure excludes localised movement of peat that would occur below an access road, creep movement or erosion type events.

The potential for peat failure at this site is examined with respect to construction works and associated activity, operation works and decommissioning works.



2.6 Main Approaches to Assessing Peat Stability

The main approaches to assessing stability for wind farm developments include the following:

- (1) Geomorphological
- (2) Qualitative (judgement)
- (3) Index/Probabilistic (probability)
- (4) Deterministic (factor of safety)

Approaches (1) to (3) listed above are considered subjective and do not provide a definitive indication of stability; in addition, a high level of judgement/experience is required which makes it difficult to relate the findings to real conditions. FT apply a more objective approach, the deterministic approach (as discussed in Section 2.6).

As part of FT's deterministic approach, a qualitative risk assessment is also carried out taking into account qualitative factors, which cannot necessarily be quantified, such as the presence of mechanically cut peat, quaking peat, bog pools, sub peat water flow, slope characteristics and numerous other factors. The qualitative factors used in the risk assessment are compiled based on FT's experience of assessments and construction in peat land sites and peat failures throughout Ireland and the UK. This approach follows the guidelines for geotechnical risk management as given in Clayton (2001), as referenced in the best practice for Peat Landslide Hazard and Risk Assessment Guide (PLHRAG, 2017), and takes into account the approach of MacCulloch (2005).

The risk assessment uses the results of the deterministic approach in combination with qualitative factors, which cannot be reasonably included in a stability calculation but nevertheless may affect the occurrence of peat instability to assess the risk of instability on a peat land site.

2.7 Peat Stability Assessment – Deterministic Approach

The peat stability assessment is carried out across a wide area to determine the stability of peat slopes and to identify areas of peatland that are suitable for development; this allows the layout of infrastructure on a particular wind farm site to be optimised. The assessment provides a numerical value (factor of safety) of the stability of individual parcels of peatland. The findings of the assessment discriminate between areas of stable and unstable peat, and areas of marginal stability where restrictions may apply. This allows for the identification of the most suitable locations for turbines, access roads and infrastructure.

A deterministic assessment requires geotechnical information and site characteristics which are obtained from desk study and site walkover, e.g. properties of peat/soil/rock, slope geometry, depth of peat, underlying strata, groundwater, etc. An adverse combination of the factors listed above could potentially result in instability. Using the information above, a factor of safety is calculated for the stability of individual parcels of peatland on a site (as discussed in Section 7).

The factor of safety is a measure of the stability of a particular slope. For any slope, the degree of stability depends on the balance of forces between the weight of the soil/peat working downslope (destabilising force) and the inherent strength of the peat/soil (shear resistance) to resist the downslope weight, see Figure 2.2.





Figure 2-2: Peat Slope Showing Balance of Forces to Maintain Stability

The factor of safety provides a direct measure of the degree of stability of a slope and is the ratio of the shear resistance over the downslope destabilising force. Provided the available shear resistance is greater than the downslope destabilising force then the factor of safety will be greater than 1.0 and the slope will remain stable. If the factor of safety is less than 1.0 the slope is unstable and liable to fail. The acceptable range for the factor of safety in peat is greater than 1.3.

2.8 Applicability of the Factor of Safety (Deterministic) Approach for Peat Slopes

The factor of safety approach is a standard engineering approach in assessing slopes which is applied to many engineering materials, such as peat, soil, rock, etc.

The factor of safety approach is included in the Peat Landslide Hazard and Risk Assessments Best Practice Guide for Proposed Electricity Generation Developments (PLHRAG, 2017); see Section 5.3.1 of the guide. This guide provides best practice methods to identify, mitigate and manage peat slide hazards and associated risks in respect of consent applications for electricity generation projects.

Furthermore, the best practice guide notes that the results from the factor of safety approach 'has provided the most informative results' with respect to analysing peat stability (Section 5.3.1 of the guide).

The factor of safety approach in this report includes undrained (short-term stability) and drained (long-term stability) analyses. The undrained condition is the critical condition for the development. The purpose of the drained analysis is to identify the relative susceptibility of rainfall-induced failures at the site.

Notwithstanding the above, the stability analysis used by FT in this report also includes qualitative factors to determine the potential for peat and general slope stability i.e. the analysis used does not solely rely on the factor of safety approach.

The deterministic analysis is considered an acceptable engineering design approach. This concurs with the best practice guide referenced above.



2.9 Assessment of Intense Rainfall and Extreme Dry Events on the Peat Slope

The deterministic approach carried out by FT examines intense rainfall and extreme dry events. The deterministic approach includes and undrained (short-term stability) and drained (long-term stability) analysis to assess the factor of safety for the peat slopes against a peat failure.

The drained loading condition applies in the long-term. This condition examines the effect of the change in groundwater level as a result of rainfall on the existing stability of the natural peat slopes. For the drained analysis the level of the water table above the failure surface is required to calculate the factor of safety for the peat slope.

In order to represent varying water levels within the peat slopes, a sensitivity analysis is carried out which assesses varying water level in the peat slopes i.e. water levels ranging from 0 to 100% of the peat depth is conducted, where 0% equates to the peat been completely dry and 100% equates to the peat being fully saturated.

By carrying out such a sensitivity analysis with varying water level in the peat slopes, the effects of intense rainfall and extreme dry events are considered and analysed. The results of which are presented in Section 7 of this report.

3. DESK STUDY

3.1 Desk Study

The main relevant sources of interest with respect to the site include:

- Geological plans and Geological Survey of Ireland database
- Ordnance survey plans
- Literature review of peat failures

The Geological Survey of Ireland (GSI, 1999) geological plans for the site were used to verify the soil and bedrock conditions.

The Ordnance Survey plans were reviewed to determine if any notable features or areas of particular interest (from a geotechnical point of view) are present on the site.

The desk study also includes a review of both published literature and GSI online dataset viewer (GSI, 2021) on peat failures/landslides in the vicinity of the site.

3.2 Soils, Subsoil & Bedrock

A review of the Geological Survey of Ireland online database and published documents from GSI was carried out.

The GSI subsoils maps indicates that the site is underlain by a combination of Till derived from Devonian Sandstones, Bedrock outcrop or sub-crop, Blanket Peat and Alluvium.

In relation to bedrock, the site location and surrounding area is underlain by the Ballytrasna Formation and the Caha Mountain Formation. The Ballytrasna Formation comprises dusky-red mudstone with subordinate palered sandstones. The Caha Mountain Formation is described as comprising purple and green siltstones and sandstones.

According to the GSI datasets, there are no karst features recorded within the proposed site. The nearest karst feature is Tubrid Well (526034E 590928N) which is located approximately 20km to the north-west of the proposed site.

The GSI Online Irish Geological Heritage database indicates that the proposed development area is not located in an area of specific geological heritage interest. The nearest site of significant geological heritage features to the study area is located approximately 3km to the east of the proposed development which is the Boggeragh Mountains. The Boggeragh Mountains is a Natural Heritage Area (NHA) that consists of upland blanket bog habitat.



3.3 Previous Failures

There are no recorded peat failures within the proposed development site (GSI, 2021). The nearest recorded failure is located some 20km west of the study area just north of Ballyvourney. No information is available on the size of this failure

The landslide susceptibility at the site was classified by the GSI (2021) as ranging from Low to Extreme. This only relates to the topography of the site and does not take any peat specific data into account (i.e. peat depths, etc). This is expected as there are certain areas across the site, predominantly in the west that are quite steep (slopes reaching up to 22 degrees).

The presence, or otherwise, of relict peat failures or clustering of relict failures within an area is an indicator that particular site conditions exist that pre-dispose a site to failure or not as the case may be. Hence based on the historical data reviewed and the terrain and ground conditions present on site it can be concluded that site conditions in the area of the proposed development have a limited potential of peat failure.

3.4 Ground Investigation Findings

As mentioned in Section 2.3 above, intrusive investigations were undertaken by Irish Drilling Limited at the proposed borrow pit locations, at selected proposed turbine locations, along the proposed access tracks to confirm the geological succession underlying the site. A total of 64 no. trial pits to a maximum depth of 4.8m BGL and 6 no. rotary boreholes (at proposed borrow pit locations) to a maximum depth of 15m BGL were carried out. The trial pit and borehole logs and a ground investigation location map are included in Appendix 9.2 of the main EIAR.

Topsoil was encountered in areas across the site during the site walkover and intrusive investigations. The Topsoil was predominantly a peaty *sandy gravelly CLAY* (0.1 to 0.8 mbgl) with areas of MADE GROUND and PEAT also present across the site. Peat deposits of an amorphous peat were found predominantly in the northern area of the site.

Peat deposits were generally noted to be limited to the northern area of the site and typical thicknesses of between 0.1 - 2.7m. Peaty topsoil was present in areas of the southern area of the site.

The Topsoil and Peat deposits described above were found to overlie Glacial Till deposits either cohesive or granular in nature. Cohesive deposits encountered typically comprised *Soft to Stiff sandy gravelly SILT with high cobble and boulder content*. The granular Glacial Till deposits encountered typically comprised *Silty sandy GRAVEL with high cobble content*.

Weathered Bedrock of the Ballytrasna Formation was encountered during site investigations at depths of between 0 to 3.8m BGL where it was typically described as comprising *Weathered SILTSTONE or SANDSTONE*.

4. FINDINGS OF SITE RECONNAISSANCE

4.1 Site Reconnaissance

As part of the assessment of potential peat failure at the proposed site, FT carried out a site reconnaissance in conjunction with the desk study review described in Section 3. This comprised walkover inspections of the site with recording of salient geomorphological features with respect to the wind farm development which included peat depth and preliminary assessment of peat strength.

The following salient geomorphological features were considered:

- Active, incipient or relict instability (where present) within the peat deposits
- Presence of shallow valley or drainage line
- Wet areas
- Any change in vegetation
- Peat depth
- Slope inclination and break in slope

The survey covered the proposed turbine locations and associated infrastructure and proposed access tracks.

The method adopted for carrying out the site reconnaissance relied on experienced practitioners carrying out a visual assessment of the site supplemented with measurement of slope inclinations.

4.2 Findings of Site Reconnaissance

The site reconnaissance comprised a walkover inspection of the site during January and August 2020 and March 2021. Weather conditions for the site visits were mainly dry.

The findings from the site walkover have been used to optimise the layout of the infrastructure on site.

The main findings of the site walkover of the wind farm site are as follows:

- (1) The site is predominantly agricultural land, forestry and peat. Areas of peat are located predominantly in the north of the site with localised areas of peaty topsoil found in the south.
- (2) A series of peat depth probes were carried out on site. Peat depths recorded across the site ranged from 0.2 to 3m. Approximately 95 percent of peat depth probes recorded peat depths of less than 2.0m. A number of localised readings were recorded where peat depths were 2.0 to 3m.
- (3) The peat depths recorded at the turbine locations where there was peat present (there was no peat encountered at 7 turbine locations) varied from 0 to 2m with an average depth of 0.63m¹.
- (4) With respect to the new proposed access tracks, peat depths are typically less than 1.0m with localised depths of up to 3m recorded.

¹ Peat was recorded at 13 of the proposed turbine locations.



- (5) Access tracks for the wind farm comprise the upgrade of existing agricultural/forestry tracks and the construction of new tracks. The construction of new tracks will be carried out using an excavate & replace construction technique which involves the removal and replacement of peat or soft ground where encountered.
- (6) Slope angles at the turbine locations ranged from 2 to 16 degrees. These slope angle readings were obtained using a combination of readings taken during the site reconnaissance by FT using handheld equipment, such as the Silva Clino Master which has an accuracy of +/- 0.25 degrees and from contour survey plans for the site.
- (7) The slope angle quoted typically reflects the slope within the footprint of each infrastructure location.
- (8) No evidence of past failures or any significant signs of peat instability were noted on site.
- (9) A summary of the site walkover findings for the wind farm are as follows:
 - (a) The site comprises relatively flat terrain with localised areas of peat in the north and north-east of the site. Peat depths recorded across the site ranged from 0 to 3m with an average depth of 0.6m. Peat probing was focused on areas of the site where peat was identified during the site walkover and desk study (the northern area of the site). Average peat depth is given for the probes carried out, which may be higher than the actual average peat depth for the site.
 - (b) The results of the peat depth probing, shear strength testing of the peat and qualitative factors identified on site have been used in the stability and risk assessments, see Sections 6, 7 and 8 of this report for details.

In summary, based on the findings from the site reconnaissance, the proposed development would be considered to have a low risk of peat instability.

SITE GROUND CONDITIONS 5.

5.1 Soils & Subsoils

A review of the GSI subsoils maps in Section 3 indicates that the site is underlain by a combination of Till derived from Devonian Sandstones, Bedrock outcrop or sub-crop, Blanket Peat and Alluvium.

Based on the site walkover undertaken by FT and trial pits excavated by IDL, the superficial deposits for the site were typically described as peaty topsoil or spongy brown/black fibrous and amorphous Peat overlying typically firm and stiff slightly gravelly Silt/Clay. Where peat was present on site, peat depths ranged from 0 to 3m with an average depth of 0.6m. At turbine locations, peat depth ranged from 0-2.3m.

5.2 **Bedrock**

A review of the GSI bedrock maps in Section 3 indicates that the site location and surrounding area is underlain by the Ballytrasna Formation and the Caha Mountain Formation. The Ballytrasna Formation comprises duskyred mudstone with subordinate pale-red sandstones. The Caha Mountain Formation is described as comprising purple and green siltstones and sandstones.

No karst features were identified in the survey area. The closest recorded karst feature is a spring noted approximately 10km to the west of the site.





6. PEAT DEPTHS, STRENGTH & SLOPE AT PROPOSED INFRASTRUCTURE LOCATIONS

As part of the site walkover, peat depth, in-situ peat strength and slope angles were recorded at various locations across the site. A map is displayed in Figure 6.1 displaying where the peat probe locations were taken across the site.

6.1 Peat Depth

Peat depth probes were carried out at/near to proposed turbine locations and access tracks and other main infrastructure elements. At turbine locations up to 5 probes were carried out around the turbine location, where accessible, and an average peat depth was calculated. This method was used predominantly in the northern area of the site where there was evidence of more extensive peat deposits.

6.2 Peat Strength

The strength testing was carried out in-situ using a Geonor H-60 Hand-Field Vane Tester. From FT's experience, hand vanes give indicative results for in-situ strength of peat and would be considered best practice for the field assessment of peat strength.

6.3 Slope Angle

The slope angles at each of the main infrastructure locations were obtained using a combination of readings taken during the site reconnaissance by FT using handheld equipment, such as the Silva Clino Master and from contour survey plans for site.

The slope angle quoted typically reflects the slope within the footprint of each infrastructure location. It should be noted that slope angles derived from contour survey plans would be considered approximate, as such surveys are dependent on the density of survey data and do not always reflect local variations in ground topography. Slope angles recorded during the site reconnaissance by FT using handheld equipment would generally be deemed more accurate and representative of local topography.

6.4 Summary of Findings

Based on the peat depths recorded across the site by FT, the peat varied in depth from 0 to 3m with an average depth of 0.6m.

A summary of the peat depths at the proposed turbine and borrow pit locations is given in Table 6.1. The data presented in Table 6.1 is used in the peat stability assessment of the site. Peat depths are based on the data collected from both the trial pitting and peat probing.



Table 6.1: Peat Depth & Slope Angle at Proposed Infrastructure Locations

Turbine	Easting	Northing	Peat Depth	Pepth Average Peat	Slope Angle	Factor of Safety (Load Condition 2)	
			Kange (m) (*)	Depth (m)	(*) (-)	Undrained	Drained
T1	534501	584042			4		
T2	534621	583586	0.3-0.8	0.6	4	37.72	10.26
Т3	535181	583428	0.5-0.6	0.6	12	12.29	3.42
T4	535989	582819			6		
T5	536420	582647	0.2-0.3	0.3	4		
Т6	535505	583151	0.2-0.3	0.1	10		
Τ7	536168	583308			12		
Т8	536754	583185			4		
Т9	536843	583683			6		
T10	536178	584279			6		
T11	535332	584249			6		
T12	535205	584703	0.2-0.4	0.3	8		
T13	536298	586077	0.5-0.6	0.5	14	12.50	3.01
T14	536707	586702	0.5-1.5	1	8	9.43	4.77
T15	537272	586528	0.4-0.6	0.5	6	20.52	7.00
T16	537466	586089	0.2-0.4	0.3	16		
T17	537125	585649	0.6-0.7	0.6	12	18.44	3.42
T18	538431	586680	1.7-2.3	2	2	26.76	17.18
T19	538959	586490	0.2-0.6	0.4	2	126.97	21.55
T20	539629	586861	0.8-1.3	1	4	30.18	9.54
BP1	533661	533661	0.1-0.4	0.3	14		
BP2	533478	533478			16		
BP3	537925	537925	0.8-1	0.9	4	25.72	25.72

Note (1) Based on probe results from the site walkovers. The range of peat depths for the infrastructure locations are typically based on a 10m grid carried out around the infrastructure element, where accessible.

Note (2) The slope angles at each of the main infrastructure locations were obtained using a combination of readings taken during the site reconnaissance by FT using handheld equipment, such as the Silva Clino Master (which has an accuracy of +/- 0.25 degrees) and from contour survey plans for site. The slope angle quoted typically reflects the slope within the footprint of each infrastructure location.

Note (3) The data presented in the Table above is used in the peat stability assessment of the site.



In addition to probing, in-situ shear vane testing was carried out as part of the ground investigation. Strength testing was carried out at selected locations across the site to provide representative coverage of indicative peat strengths. The results of the vane testing with depth taken at the turbine locations are presented in Figure 6.2.

The hand vane results indicate undrained shear strengths in the range 10 to 62kPa across the whole site, with an average value of about 25kPa. The average value at turbine locations was recorded as 41kPA. The ground investigations that was carried out by Irish Drilling Ltd. consisted of a series of trial pits and boreholes. The peat depths encountered during the trial pitting correspond with the peat depths encountered during the peat probing.

Peat strength at sites of known peat failures (assuming undrained loading failure) are generally very low, for example the undrained shear strength at the Derrybrien failure (AGEC, 2004) as derived from back-analysis, was estimated at 2.5kPa. The recorded undrained strength at the proposed development site is significantly greater than the lower bound values for Derrybrien indicating that there is no close correlation to the peat conditions at the Derrybrien site and that there is significantly less likelihood of failure on the Ballinagree Wind Farm site.



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	Wind Farm Study A	rea

Peat Probing Locations

Ballinagree Wind Farm

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7. PEAT STABILITY ASSESSMENTS

The peat stability assessment includes an assessment of the stability of the natural peat slopes for individual parcels across the site including at the turbine locations and along the proposed access tracks. The assessment also analyses the stability of the natural peat slopes with a surcharge loading of 10kPa, equivalent to placing 1m of stockpiled peat on the surface of the peat slope.

7.1 Methodology for Peat Stability Assessment

Stability of a peat slope is dependent on several factors working in combination. The main factors that influence peat stability are slope angle, shear strength of peat, depth of peat, pore water pressure and loading conditions.

An adverse combination of factors could potentially result in peat sliding. An adverse condition of one of the above-mentioned factors alone is unlikely to result in peat failure. The infinite slope model (Skempton and DeLory, 1957) is used to combine these factors to determine a factor of safety for peat sliding. This model is based on a translational slide, which is a reasonable representation of the dominant mode of movement for peat failures.

To assess the factor of safety for a peat slide, an undrained (short-term stability) and drained (long-term stability) analysis has been undertaken to determine the stability of the peat slopes on site.

- 1. The undrained loading condition applies in the short-term during construction and until construction induced pore water pressures dissipate.
- 2. The drained loading condition applies in the long-term. The condition examines the effect of the change in groundwater level as a result of rainfall on the existing stability of the natural peat slopes.

Undrained shear strength values (c_u) for peat are used for the total stress analysis. Based on the findings of the 2003 Derrybrien failure and other failures in peat, undrained loading during construction was found to be the critical failure mechanism.

A drained analysis requires effective cohesion (c') and effective friction angle (ϕ ') values for the calculations. These values can be difficult to obtain because of disturbance experienced when sampling peat and the difficulties in interpreting test results due to the excessive strain induced within the peat. To determine suitable drained strength values a review of published information on peat was carried out. Table 7.1 shows a summary of the published information on peat together with drained strength values.

From Table 7.1 the values for c' ranged from 1.1 to 8.74kPa and ϕ' ranged from 21.6 to 43°. The average c' and ϕ' values are 4.5kPa and 30° respectively. Based on the above, it was considered to adopt a conservative approach and to use design values below the averages. For design the following general drained strength values have been used for the site:

$$c' = 4$$
kPa
 $\phi' = 25^{\circ}$



Table 7.1: List of Effective Cohesion and Friction Angle Values for Peat

Reference	Cohesion, c' (kPa)	Friction Angle, ø' (degs)	Testing Apparatus/ Comments
Hanrahan et al (1967)	5 to 7	36 to 43	From triaxial apparatus
Rowe and Mylleville (1996)	2.5	28	From simple shear apparatus
Landva (1980)	2 to 4	27.1 to 32.5	Mainly ring shear apparatus for normal stress greater than 13kPa
	5 to 6	-	At zero normal stress
Carling (1986)	6.5	0	-
Earroll and Hobib	0	38	From ring shear and shear box apparatus. Results are not considered representative.
(1998)	0.61	31	From direct simple shear (DSS) apparatus. Result considered too low therefore DSS not considered appropriate
Rowe, Maclean and	1.1	26	From simple shear apparatus
Soderman (1984)	3	27	From DSS apparatus
McGreever and	6	38	From triaxial apparatus using soil with 20% organic content
Farrell (1988)	6	31	From shear box apparatus using soil with 20% organic content
Hungr and Evans (1985)	3.3	-	Back-analysed from failure
Dykes and Kirk (2006)	3.2	30.4	Test within acrotelm
Dykes and Kirk (2006)	4	28.8	Test within catotelm
Warburton et al (2003)	5	23.9	Test in basal peat
Warburton et al (2003)	8.74	21.6	Test using fibrous peat
Hendry et al (2012)	0	31	Remoulded test specimen
Komatsu et al (2011)	8	34	Remoulded test specimen
Zwanenburg et al (2012)	2.3	32.3	From DSS apparatus
Den Haan & Grognet (2014)	-	37.4	From large DSS apparatus
O'Kelly & Zhang (2013)	0	28.9 to 30.3	Tests carried out on reconstituted, undisturbed and blended peat samples



7.2 Analysis to Determine Factor of Safety (Deterministic Approach)

The purpose of the analysis was to determine the Factor of Safety (FoS) of the peat slopes using infinite slope analysis. The analysis was carried out at the turbine locations, along the proposed access tracks and at various locations across the site.

The FoS provides a direct measure of the degree of stability of the slope. A FoS of less than unity indicates that a slope is unstable, a FoS of greater than unity indicates a stable slope.

The acceptable safe range for FoS is greater than 1.3. The previous code of practice for earthworks BS 6031:1981 (BSI, 1981), provided advice on design of earthworks slopes. It stated that for a first-time failure with a good standard of site investigation the design FoS should be greater than 1.3.

As a general guide, the FoS limits for peat slopes in this report are summarised in Table 7.2:

Table 7.2:Factor of Safety Limits for Slopes

Factor of Safety (FoS)	Degree of Stability
Less than 1.0	Unstable (red)
Between 1.0 and 1.3	Marginally stable (yellow)
1.3 or greater	Acceptable (green)

Eurocode 7 (EC7) (IS EN 1997-1:2005) now serves as the reference document and the basis for design geotechnical engineering works. The design philosophy used in EC7 applies partial factors to soil parameters, actions and resistances. Unlike the traditional approach, EC7 does not provide a direct measure of stability, since global Factors of Safety are not used.

As such, and in order to provide a direct measure of the level of safety on a site, EC7 partial factors have not been used in this stability assessment. The results are given in terms of FoS.

A lower bound undrained shear strength, c_u for the peat of 8kPa was selected for the assessment based on the c_u values recorded at the proposed development site. It should be noted that a c_u of 8kPa for the peat is considered a conservative value for the analysis and is not representative of all peat present across the site. As described in Section 6.4, the hand vane results indicate undrained shear strengths in the range 10 to 62kPa across the whole site, with an average value of about 25kPa. The average value at turbine locations was recorded as 41kPA. In-situ testing of the peat at the site suggests that peat strength is greater than 10 kPa across the site.

The formula used to determine the factor of safety for the undrained condition in the peat (Bromhead, 1986) is as follows:

 $F = \frac{c_u}{\gamma z \sin \alpha \cos \alpha}$

Where:

- *F* = Factor of Safety
- c_u = Undrained strength
- γ = Bulk unit weight of material
- *z* = Depth to failure plane assumed as depth of peat
- α = Slope angle

The formula used to determine the factor of safety for the drained condition in the peat (Bromhead, 1986) is as follows:

$$F = \frac{c' + (\gamma z - \gamma_w h_w) \cos^2 \alpha \tan \phi'}{\gamma z \sin \alpha \cos \alpha}$$

Where:

- *F* = Factor of Safety
- c' = Effective cohesion
- γ = Bulk unit weight of material
- *z* = Depth to failure plane assumed as depth of peat
- γ_w = Unit weight of water
- h_w = Height of water table above failure plane
- α = Slope angle
- ϕ' = Effective friction angle

For the drained analysis the level of the water table above the failure surface is required to calculate the factor of safety for the slope. Since the water level in blanket peat can be variable and can be recharged by rainfall, it is not feasible to establish its precise location throughout the site. Therefore, a sensitivity analysis using water level ranging between 0% and 100% of the peat depth was conducted, where 0% equates to the peat being completely dry and 100% equates to the peat been fully saturated.

The following general assumptions were used in the analysis of peat slopes at each location:

- (1) Peat depths are based on the maximum peat depth recorded at each location from the walkover surveys.
- (2) The slope angles used in the peat stability assessment were obtained using of readings taken during the site reconnaissance by FT using handheld equipment.
- (3) Slope angle at base of sliding assumed to be parallel to ground surface.
- (4) A lower bound undrained shear strength, c_u for the peat of 8kPa was selected for the assessment. The lowest recorded value at the proposed development site during the walkover was 10kPa. It should be noted that a c_u of 8kPa for the peat is considered a conservative value for the analysis and is not representative of all peat present across the site. In reality, the peat at the proposed development site has a significantly higher undrained strength which is likely as a result of the extensive drainage & extraction works which have been carried out on site.



For the stability analysis two load conditions were examined, namely

Condition (1): no surcharge loading

Condition (2): surcharge of 10 kPa, equivalent to 1m of stockpiled peat assumed as a worst case.

7.3 Results of Analysis

7.3.1 Undrained Analysis for the Peat

The results of the undrained analysis for the natural peat slopes are presented in Appendix B and the results of the undrained analysis for the most critical load case (load condition 2) are shown on Figure 7.1. The undrained analysis for load condition 2 is considered the most critical load case as most peat failures occur in the short term upon loading of the peat surface. The results from the main infrastructure locations are summarised in Table 7.3. The results from all probe data taken across the site is included in Appendix B.

The calculated FoS for load condition 1 is in excess of 1.30 for each of the locations analysed with a range of FoS of 4.15 to in excess of 400 across the whole of the site (including turbine locations, access tracks, substation and temporary compound locations), indicating a low risk of peat instability across the site. The FoS at turbine locations where peat was present ranged from 18.87 to 444.4, indicating a low risk of peat instability at turbine locations.

The calculated FoS for load condition 2 is in excess of 1.30 for each of the locations analysed with a range of FoS of 3.01 to in excess of 100 across the whole of the site (including turbine locations, access tracks, substation and temporary compound locations, indicating a low risk of peat instability across the site. The FoS at turbine locations where peat was present ranged from 9.43 to 126.97, indicating a low risk of peat instability at turbine locations.

Table 7.3:	Factor of Safety	Results	(Undrained	Condition)
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Turbine No./Waypoint	Easting	Northing	Factor of Safety for Load Condition		
			Condition (1)	Condition (2)	
T1	534501	584042	No Peat		
T2	534621	583586	100.59	37.72	
Т3	535181	583428	32.78	12.29	
T4	535989	582819	No Peat		
Τ5	536420	582647	No Peat		
Т6	535505	583151	No Peat		
Τ7	536168	583308	No Peat		
Т8	536754	583185	No Peat		
Т9	536843	583683	No Peat		



Turbine No./Waypoint	Easting	Northing	Factor of Safety for Load Condition		
			Condition (1)	Condition (2)	
T10	536178	584279	No	Peat	
T11	535332	584249	No	Peat	
T12	535205	584703	No	Peat	
T13	536298	586077	37.49	12.50	
T14	536707	586702	18.87	9.43	
T15	537272	586528	61.56	20.52	
T16	537466	586089	No Peat		
T17	537125	585649	49.17	18.44	
T18	538431	586680	40.14	26.76	
T19	538959	586490	444.40	126.97	
T20	539629	586861	60.36	30.18	
BP1	533661	533661	No Peat		
BP2	533503	533503	No Peat		
BP3	533478	533478	No Peat		
BP4	537925	537925	54.29	25.72	

7.3.2 Drained Analysis for the Peat

The results of the drained analysis for the peat are presented in Appendix B. The results from the main infrastructure locations are summarised in Table 7.4. As stated previously, the drained loading condition examines the effect of rainfall and water on the existing stability of the natural peat slopes.

The calculated FoS for load condition 1 is in excess of 1.30 for each of the locations analysed with a range of FoS of 1.56 to in excess of 70 across the whole of the site (including turbine locations, access tracks, substation and temporary compound locations, indicating a low risk of peat instability across the site. The FoS at turbine locations where peat was present ranged from 5.28 to 42.02, indicating a low risk of peat instability at turbine locations.

The calculated FoS for load condition 2 is in excess of 1.30 for each of the locations analysed with a range of FoS of 1.99 to in excess of 20 across the whole of the site (including turbine locations, access tracks, substation and temporary compound locations, indicating a low risk of peat instability across the site. The FoS at turbine locations where peat was present ranged from 3.01 to 21.55, indicating a low risk of peat instability at turbine locations.

Table 7.4: Factor of Safety Results (Drained Conditions)

Turbine No./Waypoint	Easting	Northing	Factor of Safety for Load Condition		
			Condition (1)	Condition (2)	
T1	534501	584042	No	Peat	
T2	534621	583586	16.25	10.26	
Т3	535181	583428	5.47	3.42	
T4	535989	582819	No	Peat	
T5	536420	582647	No	Peat	
Т6	535505	583151	No	Peat	
Τ7	536168	583308	No	Peat	
Т8	536754	583185	No Peat		
Т9	536843	583683	No Peat		
T10	536178	584279	No Peat		
T11	535332	584249	No Peat		
T12	535205	584703	No Peat		
T13	536298	586077	5.28	3.01	
T14	536707	586702	6.22	4.77	
T15	537272	586528	12.13	7.00	
T16	537466	586089	No	Peat	
T17	537125	585649	5.47	3.42	
T18	538431	586680	19.09	17.18	
T19	538959	586490	42.02	21.55	
T20	539629	586861	12.42	9.54	
BP1	533661	533661	No Peat		
BP2	533503	533503	No Peat		
BP3	533478	533478	No	Peat	
BP4	537925	537925	13.06	9.69	

7.3.3 <u>Summary of Results</u>

The results above state that the FoS for both drained and undrained conditions at all infrastructure locations and along proposed access tracks are in excess of 1.30. This indicates that the site has a low risk of peat instability. There are areas located in the north where the FoS ranges from 1.56 to 3.63. These values are above the 1.30 allowance and there is no proposed infrastructure at these locations, therefore these areas with lower factors of safety also indicate a low risk of instability.



8. PEAT STABILITY RISK ASSESSMENT

A peat stability risk assessment was carried out for the main infrastructure elements at the wind farm. This approach takes into account guidelines for geotechnical/peat stability risk assessments as given in PLHRA (2017) and MacCulloch (2005).

The risk assessment uses the results of the stability analysis (deterministic approach) in combination with qualitative factors, which cannot be reasonably included in a stability calculation but nevertheless may affect the occurrence of peat instability, to assess the risk for each infrastructure element.

For each of the main infrastructure elements, a risk rating (product of probability and impact) is calculated and rated as shown in Table 8.1. Where a subsection is rated 'Medium' or 'High', control measures are required to reduce the risk to at least a 'Low' risk rating. Where a subsection is rated 'Low' or 'Negligible', only routine control measures are required.

Table 8.1: Risk Rating Legend

17 to 25	High: avoid works in area or significant control measures required
11 to 16	Medium: notable control measures required
5 to 10	Low: only routine control measures required
1 to 4	Negligible: none or only routine control measures required

A full methodology for the peat stability risk assessment is given in Appendix C.

8.1 Summary of Risk Assessment Results

The results of the peat stability risk assessment for potential peat failure at the main infrastructure elements is presented as a Geotechnical Risk Register in Appendix A and summarised in Table 8.2.

The risk rating for each infrastructure element at the proposed development is designated negligible with some mitigation/control measures being implemented on a precautionary basis. Sections of access tracks to the nearest infrastructure element will be subject to the same mitigation/control measures that apply to the nearest infrastructure element.

Details of the required mitigation/control measures can be found in the Geotechnical Risk Register for each infrastructure element (Appendix A).



Table 8.2: Summary of Peat Stability Risk Register

Infrastructure	Pre-Control Measure Implementation Risk Rating	Pre-Control Measure Implementatio n Risk Rating Category	Notable Control Measures Required	Post-Control Measure Implementation Risk Rating	Post-Control Measure Implementation Risk Rating Category	
Turbine T1	No peat recorded at location					
Turbine T2	Negligible	1 to 4	No	Negligible	1 to 4	
Turbine T3	Negligible	1 to 4	No	Negligible	1 to 4	
Turbine T4	No peat recorded at location					
Turbine T5	No peat recorded at location					
Turbine T6	No peat recorded at location					
Turbine T7	No peat recorded at location					
Turbine T10	No peat recorded at location					
Turbine T11	No peat recorded at location					
Turbine T12	No peat recorded at location					
Turbine T13	Negligible	1 to 4	No	Negligible	1 to 4	
Turbine T14	Negligible	1 to 4	No	Negligible	1 to 4	
Turbine T15	Negligible	1 to 4	No	Negligible	1 to 4	
Turbine T16	No peat recorded at location					
Turbine T17	Negligible	1 to 4	No	Negligible	1 to 4	
Turbine T18	Negligible	1 to 4	No	Negligible	1 to 4	
Turbine T19	Negligible	1 to 4	No	Negligible	1 to 4	
Turbine T20	Negligible	1 to 4	No	Negligible	1 to 4	
BP1	No peat recorded at location					
BP2	No peat recorded at location					
BP3	No peat recorded at location					
BP4	Negligible	1 to 4	No	Negligible	1 to 4	

INDICATIVE FOUNDATION TYPE AND FOUNDATION DEPTH FOR TURBINES 9.

9.1 Summary

Based on a review of the ground investigation information for site, a preliminary assessment of the likely foundation type and founding depths for each turbine location was carried out, where possible. A summary of this assessment is provided in Table 9-1.

Summary of Indicative Turbine Foundation Type and Founding Depths Table 9-1:

Turbine No.	Relevant GI	Geology Encountered	Turbine Foundation Type	Comment
T1	T-01	0-0.5m: Topsoil 0.5-4.3m: Glacial Till	Gravity foundation	The site investigation works carried out indicate that a gravity foundation may be required.
Т2	T-02	0-0.8m: Peat 0.8-1.7m: Glacial Till	Gravity foundation	The site investigation works carried out indicate that a gravity foundation may be required.
Т3	T-03	0-0.8m: Peat 0.8-1.3m: Bedrock	Gravity foundation	The site investigation works carried out indicate that a gravity foundation may be required.
T4	T-04	0-0.1m: Peat 0.1-1.4m: Bedrock	Gravity foundation	The site investigation works carried out indicate that a gravity foundation may be required.
Τ5	T-05	0-2.1m: Made Ground 2.1-3.6m: Bedrock	Gravity foundation	The site investigation works carried out indicate that a gravity foundation may be required.
Т6	T-06	0-0.3m: Peat 0.3-3m: Glacial Till	Gravity foundation	The site investigation works carried out indicate that a gravity foundation may be required.
Τ7	T-07	0-0.2m: Topsoil 0.2-2.5m: Glacial Till	Gravity foundation	The site investigation works carried out indicate that a gravity foundation may be required.
Т8	T-08	0-0.3m: Topsoil 0.3-2.5m: Glacial Till	Gravity foundation	The site investigation works carried out indicate that a gravity foundation may be required.



Turbine No.	Relevant GI	Geology Encountered	Turbine Foundation Type	Comment
Т9	T-09	0-0.1m: Topsoil 0.1- 4.8m: Glacial Till	Gravity foundation	The site investigation works carried out indicate that a gravity foundation may be required.
T10	T-10	0-0.2m: Topsoil 0.2-3.6m: Glacial Till	Gravity foundation	The site investigation works carried out indicate that a gravity foundation may be required.
T11	T-11	0-0.3m: Peat 0.3-4.6m: Glacial Till	Gravity foundation	The site investigation works carried out indicate that a gravity foundation may be required.
T12	T-12	0-0.2m: Topsoil 0.2-1.6m: Glacial Till	Gravity foundation	The site investigation works carried out indicate that a gravity foundation may be required.
T13	T-13	0-0.3m: Peat 0.3-4.5m: Glacial Till	Gravity foundation	The site investigation works carried out indicate that a gravity foundation may be required.
T14	T-14	0-1m: Peat 1-3.8m: Glacial Till	Gravity foundation	The site investigation works carried out indicate that a gravity foundation may be required.
T15	T-15	0-0.5m: Peat 0.5-2.1m: Glacial Till	Gravity foundation	The site investigation works carried out indicate that a gravity foundation may be required.
T16	T-16	0-0.3m: Peat 0.3-1m: Glacial Till	Gravity foundation	The site investigation works carried out indicate that a gravity foundation may be required.
T17	T-17	0-0.6m: Peat 0.6-2m: Glacial Till	Gravity foundation	The site investigation works carried out indicate that a gravity foundation may be required.
T18	T-18	0-2m: Peat 2-4.3m: Glacial Till	Gravity foundation	The site investigation works carried out indicate that a gravity foundation may be required.
T19	T-19	0-0.4m: Peat 0.4-1.4m: Glacial Till	Gravity foundation	The site investigation works carried out indicate that a gravity foundation may be required.
T20	T-20	0-0.7m: Peat 0.7-3.5m: Glacial Till	Gravity foundation	The site investigation works carried out indicate that a gravity foundation may be required.



It should be noted that further ground investigation will be carried out prior to construction at each turbine location in the form of a borehole with in-situ SPT testing at 1m intervals in the overburden and follow-on rotary core through bedrock to confirm the foundation types and founding stratums assumed in Table 10-1.

For gravity type turbine foundations, where the depth of excavation exceeds the required founding depth for the proposed turbine base, up-fill material consisting of granular fill (6N) shall be used to backfill the excavation to the required founding depth.

10. SUMMARY AND RECOMMENDATIONS

10.1 Summary

FT was engaged by Coillte and Ørsted to undertake a geotechnical and peat stability assessment of the proposed Ballinagree Wind Farm site.

The findings of the peat stability and general stability assessment displayed that the proposed development site has an acceptable margin of safety and is suitable for the proposed development. The findings include recommendations and control measures for construction work in peat lands to ensure that all works adhere to an acceptable standard of safety.

The site which comprises relatively flat/gently undulating terrain consisting predominantly of agricultural land with peat present in the north and north-east of the site.

Peat thicknesses recorded during the site walkover ranged from 0 to 3m with an average depth of 0.6m. 85% of the probes recorded peat depths of less than 1.0m. 95% of peat depth probes recorded peat depths of less than 2.0m. A number of localised readings were recorded where peat depths range from 2.0 to 3m.

Slope inclinations at the main infrastructure locations range from 4 to 16 degrees.

An analysis of peat sliding was carried out at the main infrastructure and borrow pit locations across the site for both the undrained and drained conditions. The purpose of the analysis was to determine the Factor of Safety (FoS) of the peat slopes.

For the undrained condition, the calculated FoS for load conditions 1 and 2 for the locations analysed, showed that all locations have an acceptable FoS of greater than 1.3, indicating a low risk of peat failure. The undrained analysis would be considered the most critical condition for the peat slopes.

A drained analysis was also carried out, which examined the effect of in particular, rainfall on the existing stability of the natural peat slopes on site. For the drained condition, the calculated FoS for load conditions (1) & (2) for the locations analysed, showed that all locations have an acceptable FoS of greater than 1.3.

The peat stability risk assessment at each infrastructure location identified a number of mitigation/control measures to further reduce the potential risk of peat failure. Sections of access tracks to the nearest infrastructure element should be subject to the same mitigation/control measures that apply to the nearest infrastructure element. See Appendix A for details of the required mitigation/control measures for each infrastructure element.

In summary, the findings of the peat assessment showed that the Ballinagree Wind Farm site has an acceptable margin of safety, is suitable for the proposed wind farm development and is considered to be at **low** risk of peat failure. The findings include recommendations and control measures for construction work in peat lands to ensure that all works adhere to an acceptable standard of safety.



10.2 Recommendations

The following recommendations are given.

Notwithstanding that the site has an acceptable margin of safety and low risk of peat instability a number of mitigation/control measures are given to ensure that all works adhere to an acceptable standard of safety for work in areas of peat. Mitigation/control measures identified for each of the infrastructure elements in the risk assessment will be taken into account and implemented throughout design and construction works (Appendix A).

The proposed construction method for most of the new proposed access tracks at the wind farm is excavate and replace type construction and floating roads where there is deeper peat located in the north of the site. The FoS along all of the proposed access tracks is above the 1.30 recommendation. The access tracks follow the slopes of the existing topography as much as possible therefore there should be no stability issues.

To minimise the risk of construction activity causing potential peat instability, the Construction Method Statements (CMSs) for the project will take into account, but not be limited, to the recommendations above. This will ensure that best practice guidance regarding the management of peat stability will be inherent in the construction phase.
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APPENDIX A

Peat Stability Risk Registers



Location:		Turbine T2			
Grid Reference (Eastings, Northings):		534621	583586		
Distance to Watercourse (m)	ſ	> 150			
Min & Max Measured Peat Depth (m):		0.3 - 0.8			
Control Required:		No			

		Pre-Control Measure Implementation		ementation			Post-Control Measure Implementation					
Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating	Control Required	Control measures to be implemented during construction	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating	
1	FOS = 100.59 (u), 16.25 (d)	1	1	1	Negligible	No		1	1	1	Negligible	
2	Evidence of sub peat water flow	1	1	1	Negligible	No		1	1	1	Negligible	
3	Evidence of surface water flow	3	1	3	Negligible	No		3	1	3	Negligible	
4	Evidence of previous failures/slips	0	1	0	Not Applicable	No			0	1	0	Not Applicable
5	Type of vegetation	2	1	2	Negligible	No		2	1	2	Negligible	
6	General slope characteristics upslope/downslope from infrastructure location	3	1	3	Negligible	No	See Below	3	1	3	Negligible	
7	Evidence of very soft/soft clay at base of peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable	
8	Evidence of mechanically cut peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable	
9	Evidence of quaking or buoyant peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable	
10	Evidence of bog pools	0	1	0	Not Applicable	No		0	1	0	Not Applicable	
11	Other	0	1	0	Not Applicable	No		0	1	0	Not Applicable	

	Control Measures to be Implemented Prior to/and During Construction for Turbine T2
i	Maintain hydrology of area as far as possible;
ii	Use of experienced geotechnical staff for site investigation;
iii	Use of experienced contractors and trained operators to carry out the work;
iv	Detailed ground investigation to determine peat, mineral soil and bedrock condition and properties.
v	Inspection & approval of turbine base sub-formation by a competent person.

Location:	Turbi	Turbine T3			
Grid Reference (Eastings, Northings):	535181	583428			
Distance to Watercourse (m)	> ′	150			
Min & Max Measured Peat Depth (m):	0.5	0.5-0.6			
Control Required:	N	No			

		Pre-Control Measure Implementation				Post	t-Control M	easure Im	plementation		
Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating	Control Required	Control measures to be implemented during construction	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating
1	FOS = 32.78 (u), 5.47 (d)	1	1	1	Negligible	No		1	1	1	Negligible
2	Evidence of sub peat water flow	1	1	1	Negligible	No		1	1	1	Negligible
3	Evidence of surface water flow	3	1	3	Negligible	No		3	1	3	Negligible
4	Evidence of previous failures/slips	0	1	0	Not Applicable	No		0	1	0	Not Applicable
5	Type of vegetation	2	1	2	Negligible	No		2	1	2	Negligible
6	General slope characteristics upslope/downslope from infrastructure location	3	1	3	Negligible	No	See Below	3	1	3	Negligible
7	Evidence of very soft/soft clay at base of peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
8	Evidence of mechanically cut peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
9	Evidence of quaking or buoyant peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
10	Evidence of bog pools	0	1	0	Not Applicable	No		0	1	0	Not Applicable
11	Other	0	1	0	Not Applicable	No		0	1	0	Not Applicable

	Control Measures to be Implemented Prior to/and During Construction for Turbine T3
i	Maintain hydrology of area as far as possible;
ii	Use of experienced geotechnical staff for site investigation;
iii	Use of experienced contractors and trained operators to carry out the work;
iv	Detailed ground investigation to determine peat, mineral soil and bedrock condition and properties.
v	Inspection & approval of turbine base sub-formation by a competent person.

Location:	Turl	Turbine T13			
Grid Reference (Eastings, Northings):	53629	8 586077			
Distance to Watercourse (m)	;	> 150			
Min & Max Measured Peat Depth (m):	0	0.5-0.6			
Control Required:		No			

		Pre-Control Measure Implementation					Post	t-Control M	easure Im	plementation	
Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating	Control Required	Control measures to be implemented during construction	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating
1	FOS = 37.49 (u), 5.28 (d)	1	1	1	Negligible	No		1	1	1	Negligible
2	Evidence of sub peat water flow	1	1	1	Negligible	No		1	1	1	Negligible
3	Evidence of surface water flow	3	1	3	Negligible	No		3	1	3	Negligible
4	Evidence of previous failures/slips	0	1	0	Not Applicable	No		0	1	0	Not Applicable
5	Type of vegetation	2	1	2	Negligible	No		2	1	2	Negligible
6	General slope characteristics upslope/downslope from infrastructure location	3	1	3	Negligible	No	See Below	2	1	2	Negligible
7	Evidence of very soft/soft clay at base of peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
8	Evidence of mechanically cut peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
9	Evidence of quaking or buoyant peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
10	Evidence of bog pools	0	1	0	Not Applicable	No		0	1	0	Not Applicable
11	Other	0	1	0	Not Applicable	No		0	1	0	Not Applicable

	Control Measures to be Implemented Prior to/and During Construction for Turbine T13
i	Maintain hydrology of area as far as possible;
ii	Use of experienced geotechnical staff for site investigation;
iii	Use of experienced contractors and trained operators to carry out the work;
iv	Detailed ground investigation to determine peat, mineral soil and bedrock condition and properties.
v	Inspection & approval of turbine base sub-formation by a competent person.

Location:	Turbine T14			
Grid Reference (Eastings, Northings):	536707	586702		
Distance to Watercourse (m)	> 1	> 150		
Min & Max Measured Peat Depth (m):	0.5	0.5-1.5		
Control Required:	No			

		Pre-	Pre-Control Measure Implementation				Post-Control Measure Implementation					
Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating	Control Required	Control measures to be implemented during construction	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating	
1	FOS = 18.87 (u), 6.22 (d)	1	1	1	Negligible	No		1	1	1	Negligible	
2	Evidence of sub peat water flow	1	1	1	Negligible	No		1	1	1	Negligible	
3	Evidence of surface water flow	3	1	3	Negligible	No		2	1	2	Negligible	
4	Evidence of previous failures/slips	0	1	0	Not Applicable	No			0	1	0	Not Applicable
5	Type of vegetation	2	1	2	Negligible	No		2	1	2	Negligible	
6	General slope characteristics upslope/downslope from infrastructure location	3	1	3	Negligible	No	See Below	3	1	3	Negligible	
7	Evidence of very soft/soft clay at base of peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable	
8	Evidence of mechanically cut peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable	
9	Evidence of quaking or buoyant peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable	
10	Evidence of bog pools	0	1	0	Not Applicable	No		0	1	0	Not Applicable	
11	Relatively deep peat	3	1	3	Negligible	No		2	1	2	Negligible	

	Control Measures to be Implemented Prior to/and During Construction for Turbine T14
ii	Maintain hydrology of area as far as possible;
iii	Use of experienced geotechnical staff for site investigation;
iv	Use of experienced contractors and trained operators to carry out the work;
v	Detailed ground investigation to determine peat, mineral soil and bedrock condition and properties.
vi	Inspection & approval of turbine base sub-formation by a competent person.

Location:	tion: Turbine T15				
Grid Reference (Eastings, Northings):	537272	586528			
Distance to Watercourse (m)	> 1	> 150			
Min & Max Measured Peat Depth (m):	0.4-0.6				
Control Required:	No				

		Pre-	Pre-Control Measure Implementation				Post	-Control M	leasure Im	plementation	
Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating	Control Required	Control measures to be implemented during construction	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating
1	FOS = 61.56 (u), 12.13 (d)	1	1	1	Negligible	No		1	1	1	Negligible
2	Evidence of sub peat water flow	1	1	1	Negligible	No		1	1	1	Negligible
3	Evidence of surface water flow	3	1	3	Negligible	No		2	1	2	Negligible
4	Evidence of previous failures/slips	0	1	0	Not Applicable	No		0	1	0	Not Applicable
5	Type of vegetation	2	1	2	Negligible	No		2	1	2	Negligible
6	General slope characteristics upslope/downslope from infrastructure location	3	1	3	Negligible	No	See Below	2	1	2	Negligible
7	Evidence of very soft/soft clay at base of peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
8	Evidence of mechanically cut peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
9	Evidence of quaking or buoyant peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
10	Evidence of bog pools	0	1	0	Not Applicable	No		0	1	0	Not Applicable
11	Relatively deep peat	3	1	3	Negligible	No		2	1	2	Negligible

	Control Measures to be Implemented Prior to/and During Construction for Turbine T15
ï	Maintain hydrology of area as far as possible;
iii	Use of experienced geotechnical staff for site investigation;
iv	Use of experienced contractors and trained operators to carry out the work;
V	Detailed ground investigation to determine peat, mineral soil and bedrock condition and properties.
vi	Inspection & approval of turbine base sub-formation by a competent person.

Location:	Turbine T17			
Grid Reference (Eastings, Northings):	537125	585649		
Distance to Watercourse (m)	> 1	> 150		
Min & Max Measured Peat Depth (m):	0.6	0.6-0.7		
Control Required:	N	No		

_		Pre-	Pre-Control Measure Implementation				Post-Control Measure Implementation				
Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating	Control Required	Control measures to be implemented during construction	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating
1	FOS = 49.17 (u), 5.47 (d)	1	1	1	Negligible	No		1	1	1	Negligible
2	Evidence of sub peat water flow	1	1	1	Negligible	No		1	1	1	Negligible
3	Evidence of surface water flow	3	1	3	Negligible	No		3	1	3	Negligible
4	Evidence of previous failures/slips	0	1	0	Not Applicable	No		0	1	0	Not Applicable
5	Type of vegetation	2	1	2	Negligible	No		2	1	2	Negligible
6	General slope characteristics upslope/downslope from infrastructure location	3	1	3	Negligible	No	See Below	2	1	2	Negligible
7	Evidence of very soft/soft clay at base of peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
8	Evidence of mechanically cut peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
9	Evidence of quaking or buoyant peat	1	1	1	Negligible	No		0	1	0	Not Applicable
10	Evidence of bog pools	0	1	0	Not Applicable	No		0	1	0	Not Applicable
11	Other	0	1	0	Not Applicable	No		0	1	0	Not Applicable

	Control Measures to be Implemented Prior to/and During Construction for Turbine T17
i	Maintain hydrology of area as far as possible;
ii	Use of experienced geotechnical staff for site investigation;
iii	Use of experienced contractors and trained operators to carry out the work;
iv	Detailed ground investigation to determine peat, mineral soil and bedrock condition and properties.
v	Inspection & approval of turbine base sub-formation by a competent person.

Location: Turbine T				
Grid Reference (Eastings, Northings):	538431	586680		
Distance to Watercourse (m)	> 1	> 150		
Min & Max Measured Peat Depth (m):	1.7	1.7-2.3		
Control Required:	N	No		

_		Pre-	Pre-Control Measure Implementation				Post	t-Control M	easure Im	plementation	
Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating	Control Required	Control measures to be implemented during construction	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating
1	FOS = 40.14 (u), 19.09 (d)	1	1	1	Negligible	No		1	1	1	Negligible
2	Evidence of sub peat water flow	1	1	1	Negligible	No		1	1	1	Negligible
3	Evidence of surface water flow	3	1	3	Negligible	No		2	1	2	Negligible
4	Evidence of previous failures/slips	0	1	0	Not Applicable	No		0	1	0	Not Applicable
5	Type of vegetation	2	1	2	Negligible	No		2	1	2	Negligible
6	General slope characteristics upslope/downslope from infrastructure location	3	1	3	Negligible	No	See Below	2	1	2	Negligible
7	Evidence of very soft/soft clay at base of peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
8	Evidence of mechanically cut peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
9	Evidence of quaking or buoyant peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
10	Evidence of bog pools	0	1	0	Not Applicable	No		0	1	0	Not Applicable
11	Relatively deep peat	3	1	3	Negligible	No		2	1	2	Negligible

	Control Measures to be Implemented Prior to/and During Construction for Turbine T18
i	Maintain hydrology of area as far as possible;
ii	Use of experienced geotechnical staff for site investigation;
iii	Use of experienced contractors and trained operators to carry out the work;
iv	Detailed ground investigation to determine peat, mineral soil and bedrock condition and properties.
v	Inspection & approval of turbine base sub-formation by a competent person.

Location: Turbin					
Grid Reference (Eastings, Northings):	665164	751792			
Distance to Watercourse (m)	> 1	50			
Min & Max Measured Peat Depth (m):	0.2	-0.6			
Control Required:	N	No			

		Pre-	Pre-Control Measure Implementation				Post	t-Control M	easure Im	plementation	
Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating	Control Required	Control measures to be implemented during construction	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating
1	FOS = 40.14 (u), 42.02 (d)	1	1	1	Negligible	No		1	1	1	Negligible
2	Evidence of sub peat water flow	1	1	1	Negligible	No		1	1	1	Negligible
3	Evidence of surface water flow	3	1	3	Negligible	No		2	1	2	Negligible
4	Evidence of previous failures/slips	0	1	0	Not Applicable	No		0	1	0	Not Applicable
5	Type of vegetation	2	1	2	Negligible	No		2	1	2	Negligible
6	General slope characteristics upslope/downslope from infrastructure location	3	1	3	Negligible	No	See Below	2	1	2	Negligible
7	Evidence of very soft/soft clay at base of peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
8	Evidence of mechanically cut peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
9	Evidence of quaking or buoyant peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
10	Evidence of bog pools	0	1	0	Not Applicable	No		0	1	0	Not Applicable
11	Relatively deep peat	3	1	3	Negligible	No		2	1	2	Negligible

	Control Measures to be Implemented Prior to/and During Construction for Turbine T19
i	Maintain hydrology of area as far as possible;
ii	Use of experienced geotechnical staff for site investigation;
iii	Use of experienced contractors and trained operators to carry out the work;
iv	Detailed ground investigation to determine peat, mineral soil and bedrock condition and properties.
V	Inspection & approval of turbine base sub-formation by a competent person.

Location:	Turbi	ne T20		
Grid Reference (Eastings, Northings):	539629	586861		
Distance to Watercourse (m)	> ′	> 150		
Min & Max Measured Peat Depth (m):	0.8	0.8 - 1.3		
Control Required:		No		

		Pre-	Pre-Control Measure Implementation					Post-Control Measure Implementation			
Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating	Control Required	Control measures to be implemented during construction	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating
1	FOS = 60.36 (u), 12.42 (d)	1	1	1	Negligible	No		1	1	1	Negligible
2	Evidence of sub peat water flow	1	1	1	Negligible	No		1	1	1	Negligible
3	Evidence of surface water flow	3	1	3	Negligible	No		2	1	2	Negligible
4	Evidence of previous failures/slips	0	1	0	Not Applicable	No		0	1	0	Not Applicable
5	Type of vegetation	2	1	2	Negligible	No		2	1	2	Negligible
6	General slope characteristics upslope/downslope from infrastructure location	3	1	3	Negligible	No	See Below	2	1	2	Negligible
7	Evidence of very soft/soft clay at base of peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
8	Evidence of mechanically cut peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
9	Evidence of quaking or buoyant peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
10	Evidence of bog pools	0	1	0	Not Applicable	No		0	1	0	Not Applicable
11	Relatively deep peat	3	1	3	Negligible	No		2	1	2	Negligible

	Control Measures to be Implemented Prior to/and During Construction for Turbine T20					
i	Maintain hydrology of area as far as possible;					
ii	se of experienced geotechnical staff for site investigation;					
iii	Jse of experienced contractors and trained operators to carry out the work;					
iv	Detailed ground investigation to determine peat, mineral soil and bedrock condition and properties.					
v	Inspection & approval of turbine base sub-formation by a competent person.					

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Location:	Borro	w Pit 3		
		-		
Grid Reference (Eastings, Northings):	537925	537925		
Distance to Watercourse (m)	> ′	> 150		
Min & Max Measured Peat Depth (m):	0.8	0.8-1		
Control Required:	N	No		

		Pre-Control Measure Implementation						Post-Control Measure Implementation			
Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating	Control Required	Control measures to be implemented during construction	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating
1	FOS = 54.29 (u), 13.06 (d)	1	1	1	Negligible	No		1	1	1	Negligible
2	Evidence of sub peat water flow	1	1	1	Negligible	No		1	1	1	Negligible
3	Evidence of surface water flow	3	1	3	Negligible	No		3	1	3	Negligible
4	Evidence of previous failures/slips	0	1	0	Not Applicable	No		0	1	0	Not Applicable
5	Type of vegetation	2	1	2	Negligible	No		2	1	2	Negligible
6	General slope characteristics upslope/downslope from infrastructure location	3	1	3	Negligible	No	See Below	2	1	2	Negligible
7	Evidence of very soft/soft clay at base of peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
8	Evidence of mechanically cut peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
9	Evidence of quaking or buoyant peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
10	Evidence of bog pools	0	1	0	Not Applicable	No		0	1	0	Not Applicable
11	Other	0	1	0	Not Applicable	No		0	1	0	Not Applicable

Control Measures to be Implemented Prior to/and During Construction for BP3					
Maintain hydrology of area as far as possible;					
Use of experienced geotechnical staff for site investigation;					
Use of experienced contractors and trained operators to carry out the work;					
Detailed ground investigation to determine peat, mineral soil and bedrock condition and properties.					
Inspection & approval of turbine base sub-formation by a competent person.					



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APPENDIX B

Calculated FOS for Peat Slopes on Site



Calculated FoS of Natural Peat Slopes for Ballinagree Wind Farm - Drained Analysis										
Turbine No./Waypoint	Slope	Design c'	Bulk unit weight of Peat	Unit weight of Water	Depth of In situ Peat	Friction Angle	Surcharge Equivalent Placed Fill	Equivalent Total Depth of Peat (m)	Factor of Safety	for Load Condition
	α (deg)	c' (kPa)	γ (kN/m³)	γ _w (kN/m³)	(m)	ø' (deg)	Condition (2)	Condition (2)	Condition (1)	Condition (2)
			1					-	100% Water	100% Water
		-								
1	10	4	10.0	10.0	0.4	25	1.0	1.4	5.85	3.56
2	12	4	10.0	10.0	0.4	25	1.0	1.4	4.92	2.97
4	12	4	10.0	10.0	0.2	25	1.0	1.2	4.65	3.29
5	10	4	10.0	10.0	0.6	25	1.0	1.6	3.90	3.11
6	10	4	10.0	10.0	0.4	25	1.0	1.4	8.49	4.32
7	14	4	10.0	10.0	1	25	1.0	2.0	3.57	2.72
9	12	4	10.0	10.0	0.4	25	1.0	1.4	7.11 4.59	3.00
10	10	4	10.0	10.0	1.2	25	1.0	2.0	4.98	3.81
11	12	4	10.0	10.0	0.8	25	1.0	1.8	4.65	3.29
12	14	4	10.0	10.0	1.2	25	1.0	2.2	3.29	2.64
13	8	4	10.0	10.0	1.5	25	1.0	2.5	5.25	4.48
14	10	4	10.0	10.0	1	25	1.0	2.0	2.34	2.49
15	6	4 4	10.0	10.0	1.2	25	1.0	2.2	3.21	3.77
17	8	4	10.0	10.0	1.8	25	1.0	2.8	1.61	2.22
18	8	4	10.0	10.0	0.8	25	1.0	1.8	3.63	3.46
19	6	4	10.0	10.0	0.6	25	1.0	1.6	6.41	5.18
20	8	4	10.0	10.0	0.8	25	1.0	1.8	6.95	4.93
21	12	4	10.0	10.0	15	25 25	1.0	2.0	1.97	2.08
23	6	4	10.0	10.0	0.4	25	1.0	1.4	9.62	5.92
24	6	4	10.0	10.0	2	25	1.0	3.0	6.36	5.72
25	8	4	10.0	10.0	1.2	25	1.0	2.2	5.74	4.64
26	4	4	10.0	10.0	2.2	25	1.0	3.2	9.28	8.46
27	8 4	4 4	10.0	10.0	2	25	1.0	3.0	4.77	4.29
29	4	4	10.0	10.0	2	25	1.0	3.0	9.54	8.58
30	6	4	10.0	10.0	2.5	25	1.0	3.5	5.98	5.54
31	6	4	10.0	10.0	3	25	1.0	4.0	5.72	5.40
32	8	4	10.0	10.0	2.8	25	1.0	3.8	4.35	4.08
33	6	4	10.0	10.0	2.5	25	1.0	3.5	5.98	5.54
35	10	4	10.0	10.0	2.5	25	1.0	3.5	3.58	3.31
36	8	4	10.0	10.0	3	25	1.0	4.0	4.29	4.04
37	8	4	10.0	10.0	2	25	1.0	3.0	4.77	4.29
38	12	4	10.0	10.0	2	25	1.0	3.0	3.18	2.85
40	10	4	10.0	10.0	2.3	25	1.0	3.2	3.58	3.38
41	8	4	10.0	10.0	1.5	25	1.0	2.5	5.25	4.48
42	8	4	10.0	10.0	2	25	1.0	3.0	4.77	4.29
43	8	4	10.0	10.0	2	25	1.0	3.0	4.77	4.29
<u> </u>	6	4 1	10.0	10.0	2.2	25 25	1.0	3.2	6.19 8 97	5.64 8 31
46	4	4	10.0	10.0	2.3	25	1.0	3.0	9.54	8.58
47	8	4	10.0	10.0	1.2	25	1.0	2.2	5.74	4.64
48	10	4	10.0	10.0	1.5	25	1.0	2.5	4.20	3.58
49	10	4	10.0	10.0	1	25	1.0	2.0	4.98	3.81
50 51	2 	4 4	10.0	10.0	0.8	25 25	1.0	1.8 2 5	27.69	19.72 8.97
52	4	4	10.0	10.0	1.8	25	1.0	2.8	9.86	8.72
53	4	4	10.0	10.0	1.8	25	1.0	2.8	9.86	8.72
54	10	4	10.0	10.0	2	25	1.0	3.0	3.81	3.42
55	12	4	10.0	10.0	1.2	25 25	1.0	2.2	3.83	3.09
57	14	4	10.0	10.0	1.0	25	1.0	3.0	3.18	2.35
58	10	4	10.0	10.0	1.2	25	1.0	2.2	4.59	3.71
59	10	4	10.0	10.0	0.8	25	1.0	1.8	5.57	3.94
60	8	4	10.0	10.0	1.5	25	1.0	2.5	5.25	4.48
61	8	4	10.0	10.0	2	25	1.0	3.0	4.77	4.29
63	8 6	4	10.0	10.0	1.5	25 25	1.0	2.5	5.25	4.48 5.72
64	6	4	10.0	10.0	2.5	25	1.0	3.5	5.98	5.54
65	4	4	10.0	10.0	2.2	25	1.0	3.2	9.28	8.46
66	2	4	10.0	10.0	1.8	25	1.0	2.8	19.72	17.45
67	2	4	10.0	10.0	2	25	1.0	3.0	19.09	17.18

Calculated FoS of Natural Peat Slopes for Ballinagree Wind Farm - Undrained Analysis									
Turbine No./Waypoint	Easting ITM	Northing ITM	Slope	Undrained shear strength	Bulk unit weight of Peat	Peat Depth	Surcharge Equivalent Placed Fill Depth (m)	Factor of Safety	for Load Condition
			β (deg)	c _u (kPa)	γ (kN/m³)	(m)	Condition (2)	Condition (1)	Condition (2)
1	535840.291	586192.161	10	44	10	0.4	1.4	64.32	18.38
2	535865.12	586225.221	12	10	10	0.4	1.4	12.29	3.51
3	535886.336	586244.11	6		10	0.2	1.2		
4	535905.597	586170.305	12	12	10	0.8	1.8	7.38	3.28
5	535921.65	586202.86	10	12	10	0.6	1.6	11.70	4.39 5.01
7	535968.073	586150.65	10	18	10		2.0	7.67	3.83
8	535974.339	586178.385	12	10	10	0.4	1.4	12.29	3.51
9	536003.62	586216.642	10	12	10	1.2	2.2	5.85	3.19
10	536054.517	586111.836	10	12	10	1	2.0	7.02	3.51
12	536059.64	586195.061	12	14	10	0.8	1.8	5.68	3.82
13	536128.787	586060.198	8	18	10	1.5	2.5	8.71	5.22
14	536159.395	586082.986	10	12	10	1	2.0	7.02	3.51
15	536161.861	586156.511	6	10	10	1.2	2.2	8.02	4.37
16	536229.243	586013.48	8	14	10	2	3.0	5.08	3.39
17	536243.613	586108.488	8	14	10	0.8	1.8	16.33	7.26
19	536304.885	586024.258	6	20	10	0.6	1.6	32.06	12.02
20	536311.485	586078.26	8	22	10	0.8	1.8	19.95	8.87
21	536313.344	586119.341	12	14	10	1	2.0	6.88	3.44
22	536397.053	586104.984	10	16	10	1.5	2.5	6.24	3.74
23	536230,698	586410.607	6	10	10	2	3.0	5.77	3.85
25	536390.45	586364.68	8	12	10	1.2	2.2	7.26	3.96
26	536661.684	586404.497	4	28	10	2.2	3.2	18.29	12.57
27	536802.367	586448.144	8	16	10	2	3.0	5.80	3.87
28	536809.541	586547.88	4	18	10	2	3.0	12.93	8.62
30	536826 198	586643 787	6	18	10	25	3.5	5.39	3.85
31	536788.921	586620.771	6	14	10	3	4.0	4.49	3.37
32	536753.268	586695.707	8	16	10	2.8	3.8	4.15	3.06
33	536730.577	586650.254	8	16	10	2.5	3.5	4.64	3.32
34	536691.001	586701.442	6	18	10	2.5	3.5	6.93	4.95
36	537051.568	586041.977	8	18	10	2.3	4.0	4.35	3.27
37	537226.59	586056.46	8	16	10	2	3.0	5.80	3.87
38	536936.393	585890.137	12	22	10	2	3.0	5.41	3.61
39	537044.362	585894.027	10	20	10	2.5	3.5	4.68	3.34
40	537207.197	585878.994	10	24	10	2.2	3.2	<u> </u>	4.39
42	537047.024	585772.533	8	14	10	2	3.0	5.08	3.39
43	537205.52	585776.098	8	20	10	2	3.0	7.26	4.84
44	536994.201	585621.142	6	22	10	2.2	3.2	9.62	6.61
45	537130.287	585631.478	4	24	10	2.5	3.5	13.80	9.85
40	537200.82	586052 235	4	30	10	12	3.0	7.26	3.96
48	537511.639	585996.014	10	16	10	1.5	2.5	6.24	3.74
49	537518.825	586113.058	10	16	10	1	2.0	9.36	4.68
50	537612.757	586107.865	2	32	10	0.8	1.8	114.68	50.97
51	537719.163	586200.798	4	30	10	1.5	2.5	28.74	17.24
53	537720 642	586074 992	4 4	28	10	1.8 1 R	2.8	22.35	14.37
54	537337.021	586544.934	10	16	10	2	3.0	4.68	3.12
55	537197.113	586531.858	12	16	10	1.2	2.2	6.56	3.58
56	537278.651	586451.404	14	20	10	1.5	2.5	5.68	3.41
5/	537270 856	586362 182	12	22	10	2	3.U 2.2	5.41 9.75	3.61 5 22
59	537213.074	586315.624	10	14	10	0.8	1.8	10.23	4.55
60	537328.944	586251.118	8	12	10	1.5	2.5	5.80	3.48
61	537466.084	586225.29	8	14	10	2	3.0	5.08	3.39
62	537474.503	586151.628	8	16	10	1.5	2.5	7.74	4.64
64	538273 201	586538 513	6	16	10	2	3.U 3.5	6.16	5.13
65	538404.443	586529.473	4	58	10	2.3	3.2	37.89	26.05
66	538375.906	586626.87	2	58	10	1.8	2.8	92.38	59.39
67	538364.693	586722.199	2	50	10	2	3.0	71.68	47.79
68	538505.377	586690.792	2	48	10	2.2	3.2	62.56	43.01
70	538682.997	586646 109	2	12	10	1.5	2.5	22.94 0 1 <i>1</i>	13.76 6 20
71	538805.761	586545.857	4	14	10	2.2	3.5	10.35	7.39
72	538878.444	586627.485	6	20	10	2.5	3.5	7.70	5.50
73	538936.671	586556.306	4	22	10	3	4.0	10.54	7.90



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APPENDIX C

Methodology for Peat Stability Risk Assessment



Methodology for Peat Stability Risk Assessment

A peat stability risk assessment was carried out for each of the main infrastructure elements at the proposed wind farm development. This approach takes into account guidelines for geotechnical/peat stability risk assessments as given in PLHRAG (2017) and MacCulloch (2005). The degree of risk is determined as a Risk Rating (R), which is the product of probability (P) and impact (I). How these factors are determined and applied in the analysis is described below.

The main approaches for assessing peat stability include the following:

- (a) Geomorphological
- (b) Qualitative (judgement)
- (c) Index/Probabilistic (probability)
- (d) Deterministic (factor of safety)

Approaches (a) to (c) listed above would be considered subjective and do not provide a definitive indication of stability; in addition, a high level of judgement/experience is required which makes it difficult to relate the findings to real conditions. FT apply a more objective approach, the deterministic approach. As part of FT's deterministic approach, a qualitative risk assessment is also carried out taking into account qualitative factors, which cannot necessarily be quantified.

Probability

The likelihood of a peat failure occurring was assessed based on the results of both the quantitative results of stability calculations (deterministic approach using factors of safety) and the assessment of the severity of several qualitative factors which cannot be reasonably included in a stability calculation but nevertheless may affect the occurrence of peat instability.

The qualitative factors used in the risk assessment are outlined in Table A and have been compiled based on FT's experience of assessments and construction in peat land sites and peat failures throughout Ireland and the UK.

Qualitative Factor	Type of Feature/Indicator for each Qualitative Factor ⁽¹⁾	Explanation/Description of Qualitative Factor
	No	Based on site walkover observations. Sub peat water flow generally occurs in
Evidence of sub peat	Possibly	the form of natural piping at the base of peat. Where there is a constriction or blockage in natural pipes a build-up of
water flow	Probably	water can occur at the base of the peat causing a reduction in effective stress at the base of the peat resulting in failure:
	Yes	this is particularly critical during periods of intense rainfall.

Table A: Qualitative Factors used to Assess Potential for Peat Failure

Qualitative Factor	Type of Feature/Indicator for each Qualitative Factor ⁽¹⁾	Explanation/Description of Qualitative Factor		
	Dry	Based on site walkover observations		
Evidence of surface water	Localised/Flowing in drains	The presence of surface water flow indicates if peat in an area is well		
flow	Ponded in drains	drained or saturated and if any additional loading from the ponding of		
	Springs/surface water	surface water onto the peat is likely.		
	No			
Evidence of previous	In general area	Based on site walkover observations. The presence of clustering of relict		
failures/slips	On site	existing site conditions predispose a site		
	Within 500m of location			
	Grass/Crops	Based on site walkover observations. The type of vegetation present indicates if peat in an area is well drained,		
	Improved Grass/Dry Heather			
Type of vegetation	Wet Grassland/Juncus (Rushes)	saturated, etc. Vegetation that indicates wetter ground may also indicate softer		
	Wetlands Sphagnum (Peat moss)	underlying peat deposits.		
	Concave	Based on site walkover observations. Slope morphology in the area of the infrastructure location is an important factor. A number of recorded peat failures have occurred in close proximity		
General slope characteristics	Planar to concave			
upslope/downslope from infrastructure location	Planar to convex			
	Convex	to a convex break in slope.		
Evidence of very soft/soft	No	Based on inspection of exposures in general area from site walkover. Several reported neat failures identify the		
clay at base of peat	Yes	presence of a weak layer at the base of the peat along which shear failure has		
Evidence of mechanically cut peat	No	Based on site walkover observations. Mechanically cut peat typically cut using a 'sausage' machine to extract peat for harvesting. Areas which have been cut		
	Yes	in this manner have been linked to peat instability. The mechanical cuts can notably reduce the intrinsic strength of the peat and also allow ingress of rainfall/surface water.		

Qualitative Factor	Type of Feature/Indicator for each Qualitative Factor ⁽¹⁾	Explanation/Description of Qualitative Factor		
Evidence of quaking or buoyant peat	No	Based on site walkover observations. Quaking/buoyant peat is indicative of highly saturated peat, which would		
	Yes	generally be considered to have a low strength. Quaking peat is a feature on sites that have been previously linked with peat instability.		
Evidence of bog pools	No	Based on site walkover observations. Bog pools are generally an indicator of areas of weak, saturated peat. Commonly where there are open areas		
	Yes	of water within peat these can be interconnected, with the result that there may be sub-surface bodies of water. The presence of bog pools have been previously linked with peat instability.		
Other	Varies	In addition to the above features/ indicators and based on site recordings the following are some of the features which may be identified: Excessively deep peat, weak peat, overly steep slope angles, etc.		

Note (1) The list of features/indicators for each qualitative factor are given in increasing order of probability of leading to peat instability/failure.

It should be noted that the presence of one of the qualitative factors alone from Table A is unlikely to lead to peat instability/failure. Peat instability/failure at a site is generally the combination of a number of these factors occurring at the same time at a particular location. The probability rating assigned to the quantitative and qualitative factors is judged on a 5-point scale from 1 (indicating negligible or no probability of failure) to 5 (indicating a very likely failure), as outlined in Table B.

Table B: Probability Scale

Scale	Factor of Safety	Probability
1	1.30 or greater	Negligible/None
2	1.29 to 1.20	Unlikely
3	1.19 to 1.11	Likely
4	1.01 to 1.10	Probable
5	≤1.0	Very Likely

Scale	Likelihood of Qualitative Factor leading to Peat Failure	Probability of Failure
1	Negligible/None	Least
2	Unlikely	
3	Probable	
4	Likely	
5	Very Likely	Greatest

Impact

The severity of the risk is also assessed qualitatively in terms of impact. The impact of a peat failure on the environment within and beyond the immediate wind farm site is assessed based on the potential travel distance of a peat failure. Where a peat failure enters a watercourse, it can travel a considerable distance downstream. Therefore, the proximity of a potential peat failure to a drainage course is a significant indicator of the likely potential impact.

The risk is determined based on the combination of hazard and impact. A qualitative scale has been derived for the impact of the hazard based on distance of infrastructure element to a watercourse (Table C).

The location of watercourses is based on topographic maps and supplemented by site observations from walkover survey. Note that not all watercourses are shown on maps.

Scale	Criteria	Impact
1	Proposed infrastructure element greater than 150m of watercourse	Negligible/None
2	Proposed infrastructure element within 150 to 101m of watercourse	Low
3	Proposed infrastructure element within 100 to 51m of watercourse	Medium
4	Proposed infrastructure element within 50 m of watercourse	High
5	Proposed infrastructure element within 50 m of watercourse, in an environmentally sensitive area	Extremely High

Table C: Impact Scale

Risk Rating

The degree of risk is determined as the product of probability (P) and impact (I), which gives the Risk Rating (R) as follows:

The Risk Rating is calculated from: R = P x I

Due to the 5-point scales used to assess Probability and Impact, the Risk Rating can range from 1 to 25 as shown in Table D.

			Proba	bility		
		1	2	3	4	5
	5	5	10	15	20	25
pact	4	4	8	12	16	20
μ	3	3	6	9	12	15
	2	2	4	6	8	10
	1	1	2	3	4	5

Table D: **Qualitative Risk Rating**

F	Risk Rating & Control Measures
17 to 25	High: avoid working in area or significant control measures required
11 to 16	Medium: notable control measures required
5 to 10	Low: only routine control measures required
1 to 4	Negligible: none or only routine control measures required

The risk rating is calculated individually for each contributory factor. Control measures are required to reduce the risk to at least a 'Low' risk rating. The control measures in response to the qualitative risk ratings are included in the peat stability risk registers for each main infrastructure element in Appendix A.

The risk rating is calculated individually for each contributory factor. Control measures are required to reduce the risk to at least a 'Tolerable' risk rating



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Appendix 9.2

Factual Ground Investigation Report



IRISH DRILLING LIMITED



LOUGHREA, CO. GALWAY, IRELAND

CONTRACT DRILLING SITE INVESTIGATION

Phone: (091) 841 274 Fax: (091) 847 687

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BALLINAGREE WIND FARM

SITE INVESTIGATION CONTRACT FACTUAL REPORT

Coillte, Newtownmountkennedy, Co. Wicklow. Fehily Timoney & Company, Consulting Engineers, Singleton's Lane, Bagenalstown, Carlow.

	Prepared by	Approved by	Rev. Issue Date:	Revision No.
	Ronan Killeen	Declan Joyce	15 th June2021	21_C_101/02
<u>Signature</u>				

FOREWORD

The borehole and trial pit records have been compiled from an examination of the samples by a Geotechnical Engineer and from the Drillers' descriptions.

The report presents an opinion on the configuration of the strata within the site based on the borehole and trial pit results. The assumptions, though reasonable, are given for guidance only and no liability can be accepted for changes in conditions not revealed by the boreholes and trial pits.

The fieldwork was carried out in accordance with IS EN 1997-2 and BS5930, 2015 Code of Practice for Site Investigations with precedence given to IS EN 1997-2 where applicable.



Contents:

1.0 2.0 3.0	Introduction The Site & Geology Fieldwork
Book 1 of 1	
Appendix 1	Borehole Records (Rotary Core)
Appendix 2	Trial Pit Records
Appendix 3	Groundwater Readings
Appendix 4	Photographs (Rotary Core)
Appendix 5	Photographs (Trial Pits)
Appendix 6	Site Plans
Appendix 7	Digital Data (AGS Files)



1.0 Introduction.

Irish Drilling Ltd. (IDL) was instructed by Fehily Timoney & Company, Consulting Engineers, on behalf of Coillte, to carry out a site investigation at the site of the proposed Ballinagree Wind Farm.

This site investigation was carried out to provide detailed factual geotechnical information of the underlying ground conditions at the proposed wastewater treatment works site.

The fieldwork commenced on March 8th 2021 and was completed on May 14th 2021.

2.0 Site & Geology

The site is located near Ballinagree, County Cork.

The fieldwork was carried out predominantly on privately owned farmland and forestry lands owned by Coillte.

Site Plans, prepared by the client's representatives and amended by IDL to show approximate 'as-built' locations, are included with this report.

Geological Survey Maps of the area indicate that the site is underlain by the Old Red Sandstone Rock Formation.

3.0 Fieldwork.

The following plant was mobilised to site to carry out fieldwork operations:

DeltaBase 520 Rotary Core Drill Rig. Hyundai HX140 Wide-Tracked Excavator.

Fieldwork carried out to date has included the following:

Five rotary core boreholes were carried out to establish overburden conditions and rockhead and to establish the nature and integrity of the underlying rock.

Wireline drilling techniques, using HQ size drill strings, were carried out to recover soil and rock core samples. The core samples recovered consisted of the following core diameters: 64mm (HQ).

The samples were stored in wooden boxes and returned to the laboratory where there were logged and photographed by a Geotechnical Engineer and presented for testing.

A 50mm standpipe was installed in all five boreholes to allow for the monitoring of groundwater levels over a prolonged period of time.

The rotary core boreholes were carried out to depths ranging from 15.00m to 15.20m below ground level.

A summary of water levels recorded during the fieldwork period is included with this report as Appendix 3.

Sixty-three trial pits were excavated on site using a tracked excavator.

The pits were logged and photographed by an Engineer with observations made on ground conditions, pit stability, water ingress and services encountered.



Small and bulk disturbed soil samples were recovered at each change in strata and returned to the laboratory and presented for testing.

The borehole and trial pit locations were set out on site using a Trimble CU Bluetooth GPS Surveying Unit and the co-ordinates are included on the logs presented in the appendices.

All fieldwork co-ordinates are reported to Irish Transverse Mercator (ITM) with Reduced Levels recorded relative to Malin Head Datum and with an accuracy level of + or - 0.10m.

The fieldwork was carried out in accordance with IS EN 1997-2 and BS5930, 2015 Code of Practice for Site Investigations with precedence given to IS EN 1997-2 where applicable.

The following Key Legend Table details the symbology used on the engineering logs to describe ground conditions encountered:



Ground conditions encountered during the completion of the fieldwork were typical and as expected for this region and predominantly consisted of Peat overlying Glacial Tills overlying possible bedrock.

The Glacial Tills in general consisted of slightly sandy gravelly silt/clay and/or silty sands and gravels with occasional, some or many cobbles and boulders.

Peat was encountered at many locations at a depth ranging from 0.10m to 2.80m below ground level.

Made ground was encountered at a number of trial pit locations to depths ranging from 0.70m to 2.10m to and consisted of slightly sandy gravelly clay and peat with roots and branches and/or gravel, cobbles and boulders.



Intact bedrock was encountered in the rotary core boreholes at depths ranging from 1.60m to 5.00m below ground level. Bedrock was not encountered at RC 02 to a depth of 15.00m bgl before borehole termination.

Intact bedrock in general is predominantly described as strong, locally very strong thinlybedded siltstone.

Possible weathered bedrock was also encountered in a number of boreholes and many of the trial pits at shallower depths and for detailed descriptions of bedrock encountered please refer to the engineering logs included in appendix 1 of this report.

Bedding planes are defined as the surface that separates one stratum, layer or bed stratified rock from another. Discontinuity is defined as the plane of physical weakness where the tensile strength perpendicular to the discontinuity or the shear strength along the discontinuity is lower than that of the surrounding soil or rock material.

For detailed descriptions of the ground conditions encountered please refer to the engineering logs included in the appendices of this report.

The soil and rock descriptions as noted on the borehole and trial pit logs are in general visual descriptions as observed and logged by our Engineers and are described in accordance with IS EN 1997-2 and BS5930, 2015 Code of Practice for Site Investigations.

Soils descriptions (cohesive or otherwise) are also initially assessed based on the texture and 'feel' of the soil materials as witnessed by our Geotechnical Engineers and in accordance with IS EN 1997-2 and BS5930.

Where laboratory classification tests have been carried out on soil or rock samples then these visual descriptions have been amended accordingly to take into account the results of these classification tests.

The records of all fieldwork, laboratory test results and photographs are included in the appendices of this Factual Report.

Ronan Killeen Chartered Engineer Irish Drilling Limited June 14th 2021



Appendix 01 Borehole Records (Rotary Core)



Project	Ballin	agree W	/ind Farm	n				Loca	ation					I	ORILLI	HOLE	No
								Co	Cork						R	C01	
Job No	00101	01	Date 10	0-05-21		Grou	ind Level	(m OD)	Co-Ordin	ates ()	1 1 5	01 214					
Engine	021CI er	01		-05-21			453.4	F /	E 53	53,664	.I N 38	84,313	0.2		heet	1 of	2
Engine	cı Fehilv	Timone	v & Co												1	1 01	2
			y & C0					6						K	ev. I		2
RU	N DE.	I AILS			Den	th		2		CDIE	ΤΙΟΝ					- S	men
Depth Date	(SCR)	Fractu	re Red'co Level	Legend	(Thick		i				TION		1 aim			feolc	nstru ackf
= 0.00	RQD	Spacin	ig	000	ness) E	0.0	1000000000000000000000000000000000000	overburder	n.	S	ubangular	fine to		e brow	n and		N N
-				000	F					g	rey sandst	one GR	RAVE	L.			
Ę	40	NA		0000	(1.60))											
Ē	-			0000	ŧ												
			451.8		1.6	50	0 11.00	D:	:								
2.00				× × × × × ×	Ę		sely and c	closely spac	ed, locally	y stron own fi	ig thini ine grai	y ined					
		15			Ē	ste	edium space pped, smo	ced, dipping both, with 0	g 82 to 84°, .5 to 2mm	S	ILTSTON	IE.					
	53 (23)	15			E	thi	ck reddisł	n brown silt	smear.								
-	0			× × × × × ×	F												
3.50					Ē												
		18			E												
-	100		_		F												[]目:
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	(85) 41			$\hat{\mathbf{x}} \times \hat{\mathbf{x}}$	E												
15 15 950					Ē	9.0)0 - 9.20 J dulating, l	oint, vertica ocally stepp	al dip, bed, rough,								[]目:
		9			Ē	wi sili	th 0.5 to 1 t smear, or	mm thick repeat	eddish brov	vn							に目い
	100				F	511		P • • • •									
7 07 L	$\begin{vmatrix} 100\\ (78)\\ 69 \end{vmatrix} \qquad \begin{vmatrix} \times \times \times E\\ \times \times \times E \end{vmatrix}$																
≦ - E 11.00	$\begin{array}{c c} 3 \\ 1.00 \end{array} \qquad \begin{array}{c c} \times \times \times \\ 442.47 \\ \times \times \times \\ 11.00 \end{array}$																
	Dri	lling Pro	oress an	d Wate	r Obs	ervati	ons			Rotars	7 Flush				CENI		<u>1. H.</u>
Date	Tir	ne De	pth Dem	Casing		ore Dia	Wi	ater	From (m)	To (n	n) Type	Retur	n (%)		REM	ARKS	
					<u>na</u>	mm	SITIKE	Standing	0	15.2	0 water	10)0	50mr	n standpi	pe insta	illed.
19 E														Resp	onse zon Im høl	e 3.00m	to
DALL														12.20			
0																	
All dimensions in Client: Coillte Method/ Hydreq Bit HQ Driller Log								Logge	d By E.A'	т							
Scale_	1:68.75															L/1	•



[Project	Ballin	agree W	ind Farm				Loca	ation					Ι	ORILLI	HOLE	No
	* 1							Co	Cork						R	C01	
	Job No	02101	0.1	Date 10-	-05-21	Grou	and Level ((m OD)	Co-Ordina	ates ()	1 1 50	04 215	2				
	Enginee	921CI	01	11	-03-21		433.4	- /	E 33	5,004	.1 N 38	54,513	0.2	SI	heet	$\frac{2}{2}$ of	2
	l	 Fehilv '	Timonev	v & Co										R	ev 1	2 01	2
ſ	RI	N DF1						S	TRATA						cv. 1		lt/
	Denth	TCR	(SPT)	Red'ed	D	epth			DES	SCRIP	TION					ogy	umei
ľ	Date	(SCR) RQD	Fractur Spacin	g Level	Legend (Thi	ick- Di	scontinuit	ies	Det	ail		N	ſain			Geol	Instr Back
	0.0512.20	100 (98) 96	2	_		11 ma sp rov gre	.00 - 15.20 edium spac aced, dipp ugh, with (eenish grey	0 Discontin ced, locally ing 12 to 14 0.5 to 2mm y silt smear.	uities, closely 4°, stepped, thick	V th S	ery strong iinly bedd ANDSTO	g locally ed pink NE.	/ extre ish gr	emely s ey fine	trong grained		
	11.05	100 (83)	8	_							2.20m to 1 2.65m to 1 dium gra	15.20m 13.00m avel size	: grey. : with ed clas	fine to	o vhite		
	13.70	71	3	_		20)				q	uartz.						
		100 (94) 87	3	438 27		5 20											
	1.051.3.20			430.27		5.20				B	H termina	ited at 1	l 5.20n	n bgl o	n REs		
GPJ IUL IP IEMPLAIE GUI 10/0/21																	
1 202 02 1 AMI 1	— • • • •																
<u> </u> ב		Dril	ling Pro	gress and	l Water Ol	oservati	ions]	Rotary	/ Flush				GENE	ERAL	
× ×	Date	Tin	ne Dej	pth Dept	Casing h Dia	Core Dia mm	a Wa Strike	ater Standing	From (m)	To (n	n) Type	Retur	n (%)		REMA	ARKS	
	10-05-2 11-05-2 11-05-2	1 17.0 1 08.0 1 12.0	00 12. 00 12. 00 15.	20 1.00 20 1.00 20 1.00) 99) 99) 99	63 63 63								50mr Resp 15.20	n standpi onse zone Im bgl.	pe insta 2.00m	lled. to
	All dime me Scale	ensions i etres 1:68.75	n Client:	Coillte		Metho Plant	d/ Hyc Used	lreq			Bit H Design	IQ	Drill DK	er	Logge	d By EA	Г



Project Ballinagree Wind Farm Location DRILLHO Job No Date 06-05-21 Ground Level (m OD) Co-Ordinates () RCC												HOLE	No					
	oh No			Data			Grou	and Lorval (m		Cork	atag ()				_	R	C02	
1.0	00 NO 21	021C1	01	$\begin{bmatrix} Date \\ 06 \\ 07 \end{bmatrix}$	-05-21		Grou	451 68	R (D)	E 53	33542	9 N 58	84 539	9.0				
E	Engine	er		0,	00 21			101100		E		.,	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		SI	heet	1 of	2
	I	Fehily	Timoney	/ & Co											R	ev. 1		
Γ	RU	N DE	ΓAILS						S	TRATA							1	ent/
	Depth	TCR (SCR)	(SPT) Fractur	Red'cd	Lagand	Dep (Thick	th			DES	SCRIP	TION						trum kfill
Da	ate	RQD	Spacin	g Level	x · x	ness)	Dis	scontinuitie	s	Det	ail		N	<i>Aain</i>			Ğ	A Ba
	0.00 2.00	33 (-)			\$\comes\$\		0.0	00 - 10.00 :	overburde	n.	V gr fin su sa C sa	ery stiff fi ravelly SII ne to coar ibangular indstone a obbles are indstone.	ght rec T with se. Gra fine to nd red of gre	Idish t n cobb ivel is coarse dish bi enish	orown s les. Sa subrou e of gro rown s grey	sandy nd is nded to een iltstone.		
	3.50	27 (-)			× × × × × × × × × × × × × × × × × × ×													
	5.00	27 (-)	NA		&, *, *, *, *, `, `, `, `, `, `, `, `, `, `, `, `, `,													
	6.50	60 (-) -	NA		0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0	(12.2)	0)											
DT 18/6/21	8.00	80 (-) -			* <u>0</u> *0 *0 *0 •0 *0 *0 *0 *0													
DL TP TEMPLATE.G	<u>5 9.50</u>	53 (-) -			0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,													
E 1 MAY 28 2021.GP.	<u>11.00</u>	9.50 X3 × 1 40 X3 × 0 (-) X3 × 0 11.00 X3 × 0																
		Dri	lling Pro	gress and	l Water	r Obs	servations Rotary				tary Flush				GENI	ERAL		
ME ME	Date	Tir	ne Dej	pth Dept	Casing h D		ore Dia mm	Strike	er Standing	From (m)	To (m	n) Type	Retur	n (%)		REM	ARKS	
Order Order <th< td=""><td>9</td><td>63 63</td><td></td><td></td><td>0</td><td>15.00</td><td>) polymer</td><td></td><td>)</td><td>10 lit 50mr Resp 15.00</td><td>res polyc n standpi onse zon)m bgl.</td><td>lrill usec ipe insta e 3.00m</td><td>l. Illed. to</td></th<>						9	63 63			0	15.00) polymer)	10 lit 50mr Resp 15.00	res polyc n standpi onse zon)m bgl.	lrill usec ipe insta e 3.00m	l. Illed. to
All dimensions in Client: Coillte								Method/ Hydreq Bit HQ Driller Plant Used Design DK					Logge	d By EA	T			



	Project	Ballina	agree W	ind Farm					L	ocat	tion					I	ORILLH	IOLE	No
	Joh No			Data			Grou	nd Loval	(m OD)		Cork	atas ()					RC	:02	
	2()21C10)1	06- 07-	-05-21			451 6	(m OD) 58		E 53	ales () 33-542	9 N 58	84 539	0				
	Enginee	er			00 21									.,		SI	heet	2 of	2
	F	Fehily]	Гimoney	& Co												R	ev. 1		
	RU	N DET	AILS							S	TRATA							~	ent/
	Depth	TCR (SCR)	(SPT) Fracture	Red'cd	Legend	Dept (Thick-	th				DES	SCRIP	TION					olog	trum ckfil
	Date	RQD	Spacing	g Level	×o .×	ness)	Dis	scontinuit	ies		Det	ail		N	1ain			g	⊡ Hus Ba
	-	67 (-)			(), X, Q X, X, Q X, X, X X, X, X, X X, X, X														
	12 50			439.48	× ×	$\frac{12.2}{12.5}$	20 50					D	ark orang	ish bro	wn SI	LT.			
	14.00	27 (-)	NA			(2.50)						Or ma	rangish b edium SA	rown sl AND.	ightly	silty fi	ine and		
	07.05 15.00	80 (-) -		436.68		15.0	00												
FILE 1 MAY 28 2021. GPJ IDL TP TEMPLATE GDT 18/6/21		Dril	ling Pro	gress and		r Obse	Prvati	ons				Bin	H termina struction.	ited at 1	15.00m	n bgl o	n REs	DAL	
F RC F	Date		ling Pro	gress and	1 Wate Casing_	r Obse	ervation bre Dia	ons	ater		From (m)	Kotary	Flush	Retur	n (%)		GENE REMA	RAL RKS	
Wether 07-05-21 12.00 15.00 3.00 99 63 Image: Hold Stress of the stres of the stress of the stress of the stress of the s						<u> Strike</u>	Standin	ng	- 10m (m)	10 (III	Bit			10 lit 50mr Resp 15.00	res polydr n standpip onse zone)m bgl.	ill used e insta 3.00m	l. Iled. to		
Image: Seale 1:68.75 Client: Coillte Method/ Hyperbolic									ureq				Design	ч <u>ү</u>	DK	CI		EA	Г



Project	Ballin	agree W	/ind Farr	n				Loca	ation					Ι	ORILL	HOLE	l No
			1-					Co	Cork						R	C03	
Job No	00101	0.1	Date 1	1-05-21		G	round Level	(m OD)	Co-Ordina	ates ()			5.0			000	
2 Engine	021C1	01	1	2-05-21			458.	80	E 53	3,670	.6 N 5	85,23:	5.0		haat	1 - 6	2
Engine	er Fobilu	Timono	v & Co												neet	1 01	2
	renny		y & C0											R	ev. l		
RU	N DE	TAILS			D			S	STRATA		TION						nent
Depth	(SCR)	Fractu) re Red'c	d Legend	Der I (Thicl	pm k- ⊢			DES		TION					= loi	strur ackfi
- 0.00	RQD	Spacir	ng Leve	0,0	ness)	_	Discontinui	ties : overburder	Det		uhangular	N • fine to	Main Main	um red	dish	<u></u>	A B.
		NA		000	e (0.70))	0.00 - 0.70	. overburder	1.	b	rown silts	tone G	RAVE	L.	uisii		
	50 (18)		458.1		<u>≠ 0.</u> ≸	.70	0 70 - 2 30	Non-intact a	is weathered	i V	Veathered	SILTS	TONE	rock		<u> </u>	
<u>-</u>	0				ŧ		rock.			R	ecovered	as ang	ular fi	to co	oarse		
1.60		NI			€ € (1.60))				tł	ninly lami	nated r	eddish	brown	n fine		
-	100				¥ €					g	rained SII	LISTO	NE.				
E 2.30	0		456.5		¥ 2.	.30											
					Ę		2.30 - 15.00 closely space) Discontinu	ities, very nedium and		trong loca	illy ver	y stron y sligh	g thinl tly san	y dv fine		
	100	7		× × × × × ×	Ē		closely space	ced, dipping	12 to 14° ,	a	nd mediur	n grain	ed SIL	TSTO	NE.		
	(85) 39				Ę		thick light p	oinkish brow	n silt smear								同
Ē		15			E								上 目:				
- 3.90			_		Ē												目
-	100				Ē												に目的
	47	15		× × × × × ×	Ē												[]]]
5.00					F												
	100				Ē												
Ē	100 (67)	13			Ę												
-	18		-		Ē					6	.00m to 1:	5.00m	: Drille	ers con	comment -		
<u>= 6.50</u>		15		× × × × × ×	Ē					s	low progre	ess.					
		15			Ē												「目
	100 (91)		_		Ē												
	21	20			Ę												
8.00			_		E		7.80 - 8.25	Joint, subve	rtical dip,								[]目:
				× × × × × ×	Ę		planar, smo	oth, with lig dark orangis	ht orangish h brown iro	n							l:目:
	100	5			E (12.7	70)	stain and po	owder, open.		.							[]目:
≥ - J - 	61		_		È												[:目:
					Ę												
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	(96) 47				Ē												[]目:
		12			Ē												
11.0511.00	<u> </u>	lling Pr		ad Water Observations Rotary Flush									CEN		<u></u>		
Date	Tir	ne De	pth 5	Casing	Casing Core Dia Strike Standing From (m) To (m) Type R							Retur	rn (%)		REM	eral ARKS	
11-05-2	1 17.	00 11	.00	<u>m 1</u> 9	OldmmStrikeStandingHom99630						0 water	1	00	50mr	n standp	ipe insta	ılled.
12-05-2	1 08.	00 11	.00	9	99 63									Resp	onse zon Im bøl	ie 3.00m	ı to
														15.00	Ugi.		
0																	
All dimensions in Client: Coillte Method/ Hydreq Bit HQ Driver								Dril	er	Logge	ed By						
Scale	1:68.75	ns in Client: Coillte Method/ Hydreq Bit HQ 75										DK			EA	Т	



Proj	^{ect} Ball	inagree V	Vind Farm	-	Location Co Cork								DRILLHOLE No			No	
Lab	Na		Dete			Crear	- d T1		Cork	atas ()				_	R	C03	
JOD	NO 2021C	101	Date 11	-05-21		Grou	nd Level	(m OD) 80	E 53	ates () 3.670	6 N 58	25 234	5.0				
Eng	gineer	101	12	-05-21			450.0		L 33	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	.0 11.50	,23.		S	heet	2 of	2
	Fehil	y Timone	y & Co											R	ev. 1		
	RUN D	ETAILS						S	TRATA								nt/
De	pth TCF	C (SPT) Red'cd		Dep	th			DES	SCRIP	TION					logy	rume kfill
Date	RQI	C) Fracti D Spaci	ng Level	Legend	(Thick ness)	- Dis	continuit	ies	Det	ail		Ν	Main			Geo	Instr Bac
12.05	100 (97) 43	15		× × × × × × × × × × × × × × × × × × ×		11. sub wit smo	00 - 12.3 overtical d h 0.5 to 3 ear, open.	5 2 No para lip, stepped 3mm thick g	llel joints, , smooth, rey silt	10 qu St be ar	0.90m to 1 Juartz vein. trong loca edded blui nd medium continued)	l0.95m lly ver sh gre n grain	n: subv y stron y sligh ed SIL	ertical g thinl tly san .TSTO	white y dy fine NE.		
- 12	2.50	10	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$								ommucuj						
Ē	(91) 54	4				13.	20 - 13.2	0 Non-intac	t as angula	.							
Ē	54	NI				fine and medium gravel sized clasts.											
<u>- 1</u> 4	1.00	7			E												
12.0515	5.00	2	443.80		- 15.0	00											
ווב 1 MAY 28 2021 GPU וטב ווי ומארא ביוביטטו ואסעצו רייויייייין וויוייייין וויייייין איז										B	H termina struction.	ted at	15.00r	n bgl o	n REs		
	D ata	Time Depth Casing Core Dia Start Water of the From (m) To (m) Type Returns							Datur	m (%)		GENI REM	ERAL				
Date Time Depth Opth Opth <t< td=""><td>9</td><td>63</td><td>Strike</td><td><u>Standing</u></td><td>From (m)</td><td>10 (m</td><td></td><td>Ketuf</td><td>11 (70)</td><td>50mr Resp 15.00</td><td>n standpi onse zono)m bgl.</td><td>pe insta 2 3.00m</td><td>lled. to</td></t<>					9	63	Strike	<u>Standing</u>	From (m)	10 (m		Ketuf	11 (70)	50mr Resp 15.00	n standpi onse zono)m bgl.	pe insta 2 3.00m	lled. to
	limension metres ale 1:68.7	s in Clien	t: Coillte			Methoo Plant U	1/ Hyd Ised	dreq			Bit E Design	IQ	Drill DK	er	Logge	d By EA	Г


Proje	^{ct} Ball	inagree	Wind	d Farm					Loca	ation					I	DRILLI	HOLE	No.
	_								Co	Cork						R	204	
Job N	lo 2021 C	101	D	ate 05-	-05-21		Gro	und Level ((m OD)	Co-Ordina	ates ()			~ 4			204	
Engi	2021C	101		06-	-05-21			420.0		E 53	57,944	.7 N 58	86,37.	3.4		haat	1 - 6	2
	Eehil	u Timoi	NOV &	r Co												neet	1 01	2
																ev. I		4
R		$= 1 \text{ AIL}_{3}$	о рт)	.		Dept	th				CRIE	TION					- la	fill
Dep	(SCR) Frac	cing	Red'cd	Legend	(Thick	- D	iscontinuiti	ies	DEC		HON		Aain			Geolo	nstru 3ack
= 0.0	00	/ Spa	ung	419.91		x = 0.1	0 0.	00 - 3.90 :	overburden			Dark brown	n amor	phus P	EAT.		Ĕ	38
	25				* ~ * * ~ * * ~ *0 * ~ *0						S c b d	ubrounded oarse gree rown sand ark orang	d to sub n siltst lstone (oangul one an GRAV wn silt	ar fine d redd EL wi	to ish th a little		
Ē	-				o x o x0 ⇔x0 0 x 0	-						un orung.		, in one	•			
Ē.					ð v v~v													
- 2.0	00	- N/	4		∂⊗ ∂	- (3.80)												
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= 3	50	-			ð vo ð													
F	80			416.11		- 3.9	3.	90 - 4.70 N	Jon-intact a	s probable	P	robable w	eathere	ed SIL	TSTO	NE rock.	+	部
Ē	(17)	N	I			(0.80)) W	eathered ro	ock.	•	R	lecovered ravel sized	as angi 1 clasts	ular fir of me	ne to co dium s	oarse strong		
=	00			415.31	××××	<u> </u>	4.	70 - 15.00	Discontinu	ities, closely	v a	nd weak d rained SII	lark gre	eyish g NE	reen fi	ine	\vdash	1:目:
=		7 7	/		$ \begin{array}{c} $	<u>-</u> -	ar	d very clos	sely spaced	, locally 76 to 78 a	nd s	trong loca	Illy ver	y stron	g thinl	y ,		
	100 (81) 22	10)		× × × × × × × × × × × × × × × × × × ×		18 to sn	to 20°, ste 1mm thick near.	pped, smoo reddish br	oth, with 0.5 own silt	fi	edded gre ine grained	enish g d SILT	rey sli STON	ghtly s E.	andy		
E 6'	50																	
Ē		1:	5		$\hat{\mathbf{x}}$													
Ē	100				$\hat{x} \hat{x} \hat{x}$	-												
	(88)	1			× × × × × × × × ×													
8.0	00)		× × × × × ×	-												
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≥ _ u <u>b5.0511.</u>	00				$\begin{array}{c} \times \times \times \\ \times \times \times \\ \times \times \times \end{array}$	-												
	D	rilling I	Progr	ess and	Wate	r Obse	ervat	ions			Rotary	y Flush				GENI	ERAL	
Dat	e 7	ime	Depth	Deptl	$\begin{array}{c c} Casing \\ 1 & D \end{array}$	ia Co	ore Dia mm	a Wa Strike	ater Standing	From (m)	To (n	n) Type	Retur	n (%)		REM	4RKS	
비 05-05 이 06-05	-21 1 -21 0	7.00	$\begin{array}{c} 11.00\\ 11.00 \end{array}$	2.50) 99	9	63 63			0	15.0	0 water	<1	.00	50mr Resp	n standpi onse zone	pe insta 2.00m	ulled. 1 to
		-													15.00	Om bgl.		
ے۔ ای All di	mension	s in Clie	ent: Co	illte			Metho	d/ Hyd	lreq	11		Bit F	IQ	Dril	ler	Logge	d By	
Sca	metres le 1:68.7	5					Plant	Used	1			Design		DK			ĖΑ	Т



	Project	Ballin	agree W	ind Farm					Loca	ation					Ι	ORILLI	HOLE	No
	T.1. NT.			Dete			C	. 1 T 1		Cork	-10				_	R	C04	
	JOD NO	021C1	01	Date 05	-05-21		Grou	10 Level ((m OD)	E 53	ates () 37 0 1 1	7 N 59	26 373	2 /				
	Enginee	er	01	00	-05-21			720.0	/1	L 33	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	./ 10.50	,572	. т	SI	heet	2 of	2
	l	Fehily	Timoney	/ & Co											R	ev. 1		
	RU	N DET	FAILS						S	STRATA								ent/
	Depth	TCR	(SPT)	Red'cd	T	Dept	h			DES	SCRIP	TION					logy	rume kfill
	Date	RQD	Spacin	g Level	Legend	ness)	Dis	continuit	ies	Det	ail		N	/lain			Gec	Inst Bac
		100 (97) 71	9	_	****						Si bo fi	trong loca edded gre ne grained	lly very enish g i SILTS	y stron rey sli STON	g thinl ghtly s E. <i>(cor</i>	y andy ntinued)		
	12.50		3		(
	14.00	100 (85) 63	5		^ × × × × × × × × × × × × × × × × × × ×													
	06.05 15.00	100 (84) 73	8	405.01	× × × × × × × × × × × × × × × × ×	15.0	14.: 0 sub	50 - 14.9 vertical d	0 2 No para lip, planar, s	llel joints, smooth, wit	h							
FILE 1 MAY 28 2021.GPJ IDL IP 1EMPLA1E.GD1 18/6/21							sme	ear and m n, open.		sh brown in		H termina istruction.	ited at 1		n bgl o	n REs		
UK UH (SPIS) BALLINAGREE WF RUF	Date 06-05-2	Dril Tir 1 13.	lling Pro ne Dep 00 15.	pgress and pth Dept 00 2.50	I Wate Casing h D) 9	r Obse ia Co 9	ervation re Dia mm 63	ons Strike	ater Standing	From (m)	To (n	7 Flush n) Type	Retur	n (%)	50mr Resp 15.00	GENI REM/ n standpi onse zone Om bgl.	ERAL ARKS pe insta 3.00m	lled. to
IDL AGE	All dime me Scale	ensions i etres 1:68.75	n Client:	Coillte]]	Methoc Plant U	l/ Hyd Ised	dreq			Bit H Design	IQ	Drill DK	ler	Logge	d By EA	Г



	Project	Ballin	agree W	ind Farm					Loca	tion					Ι	ORILLH	IOLE	No
	Joh No			Date			Grour	nd Level (Co m (DD)	Cork	ates ()					RC	C05	
	20	021C1	01	13 13	-05-21 -05-21		Grou	324.5	6	E 53	36.518	.2 N 58	33.047	7.0				
	Enginee	er	•		00 21			02.110	•		0,010			••	SI	heet	1 of	2
	F	Fehily	Timoney	/ & Co											R	ev. 1		
ĺ	RU	N DET	FAILS						S	TRATA								ent/
	Depth	TCR (SCR)	(SPT) Fractur	Red'cd	Lagand	Depth (Thick	11			DES	SCRIP	TION					logy	rum(
	Date	RQD	Spacing	g Level		ness)	Dis	continuiti	es	Det	ail		N	/lain			Ge	Alnst
	2.00	50 (-) -			<u>ૢૢૢ</u> ૢૢૢૢૢૢૢૢૢૢૢૢૢૢૢૢૢૢૢૢૢૢૢૢૢૢૢૢૢૢૢૢૢ		0.00	0 - 5.00 :	overburden		V gy fi fi sæ gy	ery stiff li ravelly SII ne to coar ne to coar undstone. rey sandst	ight ora LT with se. Gra se of b Cobble one.	ingish n cobb ivel is rown a s are c	brown les. Sa subang ind gre of brow	sandy nd is gular y /n and		
	3.50	53 (-)	NA		<u>, 'Q* Q* @_ C</u> 'G· D· SO × O [¥]	(5.00)												
	5.00	80 (-) -		319.56	×). ⁽¹ , ⁽¹), ⁽¹), ⁽¹), ⁽¹⁾ ,	5.00	0	0 15 10		<i></i>	-				. 1	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		
		100 (85) 7	12	_	× × × × × × × × × × × × × × × × × × ×		5.00 clos clos 82 t to 2	sely space sely space to 84°, ste mm thick	d, locally n d, dipping pped, smoo pinkish br	ties, very nedium and 18 to 20 an- oth, with 0.5 own silt	d 5	nd mediur	n grain	ed SIL	TSTO	ey fine NE.		
	6.50	100	3	_	(×××××××)		bro	wn iron s	ain.	ungish								
DT 18/6/21	8.00	(91) 50	5	_	*****													
P TEMPLATE.G	-	100 (86) 43	8	_	· · · · · · · · · · · · · · · · · · ·													
021.GPJ IDL T	9.50	100	6	_	× × × × × × × × × × × × × × × × × × ×	(10.10))											
LE 1 MAY 28 2	11.00	(75) 47	11		* * * * * * * * * * * * * * * * * * *					1								
RC F	D :	Dril	ling Pro	gress and	d Water	r Obser	rvatio	ons We	iter		Rotary	Flush	Det			GENE	RAL	
UK DH (SPTS) BALLINAGREE WF I	Date	Tin	ne Dep	oth Dept	Casing h D	ia Cor	re Dia nm	Wa Strike	iter Standing	From (m)	To (m 15.10	n) Type) water	Retur	n (%))0	50mr Resp 15.10	REMA n standpij onse zone im bgl.	ARKS be insta 3.00m	lled. to
IDL AGS	All dime me Scale	ensions i stres 1:68.75	n Client:	Coillte		N P	Method Plant U	l/ Hyc	lreq			Bit H Design	IQ	Drill DK	er	Logged	l By EA	Г



Pro	oject	Ballin	agree W	ind Farm					Loca	ition					Ι	ORILLH	IOLE	No
Lok	No			Data			Grou	nd Loval (n		Cork	atas ()					RC	:05	
	20	21C1	01	13- 14-	-05-21		Grou	324 56	по <i>D)</i> б	E 53	36518	2 N 58	3 047	7 0				
En	iginee	r			00 21					E.			,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		SI	heet	2 of	2
	F	ehily [Гітопеу	/ & Co											R	ev. 1		
	RUN	N DET	AILS						S	TRATA								ent/
D	epth	TCR (SCR)	(SPT) Fractur	Red'cd	Logand	Dep (Thick	oth			DES	SCRIP	TION					blogy	trum kfill
Dat	e	RQD	Spacin	g Level		ness)	Dis	scontinuitie	s	Det	ail		N	Aain	1. 1.	~	Ğ	: Insi Bac
	2 50	100 (87) 67	NI 2		(×××××××××××××××××××××××××××××××××××××		bro	00 - 11.20 wwn silt.	Non-intac	t as light	St ar (c 11	rong thin ad medium <i>ontinued)</i> 1.15m to 1	ly lamii n grain l 1.20m	nated ed SII : light	light gr .TSTO brown	ey fine NE. 1 silt.		
14.05	2.50	100	5	_														
- 1	4.00	(91) 65	2	_	^ X X X X X X X X X X X X X X X X X X X													
	5 10	100 (93) 91	0	200.40	× × × × × × × × × × × × × × × × × × ×		10											
14.051	5.10			<u></u>	×××	- 15.	10				B	H termina struction.	ited at 1	15.10r	n bgl o	n REs		
						-												
DT 18/6/21																		
TEMPLATE																		
1 MAY 28 202																		
		Dril	ling Pro	gress and	l Wate	r Obs	ervati	ons]	Rotary	Flush				GENF	RAL	
¥ [Date	Tin	ne Dep	oth Dept	Casing h D	via C	ore Dia mm	Wat Strike	er Standing	From (m)	To (m) Type	Retur	n (%)		REMA	RKS	
13- 14- 14- 14-	05-21 05-21 05-21	17.0 08.0 13.0	00 12. 00 12. 00 15.	50 2.00 50 2.00 10 2.00) 9) 9) 9	9 9 9	63 63 63								50mr Resp 15.10	n standpip onse zone)m bgl.	be insta 3.00m	lled. to
IIA GS NKI	dimer met	nsions in tres :68.75	n Client:	Coillte			Methoo Plant U	d/ Hydi Jsed	req			Bit E Design	 IQ	Drill DK	ler	Logged	I By EA	



Appendix 02 Trial Pit Records

PR LC	ROJECT: [DCATION:	Balliı : Co	nagree Cork	Wind Farn	n							TRIALPIT: T-01 Sheet 1 of 1
CI	JENT: Co	oillte								Co-ordinate	es:	Rig: Hyundai HX140L
EN	IGINEER:	Feh	ily Tin	noney & Co)					E 534,469.3	N 584,030.7	Rev: DRAFT
Gr GI	ound level: 3	22.111 ATE	m O.D. R			DIT			. 100 3	(A) Image: A = 1 = 1 = 1 = 1 = 1 = 1 = 1 = 1 = 1 =	<u> </u>	DATE: 10.3.21
Wa 1st 2nd 3rd	ater strikes: : dry 1: 1:	Ros	e to after:			PIT PIT LOG	DIREC DIMEN GED I	NSION BY:	: 180-3 I: 1.20 AG	60 * 4.00m D	C B	Stability: Pit unstable. Sidewall 1.20 collapse.
Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)			DESCRII	PTION
-0									TOPSC	IL: Grass over firn	n brown silty peaty SII	LT.
╞												
L												
			B	0.50-1.00			321.61	0.50	Light b	own silty sandy su	bangular to subround	ed fine to coarse siltstone GRAVEL with
F			30000			0.00			high co	bble content. Cobb	les are subangular to s	subrounded of siltstone.
ŀ			00000			5						
-1			10101 1									
L						203						
ſ												
ŀ												
ŀ									1.50m: <1000r	damp clayey with l	ow boulder content. E	Boulders are of siltstone. Boulders are
- 2			B	2.00-2.50		50.0						
╞			1010101			Ö						
ŀ			1010101			.0 a 9.0.0						
L			8			6						
						0. J						
F												
-3			S B	3.00-3.50		0. d						
L			00000									
			202022									
Γ			8080			20.0						
F												
╞												
-4			D IS	4 00 4 20								
			D D D D D D D D D D D D D	4.00-4.20					4.00m:	hard digging.		
F			23				317.81	4.30		instad -t 4 20	1	
╞						END			i P tern	iniateu at 4.30m bg	<u>5</u> 1.	
ŀ												
L												
-5 Pc	marlze. T	P dry	on excar	ation TP back	filled wi	th arisi	105					Sector
Ke	marks: 1	r ufy	on excav	auon. 17 Dack	inneu WI	ui ai ISH	ıдэ.					Scale:
Sin a	all the							Irish	n drill	ing LTD		Ph. Fax

PR	OJECT:	Balli	nagree	Wind Farn	1						TRIALPIT: T-02
	IENT: C	: Co billte	Cork						Co-ordinates:		Rig: Hyundai HX140L
EN	GINEER:	Feł	nily Tim	ioney & Co					E 534,613.6 N 583,6	603.8	Rev: DRAFT
Gro GR	und level: 3	14.20) ATE	m O.D. R						4 00		DATE: 10.3.21
Wat 1st:	er strikes: 2.60m	Ros	se to after:			PIT I PIT I	DIREC DIMEI	CTION NSION	: 180-360 <u>A</u> : 1.20 * 4.00m _D	B	Shoring/Support: N/A Stability: Pit unstable. Sidewall
2nd: 3rd:		i	r		-	LOG	GED	BY:	AG C	¥	L
(m)		- -	oles	h (m)	Vane	END	ntion D.	h (m)	I	DESCRIF	PTION
Depth	Date	Wate	Samp	Deptl	In-situ Tests	LEG	Eleva m O.J	Deptl			
-0						<u> </u>			Plastic wet brown amorphous PEAT. H8.		
ŀ						<u> ~~ ~</u>					
-				0.50.0.60		<u>1/ 1/</u> <u>1// 1/</u>					
-			$\mathbf{P}_{\mathbf{P}}$	0.30-0.00		<u>1, x1,</u>					
-						<u>×0</u> .×	313.40	0.80	Firm bluish grey sandy grayelly SILT	Γ with high a	cobble content. Gravel is subangular to
			est B	1.00-1.50		×. , , , , , , , , , , , , , , , , , , ,			subrounded fine to coarse of siltstone	e. Cobbles a	re subangular to subrounded of siltstone.
			1	1.00 1.50		^م × [×]					
			<i>3030303</i>			Ю× 					
F			30303			× .					
-						Q [×] .«					
-						۰.» کې ده					
-2						****.* * ^{0*} .*					
L						£0 •0 •0 •0 •0 •0 •0 •0 •0 •0 •					
						Ω×. ×× Ω×.					
ſ		1	₿ B	2.50-2.70		×°. (311.70	2.50	Firm to stiff orangish brown slightly	gravelly silt	y CLAY with high cobble content and low
ſ		¥ —	80808			$\mathbf{x} = \mathbf{x}$	311.50	2.70	TP terminated at 2 70m bgl. Obstruct	tion as bould	ders
-						END			Tr terminated at 2.70m bgi. Obsider	cion us boun	
-3											
2 02 11											
-4											
-											
5											
Rei	l narks: I	ngress	of water	at 2.60m bgl. '	TP back	filled w	l ith arisir	lgs.			Scale:
	<i>.</i>							Inial	drilling I TD		1:25 Ph.
1	Sarce -							1115[Fax

PR	OJECT: 1	Balli Co	nagree Cork	Wind Farn	1							TRIALPIT: T-(03
CI	JENT: Co	oillte	COIK							Co-ordinates:		Rig: Hyundai HX	140L
EN	GINEER:	Feh	nily Tim	10ney & Co	1					E 535,184.8 N 583	,481.4	Rev: DRAFT	
Gro GF Wa 1st: 2nd 3rd	ter strikes: dry dry	92.631 ATE Ros	m O.D. R ee to after:			PIT PIT LOG	DIREC DIMEN GED I	CTION NSION BY:	: 340-1 1: 1.20 AG	60 4.00 A * 4.00m D	B	DATE: 8.3.21 Shoring/Support: N Stability: Pit stable	J/A
Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	TEGEND	Elevation m O.D.	Depth (m)			DESCRII	PTION	
-0 - -			• D	0.50-0.60			291.83	0.80	Grass o H7.	ver spongy moist dark brow	n pseudo fibi	rous PEAT.	
-1			B	1.00-1.30			291 33	1 30	Weathe Recove	red SILTSTONE rock. red as orangish brown sandy	/ gravelly silt	as residual siltstone rock	
				2.00-3.00		END	<u>291.33</u> <u>288.13</u>	4.50	TP terr	red SILTSTONE rock. red as angular to subangular h brown silty sandy gravel n	r gravel cobbl natrix.	le and boulder sized clasts o	s of siltstone with
-5 Re	marks: T	P dry	on excav	ation. TP back	filled wi	th arisi	ngs.						Scale:
91 D	Million							Irisł	n drill	ing LTD			1:25 Ph. Fax

PRO LO	DJECT: 1	Ballin :_Co	nagree <u>C</u> ork	Wind Farn	1								TRIALPIT: T- Sheet 1 of 1	-04
CLI	IENT: Co	oillte								Co-ordina	ates:		Rig: Hyundai HX	(140L
ENG	GINEER:	Feh	ily Tim	ioney & Co	1					E 535,510.0	0 N 583,150.2	2	Rev: DRAFT	
GR	OUNDW.	ATE	R 0.D.			PIT	DIDEC	TION	. 020.2	00	4.00	→	Shoring/Support:	N/A
Wate 1st: 2nd:	er strikes: dry	Ros	e to after:			PIT	DIME	NSION RV:	: 1.20	* 4.00m _D		в	Stability: Pit mode	erately stable.
3rd:										L	С			
Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)			DES	SCRIP	PTION	
-0						<u></u>	362.69	0.10	Plastic	damp dark brow	n amorphous PEA	ΔT.		
- - -									H8. Weathe Recove brown	red SILTSTONF red as angular cc sandy clay matrix	E rock. bble and boulder : x.	sized c	lasts of grey and brown	siltstone with soft
-1			В <i>1000-0000</i>	1.00-1.40			361.39	1.40	1.00m:	damp and hard o	ligging.			
						END			TP tern	ninated at 1.40m	bgl.			
+														
-2														
-														
6/21														
⁷⁸ -3														
DRL.GI														
IRISH														
21.GPJ														
R 29 20														
TE WA														
MF TPS														
GREE														
SES B														
WL RIK														
[®] =5 Ne Ren	narks: T	P dry	on excava	ation. TP back	filled wi	th arisi	ngs.							Scale:
		5					-							1:25
TRIF								Irisł	n drill	ing LTD				Ph. Fax

P L	ROJECT:	Balli • Co	nagree Cork	Wind Farn	n							TRIALPIT: T-	05
C	LIENT: C	oillte	CUIK							Co-ordinates:		Rig: Hyundai HX	140L
E	NGINEER	: Feh	ily Tim	ioney & Co)					E 536,007.9 N :	582,795.3	Rev: DRAFT	
G	ound level: 3	19.05 ATE	m O.D. R								4.00 — — 	DATE: 8.3.21	NT/ A
W 15	ater strikes: t: dry	Ros	e to after:			PIT PIT	DIREC DIMEN	TION NSION	: 180-3 1: 1.20	60 * 4.00m _D	B	Stability: Pit stable	e.
21 31	d: d:	·				LOG	GED I	BY:	AG		¥		
enth (m)	late	/ater	amples	epth (m)	-situ Vane ests	EGEND	levation 1 O.D.	epth (m)			DESCRI	PTION	
		12	Ñ	<u> </u>	ЦĻ		ШШ	a	MADE				4 1 0 1 1
- - - - - - - - - - - -			B	1.00-2.00			316.95	2 10	MADE	GROUND: Soft to firm peat with roots and brand	orangish brown ches.	sandy gravelly CLAY wi	th much soft dark
- - -3			B	3.00-3.50			315.45	3.60	Weathe Recove matrix. 3.00m:	red SILTSTONE rock. red as angular cobble siz hard digging.	ed clasts of wea	k siltstone with brown sil	ty gravel and sand
-4 - - -5 R	emarks: 7	(P dry	on excava	ation. TP back	filled wi	th arisi	ngs.				o progross		Scale:
	ai N3 1	ury	Si encuri										1:25
IRIG.	Datities							Irish	n drill	ing LTD			Ph. Fax

PR	OJECT: 1	Balli Co	nagree Cork	Wind Farn	n					TRIALPIT: T-06 Sheet 1 of 1
CL	IENT: Co	oillte	COIR						Co-ordinates:	Rig: Hyundai HX140L
EN	GINEER:	Feh	ily Tim	noney & Co)				E 536,370.9 N 582,607.7	Rev: DRAFT
Gro	UND level: 2	98.351 ATE	m O.D. R			DIT			4.00	DATE: 15.3.21 Shoring/Support: N/A
Wat 1st:	er strikes: dry	Ros	e to after:			PIT	DIME	NSION	$1.20 \times 4.00 \text{ m}_{\text{D}}$	T Stability: Pit stable. B 1.20
3rd:						LUG	GEDI		AG C	l
epth (m)	ate	ater	amples	epth (m)	-situ Vane ests	EGEND	levation O.D.	epth (m)	DESC	RIPTION
	Q	M	Ň	Q	ЦĔ		E	Q		
Ŭ						<u>~~~~</u>			Plastic dark brown sandy gravelly amorphou boulder content. H8	s PEAT with medium cobble content and low
Γ			•D	0.20-0.30		<u>\\/</u> \\ &0	298.05	0.30	Orangish brown silty sandy angular to subro	inded fine to coarse sandstone and siltstone
-			D	0.50					GRAVEL with medium cobble content. Cob siltstone.	bles are angular to subrounded of sandstone and
-			Б	0.50		20				
-						201				
			B	1.00-1.50					1.00m: with low boulder content. Boulders a <500mm in diameter.	re of sandstone and siltstone. Boulders are
-			1010101							
-			1000							
-									1.50m: with high boulder content. Boulders	are angular of siltstone. Hard digging.
-2										
-						Å O×				
-										
			B	2.50-3.00						
			00000			S				
1710			00000			300				
-3		—	8				295.35	3.00	TP terminated at 3.00m bgl. Obstruction as s	iltstone rock.
-										
5										
107 67										
-4										
-										
- 5										
Rer	narks: T	P dry	on excava	ation. TP back	filled wi	th arisi	ngs.			Scale:
								T. 2 1		1:25
The second	Jane -							irist	arilling LID	Fax

PRO	JECT:	Balli	nagree Cork	Wind Farn	n							TRIALPIT: T-	-07
CLI	ENT: Co	oillte	COIR							Co-ordina	ites:	Rig: Hyundai HX	K140L
ENG	INEER:	Feh	ily Tim	ioney & Co)					E 536,749.8	N 583,186.8	Rev: DRAFT	
Grou	nd level: 3	11.75i	m O.D.									DATE: 15.3.21	
Water 1st: 2nd: 3rd:	strikes: dry	AIE. Ros	K ie to after:	-		PIT PIT LOG	DIREC DIMEI GED I	CTION NSION BY:	: 180-3 I: 1.20 AG	60 * 4.00m _D	4.00 A B C	Shoring/Support: Stability: Pit mod 1.20	N/A erately stable.
Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)			DESCRI	PTION	
-0							311.55	0.20	TOPSO	DIL: Grass over fi	rm dark grey silty sand	y gravelly SILT.	
							511.55	0.20	Orangi	sh brown mottled	l dark grey peaty silty sa	andy GRAVEL with low	cobble content.
F			ा B	0.50-1.00									
-			500000000000				311.15	0.60	Light b high co	rown silty sandy bble content. Col	subangular to subround bbles are angular to sub	led fine to coarse siltston rounded of siltstone.	e GRAVEL with
-1 - -			B B	1.00-1.50									
-2			B	2.00-2.50		8. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.			2.00m: diamet	with low boulder er.	r content. Boulders are	of siltstone. Boulders are	<1000mm in
-			B B	2.50-2.90			309.25	2.50	Weathe Recove matrix.	ered SILTSTONE red as angular co	Frock. bble and boulder sized	clasts of strong grey silts	tone with sandy silty
LE & WL RIES BALLINAGREE WF TPS ALL FILE MAR 29 2021.GPJ IRISHPRL.GDT 18/6/						END			TP terr	ninated at 2.90m	bgl. Obstruction as roc	ς.	
Rem	arks: T	P dry	on excav	ation. TP back	filled w	ith arisi	ngs.						Scale:
								Inial	النبل	ing I TD			1:25 Ph.
1								11 151	1 UI II				Fax

PRC LOC	DJECT:	Balli : Co	nagree Cork	Wind Farn	n					TRIALPIT: T-08 Sheet 1 of 1
CLI	ENT: Co	oillte							Co-ordinates:	Rig: Hyundai HX140L
ENC	GINEER:	Fel	nily Tim	oney & Co)				E 536,168.6 N 583,30	00.5 Rev: DRAFT
Grou GRO Wate 1st: 2nd: 3rd:	OUNDW. or strikes: dry	ATE Ros	R R se to after:			PIT I PIT I LOG	DIREC DIME GED 1	CTION NSION BY:	$\begin{bmatrix} 180-360 \\ N: 1.20 * 4.00m \\ AG \end{bmatrix}_{D}$	B I 1.20 B I 1.20 B I 1.20 B I 1.20 B I 1.20
Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)	D	ESCRIPTION
-0 -							277.84	0.20	TOPSOIL: Grass over sandy gravelly p	peaty CLAY with low cobble content.
-			B B	0.50-0.60			322.84	0.30	Orangish brown silty sandy angular to medium cobble content and low bould siltstone. Boulders are angular to suba	subangular fine to coarse siltstone GRAVEL with er content. Cobbles are angular to subangular of ngular of siltstone. Boulders are <400mm in diameter.
- -1 -			B	1.00-1.50			322.34	0.80	Light brown mottled black silty sandy GRAVEL with high cobble content an subangular of siltstone. Boulders are s	angular to subangular fine to coarse siltstone d low boulder content. Cobbles are angular to ubangular to subrounded of siltstone.
-			1000000						1.50m: black mottling absent with hig angular.	h boulder content. Cobbles are angular. Boulders are
-2 - -			B B B B	2.00-2.50 2.50-3.00			320.64	2.50	Weathered SILTSTONE rock.	
от 18/6/21 С			1010501050105010501 1010501050105010501				32 0.04	3.10	Recovered as angular cobble and bouk sandy gravel. Boulders are <400mm in	der sized clasts of strong grey siltstone with some silty n diameter.
EE WF TPS ALL FILE MAR 29 2021.GPJ IRISHDR.LG						END			TP terminated at 3.10m bgl. Obstruction	on as siltstone rock.
ANE & WL RISES BALLINAGRE	10 H/201 T	D drev		ation TD back	filled	ith arisi	ngs			
	arks: 1	r ary	on excava	auon. 1P back	mied wi	iin arisi	ngs.	.		Scale: 1:25
TRJ								Irisł	n drilling LTD	rn. Fax

PR LC	ROJECT:	Balliı : Co	nagree Cork	Wind Farm	1						TRIALPIT: T Sheet 1 of 1	-10
CI	JENT: Co	oillte								Co-ordinates:	Rig: Hyundai Hy	X140L
EN	NGINEER:	Feh	ily Tim n O D	ioney & Co						E 536,842.1 N 583,687.	A Rev: DRAFT	
GI Wa 1st 2nd 3rd	ROUNDW ater strikes: : dry d: :	ATE Ros	R e to after:			PIT PIT LOG	DIREC DIMEN GED I	CTION NSION BY:	: 045-2 : 1.20 AG	25 4.00m ★ 4.00m D C	Shoring/Support: Stability: Pit stab	N/A le.
Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)		DES	SCRIPTION	
-0							252.69	0.10	TOPSC	IL: Grass over soft gravelly CLAY	with rootlets.	
-			B	0.50-1.00		ૹ૾૾ૻૢઌ૾ૼૢૡૻૻ૽ૻઌ૱ૡૻ ૹ૽૾ૺ _ૹ ૺ૱ૡ૽ૢૢૢૢૢૢૢૢૢઌ૽ૼ૱ઌ૽ૢૢૢૢૢૢૢૢઌૢૢૢૢૢૢૢઌૢૢૢૢૢૢઌૢૢૢૢૢૢૢઌૢૢૢ	251 79	1.00	Firm of subrow sandsto	angish brown sandy gravelly SIL1 ided fine to coarse of siltstone. Co ne.	with low cobble content. Gra- bbles are subangular to subrou	vel is subangular to inded of siltstone and
-1 - - -2			B	1.50-2.00				1.00	Light b Cobble siltston	rown silty sandy GRAVEL with h s are subangular to subrounded of e. Boulders are <1000mm in diam	igh cobble content and low bot siltstone. Boulders are subang eter.	ulder content. ular to subrounded of
-3			B BUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU	3.00-3.50			250.09	2.70	Very st boulder Cobble subrout	iff orangish brown sandy gravelly content. Gravel is subangular to s s are subangular to subrounded of ded.	CLAY with medium cobble cc ubrounded fine to coarse of va various lithologies. Boulders a	ontent and medium trious lithologies. tre subangular to
-4			B	4.00-4.50			<u>248.79</u> 247.99	4.00	Light b Boulde	rown gravelly fine SAND with me rs are subangular of sandstone. inated at 4.80m bgl. Obstruction a	dium cobble content and low b	poulder content.
-5												
Re	marks: T	P dry	on excave	ation. TP back	filled wi	th arisi	ngs.					Scale:
- The second sec	all the							Irisł	ı drill	ing LTD		Ph. Fax

PR	OJECT:	Balli • Co	nagree Cork	Wind Farn	1							TRIALPIT: T-	11
CL	IENT: Co	. Co oillte	CUIK							Co-ordinate	s:	Rig: Hyundai HX	140L
EN	GINEER:	Fel	ily Tim	ioney & Co	1					E 536,177.4	N 584,287.5	Rev: DRAFT	
Gro	und level: 2	63.58	m O.D.									DATE: 12.3.21	
Wat 1st: 2nd: 3rd:	er strikes: 1.00m	AIE Ros	K to after:			PIT PIT LOG	DIREC DIMEN GED I	CTION NSION BY:	: 180-3 I: 1.20 AG	60 * 4.00m _D		Shoring/Support: 1 Stability: Pit unsta 1.20 collapse.	N/A ble. Sidewall
Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)			DESCRII	PTION	
-0							162.28	0.20	TOPSC	IL: Soft dark brown	n peaty SILT with hig	h cobble content.	
- - -1		Ŧ	B	0.50-1.00		١× ٦٠ ٢٠ ٩٠ ٩٠ ٩٠ ٩٠ ١ هَ ؞ػ؞ػ؞ػ؞ ۵٠ ۵٠ ۵۰ ٩٠ ٩٠ ١ ه ؞ػ؞ػ؞ػ؞ػ؞ڬ؞ڬ؞ڬ؞ڬ؞ڬ؞ڬ؞	263.38	0.20	Stiff lig subrour	ht brown sandy gra	velly SILT with medi of siltstone. Cobbles a	um cobble content. Grave are subangular to subroun	el is subangular to ided of siltstone.
-2			B	1.50-2.00			262.18	1.40	Light b with mo of siltst 2.00m:	rown clayey silty sa edium cobble conte one. Boulders are o with high boulder c	ndy subangular to sub nt and low boulder co f siltstone. Boulders a content. Boulders are a	brounded fine to coarse s intent. Cobbles are suban ire <400mm in diameter. angular of siltstone.	iltstone GRAVEL gular to subrounded
-3			B	3.00-3.60			259.98	3.60	TP term	inated at 3.60m bo	Unable to progress	TP-, sidewall collapse	
						END			11° tem	innaleu at 5.60m bg	i. Unable to progress	r - sidewall collapse.	
Rer	narks: S	eepag	e of water	r at 1.00m bgl.	TP bacl	kfilled v	vith arisi	ngs.	l				Scale:
Deg	6							Irich	drill	ing I TD			1:25 Ph.
1	94Ci *							11 151	i ur III	mg LIV			Fax

PR LO	OJECT: 1	Balli Co	nagree Cork	Wind Farn	1							TRIALPIT: T-12 Sheet 1 of 1
CL	JENT: Co	oillte								Co-ordinates:		Rig: Hyundai HX140L
EN	GINEER:	Feh	nily Tim	ioney & Co						E 535,308.9 N 584	,244.1	Rev: DRAFT
GFG GF Wa	ter strikes:	ATE Ros	R R ie to after:			PIT]	DIREC	CTION	[: 180-3]: 1.20	60 4.00m		Shoring/Support: N/A Stability: Pit stable.
2nd 3rd	: 					LOG	GED	BY:	AG	с	B T	
Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)			DESCRII	PTION
-0 -			• D	0.20-0.30		<u> </u>	290.61	0.30	Plastic H8.	dark grey amorphous PEAT		
-			B	0.50-1.00		· ×.a. ×. 9 · · × · • ·			Orangi	sh brown silty gravelly SAN	D.	
ŀ			00000000			· · · · · · · · · · · · · · · · · · ·	290.11	0.80	Light b high co	rown silty sandy subangular bble content. Cobbles are su	to subrounde	ed fine to coarse siltstone GRAVEL with subrounded of siltstone.
-1			85. 87 1970 - 19700 - 19700	1.00-1.50								
-									1.50m: are <10	with high boulder content. I 00mm in diameter. Hard dig	Boulders are a gging.	angular to subangular of siltstone. Boulders
-2 - -			B B B B B B B B B B B B B B B B B B B	2.00-2.50								
			B	4.00-4.50		$\left(\begin{array}{c} 0 \\ 0 \\ 0 \\ 0 \\ \end{array}\right) \left(\begin{array}{c} 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 $						
						END	286.31	4.60	TP tern	ninated at 4.60m bgl.		
Rei	marks: T	P dry	on excav	ation. TP back	filled wi	th arisi	ngs.					Scale:
	Steps .							Irisł	ı drill	ing LTD		Ph. Fax

PR LC	OJECT:	Balli : Co	nagree Cork	Wind Farn	1						TRIALPIT: T-13 Sheet 1 of 1
CL	JENT: CO	oillte	•1 70•							Co-ordinates: E 535 226 0 N 584 685 7	Rig: Hyundai HX140L
ENGro	GINEER:	Fer 17.42	111y 11m m O.D.	ioney & Co	1					1 333,220.0 11 304,003.7	DATE: 11.3.21
GF Wa 1st: 2nd 3rd	ROUNDW. ter strikes: 2.00m	ATE Ros	R se to after:			PIT PIT LOG	DIREC DIMEN GED I	CTION NSION BY:	: 010-1 : 1.20 AG	90 4.00 A ★ 4.00 D C	Shoring/Support: N/A Stability: Pit unstable. Sidewall 1.20 collapse.
Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)		DES	CRIPTION
-0			• D	0.10-0.20			317.22	0.20	TOPSC	DL: Grass over dark brown peaty g	ravelly SILT.
- - -1			B	0.50-1.00		6 5 6 5 7 5 7 5 7 5 7 5 7 5 7 5 7 5 7 5		0.20	Brown cobble	silty sandy subangular to subround content. Cobbles are subangular to	ed fine to coarse siltstone GRAVEL with medium subrounded of siltstone.
-2		₽	B EXECUTE DESCRIPTION	1.60-2.00			315.82	2.80	Weathe Recove sandy g	red SILTSTONE rock. red as angular cobble and boulder ravel matrix.	sized clasts of strong siltstone with brown silty
-3						END			TP tern clasts.	iinated at 2.80m bgl. Unable to pro	gress TP - sidewall collapse and boulder sized
-5											
Re	marks: S	eepag	e of wate	r at 2.00m bgl.	TP bac	kfilled v	vith arisi	ngs.			Scale: 1:25
and a second	ALL B							Irish	ı drill	ing LTD	Ph. Fax

PR	OJECT: 1	Balli	nagree	Wind Farn	1							TRIALPIT: T-1	14
	IENT: Co	oillte	CUIK							Co-ordinates:		Rig: Hyundai HX1	140L
EN	GINEER:	Feh	ily Tim	ioney & Co						E 536,300.7 N 58	6,069.0	Rev: DRAFT	
Gro GR	und level: 4	13.331 ATE	m O.D. R			DIT			1 40 0	4.00	0 — — 	DATE: 16.3.21	1/4
Wat 1st: 2nd: 3rd:	er strikes: dry	Ros	e to after:			PIT PIT LOG	DIREC DIMEN GED I	STION NSION BY:	: 140-3 1: 1.20 AG	4.00m D	B	Stability: Pit unstat 1.20 collapse from 3.00n	ble. Sidewall n bgl.
Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	TEGEND	Elevation m O.D.	Depth (m)			DESCRII	PTION	
-0						<u></u>			Grass o H8	ver plastic dark brown amo	orphous PEAT	Γ.	
-			• D	0.20-0.30		<u>, ,,</u> ,, ,,	413.03	0.30	110.				
-									Orangis siltston	sh brown becoming light be e GRAVEL with medium of a sile to subscribe the subscript of a sile to subscript of a s	rown silty sand cobble content	dy subangular to subround t and low boulder content.	led fine to coarse Cobbles are
Ļ			B	0.50-1.00					<800m	m in diameter.	one. Bouiders	are subrounded of sitisfor	ie. Boulders are
			<i>13131313</i>										
			00000										
						X							
F													
-			est B	1 50-2 00									
ŀ			1	1.30-2.00									
ŀ			3030303										
-2			1000										
ļ						X CX							
ļ							411.03	2.30	Stiff lig content	ht brown slightly sandy gra Gravel is subangular to su	avelly CLAY v	with low cobble content ar e to coarse of siltstone. Bo	nd low boulder oulders are of
			B	2.50-3.00					siltston	e.			
			3030303										
			2020202										
-3													
-													
-													
-													
-													
-4			हज्ज B	4 00-4 50									
			-										
			00000										
ſ			2020			END	408.83	4.50	TP term	ninated at 4.50m bgl. Obstr	ruction.		
										C			
-													
-5	noulis. T	D de-		tion TD best	filled '	th onini	100						Seeler
Ker	narks: T	r ary	on excava	auon. 1P back	iiiied wi	in arisi	ıgs.						Scale: 1:25
the second	State -							Irisł	n drill	ing LTD]	Ph. Fax

PR	OJECT: 1 CATION:	Ballii : Co	nagree Cork	Wind Farn	1						TRIALPIT: T	-15
CL	IENT: Co	oillte								Co-ordinates:	Rig: Hyundai Hy	K140L
EN	GINEER:	Feh	ily Tin	noney & Co						E 536,701.7 N 586,667.7	Rev: DRAFT	
Gro	und level: 4	30.261 ATE	m O.D. R			ріт				4.00	DATE: 18.3.21	N/A
Wat 1st: 2nd:	er strikes: dry	Ros	e to after:			PIT	DIME	NSION	: 020-2	• 4.00m D	$\begin{bmatrix} \mathbf{T} & \text{Stability: Pit stab} \\ \mathbf{B} \end{bmatrix} \stackrel{1.20}{1.20}$	le.
3rd:		i –	İ			LUG	GEDI		AG	С	」 ⊻	
(s	(m)	ane	Ð	on	(m)		DECC	DIDITION	
pth (n	ite	ater	mple	epth	situ V sts	EGEI	evati O.D.	pth		DESC	RIPTION	
De	Da	W,	Sa	De	In- Te:	ΓI	El	De				
Γ						<u>× 1/ ×</u> / × 1/			Spongy H7.	dark brown silty pseudo fibrous PE.	AT.	
F						<u>\\</u> <u>X</u>						
F						<u>×××</u>						
F			• D	0.50-0.60								
						<u>\\</u> \ <u>\</u> \ \ <u>\</u>						
						<u> メ</u> ベ マ マネ	429.26	1.00				
			B	1.00-2.00			127.20	1.00	Light bi medium	own silty sandy subangular to subro cobble content. Cobbles are subang	ounded fine to coarse siltston gular to subrounded of siltsto	e GRAVEL with one.
F			00000									
-			00000									
F			0101010									
			00000									
			2020202									
- ²			B	2.00-3.00								
F			00000									
+			00000									
Ļ			2020202			¢ XO			2.50m:	with high boulder content.		
			100000			Ø						
17/0/0			2020202			A DX						
-3			231			Č×						
						5						
10.170						0 2 70						
7 67 1							426.46	3.80				
									Weathe Recove	red MUDSTONE rock. red as angular cobble and boulder si	zed clasts of medium strong	to strong light brown
-4			B	4.00-4.50					muusto	ie with sandy graver matrix.		
			00000									
			00000				425 76	4 50				
						END		1.50	TP term	inated at 4.50m bgl. Obstruction as	rock.	
8-5 Rer	narks: T	P drv	on excav	ation. TP back	filled wi	th arisi	ngs.					Scale:
		- 5										1:25
	lad.							Irisł	ı drill	ing LTD		Ph. Fax

PRO LO	OJECT: 1 CATION:	Balli Co	nagree Cork	Wind Farn	n					TRIALPIT: T-16 Sheet 1 of 1
CLI	IENT: Co	oillte							Co-ordinates:	Rig: Hyundai HX140L
EN	GINEER:	Feh	ily Tim	oney & Co)				E 537,278.9 N 586,509.5	Rev: DRAFT
Grot GR Wate 1st: 2nd: 3rd:	ound level: 4 oundware er strikes: dry	ATE Ros	R e to after:			PIT PIT LOG	DIREC DIMEI GED I	CTION NSION BY:	$\begin{array}{c c} 180-360 \\ 1.20 * 4.00m \\ AG \end{array} \xrightarrow[C]{A0} 4.00 \\ D \\ C	Shoring/Support: N/A Stability: Pit stable.
Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)	DESCRI	PTION
-0 -			• ^D	0.20-0.30		<u>vv</u> v <u>vv</u> v <u>vv</u> v	471.27	0.50	Plastic dark brown amorphous PEAT. H8.	
- - -1			B Bereinen anderen andere	0.50-1.00		× × × × × × × × × × × × × × × × × × ×	470.67	1.10	Firm light grey sandy gravelly SILT with high o subangular fine to coarse of siltstone. Cobbles a	cobble content. Gravel is angular to are angular to subangular of siltstone.
- - -2			B	1.50-2.00			460.67	2.10	Light grey and purple silty peaty sandy angular GRAVEL with high cobble content. Cobbles ar 2.00m: hard digging.	to subangular fine to coarse purple siltstone e angular to subangular of purple siltstone.
& WL RISES BALLINAGREE WF TPS ALL FILE MAR 29 2021.GPJ IRISHDRL.GDT 18/6/21						END	469.67	2.10	TP terminated at 2.10m bgl. Obstruction.	
Ren	narks: T	P dry	on excava	ation. TP back	filled wi	th arisi	ngs.			Scale: 1:25
TRIA	140.							Irisł	drilling LTD	Ph. Fax

PR	OJECT:	Balli Co	nagree Cork	Wind Farn	n							TRIALPIT: T-17		
CL	JENT: Co	. <u>Co</u> oillte	COIK							Co-ordinates:		Rig: Hyundai HX140L		
EN	GINEER:	Feh	nily Tim	ioney & Co)					E 537,464.8 N	586,081.3	Rev: DRAFT		
Gro	ound level: 4	43.861 ATE	m O.D. R			DIT				70 4	4.00	DATE: 22.3.21 Shoring/Support: N/A		
Wat 1st: 2nd	ter strikes: dry :	Ros	e to after:			PIT PIT LOG	DIREC DIMEN GED I	NSION BY:	: 090-2 [: 1.20 AG	/0 * 4.00m _D	B	Stability: Pit moderately stable.		
510.					م						C			
Depth (m)	Date	Water	Samples	Depth (m	In-situ Van Tests	LEGEND	Elevation m O.D.	Depth (m			DESCRI	PTION		
-0									Firm bl	ack pseudo fibrous PEA	Т.			
F						<u>\\</u> \\ \ <u>\\</u> \\	443.56	0.30	Dealete			Des Grande and States of CDAVEL and the		
ŀ			_			000			high co are ang	own silty peaty sandy si bble content and mediui ular of siltstone.	n boulder conten	the to coarse sufficience GRAVEL with the cobbles are angular of siltstone. Boulders		
╞			B	0.50-1.00		90 - 2 20			ure ung					
L			1010101											
1			20000				442.86	1.00						
			Γ						Weathe Recove	red SILTSTONE rock. red as angular cobble an	d boulder sized o	clasts of strong purple siltstone with sandy		
F									graveny	sht matrix.				
F														
\mathbf{F}			10101010 B	1.50-1.70			442 16	1.70						
-						END	.442.10	1.70	TP term	inated at 1.70m bgl. Ob	ostruction as silts	tone rock.		
-2														
Ī														
-														
ŀ														
-														
-3														
5														
-														
-4														
-														
5					cu z									
S Rei	marks: T	P dry	on excav	ation. TP back	filled wi	ith arisii	ngs.					Scale: 1:25		
	State of the second sec							Irisł	ı drill	ing LTD		Ph. Fax		

PR LO	OJECT: 1 CATION:	Balli Co	nagree Cork	Wind Farn	n							TRIALPIT: T-18 Sheet 1 of 1		
CL	IENT: Co	oillte								Co-ordinates:		Rig: Hyundai HX140L		
EN	GINEER:	Feh	nily Tim	10ney & Co)					E 537,119.6 N 585	,649.1	Rev: DRAFT		
Gro GR	OUNDW	82.921 ATE	m O.D. R			ріт	DIRF	TION	· 090_2	70 4 .00 A	►	DATE: 22.3.21 Shoring/Support: N/A		
Wat 1st: 2nd: 3rd:	er strikes: dry	Ros	e to after:			PIT LOG	DIME GED	NSION BY:	AG	* 4.00m D	в	5 Stability: Pit stable. 1.20 2		
					e						, 			
Depth (m)	Date	Water	Samples	Depth (m	In-situ Van Tests	LEGENI	Elevation m O.D.	Depth (m			DESCRI	PTION		
-0						<u> </u>			Plastic H8.	dark brown amorphous PEA	AT.			
ŀ						<u> </u>								
ŀ				0.50.0.60		<u>v vi</u>								
ŀ			•	0.50-0.00			382.32	0.60	Brown	silty sandy peaty subangular	r to subround	led fine to coarse siltstone GRAVEL with		
ŀ									siltstor	e. Boulders are angular of si	iltstone. Boul	lders are <400mm in diameter.		
-1			В	1.00		E Contraction								
ļ							381.72	1.20	Grevsi	lty sandy angular to subrour	ded fine to c	coarse siltstone GRAVEL with high cobble		
	content and low boulder content. Cobbles are angular of siltstone. Boulders are angular of siltstone. Boulders are angular of siltstone. Boulders are angular of siltstone.													
			B	1.50-2.00										
			2020202			a di xo								
			101010101			کې	380.92	2.00						
-2							500.92	2.00	Weather Recove	red SILTSTONE rock. red as angular cobble and b	oulder sized	clasts of siltstone with some silty sand.		
ŀ														
ŀ							380.42	2.50	TD torr	ainoted at 2.50m hal. Obstru	ution of cilte	stopa roak		
F						END				iniated at 2.50m bgi. Obsire	iction as sins	None fock.		
-														
-3														
-														
-														
-4														
-5 Ro	narks• T	P drv	on excav	ation TP back	filled wi	th arisi	ngs					Scalar		
	nai k 3, 1	_ ury	on oneav	unon. II Uack		151	<u>.</u>					1:25		
	land.							Irisł	ı dril	ing LTD		Ph. Fax		

PR LO	OJECT: 1	Balli : Co	nagree Cork	Wind Farn	n						TRIALPIT: T-19 Sheet 1 of 1
CL	IENT: Co	oillte								Co-ordinates:	Rig: Hyundai HX140L
EN Gro	GINEER: und level: 4	Feh 06.911	ily Tim m O.D.	ioney & Co)					E 330,307.0 IN 300,004.2	DATE: 22.3.21
GR Wat 1st: 2nd: 3rd:	COUNDW ter strikes: 0.00m	ATE Ros	R e to after:			PIT PIT LOG	DIREC DIMEN GED I	CTION NSION BY:	: 090-2 [: 1.20 AG	70 4.00 A	Shoring/Support: N/A Stability: Pit unstable. Sidewall 1.20 collapse.
Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)		DESC	RIPTION
-0 - - - - - - - -		▼	•D	1.00-1.10		は			Plastic H8.	dark brown amorphous PEAT.	
-2 - -			B B	2.00-2.50			404.91	2.00	Soft to subrou	firm grey sandy gravelly SILT with h nded fine to coarse of siltstone. Cobb	igh cobble content. Gravel is subangular to les are subangular to subrounded of siltstone.
			B	3.00-3.50				2.00	Orangi GRAV sandsto	sh brown silty sandy subangular to sı EL with high cobble content. Cobble ne .	brounded fine to coarse siltstone and sandstone s are subangular to subrounded of siltstone and
			B	4.00-4.30			402.61	4.30	TP terr	ninated at 4.30m bgl. Unable to prog	ess TP - sidewall collapse.
Rei	marks: S	eepag	e of wate	r from g/l to 2.	00m bgl	. TP ba	ckfilled v	with aris	ings.		Scale: 1:25
	All the second sec							Irish	ı dril	ing LTD	Ph. Fax

PR LO	OJECT: 1 CATION:	Balli : Co	nagree Cork	Wind Farn	1								TRIALPIT: T Sheet 1 of 1	-20A
CL	IENT: Co	oillte								Co-ordin	ates:		Rig: Hyundai H	X140L
EN	GINEER:	Fel	nily Tim	ioney & Co						E 537,752.	8 N 586,	154.8	Rev: DRAFT	
Gro	OUNDW	42.49 ATE	m 0.D. R			DIT		TION	. 200 1	20	4.00 -	►	Shoring/Support:	N/A
Wat 1st: 2nd: 3rd:	er strikes: 0.50m	Ros	se to after:			PIT LOG	DIMEN GED I	NSION BY:	: 1.20 AG	* 4.00m _D	A	B	Stability: Pit mo	derately stable.
510.											<u> </u>			
Depth (m)	Date	Water	Samples	Depth (m	In-situ Van Tests	LEGEND	Elevation m O.D.	Depth (m				DESCRII	PTION	
-0						<u></u>			Spongy	brown pseudo	fibrous PEAT	Г.		
-			• D	0.20-0.30		<u> </u>								
\mathbf{F}		1				1, \1, 8, 10	442.09	0.40	Grey si	lty sandy suban	gular to subro	ounded fine t	to coarse siltstone GRA	VEL with high
-		Ŧ	B B	0.50-1.00		0000			cobble Boulde	content and low rs are angular of	boulder cont f siltstone.	tent. Cobbles	s are subangular to subi	rounded of siltstone.
			00000			800								
ſ			100000											
-1			22			to a								
-						NO NX								
-						%) = `` \\\\\\	441.09	1.40	Weathe	red SILTSTON	E rock.			
			B	1.50-2.00					Recove silty gr	red as angular c avelly sandy ma	obble and bo trix.	ulder sized c	clasts of strong purple s	iltstone with grey
			100000											
Γ			100000				440.40	2 00						
-2			251			END	++0.+2	2.00	TP tern	ninated at 2.00m	n bgl. Obstrue	ction as siltst	tone rock.	
F														
\mathbf{F}														
ŀ														
8/6/21														
- DRL.0														
J IRISI														
021.GP														
R 29 2(
LE MA														
4 −4														
VF TPS														
SREE V														
ES BA														
ML RIS														
S -5	narke s	eenao	e of water	r from 0.50m t	o 2 00m		P backfill	ed with	arisinos					Scale
	nai N 3 3	hag	, or water	a on 0.50m t	- <u>-</u>	، رون. 11		Ju Witti						1:25
TRIAL	Sand a							Irish	ı drill	ing LTD				Ph. Fax

PF	ROJECT:	Balli • Co	nagree Cork	Wind Farn	1					TRIALPIT: T-21A
CI	LIENT: C	oillte	COIK						Co-ordinates:	Rig: Hyundai HX140L
EN	GINEER	: Feh	nily Tim	ioney & Co					E 536,222.8 N 586,176.1	Rev: DRAFT
Gr Gl	ound level: 4	133.261 ATE	m O.D. R			DIT			4.00	DATE: 22.3.21
Wa 1st 2nd	ater strikes: : 0.00m d:	Ros	e to after:			PIT PIT LOG	DIREC DIMEN GED I	STION NSION BY:	$[1.20 \times 4.00 \text{ m}]_{\text{D}}$	Stability: Pit moderately stable.
3rc		Ì							С	
Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)	DESCR	UPTION
-0 - -		<u>.</u>	•D	0.50-0.60		2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	432.56	0.70	Plastic dark brown amorphous PEAT. H8.	
- -1			B	1.00-1.30		× `×, `×, ×, × `× ø ×Ŏ~ `Q. `Q.`;	421.06	1.20	Soft grey sandy gravelly peaty SILT with high subrounded fine to coarse of siltstone. Cobble Boulders are <400mm in diameter.	cobble content. Gravel is subangular to s are subangular to subrounded of siltstone.
-2			BB BETTER BETTER	2.00-2.50			431.96	1.30	Brown silty sandy subangular to subrounded a cobble content and low boulder content. Cobb Boulders are subangular of siltstone.	ine to coarse siltstone GRAVEL with high les are subangular to subrounded of siltstone.
-3			B	3.00-3.50			429.76	3.50	3.00m: hard digging.	
-4						END			TP terminated at 3.50m bgl. Obstruction as bo	bulders.
Re	emarks: S	Seepag	e of wate	r from g/l to 1.	30m bgl	. TP ba	ckfilled v	with aris	ngs.	Scale:
	aller .							Irish	drilling LTD	Ph. Fax

PR LO	OJECT: 1 CATION:	Ballii Co	nagree Cork	Wind Farn	n							TRIALPIT: TP-01 Sheet 1 of 1
CL	IENT: Co	oillte								Co-ordinates	:	Rig: Hyundai HX140L
EN	GINEER:	Feh	ily Tin	ioney & Co)					E 535,968.8	N 586,172.2	Rev: DRAFT
Gro GR	und level: 4	47.201 ATE	m O.D. R								<u> </u>	DATE: 16.3.21
Wat 1st: 2nd: 3rd:	er strikes: 0.50m	Ros	e to after:			PIT PIT LOG	DIREC DIMEN GED I	CTION NSION BY:	: 180-3 [: 1.20 AG	60 * 4.00m _D	A C	Shoring/Support. IV/A Stability: Pit moderately stable. 1.20
Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	TEGEND	Elevation m O.D.	Depth (m)			DESCRI	PTION
-0						<u> </u>			Plastic	lark brown amorpho	us PEAT.	
F			D	0.20-0.30		<u>1/ \\/</u>			H8.			
			<u> </u>			<u></u>	446.80	0.40				
		Ţ	₿ ^B	0.50-1.00		*0,.`` ×			Soft to content	firm grey mottled da Gravel is subangula	rk brown sandy grav ar to subrounded find failtatons	e to coarse of siltstone. Cobbles are
F			1000			Å Å			subang	nar to subrounded o	i sinstone.	
ŀ			00000			°°×°° € €						
-1			20203			×ٽ.× ×``×						
						×.×. ×.×.×	446.00	1.20				
									Light of with his siltston	angish brown silty s sh cobble content an Boulders are suba	andy angular to sub d low boulder conte regular of siltstone	angular fine to coarse substone GRAVEL nt. Cobbles are angular to subangular of
ſ			S B	1.50-2.00					Shibion	. Dourdens are such	iguna or shistone.	
F			2020202									
F			1010101									
-2			10101									
ſ												
F							444.70	2.50	TD to m	instad at 2.50m hal	Obstruction on hou	1.1
F						END			TP term	inated at 2.50m bgi.	Obstruction as bou	iders.
-												
-3												
-												
-												
-												
-												
-												
-5 Rer	narks: S	eepag	e of wate	r at 0.50m bgl.	TP bacl	cfilled v	vith arisi	ings.				Scale:
		19										1:25
and the second	1940							Irisł	ı drill	ing LTD		Ph. Fax

	ROJECT: OCATION	Balli : Co	nagree Cork	Wind Farn	1						TRIALPIT: T	P-02
C	LIENT: C	oillte								Co-ordinates:	Rig: Hyundai HX	K140L
E	NGINEER:	Feh	nily Tin	10ney & Co						E 536,203.5 N 586,063.6	Rev: DRAFT	
G W 1s 2r 3r	ater strikes: (ater strikes: (ater strikes: (ater strikes: (b)	ATE Ros	R se to after:			PIT PIT LOG	DIREC DIMEN GED I	CTION NSION BY:	: 180-3 I: 1.20 AG	60 ★ 4.00 C	Shoring/Support: Stability: Pit stabl	N/A le.
Denth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	TEGEND	Elevation m O.D.	Depth (m)		DES	CRIPTION	
-0									Soft da	k brown silty PEAT.		
-		Ţ	B	0.50-1.00			420.52	0.20	Soft gro fine to	y sandy gravelly SILT with mediun coarse of siltstone. Cobbles are ang	m cobble content. Gravel is an ular to subrounded of siltstone	gular to subrounded 2.
-1			nannan B	1.00-1.50			17.72	0.00	Orangi: high co	sh brown silty sandy angular to sub bble content. Cobbles are angular t	rounded fine to coarse siltston o subrounded of siltstone.	e GRAVEL with
-2-2			B	2.00-2.50					2.00m:	with high boulder content. Boulder	rs are angular. Boulders are <5	500mm in diameter.
			B	4.00-4.50		$ \begin{array}{c} \begin{array}{c} \begin{array}{c} \end{array} \\ \end{array} \\ \end{array} \\ \end{array} \\ \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} $	416.22	4.50	TP term	inated at 4.50m bgl on REs instruc	-tion.	
-5												
R	emarks: S	eepag	e of wate	r at 0.50m bgl.	TP bacl	kfilled v	vith arisi	ngs.				Scale:
Inter of	Dentry							Irisł	n drill	ing LTD		I:20 Ph. Fax

	ROJECT:	Balli . Co	nagree	Wind Farn	1								TRIALPIT: TP	P-03
	LIENT: C	oillte	CUIN							Co-ordii	nates:		Rig: Hyundai HX	140L
E	NGINEER	: Feł	nily Tim	ioney & Co	1	_				E 536,820	.2 N 586,0	612.3	Rev: DRAFT	
G	ound level:	432.73	m O.D.										DATE: 18.3.21	
G W 1s 2n 3r	KOUNDW ater strikes: t: 2.00m d: d:	AIE Ros	K se to after:			PIT 1 PIT 1 LOG	DIREC DIMEI GED I	CTION NSION BY:	: 340-1 1: 1.20 AG	60 * 4.00m _D	4.00 – A	B T	Shoring/Support: 1 Stability: Pit unsta 1.20 collapse.	V/A ble. Sidewall
oth (m)	te	iter	mples	pth (m)	situ Vane ts	GEND	evation O.D.	pth (m)			I	DESCRII	PTION	
Der	Da Da	N N	Sa	De	In-: Tes	Ē	Ele	De						
-0 - - - -1 - - - - - - 		ł	• D	0.50-0.60			430.73	2.00	Spongy H5.	wet dark brow	n pseudo fibro	DUS PEAT.		
- 2		Ě	B B B B B B B B B B B B B B B B B B B	2.00-2.50					Orangis mediun	h brown silty s 1 cobble conter	sandy subangul nt. Cobbles are	lar to subrou subangular	unded fine to coarse siltst to subrounded of siltston	one GRAVEL with e.
			101010101											
ŀ			30303			0 3 7 / 0	430.23	2.50	TD to m	vinetad at 2 50	n hal Unahla	4	TD sidewall colleges	
ŀ						END			IF tem	imated at 2.50	n ogi. Unable	to progress	TF - Sidewall collapse.	
Ļ														
100														
3														
-														
107														
-														
5														
5	manizer	Ingrees	ofuctor	at 2 00m hal	TD heal-	filled	ith origin							Seele
	emarks:	ingress	o or water	aı ∠.∪∪m Ogl.	IF DACK	med w	iui arisir	1 <u>5</u> 2.						Scale: 1:25
1	Delling							Irisł	n drill	ing LTD				Ph. Fax

PRO LO	OJECT:	Balli : Co	nagree Cork	Wind Farn	n					TRIALPIT: TP-04 Sheet 1 of 1
CLI	IENT: Co	oillte							Co-ordinates:	Rig: Hyundai HX140L
ENG	GINEER:	Feh	nily Tim	ioney & Co)				E 537,062.6 N 586,054.	3 Rev: DRAFT
Grou GROU Wate 1st: 2nd: 3rd:	ound level: 4 OUNDW. er strikes: dry	ATE Ros	m O.D. R ee to after:			PIT PIT LOG	DIREC DIMEI GED 1	CTION NSION BY:	: 090-270 : 1.20 * 4.00m AG C	→ Shoring/Support: N/A Stability: Pit moderately stable.
Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)	DEs	SCRIPTION
-0						<u> </u>	410.89	0.30	Spongy dark brown pseudo fibrous PEA? H7.	
- - -1			B B B B B B B B B B B B B B B B B B B	0.50-1.00					Orangish brown silty sandy subangular to medium cobble content. Cobbles are sub-	o subrounded fine to coarse siltstone GRAVEL with angular to subrounded of siltstone.
-			B	1.50-2.00			409.19	2.00	1.50m: with low boulder content. Boulde <500mm in diameter.	rs are subangular of siltstone. Boulders are
E & WL RISES BALLINAGREE WF TPS ALL FILE MAR 29 2021.GPJ IRISHDRL.GDT 18/6/21										
NEN TIA LA	narks: T	P dry	on excava	ation. TP back	filled wi	ith arisii	ngs.			Scale: 1:25
IRI 👘	ad .							Irisł	drilling LTD	rh. Fax

PR	ROJECT: 1	Ballii : Co	nagree Cork	Wind Farn	n							TRIALPIT: TP-05 Sheet 1 of 1
CI	JENT: Co	oillte								Co-ordinates:		Rig: Hyundai HX140L
EN	GINEER:	Feh	ily Tin	ioney & Co)					E 537,059.4 N 58	5,712.9	Rev: DRAFT
Gr	ound level: 3	83.791 <u>a te</u>	m O.D. R							4.00	1	DATE: 22.3.21
Wa 1st 2nd 3rd	ater strikes: : 0.00m 1: 1:	Ros	e to after:			PIT PIT LOG	DIREC DIME GED I	CTION NSION BY:	: 090-2 1: 1.20 AG	70 4.00 A	B	Shoring/Support: N/A Stability: Pit unstable. Sidewall 1.20 collapse.
Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)			DESCRII	PTION
-0		<u> </u>				<u> </u>			Spongy H7.	dark brown pseudo fibrous	s PEAT.	
\mathbf{F}						<u>~ ~ ~</u>	383 49	0.30				
Ļ							505.17	0.50	Brown mediun	silty sandy peaty subangula cobble content. Cobbles a	ar to subround are subangular	ed fine to coarse sandstone GRAVEL with to subrounded of sandstone.
			B	0.50-1.00							a e bacangana	
F			303030			\mathcal{O}						
-			2020202			×) ×						
-1			1000			K. Co						
						BOX						
F			ाइज्ञ B	1 30-2 00			382.49	1.30	W. atla			
ŀ			1010101						Recove	red as angular cobble and t	ooulder sized c	clasts of strong brown siltstone with silty
-			101010						, , ,	,		
			1010101									
			00000									
-2						END	381.79	2.00	TP tern	inated at 2.00m bgl. Unab	le to progress	TP - sidewall collapse and hard digging.
\mathbf{F}												
F												
-												
-3												
-												
-												
101												
-4												
-												
-												
Re	marks: S	eepag	e of wate	r from g/l to 0.	30m bgl	. TP ba	ckfilled v	with aris	ings.			Scale:
				-								1:25
Nil.	all the							Irisł	n drill	ing LTD		Ph. Fax

PR	PROJECT: Ballinagree Wind Farm TRIALPIT: TP-06 LOCATION: Co Cork Sheet 1 of 1 CLIENT: Coillte Co-ordinates: Rig: Hyundai HX140L ENGINEER: Fehily Timoney & Co E 537,267.8 N 586,461.8 Rev: DRAFT													
CL	IENT: Co	oillte	CUIK							Co-or	dinates:		Rig: Hyundai HX	140L
EN	GINEER:	Feł	ily Tin	noney & Co	1					E 537,2	267.8 N	586,461.8	Rev: DRAFT	
Gro GR	und level: 4	72.96) ATE	m O.D. R								4	- 4 00	DATE: 18.3.21	NT/ 4
Wat 1st:	er strikes: 1.40m	Ros	e to after:			PIT PIT	DIREC DIMEN	CTION NSION	: 020-2 : 1.20	00 * 4.00m	D	A	Stability: Pit stabl	e.
2nd: 3rd:			•			LOG	GED I	BY:	AG			C	L	
				(L	ne		u	(u						
h (m)	دە	er	ples	th (n	tu Val	EN	atio D.	th (n				DESCRI	PTION	
Dept	Date	Wat	Sam	Dep	In-si Tests	LEC	Elev m O	Dep						
-0						<u> </u>			Plastic	dark brown	amorphous	S PEAT.		
-			D	0.20-0.30		<u>1, N1,</u>			Hð.					
L			Ľ			<u></u>								
			₿ B	0.50-1.00			472.46	0.50	Light g	rey silty sar	ndy angular	fine to coarse silt	stone GRAVEL with high	n cobble content and
-			00000			0.0.0			mediur	n boulder co	ontent.			
-			2000			200								
-1			10101			00								
			B	1.10-1.50			471.86	1.10	Weathe	ered SILTS	FONE rock.			- 1.441 4
Γ		1	00000						gravelly	y silt.	llar boulder	sized clasts of str	ong purple stitstone with	a nule sandy
-		¥. 	20202				471.46	1.50						
-						END			TP tern	ninated at 1	.50m bgl. C	bstruction as rocl	K.	
-														
-														
-														
-3														
5														
707 6														
-4														
Rer	narks: S	eepag	e of wate	r from 1.40m t	o 1.50m	bgl. TF	backfill	ed with	arisings.					Scale:
	Interks: Scene: 1:25													
	1940 -							Irisł	ı drill	ing LT	TD			Ph. Fax

PR LO	PROJECT: Ballinagree Wind Farm TRIALPIT: TP-07 LOCATION: Co Cork Sheet 1 of 1 CLIENT: Coillte Co-ordinates: Rig: Hyundai HX140L ENGINEER: Fehily Timoney & Co E 537,555.8 N 586,095.0 Rev: DRAFT Ground level: 444.54m O.D. DATE: 22.3.21 DATE: 22.3.21														
CL	IENT: CO	oillte								Co-ordinates: E 537,555.8 N 586 095 0	Rig: Hyundai HX140L				
Gro	GINEEK: und level: 4	44.54	<u>111y 111r</u> m O.D.	ioney & Co						1 50 ,555 1 500,075	DATE: 22.3.21				
GR Wat 1st: 2nd: 3rd:	OUNDW. er strikes: dry	ATE Ros	R se to after:			PIT PIT LOG	DIREC DIMEN GED I	CTION NSION BY:	: 090-2 1: 1.20 AG	70 ★ 4.00 A ★ 4.00 D C	Shoring/Support: N/A Stability: Pit stable.				
Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)		DES	SCRIPTION				
-0 -						<u> </u>	444 24	0.30	Plastic H8.	dark brown amorphous PEAT.					
-			B	0.50-1.00					Orangis high co siltston	sh brown silty sandy subangular to bble content and low boulder cont e. Boulders are are subangular of s	subrounded fine to coarse siltstone GRAVEL with ent. Cobbles are subangular to subrounded of iltstone.				
-			B	1.50-2.00			443.44	1.10	Weathe Recove brown	red SILTSTONE rock. red as angular cobble and boulder silty sand matrix.	sized clasts of strong bluish grey siltstone with				
-2							442.14	2 40							
3						END	<u>++2.1+</u>	2.40	TP tern	ninated at 2.40m bgl. Obstruction a	as rock.				
-4															
Rer	narks: T	P dry	on excav	ation. TP back	filled wi	th arisi	ngs.				Scale:				
1								T. • •			1:25				
and a state	Line -							Irist	n drill	ing LTD	Fin. Fax				

CLI ENC	COJECT: Ballinagree Wind Farm TRIALPIT: TP-08 CATION: Co Cork Sheet 1 of 1 LIENT: Coillte Co-ordinates: Rig: Hyundai HX140L NGINEER: Fehily Timoney & Co E 537,563.1 N 586,197.1 Rev: DRAFT													
ENC Grou		oillte								Co-ordinate	s:	Rig: Hyundai HX14	OL	
Grou	GINEER:	Feh	ily Tim	ioney & Co)					E 537,563.1	N 586,197.1	Rev: DRAFT		
GRO	ind level: 4	64.45r ATE	n O.D. R			DIT			. 0.45.2	Ŋ5 ₩		DATE: 18.3.21 Shoring/Support: N/A		
Wate 1st: 2nd:	er strikes: dry	Ros	e to after:			PIT I PIT I LOG	DIREC DIMEN GED I	NSION BY:	: 045-2 1: 1.20 AG	²⁵ 4.00m _D	B	Stability: Pit moderate	ely stable.	
3rd:							-		-		C .			
Î			les	(m)	Vane	UN	tion	(m)			DESCRI	PTION		
epth (ate	Vater	ampl	Jepth	n-situ ests	EGE	levat 1 O.L	bepth			DLSCI			
	9	N	S		T		Ε		Plastic	dark brown amorph	ous DEAT			
				0.00.0.00		<u>., .</u> <u>1</u> , <u>.</u> 1,			H8.	ark brown amorph	OUS FEAT.			
			• ^D	0.20-0.30		<u> </u>								
			ENI B	0.50-1.50			463.95	0.50	XX 7 1		1			
-			1 199999	0.50-1.50					Recove sandsto	red SANDSTONE i red as angular cobb ne with silty peat m	cock. le and boulder sized (atrix	clasts of strong greyish brow	n fine grained	
-			00000						Sundsto	ne with sity peut in	du ix.			
			<i>190900</i>											
			<i>3030303</i>											
			3030303											
			80800				462.95	1.50						
-			в 1999/09/0	1.50-2.00					Weathe Recove	red SANDSTONE 1 red as angular cobb	ock. le and boulder sized	clasts of strong light brown a	and grey fine	
			80000						grained	sandstone with bro	wn sandy silt matrix.			
			00000				462.45	2.00						
						END			TP tern	inated at 2.00m bg	. Obstruction as rock	ς.		
F														
-														
-														
-3														
-														
-														
-4														
-5														
Kem	emarks: TP dry on excavation. TP backfilled with arisings. Scale:													
-	¢.							Irist	ı drill	ing LTD		Ph. Fax	x	

PR LO	OJECT:	Ballii :_Co	nagree <u>C</u> ork	Wind Farn	1							TRIALPIT: TP-09 Sheet 1 of 1
CL	IENT: Co	oillte								Co-ordinate	es:	Rig: Hyundai HX140L
EN	GINEER:	Feh	ily Tim	oney & Co						E 538,173.4	N 586,397.8	Rev: DRAFT
Gro GR Wate 1st: 2nd: 3rd:	OUNDW. er strikes: 1.50m	ATE Ros	R e to after:			PIT I PIT I LOG	DIREC DIMEN GED I	CTION NSION BY:	1: 180-3 1: 1.20 AG	60 ⊨ * 4.00m _D	4.00	Shoring/Support: N/A Stability: Pit stable.
Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)			DESCRI	PTION
-0 - - -1 - - -2 -2		- ₩.	D B B	1.00-1.10 2.00-2.50		٩٩,٩٩,٩٩,٩٩,٩٩,٩٩,٩٩,٩٩,٩٩,٩٩,٩٩,٩٩,٩٩,	401.32	1.80	Spongy H5.	stiff grey sandy gra subangular to su nded of siltstone.	o fibrous PEAT. avelly SILT with low brounded fine to coar	cobble content and occasional rootlets. se of siltstone. Cobbles are subangular to
TPS ALL FILE MAR 29 2021.GPJ IRISHDR.GDT 18/6/21			B B B B B B B B B B B B B B B B B B B	3.00-3.50 4.00-4.30		૬ૢ૾ઌૺૢઌૢૻૻૡૢૻૻઌૢૢૻૻઌૢૼૻઌૢૼૻઌૢૻૻઌૢૻૻૡૢૻૻૡૢૻૻઌૢૻૻઌૢૻ ઌ૾ૺઽઌ૿ઌ૾૾ૺઌૢૢૢૢૢૢૢૢૢૢઌૢૢૢૢૢૢઌૢૺૢઌૢૺૢઌૺૢ૾ઌૺૢ૾ૢૢૢૢ			3.00m:	with medium cobb	le content.	
IAL PIT VANE & WL RISES BALLINAGREE WF 1	narks: S	eepag	e of water	from 1.50m t	o 2.00m	END	398.82 P backfill	4.30 led with	TP terri	ninated at 4.30m bg	l. Maximum reach of	°excavator. Scale: 1:25 Ph.

PI L	ROJECT: 1 DCATION:	Balliı : Co	nagree Cork	Wind Farm	1					TRIALPIT: TP-10 Sheet 1 of 1
C	LIENT: Co	oillte							Co-ordinates:	Rig: Hyundai HX140L
E	NGINEER:	Feh	ily Tim	oney & Co					E 538,334.4 N 586,568	.4 Rev: DRAFT
Gr G	ound level: 4	06.931 ATE	n O.D. R			DUT			4.00	DATE: 19.3.21
W 1st 2n 3rt	ater strikes: : 0.00m d: 1:	Ros	e to after:			PIT I PIT I LOG	DIREC DIMEN GED I	STION NSION BY:	AG	Stability: Pit moderately stable.
Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)	DE	SCRIPTION
-0		<u> </u>				× ×			Plastic dark brown amorphous PEAT.	
- - - - - - - - - - - - - - - - -			•	1.00-1.30		정 회 것 가 가 가 가 가 가 가 가 가 가 가 가 가 가 가 가 가 가			н9.	
-3			B	3.00-3.50			402.53	4.40	Grey silty sandy subangular to subround cobble content. Cobbles are subangular 3.00m: with low boulder content. Bould <400mm in diameter. TP terminated at 4.40m bgl on REs instr	ed fine to coarse siltstone GRAVEL with high to subrounded of siltstone. ers are subangular of siltstone. Boulders are
R	emarks: S	eepage	e of water	from g/l to 2.	70m bgl	. TP ba	ckfilled v	with arisi	ngs.	Scale:
1	Million .							Irish	drilling LTD	1:25 Ph. Fax

PR	OJECT: 1	Ballin Co	nagree Cork	Wind Farn	1							TRIALPIT: T	P-11A		
CL	IENT: Co	oillte	COIR							Co-ordinates	:	Rig: Hyundai HX	(140L		
EN	GINEER:	Feh	ily Tim	ioney & Co						E 536,988.0	N 586,756.1	Rev: DRAFT			
Gro	OUNDW	25.451 ATE	m O.D. R			DIT			. 0.45.2	Ŋ5 ⊨	4.00	DATE: 22.3.21 Shoring/Support:	N/A		
Wat 1st: 2nd	er strikes: dry	Ros	e to after:			PIT	DIREC	NSION NSION	: 045-2 1: 1.20	²⁵ 4.00m _D	B	Stability: Pit stabl	e.		
3rd:						LUG	GEDI		AG		С				
			Sa	(m)	/ane	Q	uo .	(m)			DESCOL	DTION			
pth (r	ate	ater	Idmi	epth	-situ V sts	EGE	levati O.D	epth			DESCRI	FIION			
	Ő	W	Š	<u> </u>	Te		Ξu	Ď		CROUPUR E'					
Ŭ									MADE boulder	GROUND: Firm gre content.	ey sandy gravelly CL	AY with medium cobble	e content and low		
Γ															
-															
F															
-															
							424.45	1.00							
1						<u>, , , ,</u>			Spongy H7.	dark brown pseudo	fibrous PEAT.				
Γ						<u> </u>									
F				1 50-1 60		<u> </u>									
-			•	1.50-1.00		<u>1, x1,</u>									
ŀ						<u>~~~~</u>	422.55	1.00							
-2			ा इन्न B	2.00-2.30			423.33	1.90	Grey silty sandy subangular to subrounded fine to coarse sandstone GRAVEL with low cobble content. Cobbles are subangular to subrounded of sandstone.						
			1	2.00 2.50							5				
			2020				423.15	2.30	Weathe	red SILTSTONE roc	ek.				
F									Recove silty gra	red as angular cobble welly sand matrix.	e and boulder sized	clasts of strong purple an	d grey siltstone with		
ŀ						\sum									
-															
-3			S B	3.00-3.40											
L. CC			10101010 10101010												
			00000				422.05	3.40							
5						END			TP term	inated at 3.40m bgl.	Obstruction as rock	Κ.			
-															
-															
-4															
-															
-5															
Rer	emarks: TP dry on excavation. TP backfilled with arisings.														
								Irist	ı drill	ing LTD			1:25 Ph. Fax		
<u> (1.55</u> .	a:									8			1 HA		
CLIENT: Control ENCIRER: Foldy Timoney & Co Co-ordinates: b: 50,800 N \$56,731.0 Re; Efford 114(140). Re: DRAFT Co-ordinates: b: 50,800 N \$56,731.0 Re; Efford 114(140). Re: DRAFT Co-ordinates: b: 50,800 N \$56,731.0 D. EVENTWENT RESCRIPTION: 180,560 0 CO-OFF PL-ST Subary Support: NA Subary Support: NA Support: Subary Support: NA Subary Support: Subary Support: Support: Subary Support: Subary Support: Support: Subary Support: Sub	PR	OJECT: 1 CATION:	Balliı : Co	nagree Cork	Wind Farn	n							TRIALPIT: T	P-12	
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ENCLER: Folds Timony & Co E \$39.400 N \$8:31.0 Re:: DRAT CROUNDWATER DTT DIRECTION: 180-360 Image: 19.31 Strang/Super: 18.3 Strang/Super: 18.3 More takes, Mark PTT DIRECTION: 120 * 400m Image: 120 * 100 Strang/Super: 18.3 More takes, Mark PTT DIRECTION: 120 * 400m Image: 120 * 100 Strang/Super: 18.3 More takes, Mark Image: 120 * 100 Image: 120 * 100 Strang/Super: 18.3 More takes, Mark Image: 120 * 100 Image: 120 * 100 Strang/Super: 18.3 More takes, Mark Image: 120 * 100 Image: 120 * 100 Strang/Super: 18.3 More takes, Mark Image: 120 * 100 Image: 120 * 100 Strang/Super: 18.3 More takes, Mark Image: 120 * 100 Image: 120 * 100 Strang/Super: 18.3 More takes, Mark Image: 120 * 100 Image: 120 * 100 Strang/Super: 18.3 More takes, Mark Image: 120 * 100 Image: 120 * 100 Strang/Super: 18.3 More takes, Mark Image: 120 * 100 Image: 120 * 100 Strang/Super: 18.3 More takes, Mark Image: 120 * 100	CL	IENT: Co	oillte	com							Co-ordin	ates:	Rig: Hyundai HX	(140L	
Grown level: 398.28m (LB, GRUUL NWAT HER THE DIMENSION: 1.20 * 4.00m and and and and and and and and	EN	GINEER:	Feh	ily Tim	ioney & Co)					Е 539,009.0	0 N 586,731.0	Rev: DRAFT		
Numerical basis Busis after ITI DIRECTION 180-000 p Iteration of the second state of the s	Gro GR	und level: 3	98.351 ATE	m O.D. R								4.00	DATE: 19.3.21	N/ A	
understand understand <td>Wat 1st: 2nd: 3rd:</td> <td>er strikes: 0.50m</td> <td>Ros</td> <td>e to after:</td> <td></td> <td></td> <td>PIT PIT LOG</td> <td>DIREC DIMEN GED I</td> <td>STION NSION BY:</td> <td>N: 180-30 N: 1.20 * AG</td> <td>60 * 4.00m _D</td> <td>A C</td> <td>Shoring Support. Stability: Pit mode</td> <td>erately stable.</td>	Wat 1st: 2nd: 3rd:	er strikes: 0.50m	Ros	e to after:			PIT PIT LOG	DIREC DIMEN GED I	STION NSION BY:	N: 180-30 N: 1.20 * AG	60 * 4.00m _D	A C	Shoring Support. Stability: Pit mode	erately stable.	
0 0 <td>Depth (m)</td> <td>Date</td> <td>Water</td> <td>Samples</td> <td>Depth (m)</td> <td>In-situ Vane Tests</td> <td>LEGEND</td> <td>Elevation m O.D.</td> <td>Depth (m)</td> <td></td> <td></td> <td>DESCR</td> <td>IPTION</td> <td></td>	Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)			DESCR	IPTION		
Image: Servery of water at 0.50m bgl. TP backfilled with arisings. Image: Servery of water at 0.50m bgl. TP backfilled with arisings. Image: Servery of water at 0.50m bgl. TP backfilled with arisings.	-0						<u> ~~ ~</u>			Spongy	brown pseudo t	fibrous PEAT.			
Image: Service of water at 0.50m byl. TP backfilled with arisings. Image: Service of water at 0.50m byl. TP backfilled with arisings. Image: Service of water at 0.50m byl. TP backfilled with arisings.	╞						<u>1, 81,</u> 81, 81,			H7.					
-1 -1 -2 <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td><u>, , , ,</u></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>							<u>, , , ,</u>								
1 1			Ť				<u> </u>								
1 1 <td>F</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td><u>1/ \1/</u> \1/ \</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	F						<u>1/ \1/</u> \1/ \								
1 Image: Description of the second state	ŀ						<u>1, N1,</u>								
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - <t< td=""><td>-1</td><td></td><td></td><td>D</td><td>1.00-1.10</td><td></td><td><u> </u></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>	-1			D	1.00-1.10		<u> </u>								
-2 B 2.50-3.00 B 2.50-3.00 Constrained and the second of sites and t				•			<u> </u>								
-2 -3 -4 <	Γ						<u>1, x1,</u>								
-2 -2 <td< td=""><td>F</td><td></td><td></td><td></td><td></td><td></td><td><u> </u></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>	F						<u> </u>								
-2 -2 <td< td=""><td>F</td><td></td><td></td><td></td><td></td><td></td><td><u> </u></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>	F						<u> </u>								
-2 B 2.50-3.00 B 2.50-3.00 Very stiff grey sandy gravelly SILT with medium cobble content. Gravel is subangular to subrounded of silistone. Cobbles are subangular to subrounded of silistone of silistone. Cobbles are subangular to subrounded of silistone of silistone. Cobbles are subangular to subrounded of silistone of silistone. Cobbles are subangular to subrounded of silistone of silistone. Cobbles are subangular to subrounded of silistone of silistone. Cobbles are subangular to subrounded of silistone of silistone. Cobbles are subangular to subrounded of silistone of silistone. Cobbles are subangular to subrounded of silistone of silistone. Cobbles are subangular to subrounded of silistone of silistone. Cobbles are subangular to subrounded of silistone of silistone. Cobbles are subangular to subrounded of silistone of silistone. Cobbles are subangular to subrounded of silistone of silistone. Cobbles are subangular to subrounded of silistone of silistone. Cobbles are subangular to subrounded of silistone of silistone. Cobbles are subangular to subrounded of silistone of silistone. Silistone of silistone of silistone of silistone. Silistone of silistone of silistone of silistone of silistone of silistone. Silistone of silistone of silistone of silistone of silistone of silistone of silistone. Silistone of s	Ļ						<u>1, N1,</u>								
P B 2.50-3.00 B 2.50-3.00 Very stiff grey sandy gravelly SILT with medium cobble content. Gravel is subangular to subrounded of siltstone. Cobbles are subangular to subrounded of siltstone. B 2.50-3.00 B 2.50-3.00 Very stiff grey sandy gravelly SILT with medium cobble content. Gravel is subangular to subrounded of siltstone. C B 2.50-3.00 C Very stiff grey sandy gravelly SILT with medium cobble content. Gravel is subangular to subrounded of siltstone. C C C C Very stiff grey sandy gravelly SILT with medium cobble content. Gravel is subangular to subrounded of siltstone. C C C C C C C C C C C C C C C C C C C C C C C C C C C C C C C D D C C C C C C C C C C C C C C C C C C C C C							<u></u>								
Image: Seepage of water at 0.50m bgl. TP backfilled with arisings. END Very stiff grey sandy gravelly SILT with medium cobble content. Gravel is subangular to subrounded of siltstone. Cobbles are subangular to subrounded of siltstone. Image: Comparison of the subrounded fine to coarse of siltstone. Cobbles are subangular to subrounded of siltstone. Very stiff grey sandy gravelly SILT with medium cobble content. Gravel is subangular to subrounded of siltstone. Image: Comparison of the subrounded fine to coarse of siltstone. Very stiff grey sandy gravelly SILT with medium cobble content. Gravel is subangular to subrounded of siltstone. Image: Comparison of the subrounded fine to coarse of siltstone. Very stiff grey sandy gravelly SILT with medium cobble content. Gravel is subangular to subrounded of siltstone. Image: Comparison of the subrounded fine to coarse of siltstone. Very stiff grey sandy gravelly Sandy matrix. Image: Comparison of the subrounded fine to coarse of siltstone. Very stiff grey sandy matrix. Image: Comparison of the subrounded fine to coarse of siltstone. Very stiff grey sandy matrix. Image: Comparison of the subrounded fine to coarse of siltstone. Very stiff grey sandy matrix. Image: Comparison of the subrounded fine to coarse of siltstone. Very stiff grey sandy matrix. Image: Comparison of the subrounded fine to coarse of siltstone. Very stiff grey sandy matrix. Image: Comparison of the subrounded fine to coarse of siltstone. Very stiff grey sandy mat	F ²						<u> </u>								
3 B 2.50-3.00 So to the set of shistone. Course of shistone. Courses are standingular to subordinded of shistone. 3 B 2.50-3.00 So to the set of shistone. Courses are standingular to subordinded of shistone. 4 B 4.00-4.30 Weathered SANDSTONE rock. 8 4.00-4.30 No and the set of shistone. Recovered as angular cobile and boulder sized clasts of strong brown fine grained sands with sity gravelly sandy matrix. 4 B 4.00-4.30 TP terminated at 4.30m bgl. Maximum reach of excavator. 5 Scale: 1:25	ŀ						*0.× */	396.15	2.20	Very sti	ff grey sandy gr	avelly SILT with medi	um cobble content. Gravel	is subangular to	
A B 2.50-3.00 A	╞						× × ×			subroun		ise of sitistone. Couble:		laca of sitistone.	
-3 -3 -3 -3 -3 -4 -3 -4 -3 -4 -3 -4 -3 -4 -4 -4 -4 -5 -5 -4 <td< td=""><td>Ļ</td><td></td><td></td><td>B</td><td>2.50-3.00</td><td></td><td>$\hat{\varphi}^{*}$</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>	Ļ			B	2.50-3.00		$\hat{\varphi}^{*}$								
3 Image: Seepage of water at 0.50m bgl. TP backfilled with arisings. Weathered SANDSTONE rock. Recovered as angular cobble and boulder sized clasts of strong brown fine grained sands with sifty gravelly sandy matrix. 4 Image: Background and the strong brown fine grained sands with sifty gravelly sandy matrix. 5 Image: Background and the strong brown fine grained sands with arisings. 5 Image: Background and the strong brown fine grained sands with arisings. 5 Image: Background and the strong brown fine grained sands with arisings. 5 Image: Background and the strong brown fine grained sands with arisings. 5 Image: Background and the strong brown fine grained sands with arisings. 5 Image: Background and the strong brown fine grained sands with arisings. 5 Image: Background and the strong brown fine grained sands with arisings.				100000			ХОх. ХОх.								
3 A				1010101			× ·								
4 B 4.00-4.30 Weathered SANDSTONE rock. Recovered as angular cobble and boulder sized clasts of strong brown fine grained sands with silty gravely sandy matrix. 5 B 4.00-4.30 FND TP terminated at 4.30m bgl. Maximum reach of excavator. 5 END TP terminated at 4.30m bgl. Maximum reach of excavator. Scale: 1:25	-3			X			ۍ×. × %								
4 B 4.00-4.30 Weathered SANDSTONE rock. Recovered as angular cobble and boulder sized clasts of strong brown fine grained sands with silty gravelly sandy matrix. 4 B 4.00-4.30 Image: Comparison of the second sec	-						^{69.} ୪୦								
4 B 4.00-4.30 Weathered SANDSTONE rock. Recovered as angular cobble and boulder sized clasts of strong brown fine grained sands with silty gravelly sandy matrix. 4 B 4.00-4.30 TP terminated at 4.30m bgl. Maximum reach of excavator. 5 END TP terminated at 4.30m bgl. Maximum reach of excavator. 75 Remarks: Seepage of water at 0.50m bgl. TP backfilled with arisings. Scale: 1:25	-						×°^. ×								
A B 4.00-4.30 Weathered SANDSTONE rock. Recovered as angular cobble and boulder sized clasts of strong brown fine grained sands with silty gravelly sandy matrix. A B 4.00-4.30 TP terminated at 4.30m bgl. Maximum reach of excavator. F F F F F Remarks: Seepage of water at 0.50m bgl. TP backfilled with arisings. Scale: 1:25							0° × °C © × °C	<u>394.75</u>	<u>3.60</u>						
4 B 4.00-4.30 With silty gravelly sandy matrix. 4 B 4.00-4.30 Image: Second state sta										Weathe Recover	red SANDSTO	NE rock. obble and boulder sized	d clasts of strong brown fir	e grained sandstone	
4 B 4.00-4.30 394.05 4.30 394.05 4.30 TP terminated at 4.30m bgl. Maximum reach of excavator. 5 END TP terminated at 4.30m bgl. Maximum reach of excavator. 6 F F F 7 F F F 8 F F F 9 F F F 9 F F F 9 F F F 9 F F F 9 F F F 10 F F F 11 F F F 11 F F F 11 F F F 11 F F F	F									with silf	ty gravelly sand	y matrix.			
Image: Seepage of water at 0.50m bgl. TP backfilled with arisings. Scale: Image: Seepage of water at 0.50m bgl. TP backfilled with arisings. Image: Seepage of water at 0.50m bgl. TP backfilled with arisings.	-4			B	4.00-4.30										
Image: Seepage of water at 0.50m bgl. TP backfilled with arisings. TP terminated at 4.30m bgl. Maximum reach of excavator. Image: Seepage of water at 0.50m bgl. TP backfilled with arisings. Scale: Image: Seepage of water at 0.50m bgl. TP backfilled with arisings. 1:25	-			2020202											
-5 Remarks: Seepage of water at 0.50m bgl. TP backfilled with arisings. Scale: 1:25				8			END	394.05	4.30	TP term	inated at 4.30m	n bgl. Maximum reach o	of excavator.		
-5 Remarks: Seepage of water at 0.50m bgl. TP backfilled with arisings. Scale: 1:25															
5 Image: Seepage of water at 0.50m bgl. TP backfilled with arisings. Scale: 1:25															
-5 Remarks: Seepage of water at 0.50m bgl. TP backfilled with arisings. Scale: 1:25															
Remarks: Seepage of water at 0.50m bgl. TP backfilled with arisings. Scale: 1:25	-5													1	
1:25	Rer	narks: S	eepag	e of wate	r at 0.50m bgl.	TP bacl	kfilled v	vith arisi	ngs.					Scale:	
Irish drilling LTD Ph. Fax	an and	June -							Irisł	h drill	ing LTD			Ph. Fax	

PR LO	OJECT: 1 CATION:	Ballii Co	nagree Cork	Wind Farn	1							TRIALPIT: TP-13 Sheet 1 of 1
CL	IENT: Co	oillte	com							Co-ordina	ites:	Rig: Hyundai HX140L
EN	GINEER:	Feh	ily Tim	ioney & Co						E 539,514.3	N 586,805.8	Rev: DRAFT
Gro GR Wat 1st: 2nd: 3rd:	und level: 33 OUNDWA er strikes: dry	86.431 ATE Ros	m O.D. R e to after:			PIT PIT LOG	DIREC DIMEN GED I	CTION NSION BY:	: 010-19 (: 1.20 * AG	0 ^{⊲−} 4.00m _D	4.00	DATE: 19.3.21 Shoring/Support: N/A Stability: Pit stable.
Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)			DESCR	IPTION
-0 - - - - - - - - - - 2			• ^D	1.00-1.10		ちょういいしょういいしょういいしょういいしょういいしょういいしょういいしょういい	384.23	2.20	Spongy d H7.	lark brown pset	ido fibrous PEAT.	
-3			B	2.50-3.00			282.63	3 80	Light bro GRAVEI and sands 3.00m: w subround	wn silty sandy L with medium stone. /ith high cobble led. Boulders a	subangular to subroun cobble content. Cobbl content and low bould c <400mm in diamete	ded fine to coarse siltstone and sandstone es are subangular to subrounded of siltstone der content. Boulders are subangular to r.
-4			B	4.00-4.30		END	382.13	4.30	Weathere Recovere silty sand	ed SILTSTONE ed as angular ec l matrix. Bould nated at 4.30m	Frock. bble and boulder sizec ers are <400mm in dia bgl. Maximum reach o	l clasts of strong orangish brown siltstone with meter.
-5 Rer	narks: T	P dry	on excave	ation. TP back	filled wi	th arisi	ngs.	Irish	<u>drilli</u>	ng LTD		Scale: 1:25 Ph. Fax

PR LO	OJECT: CATION	Balli : Co	nagree Cork	Wind Farn	n						TRIALPIT: T Sheet 1 of 1	P-14
CL	IENT: C	oillte								Co-ordinates:	Rig: Hyundai HX	K140L
EN	GINEER:	Fel	nily Tin	10ney & Co)					E 533,448.8 N 585,310.6	Rev: DRAFT	
Gro	OUNDW.	ATE	m 0.D. R			DIT			ī.	4.00	Shoring/Support:	N/A
Wat 1st:	er strikes: dry	Ros	se to after:			PIT D	DIREC	NSION	: 1:1.20	* 4.00m D	Stability: Pit stabl	le.
2nd: 3rd:			i	i		LOG	GED I	BY:	AG	С	_ <u>¥</u>	
Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)		DESC	CRIPTION	
-0 - - - - - - - - - - - - - - - - - -			B	0.50-1.00					Reddisi GRAV siltston	brown silty sandy angular to subro EL with high cobble content. Cobbl S.	ounded fine to coarse sandstor es are subangular to subround	e and siltstone led of sandstone and
-3						END			TP term	inated at 2.70m bgl. Obstruction as	possible rock.	
Rer	narks: I	ngress	of surfac	e water. TP dr	y on exc	avation	. TP bac	kfilled w	ith arisin	35.		Scale:
1								T 1				1:25
	June .							Irist	ı arıll			Fax

PR LO	OJECT: 1 CATION:	Balli : Co	nagree Cork	Wind Farn	n							TRIALPIT: TP-15 Sheet 1 of 1		
CL	IENT: Co	oillte								Co-ordinates:		Rig: Hyundai HX140L		
EN	GINEER:	Feh	nily Tin	10ney & Co)	-				E 533,606.6 N 584,8	845.9	Rev: DRAFT		
Gro GR	und level: 4	34.271 ATE	m O.D. R							4.00		DATE: 11.3.21		
Wat 1st: 2nd: 3rd:	er strikes: 0.30m	Ros	e to after:			PIT PIT LOG	DIREC DIMEI GED I	CTION NSION BY:	1: N: 1.20 * AG	4.00m D	B	Shoring/Support: N/A Stability: Pit stable. 1.20		
Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)		Γ	DESCRII	PTION		
-0						<u>× ′′ ×</u>			Plastic H9.	lamp dark grey slightly silty a	amorphous	PEAT.		
-		↓	•D	0.20-0.30		<u>// x//</u> x// x/	433 97	0.30						
-		÷	Γ						Reddis low cob	brown silty sandy subangula ble content. Cobbles are suba	ar to subrou angular to si	nded fine to coarse siltstone GRAVEL with ubrounded of siltstone.		
-			B	0.50-1.00						ole coment. Coooles are suba	ingulai to si			
			2020202											
Γ			1010101											
-1			X											
-														
-														
									1.50m:	with medium cobble and low	boulder co	ntent. Boulders are subangular. Boulders are		
	<400mm in diameter.													
F														
-2			B	2.00-2.50		\bigcirc			2.00m:	with high boulder content. Bo	oulders are	<500mm in diameter.		
-														
			100000			6								
		—				FO	431.77	2.50	TP term	inated at 2.50m bgl. Obstruct	tion as rock	Σ.		
ſ														
-														
-3														
707 6														
-4														
-														
-5														
Rer	l narks: S	l light s	keepage o	f water at 0.30	l m bgl. T	P back	filled wit	l h arising	gs.			Scale:		
								.				1:25		
	Line.							Irisł	n drill	ing LTD		ги. Fax		

PR LO	OJECT:] CATION:	Balli : Co	nagree Cork	Wind Farn	n					TRIALPIT: TP-16 Sheet 1 of 1
	IENT: Co	oillte							Co-ordinates: E 533 559 2 N 584 334 7	Rig: Hyundai HX140L
EN ⁰ Gro	GINEER: und level: 4	Feb 61.95	nly Tim m O.D.	ioney & Co)				E 555,557.2 IN 504,554.7	DATE: 10.3.21
GR Wat 1st: 2nd: 3rd:	OUNDWA er strikes: 3,00m	ATE Ros	R e to after:			PIT I PIT I LOG	DIREC DIMEN GED I	CTION NSION BY:	$\begin{array}{c c} & & & & & \\ \hline & & & \\ \vdots 1.20 & * & 4.00m \\ AG \end{array} \right _{D} \\ \hline \\ & & & \\ & & \\ & & & $	Shoring/Support: N/A Stability: Pit moderately stable.
Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)	DESCR	IPTION
-0						<u>×~ ~</u>			Plastic dark grey silty amorphous PEAT with r	oots.
-			●D	0.20-0.30		$\frac{1}{X} \frac{\sqrt{1}}{2}$	461.65	0.20	H9.	
- -1 - -2			• B B B B B B B B B B B B B B B B B B B	1.00-1.50 2.00-2.50		$\frac{1}{2} \begin{bmatrix} 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \\ 0 & 0 &$	459.35	2.60	Brown silty sandy angular to subangular fine to low cobble content. Cobbles are subangular to 1.50m: with high cobble.	o coarse GRAVEL of various lithologies with subrounded of various lithologies.
-3 -4 -5	narks: S	₽		3.00-3.50	TP bad		457.25	4.70	Purple silty sandy angular siltstone GRAVEL 3.00m: brown. TP terminated at 4.70m bgl.	with high cobble content.
Rer	narks: S	eepag	e of wate	r at 3.00m bgl.	TP bac	cfilled v	with arisi	ngs.		Scale:
an and	i.							Irist	drilling LTD	1:25 Ph. Fay
1	2							11131		Fax

PR LO	OJECT: 1 CATION:	Balliı Co	nagree Cork	Wind Farn	1								TRIALPIT: T	P-17
CL	IENT: Co	oillte								Co-ord	linates:		Rig: Hyundai HX	K140L
EN	GINEER:	Feh	ily Tim	ioney & Co						E 534,5	10.1 N	583,678.8	Rev: DRAFT	
Gro	und level: 3	14.851 A TEI	m O.D. R								1.4	100 51	DATE: 10.3.21	
Wat 1st: 2nd: 3rd:	er strikes: dry	Ros	e to after:			PIT I PIT I LOG	DIREC DIMEN GED I	CTION NSION BY:	: : 1.20 AG	* 4.00m		C	Shoring/Support: Stability: Pit unst 1.20 collapse.	N/A able. Sidewall
Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)				DESCR	IPTION	
-0									TOPSC	IL: Grass ov	er peaty s	ilty sandy CLAY		
Light brows sity sady subangular to subrounded fine to coarse GRAVEL of various lithologies. Boulders are of siltstone. Boulders are <1200mm in diameter.														
-2 -			B	2.00-2.30			312 55	2 30						
-3 -3 -4 -4						END			TP term	inated at 2.3	30m bgl. U	Inable to progress	s TP - sidewall collapse.	
Rei	narks: Ir	ngress	of surfac	e water. TP dr	y on exc	avation	. TP bac	kfilled w	ith arising	gs.				Scale: 1:25
tin and	and the second se							Irish	ı drill	ing LT	D			Ph. Fax

P L	ROJECT:	Balli : Co	nagree Cork	Wind Farn	n							TRIALPIT: TP-18 Sheet 1 of 1			
С	LIENT: Co	oillte								Co-ordin	ates:	Rig: Hyundai HX140L			
E	NGINEER:	Feh	nily Tim	10ney & Co)					Е 534,442.	4 N 583,869.3	Rev: DRAFT			
G	ROUNDW	ATE	R 0.D.			DIT	DIDEC	TION	· ·	×	4.00	Shoring/Support: N/A			
W 1s 2r	ater strikes: t: dry d:	Ros	se to after:			PIT	DIMEN GED I	NSION BY:	1:1.20 AG	* 4.00m _D	В	T Stability: Pit stable.			
31	d:		r	ĺ		200					С	±			
Denth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)			DESCR	IPTION			
-0						<u> </u>			Plastic H8.	dark brown amo	orphous PEAT with root	tlets.			
-			•D	0.20-0.30		<u>\// \</u>	316.84	0.30	Stiffor	wich brown car	dy gravelly CLAV with	madium cobble content, gravel is subongular.			
-			R.	0.50.1.00		× × ×			to subre	ounded of siltsto	one. Cobbles are subang	gular to subrounded of siltstone.			
-			1	0.50 1.00											
-			00000												
-1			<i>36363</i>												
							315.84	1.30	Weathe	red SILTSTON	IE rock.				
ſ									gravelly	red as angular c / sandy matrix.	cobble and boulder sized	I clasts of siltstone with orangish brown silty			
F															
-															
-2	B 2.00-2.30														
-	B 2.00-2.30 314.84 2.30														
-	Image: State of the s														
-															
1000															
-3															
-															
-															
-4															
-															
j -															
-5															
R	emarks: 7	P dry	on excav	ation. TP back	filled wi	th arisi	ngs.					Scale:			
- Inte	Dentry							Irisł	ı drill	ing LTD		Ph. Fax			

PR	OJECT:	Ballin Co	nagree Cork	Wind Farn	n							TRIALPIT: TP-19 Sheet 1 of 1		
CL	IENT: Co	oillte	CUIK							Co-ordinat	tes:	Rig: Hyundai HX140L		
EN	GINEER:	Feh	nily Tim	ioney & Co)					E 534,489.8	N 584,122.2	Rev: DRAFT		
Gro	OUNDW	20.321 ATE	m O.D. R			ріт			T •	H	4.00	DATE: 10.3.21 Shoring/Support: N/A		
Wat 1st: 2nd	er strikes: dry	Ros	e to after:			PIT	DIME	NSION NSION	N: 1.20 *	* 4.00m _D	В	Stability: Pit moderately stable.		
3rd:						LUG					С			
(iii)			sa	(m)	'ane	Q	uo .	(m			DESCOL	PTION		
epth (r	ate	ater	ldm	epth	-situ V sts	EGE	levati O.D	epth			DESCRI	PIION		
	D	M	Š	ă	In	FI	Ξu	ă						
ľ									MADE	GROUND: Brow	n silty sandy angular s	iltstone COBBLES with low boulder content.		
Ē														
-														
-							210.62	0.70						
_							319.02	0.70	Light bi Boulder	rown silty sandy C	GRAVEL with high col	oble content and low boulder content.		
									Dounder					
			B B	1.00-1.50		$\mathcal{G}_{\mathbf{r}}$			1.00m:	hard digging.				
-			00000											
-			1010101			Ċ)								
_														
-														
-2	Image: Solution in the second seco													
-	END TP terminated at 2.00m bgl. Obstruction.													
-														
1710														
-3														
-														
5														
107 07														
-4														
-														
5														
Rer	narks: T	P dry	on excav	ation. TP back	filled wi	th arisi	ngs.		ļ			Scale:		
								Tu:-1	1 1 11	ing I TD		1:25 Ph.		
	· 1040. *							irist	ı arıll	ing LID		Fax		

PRC LOC	DJECT: 1	Ballii : Co	nagree Cork	Wind Farn	1							TRIALPIT: TP-20 Sheet 1 of 1
CLI	ENT: Co	oillte								Co-ordina	tes:	Rig: Hyundai HX140L
ENC	GINEER:	Feh	ily Tim	ioney & Co)					E 534,822.3	N 584,194.8	Rev: DRAFT
Grou GRO Wate 1st: 2nd: 3rd:	oUNDW	ATE Ros	R e to after:			PIT PIT LOG	DIREC DIMEI GED I	CTION NSION BY:	: 1:1.20 AG	★ 4.00m _D	4.00	Shoring/Support: N/A Stability: Pit stable.
Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)			DESCRI	IPTION
-0 - - -			B	0.50-1.00			290.90	0.70	MADE	GROUND: Grar	ular fill. Grey sandy G	RAVEL with high cobble content.
- -1 - -			B B	1.00-2.00					Light b high co 1.00m:	rown silty sandy bble content. Col with high boulde	subangular to subround bbles are subangular to r content. Boulders are	ted fine to coarse silfstone GRAVEL with subrounded of silfstone.
-2			20000			END	289.60	2.00	TP tern	ninated at 2.00m	bgl. Obstruction as bou	ılders.
The work rises Ballinagree wF PPS all	narks: T	P dry	on excava	ation. TP back	filled wi	ith arisin	ngs.					Scale: 1:25
								Irish	n drill	ing LTD		Ph. Fax

CLEEN: Collite ENCIPEER: Felily Timoney & Co Co-ordinates: E-SS220 N 584294. Ng: Hyundai HN1401. Re: DRAFT CHOUNDWATER Warming Box sales PTT DIRECTION: LOCGED BY: AG DAT: 1 DAT: 1 Storing Support, NA Storing Support,	PRO LOO	DJECT:	Balli : Co	nagree Cork	Wind Farn	n					TRIALPIT: TP-21 Sheet 1 of 1
ENGINER: Foliy Timoney & Co E S3/29.2 N S8/279.2 N S8/279.3 Re: BANT CONDUMATER PIT DIRECTION: DATE: 13.31 Varianticity Rest after: PIT DIRECTION: Image: Action of the second control control of the second control of the second control cont	CLI	ENT: Co	oillte							Co-ordinates:	Rig: Hyundai HX140L
Image: Construct of Construction Image: Construction Image: Construction Image: Construction Vertex rules Image: Construction Image: Construction Image: Construction Image: Construction Vertex rules Image: Construction Image: Construction Image: Construction Image: Construction Vertex rules Image: Construction Image: Construction Image: Construction Image: Construction Image: Construction Image: Construction Image: Construction Image: Construction Image: Construction Image: Construction Image: Construction Image: Construction Image: Construction Image: Construction Image: Construction Image: Construction Image: Construction Image: Construction Image: Construction Image: Construction Image: Construction Image: Construction Image: Construction Image: Construction Image: Construction Image: Construction Image: Construction Image: Construction Image: Construction Image: Construction Image: Construction Image: Construction Image: Construction Image: Construction Image: Construction Image: Construction Image: Construction Image: Construction Image: Construction Image: Construction Image: Construction Image: Construle	ENC	GINEER:	Feh	nily Tim	oney & Co)				E 535,279.2 N 584,270	D.4 Rev: DRAFT
Image: Second	Grou GRO Wate 1st: 2nd: 3rd:	oundwie 2 oundwie er strikes: dry	ATE Ros	m O.D. R he to after:			PIT PIT LOG	DIREC DIMEI GED I	CTION NSION BY:	: 4.00 AG * 4.00m D	B ↓ 1.20 DATE: 12.3.21 Shoring/Support: N/A Stability: Pit stable.
0 25 S Plastic data brown anterplace PEAT. 10 0.304.40 25 S 100 20.33 0.40 20.33 0.40 20.34 0.40 20.33 0.40 20.35 0.70 Data brown party GRAVEL with occasional roots. 20.35 0.70 20.35 0.70 1 1 1 <	Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)	DE	ESCRIPTION
1 Image: State of the state	-0 -			• D	0.30-0.40		<u>~~~~</u> <u>~~~~</u>	291 13	0.40	Plastic dark brown amorphous PEAT. H9.	
Light brown sity subangular to subangular to subangular of silistone and sandstore. B 1.00-1.50 B 1.00-1.50 B 1.50-2.00 B 1.5								290.83	0.70	Dark brown peaty GRAVEL with occas	ional roots.
1 1.50:: with high houlder content. Boulders are subangular to angular of siltstone. Boulare <500mm in diameter. Hard digging.	- -1 -			B	1.00-1.50					Light brown silty sandy angular to suba medium cobble content. Cobbles are an	ngular fine to coarse siltstone GRAVEL with gular to subangular of siltstone and sandstone.
1 1 <td>-</td> <td></td> <td></td> <td>B B</td> <td>1.50-2.00</td> <td></td> <td></td> <td></td> <td></td> <td>1.50m: with high boulder content. Boul are <500mm in diameter. Hard digging</td> <td>ders are subangular to angular of siltstone. Boulders</td>	-			B B	1.50-2.00					1.50m: with high boulder content. Boul are <500mm in diameter. Hard digging	ders are subangular to angular of siltstone. Boulders
	-2						END	289.33	2.20	TP terminated at 2.20m bgl. Obstructio	n as boulders.
	TPS ALL FILE MAR 29 2021.GPJ IRISHDRL.GDT 18/6/21										
Remarks: TP dry on excavation. TP backfilled with arisings. Scale:		narks: T	P dry	on excava	ation. TP back	filled w	ith arisi	ngs.			Scale:
Irish drilling LTD		6							Irisł	ı drilling LTD	Ph. Fax

PRO LO	DJECT:	Balliı : Co	nagree Cork	Wind Farn	n					TRIALPIT: TP-22 Sheet 1 of 1
CLI	IENT: CO	oillte							Co-ordinates:	Rig: Hyundai HX140L
EN	GINEER:	Feh	ily Tim	ioney & Co)				E 535,151.4 N 584,709.7	Rev: DRAFT
Grou GR Wate 1st: 2nd: 3rd:	oUNDW. ound level: 3 ound level: 3	ATE Ros	m O.D. R e to after:			PIT PIT LOG	DIREC DIMEI GED I	CTION NSION BY:	$\begin{array}{c} \begin{array}{c} & & & & \\ \begin{array}{c} \bullet & & \\ \bullet & & \\ 1.20 & * & 4.00m \\ AG \end{array} \end{array} \right _{D} \\ \hline \\ C \end{array}$	DATE: 11.3.21 → Shoring/Support: N/A Stability: Pit stable.
Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)	DES	CRIPTION
-0						<u> </u>	218 74	0.20	Plastic dark brown amorphous PEAT. H9.	
- - - -1			B	0.50-1.00			217.(4	1.20	Yellowish orangish brown silty sandy GRA content and low boulder content. Boulders diameter.	VEL of various lithologies with high cobble are angular of siltstone. Boulders are <400mm in
- - -2			B B B B B B B B B B B B B B B B B B B	1.50-2.00			317.64	2.10	Brown stained dark brown silty sandy ang cobble content and high boulder content. C Boulders are subangular to angular of silts	alar fine to coarse siltstone GRAVEL with high Cobbles are subangular to angular of siltstone. tone.
s & WL RISES BALLINAGREE WF TPS ALL FILE MAR 29 2021.GPJ IRISHDRL.GDT 18/6/21					END			TP terminated at 2.10m bgl. Obstruction a	s possible rock.	
NEN TIE	narks: T	P dry	on excava	ation. TP back	filled w	ith arisii	ngs.	-		Scale: 1:25
TRIA								Irisł	drilling LTD	Ph. Fax

PR LO	OJECT:	Balli : Co	nagree Cork	Wind Farn	n						TRIALPIT: 7 Sheet 1 of 1	ГР-23	
	JENT: C	oillte	COIN							Co-ordinates:	Rig: Hyundai F	IX140L	
EN	GINEER	Fel	nily Tim	ioney & Co						E 536,285.0 N 584,253.2	Rev: DRAFT		
Gro	und level: 2	60.51	m O.D.								DATE: 11.1.00		
Wa	ter strikes:	AIL Ros	K se to after:			PIT	DIREC	TION	:	₩ 4.00 → A	 Shoring/Suppor ↓ Stability: Pit un 	t: N/A stable. Sidewall	
1st: 2nd	1.00m :					LOG	GED I	NSION BY:	AG	• 4.00m _D	B 1.20 collapse.		
3ra	:									C			
			s	(m)	/ane	<u> </u>	uo.	(m)		DESC	DIDTION		
oth (r	te	ter	du	pth	situ V ts	GE	yati 0.D	pth		DESC	KIP HUN		
Del	Da	<u>s</u>	Sa	De	In-s Tes	Ľ	Ele	De					
-0									TOPSC	IL: Grass over soft dark brown peat	y SILT.		
F						<u> </u> -							
						x v v v	260.21	0.30	Firm or	angish brown sandy gravelly SILT v	with medium cobble conten	t and low boulder	
Γ			हत्रा B	0.50-1.00		× ^k×			content siltston	. Gravel is subangular to subrounded e. Boulders are of siltstone.	I fine to coarse of siltstone	. Cobbles are of	
F				0.50 1.00		^ ۲							
L			303030			× × ×							
ľ		L	00000) × × ×_ ×							
h 1		¥	8			<u>ب</u> م			1.00m:	with high boulder content.			
ŀ						× × ×							
						Ň							
F			D	1.50.2.00		×°×××							
F			D	1.30-2.00		× × × × × ×							
Γ			303030			×°×							
-2			×.			Ôx							
L						×°, ×							
						× × ×							
F			_			(⊙×) × × 6*							
F			B B B B B B B B B B B B B B B B B B B	2.50-3.00		× × ×							
			2020203			Ô×							
Ē			20202			×°^ (×							
-3			×.			ش××							
						××€							
						y₀ _× × ××		.					
ŀ						∕×₀ END	257.11	3.40	TP tern	ninated at 3.40m bgl. Unable to prog	ress TP - sidewall collapse		
ŀ													
ſ													
-4													
-													
i p													
F													
-5													
Re	marks: S	eepag	e of wate	r at 1.00m bgl.	TP bac	kfilled v	vith arisi	ngs.				Scale:	
<u> </u>								<u> </u>				1:25	
	S. Jane							Irish	n drill	ing LTD		rn. Fax	

PR LO	OJECT: 1 CATION:	Ballii : Co	nagree Cork	Wind Farn	n							TRIALPIT: TP-24 Sheet 1 of 1
CL	IENT: Co	oillte								Co-ordinat	es:	Rig: Hyundai HX140L
EN	GINEER:	Feh	ily Tin	ioney & Co)					E 536,563.3	N 583,973.0	Rev: DRAFT
GR	OUNDW	ATE	R 0.D.			DIT		TION		H	4.00	Shoring/Support: N/A
Wat 1st: 2nd	er strikes: dry	Ros	e to after:			PIT	DIME	NSION	1:1.20	* 4.00m _D	В	Stability: Pit stable.
3rd:		i	Í			LUG			AG		С	
Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)			DESCRI	PTION
-0							241.40	0.20	TOPSC	DIL: Grass over sof	t greyish brown silty p	eaty CLAY.
Γ						*0× ×			Soft to to suba	firm light brown s ngular fine to coar	andy gravelly SILT wi se of siltstone. Cobble	th medium cobble content. Gravel is angular s are angular to subangular of siltstone.
F			в	0.50		ن * م×						
╞			В	0.50		*``×`°` *Q```×						
F						XO X X X X X						
						8.×. 4						
						×						
F						x_, , , , , , , , , , , , , , , , , , ,						
ŀ			D	1.50.2.00		Ø×`,×						
F			<u>В</u>	1.50-2.00		*) × č *) × č						
Ļ			100000			× . • • Q×. ×						
			101000			ې × °						
						*0×						
F						×××××						
ŀ						$\frac{2}{100} \times \frac{100}{100}$	239.20	2.40	TP tern	ninated at 2.40m b	gl. Obstruction as bou	lders.
ŀ												
-												
-3												
-												
-												
-												
רי Rer	narks: T	P dry	on excav	ation. TP back	filled wi	th arisi	ngs.					Scale:
		-								<u> </u>		1:25
and and	, DAUL							Irisł	n drill	ing LTD		Ph. Fax

PR	OJECT:]	Balli Co	nagree Cork	Wind Farn	1						TRIALPIT: TP-25
CI	JENT: Co	oillte	COIN							Co-ordinates:	Rig: Hyundai HX140L
EN	GINEER:	Feh	nily Tin m O D	10ney & Co						E 535,895.8 N 583,722.1	Rev: DRAFT
GI GI Wa 1st: 2nd 3rd	ROUNDWA iter strikes: dry dry	ATE Ros	R e to after:			PIT I PIT I LOG	DIREC DIMEN GED I	CTION NSION BY:	: 1.20 AG	4.00 → 4.00 → A → A → A → A → A → A → A → A → A →	BATE 9.3.21 Shoring/Support: N/A Stability: Pit stable. 1.20
Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)		DESC	RIPTION
-0			• D	0.10-0.20		<u>v vr</u> <u>vr v</u>	258.25	0.20	Plastic H8.	lark brown amorphous PEAT with re	pots.
			B	1.50-2.00			254.15	4.30	2.00m: diamete	own silty sandy subangular to subro cobble content and low boulder con e. Boulders are <600mm in diameter. with high cobble content and high bo r.	unded fine to coarse siltstone GRAVEL with tent. Cobbles are subangular to subrounded of oulder content. Boulders are <500mm in boulders.
-5	marker	D dm-	00.0200	ation TD bash	filled w	th origi	nas				
		r ury	on excav	auon. 11 Dack		ui arisi	uga.				Scale: 1:25
	all the							Irisł	n drill	ing LTD	Ph. Fax

PR	OJECT:	Ballin	nagree Cork	Wind Farn	n							TRIALPIT: T	P-26
	IENT: CO	. CO billte	CUIK							Co-ordinat	es:	Rig: Hvundai HX	(140L
EN	GINEER:	Feh	ilv Tin	10nev & Co	1					E 535,732.2	N 583,708.8	Rev: DRAFT	
Gro	und level: 2	62.10r	n O.D.	J.								DATE: 9.3.21	
GR	OUNDW.	ATE	R			РІТ	DIREC	TION	:	+	4.00►	Shoring/Support:	N/A
Wate 1st:	er strikes: 1.00m	Ros	e to after:			PIT	DIME	NSION	1:1.20	* 4.00m _D	В	Stability: Pit unsta 1.20 collapse.	able. Sidewall
2nd: 3rd:	2.00m	<u> </u>				LOG	GED	BY:	AG		¥		
					8								
n			es	(L)	Van		. tion	E)			DESCRI	PTION	
pth (ate	ater	duu	epth	-situ sts	EG	eva O.I	epth					
De	Ő	Š	Sa	ă	In Te	Ξ	Ξu	D					
-0									MADE	GROUND: Soft to	o firm orangish brown	sandy gravelly CLAY wi	th much soft dark
									brown	beat with roots and	l branches.		
-													
\mathbf{F}													
1		↓											
		÷	В	1.00									
-													
Γ													
-													
						\sum_{n}	260.40	1.70	Orangis	sh brown silty sand	ly GRAVEL with med	ium cobble content and 1	ow boulder content.
1						0.0.0			Boulde	rs are subangular t	o subrounded of siltsto	one and sandstone.	
-2		Ţ				2000							
$\left \right $						3							
						END	259.60	2.50	TP tern	ninated at 2.50m b	gl. Unable to progress	TP - sidewall collapse.	
F													
-													
-3													
-													
-4													
ŀ													
-5													
Ren	narks: S	eepag	e of wate	r at 1.00m bgl	Ingress	of wate	er at 2.00	m bgl. T	P backfil	ed with arisings.			Scale:
1								T • -		• •			1:25
and a second	, (Jul) *							Irisł	n drill	ing LTD			Fax

PR LO	OJECT:	Balliı : Co	nagree Cork	Wind Farn	n						TRIALPIT: TP-27 Sheet 1 of 1	7
CL	IENT: Co	oillte								Co-ordinates:	Rig: Hyundai HX140I	Ĺ
EN Gro	GINEER: und level: 2	Feh 82.191	n O.D.	ioney & Co)					E 555,026.7 IN 565,565.7	DATE: 9.3.21	
GR Wat 1st: 2nd: 3rd:	OUNDW. er strikes: dry	ATE Ros	R e to after:			PIT PIT LOG	DIREC DIMEN GED I	CTION NSION BY:	: 180-3 : 1.20 AG	60	Shoring/Support: N/A Stability: Pit moderately	/ stable.
Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)		DES	CRIPTION	
-0 - - -			B	0.50-1.00			281.19	1.00	Weathd Recove siltston diamet	red rock. red as angular cobble and boulder s e/sandstone with peaty sandy grave r.	ized clasts of strong grey and brown lly silt matrix. Boulders are <1500m	n nm in
-1 - - -2 -						END			TP terr	ninated at 1.00m bgl. Obstruction a	s rock.	
-3												
-5 Rei	narks: T	P dry	on excav	ation. TP back	filled wi	th arisi	ngs.				Sca	ile:
	Lundo -							Irish	ı drill	ing LTD	Ph. Fax	1:25

PR	OJECT:	Balli	nagree Cork	Wind Farn	1							TRIALPIT: TP-28A
	JENT: Co	oillte	CUIK							Co-ordina	ates:	Rig: Hyundai HX140L
EN	GINEER:	Feh	ily Tim	ioney & Co						E 538,763.6	5 N 586,720.2	Rev: DRAFT
Gr	ound level: 4	01.061 A TEI	n O.D. R							L	4.00	DATE: 22.3.21
Wa 1st 2nd 3rd	ter strikes: dry	Ros	e to after:			PIT I PIT I LOG	DIREC DIMEN GED I	TION SION SY:	: 180-3 1: 1.20 AG	60 * 4.00m _D	A C	Shoring/Support: N/A Stability: Pit moderately stable.
Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)			DESCR	IPTION
-0						<u> </u>			Spongy H7	brown pseudo f	ibrous PEAT.	
-1 -1 -2			•D	1.00-1.10			209 54	2.50	Н7.			
- -3 -			в <i>валовониции</i>	2.50-3.00				2.50	Grey sil	lty sandy subang content. Cobbles	gular to subrounded fine s are subangular to subr	e to coarse siltstone GRAVEL with medium ounded of siltstone.
- -4			B B BEEREVERSE BEEREVERSE	3.50-4.10		END	<u>397.56</u> <u>396.96</u>	<u>3.50</u> 4.10	Weathe Recove grained	red SANDSTON red as angular or sandstone with inated at 4.10m	VE rock. obble and boulder sized grey silty sandy matrix. bgl. Maximum reach o	l clasts of medium strong greenish brown fine of excavator.
						th -=='-'						
Re	marks: T	P dry	on excava	ation. TP back	niled wi	th arisir	ngs.					Scale: 1:25
- Silling	and the second se							Irish	ı drill	ing LTD		Ph. Fax

CL EN Gra	JENT: Co GINEER:	oillte	COIR							
EN Gro	GINEER:								Co-ordinates:	Rig: Hyundai HX140L
Gru	und laval. 2	Feh	ily Tim	oney & Co)				E 536,880.7 N 583,582	2.3 Rev: DRAFT
GR	ROUNDW	ATE	m ().D. R			ріті	NIRFO	TION	◄ 4.00 <u>→</u>	Shoring/Support: N/A
Wa 1st: 2nd	ter strikes: 1.50m :	Ros	e to after:			PIT	DIMEN	NSION	1.20 * 4.00m D	B 1.20 Collapse.
3rd	- 					LOG		<i>,</i>	C	¥
Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)	DI	ESCRIPTION
-0							253.17	0.20	TOPSOIL: Grass over soft sandy gravel	lly CLAY with rootlets.
-							233.17	0.20	Orangish brown silty sandy GRAVEL v Boulders are subangular to subrounded	with high cobble content and low boulder content. of siltstone.
-			D	0.50.1.00						
-			1 1	0.30-1.00						
-			10000							
-1			1000							
							252.17	1.20		
						× × × × ×			Stiff locally soft to firm orangish brown high boulder content. Boulders are suba	a sandy gravelly SILT with high cobble content and angular to subrounded of siltstone.
		Ţ				××××				
-						××××				
-						x x x				
-2			В	2.00		× × × ×				
-						×^`×				
_						×°× ×°×				
			B	2.50-3.00		x x x x x x x x x x				
			00000			× × × ×				
-			00000			xo^`x x		• • • •		
-3			23			END	250.37	3.00	TP terminated at 3.00m bgl. Unable to	progress TP - sidewall collapse.
-										
-										
-										
L										
-4										
Ľ										
Γ										
-										
-										
╞										
-5										
Re	marks: Ir	ngress	of water	at 1.50m bgl. '	TP back	filled w	ith arisin	gs.		Scale:
- State	Sea and a s							Irish	drilling LTD	1:25 Ph. Fax

PRO LO	DJECT: 1 CATION:	Balliı : Co	nagree Cork	Wind Farn	n								TRIALPIT: T Sheet 1 of 1	P-30
CLI	IENT: Co	oillte								Co-ordi	nates:		Rig: Hyundai H	X140L
ENO	GINEER:	Feh	nily Tim	oney & Co)					E 536,822	2.0 N 5	83,346.4	Rev: DRAFT	
Grou GROU Wate 1st: 2nd: 3rd:	oUNDW oUNDW er strikes: dry	84.081 ATE Ros	m O.D. R se to after:			PIT PIT LOG	DIREC DIMEN GED I	CTION NSION BY:	: 100-2 : 1.20 AG	80 * 4.00m _D	4		Shoring/Support Stability: Pit uns 1.20 collapse.	: N/A stable. Sidewall
Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)				DESCRI	PTION	
-0 ·			B	0.50-1.00			283.08	1.00	Orangis Gravel subrour	sh brown silty is angular to s ded of siltsto	sandy GRA ubrounded ne. Boulder	VEL with high fine to coarse o s are angular of	i cobble content and lov f siltstone. Cobbles are strong greenish grey s	w boulder content. angular to iltstone.
-							282.08	2 00	Weathe Recove brown i diamete	red SANDST red as angular fine grained sa rr.	ONE rock. to subangundstone wi	ilar cobble and i th a little silty s	boulder sized clasts of andy gravel. Boulders a	strong yellowish are <400mm in
ANE & WL RISES BALLINAGREE WF TPS ALL FILE MAR 29 2021.GPJ IRISHDR.L.GDT 18/6/21	narks: T	P. dry		ation. TP back	filled w	END			TP term	ninated at 2.00)m bgl. Una	ble to progress	TP - sidewall collapse.	Obstruction as rock.
		r ufy	on excave	anon. IF Dack		an ar isil	идэ.	Intel	الايران	ing I TI	<u>, </u>			1:25 Ph.
т 🚺								11151	i ufill	ing L11	,			Fax

PRC	DJECT: 1	Ballin : Co	1agree ' Cork	Wind Farn	1							TRIALPIT: T	P-31
CLI	ENT: Co	oillte								Co-ordina	tes:	Rig: Hyundai HX	K140L
ENG	GINEER:	Feh	ily Tim	oney & Co	1					E 536,324.1	N 583,322.0	Rev: DRAFT	
Grou GRO	nd level: 3	15.86n ATEI	n O.D. R								4 00	DATE: 16.3.21	21/4
Water 1st: 2nd: 3rd:	r strikes: dry	Rose	e to after:			PIT PIT LOG	DIREC DIMEI GED I	CTION NSION BY:	1: 090-2 1: 1.20 AG	70 * 4.00m _D	A C	Shoring/Support: Stability: Pit mode 1.20	N/A erately stable.
Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)			DESCRI	PTION	
-0							315.66	0.20	TOPSC	IL: Firm dark bro	wn sandy gravelly pea	ty CLAY.	
						/-++@ _7 <u>P</u> 4-7	510.00	0.20	Firm da	rk grey silty grav	elly PEAT with low co	bble content.	
			ह्य B	0.50-1.00		<u>**</u> *	215.26	0.60					
-			<i></i>				315.26	0.60	Orangis siltston subang siltston	sh brown becomir e GRAVEL with ular to subrounded e.	ng light brown silty san medium cobble conten d of siltstone. Boulders	dy subangular to subrour t and low boulder content s are are subangular to sul	nded fine to coarse t. Cobbles are brounded of
-1 - -			B B B B B B B B B B B B B B B B B B B	1.00-1.50									
-2 -2			22				313.26	2.60					
0T 18/6/21			B	3.00-3.20			515.20	2.00	Weathe Recove brown s	red SILTSTONE red as angular col ilty sandy gravell	rock. oble and boulder sized y matrix.	clasts of strong greyish g	reen siltstone with
2021.GPJ IRISHDRL.G			2222			END	312.66	3.20	TP tern	ninated at 3.20m b	ogl. Obstruction as rocl	k.	
4 - 4													
	arkee T	Pdru	on excerr	ation TP back	filled w	ith arisi	ngs						Scale
	IAT 185; 1	i uiyi	on cacave	auon. Ir Uack	med W	ui ai ISII	пдэ.						1:25
								Irisł	ı drill	ing LTD			Ph. Fax

PR	OJECT:	Balli	nagree	Wind Farn	1								TRIALPIT: T	P-32A
	CATION: IENT: Co	: Co pillte	Cork							Co-ordi	inates:		Sheet 1 of 1 Rig: Hyundai HX	K140L
EN	GINEER:	Feh	nily Tim	ioney & Co	l					E 539,26	1.2 N 58	6,751.8	Rev: DRAFT	
Gro	und level: 3	93.78	m O.D.										DATE: 22.3.21	
GR Wat 1st: 2nd: 3rd:	OUNDW. er strikes: 0.30m	ATE Ros	K te to after:			PIT PIT LOG	DIREC DIMEN GED I	CTION NSION BY:	: 180-3 I: 1.20 AG	60 * 4.00m _D	▲ 4.0 A	0 B B	Shoring/Support: Stability: Pit unst 1.20 collapse.	N/A able. Sidewall
Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	TEGEND	Elevation m O.D.	Depth (m)				DESCRI	PTION	
-0						<u> ~~ ~</u>			Spongy	brown pseud	o fibrous PE	AT.		
- - - - - - - - - - - - - - - - - - -		1 <u>−</u>	●D	1.00-1.10		- シ う う う う う う う う う う う う う う う う う う	390.98	2 80	Н7.					
-3			B	3.00-3.30			390.48	3.30	TP term	Ity sandy suba content and lo rs are subangu	mgular to su boulder ea llar to subrou Om bgl. Unab	orounded fine ontent. Cobble anded of sands ole to progress	to coarse sandstone GR/ s are subangular to subro stone. TP - sidewall collapse.	AVEL with medium ounded of sandstone.
- - -5 Rer	narks: S	eepag	e of water	r at 0.30m bgl.	TP back	kfilled v	vith arisi	^{ngs.}	u drill	ing LTI)			Scale: 1:25 Ph. Fax

PRO LO	OJECT: CATION	Balli : Co	nagree Cork	Wind Farn	n								TRIALPIT: T Sheet 1 of 1	P-33
CLI	IENT: C	oillte								C0-01	dinates:	1 592 109 4	Rig: Hyundai HX	140L
EN	GINEER:	Feh	nily Tim m O D	ioney & Co)					E 535,	/45.1	583,198.4	Rev: DRAFT	
Grot GR Wate 1st: 2nd: 3rd:	ound level. 3 oundw. er strikes: dry	ATE Ros	R R se to after:			PIT I PIT I LOG	DIREC DIMEN GED I	CTION NSION BY:	1: 1.20 AG	* 4.00m	D	- 4.00	Shoring/Support: 1 Stability: Pit stable	N/A e.
Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)				DESCR	IPTION	
-0						<u>77</u> 7 7 77 7 7 7 7 7 7 7 7 7 7 7 7 7 7	342 94	0 30	Plastic H8.	dark browr	i amorphoi	is PEAT with root	S.	
-			B	0.50-1.00			242.24	1.00	Weatha Recove matrix.	ered SILTS ered as angu	TONE roch	c. sized clasts of silt	istone with orangish brown	n sandy gravel silt
-1			B Namana	1.00-1.20			342.04	1.20	Weathe Recove with br	ered SILTS ered as angu own sandy	TONE rock ilar to suba silt matrix	r. ingular cobble and	l boulder sized clasts of str	ong brown siltstone
E & WL RISES BALLINAGREE WF TPS ALL FILE MAR 29 2021.GPJ IRISHDRL.GDT 18/6/21														
	narks: T	P dry	on excava	ation. TP back	filled wi	ith arisii	ngs.	• • •						Scale: 1:25
TRI 👘	10							Irisł	ı dril	ling L7	T D			rii. Fax

PR LO	OJECT: 1 CATION:	Ballin Co	nagree Cork	Wind Farn	1					TRIALPIT: TP-34 Sheet 1 of 1
CL	JENT: Co	oillte							Co-ordinates:	Rig: Hyundai HX140L
EN	GINEER:	Feh 64 77-	ily Tim	oney & Co)				Ľ 535,455.0 N 585,104.	v Kev: DRAFT DATE: 8.3.21
GR War 1st: 2nd	ter strikes: dry	ATE Rose	R e to after:			PIT I PIT I	DIREC DIMEN	CTION NSION	: 4.00 → 4.00 □	Shoring/Support: N/A B 1.20
3rd							GEDI		AG C	
Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)	DES	SCRIPTION
-0						<u></u>	364.67	0.10	Plastic dry dark brown amorphous PEAT H8.	with roots.
-				1.00.1.20					Weathered SILTSTONE rock. Recovered as angular to subangular cobb silty sandy matrix.	le and boulder sized clasts of siltstone with brown
			1999-1997 19	1.00-1.20			363 57	1.20	1.00m: hard digging.	
ſ						END			TP terminated at 1.20m bgl. Obstruction	as rock.
1.8 WL RISES BALLINAGREE WF TPS ALL FILE MAR 29 2021.GPJ IRISHDRL.GDT 18/6/21										
NA Rei	marks: T	P dry	on excava	ation. TP back	filled wi	ith arisii	ngs.			Scale:
	little of the second seco							Irish	ı drilling LTD	1.23 Ph. Fax

PR	OJECT:	Balli	nagree Cork	Wind Farn	1							TRIALPIT: TP-35
CL	IENT: Co	oillte	CUIK							Co-ordinat	es:	Rig: Hyundai HX140L
EN	GINEER:	Feh	ily Tim	oney & Co						E 535,656.2	N 582,858.5	Rev: DRAFT
Gro GR	und level: 3	24.13 ATE	m O.D. R							-	4 00►	DATE: 8.3.21
Wat 1st: 2nd: 3rd:	er strikes: dry	Ros	e to after:			PIT PIT LOG	DIREC DIMEN GED I	TION NSION BY:	: [: 1.20 AG	* 4.00m D	A C	Stability: Pit unstable. Sidewall 1.20 collapse.
Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)			DESCRI	PTION
-0			• D	0.10-0.20		<u> </u>	323.93	0.20	Plastic H8.	damp dark brown	amorphous PEAT.	
- - -			B	1.00-1.20					Weathe Recove diamete	red SILTSTONE red as tabular and er. hard digging.	rock. angular cobble and bo	ulder sized clasts. Boulders are <400mm in
F						END	322.83	1.30	TP tern	ninated at 1.30m b	gl. Obstruction as rock	ς.
-2												
-4												
5					G11- J	4						
Rei	narks: T	P dry	on excave	ation. TP back	niled wi	th arísi	ngs.	• • •		• • • • • • • • • • • • • • • • • • • •		Scale: 1:25
1	land.							Irisł	n drill	ing LTD		Ph. Fax

PRO LO	OJECT:	Ballii : <u>C</u> o	nagree Cork	Wind Farn	n								TRIALPIT: T Sheet 1 of 1	P-36								
CLI	IENT: Co	oillte								Co-ord	inates:	5 92 912 5	Rig: Hyundai HX	K140L								
ENC	GINEER:	Feh	ily Tim	ioney & Co)					E 535,90	94.0 N	582,812.5	Rev: DRAFT									
GR	OUNDW.	ATE	n 0. <i>D</i> . R			DIT					×	4.00	Shoring/Support:	N/A								
Wate 1st: 2nd: 3rd:	er strikes: dry	Ros	e to after:			PIT PIT LOG	DIREC DIMEN GED I	NSION BY:	: 1.1.20 AG	* 4.00m ₁		B	Stability: Pit mod	erately stable.								
Ju:												C										
Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)				DESCRI	IPTION									
-0						<u></u>			Plastic H8	damp dark bi	own amor	phous PEAT.										
+			●D	0.20-0.30		<u>~ ~ ~</u>	359.33	0.30	110.													
-			-						Weathe Recove	red SILTSTO red as angula	DNE rock. Ir cobble a	nd boulder sized	clasts of strong grey fine	grained siltstone								
									with a l	ittle peaty sil	t. Boulder	s are <500mm in	i diameter.									
-1			B	1.00-1.50																		
-			<i>1919191</i>																			
			9393939						TP term	ninated at 1.3	0m bgl. O	bstruction as roc	k.									
		—	202			END	358.13	1.50														
-2																						
-3 18/9/																						
SL.GD																						
RISHD																						
± ► GBJ																						
9 2021.																						
MAR 2																						
L AF																						
AGRE																						
3ALLIN																						
ISES F																						
& MLR																						
INA Ren	narks: T	P dry	on excava	ation. TP back	filled wi	l ith arisi	ngs.							Scale:								
	1:25																					
Щ.								irist	ı arlll	ing L1	U	Irish drilling LTD Ph. Fax										

PR	PROJECT: Ballinagree Wind Farm LOCATION: Co Cork Sheet 1 of 1												
CL	JENT: Co	oillte	CUIK							Co-ordina	tes:	Rig: Hyundai HX140L	
EN	GINEER:	Feh	ily Tin	noney & Co)					E 536,061.0	N 582,675.4	Rev: DRAFT	
Gro	und level: 3	06.731 ATE	m O.D. R							4	<u> </u>	DATE: 8.3.21	
Wa 1st: 2nd 3rd	ter strikes: dry :	Ros	e to after:			PIT PIT LOG	PIT DIRECTION: PIT DIMENSION: 1.20 * 4.00m LOGGED BY: AG C A A B J C Stability: Pit unstable LOGGED BY: AG						
Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Depth (m)						
-0							306.53	0.20	MADE	GROUND: Firm	brown silty sandy GRA	AVEL.	
- - -1			B	1.00-1.50					Weathe Recove brown	red SILTSTONE red as angular col silty sandy gravel.	rock. oble and boulder sized o	clasts of grey and brown siltstone with a little	
						END	305.23	1.50	TP tern	ninated at 1.50m l	ogl. Obstruction as rock		
Re	Remarks: TP dry on excavation. TP backfilled with arisings. Scale: 1:25 1:25												
No.	Irish drilling LTD Ph. Fax Ph.												

PRC LOC	DJECT:	Balli : Co	nagree Cork	Wind Farn	n							TRIALPIT: TP-38 Sheet 1 of 1
CLI	ENT: C	oillte								Co-ordinat	es:	Rig: Hyundai HX140L
ENC	GINEER:	Fel	nily Tim m O D	oney & Co)					E 536,281.7	IN 582,448.0	Rev: DRAFT
GR Wate 1st: 2nd: 3rd:	OUNDW or strikes: 1.00m	ATE Ros	R se to after:			PIT DIRECTION: 050-230 PIT DIMENSION: 1.20 * 4.00m LOGGED BY: AG						Shoring/Support: N/A Stability: Pit moderately stable.
Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)			DESCRI	PTION
-0 -							007.71	0.20	TOPSO	IL: Firm dark bro	wn peaty CLAY with	low cobble content.
-			B	0.50-1.00		*0 × · × × · × · * × · × · * * · × · *	287.71	0.30	Firm lig boulder angular	th grey mottled li content. Gravel is to subangular of s	ght brown sandy grave s angular to subangula siltstone. Boulders are	elly SILT with high cobble content and low r fine to coarse of siltstone. Cobbles are angular.
-1		Ţ	100000001 10000000	1.00-1.50			287.21 286.81	0.80	Grey an	d brown silty GR	AVEL with high cobb	le content. Cobbles are of siltstone.
-			<i>booosaa</i> B	1.50-1.70			286.31	1.70	Weathe Recover little bro	red SILTSTONE red as angular cob own sandy gravell	rock. ble and boulder sized y silt.	clasts of very strong grey siltstone with a
ANE & WL RISES BALLINAGREE WF TPS ALL FILE MAR 29 2021.GPJ IRISHDR.LGDT 18/6/21				at 1.00m bd	TP has							Scale
	Luich duilling I TD											
- 🤇 🗰 🕅								11 131	1 41 111	mg LIV		Fax

PRC LOC	DJECT: 1	Ballii : Co	nagree Cork	Wind Farn	1							TRIALPIT: TP-39 Sheet 1 of 1		
CLI	ENT: Co	oillte								Co-ordina	tes:	Rig: Hyundai HX140L		
ENC	GINEER:	Feh	ily Tim	ioney & Co		<u> </u>				E 536,469.4	N 582,750.2	Rev: DRAFT		
Grou GRO Water 1st: 2nd: 3rd:	oUNDW	ATE Ros	R e to after:			PIT I PIT I LOG	DIREC DIMEI GED I	CTION NSION BY:	[: 270-0]: 1.20 AG	90 × 4.00m D	4.00	Shoring/Support: N/A Stability: Pit moderately stable.		
Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)		DESCRIPTION				
-0							297.30	0.20	TOPSC cobble	DIL: Grass over sc content.	ft dark brownish grey s	andy gravelly silty CLAY with medium		
- - -1 -			B	0.50-1.00			271.00	0.20	Yellow with hi 1.50m: Boulde	ish brown silty sa gh cobble content with high boulde rs are <500mm in	ndy subangular to subr . Cobbles are subangul r content. Boulders are . diameter.	ounded fine to coarse mudstone GRAVE ar to subrounded of mudstone. angular of weak to strong brown mudstor	EL.	
-2 -2 -			B	2.00-2.50										
			B	3.00-3.50			294.00	3.50						
VANE & WL RISES BALLINAGREE WF TPS ALL FILE MAR 29 2021.G B 5 B 5 B 5 C 7 C 7	narks: T	P dry	on excava	ation. TP back	filled w	END ith arisin	ngs.		TP term	ninated at 3.50m l	ogl. Unable to progress	TP - sidewall collapse. Obstruction as ro	ıck.	
							æ.					1:25		
TRI								Irisł	ı drill	ing LTD		Ph. Fax		

PR	PROJECT: Ballinagree Wind Farm LOCATION: Co Cork TRIALPIT: TP-40 Sheet 1 of 1												-40	
CL	IENT: Co	oillte	COIK							Co-ordi	nates:		Rig: Hyundai HX1	40L
EN	GINEER:	Feh	nily Tin	ioney & Co	1					E 536,493	.1 N 582,922	2.6	Rev: DRAFT	
Gro	OUNDW	ATE	m 0.D. R			ріт	DIREC	TION	· 045_2	25 +	◄ 4.00 —	⊢	Shoring/Support: N/	/A
Wat 1st: 2nd:	er strikes: dry	Ros	e to after:			PIT D	PIT DIMENSION: 1.20 * 4.00m D LOGGED BY: AG							
3rd:							С							
(m)		L	oles	u (m)	Vane	END	tion D.	u (m)			DE	SCRIP	TION	
Depth	Date	Wate	Samp	Deptl	In-situ Tests	LEG	Dept							
-0									TOPSC	IL: Grass over	silty sandy gravel	lly CLAY	with low cobble content.	
\mathbf{F}														
ŀ							311.78	0.40	Vellow	ich brown eiltu	eandy subangular	to subrou	inded fine to coarse silter	tone GRAVEI
			B	0.50-1.00		0.0.0			with hi	gh cobble cont	ent. Cobbles are su	ubangular	to subrounded of greyish	n green siltstone.
T			00000			00								
-1			121			000			1.00m: diamete	with boulders.	Boulders are suba	angular to	subrounded. Boulders are	e <500mm in
-						00					5.			
-														
F		B	1.50-2.00											
			00000											
			00000			.0 C	310.18	2.00						
						END			TP tern	ninated at 2.00	m bgl. Obstruction	n as bould	ers as possible rock.	
ſ														
ŀ														
F														
-														
-3														
5														
-														
-4														
-														
Rei	Comparison Comparison Scale													
	1:25													
	Irish drilling LTD												P F	'h. `ax

PRO LO	OJECT: CATION:	Balliı : Co	nagree Cork	Wind Farn	1				TRIALP Sheet 1	T: TP-41
	IENT: CO	oillte	9						Co-ordinates: Rig: Hyu E 536 653 0 N 583 262 4 Rev: DR	ndai HX140L AFT
Grou	und level: 3	Fen 15.54i	n O.D.	ioney & Co					DATE: 15.	3.21
GR Wate 1st: 2nd: 3rd:	OUNDW. er strikes: dry	ATE Ros	R e to after:			PIT PIT LOG	DIREC DIMEN GED I	CTION NSION BY:	$\begin{array}{c c} \mathbf{:} \mathbf{020-200} \\ \mathbf{:} 1.20 & \mathbf{*} \mathbf{4.00m} \\ \mathbf{AG} \\ \mathbf{C} \\ \end{array} \xrightarrow{B} \begin{bmatrix} 1.20 \\ 1.20 \\ \mathbf{C} \end{bmatrix} \xrightarrow{B} \begin{bmatrix} 1.20 \\ 1.20 \\ \mathbf{C} \\ \end{array} \xrightarrow{Shoring} $	/Support: N/A 7: Pit stable.
Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)	DESCRIPTION	
-0							315.14	0.40	TOPSOIL: Grass over firm dark brown sandy gravelly peaty 0	LAY with rootlets.
			B 1000000000	0.50-1.00					Orangish brown to light brown silty sandy angular to subangu GRAVEL with high cobble content. Cobbles are angular to su	lar fine to coarse siltstone bangular of siltstone.
-1 -			aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa	1.00-1.50					1.00m: with high boulder content. Boulders are angular of stre	ong grey siltstone.
-			1010101			END	314.04	1.50	TP terminated at 1.50m bgl. Obstruction as rock.	
-2										
-										
.GDT 18/6/21										
21.GPJ IRISHDRL										
L FILE MAR 29 20										
AGREE WF TPS AI										
[™] -5 Ren	narks: T	P dry	on excava	ation. TP back	filled wi	ith arisi	ngs.			Scale:
	Irish drilling LTD Ph. Fax									

PRC LOC	DJECT:	Balli : Co	nagree Cork	Wind Farn	1							TRIALPIT: T	P-42
CLI	ENT: Co	oillte	:							Co-ordina	tes:	Rig: Hyundai HX	140L
ENC	GINEER:	Fel	nily Tim	ioney & Co						E 538,106.6	N 586,230.9	Rev: DRAFT	
GRO	OUNDW.	ATE	R			ріт	DIRFO	TION	• 130_3	10	4.00	Shoring/Support:	N/A
Wate 1st: 2nd:	er strikes: 3.00m	Ros	se to after:			PIT	DIME	NSION RV·	:1.20	* 4.00m _D	В	Stability: Pit mode	erately stable.
3rd:		<u> </u>							AU		C	-	
Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)			DESCRI	PTION	
-0 F						<u></u>			Plastic H8	dark brown amorj	phous PEAT.		
-						<u> </u>			110.				
-						<u>1/ \\/</u>							
			• ^D	0.50-0.60		<u> </u>							
					<u> </u>								
						<u>1/ \//</u> @~ ·o	406.85	0.90	Lighth	rown silty sandy s	subangular to subround	ed fine to coarse siltstone	GRAVEL with
-1			B	1.00-1.50					mediun	n high cobble con	tent. Cobbles are subar	igular to subrounded of s	iltstone.
-			00000										
			0505050			0.0							
			<u> </u>			\$ } } }							
ΓΙ							105.05	1.80					
						X	405.95	1.80	Weathe	red SILTSTONE	rock. bble and boulder sized	clasts of strong grevish b	rown siltstone with
-2			B	2.00-2.50					grey sil	ty sand and grave	l matrix.	clusts of strong greyish b.	iown shistone with
-			5050505										
			36363636										
			XXX										
- 12													
-3		₽											
RL.GD							404.55	3.20	TD /				
RISHD						END			TP tern	ninated at 3.20m l	bgl. Obstruction.		
GPJ													
29 2021													
MAR													
1 -4													
TPS AI													
ΕME													
NAGRE													
BALLI													
RISES													
∛ ⊗ - 5													
Nem	narks: S	eepag	e of wate	r at 3.00m bgl.	TP bac	kfilled v	vith arisi	ngs.					Scale:
	1:25											1:25 Ph.	
Щ. Н								ITISI	urill	mg L1D			Fax

PR LO	OJECT:	Balli : Co	nagree Cork	Wind Farn	n						TRIALPIT: TP-43 Sheet 1 of 1			
CL	IENT: Co	oillte								Co-ordinates:	Rig: Hyundai HX140L			
EN	GINEER:	Feh	nily Tin	10ney & Co)					E 533,521.2 N 585,062.7	Rev: DRAFT			
GR		ATE	R			PIT	DIREC	TION	•	4.00	Shoring/Support: N/A			
1st: 2nd:	dry	KOS	e to after:			PIT I LOG	DIME I GED I	NSION BY:	l: 1.20 AG	* 4.00m _D	B 1.20			
3rd:														
(m)			oles	р (ш)	Vane	END	ntion D.	h (m)		DESCRIPTION				
Depth	Date	Wate	Samp	Deptl	In-situ Tests	LEG								
-0			•1			م م			Brown	silty sandy subangular to subround	ed fine to coarse GRAVEL of various lithologies			
ŀ									with m	edium cobble content. Cobbles are	subangular to subrounded of various lithologies.			
						3								
			₿ B	0.50-1.00		000								
F			1010101			0								
-			80000											
-1			808						1.00m:	with low boulder content. Boulders	s are angular of grey siltstone. Boulders are			
									<500m	n in diameter.				
									1.50m:	Boulders are <1500mm in diameter	er.			
F														
-														
-2			BB	2.00-2.50					2.00m [.]	hard digging				
_			0000			0.4								
			00000											
Γ			10101				449.97	2.50	TP tern	inated at 2.50m bgl. Obstruction a	s boulders.			
F										0				
-														
-3														
-														
1														
-														
-4														
-														
-														
-														
-5	5													
Rer	Remarks: TP dry on excavation. TP backfilled with arisings. Scale:													
St Deuts	à.							Irick	n drill	ing LTD	1:25			
2 *	5							11 131	i ul III	mg LIV	Fax			



Appendix 03 Groundwater Readings

IRISH DRILLING LTD.	Project:	Ballinagree Wind Farm		
Loughrea Co. Galway	Client:	Coillte		
	Location:	Ballinagree, County Cork		
Tel: (091) 841274 Fax: (091) 880861	Date:	13.05.2021	Sheet No.	1
			Checked:	RK

Water Levels in Standpipes

Location	Date	Depth	Comments
BH 01	13.05.21	6.80m	50mm standpipe, Rotary Core Borehole
BH 02	13.05.21	DRY	50mm standpipe, Rotary Core Borehole
BH 03	13.05.21	0.56m	50mm standpipe, Rotary Core Borehole
BH 04	13.05.21	7.95m	50mm standpipe, Rotary Core Borehole
BH 05	13.05.21		Borehole not completed on this date.

Remarks:

All readings record depth from ground level to top of water level.



Appendix 04 Photographs (Rotary Core)

Irish Drilling Ltd: Core Photos:












Appendix 05 Photographs (Trial Pit)



Figure 1 H:\21C101_Ballinagree TP Photos\Photos\T1\DSCF4037.JPG



Figure 2 H:\21C101_Ballinagree TP Photos\Photos\T1\DSCF4038.JPG



Figure 3 H:\21C101_Ballinagree TP Photos\Photos\T2\DSCF4057.JPG



Figure 4 H:\21C101_Ballinagree TP Photos\Photos\T2\DSCF4059.JPG



Figure 5 H:\21C101_Ballinagree TP Photos\Photos\T3\DSCF3996.JPG



Figure 6 H:\21C101_Ballinagree TP Photos\Photos\T3\DSCF3997.JPG



Figure 7 H:\21C101_Ballinagree TP Photos\Photos\T4\DSCF3962.JPG



Figure 8 H:\21C101_Ballinagree TP Photos\Photos\T4\DSCF3966.JPG



Figure 9 H:\21C101_Ballinagree TP Photos\Photos\T5\DSCF4133.JPG



Figure 10 H:\21C101_Ballinagree TP Photos\Photos\T5\DSCF4134.JPG



Figure 11 H:\21C101_Ballinagree TP Photos\Photos\T6\DSCF3987.JPG



Figure 12 H:\21C101_Ballinagree TP Photos\Photos\T6\DSCF3988.JPG



Figure 13 H:\21C101_Ballinagree TP Photos\Photos\T7\DSCF4162.JPG



Figure 14 H:\21C101_Ballinagree TP Photos\Photos\T7\DSCF4163.JPG



Figure 15 H:\21C101_Ballinagree TP Photos\Photos\T8\DSCF4158.JPG



Figure 16 H:\21C101_Ballinagree TP Photos\Photos\T8\DSCF4159.JPG



Figure 17 H:\21C101_Ballinagree TP Photos\Photos\T10\DSCF4020.JPG



Figure 18 H:\21C101_Ballinagree TP Photos\Photos\T10\DSCF4021.JPG



Figure 19 H:\21C101_Ballinagree TP Photos\Photos\T11\DSCF4111.JPG



Figure 20 H:\21C101_Ballinagree TP Photos\Photos\T11\DSCF4112.JPG



Figure 21 H:\21C101_Ballinagree TP Photos\Photos\T12\DSCF4100.JPG



Figure 22 H:\21C101_Ballinagree TP Photos\Photos\T12\DSCF4101.JPG



Figure 23 H:\21C101_Ballinagree TP Photos\Photos\T13\DSCF4093.JPG



Figure 24 H:\21C101_Ballinagree TP Photos\Photos\T13\DSCF4094.JPG



Figure 25 H:\21C101_Ballinagree TP Photos\Photos\T14\DSCF4181.JPG



Figure 26 H:\21C101_Ballinagree TP Photos\Photos\T14\DSCF4184.JPG



Figure 27 H:\21C101_Ballinagree TP Photos\Photos\T15\DSCF4201.JPG



Figure 28 H:\21C101_Ballinagree TP Photos\Photos\T15\DSCF4203.JPG



Figure 29 H:\21C101_Ballinagree TP Photos\Photos\T16\DSCF4213.JPG



Figure 30 H:\21C101_Ballinagree TP Photos\Photos\T16\DSCF4214.JPG



Figure 31 H:\21C101_Ballinagree TP Photos\Photos\T17\DSCF4310.JPG



Figure 32 H:\21C101_Ballinagree TP Photos\Photos\T17\DSCF4311.JPG



Figure 33 H:\21C101_Ballinagree TP Photos\Photos\T18\DSCF4293.JPG



Figure 34 H:\21C101_Ballinagree TP Photos\Photos\T18\DSCF4294.JPG



Figure 35 H:\21C101_Ballinagree TP Photos\Photos\T19\DSCF4247.JPG



Figure 36 H:\21C101_Ballinagree TP Photos\Photos\T19\DSCF4248.JPG



Figure 37 H:\21C101_Ballinagree TP Photos\Photos\T20A\DSCF4268.JPG



Figure 38 H:\21C101_Ballinagree TP Photos\Photos\T20A\DSCF4270.JPG



Figure 39 H:\21C101_Ballinagree TP Photos\Photos\T21A\DSCF4288.JPG



Figure 40 H:\21C101_Ballinagree TP Photos\Photos\T21A\DSCF4289.JPG



Figure 41 H:\21C101_Ballinagree TP Photos\Photos\TP01\DSCF4173.JPG



Figure 42 H:\21C101_Ballinagree TP Photos\Photos\TP01\DSCF4175.JPG



Figure 43 H:\21C101_Ballinagree TP Photos\Photos\TP02\DSCF4190.JPG



Figure 46 H:\21C101_Ballinagree TP Photos\Photos\TP03\DSCF4197.JPG



Figure 44 H:\21C101_Ballinagree TP Photos\Photos\TP02\DSCF4191.JPG



Figure 45 H:\21C101_Ballinagree TP Photos\Photos\TP03\DSCF4194.JPG



Figure 47 H:\21C101_Ballinagree TP Photos\Photos\TP04\DSCF4304.JPG



Figure 48 H:\21C101_Ballinagree TP Photos\Photos\TP04\DSCF4305.JPG



Figure 49 H:\21C101_Ballinagree TP Photos\Photos\TP05\DSCF4298.JPG



Figure 50 H:\21C101_Ballinagree TP Photos\Photos\TP05\DSCF4300.JPG



Figure 51 H:\21C101_Ballinagree TP Photos\Photos\TP06\DSCF4207.JPG



Figure 52 H:\21C101_Ballinagree TP Photos\Photos\TP06\DSCF4208.JPG



Figure 53 H:\21C101_Ballinagree TP Photos\Photos\TP07\DSCF4315.JPG



Figure 54 H:\21C101_Ballinagree TP Photos\Photos\TP07\DSCF4316.JPG



Figure 55 H:\21C101_Ballinagree TP Photos\Photos\TP08\DSCF4217.JPG



Figure 56 H:\21C101_Ballinagree TP Photos\Photos\TP08\DSCF4218.JPG



Figure 57 H:\21C101_Ballinagree TP Photos\Photos\TP09\DSCF4232.JPG



Figure 58 H:\21C101_Ballinagree TP Photos\Photos\TP09\DSCF4233.JPG



Figure 59 H:\21C101_Ballinagree TP Photos\Photos\TP10\DSCF4241.JPG



Figure 60 H:\21C101_Ballinagree TP Photos\Photos\TP10\DSCF4242.JPG



Figure 61 H:\21C101_Ballinagree TP Photos\Photos\TP11A\DSCF4283.JPG



Figure 62 H:\21C101_Ballinagree TP Photos\Photos\TP11A\DSCF4284.JPG



Figure 63 H:\21C101_Ballinagree TP Photos\Photos\TP12\DSCF4252.JPG



Figure 64 H:\21C101_Ballinagree TP Photos\Photos\TP12\DSCF4253.JPG



Figure 65 H:\21C101_Ballinagree TP Photos\Photos\TP13\DSCF4261.JPG



Figure 66 H:\21C101_Ballinagree TP Photos\Photos\TP13\DSCF4263.JPG



Figure 67 H:\21C101_Ballinagree TP Photos\Photos\TP14\DSCF4080.JPG



Figure 68 H:\21C101_Ballinagree TP Photos\Photos\TP14\DSCF4084.JPG



Figure 69 H:\21C101_Ballinagree TP Photos\Photos\TP15\DSCF4071.JPG



Figure 70 H:\21C101_Ballinagree TP Photos\Photos\TP15\DSCF4072.JPG



Figure 71 H:\21C101_Ballinagree TP Photos\Photos\TP16\DSCF4066.JPG



Figure 72 H:\21C101_Ballinagree TP Photos\Photos\TP16\DSCF4067.JPG



Figure 73 H:\21C101_Ballinagree TP Photos\Photos\TP17\DSCF4053.JPG



Figure 74 H:\21C101_Ballinagree TP Photos\Photos\TP17\DSCF4054.JPG



Figure 75 H:\21C101_Ballinagree TP Photos\Photos\TP18\DSCF4045.JPG



Figure 76 H:\21C101_Ballinagree TP Photos\Photos\TP18\DSCF4046.JPG



Figure 77 H:\21C101_Ballinagree TP Photos\Photos\TP19\DSCF4042.JPG



Figure 78 H:\21C101_Ballinagree TP Photos\Photos\TP19\DSCF4043.JPG



Figure 79 H:\21C101_Ballinagree TP Photos\Photos\TP20\DSCF4030.JPG



Figure 80 H:\21C101_Ballinagree TP Photos\Photos\TP20\DSCF4031.JPG



Figure 81 H:\21C101_Ballinagree TP Photos\Photos\TP21\DSCF4105.JPG



Figure 82 H:\21C101_Ballinagree TP Photos\Photos\TP21\DSCF4106.JPG



Figure 83 H:\21C101_Ballinagree TP Photos\Photos\TP22\DSCF4088.JPG



Figure 84 H:\21C101_Ballinagree TP Photos\Photos\TP22\DSCF4089.JPG



Figure 85 H:\21C101_Ballinagree TP Photos\Photos\TP23\DSCF4115.JPG



Figure 86 H:\21C101_Ballinagree TP Photos\Photos\TP23\DSCF4116.JPG



Figure 87 H:\21C101_Ballinagree TP Photos\Photos\TP24\DSCF4120.JPG



Figure 88 H:\21C101_Ballinagree TP Photos\Photos\TP24\DSCF4121.JPG



Figure 89 H:\21C101_Ballinagree TP Photos\Photos\TP25\DSCF4014.JPG



Figure 90 H:\21C101_Ballinagree TP Photos\Photos\TP25\DSCF4016.JPG



Figure 91 H:\21C101_Ballinagree TP Photos\Photos\TP26\DSCF4009.JPG



Figure 92 H:\21C101_Ballinagree TP Photos\Photos\TP26\DSCF4010.JPG



Figure 93 H:\21C101_Ballinagree TP Photos\Photos\TP27\DSCF3999.JPG



Figure 94 H:\21C101_Ballinagree TP Photos\Photos\TP27\DSCF4005.JPG



Figure 95 H:\21C101_Ballinagree TP Photos\Photos\TP28A\DSCF4273.JPG



Figure 96 H:\21C101_Ballinagree TP Photos\Photos\TP28A\DSCF4275.JPG



Figure 97 H:\21C101_Ballinagree TP Photos\Photos\TP29\DSCF4023.JPG



Figure 98 H:\21C101_Ballinagree TP Photos\Photos\TP29\DSCF4026.JPG



Figure 99 H:\21C101_Ballinagree TP Photos\Photos\TP30\DSCF4152.JPG



Figure 100 H:\21C101_Ballinagree TP Photos\Photos\TP30\DSCF4153.JPG



Figure 101 H:\21C101_Ballinagree TP Photos\Photos\TP31\DSCF4168.JPG



Figure 102 H:\21C101_Ballinagree TP Photos\Photos\TP31\DSCF4169.JPG



Figure 103 H:\21C101_Ballinagree TP Photos\Photos\TP32A\DSCF4277.JPG



Figure 104 H:\21C101_Ballinagree TP Photos\Photos\TP32A\DSCF4278.JPG



Figure 105 H:\21C101_Ballinagree TP Photos\Photos\TP33\DSCF3992.JPG



Figure 106 H:\21C101_Ballinagree TP Photos\Photos\TP33\DSCF3993.JPG



Figure 107 H:\21C101_Ballinagree TP Photos\Photos\TP34\DSCF3982.JPG



Figure 108 H:\21C101_Ballinagree TP Photos\Photos\TP34\DSCF3984.JPG



Figure 109 H:\21C101_Ballinagree TP Photos\Photos\TP35\DSCF3979.JPG



Figure 110 H:\21C101_Ballinagree TP Photos\Photos\TP35\DSCF3981.JPG



Figure 111 H:\21C101_Ballinagree TP Photos\Photos\TP36\DSCF3971.JPG



Figure 112 H:\21C101_Ballinagree TP Photos\Photos\TP36\DSCF3972.JPG



Figure 113 H:\21C101_Ballinagree TP Photos\Photos\TP37\DSCF3975.JPG



Figure 114 H:\21C101_Ballinagree TP Photos\Photos\TP37\DSCF3976.JPG



Figure 115 H:\21C101_Ballinagree TP Photos\Photos\TP38\DSCF4125.JPG



Figure 116 H:\21C101_Ballinagree TP Photos\Photos\TP38\DSCF4126.JPG



Figure 117 H:\21C101_Ballinagree TP Photos\Photos\TP39\DSCF4142.JPG



Figure 118 H:\21C101_Ballinagree TP Photos\Photos\TP39\DSCF4143.JPG



Figure 119 H:\21C101_Ballinagree TP Photos\Photos\TP40\DSCF4137.JPG



Figure 120 H:\21C101_Ballinagree TP Photos\Photos\TP40\DSCF4138.JPG



Figure 121 H:\21C101_Ballinagree TP Photos\Photos\TP41\DSCF4147.JPG



Figure 122 H:\21C101_Ballinagree TP Photos\Photos\TP41\DSCF4148.JPG



Figure 123 H:\21C101_Ballinagree TP Photos\Photos\TP42\DSCF4224.JPG



Figure 124 H:\21C101_Ballinagree TP Photos\Photos\TP42\DSCF4225.JPG



Figure 125 H:\21C101_Ballinagree TP Photos\Photos\TP43\DSCF4076.JPG



Figure 126 H:\21C101_Ballinagree TP Photos\Photos\TP43\DSCF4077.JPG





Appendix 06 Site Plans


































Appendix 07 AGS Data