

AGP21217_01

**REPORT
ON THE
GEOPHYSICAL INVESTIGATION
FOR THE
NORTH IRISH SEA ARRAY
ONSHORE INFRASTRUCTURE,
Co. DUBLIN
FOR
STATKRAFT**



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

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1. EXECUTIVE SUMMARY

APEX Geophysics Limited was requested by ARUP on behalf of Statkraft to carry out a geophysical survey for the North Irish Sea Array (NISA) onshore infrastructure. The onshore infrastructure will comprise of a connection of the generated energy from the offshore wind farm to the national electricity transmission network.

The objectives of the geophysical survey are to provide information on the the thickness and stratigraphy of the superficial deposits and on the depth to and nature of the bedrock at four locations indicated by the client.

The geophysical investigation was carried out between the 29th March and the 21st April 2022 and consisted of EM ground conductivity mapping, 2D Electrical Resistivity Tomography and 2D Seismic Refraction profiling at Landfall, Blakes Cross and the M1 crossing.

The results of the geophysical surveys are detailed in this draft report and presented on the drawings in Appendix D.

The findings of this draft geophysical report should be reviewed on completion of any further direct investigation.

2. INTRODUCTION

APEX Geophysics Limited was requested by ARUP on behalf of Statkraft to carry out a geophysical survey for the North Irish Sea Array (NISA) onshore infrastructure. The onshore infrastructure will comprise of a connection of the generated energy from the offshore wind farm to the national electricity transmission network.

The objectives of the geophysical survey are to aid in the preliminary design of the converter station, to identify areas of infilling and to provide information on the depth to rockhead by identifying the following:

- position and depth of any localised variations and changes of stratigraphy in the superficial deposits that could be related to areas of fill; and
- determine the two-dimensional spatial variation in the superficial deposits and underlying rock to depths not less than 10 m below ground level (bgl) in order to provide the following information:
 - overburden thickness,
 - depth to competent bedrock,
 - determination of overburden and bedrock type and variations,
 - the rock mass and engineering properties of the underlying strata.

2.1 Site Background

The geophysical investigation was carried out at 4 locations between Balbriggan and Swords, Co. Dublin (Fig 2.1) The individual sites comprise agricultural lands and the soil and bedrock geology is summarised in Table 1.

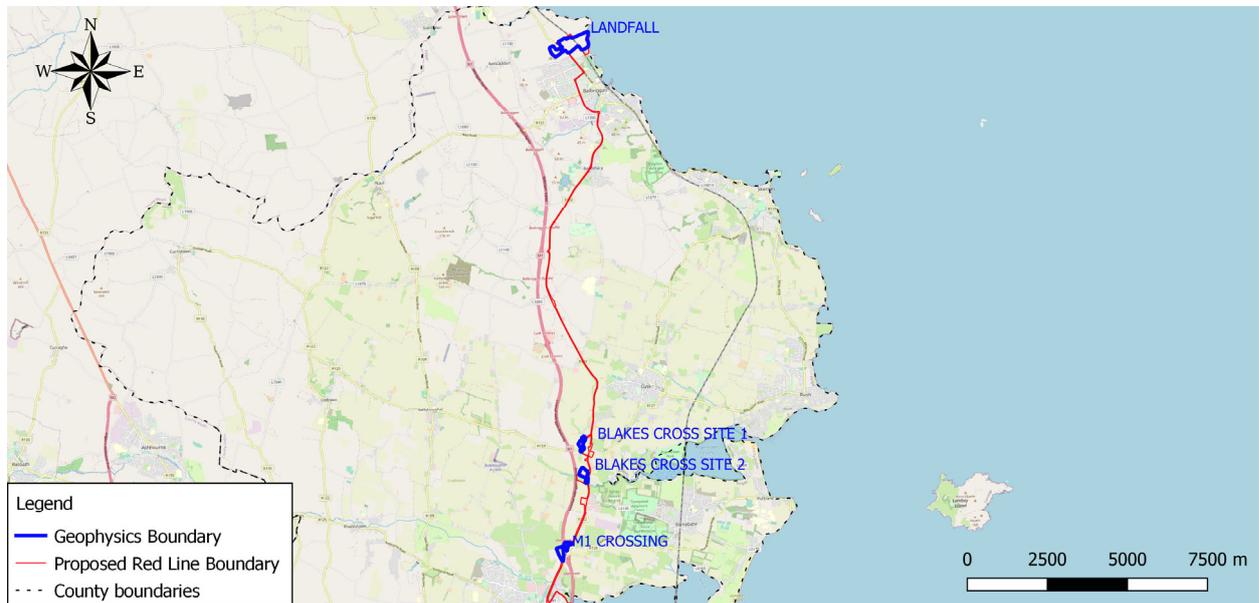


Fig 2.1: 4 Geophysical site boundaries indicated by red boundaries.

Location	Quaternary Sediments	Bedrock Geology
Landfall Site	Till & Irish Sea till with outcrop/ subcrop in places	Belcamp Formation – andesite, pillow breccia, mudstone, tuff
Blakes Cross Site 1	Till, alluvium & gravels	Lucan Formation – dark limestone & shale
Blakes Cross Site 2	Irish Sea till & alluvium	Tober Colleen Formation – shale & limestone conglomerate
M1 Crossing Sites	Irish Sea till & alluvium	Malahide Formation – limestone & shale

2.2 Survey Rationale

The survey was carried out between the 29th March and the 21st April 2022. The geophysical site boundaries and the overall project boundary are indicated on Drawing AGP21217_01 (Appendix D).

The investigation consisted of reconnaissance EM ground conductivity mapping with follow-up 2D Electrical Resistivity Tomography (ERT) and Seismic Refraction profiling as set out in the tender documents:

EM ground conductivity mapping operates on the principle of inducing currents in conductive substrata and measuring the resultant secondary electro-magnetic field. The strength of this secondary EM field is calibrated to give apparent ground conductivity in milliSiemens/metre (mS/m). This technique will provide information on the shallow (0-6m below ground level) variation of the superficial deposits and outline the shallow bedrock.

ERT images the resistivity of the materials in the subsurface along a profile to produce a cross-section showing the variation in resistivity with depth, depending on the length of the profile. Each cross-section will be interpreted to determine the material type along the profile at increasing depth, based on the typical resistivities returned for Irish ground materials.

P-wave Seismic Refraction profiling measures the velocity of refracted seismic waves through the overburden and rock material and allows an assessment of the thickness and quality of the materials present to be made. Stiffer and stronger materials usually have higher seismic velocities while soft, loose or fractured materials have lower velocities. This method allows us to profile the depth to the top of the bedrock.

As with all geophysical methods the results are based on indirect readings of the subsurface properties. The effectiveness of the proposed approach will be affected by variations in the ground properties. By combining a number of techniques it is possible to provide a higher quality interpretation and reduce any ambiguities which may otherwise exist. The methods are briefly discussed in Appendix A.

3. RESULTS

3.1 LANDFALL

3.1.1 Site Background

The Landfall site is located in the townland of Bremore, north of Balbriggan and consists of c. 43 ha of open agricultural fields (Fig. 3.1.1). Topography across the surveyed area ranges from 2.2 mOD in the east along the coastline to 33.9 mOD in the west.



Fig 3.1.1: Site boundary marked with red line.

Soils

The Geological Survey of Ireland (GSI) Quaternary soils map for the area (GS1c, 2019) indicates that the soils at the sites are till derived from sandstones and shales in the north and Irish Sea till derived from sandstones and shales in the south with subcropping/outcropping rock in places (Figure 3.1.2).

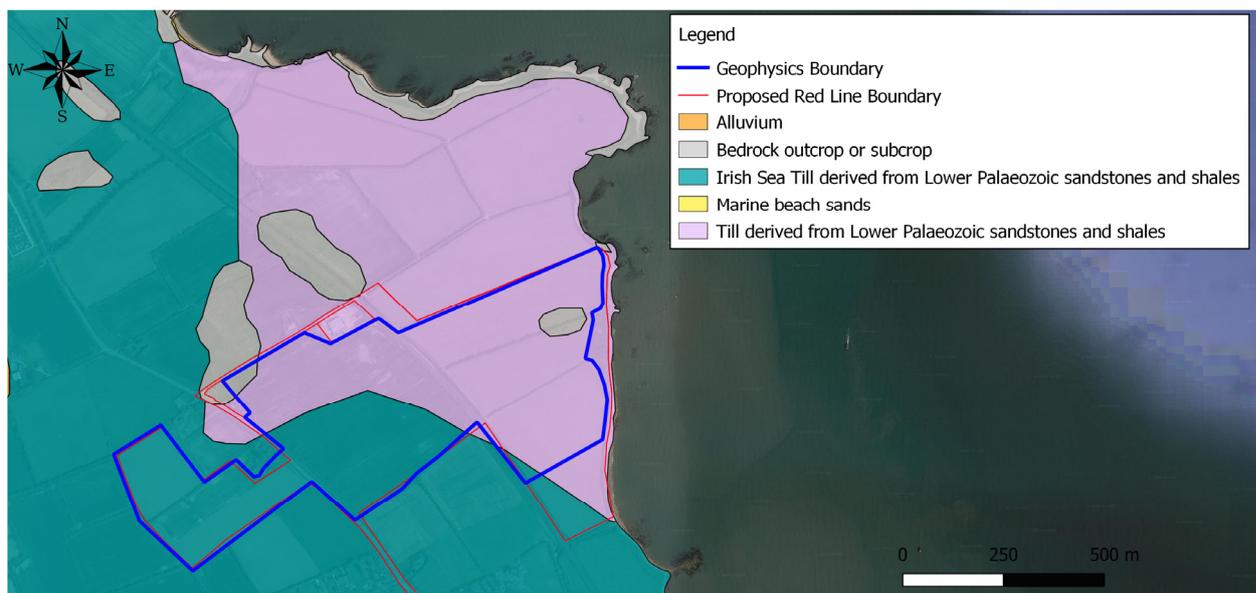


Fig 3.1.2: The GSI Quaternary sediments map (site marked in red).

Geology

The GSI 1:100k Bedrock Geology map (GSI, 2018) indicates that the site is underlain by Belcamp Formation andesite, pillow breccia, mudstone, tuff (Figure 3.1.3). Rock outcrops along the shore east of the site.

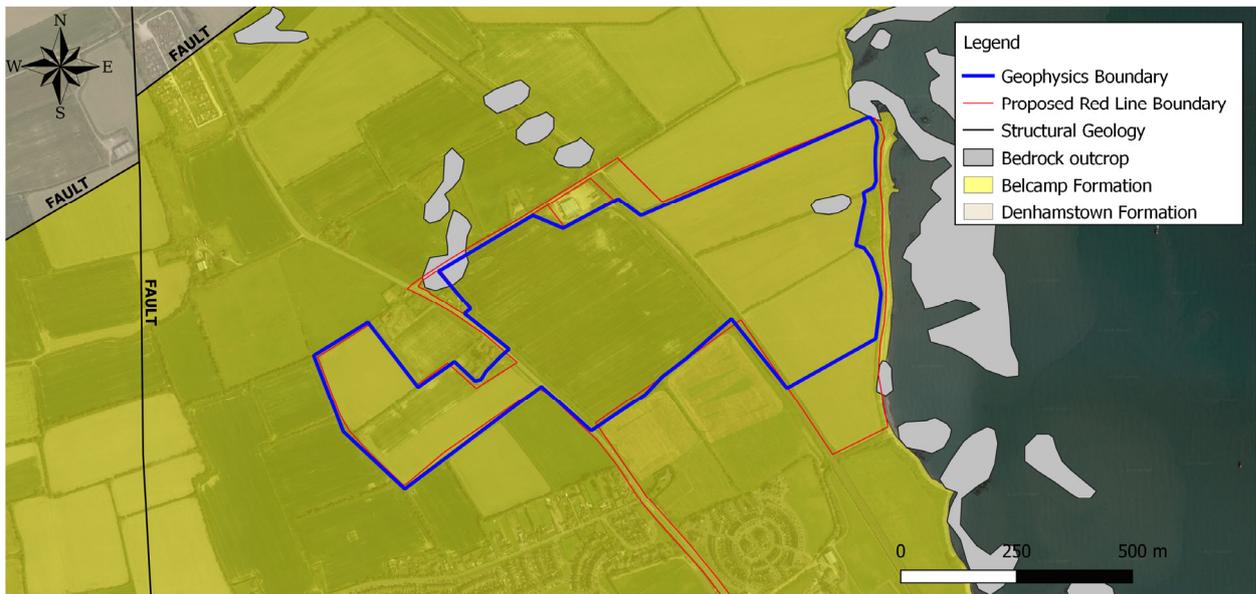


Fig 3.1.3: The GSI bedrock map (site marked in red).

Groundwater

The Belcamp Formation is classified as a 'Locally Important aquifer – bedrock which is generally moderately productive' (GSIa, 2019) (Figure 3.1.4).

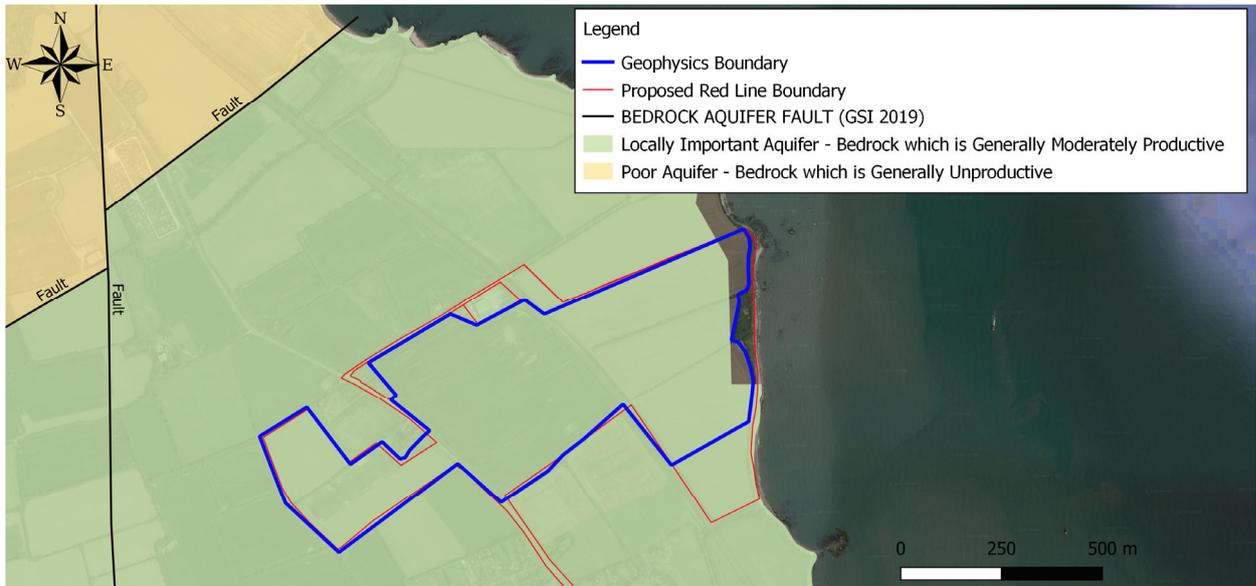


Fig 3.1.4: The GSI aquifer classification map (site marked in red).

The groundwater vulnerability rating across the sites (GSIb, 2019) varies from 'Low' to 'Extreme' (Figure 3.1.5).

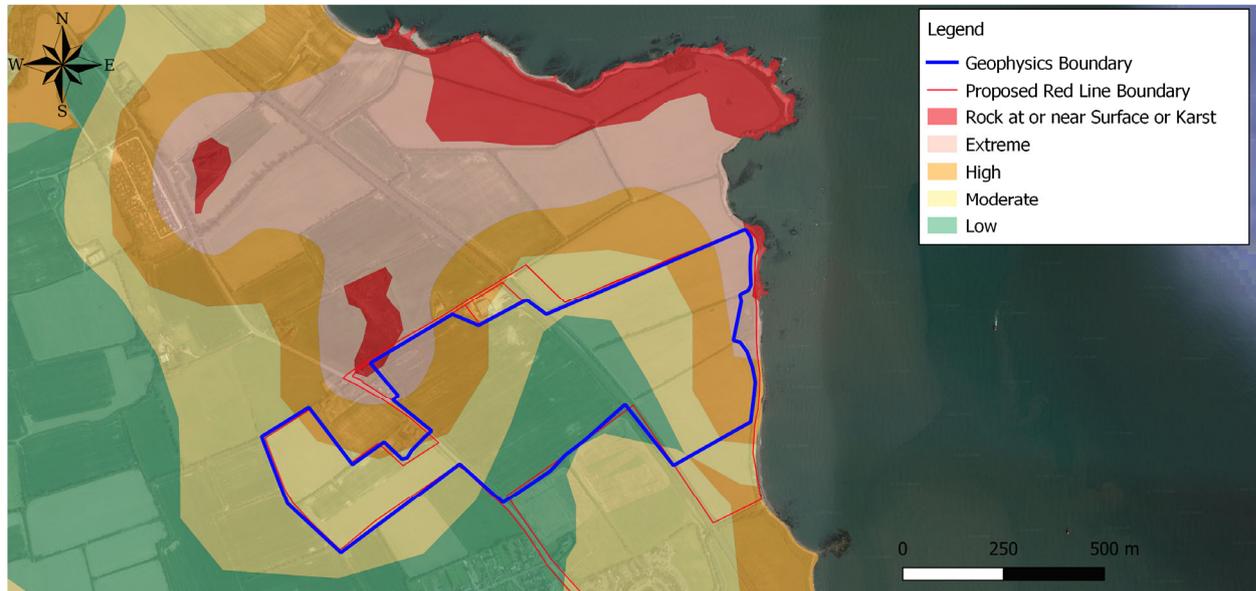


Fig 3.1.5: The GSI groundwater vulnerability classification map (site marked in red).

Historical Mapping

The historical 6 inch sheet for the area indicates 'visicular greenstone' outcropping in the northwest and the northeast of the site and along the shore northeast of the site (indicated by green hatching in Figure 3.1.6). In addition, 'dark baked and hardened slates' are mapped (grey hatching) along the shore southeast of the site.

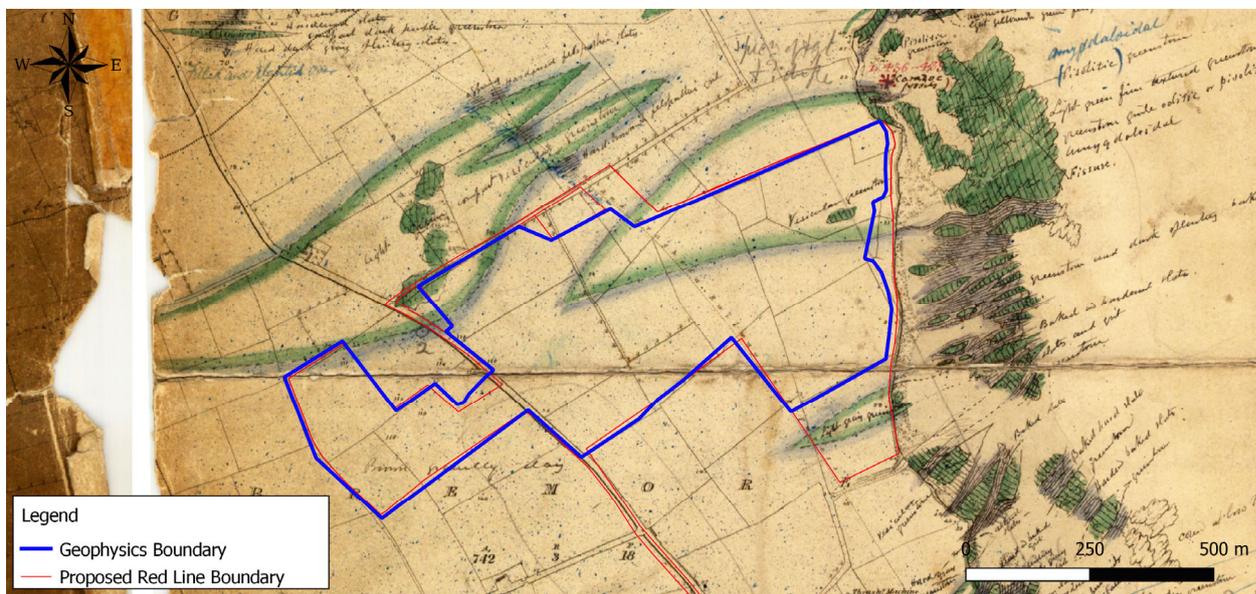


Fig 3.1.6: The historical 6 inch geological mapping (site marked in red).

Direct Investigation Data

Eleven boreholes (BH01 to BH07 & BH15 to BH18) were cored and ten trial pits (TP01 to TP05, TP07 to TP09, TP11 & TP12) were opened in this survey area (Drawing AGP21217_L01). The boreholes generally encountered soft to firm to very stiff sandy gravelly clay with occasional clayey gravelly sand over variable rock lithologies

including extremely weak destructured BRECCIA (BH07), extremely weak to very weak to medium strong partially weathered TUFF (BH05, BH07, BH17 & BH18), weak to medium strong thinly laminated partially weathered MUDSTONE (BH03, BH04, BH16, BH17 & BH18), weak to medium strong thinly to thickly laminated distinctly to partially weathered SILTSTONE (BH04, BH05, BH15, BH16 & BH17), medium strong partially weathered to unweathered ANDESITE (BH01 & BH02), weak to medium strong distinctly to partially weathered GREYWACKE (BH02, BH03, BH17 & BH18), at depths from 2.6 to 20.0 m bgl.

The trial pits encountered predominantly firm to stiff slightly sandy gravelly clay with cobbles with clayey gravel and cobbles (TP03) or silty sand with cobbles (TP05) to refusal at depths from 1.2 to 3.0 m bgl.

3.1.2 Results & Interpretation

The geophysical data acquired at this site included EM mapping, ERT and SR profiles. The results are presented on Drawings AGP21217_L01 to AGP21217_L04 (Appendix D).

EM Conductivity Mapping

The EM ground conductivity results (Drawing AGP21217_L02, Appendix D) are indicative of the bulk conductivity of the ground materials from 0 - 6.0 m bgl. The recorded conductivity values ranged from 2 to 34 mS/m and have been generally interpreted in conjunction with the ERT and seismic data as follows:

Conductivity (mS/m)	Interpretation
2.0 – 7.0	<2 m sandy gravelly SILT/CLAY over bedrock
7 – 10	2-4 m sandy gravelly SILT/CLAY over bedrock
10– 14	2-4 m slightly sandy slightly gravelly SILT/CLAY over bedrock
14 – 34	>4 m slightly sandy slightly gravelly SILT/CLAY over bedrock

ERT

Eleven ERT Profiles were acquired across the site. The resistivity values have been interpreted in conjunction with the EM, seismic refraction and direct investigation data on the following basis:

Resistivity (Ohm-m)	Interpretation
10 - 100	Slightly sandy slightly gravelly SILT/CLAY
100 - 200	Sandy gravelly SILT/CLAY or Weathered Rock
25-100	Pillow Breccia
100-400	MUDSTONE, SILTSTONE, SANDSTONE, GREYWACKE and/ or TUFF
400-4500	ANDESITE

Seismic Refraction Profiling

Seismic refraction spreads were acquired along each of the ERT profiles. The processed data are contained in Appendix C. The Vp seismic velocities recorded across the survey area indicated up to 4 velocity layers at each profile location.

The range of recorded velocities can generally be interpreted as follows:

Vp Seismic Velocity (m/s)	Average Vp (m/s)	Interpretation	Estimated Stiffness/ Rock Quality	*Estimated Excavatability
182-414	280	Soil	Soft/Loose	Diggable
348-1091	645	Soil	Soft-Firm/Loose-Medium Dense	Diggable
762-2066	1475	Soil	Firm-Stiff/ Medium Dense-Dense	Diggable
		Highly - Moderately Weathered Rock	Poor-Fair	Rippable-Break/Blast
1790-2176	1810	Soil	Very Stiff/ Very Dense	Diggable
		Moderately -Slightly Weathered Rock	Fair-Good	Marginally Rippable-Break/Blast
2339-5399	3220	Slightly Weathered – Fresh Rock	Good	Break/Blast

* It should be noted that the cut-off velocity for excavatability will be lower if excavating in trenches and when excavating parallel to the regional geological strike, due to seismic anisotropy of the bedrock.

3.1.3 Discussion & Recommendations

The ERT, Seismic Refraction, borehole and trial pit information have been combined to produce the Interpreted Sections on Drawings AGP21217_R4, AGP21217_R5 and AGP21217_R9 to AGP21217_R17 (Appendix D). The combined results have been summarised as follows:

Vp Seismic Velocity (m/s)	Resistivity (Ohm-m)	Interpretation	Estimated Stiffness/ Rock Quality	*Estimated Excavatability	
182-414	10 - 100	Slightly sandy slightly gravelly SILT/CLAY	Soft	Diggable	
	100 - 200	Sandy gravelly SILT/CLAY			
348-1091	10 - 100	Slightly sandy slightly gravelly SILT/CLAY	Soft-Firm		
	100 - 200	Sandy gravelly SILT/CLAY	Firm-Stiff		
762-2066	10 - 100	Slightly sandy slightly gravelly SILT/CLAY			Poor-Fair
	100 - 200	Sandy gravelly SILT/CLAY			
1790-2176	25-100	Slightly Weathered Pillow Breccia	Fair	Marginally Ripp - Break	
2339-5399	100-400	Slightly Weathered – Fresh MUDSTONE, SILTSTONE, SANDSTONE, GREYWACKE and/ or TUFF	Good	Break/Blast	
	400-4500	Slightly Weathered – Fresh ANDESITE			

The soils have been interpreted as predominantly slightly sandy, slightly gravelly silt/clay across the site with sandy gravelly silt/clay in the centre-west of the site. The interpreted soil thickness is plotted on Drawing AGP21217_L03 and ranges from 0.4 – 11.5 m. Seismic velocities indicate that on average the upper 0.7 m of soils will be soft becoming soft to firm to an average depth of 2.3 m bgl, becoming stiff with depth.

3.1.4 Bedrock

No consistent weathered rock layer was observed in the boreholes. However, the seismic velocities and resistivities of the layer of firm to stiff sandy gravelly silt/clay overlying the bedrock could also be indicative of highly to moderately weathered rock, the excavatability of which would vary from diggable to rippable to marginally rippable depending on the velocity and the rock type.

Three rock types have been interpreted across the site in conjunction with the borehole information; very low resistivity (25-100 Ohm-m) breccia, low resistivity (100-200 Ohm-m) rock including mudstone, siltstone, sandstone, greywacke and/or tuff; and higher resistivity (400-4500 Ohm-m) andesite. The seismic velocities indicate that the rock is generally slightly weathered to fresh rock with the exception of the breccia which appears to have lower velocities in places indicating that it is slightly weathered.

The seismic velocities indicate that any highly to moderately weathered rock would range from rippable (where velocities are ≤ 1800 m/s) to requiring breaking and any excavation of the slightly weathered to fresh rock will require breaking/blasting. It should be noted that the cut-off velocity for excavatability will be lower if excavating in trenches.

The interpreted elevation of the top of slightly weathered to fresh rock varies from -2.2 to 33.2 mOD and is contoured on Drawing AGP21217_L04.

Note: All contour maps include a degree of interpolation, and the data points used to construct the map are shown on each of the drawings.

3.2 BLAKES CROSS SITE 1

3.2.1 Site Background

Blakes Cross Site 1 is located east of the M1 Motorway, 3 km north of the Junction 4 interchange, in the townland of Corduffhall. At Site 1 there are 2 geophysical survey locations comprising of 5.5 ha of agricultural land west of the R132 road and 0.7 ha at the junction of the R132 and the L5205 roads (Fig. 3.2.1). Topography across the surveyed area ranges from 6.8 mOD in the southeast to 12.0 mOD in the north.



Fig 3.2.1: Site boundary marked with red line.

Soils

The GSI Quaternary soils map for the area (GSI, 2019) indicates that the soils at the site are alluvium through the centre and Irish Sea till derived from sandstones and shales in the southwest and the east (Figure 3.2.2).

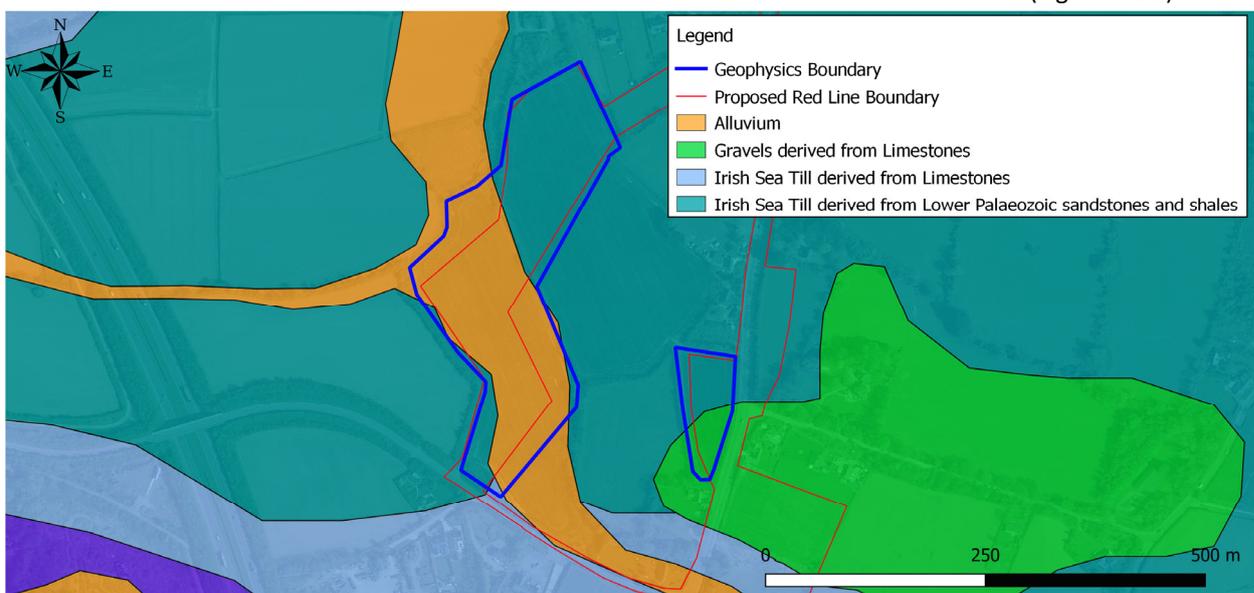


Fig 3.2.2: The GSI Quaternary sediments map (site marked in red).

Geology

The GSI 1:100k Bedrock Geology map (GSI, 2018) indicates that the sites are predominantly underlain by dark limestone and shale of the Lucan 'Calp' Formation (Figure 3.2.3). A NE-SW fault is located in the southeast of the site.

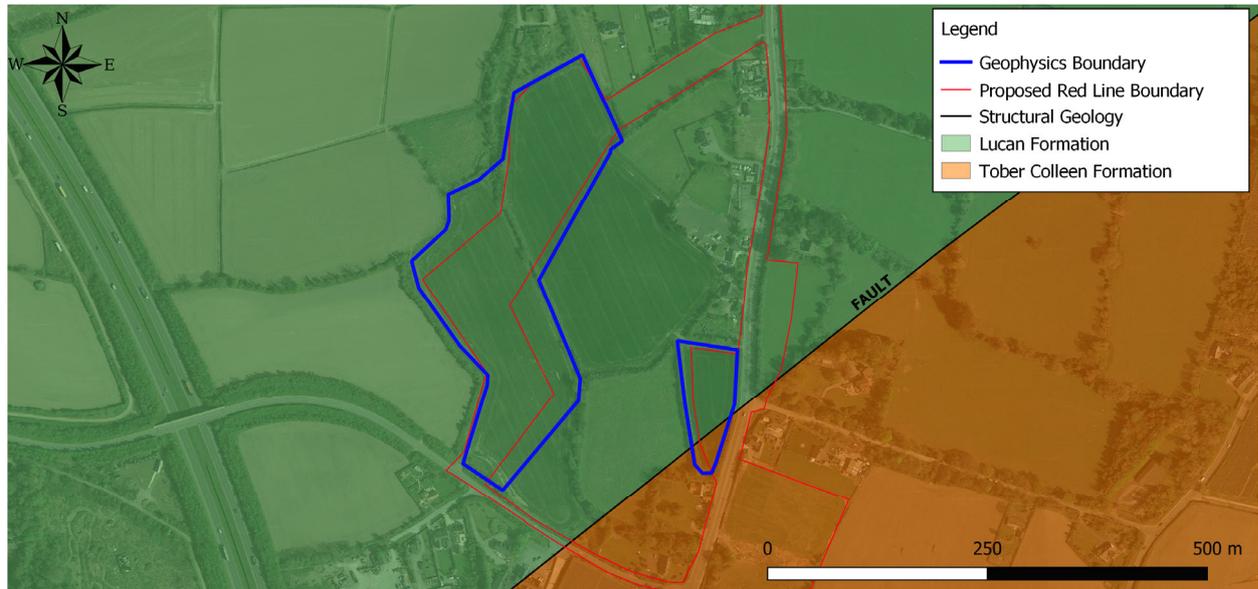


Fig 3.2.3: The GSI bedrock map (site marked in red).

Groundwater

The Lucan Formation is classified as a 'Locally Important aquifer – bedrock which is moderately productive only in local zones' (GSIa, 2019) (Figure 3.2.4).

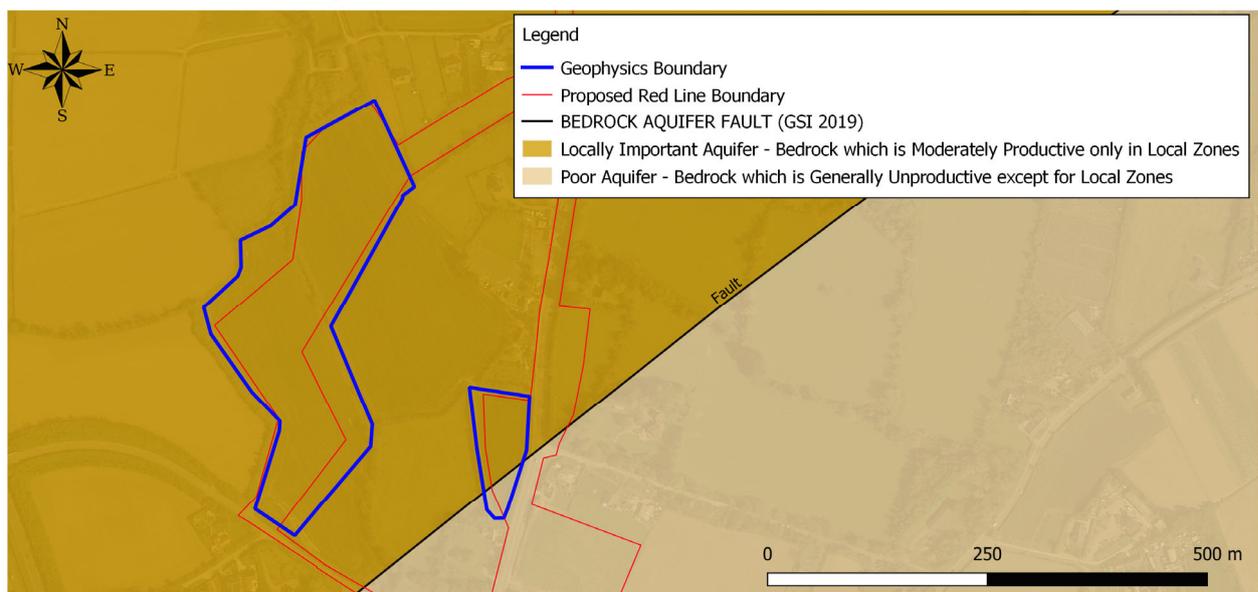


Fig 3.2.4: The GSI aquifer classification map (site marked in red).

The groundwater vulnerability rating across the sites (GSIb, 2019) varies from 'Low' in the west and east to 'High' in the north (Figure 3.2.5).



Fig 3.2.5: The GSI groundwater vulnerability classification map (site marked in red).

Historical Mapping

The historical 6 inch sheet for the area indicates 'dark grey and black shales outcropping 190 m NW of the site (indicated by blue hatching in Figure 3.2.6).

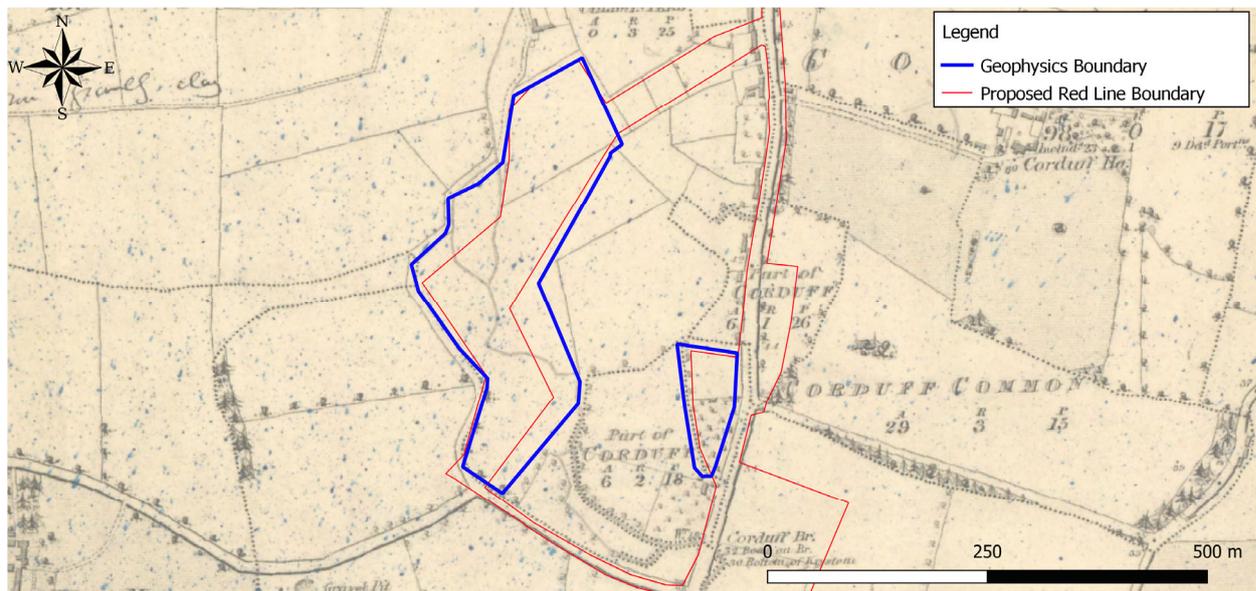


Fig 3.2.6: The historical 6 inch geological mapping (site marked in red).

Direct Investigation Data

Two trial pits (TP17 & TP18) were opened in this survey area (Drawing AGP21217_B01) and encountered topsoil over soft to firm to stiff slightly sandy gravelly clay to refusal at depths from 2.7 to 2.8 m bgl.

3.2.2 Results & Interpretation

The geophysical data acquired at this site included EM mapping and ERT profiles. The results are presented on Drawings AGP21217_B01, AGP21217_B02 and AGP21217_B03 (Appendix D).

EM Conductivity Mapping

The EM ground conductivity results (Drawing AGP21217_B02, Appendix D) are indicative of the bulk conductivity of the ground materials from 0 - 6.0 m bgl. The recorded conductivity values ranged from 7 to 23 mS/m and have been generally interpreted in conjunction with the ERT and seismic data as follows:

Conductivity (mS/m)	Interpretation
7-13	Sandy gravelly SILT/CLAY over bedrock
13 - 23	Slightly sandy slightly gravelly SILT/CLAY over bedrock

ERT

Three ERT Profiles were acquired in the western survey area. The resistivity values have been interpreted in conjunction with the EM, seismic refraction and direct investigation data on the following basis:

Resistivity (Ohm-m)	Interpretation
50 - 100	Slightly sandy slightly gravelly SILT/CLAY
100 - 200	Sandy gravelly SILT/CLAY
100 - 1500	Dark LIMESTONE with thin interbedded SHALES (Lucan Formation)

3.2.3 Discussion & Recommendations

The ERT and trial pit information have been combined to produce the Interpreted Sections on Drawings AGP21217_R6, AGP21217_R7 and AGP21217_R8 (Appendix D).

The soils have been interpreted as slightly sandy, slightly gravelly silt/clay and/or sandy gravelly silt/clay varying in thickness from 2.7 to 21.7 m thick.

Bedrock has been interpreted as dark limestone with thin interbedded shales.

3.3 BLAKES CROSS SITE 2

3.3.1 Site Background

Blakes Cross Site 2 is located east of the M1 Motorway, 2.5 km north of the Junction 4 interchange, in the townland of Coldwinters. The geophysical survey area comprises of 7.2 ha of agricultural land between the motorway and 2.9 ha east of the R132 road (Fig. 3.3.1). Topography across the surveyed area ranges from 2.6 mOD in the south to 5.3 mOD in the west/northwest.

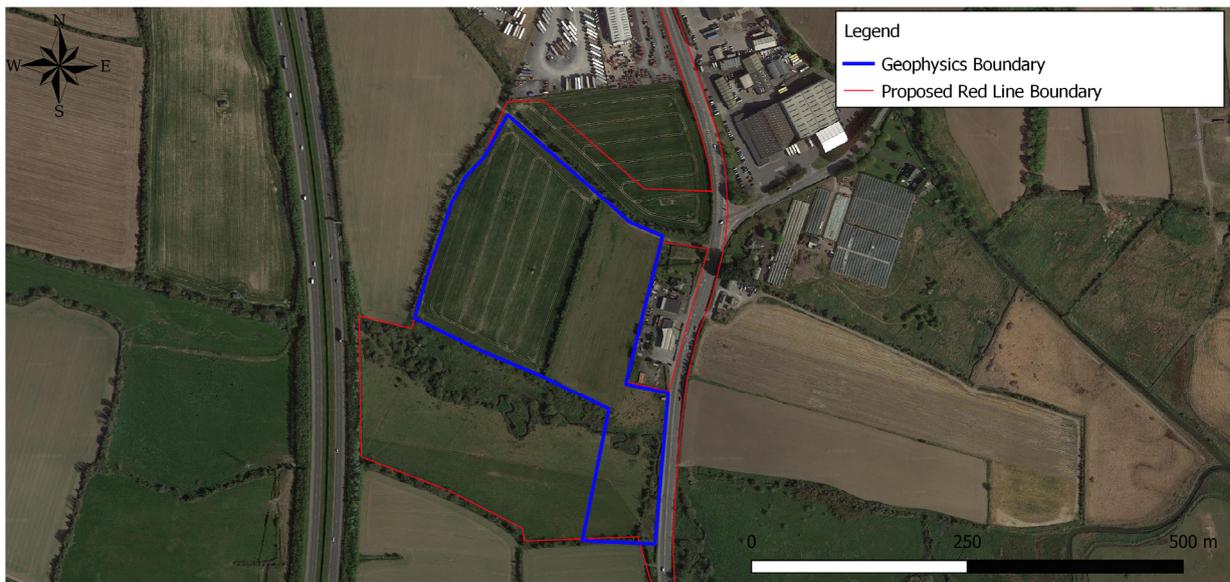


Fig 3.3.1: Site boundary marked with red line.

Soils

The GSI Quaternary soils map for the area (GSIC, 2019) indicates that the soils at the site are alluvium in the southeast and Irish Sea till derived from limestones in the southwest north (Figure 3.3.2).

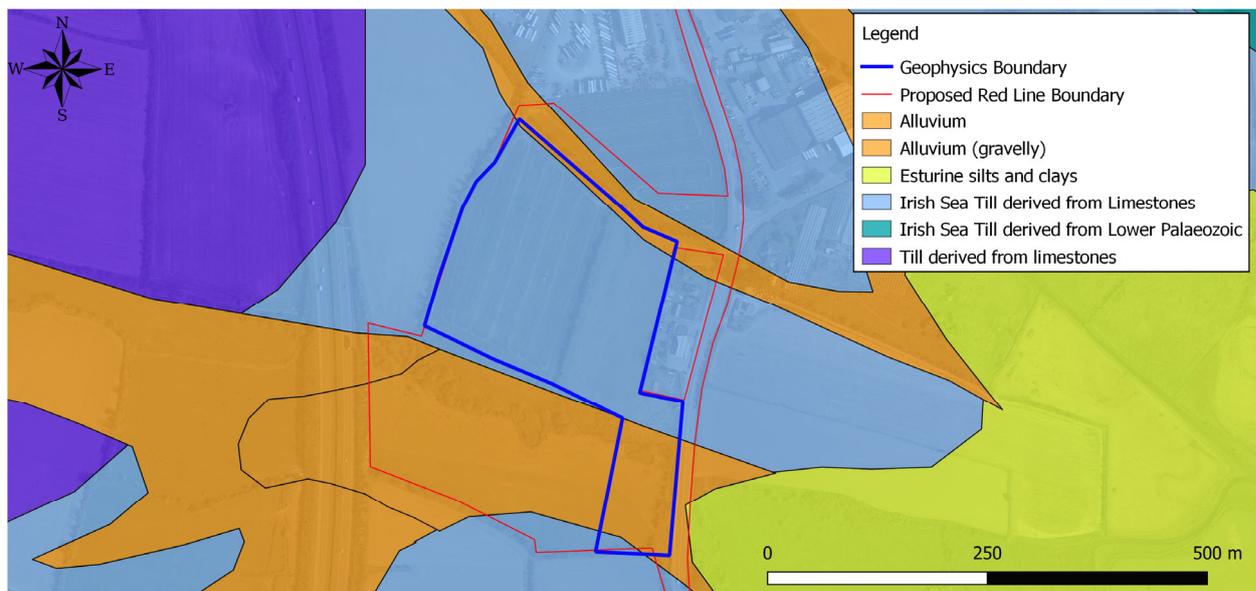


Fig 3.3.2: The GSI Quaternary sediments map (site marked in red).

Geology

The GSI 1:100k Bedrock Geology map (GSI, 2018) indicates that the site is predominantly underlain by Tober Colleen Formation calcareous shale and limestone conglomerate (Figure 3.3.3).



Fig 3.3.3: The GSI bedrock map (site marked in red).

Groundwater

The Tober Colleen Formation is classified as a 'Poor aquifer – bedrock which is generally unproductive except for local zones' (GSIa, 2019) (Figure 3.3.4).

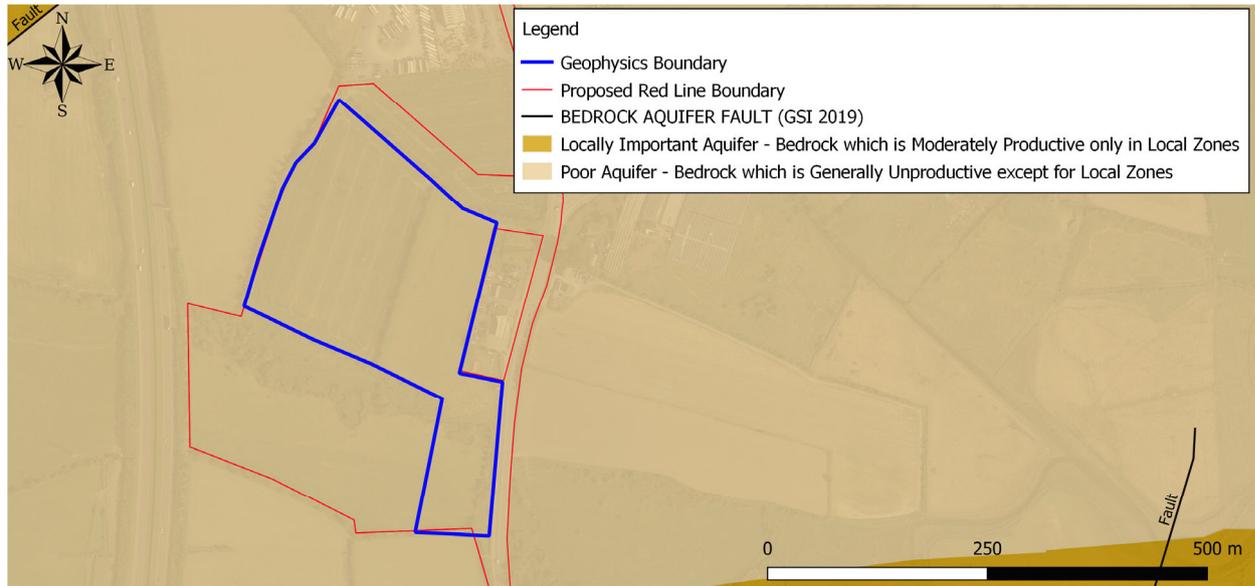


Fig 3.3.4: The GSI aquifer classification map (site marked in red).

The groundwater vulnerability rating across the site (GSIb, 2019) is classified as 'Low' (Figure 3.3.5).



Fig 3.3.5: The GSI groundwater vulnerability classification map (site marked in red).

Historical Mapping

The historical 6 inch sheet for the area does not indicate any outcropping rock in the vicinity of this site (Figure 3.3.6).

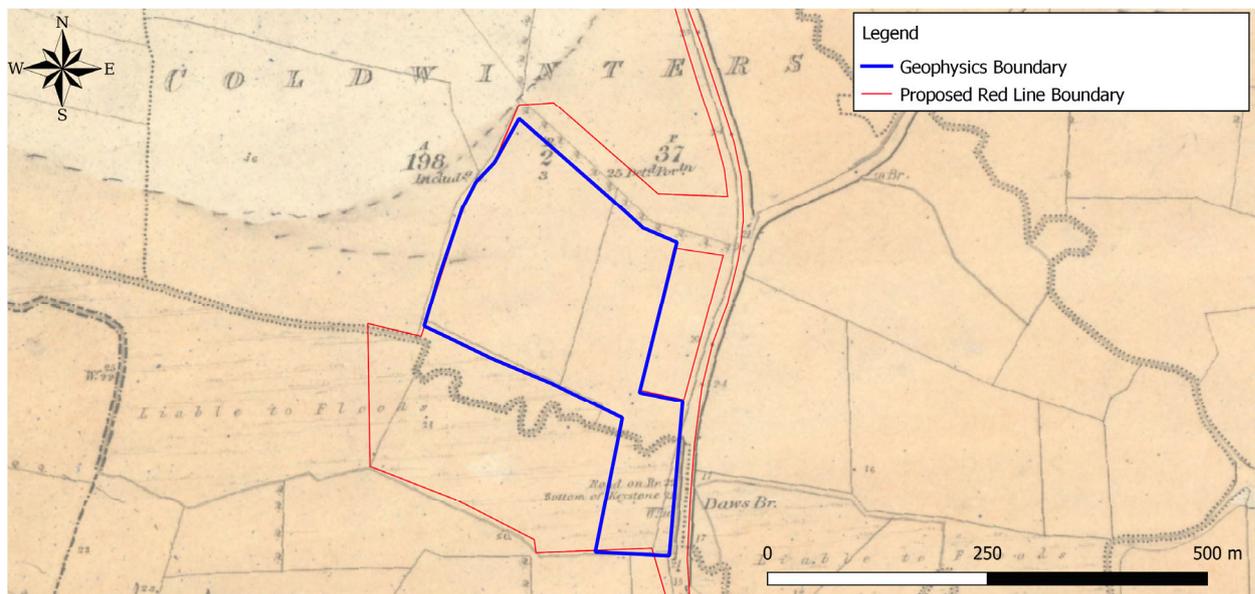


Fig 3.3.6: The historical 6 inch geological mapping (site marked in red).

Direct Investigation Data

Three trial pits (TP19, TP20 & TP21) were opened in this survey area (Drawing AGP21217_B04) and encountered topsoil over 0.5 to 0.55 m made ground (TP19 and TP21 only) over soft to stiff slightly sandy gravelly clay over gravel with cobbles or soft silt (TP21 only) to refusal at depths from 1.1 to 3.0 m bgl.

3.3.2 Results & Interpretation

The geophysical data acquired at this site included EM mapping, ERT and SR profiles. The results are presented on Drawings AGP21217_B04, AGP21217_B05 and AGP21217_B06 (Appendix D).

EM Conductivity Mapping

The EM ground conductivity results (Drawing AGP21217_B05, Appendix D) are indicative of the bulk conductivity of the ground materials from 0 - 6.0 m bgl. The recorded conductivity values ranged from 7 to 23 mS/m and have been generally interpreted in conjunction with the ERT and seismic data as follows:

Conductivity (mS/m)	Interpretation
7 - 10	≤ 2m slightly sandy slightly gravelly SILT/CLAY over bedrock or ≥ 6 m sandy gravelly SILT/CLAY over bedrock
10 - 14	2 - 4 m Slightly sandy slightly gravelly SILT/CLAY over sandy gravelly SILT/CLAY over bedrock
14 - 23	4 -6 m Slightly sandy slightly gravelly SILT/CLAY over sandy gravelly SILT/CLAY over bedrock

ERT

Due to limited access only two ERT Profiles were acquired across the site. The resistivity values have been interpreted in conjunction with the EM, seismic refraction and direct investigation data on the following basis:

Resistivity (Ohm-m)	Interpretation
50 - 100	Slightly sandy slightly gravelly SILT/CLAY
100 - 200	Sandy gravelly SILT/CLAY
125-750	SHALE/LIMESTONE (Tober Colleen Formation)

Seismic Refraction Profiling

Seismic refraction spreads were acquired along each of the ERT profiles. The processed data are contained in Appendix C. The Vp seismic velocities recorded across the survey area can broadly be interpreted as follows:

Vp Seismic Velocity (m/s)	Average Vp (m/s)	Interpretation	Estimated Stiffness/ Rock Quality	*Estimated Excavatability
203-371	290	Soil	Soft /Loose	Diggable
333-808**	545	Soil	Firm/Medium Dense	Diggable
933-1990	1400	Soil	Stiff-Very stiff/ Dense-Very dense	Diggable
		Highly - Moderately Weathered Rock	Poor-Fair	*Rippable-Marginally Rippable
2904-3891	3300	Slightly Weathered – Fresh Bedrock	Good	Break/Blast

* It should be noted that the cut-off velocity for excavatability will be lower if excavating in trenches and when excavating parallel to the regional geological strike, due to seismic anisotropy of the bedrock.

** Layer 2 is only observed along R18.

3.3.3 Discussion & Recommendations

The ERT, Seismic Refraction, borehole and trial pit information have been combined to produce the Interpreted Sections on Drawings AGP21217_R18 and AGP21217_R19 (Appendix D).

The combined results have been summarised as follows:

Vp Seismic Velocity (m/s)	Resistivity (Ohm-m)	Interpretation	Estimated Stiffness/ Rock Quality	Estimated Excavatability
203-371	50 - 100	Slightly sandy slightly gravelly SILT/CLAY	Soft	Diggable
	100 - 200	Sandy gravelly SILT/CLAY		
333-808	50 - 100	Slightly sandy slightly gravelly SILT/CLAY	Firm	
	100 - 200	Sandy gravelly SILT/CLAY		
933-1990	50 - 100	Slightly sandy slightly gravelly SILT/CLAY	Stiff-Very stiff	
		Sandy gravelly SILT/CLAY		
	100 - 200	Possible Highly – Moderately Weathered SHALE/LIMESTONE	Poor-Fair	Rippable-Marginally Rippable
2904-3891	125-750	Slightly Weathered – Fresh SHALE/LIMESTONE	Good	Break/Blast

The soils have been interpreted as slightly sandy, slightly gravelly silt/clay and/or sandy gravelly silt/clay. Seismic velocities indicate that on average the upper 0.6 m of soils will be soft becoming firm to an average depth of 1.6 m bgl, becoming stiff to very stiff with depth.

No distinct weathered rock layer was interpreted however the seismic velocities and resistivities of the layer of stiff to very stiff sandy gravelly silt/clay overlying the bedrock could also be indicative of highly to moderately weathered rock, the excavatability of which would range from rippable to marginally rippable.

Bedrock been interpreted as shale and limestone. The seismic velocities indicate that the rock is slightly weathered to fresh rock and any excavation will require breaking/blasting. It should be noted that the cut-off velocity for excavatability will be lower if excavating in trenches.

3.4 M1 CROSSING

3.4.1 Site Background

The M1 site comprises of 2 survey locations located either side of the M1 Motorway, north of the Junction 4 interchange, in the townland of Lissenhall Little. They include 6.2 ha of agricultural land west of the motorway and 2.9 ha east of the motorway (Fig. 3.4.1). Topography across the area varies from 5.7 mOD in the west to 11.4 mOD in the east.

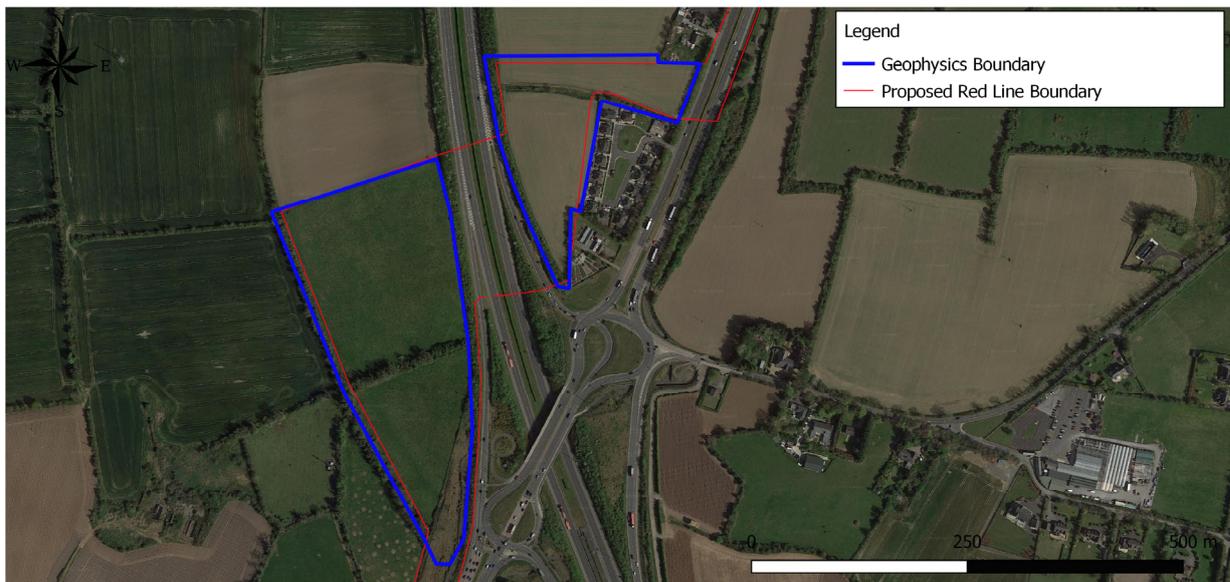


Fig 3.4.1: Site boundary marked with red line.

Soils

The GSI and Quaternary soils map for the area (GSIc, 2019) indicates that the soils at the site are alluvium along the western boundary and Irish Sea till derived from limestones across the majority of the site (Figure 3.4.2).



Fig 3.4.2: The GSI Quaternary sediments map (site marked in red).

Geology

The GSI 1:100k Bedrock Geology map (GSI, 2018) indicates that the site is underlain by Malahide Formation argillaceous bioclastic limestone and shale (Figure 3.4.3). The geological map indicates an anticlinal fold southeast of the site with NW-SE and NNE-SSW trending faults in the wider area



Fig 3.4.3: The GSI bedrock map (site marked in red).

Groundwater

The Malahide Formation is classified as a 'Locally Important aquifer – bedrock which is moderately productive only in local zones' (GSIa, 2019) (Figure 3.4.4).



Fig 3.4.4: The GSI aquifer classification map (site marked in red).

The groundwater vulnerability rating across the sites (GSIb, 2019) varies from 'Low' to 'Moderate' (Figure 3.4.5).

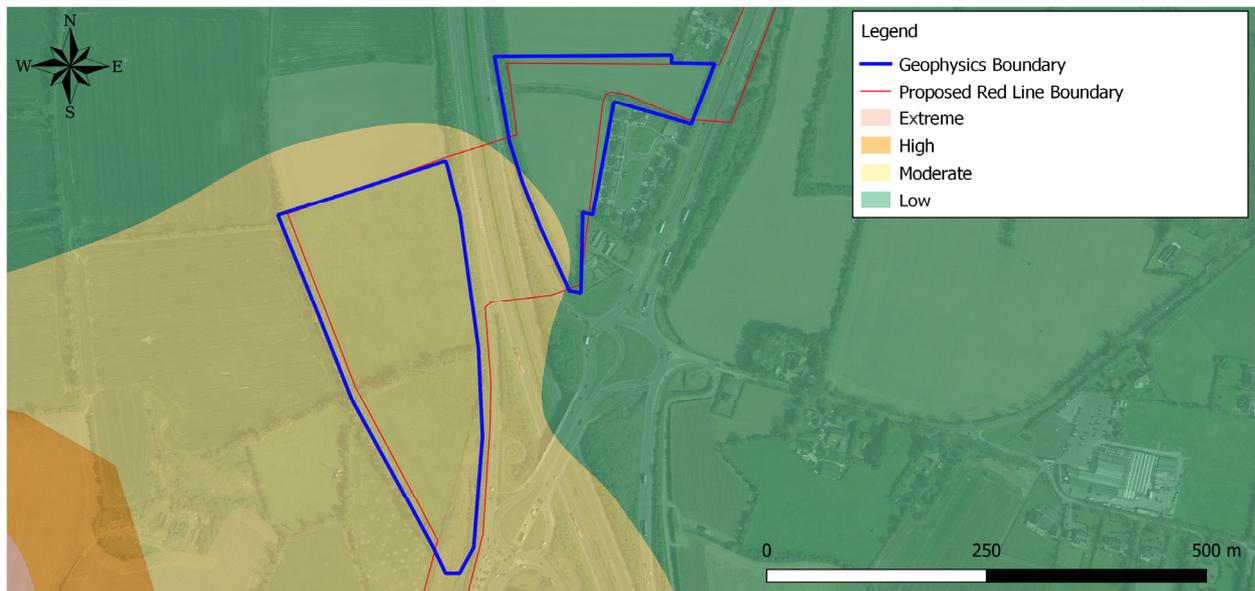


Fig 3.4.5: The GSI groundwater vulnerability classification map (site marked in red).

Historical Mapping

The historical 6 inch sheet for the area indicates 'dark grey compact limestone' outcropping 500 m west of the site (indicated by blue hatching in Figure 3.4.6) and 'flaggy' limestone and shales 200 m north and northwest of the site.

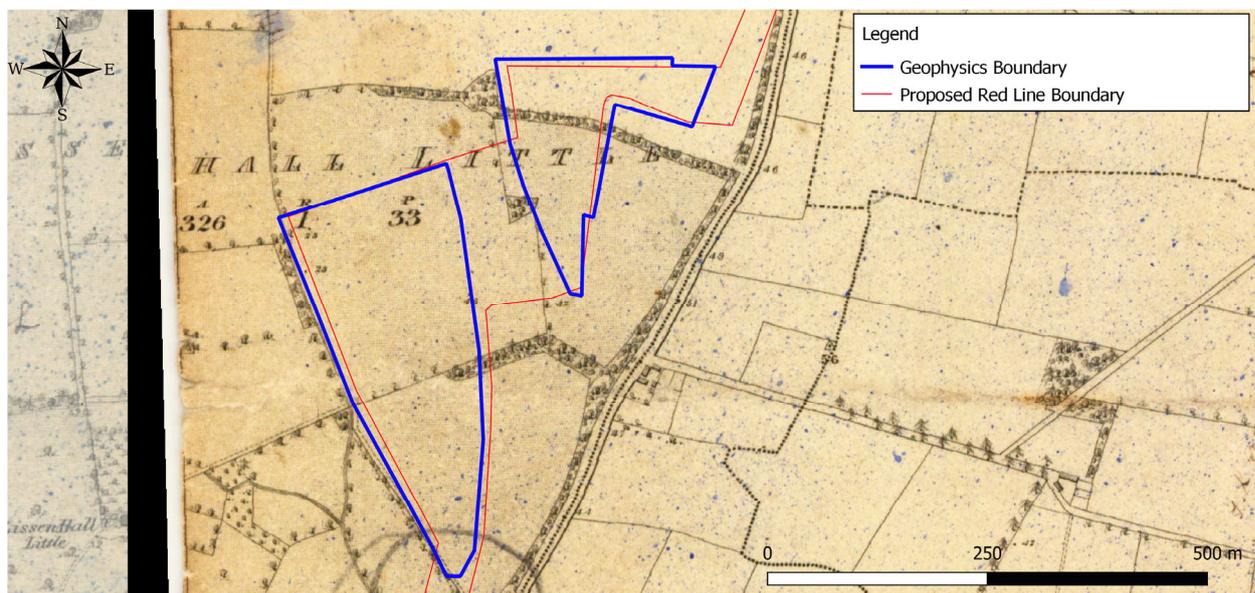


Fig 3.4.6: The historical 6 inch geological mapping (site marked in red).

Direct Investigation Data

Two boreholes (BH08 & BH09) were cored and five trial pits (TP16, TP22, TP23, TP24 & TP25) were opened in this survey area (Drawing AGP21217_M01). The boreholes encountered soft to very stiff sandy gravelly clay and medium dense (clayey) sand over partially weathered, medium strong to strong thinly laminated dark greyish black limestone was encountered at depths from 6.7 to 7.2 m bgl.

The trial pits encountered firm to stiff slightly sandy gravelly clay with cobbles to refusal at depths from 2.2 to 2.9 m bgl.

3.4.2 Results & Interpretation

The geophysical data acquired at this site included EM mapping, ERT and SR profiles. The results are presented on Drawings AGP21217_M01, AGP21217_M02 and AGP21217_M03 (Appendix D).

EM Conductivity Mapping

The EM ground conductivity results (Drawing AGP21219_M02, Appendix D) are indicative of the bulk conductivity of the ground materials from 0 - 6.0 m bgl. The recorded conductivity values ranged from 5 to 20 mS/m and have been generally interpreted in conjunction with the ERT and seismic data as follows:

Conductivity (mS/m)	Interpretation
5 - 6	≤ 2 m slightly sandy slightly gravelly SILT/CLAY and sandy gravelly SILT/CLAY over bedrock
6 - 7.5	2-4 m slightly sandy slightly gravelly SILT/CLAY and sandy gravelly SILT/CLAY over bedrock
5 - 7.5	Silty clayey SAND/GRAVEL
7.5 - 13	> 4 m slightly sandy slightly gravelly SILT/CLAY and sandy gravelly SILT/CLAY over bedrock
13 - 20	> 4 m slightly sandy slightly gravelly SILT/CLAY over bedrock

ERT

Three ERT Profiles (R1-R3) were acquired. The resistivity values have been interpreted in conjunction with the EM, seismic refraction and direct investigation data on the following basis:

Resistivity (Ohm-m)	Interpretation
50 - 100	Slightly sandy slightly gravelly SILT/CLAY
100 - 250	Sandy gravelly SILT/CLAY
250-500	Silty clayey SAND/GRAVEL
75 - 150	SHALE (Malahide Formation)
125 - 2250	LIMESTONE/SHALE (Malahide Formation)

Seismic Refraction Profiling

Seismic refraction spreads were acquired along each of the ERT profiles. The processed data are contained in Appendix C. The Vp seismic velocities recorded across the survey area can broadly be interpreted as follows:

Vp Seismic Velocity (m/s)	Average Vp (m/s)	Interpretation	Estimated Stiffness/ Rock Quality	*Estimated Excavatability
193-615	330	Soil	Soft-Firm/Loose-Medium Dense	Diggable
467-900	640	Soil	Firm/ Medium Dense	Diggable
804-1470	1150	Soil	Stiff/ Dense	Diggable
		Highly - Moderately Weathered Rock	Poor-Fair	Rippable
2944-4622	4020	Slightly Weathered – Fresh Bedrock	Good	Break/Blast

* It should be noted that the cut-off velocity for excavatability will be lower if excavating in trenches and when excavating parallel to the regional geological strike, due to seismic anisotropy of the bedrock.

3.4.1 Discussion & Recommendations

The ERT, Seismic Refraction, borehole and trial pit information have been combined to produce the Interpreted Sections on Drawings AGP21217_R1, AGP21217_R2 and AGP21217_R3 (Appendix D). The combined results have been summarised as follows:

Vp Seismic Velocity (m/s)	Resistivity (Ohm-m)	Interpretation	Estimated Stiffness/ Rock Quality	Estimated Excavatability
193-615	50 - 100	Slightly sandy slightly gravelly SILT/CLAY	Soft-Firm	Diggable
	100-250	Sandy gravelly SILT/CLAY		
	250-500	Silty clayey SAND/GRAVEL	Loose-Medium Dense	
467-900	50 - 100	Slightly sandy slightly gravelly SILT/CLAY	Firm	
	100-250	Sandy gravelly SILT/CLAY	Medium Dense	
	250-500	Silty clayey SAND/GRAVEL		
804-1470	50 - 100	Slightly sandy slightly gravelly SILT/CLAY	Stiff	
	100-250	Sandy gravelly SILT/CLAY		
			Possible Highly – Moderately Weathered LIMESTONE/SHALE	Poor-Fair
2944-4622	75 - 150	Slightly Weathered – Fresh SHALE	Good	Break/Blast
	125 - 2250	Slightly Weathered – Fresh LIMESTONE/SHALE		

The soils have been interpreted as predominantly slightly sandy, slightly gravelly silt/clay and/or sandy gravelly silt/clay with a small pocket of silty/clayey sand/gravel (Drawing AGP21217_M03). Seismic velocities indicate that on average the upper 0.7 m of soils will be soft to firm or loose to medium dense, becoming firm or medium dense to an average depth of 2.2 m bgl, becoming stiff with depth.

No distinct weathered rock layer was interpreted however the seismic velocities and resistivities of the layer of stiff sandy gravelly silt/clay overlying the bedrock could also be indicative of highly to moderately weathered rock, the excavatability of which would be rippable.

Two rock types have been interpreted in conjunction with the borehole information; low resistivity (75-150 Ohm-m) shale; and higher resistivity (150-2250 Ohm-m) limestone and shale. The seismic velocities indicate that the rock is slightly weathered to fresh rock and any excavation will require breaking/blasting. It should be noted that the cut-off velocity for excavatability will be lower if excavating in trenches.

4. RECOMMENDATIONS

Recommended boreholes have been discussed throughout the report text.

If any bedrock excavation is proposed, a detailed assessment of excavatability should be carried out combining the results of the geophysical survey, any rotary core drilling, strength testing and trial excavation pits using a high powered excavator such as a CAT 336E or more powerful model. A more detailed discussion of velocity and excavatability is contained in Appendix B.

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

REFERENCES

Bell F.G., 1993;

'Engineering Geology', Blackwell Scientific Press.

Geotomo Software, 2006;

'RES2DINV Users Manual', Malaysia.

GSI, 2018;

Bedrock Geology 1:100,000 Shapefile. <http://www.gsi.ie/Mapping.htm>

GSIa, 2019;

Bedrock Aquifer Shapefile. <http://www.gsi.ie/Mapping.htm>

GSIb, 2019;

Groundwater Vulnerability Shapefile. <http://www.gsi.ie/Mapping.htm>

GSIc, 2019;

Quaternary Subsoils Shapefile. <http://www.gsi.ie/Mapping.htm>

Hagedoorn, J.G., 1959;

'The plus - minus method of interpreting seismic refraction sections', Geophysical Prospecting, 7, 158 - 182.

Palmer, D., 1980;

'The Generalized Reciprocal Method of seismic refraction interpretation', SEG.

Redpath, B.B., 1973;

'Seismic refraction exploration for engineering site investigations', NTIS, U.S. Dept. of Commerce

Sheriff, R.E., and Geldart, L.P., 1982;

Exploration seismology, volume 1: Cambridge University Press, 253 pp.

'The blind zone problem in engineering geophysics', Geophysics, 24, pp 359-365.

Weaver, J. M., 1975:

Geological Factors Significant in the Assessment of Rippability, The Civil Engineer in South Africa, Vol. 17, No. 12,.

APPENDIX A: DETAILED METHODOLOGY

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

EM Ground Conductivity Mapping

Principles

This is an electromagnetic technique used to investigate lateral variations in overburden material and to assist with the indication of the depth to bedrock. This method operates on the principle of inducing currents in conductive substrata and measuring the resultant secondary electro-magnetic field. The strength of this secondary EM field is calibrated to give apparent ground conductivity in milliSiemens/metre (mS/m). Readings over material such as organic waste and peat give high conductivity values while readings over dry materials with low clay mineral content such as gravels, limestone or quartzite give low readings. The EM31 survey technique determines the apparent conductivity of the different overburden layers from 0-6m bgl depending on the dipole mode used.

Data collection

The EM31 equipment used was a GF CMD-4 conductivity meter equipped with data logger and integrated GPS. This instrument features a real time graphic display of the previous 20 measurement points to monitor data quality and results. Conductivity and in-phase values were recorded across the site. Local conditions and variations were recorded.

Data processing

The conductivity and in-phase field readings were downloaded, contoured and plotted using the SURFER 12 program (Golden Software, 2015). Data which was affected by metallic objects was removed. Assignment of material types and possible anomaly sources was carried out, with cross-reference to other data.

Electrical Resistivity Tomography (ERT)

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

Principles

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

Data Collection

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

Data Processing

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

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

Seismic Refraction Profiling

Principles

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

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

Data Collection

A Geode high resolution 24 channel digital seismograph, 24 10HZ vertical geophones and a 10 kg hammer were used to provide first break information, with a 24 take-out cable (2m spacing). Equipment was carried was operated by a two to three person crew.

Readings are taken using geophones connected via multi-core cable to a seismograph. The depth of resolution of soil/bedrock boundaries is determined by the length of the seismic spread, typically the depth of resolution is about one third the length of the profile (e.g. 46m profile ~16m depth). Shots from seven different positions were taken (2 x off-end, 2 x end, 3 x middle) to ensure optimum coverage of all refractors.

Data Processing

First break picking in digital format was carried out using the FIRSTPIX software program to construct traveltime plots for each spread. The recorded data was processed and interpreted using the GREMIX software program to calculate the thickness of individual velocity units. GREMIX interprets seismic refraction data as a laterally varying layered earth structure. It incorporates the slope-intercept method, parts of the Plus-Minus Method of Hagedoorn (1959), Time-Delay Method, and features the Generalized Reciprocal Method (GRM) of Palmer (1980). Up to four layers can be mapped; one deduced from direct arrivals and three deduced from refractions. Phantoming of all possible travel time pairs can be carried out by adjusting reciprocal times of off shots. Material types were assigned and estimation made of material properties, cross-referenced to other geophysical data.

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

Spatial Relocation

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

Projection:	Irish Transverse Mercator
Datum:	Ordnance
Coordinate units:	Meters
Altitude units:	Meters
Survey altitude reference:	MSL
Geoid model:	Republic of Ireland

APPENDIX B: EXCAVATABILITY

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

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

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

Fig.1 Rippability Rating Chart

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

APPENDIX C: SEISMIC REFRACTION DATA

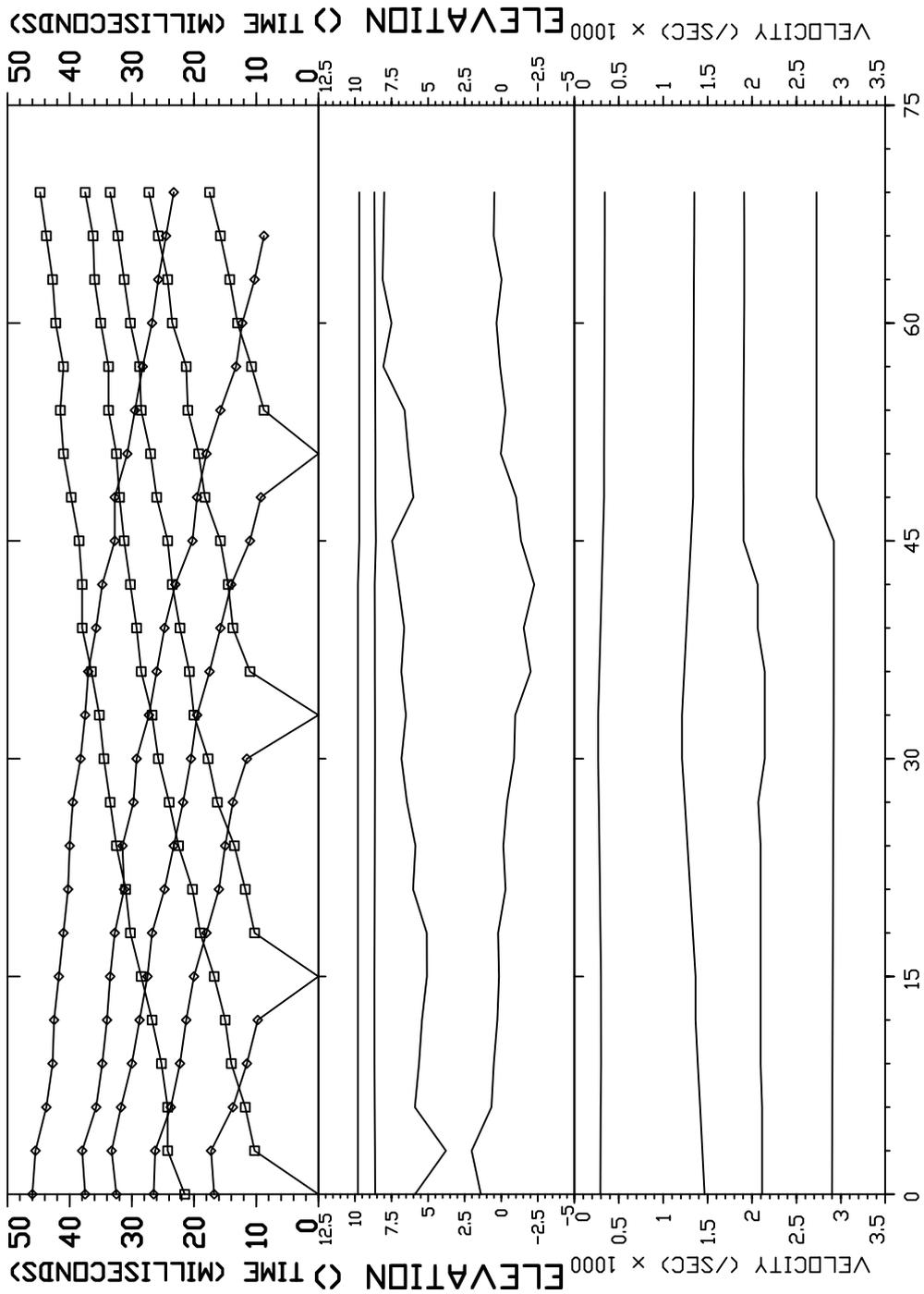


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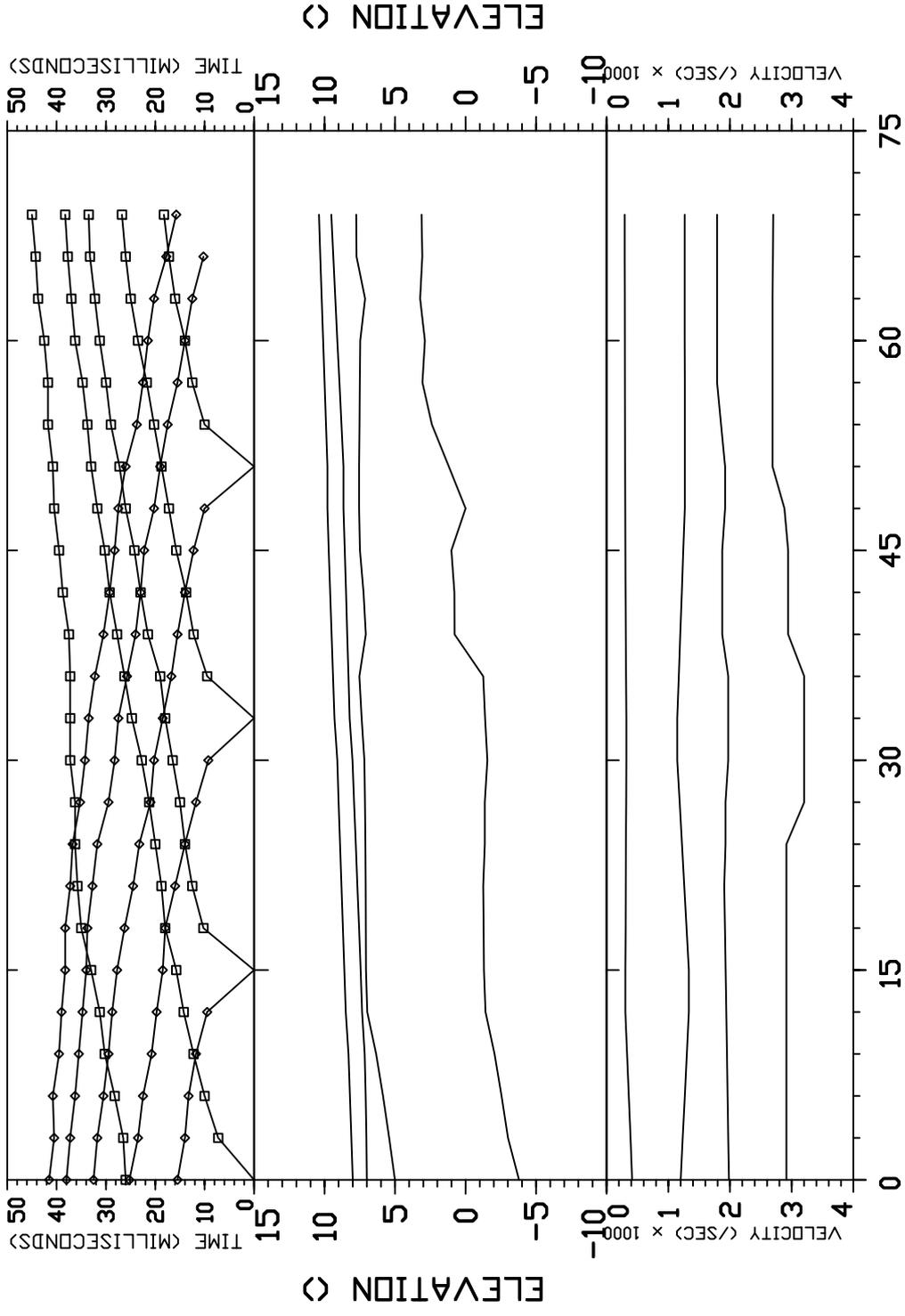


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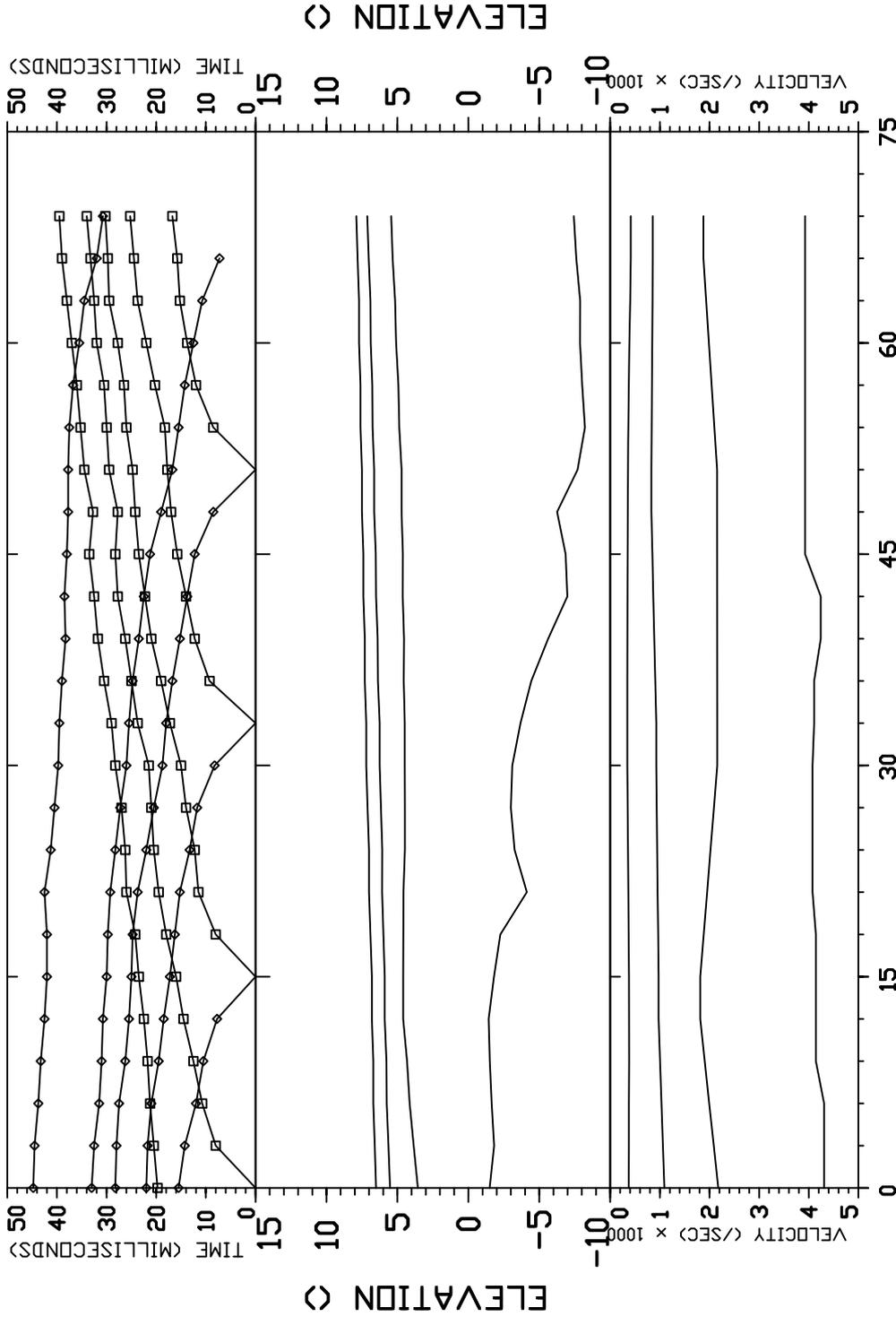


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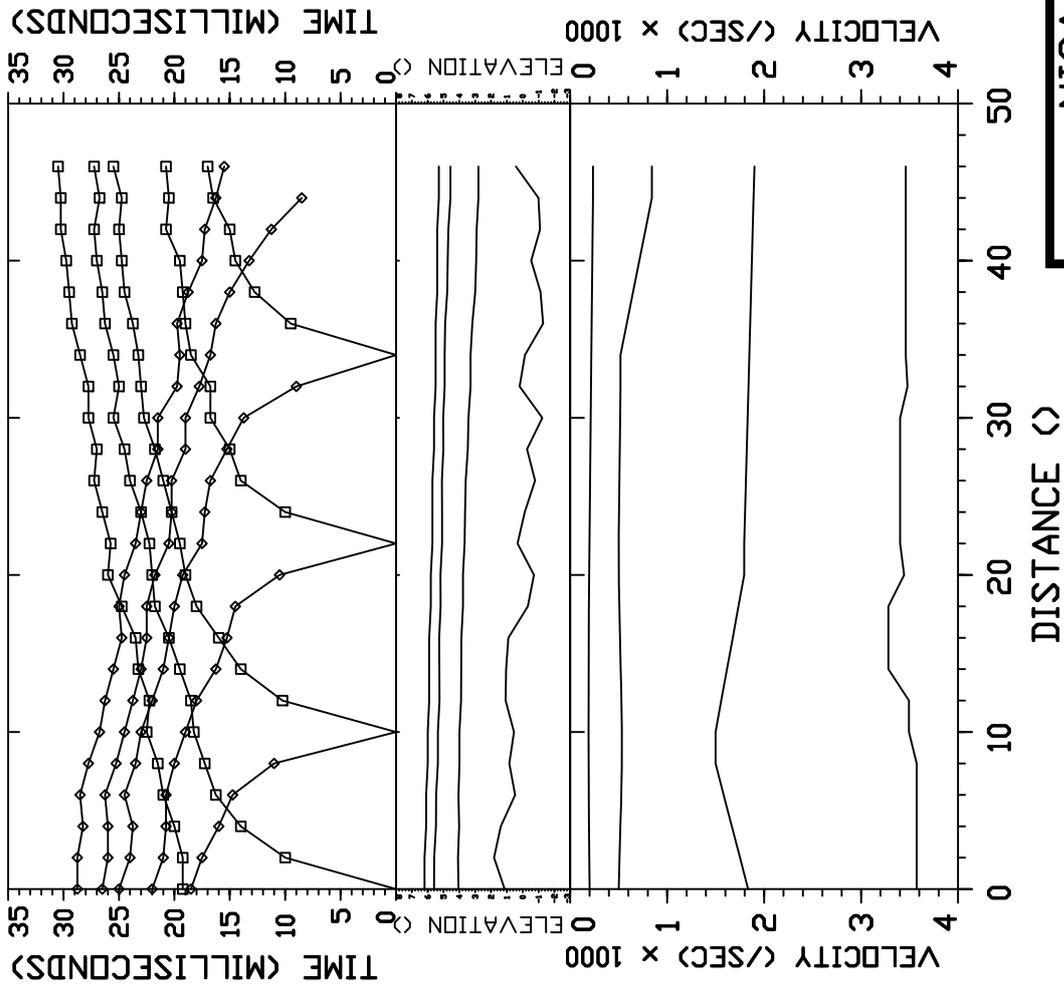


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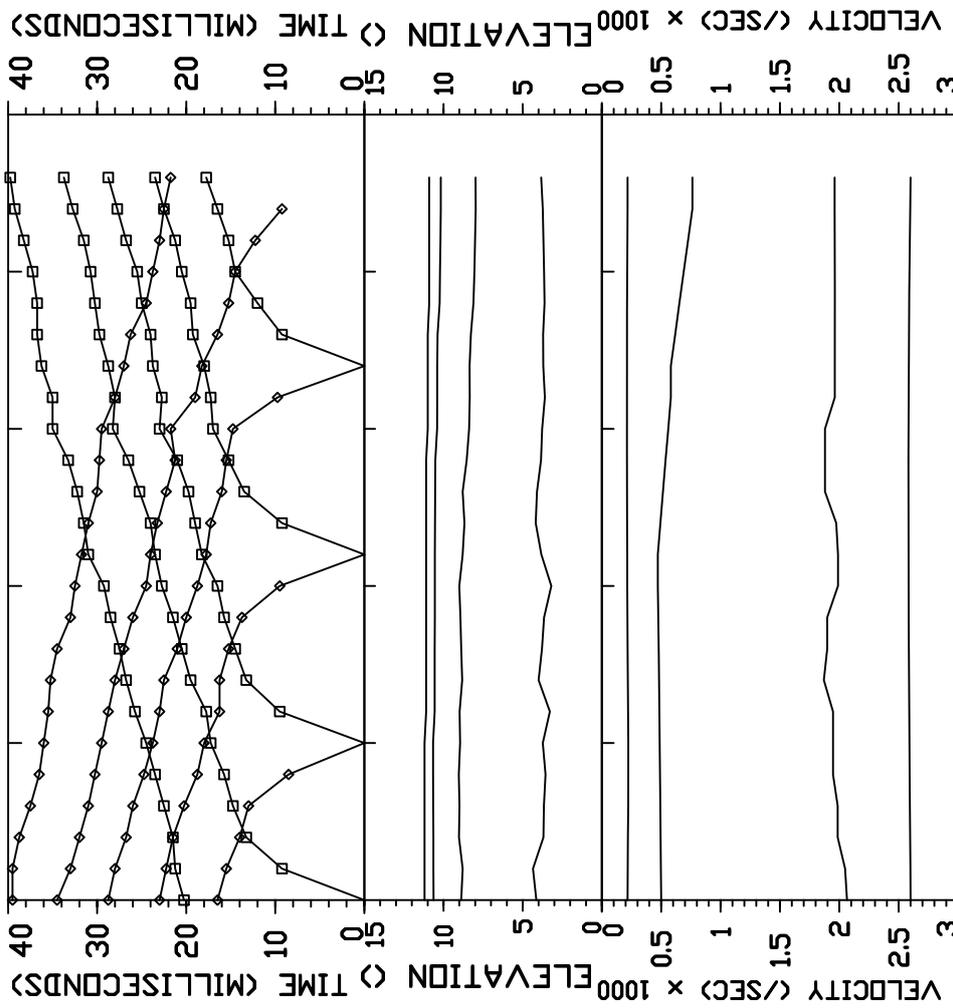


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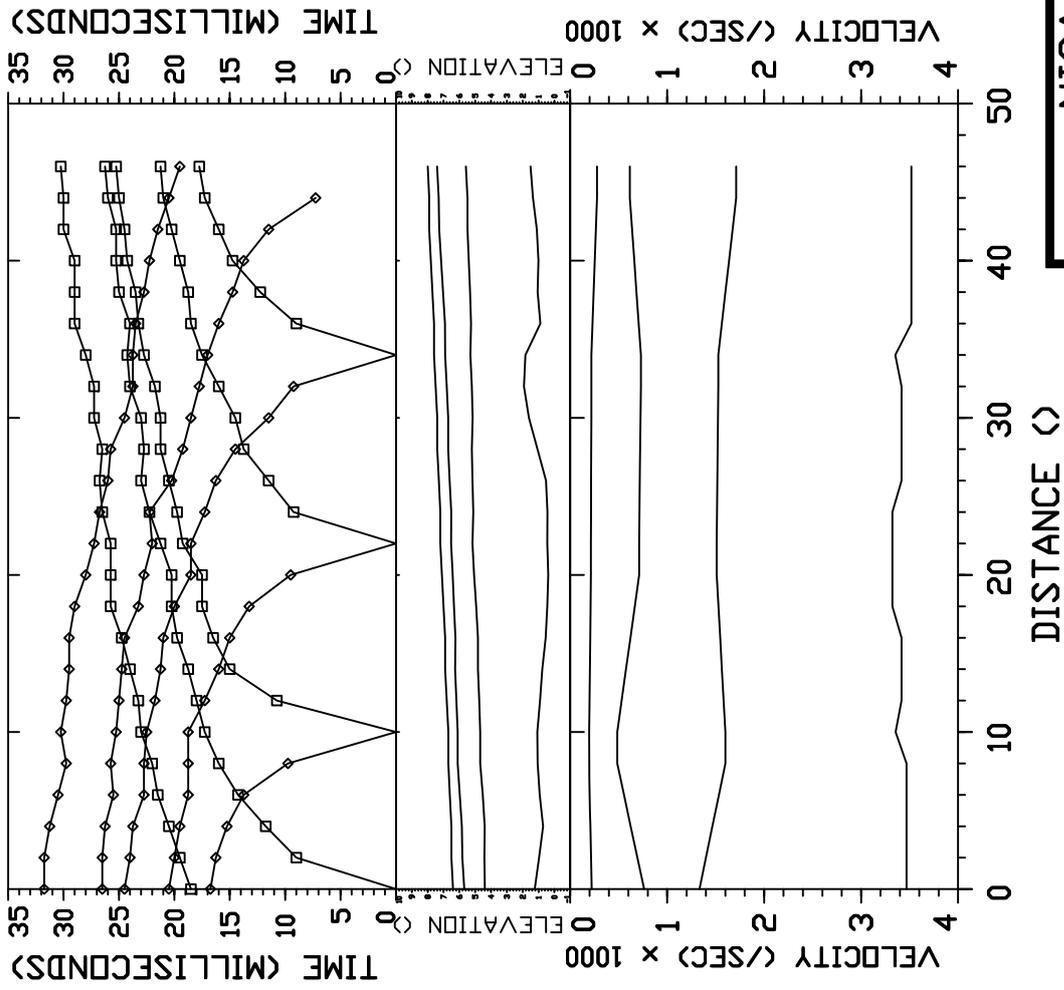


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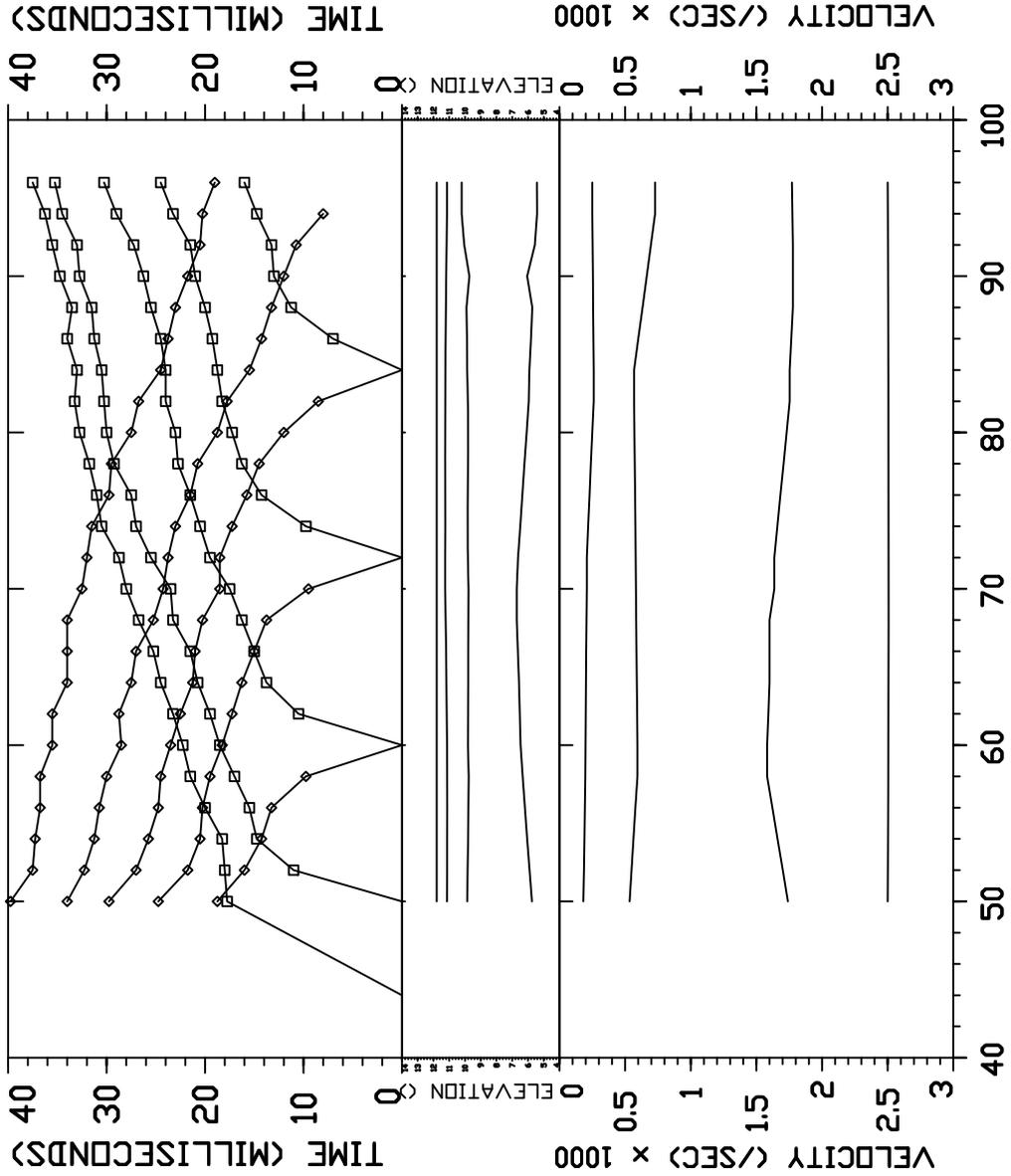


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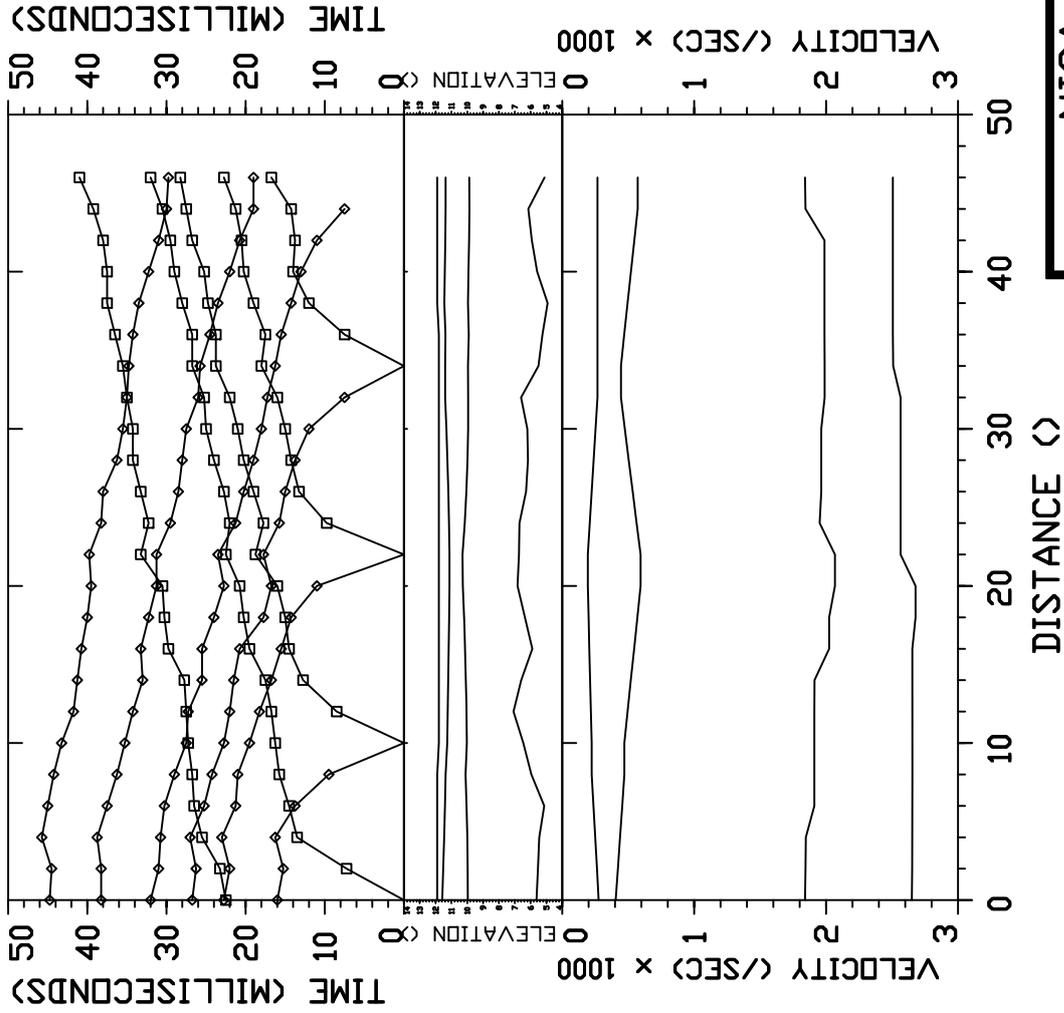


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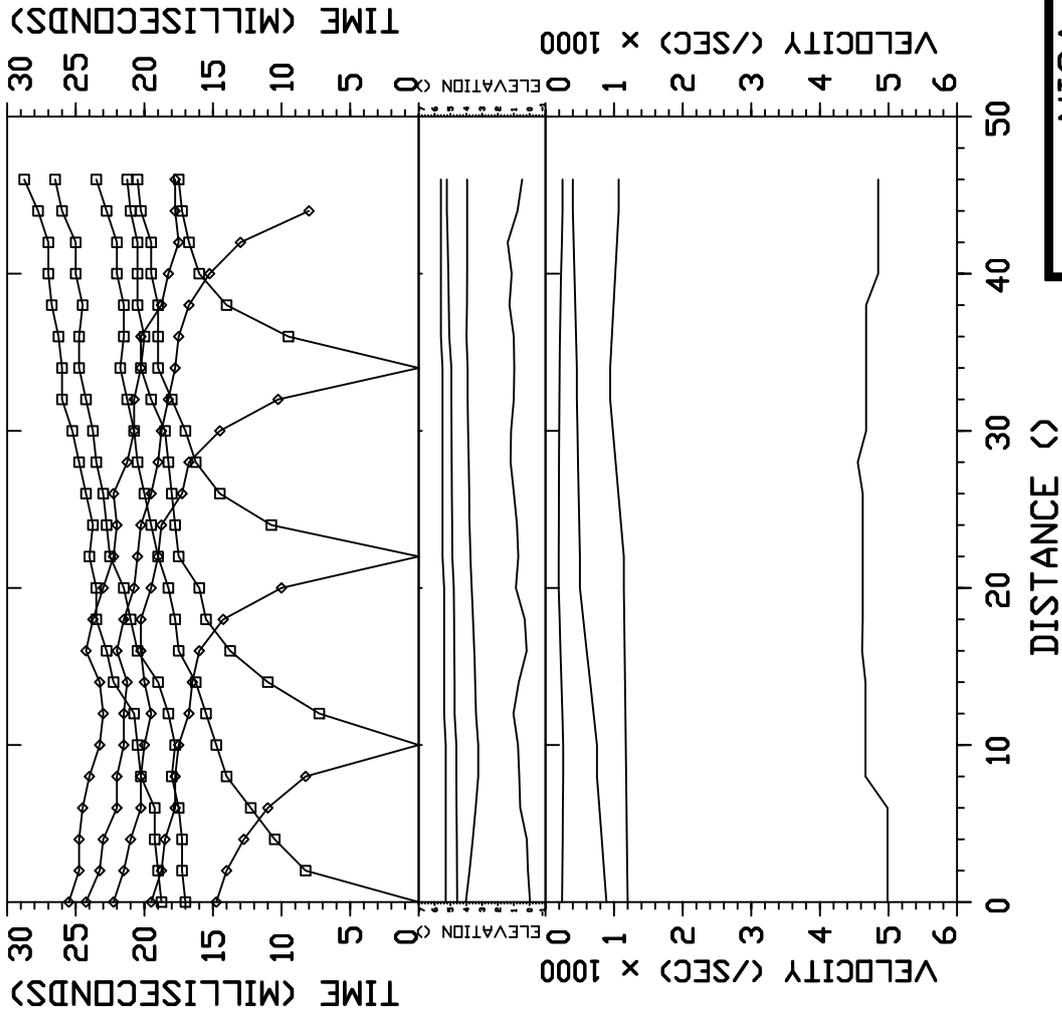


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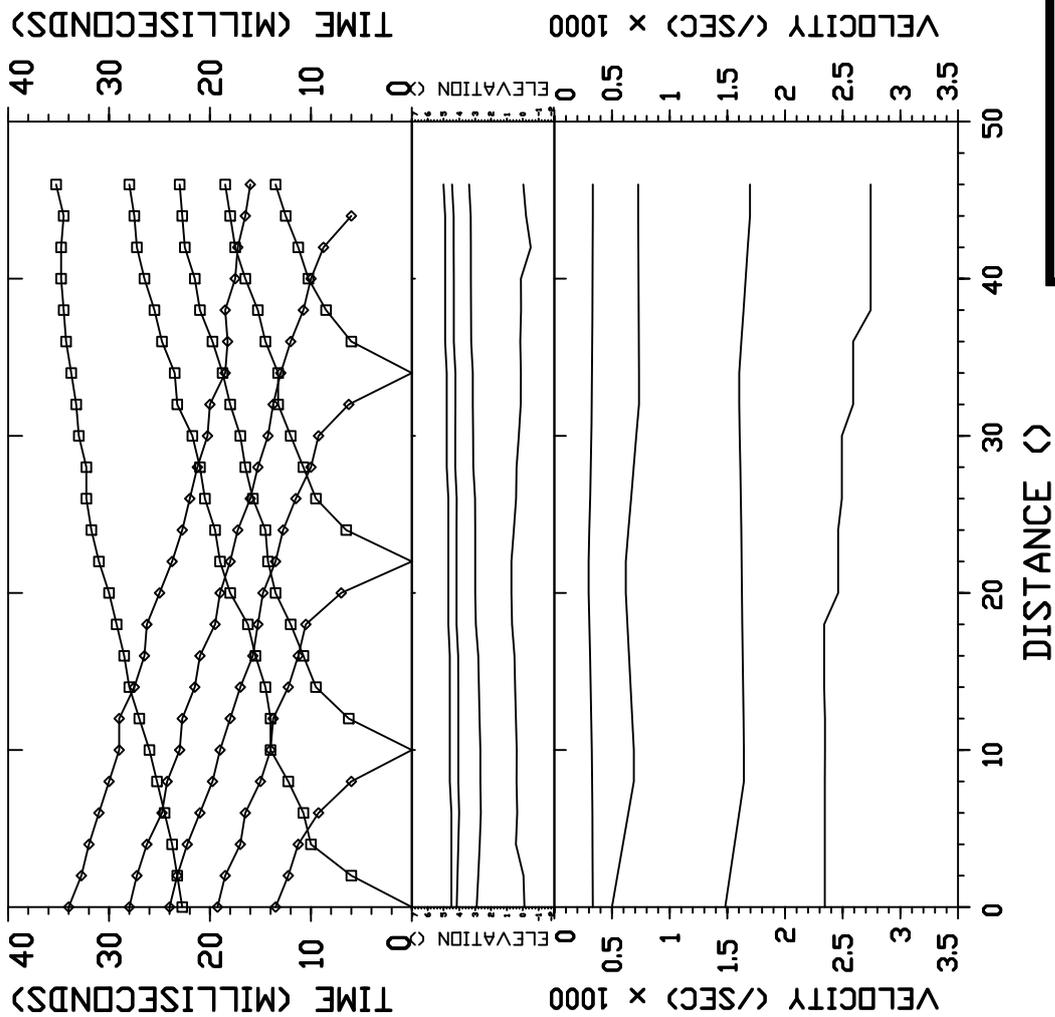


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VELOCITY (/SEC) x 1000 ELEVATION (') TIME (MILLISECONDS)

35 30 25 20 15 10 5 0 22.5 20 17.5 15 12.5 10 7.5 0 0.5 1 1.5 2 2.5 3 3.5

0 10 20 30 40 50

VELOCITY (/SEC) x 1000 ELEVATION (') TIME (MILLISECONDS)

35 30 25 20 15 10 5 0 22.5 20 17.5 15 12.5 10 7.5 0 0.5 1 1.5 2 2.5 3 3.5

0 10 20 30 40 50

VELOCITY (/SEC) x 1000 ELEVATION (') TIME (MILLISECONDS)

35 30 25 20 15 10 5 0 22.5 20 17.5 15 12.5 10 7.5 0 0.5 1 1.5 2 2.5 3 3.5

0 10 20 30 40 50

VELOCITY (/SEC) x 1000 ELEVATION (') TIME (MILLISECONDS)

35 30 25 20 15 10 5 0 22.5 20 17.5 15 12.5 10 7.5 0 0.5 1 1.5 2 2.5 3 3.5

0 10 20 30 40 50

VELOCITY (/SEC) x 1000 ELEVATION (') TIME (MILLISECONDS)

35 30 25 20 15 10 5 0 22.5 20 17.5 15 12.5 10 7.5 0 0.5 1 1.5 2 2.5 3 3.5

0 10 20 30 40 50

VELOCITY (/SEC) x 1000 ELEVATION (') TIME (MILLISECONDS)

35 30 25 20 15 10 5 0 22.5 20 17.5 15 12.5 10 7.5 0 0.5 1 1.5 2 2.5 3 3.5

0 10 20 30 40 50

VELOCITY (/SEC) x 1000 ELEVATION (') TIME (MILLISECONDS)

35 30 25 20 15 10 5 0 22.5 20 17.5 15 12.5 10 7.5 0 0.5 1 1.5 2 2.5 3 3.5

0 10 20 30 40 50

VELOCITY (/SEC) x 1000 ELEVATION (') TIME (MILLISECONDS)

35 30 25 20 15 10 5 0 22.5 20 17.5 15 12.5 10 7.5 0 0.5 1 1.5 2 2.5 3 3.5

0 10 20 30 40 50

DISTANCE (')

Plate: 10a

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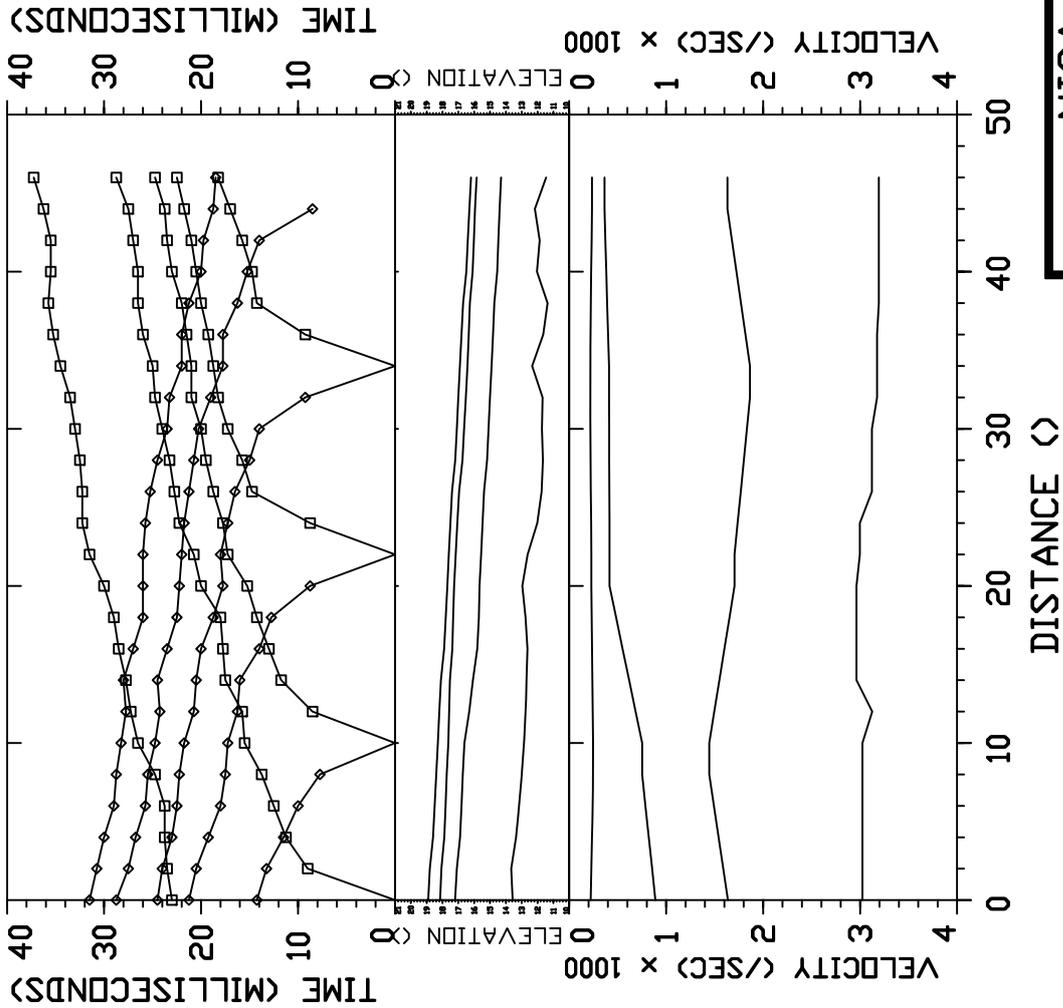


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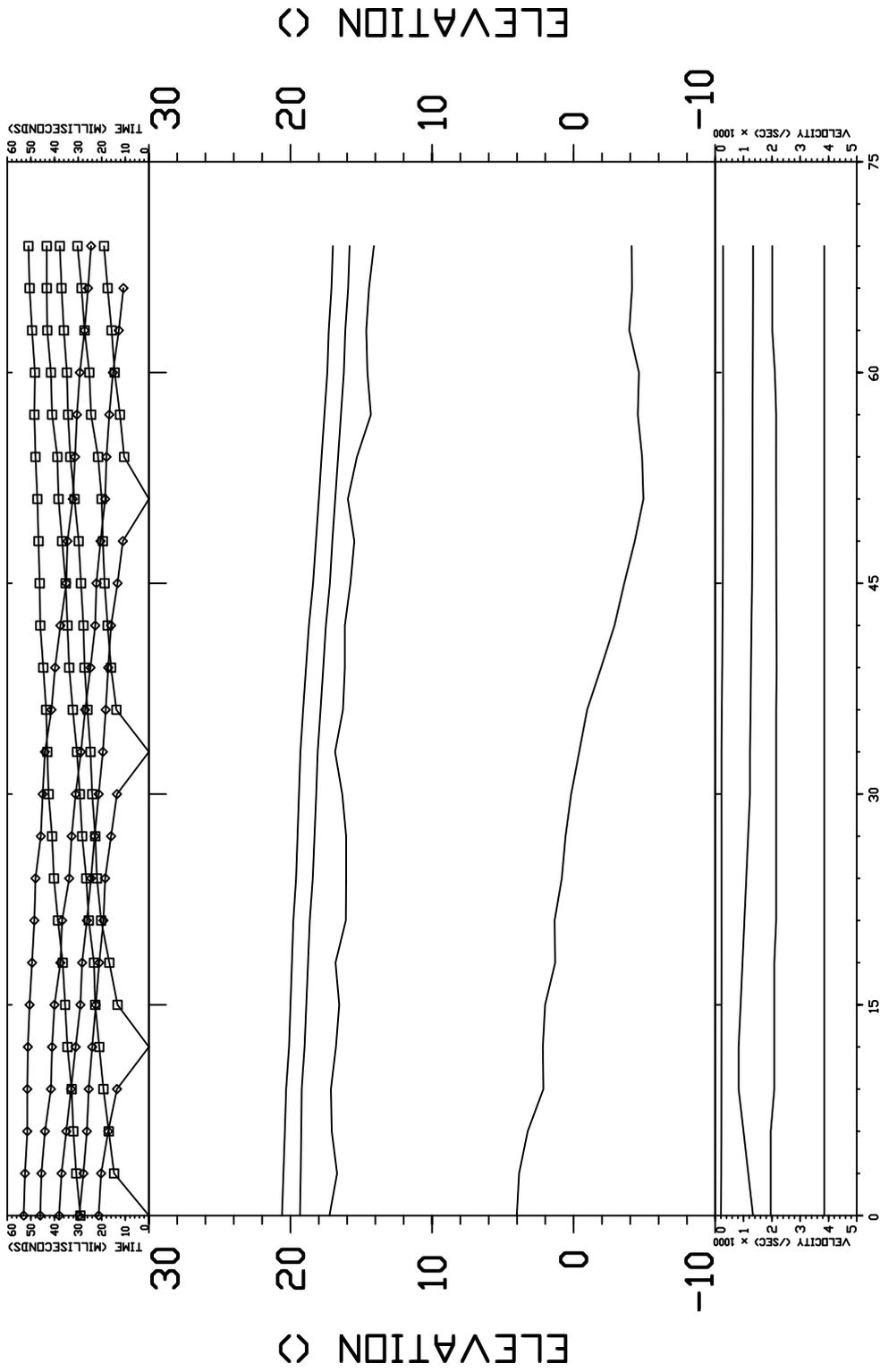


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Date: 20/04/22

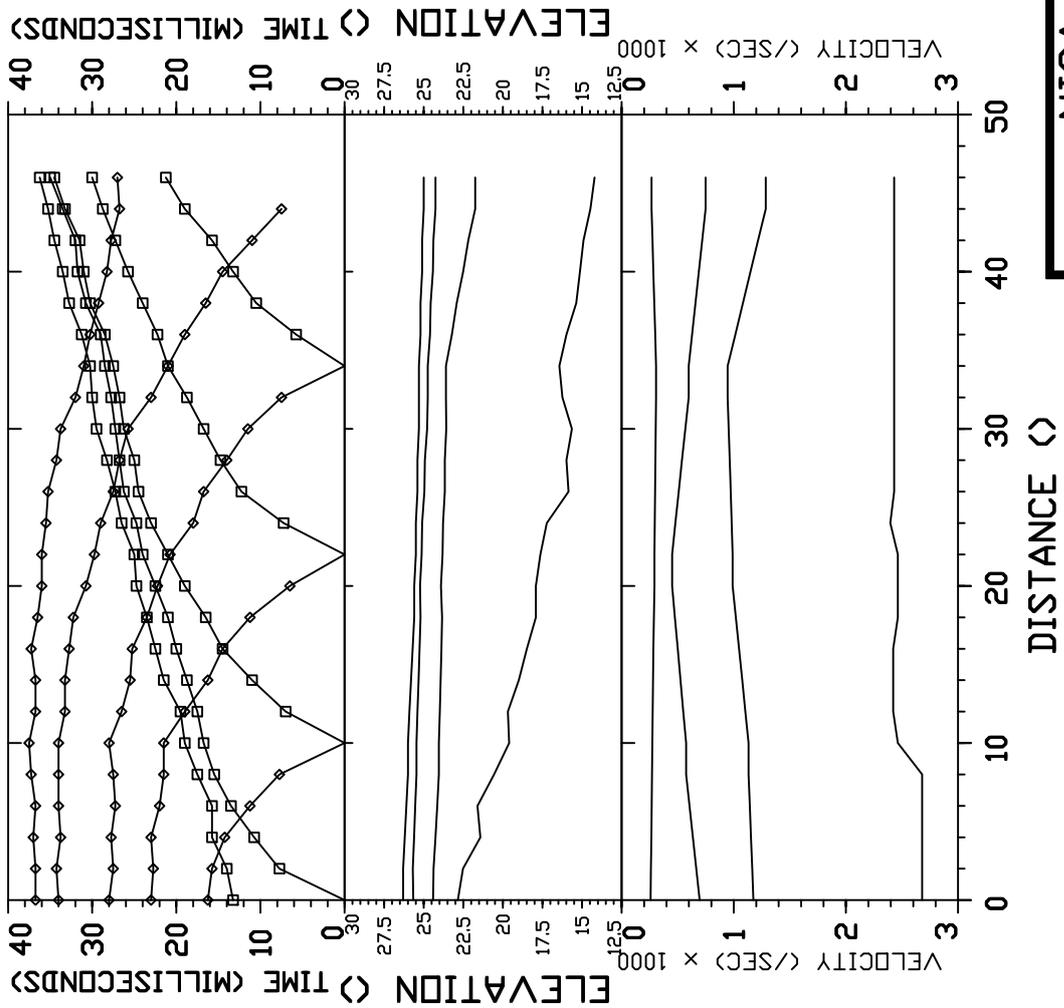


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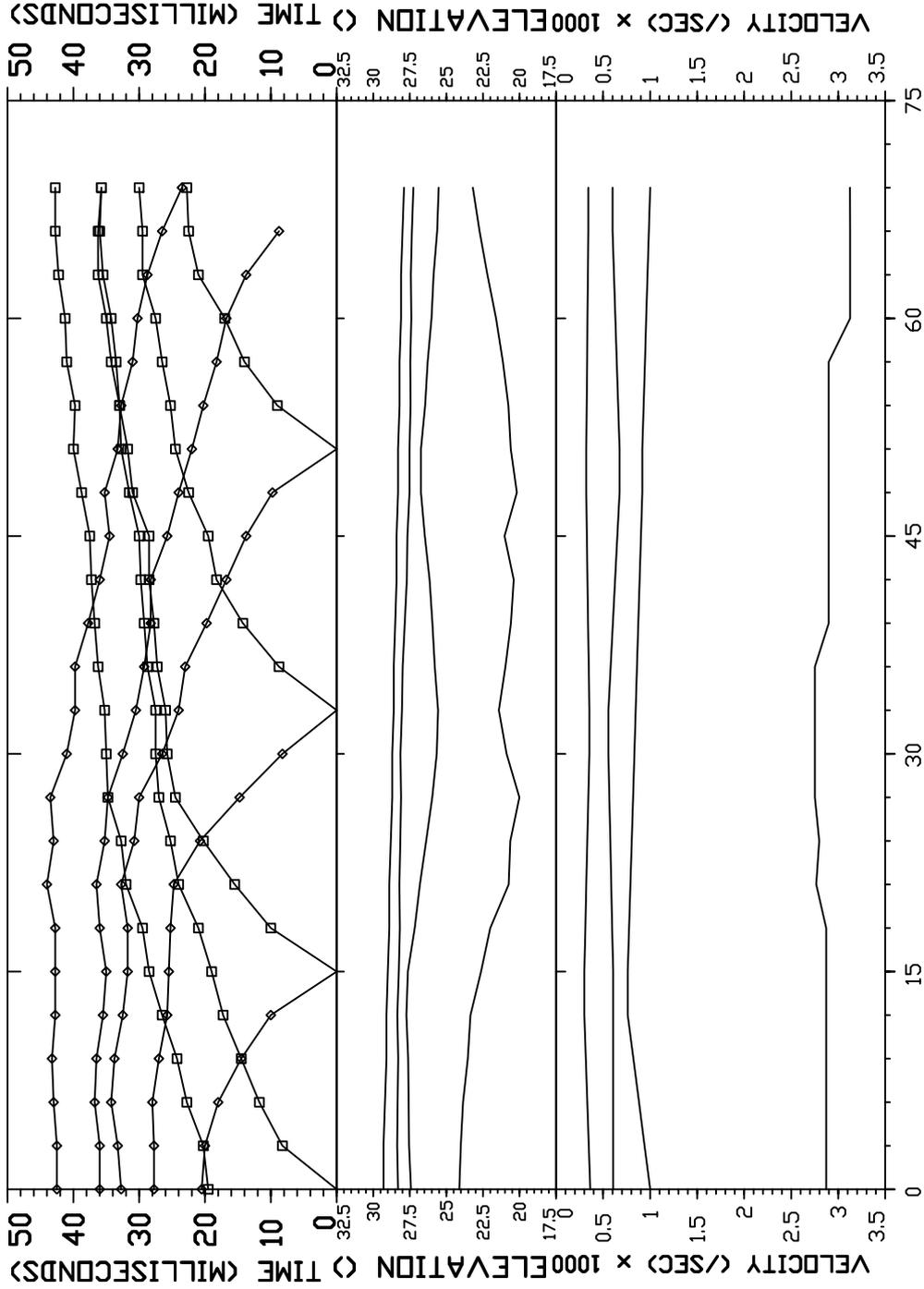


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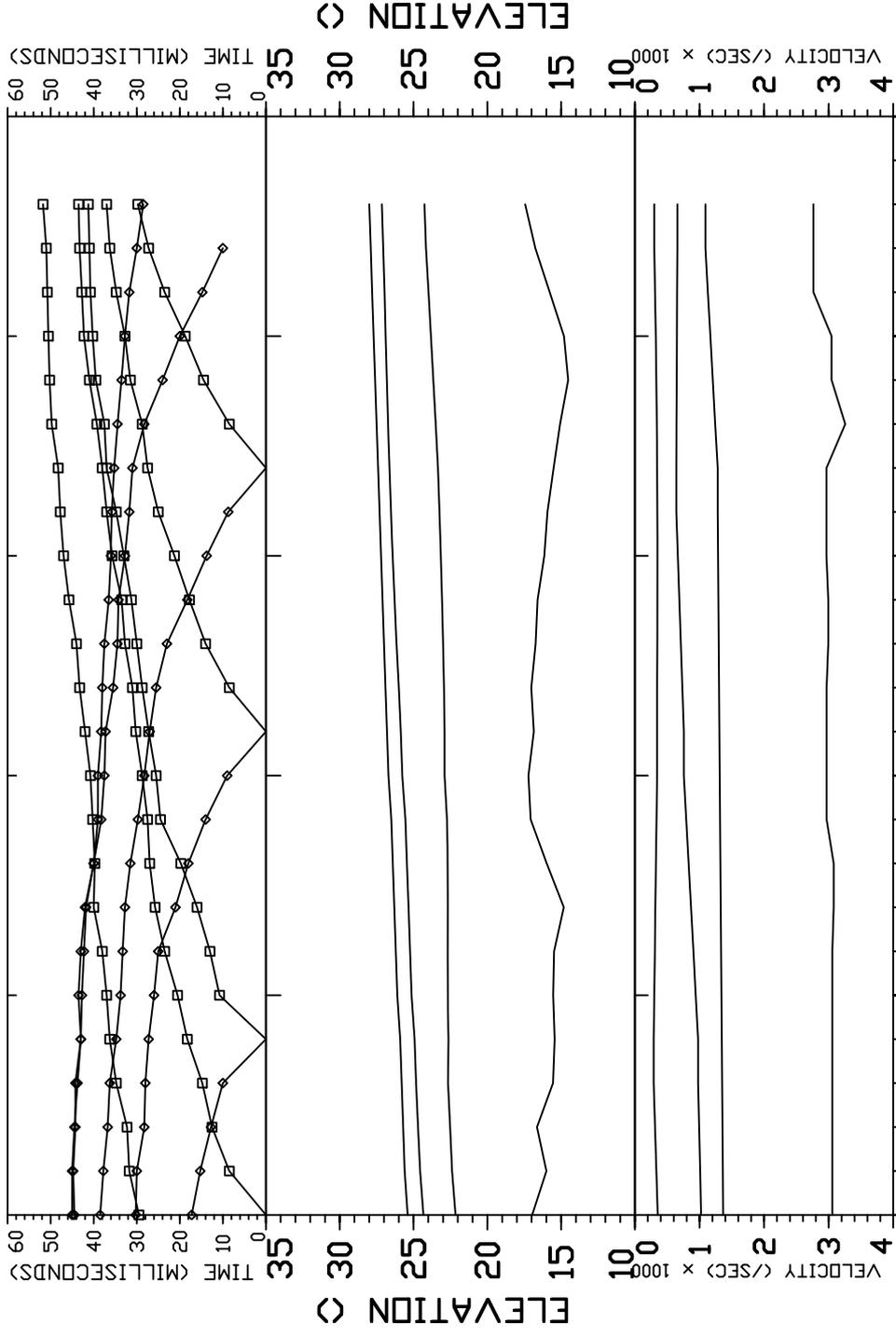


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by:	Strata Geophysical, Inc.	LANDFALL DUBLIN
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Equipment:	GEODE	Spread: S16
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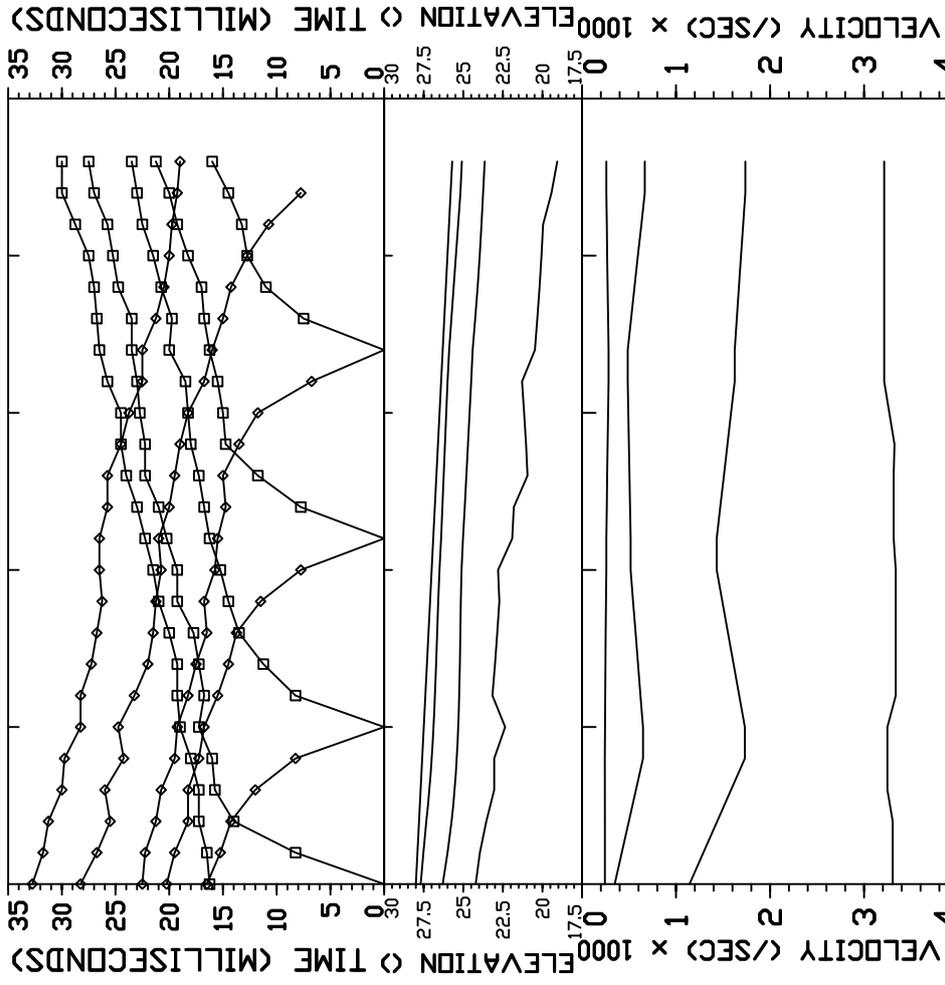


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for:	NISA	AGP21217
by:	Strata Geophysical, Inc.	LANDFALL DUBLIN
Data Set:	SetS17R	Date: 21/04/22
Equipment:	GEODE	Spread: S17
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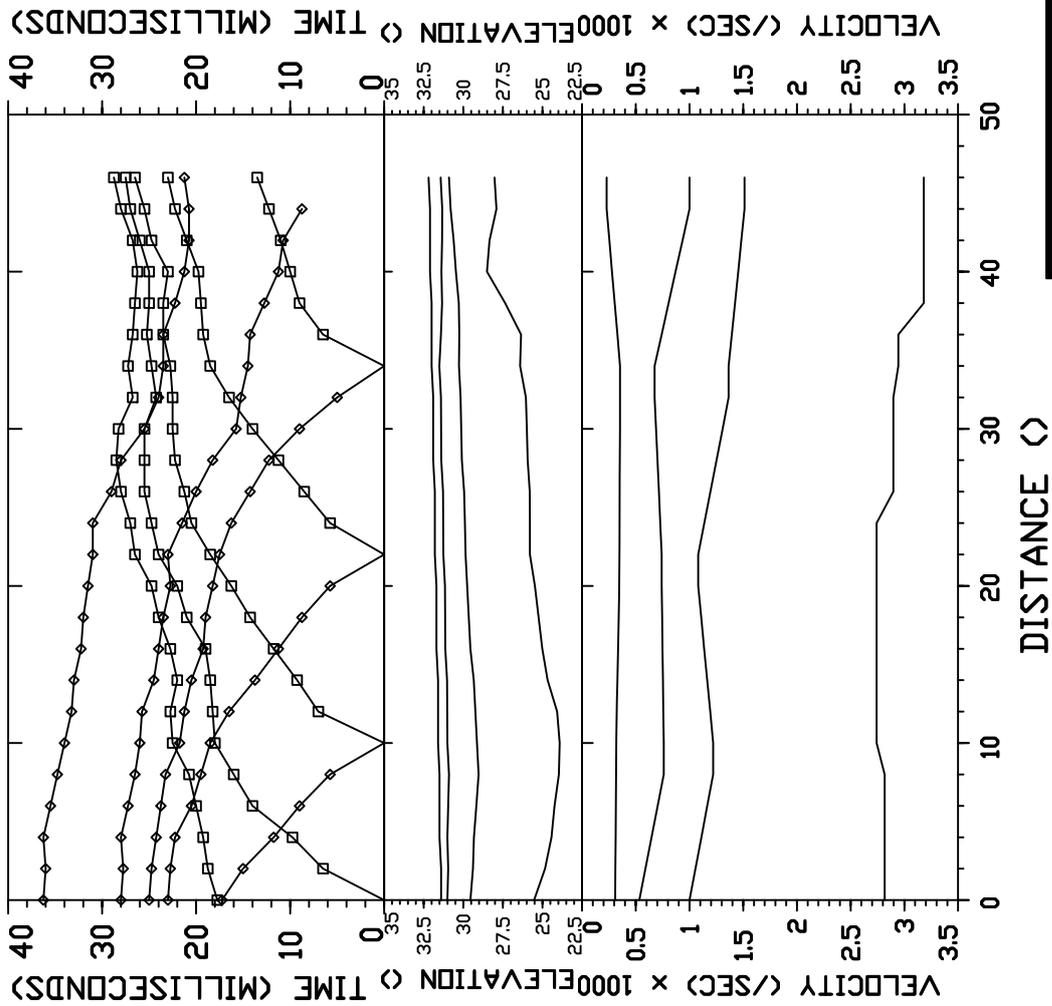


Plate: 10a

for:	NISA	AGP21217	
by:	Strata Geophysical, Inc.	LANDFALL	
Data Set:	SetS18R	DUBLIN	
Equipment:	GEODE	Azimuth:	
		Spread:	S18

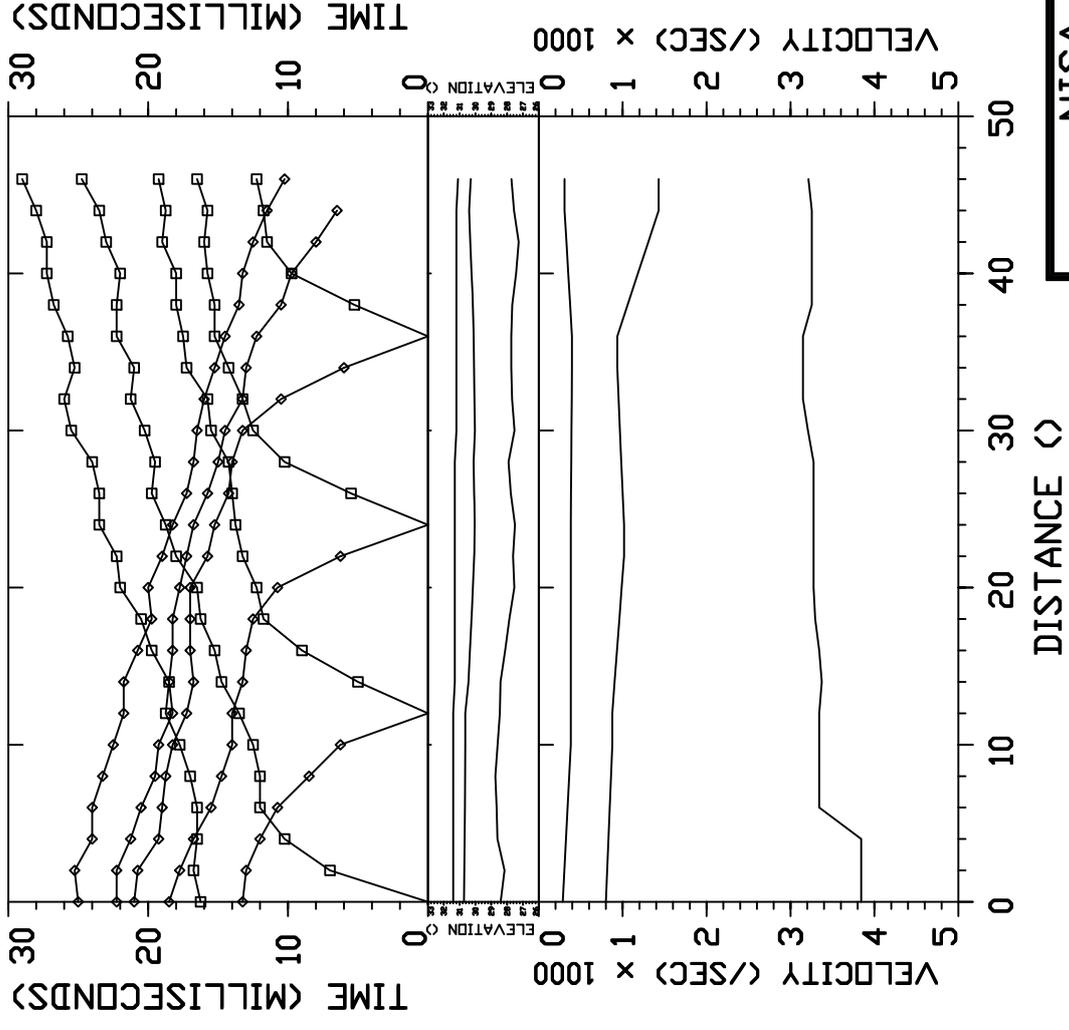


Plate: 10a

for: NISA	AGP21217
by: Strata Geophysical, Inc.	LANDFALL DUBLIN
Data Set: S19R	Date: 21/04/22
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	Azimuth:

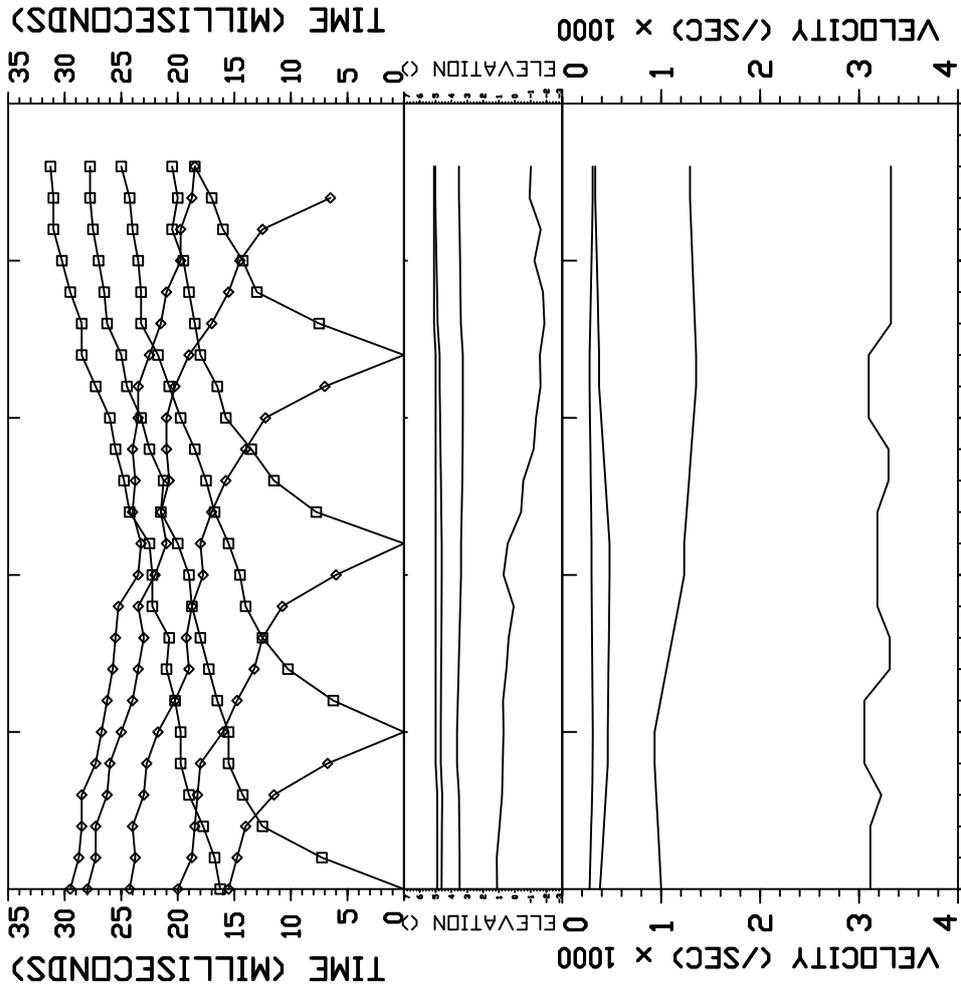


Plate: 10a

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Data Set:	S21R	Date: 21/04/22
Equipment:	GEODE	Spread: S21
		Azimuth:

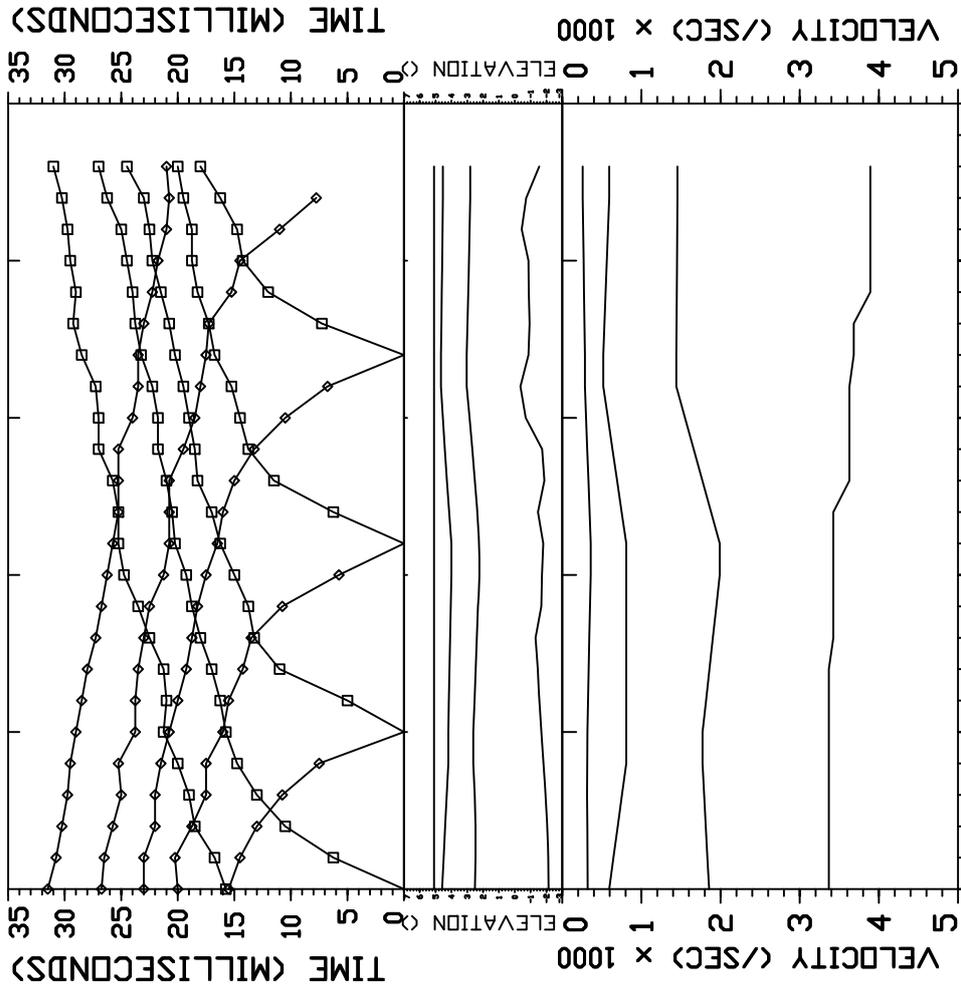


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Equipment:	GEODE	Spread: S22
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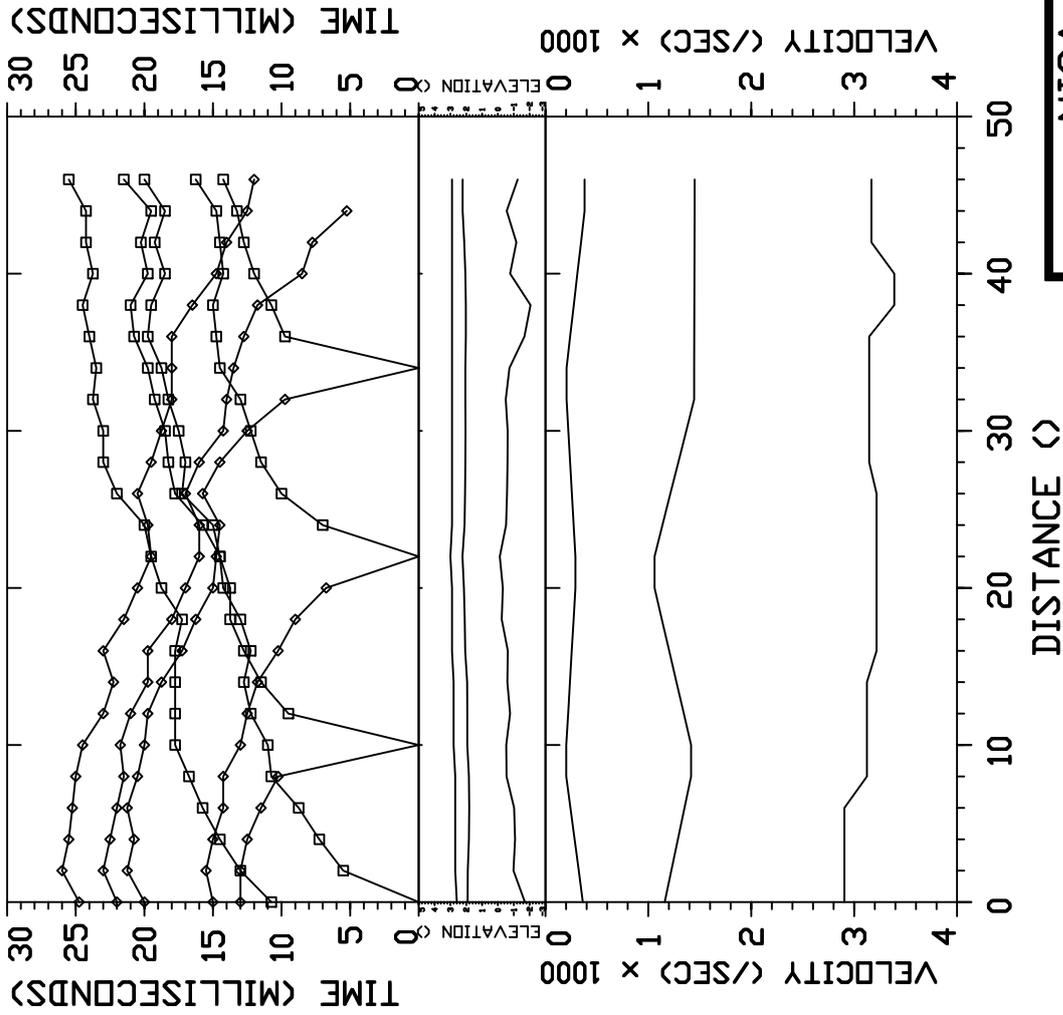


Plate: 10a

for:	NISA	AGP21217
by:	Strata Geophysical, Inc.	BLAKES CROSS DUBLIN
Data Set:	S23R	Date: 21/04/22
Equipment:	GEODE	Spread: S23
		Azimuth:

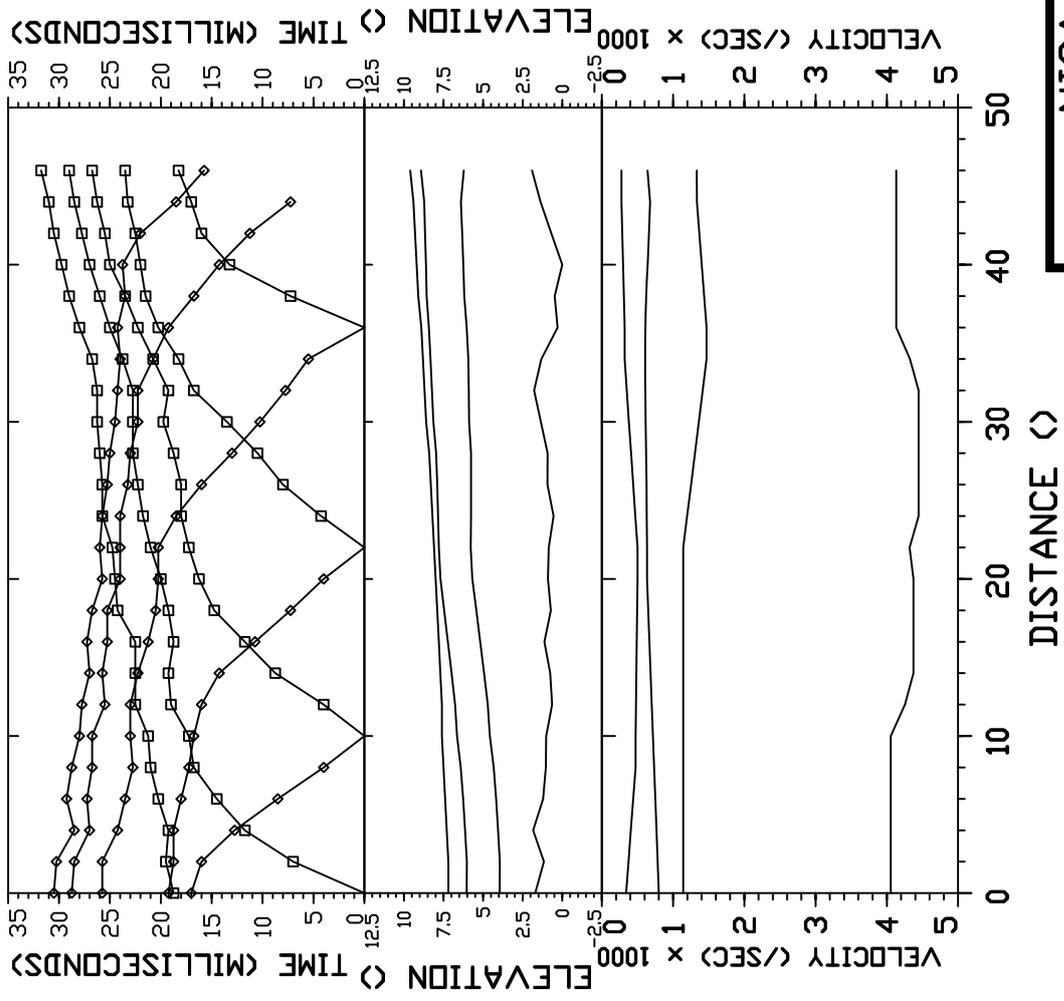


Plate: 10a

for:	NISA	AGP21217
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Data Set:	S24R	DUBLIN
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		Azimuth:

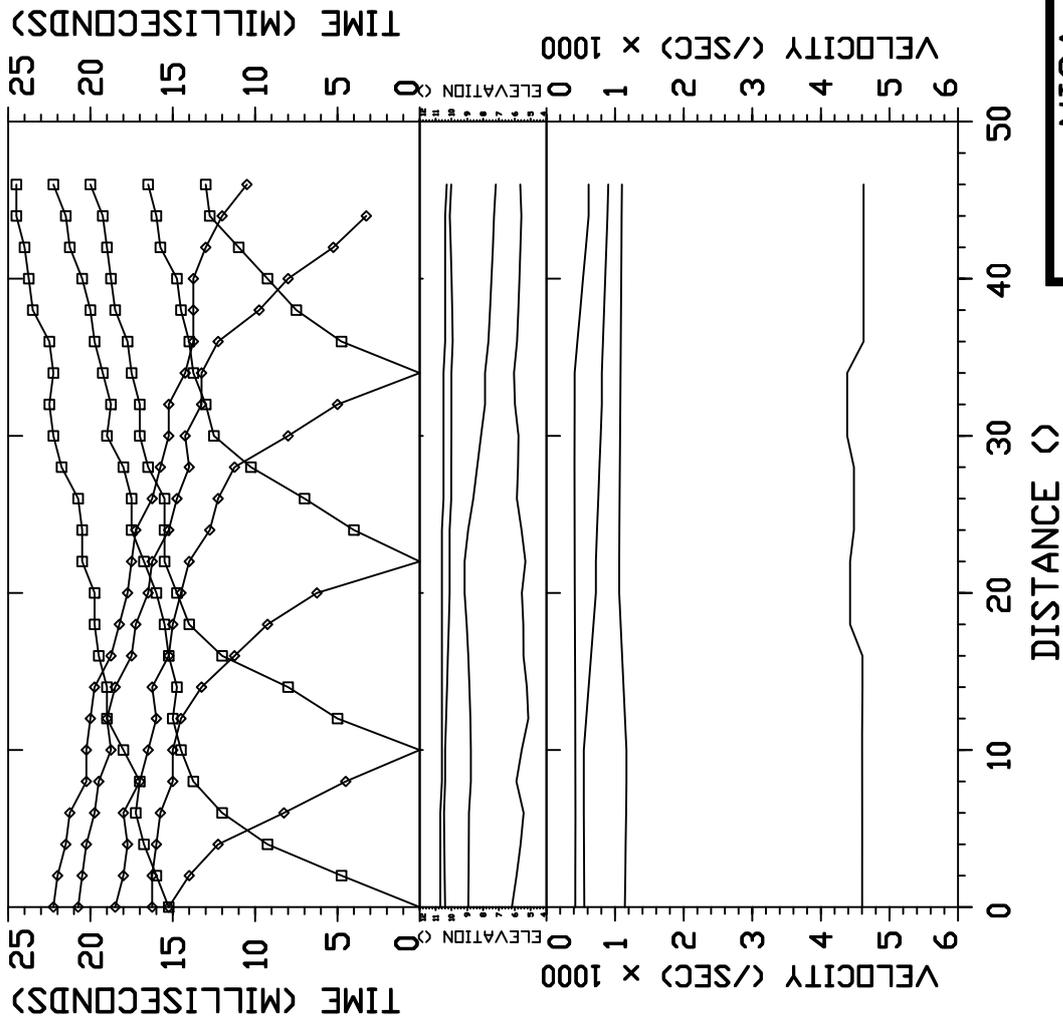


Plate: 10a

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Data Set:	S25R	DUBLIN
Equipment:	GEODE	Spread:
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		Azimuth:

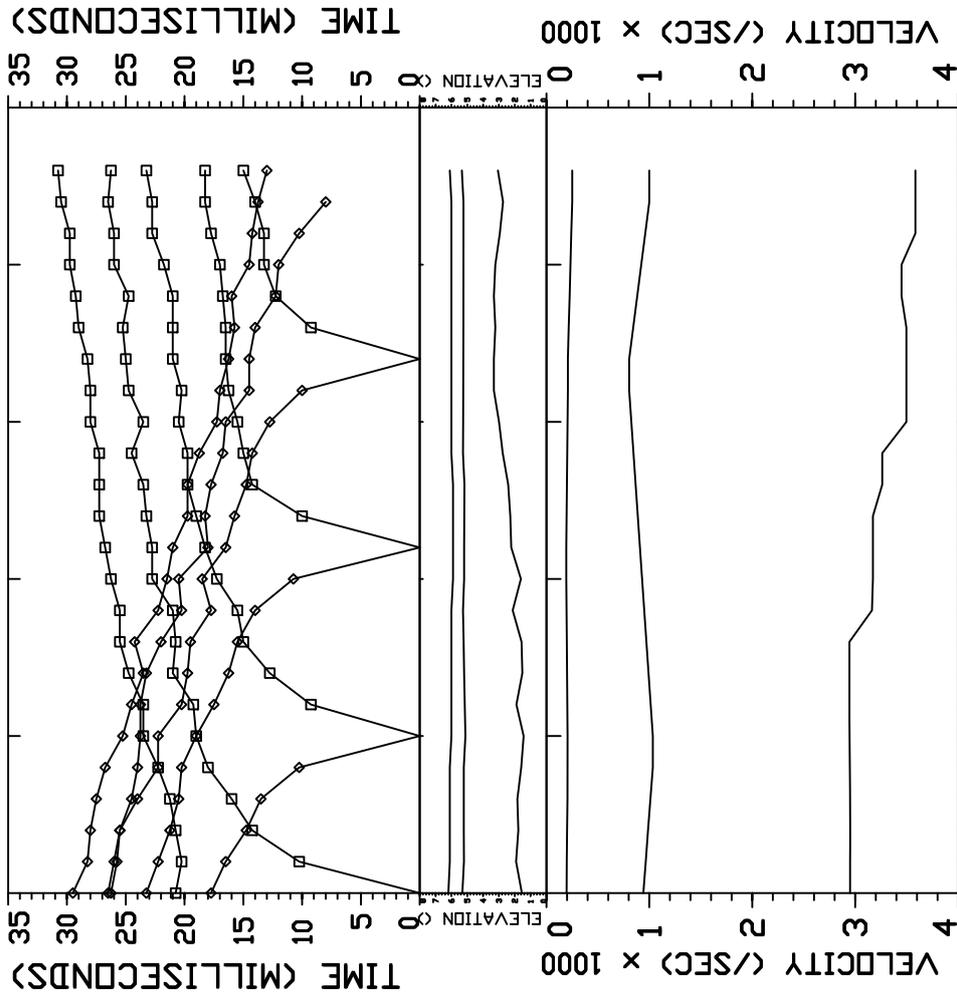


Plate: 10a

for:	NISA	AGP21217
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Data Set:	S26R	DUBLIN
Equipment:	GEODE	Spread:
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		Azimuth:

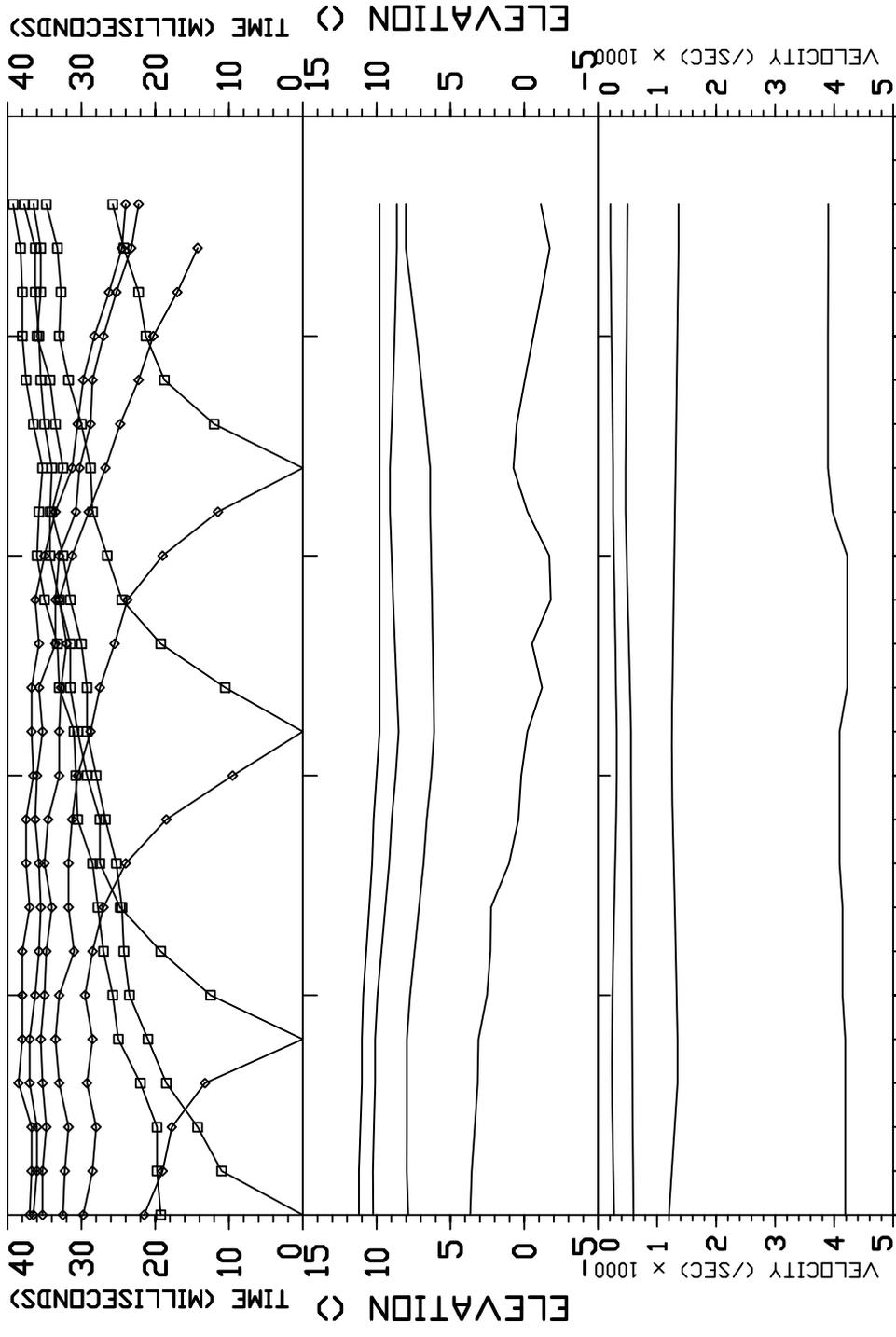


Plate: 10a

DISTANCE (M)

for:	NISA	AGP21217
by:	Strata Geophysical, Inc.	M1 CROSSING DUBLIN
Data Set:	SetS27R	Date: 22/04/22
Equipment:	GEODE	Spread: S27
		Azimuth:

APPENDIX D: DRAWINGS

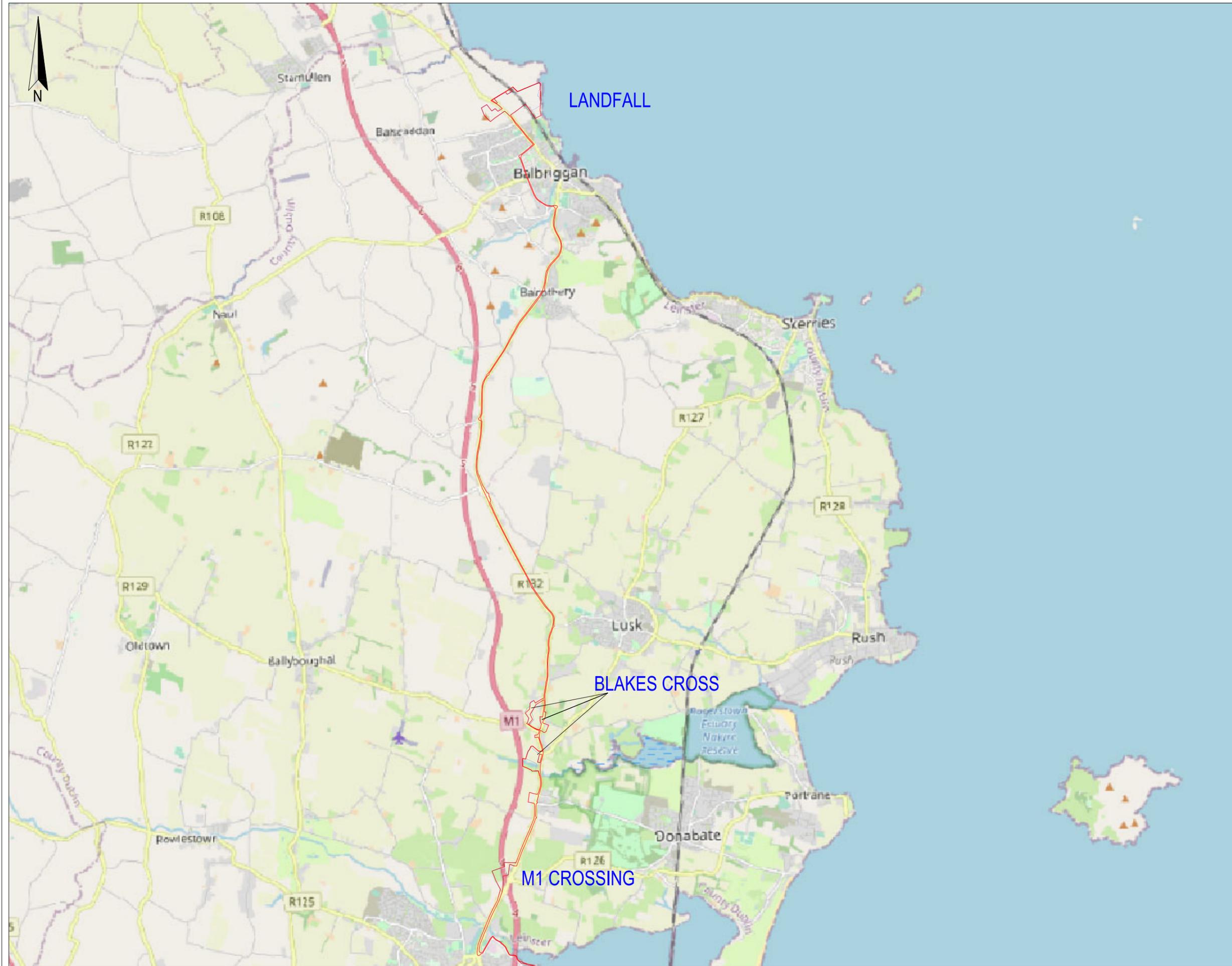
AGP21217_01 Regional Location Map NTS @ A3

The information derived from the geophysical investigation At the Landfall site is presented in the following drawings:

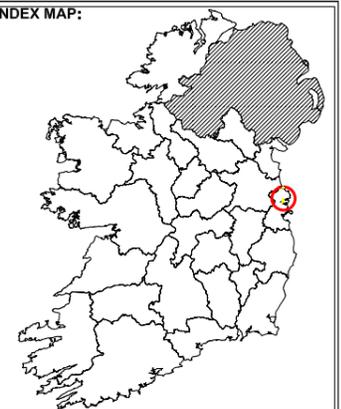
AGP21217_L01	Geophysical Locations – Landfall Site	1:4000	@ A3
AGP21217_L02	EM Conductivity Contours – Landfall Site	1:4000	@ A3
AGP21217_L03	Interpreted depth to rock – Landfall Site	1:4000	@ A3
AGP21217_L04	Interpreted rock elevation– Landfall Site	1:4000	@ A3
AGP21217_R4	Landfall Site Results & Interpretation – ERT R4	1:2000	@ A4
AGP21217_R5	Landfall Site Results & Interpretation – ERT R5	1:2000	@ A4
AGP21217_R9	Landfall Site Results & Interpretation – ERT R9	1:2000	@ A4
AGP21217_R10	Landfall Site Results & Interpretation – ERT R10	1:2500	@ A4
AGP21217_R11	Landfall Site Results & Interpretation – ERT R11	1:2000	@ A4
AGP21217_R12	Landfall Site Results & Interpretation – ERT R12	1:2000	@ A4
AGP21217_R13	Landfall Site Results & Interpretation – ERT R13	1:2000	@ A4
AGP21217_R14	Landfall Site Results & Interpretation – ERT R14	1:2000	@ A4
AGP21217_R15	Landfall Site Results & Interpretation – ERT R15	1:2000	@ A4
AGP21217_R16	Landfall Site Results & Interpretation – ERT R16	1:2000	@ A4
AGP21217_R17	Landfall Site Results & Interpretation – ERT R17	1:2000	@ A4

REGIONAL LOCATION MAP

NOT TO SCALE



INDEX MAP:



LEGEND:

- Geophysics Boundary
- Proposed Red Line Boundary

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CLIENT: STATKRAFT

DRAWING NO: AGP21217_01

SCALE: AS INDICATED @ A3

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REGIONAL LOCATION MAP

NOT TO SCALE



INDEX MAP:



LEGEND:

-  Geophysics Boundary
-  Proposed Red Line Boundary

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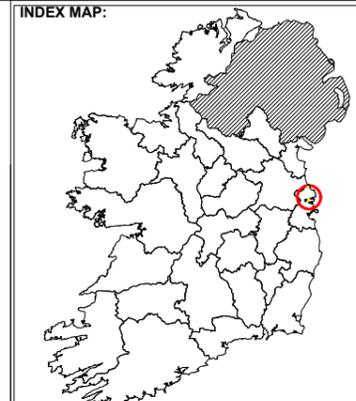
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- LEGEND:**
- ▭ Geophysics Boundary
 - ▭ Proposed Red Line Boundary
 - ▭ EM conductivity reading
 - 2D resistivity profile
 - Seismic refraction profile
 - Borehole
 - + Trial pit

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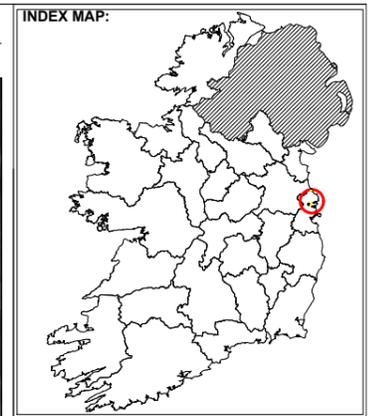
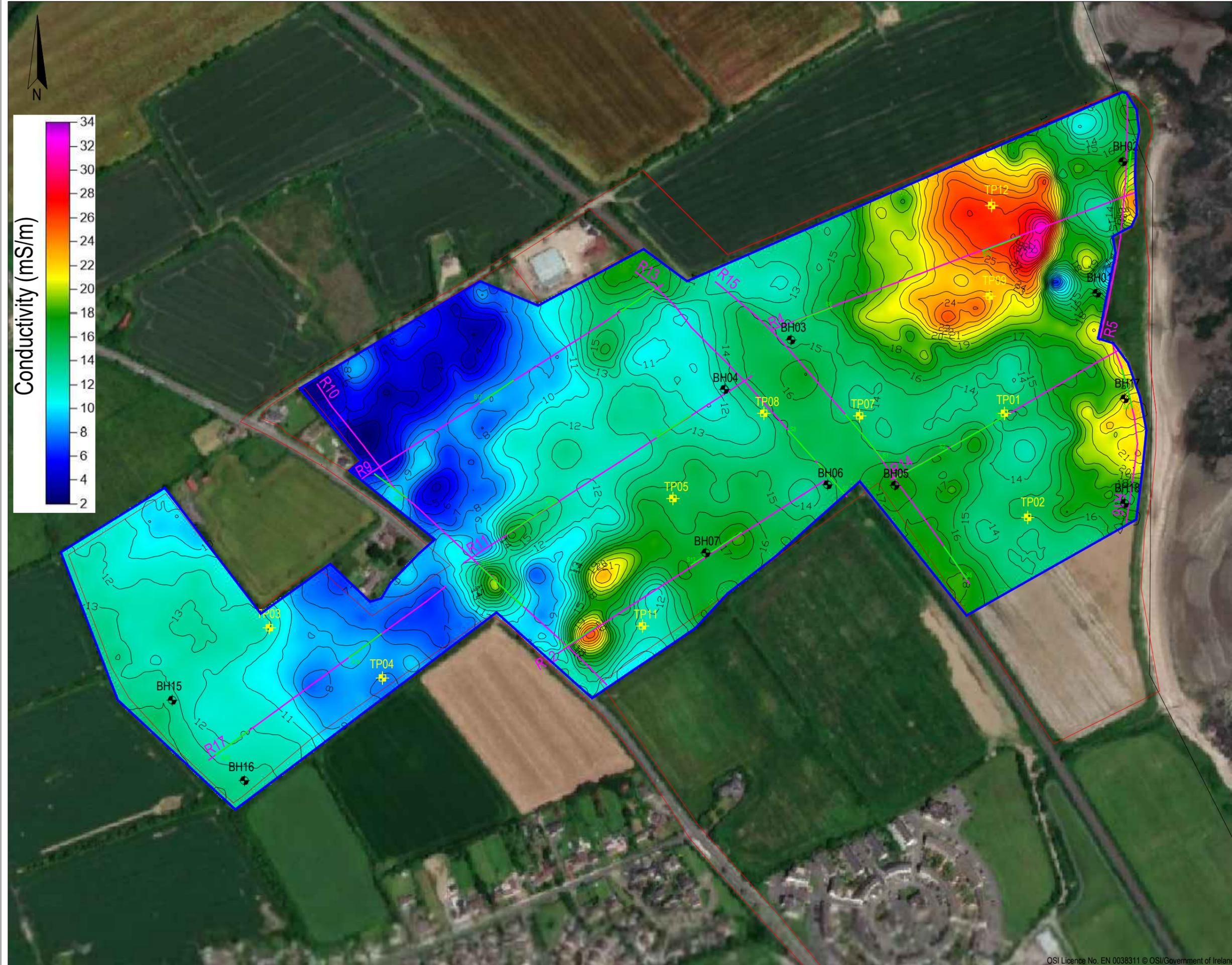
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EM CONDUCTIVITY CONTOURS - LANDFALL SITE

SCALE 1:4000



- LEGEND:**
- Geophysics Boundary
 - Proposed Red Line Boundary
 - EM conductivity reading
 - 2D resistivity profile
 - Seismic refraction profile
 - Borehole
 - + Trial pit

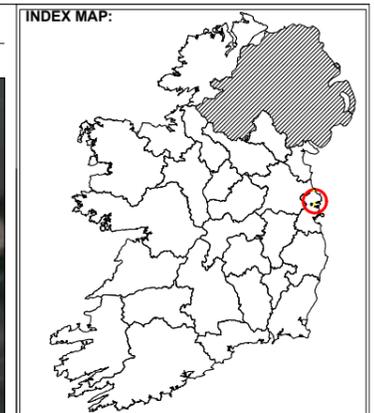
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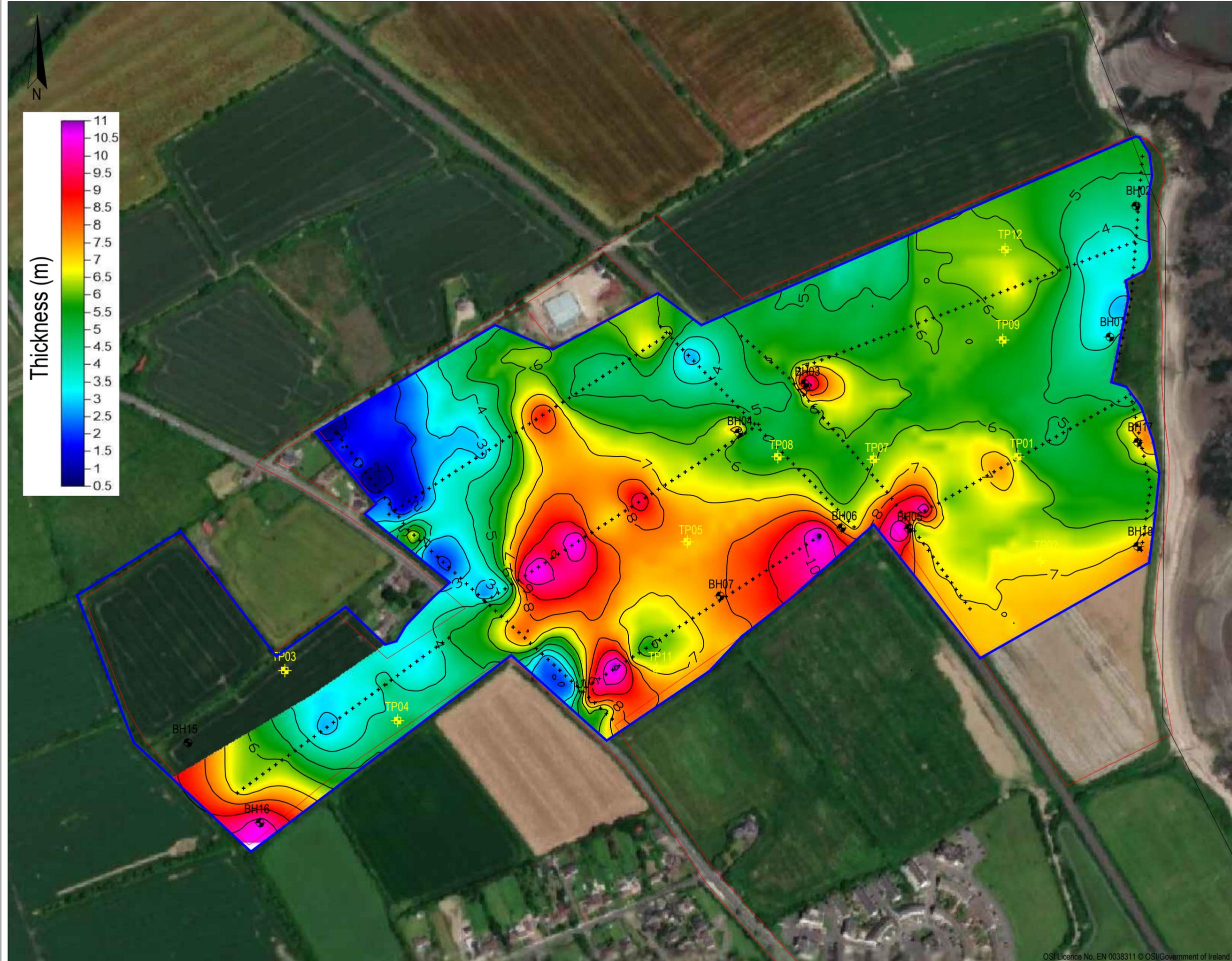
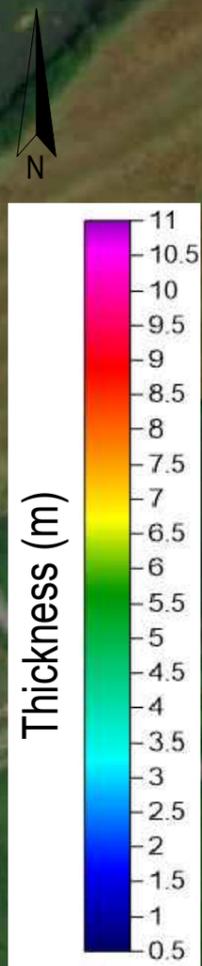
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CLIENT:	STATKRAFT		
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SCALE:	AS INDICATED @ A3		
DATE:	31-05-2022		
Version:	Date:	Drawn By:	Checked:
Draft	31-05-2022	YOC	TL
01	13-06-2022	YOC	



- LEGEND:**
- Geophysics Boundary
 - Proposed Red Line Boundary
 - Data Point
 - BH1 Borehole
 - TP1 Trial pit



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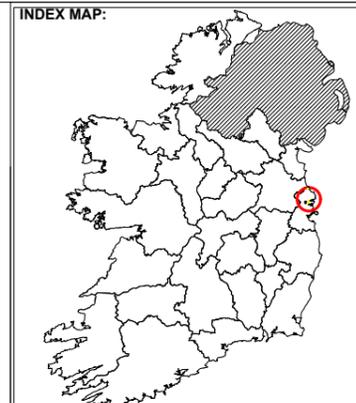
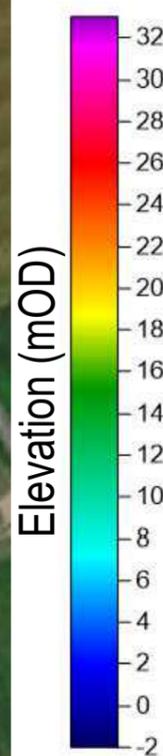
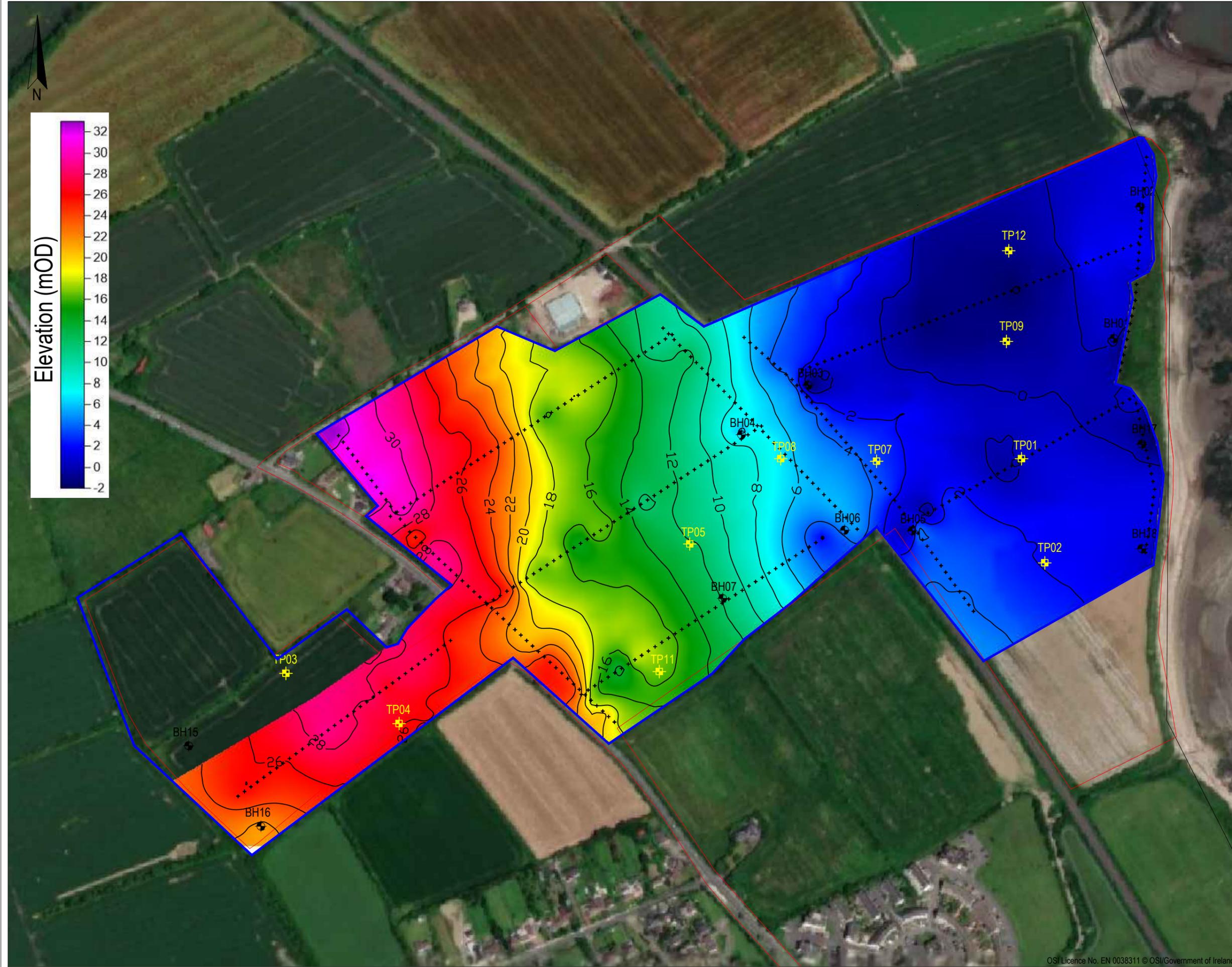
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SCALE: AS INDICATED @ A3

DATE: 31-05-2022

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- LEGEND:**
- Geophysics Boundary
 - Proposed Red Line Boundary
 - +
 - Borehole
 - Trial pit

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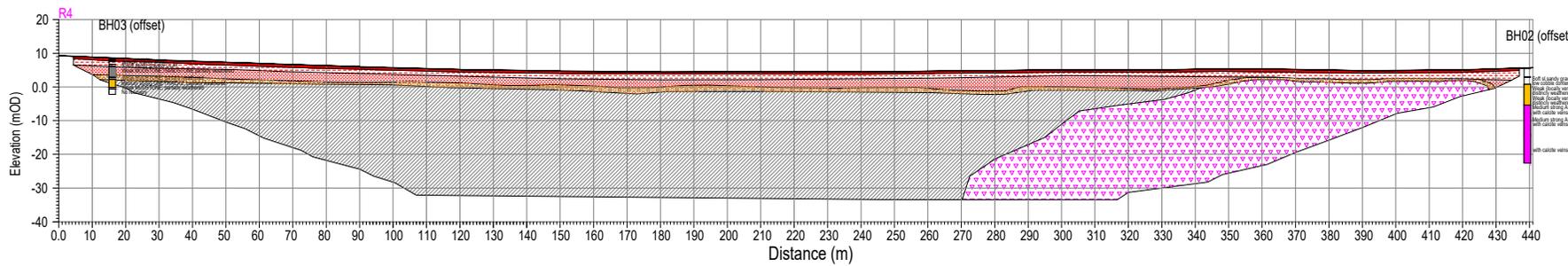
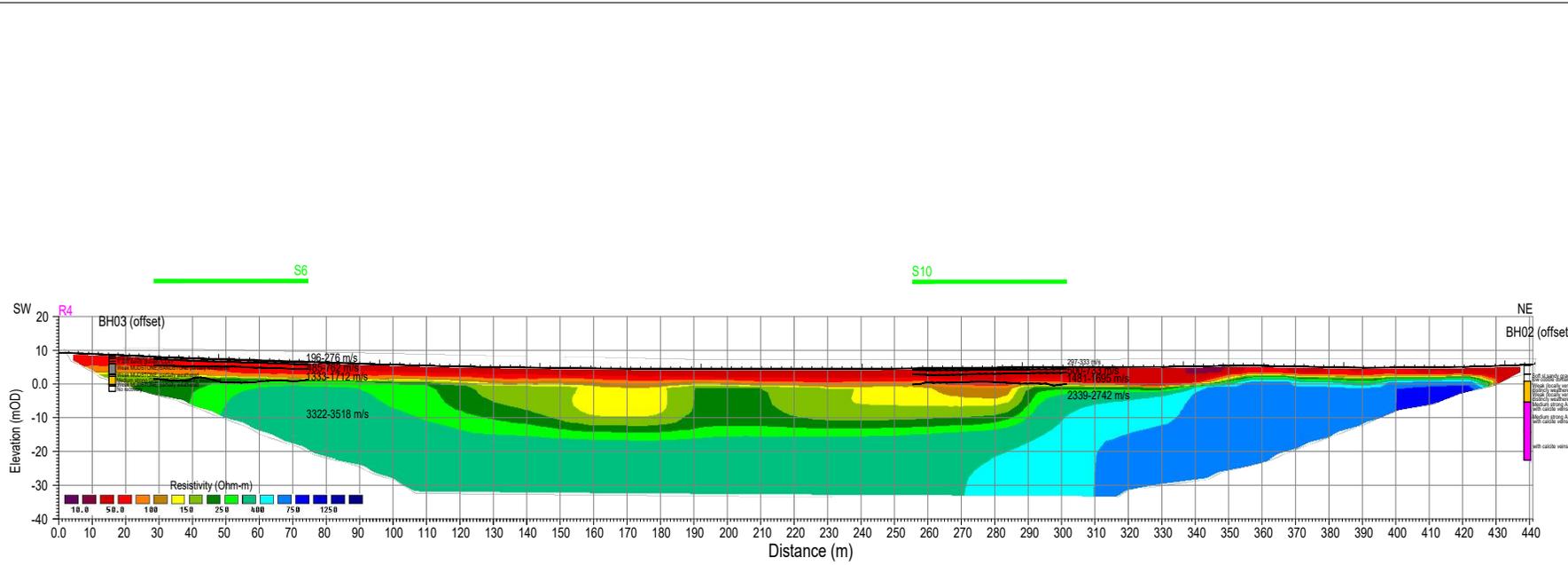


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SCALE:	AS INDICATED @ A3		
DATE:	31-05-2022		

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01	13-06-2022	YOC	



- LEGEND:**
- Seismic refraction layer with interpreted P-wave velocity
 - Soft slightly sandy gravelly SILT/CLAY
 - Soft-Firm slightly sandy gravelly SILT/CLAY
 - Firm-Stiff slightly sandy gravelly SILT/CLAY
 - Soft sandy gravelly SILT/CLAY
 - Soft-Firm sandy gravelly SILT/CLAY
 - Firm-Stiff sandy gravelly SILT/CLAY and/or Moderately-Slightly Weathered ROCK
 - Slightly Weathered BRECCIA
 - Slightly Weathered - Fresh MUDSTONE, SILTSTONE, SANDSTONE, GREYWACKE and/or TUFF
 - Slightly Weathered - Fresh ANDESITE

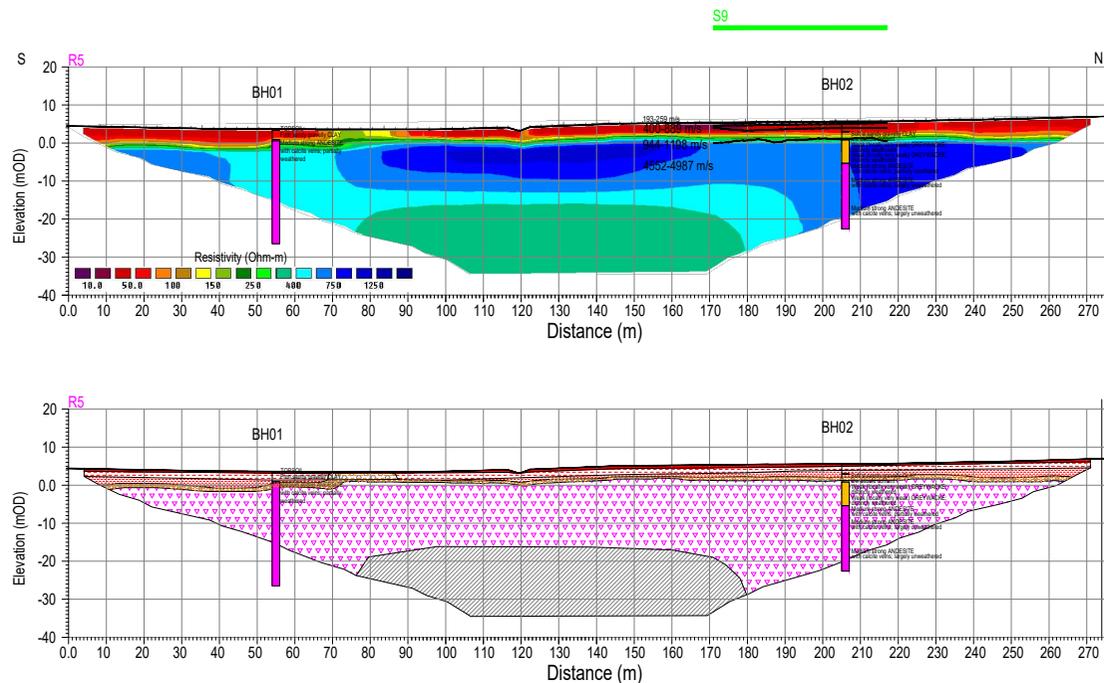
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DATE:	31-05-2022		
Version:	Date:	Drawn By:	Checked:
Draft	31-05-2022	YOC	TL
01	13-06-2022	YOC	



- LEGEND:**
- Seismic refraction layer with interpreted P-wave velocity
 - Soft slightly sandy gravelly SILT/CLAY
 - Soft-Firm slightly sandy gravelly SILT/CLAY
 - Firm-Stiff slightly sandy gravelly SILT/CLAY
 - Soft sandy gravelly SILT/CLAY
 - Soft-Firm sandy gravelly SILT/CLAY
 - Firm-Stiff sandy gravelly SILT/CLAY and/or Moderately-Slightly Weathered ROCK
 - Slightly Weathered BRECCIA
 - Slightly Weathered - Fresh MUDSTONE, SILTSTONE, SANDSTONE, GREYWACKE and/or TUFF
 - Slightly Weathered - Fresh ANDESITE

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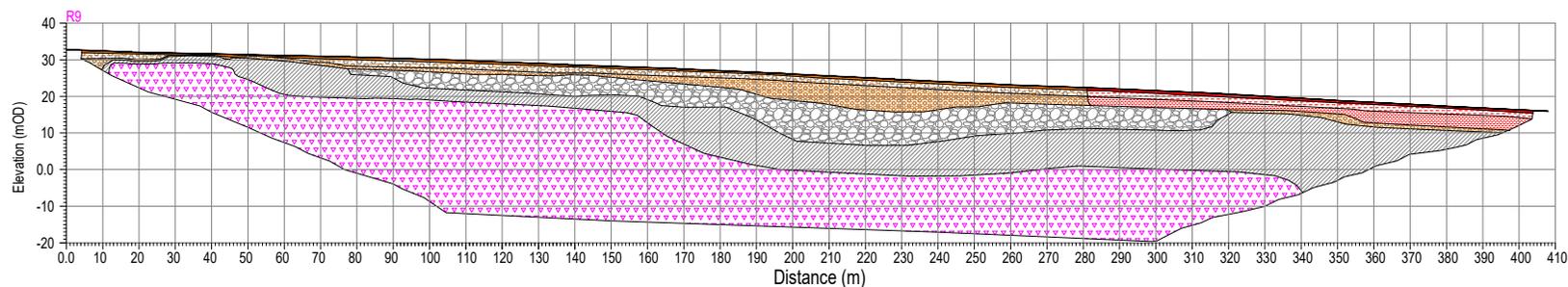
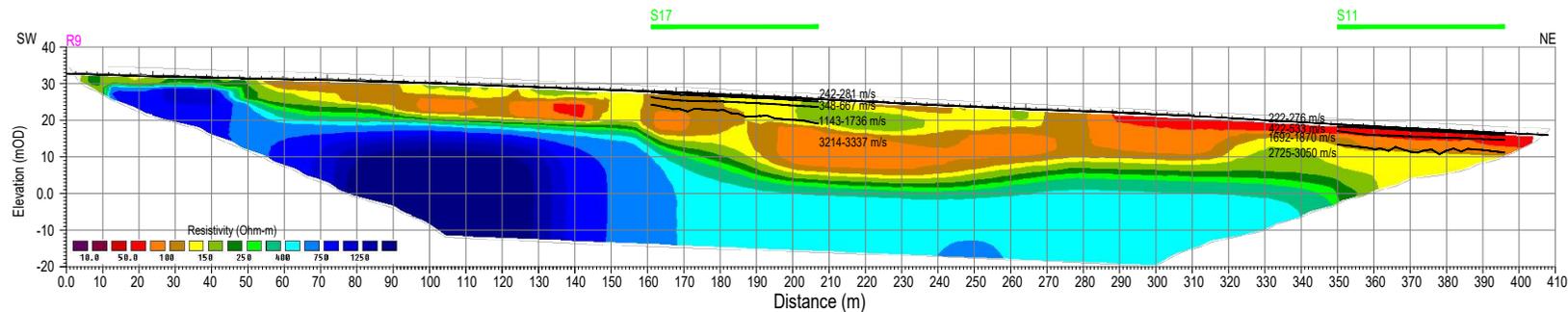
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SCALE: AS INDICATED @ A4

DATE: 31-05-2022

Version:	Date:	Drawn By:	Checked:
Draft	31-05-2022	YOC	TL
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- LEGEND:**
- Seismic refraction layer with interpreted P-wave velocity
 - Soft slightly sandy gravelly SILT/CLAY
 - Soft-Firm slightly sandy gravelly SILT/CLAY
 - Firm-Stiff slightly sandy gravelly SILT/CLAY
 - Soft sandy gravelly SILT/CLAY
 - Soft-Firm sandy gravelly SILT/CLAY
 - Firm-Stiff sandy gravelly SILT/CLAY and/or Moderately-Slightly Weathered ROCK
 - Slightly Weathered BRECCIA
 - Slightly Weathered - Fresh MUDSTONE, SILTSTONE, SANDSTONE, GREYWACKE and/or TUFF
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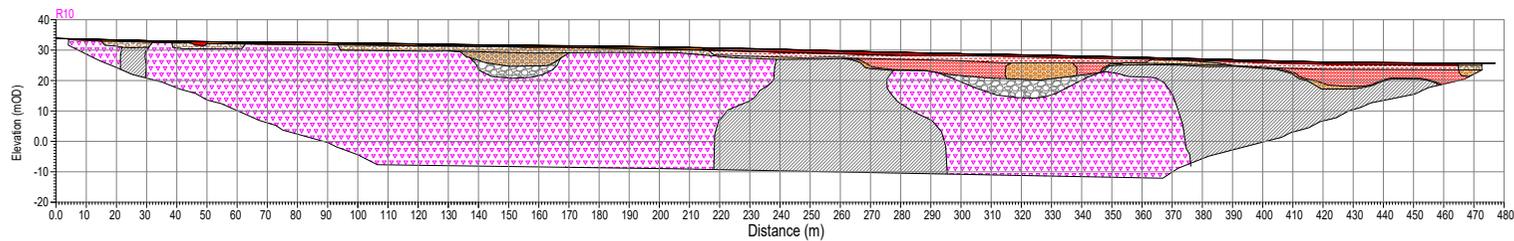
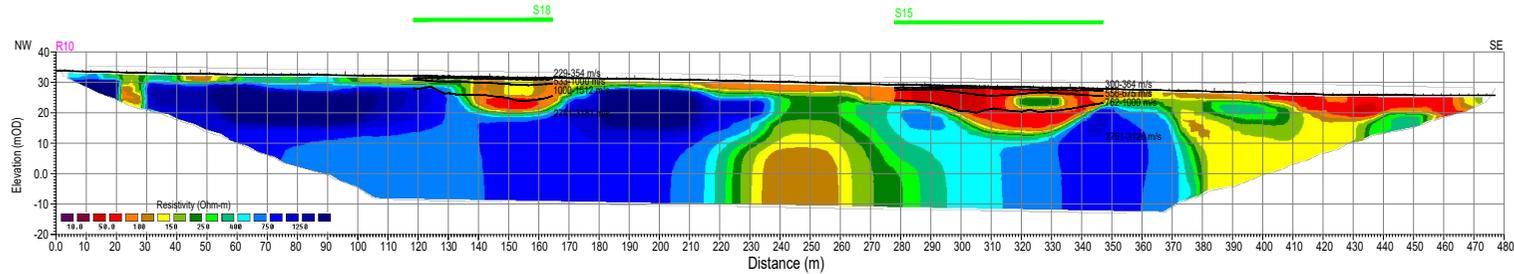
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DATE: 31-05-2022

Version:	Date:	Drawn By:	Checked:
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- LEGEND:**
- Seismic refraction layer with interpreted P-wave velocity
 - Soft slightly sandy gravelly SILT/CLAY
 - Soft-Firm slightly sandy gravelly SILT/CLAY
 - Firm-Stiff slightly sandy gravelly SILT/CLAY
 - Soft sandy gravelly SILT/CLAY
 - Soft-Firm sandy gravelly SILT/CLAY
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 - Slightly Weathered BRECCIA
 - Slightly Weathered - Fresh MUDSTONE, SILTSTONE, SANDSTONE, GREYWACKE and/or TUFF
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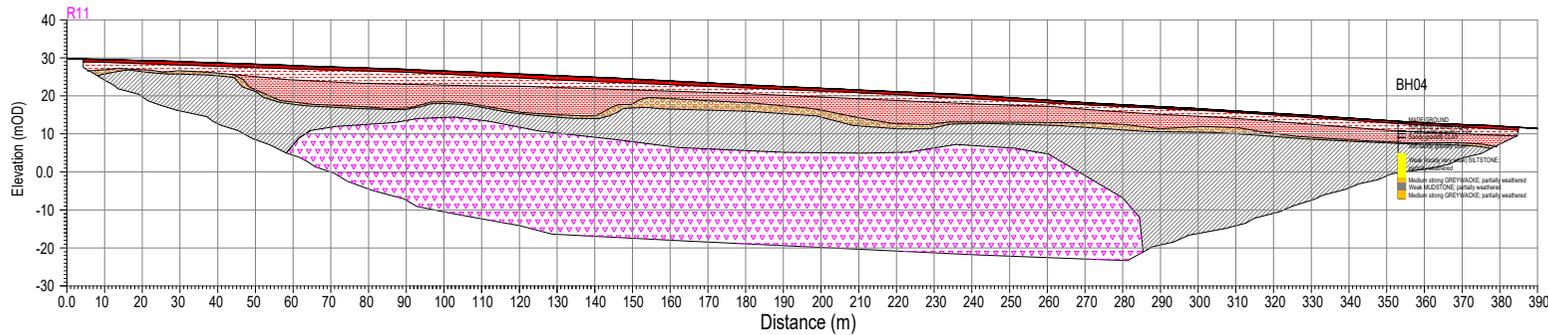
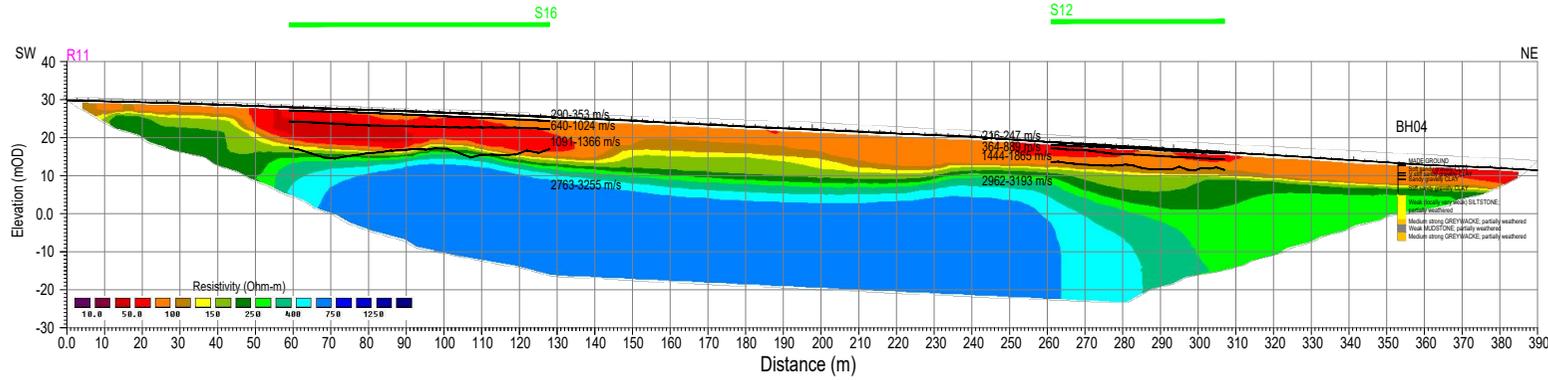
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SCALE: AS INDICATED @ A4

DATE: 31-05-2022

Version:	Date:	Drawn By:	Checked:
01	31-05-2022	YOC	TL



- LEGEND:**
- Seismic refraction layer with interpreted P-wave velocity
 - Soft slightly sandy gravelly SILT/CLAY
 - Soft-Firm slightly sandy gravelly SILT/CLAY
 - Firm-Stiff slightly sandy gravelly SILT/CLAY
 - Soft sandy gravelly SILT/CLAY
 - Soft-Firm sandy gravelly SILT/CLAY
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 - Slightly Weathered BRECCIA
 - Slightly Weathered - Fresh MUDSTONE, SILTSTONE, SANDSTONE, GREYWACKE and/or TUFF
 - Slightly Weathered - Fresh ANDESITE

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CLIENT:	STATKRAFT		
DRAWING NO:	AGP21217_R11		
SCALE:	AS INDICATED @ A4		
DATE:	31-05-2022		

Version:	Date:	Drawn By:	Checked:
Draft	31-05-2022	YOC	TL
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- LEGEND:**
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 - Soft slightly sandy gravelly SILT/CLAY
 - Soft-Firm slightly sandy gravelly SILT/CLAY
 - Firm-Stiff slightly sandy gravelly SILT/CLAY
 - Soft sandy gravelly SILT/CLAY
 - Soft-Firm sandy gravelly SILT/CLAY
 - Firm-Stiff sandy gravelly SILT/CLAY and/or Moderately-Slightly Weathered ROCK
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 - Slightly Weathered - Fresh MUDSTONE, SILTSTONE, SANDSTONE, GREYWACKE and/or TUFF
 - Slightly Weathered - Fresh ANDESITE

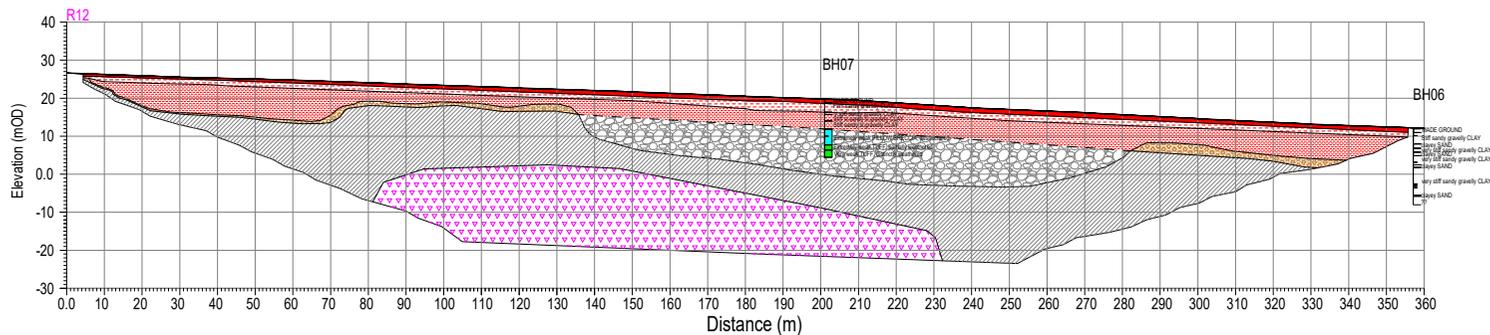
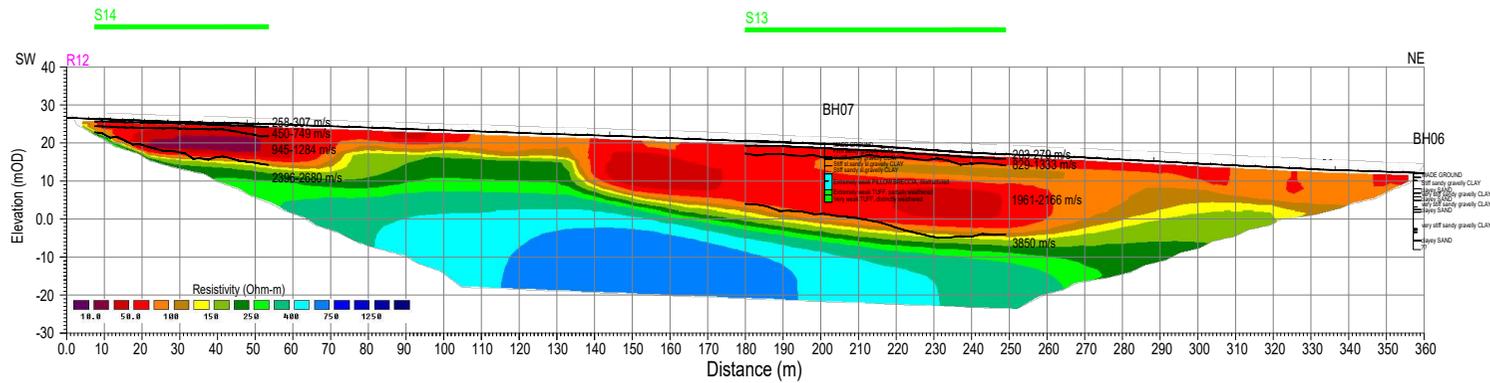
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CLIENT:	STATKRAFT		
DRAWING NO:	AGP21217_R12		
SCALE:	AS INDICATED @ A4		
DATE:	31-05-2022		
Version:	Date:	Drawn By:	Checked:
Draft	31-05-2022	YOC	TL
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- LEGEND:**
- Seismic refraction layer with interpreted P-wave velocity
 - Soft slightly sandy gravelly SILT/CLAY
 - Soft-Firm slightly sandy gravelly SILT/CLAY
 - Firm-Stiff slightly sandy gravelly SILT/CLAY
 - Soft sandy gravelly SILT/CLAY
 - Soft-Firm sandy gravelly SILT/CLAY
 - Firm-Stiff sandy gravelly SILT/CLAY and/or Moderately-Slightly Weathered ROCK
 - Slightly Weathered BRECCIA
 - Slightly Weathered - Fresh MUDSTONE, SILTSTONE, SANDSTONE, GREYWACKE and/or TUFF
 - Slightly Weathered - Fresh ANDESITE

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PROJECT: NORTH IRISH SEA ARRAY ONSHORE CABLE ROUTE - GEOPHYSICAL SURVEY

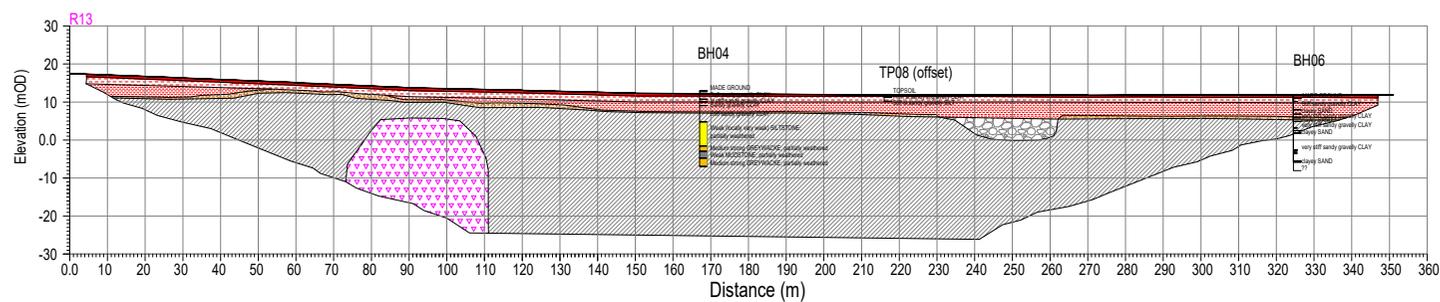
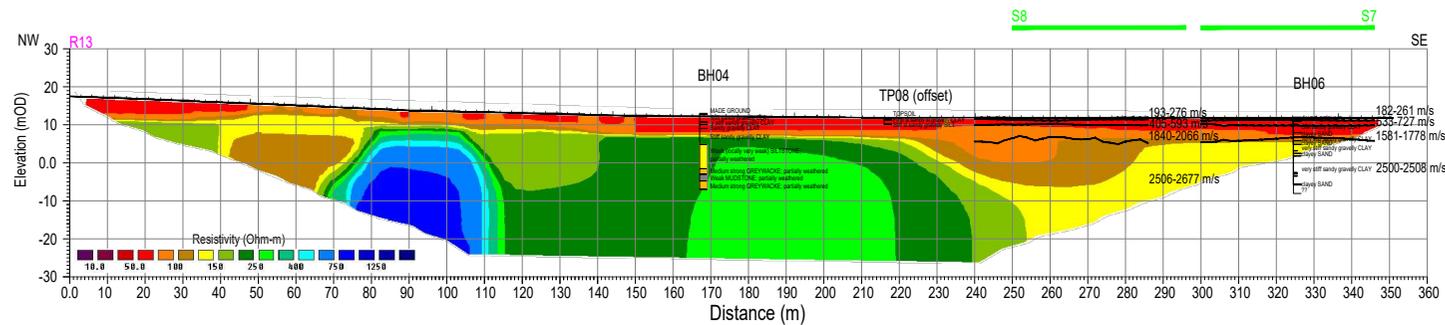
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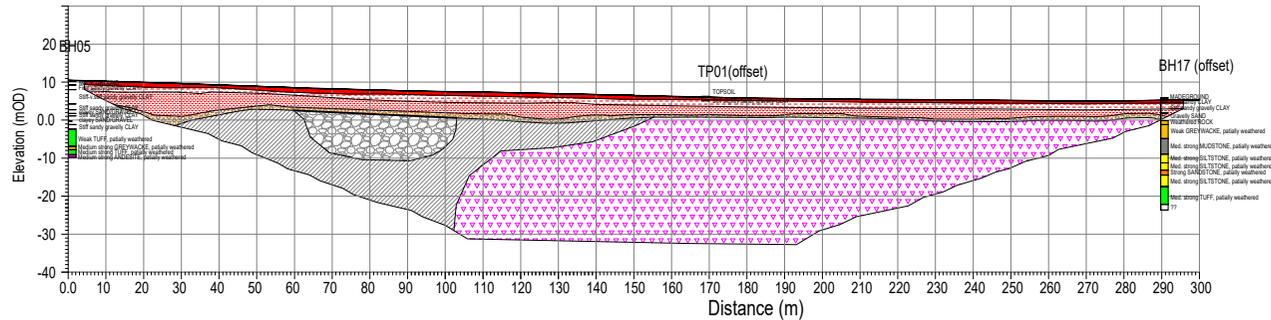
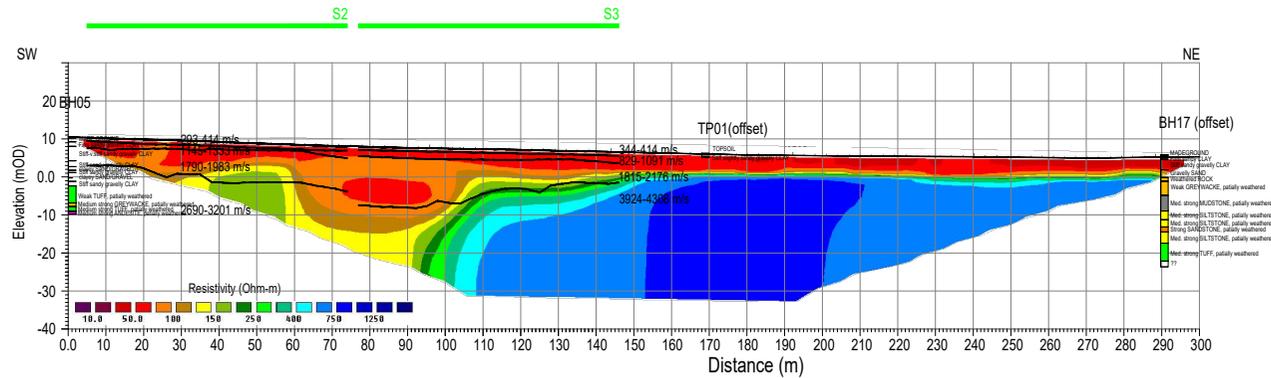
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SCALE: AS INDICATED @ A4

DATE: 31-05-2022

Version:	Date:	Drawn By:	Checked:
Draft	31-05-2022	YOC	TL
01	13-06-2022	YOC	





LEGEND:

- Seismic refraction layer with interpreted P-wave velocity
- Soft slightly sandy gravelly SILT/CLAY
- Soft-Firm slightly sandy gravelly SILT/CLAY
- Firm-Stiff slightly sandy gravelly SILT/CLAY
- Soft sandy gravelly SILT/CLAY
- Soft-Firm sandy gravelly SILT/CLAY
- Firm-Stiff sandy gravelly SILT/CLAY and/or Moderately-Slightly Weathered ROCK
- Slightly Weathered BRECCIA
- Slightly Weathered - Fresh MUDSTONE, SILTSTONE, SANDSTONE, GREYWACKE and/or TUFF
- Slightly Weathered - Fresh ANDESITE

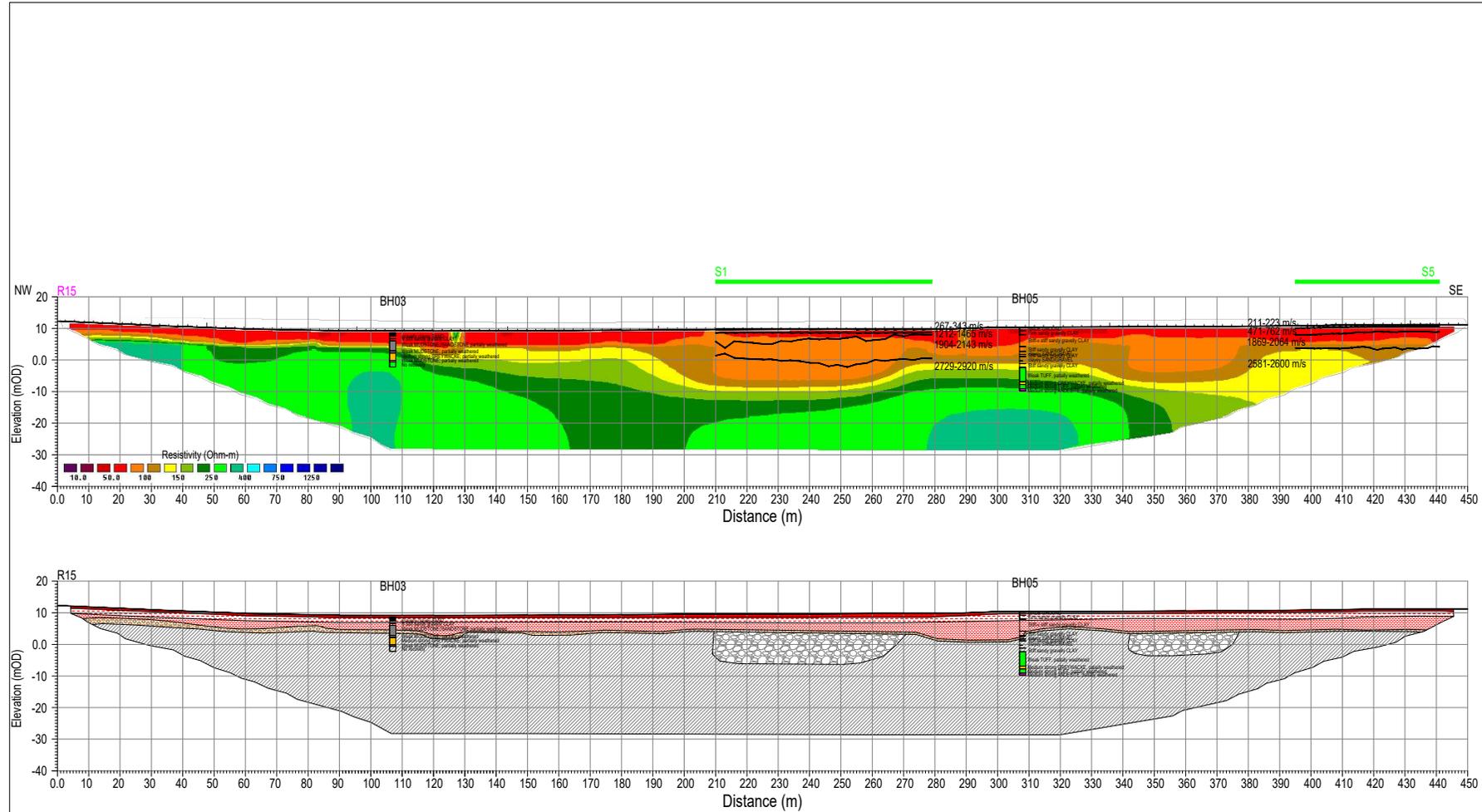
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PROJECT:	NORTH IRISH SEA ARRAY ONSHORE CABLE ROUTE - GEOPHYSICAL SURVEY		
CLIENT:	STATKRAFT		
DRAWING NO:	AGP21217_R14		
SCALE:	AS INDICATED @ A4		
DATE:	31-05-2022		
Version:	Date:	Drawn By:	Checked:
Draft	31-05-2022	YOC	TL
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- LEGEND:**
- Seismic refraction layer with interpreted P-wave velocity
 - Soft slightly sandy gravelly SILT/CLAY
 - Soft-Firm slightly sandy gravelly SILT/CLAY
 - Firm-Stiff slightly sandy gravelly SILT/CLAY
 - Soft sandy gravelly SILT/CLAY
 - Soft-Firm sandy gravelly SILT/CLAY
 - Firm-Stiff sandy gravelly SILT/CLAY and/or Moderately-Slightly Weathered ROCK
 - Slightly Weathered BRECCIA
 - Slightly Weathered - Fresh MUDSTONE, SILTSTONE, SANDSTONE, GREYWACKE and/or TUFF
 - Slightly Weathered - Fresh ANDESITE

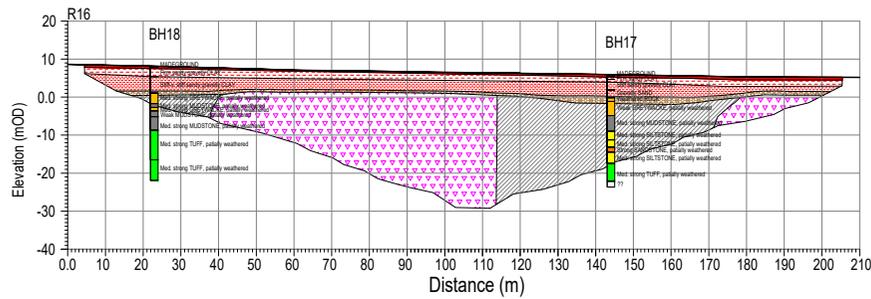
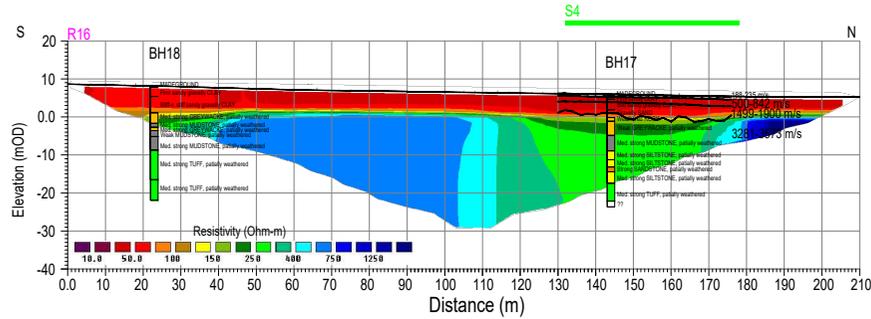
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SCALE:	AS INDICATED @ A4		
DATE:	31-05-2022		
Version:	Date:	Drawn By:	Checked:
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- LEGEND:**
- Seismic refraction layer with interpreted P-wave velocity
 - Soft slightly sandy gravelly SILT/CLAY
 - Soft-Firm slightly sandy gravelly SILT/CLAY
 - Firm-Stiff slightly sandy gravelly SILT/CLAY
 - Soft sandy gravelly SILT/CLAY
 - Soft-Firm sandy gravelly SILT/CLAY
 - Firm-Stiff sandy gravelly SILT/CLAY and/or Moderately-Slightly Weathered ROCK
 - Slightly Weathered BRECCIA
 - Slightly Weathered - Fresh MUDSTONE, SILTSTONE, SANDSTONE, GREYWACKE and/or TUFF
 - Slightly Weathered - Fresh ANDESITE

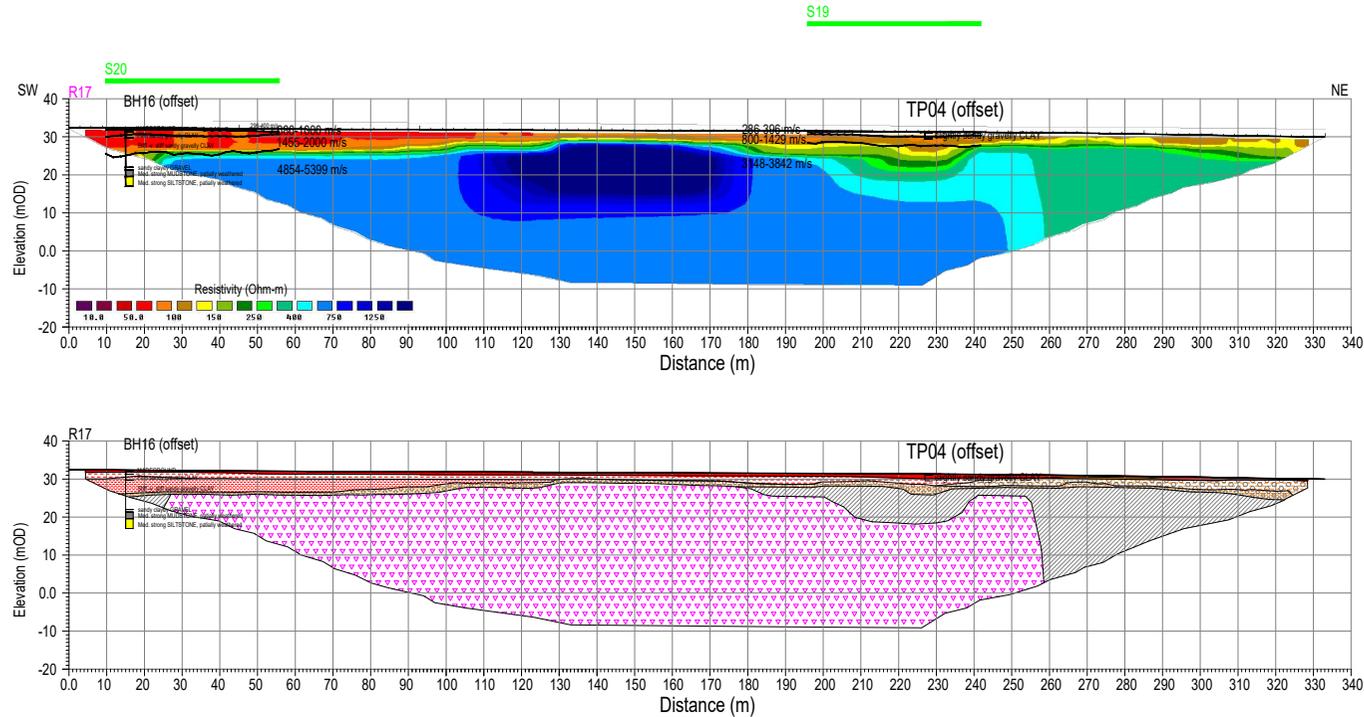
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SCALE:	AS INDICATED @ A4		
DATE:	31-05-2022		
Version:	Date:	Drawn By:	Checked:
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01	13-06-2022	YOC	



- LEGEND:**
- Seismic refraction layer with interpreted P-wave velocity
 - Soft slightly sandy gravelly SILT/CLAY
 - Soft-Firm slightly sandy gravelly SILT/CLAY
 - Firm-Stiff slightly sandy gravelly SILT/CLAY
 - Soft sandy gravelly SILT/CLAY
 - Soft-Firm sandy gravelly SILT/CLAY
 - Firm-Stiff sandy gravelly SILT/CLAY and/or Moderately-Slightly Weathered ROCK
 - Slightly Weathered BRECCIA
 - Slightly Weathered - Fresh MUDSTONE, SILTSTONE, SANDSTONE, GREYWACKE and/or TUFF
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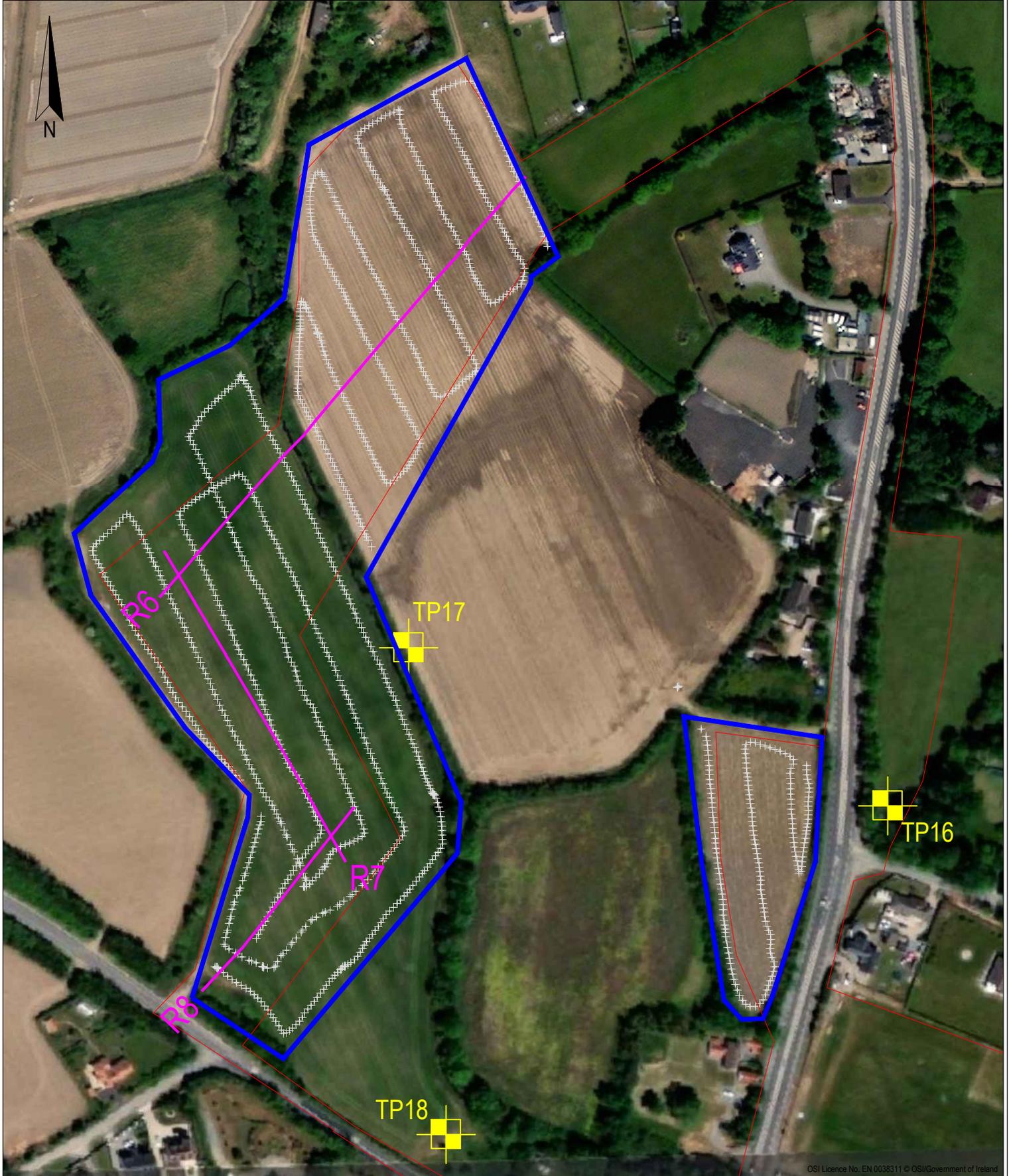
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The information derived from the geophysical investigation at the Blakes Cross sites is presented in the following drawings:

AGP21217_B01	Geophysical Locations – Blakes Cross Site 1	1:2500	@ A4
AGP21217_B02	EM Conductivity Contours – Blakes Cross Site 1	1:2500	@ A4
AGP21217_B03	Summary Interpretation Map – Blakes Cross Site 1	1:2500	@ A4
AGP21217_R6	Blakes Crossing Site 1 Results & Interpretation – ERT R6	1:1250	@ A4
AGP21217_R7	Blakes Crossing Site 1 Results & Interpretation – ERT R7	1:1000	@ A4
AGP21217_R8	Blakes Crossing Site 1 Results & Interpretation – ERT R8	1:1000	@ A4
AGP21217_B04	Geophysical Locations – Blakes Cross Site 2	1:2500	@ A4
AGP21217_B05	EM Conductivity Contours – Blakes Cross Site 2	1:2500	@ A4
AGP21217_B06	Summary Interpretation Map – Blakes Cross Site 2	1:2500	@ A4
AGP21217_R18	Blakes Crossing Site 2 Results & Interpretation – ERT R18	1:1250	@ A4
AGP21217_R19	Blakes Crossing Site 2 Results & Interpretation – ERT R19	1:1000	@ A4



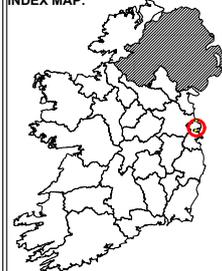
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INDEX MAP:

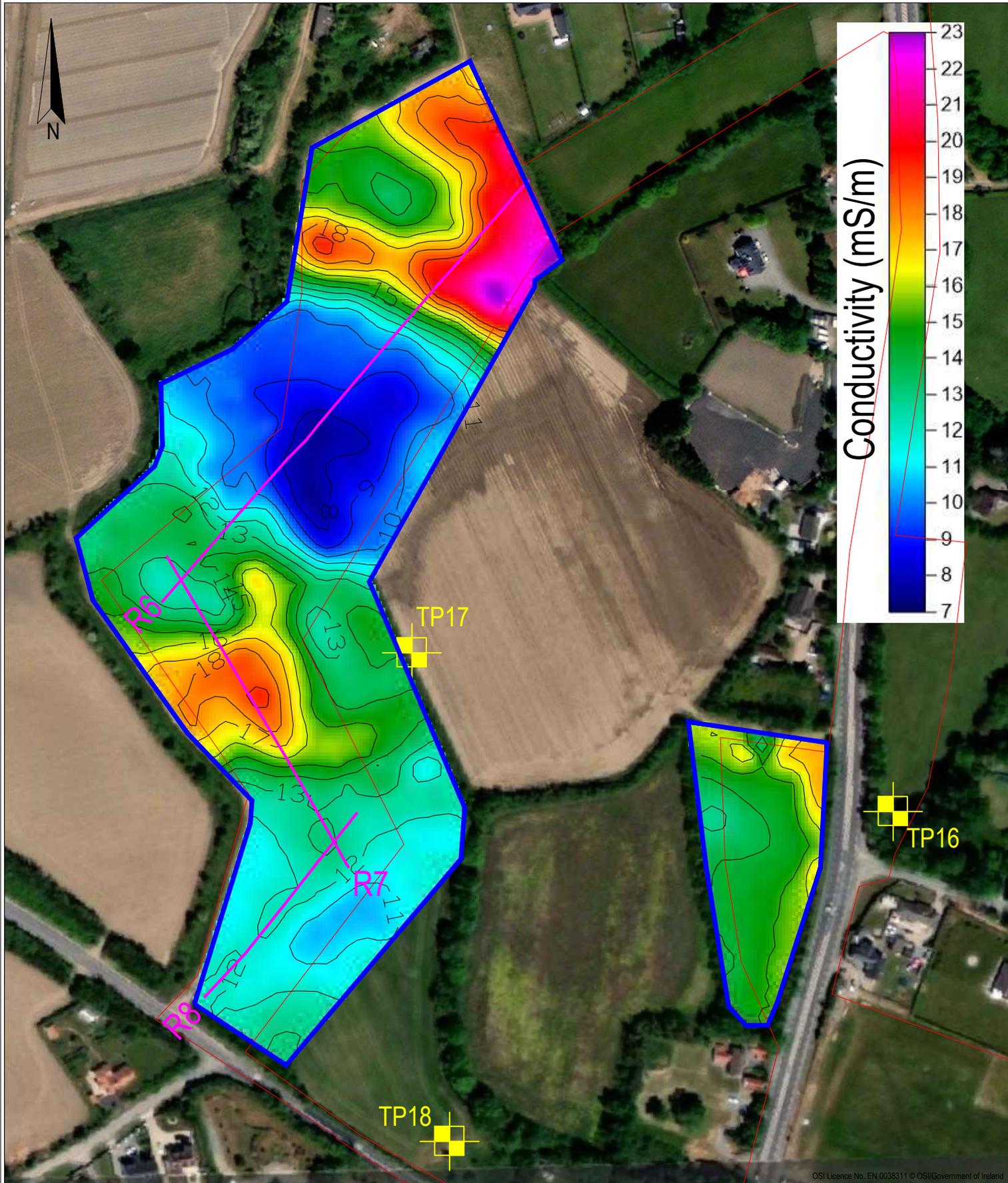


LEGEND:

- Geophysics Boundary
- Proposed Red Line Boundary
- EM conductivity reading
- 2D resistivity profile
- Borehole
- Trial pit

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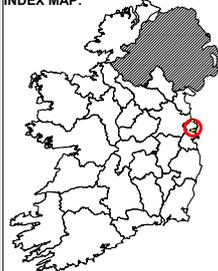
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INDEX MAP:



LEGEND:

- Geophysics Boundary
- Proposed Red Line Boundary
- EM conductivity reading
- 2D resistivity profile
- Borehole
- Trial pit

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DATE: 31-05-2022			
Version:	Date:	Drawn By:	Checked:
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SUMMARY INTERPRETATION MAP - BLAKES CROSS SITE 1

SCALE 1:2500



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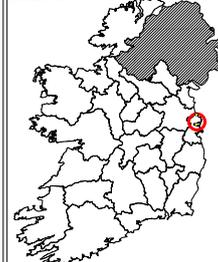
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INDEX MAP:

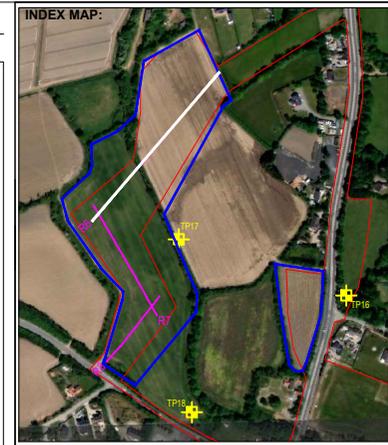
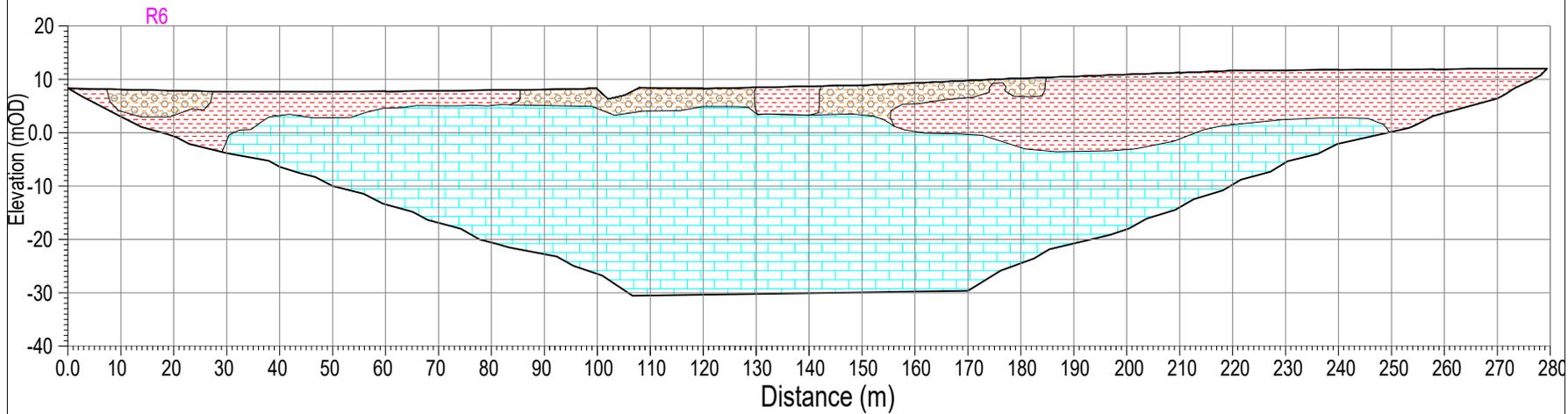
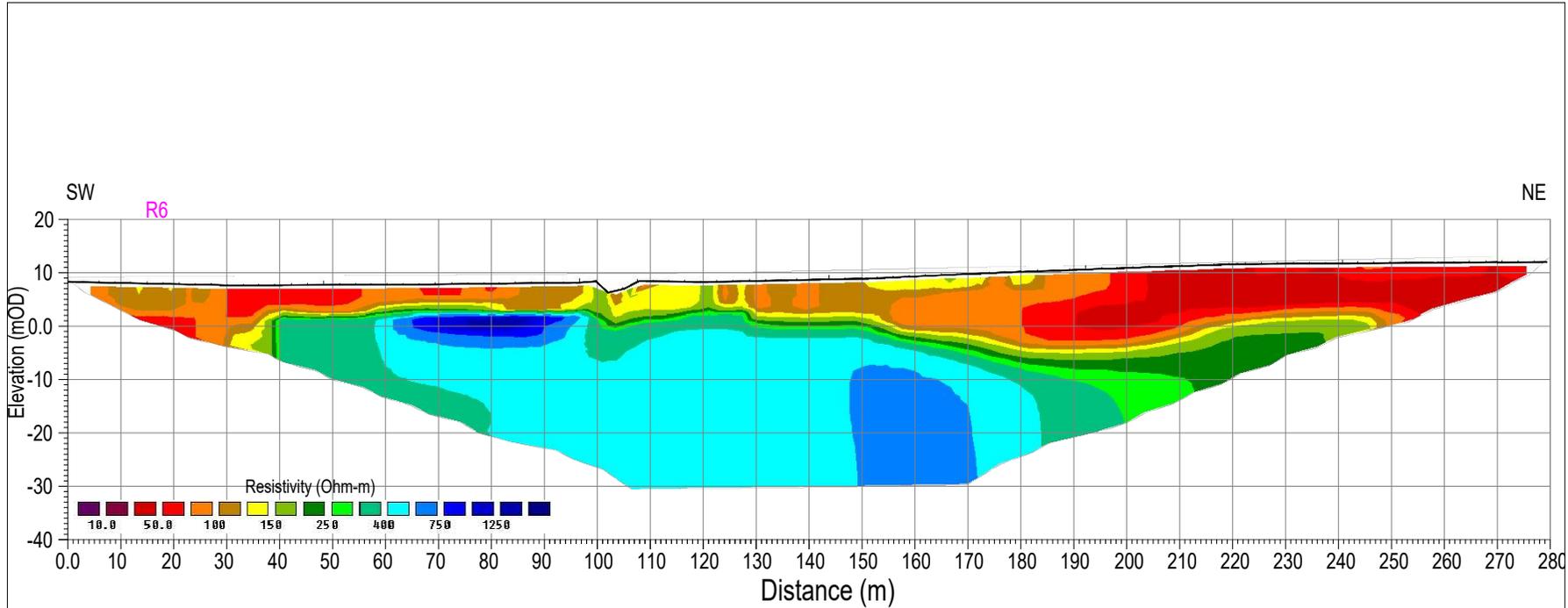


LEGEND:

- Geophysics Boundary
- slightly sandy slightly gravelly SILT/CLAY over bedrock
- sandy gravelly SILT/CLAY over bedrock
- Trial pit

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SCALE:	AS INDICATED @ A4		
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	13-06-2022	YOC	



- LEGEND:**
- Slightly sandy gravelly SILT/CLAY
 - Sandy gravelly SILT/CLAY
 - Muddy LIMESTONE

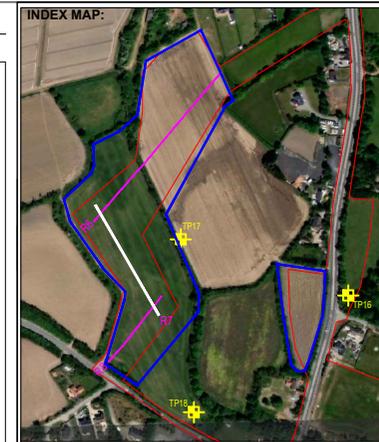
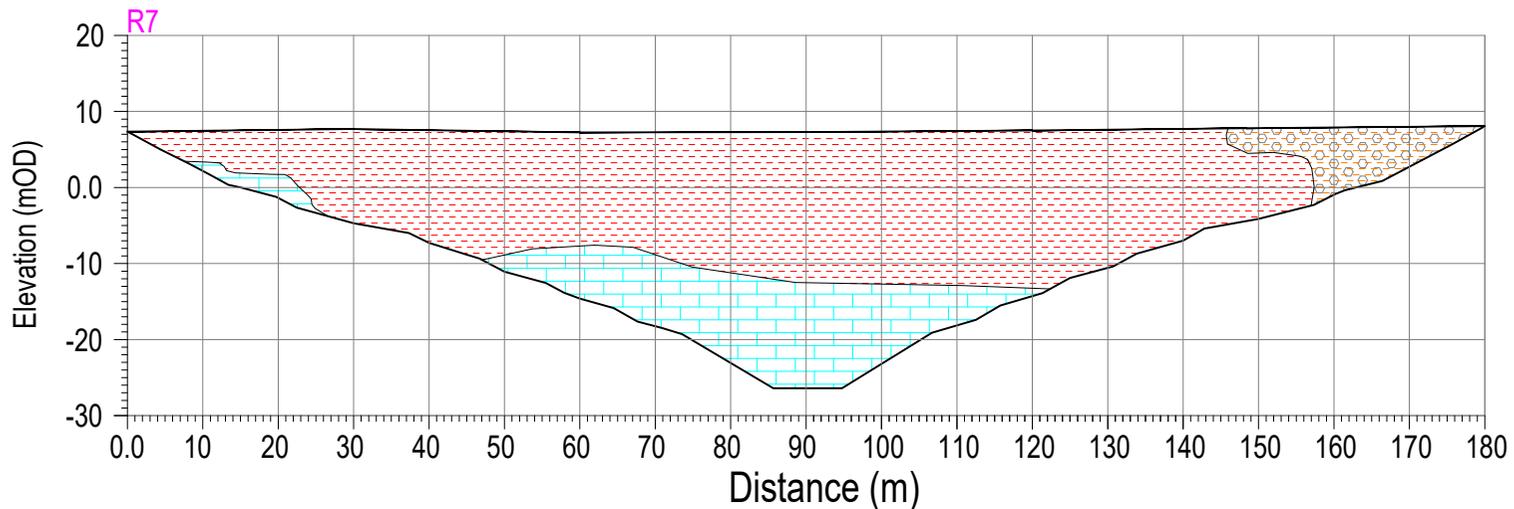
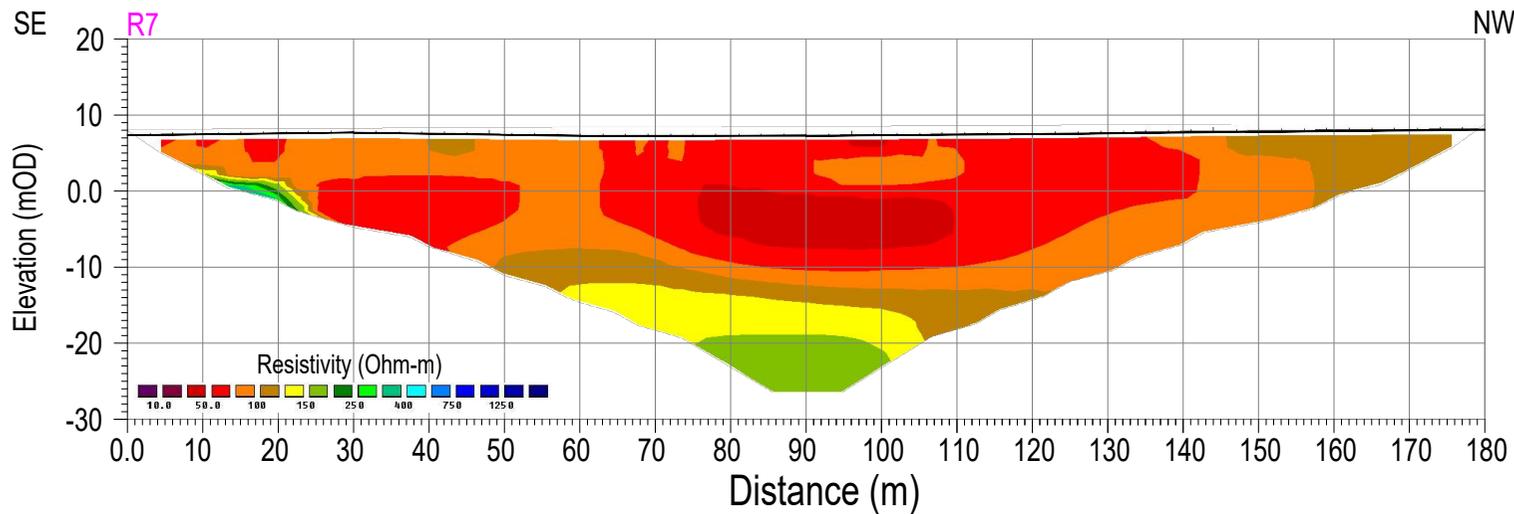
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SCALE:	AS INDICATED @ A4		
DATE:	31-05-2022		
Version:	Date:	Drawn By:	Checked:
Draft	31-05-2022	YOC	TL
01	13-06-2022	YOC	



LEGEND:

- Slightly sandy gravelly SILT/CLAY
- Sandy gravelly SILT/CLAY
- Muddy LIMESTONE

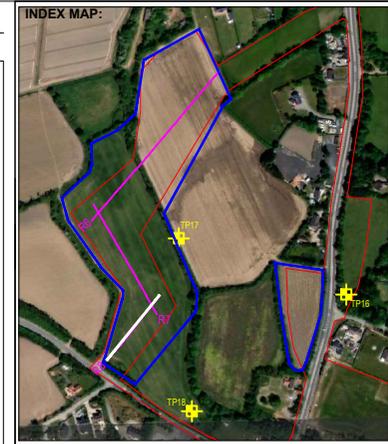
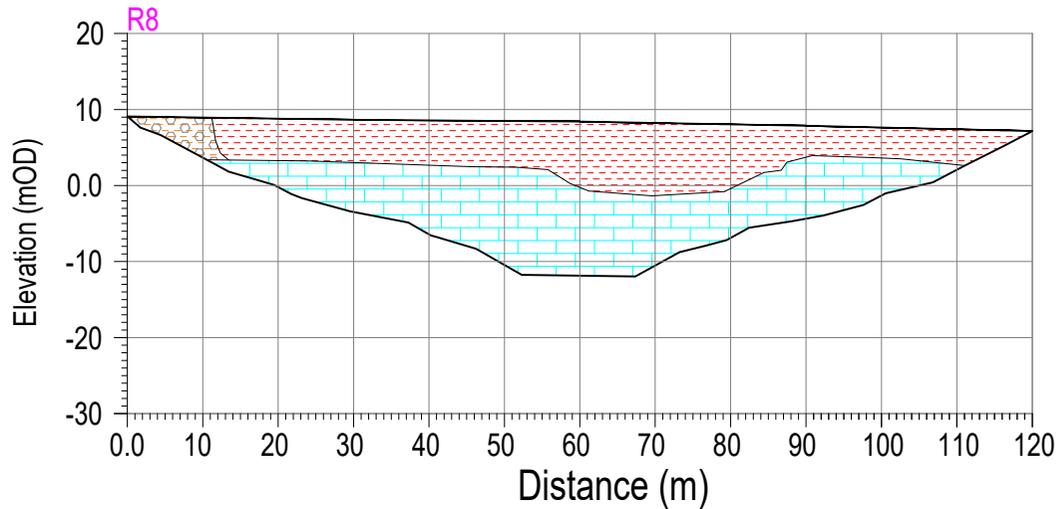
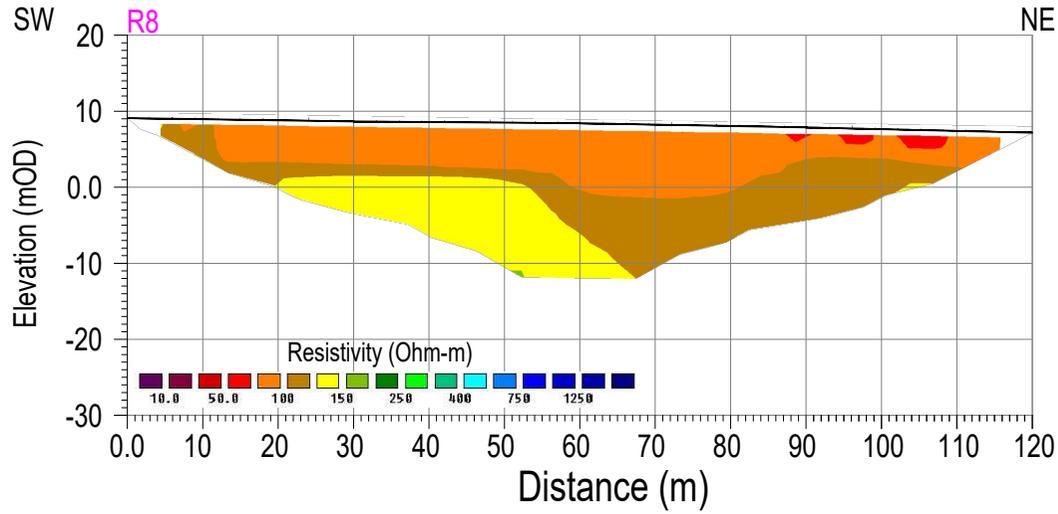
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DRAWING NO:	AGP21217_R7		
SCALE:	AS INDICATED @ A4		
DATE:	31-05-2022		
Version:	Date:	Drawn By:	Checked:
Draft	31-05-2022	YOC	TL
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- LEGEND:**
- Slightly sandy gravelly SILT/CLAY
 - Sandy gravelly SILT/CLAY
 - Muddy LIMESTONE

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SCALE:	AS INDICATED @ A4		
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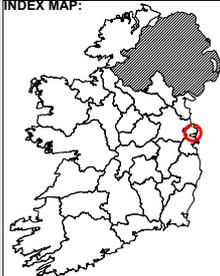
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INDEX MAP:



LEGEND:

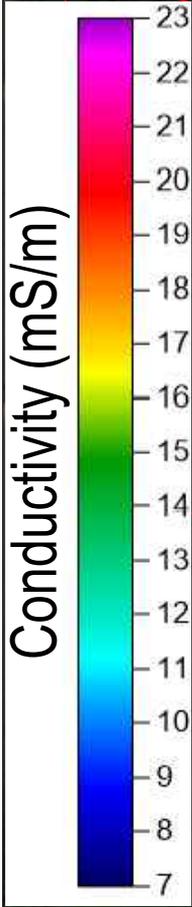
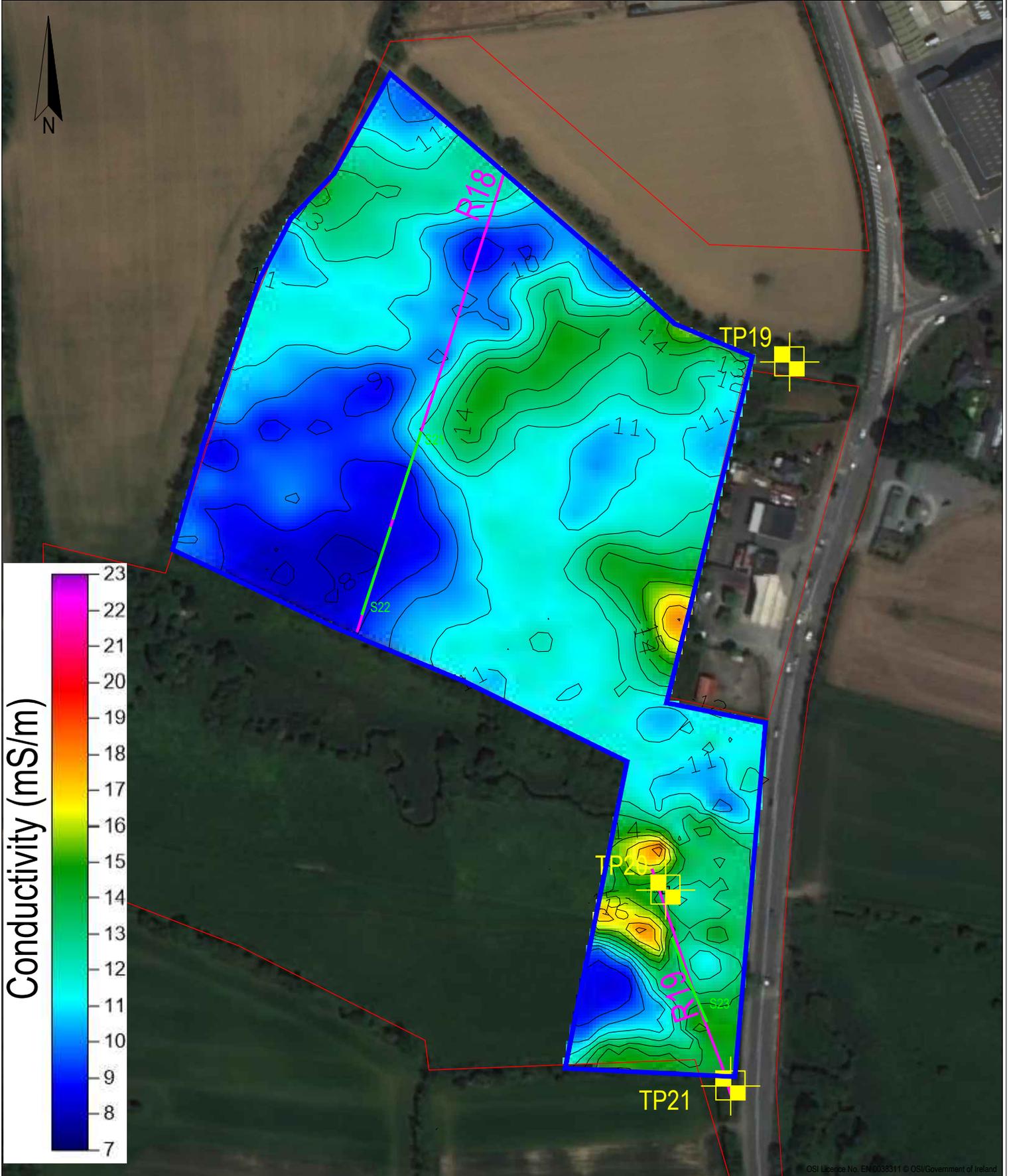
- Geophysics Boundary
- Proposed Red Line Boundary
- EM conductivity reading
- 2D resistivity profile
- Seismic refraction profile
- Borehole
- Trial pit

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SCALE: AS INDICATED @ A4			
DATE: 31-05-2022			
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Draft 01	31-05-2022	YOC	TL
	13-06-2022	YOC	

EM CONDUCTIVITY CONTOURS - BLAKES CROSS SITE 2

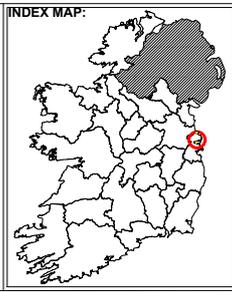
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LEGEND:

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- EM conductivity reading
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SUMMARY INTERPRETATION MAP - BLAKES CROSS SITE 2

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INDEX MAP:

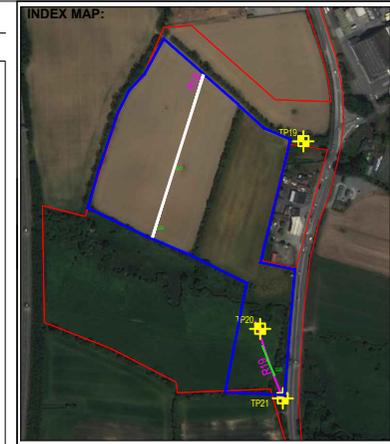
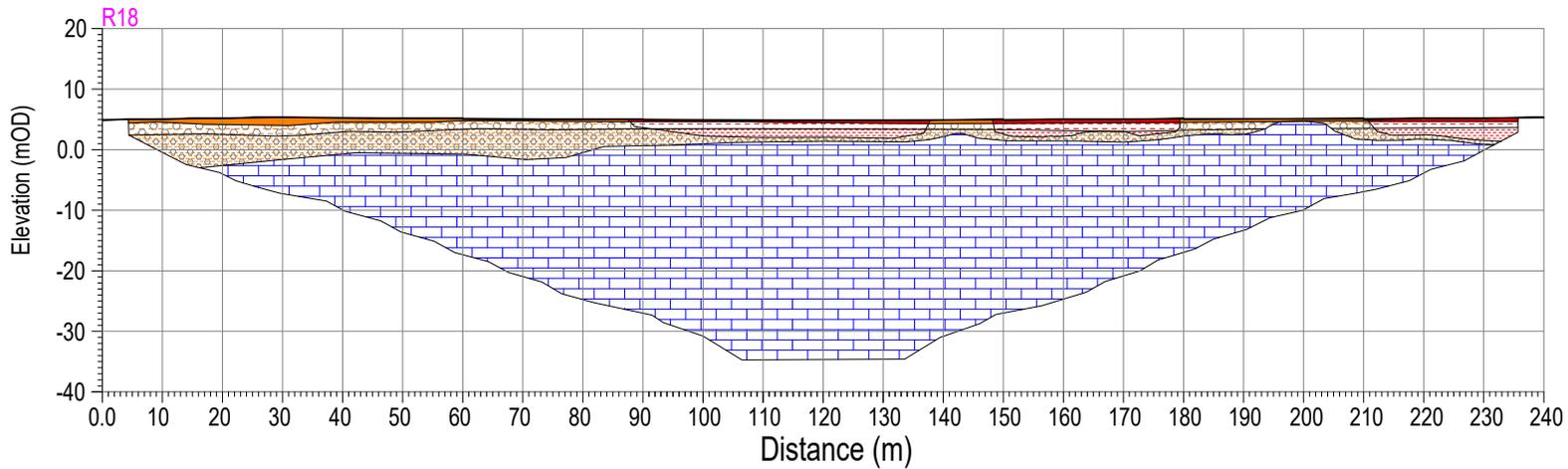
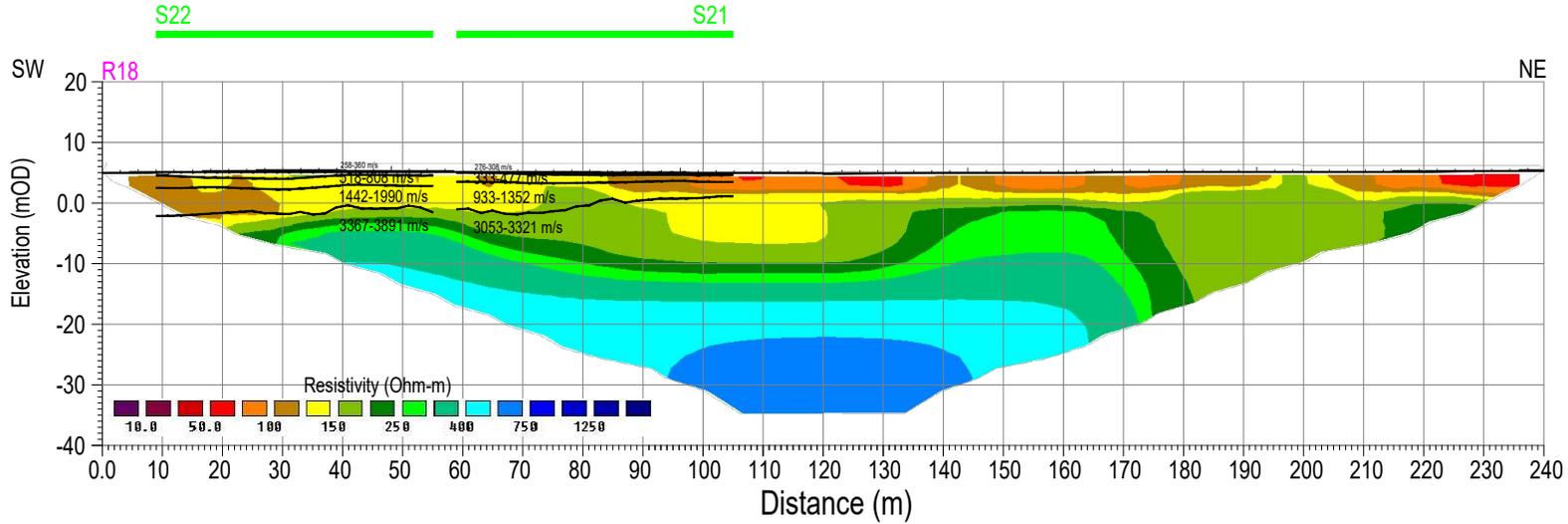


LEGEND:

- Geophysics Boundary
- ≤ 2 m slightly sandy slightly gravelly SILT/CLAY over bedrock
- 2-4 m slightly sandy slightly gravelly SILT/CLAY over sandy gravelly SILT/CLAY over bedrock
- 4-6 m slightly sandy slightly gravelly SILT/CLAY over sandy gravelly SILT/CLAY over bedrock
- ≥ 6 m sandy gravelly SILT/CLAY over bedrock
- Trial pit

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CLIENT:	STATKRAFT		
DRAWING NO:	AGP21217_B06		
SCALE:	AS INDICATED @ A4		
DATE:	31-05-2022		
Version:	Date:	Drawn By:	Checked:
Draft	31-05-2022	YOC	TL
01	13-06-2022	YOC	



- LEGEND:**
- Seismic refraction layer with interpreted P-wave velocity
 - Soft slightly sandy gravelly SILT/CLAY
 - Firm slightly sandy gravelly SILT/CLAY
 - Stiff-Very stiff slightly sandy gravelly SILT/CLAY
 - Soft sandy gravelly SILT/CLAY
 - Firm sandy gravelly SILT/CLAY
 - Stiff-Very stiff sandy gravelly SILT/CLAY
 - Slightly Weathered - Fresh LIMESTONE/SHALE

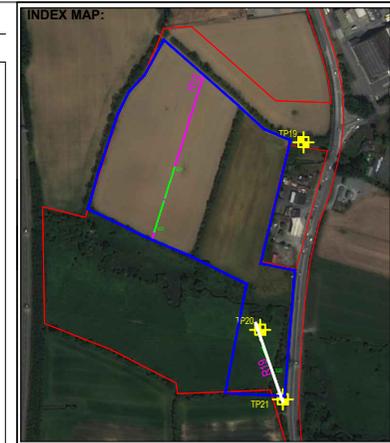
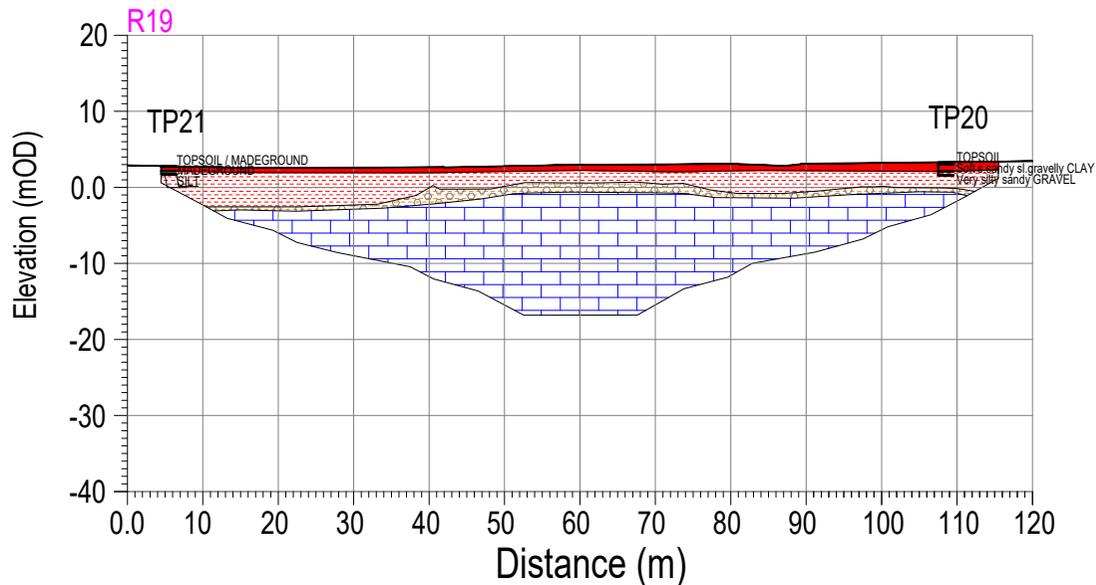
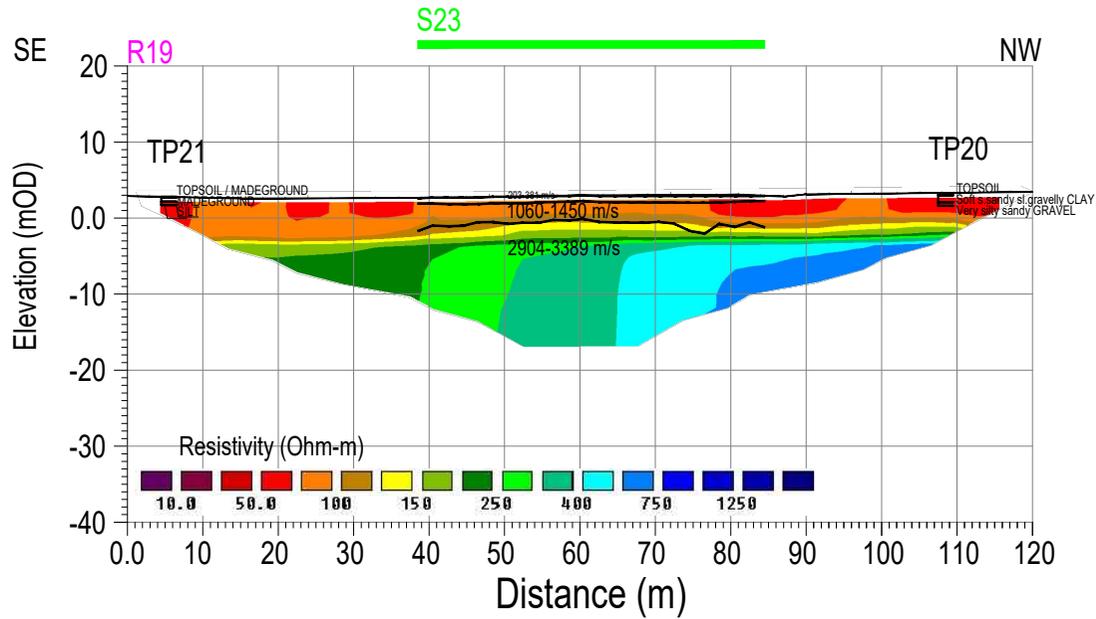
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PROJECT:	NORTH IRISH SEA ARRAY ONSHORE CABLE ROUTE - GEOPHYSICAL SURVEY		
CLIENT:	STATKRAFT		
DRAWING NO:	AGP21217_R18		
SCALE:	AS INDICATED @ A4		
DATE:	31-05-2022		
Version:	Date:	Drawn By:	Checked:
Draft	31-05-2022	YOC	TL
01	13-06-2022	YOC	



- LEGEND:**
- Seismic refraction layer with interpreted P-wave velocity
 - Soft slightly sandy gravelly SILT/CLAY
 - Firm slightly sandy gravelly SILT/CLAY
 - Stiff-Very stiff slightly sandy gravelly SILT/CLAY
 - Soft sandy gravelly SILT/CLAY
 - Firm sandy gravelly SILT/CLAY
 - Stiff-Very stiff sandy gravelly SILT/CLAY
 - Slightly Weathered - Fresh LIMESTONE/SHALE

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PROJECT: NORTH IRISH SEA ARRAY ONSHORE CABLE ROUTE - GEOPHYSICAL SURVEY

CLIENT: STATKRAFT

DRAWING NO: AGP21217_R19

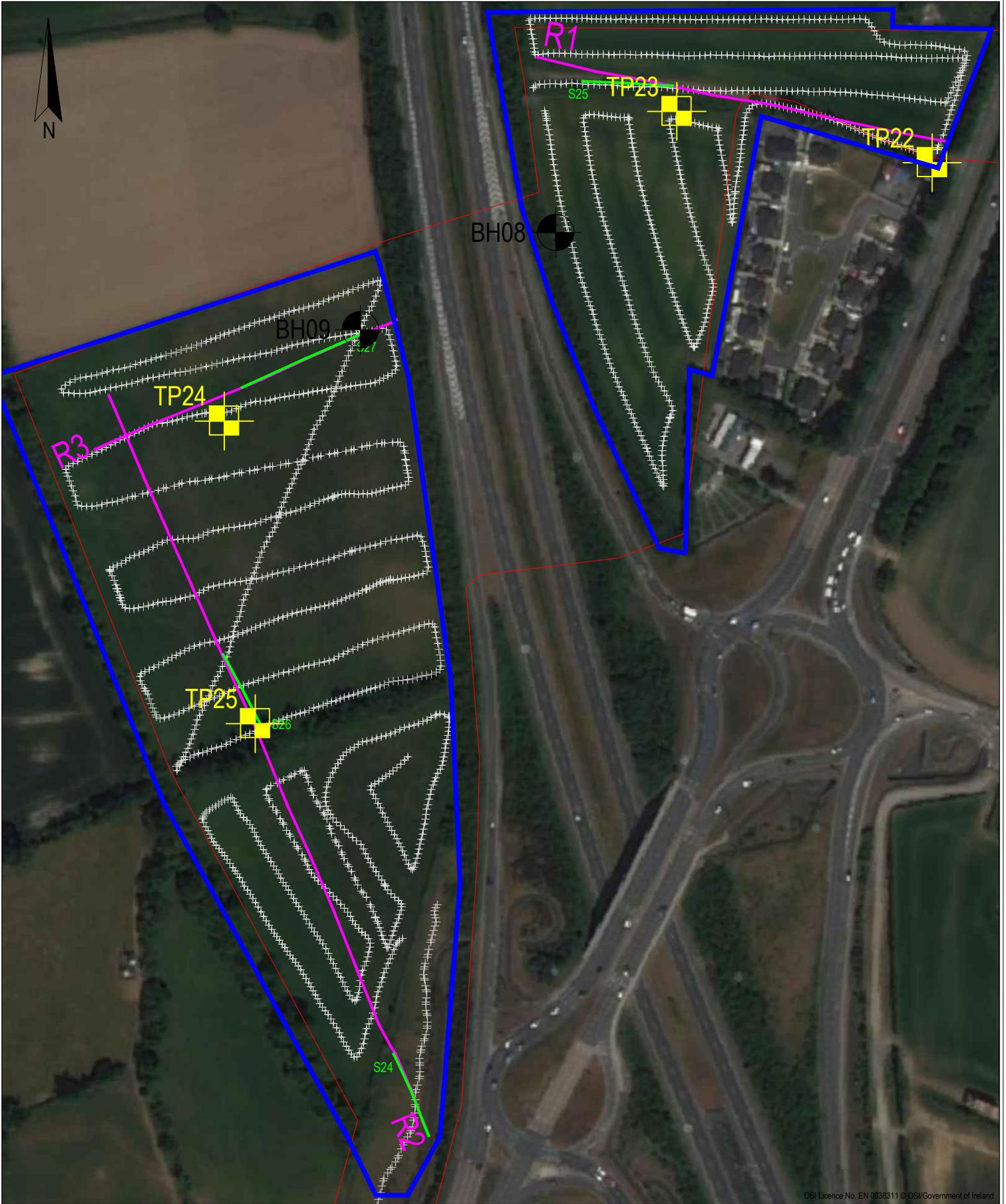
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DATE: 31-05-2022

Version:	Date:	Drawn By:	Checked:
Draft	31-05-2022	YOC	TL
01	13-06-2022	YOC	

The information derived from the geophysical investigation at the M1 Crossing sites is presented in the following drawings:

AGP21217_M01	Geophysical Locations – M1 Crossing Site	1:2500	@ A4
AGP21217_M02	EM Conductivity Contours – M1 Crossing Site 1	1:2500	@ A4
AGP21217_M03	Summary Interpretation Map – M1 Crossing Site 1	1:2500	@ A4
AGP21217_R1	M1 Crossing Results & Interpretation – ERT R1	1:1000	@ A4
AGP21217_R2	M1 Crossing Results & Interpretation – ERT R2	1:2000	@ A4
AGP21217_R3	M1 Crossing Results & Interpretation – ERT R3	1:1000	@ A4



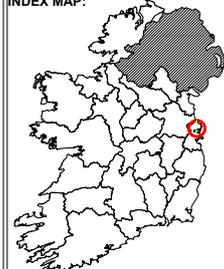
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INDEX MAP:

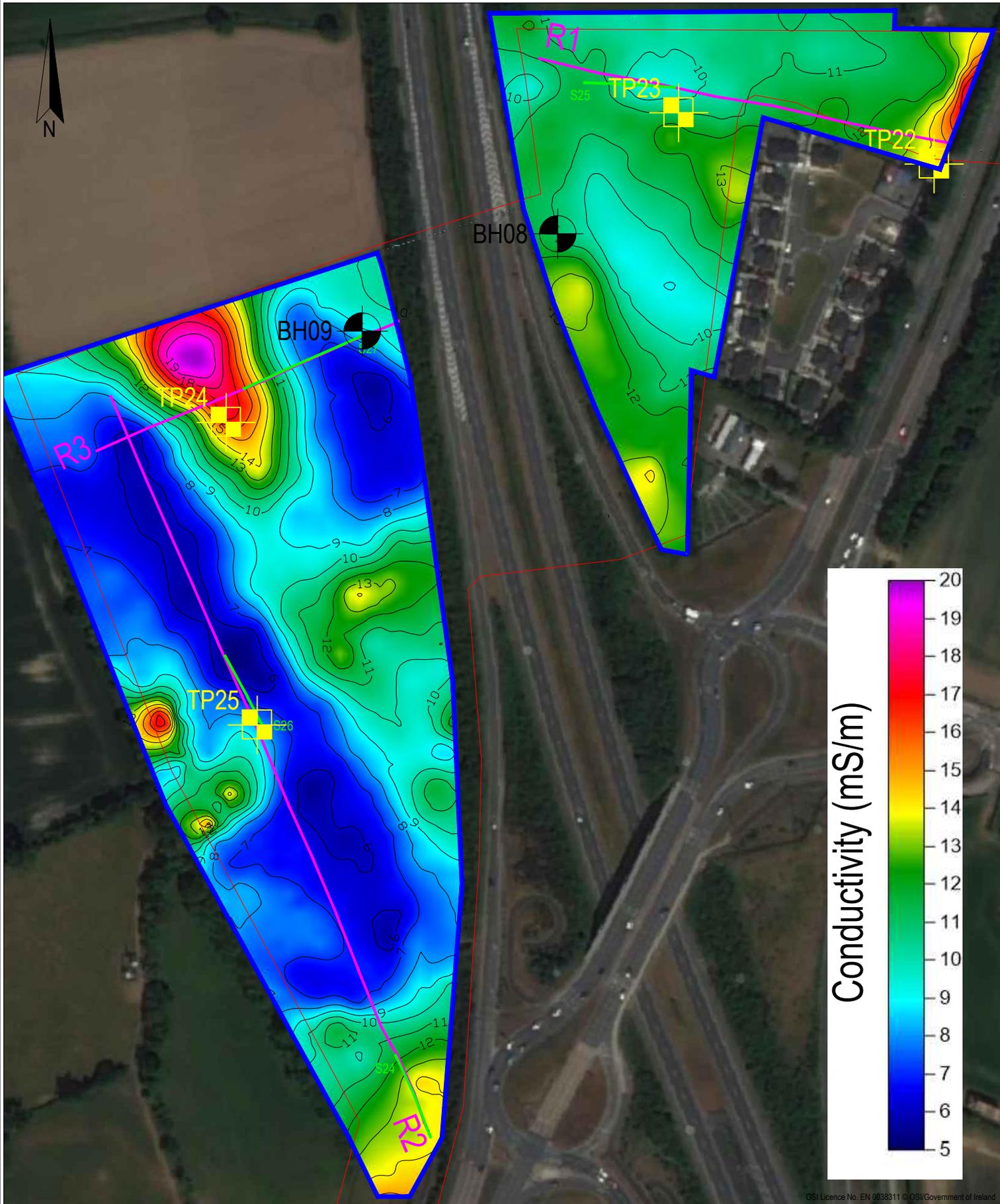


LEGEND:

- Geophysics Boundary
- Proposed Red Line Boundary
- EM conductivity reading
- 2D resistivity profile
- Seismic refraction profile
- Borehole
- Trial pit

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Report on the Geophysical Investigation for the North Irish Sea Array Cable Route
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PROJECT:		NORTH IRISH SEA ARRAY ONSHORE CABLE ROUTE - GEOPHYSICAL SURVEY	
CLIENT:		STATKRAFT	
DRAWING NO:		AGP21217_M01	
SCALE:		AS INDICATED @ A4	
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INDEX MAP:



LEGEND:

- Geophysics Boundary
- Proposed Red Line Boundary
- EM conductivity reading
- 2D resistivity profile
- Seismic refraction profile
- Borehole
- Trial pit

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PROJECT: NORTH IRISH SEA ARRAY ONSHORE CABLE
ROUTE - GEOPHYSICAL SURVEY

CLIENT: STATKRAFT

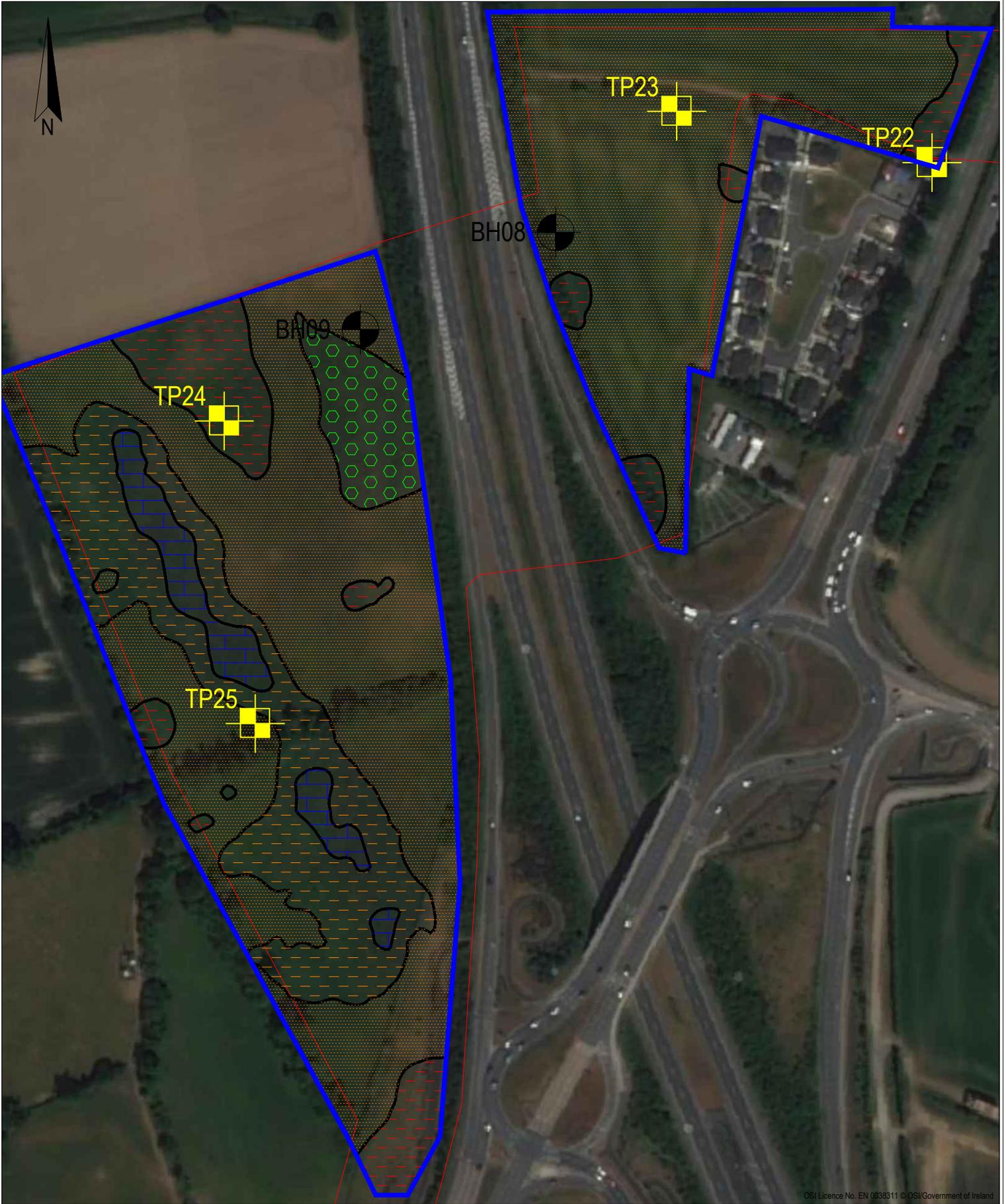
DRAWING NO: AGP21217_M02

SCALE: AS INDICATED @ A4

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INDEX MAP:

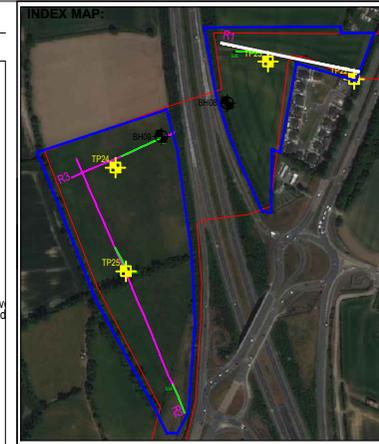
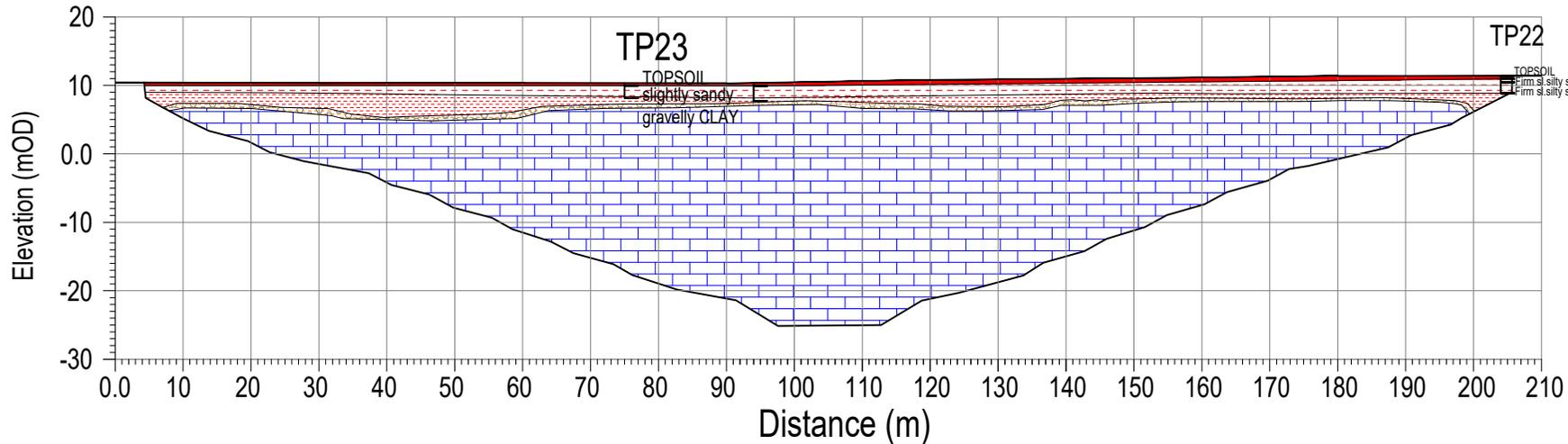
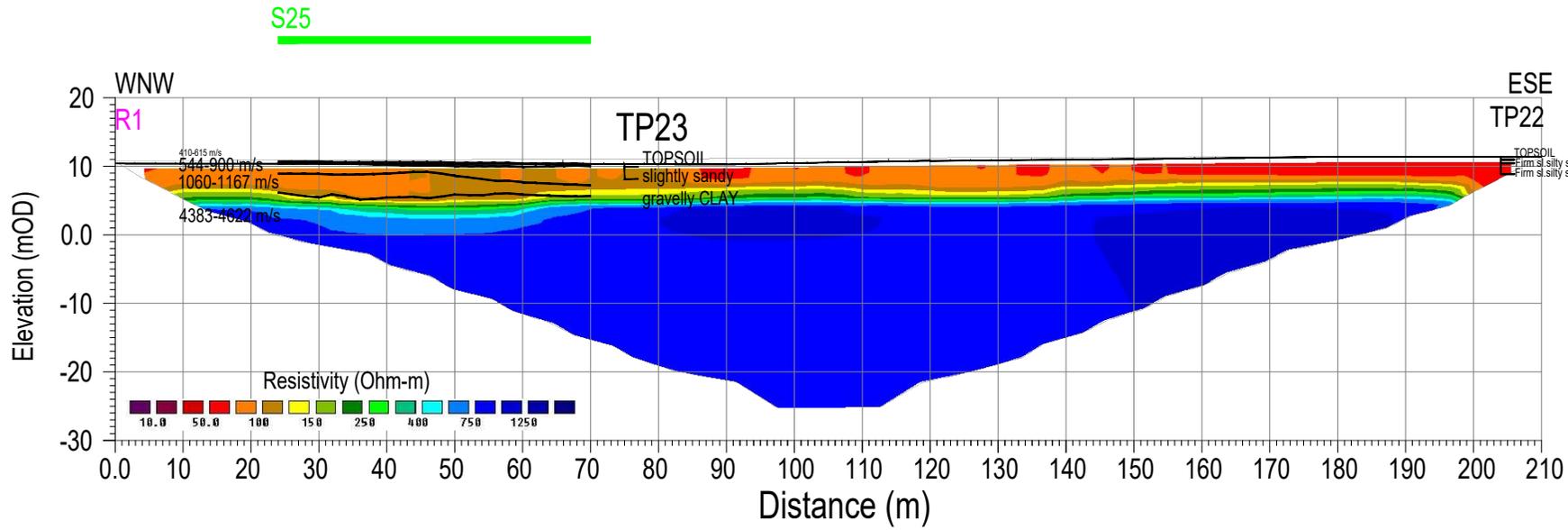


LEGEND:

- ≤ 2 m slightly sandy slightly gravelly SILT/CLAY and sandy gravelly SILT/CLAY over bedrock
- 2-4 m slightly sandy slightly gravelly SILT/CLAY and sandy gravelly SILT/CLAY over bedrock
- > 4 m slightly sandy slightly gravelly SILT/CLAY and sandy gravelly SILT/CLAY over bedrock
- 2-4 m silty clayey SAND/GRAVEL over sandy gravelly SILT/CLAY over bedrock
- > 4 m slightly sandy slightly gravelly SILT/CLAY over bedrock

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SCALE:	AS INDICATED @ A4		
DATE:	31-05-2022		
Version:	Date:	Drawn By:	Checked:
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- LEGEND:**
- Seismic refraction layer with interpreted P-wave velocity
 - Soft-Firm slightly sandy gravelly SILT/CLAY
 - Firm slightly sandy gravelly SILT/CLAY
 - Stiff slightly sandy gravelly SILT/CLAY
 - Soft-Firm sandy gravelly SILT/CLAY
 - Firm sandy gravelly SILT/CLAY
 - Stiff sandy gravelly SILT/CLAY
 - Loose-Med. dense silty clayey SAND/GRAVEL
 - Med. dense silty clayey SAND/GRAVEL
 - Slightly Weathered - Fresh SHALE
 - Slightly Weathered - Fresh LIMESTONE/SHALE

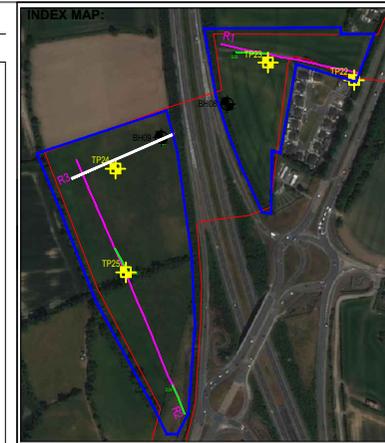
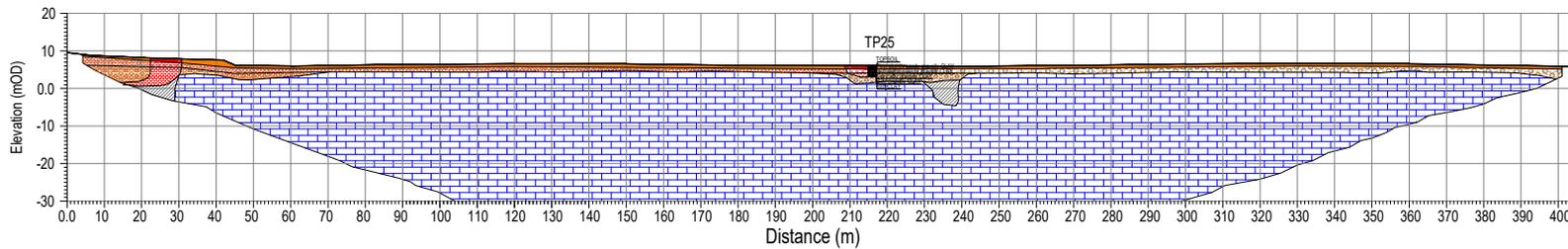
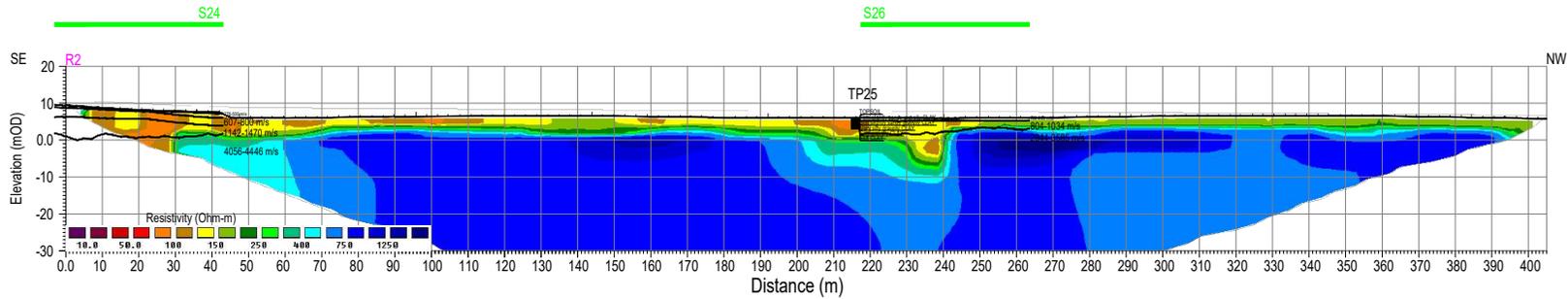
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DRAWING NO:	AGP21217_R1		
SCALE:	AS INDICATED @ A4		
DATE:	31-05-2022		
Version:	Date:	Drawn By:	Checked:
Draft	31-05-2022	YOC	TL
01	13-06-2022	YOC	



- LEGEND:**
- Seismic refraction layer with interpreted P-wave velocity
 - Soft-Firm slightly sandy gravelly SILT/CLAY
 - Firm slightly sandy gravelly SILT/CLAY
 - Stiff slightly sandy gravelly SILT/CLAY
 - Soft-Firm sandy gravelly SILT/CLAY
 - Firm sandy gravelly SILT/CLAY
 - Stiff sandy gravelly SILT/CLAY
 - Loose-Med. dense silty clayey SAND/GRAVEL
 - Med. dense silty clayey SAND/GRAVEL
 - Slightly Weathered - Fresh SHALE
 - Slightly Weathered - Fresh LIMESTONE/SHALE

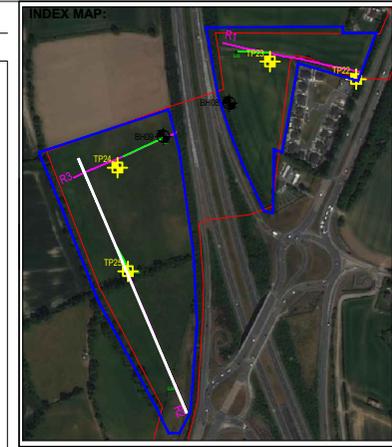
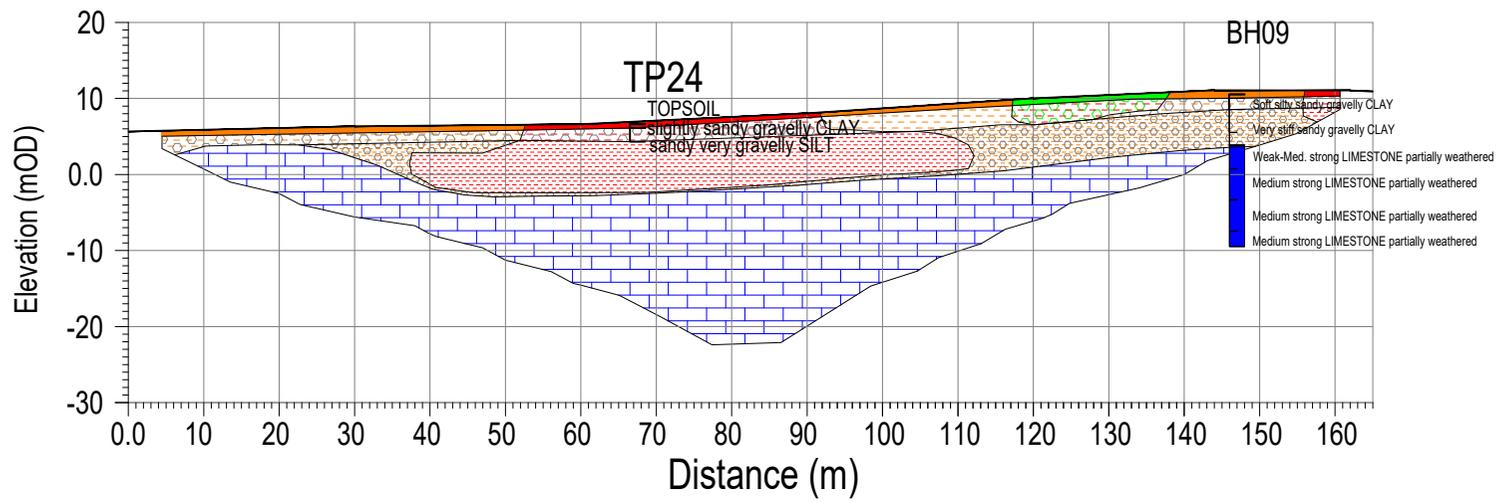
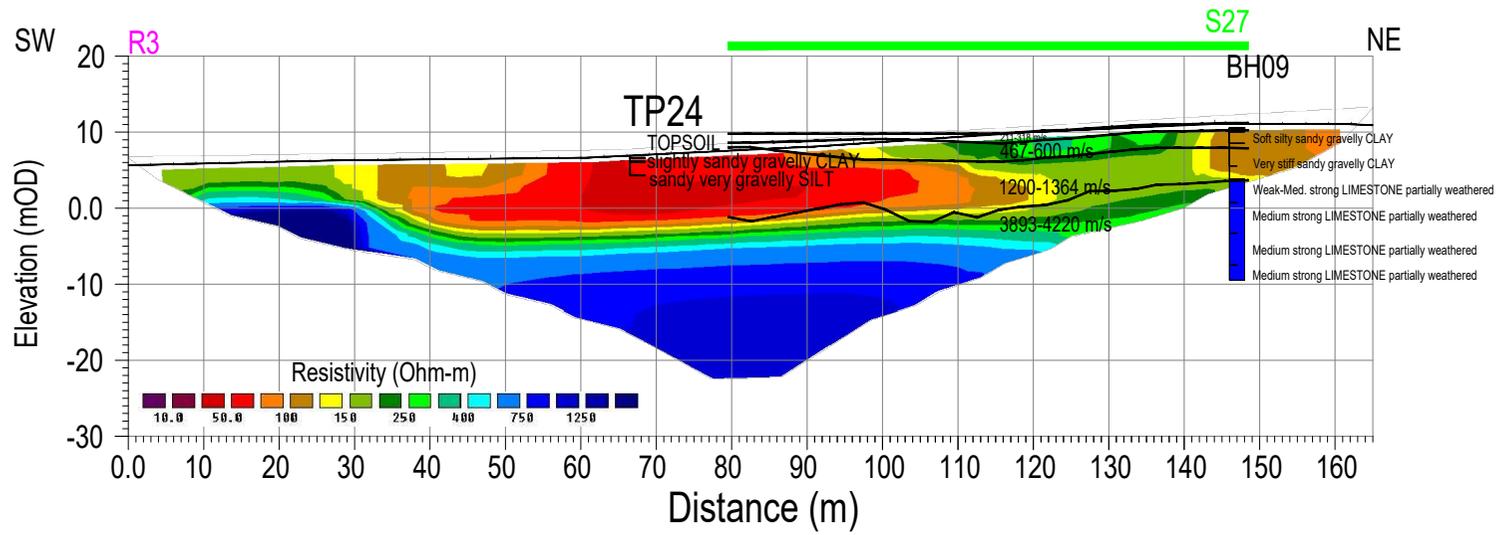
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PROJECT: NORTH IRISH SEA ARRAY ONSHORE CABLE ROUTE - GEOPHYSICAL SURVEY			
CLIENT: STATKRAFT			
DRAWING NO: AGP21217_R2			
SCALE: AS INDICATED @ A4			
DATE: 31-05-2022			
Version:	Date:	Drawn By:	Checked:
Draft	31-05-2022	YOC	TL
01	13-06-2022	YOC	



- LEGEND:**
- Seismic refraction layer with interpreted P-wave velocity
 - Soft-Firm slightly sandy gravelly SILT/CLAY
 - Firm slightly sandy gravelly SILT/CLAY
 - Stiff slightly sandy gravelly SILT/CLAY
 - Soft-Firm sandy gravelly SILT/CLAY
 - Firm sandy gravelly SILT/CLAY
 - Stiff sandy gravelly SILT/CLAY
 - Loose-Med. dense silty clayey SAND/GRAVEL
 - Med. dense silty clayey SAND/GRAVEL
 - Slightly Weathered - Fresh SHALE
 - Slightly Weathered - Fresh LIMESTONE/SHALE

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CLIENT:	STATKRAFT		
DRAWING NO:	AGP21217_R3		
SCALE:	AS INDICATED @ A4		
DATE:	31-05-2022		
Version:	Date:	Drawn By:	Checked:
Draft	31-05-2022	YOC	TL
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