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Wyndham Place, Egremont: Ground Investigation Report

1.1 Commission

Hydrock Consultants Limited were commissioned by Aldi Stores Limited (the Client) to carry out a preliminary ground investigation for a site located off Wyndham Place, Egremont, Cumbria. This report highlights potential ground related environmental and geotechnical considerations in relation to the proposed development which includes the construction of a new Aldi store with associated car parking, service yard and soft landscaping as shown on the proposed site plan included in Appendix A.

1.2 Limitations

It should be noted, large derelict buildings occupied approximately 30 percent of the site and access was prohibited during the ground investigation works. Due to this, it is recommended that further Phase 2 ground investigation works will be required to target this area of the site, following demolition of the buildings.

In addition, due to the presence of a number of below ground services running across the site (in particular across the northern site area along with the presence of underground fuel storage tanks, investigation works were limited to areas which were absent of these features.

1.3 Objectives

This preliminary ground investigation report has been produced to provide an initial assessment of potential geotechnical and environmental conditions and constraints at the site to assist with providing an assessment of potential abnormals associated with the site and to aid with the design of the development.

A Phase I Geo-environmental Assessment (Desk Study) was previously for the site by 3E Consulting Engineers Limited in September 2021 (report ref: P21-171/P1) and it is recommended that this report be read in conjunction with this assessment.

The objectives of this assessment are:

- to provide a preliminary assessment to determine potential risks posed by any ground or groundwater contamination and to identify any geo-environmental mitigation requirements to enable development to progress.
- to provide a preliminary assessment of the risk posed by hazardous ground gases.
- To provide a preliminary assessment on off-site disposal characterisation of materials on the site.
- to provide advice and preliminary geotechnical recommendations for design.

2. Location and Description

The site, centred on National Grid Reference 301180, 511080, approximately 500m north of Egremont town centre.

The site is roughly rectangular in shape and is located directly south west of Wyndham Place, south of East Road and north east of Egremont Bypass (A595) with a roundabout directly to the north west of the site at the junction of East Road and Egremont Bypass.

The site is occupied by a vacant petrol filling station in the north, with garages associated with vehicle maintenance garage and a car showroom and yard to the south. The site appears to be tiered with the petrol filling station level with the adjacent roundabout to the north, with ramps to both the east and west allowing access to the garages and showroom at a level approximately 2m lower. A plan of the petrol filling station infrastructure has identified there are two 9000 gallon tanks to the north west of the pump islands and two smaller tanks (assumed to be 3000 gallon tanks based on the rough dimensions). A copy of the petrol filling station infrastructure plan is included as Drawing G0002 included in Appendix A. Car wash bays are present to the rear of the petrol filling station and north-east of the existing garage (MOT, service and repair / showroom).

The majority of site appears to be covered in concrete and coated macadam with palisade enclosed yard in the south surfaced with gravel hardstanding. The site is bound by timber post and rail fence in the east with an access point off Wyndham Place half way along the boundary. The northern end of the site is open where access is made to the petrol filling station and the north western boundary is formed by a highway retaining wall with metal rail fencing on top with the south western boundary formed with semi mature and mature trees.

The adjacent land use is as follows:

- North: East Road and Wyndham Place with housing and open land beyond.
- East: Wyndham Place with residential properties beyond.
- West: Egremont Bypass with shops, a car park and residential properties
- beyond.
- South: Residential properties.

3. Scope of Ground Investigation Works

The ground investigation works were completed within areas of the site which were accessible at the time of the investigation and comprised the following:

- 9 no. mini-percussive borehole (WS01, WS05, WS06, WS07, WS08, WS09, WS10, WS12 and WS13)
- 8 no. Continuous Penetration Tests (CPT) (CPT01 to CPT03 and CPT05 to CPT09)
- 7 no. combined gas and groundwater monitoring wells, installed at the locations of WS01, Ws06, WS07, WS08, WS09, WS12 & WS13.
- Appropriate laboratory geotechnical and chemical testing.

The above scope of works was specifically designed to aid in providing an assessment of potential environmental and geotechnical constraints associated with the site.

Any diagram or opinion relating to site geology, contamination or other spatially variable features between or beyond investigation positions is conjectural and provided for guidance only. Confirmation of ground conditions between exploratory holes should be undertaken if deemed necessary. Evaluation of ground gas and groundwater is based on observations made at the time of the investigation and any monitoring visits, and it should be noted that levels may vary due to seasonal effects.

4. Ground Conditions

A summary of the ground profile encountered during the investigation is summarised below. However, it should be noted that there is a potential for some local variation across the site and reference should be made to individual exploratory hole records.

The exploratory hole locations are included on Drawing G0002 included in Appendix A, whilst exploratory hole record sheets for the ground investigation works undertaken on the site by Hydrock are included in Appendix B.

All depths recorded are taken from below existing ground level whilst also taking into account existing access constraints and making allowance for buried utilities. Fieldwork and soil descriptions were carried out in general accordance with BS5930:2015+A1:2020 'Code of Practice for Ground Investigations', BS EN ISO 14688-1, BS EN ISO 14689-1 and BS10175:2011+A2:2017 'Investigation of Potentially Contaminated Sites – Code of Practice'.

4.1 Hardstanding

Concrete hardstanding was recorded at WS01 and WS06 at thicknesses of between 0.15m and 0.25m and noted to be reinforced within WS01 located within the forecourt area of the former fuel filling station. WS06 was positioned to target a bay formerly used for jet washing vehicles.

During the ground investigation works, tarmacadam hardstanding was recorded at the locations of WS05, WS07, WS08, WS09 and WS10 within external areas of the site (out-with the former forecourt area and jet wash bays) to recorded depths of between 0.10m and 0.13m.

4.2 Made Ground

Made ground underlying areas of hardstanding across the former fuel filling station and garage was noted to generally comprise greyish beige / beige sandy gravel of limestone with occasional cobbles (sub-base) to depths of between 0.30m and 1.30m. Within boreholes where hardstanding was noted to be absent (i.e. across the southern site area), made ground was initially recorded to comprise grey sandy gravel of concrete and mudstone to a depth of 0.60m.

The made ground materials recorded to underlie the initial surfacing and sub-base materials generally comprised a mixture reworked gravelly clays and gravelly sands with mudstone, sandstone, limestone, coal, clinker brick and concrete recorded to depths of between 0.30m and >3.55m. Localised pockets of ashy sand made ground containing coal and clinker were recorded within WS09 and WS13, located across the central and southern site area where made ground materials were generally noted to be greatest in thickness, likely associated with a build-up in site levels across these areas to facilitate the existing development.

Within WS10, a possible former roadway was recorded between 0.30m and 0.40m, whereas a silt band containing paper waste and desiccated roots was identified between 2.00m and >2.40m.

4.3 Superficial Deposits

Across the northern and north-western site area (WS01,WS07 and WS08), superficial deposits (likely Glacio-fluvial deposits) comprising medium dense gravelly sands and silty sandy gravels with mudstone, sandstone and limestone were recorded from depths of between 0.30m and 1.70m to depths in excess of 2.50m and in excess of 5.00m.

Natural superficial deposits encountered across the remaining exploratory holes generally comprised mixed deposits of gravelly sand, silty sands and soft and firm gravelly clays recorded to depths in excess of 5.00m (likely River Terrace Gravel deposits). Within Ws05, immediately underlying the made ground at a depth of 1.30m, soft to firm sandy organic silt was noted with a slight organic odour to a depth of 2.00m, with this considered to potentially represent a relic topsoil layer.

From the findings of the CPT's targeted within the proposed building footprint refusal of testing equipment also occurred at depths of between 4.50m and 11.90m, with these considered likely to be associated with dense superficial deposits or cobbles / boulders within the natural soil strata.

4.4 Obstructions

Sub-surface obstructions were encountered in a number of borehole locations during the investigation works as summarised in Table 4.1.

Table 4.1: Sub-Surface Obstructions

Location	Depth (**m** bgl)	Description
Ws07	3.00	Refusal of sampling equipment on possible obstruction
Ws10	0.30 – 0.40	Tarmac (possible former road)
Ws10	0.70	Obstruction within made ground during excavation of inspection pit.
WS13	4.00	Refusal of sampling equipment on possible obstruction

In addition to the above, infrastructure associated with usage as a garage and petrol filling station is also present below the southern site area, with service pits also potentially present within the area of the former building.

From a plan of the petrol filling station infrastructure included within the Phase I report produced by 3e, two 9000 gallon underground fuel storage tanks are shown to the north of the existing garage building and north-west of the pump islands, with a further two smaller underground storage tanks (assumed to be 3000 gallon tanks based on the rough dimensions) shown in the immediate area of the pump islands. Infrastructure associated with usage as a petrol filling station (i.e. fuel lines and vent pipes, etc) is also shown within the former forecourt area, with an petrol interceptor tank also recorded to the east of the existing garage buildings. A copy of the petrol filling station infrastructure plan is included as Drawing G0002 included in Appendix A.

As the building still occupies the southern site area floor slabs and foundations are also present within this area, with a former vehicle wash bay also indicated within the north-western edge of the building.

4.5 Visual and olfactory evidence of contamination (soil)

During the ground investigation works, occasional localised pockets of ashy sand made ground containing coal and clinker were recorded within WS09 and WS13, located across the central and southern site area.

In addition to the more common man-made constituents (brick, concrete, etc.) visual and olfactory evidence of contamination is summarised in Table 4.2.

Table 4.2: Visual and olfactory evidence of contamination - soils

Stratum	Location	Depth (m bgl)	Description
Made Ground	WS06	0.30->0.50	Visible hydrocarbons and strong hydrocarbon odour noted within the made ground.
Natural Superficial deposits	WS09	4.00->4.30	Visible hydrocarbons and strong hydrocarbon odour noted

Stratum	Location	Depth (m bgl)	Description
Made Ground	WS10	0.40->0.70	Visible hydrocarbons and strong hydrocarbon odour noted within the made ground.
Made Ground	WS12	0.60-1.40	Visible hydrocarbons and strong hydrocarbon odour noted within the made ground.
Made Ground	WS12	1.40-1.85	Treated wood within the made ground

5. Groundwater

During the investigation works, the underlying strata was recorded to be wet from depths of between 0.30m and 3.00m within WS01, WS05, WS07, WS12 and WS13 with groundwater strikes recorded at 4.20m within WS08 and 4.50m within WS06 considered likely to be attributable to groundwater contained within the granular made ground and / or superficial soils below the site.

During preliminary groundwater monitoring (2 visits) of the wells installed within WS01, WS05, WS06, WS07 WS08 and WS13 standing water levels of between 1.05m and 4.13m below ground level have been recorded to date. The results of the groundwater monitoring are included in Appendix C.

It should be noted groundwater levels fluctuate seasonally and a higher groundwater level than those identified during the ground investigation and subsequent groundwater monitoring may occur.

6. In-situ Testing

6.1 Standard Penetration Tests (SPT's)

The results of the SPT 'N' values recorded for the made ground and superficial deposits at the mini percussive borehole locations are summarised in Table 6.1.

Table 6.1: Standard Penetration Tests (SPT's)

Stratum	No. of Tests	Depth (m bgl)	SPT 'N' Range	Average SPT 'N' Value
Made Ground	4	1.20	6-12	10
	3	2.00	3-18	10
	2	3.00	7-16	12
Natural Superficial Deposits	4	1.20	4-22	11
	5	2.00	10-17	13
	3	3.00	25-34	30
	5	4.00	13-50	30
	1	5.00	31	31

In summary, in-situ SPT 'N' values of between 3 and 18 were recorded for the made ground indicative of loose to medium dense materials, with average SPT' N' values ranging between 10 and 11.

SPT 'N' values undertaken within the superficial deposits recorded values of between 4 and 50, with average SPT 'N' values ranging between 11 and 31, generally indicative of medium dense to dense deposits.

6.2 Continuous Penetration Tests (CPT's)

A total of 8 no. CPT's (CPT01 to CPT03 and CPT05 to CPT09) were undertaken across the proposed building footprint to determine geotechnical properties of the upper made ground and superficial deposits within this area to aid in foundation design.

The CPT report is included in Appendix D.

7. Geotechnical Testing

7.1 Plasticity Index and Volume Change Potential

In total, Atterberg limit determination analysis was undertaken on 3 no. representative samples of the natural fine (cohesive) deposits ranging from depths of between 1.70m and 2.25m below current ground levels. These are summarised in Table 7.1.

Table 7.1: Volume change potential

Stratum	No. of tests	Plasticity Index			Modified Plasticity Index			Plasticity designation	Volume Change Potential
		Min.	Max	Av.	Min.	Max	Av.		
Superficial Deposits	3	15	23	18	5.85	17.3	11.0	Medium to High	Low

In summary, the results of the analysis recorded modified plasticity indices of between 5.85% and 17.25%, which is indicative of fine (cohesive) soils with a low volume change potential.

7.2 Particle Size Distribution Tests

Particle Size Distribution test (PSDs) results are summarised in Table 7.2 and summary descriptions and PSD plots of the material analysed are presented in Appendix E.

Table 7.2: PSD results summary

Stratum	No. of tests	Silt/Clay %	Sand %	Gravel %	General description
Glacio-fluvial Deposits	2	14 - 16	17 - 31	53 - 69	Clayey sandy GRAVEL

7.3 Sulphate and pH Determinations

In accordance with BRE (Special Digest 1), the Design Sulphate (DS) classification and the Aggressive Chemical Environment for Concrete (ACEC) classification are presented in Table 7.3.

Table 7.3: Aggressive chemical environment concrete classification

Stratum	No. tests	DS	ACEC
Made Ground	13	DS-2	AC-2

Natural Superficial Deposits	2	DS-1	AC-1

Within the Made Ground water soluble sulphate concentrations ranged between 32mg/l and 913mg/l with pH values between 7.2 and 10.9. This indicates a BRE Design Special Digest 1:2005 Design Sulphate Class DS-2 with an ACEC site classification AC-2. It should be noted the 2 no. increased water soluble sulphate concentrations recorded were both located within the made ground across the southern portion of the site within close proximity to the proposed building footprint.

Within the natural superficial deposits, water soluble sulphate concentrations ranged between 64.1mg/l and 153mg/l with pH values between 7.5 and 7.8. This indicates a BRE Design Special Digest 1:2005 Design Sulphate Class DS-1 with an ACEC site classification AC-1.

The results of the pH and water soluble sulphate testing is included within Appendix F.

8. Human Health Contamination Assessment

8.1 Generic Assessment Criteria

The soil screening values used are generic assessment criteria (GAC) (i.e. derived in accordance with EA CLEA guidance (2009) using the updated exposure model detailed in Defra SP1010 (2014), with the exception of published C4SL's. The term 'GAC' used in this report is inclusive of all generic soil screening values.

In relation to human health risk generally the results of the analysis have been assessed using the LQM/CIEH Suitable for Use Levels (S4UL's) for Human Health Risk Assessment (Copyright Land Quality Management Limited reproduced with permission; Publication Number S4UL3170; All rights reserved), which have been derived in accordance with current UK legislation, and national policy using the most recent version of the CLEA software (v1.06).

The derived S4UL's are based on the concept of minimal tolerable risk as described in SR2 (Environment Agency 2009a) which underpins all previous Environment Agency (EA) SGV's and other GAC's. As part of this assessment, it is noted that S4UL's do not incorporate any toxicological parameter changes to the CLEA base model, however recent toxicological data has been incorporated into the contaminant databases.

Furthermore, S4UL GAC's are considered to be equivalent to the previously published Environment agency SGV's, and previous iterations of LQM/CIEH GAC's and as such are suitable for use in generic quantitative risk assessments under both planning and Part IIa regimes. Taking this into account, it is considered that the modified exposure assumptions adopted in S4UL's are sufficiently conservative in relation to assessing the level of potential risk to human health for the development and future end users.

Where no S4UL is available, GAC have been selected based on the following hierarchy, with all GAC used as part of this assessment considered to be sufficiently conservative in relation to assessing the level of potential risk to human health.

- Category 4 Screening Levels (C4SL's), where available.
- EIC/AGS:CL:AIRE GAC's for standard land uses, where available.
- SoBRA Acute GAC for free cyanide, with acute dose toxicity as the primary risk driver.

In consideration of the proposed development, GAC based on a commercial CLEA land use scenario have been adopted. Based on the laboratory results, an SOM of 2.5% has also been used in the assessment. The results of the chemical testing are presented in Appendix F.

8.2 Assessment Results

In order to provide an assessment of potential contamination, representative samples of made ground and natural soil recovered during the investigation works, were screened for the following range of determinands:

- 16 no. samples screened for Metals: Arsenic, Boron, Copper, Cadmium, Chromium (total), Chromium (VI), Cyanide (free), Cyanide (total) Lead, Mercury, Nickel, Selenium, Zinc and TOC.
- 16 no. samples screened for Polycyclic Aromatic Hydrocarbons (USEPA 16).
- 23 no. samples screened for Total Petroleum Hydrocarbons (TPH CWG, with BTEX & MTBE).
- 1 no. samples screened for SVOC's and VOC's
- 15 no. samples screened for samples screened for the presence of Asbestos.
- 4 no. samples screened for WAC with metals
- 15 no. pH and water soluble sulphate

From the results of the analysis, no increased levels of potential contaminants of concern were recorded above the specified assessment criteria for a proposed commercial end use. However, as part of the investigation works 15 no. representative samples of made ground recovered from across the site were screened for the presence of asbestos. From the results of the testing, the presence of loose chrysotile fibres were noted within WS06 at 0.30m and 1.00m with no asbestos detected within any of the remaining sample screened. It is considered this may be associated with a localised 'hotspot of made ground at the location of WS06, with the presence of asbestos fibres not uncommon within demolition related materials (i.e. brick and concrete). Quantification testing has been carried out on the samples, with the results of the quantification testing to be issued as an addendum to this report.

At this stage, when considering the presence of asbestos fibres within the made ground at WS06 and the potential for unforeseen contamination to be present within areas of the site which have not been investigated (including a large portion currently occupied by derelict buildings), it is considered remedial measures will be required for the site in order to mitigate any potential risk to human health. This will require a dedicated clean cover system within all areas of new proposed soft landscaping comprising a minimum 450mm clean 'suitable for use' imported soil overlying a geotextile marker layer at the base of the clean cover system.

In addition, all site staff should be made aware that there is a likelihood of encountering further asbestos within the Made Ground anywhere on the site, and at any stage of the development. It is advised that the Contractor should supply suitable and sufficient 'Asbestos Awareness' training (specific to asbestos in soils) to all site staff who could foreseeably encounter asbestos containing materials during the course of their work.

The Contractor for each stage of works must undertake a suitable and sufficient Risk Assessment in accordance the Regulation 6 of the Control of Asbestos Regulations 2012 (CAR2012). The results of the assessment should be used to compile a methodology in accordance with Regulation 7 of CAR2012, which limits potential exposure and spread of asbestos fibre. Appropriate training should be provided to all site staff identified within the risk assessment as having the potential to be exposed or encounter asbestos during their work in accordance with Regulation 10 of CAR2012.

It is the responsibility of the Contractor to ensure that mitigation measures are suitable and sufficient to prevent exposure to airborne asbestos so far as is reasonably practicable in accordance with Regulation 11 of CAR2012.

9. Groundwater Contamination Assessment

The risks to groundwater and surface water from contaminants on site have been assessed in accordance with the Environment Agency (2006) Remedial Targets Methodology (RTM).

Site contaminant loadings are compared with relevant screening values (Water Quality Targets(WQTs), which are linked to the CSM.

Acceptable WQTs are defined for protection of human health (based on Drinking Water Standards (DWS)) and for protection of aquatic ecosystems (Environmental Quality Standards (EQS)).

From the phase I report completed for the site, the River Ehen lies approximately 75m to the east of the site, the underlying superficial deposits and bedrock deposits are classified as a Secondary A Aquifer and the site. In addition, a Source Protection Zone (Zone III -Total Catchment) lies some 148m west of the site.

In order to assess the potential risk to the controlled waters, representative groundwater samples were obtained from the monitoring well installed at the location of WS07 on 4th December 2023, were screened for the following range of determinands. It should be noted although groundwater samples were attempted within the remaining monitoring wells there was insufficient recharge rates to allow for representative samples to be obtained.

- 1 no. samples screened for Polycyclic Aromatic Hydrocarbons (USEPA 16 PAH's).
- 1 no. samples screened for Total Petroleum Hydrocarbons (TPH CWG, including MTBE and BTEX (Benzene, Toluene, Ethylbenzene and Xylene)).
- 1 no. sample for SVOCs and VOCs.

The results of the groundwater analysis are provided in Appendix F.

From the results of the groundwater analysis, slightly increased levels of TPH Aliphatic C12-C16 and C16-C35 have been recorded above the WQT, with all other potential contaminants of concern within the groundwater sample recorded below detection limit. In view of this, a very low risk is considered to controlled waters associated with the levels of potential contaminants identified within WS07, with the effects of attenuation and dispersion likely to reduce the concentrations to negligible levels before reaching the potential receptor.

However, at this stage, localised significant hydrocarbon contamination is likely to be present associated with the underground storage tanks across the northern site area, interceptor tanks and jet wash bays (local to WS06), with further remedial works required across these areas of the site to mitigate any potential risk to controlled waters.

In addition, although the presence of hydrocarbons was generally localised to the upper made ground across the remainder of the site and unlikely to pose any significant risk to controlled water receptors (i.e. WS10 and WS12), the presence of hydrocarbons within the underlying superficial deposits was noted at WS09 and although a low risk is considered at this stage, it is recommended further assessment is undertaken in this regard as part of future phase 2 works.

10. Preliminary Ground Gas Risk Assessment

From the results of the ground gas monitoring carried out to date on 4th December 2023 and 15th December (2 visits), Methane has been recorded at a maximum concentration of 8.8%, whilst Carbon dioxide has been recorded at a maximum concentration of 7.7%v/v. Oxygen levels have been recorded at a minimum concentration of 0.2%v/v whilst a maximum recorded positive flow of 0.3l/hr was detected during monitoring visit completed to date. The results of the ground gas monitoring carried out to date is provided in Appendix E.

Based on the initial results of gas monitoring completed to date a maximum Gas Screening Value (GSV) of 0.0264l/hr for methane and 0.0231l/hr for carbon dioxide has been calculated. From these results, the preliminary GSV's for Carbon Dioxide and Methane do not exceed the GSV minimum assessment values for a Characteristic Situation 1 (CS1). However, as Carbon Dioxide and Methane are recorded to exceed the 5% and 1% threshold for CS1 respectively, it is recommended that an allowance be included

for the installation of gas protection measures to Characteristic Situation 2 (CS2), as outlined in BS8485:2015+A1:2019 and CIRIA C665.

A further 4 no. ground gas visits are still required and any conclusions are subject to change until completion of the ground gas monitoring programme.

11. Vapours

During the ground investigation works, visible hydrocarbons and a strong hydrocarbon odour was noted within the made ground at WS06, WS10 and WS12 and within the superficial deposits at WS09. As part of this assessment, in order to assess the potential risk from vapours to future receptors, ground gas and groundwater monitoring wells were installed within WS09 and WS12 to allow for photo-ionisation detector (PID) monitoring to be carried out to assess the risk from volatile organic compounds (VOCs).

During the initial visit, a VOC level of 16.7ppm and 103ppm were recorded within WS12 and WS13 respectively, with the remaining wells recorded levels less than detection limit. When considering the increased levels of VOC's recorded which are likely associated by residual hydrocarbon's below the site, it is considered necessary for allowance be included for the proposed gas membrane to be sufficiently resistant to volatile organic compounds (vapour resistant membrane)

11.1 Radon

From information obtained as part of the Phase I report the site is located within a intermediate probability radon area (3% to 5% of homes are estimated to be at or above the action level), with basic radon measures considered necessary for new buildings on the site. It should be noted however, as the Phase I report was produced prior to December 2022, when an update to the radon potential map of Great Britain was published by the UK Health Security Agency (UKHSA), to confirm the level of risk to the site as part of this assessment a review has been made of the updated maps included on UK Radon Interactive Viewer.

A review of updated radon maps indicates the site now lies within a maximum radon potential area of 10% to 30%. In view of this, it is considered basic radon protection measures will be required for the proposed development in line with the Phase I report.

12. Off-Site Disposal

As part of the investigation works contamination screening was completed on a representative sample of the made ground and natural soil recovered from the exploratory hole locations to aid in assessing the potential risk to human health (i.e. future end users) and the environment. However, the results of this chemical analysis can also allow for an initial assessment to be made with regards potential disposal of materials off-site. In addition, WAC analysis was undertaken on representative samples of the made ground recovered from across the site, the results of which are included within Appendix F.

From the results of the WAC analysis, the made ground materials taken from WS06 at 0.30m and natural soil from WS09 at 4.20m are likely to be classified as Hazardous for disposal, with both these materials recorded to have TPH levels in excess of 1000mg/kg which corroborates with the presence visible hydrocarbons and a strong hydrocarbon odour recorded within these samples. The WAC result for WS10 at 0.60m indicates this is potentially suitable for disposal to an Inert landfill, however, it should be noted during the investigation works, this material was noted to show visible hydrocarbons and a strong hydrocarbon odour and as such care should be taken when coming across hydrocarbon impacted materials, with these to be segregated separately from materials which are free from hydrocarbon's.

In addition, the sample of ash made ground at WS13 at 1.50m also recorded increased levels of TOC's above the Inert waste threshold criteria, with this material likely to be classified as Non-Hazardous for disposal.

The results of this chemical analysis can also allow for an initial assessment to be made with regards potential disposal of materials off-site. From the results of the chemical testing, the made ground and natural soils which were noted to be impacted by hydrocarbons are generally recorded to exceed the threshold criteria for a Non-Hazardous landfill for total TPH (i.e. 1000mg/kg) and therefore are likely to be classified as Hazardous for disposal. The remaining made ground below the site (free from hydrocarbon's) is likely to be classified as Non-Hazardous.

Natural deposits which are free from hydrocarbon's beneath the site will likely generally be suitable for disposal at an Inert landfill.

Where offsite disposal of waste soils is required, the results of the investigation should be made available to the waste carrier/receiver in order to determine the waste classification, costs for disposal and the requirement for further testing. Sufficient time should be allowed in the site programme to effectively segregate soils based on material type, including the time allowed for any further laboratory classification analysis as required.

13. Foundations

When considering the general thickness of made ground identified within borehole across the proposed building footprint, the use of conventional strip and / or pad foundations is not considered suitable for the site in its current condition.

In view of the ground conditions encountered, it is considered ground improvement techniques such as vibro stone columns or CMC's (controlled modulus columns) may be a viable option for the site to improve the underlying ground conditions to facilitate the use of strip and / or pad foundation. It is recommended the results of this investigation is forwarded on to a specialist ground improvement contractor to determine the viability of these option. In addition, when considering the presence of a live gas main immediately to the east of the proposed building footprint, recourse should be made with the specialist contractor and utility company to confirm whether the ground improvement method proposed will not cause any damage to this feature.

Should the above not be considered suitable, a piled foundation solution will likely be required for the site. The results of the investigation should be forwarded on to a specialist piling contractor to determine the suitable length of piles, piling method, type of piles and founding strata. As per above, when considering the presence of a live gas main immediately to the east of the proposed building footprint, recourse should be made with the piling contractor and utility company to confirm the method of piling proposed will not cause any damage to this feature.

Any foundation options considered for the site will need to take into account the presence of trees (past, present and proposed).

14. Floor Slab

Due to the thickness of made ground and poor nature and variability of the upper superficial deposits across the proposed building footprint, if a piled foundation solution is to be adopted it is considered a suspended floor slab will be required for the proposed development.

Alternatively, should ground improvement (e.g. Vibro-stone columns or CMC's) be considered suitable for the site, the use of this ground improvement technique may allow for a ground bearing floor slab to be feasible on the site. Further recourse with a specialist ground improvement contractor will need to me made to assess the potential viability of vibro-stone columns or CMC's on the site.

Floor slab options will need to take into account the presence of trees (past, present and proposed).

15. External Works

At this stage it is recommended that a CBR value of 2% be adopted for the subgrade for the design of any new hardstanding, which in accordance with Department for Transport Standards technical guidance for Highways; Design for new Pavement Foundations, would result in a preliminary

requirement for the inclusion of 400mm sub-base thickness within external hard-standing areas. This should be reviewed following the completion of in-situ plate load (CBR) tests during the initial stages of the development works when the final formation level has been confirmed.

In accordance with current guidance and best practice it is also recommended that proof rolling of the formation level be undertaken, and where encountered any soft spots be removed and replaced with an engineered fill. The formation level will also need to be protected during inclement weather from deterioration. In addition, where applicable it also recommended that a suitably experienced geotechnical engineer from Hydrock be in attendance during proof rolling.

In accordance with SHW Series 600 methodology (layer thickness and number of passes of roller) for the works will be based on the nature and type of materials. Dependent on the nature of material it is also generally recommended that the works be undertaken using a vibratory roller (min. over 700kg category) with layer thicknesses to be determined in accordance with SHW Series 600.

The design of external works should also be fully compliant with Aldi UK Standard Store Specification Chapter 11, Section 11.3, for Hard Landscaping dated 26/06/2020, which notes that the design shall generally comply with current British Standard recommendations, and as a minimum be capable of taking 42 tonnes triple axle vehicle traffic.

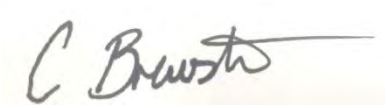
16. Recommended for Further Work

Following the ground investigation works undertaken to date, the following further works will be required:

- completion and reporting of the ongoing gas monitoring, hence the conclusions in this report relating to ground gas are provisional, subject to the completion of ground gas monitoring;
- Further groundwater assessment (including deeper boreholes) in relation to hydrocarbons identified within the underlying natural soils local to WS09 to more accurately assess the risk to controlled waters following demolition of the existing building which currently occupies a large portion of the site.
- Further surveys to record the locations of any potential service pits and / or underground basements below the existing buildings, voids, service runs etc.
- A post-demolition ground investigation to determine the underlying ground conditions below the existing building footprint which was not accessible at the time of the ground investigation works.
- Safe decommissioning and removal of the 4 no. known underground storage tanks, associated fuel lines, infrastructure and significantly hydrocarbon impacted soils on the site. With the removal, remediation and validation works to be undertaken by a suitably qualified geo-environmental engineer.
- Remedial works local to the interceptor tanks and car wash bays on the site to be carried out under supervision of a suitably qualified geo-environmental engineer.
- Should ground improvement or piling be adopted, recourse should be made with the specialist contractor and relevant authority / supplier to confirm a suitable stand-off zone and mitigation measures to prevent damage to the adjacent underpass, neighbouring properties and utilities.
- discussions with regulatory bodies and the warranty provider regarding the conclusions of this report;
- A UKWIR assessment to determine a suitable material for potable water supply pipes on the site.
- assessment of tree influence on foundations and design of foundations;

- Discussions with the ground improvement and / or piling Contractors regarding conclusions of this report and the potential use of VSCs / CMC's and design of the piles;
- production of a Remediation Strategy and Verification Plan (and agreement with the regulatory bodies and the warranty provider);
- if re-use of site won materials are proposed as part of the development; production of a Materials Management Plan relating to reuse of soils at the site and import of soils to the site;
- remediation and mitigation works; and
- verification of the remediation and mitigation works.

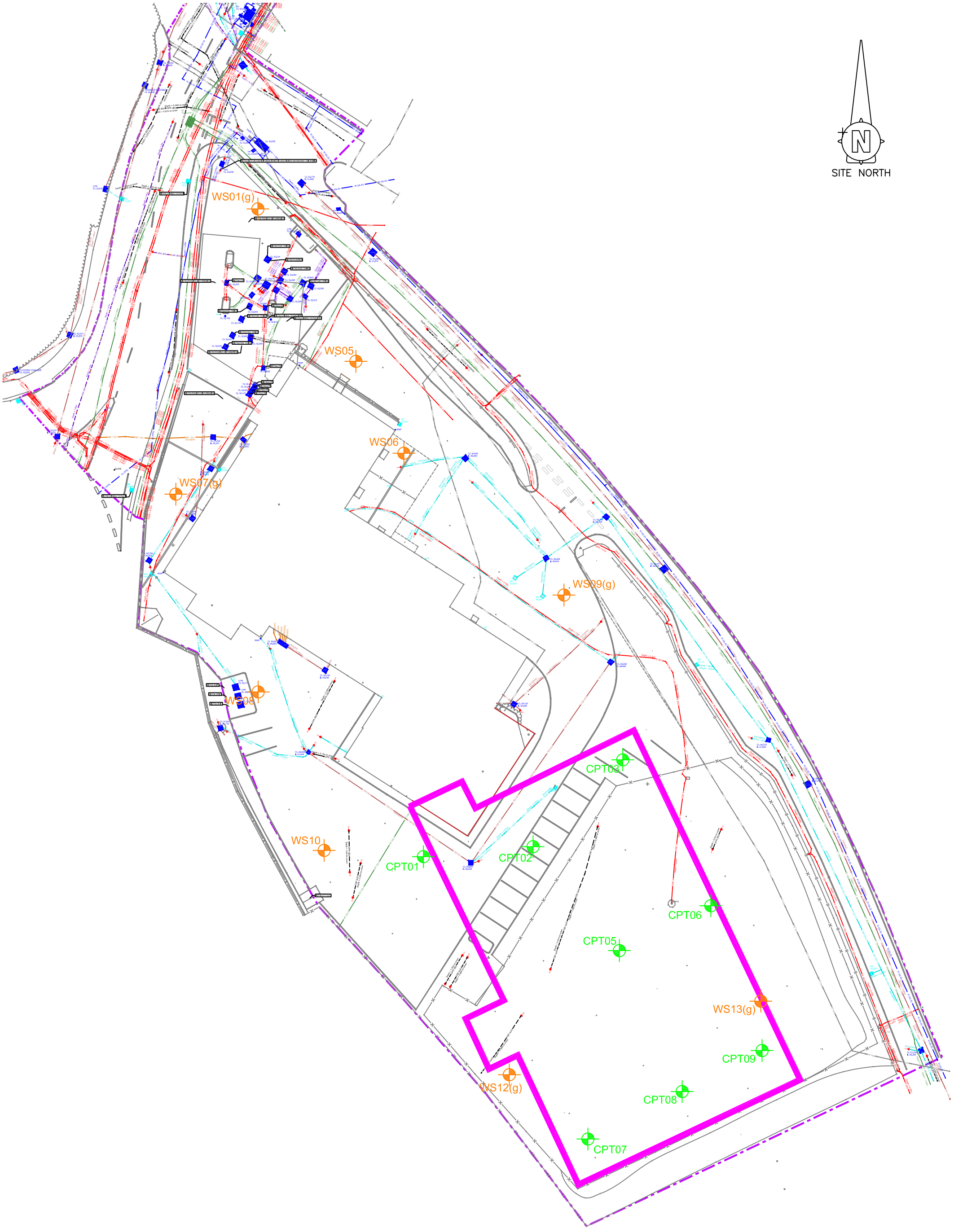
Yours sincerely



Christopher Brewster Bsc (Hons) Msc FGS
Principal Geo-environmental Engineer

For and on behalf of Hydrock Consultants Limited

Appendix A – Drawings



Key:

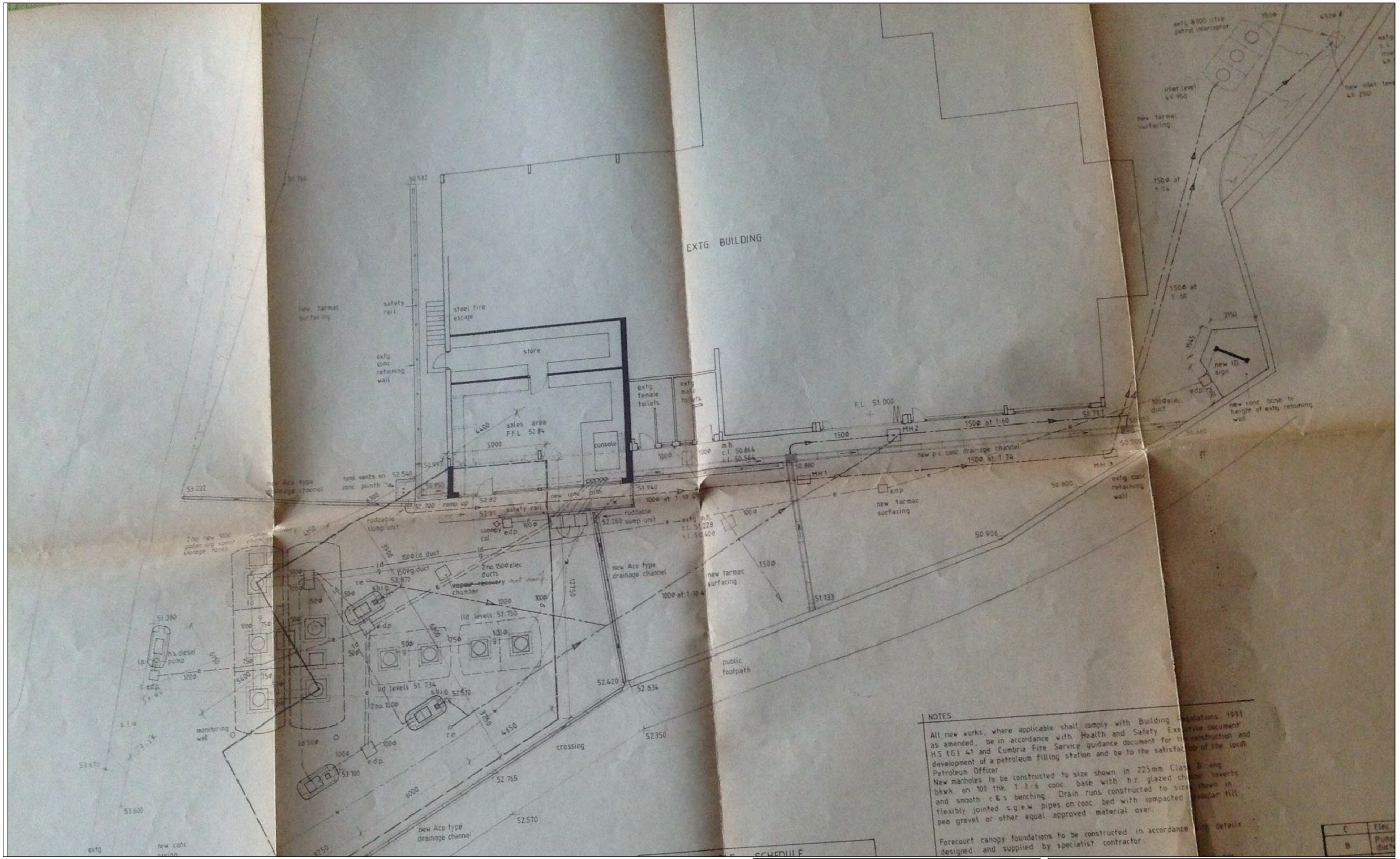
WS — Mini-percussive Borehole Location

CPT — CPT Location

Proposed Building Footprint

Hydrock
2 Esh Plaza
Sir Bobby Robson Way
Great Park
Newcastle upon Tyne
NE13 9BA
tel: 0191 230 2993
www.3econsult.com

Project	Wyndham Place, Egremont for Aldi Stores Limited		
Title	Exploratory Hole Location Plan		
Scale: NTS	Drawn: CB	Checked: NW	Date: 02.11.23
Job No.: 29348	Drawing No.: G0001		Rev: 1



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Project	Wyndham Place, Egremont for Aldi Stores Limited			
Title	Underground Storage Tank & Infrastucture Plan			
Scale	NTS	Drawn NW	Checked CB	Date Dec' 23
Job No.	29348	Drawing No. G0002		Rev 0

Appendix B – Exploratory Hole Records

Hydrock

Project: Aldi Egremont

Borehole No
WS01
Page No. 1 of 1

Method: Window Sampler	Date(s): 08/11/2023	Logged By: JWM	Drilled By: Geo Environmental Engineering
Client: Aldi Stores Limited	Co-ords: 301147.19, 511141.96	Checked By: NW	Rig: WS Rig
Hydrock Project No: 29348 GNEW	Ground Level: 53.62m OD		Scale: 1:30

Sample Run Info			Testing			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend	Instrumentation / Backfill
Sample Run	Run Ø	Recovery	Depth (m)	Type	Results							
							MADE GROUND: Concrete with metal rebar.	0.25	(0.25)	53.37		
			0.40	ES			MADE GROUND: Greyish beige sandy GRAVEL. Sand is fine to coarse. Gravel is coarse angular limestone.	0.60	(0.35)	53.02		
			1.00	ES			MADE GROUND: Loose brown gravelly SAND. Sand is fine to medium. Gravel is fine to coarse subangular to rounded coal, clinker, mudstone and sandstone.	1.70	(1.10)	51.92		
			1.20	SPT	N=6 (1,1,1,2,1,2)							
			1.90	ES			Brown slightly gravelly SAND. Sand is fine to medium. Gravel is fine to medium subangular to subrounded mudstone, sandstone and limestone.	2.00	(0.30)	51.62		
			2.00	SPT	N=11 (1,2,4,2,3,2)		Medium dense brown gravelly silty SAND. Sand is fine. Gravel is fine to medium subangular to subrounded mudstone, sandstone and limestone.	2.55	(0.55)	51.07		
			2.40	D			No recovery due to loose material fallout from barrel.	4.00	(1.45)	49.62		
			3.00	SPT	N=13 (2,4,4,5,1,3)							
			4.00	SPT	N=13 (1,4,4,4,2,3)		Medium dense brown gravelly SAND. Sand is fine to coarse. Gravel is fine subangular to rounded mudstone, sandstone and limestone.	4.50	(0.50)	49.12		
			4.30	D			No recovery due to loose material fallout from barrel.	5.00	(0.50)	48.62		
			5.00	SPT	N=26 (1,2,5,7,8,6)		End of Borehole at 5.00m					

General Remarks:
1. Wet from 2.0m. 2. Inspection pit to 1.2m. 3. No visual or olfactory evidence of contamination. 4. Monitoring well installed to 3.0m. 5. Coordinates and elevation obtained using 3rd party surveyor.

Logged in general accordance with BS5930:2015

Hydrock

Project: Aldi Egremont

Borehole No
WS05
Page No. 1 of 1

Method: Window Sampler	Date(s): 07/11/2023	Logged By: JWM	Drilled By: Geo Environmental Engineering
Client: Aldi Stores Limited	Co-ords: 301159.98, 511122.14	Checked By: NW	Rig: WS Rig
Hydrock Project No: 29348 GNEW	Ground Level: 51.82m OD		Scale: 1:30

Sample Run Info			Testing			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend	Instrumentation / Backfill
Sample Run	Run Ø	Recovery	Depth (m)	Type	Results							
			0.10	ES			MADE GROUND: Tarmac.	0.20	(0.20)	51.62		
			0.30	ES			MADE GROUND: Grey SAND and GRAVEL with low cobble content. Sand is fine to coarse. Gravel is fine to coarse angular limestone. Cobbles are angular limestone.	1.30	(1.10)	50.52		
			1.20	SPT	N=22 (7,9,8,5,5,4)							
			1.45	ES			Soft to firm brownish dark grey sandy organic SILT. Sand is fine to medium. Includes slight rotting roots odour.	2.00	(0.70)	49.82		
			1.70	D								
			2.00	SPT	N=11 (1,3,3,2,2,4)		Medium dense brown silty SAND. Sand is fine to medium.	2.45	(0.45)	49.37		
			2.20	D								
			2.55	D			Grey slightly gravelly SAND. Sand is fine to coarse. Gravel is fine subangular limestone.	2.65	(0.20)	49.17		
							No recovery due to loose material fallout from barrel.	3.00	(0.35)	48.82		
			3.00	SPT	N=30 (1,1,4,6,10,10)		Medium dense brown silty SAND. Sand is fine to medium.	3.20	(0.20)	48.62		
							Soft brown sandy slightly gravelly CLAY. Sand is fine to medium. Gravel is fine to medium subangular to rounded mudstone and sandstone.	3.55	(0.35)	48.27		
			3.50	D			No recovery.	4.00	(0.45)	47.82		
			4.00	SPT	N=29 (4,4,8,8,7,6)		Medium dense brown silty sandy GRAVEL. Sand is fine. Gravel is fine to coarse angular limestone , mudstone and sandstone.	4.45	(0.45)	47.37		
			4.50	D			Soft brown sandy slightly gravelly CLAY. Sand is fine to medium. Gravel is fine to medium subangular to rounded mudstone and sandstone.	4.65	(0.20)	47.17		
							No recovery.	5.00	(0.35)	46.82		
			5.00	SPT	N=56 (6,9,10,8,18,20)		End of Borehole at 5.00m					

General Remarks:
1. Wet from 3.0m. 2. Inspection pit to 1.2m. 3. No visual or olfactory evidence of contamination. 4. Backfilled with arisings upon completion. 5. Coordinates and elevation obtained using 3rd party surveyor.

Logged in general accordance with BS5930:2015

Hydrock

Project: Aldi Egremont

Borehole No
WS06
Page No. 1 of 1

Method: Window Sampler	Date(s): 08/11/2023	Logged By: JWM/CH	Drilled By: RD Drilling
Client: Aldi Stores Limited	Co-ords: 301166.24, 511110.06	Checked By: NW	Rig: WS Rig
Hydrock Project No: 29348 GNEW	Ground Level: 50.47m OD		Scale: 1:30

Sample Run Info			Testing			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend	Instrumentation / Backfill
Sample Run	Run Ø	Recovery	Depth (m)	Type	Results							
			0.20	ES			MADE GROUND: Concrete.	0.15	(0.15)	50.32		
			0.30	ES			MADE GROUND: Beige sandy GRAVEL with a low cobble content. Sand is fine to coarse. Gravel is fine to coarse angular limestone. Cobbles are subangular limestone.	0.30	(0.15)	50.17		
			0.50	ES			MADE GROUND: Brown clayey SAND AND GRAVEL with a medium cobble content. Sand is fine to coarse. Gravel is fine to coarse angular brick and concrete. Cobbles are angular brick and concrete. Includes visible hydrocarbons and strong hydrocarbon odour.	0.55	(0.25)	49.92		
			1.00	ES			MADE GROUND: Reddish brown slightly clayey gravelly fine to coarse SAND with a medium cobble content. Gravel is fine to coarse, angular to subrounded of sandstone and brick. Cobbles are subrounded of brick.	1	(0.70)			
			1.20	SPT	N=4 (1,2,1,1,1,1)			1.20		49.27		
			1.80	ES			Loose becoming medium dense dark brownish grey slightly clayey gravelly fine to medium SAND. Gravel is fine to medium, subangular to subrounded of sandstone.	2	(1.45)			
			2.00	SPT	N=17 (2,3,4,4,4,5)			2.65		47.82		
			2.80	ES			Firm Brown sandy slightly gravelly CLAY. Sand is fine to medium. Gravel is fine to medium, subangular to subrounded of sandstone.	3.00	(0.35)	47.47		
			3.00	SPT	N=25 (2,3,6,6,6,7)		Medium dense reddish brown slightly clayey gravelly fine to coarse SAND. Gravel is fine to medium, subangular to subrounded of sandstone.	3				
			3.50	ES								
			4.00	SPT	N=50 (8,9,9,10,19,12)			4	(1.90)			
			4.90	SPT	50/1mm (25,50)		End of Borehole at 4.90m	4.90		45.57		
								5				
								6				

General Remarks:
1. Inspection pit to 1.2m. 2. Visual and olfactory evidence of hydro carbon contamination from 0.3m. 3. Monitoring well installed to 4.9m. 4. Coordinates and elevations obtained using 3rd party surveyor.

Logged in general accordance with BS5930:2015

Hydrock	Project: Aldi Egremont	Borehole No WS07 Page No. 1 of 1

Method: Window Sampler	Date(s): 08/11/2023	Logged By: JWM	Drilled By: Geo Environmental Engineering
Client: Aldi Stores Limited	Co-ords: 301136.48, 511104.72	Checked By: NW	Rig: WS Rig
Hydrock Project No: 29348 GNEW	Ground Level: 50.84m OD		Scale: 1:30

Sample Run Info			Testing			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend	Instrumentation / Backfill
Sample Run	Run Ø	Recovery	Depth (m)	Type	Results							
			0.05	ES			MADE GROUND: Tarmac.	0.10	(0.10)	50.74		
							MADE GROUND: Greyish beige sandy GRAVEL. Sand is fine to coarse. Gravel is coarse angular limestone.	0.30	(0.20)	50.54		
			0.90	ES			Medium dense brown gravelly SAND. Sand is fine to medium. Gravel is fine to coarse subangular to rounded mudstone, sandstone and limestone.					
			1.20	SPT	N=13 (1,1,2,4,3,4)				(1.50)			
			1.60	D				1.80		49.04		
							No recovery due to loose material fallout from barrel.	2.00	(0.20)	48.84		
			2.00	SPT	N=16 (2,1,5,4,4,3)		Medium dense brown silty sandy GRAVEL. Sand is fine to medium. Gravel is fine to coarse subangular to rounded mudstone, sandstone and limestone.					
			2.30	D				2.50	(0.50)	48.34		
							No recovery due to loose material fallout from barrel.	3.00	(0.50)	47.84		
			3.00	SPT	N=64 (5,5,10,16,18,20)		End of Borehole at 3.00m					

General Remarks:
1. Wet from 1.4m. 2. Inspection pit to 1.2m. 3. No visual or olfactory evidence of contamination. 4. Monitoring well installed to 3.0m. 5. Coordinates and elevation obtained using 3rd party surveyor. 6. Refusal at 3.0m.

Logged in general accordance with BS5930:2015

Hydrock

Project: Aldi Egremont

Borehole No
WS08
Page No. 1 of 1

Method: Window Sampler	Date(s): 04/12/2023	Logged By: CH	Drilled By: RD Drilling
Client: Aldi Stores Limited	Co-ords: 301147.23, 511078.90	Checked By: NW	Rig: WS Rig
Hydrock Project No: 29348 GNEW	Ground Level: 50.50m OD		Scale: 1:30

Sample Run Info			Testing			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend	Instrumentation / Backfill
Sample Run	Run Ø	Recovery	Depth (m)	Type	Results							
							MADE GROUND: Black tarmac	0.13	(0.13)	50.37		
			0.50	ES			MADE GROUND: Reddish brown slightly clayey SAND AND GRAVEL. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of sandstone and concrete.	0.80	(0.67)	49.70		
			0.90	ES			MADE GROUND: Firm dark brownish grey sandy gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of sandstone, brick and concrete. 1	1.00	(0.20)	49.50		
			1.10	ES			MADE GROUND: Reddish brown gravelly fine to coarse SAND. Gravel is fine to coarse, angular to subrounded of sandstone.	1.20	(0.20)	49.30		
			1.20	SPT	N=6 (1,2,1,2,2,1)		Loose reddish brown becoming dark grey clayey gravelly fine to coarse SAND. Gravel is fine to coarse, subangular to subrounded of sandstone and mudstone.					
			2.00	SPT	N=10 (2,2,2,2,2,4)		2		(2.00)			
			2.00	ES								
			3.00	SPT	N=34 (9,10,9,8,8,9)		3	3.20		47.30		
			3.50	ES			Medium dense orangish red slightly clayey gravelly fine to coarse SAND. Gravel is fine to medium, subangular to subrounded of coal and sandstone.					
			4.00	SPT	N=30 (9,9,8,7,7,8)		4		(1.80)			
			5.00	SPT	N=31 (6,6,9,7,7,8)		5 End of Borehole at 5.00m	5.00		45.50		
							6					

General Remarks:
1. Final water level 4.20m. 2. Monitoring well installed to 5mbgl.

Logged in general accordance with BS5930:2015

Hydrock

Project: Aldi Egremont

Borehole No
WS09
Page No. 1 of 1

Method: Window Sampler	Date(s): 07/11/2023	Logged By: JWM	Drilled By: Geo Environmental Engineering
Client: Aldi Stores Limited	Co-ords: 301187.12, 511091.55	Checked By: NW	Rig: WS Rig
Hydrock Project No: 29348 GNEW	Ground Level: 50.09m OD		Scale: 1:30

Sample Run Info			Testing			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend	Instrumentation / Backfill
Sample Run	Run Ø	Recovery	Depth (m)	Type	Results							
							MADE GROUND: Tarmac.	0.10	(0.10)	49.99		
			0.20	ES			MADE GROUND: Grey SAND and GRAVEL with low cobble content. Sand is fine to coarse. Gravel is fine to coarse angular limestone. Cobbles are angular limestone.	0.45	(0.35)	49.64		
			0.60	ES			MADE GROUND: Brown clayey SAND. Sand is fine to medium.	1.20	(0.75)	48.89		
			1.20	SPT	N=12 (2,3,4,3,2,3)		MADE GROUND: Medium dense brownish black gravelly SAND. Sand is fine to coarse ash. Gravel is fine angular coal, clinker and mudstone.	1.80	(0.60)	48.29		
			1.70	ES			MADE GROUND: Soft brown slightly sandy gravelly CLAY. Sand is fine to medium. Gravel is fine to medium subangular to rounded mudstone, coal, clinker and red brick.	2.50	(0.70)	47.59		
			1.90	ES			No recovery due to loose material fallout from barrel.	3.00	(0.50)	47.09		
			2.00	SPT	N=8 (2,1,2,2,2,2)		MADE GROUND: Medium dense black slightly gravelly SAND. Sand is fine to medium ash. Gravel is fine subangular coal and clinker.	3.45	(0.45)	46.64		
			3.00	SPT	N=16 (6,3,2,6,5,3)		No recovery due to brick cobble.	4.00	(0.55)	46.09		
			3.20	ES			Firm grey slightly sandy slightly gravelly CLAY. Sand is fine. Gravel is fine subangular to subrounded coal and mudstone. Includes visible streaks of hydrocarbons within cracks and includes a strong hydrocarbon odour.	4.30	(0.30)	45.79		
			4.00	SPT	N=26 (2,1,5,13,4,4)		No recovery.	5.00	(0.70)	45.09		
			4.20	ES			End of Borehole at 5.00m					
			5.00	SPT	N=32 (6,7,15,7,5,5)							
			5.00	ES								

General Remarks:
1. No groundwater encountered. 2. Inspection pit to 1.2m. 3. Visual and olfactory evidence of hydrocarbon contamination from 4.0m. 4. Monitoring well installed to 4.0m due to hole collapsing from 4.0m. 5. Coordinates and elevation obtained using 3rd party surveyor.

Logged in general accordance with BS5930:2015

Hydrock

Project: Aldi Egremont

Trialpit No
WS10
Page No. 1 of 1

Method: Trial Pit	Date(s): 09/11/2023	Logged By: JWM	Checked By: NW
Client: Aldi Stores Limited	Co-ords: 301155.83, 511058.21	Stability:	Dimensions: m
Hydrock Project No: 29348 GNEW	Ground Level: 50.12m OD	Plant: Hand Dug	Scale: 1:25

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
				MADE GROUND: Tarmac.	0.10	(0.10)	50.02	
				MADE GROUND: Greyish beige sandy GRAVEL. Sand is fine to coarse. Gravel is coarse angular limestone.	0.30	(0.20)	49.82	
				MADE GROUND: Black GRAVEL. Gravel is coarse angular tarmac. (Potentially former road)	0.40	(0.10)	49.72	
0.60	ES			MADE GROUND: Grey sandy GRAVEL with a medium cobble content. Sand is fine to coarse. Gravel is fine to coarse angular concrete, mudstone and limestone. Cobbles are angular brick and concrete. Includes visible hydrocarbons and strong hydrocarbon odour.	0.70	(0.30)	49.42	
				Base of Excavation at 0.70m				

General Remarks:
1. Inspection pit only due to hand tools being unable to penetrate past 0.7m. 2. Visual and olfactory evidence of hydro carbon contamination from 0.4m. 3. Backfilled with arisings upon completion. 4. Coordinates and elevations obtained using 3rd party surveyor.

Logged in general accordance with BS5930:2015

Hydrock	Project: Aldi Egremont	Borehole No WS12 Page No. 1 of 1

Method: Window Sampler	Date(s): 09/11/2023	Logged By: JWM	Drilled By: Geo Environmental Engineering
Client: Aldi Stores Limited	Co-ords: 301179.99, 511028.92	Checked By: NW	Rig: WS Rig
Hydrock Project No: 29348 GNEW	Ground Level: 49.12m OD		Scale: 1:30

Sample Run Info			Testing			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend	Instrumentation / Backfill
Sample Run	Run Ø	Recovery	Depth (m)	Type	Results							
			0.20	ES			MADE GROUND: Grey sandy GRAVEL. Sand is fine to coarse. Gravel is fine to coarse angular concrete and mudstone.	0.60	(0.60)	48.52		
			1.00	ES			MADE GROUND: Medium dense brown sandy GRAVEL with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse angular to rounded mudstone and sandstone. Cobbles are subangular limestone and sandstone. Includes visible hydrocarbons and hydrocarbons odour.	1.40	(0.80)	47.72		
			1.20	SPT	N=12 (1,1,2,2,3,5)							
			1.65	ES			MADE GROUND: Soft brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse subangular to subrounded mudstone, sandstone and limestone. Includes treated wood.	1.85	(0.45)	47.27		
			2.00	SPT	N=3 (0,0,1,0,1,1)		No recovery.	2.00	(0.15)	47.12		
			2.25	ES			MADE GROUND: Soft brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse subangular to subrounded concrete, mudstone, sandstone and limestone. Includes glass fragments.	2.40	(0.40)	46.72		
			3.00	SPT	N=7 (1,2,2,1,2,2)		No recovery.	3.00	(0.60)	46.12		
			3.30	ES			MADE GROUND: Soft brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse subangular to subrounded concrete, mudstone, sandstone and limestone. Includes glass fragments.	3.55	(0.55)	45.57		
			4.00	SPT	N=12 (2,3,3,3,3,3)		No recovery.					
			4.00 - 5.00	D			*... From 4.0m to 5.0m - Recovery less than 10cm, recovered material was brown sandy GRAVEL. Sand is fine to coarse. Gravel is fine to coarse angular mudstone, sandstone and limestone.*	5.00	(1.45)	44.12		
			5.00	SPT	N=25 (8,8,8,7,5,5)		End of Borehole at 5.00m					

General Remarks:
1. Wet from 0.3m. 2. Inspection pit to 1.2m. 3. visual and olfactory evidence of hydrocarbon contamination from 0.8m. 4. Monitoring well installed to 4.0m. 5. Coordinates and elevation obtained using 3rd party surveyor.

Logged in general accordance with BS5930:2015

Hydrock

Project: Aldi Egremont

Borehole No
WS13
Page No. 1 of 1

Method: Window Sampler	Date(s): 09/11/2023	Logged By: JWM	Drilled By: Geo Environmental Engineering
Client: Aldi Stores Limited	Co-ords: 301212.81, 511038.52	Checked By: NW	Rig: WS Rig
Hydrock Project No: 29348 GNEW	Ground Level: 48.97m OD		Scale: 1:30

Sample Run Info			Testing			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend	Instrumentation / Backfill
Sample Run	Run Ø	Recovery	Depth (m)	Type	Results							
			0.30	ES			MADE GROUND: Grey sandy GRAVEL. Sand is fine to coarse. Gravel is fine to coarse angular concrete and mudstone.	0.60	(0.60)	48.37		
			1.00	ES			MADE GROUND: Medium dense black gravelly SAND with a medium cobble content. Sand is fine to coarse ash. Gravel is fine to coarse angular coal, clinker, brick and concrete.	1.70	(1.10)	47.27		
			1.20	SPT	N=11 (1,2,2,2,3,4)							
			1.50	ES			No recovery due to loose material fallout from barrel.	2.00	(0.30)	46.97		
			2.00	SPT	N=18 (1,2,3,5,5,5)		MADE GROUND: Blackish brown slightly sandy slightly gravelly SILT. Sand is fine to coarse. Gravel is fine to medium subangular sandstone, mudstone and clinker. Includes paper waste and desiccated roots.	2.40	(0.40)	46.57		
			2.20	ES			No recovery.					
			3.00	SPT	N=17 (2,3,4,4,5,4)		*... At 3.0m - SPT partial recovery of soft to firm brownish grey slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is fine subangular to rounded mudstone and sandstone.*	4.00	(1.60)	44.97		
			4.00	SPT	N=2 (1,0,1,0,1,0)		End of Borehole at 4.00m					

General Remarks:
1. Wet from 1.0m. 2. Inspection pit to 1.2m. 3. No visual or olfactory evidence of contamination. 4. Monitoring well installed to 4.0m. 5. Coordinates and elevation obtained using 3rd party surveyor. 6. Refusal at 4.0m.

Logged in general accordance with BS5930:2015

Appendix C – Gas and Groundwater Monitoring Results

Ground Gas and Water Monitoring Certificate

Hydrock 3E

Site: Aldi, Egremont
Project No. 29348
Date: 04/12/23

Borehole	Gas Flow (l/hr)	Time	Atmospheric Pressure (mB)	Methane (%v/v)		Methane (% LEL*)		Carbon Dioxide (%v/v)		Oxygen (%v/v)		Other Gases (ppm)			Depth to Water (mBGL)
				Peak	Steady	Initial	Steady	Peak	Steady	Minimum	Steady	PID	H_2S	CO	
WS12	+0.3	1230	996	8.8	8.8	-	-	6.5	6.5	0.5	0.5	16.7*	0	0	DRY
WS13	+0.0	1235	996	0.2	0.2	-	-	2.0	2.0	0.2	0.2	103*	0	0	3.09
WS09	+0.2	1240	996	0	0	-	-	3.2	3.2	19.0	19.0	0	0	0	DRY
WS07	-0.5	1245	996	0	0	-	-	0.2	0.2	22.4	22.4	0	0	0	1.20
WS01	0.0	1300	996	0	0	-	-	2.4	2.4	20.6	20.6	0	0	0	2.76

Notes:
Monitoring should be for **not less** than 3 minutes. However, if high concentrations of gases initially recorded, monitoring should be for up to 10 minutes
* LEL = Lower Explosive Limit = 5%v/v. mBGL = metres Below Ground Level.
PID RECORDED HIGH PPM FIRST ROUND AND THEN WHEN CHECKED LATER RECORDED 0, POSSIBLE GLITCH ON PID MONITOR

Relevant Information At Time Of Monitoring				
Monitored by:	Callum Hall			
Atmospheric Pressure (mB):	996			
Weather:	Dry, cold			
Atmospheric Pressure Trend:	Falling			
Equipment Used:	Infra-red Gas Analyser	Yes	**Last calibrated:**	04.04.23
	Mass Balance Transducer	~	**Last calibrated:**	~
	Tiger PID	Yes	**Last calibrated:**	~
Visible Signs of Vegetation Stress:	~			
Other Comments / Observations:	~			
Boreholes Sampled For Laboratory Analysis:	~			

Ground Gas and Water Monitoring Certificate

Hydrock 3E

Site: Aldi, Egremont
Project No. 29348
Date: 15/12/23

Borehole	Gas Flow (l/hr)	Time	Atmospheric Pressure (mB)	Methane (%v/v)		Methane (% LEL*)		Carbon Dioxide (%v/v)		Oxygen (%v/v)		Other Gases (ppm)			Depth to Water (mBGL)
				Peak	Steady	Initial	Steady	Peak	Steady	Minimum	Steady	PID	H_2S	CO	
WS12	0.0	~	1027	0.5	0.5	-	-	7.1	7.1	8.2	8.2	~	0	0	4.12
WS13	0.0	~	1027	0.2	0.2	-	-	0.8	0.8	0.4	0.4	~	0	0	2.52
WS09	0.0	~	1026	0.0	0.0	-	-	2.6	2.6	19.1	19.1	~	0	0	4.13
WS07	0.0	~	1027	0.0	0.0	-	-	0.2	0.2	22.9	22.9	~	0	0	1.05
WS01	0.0	~	1026	0.0	0.0	-	-	2.5	2.5	20.7	20.7	~	0	0	4.12
WS06	+0.1	~	1026	0.0	0.0	-	-	0.3	0.3	21.5	21.5	~	0	0	2.23
WS08	0.0	~	1026	0.0	0.0	-	-	1.4	1.4	20.8	20.8	~	0	0	3.29

Notes:
Monitoring should be for **not less** than 3 minutes. However, if high concentrations of gases initially recorded, monitoring should be for up to 10 minutes
* LEL = Lower Explosive Limit = 5%v/v. mBGL = metres Below Ground Level.
PID RECORDED HIGH PPM FIRST ROUND AND THEN WHEN CHECKED LATER RECORDED 0, POSSIBLE GLITCH ON PID MONITOR

Relevant Information At Time Of Monitoring				
Monitored by:	SW			
Atmospheric Pressure (mB):	1026 - 1027			
Weather:	Dry, cloudy and cold			
Atmospheric Pressure Trend:	Rising			
Equipment Used:	Infra-red Gas Analyser	Yes	**Last calibrated:**	04.04.23
	Mass Balance Transducer	~	**Last calibrated:**	~
	Tiger PID	~	**Last calibrated:**	~
Visible Signs of Vegetation Stress:	~			
Other Comments / Observations:	~			
Boreholes Sampled For Laboratory Analysis:	~			

Appendix D – CPT Report

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ALDI, WYNDHAM PLACE, EGREMONT (P21-172)

SOIL INVESTIGATION

CPT REPORT

Cone penetration testing
Parameter interpretation

Project Reference.: P-108464-1

Report Issue No.: 01 P-108464_01

PROJECT:	Aldi, Wyndham Place, Egremont (P21-172)

CLIENT:	Hydrock

FIELDWORK

CPT rig(s)	20.5-tonne track-truck mounted CPT unit (UK3)
Date fieldwork started	21st November 2023
Date fieldwork completed	21st November 2023
Lankelma's representative	Paul Dimelow
Client's representative	Nicola Watson

DOCUMENT CHECKING

Action	Date	Name
Completed	22/11/2023	Christopher Player
Checked	22/11/2023	Joseph Hobbs
Approved	22/11/2023	Joseph Hobbs

Issue	Date	Status
01_01	22/11/2023	Final

CONTENTS

1 INTRODUCTION

At the request of Hydrock, a soils investigation was carried out on project *Aldi, Wyndham Place, Egremont (P21-172)*.

Site location:

(In the general region of)

60 Wyndham Place
Egremont
CA22 2DY

2 DISCLAIMER

The investigation information, raw data and interpretations provided in this report are for the sole benefit of the Client identified at the front of the report.

Lankelma has exercised reasonable skill and care in the fieldwork and preparation of this report. This report has been completed based on information available to Lankelma at the time of preparation. The measurement and interpreted data in this report do not constitute recommendations for design purposes. An appropriately qualified person must review and interpret the data given in this report, together with any assumptions we have made that affect the data, before using the data for design or recommendation. Lankelma accepts no responsibility for the accuracy or suitability of any assumptions, derived soil parameters, soil classification descriptions or soil layer boundaries contained in this report.

3 COMPLETED WORKS

- 8 nr. cone penetration tests with pore pressure measurement (CPTu)
- Factual report including point data interpretation of selected parameters

Appendix A contains tabulated details of the works completed together with analysis results where applicable.

4 FIELDWORK GENERAL

Fieldwork was performed with a 20.5-tonne track-truck mounted CPT unit (UK3) equipped with a 17.0-tonne capacity hydraulic ram set.

The Client was responsible for the positioning and re-survey of all investigative locations.

The target depth for the investigation was 40 m below ground level. Table 3 details the final test depths and reasons for test termination (*refusal factor).* Where required, each penetration refusal decision was verbally confirmed with the Client's on-site representative.

5 CONE PENETRATION TESTS

Cone penetration testing was carried out in general accordance with BS ISO 22476-1:2012.

Penetrometer measurements included cone tip resistance, friction sleeve resistance and dynamic pore water pressure sampled at a 10 mm resolution.

Penetrometers were calibrated in accordance with ISO 376:2011. The management of calibration records is in accordance with ISO 10012. Copies of all calibration certificates for the cones used are provided in Appendix B.

The penetrometer used was a digital model (down-hole digitisation) with internal measurement of load cell temperature. The temperature data was used for QA during the test and QC during processing. The test operative aimed to keep the rate of temperature change to less than 0.5°/min in low strength soils to maintain acceptable measurement error. The temperature data can be used to assess ground temperature at depths where the cone has paused for more than 10 minutes with an accuracy of ~+- 0.5°.

The piezometer filter element was in the u_2 position and was vacuum saturated in a > 99.9% vacuum under 1000 cSt silicone oil for > 7 days prior to mobilisation. The pore pressure system was vacuum saturated in the disassembled state under 500 cSt glycerine oil (dipropylene glycol or propylene glycol) and assembled under oil prior to each test.

5.1 GLOSSARY OF CPT TERMS AND SYMBOLS

SYMBOLS & ABBREVIATIONS

B_q	**Pore pressure ratio.** The net pore pressure normalized with respect to the net cone resistance: $B_q = (u_2 - u_0)/(q_t - \sigma_v)$
F_r	**Normalised friction sleeve resistance:** $F_r = f_s / (q_c - \sigma_v)$
f_s	**Friction sleeve resistance:** The total frictional force acting on the friction sleeve, F_s, divided by its surface area A_s: $f_s = F_s/A_s$.
G	**Shear modulus**
g	**Gravitational field strength:** g **=** 9.81 m/s^2
G_0	**Small strain shear modulus**
Gs	**Specific gravity of solids**
HOC	**Heavily overconsolidated**
I_c	**Soil Behaviour Type Index:** Continuous numerical representation of Robertson (1990) soil behaviour type classification chart.
LOC	**Lightly overconsolidated**
NC	**Normally consolidated**
OC	**Overconsolidated**
q_c	**Cone resistance:** The total force acting on the cone Q_c, divided by the projected area of the cone, A_c: $q_c = Q_c/A_c$.
Q_t	**Normalised cone resistance** (Method 1): $Q_t = (q_c - \sigma_v)/\sigma'v$

q_t	**Corrected tip resistance:** The cone tip resistance q_c corrected for pore water pressure effects on the cone shoulder.
q_{t-net}	**Net cone resistance:** $q_{t-net} = q_t - \sigma_v$. Where q_t is unavailable q_c is applied.
q_{t1}	**Normalised cone resistance** (Method 2): $q_{t1} = (q_t)/(\sigma'_v)^{0.5}$
R_f	**Friction ratio:** The ratio, expressed as a percentage, of the sleeve friction, f_s, to the cone resistance, q_c, at a given depth: $R_f = (f_s/q_c) \cdot 100$
SBT or SBTn	**Soil behaviour type classification**
SPT	**Standard Penetration Test**
u_0	**Equilibrium pore pressure**
u_2	**Pore pressure:** Dynamic pore pressure measured at the shoulder position (u_2) during penetration and during dissipation tests. $u_2 = \Delta u_2 + u_0$
Δu_2	**Excess pore pressure:** $\Delta u_2 = u_2 - u_0$
V_s, V_p	**Shear wave velocity, V_s, and pressure wave velocity, V_p.** Measured with use of a seismic receiver.
z	**Depth below ground level:** Depth as penetration length without correction for inclination, or true depth after correction for inclination.

Greek

γ	**Unit weight of soil**
γ_w	**Unit weight of water**
ρ	**Volumetric mass density (or specific mass) of soil:** $\rho = \gamma/g$
σ_v	**Total overburden stress**
σ'_v	**Effective overburden stress**
σ_{atm}, **or,** P_a	**Reference atmospheric stress:** σ_{atm} **=** 101.3 kPa

TERMS

Cone or 'tip': The conical tip of the cone penetrometer.

Friction sleeve: The section of the cone penetrometer upon which the sleeve friction is measured, located behind the cone tip.

Piezocone: A cone penetrometer with a pore pressure sensor (u_2 or u_1)

Seismic cone: A cone penetrometer with a seismic receiver incorporated inside or behind.

Dynamic pore pressure: The pore pressure measured during penetration (u_2 or u_1) .

Soil behaviour type, or 'SBT': Soil classification scheme or classified soil type according to Robertson (1990, 2016) often abbreviated to SBT or according to normalised cone parameters SBTn.

Rod string: The series of hollow tube push rods that transmit force to the penetrometer.

5.2 CPT DATA REDUCTION AND PRESENTATION

The CPT results are presented in Appendix C. The corrected cone resistance (q_t), local side friction (f_s), dynamic pore water pressure (u_2), friction ratio (R_f) and inclination are all presented against depth and elevation in accordance BS ISO 22476-1:2012. CPT data and the associated derived geotechnical parameters are included in the 4.0 data file provided.

The cone tip and sleeve force measurements were converted to pressure using the nominal dimensions of the penetrometer.

Zero load output values were recorded before and after each test. The set of zero values applied to the measurements (subtracted from the raw output measurement) were those deemed to be obtained at a temperature closest to ground temperature, or the average of the two sets where appropriate.

For tests performed with digital cones, the tip sleeve and pore pressure measurements were corrected for static and transient temperature effects using parameters obtained from the *TEMPERATURE EFFECTS* section of the calibration certificate. For each CPT, the dataset was first grouped into penetration strokes (max 1.2 m) and then locally sub-grouped by tip resistance above and below 2 MPa. For each sub-group of qc < 2 MPa, the slope of the temperature (T) profile with time (t) was determined by regression to obtain the rate of temperature change $\Delta T/\Delta t$. For each recorded value, the static and transient temperature error component (apparent sensor output due to change in temperature) was subtracted from the reading.

For subtraction type cones incorporating traditional temperature compensation wiring in the strain gauge circuit, the residual apparent cone tip resistance ($q_{c:a}$) and sleeve resistance ($f_{s:a}$) due to static and transient temperature effects can be approximated by

$q_{c:a} = a(\Delta T/\Delta t) + b(\Delta T)$,

$f_{s:a} = a(\Delta T/\Delta t) + b(\Delta T) - q_{c:a}$

and

$u_a = b(\Delta T)$

Where $q_{c:a}$ is the apparent tip resistance, $f_{s:a}$ is the apparent sleeve resistance, a is the apparent resistance due to unit transient temperature change $\Delta T/\Delta t$, and b is the change in apparent resistance per unit static temperature change relative to the temperature of the penetrometer at the time of zero load output measurement. Note that for the piezometer sensor only the static temperature component is considered and is only applied to piezometer sensors without temperature compensation circuitry.

Parameter a is established by subjecting the cone to a positive and negative nominal temperature change (ΔT ~ +- 9°) in water and measuring the apparent output corresponding to the maximum rate of temperature change at the load cells. Parameter b is established by measuring the apparent output after the cone has temperature stabilised.

The temperature corrected tip ($q_{c:c}$), sleeve resistance ($f_{s:c}$) and pore pressure ($u_{:c}$) are then found from

$q_{c:c} = q_{c:m} - q_{c:a,}$

$f_{s:c} = f_{s:m} - f_{s:a}$

$u_{:c} = u_{:m} - u_{:a}$

Where subscript '$_{:m}$', denotes the field measured resistance/pressure as recorded in the raw data files.

Notes:

1. Depending on the temperature performance of the individual cone, temperature correction of the sleeve is often not warranted as it does not substantially improve accuracy. This is because for subtraction type cones the errors in the sleeve force largely cancel with errors in the tip force when they have the same sign.

2. There is currently no recognised nomenclature for CPT parameters with temperature correction applied during post processing. To avoid confusion the nomenclature is kept unchanged in the logs and AGS data (q_c/q_t, f_s, and u_2) and unless stated otherwise, temperature correction has been applied using the parameters reported in the calibration certificate.

For piezocone tests the total cone resistance (or 'corrected cone resistance') was calculated according to the formula

$$q_t = q_c + u_2 \times (1 - a)$$

Where a is the 'area ratio' and (1- a) is the proportion of cross-sectional area between the cone tip and penetrometer body where pore pressures (positive or negative) can act to add or subtract from the total external axial force on the tip. The difference between measured and corrected values is largest in low strength collapsible soils with large excess pore pressures. The percentage adjustment is described by the curves on the chart below for a = 0.8:

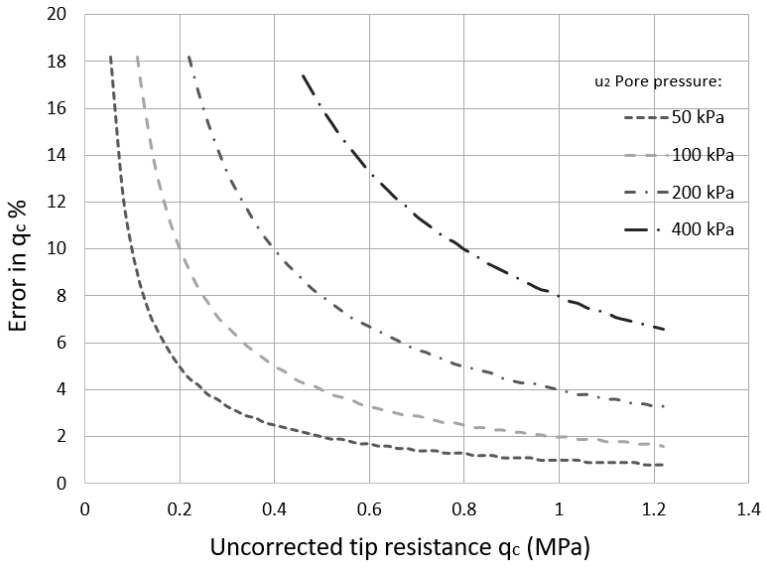


Figure 5-1 Uncorrected tip with measured tip resistance

Penetration length readings were corrected for inclination and sleeve readings were depth corrected for the dimensional offset between cone tip and sleeve during post processing. Rod spikes (artefacts of the pause for push rod addition) were filtered from the cone tip and sleeve data and replaced with an interpolated value. The data was re-sampled from 10 mm resolution to 20 mm to reduce the size of the data set to a more manageable size for end users. A 20 mm resolution is well within the intrinsic influence zone of the cone tip measurement and the loss of meaningful resolution is negligible.

The raw data is presented in Appendix C. For piezocone tests q_t is reported on all logs, and q_c only appears in the digital AGS data.

Geotechnical parameters appropriate for drained and undrained cone penetration conditions were derived for corresponding drained and undrained derived soil behaviour types (SBTs) respectively, however, to account for uncertainty in the SBT correlation with drainage behaviour, all parameters were derived over a range of transitional soils within the range $2.4 < Ic < 2.7$ (see section 6.3).

In general, the engineering parameters derived for fine grain soils (undrained) are suitable for soils of both silicate and carbonate composition, whereas parameters derived for coarse soils are intended for non-cemented silicate composition.

5.3 IN-SITU STRESS CONDITIONS

An estimate of the equilibrium pore pressure and total and effective vertical stress states is required for derivation of most soil parameters obtained from the CPT and dissipation test.

The total vertical stress with depth was calculated as the sum of the derived soil unit weight above a given depth. See section 5.4 for information on the empirical estimate of soil unit weight.

An arbitrary phreatic surface of 3.00 mBGL was applied in the calculation of effective stress.

Note: The term phreatic surface is used here, however when it is based on piezometer measurements (piezocone) it is assumed that the piezometric level (under hydrostatic conditions) and phreatic surface coincide. The phreatic or piezometric level reported is intended to provide information about pore pressure distribution assumed for calculation purposes and may not represent the true position of the groundwater table or perched water bodies. Complex groundwater pressure distributions will be applied if they are observed from the measurements and are sufficiently well defined.

5.4 SOIL UNIT WEIGHT

The soil unit weight was estimated using the following method proposed by Robertson (2010b).

$$\frac{y}{y_w} = 0.27\,Log(R_f) + 0.36\,(Log(q_t/R_f)) + 1.236$$

Throughout pre-drilled zones (inspection pits or drill-out) the soil was assigned a nominal unit weight of 17 kN/m^3.

For depths where the friction sleeve resistance measurement was less than zero due to measurement limitations, the friction sleeve resistance input parameter was substituted with a nominal 1.0 kPa resistance for the purpose of obtaining an approximate soil unit weight necessary for estimation of total vertical stress over the entire profile.

5.5 SOIL BEHAVIOUR TYPE

The data have been interpreted using 4 soil behaviour type schemes: Robertson (1990, 2010, 2016) and Schneider et al, 2008. The Robertson (1990) scheme is widely used and forms the bases of the layer analysis whereby the profile is split into zones of common classification. The Robertson (2010 & 2016) and Schneider at al methods are less widely used but can provide better or more relevant classification in many instances. Differences in classification between the Robertson 1990, 2016 and Schneider et al schemes can also help to identify significant structure/cementation (Robertson 2016).

A dedicated soil behaviour type comparison log is provided in Appendix D.

Robertson (1990, 2010)

The soil behaviour type (SBT) was interpreted using the Robertson (1990) classification system based on the normalised cone resistance (Qt) and normalised friction sleeve resistance (Fr) for silicate and organic soils.

While the classification based on normalised parameters is more accurate, particularly for NC soils exceeding 15 m depth, the classification is often significantly in error (artificially granular/drained) at shallow depth (< 1-3 m). The error at shallow depth is associated with the potentially large difference between the estimated vertical effective stress (applied in normalisation) and the unknown horizontal stress influencing penetration resistance.

Robertson (2010) proposed a non-normalised version of the 1990 chart which uses dimensionless cone resistance (q_c/Pa) and friction ratio (Rf). The classification according to this chart can be more reliable at shallow depth.

It should be noted that:

- The SBT classification provides a general soil type and tends to show biased towards the soil fraction that dominates the mechanical behaviour.
- If fine cohesive soils are dry and overconsolidated, the classification tends to shift towards a coarser soil type (or lower I_c index)

While the repeatability and behavioural bias of the SBT is usually beneficial, the classification is not always an appropriate substitute for classification based on particle size and plasticity index tests.

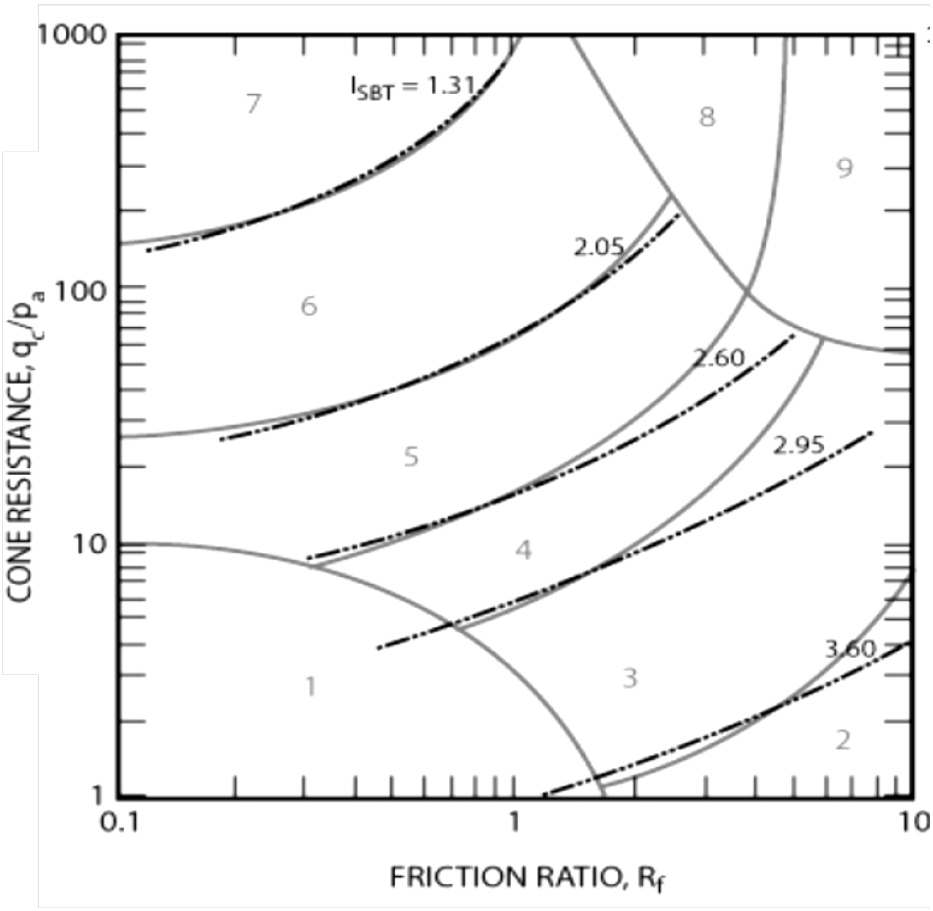


Figure 5-2 Non-normalised SBT chart by Robertson et al. (2010) based on dimensionless cone resistance (qc/Pa) and friction ration, Rf, showing contours of SBT index ISBT (denoted Ic on the test plots). The chart is also applicable to normalised tip (Q_t) and sleeve (F_r) values.

Table 1 Robertson (1990, 2010) soil behaviour type zone descriptions

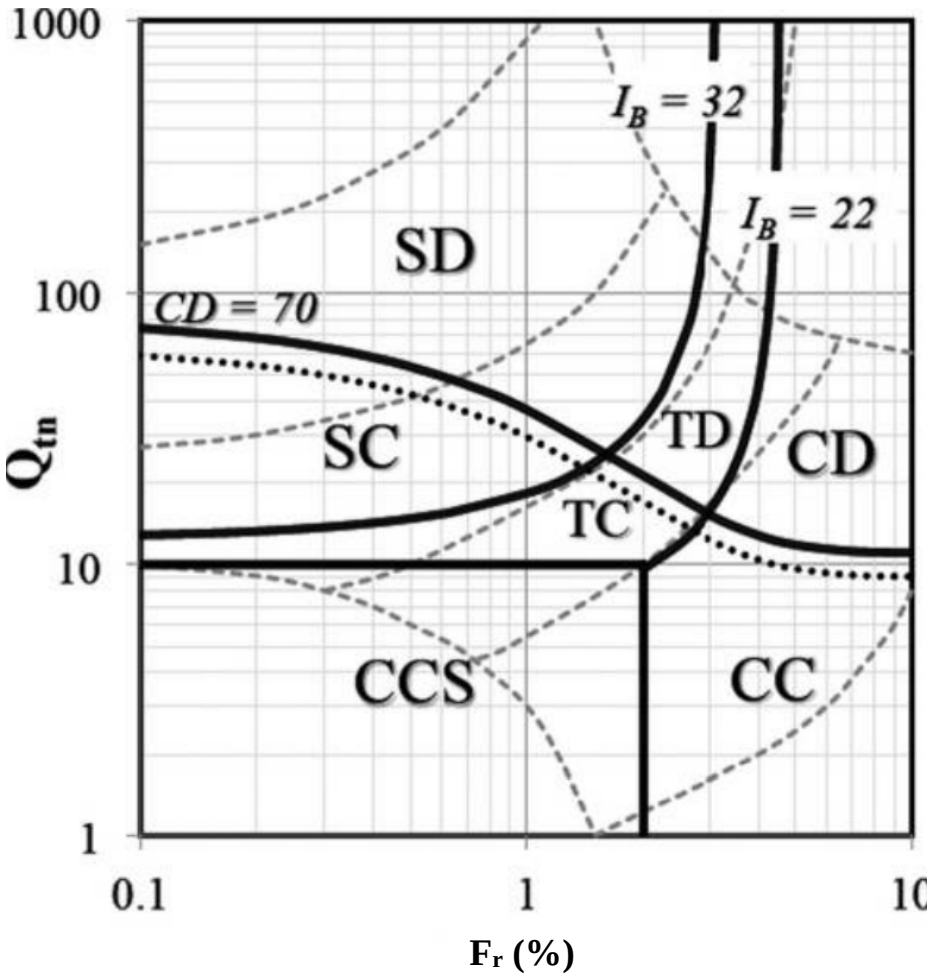
Zone	Soil Behaviour Type (SBT)		
1	Sensitive fine-grained	6	Sands - clean sand to silty sand
2	Organic soils	7	Gravelly sand to sand
3	Clays – clay to silty clay	8*	Very stiff/dense sand to clayey sand[1]
4	Silt mixtures - clayey silt to silty clay	9*	Very stiff fine grained[1]
5	Sand mixtures – silty sand to sandy silt	*Heavily overconsolidated or cemented	

[1]Note zones 8 and 9 appear as *'Very stiff/dense sand to clayey sand – HOC or cemented'* and *'Very stiff fine grained – HOC or cemented'* within the soil unit descriptions of plots in Appendix D.

Results are presented in Appendix D.

Robertson 2016

Using the same Q_t - F_r space as above, Robertson (2016) proposed an alternative purely behavioural classification system that places less emphasis on classification according to composition/textural properties and more emphasis on mechanical behaviour – namely the tendency of the soil to dilate or collapse during large strain shear, and sensitivity.



Zone	Soil Behaviour Type (SBT)
CCS	Clay-like – contractive - sensitive
CC	Clay-like – Contractive
CD	Clay-like – Dilative
TC	Transitional - Contractive
TD	Transitional - Dilative
SC	Sand-like - Contractive
SD	Sand-like - Dilative

Figure 5-3 Robertson 2016 soil behaviour type classification chart and zone descriptions

Schneider *et al.* (2008)

Schneider *et al.* (2008) proposed a classification system based on the normalised pore pressure B_q and tip resistance Q_t. This system is particularly useful for soils of very low strength or that exhibit drainage behaviour or u_2 response inconsistent with the SBT derived from tip and sleeve measurements. However, when using this method for onshore CPT data, the u_2 piezometer response should be assessed for possible desaturation. Generally, it is safest to only use this method when the piezometer response is 'spikey' and responding dynamically to changes in tip resistance.

A set of logs showing both the Robertson and Schneider et al. classification results are provided for comparison in Appendix D.

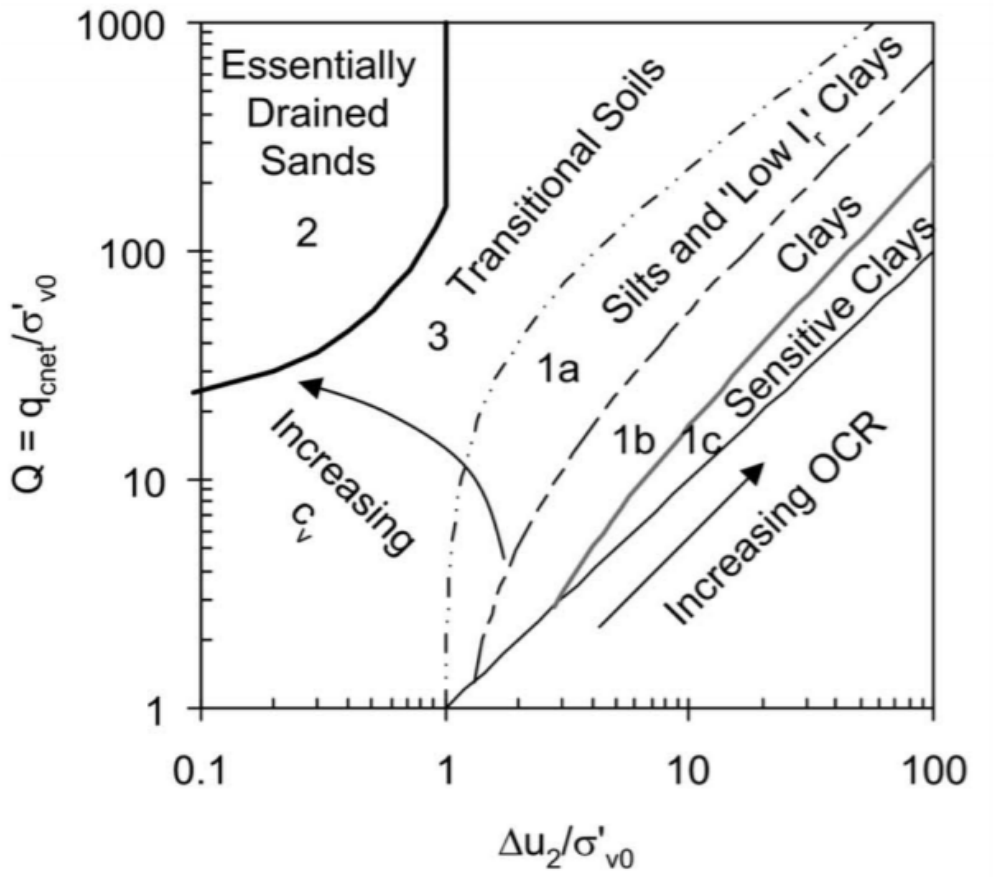


Figure 5-4 Schneider 2008 soil behaviour type classification chart and zone descriptions

Layer Analysis

The layer boundaries are manually interpreted based on broad changes in Robertson 1990 SBT classification or variance with depth. Once layer boundaries are defined, the SBT zones classified within each layer are listed together with the corresponding percentage of data points within the layer (excluding null/filtered data). The modal classification is reported in full, with abbreviated short descriptions for all secondary zones, for example - '*Clays – clay to silty clay [74%]; *Silt mixtures [20%]*', where the asterisk represents an abbreviation of the full description '*Silt mixtures – clayey silt to silty clay*'. It is important to consider that the classification zone boundaries do not exist in nature and small shifts in the cone response can lead to multiple classifications within layers of relatively uniform behaviour; especially were the layer data plot close to a zone junction and/or has spurious spikes or very thin layers. Therefore, some system is required to limit the number of classified zones that appear within each layer description. The following logic has been used to only retain high % constituent classification values:

For LT >= 1, C = 85
For 0.5 <= LT < 1, C = 75
For 0 < LT < 0.5, C = 65

Where
C = Minimum % SBT zone classification coverage within the layer description text
LT = Layer thickness (m)

For layers having a thickness of less than 1 m, 10% of data at the top and bottom of the layer are excluded to limit the effect of transition zone data (measured resistance influenced by overlying or underlying strata) being included in the classification.

The continuous SBT index I_c should be used to assess the classification distribution and variation not accounted for by the layer description.

5.6 SOIL BEHAVIOUR TYPE INDEX - I_c

The principal trend in soil behaviour type (SBT) variation can be expressed by a continuous index, I_c, proposed by Robertson and Wride (1998) based on a similar index proposed by Jefferies and Davies (1993). The index provides a continuous profile of SBT variation with depth for end-user analysis of soil units and variation within units. The equivalent non-normalised version proposed by Robertson (2010) is provided for comparison.

The basis of I_c and its approximation of the original chart classification zones may be seen from Figure 5-2. The method does not identify zones 1 (*sensitive fine grained)* or zones 8 & 9 (*heavily overconsolidated or cemented*).

Normalised SBT index I_c (Robertson and Wride, 1998)*:*

$$I_c = [(3.47 - \log Q_t)^2 + (logF_r + 1.22)^2]^{0.5}$$

Non-normalised SBT index I_c (Robertson, 2010)*:*

$$I_c = \left[\left(3.47 - \log\left(\frac{q_c}{\sigma_{atm}}\right)\right)^2 + (logR_f + 1.22)^2\right]^{0.5}$$

The normalised version of I_c is generally more accurate, while the non-normalised version is intended for compatibility with the non-normalised Robertson's (2010) SBT chart and may be more accurate at shallow depths in overconsolidated soils.

The results are presented in Appendix D.

5.7 RELATIVE DENSITY

The relative density of sands was calculated based on an empirical relationship proposed by Jamiolkowski *et al.* (2001) based on a large database of undisturbed frozen samples and calibration chamber tests on clean sands.

$$D_r = 100\left[0.268 \cdot \ln\left(\frac{q_t/\sigma_{atm}}{\sqrt{\sigma_{vo}'/\sigma_{atm}}}\right) - k\right]$$

k = Compressibility dependant constant can be taken as -0.675 for medium compressibility (applied value in our interpretation), <= 1 for high compressibility and >= 2 for compressible sands.

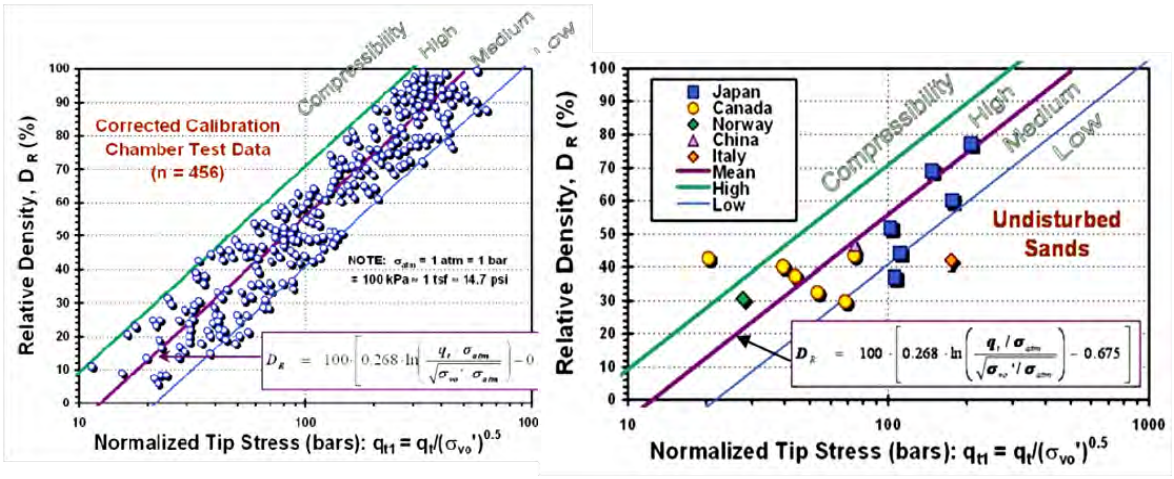


Figure 5-5 Relative density with normalised tip stress and sand compressibility from calibration chamber tests (left) and undisturbed frozen samples (right). Jamiolkowski *et al.* (2001). Reproduced from Mayne (2007).

The results are presented in Appendix F.

5.8 UNDRAINED SHEAR STRENGTH

The undrained shear strength s_u is usually estimated by the bearing capacity method, whereby the net tip resistance is divided by a factor N_k (Lunne *et al*, 1981):

$$s_u = \frac{q_c - \sigma_{v0}}{N_k}$$

Where N_k is an empirical factor which varies with soil type, stress history, structure/fabric, plasticity, and the mode of shear.

Mayne and Peuchen (2018) performed an evaluation of 407 high-quality undrained anisotropically consolidated triaxial compression tests (CAUC) with net tip resistance data pairs, resulting in N_{kt} factors with regression analysis details for five categories of clays shown in Table 2.

Table 2 Summary of CAUC s_u versus q_{net} for clays. Reproduced from Mayne and Peuchen (2018).

Clay Group	Number of sites	Nr Data	Correlation Coefficient r^2	Factor N_{kt}	Mean Pore Pressure Parameter B_q
Offshore NC-LOC	17	115	0.98	12.32	0.51
Onshore NC-LOC	30	191	0.867	12	0.53
Sensitive NC-LOC	5	43	0.507	10.33	0.84
OC Intact	5	36	0.862	13.57	0.49
OC Fissured	5	22	0.393	22.47	-0.01
All clays	62	407	0.923	13.33	0.55

Alternatively, a variable N_{kt} factor can be estimated for the profile as a function of the pore pressure parameter B_q, applicable for B_q values of > -0.01. The following equation proposed by Mayne and Peuchen is based on the same database evaluation:

$$N_{kt} = 10.5 - 4.6 \cdot \ln(B_q + 0.1)$$

Where the pore pressure parameter B_q is the ratio of excess pore pressure to net tip resistance:

$$B_q = \frac{u_2 - u_0}{q_t - \sigma_{v0}}$$

The N_{kt} estimate has a standard error of 2.4 N_k and correlation coefficient of 0.645.

The estimate based on B_q is presented as 's_u5' on the parameter plots and is only suitable for tests that have a high-quality pore pressure data, often indicated by a positive, repeatable, and dynamic response.

Note: N_{kt} (with subscript 't') indicates a N_k factor that has been established using the corrected tip resistance q_t. N_{kt} can be applied to the uncorrected tip resistance q_c (non-piezocone tests) but results in a slightly lower estimate of s_u depending on the correction magnitude (q_c - q_t) in lower strength soils.

Undrained shear strengths corresponding to selected values of N_k are presented on the plots of Appendix D. *'s_u3'* on the logs (N_k = 15) has been included as a reference for comparison to traditionally applied N_k values of 15 and 20.

The results are presented in Appendix E.

5.9 OVERCONSOLIDATION RATIO

The preconsolidation stress σ_p' was calculated based on the method proposed by Mayne et al (2009):

$$\sigma_p' = k \cdot (q_t - \sigma_{vo})^{m\prime}$$

$$OCR = \sigma_p{}'/\sigma'_{v0}{}'$$

Mayne *et al* found that the trend with mean grain size followed a power law through the addition of exponent m' and that its value can be estimated by relation to soil behaviour type index I_c:

$$m' = 1 - \frac{0.28}{1 + \left(\frac{I_c}{2.65}\right)^{25}}$$

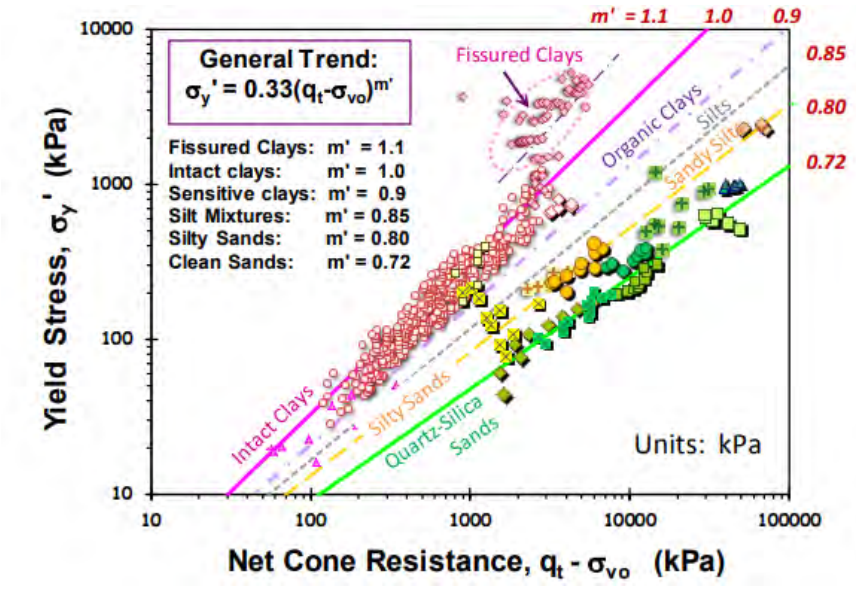


Figure 5-6 Preconsolidation stress with net cone resistance power law, reproduced from Mayne (2014).

An additional set of σ_p' and OCR values were calculated for m' = 1.1 to reflect the upper trend for over consolidated fissured clays not captured by the correlation with I_c.

The results are presented in Appendix E.

5.10 SPT N60 VALUES

Equivalent SPT N_{60} values, defined as the non-normalised SPT blow count over a 30 cm interval, with a reference hammer efficiency (energy transfer ratio, 'ETR' or 'ER') of 60%, were derived for two correlations.

Method 1 - Jefferies and Davies (1993) cited in Lunne *et al.* (1997):

$$N_{60} = \frac{q_t}{8.5 \cdot \sigma_{atm} \cdot \left(1 - \frac{I_c}{4.6}\right)}$$

Method 2 - Robertson (2012):

$$\frac{\left(\frac{q_t}{p_a}\right)}{N_{60}} = 10^{(1.268 - 0.2817 I_c)}$$

The correlations are intended for clays, silts and sands and not for carbonates or cemented geo-materials.

Conversion of N_{60} values for comparison to other hammer efficiency values, or vice-versa, uses the relationship:

N_{60} x 60/ETR = N

The results are presented in Appendix F.

5.11 FRICTION ANGLE

Sands

The peak friction angle of granular materials was calculated using the Kulhawy and Mayne (1990) method. The relationship is based on a calibration chamber database from 24 sands of varying mineralogy and is found from:

$$\phi' = 17.6 + 11.0 \cdot \log (q_{t1})$$

Where:

ϕ' = Peak friction angle (degrees)

q_{t1} = stress normalised cone resistance:

$$q_{t1} = \left(\frac{q_t}{\sigma_{atm}}\right) / \left(\frac{\sigma_{v0'}}{\sigma_{atm}}\right)^{0.5}$$

The presence of compressible minerals tends to reduce tip resistance resulting in lower estimate of friction angle, while very coarse (sand) or larger grain size tends to increase tip resistance resulting in higher estimate. Increased penetration resistance due to high k_0 conditions also results in an overestimate of friction angle.

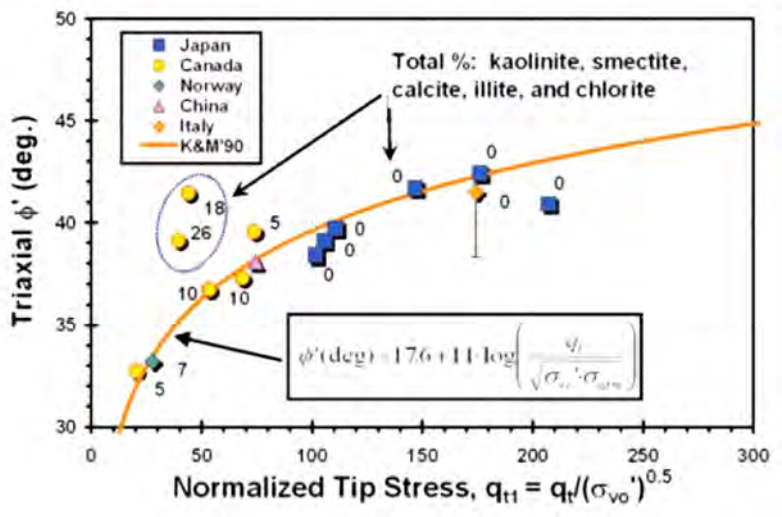


Figure 5-7 Peak triaxial friction angle from undisturbed sands with normalised cone resistance.

Fine grained soils

The effective friction angle for fine grained soils was calculated based on the Senneset *et al.* (1988, 1989) method by applying the approximate closed form solution by Mayne & Campanella (2005) as a direct function of the pore pressure parameter Bq and normalised tip resistance Q. The method is applicable where $0.1 < B_q < 1.0$ and $20° < \phi' < 45°$ and generally appropriate for non-cemented normally consolidated to lightly overconsolidated soils.

$$\phi' = 29.5° \, B_q{}^{0.121} [0.256 + 0.336 \, B_q + \log Q]$$

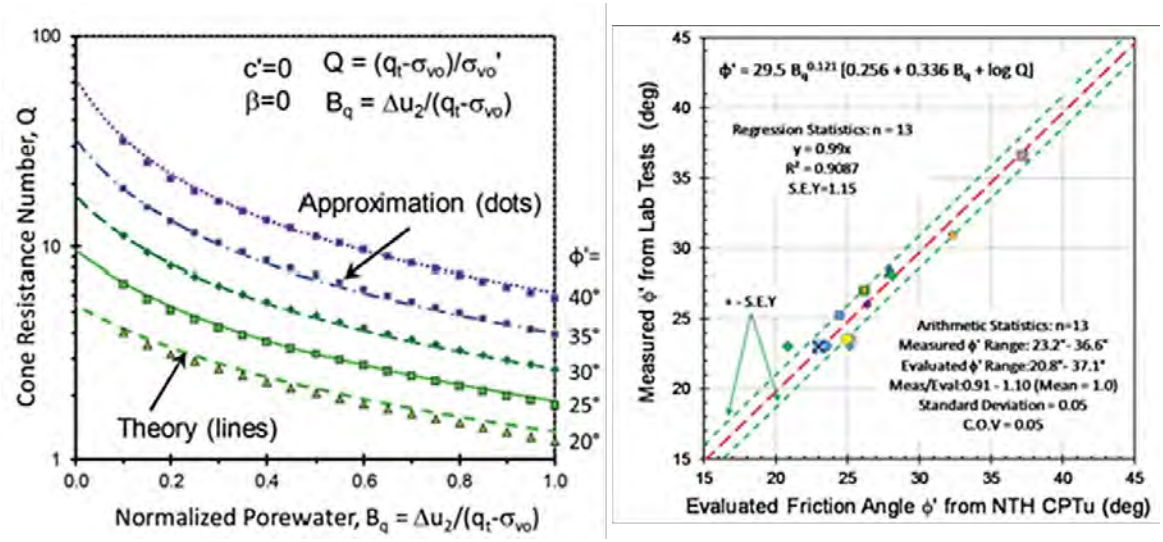


Figure 5-8 [Left] Theoretical curves with function approximation (dots) overlay [Right] calibration data from geotechnical centrifuge tests for a variety of soils. Redrawn from Ouyang & Mayne (2018).

The results are presented in Appendix F.

5.12 COEFFICIENT OF VOLUME CHANGE

Coefficient of volume change m_v defined as the inverse of the constrained modulus M, is evaluated for all soil types using the constrained modulus method proposed by Mayne (2006) cited in Mayne (2007). The value may be used to predict settlement at the end of primary consolidation and is applicable to the present state of vertical effective stress up to the pre-consolidation stress for overconsolidated soils.

$$m_v = \frac{1}{M}$$

Where:

$$M = \alpha \cdot (q_t - \sigma_v)$$

$$\alpha = 5$$

An alpha factor of 8.25 reported by Kulhawy & Mayne (1990) for fine grained soils appears to provide a better fit through the data for intact non-organic clays, reducing to around 1 to 2 for organic plastic clays.

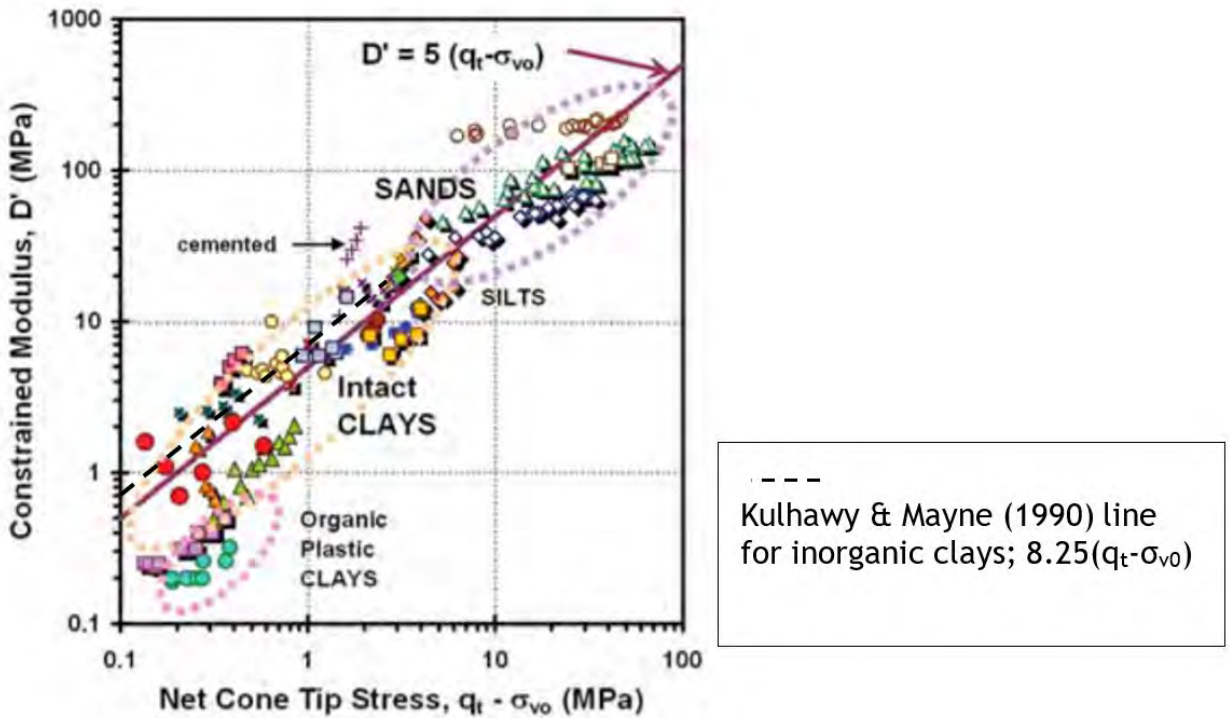


Figure 5-9 Constrained modulus of Mayne (2006). Annotated/redrawn from NCHRP Synthesis 368 (2007).

The results are presented in Appendix E.

5.13 YOUNG'S MODULUS

The secant Young's modulus E' at 25% mobilised shear strength (FOS = 4) was calculated according to the method proposed by Robertson (2009):

$$E' = \alpha(q_t - \sigma_v)$$

Where:

$$\alpha = 0.015(10^{0.55\boldsymbol{Ic}+1.68})$$

The method described by Robertson may be adapted to estimate E' for loading at different percentages of mobilised shear strength.

The results are presented in Appendix F.

6 CPT INTERPRETATION NOTES

Provided below is a non-exhaustive set of notes on interpretation of the acquired CPT data with reference to examples within the dataset where appropriate.

DRAINED AND UNDRAINED SOIL BEHAVIOUR

Geotechnical parameters appropriate for drained and undrained cone penetration conditions are derived for drained and undrained soil behaviour types (SBTs) respectively, however, to help mitigate the uncertainty in the SBT correlation with drainage behaviour, all parameters are derived over the Soil Behaviour Type range $2.4 < I_c < 2.7$. For partially drained conditions, error will be introduced within derived parameters.

Piezocone dynamic pore pressure and dissipation tests may be used to identify drainage conditions. Dissipation t_{50} values exceeding 50 seconds indicate undrained penetration behaviour based on the findings of Kim *et al.* (2008).

In partially drained materials the friction sleeve resistance may rise significantly immediately following a pause in penetration due to consolidation and increased effective stress on the friction sleeve.

DYNAMIC PORE PRESSURE u_2 (CPTu)

While the piezo system is saturated before use, testing through unsaturated soils may result in some degree of desaturation leading to a less accurate and more 'sluggish' pore pressure response. Desaturation can also occur during penetration due to suction pressure causing cavitation during dilative shear at the cone shoulder. Dissipation tests that are undertaken following desaturation are likely to have a more pronounced initial rise and the results of analysis may have some degree of error.

If the piezometer system becomes desaturated it may re-saturate at higher excess pressures later in the test as gas dissolves under pressure. The pore pressure response in saturated contractive soils should normally have a dynamic 'peaky' appearance.

The tip resistance in lower strength contractive soils without pore pressure measurement in the u_2 position is likely to be significantly lower (up to 20%, typically ~10%) than the equivalent corrected tip resistance depending on the magnitude of excess pore pressure generated during penetration.

CONE TIP AND SLEEVE OFFSET

The accuracy of the SBT over thin layers and at layer boundaries is sensitive to offset error in the friction ratio often resulting in sharp peaks or troughs at boundaries. The friction ratio is often inaccurate in heavily disturbed soils with a 'blocky' macro fabric. The last ~8 cm of data is also not included in the SBT material description as no friction sleeve measurements are recorded.

FRICTION SLEEVE DATA

There are three common causes of friction sleeve measurement error; 1) unequal pore pressure acting on the sleeve end areas as the sleeve passes though materials of different permeability and hence excess pore pressure Δu_2, often resulting in a negative/positive spike, 2) Accuracy limitations and temperature effects in very low strength or sensitive soils, and 3) error associated with bending strain that occurs while the cone inclination deviates rapidly. Temperature effects

are generally mitigated by temperature stabilisation during the test and at the time of zero output measurement.

CONE TYPE

The reference cone type has a 10 cm^2 projected cone tip area and 150 cm^2 friction sleeve area, however it is common to use a larger 15 cm^2 cone with a 225 cm^2 friction sleeve area for improved sensitivity, temperature stability, damage prevention and penetration depth potential due to the higher bending strength. Use of a 15 cm^2 cone does however require higher penetration force (reaction force) for a given penetration pressure and produces more pronounced transitions zones and thin layer effects due to the larger influence zone.

TRANSITION ZONES AND THIN LAYER EFFECTS

During penetration at the boundary between soils of contrasting stiffness, a transition zone is often evident prior to mobilisation of the true soil stiffness. These should be cautiously ignored in assessment of soil behaviour type and parameter evaluation. Where the stiff layer is thin (<~1 m) mobilised resistance may be significantly less than that of an equivalent thick layer. The effect for thin low stiffness layers is less significant. Procedures for thin-layer effect correction are provided by Robertson and Wride (1998) and Boulanger & DeJong (2018).

GRAVELS

The presence of gravel or larger clasts in a soil is often characterised by short peaks in the CPT tip and sleeve readings, possibly with associate inclinometer 'shake' and/or short sharp reductions in pore water readings due to dilation effects. Frequent gravels in soft or loose soils may generate localised erroneous friction ratio values.

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APPENDICES

APPENDIX A SUMMARY TABLES

Table 3 CPT summary

Location ID	Stroke number	Final depth (m)	Cone ID	Piezocone test	Pre-drilled (m)	Pre-drilling details	Rig	Primary refusal factor	Applied zero values: qc, fs, u2	Tip zero drift (kPa)	Sleeve zero drift (subtraction) (kPa)	Piezo. zero drift (kPa)	Nr dissipation tests	Raw file name	Easting (m)	Northing (m)	Elevation (m)	Date	Remarks
CPT01	1	7.38	S15-CFIPTT.1646	YES	1.20	IP-BF	UK3	Tip load	pre, pre, pre	-15.00	0.60	18.40		108464-V1-211123-UK03-LP112.L04				21/11/2023	
CPT02	1	4.54	S15-CFIPTT.1646	YES	1.20	IP-BF	UK3	Tip/sleeve load + inclination	ave, ave, ave	-2.20	-1.20	-1.60		108464-V1-211123-UK03-LP112.L01				21/11/2023	Negative sleeve values potentially caused by large bending stresses on the cone load cell with excessive inclination; 2.32 - 2.58 m
CPT03	1	8.94	S15-CFIPTT.1646	YES	1.20	IP-BF	UK3	Tip/sleeve load + inclination	pre, pre, pre	-13.00	1.20	-4.40		108464-V1-211123-UK03-LP112.L06				21/11/2023	
CPT05	1	7.86	S15-CFIPTT.1646	YES	1.20	IP-BF	UK3	Tip/sleeve load + inclination	pre, pre, pre	-2.00	-0.10	-1.60		108464-V1-211123-UK03-LP112.L02				21/11/2023	
CPT06	1	5.04	S15-CFIPTT.1646	YES	1.20	IP-BF	UK3	Tip load	pre, pre, pre	-14.00	-3.20	-0.70		108464-V1-211123-UK03-LP112.L08				21/11/2023	
CPT07	1	4.50	S15-CFIPTT.1646	YES	1.20	IP-BF	UK3	Tip/sleeve load + inclination	pre, pre, pre	23.40	-2.30	-2.90		108464-V1-211123-UK03-LP112.L05				21/11/2023	
CPT08	1	11.90	S15-CFIPTT.1646	YES	1.20	IP-BF	UK3	sudden inclination	pre, pre, pre	1.60	-4.30	8.30		108464-V1-211123-UK03-LP112.L07				21/11/2023	
CPT09	1	6.84	S15-CFIPTT.1646	YES	1.20	IP-BF	UK3	Tip/sleeve load + inclination	pre, pre, pre	-8.00	0.40	-3.30		108464-V1-211123-UK03-LP112.L03				21/11/2023	

CPT test plots are presented in Appendix C.

APPENDIX B GENERAL INFORMATION

LIST OF FIGURES

Cone calibration certificate: S15-CFIIP.1646

Data sheet: 20.5-tonne track-truck mounted CPT unit (UK3)

CERTIFICATE OF CALIBRATION

Certificate Number: 1548

Cone Serial Number: S15-CFIIPTT.1646

Instrument:	**Digital-Geopoint-S15-150kN-5MPa**	**Location:**	**Lankelma Calibration Laboratory**
Serial number:	**S15-CFIIPTT.1646**	**Temperature (°C):**	**19.7**
Manufacturer:	**Geopoint**	**Temperature change (°C):**	**0.09**
Calibration standard:	**Conforms to ISO 376:2011 & ISO 22476-1:2012**	**Calibration engineer:**	**P Metcalf**
ISO 22476-1:2012 application class:	**Class 1**	**Date of calibration:**	**02/10/2023**
		Calibration expiry:	**02/04/2024**

This calibration certificate is valid for 6 months.

Calibration signed and dated by:

P Metcalf

Calibration checked and dated by:

A Harman

REFERENCE INSTRUMENTS	SERIAL NUMBER	UNCERTAINTY OF RECORDED VALUE	CALIBRATION DATE
AM DSCCHA-100kN Load Cell	66914	0.02%	19/06/2023
AM DSCCHA-5kN Load Cell	90446	0.05%	19/06/2023
Omega MMG750V	502273	0.01%	09/08/2023
Keithley 3706A Multimeter	4067652	10ppm	11/08/2023
LD Solar2-45	168558	0.04°	01/08/2022
ETI Ref Thermometer	D20345255	0.01°C	08/09/2022

The calibration tests were made in the Lankelma force standards machine. The applied forces of which are within an uncertainty of:
± 0.050 % of nominal value from 0.5kN up to 10kN, then 0.02% of nominal from 10kN up to 100kN.

MEASUREMENTS
1. The forces applied, and the resulting deflections are given in Tables 1. No corrections for temperature have been applied to these results.
2. The cone was loaded to full range 3 times for no less than 1 minute before calibration and after each rotation.
3. The cone was calibrated in low and high range using two reference load cells. The low range calibration consisted of a maximum load of 5kN with 4 sets of increasing forces and 2 sets of decreasing forces. The high range calibration consisted of a maximum load of 100kN with 3 sets of increasing forces and 2 sets of decreasing forces.
4. The difference in deflection for each applied force with rotation is the relative reproducibility error b, shown as a percentage of the recorded value and in units of pressure MPa. The uncertainty relating to the difference in deflection for increasing forces against degreasing forces is the reversibility uncertainty U_rev, shown as a percentage of the recorded value and in units of pressure MPa.
5. For each application of force, the coefficients of a linear and third order equation relating the estimate of the mean deflection as a function of the applied calibration force were calculated. Table 2.
6. The combined expanded uncertainty of deflection U for each force is shown as a percentage of the recorded value and in units of pressure MPa.
7. The coefficients of a third order equation relating a given applied force to the estimate of the mean deflection were also calculated. The coefficients are given in Table 3.
8. In use the forces acting on the sleeve load cell element are a combination of tip resistance and sleeve friction, with the tip resistance from the tip load cell element being subtracted to give the sleeve friction value. The resultant error values for differing tip and sleeve values are shown in Table 4.
* The combined expanded uncertainties shown are to k=2 with a 95% coverage factor.

The calibration uncertainty is the uncertainty in the force value calculated from the interpolation equation at any deflection.

At each calibration point a combined standard uncertainty *uc* is calculated from the readings obtained during the calibration.

$$uc = \sqrt{\sum_{i=1}^{8} ui^2}$$

and

$$U = k \times uc$$

where

u1 is the standard uncertainty associated with the applied calibration force.
u2 is the standard uncertainty associated with the reproducibility of the calibration results.
u3 is the standard uncertainty associated with the repeatability of the calibration results.
u4 is the standard uncertainty associated with the resolution and noise of the system.
u5 is the standard uncertainty associated with the creep of the instrument.
u6 is the standard uncertainty associated with the drift in zero output.
u7 is the standard uncertainty associated with temperature of the instrument.
u8 is the standard uncertainty associated with interpolation best fit of the linear or 3rd order polynomial equation.

Symbols and their designations

Symbol	Designation
Ref LC	Reference load cell with calibration force in kN
cts	Counts. Base digital cone units.
0.1N	Interpolated digital cone units from counts
b	Relative reproducibility error
U_rev	Reversibility uncertainty
Uc	Combined standard uncertainty
Uc_sub	Combined standard uncertainty including sleeve subtraction
U	Combined expanded uncertainty
k=2	95% uncertainty coverage factor

Cone tempreture effect profile:

This section deals with the apparent pressure readings obtained from sensors due to static and transient temperature change. The parameters for post-processing temperature correction are established and the apparent pressures after correction are presented. Depending on the design or temperature performance, correction of the friction sleeve and/or piezometer readings may not be warranted

LANKELMA

CERTIFICATE OF CALIBRATION

Certificate Number: 1548

Cone Serial Number: S15-CFIIPTT.1646

CONE END RESISTANCE CALIBRATION

Table 1-a.

Low range calibration									High range calibration							
	Tip change In output (cts)				Reproducibility error *b*		Reversibility error *U_rev*			Tip change in output (cts)			Reproducibility error *b*		Reversibility error *U_rev*	
Ref LC	1	2	3	4					Ref LC	1	2	3				
(kN)	0°	120°	240°	240°	MPa	%	MPa	%	(kN)	0°	120°	240°	MPa	%	MPa	%
0.100	9.988E+04	1.083E+05	1.163E+05	1.163E+05	0.003	4.37			5.000	5.747E+06	5.753E+06	5.758E+06	0.002	0.05		
0.500	5.716E+05	5.731E+05	5.724E+05	5.769E+05	0.000	0.07			10.000	1.150E+07	1.150E+07	1.151E+07	0.001	0.02		
1.000	1.136E+06	1.145E+06	1.152E+06	1.153E+06	0.003	0.39			15.000	1.724E+07	1.725E+07	1.726E+07	0.002	0.02		
1.500	1.722E+06	1.727E+06	1.718E+06	1.720E+06	0.001	0.15			20.000	2.299E+07	2.300E+07	2.300E+07	0.002	0.02		
2.000	2.300E+06	2.298E+06	2.306E+06	2.299E+06	0.001	0.10			30.000	3.447E+07	3.448E+07	3.449E+07	0.003	0.01		
2.500	2.874E+06	2.876E+06	2.867E+06	2.876E+06	0.002	0.10			40.000	4.595E+07	4.596E+07	4.596E+07	0.003	0.01		
3.000	3.441E+06	3.447E+06	3.450E+06	3.450E+06	0.002	0.08			50.000	5.741E+07	5.742E+07	5.743E+07	0.003	0.01		
3.500	4.006E+06	4.031E+06	4.021E+06	4.023E+06	0.004	0.19			60.000	6.886E+07	6.888E+07	6.888E+07	0.003	0.01		
4.000	4.595E+06	4.597E+06	4.615E+06	4.606E+06	0.004	0.14			80.000	9.174E+07	9.176E+07	9.176E+07	0.003	0.01		
5.000	5.750E+06	5.755E+06	5.751E+06	5.762E+06	0.001	0.03			100.000	1.146E+08	1.146E+08	1.146E+08	0.004	0.01		
4.000	4.593E+06	4.601E+06			0.002	0.06	0.000	-0.01	80.000	9.175E+07	9.176E+07		0.002	0.00	-0.001	0.00
3.500	4.012E+06	4.031E+06			0.004	0.17	-0.001	-0.04	60.000	6.889E+07	6.890E+07		0.002	0.01	-0.007	-0.02
3.000	3.447E+06	3.449E+06			0.000	0.02	-0.001	-0.06	50.000	5.744E+07	5.745E+07		0.002	0.01	-0.009	-0.03
2.500	2.885E+06	2.851E+06			0.007	0.42	0.002	0.13	40.000	4.598E+07	4.598E+07		0.002	0.01	-0.010	-0.04
2.000	2.293E+06	2.285E+06			0.002	0.13	0.003	0.25	30.000	3.450E+07	3.451E+07		0.001	0.01	-0.009	-0.04
1.500	1.716E+06	1.716E+06			0.000	0.01	0.003	0.28	20.000	2.301E+07	2.302E+07		0.001	0.01	-0.008	-0.06
1.000	1.142E+06	1.147E+06			0.001	0.15	-0.001	-0.19	15.000	1.727E+07	1.727E+07		0.001	0.01	-0.007	-0.07
0.500	5.726E+05	5.716E+05			0.000	0.06	0.000	0.03	10.000	1.152E+07	1.152E+07		0.000	0.00	-0.006	-0.08
0.100	1.050E+05	1.031E+05			0.000	0.66	0.000	-0.10	5.000	5.763E+06	5.764E+06		0.000	0.01	-0.005	-0.14

Table 2-a.

Low range calibration								High range calibration							
Reference output		Linear equation			3rd order equation			Reference output		Linear equation			3rd order equation		
Ref Load Cell Nom. (MPa)	Ref Load Cell (0.1N)	Cone output (0.1N)	Expanded uncertainty *U** MPa	%	Equation output (0.1N)	Expanded uncertainty *U** MPa	%	Ref Load Cell Nom. (MPa)	Ref Load Cell (0.1N)	Cone output (0.1N)	Expanded uncertainty *U** MPa	%	Equation output (0.1N)	Expanded uncertainty *U** MPa	%
0.067	1000	943	0.010	14.48	1018	0.006	9.56	3.333	50000	50150	0.021	0.62	50054	0.009	0.27
0.333	5000	4990	0.003	0.95	5049	0.007	2.19	6.667	100000	100276	0.038	0.57	100034	0.010	0.16
0.667	10000	9975	0.006	0.89	10016	0.006	0.93	10.000	150000	150391	0.054	0.54	150029	0.013	0.13
1.000	15000	15014	0.005	0.49	15038	0.007	0.70	13.333	200000	200474	0.065	0.49	200018	0.015	0.12
1.333	20000	20062	0.010	0.73	20067	0.011	0.82	20.000	300000	300592	0.081	0.41	300023	0.020	0.10
1.667	25000	25038	0.010	0.58	25026	0.008	0.49	26.667	400000	400608	0.084	0.32	400022	0.024	0.09
2.000	30000	30042	0.008	0.42	30013	0.005	0.26	33.333	500000	500535	0.077	0.23	500022	0.029	0.09
2.333	35000	35037	0.011	0.49	34991	0.010	0.41	40.000	600000	600390	0.061	0.15	600033	0.033	0.08
2.667	40000	40121	0.020	0.74	40058	0.013	0.48	53.333	800000	799840	0.050	0.09	800024	0.046	0.09
3.333	50000	50142	0.023	0.70	50046	0.010	0.31	66.667	1000000	999145	0.140	0.21	1000138	0.084	0.13
2.667	40000	40071	0.010	0.39	40008	0.004	0.16	53.333	800000	799843	0.045	0.08	800027	0.040	0.07
2.333	35000	35055	0.011	0.47	35009	0.008	0.35	40.000	600000	600549	0.079	0.20	600192	0.040	0.10
2.000	30000	30055	0.008	0.40	30026	0.005	0.23	33.333	500000	500739	0.101	0.30	500225	0.039	0.12
1.667	25000	25004	0.014	0.86	24992	0.014	0.87	26.667	400000	400822	0.111	0.42	400236	0.039	0.15
1.333	20000	19957	0.007	0.55	19962	0.007	0.50	20.000	300000	300780	0.105	0.52	300211	0.033	0.16
1.000	15000	14959	0.006	0.59	14983	0.003	0.33	13.333	200000	200648	0.087	0.65	200191	0.028	0.21
0.667	10000	9974	0.004	0.63	10016	0.003	0.49	10.000	150000	150546	0.073	0.73	150183	0.026	0.26
0.333	5000	4987	0.002	0.65	5047	0.006	1.93	6.667	100000	100406	0.054	0.82	100163	0.023	0.34
0.067	1000	907	0.014	21.23	982	0.003	4.11	3.333	50000	50245	0.033	0.99	50149	0.020	0.61

Table 3-a. Third order equation

For a given cone indicated output of D (0.1N units), the corrected applied force

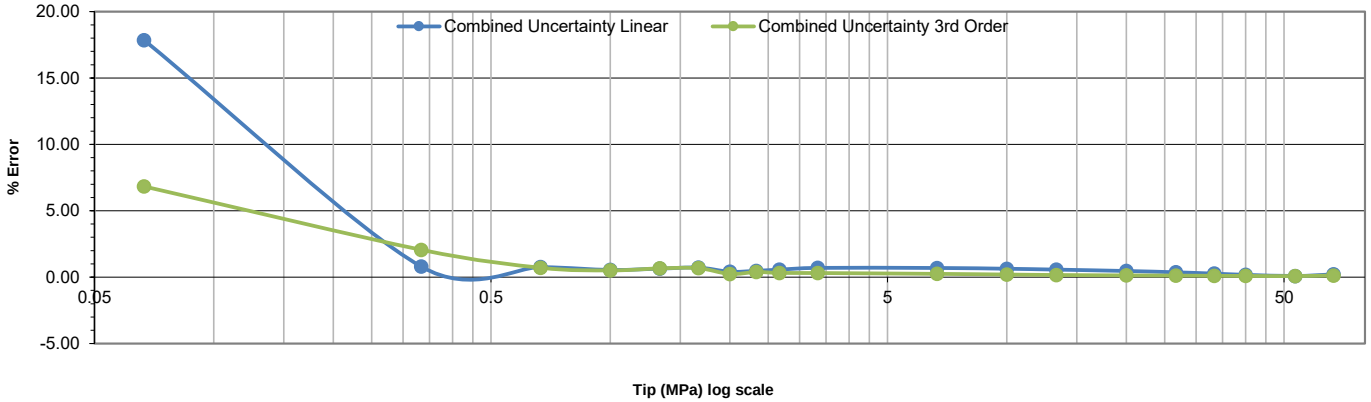
F (in 0.1N units) is calculated from :

$F = (a3 \times D^3) + (a2 \times D^2) + (a1 \times D) + a0$

a0	=	78.48732
a1	=	0.99625
a2	=	5.60000E-09
a3	=	-9.28823E-16

Maximum tip zero drift during the calibration (MPa) =	0.001
Maximum load cell zero drift during the calibration (MPa) =	0.001
Factor used to convert from counts to 0.1N units =	0.0087173
Maximum tip full scale reading (MPa) =	100.00
Tip resolution (Pa) =	66.7
Tip area (cm²) =	15
Tip area ratio factor =	0.809

COMBINED EXPANDED UNCERTAINTY TIP



* The combined expanded uncertainties shown are to k=2 with a 95% coverage factor.

LANKELMA

CERTIFICATE OF CALIBRATION

Certificate Number: 1548

Cone Serial Number: S15-CFIIPTT.1646

SLEEVE FRICTION CALIBRATION

Table1-b.

Low range calibration									High range calibration							
	Sleeve change In output (cts)				Reproducibility error *b*		Reversibility error *U_rev*			Sleeve change in output (cts)			Reproducibility error *b*		Reversibility error *U_rev*	
Ref LC	1	2	3	4					Ref LC	1	2	3				
(kN)	0°	120°	240°	240°	kPa	%	kPa	%	(kN)	0°	120°	240°	kPa	%	kPa	%
0.100	1.088E+05	1.127E+05	1.188E+05	1.188E+05	0.112	2.55			5.000	5.929E+06	5.928E+06	5.919E+06	0.119	0.05		
0.500	5.945E+05	5.908E+05	5.888E+05	5.955E+05	0.062	0.28			10.000	1.184E+07	1.184E+07	1.182E+07	0.190	0.04		
1.000	1.176E+06	1.183E+06	1.188E+06	1.188E+06	0.132	0.30			15.000	1.774E+07	1.775E+07	1.773E+07	0.214	0.03		
1.500	1.778E+06	1.781E+06	1.773E+06	1.770E+06	0.091	0.14			20.000	2.364E+07	2.365E+07	2.363E+07	0.205	0.02		
2.000	2.376E+06	2.370E+06	2.378E+06	2.366E+06	0.080	0.09			30.000	3.544E+07	3.545E+07	3.544E+07	0.128	0.01		
2.500	2.966E+06	2.962E+06	2.953E+06	2.962E+06	0.142	0.13			40.000	4.723E+07	4.724E+07	4.724E+07	0.086	0.00		
3.000	3.549E+06	3.551E+06	3.554E+06	3.551E+06	0.053	0.04			50.000	5.900E+07	5.902E+07	5.902E+07	0.183	0.01		
3.500	4.128E+06	4.152E+06	4.140E+06	4.138E+06	0.256	0.17			60.000	7.077E+07	7.079E+07	7.080E+07	0.263	0.01		
4.000	4.734E+06	4.733E+06	4.749E+06	4.736E+06	0.196	0.11			80.000	9.427E+07	9.430E+07	9.432E+07	0.531	0.02		
5.000	5.921E+06	5.922E+06	5.921E+06	5.925E+06	0.020	0.01			100.000	1.178E+08	1.178E+08	1.178E+08	0.849	0.02		
4.000	4.730E+06	4.740E+06			0.131	0.07	-0.036	-0.02	80.000	9.429E+07	9.431E+07		0.305	0.01	-0.251	-0.01
3.500	4.134E+06	4.154E+06			0.262	0.17	-0.076	-0.05	60.000	7.080E+07	7.082E+07		0.200	0.01	-0.724	-0.03
3.000	3.554E+06	3.557E+06			0.039	0.03	-0.116	-0.09	50.000	5.904E+07	5.906E+07		0.216	0.01	-0.884	-0.04
2.500	2.977E+06	2.940E+06			0.479	0.44	0.121	0.11	40.000	4.727E+07	4.728E+07		0.241	0.01	-0.930	-0.05
2.000	2.366E+06	2.358E+06			0.104	0.12	0.231	0.26	30.000	3.548E+07	3.550E+07		0.199	0.02	-0.909	-0.07
1.500	1.770E+06	1.775E+06			0.057	0.09	0.150	0.23	20.000	2.368E+07	2.369E+07		0.211	0.02	-0.867	-0.10
1.000	1.179E+06	1.185E+06			0.077	0.17	-0.061	-0.14	15.000	1.777E+07	1.779E+07		0.212	0.03	-0.764	-0.12
0.500	5.905E+05	5.928E+05			0.031	0.14	0.020	0.09	10.000	1.186E+07	1.187E+07		0.145	0.03	-0.610	-0.14
0.100	1.112E+05	1.091E+05			0.029	0.65	0.013	0.30	5.000	5.941E+06	5.946E+06		0.066	0.03	-0.327	-0.15

Table 2-b.

Low range calibration							
Reference output		Linear factor output			3rd order equation		
Ref Load Cell Nom. (kPa)	Ref Load Cell (0.1N)	Cone output (0.1N)	Expanded uncertainty *U** kPa	%	Equation output (0.1N)	Expanded uncertainty *U** kPa	%
4	1000	962	0.406	9.22	1014	0.264	6.00
22	5000	5016	0.331	1.50	5047	0.509	2.31
44	10000	10026	0.387	0.88	10031	0.416	0.94
66	15000	15076	0.744	1.13	15056	0.589	0.89
88	20000	20143	1.368	1.55	20098	1.018	1.16
110	25000	25113	1.110	1.01	25044	0.631	0.57
132	30000	30126	1.148	0.87	30033	0.424	0.32
154	35000	35117	1.182	0.77	35002	0.572	0.37
176	40000	40196	1.864	1.06	40058	0.860	0.49
220	50000	50226	2.029	0.92	50044	0.538	0.24
176	40000	40166	1.496	0.85	40028	0.399	0.23
154	35000	35148	1.416	0.92	35032	0.623	0.40
132	30000	30161	1.431	1.08	30068	0.637	0.48
110	25000	25096	1.289	1.17	25027	1.004	0.91
88	20000	20039	0.444	0.50	19994	0.291	0.33
66	15000	15036	0.363	0.55	15016	0.226	0.34
44	10000	10025	0.281	0.64	10030	0.319	0.72
22	5000	5019	0.198	0.90	5050	0.449	2.04
4	1000	934	0.586	13.30	986	0.153	3.48

High range calibration							
Reference output		Linear factor output			3rd order equation		
Ref Load Cell Nom. (kPa)	Ref Load Cell (0.1N)	Cone output (0.1N)	Expanded uncertainty *U** kPa	%	Equation output (0.1N)	Expanded uncertainty *U** kPa	%
220	50000	50258	2.301	1.04	50075	0.755	0.34
441	100000	100371	3.338	0.76	99994	0.698	0.08
661	150000	150459	4.139	0.63	149931	1.083	0.08
881	200000	200520	4.693	0.53	199880	1.475	0.08
1322	300000	300635	5.743	0.43	299882	1.653	0.06
1762	400000	400644	5.879	0.33	399903	1.767	0.05
2203	500000	500564	5.319	0.24	499944	1.959	0.04
2643	600000	600417	4.279	0.16	600004	2.190	0.04
3524	800000	799867	3.354	0.10	800045	3.167	0.04
4405	1000000	999206	8.972	0.20	1000078	5.664	0.06
3524	800000	799859	2.922	0.08	800038	2.668	0.04
2643	600000	600651	6.077	0.23	600239	2.901	0.05
2203	500000	500884	7.967	0.36	500264	2.869	0.07
1762	400000	401001	8.952	0.51	400261	2.767	0.08
1322	300000	301020	9.062	0.69	300266	2.622	0.10
881	200000	200908	8.043	0.91	200268	2.502	0.14
661	150000	150807	7.149	1.08	150279	2.563	0.19
441	100000	100655	5.792	1.31	100277	2.502	0.28
220	50000	50414	3.663	1.66	50231	2.057	0.47

Table 3-b. Third order equation

For a given cone indicated output of D (0.1N units), the corrected applied force

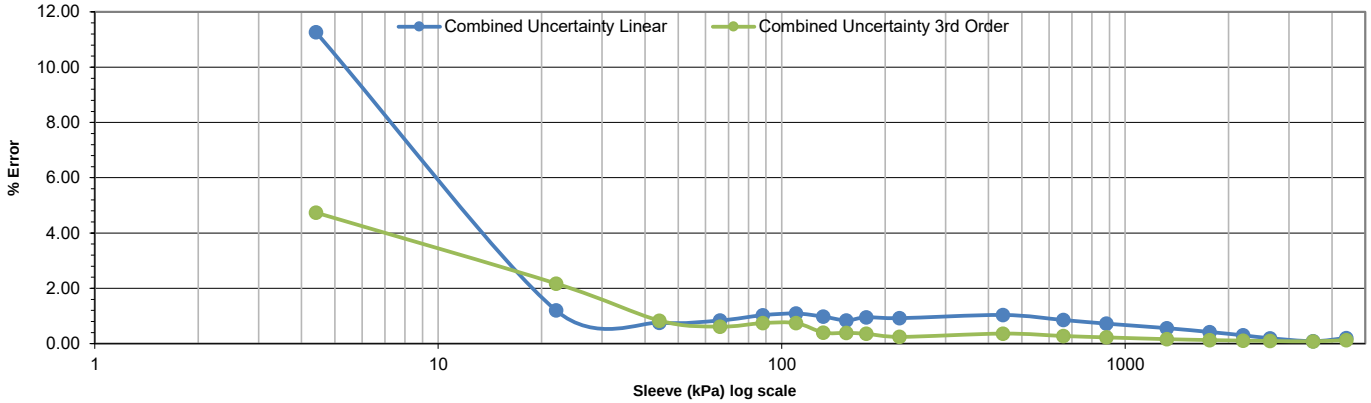
F (in 0.1N units) is calculated from :

$F = (a3 \times D^3) + (a2 \times D^2) + (a1 \times D) + a0$

a0	=	56.63591
a1	=	0.99477
a2	=	9.43861E-09
a3	=	-3.39439E-15

Maximum sleeve zero drift during the calibration (kPa) =	0.037
Maximum load cell zero drift during the calibration (kPa) =	0.033
Factor used to convert from counts to 0.1N units =	0.0084823
Physical strength limited maximum sleeve reading (MPa) =	1.333
Sleeve resolution (Pa) =	4.4
Sleeve area (cm²) =	227
Sleeve area ratio factor =	-0.002

COMBINED EXPANDED UNCERTAINTY SLEEVE



* The combined expanded uncertainties shown are to k=2 with a 95% coverage factor.

LANKELMA

CERTIFICATE OF CALIBRATION

Certificate Number: 1548

Cone Serial Number: S15-CFIIPTT.1646

Table 4-b **Sleeve friction - tip subtraction combined standard uncertainty Uc_sub, where friction ratio is between 0.25% and 10%.**

Tip MPa	Sleeve linear equation subtraction error (%) Sleeve kPa → 4	22	44	66	110	154	220	661
0.07	11.4	-	-	-	-	-	-	-
0.33	6.0	0.7	-	-	-	-	-	-
0.67	6.3	0.7	0.4	0.5	-	-	-	-
1.00	8.0	1.1	0.6	0.6	-	-	-	-
1.67	11.4	1.7	1.0	0.8	0.8	0.6	-	-
2.33	-	2.1	1.1	0.9	0.8	0.6	0.6	-
3.33	-	4.9	2.5	1.9	1.4	1.0	0.9	-
10.00	-	-	2.6	1.9	1.4	1.1	0.9	0.5
13.33	-	-	2.5	1.5	1.4	1.0	0.8	0.4

Tip MPa	Sleeve 3rd order equation subtraction error (%) Sleeve kPa → 4	22	44	66	110	154	220	661
0.07	2.4	-	-	-	-	-	-	-
0.33	7.4	2.1	-	-	-	-	-	-
0.67	6.6	1.9	0.8	0.6	-	-	-	-
1.00	7.1	2.0	0.9	0.6	-	-	-	-
1.67	8.4	2.3	1.0	0.7	0.6	0.4	-	-
2.33	-	2.2	1.0	0.7	0.6	0.4	0.2	-
3.33	-	2.9	1.3	0.9	0.7	0.4	0.3	-
10.00	-	-	1.1	0.7	0.6	0.4	0.3	0.2
13.33	-	-	0.8	0.5	0.5	0.3	0.2	0.2

PORE PRESSURE CALIBRATION

Table1-c.

Ref PR (kPa)	PWP change in output (cts) 1 0°	2 120°	3 240°	Reproducibility error *b* kPa	%	Reversibility error *U_rev* kPa	%
100	2.064E+07	2.061E+07	2.055E+07	0.1	0.13		
200	4.119E+07	4.116E+07	4.121E+07	0.1	0.03		
400	8.240E+07	8.237E+07	8.242E+07	0.1	0.02		
600	1.236E+08	1.236E+08	1.236E+08	0.1	0.01		
800	1.648E+08	1.648E+08	1.649E+08	0.1	0.01		
1000	2.061E+08	2.060E+08	2.060E+08	0.2	0.02		
1500	3.091E+08	3.090E+08	3.091E+08	0.2	0.01		
2000	4.123E+08	4.122E+08	4.123E+08	0.1	0.01		
2500	5.157E+08	5.157E+08	5.157E+08	0.1	0.01		
3000	6.194E+08	6.195E+08	6.195E+08	0.1	0.00		
2500	5.155E+08	5.156E+08		0.1	0.00	0.4	0.02
2000	4.115E+08	4.116E+08		0.2	0.01	2.1	0.10
1500	3.078E+08	3.079E+08		0.1	0.01	3.5	0.23
1000	2.049E+08	2.050E+08		0.2	0.02	3.1	0.31
800	1.639E+08	1.639E+08		0.1	0.01	2.6	0.32
600	1.228E+08	1.229E+08		0.1	0.02	2.1	0.35
400	8.178E+07	8.187E+07		0.2	0.04	1.6	0.39
200	4.072E+07	4.083E+07		0.2	0.09	1.1	0.56
100	2.029E+07	2.038E+07		0.2	0.16	0.8	0.81

Table 2-c.

Reference output: Ref Pressure (kPa)	Ref Pressure (0.1Pa)	Linear factor output: Cone output (0.1Pa)	Expanded uncertainty *U** kPa	%	3rd order equation: Equation output (0.1N)	Expanded uncertainty *U** kPa	%
100	1000000	998134	0.724	0.72	1006470	1.433	1.43
200	2000000	1995505	1.198	0.60	2008911	1.949	0.97
400	4000000	3991927	1.973	0.49	4014671	3.145	0.79
600	6000000	5988546	2.766	0.46	6019439	4.184	0.70
800	8000000	7985569	3.466	0.43	8023294	5.036	0.63
1000	10000000	9981571	4.356	0.44	10024676	5.451	0.55
1500	15000000	14974167	5.899	0.39	15023548	5.495	0.37
2000	20000000	19972958	5.970	0.30	20016721	4.178	0.21
2500	25000000	24985641	3.895	0.16	25009774	3.274	0.13
3000	30000000	30013061	4.115	0.14	30001378	3.187	0.11
2500	25000000	24977737	5.172	0.21	25001914	2.644	0.11
2000	20000000	19937127	12.864	0.64	19980978	4.559	0.23
1500	15000000	14913737	17.532	1.17	14963109	7.901	0.53
1000	10000000	9929075	14.436	1.44	9972059	6.051	0.61
800	8000000	7940421	12.127	1.52	7978007	4.797	0.60
600	6000000	5951643	9.850	1.64	5982397	3.850	0.64
400	4000000	3964476	7.258	1.81	3987099	2.830	0.71
200	2000000	1975658	4.979	2.49	1988966	2.370	1.18
100	1000000	985262	3.062	3.06	993530	1.444	1.44

Table 3-c. Third order equation

For a given cone indicated output of D (0.1N units), the corrected applied force

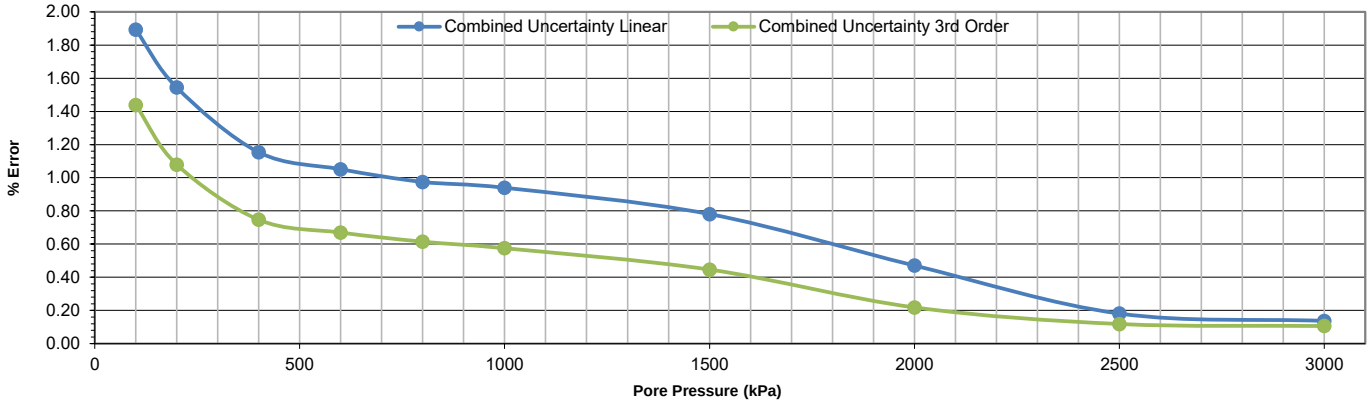
F (in 0.1N units) is calculated from :

$F = (a3 \times D^3) + (a2 \times D^2) + (a1 \times D) + a0$

a0	=	3013.05942
a1	=	1.00545
a2	=	-1.16810E-10
a3	=	-2.70421E-18

Maximum PWP zero drift during the calibration (kPa) =	0.12
Maximum reference zero drift during the calibration (kPa) =	0.231
Factor used to convert from counts to 0.1Pa units =	0.0484488
Maximum PWP full scale reading (kPa) =	5000
PWP resolution (Pa) =	0.1

COMBINED EXPANDED UNCERTAINTY PORE PRESSURE



* The combined expanded uncertainties shown are to k=2 with a 95% coverage factor.

LANKELMA

CERTIFICATE OF CALIBRATION

Certificate Number: 1548

Cone Serial Number: S15-CFIIPTT.1646

INCLINATION CALIBRATION

Ref Inclination (°C)	Cone inclination output X Inc (cts)	Y Inc (cts)
-25	-25782	24304
0	-519	-1125
25	24688	-26592

Ref Inclination (°)	Cone inclination output X Inc (°)	Y Inc (°)
-25	-25.0	-25.0
0	0.0	0.0
25	25.0	25.0

	X inc	Y inc
Factor used to convert from counts to 0.1m° units =	9.90687131	-9.8239529
Inclination error (°) =	0.0	0.0

TEMPERATURE CALIBRATION

Recorded temp (°C)	Cone output 1 FS (cts)	Cone output 2 QC (cts)
6.75	6922042	6897311
10.78	7023247	7002247
15.59	7151470	7127136
20.24	7272505	7248140
25.19	7400749	7376590

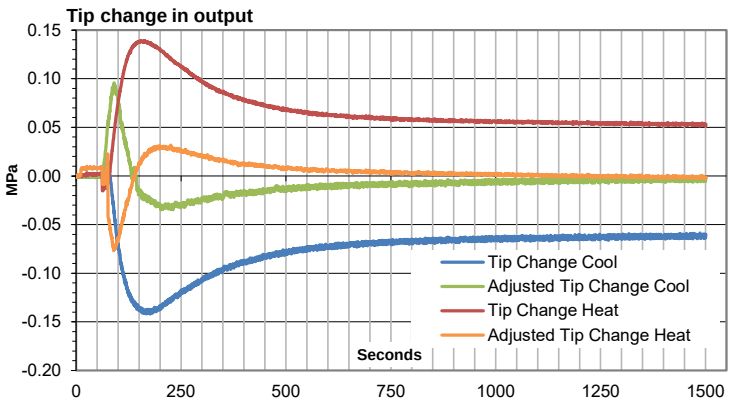
Recorded temp (°C)	Cone output 1 FS (°C)	Cone output 2 QC (°C)
6.75	6.80	6.75
10.78	10.69	10.78
15.59	15.61	15.59
20.24	20.26	20.25
25.19	25.19	25.19

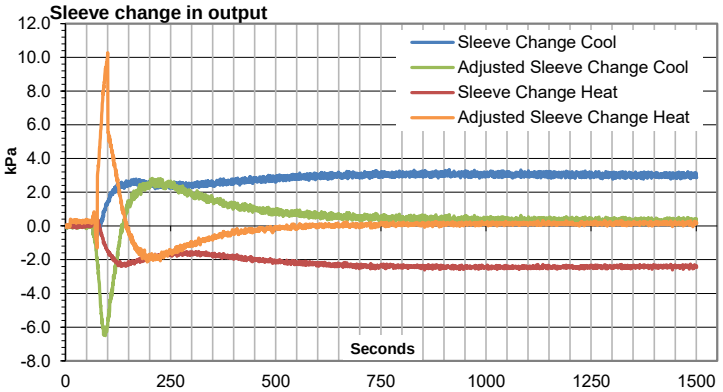
Factor used to convert from counts to 0.00001°C units =	0.384035796	0.384817257
Temperature error (°C) =	0.09	0.01

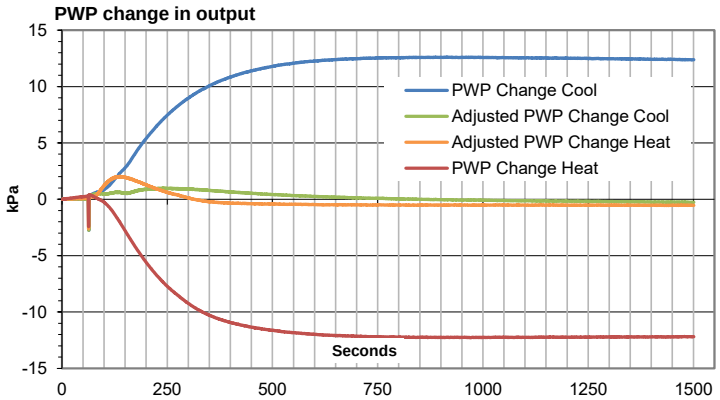
CONE TEMERATURE RESPONSE AND CORRECTION

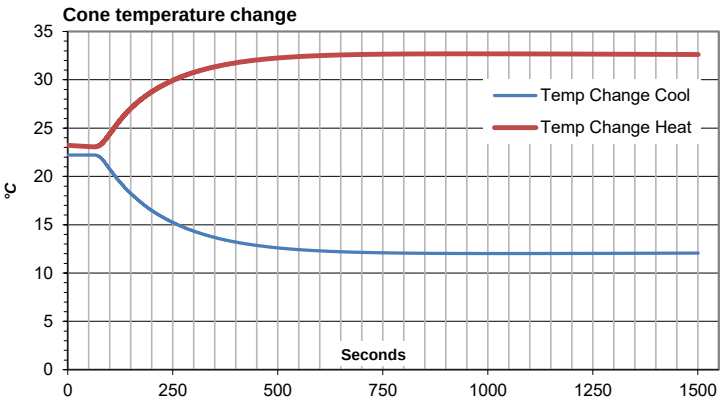
	Cooling	Heating
Start temperature =	22.22	23.06
End temperature =	12.02	32.69
Temperature change =	-10.20	9.63

	Cooling	Heating
Tip maximum rate of change (MPa/(°C/min)) =	0.039	0.039
Tip end change (MPa/°C) =	-0.006	0.006
Adjusted tip end change (MPa/°C) =	0.000	0.000
Sleeve maximum rate of change (kPa/(°C/min)) =	2.90	3.20
Sleeve end change (kPa/°C) =	0.28	-0.27
Adjusted sleeve end change (kPa/°C) =	0.02	0.02
PWP end change (kPa/°C) =	1.21	-1.27
Adjusted PWP end change (kPa/°C) =	0.03	-0.06









UK3
Track-truck

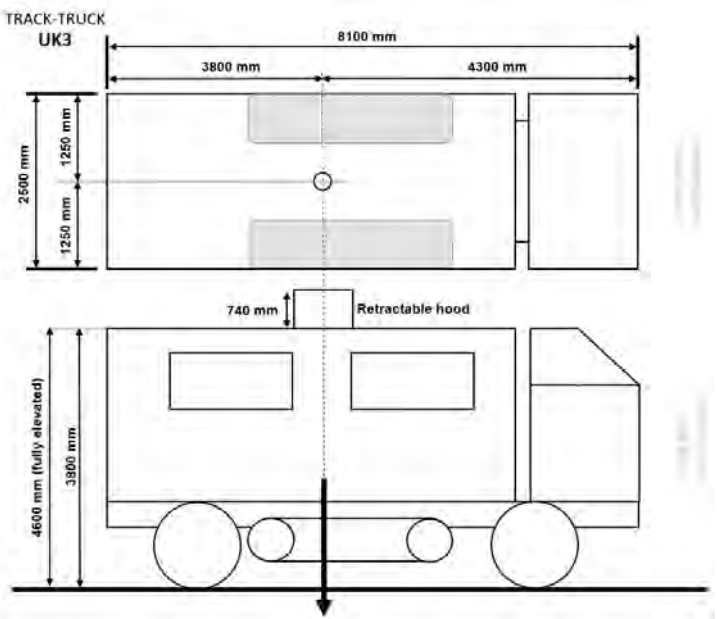
LANKELMA
01797 280050 – www.lankelma.com

Rig weight	20.5 T
Max. operating ram capacity	17 T
Max. travelling speed	86 km/h
Track material	Steel
Track length	3300 mm
Track width	650 mm
Jack plate dimensions	Tracks act as jacks
Jack arrangements	1nr. on each side
Max. ground clearance on jacks	210 mm
Max. ground bearing pressure	Tracking/pushing – 47 kPa Pulling – 88 kPa
Max. testing gradient	10 degrees
Max. traversing gradient	20 degrees (operator assessed)
Noise output at 2 m	Testing - 74 dBA Driving – 87 dBA
Clamp arrangement	36/55 push-pull clamp
Ram stroke	1.2 m
Max. casing size	55 mm

Lankelma's versatile track-truck is suitable for most geotechnical sites. The rig is driven to site as a self-contained HGV with tracks that can be deployed to cope with soft or uneven terrain. Fitted with a chalwyn valve and spark arrestor.

Typical production
An expected 100m+ of standard CPTu testing can be executed in a day (depending on conditions and access).

Specialist testing	**Installations**	**Sampling**
Seismic	VWP	MOSTAP
Pressuremeter	Piezometer	Shelby
Magnetometer	Inclinometer	
Video cone		
Wing cone		
Push-in shear vane		



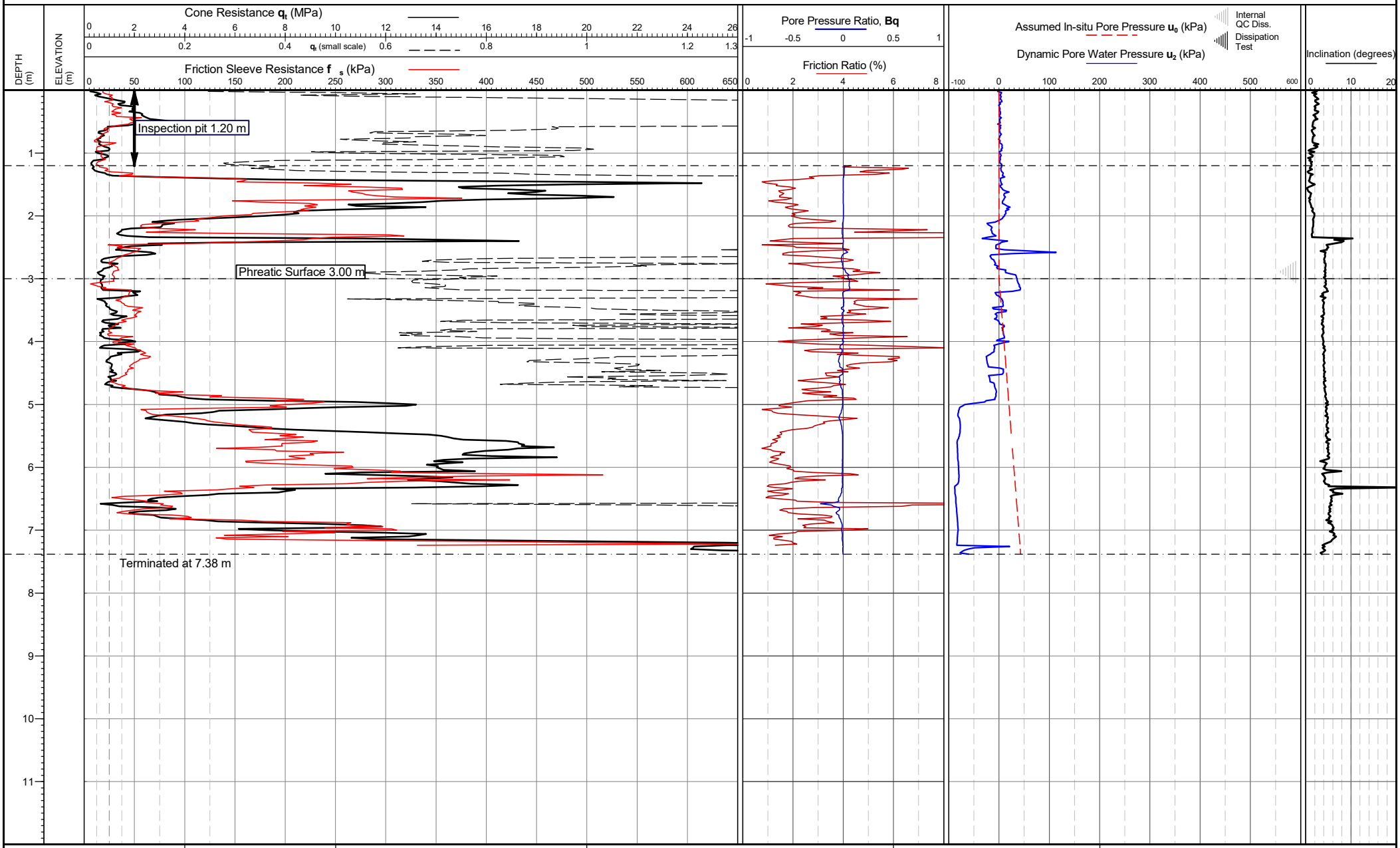
APPENDIX C CONE PENETRATION TEST RESULTS

Measured CPT parameters

intermediate parameters R_f and B_q

Project: ALDI, WYNDHAM PLACE, EGREMONT (P21-172)

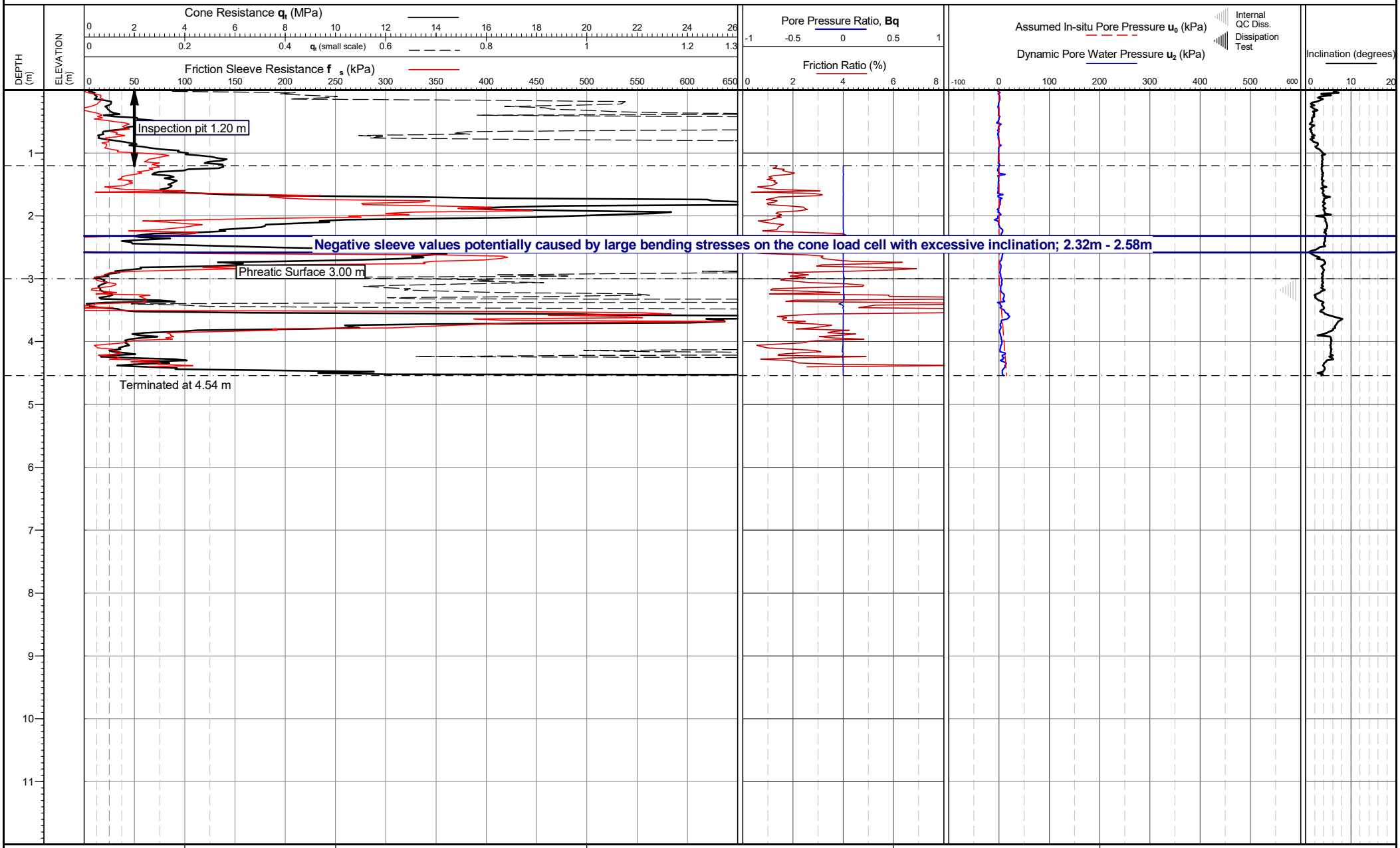
Client: HYDROCK



Cone area (mm2): Cone ID: S15-CFIPTT.1646 Operator: Walter Geddes Rig Used: UK3 Date of test: 21/11/2023 11:43:03	Zero drift (Pre/post test) q_c (kPa): -15.0 f_s (kPa): 0.6 ($f_{s\,drift}$ - $q_{c\,drift}$) u_2 (kPa): 18.5	Location: Cumbria, UK Coordinates: , Elevation: Coordinate system:	Remarks: *Phreatic surface origin: Arbitrary value Termination Remark: Tip load	Date of plot: 21-11-23 Checked by: Chris Player	Lankelma Project Ref: P-108464-1	**TEST ID: CPT01** Page 1 of 1

Project: ALDI, WYNDHAM PLACE, EGREMONT (P21-172)

Client: HYDROCK

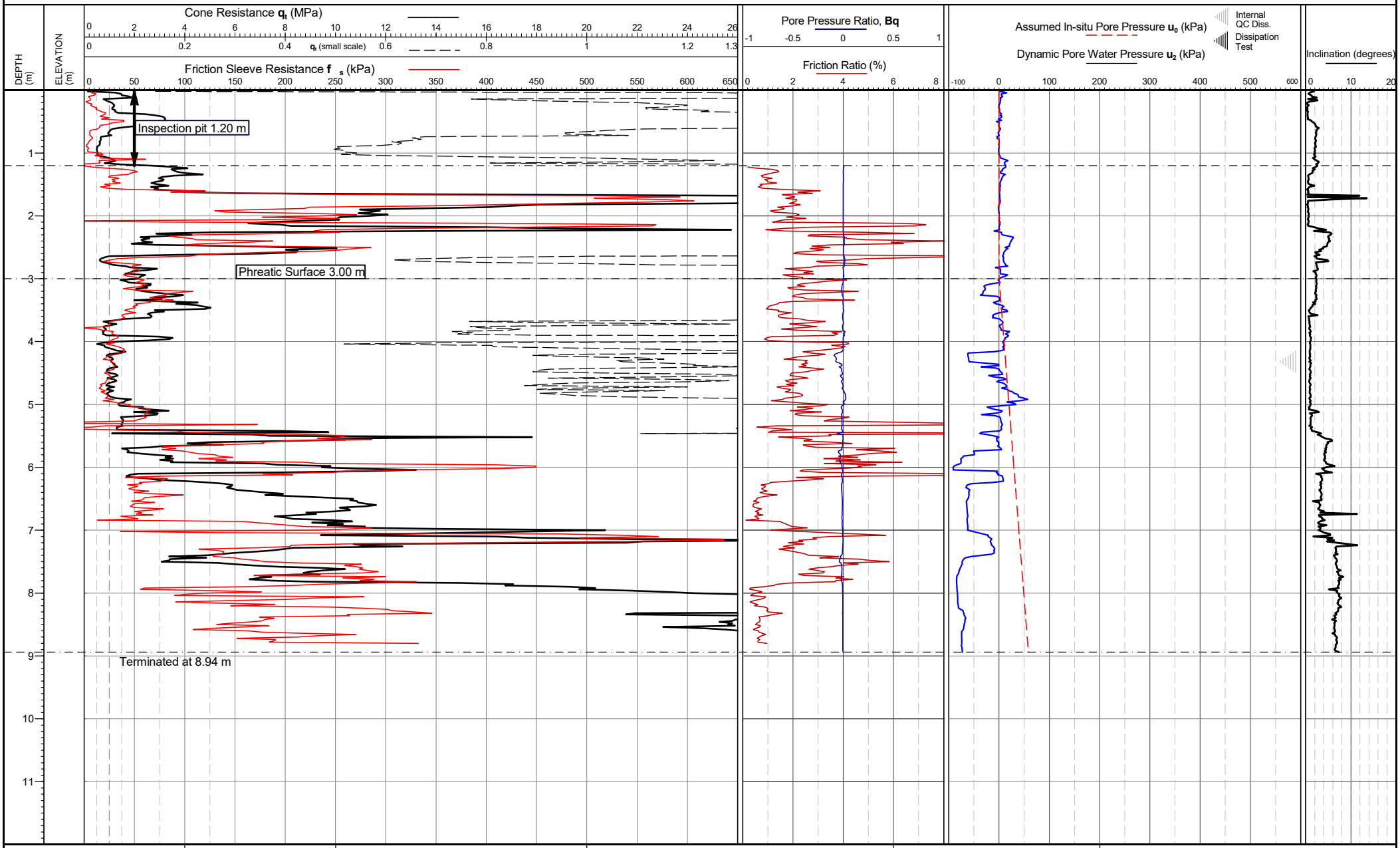


Cone area (mm2): Cone ID: S15-CFIPTT.1646 Operator: Chris Clarke Rig Used: UK3 Date of test: 21/11/2023 09:18:04	Zero drift (Pre/post test) q_c (kPa): -2.2 f_s (kPa): -1.2 ($f_{s\ drift}$ - $q_{c\ drift}$) u_2 (kPa): -1.6	Location: Cumbria, UK Coordinates: , Elevation: Coordinate system:	Remarks: Negative sleeve values potentially caused by large bending stresses on the cone load cell with excessive inclination; 2.32 - 2.58 m. *Phreatic surface origin: Arbitrary value Termination Remark: Tip/sleeve load + inclination	Date of plot: 21-11-23 Checked by: Chris Player	Lankelma Project Ref: P-108464-1

TEST ID: CPT02

Project: ALDI, WYNDHAM PLACE, EGREMONT (P21-172)

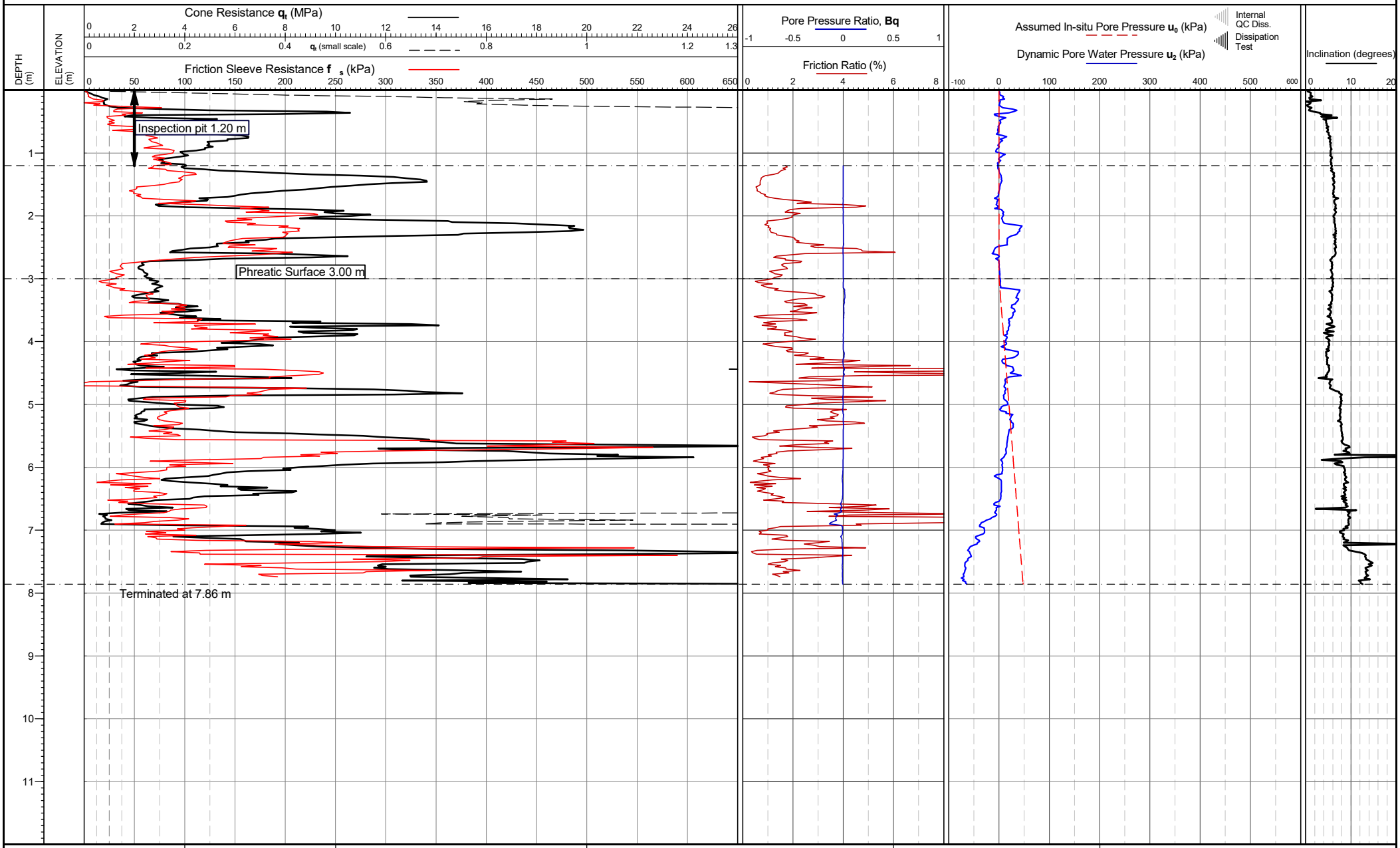
Client: HYDROCK



Cone area (mm2): Cone ID: S15-CFIPTT.1646 Operator: Walter Geddes Rig Used: UK3 Date of test: 21/11/2023 13:16:01	Zero drift (Pre/post test) q_c (kPa): -13.0 f_s (kPa): 1.2 ($f_{s\,drift}$ - $q_{c\,drift}$) u_2 (kPa): -4.4	Location: Cumbria, UK Coordinates: , Elevation: Coordinate system:	Remarks: *Phreatic surface origin: Arbitrary value Termination Remark: Tip/sleeve load + inclination	Date of plot: 21-11-23 Checked by: Chris Player	Lankelma Project Ref: P-108464-1	**TEST ID: CPT03** Page 1 of 1

Project: ALDI, WYNDHAM PLACE, EGREMONT (P21-172)

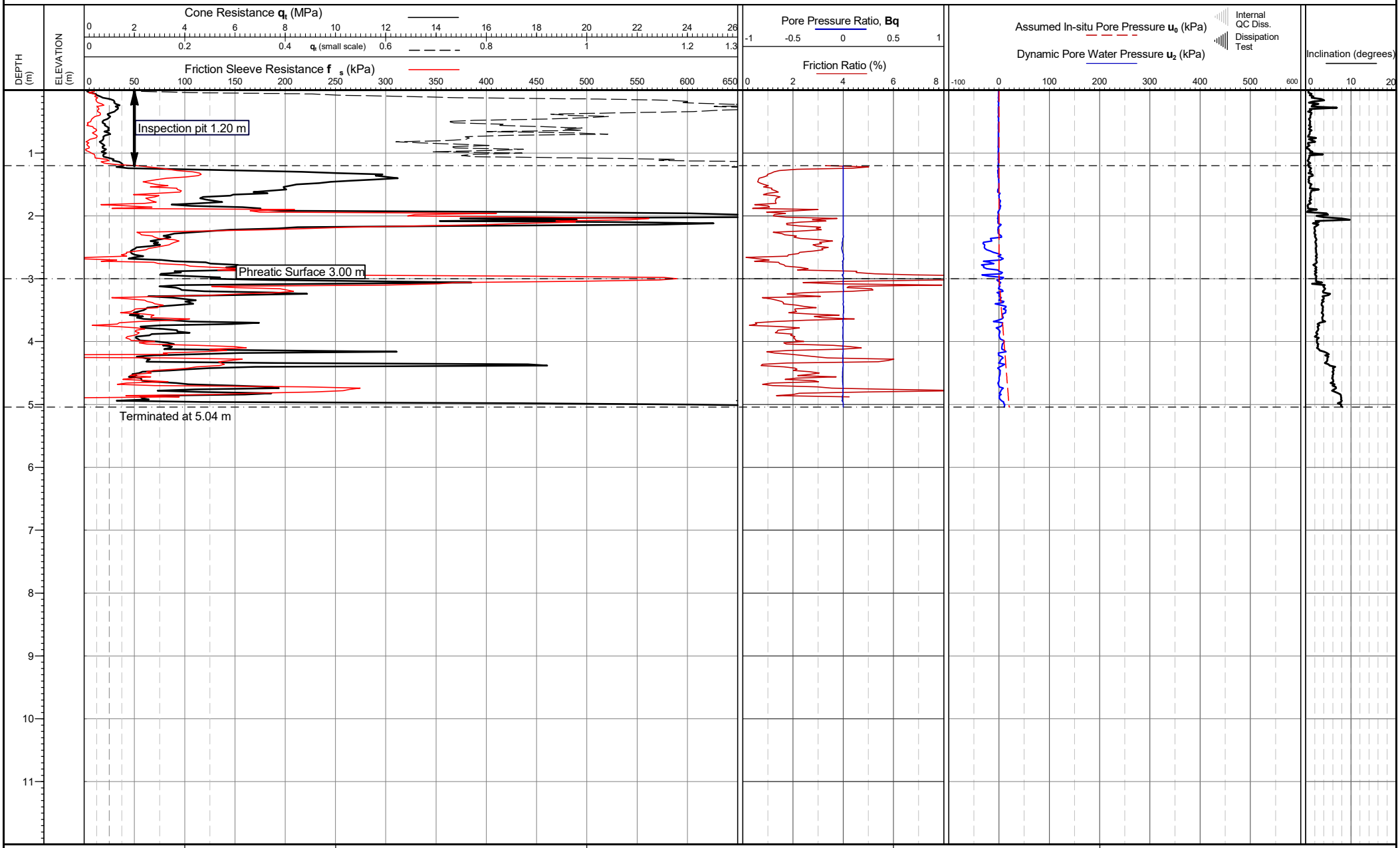
Client: HYDROCK



Cone area (mm2): Cone ID: S15-CFIPTT.1646 Operator: Walter Geddes Rig Used: UK3 Date of test: 21/11/2023 10:20:33	Zero drift (Pre/post test) q_c (kPa): -2.0 f_s (kPa): -0.1 ($f_{s\,drift}$ - $q_{c\,drift}$) u_2 (kPa): -1.6	Location: Cumbria, UK Coordinates: , Elevation: Coordinate system:	Remarks: *Phreatic surface origin: Arbitrary value Termination Remark: Tip/sleeve load + inclination	Date of plot: 21-11-23 Checked by: Chris Player	Lankelma Project Ref: P-108464-1	**TEST ID: CPT05** Page 1 of 1

Project: ALDI, WYNDHAM PLACE, EGREMONT (P21-172)

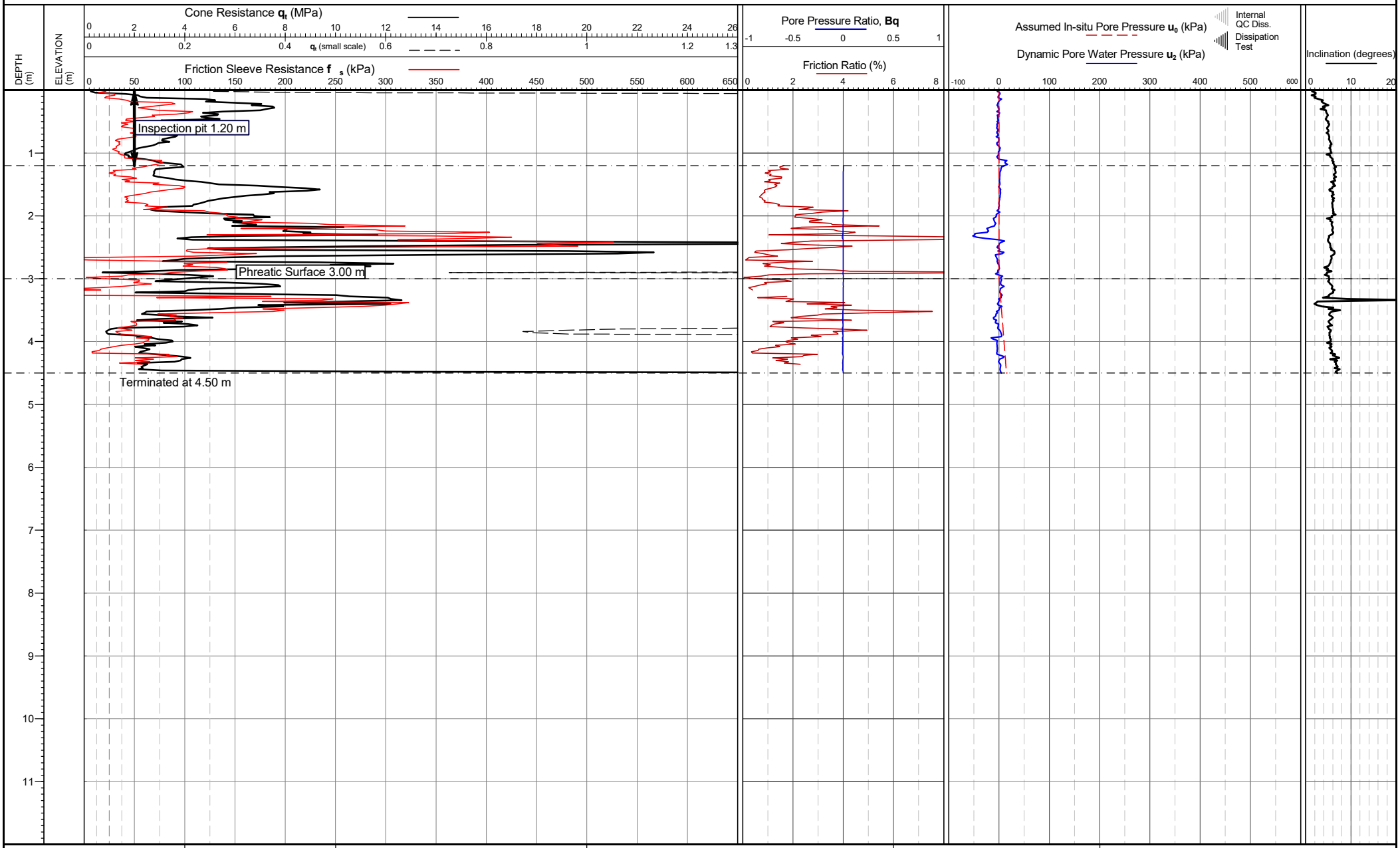
Client: HYDROCK



Cone area (mm2): Cone ID: S15-CFIPTT.1646 Operator: Walter Geddes Rig Used: UK3 Date of test: 21/11/2023 14:51:36	Zero drift (Pre/post test) q_c (kPa): -14.0 f_s (kPa): -3.2 ($f_{s\,drift}$ - $q_{c\,drift}$) u_2 (kPa): -0.7	Location: Cumbria, UK Coordinates: , Elevation: Coordinate system:	Remarks: *Phreatic surface origin: Arbitrary value Termination Remark: Tip load	Date of plot: 21-11-23 Checked by: Chris Player	Lankelma Project Ref: P-108464-1	**TEST ID: CPT06** Page 1 of 1

Project: ALDI, WYNDHAM PLACE, EGREMONT (P21-172)

Client: HYDROCK

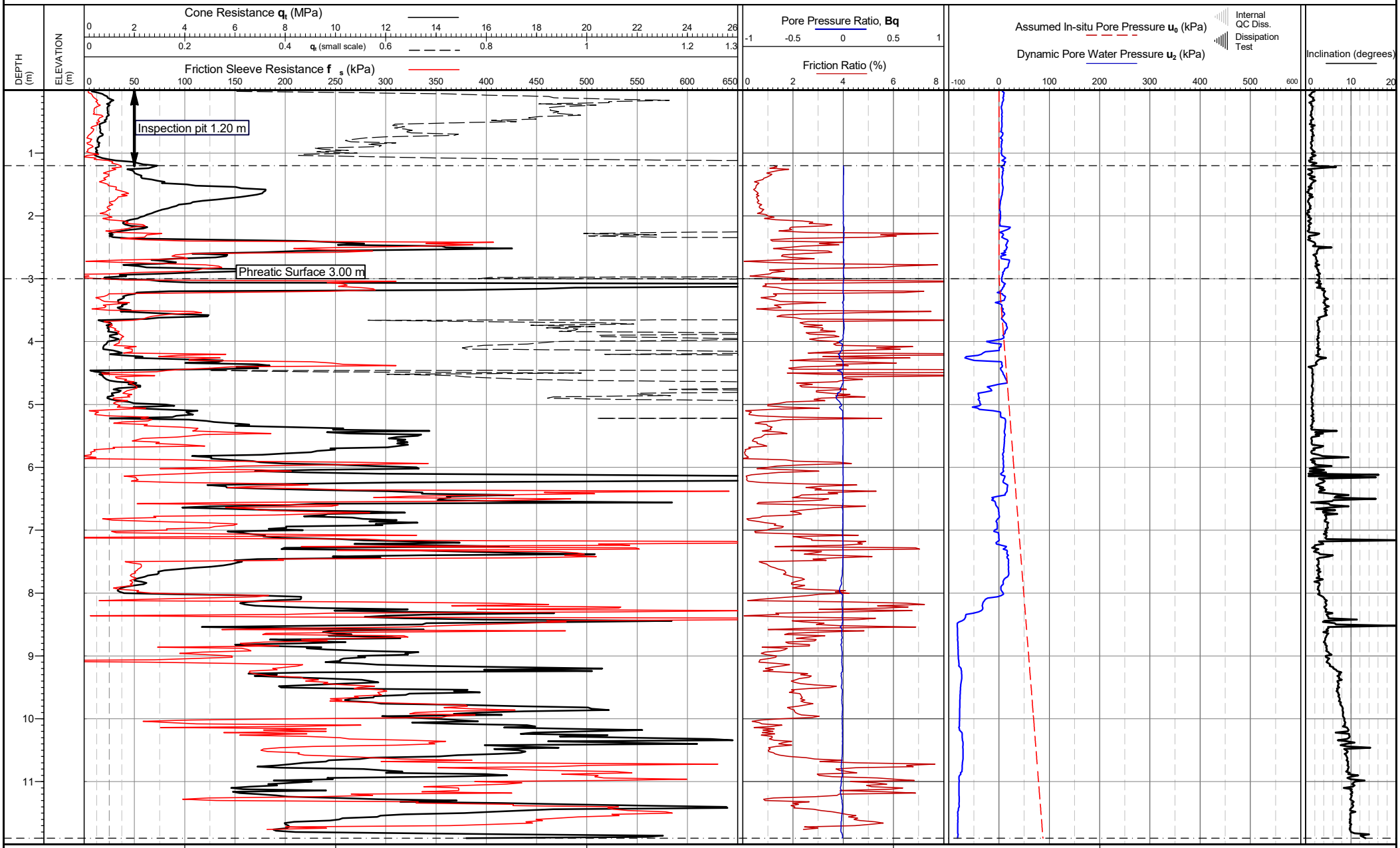


Cone area (mm2): Cone ID: S15-CFIPTT.1646 Operator: Walter Geddes Rig Used: UK3 Date of test: 21/11/2023 12:48:53	Zero drift (Pre/post test) q_c (kPa): 23.4 f_s (kPa): -2.3 ($f_{s\,drift}$ - $q_{c\,drift}$) u_2 (kPa): -2.9	Location: Cumbria, UK Coordinates: , Elevation: Coordinate system:	Remarks: *Phreatic surface origin: Arbitrary value Termination Remark: Tip/sleeve load + inclination	Date of plot: 21-11-23 Checked by: Chris Player	Lankelma Project Ref: P-108464-1

TEST ID: CPT07

Project: ALDI, WYNDHAM PLACE, EGREMONT (P21-172)

Client: HYDROCK

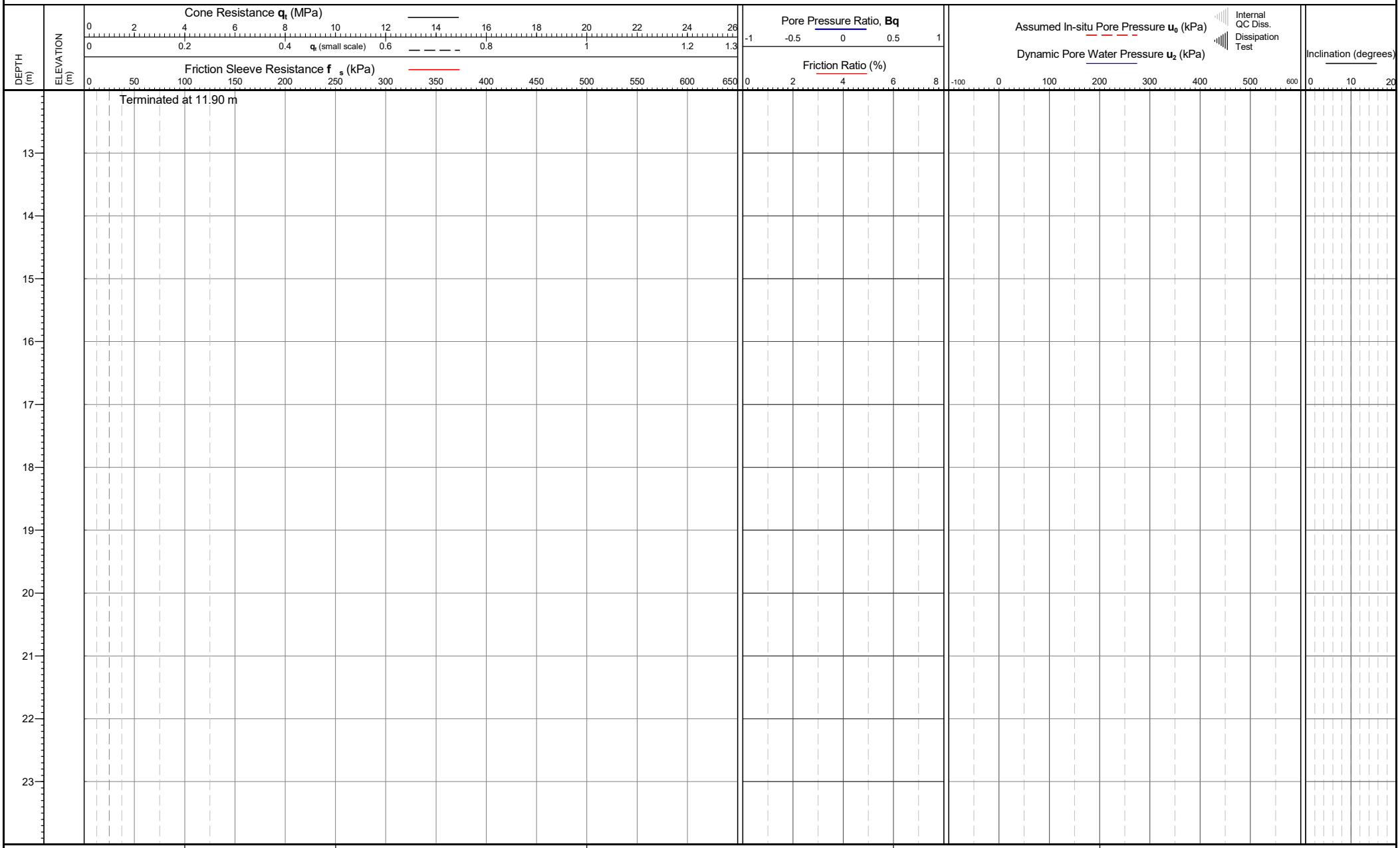


Cone area (mm2): Cone ID: S15-CFIPTT.1646 Operator: Walter Geddes Rig Used: UK3 Date of test: 21/11/2023 14:03:59	Zero drift (Pre/post test) q_c (kPa): 1.6 f_s (kPa): -4.3 ($f_{s\,drift}$ - $q_{c\,drift}$) u_2 (kPa): 8.3	Location: Cumbria, UK Coordinates: , Elevation: Coordinate system:	Remarks: *Phreatic surface origin: Arbitrary value Termination Remark: sudden inclination	Date of plot: 21-11-23 Checked by: Chris Player	Lankelma Project Ref: P-108464-1

TEST ID: CPT08

Project: ALDI, WYNDHAM PLACE, EGREMONT (P21-172)

Client: HYDROCK



Cone area (mm2):
Cone ID: S15-CFIPTT.1646
Operator: Walter Geddes
Rig Used: UK3
Date of test: 21/11/2023 14:03:59

Zero drift (Pre/post test)
q_c (kPa): 1.6
f_s (kPa): -4.3 ($f_{s\ drift}$ - $q_{c\ drift}$)
u_2 (kPa): 8.3

Location: Cumbria, UK
Coordinates: ,
Elevation:
Coordinate system:

Remarks:
*Phreatic surface origin: Arbitrary value

Termination Remark: sudden inclination

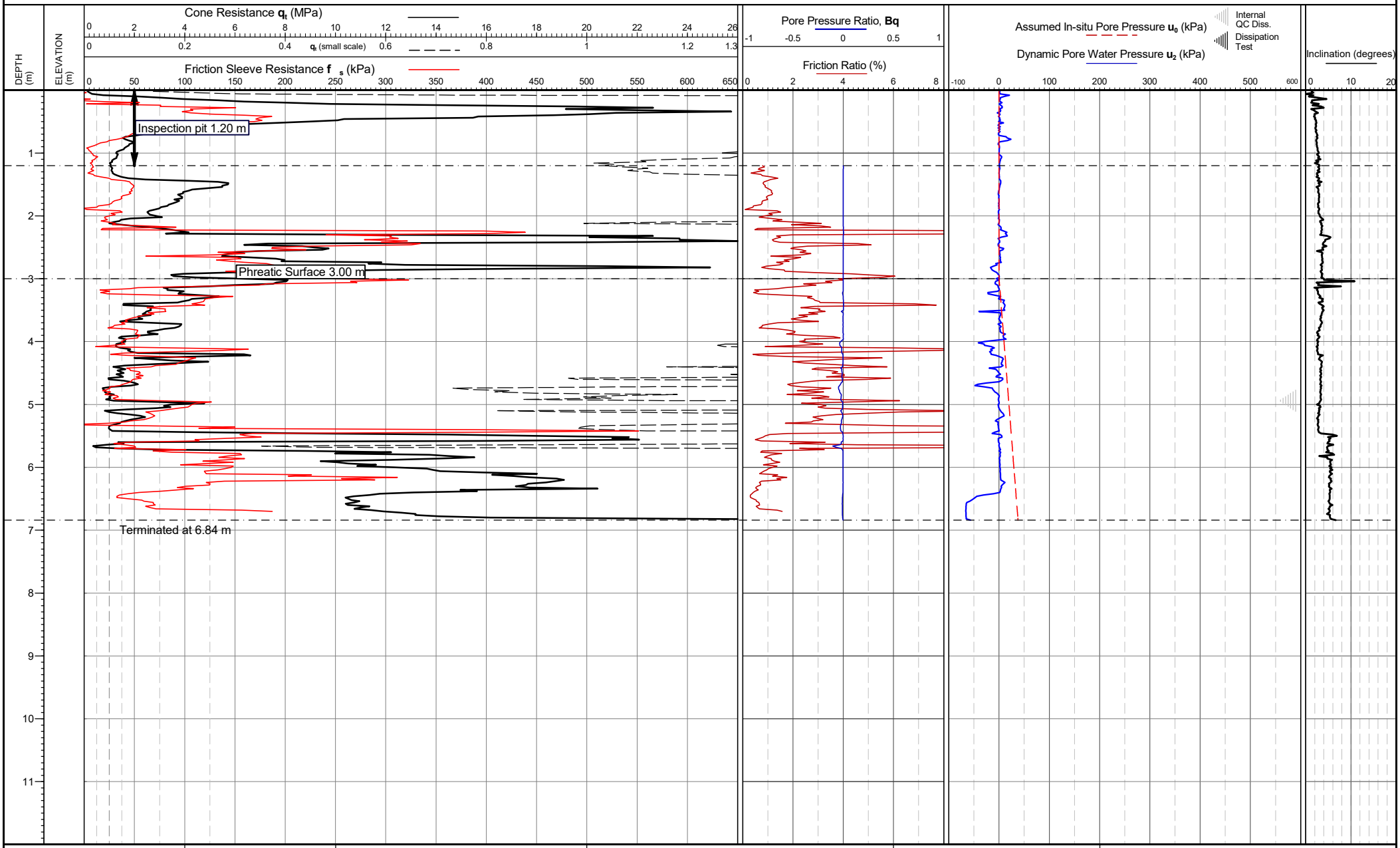
Date of plot: 21-11-23
Checked by: Chris Player

Lankelma Project Ref: P-108464-1

TEST ID: CPT08

Project: ALDI, WYNDHAM PLACE, EGREMONT (P21-172)

Client: HYDROCK



Cone area (mm2): Cone ID: S15-CFIPTT.1646 Operator: Walter Geddes Rig Used: UK3 Date of test: 21/11/2023 10:59:16	Zero drift (Pre/post test) q_c (kPa): -8.0 f_s (kPa): 0.4 ($f_{s\,drift}$ - $q_{c\,drift}$) u_2 (kPa): -3.3	Location: Cumbria, UK Coordinates: , Elevation: Coordinate system:	Remarks: *Phreatic surface origin: Arbitrary value Termination Remark: Tip/sleeve load + inclination	Date of plot: 21-11-23 Checked by: Chris Player	Lankelma Project Ref: P-108464-1	**TEST ID: CPT09** Page 1 of 1

APPENDIX D SOIL BEHAVIOUR TYPE RESULTS

Soil behaviour type (SBT) point data evaluation according to:

Schneider et al (2008)

Robertson (2016)

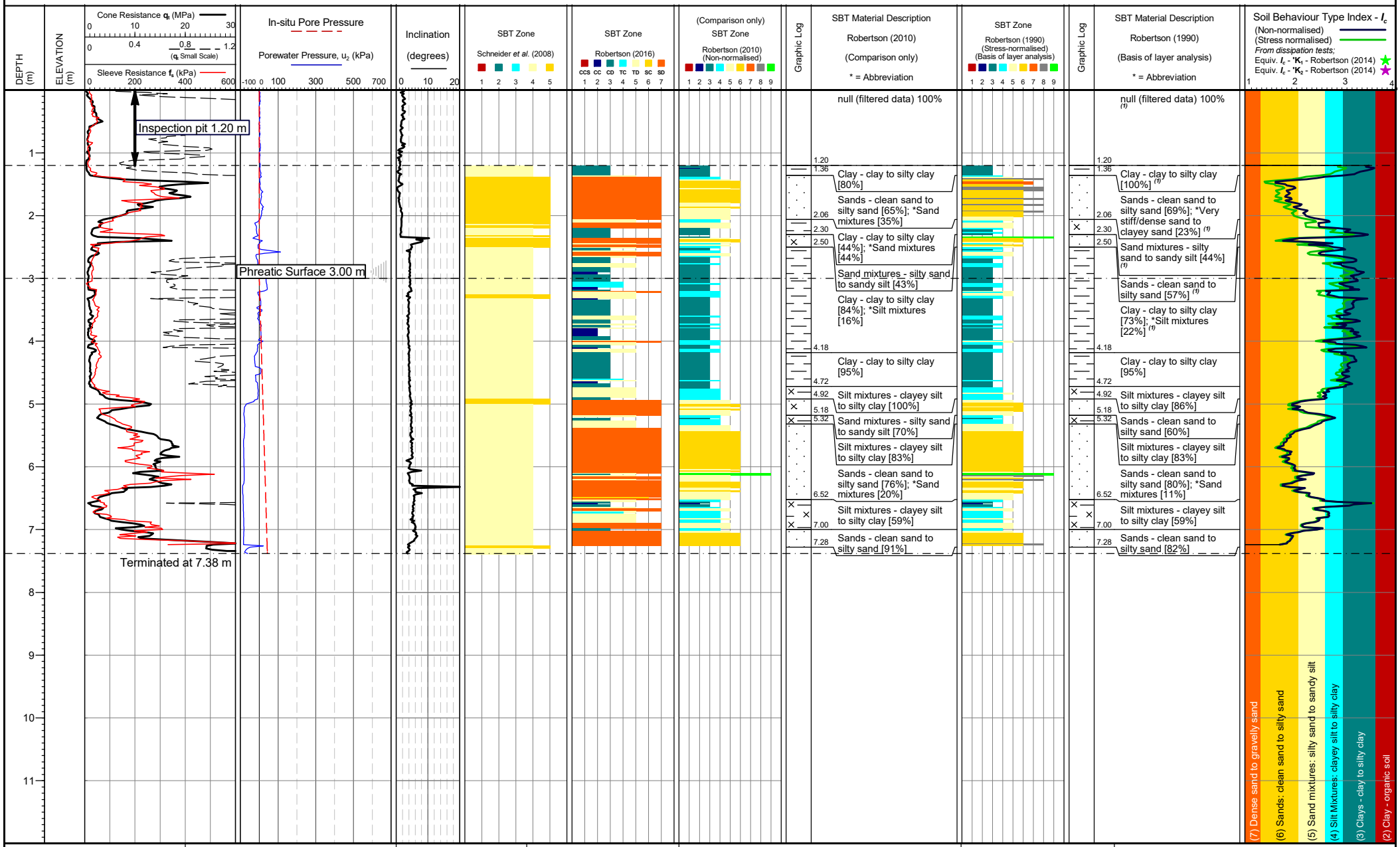
Robertson (2010) with aggregate layer descriptions

Robertson (1990) with aggregate layer descriptions

Project: ALDI, WYNDHAM PLACE, EGREMONT (P21-172)

Client: HYDROCK

Lankelma Project Ref: P-108464-1



Cone area (mm2):
ConeID: S15-CFIPTT.1646
Location: Cumbria, UK
Rig Used: UK3
Date of test: 21/11/2023 11:43:03

Remarks: *Phreatic surface origin: Arbitrary value

Coordinates: ,
Elevation:

Schneider *et al.* (2008) Material Type
1 - (1c) Sensitive clays
2 - (1b) Clays
3 - (1a) Silts & low I, clays
4 - (3) Transitional soils
5 - (2) Essentially drained sands

Robertson (2016) Material Type
1 - **CCS** - Clay-like - Contractive - Sensitive
2 - **CC** - Clay-like - Contractive
3 - **CD** - Clay-like - Dilative
4 - **TC** - Transitional - Contractive
5 - **TD** - Transitional - Dilative
6 - **SC** - Sand-like - Contractive
7 - **SD** - Sand-like - Dilative

Robertson (1990 & 2010) Material Type
1 - Sensitive fine-grained
2 - Organic soils
3 - Clays - clay to silty clay
4 - Silt mixtures - clayey silt to silty clay
5 - Sand mixtures - silty sand to sandy silt
6 - Sands - clean sand to silty sand
7 - Gravelly sand to sand
8 - Very stiff/dense sand to clayey sand
9 - Very stiff fine grained

(1) 0-3 m: Normalised SBT often artificially coarse/stiff at very low in-situ stresses

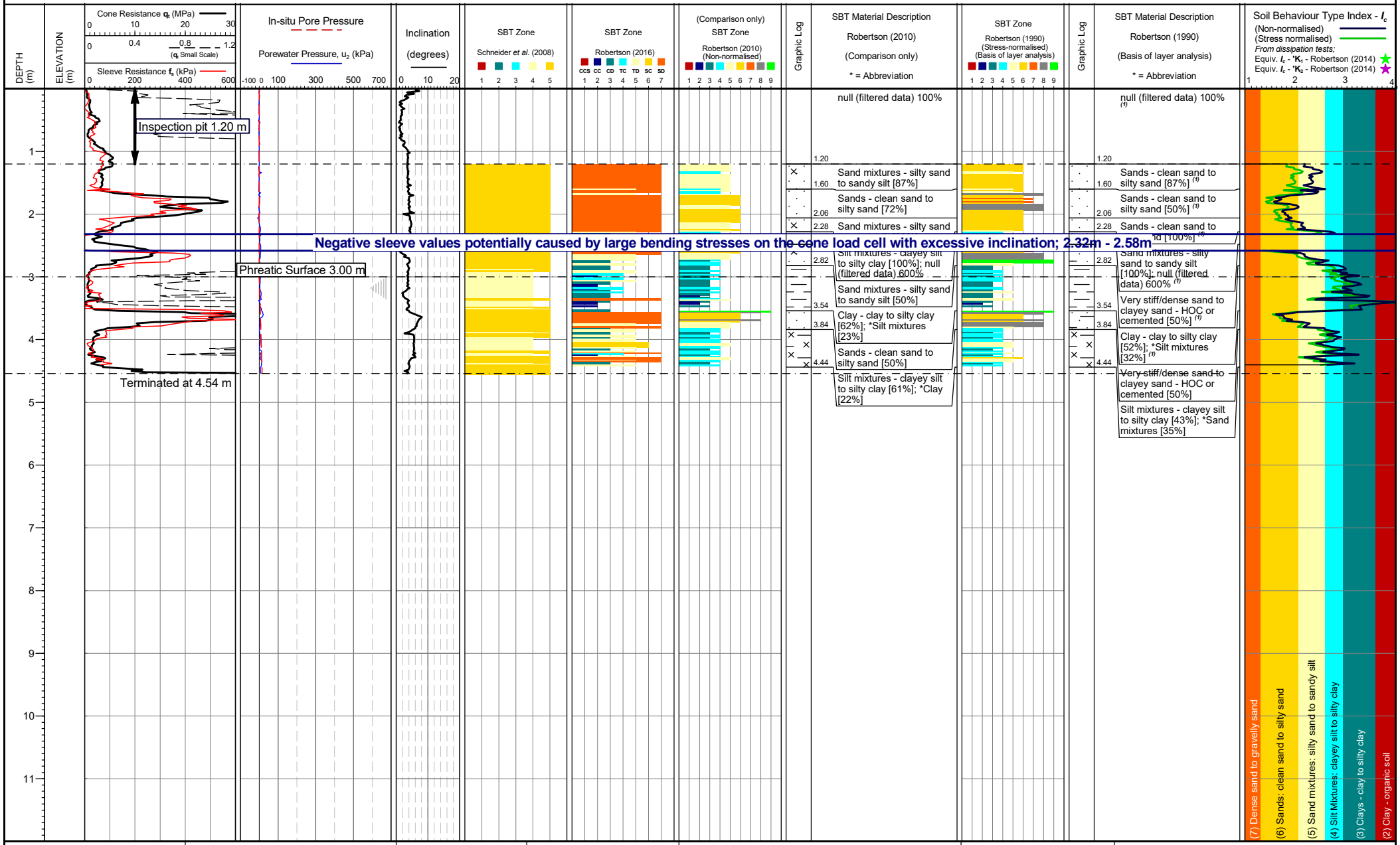
Internal QA Diss.
Dissipation Test

TEST ID: CPT01

Project: ALDI, WYNDHAM PLACE, EGREMONT (P21-172)

Client: HYDROCK

Lankelma Project Ref: P-108464-1



Cone area (mm2):
ConeID: S15-CFIPTT.1646
Location: Cumbria, UK
Rig Used: UK3
Date of test: 21/11/2023 09:18:04

Remarks: Negative sleeve values potentially caused by large bending stresses on the cone load cell with excessive inclination; 2.32 - 2.58 m.
*Phreatic surface origin: Arbitrary value

Coordinates: ,
Elevation:

Schneider *et al.* (2008) Material Type
1 - (1c) Sensitive clays
2 - (1b) Clays
3 - (1a) Silts & low I, clays
4 - (3) Transitional soils
5 - (2) Essentially drained sands

Robertson (2016) Material Type
1 - **CCS** - Clay-like - Contractive - Sensitive
2 - **CC** - Clay-like - Contractive
3 - **CD** - Clay-like - Dilative
4 - **TC** - Transitional - Contractive
5 - **TD** - Transitional - Dilative
6 - **SC** - Sand-like - Contractive
7 - **SD** - Sand-like - Dilative

Robertson (1990 & 2010) Material Type
1 - Sensitive fine-grained
2 - Organic soils
3 - Clays - clay to silty clay
4 - Silt mixtures - clayey silt to silty clay
5 - Sand mixtures - silty sand to sandy silt
6 - Sands - clean sand to silty sand
7 - Gravelly sand to sand
8 - Very stiff/dense sand to clayey sand
9 - Very stiff fine grained

(1) 0-3 m: Normalised SBT often artificially coarse/stiff at very low in-situ stresses

Internal QA Diss.
Dissipation Test

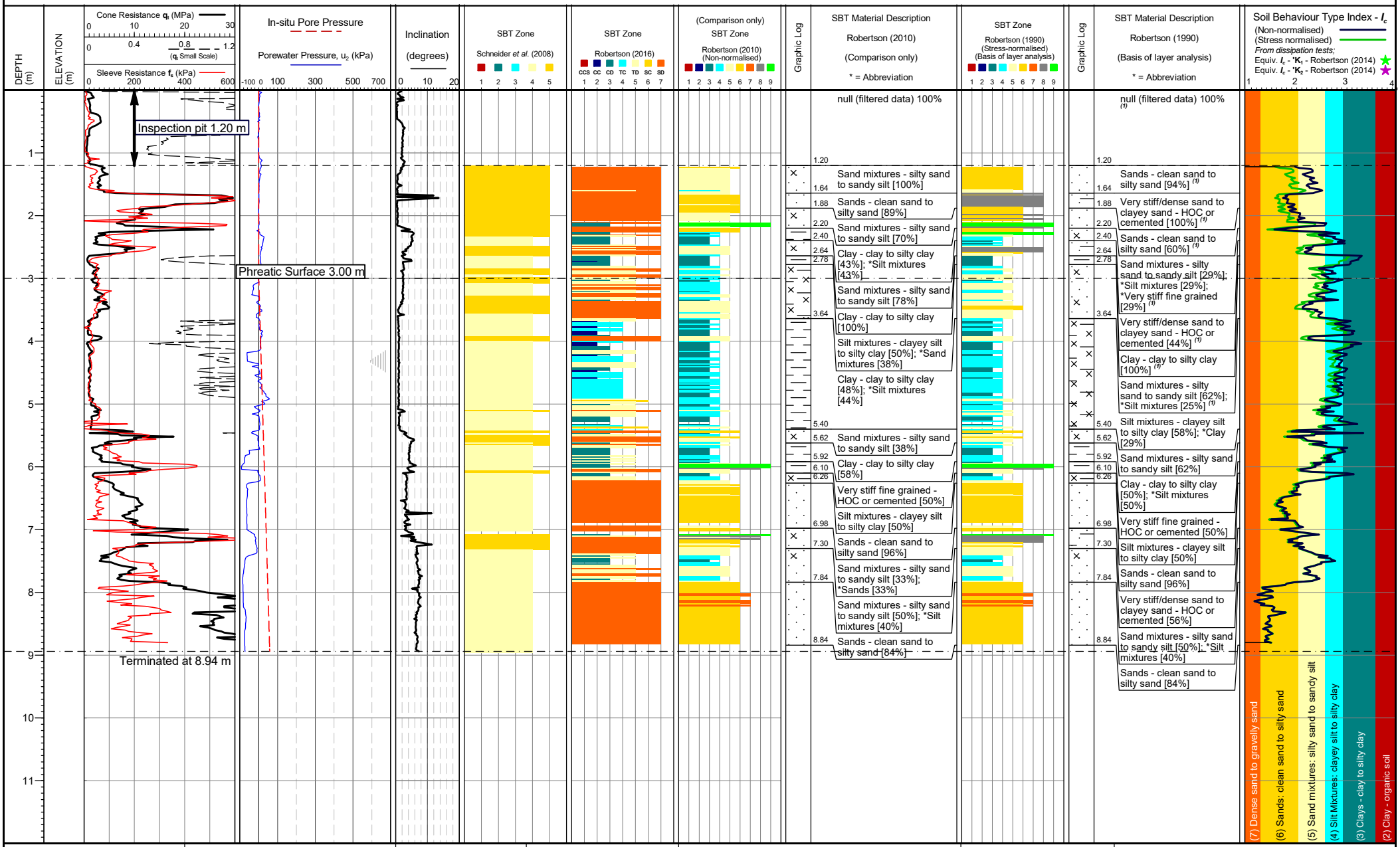
TEST ID: CPT02

LANKELMA

Project: ALDI, WYNDHAM PLACE, EGREMONT (P21-172)

Client: HYDROCK

Lankelma Project Ref: P-108464-1



Cone area (mm2):
ConeID: S15-CFIPTT.1646
Location: Cumbria, UK
Rig Used: UK3
Date of test: 21/11/2023 13:16:01

Remarks: *Phreatic surface origin: Arbitrary value

Coordinates: ,
Elevation:

Schneider *et al.* (2008) Material Type
1 - (1c) Sensitive clays
2 - (1b) Clays
3 - (1a) Silts & low I, clays
4 - (3) Transitional soils
5 - (2) Essentially drained sands

Robertson (2016) Material Type
1 - **CCS** - Clay-like - Contractive - Sensitive
2 - **CC** - Clay-like - Contractive
3 - **CD** - Clay-like - Dilative
4 - **TC** - Transitional - Contractive
5 - **TD** - Transitional - Dilative
6 - **SC** - Sand-like - Contractive
7 - **SD** - Sand-like - Dilative

Robertson (1990 & 2010) Material Type
1 - Sensitive fine-grained
2 - Organic soils
3 - Clays - clay to silty clay
4 - Silt mixtures - clayey silt to silty clay
5 - Sand mixtures - silty sand to sandy silt
6 - Sands - clean sand to silty sand
7 - Gravelly sand to sand
8 - Very stiff/dense sand to clayey sand
9 - Very stiff fine grained

(1) 0-3 m: Normalised SBT often artificially coarse/stiff at very low in-situ stresses

Internal QA Diss.
Dissipation Test

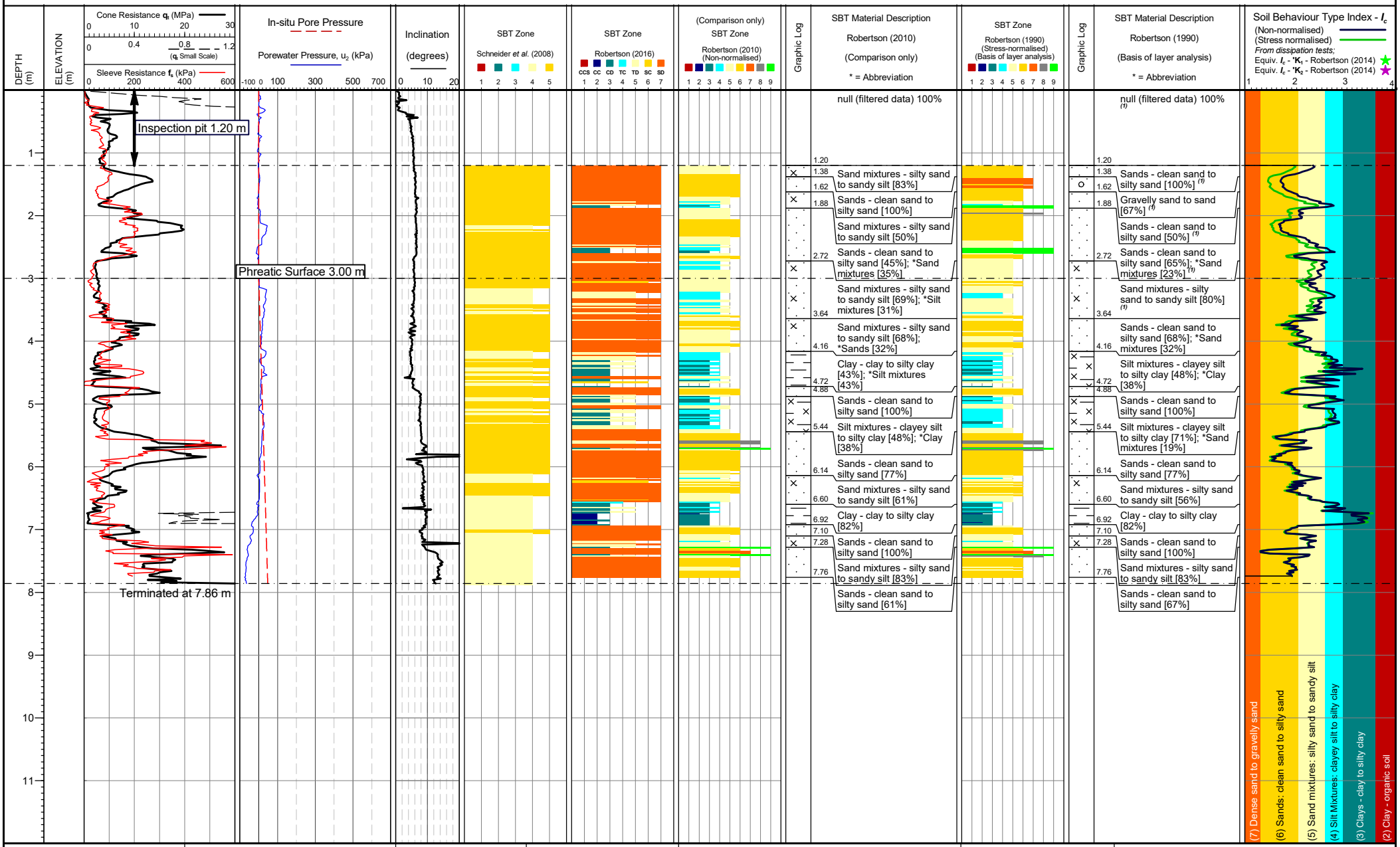
TEST ID: CPT03

LANKELMA

Project: ALDI, WYNDHAM PLACE, EGREMONT (P21-172)

Client: HYDROCK

Lankelma Project Ref: P-108464-1



Cone area (mm2):
ConeID: S15-CFIPTT.1646
Location: Cumbria, UK
Rig Used: UK3
Date of test: 21/11/2023 10:20:33

Remarks: *Phreatic surface origin: Arbitrary value

Coordinates: ,
Elevation:

Schneider *et al.* (2008) Material Type
1 - (1c) Sensitive clays
2 - (1b) Clays
3 - (1a) Silts & low I, clays
4 - (3) Transitional soils
5 - (2) Essentially drained sands

Robertson (2016) Material Type
1 - **CCS** - Clay-like - Contractive - Sensitive
2 - **CC** - Clay-like - Contractive
3 - **CD** - Clay-like - Dilative
4 - **TC** - Transitional - Contractive
5 - **TD** - Transitional - Dilative
6 - **SC** - Sand-like - Contractive
7 - **SD** - Sand-like - Dilative

Robertson (1990 & 2010) Material Type
1 - Sensitive fine-grained
2 - Organic soils
3 - Clays - clay to silty clay
4 - Silt mixtures - clayey silt to silty clay
5 - Sand mixtures - silty sand to sandy silt
6 - Sands - clean sand to silty sand
7 - Gravelly sand to sand
8 - Very stiff/dense sand to clayey sand
9 - Very stiff fine grained

(1) 0-3 m: Normalised SBT often artificially coarse/stiff at very low in-situ stresses

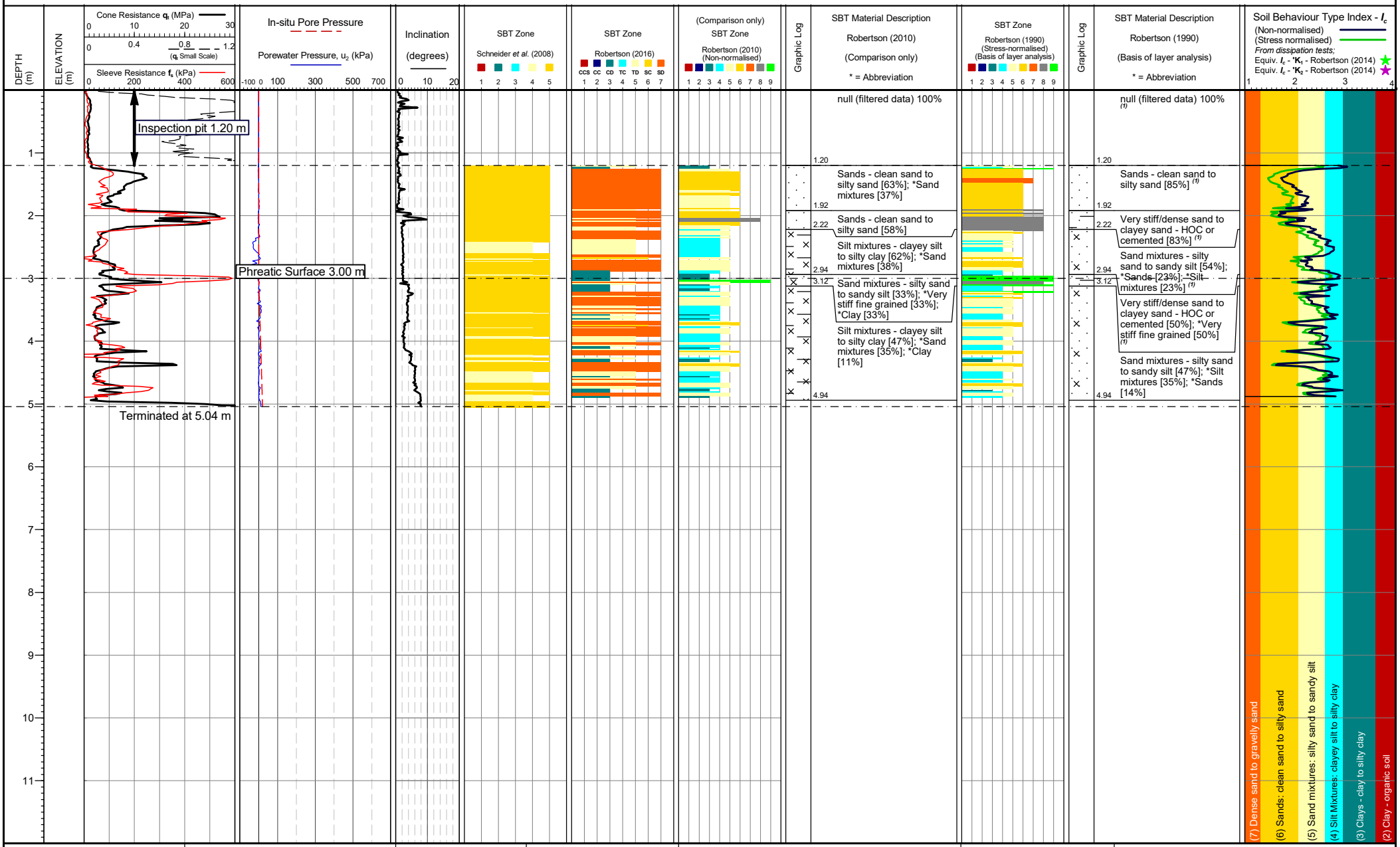
Internal QA Diss. | Dissipation Test

TEST ID: CPT05

Project: ALDI, WYNDHAM PLACE, EGREMONT (P21-172)

Client: HYDROCK

Lankelma Project Ref: P-108464-1



Cone area (mm2):
ConeID: S15-CFIPTT.1646
Location: Cumbria, UK
Rig Used: UK3
Date of test: 21/11/2023 14:51:36

Remarks: *Phreatic surface origin: Arbitrary value

Coordinates: ,
Elevation:

Schneider *et al.* (2008) Material Type
1 - (1c) Sensitive clays
2 - (1b) Clays
3 - (1a) Silts & low I, clays
4 - (3) Transitional soils
5 - (2) Essentially drained sands

Robertson (2016) Material Type
1 - **CCS** - Clay-like - Contractive - Sensitive
2 - **CC** - Clay-like - Contractive
3 - **CD** - Clay-like - Dilative
4 - **TC** - Transitional - Contractive
5 - **TD** - Transitional - Dilative
6 - **SC** - Sand-like - Contractive
7 - **SD** - Sand-like - Dilative

Robertson (1990 & 2010) Material Type
1 - Sensitive fine-grained
2 - Organic soils
3 - Clays - clay to silty clay
4 - Silt mixtures - clayey silt to silty clay
5 - Sand mixtures - silty sand to sandy silt
6 - Sands - clean sand to silty sand
7 - Gravelly sand to sand
8 - Very stiff/dense sand to clayey sand
9 - Very stiff fine grained

(1) 0-3 m: Normalised SBT often artificially coarse/stiff at very low in-situ stresses

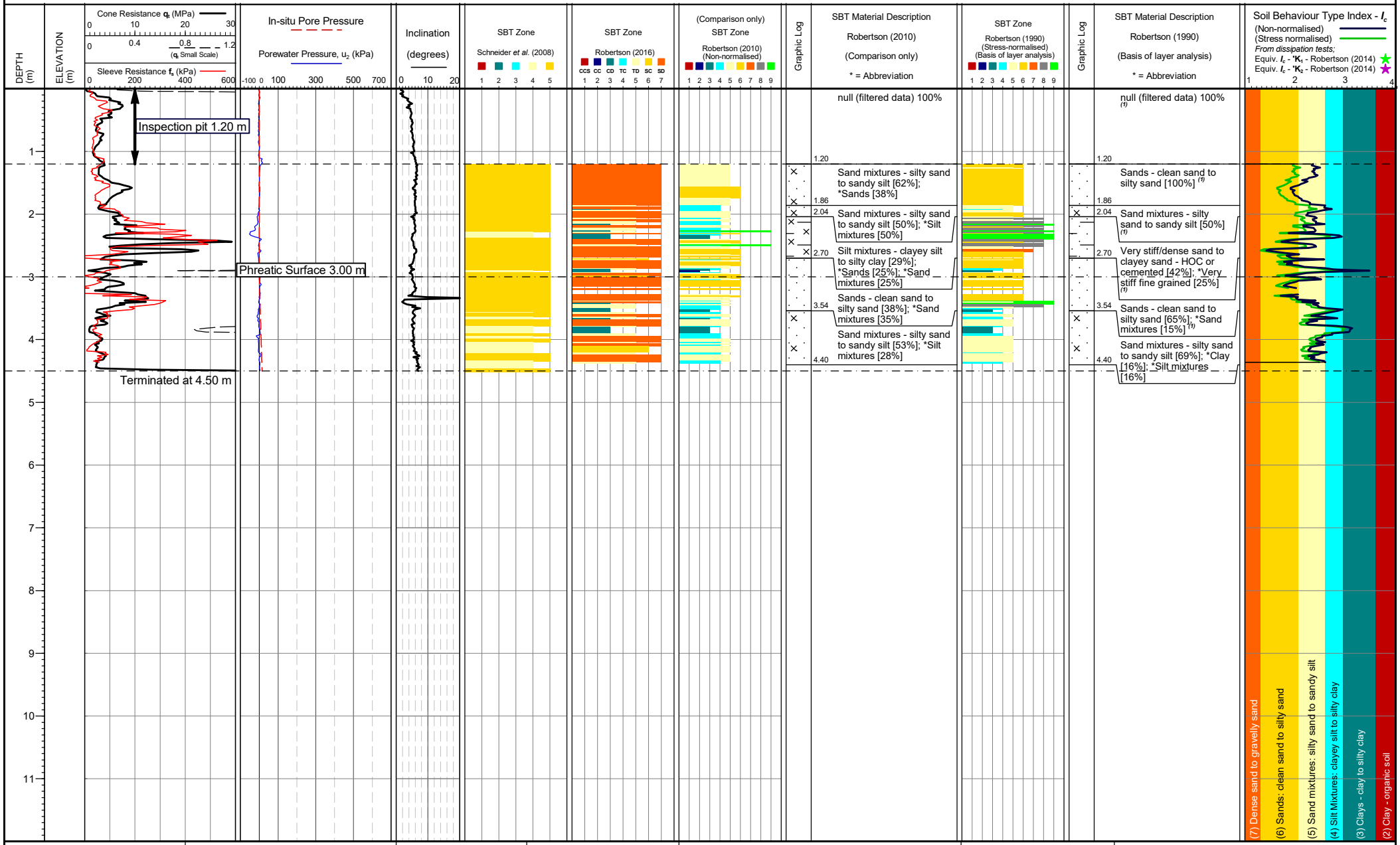
Internal QA Diss.
Dissipation Test

TEST ID: CPT06

Project: ALDI, WYNDHAM PLACE, EGREMONT (P21-172)

Client: HYDROCK

Lankelma Project Ref: P-108464-1



Cone area (mm2):
ConeID: S15-CFIPTT.1646
Location: Cumbria, UK
Rig Used: UK3
Date of test: 21/11/2023 12:48:53

Remarks: *Phreatic surface origin: Arbitrary value

Coordinates: ,
Elevation:

Schneider *et al.* (2008) Material Type
1 - (1c) Sensitive clays
2 - (1b) Clays
3 - (1a) Silts & low I, clays
4 - (3) Transitional soils
5 - (2) Essentially drained sands

Robertson (2016) Material Type
1 - **CCS** - Clay-like - Contractive - Sensitive
2 - **CC** - Clay-like - Contractive
3 - **CD** - Clay-like - Dilative
4 - **TC** - Transitional - Contractive
5 - **TD** - Transitional - Dilative
6 - **SC** - Sand-like - Contractive
7 - **SD** - Sand-like - Dilative

Robertson (1990 & 2010) Material Type
1 - Sensitive fine-grained
2 - Organic soils
3 - Clays - clay to silty clay
4 - Silt mixtures - clayey silt to silty clay
5 - Sand mixtures - silty sand to sandy silt
6 - Sands - clean sand to silty sand
7 - Gravelly sand to sand
8 - Very stiff/dense sand to clayey sand
9 - Very stiff fine grained

(1) 0-3 m: Normalised SBT often artificially coarse/stiff at very low in-situ stresses

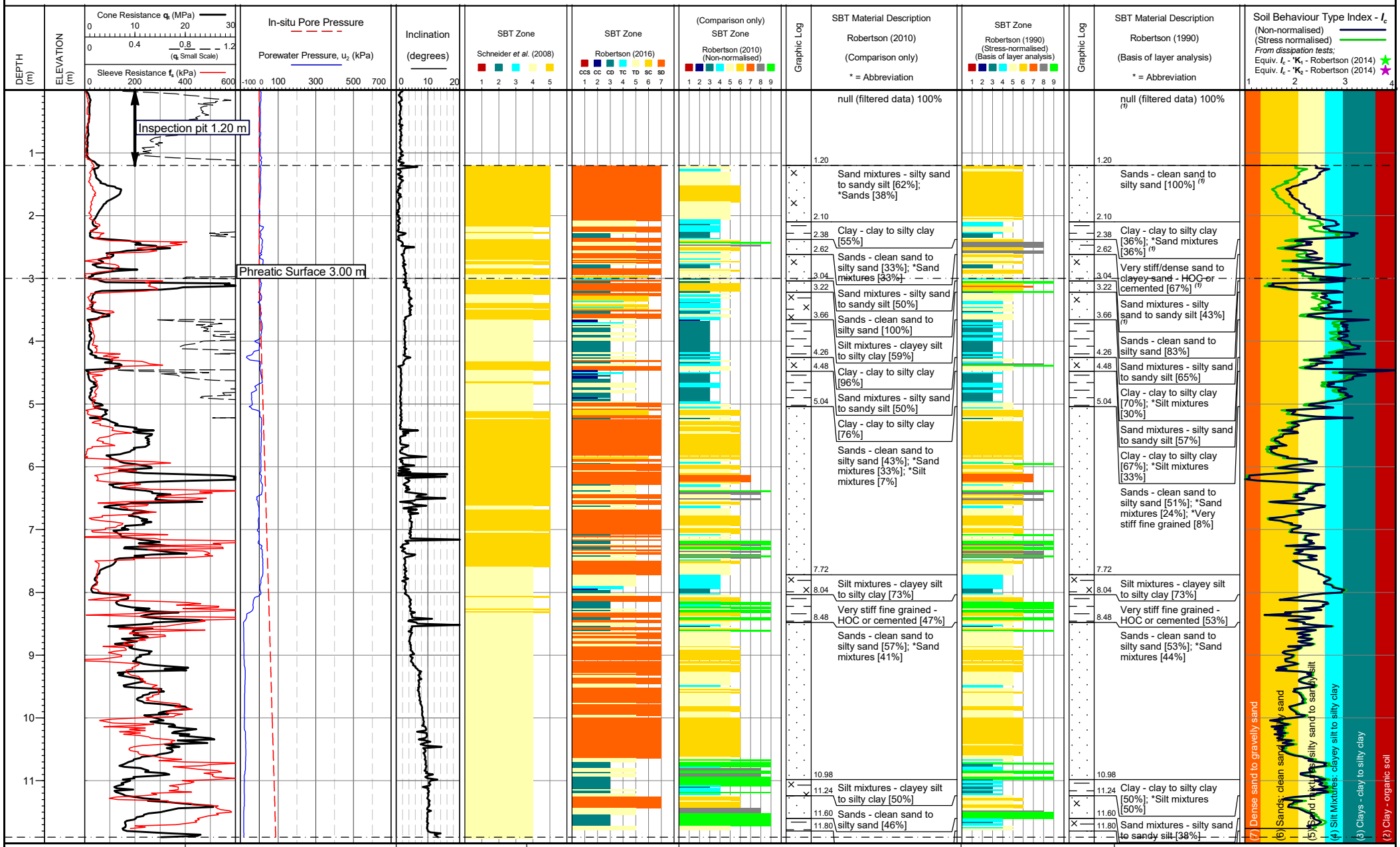
Internal QA Diss.
Dissipation Test

TEST ID: CPT07

Project: ALDI, WYNDHAM PLACE, EGREMONT (P21-172)

Client: HYDROCK

Lankelma Project Ref: P-108464-1



Cone area (mm2):
ConeID: S15-CFIPTT.1646
Location: Cumbria, UK
Rig Used: UK3
Date of test: 21/11/2023 14:03:59

Remarks: *Phreatic surface origin: Arbitrary value

Coordinates: ,
Elevation:

Schneider *et al.* (2008) Material Type
1 - (1c) Sensitive clays
2 - (1b) Clays
3 - (1a) Silts & low I, clays
4 - (3) Transitional soils
5 - (2) Essentially drained sands

Robertson (2016) Material Type
1 - **CCS** - Clay-like - Contractive - Sensitive
2 - **CC** - Clay-like - Contractive
3 - **CD** - Clay-like - Dilative
4 - **TC** - Transitional - Contractive
5 - **TD** - Transitional - Dilative
6 - **SC** - Sand-like - Contractive
7 - **SD** - Sand-like - Dilative

Robertson (1990 & 2010) Material Type
1 - Sensitive fine-grained
2 - Organic soils
3 - Clays - clay to silty clay
4 - Silt mixtures - clayey silt to silty clay
5 - Sand mixtures - silty sand to sandy silt
6 - Sands - clean sand to silty sand
7 - Gravelly sand to sand
8 - Very stiff/dense sand to clayey sand
9 - Very stiff fine grained

(1) 0-3 m: Normalised SBT often artificially coarse/stiff at very low in-situ stresses

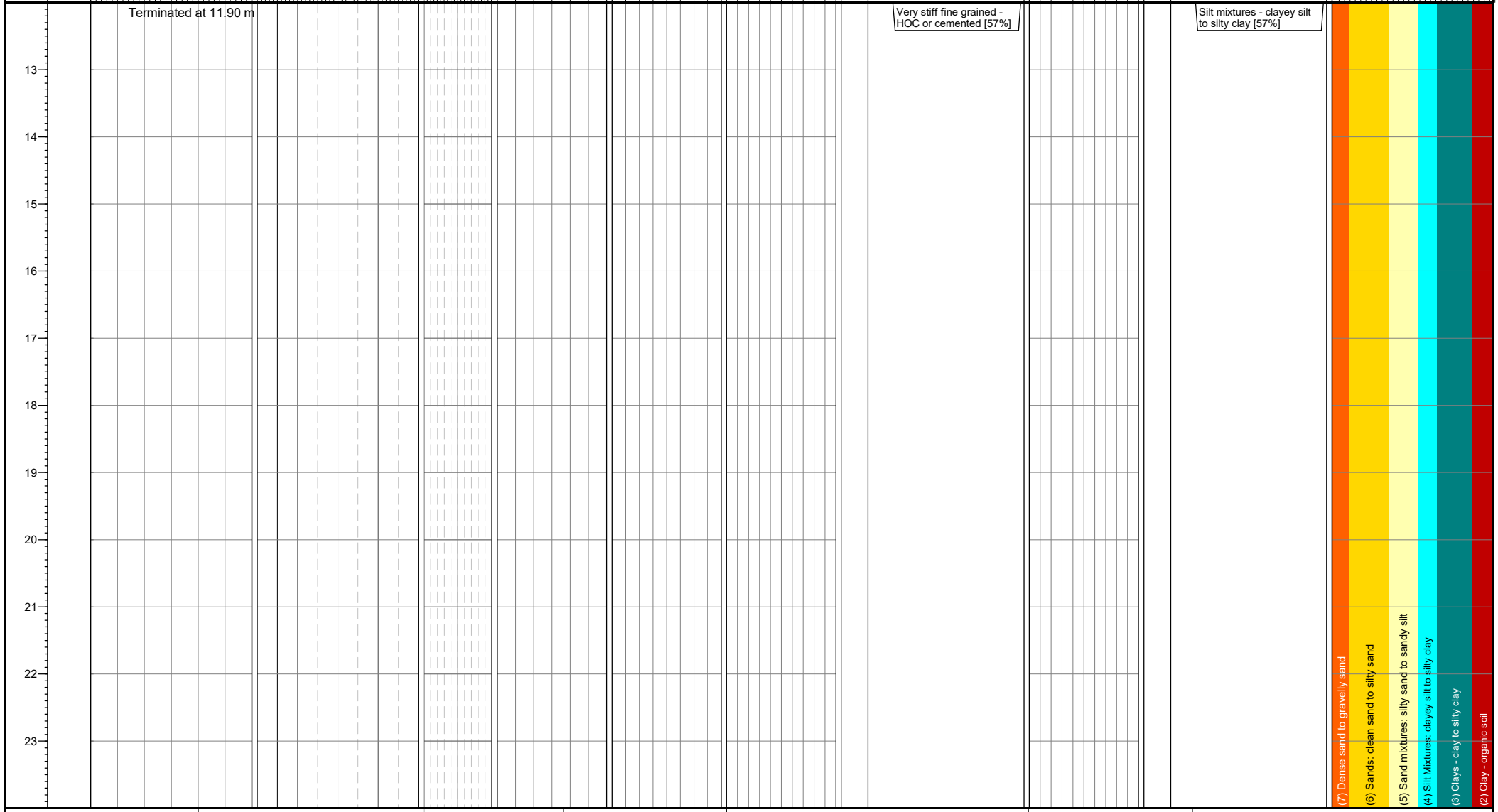
Internal QA Diss.
Dissipation Test

TEST ID: CPT08

Project: ALDI, WYNDHAM PLACE, EGREMONT (P21-172)

Client: HYDROCK

Lankelma Project Ref: P-108464-1



Cone area (mm2):
ConeID: S15-CFIPTT.1646
Location: Cumbria, UK
Rig Used: UK3
Date of test: 21/11/2023 14:03:59

Remarks: *Phreatic surface origin: Arbitrary value

Coordinates: ,
Elevation:

Schneider *et al.* (2008) Material Type
1 - (1c) Sensitive clays
2 - (1b) Clays
3 - (1a) Silts & low I, clays
4 - (3) Transitional soils
5 - (2) Essentially drained sands

Robertson (2016) Material Type
1 - **CCS** - Clay-like - Contractive - Sensitive
2 - **CC** - Clay-like - Contractive
3 - **CD** - Clay-like - Dilative
4 - **TC** - Transitional - Contractive
5 - **TD** - Transitional - Dilative
6 - **SC** - Sand-like - Contractive
7 - **SD** - Sand-like - Dilative

Robertson (1990 & 2010) Material Type
1 - Sensitive fine-grained
2 - Organic soils
3 - Clays - clay to silty clay
4 - Silt mixtures - clayey silt to silty clay
5 - Sand mixtures - silty sand to sandy silt
6 - Sands - clean sand to silty sand
7 - Gravelly sand to sand
8 - Very stiff/dense sand to clayey sand
9 - Very stiff fine grained

(1) 0-3 m: Normalised SBT often artificially coarse/stiff at very low in-situ stresses

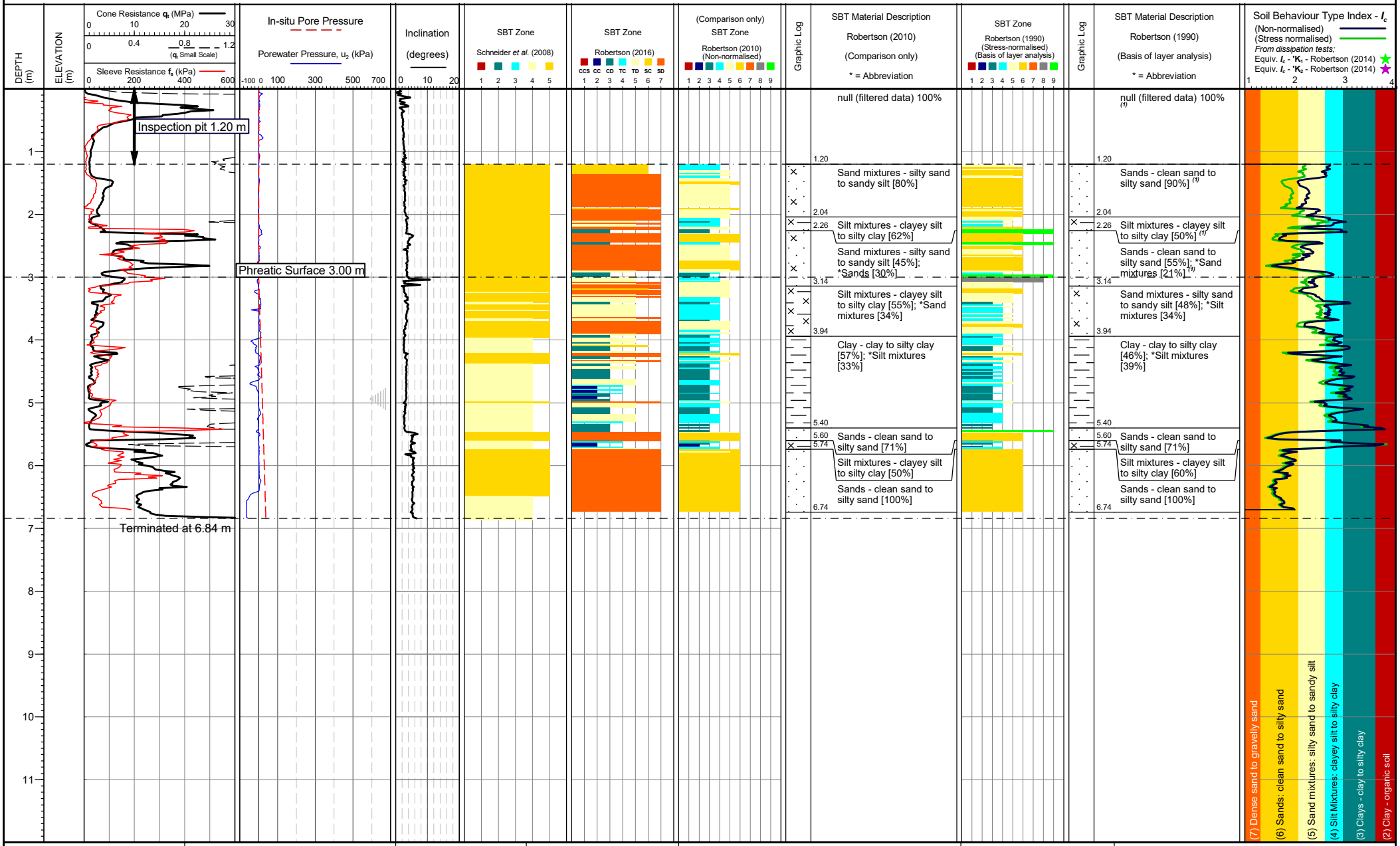
Internal QA Diss. Dissipation Test

TEST ID: CPT08

Project: ALDI, WYNDHAM PLACE, EGREMONT (P21-172)

Client: HYDROCK

Lankelma Project Ref: P-108464-1



Cone area (mm2):
ConeID: S15-CFIPTT.1646
Location: Cumbria, UK
Rig Used: UK3
Date of test: 21/11/2023 10:59:16

Remarks: *Phreatic surface origin: Arbitrary value

Coordinates: ,
Elevation:

Schneider *et al.* (2008) Material Type
1 - (1c) Sensitive clays
2 - (1b) Clays
3 - (1a) Silts & low I, clays
4 - (3) Transitional soils
5 - (2) Essentially drained sands

Robertson (2016) Material Type
1 - **CCS** - Clay-like - Contractive - Sensitive
2 - **CC** - Clay-like - Contractive
3 - **CD** - Clay-like - Dilative
4 - **TC** - Transitional - Contractive
5 - **TD** - Transitional - Dilative
6 - **SC** - Sand-like - Contractive
7 - **SD** - Sand-like - Dilative

Robertson (1990 & 2010) Material Type
1 - Sensitive fine-grained
2 - Organic soils
3 - Clays - clay to silty clay
4 - Silt mixtures - clayey silt to silty clay
5 - Sand mixtures - silty sand to sandy silt
6 - Sands - clean sand to silty sand
7 - Gravelly sand to sand
8 - Very stiff/dense sand to clayey sand
9 - Very stiff fine grained

(1) 0-3 m: Normalised SBT often artificially coarse/stiff at very low in-situ stresses

Internal QA Diss.
Dissipation Test

TEST ID: CPT09

APPENDIX E PARAMETER RESULTS 1 – S_U, M_V, OCR, SBT, I_C

Undrained shear strength

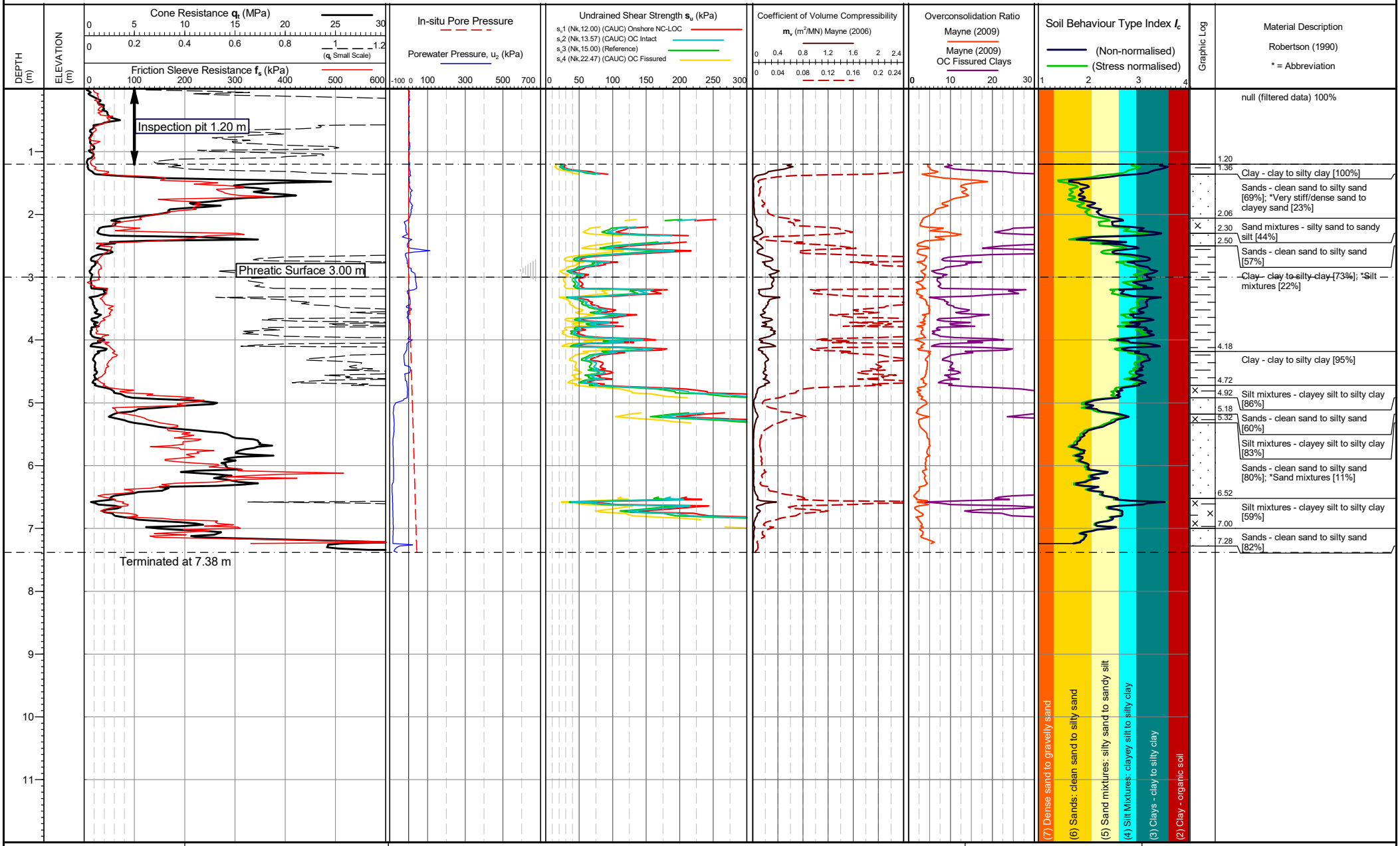
Coefficient of volume change

Overconsolidation ratio

Robertson 1990 SBT descriptions & SBT index I_c

Project: ALDI, WYNDHAM PLACE, EGREMONT (P21-172)

Client: HYDROCK



Cone area (mm2):
ConeID: S15-CFIPTT.1646
Operator: Walter Geddes
Rig Used: UK3
Date of test: 21/11/2023 11:43:03

Location: Cumbria, UK
Coordinates: ,
Elevation:
Coordinate system:

Remarks: *Phreatic surface origin: Arbitrary value

Termination Remark:
Tip load

Internal QA Diss.
Dissipation Test
Penetration Pause (<1cm/s)

Both drained and undrained parameters are calculated for mixed SBTs = Ic 2.40-2.70. See report text for methods and discussion of parameter evaluation.

Date of plot: 21-11-23

Checked by: Chris Player

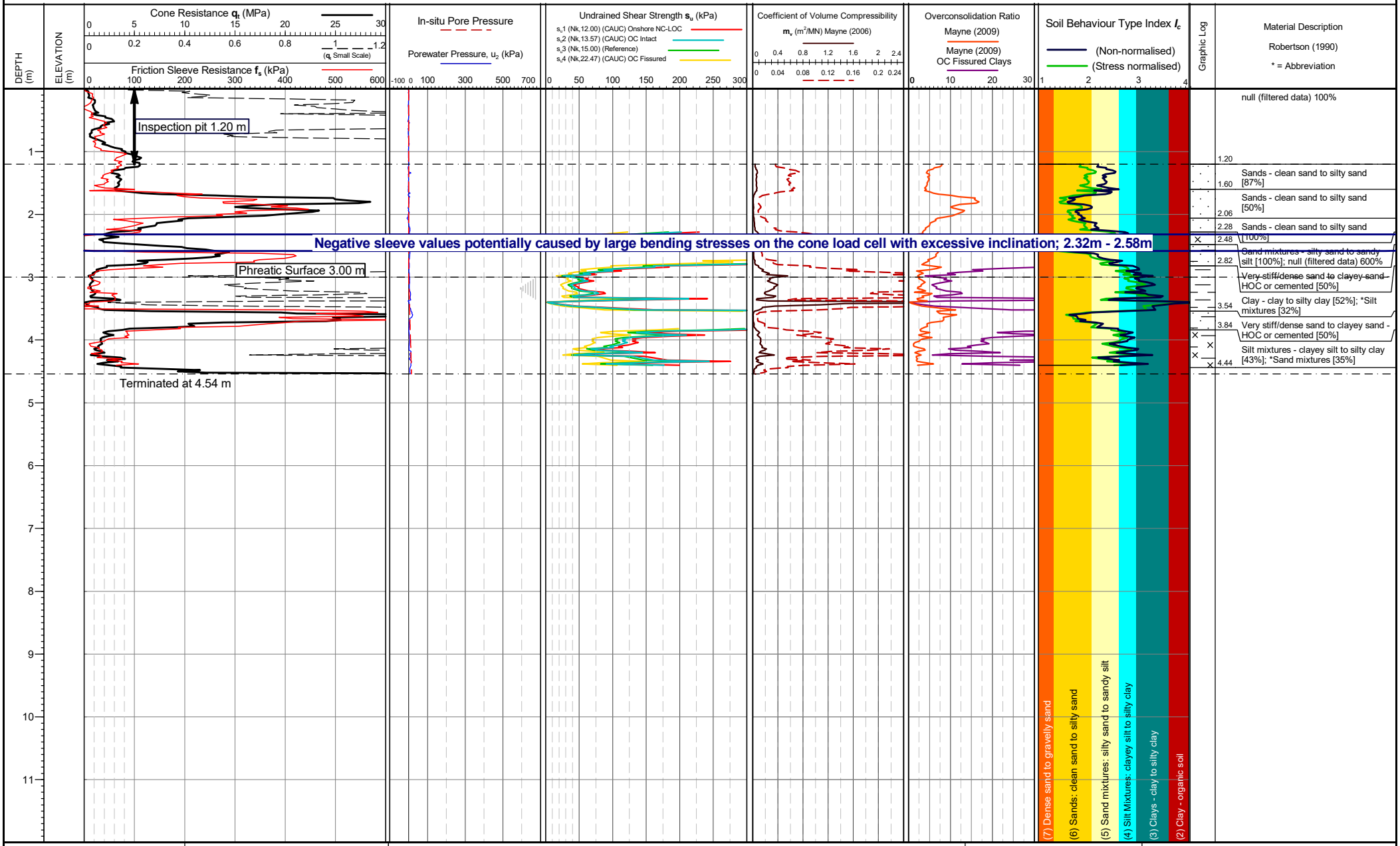
Lankelma Project Ref: P-108464-1

TEST ID: CPT01

LANKELMA

Project: ALDI, WYNDHAM PLACE, EGREMONT (P21-172)

Client: HYDROCK



Cone area (mm2):
ConeID: S15-CFIPTT.1646
Operator: Chris Clarke
Rig Used: UK3
Date of test: 21/11/2023 09:18:04

Location: Cumbria, UK
Coordinates: ,
Elevation:
Coordinate system:

Remarks: Negative sleeve values potentially caused by large bending stresses on the cone load cell with excessive inclination; 2.32 - 2.58 m. *Phreatic surface origin: Arbitrary value

Termination Remark:
Tip/sleeve load + inclination

Internal QA Diss.
Dissipation Test
Penetration Pause (<1cm/s)

Both drained and undrained parameters are calculated for mixed SBTs = Ic 2.40-2.70. See report text for methods and discussion of parameter evaluation.

Date of plot: 21-11-23
Lankelma Project Ref: P-108464-1

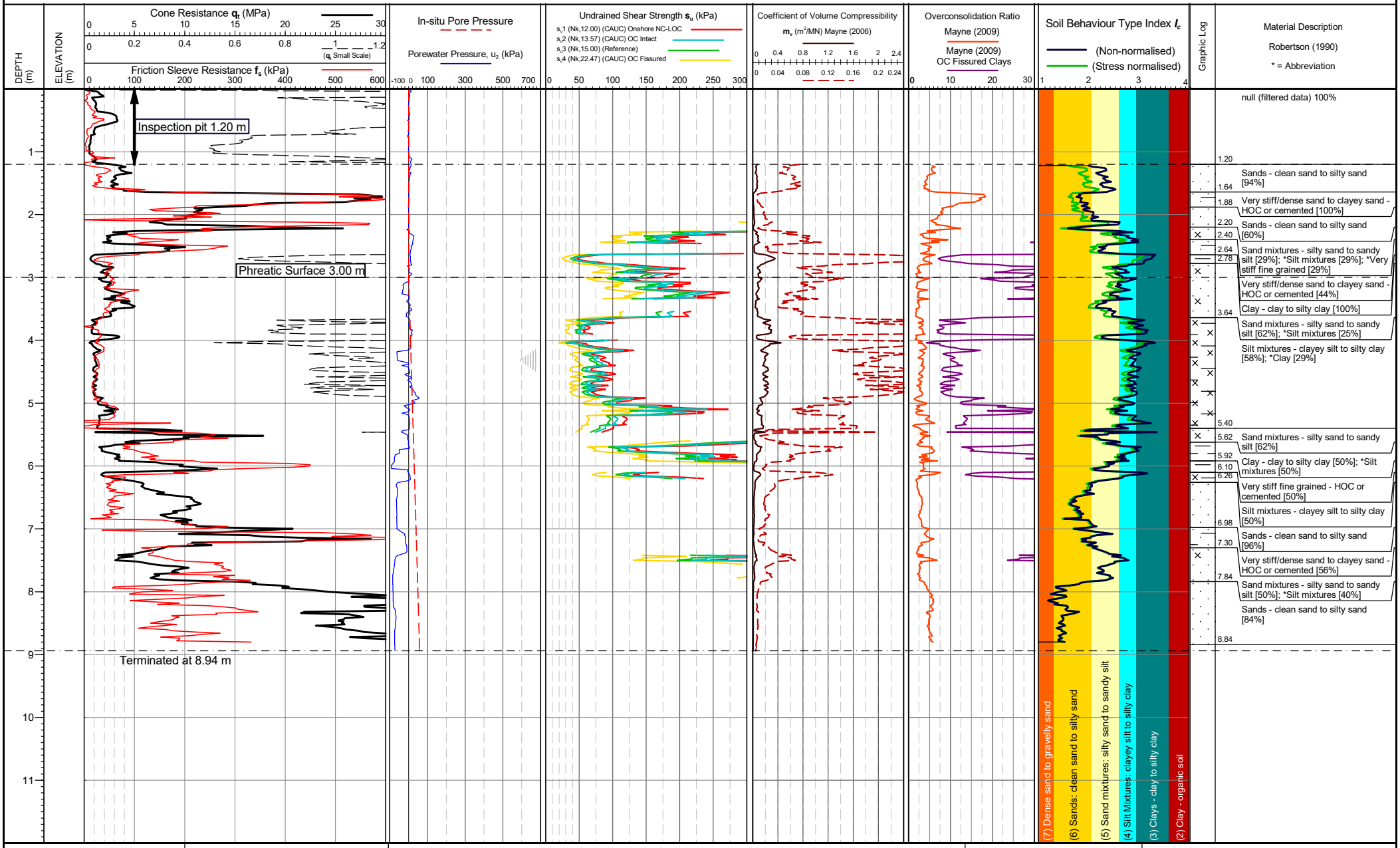
Checked by:
Chris Player

TEST ID: CPT02

LANKELMA

Project: ALDI, WYNDHAM PLACE, EGREMONT (P21-172)

Client: HYDROCK



Cone area (mm2):
ConeID: S15-CFIPTT.1646
Operator: Walter Geddes
Rig Used: UK3
Date of test: 21/11/2023 13:16:01

Location: Cumbria, UK
Coordinates: ,
Elevation:
Coordinate system:

Remarks: *Phreatic surface origin: Arbitrary value

Termination Remark:
Tip/sleeve load + inclination

Internal QA Diss.
Dissipation Test
Penetration Pause (<1cm/s)

Both drained and undrained parameters are calculated for mixed SBTs = Ic 2.40-2.70. See report text for methods and discussion of parameter evaluation.

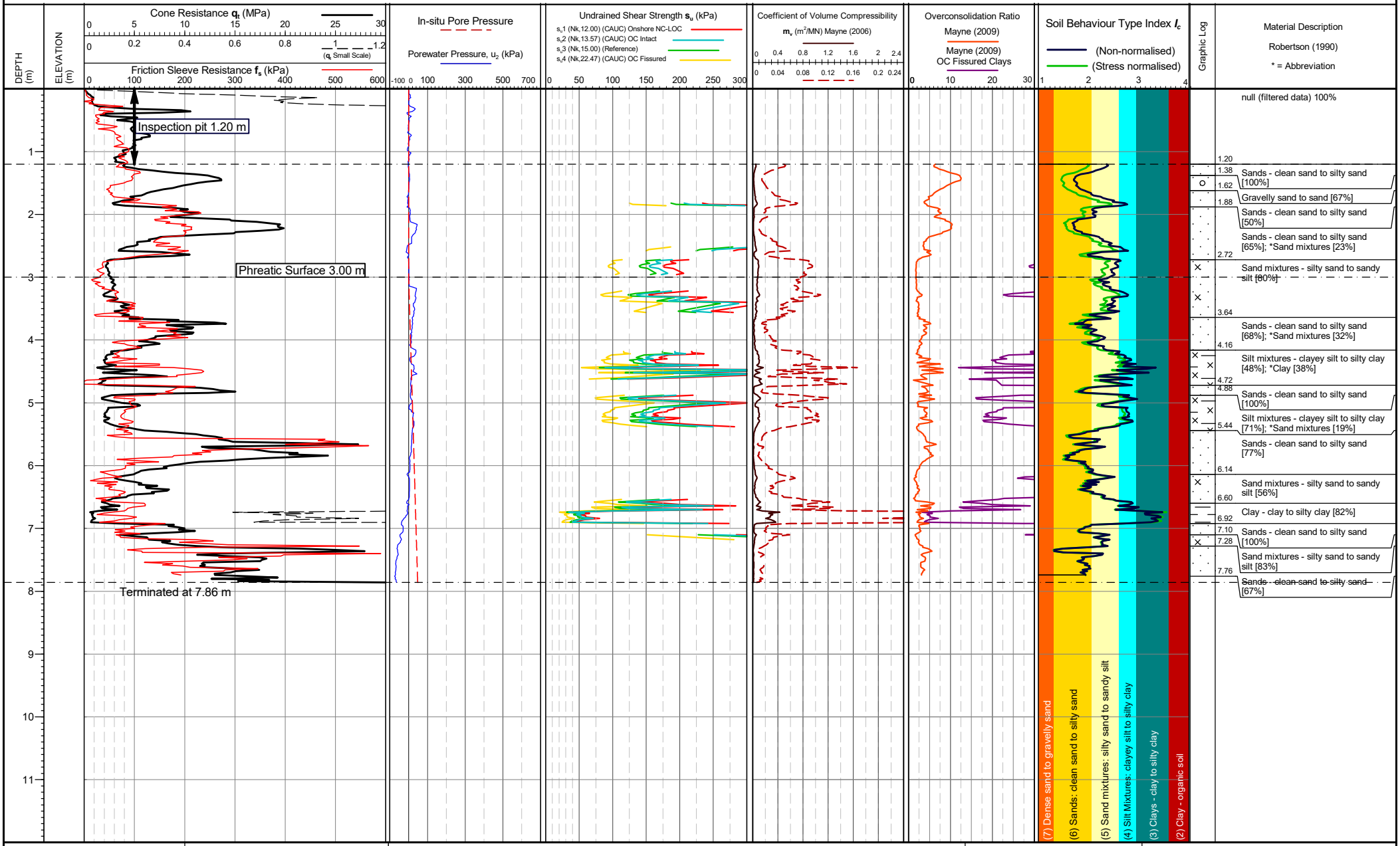
Date of plot: 21-11-23
Checked by: Chris Player

Lankelma Project Ref: P-108464-1

TEST ID: CPT03

Project: ALDI, WYNDHAM PLACE, EGREMONT (P21-172)

Client: HYDROCK



Cone area (mm2):
ConeID: S15-CFIPTT.1646
Operator: Walter Geddes
Rig Used: UK3
Date of test: 21/11/2023 10:20:33

Location: Cumbria, UK
Coordinates: ,
Elevation:
Coordinate system:

Remarks: *Phreatic surface origin: Arbitrary value

Termination Remark:
Tip/sleeve load + inclination

Internal QA Diss.
Dissipation Test
Penetration Pause (<1cm/s)

Both drained and undrained parameters are calculated for mixed SBTs = Ic 2.40-2.70. See report text for methods and discussion of parameter evaluation.

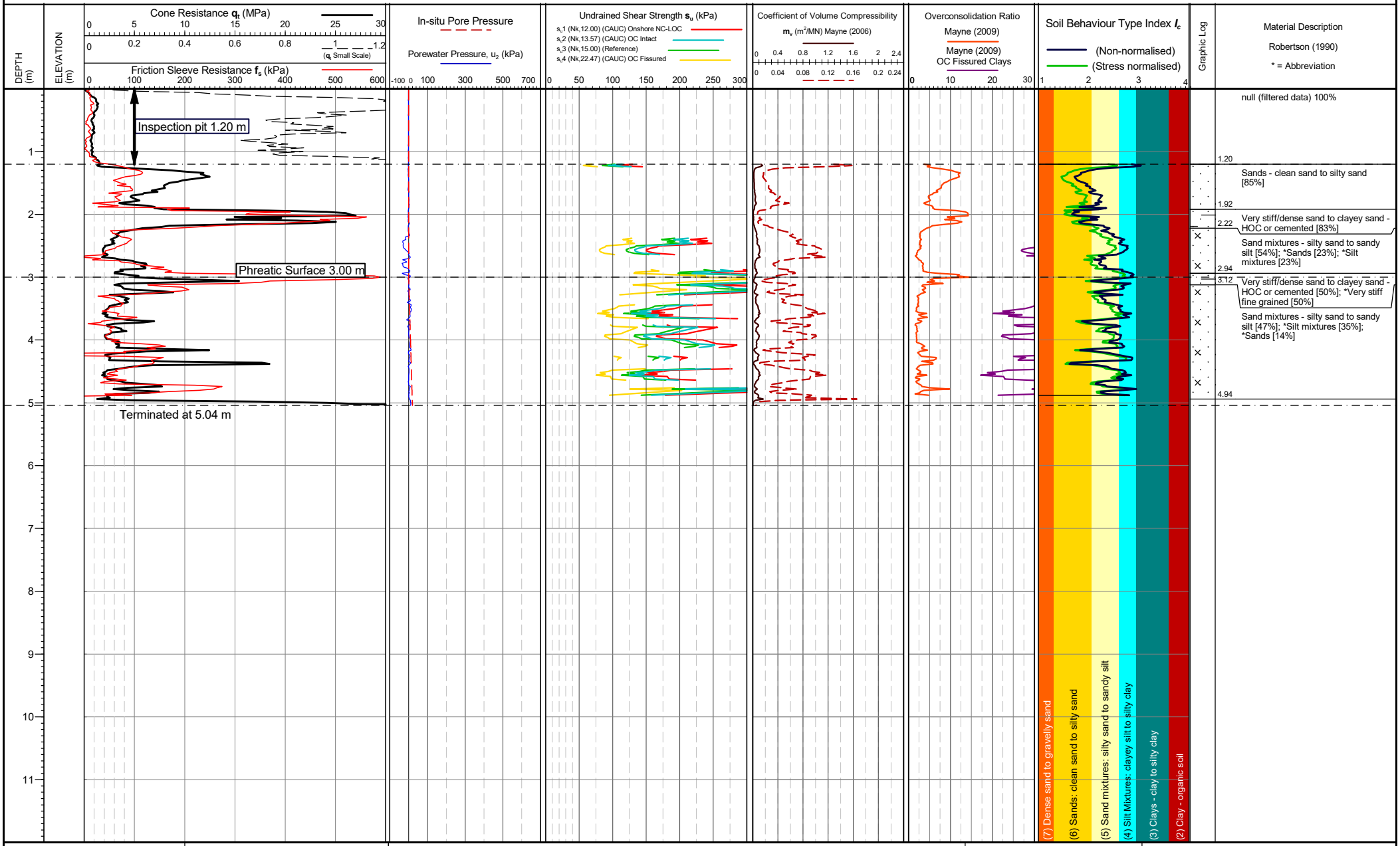
Date of plot: 21-11-23
Lankelma Project Ref: P-108464-1

Checked by:
Chris Player

TEST ID: CPT05

Project: ALDI, WYNDHAM PLACE, EGREMONT (P21-172)

Client: HYDROCK



Cone area (mm2):
ConeID: S15-CFIPTT.1646
Operator: Walter Geddes
Rig Used: UK3
Date of test: 21/11/2023 14:51:36

Location: Cumbria, UK
Coordinates: ,
Elevation:
Coordinate system:

Remarks: *Phreatic surface origin: Arbitrary value

Termination Remark:
Tip load

Internal QA Diss.
Dissipation Test
Penetration Pause (<1cm/s)

Both drained and undrained parameters are calculated for mixed SBTs = Ic 2.40-2.70. See report text for methods and discussion of parameter evaluation.

Date of plot: 21-11-23

Checked by: Chris Player

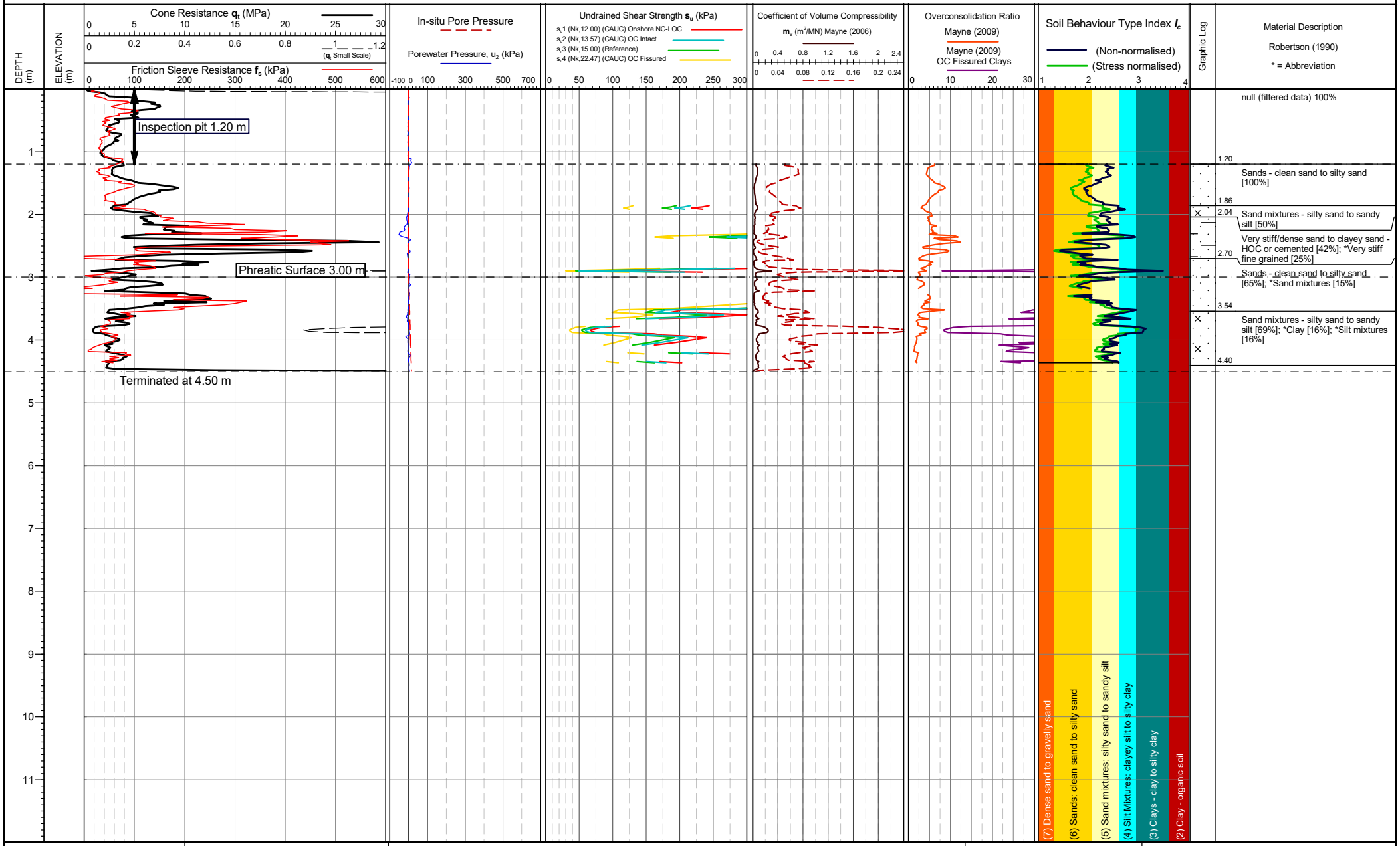
Lankelma Project Ref: P-108464-1

TEST ID: CPT06

LANKELMA

Project: ALDI, WYNDHAM PLACE, EGREMONT (P21-172)

Client: HYDROCK



Cone area (mm2):
ConeID: S15-CFIPTT.1646
Operator: Walter Geddes
Rig Used: UK3
Date of test: 21/11/2023 12:48:53

Location: Cumbria, UK
Coordinates: ,
Elevation:
Coordinate system:

Remarks: *Phreatic surface origin: Arbitrary value

Termination Remark:
Tip/sleeve load + inclination

Internal QA Diss.
Dissipation Test
Penetration Pause (<1cm/s)

Both drained and undrained parameters are calculated for mixed SBTs = Ic 2.40-2.70. See report text for methods and discussion of parameter evaluation.

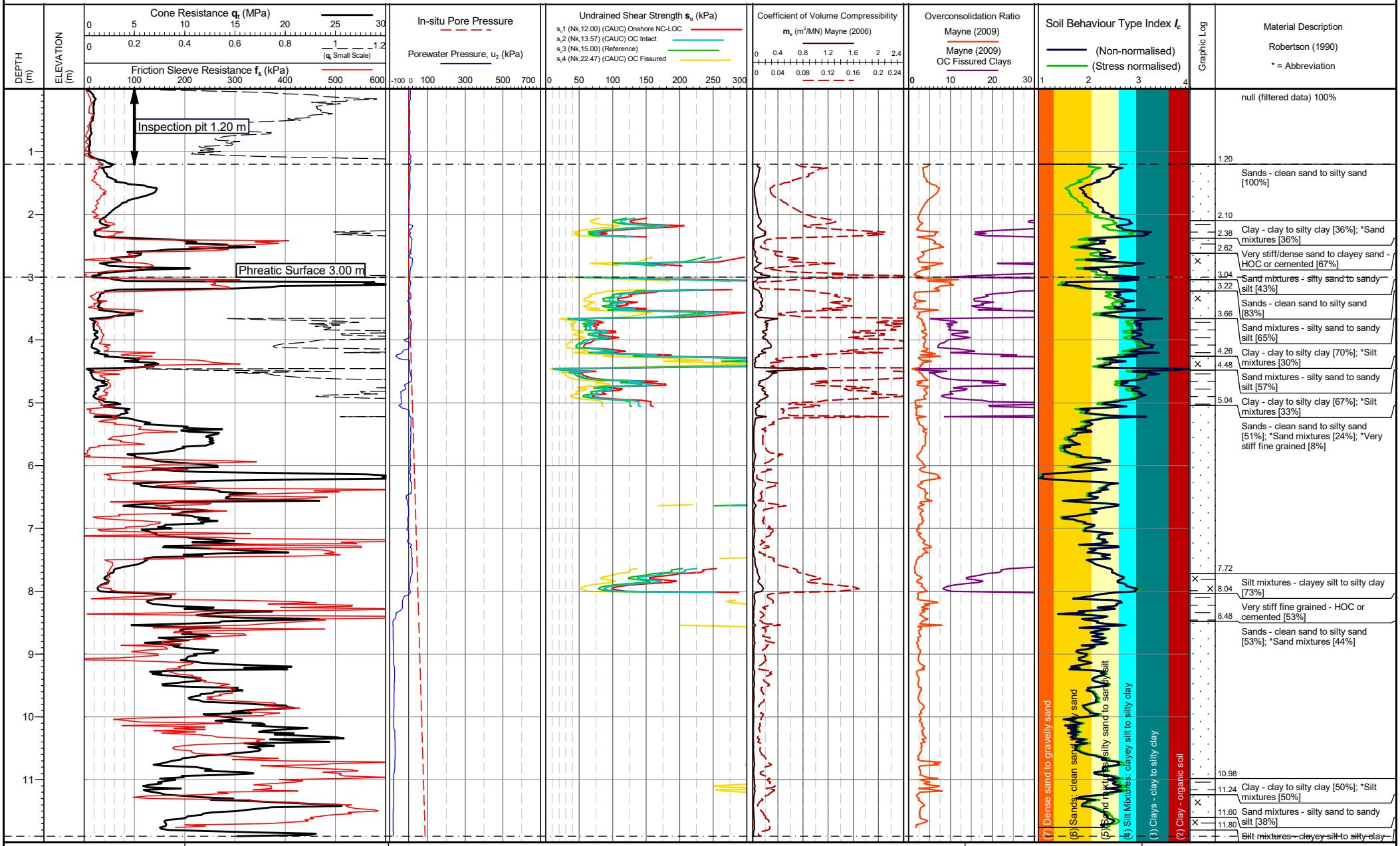
Date of plot: 21-11-23
Lankelma Project Ref: P-108464-1

Checked by:
Chris Player

TEST ID: CPT07

Project: ALDI, WYNDHAM PLACE, EGREMONT (P21-172)

Client: HYDROCK



Cone area (mm2):
ConeID: S15-CFIPTT.1646
Operator: Walter Geddes
Rig Used: UK3
Date of test: 21/11/2023 14:03:59

Location: Cumbria, UK
Coordinates: ,
Elevation:
Coordinate system:

Remarks: *Phreatic surface origin: Arbitrary value

Termination Remark:
sudden inclination

Internal QA Diss.
Dissipation Test
Penetration Pause (<1cm/s)

Both drained and undrained parameters are calculated for mixed SBTs = Ic 2.40-2.70. See report text for methods and discussion of parameter evaluation.

Date of plot: 21-11-23

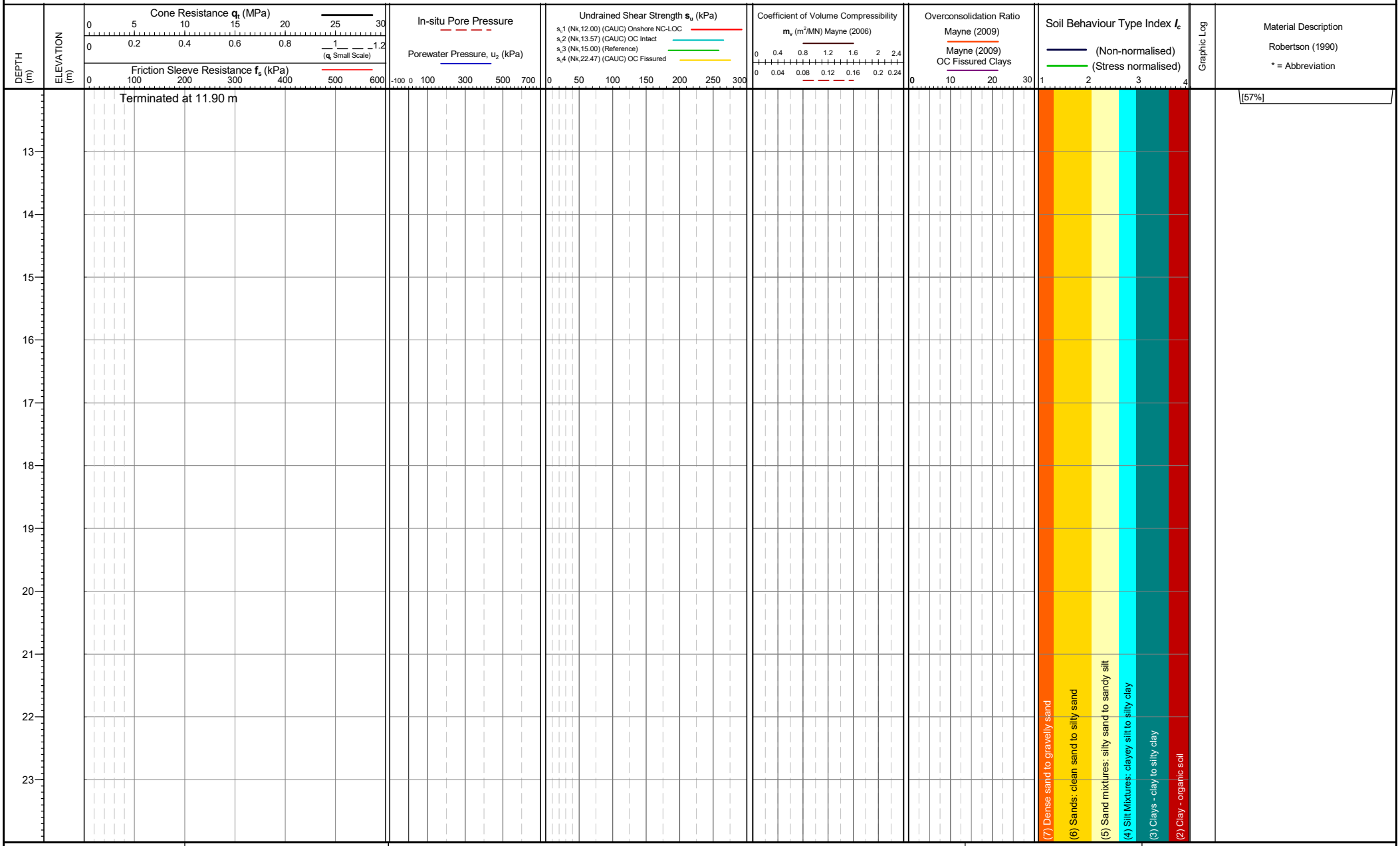
Checked by:
Chris Player

Lankelma Project Ref:
P-108464-1

TEST ID: CPT08

Project: ALDI, WYNDHAM PLACE, EGREMONT (P21-172)

Client: HYDROCK



Cone area (mm2):
ConeID: S15-CFIPTT.1646
Operator: Walter Geddes
Rig Used: UK3
Date of test: 21/11/2023 14:03:59

Location: Cumbria, UK
Coordinates: ,
Elevation:
Coordinate system:

Remarks: *Phreatic surface origin: Arbitrary value

Termination Remark:
sudden inclination

Internal QA Diss.
Dissipation Test
Penetration Pause (<1cm/s)

Both drained and undrained parameters are calculated for mixed SBTs = Ic 2.40-2.70. See report text for methods and discussion of parameter evaluation.

Date of plot: 21-11-23
Checked by: Chris Player

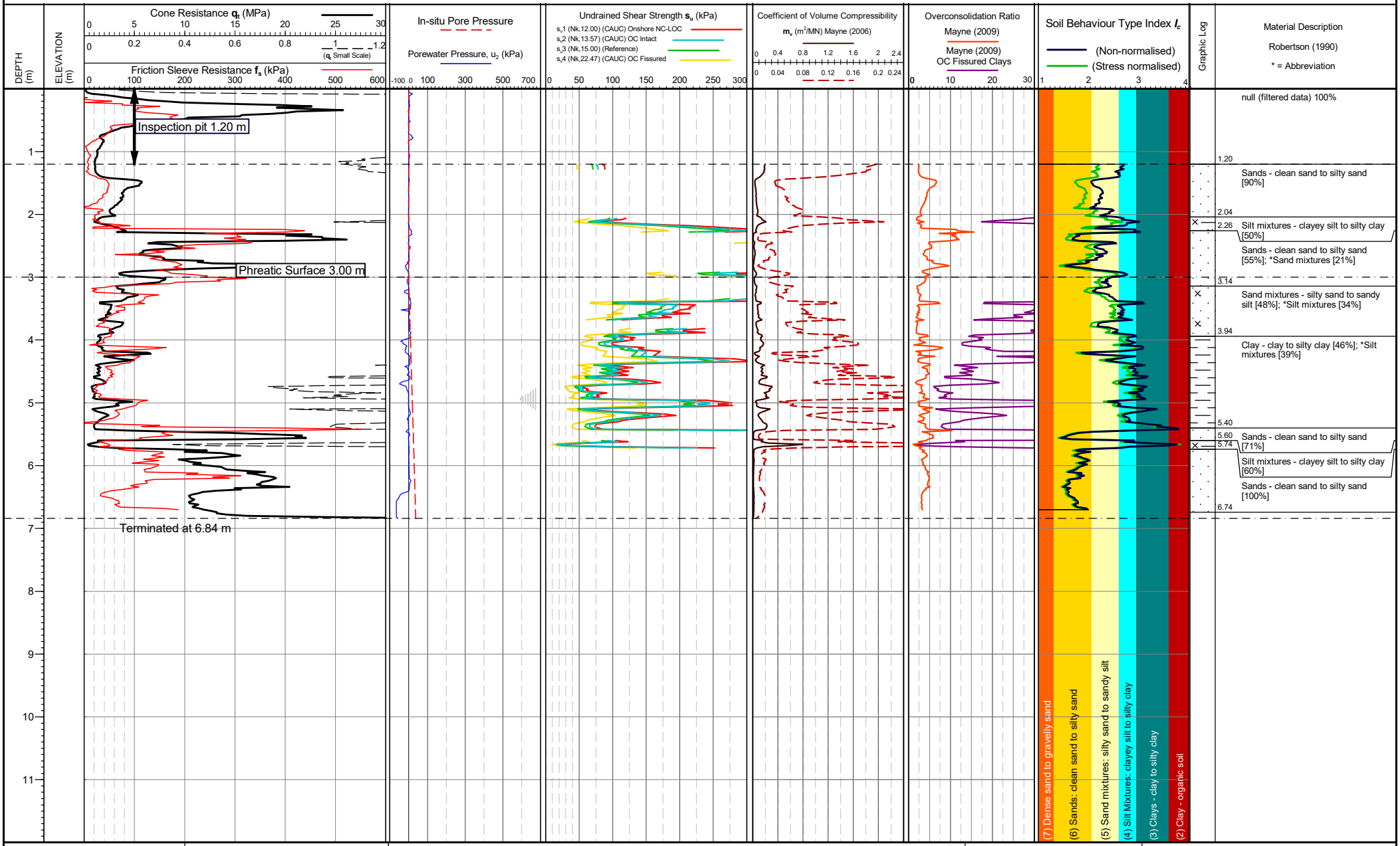
Lankelma Project Ref: P-108464-1

TEST ID: CPT08

LANKELMA

Project: ALDI, WYNDHAM PLACE, EGREMONT (P21-172)

Client: HYDROCK



Cone area (mm2):
ConeID: S15-CFIPTT.1646
Operator: Walter Geddes
Rig Used: UK3
Date of test: 21/11/2023 10:59:16

Location: Cumbria, UK
Coordinates: ,
Elevation:
Coordinate system:

Remarks: *Phreatic surface origin: Arbitrary value

Termination Remark:
Tip/sleeve load + inclination

Internal QA Diss.
Dissipation Test
Penetration Pause (<1cm/s)

Both drained and undrained parameters are calculated for mixed SBTs = Ic 2.40-2.70. See report text for methods and discussion of parameter evaluation.

Date of plot: 21-11-23

Checked by: Chris Player

Lankelma Project Ref: P-108464-1

TEST ID: CPT09

APPENDIX F PARAMETER RESULTS 2 – SPT N60, PHI, D_R, E, I_C

Equivalent SPT N60

Peak friction angle

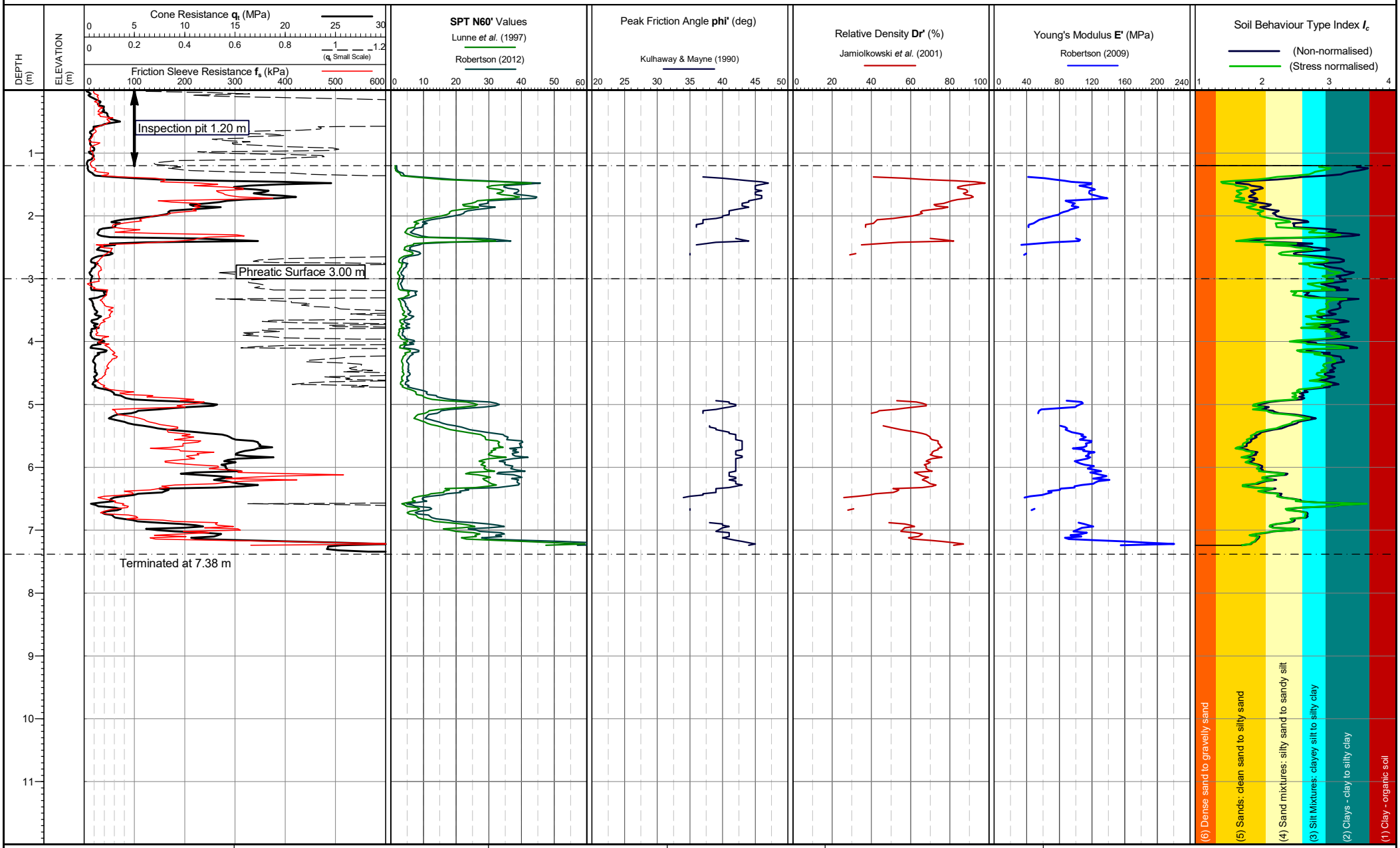
Relative density

Young's modulus

SBT index I_c

Project: ALDI, WYNDHAM PLACE, EGREMONT (P21-172)

Client: HYDROCK



Cone area (mm2):
Cone ID: S15-CFIPTT.1646
Operator: Walter Geddes
Date of test: 21/11/2023 11:43:03

Location: Cumbria, UK
Coordinates: ,
Elevation:
Coordinate system:

Both drained and undrained parameters are calculated for mixed SBTs = Ic 2.40-2.70. See report text for methods and discussion of parameter evaluation.

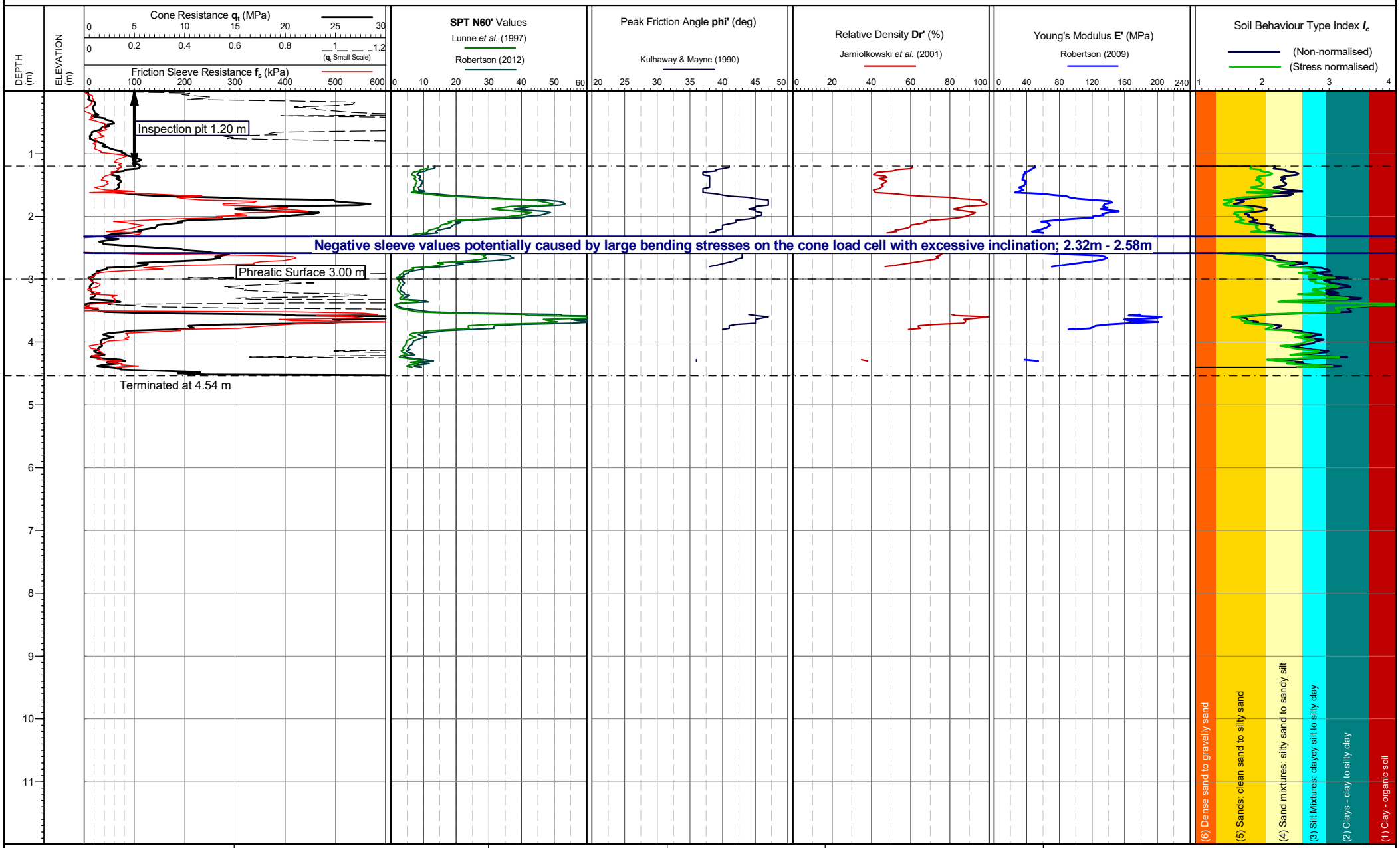
Date of plot: 21-11-23
Checked by: Chris Player

Lankelma Project Ref: P-108464-1

TEST ID: CPT01

Project: ALDI, WYNDHAM PLACE, EGREMONT (P21-172)

Client: HYDROCK



Cone area (mm2):
Cone ID: S15-CFIPTT.1646
Operator: Chris Clarke
Date of test: 21/11/2023 09:18:04

Location: Cumbria, UK
Coordinates: ,
Elevation:
Coordinate system:

Both drained and undrained parameters are calculated for mixed SBTs = Ic 2.40-2.70. See report text for methods and discussion of parameter evaluation.

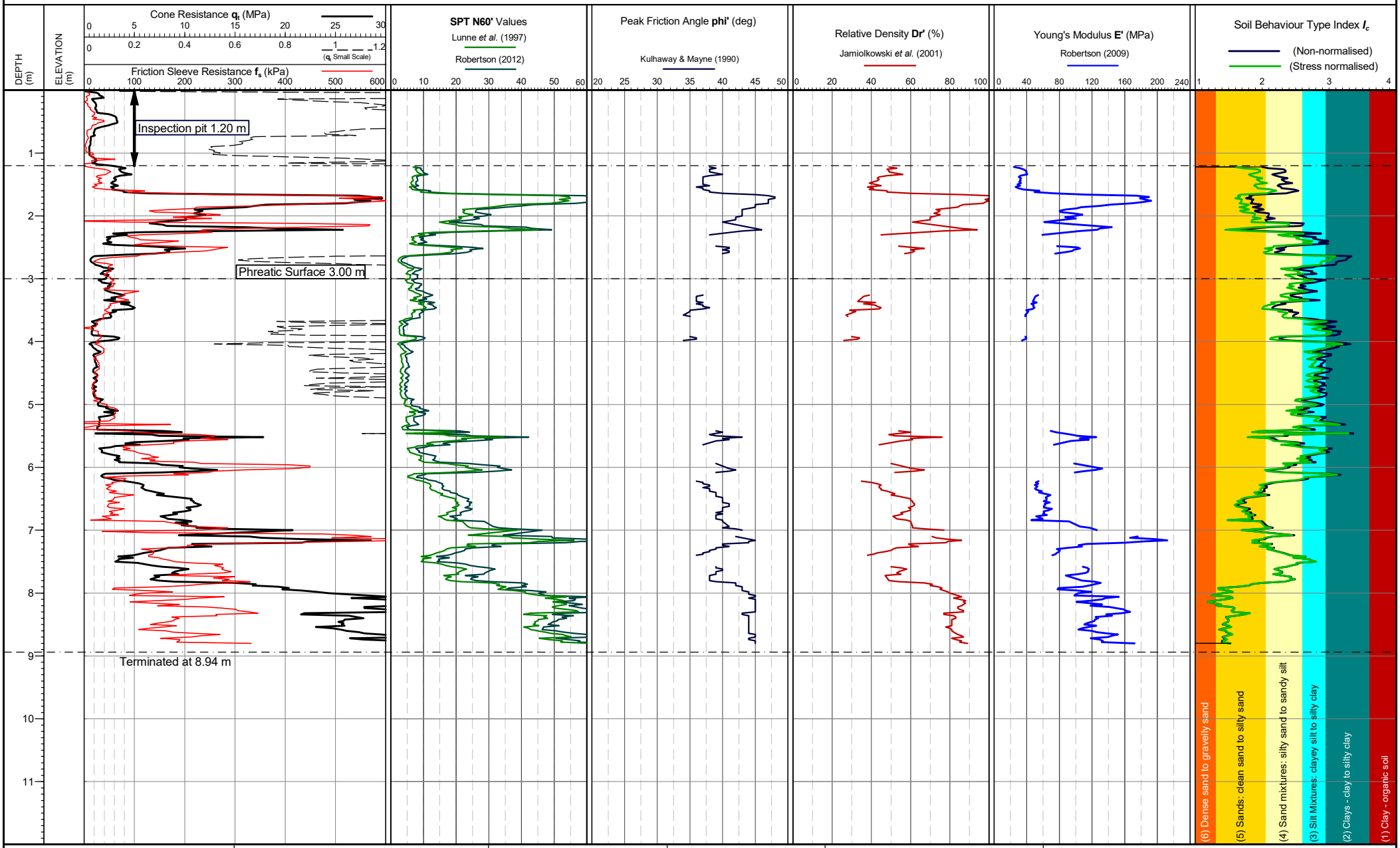
Date of plot: 21-11-23
Checked by: Chris Player

Lankelma Project Ref: P-108464-1

TEST ID: CPT02

Project: ALDI, WYNDHAM PLACE, EGREMONT (P21-172)

Client: HYDROCK



Cone area (mm2):
Cone ID: S15-CFIPTT.1646
Operator: Walter Geddes
Date of test: 21/11/2023 13:16:01

Location: Cumbria, UK
Coordinates: ,
Elevation:
Coordinate system:

Both drained and undrained parameters are calculated for mixed SBTs = Ic 2.40-2.70. See report text for methods and discussion of parameter evaluation.

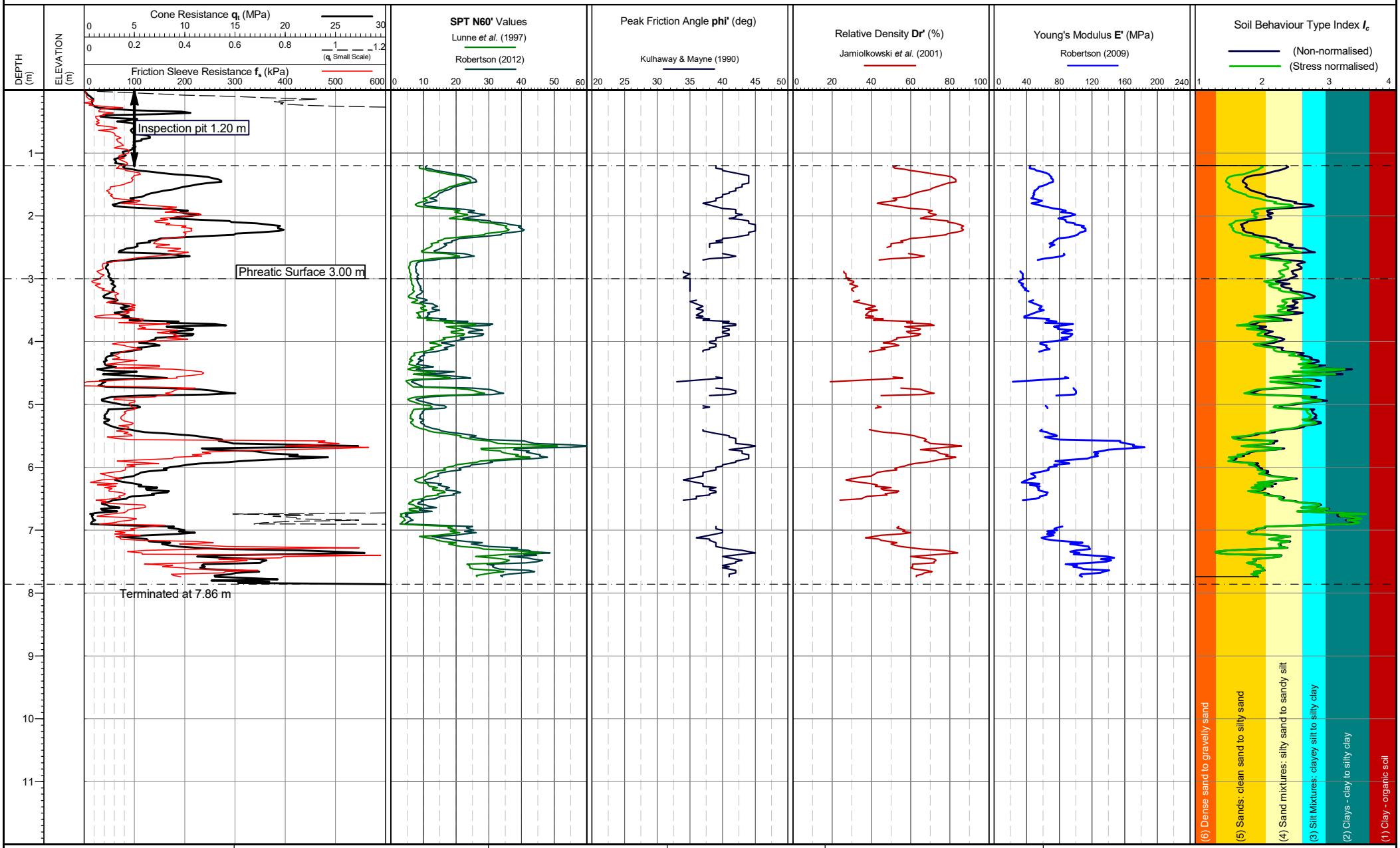
Date of plot: 21-11-23
Checked by: Chris Player

Lankelma Project Ref: P-108464-1

TEST ID: CPT03

Project: ALDI, WYNDHAM PLACE, EGREMONT (P21-172)

Client: HYDROCK



Cone area (mm2):
Cone ID: S15-CFIPTT.1646
Operator: Walter Geddes
Date of test: 21/11/2023 10:20:33

Location: Cumbria, UK
Coordinates: ,
Elevation:
Coordinate system:

Both drained and undrained parameters are calculated for mixed SBTs = Ic 2.40-2.70. See report text for methods and discussion of parameter evaluation.

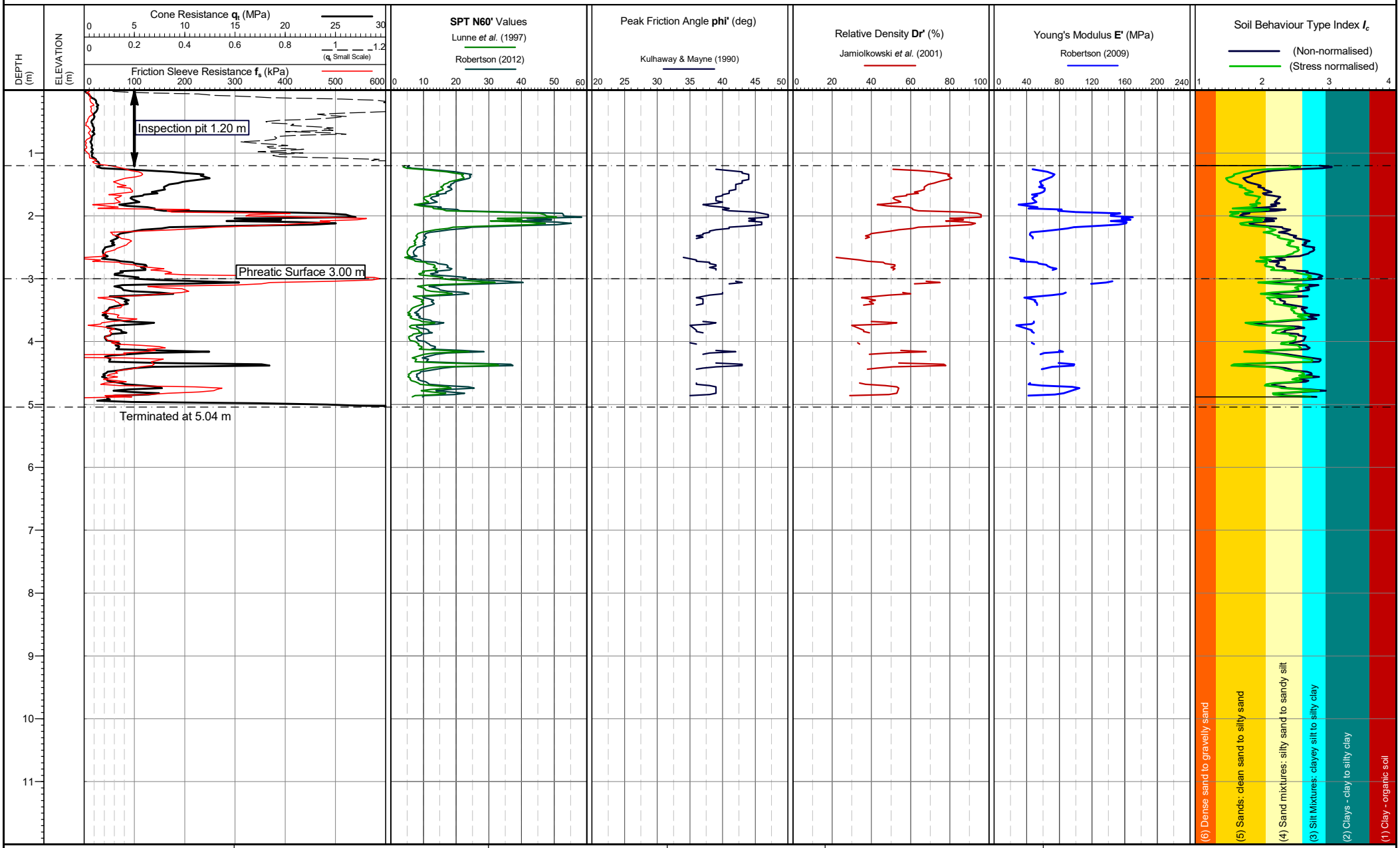
Date of plot: 21-11-23
Checked by: Chris Player

Lankelma Project Ref: P-108464-1

TEST ID: CPT05

Project: ALDI, WYNDHAM PLACE, EGREMONT (P21-172)

Client: HYDROCK



Cone area (mm2):
Cone ID: S15-CFIPTT.1646
Operator: Walter Geddes
Date of test: 21/11/2023 14:51:36

Location: Cumbria, UK
Coordinates: ,
Elevation:
Coordinate system:

Both drained and undrained parameters are calculated for mixed SBTs = Ic 2.40-2.70. See report text for methods and discussion of parameter evaluation.

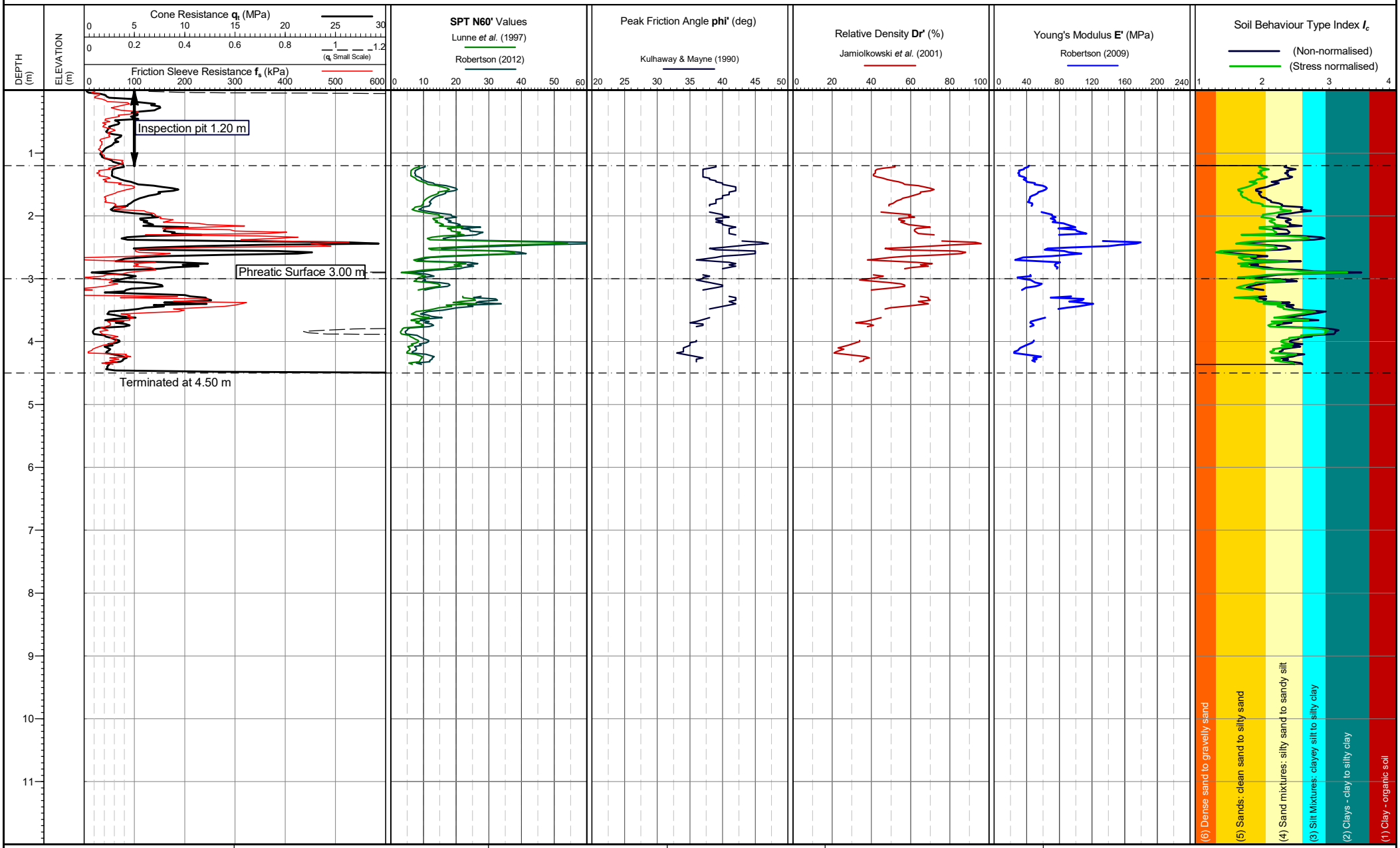
Date of plot: 21-11-23
Checked by: Chris Player

Lankelma Project Ref: P-108464-1

TEST ID: CPT06

Project: ALDI, WYNDHAM PLACE, EGREMONT (P21-172)

Client: HYDROCK



Cone area (mm2):
Cone ID: S15-CFIPTT.1646
Operator: Walter Geddes
Date of test: 21/11/2023 12:48:53

Location: Cumbria, UK
Coordinates: ,
Elevation:
Coordinate system:

Both drained and undrained parameters are calculated for mixed SBTs = Ic 2.40-2.70. See report text for methods and discussion of parameter evaluation.

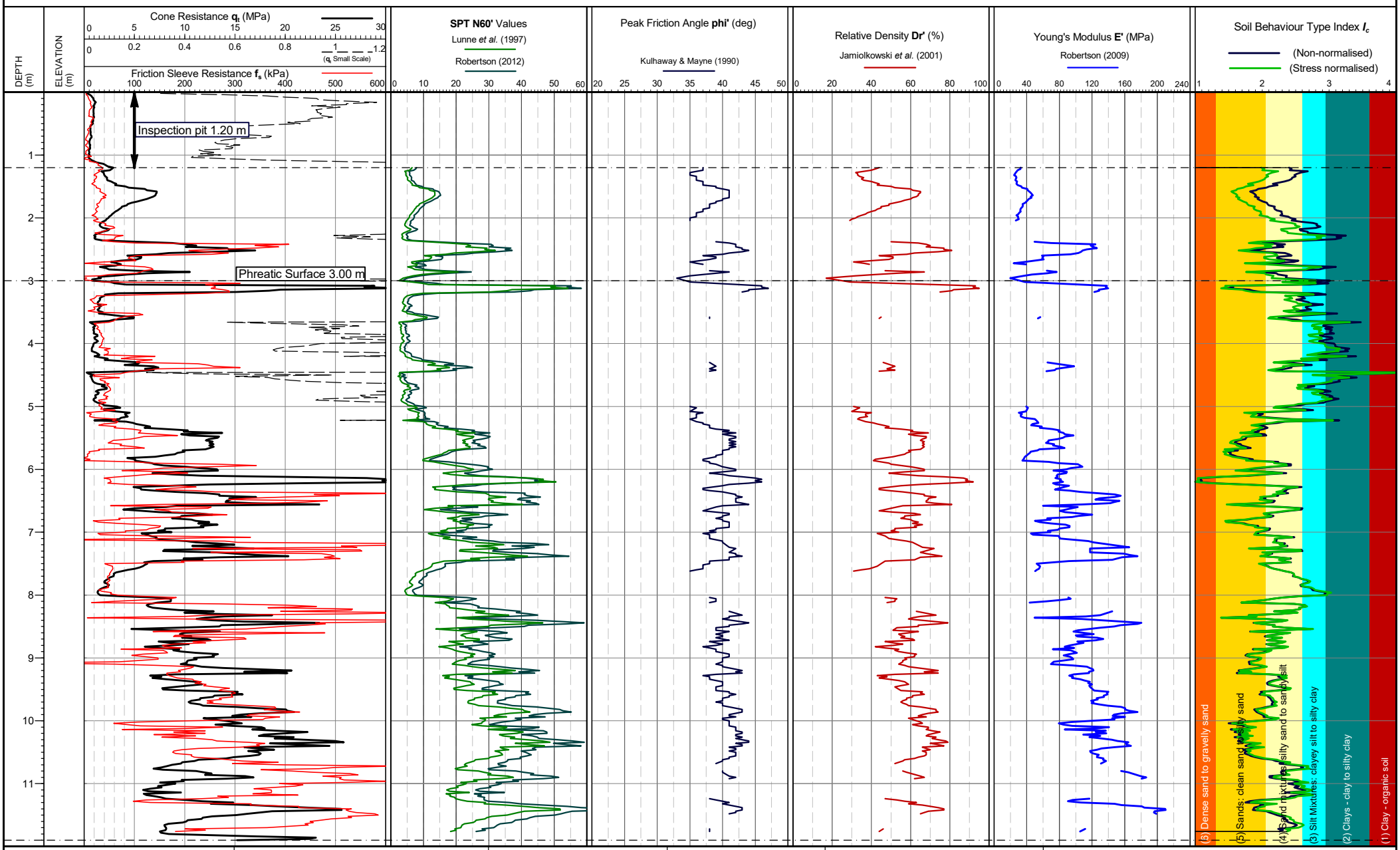
Date of plot: 21-11-23
Checked by: Chris Player

Lankelma Project Ref: P-108464-1

TEST ID: CPT07

Project: ALDI, WYNDHAM PLACE, EGREMONT (P21-172)

Client: HYDROCK



Cone area (mm2):
Cone ID: S15-CFIPTT.1646
Operator: Walter Geddes
Date of test: 21/11/2023 14:03:59

Location: Cumbria, UK
Coordinates: ,
Elevation:
Coordinate system:

Both drained and undrained parameters are calculated for mixed SBTs = Ic 2.40-2.70. See report text for methods and discussion of parameter evaluation.

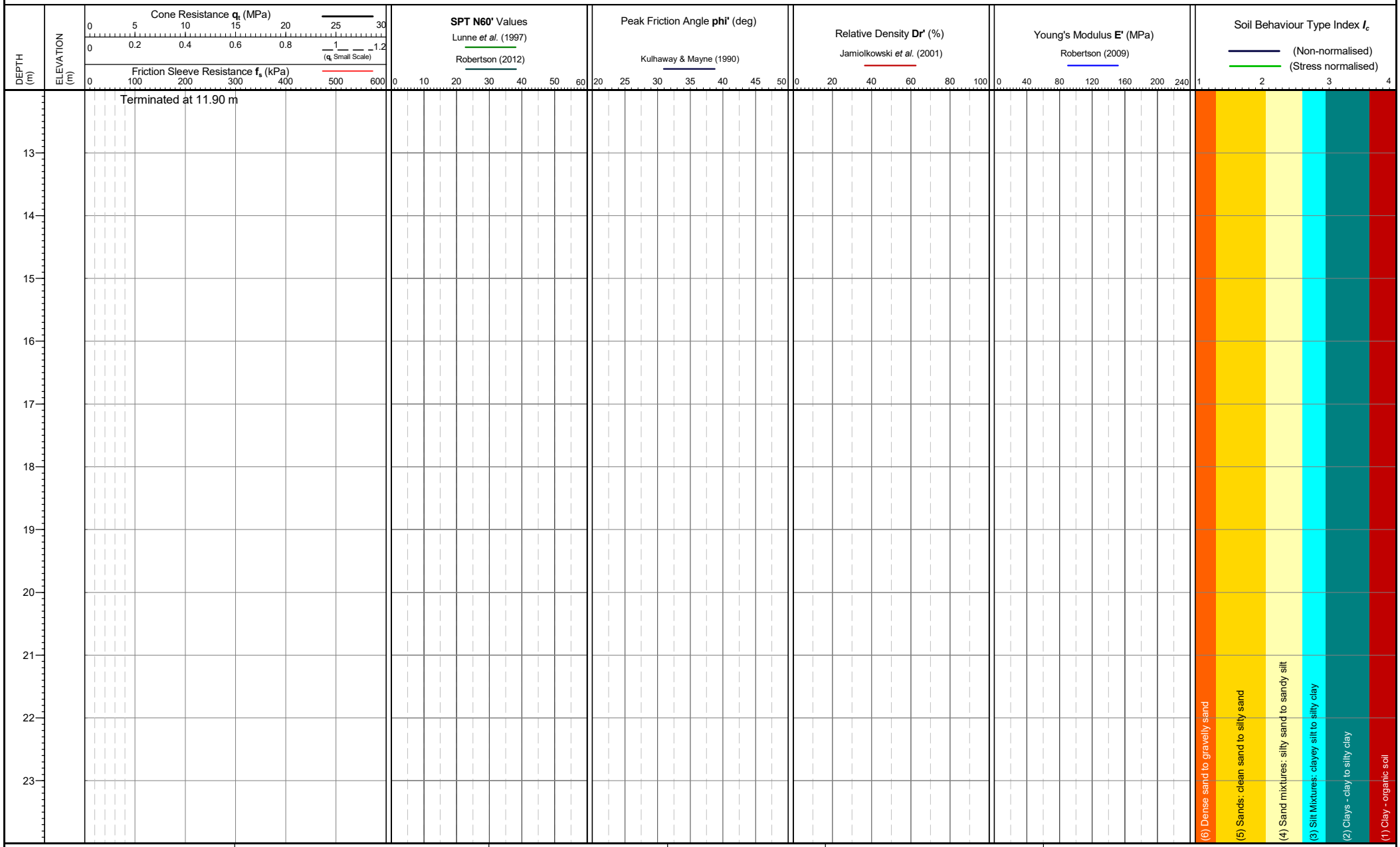
Date of plot: 21-11-23
Checked by: Chris Player

Lankelma Project Ref: P-108464-1

TEST ID: CPT08

Project: ALDI, WYNDHAM PLACE, EGREMONT (P21-172)

Client: HYDROCK



Cone area (mm2):
Cone ID: S15-CFIPTT.1646
Operator: Walter Geddes
Date of test: 21/11/2023 14:03:59

Location: Cumbria, UK
Coordinates: ,
Elevation:
Coordinate system:

Both drained and undrained parameters are calculated for mixed SBTs = Ic 2.40-2.70. See report text for methods and discussion of parameter evaluation.

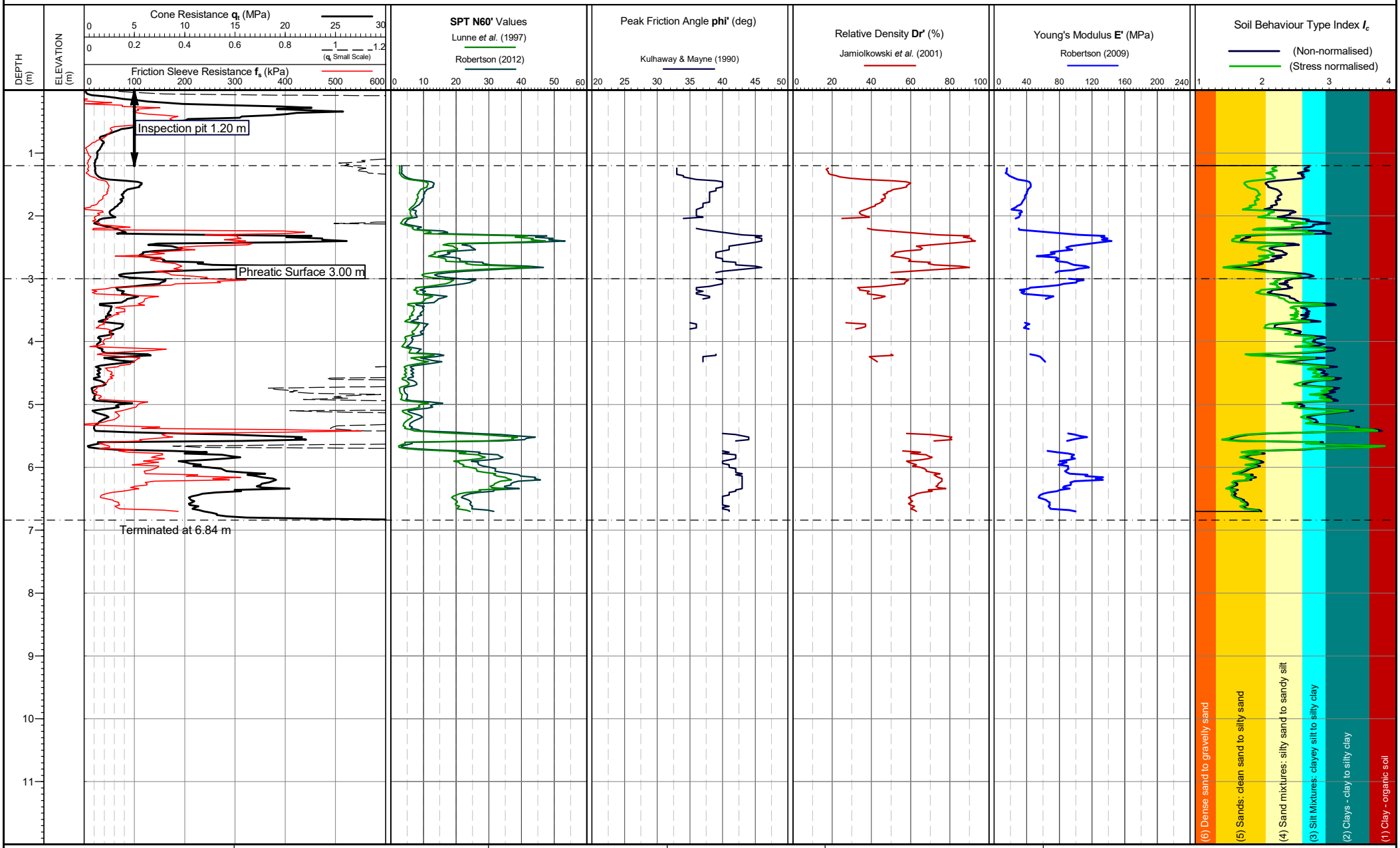
Date of plot: 21-11-23
Checked by: Chris Player

Lankelma Project Ref: P-108464-1

TEST ID: CPT08

Project: ALDI, WYNDHAM PLACE, EGREMONT (P21-172)

Client: HYDROCK



Cone area (mm2):
Cone ID: S15-CFIPTT.1646
Operator: Walter Geddes
Date of test: 21/11/2023 10:59:16

Location: Cumbria, UK
Coordinates: ,
Elevation:
Coordinate system:

Both drained and undrained parameters are calculated for mixed SBTs = Ic 2.40-2.70. See report text for methods and discussion of parameter evaluation.

Date of plot: 21-11-23
Checked by: Chris Player

Lankelma Project Ref: P-108464-1

TEST ID: CPT09

APPENDIX G PENETROMETER TEMPERATURE RESULTS

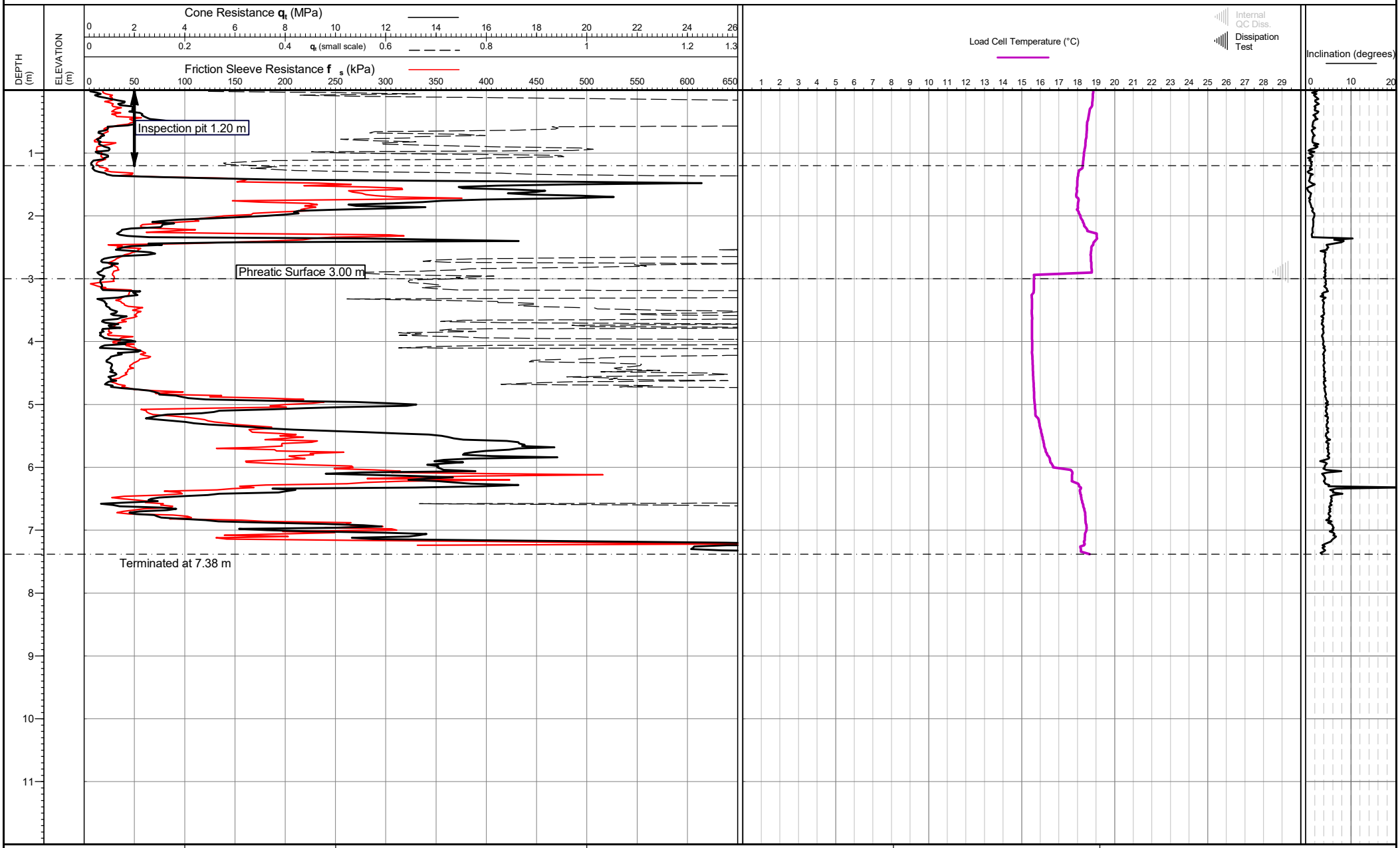
The temperature values in these logs represent the internal load cell temperature of the penetrometer and are used for QC purposes by comparison to the measured temperature response indicated on the calibration certificate. The CPT results have been corrected for transient and static temperature effects during post processing.

Ground temperature is only represented following a penetration pause of > 11 minutes.

Plots are provided for locations performed with a digital penetrometer measuring internal load cell temperature.

Project: ALDI, WYNDHAM PLACE, EGREMONT (P21-172)

Client: HYDROCK

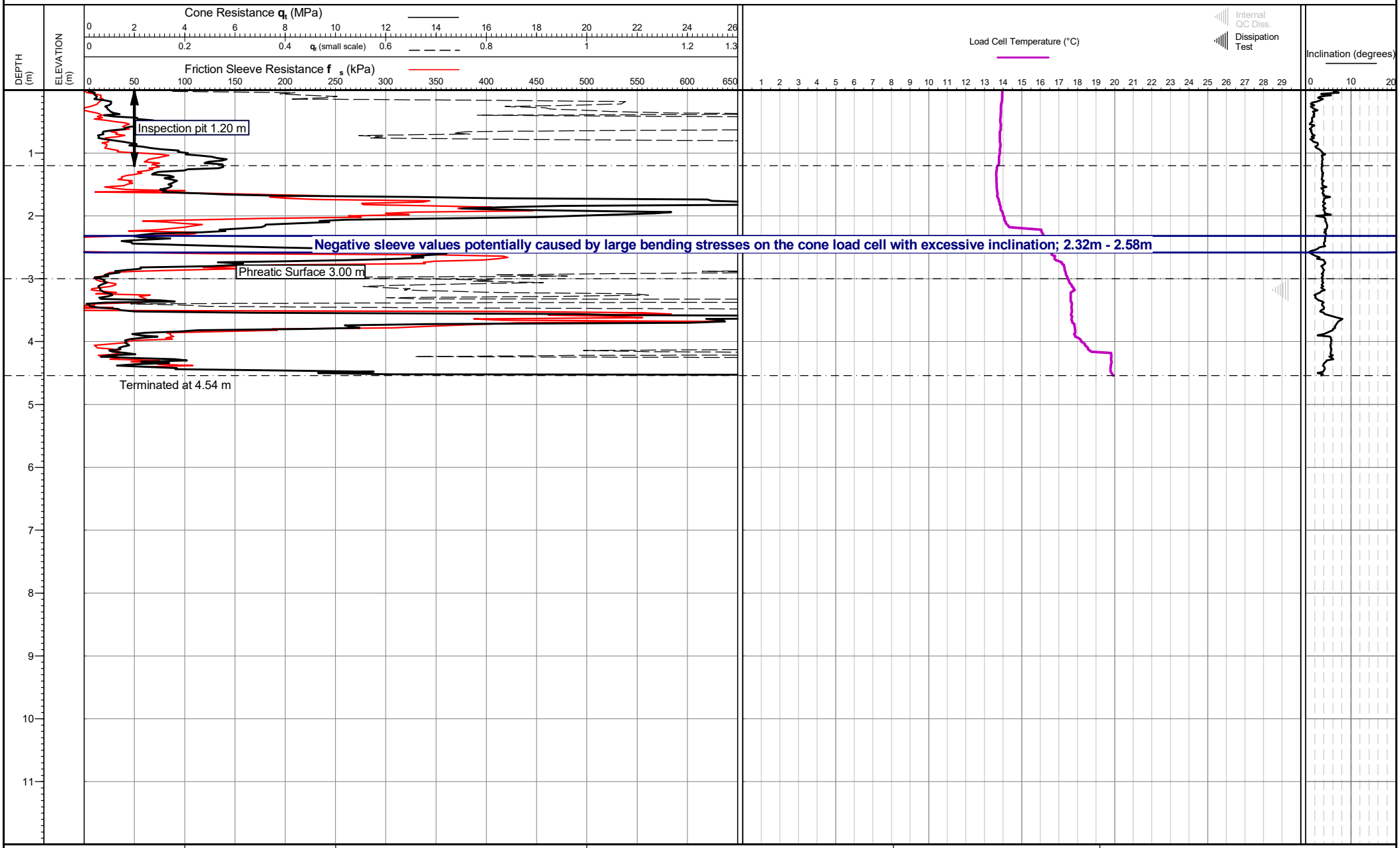


Cone area (mm2): Cone ID: S15-CFIPTT.1646 Operator: Walter Geddes Rig Used: UK3 Date of test: 21/11/2023 11:43:03	Zero drift (Pre/post test) q_c (kPa): -15.0 f_s (kPa): 0.6 ($f_{s\,drift}$ - $q_{c\,drift}$) u_2 (kPa): 18.5	Location: Cumbria, UK Coordinates: , Elevation: Coordinate system:	Remarks: *Phreatic surface origin: Arbitrary value Termination Remark: Tip load	Date of plot: 21-11-23 Checked by: Chris Player	Lankelma Project Ref: P-108464-1

TEST ID: CPT01

Project: ALDI, WYNDHAM PLACE, EGREMONT (P21-172)

Client: HYDROCK

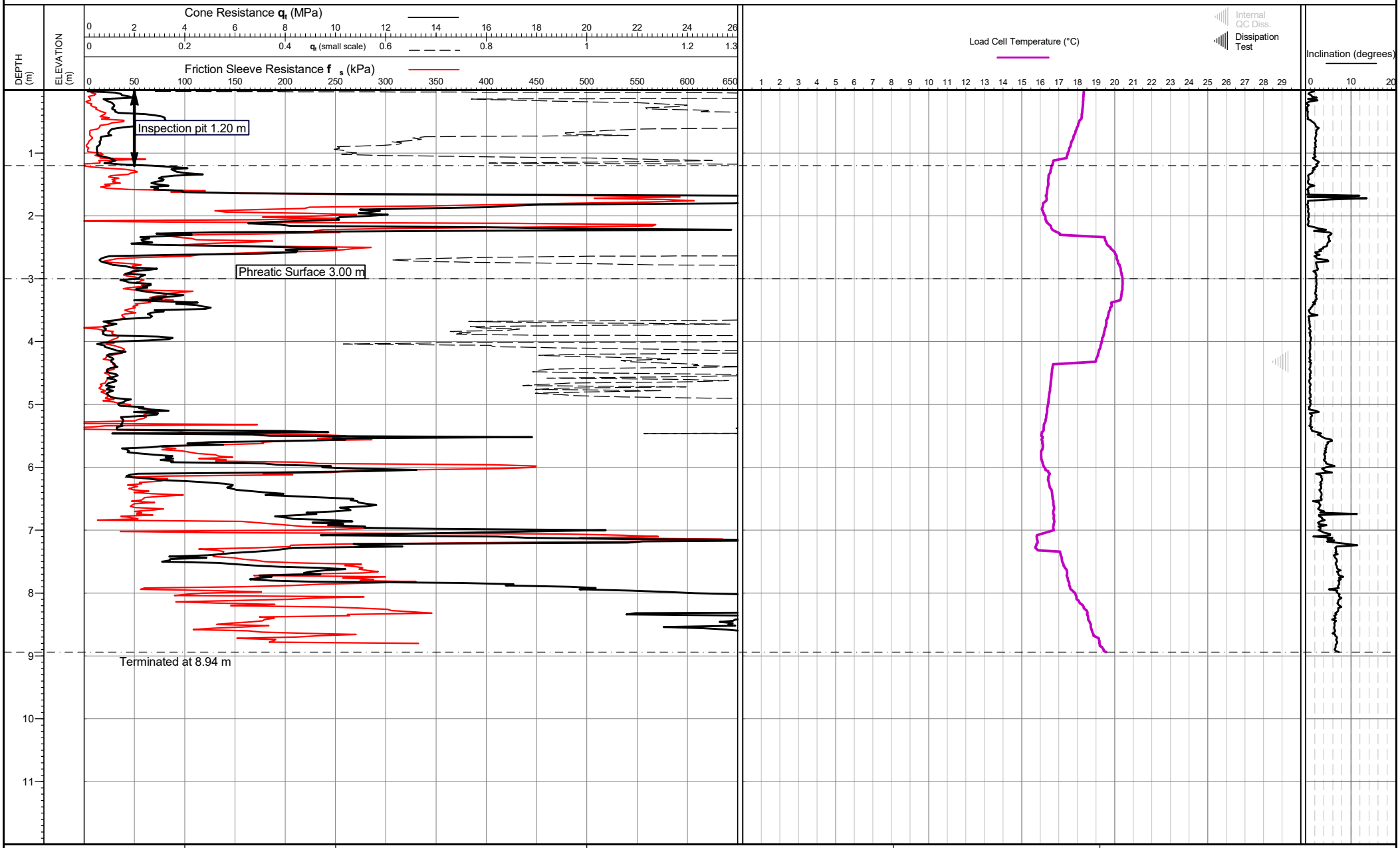


Cone area (mm2): Cone ID: S15-CFIPTT.1646 Operator: Chris Clarke Rig Used: UK3 Date of test: 21/11/2023 09:18:04	Zero drift (Pre/post test) q_c (kPa): -2.2 f_s (kPa): -1.2 ($f_{s\ drift}$ - $q_{c\ drift}$) u_2 (kPa): -1.6	Location: Cumbria, UK Coordinates: , Elevation: Coordinate system:	Remarks: Negative sleeve values potentially caused by large bending stresses on the cone load cell with excessive inclination; 2.32 - 2.58 m. *Phreatic surface origin: Arbitrary value Termination Remark: Tip/sleeve load + inclination	Date of plot: 21-11-23 Checked by: Chris Player	Lankelma Project Ref: P-108464-1

TEST ID: CPT02

Project: ALDI, WYNDHAM PLACE, EGREMONT (P21-172)

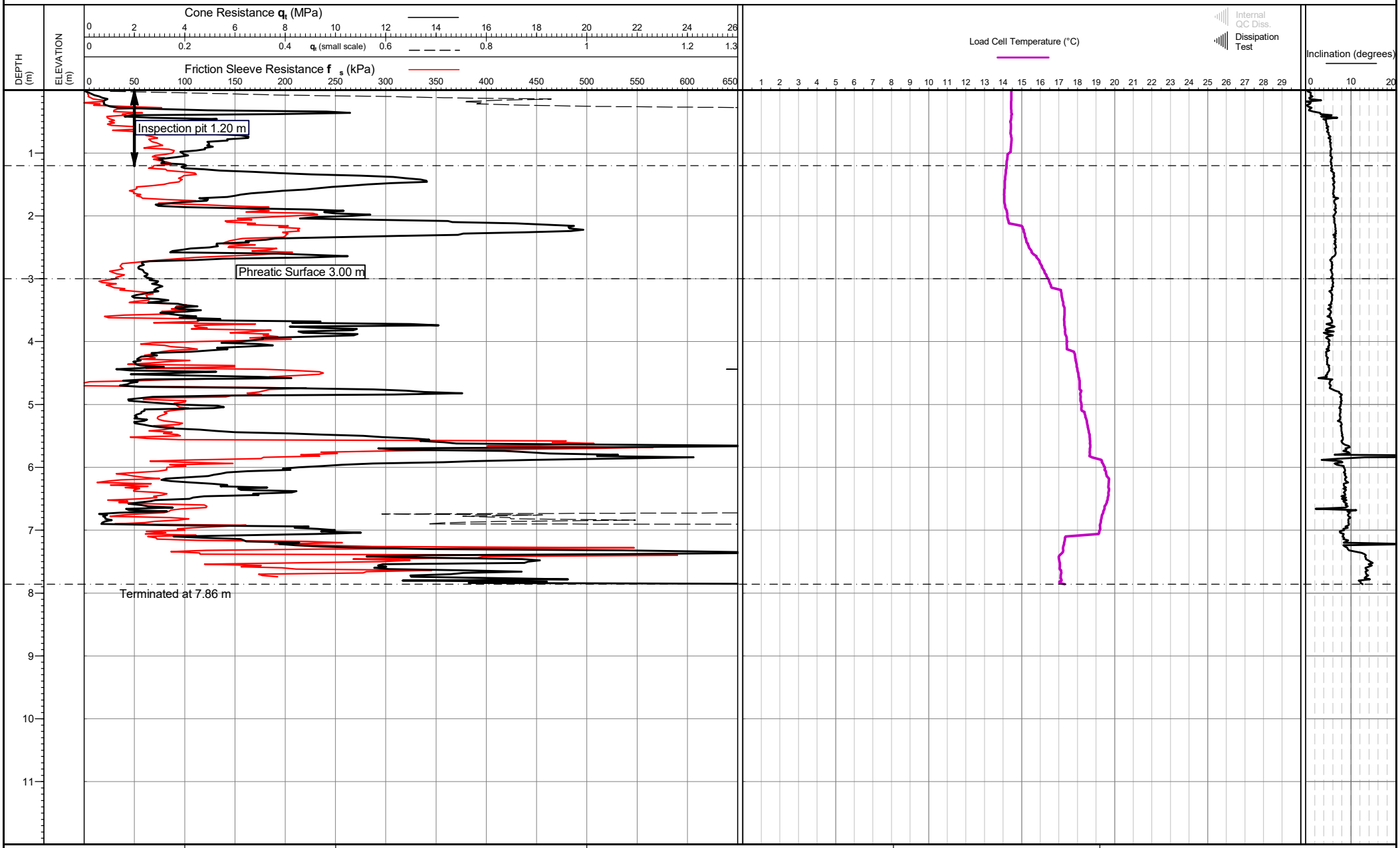
Client: HYDROCK



Cone area (mm2): Cone ID: S15-CFIPTT.1646 Operator: Walter Geddes Rig Used: UK3 Date of test: 21/11/2023 13:16:01	Zero drift (Pre/post test) q_c (kPa): -13.0 f_s (kPa): 1.2 ($f_{s\,drift}$ - $q_{c\,drift}$) u_2 (kPa): -4.4	Location: Cumbria, UK Coordinates: , Elevation: Coordinate system:	Remarks: *Phreatic surface origin: Arbitrary value Termination Remark: Tip/sleeve load + inclination	Date of plot: 21-11-23 Checked by: Chris Player	Lankelma Project Ref: P-108464-1	**TEST ID: CPT03** Page 1 of 1

Project: ALDI, WYNDHAM PLACE, EGREMONT (P21-172)

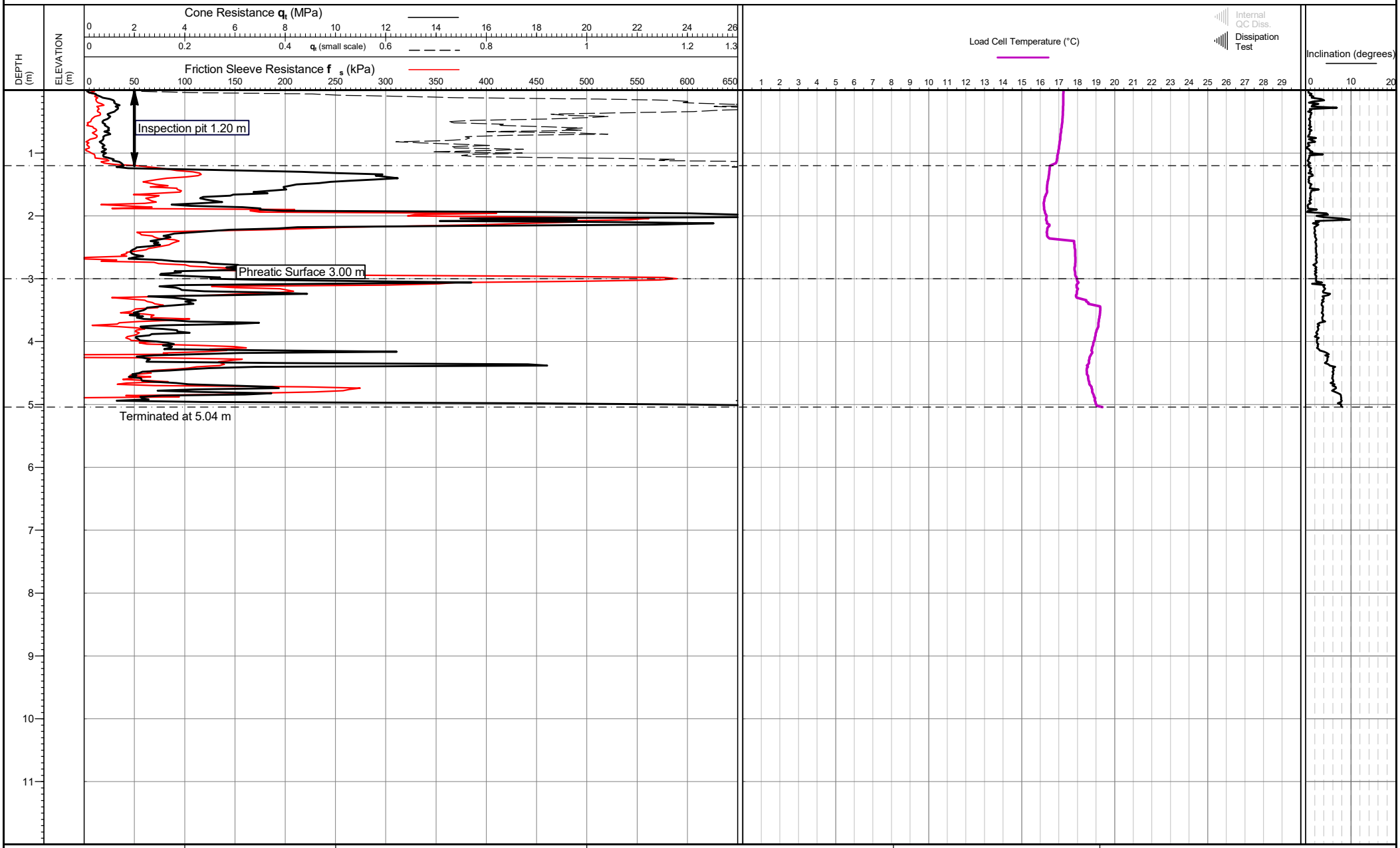
Client: HYDROCK



Cone area (mm2): Cone ID: S15-CFIPTT.1646 Operator: Walter Geddes Rig Used: UK3 Date of test: 21/11/2023 10:20:33	Zero drift (Pre/post test) q_c (kPa): -2.0 f_s (kPa): -0.1 ($f_{s\ drift}$ - $q_{c\ drift}$) u_2 (kPa): -1.6	Location: Cumbria, UK Coordinates: , Elevation: Coordinate system:	Remarks: *Phreatic surface origin: Arbitrary value Termination Remark: Tip/sleeve load + inclination	Date of plot: 21-11-23 Checked by: Chris Player	Lankelma Project Ref: P-108464-1	**TEST ID: CPT05** Page 1 of 1

Project: ALDI, WYNDHAM PLACE, EGREMONT (P21-172)

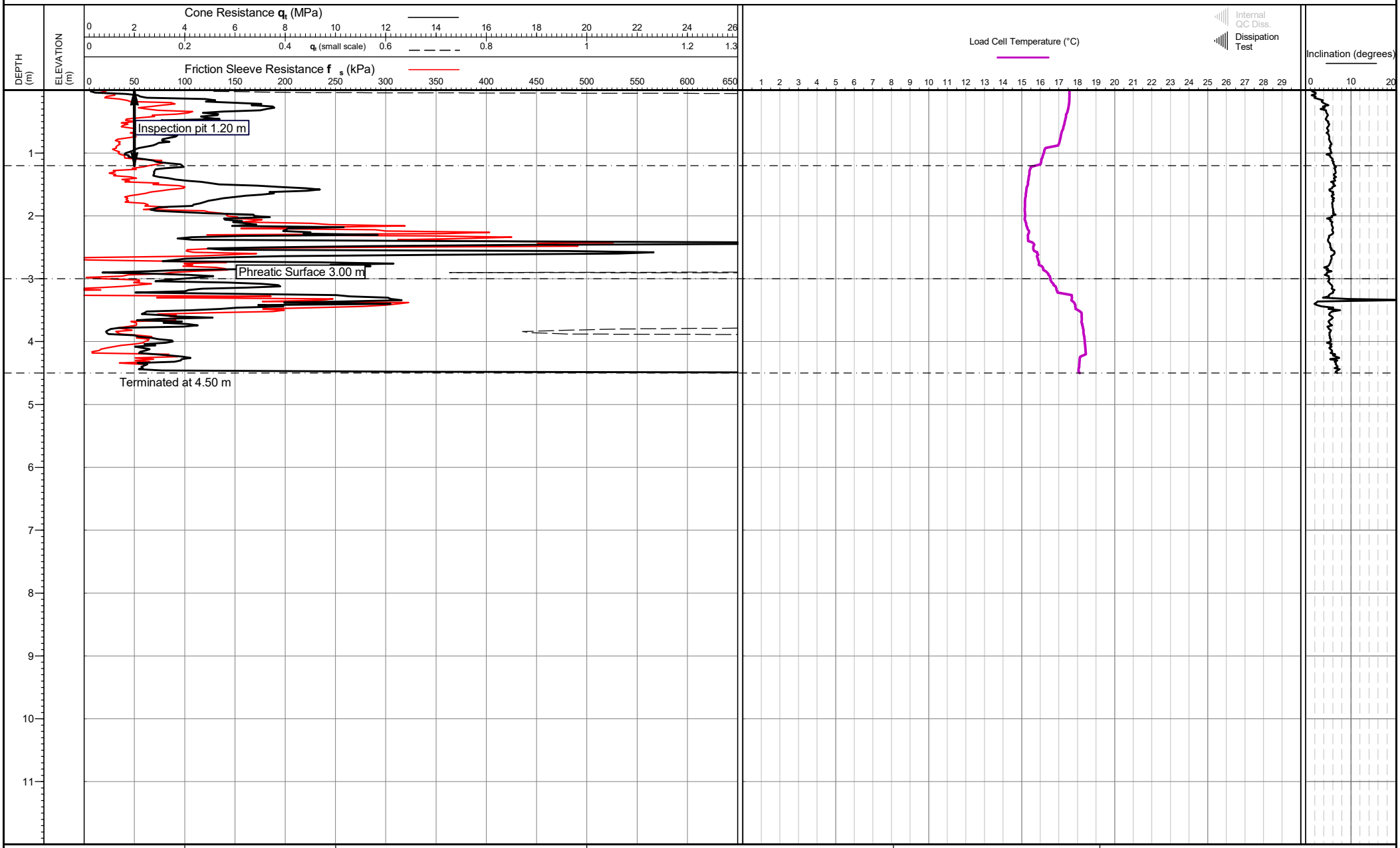
Client: HYDROCK



Cone area (mm2): Cone ID: S15-CFIPTT.1646 Operator: Walter Geddes Rig Used: UK3 Date of test: 21/11/2023 14:51:36	Zero drift (Pre/post test) q_c (kPa): -14.0 f_s (kPa): -3.2 ($f_{s\ drift}$ - $q_{c\ drift}$) u_2 (kPa): -0.7	Location: Cumbria, UK Coordinates: , Elevation: Coordinate system:	Remarks: *Phreatic surface origin: Arbitrary value Termination Remark: Tip load	Date of plot: 21-11-23 Checked by: Chris Player	Lankelma Project Ref: P-108464-1	**TEST ID: CPT06** Page 1 of 1

Project: ALDI, WYNDHAM PLACE, EGREMONT (P21-172)

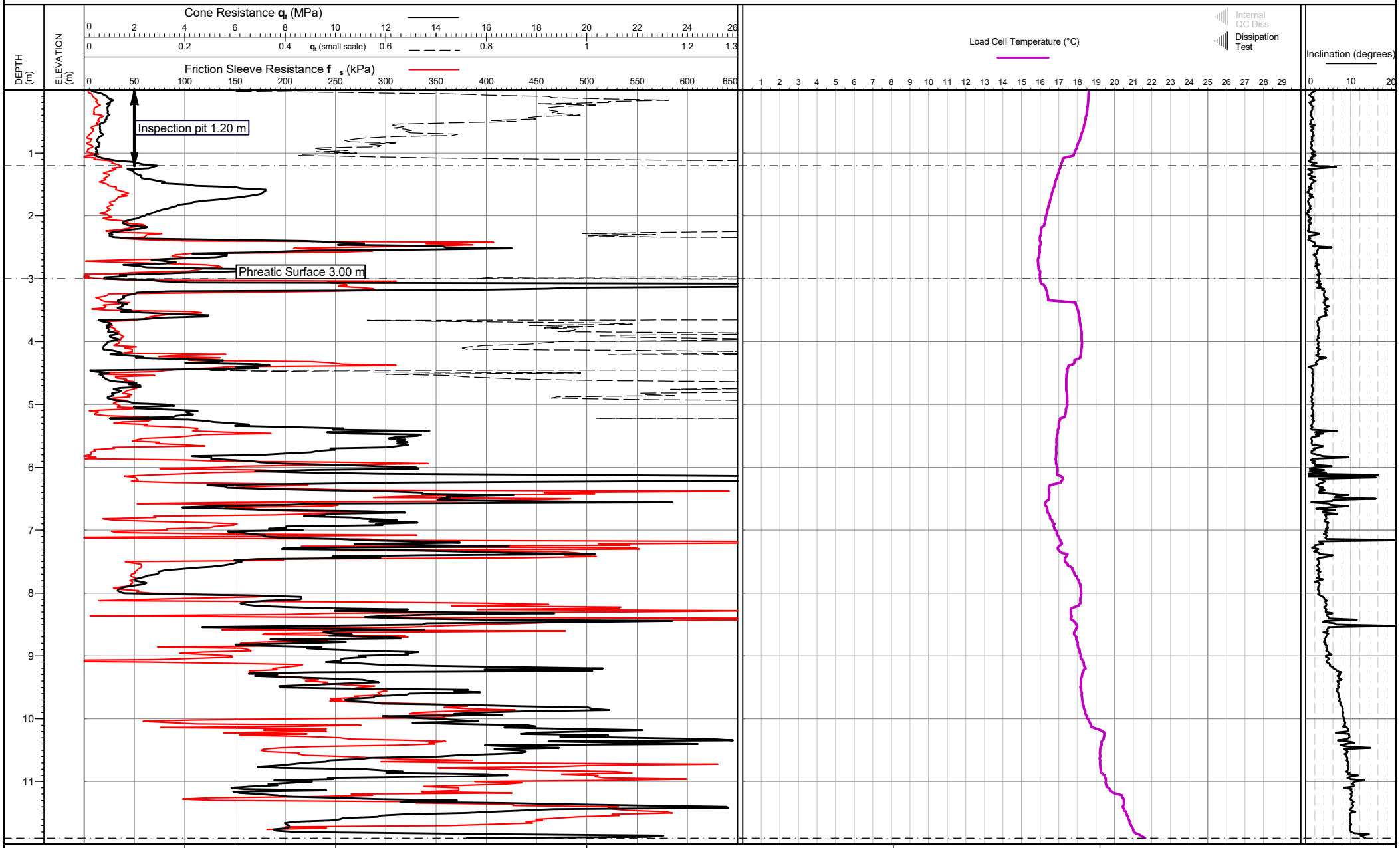
Client: HYDROCK



Cone area (mm2): Cone ID: S15-CFIPTT.1646 Operator: Walter Geddes Rig Used: UK3 Date of test: 21/11/2023 12:48:53	Zero drift (Pre/post test) q_c (kPa): 23.4 f_s (kPa): -2.3 ($f_{s\ drift}$ - $q_{c\ drift}$) u_2 (kPa): -2.9	Location: Cumbria, UK Coordinates: , Elevation: Coordinate system:	Remarks: *Phreatic surface origin: Arbitrary value Termination Remark: Tip/sleeve load + inclination	Date of plot: 21-11-23 Checked by: Chris Player	Lankelma Project Ref: P-108464-1	**TEST ID: CPT07** Page 1 of 1

Project: ALDI, WYNDHAM PLACE, EGREMONT (P21-172)

Client: HYDROCK

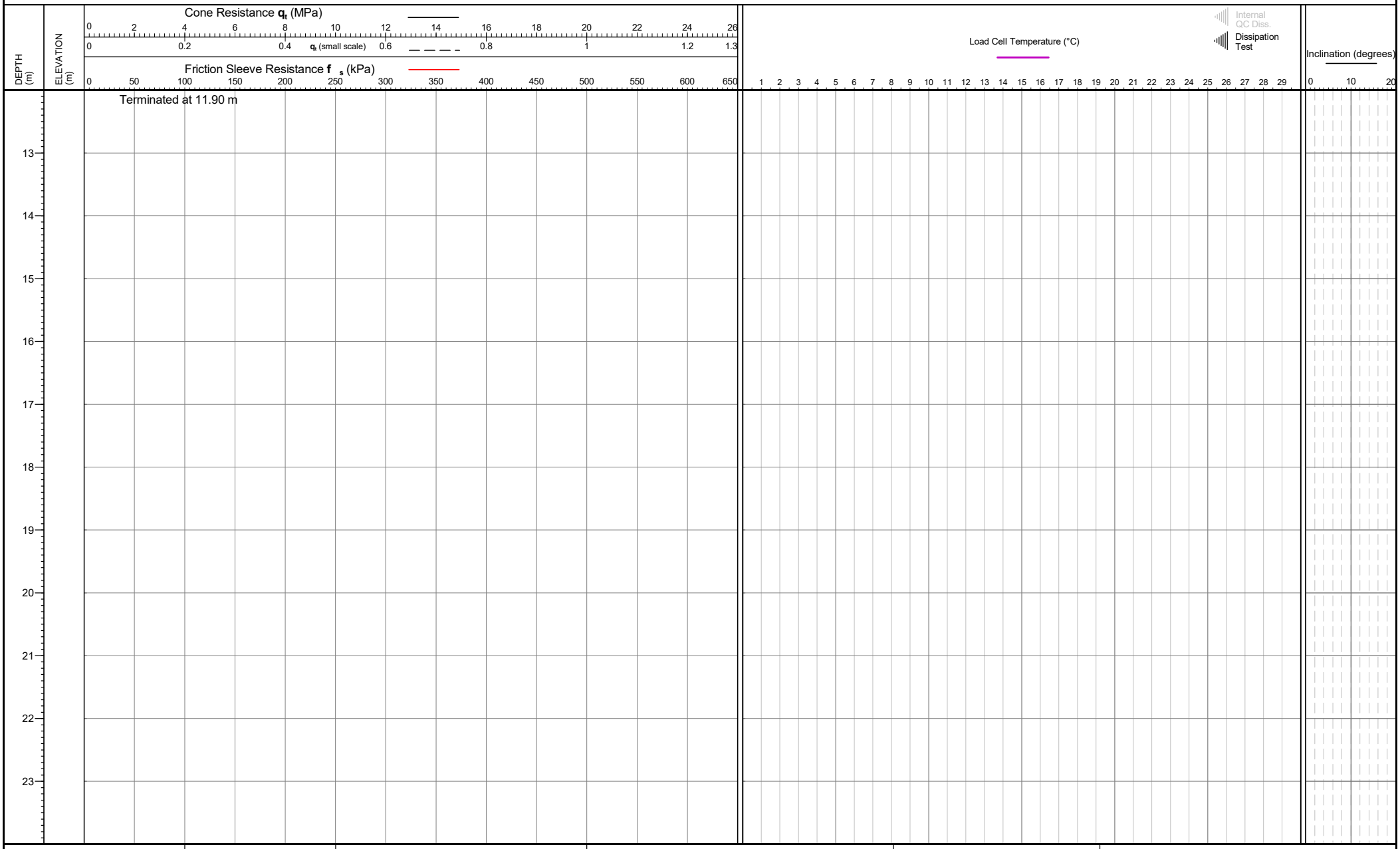


Cone area (mm2): Cone ID: S15-CFIPTT.1646 Operator: Walter Geddes Rig Used: UK3 Date of test: 21/11/2023 14:03:59	Zero drift (Pre/post test) q_c (kPa): 1.6 f_s (kPa): -4.3 ($f_{s\,drift}$ - $q_{c\,drift}$) u_2 (kPa): 8.3	Location: Cumbria, UK Coordinates: , Elevation: Coordinate system:	Remarks: *Phreatic surface origin: Arbitrary value Termination Remark: sudden inclination	Date of plot: 21-11-23 Checked by: Chris Player	Lankelma Project Ref: P-108464-1

TEST ID: CPT08

Project: ALDI, WYNDHAM PLACE, EGREMONT (P21-172)

Client: HYDROCK



Cone area (mm2):
Cone ID: S15-CFIPTT.1646
Operator: Walter Geddes
Rig Used: UK3
Date of test: 21/11/2023 14:03:59

Zero drift (Pre/post test)
q_c (kPa): 1.6
f_s (kPa): -4.3 ($f_{s\ drift}$ - $q_{c\ drift}$)
u_2 (kPa): 8.3

Location: Cumbria, UK
Coordinates: ,
Elevation:
Coordinate system:

Remarks:
*Phreatic surface origin: Arbitrary value

Termination Remark: sudden inclination

Date of plot: 21-11-23
Checked by: Chris Player

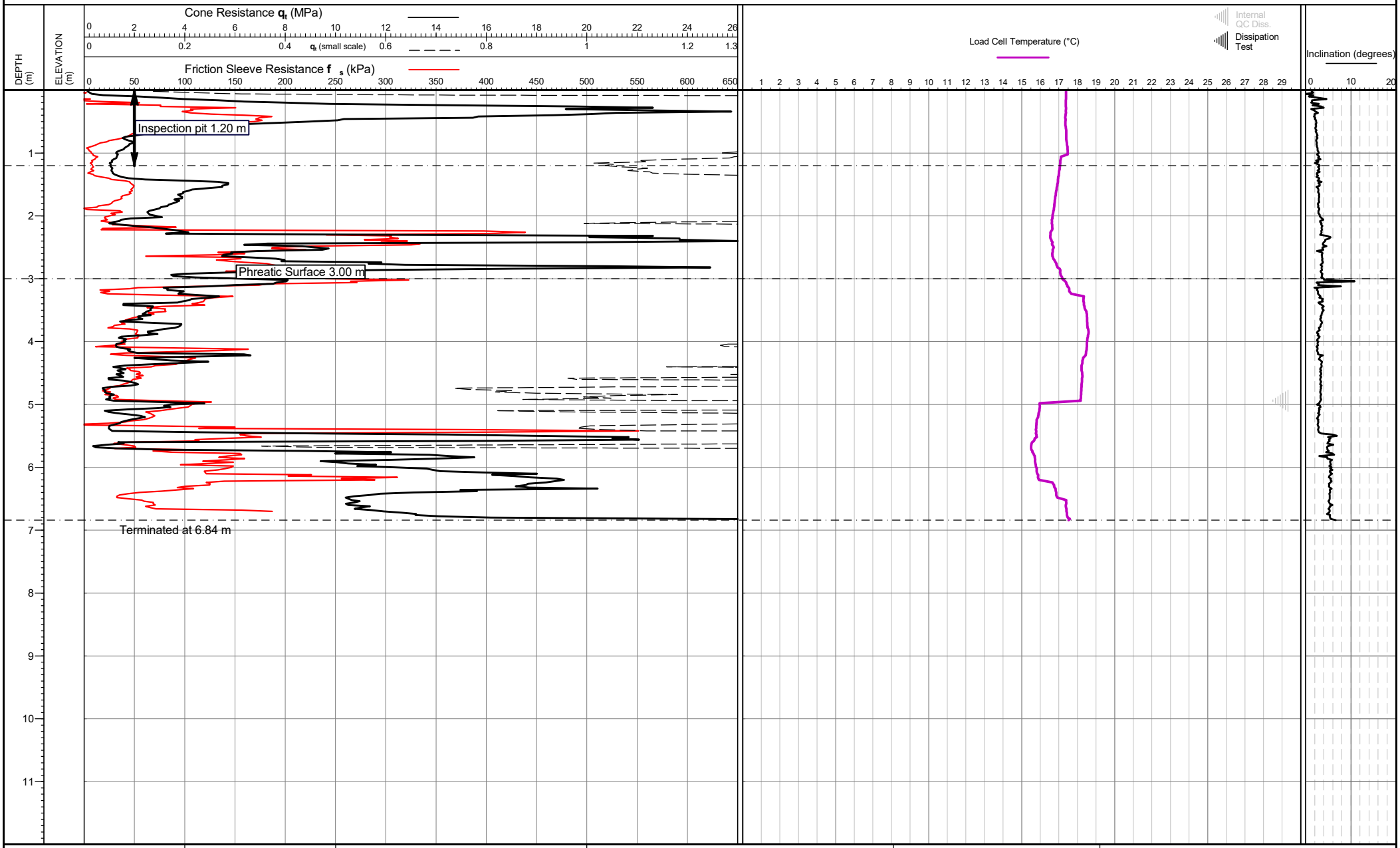
Lankelma Project Ref: P-108464-1

TEST ID: CPT08

LANKELMA

Project: ALDI, WYNDHAM PLACE, EGREMONT (P21-172)

Client: HYDROCK



Cone area (mm2): Cone ID: S15-CFIPTT.1646 Operator: Walter Geddes Rig Used: UK3 Date of test: 21/11/2023 10:59:16	Zero drift (Pre/post test) q_c (kPa): -8.0 f_s (kPa): 0.4 ($f_{s\,drift}$ - $q_{c\,drift}$) u_2 (kPa): -3.3	Location: Cumbria, UK Coordinates: , Elevation: Coordinate system:	Remarks: *Phreatic surface origin: Arbitrary value Termination Remark: Tip/sleeve load + inclination	Date of plot: 21-11-23 Checked by: Chris Player	Lankelma Project Ref: P-108464-1

TEST ID: CPT09

Appendix E – Laboratory Geotechnical Test Results

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS
Tested in Accordance with:BS 1377-2:1990:Clause 4.4 and 5

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

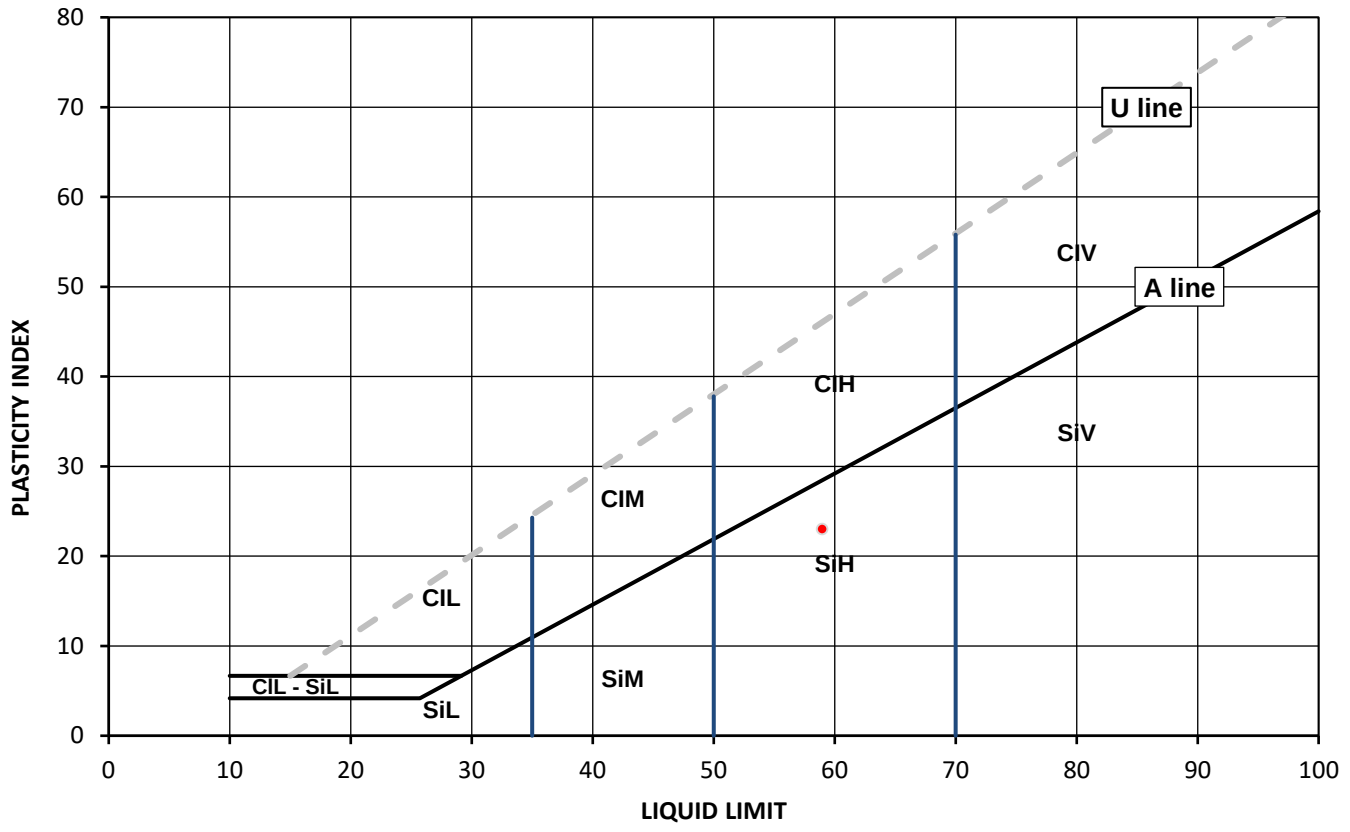
Client:	Hydrock Consultants Ltd	Client Reference:	29348
Client Address:	2 Esh 2 Esh Plaza, Sir Bobby Robson Way, Newcastle, NE13 9BA	Job Number:	23-69861-1
		Date Sampled:	07/11/2023
		Date Received:	20/11/2023
Contact:	Joe McIntyre	Date Tested:	27/11/2023
Site Address:	Aldi Egremont	Sampled By:	Client - JWM

Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2883905	Depth Top [m]:	1.70
Hole No.:	WS05	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Dark brown slightly gravelly slightly sandy clayey SILT		
Sample Preparation:	Tested after washing to remove >425 µm		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
28	59	36	23	75



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed:

Katarzyna Koziel
Senior Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 04/12/2023

GF 232.13

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS
Tested in Accordance with:BS 1377-2:1990:Clause 4.4 and 5

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

Client:	Hydrock Consultants Ltd	Client Reference:	29348
Client Address:	2 Esh 2 Esh Plaza, Sir Bobby Robson Way, Newcastle, NE13 9BA	Job Number:	23-69861-1
		Date Sampled:	07/11/2023
		Date Received:	20/11/2023
Contact:	Joe McIntyre	Date Tested:	27/11/2023
Site Address:	Aldi Egremont	Sampled By:	Client - JWM

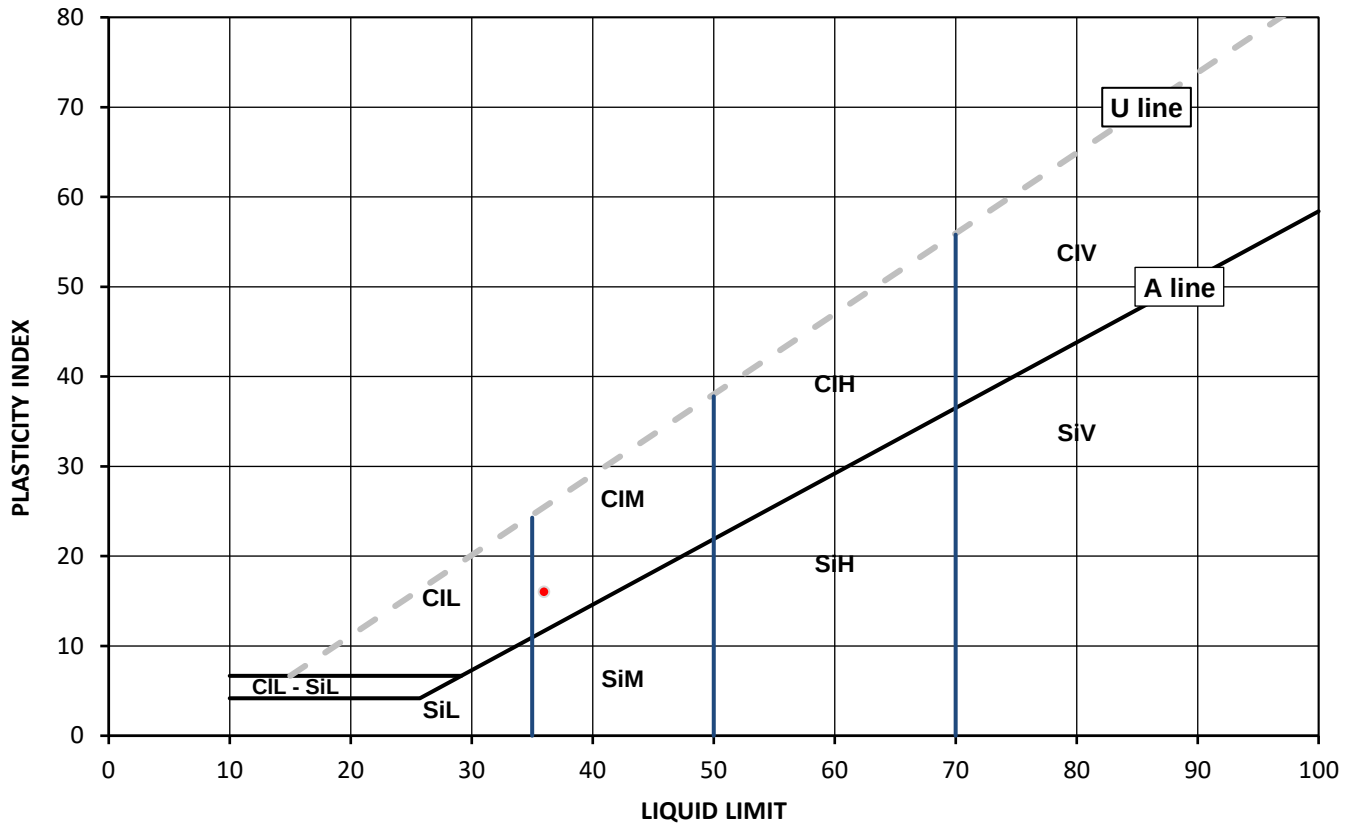
Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2883907	Depth Top [m]:	1.90
Hole No.:	WS09	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Brown gravelly sandy CLAY		

Sample Preparation: Tested after washing to remove >425 µm

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
17	36	20	16	61



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed:

Katarzyna Koziel
Senior Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 04/12/2023

GF 232.13

4041

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS
Tested in Accordance with:BS 1377-2:1990:Clause 4.4 and 5

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

Environmental Science

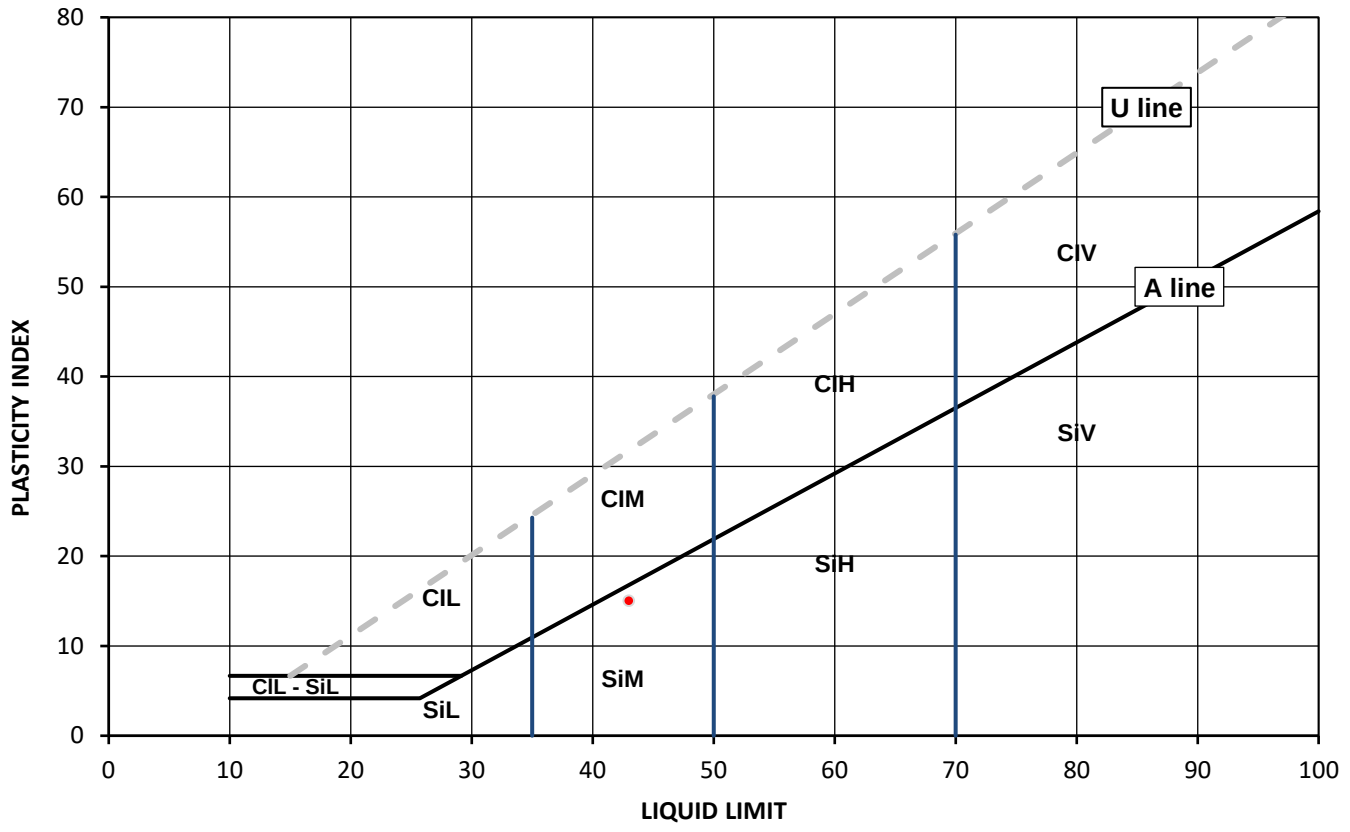
Client:	Hydrock Consultants Ltd	Client Reference:	29348
Client Address:	2 Esh 2 Esh Plaza, Sir Bobby Robson Way, Newcastle, NE13 9BA	Job Number:	23-69861-1
		Date Sampled:	07/11/2023
		Date Received:	20/11/2023
Contact:	Joe McIntyre	Date Tested:	27/11/2023
Site Address:	Aldi Egremont	Sampled By:	Client - JWM

Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2883908	Depth Top [m]:	2.25
Hole No.:	WS12	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Brown gravelly sandy clayey SILT		
Sample Preparation:	Tested after washing to remove >425 µm		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
22	43	28	15	39



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed: Katarzyna Koziel

Katarzyna Koziel
Senior Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 04/12/2023

GF 232.13

SUMMARY REPORT

SUMMARY OF CLASSIFICATION TEST RESULTS

Tested in Accordance with:

Water Content by BS 1377-2:1990: Clause 3.2Atterberg by BS 1377-2: 1990: Clause 4.3 (4 Point Test), Clause 4.4 (1 Point Test) and 5

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

Client: Hydrock Consultants Ltd

Client Address: 2 Esh 2 Esh Plaza, Sir Bobby Robson Way, Newcastle, NE13 9BA

Contact: Joe McIntyre

Site Address: Aldi Egremont

Client Reference: 29348
Job Number: 23-69861-1
Date Sampled: 07/11/2023
Date Received: 20/11/2023
Date Tested: 27/11/2023
Sampled By: Client - JWM

Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	Water Content BS 1377-2 [W]	Water Content BS EN ISO 17892-1 [W]	Atterberg				Density			Total Porosity#		
		Reference	Depth Top	Depth Base	Type					% Passing 425um	WL	Wp	Ip	bulk	dry	PD			
			m	m				%	%	%	%	%	%	Mg/m3	Mg/m3	Mg/m3	%		
2883905	WS05	Not Given	1.70	Not Given	D	Dark brown slightly gravelly slightly sandy clayey SILT	Atterberg 1 Point	28		75	59	36	23						
2883907	WS09	Not Given	1.90	Not Given	D	Brown gravelly sandy CLAY	Atterberg 1 Point	17		61	36	20	16						
2883908	WS12	Not Given	2.25	Not Given	D	Brown gravelly sandy clayey SILT	Atterberg 1 Point	22		39	43	28	15						

Note: # Non accredited; NP - Non plastic

Comments:

Signed:

Katarzyna Koziel
Senior Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 04/12/2023

GF 234.16

SUMMARY REPORT

DETERMINATION OF WATER CONTENT

Tested in Accordance with: BS 1377-2: 1990: Clause 3.2

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

Client: Hydrock Consultants Ltd

Client Address: 2 Esh 2 Esh Plaza, Sir Bobby Robson Way,
Newcastle, NE13 9BA

Contact: Joe McIntyre

Site Address: Aldi Egremont

Client Reference: 29348
Job Number: 23-69861-1
Date Sampled: 07/11/2023
Date Received: 20/11/2023
Date Tested: 27/11/2023
Sampled By: Client - JWM

Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	WC	Sample preparation / Oven temperature at the time of testing			
		Reference	Depth Top m	Depth Base m	Type			%				
2883905	WS05	Not Given	1.70	Not Given	D	Dark brown slightly gravelly slightly sandy clayey SILT		28	Sample was quartered, oven dried at 106.1 °C			
2883907	WS09	Not Given	1.90	Not Given	D	Brown gravelly sandy CLAY		17	Sample was quartered, oven dried at 106.1 °C			
2883908	WS12	Not Given	2.25	Not Given	D	Brown gravelly sandy clayey SILT		22	Sample was quartered, oven dried at 106.1 °C			

Comments:

Signed:

Katarzyna Koziel
Senior Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 04/12/2023

GF 099.17

TEST CERTIFICATE

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Tested in Accordance with: BS 1377-2: 1990

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

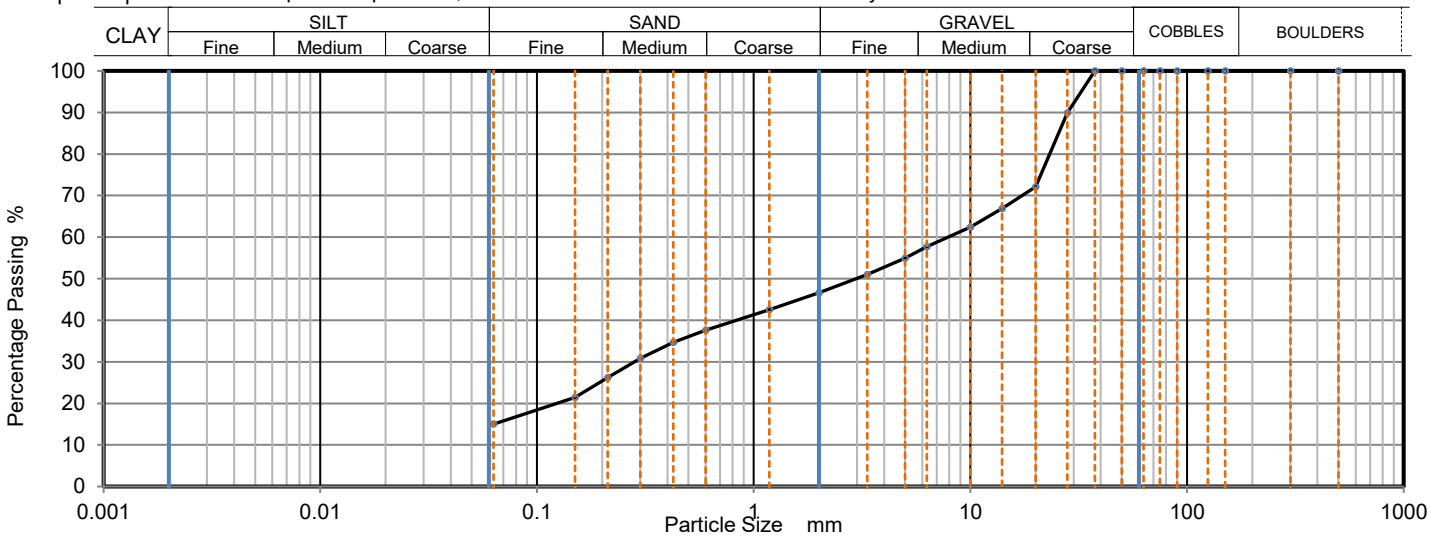
4041

Client:	Hydrock Consultants Ltd	Client Reference:	29348
Client Address:	2 Esh 2 Esh Plaza, Sir Bobby Robson Way, Newcastle, NE13 9BA	Job Number:	23-69861-1
		Date Sampled:	08/11/2023
		Date Received:	20/11/2023
Contact:	Joe McIntyre	Date Tested:	27/11/2023
Site Address:	Aldi Egremont	Sampled By:	Client - JWM

Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2883904	Depth Top [m]:	2.40
Hole No.:	WS01	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Brown sandy clayey GRAVEL		
Sample Preparation:	Sample was quartered, oven dried at 108.5 °C and broken down by hand.		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
150	100		
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	90		
20	72		
14	67		
10	62		
6.3	58		
5	55		
3.35	51		
2	47		
1.18	43		
0.6	38		
0.425	35		
0.3	31		
0.212	26		
0.15	21		
0.063	16		

Sample Proportions	% dry mass
Very coarse	0
Gravel	53
Sand	31
Fines <0.063mm	16

Grading Analysis		
D100	mm	37.5
D60	mm	7.87
D30	mm	0.283
D10	mm	
Uniformity Coefficient		> 120
Curvature Coefficient		

Uniformity and Curvature Coefficient calculated in accordance with BS EN ISO 14688-2:2018

Note: Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Remarks:

Signed:

Katarzyna Koziel
Senior Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 04/12/2023

GF 100.23

TEST CERTIFICATE

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Tested in Accordance with: BS 1377-2: 1990

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

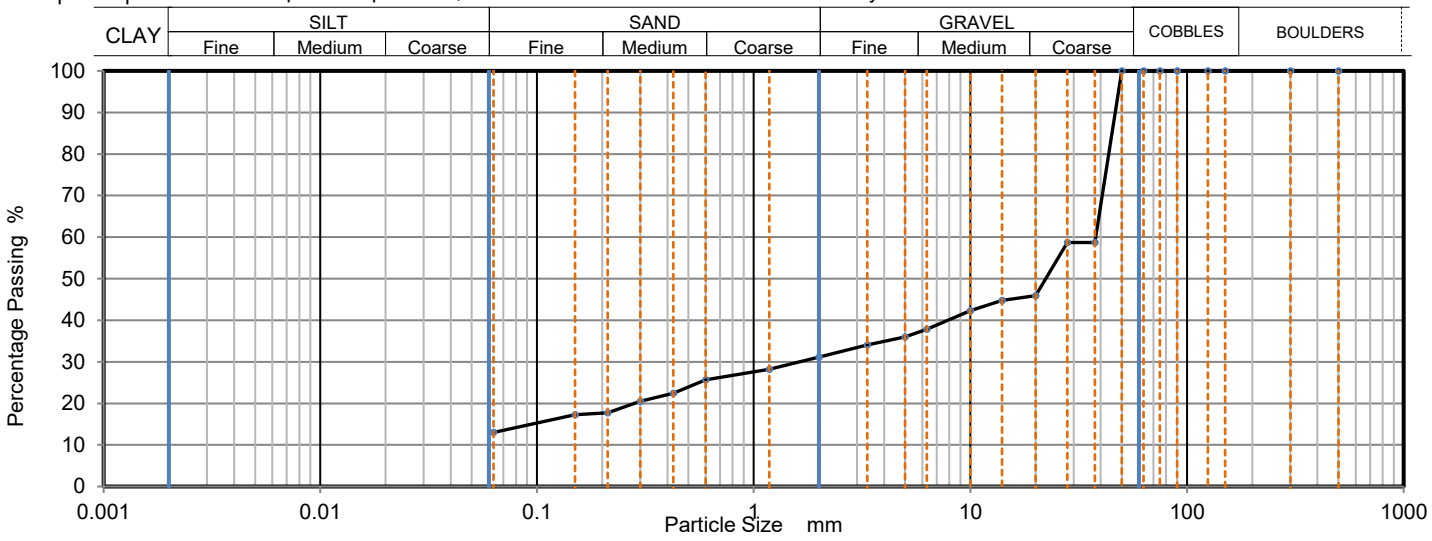
4041

Client:	Hydrock Consultants Ltd	Client Reference:	29348
Client Address:	2 Esh 2 Esh Plaza, Sir Bobby Robson Way, Newcastle, NE13 9BA	Job Number:	23-69861-1
		Date Sampled:	08/11/2023
		Date Received:	20/11/2023
Contact:	Joe McIntyre	Date Tested:	27/11/2023
Site Address:	Aldi Egremont	Sampled By:	Client - JWM

Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2883906	Depth Top [m]:	2.30
Hole No.:	WS07	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Brown GRAVEL		
Sample Preparation:	Sample was quartered, oven dried at 108.5 °C and broken down by hand.		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
150	100		
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	59		
28	59		
20	46		
14	45		
10	42		
6.3	38		
5	36		
3.35	34		
2	31		
1.18	28		
0.6	26		
0.425	22		
0.3	21		
0.212	18		
0.15	17		
0.063	14		

Sample Proportions	% dry mass
Very coarse	0
Gravel	69
Sand	17
Fines <0.063mm	14

Grading Analysis		
D100	mm	50
D60	mm	37.8
D30	mm	1.64
D10	mm	
Uniformity Coefficient		> 600
Curvature Coefficient		

Uniformity and Curvature Coefficient calculated in accordance with BS EN ISO 14688-2:2018

Note: Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Remarks: The material submitted - fails to meet the minimum mass requirements as stated in BS1377 Part 2 Table 3

Signed:

Katarzyna Koziel
Senior Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 04/12/2023

GF 100.23

Appendix F – Laboratory Chemical Test Results

Joe Egremont
Hydrock Consultants Ltd
2 Esh 2 Esh Plaza
Sir Bobby Robson Way
Newcastle
NE13 9BA

e:

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

t: 01923 225404
f: 01923 237404
e: reception@i2analytical.com

Analytical Report Number : 23-69138

Project / Site name:	Aldi Egremont	**Samples received on:**	15/11/2023
Your job number:	29348	**Samples instructed on/ Analysis started on:**	15/11/2023
Your order number:	PO30056	**Analysis completed by:**	22/11/2023
Report Issue Number:	1	**Report issued on:**	22/11/2023
Samples Analysed:	15 soil samples		

Signed:

Dominika Warjan
Reporting Specialist
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41-711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 23-69138
Project / Site name: Aldi Egremont
Your Order No: PO30056

Lab Sample Number				2880179	2880180	2880181	2880182	2880183
Sample Reference				WS01	WS01	WS05	WS05	SW06
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.00	1.90	0.30	1.45	0.30
Date Sampled				08/11/2023	08/11/2023	07/11/2023	07/11/2023	08/11/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	56	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	15	18	3.5	11	13
Total mass of sample received	kg	0.001	NONE	0.8	0.7	0.8	0.9	0.8
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-	-	Chrysotile- Loose Fibrous Debris
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	-	Not-detected	-	Detected
Asbestos Analyst ID	N/A	N/A	N/A	IZJ	N/A	IZJ	N/A	IZJ

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.1	-	8.7	7.6	9.1
Free Cyanide	mg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
Water Soluble Sulphate as SO4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	130	-	64	130	340
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.064	-	0.032	0.0641	0.169
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	64	-	32	64.1	169
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	2.8	-	0.5	0.9	5.6

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	0.35	-	0.08	0.06	0.33
Acenaphthylene	mg/kg	0.05	MCERTS	0.96	-	< 0.05	< 0.05	0.13
Acenaphthene	mg/kg	0.05	MCERTS	0.93	-	< 0.05	< 0.05	0.13
Fluorene	mg/kg	0.05	MCERTS	1.1	-	< 0.05	< 0.05	0.32
Phenanthrene	mg/kg	0.05	MCERTS	15	-	0.12	0.09	0.99
Anthracene	mg/kg	0.05	MCERTS	3.6	-	< 0.05	< 0.05	0.45
Fluoranthene	mg/kg	0.05	MCERTS	46	-	0.18	0.14	4.6
Pyrene	mg/kg	0.05	MCERTS	36	-	0.15	0.12	7.5
Benzo(a)anthracene	mg/kg	0.05	MCERTS	22	-	0.11	0.08	3.2
Chrysene	mg/kg	0.05	MCERTS	22	-	0.11	0.06	3.7
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	31	-	0.14	0.09	5.9
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	8.2	-	0.05	< 0.05	2.6
Benzo(a)pyrene	mg/kg	0.05	MCERTS	23	-	0.09	0.07	3.5
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	11	-	< 0.05	< 0.05	2.6
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	3.1	-	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	11	-	< 0.05	< 0.05	3.7

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	233	-	1.03	< 0.80	39.7

Analytical Report Number: 23-69138
Project / Site name: Aldi Egremont
Your Order No: PO30056

Lab Sample Number				2880179	2880180	2880181	2880182	2880183
Sample Reference				WS01	WS01	WS05	WS05	SW06
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.00	1.90	0.30	1.45	0.30
Date Sampled				08/11/2023	08/11/2023	07/11/2023	07/11/2023	08/11/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Heavy Metals / Metalloids								
Antimony (aqua regia extractable)	mg/kg	1	ISO 17025	-	-	-	-	7.5
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	22	-	3.1	16	18
Barium (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	510
Boron (water soluble)	mg/kg	0.2	MCERTS	0.5	-	< 0.2	< 0.2	0.7
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	-	< 0.2	< 0.2	4.2
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	-	< 1.8	< 1.8	< 1.8
Chromium (III)	mg/kg	1	NONE	20	-	4.1	19	26
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	22	-	4.2	20	27
Copper (aqua regia extractable)	mg/kg	1	MCERTS	54	-	7	17	110
Lead (aqua regia extractable)	mg/kg	1	MCERTS	130	-	4.9	41	810
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	-	< 0.3	< 0.3	< 0.3
Molybdenum (aqua regia extractable)	mg/kg	0.25	MCERTS	-	-	-	-	3.9
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	37	-	4.6	22	39
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	-	< 1.0	1.2	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	100	-	9.7	40	590
Monoaromatics & Oxygenates								
Benzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Toluene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Ethylbenzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
p & m-xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
o-xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	NONE	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6 $_{HS\_1D\_AL}$	mg/kg	0.02	NONE	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
TPH-CWG - Aliphatic >EC6 - EC8 $_{HS\_1D\_AL}$	mg/kg	0.02	NONE	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
TPH-CWG - Aliphatic >EC8 - EC10 $_{HS\_1D\_AL}$	mg/kg	0.05	NONE	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
TPH-CWG - Aliphatic >EC10 - EC12 $_{EH\_CU\_1D\_AL}$	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16 $_{EH\_CU\_1D\_AL}$	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	22
TPH-CWG - Aliphatic >EC16 - EC21 $_{EH\_CU\_1D\_AL}$	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	600
TPH-CWG - Aliphatic >EC21 - EC35 $_{EH\_CU\_1D\_AL}$	mg/kg	8	MCERTS	< 8.0	< 8.0	42	< 8.0	14000
TPH-CWG - Aliphatic >EC16 - EC35 $_{EH\_CU\_1D\_AL}$	mg/kg	10	MCERTS	< 10	< 10	42	< 10	14000
TPH-CWG - Aliphatic > EC35 - EC44 $_{EH\_CU\_1D\_AL}$	mg/kg	8.4	NONE	< 8.4	< 8.4	78	< 8.4	1900
TPH-CWG - Aliphatic (EC5 - EC35) $_{EH\_CU+HS\_1D\_AL}$	mg/kg	10	NONE	< 10	< 10	43	< 10	14000
TPH-CWG - Aliphatic (EC5 - EC44) $_{EH\_CU+HS\_1D\_AL}$	mg/kg	10	NONE	< 10	< 10	120	< 10	16000
TPH-CWG - Aromatic >EC5 - EC7 $_{HS\_1D\_AR}$	mg/kg	0.01	NONE	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPH-CWG - Aromatic >EC7 - EC8 $_{HS\_1D\_AR}$	mg/kg	0.01	NONE	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPH-CWG - Aromatic >EC8 - EC10 $_{HS\_1D\_AR}$	mg/kg	0.05	NONE	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
TPH-CWG - Aromatic >EC10 - EC12 $_{EH\_CU\_1D\_AR}$	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16 $_{EH\_CU\_1D\_AR}$	mg/kg	2	MCERTS	5.2	< 2.0	< 2.0	< 2.0	20
TPH-CWG - Aromatic >EC16 - EC21 $_{EH\_CU\_1D\_AR}$	mg/kg	10	MCERTS	71	< 10	< 10	< 10	260
TPH-CWG - Aromatic >EC21 - EC35 $_{EH\_CU\_1D\_AR}$	mg/kg	10	MCERTS	150	< 10	34	< 10	5100
TPH-CWG - Aromatic > EC35 - EC44 $_{EH\_CU\_1D\_AR}$	mg/kg	8.4	NONE	19	< 8.4	52	< 8.4	1300
TPH-CWG - Aromatic (EC5 - EC35) $_{EH\_CU+HS\_1D\_AR}$	mg/kg	10	NONE	230	< 10	35	< 10	5400
TPH-CWG - Aromatic (EC5 - EC44) $_{EH\_CU+HS\_1D\_AR}$	mg/kg	10	NONE	250	< 10	86	< 10	6700
TPH Total C5 - C44 $_{EH\_CU+HS\_1D\_TOTAL}$	mg/kg	10	NONE	250	< 10	210	< 10	23000

Analytical Report Number: 23-69138
Project / Site name: Aldi Egremont
Your Order No: PO30056

Lab Sample Number				2880179	2880180	2880181	2880182	2880183
Sample Reference				WS01	WS01	WS05	WS05	SW06
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.00	1.90	0.30	1.45	0.30
Date Sampled				08/11/2023	08/11/2023	07/11/2023	07/11/2023	08/11/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
VOCs								
Chloromethane	µg/kg	5	NONE	-	-	-	-	-
Chloroethane	µg/kg	5	NONE	-	-	-	-	-
Bromomethane	µg/kg	5	NONE	-	-	-	-	-
Vinyl Chloride	µg/kg	5	NONE	-	-	-	-	-
Trichlorofluoromethane	µg/kg	5	NONE	-	-	-	-	-
1,1-dichloroethene	µg/kg	5	NONE	-	-	-	-	-
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	5	NONE	-	-	-	-	-
Trans 1,2-dichloroethylene	µg/kg	5	NONE	-	-	-	-	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	NONE	-	-	-	-	-
1,1-dichloroethane	µg/kg	5	ISO 17025	-	-	-	-	-
2,2-Dichloropropane	µg/kg	5	ISO 17025	-	-	-	-	-
Chloroform	µg/kg	5	NONE	-	-	-	-	-
1,1,1-Trichloroethane	µg/kg	5	ISO 17025	-	-	-	-	-
1,2-dichloroethane	µg/kg	5	ISO 17025	-	-	-	-	-
1,1-Dichloropropene	µg/kg	5	NONE	-	-	-	-	-
Cis-1,2-dichloroethene	µg/kg	5	NONE	-	-	-	-	-
Benzene	µg/kg	5	MCERTS	-	-	-	-	-
Carbontetrachloride	µg/kg	5	NONE	-	-	-	-	-
1,2-dichloropropane	µg/kg	5	ISO 17025	-	-	-	-	-
Trichloroethene	µg/kg	5	ISO 17025	-	-	-	-	-
Dibromomethane	µg/kg	5	ISO 17025	-	-	-	-	-
Bromodichloromethane	µg/kg	5	ISO 17025	-	-	-	-	-
Cis-1,3-dichloropropene	µg/kg	5	ISO 17025	-	-	-	-	-
Trans-1,3-dichloropropene	µg/kg	5	ISO 17025	-	-	-	-	-
Toluene	µg/kg	5	MCERTS	-	-	-	-	-
1,1,2-Trichloroethane	µg/kg	5	ISO 17025	-	-	-	-	-
1,3-Dichloropropane	µg/kg	5	ISO 17025	-	-	-	-	-
Dibromochloromethane	µg/kg	5	ISO 17025	-	-	-	-	-
Tetrachloroethene	µg/kg	5	NONE	-	-	-	-	-
1,2-Dibromoethane	µg/kg	5	ISO 17025	-	-	-	-	-
Chlorobenzene	µg/kg	5	ISO 17025	-	-	-	-	-
1,1,1,2-Tetrachloroethane	µg/kg	5	ISO 17025	-	-	-	-	-
Ethylbenzene	µg/kg	5	MCERTS	-	-	-	-	-
p & m-xylene	µg/kg	5	MCERTS	-	-	-	-	-
Styrene	µg/kg	5	ISO 17025	-	-	-	-	-
Bromoform	µg/kg	5	NONE	-	-	-	-	-
o-xylene	µg/kg	5	MCERTS	-	-	-	-	-
Isopropylbenzene	µg/kg	5	ISO 17025	-	-	-	-	-
1,1,2,2-Tetrachloroethane	µg/kg	5	ISO 17025	-	-	-	-	-
Bromobenzene	µg/kg	5	NONE	-	-	-	-	-
N-Propylbenzene	µg/kg	5	ISO 17025	-	-	-	-	-
2-Chlorotoluene	µg/kg	5	ISO 17025	-	-	-	-	-
4-Chlorotoluene	µg/kg	5	ISO 17025	-	-	-	-	-
1,3,5-Trimethylbenzene	µg/kg	5	ISO 17025	-	-	-	-	-
Tert-Butylbenzene	µg/kg	5	ISO 17025	-	-	-	-	-
1,2,4-Trimethylbenzene	µg/kg	5	ISO 17025	-	-	-	-	-
Sec-Butylbenzene	µg/kg	5	ISO 17025	-	-	-	-	-
1,3-dichlorobenzene	µg/kg	5	ISO 17025	-	-	-	-	-
P-Isopropyltoluene	µg/kg	5	ISO 17025	-	-	-	-	-
1,4-dichlorobenzene	µg/kg	5	ISO 17025	-	-	-	-	-
1,2-dichlorobenzene	µg/kg	5	ISO 17025	-	-	-	-	-

Analytical Report Number: 23-69138
Project / Site name: Aldi Egremont
Your Order No: PO30056

Lab Sample Number				2880179	2880180	2880181	2880182	2880183
Sample Reference				WS01	WS01	WS05	WS05	SW06
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.00	1.90	0.30	1.45	0.30
Date Sampled				08/11/2023	08/11/2023	07/11/2023	07/11/2023	08/11/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Butylbenzene	µg/kg	5	NONE	-	-	-	-	-
1,2-Dibromo-3-chloropropane	µg/kg	5	ISO 17025	-	-	-	-	-
1,2,4-Trichlorobenzene	µg/kg	5	ISO 17025	-	-	-	-	-
Hexachlorobutadiene	µg/kg	5	NONE	-	-	-	-	-
1,2,3-Trichlorobenzene	µg/kg	5	ISO 17025	-	-	-	-	-
SVOCs								
Aniline	mg/kg	0.1	NONE	-	-	-	-	-
Phenol	mg/kg	0.2	ISO 17025	-	-	-	-	-
2-Chlorophenol	mg/kg	0.1	MCERTS	-	-	-	-	-
Bis(2-chloroethyl)ether	mg/kg	0.2	MCERTS	-	-	-	-	-
1,3-Dichlorobenzene	mg/kg	0.2	MCERTS	-	-	-	-	-
1,2-Dichlorobenzene	mg/kg	0.1	MCERTS	-	-	-	-	-
1,4-Dichlorobenzene	mg/kg	0.2	MCERTS	-	-	-	-	-
Bis(2-chloroisopropyl)ether	mg/kg	0.1	MCERTS	-	-	-	-	-
2-Methylphenol	mg/kg	0.3	MCERTS	-	-	-	-	-
Hexachloroethane	mg/kg	0.05	ISO 17025	-	-	-	-	-
Nitrobenzene	mg/kg	0.3	MCERTS	-	-	-	-	-
4-Methylphenol	mg/kg	0.2	NONE	-	-	-	-	-
Isophorone	mg/kg	0.2	MCERTS	-	-	-	-	-
2-Nitrophenol	mg/kg	0.3	NONE	-	-	-	-	-
2,4-Dimethylphenol	mg/kg	0.3	MCERTS	-	-	-	-	-
Bis(2-chloroethoxy)methane	mg/kg	0.3	MCERTS	-	-	-	-	-
1,2,4-Trichlorobenzene	mg/kg	0.3	MCERTS	-	-	-	-	-
Naphthalene	mg/kg	0.05	MCERTS	-	-	-	-	-
2,4-Dichlorophenol	mg/kg	0.3	MCERTS	-	-	-	-	-
4-Chloroaniline	mg/kg	0.1	NONE	-	-	-	-	-
Hexachlorobutadiene	mg/kg	0.1	MCERTS	-	-	-	-	-
4-Chloro-3-methylphenol	mg/kg	0.1	NONE	-	-	-	-	-
2,4,6-Trichlorophenol	mg/kg	0.1	NONE	-	-	-	-	-
2,4,5-Trichlorophenol	mg/kg	0.2	NONE	-	-	-	-	-
2-Methylnaphthalene	mg/kg	0.1	NONE	-	-	-	-	-
2-Chloronaphthalene	mg/kg	0.1	MCERTS	-	-	-	-	-
Dimethylphthalate	mg/kg	0.1	MCERTS	-	-	-	-	-
2,6-Dinitrotoluene	mg/kg	0.1	NONE	-	-	-	-	-
Acenaphthylene	mg/kg	0.05	MCERTS	-	-	-	-	-
Acenaphthene	mg/kg	0.05	MCERTS	-	-	-	-	-
2,4-Dinitrotoluene	mg/kg	0.2	NONE	-	-	-	-	-
Dibenzofuran	mg/kg	0.2	MCERTS	-	-	-	-	-
4-Chlorophenyl phenyl ether	mg/kg	0.3	MCERTS	-	-	-	-	-
Diethyl phthalate	mg/kg	0.2	MCERTS	-	-	-	-	-
4-Nitroaniline	mg/kg	0.2	NONE	-	-	-	-	-
Fluorene	mg/kg	0.05	MCERTS	-	-	-	-	-
Azobenzene	mg/kg	0.3	NONE	-	-	-	-	-
Bromophenyl phenyl ether	mg/kg	0.2	MCERTS	-	-	-	-	-
Hexachlorobenzene	mg/kg	0.3	MCERTS	-	-	-	-	-
Phenanthrene	mg/kg	0.05	MCERTS	-	-	-	-	-
Anthracene	mg/kg	0.05	MCERTS	-	-	-	-	-
Carbazole	mg/kg	0.3	MCERTS	-	-	-	-	-
Dibutyl phthalate	mg/kg	0.2	NONE	-	-	-	-	-
Anthraquinone	mg/kg	0.3	NONE	-	-	-	-	-
Fluoranthene	mg/kg	0.05	MCERTS	-	-	-	-	-

Analytical Report Number: 23-69138
Project / Site name: Aldi Egremont
Your Order No: PO30056

Lab Sample Number				2880179	2880180	2880181	2880182	2880183
Sample Reference				WS01	WS01	WS05	WS05	SW06
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.00	1.90	0.30	1.45	0.30
Date Sampled				08/11/2023	08/11/2023	07/11/2023	07/11/2023	08/11/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Pyrene	mg/kg	0.05	MCERTS	-	-	-	-	-
Butyl benzyl phthalate	mg/kg	0.3	NONE	-	-	-	-	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	-	-	-	-
Chrysene	mg/kg	0.05	MCERTS	-	-	-	-	-
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	-	-	-	-	-
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	-	-	-	-	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	-	-	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	-	-	-	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	-	-	-	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	-	-	-	-

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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Project / Site name: Aldi Egremont
Your Order No: PO30056

Lab Sample Number				2880184	2880185	2880186	2880187	2880188
Sample Reference				WS07	WS09	WS09	WS10	WS12
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.90	1.70	4.20	0.60	1.00
Date Sampled				08/11/2023	07/11/2023	07/11/2023	09/11/2023	09/11/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	40	15	< 0.1	74	56
Moisture Content	%	0.01	NONE	11	13	19	7.2	14
Total mass of sample received	kg	0.001	NONE	0.8	0.8	0.6	0.7	0.7
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-	-	-
Asbestos in Soil	Type	N/A	ISO 17025	-	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	N/A	IZJ	IZJ	IZJ	IZJ
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	7.8	7.9	7.5	10.9	10.3
Free Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Water Soluble Sulphate as SO4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	310	180	280	420	340
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.153	0.089	0.14	0.208	0.17
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	153	89	140	208	170
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	0.4	7	3.5	0.7	1.7
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	0.08	3.8	1.7	0.1	0.54
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	0.48	< 0.05	< 0.05	0.09
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	2.6	< 0.05	0.22	0.81
Fluorene	mg/kg	0.05	MCERTS	< 0.05	2.9	1.7	0.42	0.77
Phenanthrene	mg/kg	0.05	MCERTS	0.33	32	2.9	2.2	4.7
Anthracene	mg/kg	0.05	MCERTS	0.06	5.9	0.6	1.2	1.3
Fluoranthene	mg/kg	0.05	MCERTS	0.55	54	1.7	3.4	8.1
Pyrene	mg/kg	0.05	MCERTS	0.47	42	1.7	2.5	6.6
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.27	26	0.66	1.6	3.8
Chrysene	mg/kg	0.05	MCERTS	0.26	22	0.66	1.5	3.4
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	0.36	28	0.66	1.6	4.2
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	0.12	10	0.32	0.72	1.5
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.28	22	0.49	1.4	3.3
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.15	11	< 0.05	0.7	1.5
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	3	< 0.05	0.19	0.4
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.16	11	< 0.05	0.6	1.5
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	3.09	277	13.1	18.4	42.5

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Project / Site name: Aldi Egremont
Your Order No: PO30056

Lab Sample Number				2880184	2880185	2880186	2880187	2880188
Sample Reference				WS07	WS09	WS09	WS10	WS12
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.90	1.70	4.20	0.60	1.00
Date Sampled				08/11/2023	07/11/2023	07/11/2023	09/11/2023	09/11/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Heavy Metals / Metalloids								
Antimony (aqua regia extractable)	mg/kg	1	ISO 17025	-	-	4.6	2.2	-
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	17	43	25	3.9	13
Barium (aqua regia extractable)	mg/kg	1	MCERTS	-	-	200	1000	-
Boron (water soluble)	mg/kg	0.2	MCERTS	< 0.2	1	1.9	0.8	2.1
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	0.2	< 0.2
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8
Chromium (III)	mg/kg	1	NONE	32	24	22	4.1	12
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	32	24	22	4.2	13
Copper (aqua regia extractable)	mg/kg	1	MCERTS	22	110	55	9.4	24
Lead (aqua regia extractable)	mg/kg	1	MCERTS	15	81	77	9.2	33
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Molybdenum (aqua regia extractable)	mg/kg	0.25	MCERTS	-	-	3.5	0.41	-
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	27	54	32	5.7	18
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	1.6	< 1.0	1.6	1.8	1.5
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	41	140	58	13	43
Monoaromatics & Oxygenates								
Benzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Toluene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Ethylbenzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
p & m-xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
o-xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	NONE	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6 $_{HS\_1D\_AL}$	mg/kg	0.02	NONE	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
TPH-CWG - Aliphatic >EC6 - EC8 $_{HS\_1D\_AL}$	mg/kg	0.02	NONE	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
TPH-CWG - Aliphatic >EC8 - EC10 $_{HS\_1D\_AL}$	mg/kg	0.05	NONE	< 0.050	< 0.050	< 0.050	0.46	< 0.050
TPH-CWG - Aliphatic >EC10 - EC12 $_{EH\_CU\_1D\_AL}$	mg/kg	1	MCERTS	< 1.0	12	2.1	3.8	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16 $_{EH\_CU\_1D\_AL}$	mg/kg	2	MCERTS	< 2.0	28	130	19	2.1
TPH-CWG - Aliphatic >EC16 - EC21 $_{EH\_CU\_1D\_AL}$	mg/kg	8	MCERTS	< 8.0	49	340	16	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35 $_{EH\_CU\_1D\_AL}$	mg/kg	8	MCERTS	< 8.0	230	1400	67	170
TPH-CWG - Aliphatic >EC16 - EC35 $_{EH\_CU\_1D\_AL}$	mg/kg	10	MCERTS	< 10	280	1800	83	170
TPH-CWG - Aliphatic > EC35 - EC44 $_{EH\_CU\_1D\_AL}$	mg/kg	8.4	NONE	< 8.4	80	280	67	160
TPH-CWG - Aliphatic (EC5 - EC35) $_{EH\_CU+HS\_1D\_AL}$	mg/kg	10	NONE	< 10	320	1900	110	180
TPH-CWG - Aliphatic (EC5 - EC44) $_{EH\_CU+HS\_1D\_AL}$	mg/kg	10	NONE	< 10	400	2200	170	340
TPH-CWG - Aromatic >EC5 - EC7 $_{HS\_1D\_AR}$	mg/kg	0.01	NONE	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPH-CWG - Aromatic >EC7 - EC8 $_{HS\_1D\_AR}$	mg/kg	0.01	NONE	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPH-CWG - Aromatic >EC8 - EC10 $_{HS\_1D\_AR}$	mg/kg	0.05	NONE	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
TPH-CWG - Aromatic >EC10 - EC12 $_{EH\_CU\_1D\_AR}$	mg/kg	1	MCERTS	< 1.0	2.5	4.9	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16 $_{EH\_CU\_1D\_AR}$	mg/kg	2	MCERTS	< 2.0	26	88	5.3	2.6
TPH-CWG - Aromatic >EC16 - EC21 $_{EH\_CU\_1D\_AR}$	mg/kg	10	MCERTS	< 10	240	180	12	20
TPH-CWG - Aromatic >EC21 - EC35 $_{EH\_CU\_1D\_AR}$	mg/kg	10	MCERTS	< 10	400	460	69	190
TPH-CWG - Aromatic > EC35 - EC44 $_{EH\_CU\_1D\_AR}$	mg/kg	8.4	NONE	< 8.4	59	110	70	180
TPH-CWG - Aromatic (EC5 - EC35) $_{EH\_CU+HS\_1D\_AR}$	mg/kg	10	NONE	< 10	670	730	86	210
TPH-CWG - Aromatic (EC5 - EC44) $_{EH\_CU+HS\_1D\_AR}$	mg/kg	10	NONE	< 10	730	850	160	380
TPH Total C5 - C44 $_{EH\_CU+HS\_1D\_TOTAL}$	mg/kg	10	NONE	< 10	1100	3000	330	720

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Project / Site name: Aldi Egremont
Your Order No: PO30056

Lab Sample Number				2880184	2880185	2880186	2880187	2880188
Sample Reference				WS07	WS09	WS09	WS10	WS12
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.90	1.70	4.20	0.60	1.00
Date Sampled				08/11/2023	07/11/2023	07/11/2023	09/11/2023	09/11/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
VOCs								
Chloromethane	µg/kg	5	NONE	-	-	< 5.0#	-	-
Chloroethane	µg/kg	5	NONE	-	-	< 5.0	-	-
Bromomethane	µg/kg	5	NONE	-	-	< 5.0#	-	-
Vinyl Chloride	µg/kg	5	NONE	-	-	< 5.0	-	-
Trichlorofluoromethane	µg/kg	5	NONE	-	-	< 5.0	-	-
1,1-dichloroethene	µg/kg	5	NONE	-	-	< 5.0	-	-
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	5	NONE	-	-	< 5.0	-	-
Trans 1,2-dichloroethylene	µg/kg	5	NONE	-	-	< 5.0#	-	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	NONE	-	-	< 5.0	-	-
1,1-dichloroethane	µg/kg	5	ISO 17025	-	-	< 5.0	-	-
2,2-Dichloropropane	µg/kg	5	ISO 17025	-	-	< 5.0	-	-
Chloroform	µg/kg	5	NONE	-	-	< 5.0	-	-
1,1,1-Trichloroethane	µg/kg	5	ISO 17025	-	-	< 5.0	-	-
1,2-dichloroethane	µg/kg	5	ISO 17025	-	-	< 5.0	-	-
1,1-Dichloropropene	µg/kg	5	NONE	-	-	< 5.0#	-	-
Cis-1,2-dichloroethene	µg/kg	5	NONE	-	-	< 5.0#	-	-
Benzene	µg/kg	5	MCERTS	-	-	< 5.0	-	-
Carbontetrachloride	µg/kg	5	NONE	-	-	< 5.0	-	-
1,2-dichloropropane	µg/kg	5	ISO 17025	-	-	< 5.0	-	-
Trichloroethene	µg/kg	5	ISO 17025	-	-	< 5.0	-	-
Dibromomethane	µg/kg	5	ISO 17025	-	-	< 5.0	-	-
Bromodichloromethane	µg/kg	5	ISO 17025	-	-	< 5.0	-	-
Cis-1,3-dichloropropene	µg/kg	5	ISO 17025	-	-	< 5.0	-	-
Trans-1,3-dichloropropene	µg/kg	5	ISO 17025	-	-	< 5.0	-	-
Toluene	µg/kg	5	MCERTS	-	-	< 5.0	-	-
1,1,2-Trichloroethane	µg/kg	5	ISO 17025	-	-	< 5.0	-	-
1,3-Dichloropropane	µg/kg	5	ISO 17025	-	-	< 5.0	-	-
Dibromochloromethane	µg/kg	5	ISO 17025	-	-	< 5.0	-	-
Tetrachloroethene	µg/kg	5	NONE	-	-	< 5.0	-	-
1,2-Dibromoethane	µg/kg	5	ISO 17025	-	-	< 5.0	-	-
Chlorobenzene	µg/kg	5	ISO 17025	-	-	< 5.0	-	-
1,1,1,2-Tetrachloroethane	µg/kg	5	ISO 17025	-	-	< 5.0	-	-
Ethylbenzene	µg/kg	5	MCERTS	-	-	< 5.0	-	-
p & m-xylene	µg/kg	5	MCERTS	-	-	< 5.0	-	-
Styrene	µg/kg	5	ISO 17025	-	-	< 5.0	-	-
Bromoform	µg/kg	5	NONE	-	-	< 5.0	-	-
o-xylene	µg/kg	5	MCERTS	-	-	< 5.0	-	-
Isopropylbenzene	µg/kg	5	ISO 17025	-	-	< 5.0	-	-
1,1,2,2-Tetrachloroethane	µg/kg	5	ISO 17025	-	-	< 5.0	-	-
Bromobenzene	µg/kg	5	NONE	-	-	< 5.0	-	-
N-Propylbenzene	µg/kg	5	ISO 17025	-	-	< 5.0	-	-
2-Chlorotoluene	µg/kg	5	ISO 17025	-	-	< 5.0	-	-
4-Chlorotoluene	µg/kg	5	ISO 17025	-	-	< 5.0	-	-
1,3,5-Trimethylbenzene	µg/kg	5	ISO 17025	-	-	33	-	-
Tert-Butylbenzene	µg/kg	5	ISO 17025	-	-	< 5.0	-	-
1,2,4-Trimethylbenzene	µg/kg	5	ISO 17025	-	-	130	-	-
Sec-Butylbenzene	µg/kg	5	ISO 17025	-	-	49	-	-
1,3-dichlorobenzene	µg/kg	5	ISO 17025	-	-	< 5.0	-	-
P-Isopropyltoluene	µg/kg	5	ISO 17025	-	-	< 5.0	-	-
1,4-dichlorobenzene	µg/kg	5	ISO 17025	-	-	< 5.0	-	-
1,2-dichlorobenzene	µg/kg	5	ISO 17025	-	-	< 5.0	-	-

Analytical Report Number: 23-69138
Project / Site name: Aldi Egremont
Your Order No: PO30056

Lab Sample Number				2880184	2880185	2880186	2880187	2880188
Sample Reference				WS07	WS09	WS09	WS10	WS12
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.90	1.70	4.20	0.60	1.00
Date Sampled				08/11/2023	07/11/2023	07/11/2023	09/11/2023	09/11/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Butylbenzene	µg/kg	5	NONE	-	-	< 5.0	-	-
1,2-Dibromo-3-chloropropane	µg/kg	5	ISO 17025	-	-	< 5.0	-	-
1,2,4-Trichlorobenzene	µg/kg	5	ISO 17025	-	-	< 5.0	-	-
Hexachlorobutadiene	µg/kg	5	NONE	-	-	< 5.0	-	-
1,2,3-Trichlorobenzene	µg/kg	5	ISO 17025	-	-	< 5.0	-	-
SVOCs								
Aniline	mg/kg	0.1	NONE	-	-	< 0.1	-	-
Phenol	mg/kg	0.2	ISO 17025	-	-	< 0.2	-	-
2-Chlorophenol	mg/kg	0.1	MCERTS	-	-	< 0.1	-	-
Bis(2-chloroethyl)ether	mg/kg	0.2	MCERTS	-	-	< 0.2	-	-
1,3-Dichlorobenzene	mg/kg	0.2	MCERTS	-	-	< 0.2	-	-
1,2-Dichlorobenzene	mg/kg	0.1	MCERTS	-	-	< 0.1	-	-
1,4-Dichlorobenzene	mg/kg	0.2	MCERTS	-	-	< 0.2	-	-
Bis(2-chloroisopropyl)ether	mg/kg	0.1	MCERTS	-	-	< 0.1	-	-
2-Methylphenol	mg/kg	0.3	MCERTS	-	-	< 0.3	-	-
Hexachloroethane	mg/kg	0.05	ISO 17025	-	-	< 0.05	-	-
Nitrobenzene	mg/kg	0.3	MCERTS	-	-	< 0.3	-	-
4-Methylphenol	mg/kg	0.2	NONE	-	-	< 0.2	-	-
Isophorone	mg/kg	0.2	MCERTS	-	-	< 0.2	-	-
2-Nitrophenol	mg/kg	0.3	NONE	-	-	< 0.3	-	-
2,4-Dimethylphenol	mg/kg	0.3	MCERTS	-	-	< 0.3	-	-
Bis(2-chloroethoxy)methane	mg/kg	0.3	MCERTS	-	-	< 0.3	-	-
1,2,4-Trichlorobenzene	mg/kg	0.3	MCERTS	-	-	< 0.3	-	-
Naphthalene	mg/kg	0.05	MCERTS	-	-	1.7	-	-
2,4-Dichlorophenol	mg/kg	0.3	MCERTS	-	-	< 0.3	-	-
4-Chloroaniline	mg/kg	0.1	NONE	-	-	< 0.1	-	-
Hexachlorobutadiene	mg/kg	0.1	MCERTS	-	-	< 0.1	-	-
4-Chloro-3-methylphenol	mg/kg	0.1	NONE	-	-	< 0.1	-	-
2,4,6-Trichlorophenol	mg/kg	0.1	NONE	-	-	< 0.1	-	-
2,4,5-Trichlorophenol	mg/kg	0.2	NONE	-	-	< 0.2	-	-
2-Methylnaphthalene	mg/kg	0.1	NONE	-	-	4.2	-	-
2-Chloronaphthalene	mg/kg	0.1	MCERTS	-	-	< 0.1	-	-
Dimethylphthalate	mg/kg	0.1	MCERTS	-	-	< 0.1	-	-
2,6-Dinitrotoluene	mg/kg	0.1	NONE	-	-	< 0.1	-	-
Acenaphthylene	mg/kg	0.05	MCERTS	-	-	< 0.05	-	-
Acenaphthene	mg/kg	0.05	MCERTS	-	-	< 0.05	-	-
2,4-Dinitrotoluene	mg/kg	0.2	NONE	-	-	< 0.2	-	-
Dibenzofuran	mg/kg	0.2	MCERTS	-	-	< 0.2	-	-
4-Chlorophenyl phenyl ether	mg/kg	0.3	MCERTS	-	-	< 0.3	-	-
Diethyl phthalate	mg/kg	0.2	MCERTS	-	-	< 0.2	-	-
4-Nitroaniline	mg/kg	0.2	NONE	-	-	< 0.2	-	-
Fluorene	mg/kg	0.05	MCERTS	-	-	1.7	-	-
Azobenzene	mg/kg	0.3	NONE	-	-	< 0.3	-	-
Bromophenyl phenyl ether	mg/kg	0.2	MCERTS	-	-	< 0.2	-	-
Hexachlorobenzene	mg/kg	0.3	MCERTS	-	-	< 0.3	-	-
Phenanthrene	mg/kg	0.05	MCERTS	-	-	2.9	-	-
Anthracene	mg/kg	0.05	MCERTS	-	-	0.6	-	-
Carbazole	mg/kg	0.3	MCERTS	-	-	< 0.3	-	-
Dibutyl phthalate	mg/kg	0.2	NONE	-	-	< 0.2	-	-
Anthraquinone	mg/kg	0.3	NONE	-	-	< 0.3	-	-
Fluoranthene	mg/kg	0.05	MCERTS	-	-	1.7	-	-

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Your Order No: PO30056

Lab Sample Number				2880184	2880185	2880186	2880187	2880188
Sample Reference				WS07	WS09	WS09	WS10	WS12
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.90	1.70	4.20	0.60	1.00
Date Sampled				08/11/2023	07/11/2023	07/11/2023	09/11/2023	09/11/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Pyrene	mg/kg	0.05	MCERTS	-	-	1.7	-	-
Butyl benzyl phthalate	mg/kg	0.3	NONE	-	-	< 0.3	-	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	-	0.66	-	-
Chrysene	mg/kg	0.05	MCERTS	-	-	0.66	-	-
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	-	-	0.66	-	-
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	-	-	0.32	-	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	-	0.49	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	-	< 0.05	-	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	-	< 0.05	-	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	-	< 0.05	-	-

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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Lab Sample Number				2880189	2880190	2880191	2880192	2880193
Sample Reference				WS12	WS12	WS13	WS13	WS13
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.65	3.30	0.30	1.00	2.20
Date Sampled				09/11/2023	09/11/2023	09/11/2023	09/11/2023	09/11/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	56	< 0.1	66
Moisture Content	%	0.01	NONE	19	13	8.8	19	12
Total mass of sample received	kg	0.001	NONE	0.8	0.9	0.8	0.9	0.8
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-	-	-
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	IZJ	IZJ	IZJ	DSO	DSO
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	8.2	10.5	-	8	7.2
Free Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	-	< 1.0	< 1.0
Water Soluble Sulphate as SO4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	330	1600	-	270	1800
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.167	0.815	-	0.133	0.913
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	167	815	-	133	913
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	2.2	1.5	-	3.6	1.9
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	0.61	0.19	-	0.97	0.21
Acenaphthylene	mg/kg	0.05	MCERTS	0.16	0.13	-	0.23	0.09
Acenaphthene	mg/kg	0.05	MCERTS	0.83	0.18	-	0.24	0.08
Fluorene	mg/kg	0.05	MCERTS	1.1	0.2	-	0.28	0.1
Phenanthrene	mg/kg	0.05	MCERTS	4	2.6	-	3.4	1.2
Anthracene	mg/kg	0.05	MCERTS	0.97	0.56	-	1.1	0.38
Fluoranthene	mg/kg	0.05	MCERTS	6.8	5.9	-	7.2	3
Pyrene	mg/kg	0.05	MCERTS	5.5	4.9	-	6.2	2.7
Benzo(a)anthracene	mg/kg	0.05	MCERTS	3.3	3	-	3.7	1.7
Chrysene	mg/kg	0.05	MCERTS	3.1	2.8	-	4.1	1.6
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	3.9	3.6	-	5	2.2
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	1.1	1.6	-	1.8	1
Benzo(a)pyrene	mg/kg	0.05	MCERTS	3	3.1	-	3.6	1.8
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	1.3	1.5	-	1.8	0.9
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.36	0.39	-	0.52	0.24
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	1.4	1.5	-	1.9	0.93
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	37.4	32.2	-	42.1	18.1

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Lab Sample Number				2880189	2880190	2880191	2880192	2880193
Sample Reference				WS12	WS12	WS13	WS13	WS13
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.65	3.30	0.30	1.00	2.20
Date Sampled				09/11/2023	09/11/2023	09/11/2023	09/11/2023	09/11/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Heavy Metals / Metalloids								
Antimony (aqua regia extractable)	mg/kg	1	ISO 17025	-	-	-	-	-
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	31	21	-	59	30
Barium (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	-
Boron (water soluble)	mg/kg	0.2	MCERTS	1	1.7	-	1.7	1.4
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	-	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8	-	< 1.8	< 1.8
Chromium (III)	mg/kg	1	NONE	22	17	-	25	20
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	23	18	-	26	21
Copper (aqua regia extractable)	mg/kg	1	MCERTS	62	59	-	190	200
Lead (aqua regia extractable)	mg/kg	1	MCERTS	170	110	-	370	130
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	-	0.6	< 0.3
Molybdenum (aqua regia extractable)	mg/kg	0.25	MCERTS	-	-	-	-	-
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	34	29	-	68	94
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	1.7	-	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	160	170	-	180	87
Monoaromatics & Oxygenates								
Benzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Toluene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Ethylbenzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
p & m-xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
o-xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	NONE	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6 $_{HS\_1D\_AL}$	mg/kg	0.02	NONE	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
TPH-CWG - Aliphatic >EC6 - EC8 $_{HS\_1D\_AL}$	mg/kg	0.02	NONE	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
TPH-CWG - Aliphatic >EC8 - EC10 $_{HS\_1D\_AL}$	mg/kg	0.05	NONE	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
TPH-CWG - Aliphatic >EC10 - EC12 $_{EH\_CU\_1D\_AL}$	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16 $_{EH\_CU\_1D\_AL}$	mg/kg	2	MCERTS	4.1	< 2.0	< 2.0	3.4	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21 $_{EH\_CU\_1D\_AL}$	mg/kg	8	MCERTS	9.3	< 8.0	< 8.0	14	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35 $_{EH\_CU\_1D\_AL}$	mg/kg	8	MCERTS	21	< 8.0	83	190	68
TPH-CWG - Aliphatic >EC16 - EC35 $_{EH\_CU\_1D\_AL}$	mg/kg	10	MCERTS	31	< 10	83	200	68
TPH-CWG - Aliphatic > EC35 - EC44 $_{EH\_CU\_1D\_AL}$	mg/kg	8.4	NONE	< 8.4	< 8.4	72	100	30
TPH-CWG - Aliphatic (EC5 - EC35) $_{EH\_CU+HS\_1D\_AL}$	mg/kg	10	NONE	35	< 10	90	210	73
TPH-CWG - Aliphatic (EC5 - EC44) $_{EH\_CU+HS\_1D\_AL}$	mg/kg	10	NONE	40	< 10	160	310	100
TPH-CWG - Aromatic >EC5 - EC7 $_{HS\_1D\_AR}$	mg/kg	0.01	NONE	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPH-CWG - Aromatic >EC7 - EC8 $_{HS\_1D\_AR}$	mg/kg	0.01	NONE	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPH-CWG - Aromatic >EC8 - EC10 $_{HS\_1D\_AR}$	mg/kg	0.05	NONE	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
TPH-CWG - Aromatic >EC10 - EC12 $_{EH\_CU\_1D\_AR}$	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16 $_{EH\_CU\_1D\_AR}$	mg/kg	2	MCERTS	3.7	< 2.0	4.2	2	< 2.0
TPH-CWG - Aromatic >EC16 - EC21 $_{EH\_CU\_1D\_AR}$	mg/kg	10	MCERTS	16	< 10	56	13	< 10
TPH-CWG - Aromatic >EC21 - EC35 $_{EH\_CU\_1D\_AR}$	mg/kg	10	MCERTS	24	17	230	44	32
TPH-CWG - Aromatic > EC35 - EC44 $_{EH\_CU\_1D\_AR}$	mg/kg	8.4	NONE	50	< 8.4	120	37	23
TPH-CWG - Aromatic (EC5 - EC35) $_{EH\_CU+HS\_1D\_AR}$	mg/kg	10	NONE	44	25	290	59	36
TPH-CWG - Aromatic (EC5 - EC44) $_{EH\_CU+HS\_1D\_AR}$	mg/kg	10	NONE	94	26	410	96	59
TPH Total C5 - C44 $_{EH\_CU+HS\_1D\_TOTAL}$	mg/kg	10	NONE	130	26	580	400	160

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Lab Sample Number				2880189	2880190	2880191	2880192	2880193
Sample Reference				WS12	WS12	WS13	WS13	WS13
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.65	3.30	0.30	1.00	2.20
Date Sampled				09/11/2023	09/11/2023	09/11/2023	09/11/2023	09/11/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
VOCs								
Chloromethane	µg/kg	5	NONE	-	-	-	-	-
Chloroethane	µg/kg	5	NONE	-	-	-	-	-
Bromomethane	µg/kg	5	NONE	-	-	-	-	-
Vinyl Chloride	µg/kg	5	NONE	-	-	-	-	-
Trichlorofluoromethane	µg/kg	5	NONE	-	-	-	-	-
1,1-dichloroethene	µg/kg	5	NONE	-	-	-	-	-
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	5	NONE	-	-	-	-	-
Trans 1,2-dichloroethylene	µg/kg	5	NONE	-	-	-	-	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	NONE	-	-	-	-	-
1,1-dichloroethane	µg/kg	5	ISO 17025	-	-	-	-	-
2,2-Dichloropropane	µg/kg	5	ISO 17025	-	-	-	-	-
Chloroform	µg/kg	5	NONE	-	-	-	-	-
1,1,1-Trichloroethane	µg/kg	5	ISO 17025	-	-	-	-	-
1,2-dichloroethane	µg/kg	5	ISO 17025	-	-	-	-	-
1,1-Dichloropropene	µg/kg	5	NONE	-	-	-	-	-
Cis-1,2-dichloroethene	µg/kg	5	NONE	-	-	-	-	-
Benzene	µg/kg	5	MCERTS	-	-	-	-	-
Carbontetrachloride	µg/kg	5	NONE	-	-	-	-	-
1,2-dichloropropane	µg/kg	5	ISO 17025	-	-	-	-	-
Trichloroethene	µg/kg	5	ISO 17025	-	-	-	-	-
Dibromomethane	µg/kg	5	ISO 17025	-	-	-	-	-
Bromodichloromethane	µg/kg	5	ISO 17025	-	-	-	-	-
Cis-1,3-dichloropropene	µg/kg	5	ISO 17025	-	-	-	-	-
Trans-1,3-dichloropropene	µg/kg	5	ISO 17025	-	-	-	-	-
Toluene	µg/kg	5	MCERTS	-	-	-	-	-
1,1,2-Trichloroethane	µg/kg	5	ISO 17025	-	-	-	-	-
1,3-Dichloropropane	µg/kg	5	ISO 17025	-	-	-	-	-
Dibromochloromethane	µg/kg	5	ISO 17025	-	-	-	-	-
Tetrachloroethene	µg/kg	5	NONE	-	-	-	-	-
1,2-Dibromoethane	µg/kg	5	ISO 17025	-	-	-	-	-
Chlorobenzene	µg/kg	5	ISO 17025	-	-	-	-	-
1,1,1,2-Tetrachloroethane	µg/kg	5	ISO 17025	-	-	-	-	-
Ethylbenzene	µg/kg	5	MCERTS	-	-	-	-	-
p & m-xylene	µg/kg	5	MCERTS	-	-	-	-	-
Styrene	µg/kg	5	ISO 17025	-	-	-	-	-
Bromoform	µg/kg	5	NONE	-	-	-	-	-
o-xylene	µg/kg	5	MCERTS	-	-	-	-	-
Isopropylbenzene	µg/kg	5	ISO 17025	-	-	-	-	-
1,1,2,2-Tetrachloroethane	µg/kg	5	ISO 17025	-	-	-	-	-
Bromobenzene	µg/kg	5	NONE	-	-	-	-	-
N-Propylbenzene	µg/kg	5	ISO 17025	-	-	-	-	-
2-Chlorotoluene	µg/kg	5	ISO 17025	-	-	-	-	-
4-Chlorotoluene	µg/kg	5	ISO 17025	-	-	-	-	-
1,3,5-Trimethylbenzene	µg/kg	5	ISO 17025	-	-	-	-	-
Tert-Butylbenzene	µg/kg	5	ISO 17025	-	-	-	-	-
1,2,4-Trimethylbenzene	µg/kg	5	ISO 17025	-	-	-	-	-
Sec-Butylbenzene	µg/kg	5	ISO 17025	-	-	-	-	-
1,3-dichlorobenzene	µg/kg	5	ISO 17025	-	-	-	-	-
P-Isopropyltoluene	µg/kg	5	ISO 17025	-	-	-	-	-
1,4-dichlorobenzene	µg/kg	5	ISO 17025	-	-	-	-	-
1,2-dichlorobenzene	µg/kg	5	ISO 17025	-	-	-	-	-

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Lab Sample Number				2880189	2880190	2880191	2880192	2880193
Sample Reference				WS12	WS12	WS13	WS13	WS13
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.65	3.30	0.30	1.00	2.20
Date Sampled				09/11/2023	09/11/2023	09/11/2023	09/11/2023	09/11/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Butylbenzene	µg/kg	5	NONE	-	-	-	-	-
1,2-Dibromo-3-chloropropane	µg/kg	5	ISO 17025	-	-	-	-	-
1,2,4-Trichlorobenzene	µg/kg	5	ISO 17025	-	-	-	-	-
Hexachlorobutadiene	µg/kg	5	NONE	-	-	-	-	-
1,2,3-Trichlorobenzene	µg/kg	5	ISO 17025	-	-	-	-	-
SVOCs								
Aniline	mg/kg	0.1	NONE	-	-	-	-	-
Phenol	mg/kg	0.2	ISO 17025	-	-	-	-	-
2-Chlorophenol	mg/kg	0.1	MCERTS	-	-	-	-	-
Bis(2-chloroethyl)ether	mg/kg	0.2	MCERTS	-	-	-	-	-
1,3-Dichlorobenzene	mg/kg	0.2	MCERTS	-	-	-	-	-
1,2-Dichlorobenzene	mg/kg	0.1	MCERTS	-	-	-	-	-
1,4-Dichlorobenzene	mg/kg	0.2	MCERTS	-	-	-	-	-
Bis(2-chloroisopropyl)ether	mg/kg	0.1	MCERTS	-	-	-	-	-
2-Methylphenol	mg/kg	0.3	MCERTS	-	-	-	-	-
Hexachloroethane	mg/kg	0.05	ISO 17025	-	-	-	-	-
Nitrobenzene	mg/kg	0.3	MCERTS	-	-	-	-	-
4-Methylphenol	mg/kg	0.2	NONE	-	-	-	-	-
Isophorone	mg/kg	0.2	MCERTS	-	-	-	-	-
2-Nitrophenol	mg/kg	0.3	NONE	-	-	-	-	-
2,4-Dimethylphenol	mg/kg	0.3	MCERTS	-	-	-	-	-
Bis(2-chloroethoxy)methane	mg/kg	0.3	MCERTS	-	-	-	-	-
1,2,4-Trichlorobenzene	mg/kg	0.3	MCERTS	-	-	-	-	-
Naphthalene	mg/kg	0.05	MCERTS	-	-	-	-	-
2,4-Dichlorophenol	mg/kg	0.3	MCERTS	-	-	-	-	-
4-Chloroaniline	mg/kg	0.1	NONE	-	-	-	-	-
Hexachlorobutadiene	mg/kg	0.1	MCERTS	-	-	-	-	-
4-Chloro-3-methylphenol	mg/kg	0.1	NONE	-	-	-	-	-
2,4,6-Trichlorophenol	mg/kg	0.1	NONE	-	-	-	-	-
2,4,5-Trichlorophenol	mg/kg	0.2	NONE	-	-	-	-	-
2-Methylnaphthalene	mg/kg	0.1	NONE	-	-	-	-	-
2-Chloronaphthalene	mg/kg	0.1	MCERTS	-	-	-	-	-
Dimethylphthalate	mg/kg	0.1	MCERTS	-	-	-	-	-
2,6-Dinitrotoluene	mg/kg	0.1	NONE	-	-	-	-	-
Acenaphthylene	mg/kg	0.05	MCERTS	-	-	-	-	-
Acenaphthene	mg/kg	0.05	MCERTS	-	-	-	-	-
2,4-Dinitrotoluene	mg/kg	0.2	NONE	-	-	-	-	-
Dibenzofuran	mg/kg	0.2	MCERTS	-	-	-	-	-
4-Chlorophenyl phenyl ether	mg/kg	0.3	MCERTS	-	-	-	-	-
Diethyl phthalate	mg/kg	0.2	MCERTS	-	-	-	-	-
4-Nitroaniline	mg/kg	0.2	NONE	-	-	-	-	-
Fluorene	mg/kg	0.05	MCERTS	-	-	-	-	-
Azobenzene	mg/kg	0.3	NONE	-	-	-	-	-
Bromophenyl phenyl ether	mg/kg	0.2	MCERTS	-	-	-	-	-
Hexachlorobenzene	mg/kg	0.3	MCERTS	-	-	-	-	-
Phenanthrene	mg/kg	0.05	MCERTS	-	-	-	-	-
Anthracene	mg/kg	0.05	MCERTS	-	-	-	-	-
Carbazole	mg/kg	0.3	MCERTS	-	-	-	-	-
Dibutyl phthalate	mg/kg	0.2	NONE	-	-	-	-	-
Anthraquinone	mg/kg	0.3	NONE	-	-	-	-	-
Fluoranthene	mg/kg	0.05	MCERTS	-	-	-	-	-

Analytical Report Number: 23-69138
Project / Site name: Aldi Egremont
Your Order No: PO30056

Lab Sample Number				2880189	2880190	2880191	2880192	2880193
Sample Reference				WS12	WS12	WS13	WS13	WS13
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.65	3.30	0.30	1.00	2.20
Date Sampled				09/11/2023	09/11/2023	09/11/2023	09/11/2023	09/11/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Pyrene	mg/kg	0.05	MCERTS	-	-	-	-	-
Butyl benzyl phthalate	mg/kg	0.3	NONE	-	-	-	-	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	-	-	-	-
Chrysene	mg/kg	0.05	MCERTS	-	-	-	-	-
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	-	-	-	-	-
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	-	-	-	-	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	-	-	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	-	-	-	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	-	-	-	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	-	-	-	-

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number : 23-69138
Project / Site name: Aldi Egremont

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2880179	WS01	None Supplied	1	Brown sand with gravel.
2880180	WS01	None Supplied	1.9	Brown sand with gravel.
2880181	WS05	None Supplied	0.3	Brown sand with gravel and stones.
2880182	WS05	None Supplied	1.45	Brown clay with gravel.
2880183	SW06	None Supplied	0.3	Brown sandy clay with gravel.
2880184	WS07	None Supplied	0.9	Brown clay and sand with gravel and stones.
2880185	WS09	None Supplied	1.7	Brown sand with gravel and stones.
2880186	WS09	None Supplied	4.2	Brown clay and sand with gravel.
2880187	WS10	None Supplied	0.6	Brown sand with gravel and stones.
2880188	WS12	None Supplied	1	Brown sand with gravel and stones.
2880189	WS12	None Supplied	1.65	Brown clay and sand with gravel and vegetation.
2880190	WS12	None Supplied	3.3	Brown clay and sand with gravel.
2880191	WS13	None Supplied	0.3	Brown sand with gravel and stones.
2880192	WS13	None Supplied	1	Brown sand with gravel.
2880193	WS13	None Supplied	2.2	Brown sand with gravel and stones.

Analytical Report Number : 23-69138
Project / Site name: Aldi Egremont

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
Free cyanide in soil	Determination of free cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards. Refer to CoA for analyte specific accreditation.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds in soil by extraction in dichloromethane and hexane followed by GC-MS.Refer to CoA for analyte specific accreditation.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS. Individual components MCERTS accredited	In-house method based on USEPA8260. Refer to CoA for analyte specific accreditation	L073B-PL	W	MCERTS
TPH Chromatogram in Soil	TPH Chromatogram in Soil.	In-house method	L064-PL	D	NONE
Cr (III) in soil	In-house method by calculation from total Cr and Cr VI.	In-house method by calculation	L080-PL	W	NONE
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID. Refer to CoA for band specific accreditation.	In-house method with silica gel split/clean up.	L088/76-PL	D	MCERTS

Analytical Report Number : 23-69138
Project / Site name: Aldi Egremont

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
TPH in (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	D	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in NaOH and addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Sulphate, water soluble, in soil	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS

For method numbers ending in 'UK or A' analysis have been carried out in our laboratory in the United Kingdom (WATFORD).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
For method numbers ending in 'PL or B' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.
Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - understore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

- Data reported unaccredited due to quality control parameter failure associated with this result; other checks applied prior to reporting the data have been accepted. The result should be considered as being deviating and may be compromised

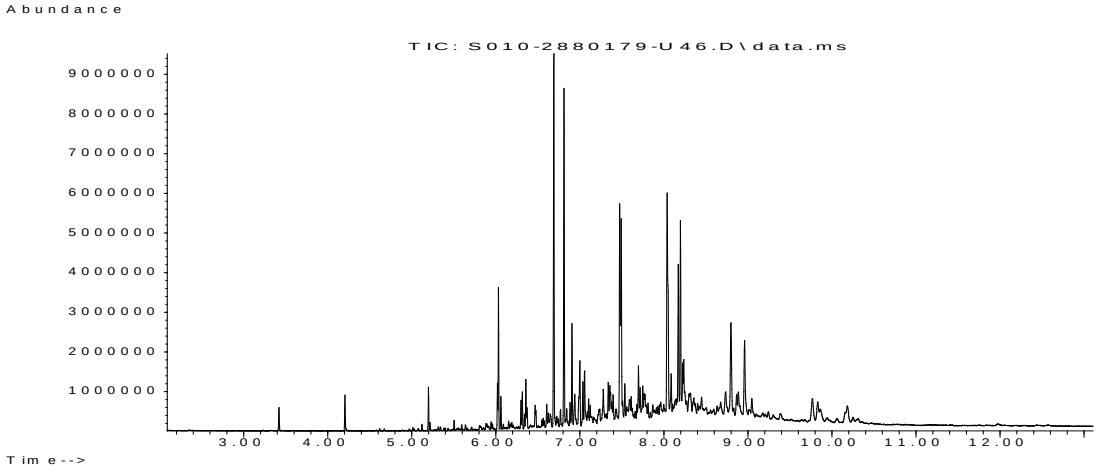
Sample Deviation Report

Analytical Report Number : 23-69138
Project / Site name: Aldi Egremont

This deviation report indicates the sample and test deviations that apply to the samples submitted for analysis.Please note that the associated result(s) may be unreliable and should be interpreted with care.

Key: a - No sampling date b - Incorrect container c - Holding time d - Headspace e - Temperature

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
SW06	None Supplied	S	2880183	c	Free cyanide in soil	L080-PL	c
WS01	None Supplied	S	2880179	c	Free cyanide in soil	L080-PL	c
WS05	None Supplied	S	2880181	c	Free cyanide in soil	L080-PL	c
WS05	None Supplied	S	2880182	c	Free cyanide in soil	L080-PL	c
WS07	None Supplied	S	2880184	c	Free cyanide in soil	L080-PL	c
WS09	None Supplied	S	2880185	c	Free cyanide in soil	L080-PL	c
WS09	None Supplied	S	2880186	c	Free cyanide in soil	L080-PL	c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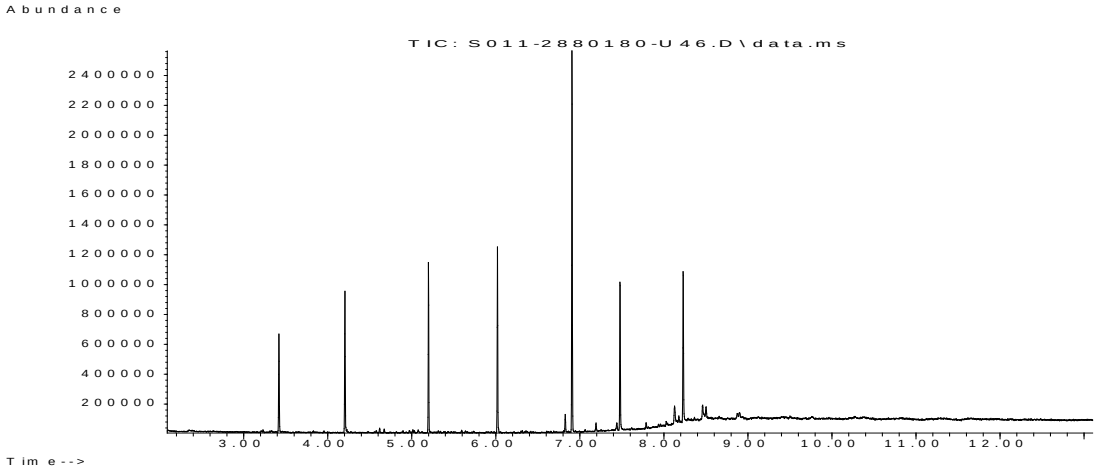
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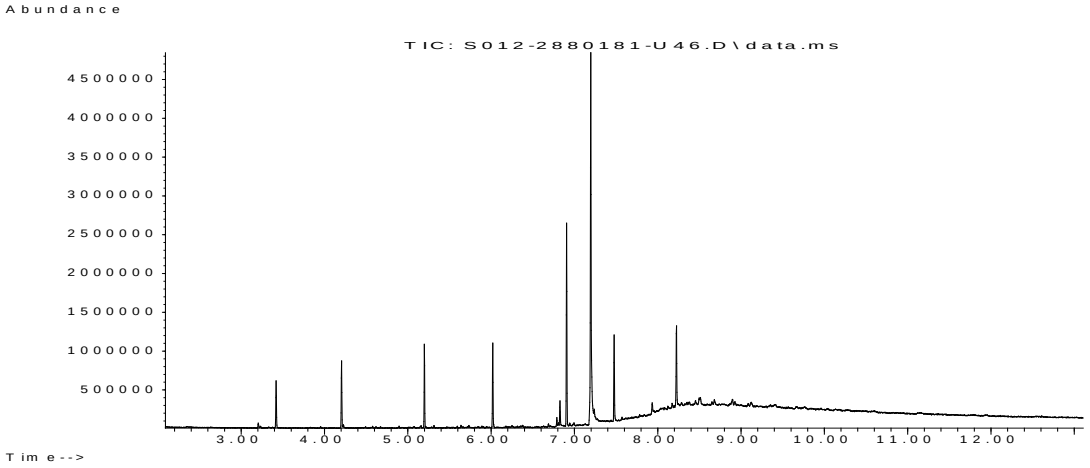
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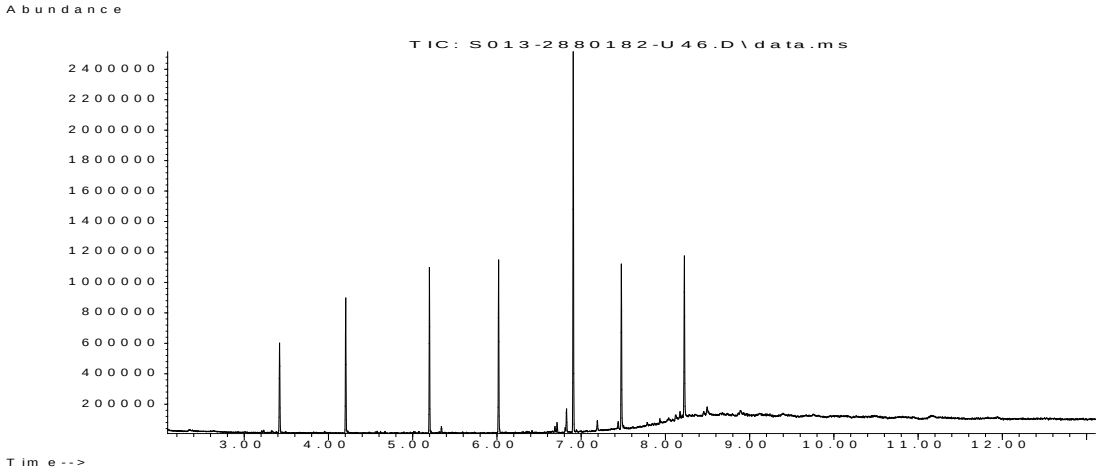
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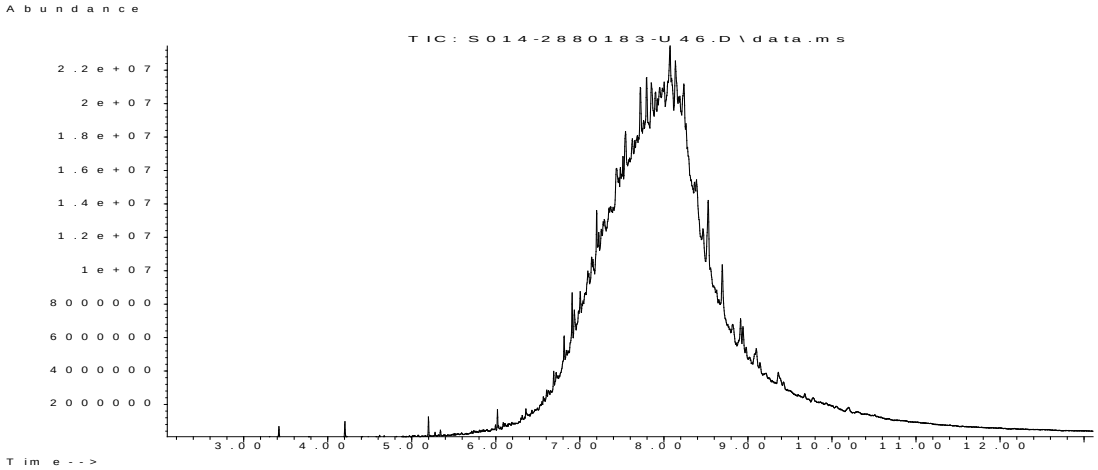
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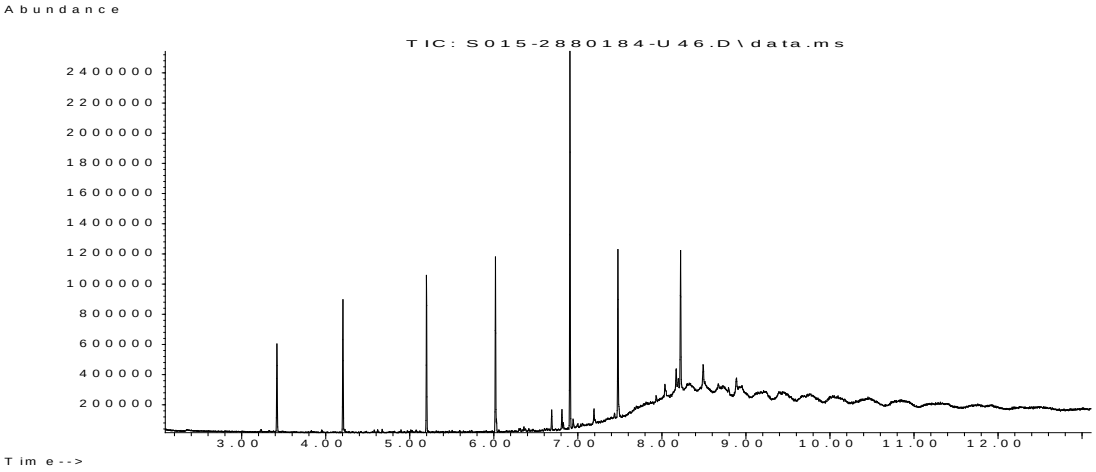
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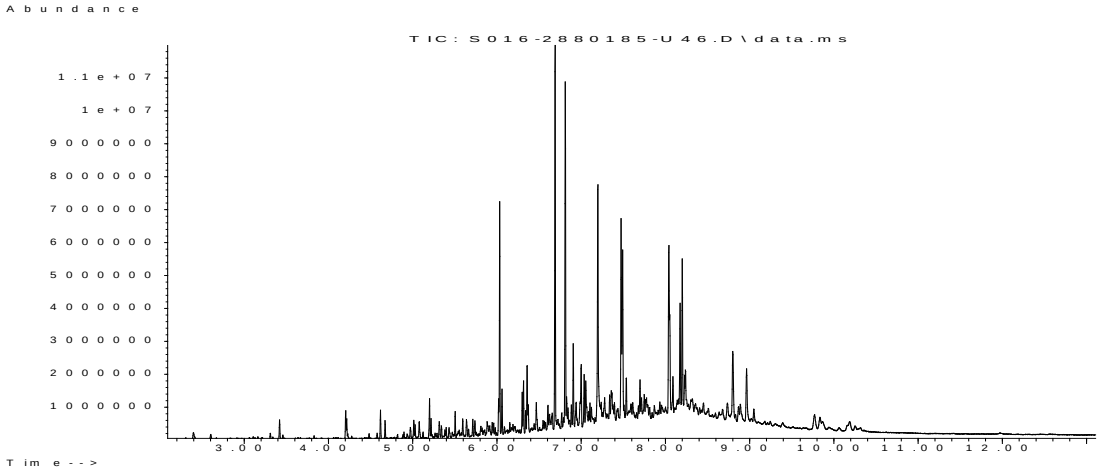
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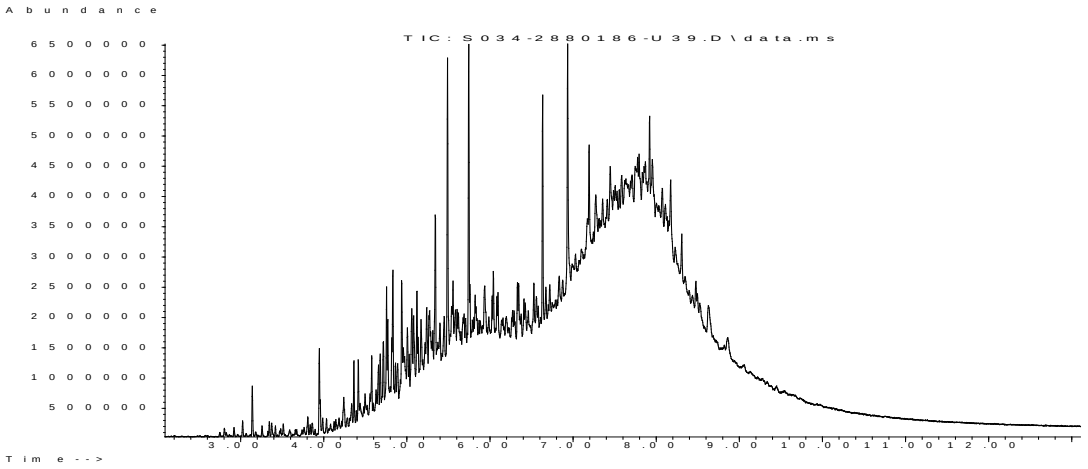
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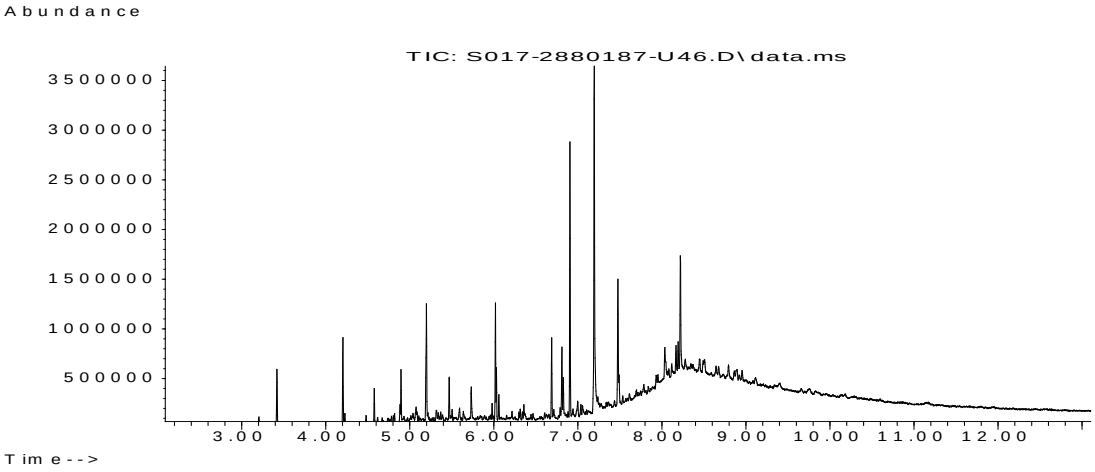
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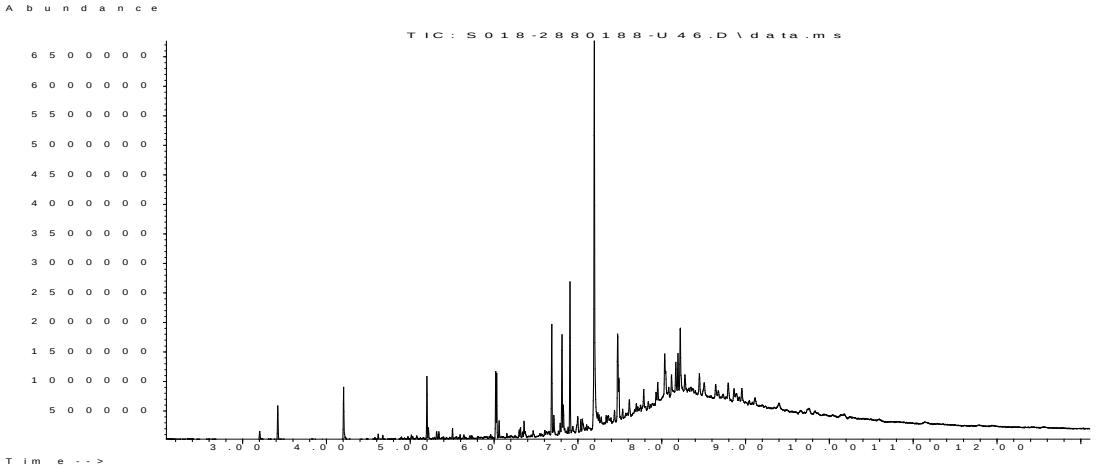
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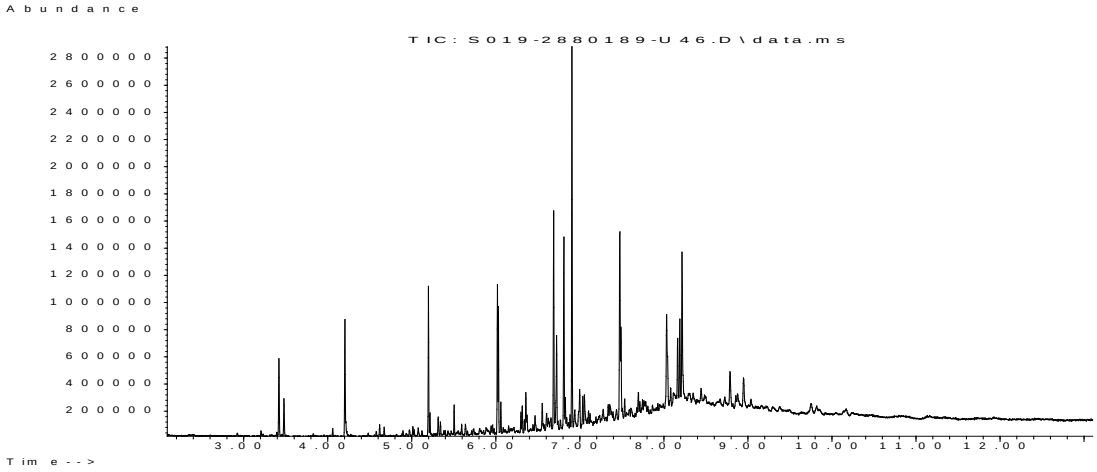
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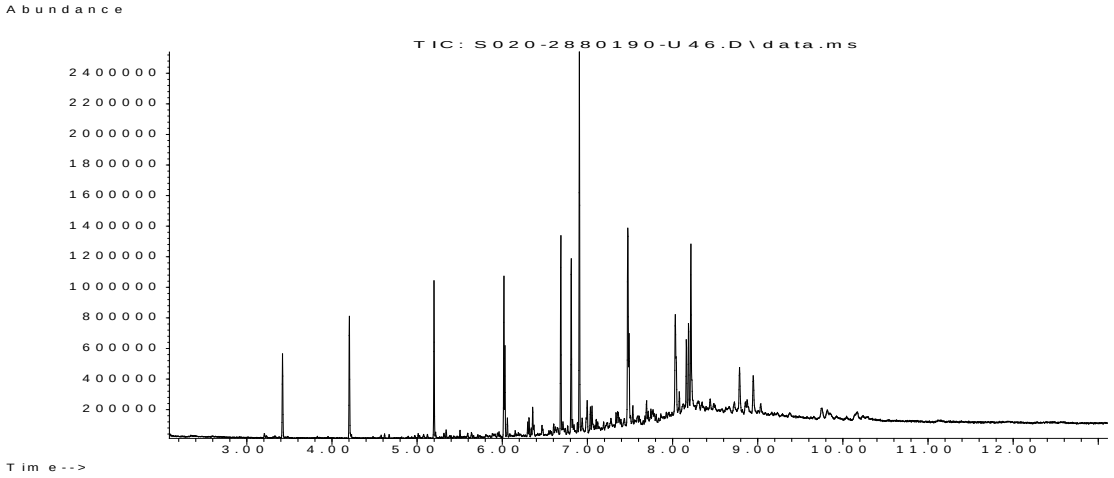
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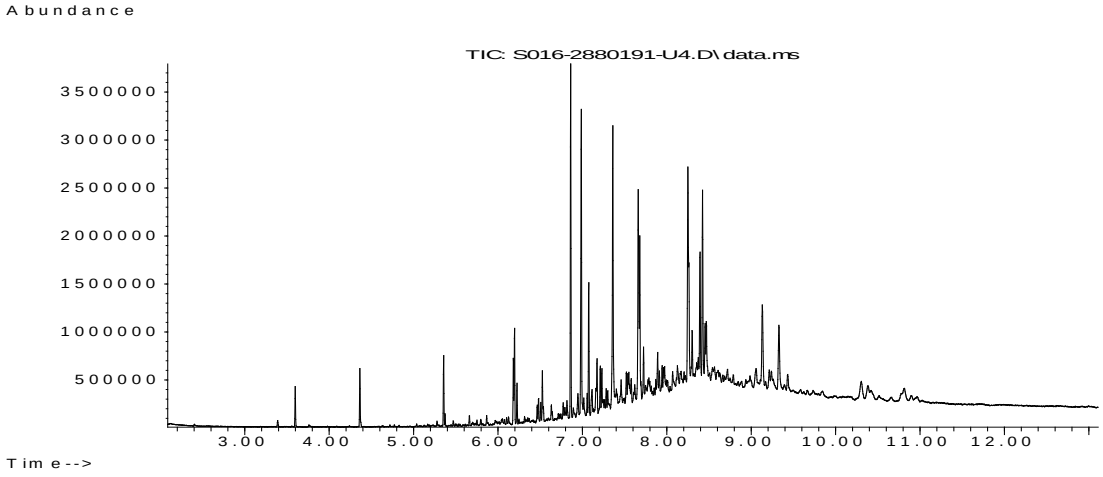
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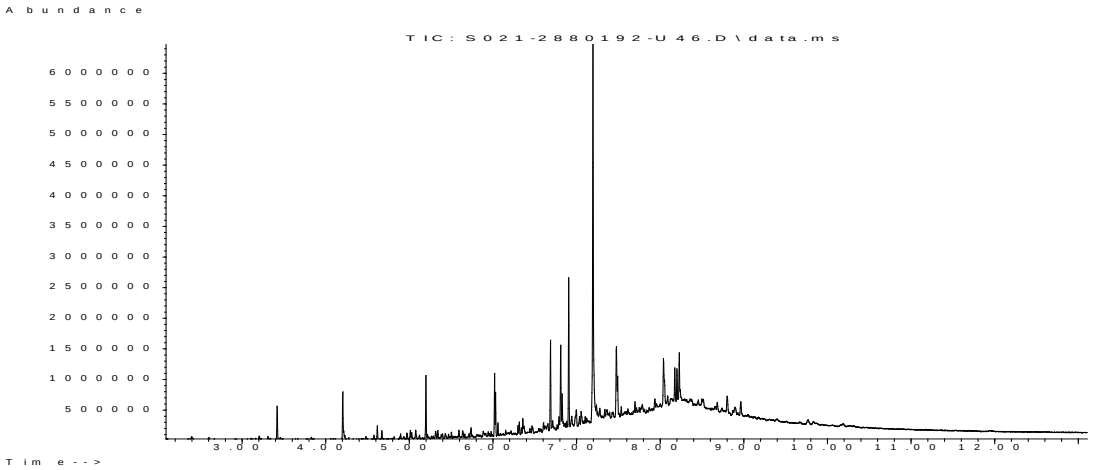
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7 Woodshots Meadow,
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Herts,
WD18 8YS

t: 01923 225404
f: 01923 237404
e: reception@i2analytical.com

Analytical Report Number : 23-73411

Project / Site name:	Aldi Egremont	**Samples received on:**	06/12/2023
Your job number:	29348 GNEW	**Samples instructed on/ Analysis started on:**	06/12/2023
Your order number:	PO30570	**Analysis completed by:**	14/12/2023
Report Issue Number:	1	**Report issued on:**	14/12/2023
Samples Analysed:	8 soil samples - 1 water sample		

Signed:

Dominika Liana
Junior Reporting Specialist
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41-711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

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Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 23-73411
Project / Site name: Aldi Egremont
Your Order No: PO30570

Lab Sample Number				2902570	2902571	2902572	2902573	2902574
Sample Reference				WS06	WS06	WS06	WS06	WS08
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.00	1.80	2.80	3.50	0.50
Date Sampled				04/12/2023	04/12/2023	04/12/2023	04/12/2023	04/12/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	61
Moisture Content	%	0.01	NONE	9.3	18	19	18	5
Total mass of sample received	kg	0.001	NONE	0.7	0.5	0.8	0.8	0.7
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	Chrysotile- Loose Fibres	-	-	-	-
Asbestos in Soil	Type	N/A	ISO 17025	Detected	-	-	-	-
Asbestos Analyst ID	N/A	N/A	N/A	DSO	N/A	N/A	N/A	N/A
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	8.5	-	-	-	10.2
Free Cyanide	mg/kg	1	MCERTS	< 1.0	-	-	-	< 1.0
Water Soluble Sulphate as SO4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	75	-	-	-	420
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.0375	-	-	-	0.21
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	37.5	-	-	-	210
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	0.7	-	-	-	0.4
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	-	-	-	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	-	-	-	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	0.13	-	-	-	0.24
Fluorene	mg/kg	0.05	MCERTS	0.12	-	-	-	0.2
Phenanthrene	mg/kg	0.05	MCERTS	0.2	-	-	-	1.2
Anthracene	mg/kg	0.05	MCERTS	< 0.05	-	-	-	0.36
Fluoranthene	mg/kg	0.05	MCERTS	0.32	-	-	-	5.1
Pyrene	mg/kg	0.05	MCERTS	0.32	-	-	-	5
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.2	-	-	-	3.1
Chrysene	mg/kg	0.05	MCERTS	0.2	-	-	-	2.4
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	0.26	-	-	-	2.9
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	0.18	-	-	-	1.5
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.22	-	-	-	2.5
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.12	-	-	-	1.1
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	-	-	-	0.36
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.15	-	-	-	1.1
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	2.42	-	-	-	27

Analytical Report Number: 23-73411
Project / Site name: Aldi Egremont
Your Order No: PO30570

Lab Sample Number				2902570	2902571	2902572	2902573	2902574
Sample Reference				WS06	WS06	WS06	WS06	WS08
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.00	1.80	2.80	3.50	0.50
Date Sampled				04/12/2023	04/12/2023	04/12/2023	04/12/2023	04/12/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	13	-	-	-	4.9
Boron (water soluble)	mg/kg	0.2	MCERTS	0.3	-	-	-	1.9
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	-	-	-	0.3
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	-	-	-	< 1.8
Chromium (III)	mg/kg	1	NONE	16	-	-	-	6.6
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	16	-	-	-	6.7
Copper (aqua regia extractable)	mg/kg	1	MCERTS	18	-	-	-	10
Lead (aqua regia extractable)	mg/kg	1	MCERTS	25	-	-	-	72
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	-	-	-	2.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	16	-	-	-	7
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	-	-	-	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	36	-	-	-	63
Monoaromatics & Oxygenates								
Benzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Toluene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Ethylbenzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
p & m-xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
o-xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	NONE	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6 $_{HS\_1D\_AL}$	mg/kg	0.02	NONE	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
TPH-CWG - Aliphatic >EC6 - EC8 $_{HS\_1D\_AL}$	mg/kg	0.02	NONE	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
TPH-CWG - Aliphatic >EC8 - EC10 $_{HS\_1D\_AL}$	mg/kg	0.05	NONE	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
TPH-CWG - Aliphatic >EC10 - EC12 $_{EH\_CU\_1D\_AL}$	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16 $_{EH\_CU\_1D\_AL}$	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21 $_{EH\_CU\_1D\_AL}$	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35 $_{EH\_CU\_1D\_AL}$	mg/kg	8	MCERTS	140	48	< 8.0	< 8.0	22
TPH-CWG - Aliphatic >EC16 - EC35 $_{EH\_CU\_1D\_AL}$	mg/kg	10	MCERTS	140	48	< 10	< 10	22
TPH-CWG - Aliphatic > EC35 - EC44 $_{EH\_CU\_1D\_AL}$	mg/kg	8.4	NONE	37	9.2	< 8.4	< 8.4	24
TPH-CWG - Aliphatic (EC5 - EC35) $_{EH\_CU+HS\_1D\_AL}$	mg/kg	10	NONE	150	51	< 10	< 10	25
TPH-CWG - Aliphatic (EC5 - EC44) $_{EH\_CU+HS\_1D\_AL}$	mg/kg	10	NONE	190	61	< 10	< 10	50
TPH-CWG - Aromatic >EC5 - EC7 $_{HS\_1D\_AR}$	mg/kg	0.01	NONE	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPH-CWG - Aromatic >EC7 - EC8 $_{HS\_1D\_AR}$	mg/kg	0.01	NONE	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPH-CWG - Aromatic >EC8 - EC10 $_{HS\_1D\_AR}$	mg/kg	0.05	NONE	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
TPH-CWG - Aromatic >EC10 - EC12 $_{EH\_CU\_1D\_AR}$	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	1.2
TPH-CWG - Aromatic >EC12 - EC16 $_{EH\_CU\_1D\_AR}$	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	4.4
TPH-CWG - Aromatic >EC16 - EC21 $_{EH\_CU\_1D\_AR}$	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	20
TPH-CWG - Aromatic >EC21 - EC35 $_{EH\_CU\_1D\_AR}$	mg/kg	10	MCERTS	50	25	< 10	< 10	65
TPH-CWG - Aromatic > EC35 - EC44 $_{EH\_CU\_1D\_AR}$	mg/kg	8.4	NONE	13	9.2	< 8.4	< 8.4	33
TPH-CWG - Aromatic (EC5 - EC35) $_{EH\_CU+HS\_1D\_AR}$	mg/kg	10	NONE	54	30	< 10	< 10	90
TPH-CWG - Aromatic (EC5 - EC44) $_{EH\_CU+HS\_1D\_AR}$	mg/kg	10	NONE	67	40	< 10	< 10	120
TPH Total C5 - C44 $_{EH\_CU+HS\_1D\_TOTAL}$	mg/kg	10	NONE	250	100	< 10	< 10	170

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number: 23-73411
Project / Site name: Aldi Egremont
Your Order No: PO30570

Lab Sample Number				2902575	2902576	2902577
Sample Reference				WS08	WS08	WS08
Sample Number				None Supplied	None Supplied	None Supplied
Depth (m)				1.10	2.00	3.50
Date Sampled				04/12/2023	04/12/2023	04/12/2023
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**			
Stone Content	%	0.1	NONE	85	35	< 0.1
Moisture Content	%	0.01	NONE	5.3	12	10
Total mass of sample received	kg	0.001	NONE	0.8	0.7	0.8
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	-	-
Asbestos Analyst ID	N/A	N/A	N/A	DSO	N/A	N/A
General Inorganics						
pH - Automated	pH Units	N/A	MCERTS	10.8	-	-
Free Cyanide	mg/kg	1	MCERTS	< 1.0	-	-
Water Soluble Sulphate as SO4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	300	-	-
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.149	-	-
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	149	-	-
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	0.5	-	-
Speciated PAHs						
Naphthalene	mg/kg	0.05	MCERTS	0.19	-	-
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	-	-
Acenaphthene	mg/kg	0.05	MCERTS	0.25	-	-
Fluorene	mg/kg	0.05	MCERTS	0.21	-	-
Phenanthrene	mg/kg	0.05	MCERTS	1.7	-	-
Anthracene	mg/kg	0.05	MCERTS	0.38	-	-
Fluoranthene	mg/kg	0.05	MCERTS	4.7	-	-
Pyrene	mg/kg	0.05	MCERTS	3.9	-	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	2.5	-	-
Chrysene	mg/kg	0.05	MCERTS	2.1	-	-
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	2.5	-	-
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	1	-	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	2	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.89	-	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.28	-	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.93	-	-
Total PAH						
Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	23.5	-	-

Analytical Report Number: 23-73411
Project / Site name: Aldi Egremont
Your Order No: PO30570

Lab Sample Number				2902575	2902576	2902577
Sample Reference				WS08	WS08	WS08
Sample Number				None Supplied	None Supplied	None Supplied
Depth (m)				1.10	2.00	3.50
Date Sampled				04/12/2023	04/12/2023	04/12/2023
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**			
Heavy Metals / Metalloids						
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	7	-	-
Boron (water soluble)	mg/kg	0.2	MCERTS	0.5	-	-
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	-	-
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	-	-
Chromium (III)	mg/kg	1	NONE	10	-	-
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	10	-	-
Copper (aqua regia extractable)	mg/kg	1	MCERTS	7	-	-
Lead (aqua regia extractable)	mg/kg	1	MCERTS	11	-	-
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.4	-	-
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	9.1	-	-
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	-	-
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	31	-	-
Monoaromatics & Oxygenates						
Benzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
Toluene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
Ethylbenzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
p & m-xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
o-xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	NONE	< 5.0	< 5.0	< 5.0
Petroleum Hydrocarbons						
TPH-CWG - Aliphatic >EC5 - EC6 $_{HS\_1D\_AL}$	mg/kg	0.02	NONE	< 0.020	< 0.020	< 0.020
TPH-CWG - Aliphatic >EC6 - EC8 $_{HS\_1D\_AL}$	mg/kg	0.02	NONE	< 0.020	< 0.020	< 0.020
TPH-CWG - Aliphatic >EC8 - EC10 $_{HS\_1D\_AL}$	mg/kg	0.05	NONE	< 0.050	< 0.050	< 0.050
TPH-CWG - Aliphatic >EC10 - EC12 $_{EH\_CU\_1D\_AL}$	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16 $_{EH\_CU\_1D\_AL}$	mg/kg	2	MCERTS	2.8	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21 $_{EH\_CU\_1D\_AL}$	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35 $_{EH\_CU\_1D\_AL}$	mg/kg	8	MCERTS	67	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC16 - EC35 $_{EH\_CU\_1D\_AL}$	mg/kg	10	MCERTS	67	< 10	< 10
TPH-CWG - Aliphatic > EC35 - EC44 $_{EH\_CU\_1D\_AL}$	mg/kg	8.4	NONE	60	< 8.4	< 8.4
TPH-CWG - Aliphatic (EC5 - EC35) $_{EH\_CU+HS\_1D\_AL}$	mg/kg	10	NONE	77	< 10	< 10
TPH-CWG - Aliphatic (EC5 - EC44) $_{EH\_CU+HS\_1D\_AL}$	mg/kg	10	NONE	140	< 10	< 10
TPH-CWG - Aromatic >EC5 - EC7 $_{HS\_1D\_AR}$	mg/kg	0.01	NONE	< 0.010	< 0.010	< 0.010
TPH-CWG - Aromatic >EC7 - EC8 $_{HS\_1D\_AR}$	mg/kg	0.01	NONE	< 0.010	< 0.010	< 0.010
TPH-CWG - Aromatic >EC8 - EC10 $_{HS\_1D\_AR}$	mg/kg	0.05	NONE	< 0.050	< 0.050	< 0.050
TPH-CWG - Aromatic >EC10 - EC12 $_{EH\_CU\_1D\_AR}$	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16 $_{EH\_CU\_1D\_AR}$	mg/kg	2	MCERTS	4.9	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21 $_{EH\_CU\_1D\_AR}$	mg/kg	10	MCERTS	25	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35 $_{EH\_CU\_1D\_AR}$	mg/kg	10	MCERTS	93	< 10	< 10
TPH-CWG - Aromatic > EC35 - EC44 $_{EH\_CU\_1D\_AR}$	mg/kg	8.4	NONE	52	< 8.4	< 8.4
TPH-CWG - Aromatic (EC5 - EC35) $_{EH\_CU+HS\_1D\_AR}$	mg/kg	10	NONE	120	< 10	< 10
TPH-CWG - Aromatic (EC5 - EC44) $_{EH\_CU+HS\_1D\_AR}$	mg/kg	10	NONE	170	< 10	< 10
TPH Total C5 - C44 $_{EH\_CU+HS\_1D\_TOTAL}$	mg/kg	10	NONE	310	< 10	< 10

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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Analytical Report Number: 23-73411
Project / Site name: Aldi Egremont

Your Order No: PO30570

Lab Sample Number				2902578
Sample Reference				WS07
Sample Number				None Supplied
Depth (m)				1.20
Date Sampled				04/12/2023
Time Taken				1430
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**Accreditation Status**	
General Inorganics				
pH (L099)	pH Units	N/A	ISO 17025	8.3
Total Cyanide (Low Level 1 µg/l)	µg/l	1	NONE	< 1.0
Sulphate as SO4	mg/l	0.045	ISO 17025	U/S**
Speciated PAHs				
Naphthalene	µg/l	0.01	ISO 17025	< 0.01
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01
Fluorene	µg/l	0.01	ISO 17025	< 0.01
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01
Anthracene	µg/l	0.01	ISO 17025	< 0.01
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01
Pyrene	µg/l	0.01	ISO 17025	< 0.01
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	< 0.01
Total PAH				
Total EPA-16 PAHs	µg/l	0.16	ISO 17025	< 0.16
Heavy Metals / Metalloids				
Arsenic (dissolved)	µg/l	1	ISO 17025	U/S**
Boron (dissolved)	µg/l	10	ISO 17025	U/S**
Cadmium (dissolved)	µg/l	0.08	ISO 17025	U/S**
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0
Chromium (III)	µg/l	5	NONE	U/S**
Chromium (dissolved)	µg/l	0.4	ISO 17025	U/S**
Copper (dissolved)	µg/l	0.7	ISO 17025	U/S**
Lead (dissolved)	µg/l	1	ISO 17025	U/S**
Mercury (dissolved)	µg/l	0.5	ISO 17025	U/S**
Nickel (dissolved)	µg/l	0.3	ISO 17025	U/S**
Selenium (dissolved)	µg/l	4	ISO 17025	U/S**
Zinc (dissolved)	µg/l	0.4	ISO 17025	U/S**
Monoaromatics & Oxygenates				
Benzene	µg/l	3	ISO 17025	< 3.0
Toluene	µg/l	3	ISO 17025	< 3.0
Ethylbenzene	µg/l	3	ISO 17025	< 3.0
p & m-xylene	µg/l	3	ISO 17025	< 3.0
o-xylene	µg/l	3	ISO 17025	< 3.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	3	ISO 17025	< 3.0
Sum of m, p & o-Xylene	µg/l	2	ISO 17025	< 2.0

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Analytical Report Number: 23-73411
Project / Site name: Aldi Egremont

Your Order No: PO30570

Lab Sample Number				2902578
Sample Reference				WS07
Sample Number				None Supplied
Depth (m)				1.20
Date Sampled				04/12/2023
Time Taken				1430
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**Accreditation Status**	
Petroleum Hydrocarbons				
TPH-CWG - Aliphatic >C5 - C6 $_{HS\_1D\_AL}$	µg/l	1	ISO 17025	< 1.0
TPH-CWG - Aliphatic >C6 - C8 $_{HS\_1D\_AL}$	µg/l	1	ISO 17025	< 1.0
TPH-CWG - Aliphatic >C8 - C10 $_{HS\_1D\_AL}$	µg/l	1	ISO 17025	< 1.0
TPH-CWG - Aliphatic >C10 - C12 $_{EH\_1D\_AL\_MS}$	µg/l	10	NONE	< 10
TPH-CWG - Aliphatic >C12 - C16 $_{EH\_1D\_AL\_MS}$	µg/l	10	NONE	51
TPH-CWG - Aliphatic >C16 - C21 $_{EH\_1D\_AL\_MS}$	µg/l	10	NONE	63
TPH-CWG - Aliphatic >C21 - C35 $_{EH\_1D\_AL\_MS}$	µg/l	10	NONE	75
TPH-CWG - Aliphatic >C16 - C35 $_{EH\_1D\_AL\_MS}$	µg/l	10	NONE	140
TPH-CWG - Aliphatic >C35 - C44 $_{EH\_1D\_AL\_MS}$	µg/l	10	NONE	< 10
TPH-CWG - Aliphatic (C5 - C35) $_{HS+EH\_1D\_AL\_MS}$	µg/l	10	NONE	190
TPH-CWG - Aliphatic (C5 - C44) $_{HS+EH\_1D\_AL\_MS}$	µg/l	10	NONE	190
TPH-CWG - Aromatic >C5 - C7 $_{HS\_1D\_AR}$	µg/l	1	ISO 17025	< 1.0
TPH-CWG - Aromatic >C7 - C8 $_{HS\_1D\_AR}$	µg/l	1	ISO 17025	< 1.0
TPH-CWG - Aromatic >C8 - C10 $_{HS\_1D\_AR}$	µg/l	1	ISO 17025	< 1.0
TPH-CWG - Aromatic >C10 - C12 $_{EH\_1D\_AR\_MS}$	µg/l	10	NONE	< 10
TPH-CWG - Aromatic >C12 - C16 $_{EH\_1D\_AR\_MS}$	µg/l	10	NONE	< 10
TPH-CWG - Aromatic >C16 - C21 $_{EH\_1D\_AR\_MS}$	µg/l	10	NONE	< 10
TPH-CWG - Aromatic >C21 - C35 $_{EH\_1D\_AR\_MS}$	µg/l	10	NONE	< 10
TPH-CWG - Aromatic >C35 - C44 $_{EH\_1D\_AR\_MS}$	µg/l	10	NONE	< 10
TPH-CWG - Aromatic (C5 - C35) $_{HS+EH\_1D\_AR\_MS}$	µg/l	10	NONE	< 10
TPH-CWG - Aromatic (C5 - C44) $_{HS+EH\_1D\_AR\_MS}$	µg/l	10	NONE	< 10
TPH-CWG Total C5 - C44 $_{EH+HS\_1D\_TOTAL\_MS}$	µg/l	10	NONE	190

UKAS TESTING
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Analytical i2 Environmental Science

Analytical Report Number: 23-73411
Project / Site name: Aldi Egremont

Your Order No: PO30570

Lab Sample Number	2902578
Sample Reference	WS07
Sample Number	None Supplied
Depth (m)	1.20
Date Sampled	04/12/2023
Time Taken	1430

Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status	
VOCs				
Chloromethane	µg/l	3	ISO 17025	< 3.0
Chloroethane	µg/l	3	ISO 17025	< 3.0
Bromomethane	µg/l	3	ISO 17025	< 3.0
Vinyl Chloride	µg/l	3	NONE	< 3.0
Trichlorofluoromethane	µg/l	3	NONE	< 3.0
1,1-Dichloroethene	µg/l	3	ISO 17025	< 3.0
1,1,2-Trichloro-1,2,2-trifluoroethane	µg/l	3	ISO 17025	< 3.0
Trans 1,2-dichloroethylene	µg/l	3	ISO 17025	< 3.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	3	ISO 17025	< 3.0
1,1-Dichloroethane	µg/l	3	ISO 17025	< 3.0
2,2-Dichloropropane##	µg/l	3	ISO 17025	< 3.0
Chloroform	µg/l	3	ISO 17025	< 3.0
1,1,1-Trichloroethane	µg/l	3	ISO 17025	< 3.0
1,2-Dichloroethane	µg/l	3	ISO 17025	< 3.0
1,1-Dichloropropene	µg/l	3	ISO 17025	< 3.0
Cis-1,2-dichloroethene	µg/l	3	ISO 17025	< 3.0
Benzene	µg/l	3	ISO 17025	< 3.0
Carbontetrachloride	µg/l	3	ISO 17025	< 3.0
1,2-Dichloropropane	µg/l	3	ISO 17025	< 3.0
Trichloroethene	µg/l	3	ISO 17025	< 3.0
Dibromomethane	µg/l	3	ISO 17025	< 3.0
Bromodichloromethane	µg/l	3	ISO 17025	< 3.0
Cis-1,3-dichloropropene	µg/l	3	ISO 17025	< 3.0
Trans-1,3-dichloropropene	µg/l	3	ISO 17025	< 3.0
Toluene	µg/l	3	ISO 17025	< 3.0
1,1,2-Trichloroethane	µg/l	3	ISO 17025	< 3.0
1,3-Dichloropropane	µg/l	3	ISO 17025	< 3.0
Dibromochloromethane	µg/l	3	ISO 17025	< 3.0
Tetrachloroethene	µg/l	3	ISO 17025	< 3.0
1,2-Dibromoethane	µg/l	3	ISO 17025	< 3.0
Chlorobenzene	µg/l	3	ISO 17025	< 3.0
1,1,1,2-Tetrachloroethane	µg/l	3	ISO 17025	< 3.0
Ethylbenzene	µg/l	3	ISO 17025	< 3.0
p & m-Xylene	µg/l	3	ISO 17025	< 3.0
Styrene	µg/l	3	ISO 17025	< 3.0
Bromoform	µg/l	3	ISO 17025	< 3.0
o-Xylene	µg/l	3	ISO 17025	< 3.0
Isopropylbenzene	µg/l	3	ISO 17025	< 3.0
1,1,2,2-Tetrachloroethane	µg/l	3	ISO 17025	< 3.0
Bromobenzene	µg/l	3	ISO 17025	< 3.0
n-Propylbenzene	µg/l	3	ISO 17025	< 3.0
2-Chlorotoluene	µg/l	3	ISO 17025	< 3.0
4-Chlorotoluene	µg/l	3	ISO 17025	< 3.0
1,3,5-Trimethylbenzene	µg/l	3	ISO 17025	< 3.0
tert-Butylbenzene	µg/l	3	ISO 17025	< 3.0
1,2,4-Trimethylbenzene	µg/l	3	ISO 17025	< 3.0
sec-Butylbenzene	µg/l	3	ISO 17025	< 3.0
1,3-Dichlorobenzene	µg/l	3	ISO 17025	< 3.0
p-Isopropyltoluene	µg/l	3	ISO 17025	< 3.0
1,4-Dichlorobenzene	µg/l	3	ISO 17025	< 3.0
1,2-Dichlorobenzene	µg/l	3	ISO 17025	< 3.0

Analytical Report Number: 23-73411
Project / Site name: Aldi Egremont

Your Order No: PO30570

Lab Sample Number				2902578
Sample Reference				WS07
Sample Number				None Supplied
Depth (m)				1.20
Date Sampled				04/12/2023
Time Taken				1430
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**Accreditation Status**	
Butylbenzene	µg/l	3	ISO 17025	< 3.0
1,2-Dibromo-3-chloropropane	µg/l	3	ISO 17025	< 3.0
1,2,4-Trichlorobenzene	µg/l	3	ISO 17025	< 3.0
Hexachlorobutadiene	µg/l	3	ISO 17025	< 3.0
1,2,3-Trichlorobenzene	µg/l	3	ISO 17025	< 3.0
Dichloromethane	µg/l	3	NONE	< 3.0
Dichlorodifluoromethane	µg/l	3	NONE	< 3.0
Total Trihalomethanes	µg/l	4	NONE	< 4.0
Total Trichlorobenzenes	ug/l	3	NONE	< 3.0
Total Dichlorobenzenes	ug/l	3	NONE	< 3.0
Trichloroethylene (TCE) + Tetrachloroethylene (PCE)	ug/l	2	NONE	< 2.0
Total 1,2-Dichloroethene	ug/l	2	NONE	< 2.0
Total 1,3-Dichloropropane	ug/l	2	NONE	< 2.0
Tetrachloroethane	ug/l	2	NONE	< 2.0

SVOCs

Aniline	µg/l	0.05	NONE	< 0.05
Phenol	µg/l	0.05	NONE	< 0.05
2-Chlorophenol	µg/l	0.05	NONE	< 0.05
Bis(2-chloroethyl)ether	µg/l	0.05	NONE	< 0.05
1,3-Dichlorobenzene	µg/l	0.05	NONE	< 0.05
1,2-Dichlorobenzene	µg/l	0.05	NONE	< 0.05
1,4-Dichlorobenzene	µg/l	0.05	NONE	< 0.05
Bis(2-chloroisopropyl)ether	µg/l	0.05	NONE	< 0.05
2-Methylphenol	µg/l	0.05	NONE	< 0.05
Hexachloroethane	µg/l	0.05	NONE	< 0.05
Nitrobenzene	µg/l	0.05	NONE	< 0.05
4-Methylphenol	µg/l	0.05	NONE	< 0.05
Isophorone	µg/l	0.05	NONE	< 0.05
2-Nitrophenol	µg/l	0.05	NONE	< 0.05
2,4-Dimethylphenol	µg/l	0.05	NONE	< 0.05
Bis(2-chloroethoxy)methane	µg/l	0.05	NONE	< 0.05
1,2,4-Trichlorobenzene	µg/l	0.05	NONE	< 0.05
Naphthalene	µg/l	0.01	ISO 17025	< 0.01
2,4-Dichlorophenol	µg/l	0.05	NONE	< 0.05
4-Chloroaniline	µg/l	0.05	NONE	< 0.05
Hexachlorobutadiene	µg/l	0.05	NONE	< 0.05
4-Chloro-3-methylphenol	µg/l	0.05	NONE	< 0.05
2,4,6-Trichlorophenol	µg/l	0.05	NONE	< 0.05
2,4,5-Trichlorophenol	µg/l	0.05	NONE	< 0.05
2-Methylnaphthalene	µg/l	0.05	NONE	< 0.05
2-Chloronaphthalene	µg/l	0.05	NONE	< 0.05
Dimethylphthalate	µg/l	0.05	NONE	< 0.05
2,6-Dinitrotoluene	µg/l	0.05	NONE	< 0.05
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01
2,4-Dinitrotoluene	µg/l	0.05	NONE	< 0.05
Dibenzofuran	µg/l	0.05	NONE	< 0.05
4-Chlorophenyl phenyl ether	µg/l	0.05	NONE	< 0.05
Diethyl phthalate	µg/l	0.05	NONE	< 0.05
4-Nitroaniline	µg/l	0.05	NONE	< 0.05

4041

Analytical Report Number: 23-73411
Project / Site name: Aldi Egremont

Your Order No: PO30570

Lab Sample Number				2902578
Sample Reference				WS07
Sample Number				None Supplied
Depth (m)				1.20
Date Sampled				04/12/2023
Time Taken				1430
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**Accreditation Status**	
Fluorene	µg/l	0.01	ISO 17025	< 0.01
Azobenzene	µg/l	0.05	NONE	< 0.05
Bromophenyl phenyl ether	µg/l	0.05	NONE	< 0.05
Hexachlorobenzene	µg/l	0.05	NONE	< 0.05
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01
Anthracene	µg/l	0.01	ISO 17025	< 0.01
Carbazole	µg/l	0.05	NONE	< 0.05
Dibutyl phthalate	µg/l	0.05	NONE	< 0.05
Anthraquinone	µg/l	0.05	NONE	< 0.05
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01
Pyrene	µg/l	0.01	ISO 17025	< 0.01
Butyl benzyl phthalate	µg/l	0.05	NONE	< 0.05
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	< 0.01

3&4-Methylphenol	µg/l	0.1	NONE	< 0.10

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number : 23-73411
Project / Site name: Aldi Egremont

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2902570	WS06	None Supplied	1	Brown clay and sand with gravel and glass.
2902571	WS06	None Supplied	1.8	Brown clay and sand with gravel.
2902572	WS06	None Supplied	2.8	Brown clay and sand with gravel.
2902573	WS06	None Supplied	3.5	Brown clay and sand with gravel.
2902574	WS08	None Supplied	0.5	Brown clay and sand with gravel and stones.
2902575	WS08	None Supplied	1.1	Brown clay and sand with gravel and stones.
2902576	WS08	None Supplied	2	Brown clay and sand with gravel and stones.
2902577	WS08	None Supplied	3.5	Brown clay and sand with gravel.

Analytical Report Number : 23-73411
Project / Site name: Aldi Egremont

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Metals in water by ICP-OES (dissolved)	Determination of metals in water by acidification followed by ICP-OES. Accredited Matrices SW, GW, PW, PrW.(Al, Cu,Fe,Zn).	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Metals in water by ICP-MS (dissolved)	Determination of metals in water by acidification followed by ICP-MS. Accredited Matrices: SW, GW, PW except B=SW,GW, Hg=SW,PW, Al=SW,PW.	In-house method based on USEPA Method 6020 & 200.8 "for the determination of trace elements in water by ICP-MS.	L012-PL	W	ISO 17025
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron in water	Determination of boron in water by acidification followed by ICP-OES. Accredited matrices: SW PW GW	In-house method based on MEWAM	L039-PL	W	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
Hexavalent chromium in water	Determination of hexavalent chromium in water by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method by continuous flow analyser. Accredited Matrices SW, GW, PW.	L080-PL	W	ISO 17025
Free cyanide in soil	Determination of free cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards. Refer to CoA for analyte specific accreditation.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Speciated EPA-16 PAHs in water	Determination of PAH compounds in water by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards. Accredited matrices: SW PW GW	In-house method based on USEPA 8270	L102B-PL	W	ISO 17025
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Sulphate in water	Determination of sulphate in water after filtration by acidification followed by ICP-OES. Accredited Matrices SW, GW, PW.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Semi-volatile organic compounds in water	Determination of semi-volatile organic compounds in leachate by extraction in dichloromethane followed by GC-MS.	In-house method based on USEPA 8270	L102B-PL	W	ISO 17025

Analytical Report Number : 23-73411
Project / Site name: Aldi Egremont

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
TPHCWG (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS, speciation by interpretation.	In-house method	L070-PL	W	ISO 17025
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
Volatile organic compounds in water	Determination of volatile organic compounds in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260	L073B-PL	W	ISO 17025
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS. Individual components MCERTS accredited	In-house method based on USEPA8260. Refer to CoA for analyte specific accreditation	L073B-PL	W	MCERTS
BTEX and MTBE in water (Monoaromatics)	Determination of BTEX and MTBE in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260. Refer to CoA for analyte specific accreditation	L073B-PL	W	ISO 17025
TPH in (Water)	Determination of TPH bands by HS-GC-MS/GC-MS	In-house method, TPH with carbon banding.	L070-PL	W	NONE
TPH Chromatogram in Soil	TPH Chromatogram in Soil.	In-house method	L064-PL	D	NONE
TPH Chromatogram in Water	TPH Chromatogram in Water.	In-house method	L070-PL	W	NONE
Volatile organic compounds in water extended	Determination of volatile organic compounds in water by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	NONE
Cr (III) in water		In-house method by calculation	L080-PL		NONE
Cr (III) in soil	In-house method by calculation from total Cr and Cr VI.	In-house method by calculation	L080-PL	W	NONE
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID. Refer to CoA for band specific accreditation.	In-house method with silica gel split/clean up.	L088/76-PL	D	MCERTS
TPH in (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	D	MCERTS
Low level total cyanide in water	Determination of total cyanide by distillation followed by colorimetry. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	NONE
pH at 20oC in water (automated)	Determination of pH in water by electrometric measurement. Accredited matrices: SW PW GW	In house method.	L099-PL	W	ISO 17025
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in NaOH and addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS

Analytical Report Number : 23-73411
Project / Site name: Aldi Egremont

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Sulphate, water soluble, in soil	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS

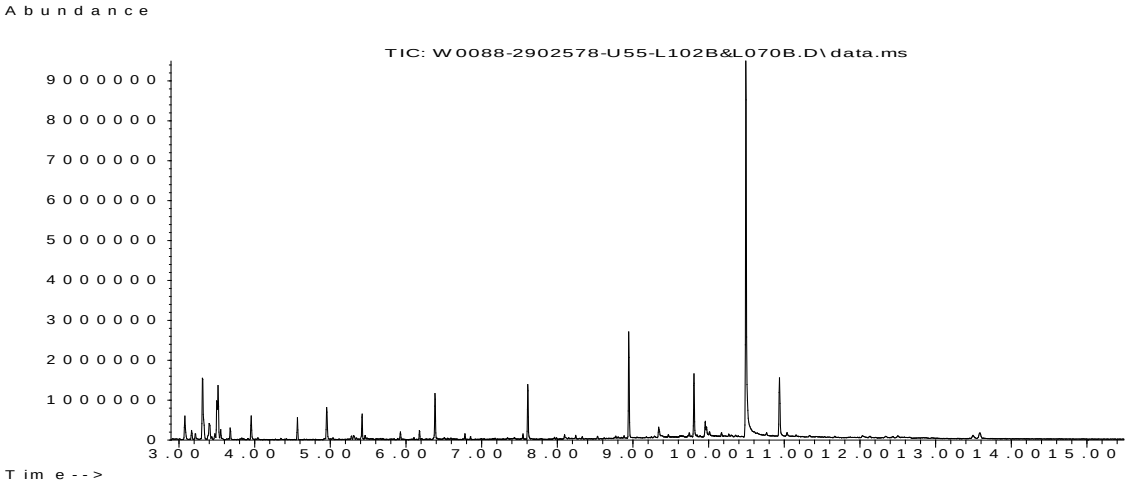
For method numbers ending in 'UK or A' analysis have been carried out in our laboratory in the United Kingdom (WATFORD).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
For method numbers ending in 'PL or B' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.
Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - understore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

- Quality control parameter has a high recovery (outside of limit); however the associated result is below the reporting limit, other checks applied prior to reporting the data have been accepted. The result should be considered as being deviating and may be compromised
** - Unsuitable for analysis due to sample matrix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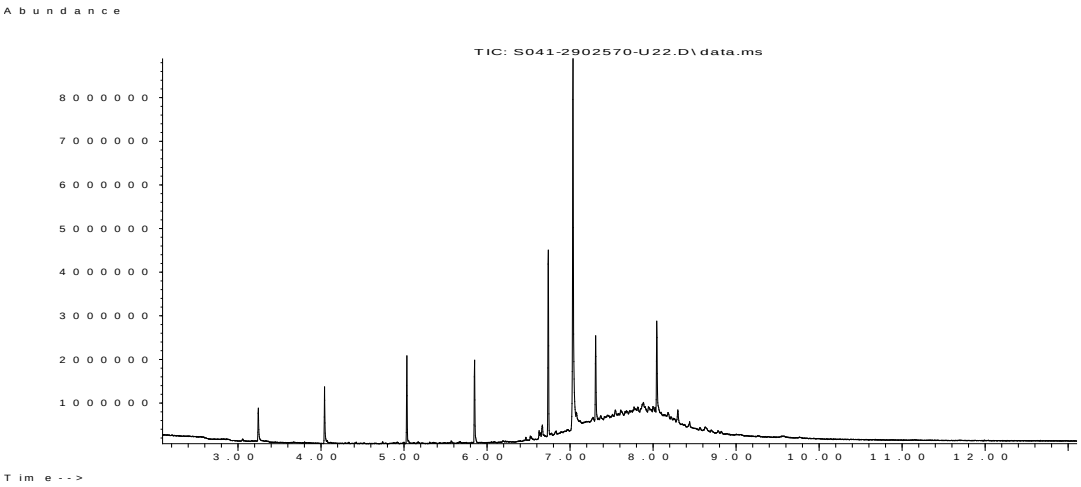
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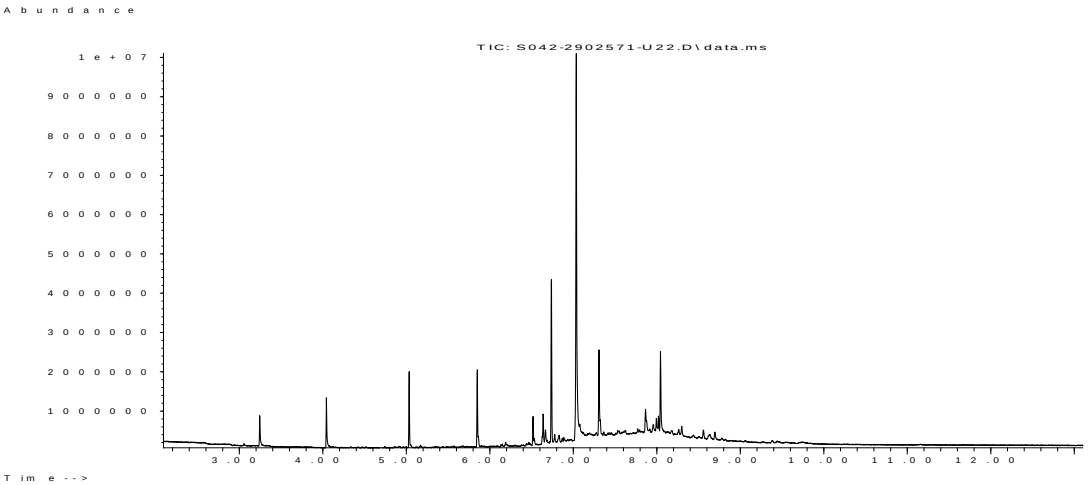
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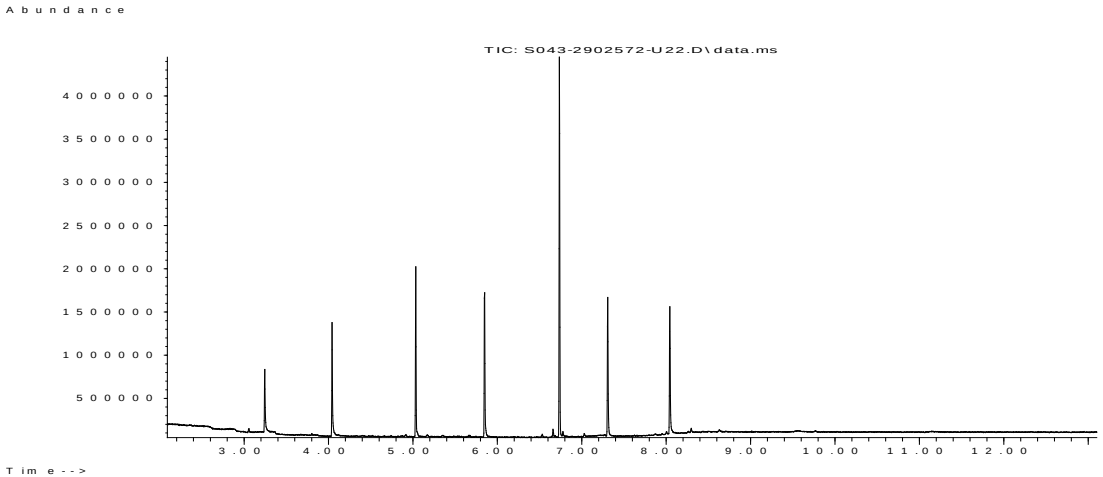
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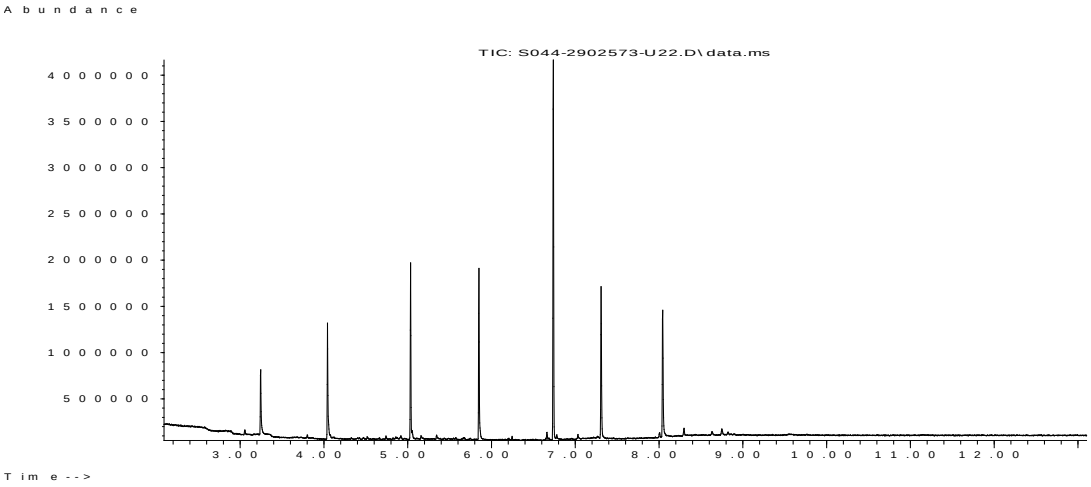
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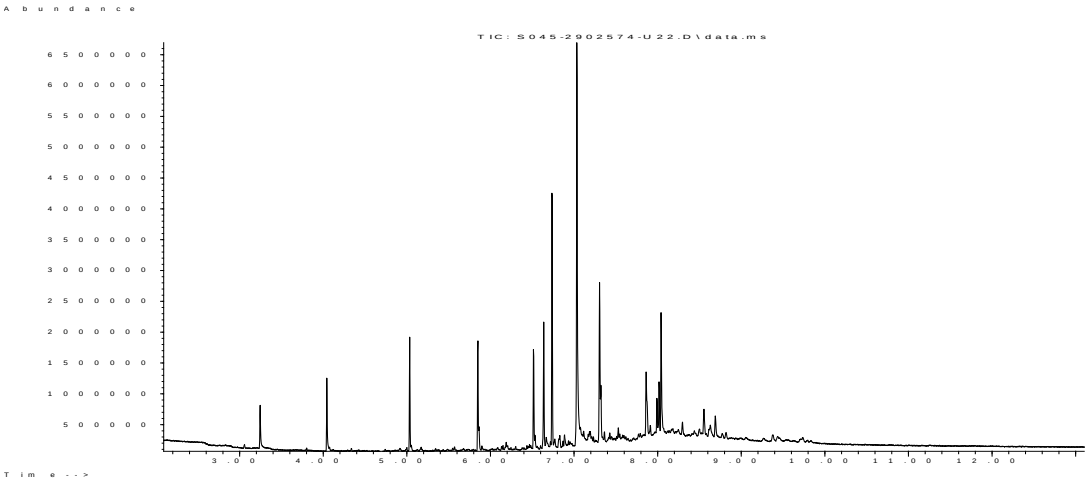
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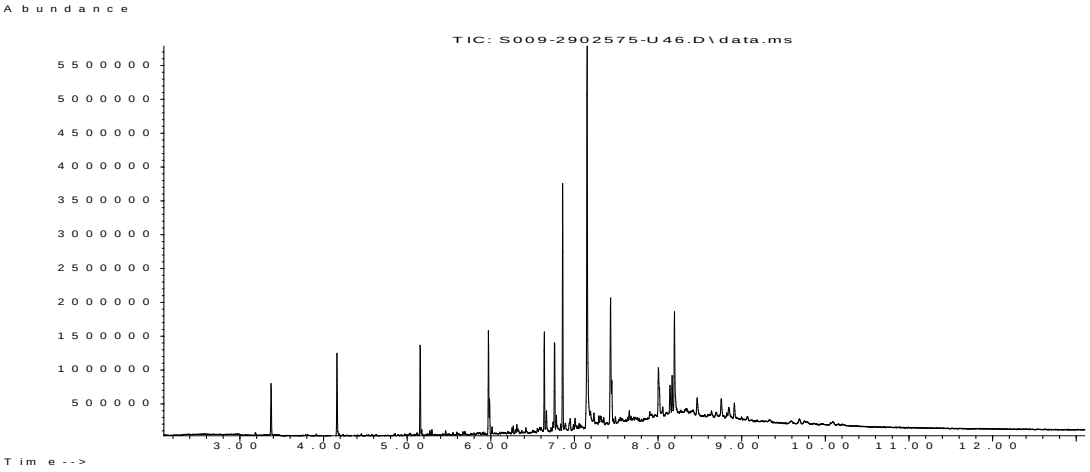
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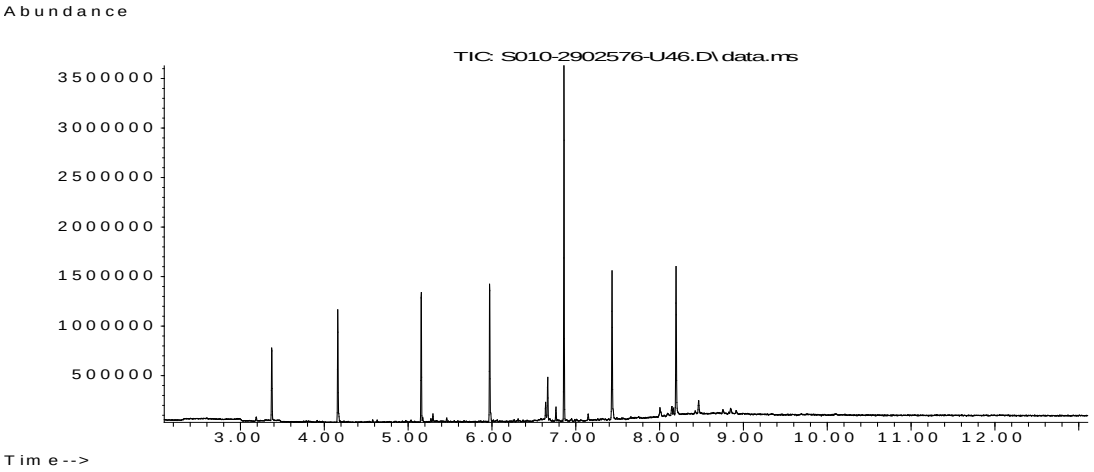
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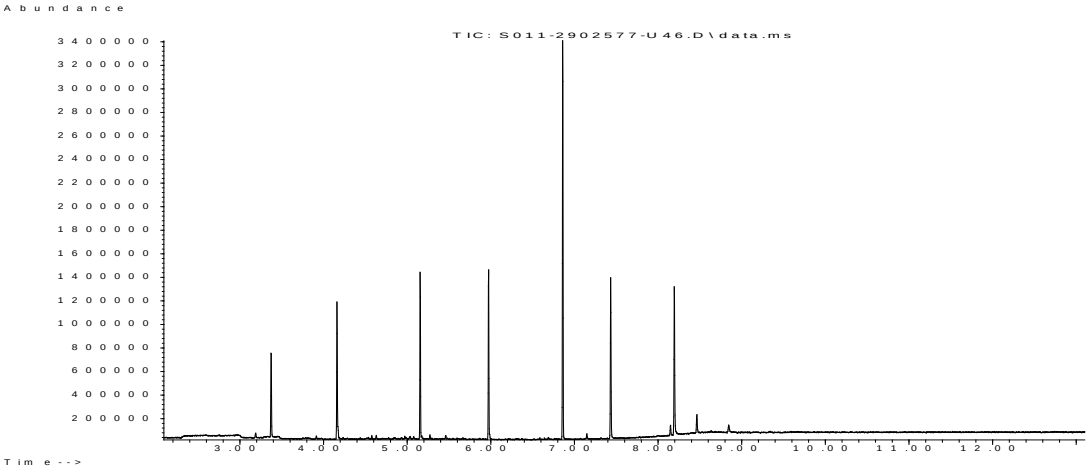
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Time -->

Analytical Report Number : 23-73411
Project / Site name: Aldi Egremont

This deviation report indicates the sample and test deviations that apply to the samples submitted for analysis.Please note that the associated result(s) may be unreliable and should be interpreted with care.

Key: a - No sampling date b - Incorrect container c - Holding time d - Headspace e - Temperature

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
WS06	None Supplied	S	2902570	b	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
WS06	None Supplied	S	2902570	b	TPHCWG (Soil)	L088/76-PL	b
WS06	None Supplied	S	2902571	b	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
WS06	None Supplied	S	2902571	b	TPHCWG (Soil)	L088/76-PL	b
WS06	None Supplied	S	2902572	b	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
WS06	None Supplied	S	2902572	b	TPHCWG (Soil)	L088/76-PL	b
WS06	None Supplied	S	2902573	b	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
WS06	None Supplied	S	2902573	b	TPHCWG (Soil)	L088/76-PL	b
WS08	None Supplied	S	2902574	b	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
WS08	None Supplied	S	2902574	b	TPHCWG (Soil)	L088/76-PL	b
WS08	None Supplied	S	2902575	b	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
WS08	None Supplied	S	2902575	b	TPHCWG (Soil)	L088/76-PL	b
WS08	None Supplied	S	2902576	b	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
WS08	None Supplied	S	2902576	b	TPHCWG (Soil)	L088/76-PL	b
WS08	None Supplied	S	2902577	b	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
WS08	None Supplied	S	2902577	b	TPHCWG (Soil)	L088/76-PL	b

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Analytical Report Number : 23-69143

Project / Site name:	Aldi Egremont	**Samples received on:**	15/11/2023
Your job number:	29348	**Samples instructed on/ Analysis started on:**	15/11/2023
Your order number:	PO30056	**Analysis completed by:**	22/11/2023
Report Issue Number:	1	**Report issued on:**	22/11/2023
Samples Analysed:	4 10:1 WAC samples		

Signed: JSzwagrak

Joanna Szwagrzak
Reporting Specialist
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41-711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

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Waste Acceptance Criteria Analytical Results

Report No:	**23-69143**						
					Client:	**HYDROCK**	
Location	**Aldi Egremont**				**Landfill Waste Acceptance Criteria**		
Lab Reference (Sample Number)	2880208 / 2880209				**Limits**		
Sampling Date	08/11/2023				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	WS06						
Depth (m)	0.30						
Solid Waste Analysis							
TOC (%)**	5.6				3%	5%	6%
Loss on Ignition (%) **	9.7				--	--	10%
BTEX (µg/kg)**	< 5.0				6000	--	--
Sum of PCBs (mg/kg)**	< 0.007				1	--	--
Mineral Oil (mg/kg) EH_1D_CU_AL	17000				500	--	--
Total PAH (WAC-17) (mg/kg)	38.9				100	--	--
pH (units)**	7.7				--	>6	--
Acid Neutralisation Capacity (mmol / kg)	1.9				--	To be evaluated	To be evaluated
Eluate Analysis (BS EN 12457 - 2 preparation utilising end over end leaching procedure)	10:1 mg/l			10:1 mg/kg	Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg (mg/kg)		
Arsenic *	0.0057			0.0573	0.5	2	25
Barium *	0.0394			0.394	20	100	300
Cadmium *	< 0.0001			< 0.0008	0.04	1	5
Chromium *	0.0061			0.061	0.5	10	70
Copper *	0.027			0.27	2	50	100
Mercury *	< 0.0005			< 0.0050	0.01	0.2	2
Molybdenum *	0.0070			0.0702	0.5	10	30
Nickel *	0.0032			0.032	0.4	10	40
Lead *	0.024			0.24	0.5	10	50
Antimony *	< 0.0017			< 0.017	0.06	0.7	5
Selenium *	< 0.0040			< 0.040	0.1	0.5	7
Zinc *	0.027			0.27	4	50	200
Chloride *	0.53			5.3	800	15000	25000
Fluoride*	0.39			3.9	10	150	500
Sulphate *	20			200	1000	20000	50000
TDS*	60			600	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.010			< 0.10	1	-	-
DOC	15.1			151	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	0.80						
Dry Matter (%)	87						
Moisture (%)	13						

Results are expressed on a dry weight basis, after correction for moisture content where applicable.

*= UKAS accredited (liquid eluate analysis only)

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** = MCERTS accredited

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Waste Acceptance Criteria Analytical Results

Report No:	**23-69143**						
					Client:	**HYDROCK**	
Location	**Aldi Egremont**						
Lab Reference (Sample Number)	2880210 / 2880211				**Landfill Waste Acceptance Criteria Limits**		
Sampling Date	07/11/2023				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	WS09						
Depth (m)	4.20						
Solid Waste Analysis							
TOC (%)**	3.5				3%	5%	6%
Loss on Ignition (%) **	8.4				--	--	10%
BTEX (µg/kg)**	< 5.0				6000	--	--
Sum of PCBs (mg/kg)**	< 0.007				1	--	--
Mineral Oil (mg/kg) EH_1D_CU_AL	1900				500	--	--
Total PAH (WAC-17) (mg/kg)	12.2				100	--	--
pH (units)**	7.0				--	>6	--
Acid Neutralisation Capacity (mmol / kg)	0.00				--	To be evaluated	To be evaluated
Eluate Analysis (BS EN 12457 - 2 preparation utilising end over end leaching procedure)	10:1 mg/l			10:1 mg/kg	Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg (mg/kg)		
Arsenic *	0.0030			0.0300	0.5	2	25
Barium *	0.0686			0.686	20	100	300
Cadmium *	< 0.0001			< 0.0008	0.04	1	5
Chromium *	< 0.0004			< 0.0040	0.5	10	70
Copper *	0.020			0.20	2	50	100
Mercury *	< 0.0005			< 0.0050	0.01	0.2	2
Molybdenum *	0.0161			0.161	0.5	10	30
Nickel *	0.0022			0.022	0.4	10	40
Lead *	0.0017			0.017	0.5	10	50
Antimony *	< 0.0017			< 0.017	0.06	0.7	5
Selenium *	< 0.0040			< 0.040	0.1	0.5	7
Zinc *	0.017			0.17	4	50	200
Chloride *	0.68			6.8	800	15000	25000
Fluoride*	0.39			3.9	10	150	500
Sulphate *	93			930	1000	20000	50000
TDS*	160			1600	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.010			< 0.10	1	-	-
DOC	10.2			102	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	0.60						
Dry Matter (%)	81						
Moisture (%)	19						

Results are expressed on a dry weight basis, after correction for moisture content where applicable.

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Waste Acceptance Criteria Analytical Results

Report No:	**23-69143**						
					Client:	**HYDROCK**	
Location	**Aldi Egremont**						
Lab Reference (Sample Number)	2880212 / 2880213				**Landfill Waste Acceptance Criteria Limits**		
Sampling Date	09/11/2023				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	WS10						
Depth (m)	0.60						
Solid Waste Analysis							
TOC (%)**	0.7				3%	5%	6%
Loss on Ignition (%) **	1.3				--	--	10%
BTEX (µg/kg)**	110				6000	--	--
Sum of PCBs (mg/kg)**	< 0.007				1	--	--
Mineral Oil (mg/kg) EH_1D_CU_AL	220				500	--	--
Total PAH (WAC-17) (mg/kg)	18.3				100	--	--
pH (units)**	9.9				--	>6	--
Acid Neutralisation Capacity (mmol / kg)	5.1				--	To be evaluated	To be evaluated
Eluate Analysis	10:1			10:1	Limit values for compliance leaching test		
(BS EN 12457 - 2 preparation utilising end over end leaching procedure)	mg/l			mg/kg	using BS EN 12457-2 at L/S 10 l/kg (mg/kg)		
Arsenic *	0.0050			0.0499	0.5	2	25
Barium *	0.105			1.05	20	100	300
Cadmium *	< 0.0001			< 0.0008	0.04	1	5
Chromium *	0.0020			0.020	0.5	10	70
Copper *	0.0083			0.083	2	50	100
Mercury *	< 0.0005			< 0.0050	0.01	0.2	2
Molybdenum *	0.0085			0.0853	0.5	10	30
Nickel *	0.0015			0.015	0.4	10	40
Lead *	< 0.0010			< 0.010	0.5	10	50
Antimony *	< 0.0017			< 0.017	0.06	0.7	5
Selenium *	< 0.0040			< 0.040	0.1	0.5	7
Zinc *	0.0058			0.058	4	50	200
Chloride *	0.31			3.1	800	15000	25000
Fluoride*	0.79			7.9	10	150	500
Sulphate *	36			360	1000	20000	50000
TDS*	87			870	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.010			< 0.10	1	-	-
DOC	5.54			55.4	500	800	1000
Leach Test Information							
Stone Content (%)	74						
Sample Mass (kg)	0.70						
Dry Matter (%)	93						
Moisture (%)	7.2						

Results are expressed on a dry weight basis, after correction for moisture content where applicable.

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Waste Acceptance Criteria Analytical Results

Report No:	**23-69143**						
					Client:	**HYDROCK**	
Location	**Aldi Egremont**						
Lab Reference (Sample Number)	2880214 / 2880215				**Landfill Waste Acceptance Criteria Limits**		
Sampling Date	09/11/2023				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	WS13						
Depth (m)	1.50						
Solid Waste Analysis							
TOC (%)**	4.3				3%	5%	6%
Loss on Ignition (%) **	13.9				--	--	10%
BTEX (µg/kg)**	< 5.0				6000	--	--
Sum of PCBs (mg/kg)**	< 0.007				1	--	--
Mineral Oil (mg/kg) EH_1D_CU_AL	15				500	--	--
Total PAH (WAC-17) (mg/kg)	9.56				100	--	--
pH (units)**	7.0				--	>6	--
Acid Neutralisation Capacity (mmol / kg)	0.00				--	To be evaluated	To be evaluated
Eluate Analysis	10:1			10:1	Limit values for compliance leaching test		
(BS EN 12457 - 2 preparation utilising end over end leaching procedure)	mg/l			mg/kg	using BS EN 12457-2 at L/S 10 l/kg (mg/kg)		
Arsenic *	0.0023			0.0227	0.5	2	25
Barium *	0.0421			0.421	20	100	300
Cadmium *	< 0.0001			< 0.0008	0.04	1	5
Chromium *	0.0006			0.0063	0.5	10	70
Copper *	0.0055			0.055	2	50	100
Mercury *	< 0.0005			< 0.0050	0.01	0.2	2
Molybdenum *	0.0018			0.0176	0.5	10	30
Nickel *	0.0011			0.011	0.4	10	40
Lead *	0.0012			0.012	0.5	10	50
Antimony *	< 0.0017			< 0.017	0.06	0.7	5
Selenium *	< 0.0040			< 0.040	0.1	0.5	7
Zinc *	0.010			0.10	4	50	200
Chloride *	0.32			3.2	800	15000	25000
Fluoride*	1.0			10	10	150	500
Sulphate *	8.4			84	1000	20000	50000
TDS*	40			400	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.010			< 0.10	1	-	-
DOC	5.07			50.7	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	0.80						
Dry Matter (%)	78						
Moisture (%)	22						

Results are expressed on a dry weight basis, after correction for moisture content where applicable.

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Analytical Report Number : 23-69143
Project / Site name: Aldi Egremont

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2880208	WS06	None Supplied	0.3	Brown sandy clay with gravel.
2880210	WS09	None Supplied	4.2	Brown clay and sand with gravel.
2880212	WS10	None Supplied	0.6	Brown sand with gravel and stones.
2880214	WS13	None Supplied	1.5	Brown sand with gravel.

Analytical Report Number : 23-69143
Project / Site name: Aldi Egremont

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
BS EN 12457-2 (10:1) Leachate Prep	10:1 (as recieved, moisture adjusted) end over end extraction with water for 24 hours. Eluate filtered prior to analysis.	In-house method based on BSEN12457-2.	L043-PL	W	NONE
Acid neutralisation capacity of soil	Determination of acid neutralisation capacity by addition of acid or alkali followed by electronic probe.	In-house method based on Guidance an Sampling and Testing of Wastes to Meet Landfill Waste Acceptance""	L046-PL	W	NONE
Loss on ignition of soil @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace.	In house method.	L047-PL	D	MCERTS
Mineral Oil (Soil) C10 - C40	Determination of mineral oil fraction extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L076-PL	D	NONE
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Speciated WAC-17 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270.	L064-PL	D	MCERTS
PCB's By GC-MS in soil	Determination of PCB by extraction with acetone and hexane followed by GC-MS.	In-house method based on USEPA 8082	L027-PL	D	MCERTS
pH at 20oC in soil	Determination of pH in soil by addition of water followed by electrometric measurement.	In house method.	L005-PL	W	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
BTEX in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS. Individual components MCERTS accredited	In-house method based on USEPA8260. Refer to CoA for analyte specific accreditation	L073B-PL	W	MCERTS
Total BTEX in soil (Poland)	Determination of BTEX in soil by headspace GC-MS. Individual components MCERTS accredited	In-house method based on USEPA8260. Refer to CoA for analyte specific accreditation	L073-PL	W	MCERTS
Metals in leachate by ICP-OES	Determination of metals in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil""	L039-PL	W	ISO 17025
Chloride 10:1 WAC	Determination of Chloride colorimetrically by discrete analyser.	In house based on MEWAM Method ISBN 0117516260.	L082-PL	W	ISO 17025
Fluoride 10:1 WAC	Determination of fluoride in leachate by 1:1ratio with a buffer solution followed by Ion Selective Electrode.	In-house method based on Use of Total Ionic Strength Adjustment Buffer for Electrode Determination"	L033B-PL	W	ISO 17025
Sulphate 10:1 WAC	Determination of sulphate in leachate by ICP-OES	In-house method based on MEWAM 1986 Methods for the Determination of Metals in Soil""	L039-PL	W	ISO 17025

Analytical Report Number : 23-69143
Project / Site name: Aldi Egremont

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Total dissolved solids 10:1 WAC	Determination of total dissolved solids in water by EC probe using a factor of 0.6.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L031-PL	W	ISO 17025
Monohydric phenols 10:1 WAC	Determination of phenols in leachate by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	ISO 17025
Dissolved organic carbon 10:1 WAC	Determination of dissolved inorganic carbon in leachate by TOC/DOC NDIR Analyser.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	NONE

For method numbers ending in 'UK or A' analysis have been carried out in our laboratory in the United Kingdom (WATFORD).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
For method numbers ending in 'PL or B' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.
Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - understore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total