

Phase 2: Site Investigation

Fujifilm Synthonia Site, Billingham

Fujifilm

S220408

Solmek Ltd

12 Yarm Road
Stockton-on-Tees
TS18 3NA
Tel: 01642 607083

www.solmek.com

info@solmek.com



PHASE 2 SITE INVESTIGATION REPORT

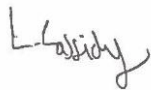


FUJIFILM SYNTHONIA SITE, BILLINGHAM

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Revision	Date	Prepared By	Signed
Final	May 2022	L Cassidy <i>Senior Environmental Engineer</i>	
		Checked By	
		A Lowry <i>Senior Geotechnical Engineer</i>	
		Approved By	
		R Woods <i>Principal Geotechnical Engineer</i>	

1 EXECUTIVE SUMMARY

Site Address	Central Avenue, Billingham, TS21 1LF
Proposed Development	The site is outlined for a Commercial development.
Fieldwork	<ul style="list-style-type: none"> • 10no cable percussive boreholes (BH01 to BH10) drilled to a maximum of 20.00mbgl with 4no. monitoring pipes in BH04, BH05, BH06 and BH08. • 24no machine excavated trial pits (TP01 to TP24) to a maximum depth of 3.00mbgl
Ground Conditions	<ul style="list-style-type: none"> • Made ground was encountered to depths of between 0.15mbgl and 1.50mbgl. • Widespread concrete obstructions in the east of the site. • Firm becoming stiff (locally soft) sandy gravelly low to medium improving to high strength locally silty clay was generally encountered down to a maximum depth of 20.00mbgl. • Generally underlain by granular deposits, first encountered between 11.60-19.50mbgl, comprising medium dense to dense (locally very dense) locally silty locally gravelly sand. • Localised perched groundwater (1.95-2.40mbgl), deeper groundwater strikes across the site (12.15-15.80mbgl).
Contamination Testing Results	<ul style="list-style-type: none"> • 17no made ground samples and 3no natural samples tested. • No elevated inorganic determinants recorded. • Elevated dibenzo(a,h)anthracene within 1no sample. • No asbestos fibres recorded. • Slightly alkaline pH.
Contamination Analysis	<ul style="list-style-type: none"> • Given the site's proposed Commercial land use, the levels of contamination recorded on site are unlikely to pose a significant risk to the current and future users of the site. • If any zones of odorous, brightly coloured or suspected contaminated ground or groundwater are encountered then work should cease in that area until the material has been investigated. The results of the investigation will therefore determine whether or not remediation will be required. • Made ground classed as posing a low to moderate risk with respect to construction workers. PPE for workers. Damping down of site during dry windy conditions. • Controlled waters unlikely to be at risk. • With respect to utilities pH was elevated; as a minimum all services should be laid in clean trenches. • Sub surface concrete should be designed to DS-3 ACEC (Class AC-2s). This assumes static groundwater conditions.
Geotechnical Testing Results	<ul style="list-style-type: none"> • Cohesive deposits low to high strength (32kPa-124kPa) based on in-situ hand vanes. • Triaxial testing indicates low to high strength (26-155kPa). • Cohesive materials on site have a medium volume change potential. • Moisture contents between 15 and 32%. • Sulphates between <10-72mg/l, pH slightly alkaline. • 3no. soakaway tests returned infiltration rates of 0.29 to 0.52 x 10⁻⁶ m/sec.
Geotechnical Analysis & Foundation Recommendations	<ul style="list-style-type: none"> • Piled foundations recommended – this report should be made available to a competent piling contractor. • Settlements within 25mm. • Normal earthworks plant for excavations.

2 INTRODUCTION

2.1 Authorisation

The site investigation described in this report was carried out by Solmek to the instructions of Fujifilm, on land located north of Central Avenue, Billingham, TS21 1LF.

Sources of information, including previous work undertaken at the site, are detailed below:

- *Solmek Phase 1 Desk Study (S220408) April 2022.*

Reference should be made to the above report for details of the site's history and environmental setting.

2.2 Scope of Works

The site is expected to be developed with new commercial/industrial buildings related to the wider Fujifilm site.

The following steps may be required in the investigation and remediation of potentially contaminated land:

- Phase 1: Desk Study
- Phase 2: Intrusive Investigation
- Phase 3: Remediation Statement
- Phase 4: Validation Reports

Phases 1 and 2 are generally required in the redevelopment of most sites. Phases 3 and 4 are subject to the findings of the initial stages.

A geotechnical and environmental (Phase 2) investigation including a ground gas risk assessment was requested. The fieldwork and testing was generally carried out according to;

- BS 5930:2015+A1:2020 Code of Practice for Ground Investigations
- BS 10175:2011+A1:2013 Investigation of Potentially Contaminated Sites – Code of Practice.
- CIRIA C665:2007 Assessing Risks Posed by Hazardous Ground Gas to Buildings
- BS 8485:2015+A1:2019 Code of Practice for the Characterization and Remediation from Ground Gas in Affected Developments
- Rock and soil descriptions shall be in accordance with BS EN ISO 14689-1:2003, BS EN ISO 14688-1:2002 and BS EN ISO 14688-2:2004

This report forms part of a Stage 1 Risk Assessment (Generic Quantitative Risk Assessment) with respect to the Environment Agency's guidance document Environment Agency *Land Contamination Risk Management*, which replaced the now-withdrawn *Contaminated Land Report 11 – Model Procedures for the Management of Land Contamination (2004)*.

The information provided in this report is based on the investigation fieldwork and is subject to the comments and approval of the various regulatory authorities. There may be other conditions prevailing on the site which have not been disclosed by this investigation and which have not been taken into account by this report. Solmek reserve the right to alter conclusions and recommendations should further information be available or provided. Any schematic representation or opinion of the possible configuration of ground conditions between exploratory holes is conjectural and given for guidance only and confirmation of intermediate ground conditions should be considered if deemed necessary.

3 SITE DESCRIPTION AND FIELDWORK

A site inspection, as recommended in BS 5930 and BS 10175, was undertaken on 12th April 2022. The site is centred at Ordnance Survey Co-ordinates 446500, 522960 and covers approximately 3.41Ha.

The site is located on a parcel of land north of Central Avenue.

The site is irregularly shaped and has a mostly flat and even topography. The majority of the site is currently

disused with the east portion of the site in use as a car park.

No buildings are present on the site.

The majority of the site is made ground/waste/overgrown grassland and the remainder of the site consists of gravel fill for the car park, with material/waste in the northeast and generally around the site. Hardstanding concrete is present along the old running track around the site. Utilities are noted across the site.

The site perimeter is secure with gated access to the south.

A school is present to the immediate west and a railway is present to the immediate north of the site. The north and west of the site are residential and the south of the site is agricultural in nature.

3.1 Fieldwork

The fieldwork commenced on 25th April 2022. The extent of the investigation was:

- Ground penetrating radar (GPR) scan of the site.
- Topographic survey of the site.
- 10no cable percussive boreholes (BH01 to BH10 inclusive) to a maximum depth of 20.00m below ground level (bgl).
 - The borehole locations were specified by the client.
- Gas monitoring wells were installed in BH's 04, 05, 06 & 08.
 - The wells were spaced at <25m centres evenly around the site in accordance with CIRIA C665.
- 24no machine excavated trial pits (TP01 to TP24) were dug to a maximum depth of 3.00mbgl.
 - The trial pit locations were specified by the client.
- In-situ soakaway testing carried out in TP04, TP22 and TP22.
- Insitu testing in the exploratory positions as California Bearing Ratio (CBR), Standard Penetration Tests (SPTs) and hand shear vanes.
- Retrieval of samples for geotechnical and chemical testing.

The trial pits and boreholes were respectively backfilled with clean arisings and bentonite/installations upon completion. Selected plates of the trial pits are presented in Appendix A.

Descriptions of the strata encountered in the boreholes and trial pits together with details of sampling and groundwater are presented in Appendix B of this report. A plan showing the location of the boreholes and trial pits can be found in Appendix A (Figure 2).

4 GROUND CONDITIONS

A summary of the ground conditions encountered is given below.

4.1 Made Ground

Made ground was variable across the site and, where penetrated, was encountered to a minimum depth of 0.15mbgl (BH10) and a maximum depth of 1.10mbgl (TP06). The made ground consisted of a variable surface covering of either topsoil or granular made ground, locally underlain by further granular/cohesive made ground with the gravel component variably comprising sandstone, brick, plastic, concrete, mudstone, dolomite and quartz.

Locally, buried concrete was encountered within the made ground (Section 4.2).

Made ground was not fully penetrated within TP07, which terminated at 1.50mbgl atop a concrete obstruction.

4.2 Obstructions

Buried concrete obstructions were encountered within the below positions:

- TP02 – reinforced concrete from 0.35-0.60m
- TP06 – reinforced concrete from 0.50-1.10m
- TP07 – reinforced concrete from 0.50-1.00m, and at 1.50m
- TP20 – reinforced concrete from 0.35-0.80m
- TP24 – reinforced concrete from 0.22-0.70m

The above positions were all in the east of the site, with the buried concrete inferred to relate to footings for the former stand, which was present in this area from the 1950s onwards. It is likely that any excavations in this area are likely to encounter similar concrete obstructions.

In addition, cobbles/boulders are inferred to be present throughout the cohesive deposits, particularly at depth.

4.3 Natural Deposits

Proven to underlie the made ground deposits across the site, natural ground generally comprised firm to stiff (locally soft at shallow depth) sandy gravelly initially low to medium improving with depth to high strength locally silty clay, which was encountered to a maximum determination depth of 20.00mbgl within the boreholes. Locally the clay was noted as laminated.

Locally, within BH01, BH02, BH05, BH08, BH09 and BH10 the cohesive deposits were underlain by granular deposits, first encountered at depths between 11.60 and 19.50mbgl, generally comprising medium dense to dense (locally very dense) locally silty locally gravelly sand.

4.4 Groundwater

Groundwater strikes, where encountered, are presented on the exploratory logs (Appendix B) and are summarised below in Table 1:

TABLE 1: SUMMARY OF GROUNDWATER STRIKES

Exploratory Position	Depth Encountered (mbgl)	Depth after 20 minutes (mbgl)	Strata
BH01	15.80	14.70	Clay
BH02	16.20	15.30	Sand
BH03	15.20	14.90	Clay
BH04	12.15	11.70	Clay
	15.30	14.40	Clay
BH05	14.20	13.80	Clay
BH06	15.00	14.90	Clay
BH07	15.30	14.20	Clay
BH08	15.80	15.45	Sand
BH09	15.20	14.60	Sand
BH10	15.90	15.50	Sand
TP10	2.40	-	Clay
TP21	1.95*	-	Clay

*slight seepage

It should be noted the rapid rate of advancement of the exploratory holes may mask minor seepages and it should be borne in mind that water levels fluctuate with a number of influences including season, rainfall, dewatering and pumping activities. Therefore, water levels significantly higher than those found during this investigation may be encountered.

5 CONTAMINATION TESTING RESULTS

The proposed development of the site is to involve the construction of a commercial building with associated parking and access roads. The chemical samples were generally retrieved in line with BS ISO 18400-105:2017 *Soil Quality. Sampling*. The chemical results are presented in Appendix C.

5.1 Site Characterisation

Within the Solmek Phase 1 Desk Study, a preliminary conceptual model was formed based on the information obtained. The initial risk was based on the site history which recorded generally open land throughout the sites history, until a sports ground was constructed in the 1950s, which was demolished by 2022.

An overall very low to moderate risk was provided for various receptors:

- Human Health – Low to Moderate
- Controlled Water – Very Low to Moderate
- Current Site Users (on-site workers/visitors) – Low to Moderate
- Vegetation – Very Low
- Construction Materials – Low to Moderate

5.2 Contamination Testing and Rationale

To provide information upon the possibility of ground contamination seventeen samples of made ground and three samples of natural clay were selected for shallow contamination testing. A Low to Moderate overall contamination risk was highlighted in the Phase 1 Desk Study due to previous land uses. This coupled with the end use being Commercial means that twenty samples are considered appropriate for testing. The samples selected are detailed below:

- TP01 – 0.20m (Made ground – topsoil)
- TP02 – 0.20-0.30m (Made ground – granular)
- TP03 – 0.20-0.30m (Made ground – topsoil)
- TP04 – 0.20-0.30m (Made ground – granular)
- TP06 – 0.20-0.30m (Made ground – granular)
- TP07 – 1.00-1.20m (Made ground – cohesive)
- TP08 – 0.50m (Natural clay)
- TP10 – 0.60-0.70m (Made ground – cohesive)
- TP11 – 0.20-0.30m (Made ground – topsoil)
- TP13 – 0.30-0.40m (Made ground – granular)
- TP15 – 0.50-0.60m (Made ground – granular)
- TP16 – 0.20-0.30m (Made ground – topsoil)
- TP17 – 0.20-0.30m (Made ground – granular)
- TP18 – 0.60-0.70m (Natural clay)
- TP20 – 0.20-0.30m (Made ground – granular)
- TP21 – 0.20-0.30m (Made ground – granular)
- TP22 – 0.20-0.30m (Made ground – granular)
- TP23 – 0.20-0.30m (Made ground – granular)
- TP24 – 0.70-0.80m (Natural clay)
- BH09 – 0.60-0.80m (Made ground – cohesive)

The samples selected are considered to provide coverage of both the made ground and shallow natural strata from across the site that would be most likely to be exposed during future site works. The samples were tested for the following contaminant suites:

- 20no Metals, semi-metals, non-metals, inorganic determinants
- 20no Asbestos identification screenings
- 20no Speciated Polyaromatic Hydrocarbons (PAHs)
- 10no Total Petroleum Hydrocarbon Criteria Working Group fractions (TPHCWG)

5.3 Test Results

Based on the proposed development at the site, the test results have been compared to a series of Land Quality Management (LQM) Suitable for Use Levels (S4UL) based on a Commercial land use. These are the most up to date thresholds published in December 2014.

The value for lead has been compared with the Category 4 Screening Level (March 2014) developed by Contaminated Land: Applications In Real Environments (CL:AIRE).

The test results are presented in Appendix C, and a summary is provided below in Tables 2 and 3.

TABLE 2: SUMMARY OF INORGANIC CONTAMINATION TESTING RESULTS

Determinand	Units	Number of Samples above Level of Detection	Minimum Recorded Level	Maximum Recorded Level	Commercial Threshold Value	Number of Results Exceeding Threshold Value
Metals						
Cadmium	mg/kg	14	<0.1	0.46	190	0
Chromium	mg/kg	20	4.4	25	8600	0
Copper	mg/kg	20	4.5	92	68000	0
Lead	mg/kg	20	10	180	2300*	0
Mercury	mg/kg	5	<0.1	0.38	1100	0
Nickel	mg/kg	20	4.1	55	980	0
Zinc	mg/kg	20	19	280	730000	0
Semi metals and non metals						
Arsenic	mg/kg	20	2	52	640**	0
Boron	mg/kg	19	<0.4	11	240000	0
Selenium	mg/kg	19	<0.2	6.4	12000	0
Inorganic chemicals						
Cyanide (Total)	mg/kg	1	<0.5	8.3	1580**	0
Sulphate (2:1 Water Soluble)	mg/l	6	<10	1700	2000^	0
Other						
pH	pH	-	8.1	8.8	5.5^	0
* Category 4 Screening Levels, March 2014						
** CLEA Software Version 1.06 (pH7 and 1%SOM)						
^ EA Threshold Values						

5.4 Metals, Semi Metals and Non Metals

No samples indicated raised levels of contamination above the S4UL threshold values, based on the twenty samples tested.

5.5 Inorganic Chemicals

Soluble sulphates (potentially aggressive to foundation concrete) were recorded between <10 and 1700mg/l. None of the samples were elevated above levels affecting human health, however two samples (TP02 & TP20) exceeded the BRE Special Digest 1 500mg/l limit for the sulphate classification of concrete.

The results of the pH testing were between 8.1 and 8.8, which is consistent with slightly alkaline conditions.

5.6 Organic Chemicals

The organic thresholds vary depending on the levels of soil organic matter (SOM).

The average SOM recorded across the site was 14.8% therefore a SOM of 6% has been used to determine the S4UL thresholds. Table 3, below, summarises the results.

TABLE 3: SUMMARY OF ORGANIC CONTAMINATION TESTING RESULTS

Determinand	Units	Number of Samples above Level of Detection	Minimum Recorded Level	Maximum Recorded Level	Commercial Threshold Value at 6% SOM	Number of Results Exceeding Threshold Value
TPH Aliphatic Fractions						
Aliphatic (C5-C6)	mg/kg	0	<1	-	12000	0
Aliphatic (C6-C8)	mg/kg	0	<1	-	40000	0
Aliphatic (C8-C10)	mg/kg	0	<1	-	11000	0
Aliphatic (C10-C12)	mg/kg	1	<1	4.5	47000	0
Aliphatic (C12-C16)	mg/kg	2	<1	11	90000	0
Aliphatic (C16-C21)	mg/kg	0	<1	-	1800000	0
Aliphatic (C21-C35)	mg/kg	2	<1	190	1800000	0
Aliphatic (C35-C44)	mg/kg	0	<1	-	1800000	0
TPH Aromatic Fractions						
Aromatic (C5-C7)	mg/kg	0	<1	-	86000	0
Aromatic (C7-C8)	mg/kg	0	<1	-	180000	0
Aromatic (C8-C10)	mg/kg	0	<1	-	17000	0
Aromatic (C10-C12)	mg/kg	0	<1	-	34000	0
Aromatic (C12-C16)	mg/kg	0	<1	-	38000	0
Aromatic (C16-C21)	mg/kg	1	<1	15	28000	0
Aromatic (C21-C35)	mg/kg	5	<1	1300	28000	0
Aromatic (C35-C44)	mg/kg	0	<1	-	28000	0
Speciated PAH						
Naphthalene	mg/kg	2	<0.1	0.48	1100	0
Acenaphthylene	mg/kg	2	<0.1	1.6	100000	0
Acenaphthene	mg/kg	2	<0.1	1.1	100000	0
Fluorene	mg/kg	2	<0.1	1.3	71000	0
Phenanthrene	mg/kg	5	<0.1	9.9	23000	0
Anthracene	mg/kg	5	<0.1	3.5	540000	0
Fluoranthene	mg/kg	11	<0.1	21	23000	0
Pyrene	mg/kg	11	<0.1	20	54000	0
Benzo[a]anthracene	mg/kg	7	<0.1	11	180	0
Chrysene	mg/kg	7	<0.1	12	350	0
Benzo[b]fluoranthene	mg/kg	5	<0.1	14	45	0
Benzo[k]fluoranthene	mg/kg	5	<0.1	5.2	1200	0
Benzo[a]pyrene	mg/kg	5	<0.1	12	36	0
Benzo[g,h,i]perylene	mg/kg	5	<0.1	15	4000	0
Dibenz(a,h)Anthracene	mg/kg	5	<0.1	4	3.6	1
Indeno(1,2,3-c,d)Pyrene	mg/kg	5	<0.1	11	510	0
Total PAH	mg/kg	6	<2	130	1000*	0
Total Phenol	mg/kg	0	<0.3	-	3200	0
* EA Threshold Values						

From the 20no samples tested, the only recorded exceedance was for dibenzo(a,h)anthracene within TP20 (0.20-0.30m).

5.7 Asbestos

From the 20no samples subject to asbestos screening, no asbestos fibres were recorded.

5.8 Environmental Protection Act 1990: Part 2A Revised Statutory Guidance (April 2012)

This revised document explains how the Local Authority should decide if land, based on a legal interpretation, is contaminated. The document replaces the previous guidance given in Annex 3 of DEFRA Circular 01/2006, issued in accordance with section 78YA of the 1990 Environmental Protection Act.

The main objectives of the Part 2A regime are to “*identify and remove unacceptable risks to human health and the environment*” and to “*seek to ensure that contaminated land is made suitable for its current use*”. Part 2A uses a risk based approach to defining contaminated land whereby the “risk” is interpreted as “*the likelihood that harm, or pollution of water, will occur as a result of contaminants in, on or under the land*” and by “*the scale and seriousness of such harm or pollution if it did occur*”.

For a relevant risk to exist a contaminant, pathway and receptor linkage must be present before the land can be considered to be contaminated. The document explains that “*for a risk to exist there must be contaminants present in, on or under the land in a form and quantity that poses a hazard, and one or more pathways by which they might significantly harm people, the environment, or property; or significantly pollute controlled waters.*”

A conceptual model is used to develop and communicate the risks associated with a particular site.

To determine if land is contaminated the local authority use various categories from 1 to 4. Categories 1 and 2 include “*land which is capable of being determined as contaminated land on grounds of significant possibility of significant harm to human health.*” Categories 3 and 4 “*encompass land which is not capable of being determined on such grounds*”.

See Appendix E for additional notes on contamination guidelines.

6 CONCEPTUAL MODEL AND CONTAMINATION ANALYSIS

The contamination conceptual model in Table 4 identifies the potential pollution linkages present on site based on source – pathway – receptor relationships.

TABLE 4: CONCEPTUAL MODEL

Source	Pathway	Receptor	Risk Rating	Comments
Asphyxiating or explosive ground gases <ul style="list-style-type: none"> Made ground (<1.70m) No coal mining Infilled clay pits to northwest 	Ground gas migration <ul style="list-style-type: none"> Migration through permeable soils Inhalation 	Future site users <ul style="list-style-type: none"> Transient adult workers 	Moderate /Low	Gas monitoring in progress, source risk rating subject to change.
		Users during development <ul style="list-style-type: none"> Construction workers 	Low	
Areas of contamination hazardous to human health (Commercial Thresholds) <ul style="list-style-type: none"> 20no samples tested No elevated inorganics Elevated PAHs within 1no sample No asbestos fibres recorded 	<ul style="list-style-type: none"> Inhalation Dust ingestion Dermal contact 	Future site users <ul style="list-style-type: none"> Transient adult workers 	Low	Localised contamination to be mitigated by proposed structure footprint and hardstanding.
		Users during development <ul style="list-style-type: none"> Construction workers 	Low	Localised contamination – mitigation measures required during construction. Consideration to be given to Health and Safety Executive: <i>Protection of Workers and the General Public During the Development of Contaminated Land</i> .
	<ul style="list-style-type: none"> Inhalation Dust ingestion 	Users of surrounding sites <ul style="list-style-type: none"> Transient adult workers/nearby school 	Low	Potential low risk during remediation/construction from dust generation. Consideration to be given to dust suppression, in line with BRE: <i>The Control of Dust and Emissions from Construction and Demolition, Best Practice Guidance</i> .
		<ul style="list-style-type: none"> Leaching of mobilised contaminants 	Solid geology <ul style="list-style-type: none"> Principal Aquifer 	Low
	Drift geology <ul style="list-style-type: none"> Unproductive Strata 		Low	The low permeability and low sensitivity aquifer is unlikely to be impacted by the localised contamination encountered.
	<ul style="list-style-type: none"> Drainage Lateral migration Accumulation of contaminated sediment 	Surface water features <ul style="list-style-type: none"> Pond 62m northeast 	Low	Distant surface waters unlikely to be impacted.
	Areas of phytotoxic contamination	<ul style="list-style-type: none"> Uptake via roots and leaf surfaces 	Vegetation <ul style="list-style-type: none"> None proposed 	Very Low
Areas of contamination above service fabric or BRE Special Digest 1 thresholds	<ul style="list-style-type: none"> Direct contact 	Construction Materials <ul style="list-style-type: none"> Concrete 	Moderate	Mitigation through use of sulphate resistant concrete where in contact with made ground (DS-3 AC-2s).
		Construction Materials <ul style="list-style-type: none"> Service Fabric 	Moderate	Polyethylene (locally) and copper piping to be avoided and prudent to lay any service within a clean bedding.

In general terms, future users, construction workers and construction materials are **potentially most** at risk as pollution linkages may be present for each of these receptors. Users of the site, users of the surrounding sites, controlled waters and vegetation are considered to be at **potentially less** of a risk.

Mitigation measures to reduce the risks identified for each receptor are discussed in the following sections.

6.1 Users of the Site Once Development is Complete

The users of the site, particularly construction workers, are likely to be exposed to contaminants present in the soils beneath the site during redevelopment work. **Potential** exposure pathways include dermal absorption after contact with contaminated ground, inhalation of soil or dust, inhalation of volatilised compounds, and inadvertent soil ingestion.

To establish if the levels of contaminants present on site may pose a risk to the health of the future users of the site the results of the contamination testing have been compared to a series of LQM/CIEH S4UL based on a Commercial land-use.

The levels of contaminants across the site are generally low with exceedances noted within just one of the 20no samples, for dibenz(ah)anthracene within TP20 (0.20-0.30m).

The new development is expected to comprise a new commercial building with associated parking/access roads. Based on the **shallow** soil contamination testing, it is considered that the levels of contamination are unlikely to pose a risk to future users of the site, as long as all contaminated areas are covered either by buildings or hardstanding.

6.2 Construction Workers and Users of Surrounding Sites

Short term human exposure to contaminants present in soils can occur via several pathways during the construction and ground works phase of the development. These include dermal absorption after contact with contaminated ground, inhalation of soil or dust (including windblown dust), inhalation of volatilised compounds, inadvertent soil ingestion and contact with contaminated groundwater.

Locally elevated levels of PAHs were detected. It is considered that such levels of contamination may pose a risk to construction workers and users of surrounding sites. As good practice, full PPE must be employed in accordance with Health and Safety Executive: *Protection of Workers and the General Public During the Development of Contaminated Land* and safeguards should be taken to limit dust during ground works, and access to the public should be restricted. Construction workers should use gloves as a precaution when handling any fill materials. Provision of suitable hygiene facilities are needed for site workers.

Although asbestos was not detected from the soil samples subjected to testing within this investigation, the possibility still exists that asbestos containing materials may still be present on site and currently lie undetected. It is therefore advised that a 'watching brief' is undertaken during the initial site strip and any excavation works and advice sought if asbestos is found or suspected.

During dry weather, any excavations may require clean water to be sprinkled at shallow depth to prevent excess dust escaping to off-site receptors. Monitoring of dust concentrations during construction should be given careful consideration to ensure Monitoring of dust concentrations during construction should be given careful consideration to ensure occupational exposure levels are not exceeded. A moisture content of >15% is required to inhibit dust migration. Works should be undertaken in line with BRE: *The Control of Dust and Emissions from Construction and Demolition, Best Practice Guidance*.

6.3 Vegetation

Plants can be affected by soil contamination in a number of ways resulting in growth inhibition, nutrient deficiencies and yellowing of leaves. Contaminants are taken up by plants through the roots and through foliage. Contaminants identified as being highly phytotoxic include boron, cadmium, copper, nickel, and zinc.

For this development, no vegetation is proposed therefore vegetation is not considered to be a sensitive receptor.

6.4 Ground and Surface Water

The principal pathway by which soil contamination may reach the water environment is through a slow seepage or leaching to groundwater or surface water. The potential for contaminants to migrate along such pathways is dependent on the chemical and physical characteristics of the contaminants and the local hydrogeology.

From the site investigation undertaken, ground conditions broadly comprise variable made ground (<1.70m) over drift deposits generally comprising cohesive deposits to at least ca. 11.00mbgl, at which point granular deposits were locally encountered. The cohesive deposits can be considered to have a low permeability whilst the granular deposits at depth, where encountered, are likely to have a moderate permeability. The drift deposits are designated as an Unproductive Strata by the Environment Agency.

The published geology indicates the site is underlain by solid geology of Sherwood Sandstone, which is designated as a Principal Aquifer by the Environment Agency. Rockhead was not proven in the intrusive investigation however drift deposits were proven to 20.00mbgl.

The nearest surface water feature is a pond located 62m northeast of the site.

Due to the generally low contamination found across the site, the aquifer designations of the thick drift deposits beneath the site, and the distance to surface waters, the development is considered to represent a low risk to groundwater or surface water receptors.

6.5 Construction Materials

Materials at risk from potential soil contamination include inorganic matrices such as cement and concrete and also organic material; e.g. plastics and rubbers. Acid ground conditions and elevated levels of sulphates can accelerate the corrosion of building materials. Plastics and rubbers are generally used for piping and service ducts and are potentially attacked by a range of chemicals, most of which are organic, particularly petroleum-based substances. Drinking water supplies can be tainted by substances that can penetrate piping and water companies enforce stringent threshold values.

6.5.1 Concrete Classification

BRE Special Digest One: *Concrete in Aggressive Ground: 2005 3rd Edition* has been used to assess the risks posed to underground concrete and to establish the design measures required to mitigate the risks. The results of the pH and water-soluble sulphate tests (when converted to total potential sulphate) fall into Class DS-3 ACEC (Class AC-2s) requirements for concrete protection. This assumes static groundwater conditions.

6.5.2 Water Supply Pipes Material Selection

The levels of potential contaminants should be compared to thresholds supplied in the UK Water Industry Research (UKWIR) publication *Guidance for the selection of Water Supply Pipes to be used in Brownfield Sites* (January 2011). A Brownfield Site is defined in the document as "Land or premises that have previously been used or developed that may be vacant or derelict". It should be noted that Brownfield sites may not be contaminated. The guidance does not apply to Greenfield Sites however water companies may have their own assessment criteria which should be checked by the developer.

Level of acidic to alkaline pH (8.1 to 9.4) were recorded across the site at depths of between 0.20mbgl and 19.95mbgl within the made ground and natural samples.

The concentrations of the selected determinants should be compared to the pipe material selection table in Appendix E, and consultation with the appropriate utility supply company is required to identify the most suitable service fabric. However, the pH levels preclude the use of copper pipes.

6.6 Unexpected Contamination

If during the initial site strip or subsequent ongoing construction activities, any zones of odorous, brightly coloured or suspected contaminated ground are encountered, then the following procedure should be followed:

- Stop work in the affected area
- Contact Solmek and provide pictures of the affected area
- Solmek can visit site to investigate the material and provide guidance
- If required – Solmek can sample and test the material
- Once test results are returned, this will determine whether or not remediation will be required

6.7 Waste Classification and WAC Testing

During the site strip and construction activities, material may be required to be removed from site. Any such material would require classification, in line with Environment Agency Technical Guidance *Waste Classification: Guidance on the classification and assessment of waste* (2015). This would classify the material as either Non-Hazardous or Hazardous Waste.

Once the material has been classified, determining the suitable landfill for disposal is governed by landfill directive Waste Acceptance Criteria (WAC) testing, with landfills categorized as Inert Waste, Stable Non-Reactive Hazardous Waste and Hazardous Waste.

If waste classification and/or WAC testing are not undertaken, material taken off site may be subject to WAC testing by the appropriate waste disposal company. The decision on whether or not to accept waste, or whether further testing is required, is at the discretion of the waste disposal company.

For this project, Waste Classification has not been requested by the client. Waste classification, in line with the aforementioned EA guidance, would be needed to classify the material as Hazardous or Non-Hazardous Waste. WAC testing would then be required to determine the suitability of the material for the relevant landfill.

7 GROUND GAS ASSESSMENT

The proposed development includes the construction of a Commercial building.

Ground gases such as carbon dioxide (CO₂), methane (CH₄), carbon monoxide (CO) and volatile organic compounds (VOCs) can be classed as a form of contamination where there is a potential risk to human health.

For this report, gas monitoring is via measuring emissions from five standpipes (Table 5) that were installed during the sitework. The gas monitoring will consist of six visits over a period of three months. The gas monitoring results will be presented as an addendum to this report.

7.1 Monitoring Wells and Response Zones

The response zones of the five monitoring wells were specified by Solmek, and are briefly summarised below in Table 5.

TABLE 5: SUMMARY OF MONITORING WELL RESPONSE ZONES

Borehole	Pipework	Installation Depth (mbgl)	Response zone of slotted pipework (mbgl)	Response Zone Stratum
BH04	50mm HDPE pipe	17.00	9.00-17.00	CLAY (groundwater strikes at 12.15m & 15.30m)
BH05	50mm HDPE pipe	20.00	11.00-20.00	CLAY (groundwater strike at 14.20m)
BH06	50mm HDPE pipe	6.00	1.00-6.00	Shallow CLAY
BH07	50mm HDPE pipe	6.50	1.00-6.00	Shallow CLAY
BH08	50mm HDPE pipe	6.00	1.00-6.00	Shallow CLAY

8 GEOTECHNICAL TESTING AND ANALYSIS

Samples taken from the boreholes and trial pits underwent a series of geotechnical tests (BS 1377:1990) to aid foundation design and soil description. In addition, insitu Standard Penetration Tests (SPTs) and Hand Shear Vane Tests were undertaken at regular intervals during drilling. The geotechnical results are presented in Appendix D.

8.1 Strength and Density

8.1.1 Undisturbed Triaxial Tests

Nineteen U100 samples were subjected to undrained triaxial testing from BH01-BH10, ranging in depth from 1.20-19.50m.

The results ranged from 26kPa to 155kPa (low to high strength). The lower values of 40kN/m^2 were generally encountered within the top 5.00m of the deposit.

8.1.2 SPT N Values

Standard Penetration Tests undertaken within the natural cohesive deposits yielded N values of between 5 to 50+, with these results indicating variably low to high strength deposits.

Standard Penetration Tests undertaken within the natural granular deposits yielded N values of between 11 and 50+, indicative of medium dense to very dense deposits.

8.1.3 Hand Shear Vanes

Hand shear vane testing within the natural cohesive deposits returned results generally ranging from 50kPa to 124kPa, which are indicative of medium to high strength conditions. Locally (TP06) lower results were recorded, ranging from 32 to 44kPa (low to medium strength deposits).

8.2 Consolidation Testing

Six samples of natural clay were selected for one dimensional consolidation testing at depths ranging from 1.20 to 5.00mbgl. Testing was undertaken in five stages at incremental pressure increases from 0, to 20, to 40, to 80, to 160, to 320kPa.

The full results for each pressure increment are provided in the appendices.

8.3 Moisture Contents

22no samples recovered from the boreholes have been subject to moisture content tests to determine the moisture profile at depths of between 1.20 and 19.95mbgl. Moisture levels were between 15% and 32%.

8.4 Atterberg Limit Determinations

Fourteen Atterberg Limit Determination tests were carried out on samples of cohesive material to classify the fine grained soils. The results were compared to the Casagrande Chart published in BS 5930 and showed the samples to generally be clay/silt of variably low to high plasticity.

The Plasticity Indices ranged from 11 to 28 with equivalent moisture contents recorded above and below the corresponding plastic limits. The cohesive material can be assessed as having a medium shrinkage potential in relation to current guidance.

8.5 Particle Size Distribution and Sedimentation Testing

Nine samples from the boreholes at varying depths were subject to Particle Size Distribution (PSD) tests in accordance with BS1377 Part 2 to aid soil descriptions. In addition to the PSD tests, one of the samples was then subjected to sedimentation analysis using a hydrometer to further classify the fine grained soils (i.e. the quantities of clay and silt). The results have been used to prepare precise soil descriptions in accordance with BS5930:2015 Section 6 and are presented in Appendix D.

8.6 pH and Sulphate Results

Thirteen natural samples from the boreholes were tested for acidity and soluble sulphate content to assess whether the material may be potentially aggressive to building fabric. The results of the testing for pH ranged from 8.4 to 9.2 indicating slightly alkaline conditions. Soluble sulphates were recorded at levels ranging from <10mg/l to 72mg/l.

8.7 Percolation Tests

Three percolation tests were carried out within the bases of TP04, TP21 and TP22. The tests recorded negligible drops in water level and returned inferred infiltration rates of between 0.29 & 0.52×10^{-6} m/sec for both tests.

Given the results encountered and the significant thickness of low permeability cohesive deposits, soakaway drainage may not be suitable for the proposed development. Soakaway drainage, if incorporated, should be designed in accordance with BRE *Special Digest 365 – Soakaway Design*. The results are presented in Appendix D.

8.8 CBR Tests

CBR testing via Plate Load Testing was undertaken within the natural clay in TP01, TP03, TP05, TP11, TP12, TP13 and TP23, along the route of a proposed road. The in-situ CBR results are detailed below in Table 6.

TABLE 6: SUMMARY OF CBR TESTING RESULTS

Trial Pit	Test Depth (m)	Test Strata	CBR result (%)
TP01	0.60	Firm CLAY	3.30
TP03	0.30		1.11
TP05	0.30		2.12
TP11	0.30		2.25
TP12	0.30		2.03
TP13	0.30		1.50
TP23	0.30		2.18

Locally Plate Load Testing was not possible due to made ground and/or concrete obstructions. In all trial pit positions, hand shear vane testing results at depths between 0.30 and 0.60m bgl yielded results of between 50 and 92kPa, which correspond to CBRs of approximately 2.2 to 4%.

8.9 Preliminary Ground Model

The information gathered during the intrusive works has been collated and summarised in the below preliminary ground model.

TABLE 7: PRELIMINARY GROUND MODEL

Strata	Depth (mbgl)		Parameters Range (average)	Reference
	From	To		
Made Ground	0.00	0.15-1.50	pH = 8.1-8.6 (8.4)	Laboratory Testing
			SO ⁴ = <10-1700 (211)	
			kPa = 59-77 (67)	In-Situ Hand Vane
Sandy gravelly locally silty CLAY	0.15-1.10	11.80-20.00	kPa = 32-128kPa (81.6)	In-Situ Hand Vane
			N = 5-50 (17.6)	In-situ SPT
			CBR – 1.11-3% (2.07)	Plate Bearing Test
			C _u = 26-155kPa (72.1)	Undrained Triaxial Testing
			pH = 8.1-9.3 (8.8)	Laboratory Testing
			SO ⁴ = <10-210 (30.6)	
			IP = 11-28 (20.8)	Atterberg Limit Testing
Bulk Density – 1.84-2.21mg/m ³	Triaxial/Consolidation Testing			
Clayey silty gravelly SAND	11.60-19.50	12.40-20.00	N = 11-50+ (31.1)	In-situ SPT
			pH = 9.0-9.1 (9.1)	Laboratory Testing
			SO ⁴ = <10 (<10)	
			Fines – 36-44.5% (39.5)	Particle Size Distribution Testing
			Sand – 55.5-63.6% (60.33)	
			Gravel – 0%	

8.10 Foundations

8.10.1 Piled Foundations

For the proposed development, it is understood that piled foundations are proposed.

Information provided in this report should be made available to a competent piling contractor who can design appropriate foundations in accordance with Section 7: Pile foundations of BS EN 1997 – 1:2004 which applies to end-bearing piles, friction piles, tension piles and transversely loaded piles installed by driving, by jacking, and by screwing or boring. The piling contractor will need to take into consideration the possible effects of negative skin friction from made ground and localised soft deposits. Allowance should be made for breaking through known and unknown buried obstructions.

The precise method of pile installation and the applicability of proprietary systems, diameters and depths required would need to be determined by a specialist piling contractor.

8.10.2 Ground Slabs

Made ground is in excess of 600mm and a suspended reinforced ground slab or precast concrete floor should therefore be used. However, if the made ground was removed from beneath the foot print of the building and a blanket of compacted inert granular fill was placed in accordance with an engineering specification, ground bearing slabs may be possible, if applicable.

8.10.3 Roads/Parking/Hard Standing

Based on the Hand Shear Vane and Plate Bearing Testing, a CBR of 2-3% can be assumed for the firm and stiff clays and <2% for the cohesive made ground.

Where granular made ground is recompacted a CBR of at least 5% should be achievable, however, this should be verified by insitu CBR testing on site and confirmed with the adopting authority.

8.10.4 *General Foundation Comments*

Prior to placing foundation concrete, obvious soft or loose spots should be removed and replaced with suitably recompacted hardcore or lean mix concrete. In addition, all excavations should be inspected to ensure that they fully penetrate areas of disturbed ground.

Further advice should be sought from Solmek if unexpected ground conditions are encountered during redevelopment.

8.11 **Excavation**

Based on the nature of the ground conditions encountered, excavations should be within the capacity of normal earthworks plant although breaking out of relic foundations (Section 4.2) and other obstructions should be anticipated. Stability of excavations will be poor in the made ground but should improve in the natural clay. Excavation sides should be designed, constructed and supported in accordance with the recommendations given in CIRIA Report No. 97: *Trenching Practice*.

8.12 **Groundwater**

Perched shallow groundwater was encountered locally (1.95-2.40mbgl) whilst deeper groundwater strikes were noted across the site (12.15-16.20mbgl)

It should be noted the rapid rate of advancement of the exploratory holes may mask minor seepages and it should be borne in mind that water levels fluctuate with a number of influences including season, rainfall, dewatering and pumping activities. Therefore, water levels significantly higher than those found during this investigation may be encountered.

SOLMEK

**APPENDIX A:
Figures and Drawings**



12-16 Yarm Road, Stockton on Tees, TS18 3NA
 Tel: 01642 607083 Email: info@solmek.com

Figure Title

Site Location Plan

Project Number

S220408

Project Name

Project Borealis, Fujifilm

Client

Fujifilm

Date

May 2022

DRG Number

Figure 1

Scale

1:2500 @ A4 [DO NOT SCALE]

Legend Key

Project Bounds - Project Bounds



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Figure Title

Exploratory Hole Location Plan

Project Number

S220408

Project Name

Project Borealis, Fujifilm

Client

Fujifilm

Date

May 2022




DRG Number

Figure 2

Scale

1:2000 @ A4 [DO NOT SCALE]

Legend Key

-  Locations By Type - BH
-  Locations By Type - TP
-  Project Bounds - Project Bounds

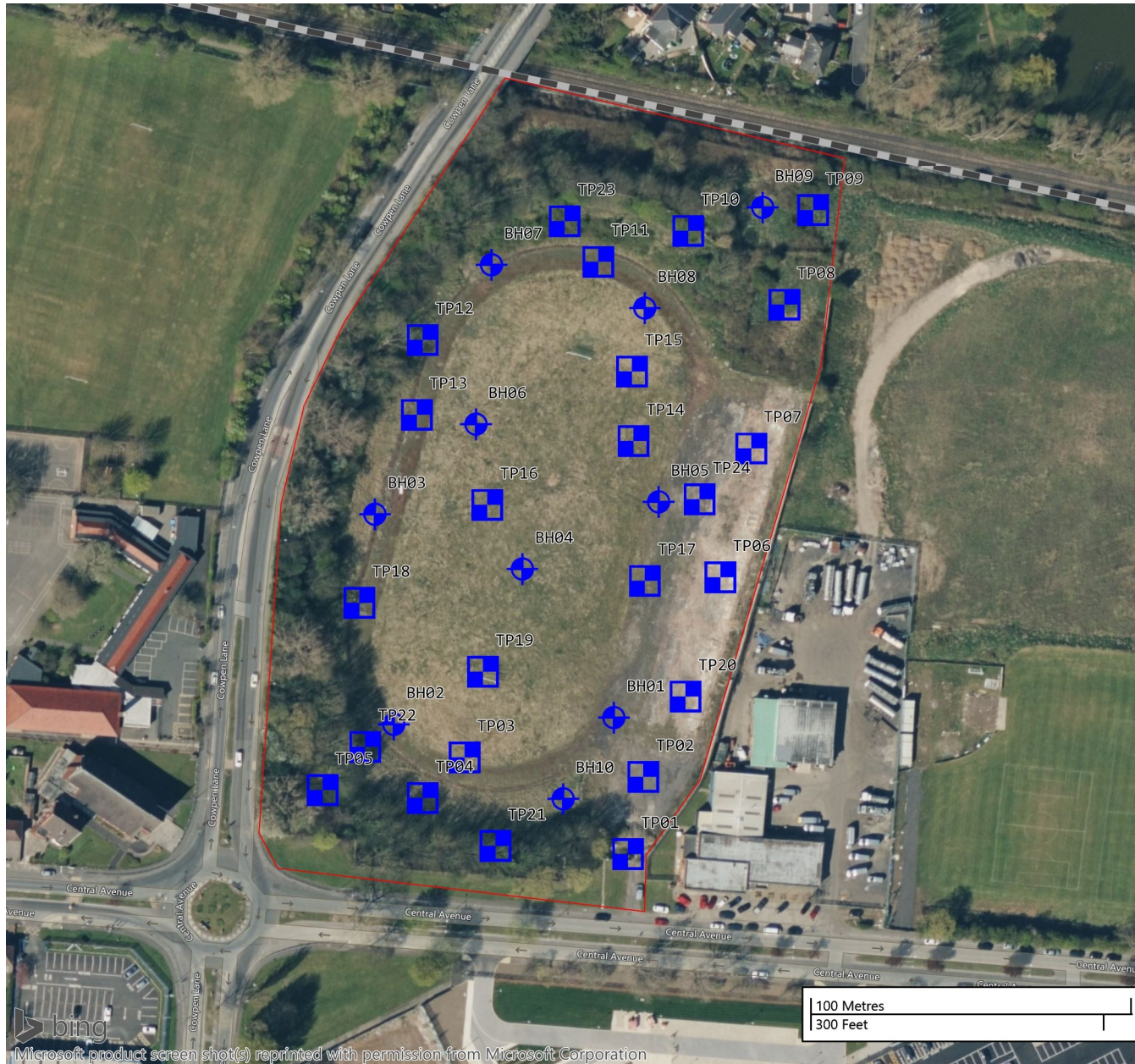




Figure 3: TP01.



Figure 4: TP01 Spoil.

Title	Date
Figures 3 & 4	May 2022
Project	
Project Borealis, Fujifilm	
Client	
Fujifilm	

Solmek Ltd.
 12 Yarm Road
 Stockton-on-Tees
 TS18 3NA

Tel: +44 (0) 1642 607083
 Fax: +44 (0) 1642 612355
 e-mail: south@solmek.com
www.solmek.com





Figure 5: TP02.



Figure 6: TP02 Spoil.

Title	Date
Figures 5 & 6	May 2022
Project	
Project Borealis, Fujifilm	
Client	
Fujifilm	

Solmek Ltd.
 12 Yarm Road
 Stockton-on-Tees
 TS18 3NA

Tel: +44 (0) 1642 607083
 Fax: +44 (0) 1642 612355
 e-mail: south@solmek.com
www.solmek.com





Figure 7: TP03.



Figure 8: TP03 Spoil.

Title	Date
Figures 7 & 8	May 2022
Project	
Project Borealis, Fujifilm	
Client	
Fujifilm	

Solmek Ltd.
 12 Yarm Road
 Stockton-on-Tees
 TS18 3NA

Tel: +44 (0) 1642 607083
 Fax: +44 (0) 1642 612355
 e-mail: south@solmek.com
www.solmek.com





Figure 9: TP04.



Figure 10: TP04 Spoil

Title	Date
Figures 9 & 10	May 2022
Project	
Project Borealis, Fujifilm	
Client	
Fujifilm	

Solmek Ltd.
 12 Yarm Road
 Stockton-on-Tees
 TS18 3NA

Tel: +44 (0) 1642 607083
 Fax: +44 (0) 1642 612355
 e-mail: south@solmek.com
www.solmek.com





Figure 11: TP06.



Figure 12: TP06 Spoil.

Title	Date
Figures 11 & 12	May 2022
Project	
Project Borealis, Fujifilm	
Client	
Fujifilm	

Solmek Ltd.
 12 Yarm Road
 Stockton-on-Tees
 TS18 3NA

Tel: +44 (0) 1642 607083
 Fax: +44 (0) 1642 612355
 e-mail: south@solmek.com
www.solmek.com





Figure 13: TP07.



Figure 14: TP07 Spoil.

Title	Date
Figures 13 & 14	May 2022
Project	
Project Borealis, Fujifilm	
Client	
Fujifilm	

Solmek Ltd.
 12 Yarm Road
 Stockton-on-Tees
 TS18 3NA

Tel: +44 (0) 1642 607083
 Fax: +44 (0) 1642 612355
 e-mail: south@solmek.com
www.solmek.com





Figure 15: TP08.



Figure 16: TP08 Spoil.

Title	Date
Figures 15 & 16	May 2022
Project	
Project Borealis, Fujifilm	
Client	
Fujifilm	

Solmek Ltd.
 12 Yarm Road
 Stockton-on-Tees
 TS18 3NA

Tel: +44 (0) 1642 607083
 Fax: +44 (0) 1642 612355
 e-mail: south@solmek.com
www.solmek.com





Figure 17: TP09.



Figure 18: TP09 Spoil

Title	Date
Figures 17 & 18	May 2022
Project	
Project Borealis, Fujifilm	
Client	
Fujifilm	

Solmek Ltd.
 12 Yarm Road
 Stockton-on-Tees
 TS18 3NA

Tel: +44 (0) 1642 607083
 Fax: +44 (0) 1642 612355
 e-mail: south@solmek.com
www.solmek.com





Figure 19: TP10.



Figure 20: TP10 Spoil.

Title	Date
Figures 19 & 20	May 2022
Project	
Project Borealis, Fujifilm	
Client	
Fujifilm	

Solmek Ltd.
12 Yarm Road
Stockton-on-Tees
TS18 3NA

Tel: +44 (0) 1642 607083
Fax: +44 (0) 1642 612355
e-mail: south@solmek.com
www.solmek.com





Figure 21: TP11.



Figure 22: TP11 Spoil.

Title	Date
Figures 21 & 22	May 2022
Project	
Project Borealis, Fujifilm	
Client	
Fujifilm	

Solmek Ltd.
 12 Yarm Road
 Stockton-on-Tees
 TS18 3NA

Tel: +44 (0) 1642 607083
 Fax: +44 (0) 1642 612355
 e-mail: south@solmek.com
www.solmek.com





Figure 23: TP12.



Figure 24: TP12 Spoil.

Title	Date
Figures 23 & 24	May 2022
Project	
Project Borealis, Fujifilm	
Client	
Fujifilm	

Solmek Ltd.
 12 Yarm Road
 Stockton-on-Tees
 TS18 3NA

Tel: +44 (0) 1642 607083
 Fax: +44 (0) 1642 612355
 e-mail: south@solmek.com
www.solmek.com





Figure 25: TP13.



Figure 26: TP13 Spoil.

Title	Date
Figures 25 & 26	May 2022
Project	
Project Borealis, Fujifilm	
Client	
Fujifilm	

Solmek Ltd.
12 Yarm Road
Stockton-on-Tees
TS18 3NA

Tel: +44 (0) 1642 607083
Fax: +44 (0) 1642 612355
e-mail: south@solmek.com
www.solmek.com





Figure 27: TP14.



Figure 28: TP14 Spoil

Title	Date
Figures 27 & 28	May 2022
Project	
Project Borealis, Fujifilm	
Client	
Fujifilm	

Solmek Ltd.
 12 Yarm Road
 Stockton-on-Tees
 TS18 3NA

Tel: +44 (0) 1642 607083
 Fax: +44 (0) 1642 612355
 e-mail: south@solmek.com
www.solmek.com





Figure 29: TP16.



Figure 30: TP16 Spoil.

Title	Date
Figures 29 & 30	May 2022
Project	
Project Borealis, Fujifilm	
Client	
Fujifilm	

Solmek Ltd.
 12 Yarm Road
 Stockton-on-Tees
 TS18 3NA

Tel: +44 (0) 1642 607083
 Fax: +44 (0) 1642 612355
 e-mail: south@solmek.com
www.solmek.com





Figure 31: TP20.



Figure 32: TP20 Spoil.

Title	Date
Figures 31 & 32	May 2022
Project	
Project Borealis, Fujifilm	
Client	
Fujifilm	

Solmek Ltd.
 12 Yarm Road
 Stockton-on-Tees
 TS18 3NA

Tel: +44 (0) 1642 607083
 Fax: +44 (0) 1642 612355
 e-mail: south@solmek.com
www.solmek.com





Figure 33: TP21.



Figure 34: TP21 Spoil.

Title	Date
Figures 33 & 34	May 2022
Project	
Project Borealis, Fujifilm	
Client	
Fujifilm	

Solmek Ltd.
 12 Yarm Road
 Stockton-on-Tees
 TS18 3NA

Tel: +44 (0) 1642 607083
 Fax: +44 (0) 1642 612355
 e-mail: south@solmek.com
www.solmek.com





Figure 35: TP23.



Figure 36: TP23 Spoil.

Title	Date
Figures 35 & 36	May 2022
Project	
Project Borealis, Fujifilm	
Client	
Fujifilm	

Solmek Ltd.
 12 Yarm Road
 Stockton-on-Tees
 TS18 3NA

Tel: +44 (0) 1642 607083
 Fax: +44 (0) 1642 612355
 e-mail: south@solmek.com
www.solmek.com



APPENDIX B:
Borehole Logs & Trial Pit Logs



12-16 Yarm Road
Stockton on Tees
TS18 3NA
01642 607083
info@solmek.com

Borehole Log

Scale 1:50 Sheet 1 of 2

BH01

Contract no: S220408	Site: Project Borealis, Fujifilm	Driller: Bainbridge Brothers Ltd	GL (AOD):
Client: Fujifilm		Plant used: Dando 2000	Eastings: 446522
Method: Cable Percussive		Started: 27/04/2022	Northing: 522902
		Ended: 27/04/2022	Logged: SM
		Backfilled: 27/04/2022	Status: FINAL


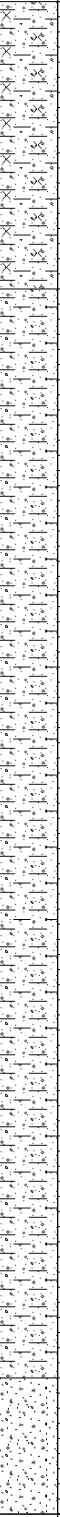
Backfill / Installation	Legend	Depth (m)	Level (m AOD)	Stratum Description	Samples and Insitu Testing		
					Depth (m)	Type	Results
		0.10		MADE GROUND: Dark grey sandy gravel. Sand is medium to coarse grained. Gravel is Angular to subrounded, fine to coarse of limestone. (14-20mm stone chipping)	0.30 - 0.40	B+ES	
		0.60		MADE GROUND: Black gravelly sand. Sand is medium to coarse grained. Gravel is subangular to subrounded, fine to coarse of ash, limestone, red brick, sandstone and quartz.	0.70 - 0.80	B+ES	
				Stiff thinly laminated greenish brown mottled grey sandy slightly gravelly medium strength silty CLAY of intermediate plasticity. Sand is medium to coarse grained. Gravel is subangular to subrounded, fine to medium of sandstone and quartz.	1.20 - 1.65	U	82 blows [450mm]
		1.60		Firm becoming stiff dark brown mottled grey slightly sandy slightly gravelly low to high strength CLAY. Sand is medium to coarse grained. Gravel is subangular to subrounded, fine to coarse of sandstone, mudstone and quartz.	1.65 - 1.70	D	
					2.00 - 2.45	SPT (S)	N=8 (1,2/2,2,3,1)
					2.00 - 2.45	B + D	
					3.00 - 3.45	U	62 blows [450mm]
					3.45 - 3.50	D	
					4.00 - 4.45	SPT (S)	N=5 (1,1/0,1,2,2)
					4.00 - 4.45	B+D	
					5.00 - 5.45	SPT (S)	N=11 (1,2/2,3,3,3)
					5.00 - 5.45	B+D	
					6.00 - 6.45	U	71 blows [450mm]
					6.45 - 6.50	D	
					7.50 - 7.95	SPT (S)	N=11 (1,2/2,3,3,3)
					7.50 - 7.95	B+D	
		8.20		Stiff dark brown slightly sandy slightly gravelly high strength CLAY. Sand is fine to medium coarse grained. Gravel is Angular to subrounded, fine to coarse of sandstone, mudstone and quartz.	9.00 - 9.45	U	168 blows [450mm]
					9.45 - 9.50	D	
		9.90					

Hole Diameter		Casing Depths		General Remarks	Chiselling			Ground Water				
Depth Base (m)	Diameter (mm)	Depth Base (m)	Diameter (mm)		From (m)	To (m)	Time (hr)	Depth Strike (m)	Depth Casing (m)	Depth Sealed (m)	Time Elapsed (min)	Water Level (m)
20.00	150	19.50	150	1.2m hand excavated inspection pit dug Ground water encountered at 15.80m				15.80	15.70		20	14.70

Borehole Log

BH01

Contract no: S220408	Site: Project Borealis, Fujifilm	Driller: Bainbridge Brothers Ltd	GL (AOD):
Client: Fujifilm		Plant used: Dando 2000	Eastings: 446522
Method: Cable Percussive		Started: 27/04/2022	Northing: 522902
		Ended: 27/04/2022	Logged: SM
		Backfilled: 27/04/2022	Status: FINAL


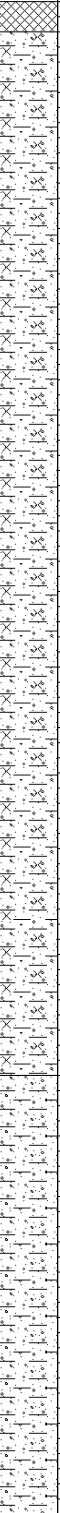
Backfill / Installation	Legend	Depth (m)	Level (m AOD)	Stratum Description	Samples and Insitu Testing		
					Depth (m)	Type	Results
		11.90		Medium dense light reddish brown silty slightly gravelly SAND. Sand is medium to coarse grained. Gravel is subangular to subrounded, fine to medium of sandstone, coal and quartz.	10.50 - 10.95	SPT (S) B+D	N=15 (2,3/3,3,4,5)
				Stiff with areas of firmness reddish brown mottled grey very sandy slightly gravelly medium strength CLAY. Sand is medium to coarse grained. Gravel is subangular to subrounded, fine to coarse of mudstone, sandstone and quartz.	12.00 - 12.45	SPT (S) B+D	N=20 (2,3/4,4,5,7)
					13.50 - 13.95	SPT (S) B+D	N=50+ (7,9/11,16,18,15)
					15.00 - 15.45	SPT (S) B+D	N=50+ (6,8/12,17,21,45)
					16.50 - 16.95	SPT (S) B+D	N=37 (5,6/6,9,10,12)
		18.00 - 18.45	SPT (S) B + D	N=34 (4,5/7,8,8,11)			
		19.10		Dense light orangish brown slightly gravelly SAND. Sand is medium to coarse grained. Gravel is subangular to subrounded, fine to coarse of coal, mudstone and quartz.	19.50 - 19.95	SPT (S) B+D	N=33 (3,7/8,8,8,9)
		20.00		End of Borehole at 20.000m			

Hole Diameter				Casing Depths				General Remarks			Chiselling			Ground Water				
Depth Base (m)	Diameter (mm)	Depth Base (m)	Diameter (mm)	1.2m hand excavated inspection pit dug Ground water encountered at 15.80m			From (m)	To (m)	Time (hr)	Depth Strike (m)	Depth Casing (m)	Depth Sealed (m)	Time Elapsed (min)	Water Level (m)				
20.00	150	19.50	150							15.80	15.70		20	14.70				

Borehole Log

BH02

Contract no: S220408	Site: Project Borealis, Fujifilm	Driller: Bainbridge Brothers Ltd	GL (AOD):
Client: Fujifilm		Plant used: Dando 2000	Easting: 446452
Method: Cable Percussive		Started: 27/04/2022	Northing: 522899
		Ended: 27/04/2022	Logged: SM
		Backfilled: 27/04/2022	Status: FINAL

Backfill / Installation	Legend	Depth (m)	Level (m AOD)	Stratum Description	Samples and Insitu Testing			
					Depth (m)	Type	Results	
		0.20		MADE GROUND: Grass over dark brown and black, sandy gravel with some fine to medium plant rootlets. Sand is medium to coarse grained. Gravel is Angular to subrounded, fine to medium of ash, ballast, limestone, mudstone, red brick and quartz. Firm becoming stiff with depth light brown and grey sandy slightly gravelly low to medium strength silty CLAY of intermediate plasticity with occasional silty sand inclusions (2.80-3.60mbgl) Sand is medium to coarse grained. Gravel is subangular to subrounded, fine to medium of mudstone, sandstone and quartz.	0.20 - 0.30	B+ES		
					0.60 - 0.70	B+ES		
					1.20 - 1.65	SPT (S)		N=7 (1,1/1,2,2,2)
					1.20 - 1.65	B+D		
					2.00 - 2.45	SPT (S)		N=7 (1,0/1,2,2,2)
					2.00 - 2.45	B+D		
					3.00 - 3.45	U		84 blows [450mm]
					3.45 - 3.50	D		
					4.00 - 4.45	SPT (S)		N=11 (1,1/2,2,3,4)
					4.00 - 4.45	B+D		
					5.00 - 5.45	U		88 blows [450mm]
					5.45 - 5.50	D		
					6.00 - 6.45	SPT (S)		N=12 (1,2/2,3,3,4)
					6.00 - 6.45	B+D		
		7.10		Stiff brown mottled grey slightly sandy slightly gravelly high strength CLAY with occasional medium to coarse gravel inclusions (10.20-10.70mbgl) and occasional sand inclusions 11.10 - 11.90mbgl. Sand is fine to medium grained. Gravel is subangular to subrounded, fine to coarse of mudstone, sandstone, coal and quartz.	7.50 - 7.95	SPT (S)	N=14 (2,2/3,3,3,5)	
				7.50 - 7.95	B+D			
					9.00 - 9.45	U	146 blows [450mm]	
					9.45 - 9.50	D		

Hole Diameter				Casing Depths				General Remarks			Chiselling			Ground Water				
Depth Base (m)	Diameter (mm)	Depth Base (m)	Diameter (mm)				From (m)	To (m)	Time (hr)	Depth Strike (m)	Depth Casing (m)	Depth Sealed (m)	Time Elapsed (min)	Water Level (m)				
20.00	150	19.50	150	1.2m hand excavated inspection pit dug Ground water encountered at 16.20m Moving Plant to Position.						16.20	16.10		20	15.30				

Borehole Log

BH02

Contract no: S220408	Site: Project Borealis, Fujifilm	Driller: Bainbridge Brothers Ltd	GL (AOD):
Client: Fujifilm		Plant used: Dando 2000	Easting: 446452
Method: Cable Percussive		Started: 27/04/2022	Northing: 522899
		Ended: 27/04/2022	Logged: SM
		Backfilled: 27/04/2022	Status: FINAL

Backfill / Installation	Legend	Depth (m)	Level (m AOD)	Stratum Description	Samples and Insitu Testing		
					Depth (m)	Type	Results
		11.90		Stiff brown mottled grey slightly sandy slightly gravelly high strength CLAY with occasional medium to coarse gravel inclusions (10.20-10.70mbgl) and occasional sand inclusions 11.10 - 11.90mbgl. Sand is fine to medium grained. Gravel is subangular to subrounded, fine to coarse of mudstone, sandstone, coal and quartz.	10.50 - 10.95 10.50 - 10.95	SPT (S) B+D	N=47 (5,9/10,10,11,16)
				Dense to very dense light reddish brown slightly silty slightly gravelly SAND. Sand is medium to coarse grained. Gravel is subangular to subrounded, fine to medium of mudstone, sandstone, coal and quartz.	12.00 - 12.45 12.00 - 12.45	SPT (S) B+D	N=36 (3,6/7,9,10,10)
					13.50 - 13.95 13.50 - 13.95	SPT (S) B+D	N=47 (4,5/9,12,13,13)
					15.00 - 15.45 15.00 - 15.45	SPT (S) B+D	N=42 (5,7/9,10,11,12)
					16.50 - 16.95 16.50 - 16.95	SPT (S) B+D	N=25 (4,4/5,6,6,8)
					18.00 - 18.45 18.00 - 18.45	SPT (S) B+D	N=24 (3,3/5,5,7,7)
		19.40		Stiff dark brown slightly sandy slightly gravelly high strength CLAY. Sand is fine to medium grained, Gravel is subangular to subrounded, fine to coarse of sandstone, siltstone, mudstone and quartz.	19.50 - 19.95 19.50 - 19.95	SPT (S) B+D	N=28 (3,4/6,6,7,9)
		20.00		End of Borehole at 20.000m			

Hole Diameter		Casing Depths		General Remarks	Chiselling			Ground Water				
Depth Base (m)	Diameter (mm)	Depth Base (m)	Diameter (mm)		From (m)	To (m)	Time (hr)	Depth Strike (m)	Depth Casing (m)	Depth Sealed (m)	Time Elapsed (min)	Water Level (m)
20.00	150	19.50	150	1.2m hand excavated inspection pit dug Ground water encountered at 16.20m Moving Plant to Position.				16.20	16.10		20	15.30

Borehole Log

BH03

Contract no: S220408	Site: Project Borealis, Fujifilm	Driller: Bainbridge Brothers Ltd	GL (AOD):
Client: Fujifilm		Plant used: Dando 2000	Eastings: 446446
Method: Cable Percussive		Started: 29/04/2022	Northing: 522965
		Ended: 03/05/2022	Logged: SM
		Backfilled: 03/05/2022	Status: FINAL



Backfill / Installation	Legend	Depth (m)	Level (m AOD)	Stratum Description	Samples and Insitu Testing				
					Depth (m)	Type	Results		
		0.30		MADE GROUND: Grass over dark brown/black gravelly sand with some fine to medium plant rootlets. Sand is medium to coarse grained. Gravel is subangular to subrounded fine to coarse of ash, red brick, dolomite and quartz.	0.20	B+ES			
		0.45			0.30	B+ES			
					0.60	B+ES			
				1.10		MADE GROUND: Light greenish grey slightly sandy slightly gravelly clay. Gravel is subangular to subrounded fine to coarse of ash, red brick, dolomite, sandstone and quartz.			
						Firm light brown sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse of mudstone, sandstone and quartz.			
						Firm dark brown slightly sandy slightly gravelly medium strength CLAY. Gravel is subangular to subrounded fine to coarse of sandstone, coal, quartz and mudstone.	1.20 - 1.65	SPT (S)	N=8 (1,1/2,2,2,2)
							1.20 - 1.65	B + D	
							2.00 - 2.45	SPT (S)	N=8 (1,1/1,2,2,3)
							2.00 - 2.45	B + D	
				2.80		Firm becoming stiff thinly laminated dark brown and grey slightly sandy slightly gravelly medium to high strength silty CLAY of intermediate plasticity. Sand is medium to coarse grained. Gravel is subangular to subrounded fine to coarse of mudstone, sandstone and quartz.	3.00 - 3.45	U	32 blows [450mm]
							3.45 - 3.50	D	
							4.00 - 4.45	SPT (S)	N=9 (1,2/2,2,3)
							4.00 - 4.45	B + D	
							5.00 - 5.45	U	39 blows [450mm]
							5.45 - 5.50	D	
					6.00 - 6.45	SPT (S)	N=11 (2,2/2,3,3,3)		
					6.00 - 6.45	B + D			
					7.50 - 7.95	U	82 blows [450mm]		
					7.95 - 8.00	D			
		8.40		Stiff brown slightly sandy slightly gravelly medium to high strength CLAY. Sand is medium to coarse grained. Gravel is subangular to subrounded fine to coarse of sandstone and quartz.	9.00 - 9.45	SPT (S)	N=21 (2,4/4,5,5,7)		
					9.00 - 9.45	B + D			

Hole Diameter				Casing Depths				General Remarks			Chiselling			Ground Water				
Depth Base (m)	Diameter (mm)	Depth Base (m)	Diameter (mm)	1.2m hand excavated inspection pit dug Ground water encountered at 15.20m			From (m)	To (m)	Time (hr)	Depth Strike (m)	Depth Casing (m)	Depth Sealed (m)	Time Elapsed (min)	Water Level (m)				
20.00	150	19.50	150							15.20			20	14.90				

Borehole Log

BH03

Contract no: S220408	Site: Project Borealis, Fujifilm	Driller: Bainbridge Brothers Ltd	GL (AOD):
Client: Fujifilm		Plant used: Dando 2000	Eastings: 446446
Method: Cable Percussive		Started: 29/04/2022	Northing: 522965
		Ended: 03/05/2022	Logged: SM
		Backfilled: 03/05/2022	Status: FINAL

Backfill / Installation	Legend	Depth (m)	Level (m AOD)	Stratum Description	Samples and Insitu Testing		
					Depth (m)	Type	Results
		11.30		Stiff brown slightly sandy slightly gravelly medium to high strength CLAY. Sand is medium to coarse grained. Gravel is subangular to subrounded fine to coarse of sandstone and quartz.	10.50 - 10.95	U	89 blows [450mm]
				Stiff dark reddish brown sandy high strength silty CLAY with some gravel inclusions. Sand is medium to coarse grained. Gravel is subangular to subrounded fine to coarse of sandstone, quartz, coal and mudstone.	12.00 - 12.45 12.00 - 12.45	SPT (S) B + D	N=16 (2,3/3,4,4,5)
					13.50 - 13.95 13.50 - 13.95	SPT (S) B + D	N=23 (3,4/5,6,6,6)
					15.00 - 15.45 15.00 - 15.45	SPT (S) B + D	N=25 (4,4/6,6,6,7)
					16.50 - 16.95 16.50 - 16.95	SPT (S) B + D	N=27 (4,5/6,7,7,7)
					18.00 - 18.45 18.00 - 18.45	SPT (S) B + D	N=26 (3,4/6,6,7,7)
		19.50		Stiff dark reddish brown slightly sandy slightly gravelly high strength CLAY. Sand is fine to medium grained. Gravel is subangular to subrounded fine to medium of sandstone, mudstone and quartz.	19.50 - 19.95 19.50 - 19.95	SPT (S) B + D	N=31 (3,5/6,8,8,9)
		20.00		End of Borehole at 20.000m			

Hole Diameter		Casing Depths		General Remarks	Chiselling			Ground Water				
Depth Base (m)	Diameter (mm)	Depth Base (m)	Diameter (mm)		From (m)	To (m)	Time (hr)	Depth Strike (m)	Depth Casing (m)	Depth Sealed (m)	Time Elapsed (min)	Water Level (m)
20.00	150	19.50	150	1.2m hand excavated inspection pit dug Ground water encountered at 15.20m				15.20			20	14.90



12-16 Yarm Road
Stockton on Tees
TS18 3NA
01642 607083
info@solmek.com

Borehole Log

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BH04

Contract no: S220408	Site: Project Borealis, Fujifilm	Driller: Bainbridge Brothers Ltd	GL (AOD):
Client: Fujifilm		Plant used: Dando 2000	Eastings: 446492
Method: Cable Percussive		Started: 04/05/2022	Northing: 522948
		Ended: 04/05/2022	Logged: SM
		Backfilled: 04/05/2022	Status: FINAL

Backfill / Installation	Legend	Depth (m)	Level (m AOD)	Stratum Description	Samples and Insitu Testing		
					Depth (m)	Type	Results
		0.30		MADE GROUND: Grass over dark brown slightly clayey gravelly sand topsoil with some fine to medium plant rootlets. Gravel is subangular to subrounded fine to coarse of ash, quartz and mudstone.	0.20	B+ES	
		0.95		Firm brown mottled grey slightly sandy slightly gravelly medium strength CLAY. Sand is fine to medium grained. Gravel is subangular to subrounded fine to medium of pottery, mudstone, sandstone and quartz (re-worked).	0.70 - 0.80	B+ES	
		2.80		Firm occasionally thinly laminated brown and light brown sandy low to medium strength silty CLAY. Sand is medium to coarse grained.	1.20 - 1.65 1.20 - 1.65	SPT (S) B + D	N=7 (1,1/1,2,2,2)
					2.00 - 2.45 2.00 - 2.45	SPT (S) B + D	N=8 (1,2/2,2,2,2)
					3.00 - 3.45	U	39 blows [450mm]
					3.45 - 3.50	D	
					4.00 - 4.45 4.00 - 4.45	SPT (S) B + D	N=9 (1,2/2,2,2,3)
					5.00 - 5.45	U	46 blows [450mm]
					5.45 - 5.50	D	
					6.00 - 6.45 6.00 - 6.45	SPT (S) B + D	N=10 (2,2/2,2,3,3)
					7.50 - 7.95 7.50 - 7.95	B U	111 blows [NR]
					9.00 - 9.45 9.00 - 9.45	SPT (S) B + D	N=21 (2,3/4,5,6,6)

Hole Diameter				Casing Depths				General Remarks			Chiselling			Ground Water				
Depth Base (m)	Diameter (mm)	Depth Base (m)	Diameter (mm)				From (m)	To (m)	Time (hr)	Depth Strike (m)	Depth Casing (m)	Depth Sealed (m)	Time Elapsed (min)	Water Level (m)				
20.00	150	19.50	150	1.2m hand excavated inspection pit dug Ground water encountered at 12.10m and 15.30m.						12.15 15.30			20 20	11.70 14.40				

Borehole Log

BH04

Contract no: S220408	Site: Project Borealis, Fujifilm	Driller: Bainbridge Brothers Ltd	GL (AOD):
Client: Fujifilm		Plant used: Dando 2000	Eastings: 446492
Method: Cable Percussive		Started: 04/05/2022	Northing: 522948
		Ended: 04/05/2022	Logged: SM
		Backfilled: 04/05/2022	Status: FINAL

Backfill / Installation	Legend	Depth (m)	Level (m AOD)	Stratum Description	Samples and Insitu Testing		
					Depth (m)	Type	Results
		10.90		Stiff brown slightly sandy slightly gravelly high strength CLAY. Sand is medium to coarse grained. Gravel is subangular to subrounded fine to coarse of mudstone, siltstone, sandstone and quartz.	10.50 - 10.95 10.50 - 10.95	B U	120 blows [NR]
		12.05		Stiff with localised areas of firmness brown very sandy medium strength CLAY. Sand is medium to coarse grained.	12.00 - 12.45 12.00 - 12.45	SPT (S) B + D	N=25 (3,4/6,6,7)
		13.45		Stiff dark brown slightly sandy slightly gravelly high strength CLAY. Sand is medium to coarse grained. Gravel is subangular to subrounded fine to coarse of mudstone, sandstone, quartz and coal.	13.50 - 13.95 13.50 - 13.95	SPT (S) B + D	N=43 (3,6/9,10,12,12)
		15.00		Dense dark reddish brown silty slightly gravelly SAND. Sand is medium to coarse grained. Gravel is subangular to subrounded fine to coarse of quartz, sandstone and coal.	15.00 - 15.45 15.00 - 15.45	SPT (S) B + D	N=50+ (8,12/12,15,18,5)
		16.50			16.50 - 16.95 16.50 - 16.95	SPT (S) B + D	N=50+ (9,12/13,14,20,5)
		18.00			18.00 - 18.45 18.00 - 18.45	SPT (S) B + D	N=50+ (10,11/12,13,18,7)
		18.90		Stiff dark brown slightly sandy slightly gravelly high strength CLAY. Sand is medium to coarse grained. Gravel is subangular to subrounded fine to coarse of sandstone, mudstone and quartz.	19.50 - 19.95 19.50 - 19.95	SPT (S) B+D	N=36 (4,6/8,8,10,10)
		20.00		End of Borehole at 20.000m			

Hole Diameter		Casing Depths		General Remarks	Chiselling			Ground Water				
Depth Base (m)	Diameter (mm)	Depth Base (m)	Diameter (mm)		From (m)	To (m)	Time (hr)	Depth Strike (m)	Depth Casing (m)	Depth Sealed (m)	Time Elapsed (min)	Water Level (m)
20.00	150	19.50	150	1.2m hand excavated inspection pit dug Ground water encountered at 12.10m and 15.30m.				12.15 15.30			20 20	11.70 14.40



12-16 Yarm Road
Stockton on Tees
TS18 3NA
01642 607083
info@solmek.com

Borehole Log

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BH05

Contract no: S220408	Site: Project Borealis, Fujifilm	Driller: Bainbridge Brothers Ltd	GL (AOD):
Client: Fujifilm		Plant used: Dando 2000	Eastings: 446535
Method: Cable Percussive		Started: 26/04/2022	Northing: 522969
		Ended: 26/04/2022	Logged: SM
		Backfilled: 26/04/2022	Status: FINAL

Backfill / Installation	Legend	Depth (m)	Level (m AOD)	Stratum Description	Samples and Insitu Testing		
					Depth (m)	Type	Results
		0.15		MADE GROUND: Dark grey, sandy gravel. Sand is medium to coarse grained. Gravel is angular to subrounded, fine to coarse of limestone. (14-20mm stone chippings)	0.30 - 0.40	B+ES	
				MADE GROUND: Dark greyish brown and black very gravelly sand. Sand is medium to coarse grained. Gravel is subangular to subrounded, fine to coarse of ash, ballast, red brick, concrete, dolomite and quartz.	0.70 - 0.80	B+ES	
		1.00		Firm becoming stiff thinly laminated light brown mottled grey slightly sandy slightly gravelly medium to high strength CLAY of intermediate plasticity. Sand is medium to coarse grained. Gravel is subangular to subrounded, fine to medium of sandstone, mudstone and quartz.	1.20 - 1.65	SPT (S)	N=10 (1,2/2,2,3,3)
					1.20 - 1.65	B + D	
					2.00 - 2.45	U	117 blows [450mm]
					2.45 - 2.50	B	
					3.00 - 3.45	SPT (S)	N=6 (1,1/1,1,2,2)
					3.00 - 3.45	B + D	
					4.00 - 4.45	U	79 blows [450mm]
					4.45 - 4.50	B	
					5.00 - 5.45	SPT (S)	N=8 (1,1/1,2,2,3)
					5.00 - 5.45	B + D	
					6.00 - 6.45	U	84 blows [450mm]
					6.45 - 6.50	B	
			7.50 - 7.95	SPT (S)	N=8 (1,1/2,2,2,2)		
			7.50 - 7.95	B + D			
		8.50		Firm Becoming stiff brown slightly sandy, slightly gravelly medium to high strength CLAY. Sand is medium to coarse grained. Gravel is angular to subrounded, fine to coarse of mudstone, siltstone, sandstone and quartz.	9.00 - 9.45	U	136 blows [450mm]
					9.45 - 9.50	B	

Hole Diameter				Casing Depths				General Remarks			Chiselling			Ground Water				
Depth Base (m)	Diameter (mm)	Depth Base (m)	Diameter (mm)				From (m)	To (m)	Time (hr)	Depth Strike (m)	Depth Casing (m)	Depth Sealed (m)	Time Elapsed (min)	Water Level (m)				
20.00	150	19.50	150	1.2m hand excavated inspection pit. Groundwater encountered at 14.20m. Filling IBC 1000L. Moving all plant to next BH Location. Sample at 0.30- 0.40m identified possible asbestos. Sent for ID and Quantification 26/04						14.20	14.10	19.50	20	13.80				

Borehole Log

BH05

Contract no: S220408	Site: Project Borealis, Fujifilm	Driller: Bainbridge Brothers Ltd	GL (AOD):
Client: Fujifilm		Plant used: Dando 2000	Eastings: 446535
Method: Cable Percussive		Started: 26/04/2022	Northing: 522969
		Ended: 26/04/2022	Logged: SM
		Backfilled: 26/04/2022	Status: FINAL

Backfill / Installation	Legend	Depth (m)	Level (m AOD)	Stratum Description	Samples and Insitu Testing		
					Depth (m)	Type	Results
		11.60		Firm Becoming stiff brown slightly sandy, slightly gravelly medium to high strength CLAY. Sand is medium to coarse grained. Gravel is angular to subrounded, fine to coarse of mudstone, siltstone, sandstone and quartz.	10.50 - 10.95 10.50 - 10.95	SPT (S) B + D	N=14 (2,2/3,3,4,4)
		12.40		Medium dense reddish, brown silty SAND. Sand is medium to coarse grained.	12.00 - 12.45 12.00 - 12.45	SPT (S) B + D	N=13 (1,2/2,3,3,5)
		13.00		Stiff reddish brown slightly sandy, slightly gravelly, high strength CLAY, with some medium to coarse sand inclusions. Sand is medium to coarse grained. Gravel is Subangular to subrounded, fine to coarse of mudstone, siltstone, sandstone and quartz.			
		17.60		Medium dense dark reddish brown, slightly silty, slightly gravelly SAND. Sand is medium to coarse grained. Gravel is subangular to subrounded, fine to coarse of coal, mudstone and quartz.	13.50 - 13.95 13.50 - 13.95	SPT (S) B + D	N=15 (2,2/3,3,4,5)
					15.00 - 15.45 15.00 - 15.45	SPT (S) B + D	N=11 (1,1/2,2,3,4)
					16.50 - 16.95 16.50 - 16.95	SPT (S) B + D	N=16 (2,2/2,3,5,6)
				Stiff dark greyish brown slightly sandy slightly gravelly high strength silty CLAY. Sand is fine to medium grained. Gravel is subangular to subrounded, fine to medium of mudstone, sandstone and quartz.	18.00 - 18.45 18.00 - 18.45	SPT (S) B + D	N=31 (3,5/7,7,8,9)
					19.50 - 19.95	U	200 blows [450mm]
					19.95 - 20.00	B	
End of Borehole at 20.000m							

Hole Diameter		Casing Depths		General Remarks	Chiselling			Ground Water				
Depth Base (m)	Diameter (mm)	Depth Base (m)	Diameter (mm)		From (m)	To (m)	Time (hr)	Depth Strike (m)	Depth Casing (m)	Depth Sealed (m)	Time Elapsed (min)	Water Level (m)
20.00	150	19.50	150	1.2m hand excavated inspection pit. Groundwater encountered at 14.20m. Filling IBC 1000L Moving all plant to next BH Location. Sample at 0.30- 0.40m identified possible asbestos. Sent for ID and Quantification 26/04				14.20	14.10	19.50	20	13.80



12-16 Yarm Road
Stockton on Tees
TS18 3NA
01642 607083
info@solmek.com

Borehole Log

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BH06

Contract no: S220408	Site: Project Borealis, Fujifilm	Driller: Bainbridge Brothers Ltd	GL (AOD):
Client: Fujifilm		Plant used: Dando 2000	Easting: 446477
Method: Cable Percussive		Started: 27/04/2022	Northing: 522993
		Ended: 27/04/2022	Logged: SM
		Backfilled: 27/04/2022	Status: FINAL

Backfill / Installation	Legend	Depth (m)	Level (m AOD)	Stratum Description	Samples and Insitu Testing		
					Depth (m)	Type	Results
		0.40		MADE GROUND: Grass over dark brown slightly clayey slightly gravelly sand topsoil with some fine to medium plant rootlets Sand is medium to coarse grained. Gravel is subangular to subrounded fine to coarse of sandstone pottery, glass, red brick and quartz.	0.10 - 0.20	B+ES	
		0.50		MADE GROUND: Black slightly clayey gravelly sand. Sand is medium to coarse grained. Gravel is angular to subrounded fine to coarse of ash, slag, mudstone and quartz.	0.60 - 0.70	B+ES	
		1.10		Dark brown slightly sandy slightly gravelly CLAY. Sand is fine to medium grained. Gravel is subangular to subrounded fine to coarse of clay, red brick, mudstone and quartz (re-worked).	1.10 - 1.20	B+ES	N=8 (1,1/2,2,2,2)
				Firm dark brown mottled grey slightly sandy slightly gravelly medium strength CLAY of intermediate plasticity. Sand is fine to medium grained. Gravel is subangular to subrounded fine to coarse of sandstone, mudstone and quartz.	1.20 - 1.65	SPT (S)	
					1.20 - 1.65	B+D	
		3.45		Firm becoming stiff with depth dark brown slightly sandy slightly gravelly high strength CLAY. Sand is fine to medium grained. Gravel is subangular to subrounded fine to coarse of sandstone, mudstone and quartz.	2.00 - 2.45	SPT (S)	N=9 (1,1/2,2,2,3)
					2.00 - 2.45	B+D	
					3.00 - 3.45	U	42 blows [450mm]
					3.45 - 3.50	B	
					4.00 - 4.45	SPT (S)	N=10 (1,1/2,2,3,3)
					4.00 - 4.45	B+D	
					5.00 - 5.45	U	48 blows [450mm]
					5.45 - 5.50	B	
					6.00 - 6.45	SPT (S)	N=10 (1,2/2,2,3,3)
					6.00 - 6.45	B+D	
					7.50 - 7.95	U	62 blows [450mm]
					7.95 - 8.00	B	
					9.00 - 9.45	SPT (S)	N=23 (2,3/4,5,7,7)
					9.00 - 9.45	B+D	

Hole Diameter				Casing Depths				General Remarks			Chiselling			Ground Water				
Depth Base (m)	Diameter (mm)	Depth Base (m)	Diameter (mm)	From (m)	To (m)	Time (hr)	Depth Strike (m)	Depth Casing (m)	Depth Sealed (m)	Time Elapsed (min)	Water Level (m)							
20.00	150	19.50	150				15.00	14.90	19.50	20	14.90							

1.2m hand excavated inspection pit dug
Ground water encountered at 15.00m

Borehole Log

BH06

Contract no: S220408	Site: Project Borealis, Fujifilm	Driller: Bainbridge Brothers Ltd	GL (AOD):
Client: Fujifilm		Plant used: Dando 2000	Easting: 446477
Method: Cable Percussive		Started: 27/04/2022	Northing: 522993
		Ended: 27/04/2022	Logged: SM
		Backfilled: 27/04/2022	Status: FINAL

Backfill / Installation	Legend	Depth (m)	Level (m AOD)	Stratum Description	Samples and Insitu Testing		
					Depth (m)	Type	Results
				Firm becoming stiff with depth dark brown slightly sandy slightly gravelly high strength CLAY. Sand is fine to medium grained. Gravel is subangular to subrounded fine to coarse of sandstone, mudstone and quartz.	10.50 - 10.95	U	120 blows [450mm]
		10.95		Stiff thinly laminated brown sandy slightly gravelly medium to high strength CLAY. Sand is medium to coarse grained. Gravel is angular to subrounded fine to medium of sandstone and quartz.	10.95 - 11.00	B	
		11.30		Stiff thinly laminated reddish brown sandy slightly gravelly medium to high strength silty CLAY. Sand is medium to coarse grained. Gravel is subangular to subrounded fine to coarse of sandstone, siltstone, mudstone and quartz.	12.00 - 12.45	SPT (S)	N=25 (3,4/5,6,7,7)
					12.00 - 12.45	B + D	
					13.50 - 13.95	SPT (S)	N=23 (4,4/5,6,6,6)
					13.50 - 13.95	B + D	
					15.00 - 15.45	SPT (S)	N=22 (3,5/5,5,6,6)
					15.00 - 15.45	B + D	
					16.50 - 16.95	SPT (S)	N=25 (3,4/6,6,6,7)
					16.50 - 16.95	B + D	
					18.00 - 18.45	SPT (S)	N=27 (4,4/6,6,7,8)
					18.00 - 18.45	B + D	
		18.55		Stiff dark brown slightly sandy, slightly gravelly high strength CLAY. Sand is medium to coarse grained. Gravel is subangular to subrounded, fine to medium of mudstone, sandstone and quartz.	19.50 - 19.95	SPT (S)	N=40 (4,5/7,10,11,12)
					19.50 - 19.95	B + D	
		20.00		End of Borehole at 20.000m			

Hole Diameter				Casing Depths				General Remarks			Chiselling			Ground Water				
Depth Base (m)	Diameter (mm)	Depth Base (m)	Diameter (mm)				From (m)	To (m)	Time (hr)	Depth Strike (m)	Depth Casing (m)	Depth Sealed (m)	Time Elapsed (min)	Water Level (m)				
20.00	150	19.50	150	1.2m hand excavated inspection pit dug Ground water encountered at 15.00m						15.00	14.90	19.50	20	14.90				



12-16 Yarm Road
Stockton on Tees
TS18 3NA
01642 607083
info@solmek.com

Borehole Log

Scale 1:50 Sheet 1 of 2

BH07

Contract no: S220408	Site: Project Borealis, Fujifilm	Driller: Bainbridge Brothers Ltd	GL (AOD):
Client: Fujifilm		Plant used: Dando 2000	Easting: 446482
Method: Cable Percussive		Started: 28/04/2022	Northing: 523043
		Ended: 28/04/2022	Logged: SM
		Backfilled: 28/04/2022	Status: FINAL

Backfill / Installation	Legend	Depth (m)	Level (m AOD)	Stratum Description	Samples and Insitu Testing		
					Depth (m)	Type	Results
		0.30		MADE GROUND: Grass over dark brown/black gravelly sand with some fine to medium plant rootlets. Sand is medium to coarse grained. Gravel is angular to subrounded fine to coarse of ash, red brick, concrete, mudstone and quartz.	0.20 - 0.30	B+ES	
		0.60		Firm greenish grey slightly sandy slightly gravelly medium strength CLAY. Sand is fine to medium grained. Gravel is subangular to subrounded fine to coarse of mudstone, sandstone and quartz.	0.60 - 0.70	B+ES	
		1.00		Firm light brown sandy gravelly low to medium strength CLAY. Sand is medium to coarse grained. Gravel is angular to subrounded fine to medium of mudstone, sandstone, siltstone and quartz.	1.20 - 1.65	SPT (S)	N=7 (1,1/1,2,2,2)
					1.20 - 1.65	B+D	
					2.00 - 2.45	SPT (S)	N=7 (1,1/1,2,2,2)
					2.00 - 2.45	B+D	
		2.80		Firm becoming stiff thinly laminated brown mottled grey slightly sandy slightly gravelly low to high strength CLAY of high plasticity. Sand is fine to medium grained. Gravel is subangular to subrounded fine to coarse of mudstone, sandstone and quartz.	3.00 - 3.45	U	32 blows [450mm]
					3.45 - 3.50	B	
					4.00 - 4.45	SPT (S)	N=9 (1,2/2,2,2,3)
					4.00 - 4.45	B+D	
					5.00 - 5.45	U	39 blows [450mm]
					5.45 - 5.50	B	
6.05		Stiff dark brown slightly sandy slightly gravelly high strength CLAY. Gravel is subangular to subrounded fine to coarse of mudstone, sandstone and quartz.	6.00 - 6.45	SPT (S)	N=15 (2,3/3,4,4,4)		
			6.00 - 6.45	B+D			
			7.50 - 7.95	U	117 blows [450mm]		
			7.95 - 8.00	B			
8.70		Stiff occasionally thinly laminated dark brown sandy slightly gravelly medium strength CLAY. Sand is medium to coarse grained. Gravel is subangular to subrounded fine to coarse of mudstone and quartz.	9.00 - 9.45	SPT (S)	N=14 (2,2/3,3,4,4)		
			9.00 - 9.45	B+D			
10.00							

Hole Diameter				Casing Depths				General Remarks			Chiselling			Ground Water				
Depth Base (m)	Diameter (mm)	Depth Base (m)	Diameter (mm)	From (m)	To (m)	Time (hr)	Depth Strike (m)	Depth Casing (m)	Depth Sealed (m)	Time Elapsed (min)	Water Level (m)							
20.00	150	19.50	150				15.30	15.20		20	14.20							

1.2m hand excavated inspection pit dug
Ground water encountered at 15.30m

Borehole Log

BH07

Contract no: S220408	Site: Project Borealis, Fujifilm	Driller: Bainbridge Brothers Ltd	GL (AOD):
Client: Fujifilm		Plant used: Dando 2000	Easting: 446482
Method: Cable Percussive		Started: 28/04/2022	Northing: 523043
		Ended: 28/04/2022	Logged: SM
		Backfilled: 28/04/2022	Status: FINAL

Backfill / Installation	Legend	Depth (m)	Level (m AOD)	Stratum Description	Samples and Insitu Testing					
					Depth (m)	Type	Results			
		12.80		Stiff dark brown slightly gravelly high strength silty CLAY of intermediate plasticity. Sand is fine to medium grained. Gravel is subangular to subrounded fine to coarse of sandstone and mudstone.	10.50 - 10.95	U	116 blows [450mm]			
					10.95 - 11.00	B				
					12.00 - 12.45	SPT (S)	N=13 (1,2/2,3,3,5)			
					12.00 - 12.45	B+D				
					12.80		Stiff dark reddish brown sandy slightly gravelly high strength CLAY. Sand is medium to coarse grained. Gravel is subangular to subrounded fine to coarse of sandstone, mudstone and quartz.	13.50 - 13.95	SPT (S)	N=22 (2,2/5,5,5,7)
							13.50 - 13.95	B+D		
								15.00 - 15.45	SPT (S)	N=24 (2,3/5,6,6,7)
								15.00 - 15.45	B+D	
								16.50 - 16.95	SPT (S)	N=25 (3,5/5,6,6,8)
								16.50 - 16.95	B+D	
				18.00 - 18.45	SPT (S)	N=24 (3,4/6,6,6,6)				
				18.00 - 18.45	B+D					
				19.00 - 19.45	SPT (S)	N=23 (3,4/4,5,6,8)				
				19.00 - 19.95	B+D					
		20.00		End of Borehole at 20.000m						

Hole Diameter				Casing Depths				General Remarks			Chiselling			Ground Water				
Depth Base (m)	Diameter (mm)	Depth Base (m)	Diameter (mm)				From (m)	To (m)	Time (hr)	Depth Strike (m)	Depth Casing (m)	Depth Sealed (m)	Time Elapsed (min)	Water Level (m)				
20.00	150	19.50	150	1.2m hand excavated inspection pit dug Ground water encountered at 15.30m						15.30	15.20		20	14.20				

Borehole Log

BH08

Contract no: S220408	Site: Project Borealis, Fujifilm	Driller: Bainbridge Brothers Ltd	GL (AOD):
Client: Fujifilm		Plant used: Dando 2000	Eastings: 446530
Method: Cable Percussive		Started: 25/04/2022	Northing: 523030
		Ended: 25/04/2022	Logged: SM
		Backfilled: 24/04/2022	Status: FINAL

Backfill / Installation	Legend	Depth (m)	Level (m AOD)	Stratum Description	Samples and Insitu Testing				
					Depth (m)	Type	Results		
		0.40		MADE GROUND: Brown slightly sandy gravelly clay. Sand is medium to coarse grained. Gravel is subangular to subrounded fine to coarse of red brick, concrete, ash, dolomite, mudstone, sandstone and quartz.	0.30 - 0.40	B+ES			
				Firm to stiff light brown sandy gravelly medium strength CLAY. Sand is medium to coarse grained. Gravel is subangular to subrounded fine to coarse of mudstone, sandstone and quartz.	0.70 - 0.80	B+ES			
					1.20 - 1.65	SPT (S)	N=12 (2,2/3,3,3,3)		
					1.20 - 1.65	B+D			
					2.00 - 2.45	SPT (S)	N=12 (1,2/3,3,3,3)		
					2.00 - 2.45	B+D			
				2.70		Firm to stiff thin laminated dark brown mottled grey slightly sandy slightly gravelly low to high strength silty CLAY of high plasticity. Sand is medium to coarse grained. Gravel is subangular to subrounded fine to coarse of mudstone, sandstone and quartz.	3.00 - 3.45	U	33 blows [450mm]
							3.45 - 3.50	B	
							4.00 - 4.45	SPT (S)	N=9 (2,2/2,2,2,3)
							4.00 - 4.45	B + D	
					5.00 - 5.45	U	32 blows [450mm]		
					5.45 - 5.50	B			
					6.00 - 6.45	SPT (S)	N=25 (2,2/4,5,8,8)		
					6.00 - 6.45	B+D			
					7.50 - 7.95	SPT (S)	N=24 (2,3/5,5,7,7)		
					7.50 - 7.95	B+D			
					9.00 - 9.45	SPT (S)	N=19 (2,3/4,4,5,6)		
					9.00 - 9.45	B+D			
		9.40		Stiff occasionally thin laminated dark greyish brown slightly sandy slightly gravelly medium to high strength CLAY. Sand is medium to coarse grained. Gravel is angular to subrounded fine to coarse of mudstone, sandstone and quartz.					


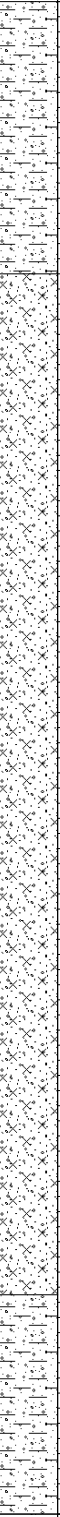
Hole Diameter				Casing Depths				General Remarks			Chiselling			Ground Water				
Depth Base (m)	Diameter (mm)	Depth Base (m)	Diameter (mm)	From (m)	To (m)	Time (hr)	Depth Strike (m)	Depth Casing (m)	Depth Sealed (m)	Time Elapsed (min)	Water Level (m)							
20.00	150	19.50	150				15.80	15.70	17.00	20	15.45							

1.2m hand excavated inspection pit.
Groundwater encountered at 15.80m.

Borehole Log

BH08

Contract no: S220408	Site: Project Borealis, Fujifilm	Driller: Bainbridge Brothers Ltd	GL (AOD):
Client: Fujifilm		Plant used: Dando 2000	Easting: 446530
Method: Cable Percussive		Started: 25/04/2022	Northing: 523030
		Ended: 25/04/2022	Logged: SM
		Backfilled: 24/04/2022	Status: FINAL

Backfill / Installation	Legend	Depth (m)	Level (m AOD)	Stratum Description	Samples and Insitu Testing		
					Depth (m)	Type	Results
		11.80		Stiff occasionally thin laminated dark greyish brown slightly sandy slightly gravelly medium to high strength CLAY. Sand is medium to coarse grained. Gravel is angular to subrounded fine to coarse of mudstone, sandstone and quartz.	10.50 - 10.95	SPT (S) B+D	N=15 (2,3/3,4,4,4)
				Dense light reddish brown slightly gravelly very silty SAND with occasional CLAY inclusions. Sand is fine to medium grained. Gravel is subangular to subrounded fine to medium of mudstone, sandstone and quartz.	12.00 - 12.45	SPT (S) B+D	N=20 (2,3/4,5,5,6)
					13.50 - 13.95	SPT (S) B+D	N=20 (2,3/4,5,5,6)
					15.00 - 15.45	SPT (S) B+D	N=21 (3,3/4,5,6,6)
					16.50 - 16.95	SPT (S) B+D	N=20 (2,3/3,5,6,6)
					18.00 - 18.45	SPT (S) B+D	N=36 (3,4/8,8,10,10)
		18.55		Stiff dark brown slightly sandy slightly gravelly high strength CLAY. Sand is fine to medium grained. Gravel is subangular to subrounded fine to coarse of mudstone, sandstone and quartz.	19.50 - 19.95	SPT (S) B+D	N=26 (3,5/5,6,6,9)
		20.00		End of Borehole at 20.000m			

Hole Diameter				Casing Depths				General Remarks			Chiselling			Ground Water				
Depth Base (m)	Diameter (mm)	Depth Base (m)	Diameter (mm)				From (m)	To (m)	Time (hr)	Depth Strike (m)	Depth Casing (m)	Depth Sealed (m)	Time Elapsed (min)	Water Level (m)				
20.00	150	19.50	150	1.2m hand excavated inspection pit. Groundwater encountered at 15.80m.						15.80	15.70	17.00	20	15.45				

Borehole Log

BH09

Contract no: S220408	Site: Project Borealis, Fujifilm	Driller: Bainbridge Brothers Ltd	GL (AOD):
Client: Fujifilm		Plant used: Dando 2000	Easting: 446567
Method: Cable Percussive		Started: 05/05/2022	Northing: 523062
		Ended: 05/05/2022	Logged: SM
		Backfilled: 05/05/2022	Status: FINAL

Backfill / Installation	Legend	Depth (m)	Level (m AOD)	Stratum Description	Samples and Insitu Testing		
					Depth (m)	Type	Results
				Stiff brown mottled grey slightly sandy slightly gravelly high strength CLAY. Sand is fine to medium grained. Gravel is subangular to subrounded fine to coarse of mudstone sandstone, coal and quartz.	10.50 - 10.95 10.50 - 10.95	SPT (S) B + D	N=27 (3,3/6,6,7,8)
		11.90		Dense becoming very dense reddish brown slightly silty slightly gravelly SAND. Sand is medium to coarse grained. Gravel is subangular to subrounded fine to coarse of coal and quartz.	12.00 - 12.45 12.00 - 12.45	SPT (S) B + D	N=25 (3,3/5,5,7,8)
					13.50 - 13.95 13.50 - 13.95	SPT (S) B + D	N=50+ (5,8/12,16,16,6)
		14.60		Dense reddish brown slightly silty SAND with some clay bands. Sand is is fine to medium grained.	15.00 - 15.45 15.00 - 15.45	SPT (S) B + D	N=22 (3,5/5,5,6,6)
					16.50 - 16.95 16.50 - 16.95	SPT (S) B + D	N=23 (3,4/5,6,6,6)
					18.00 - 18.45 18.00 - 18.45	SPT (S) B + D	N=25 (2,4/6,6,6,7)
		18.90		Stiff brown slightly sandy slightly gravelly high strength CLAY. Gravel is subangular to subrounded fine to coarse of mudstone, sandstone and quartz.	19.50 - 19.95 19.50 - 19.95	SPT (S) B + D	N=34 (4,5/7,8,9,10)
		20.00		End of Borehole at 20.000m			

Hole Diameter				Casing Depths				General Remarks			Chiselling			Ground Water				
Depth Base (m)	Diameter (mm)	Depth Base (m)	Diameter (mm)	1.2m hand excavated inspection pit. Groundwater encountered at 15.20m.			From (m)	To (m)	Time (hr)	Depth Strike (m)	Depth Casing (m)	Depth Sealed (m)	Time Elapsed (min)	Water Level (m)				
20.00	150	19.50	150							15.20			20	14.60				



12-16 Yarm Road
Stockton on Tees
TS18 3NA
01642 607083
info@solmek.com

Borehole Log

Scale 1:50 Sheet 1 of 2

BH10

Contract no: S220408	Site: Project Borealis, Fujifilm	Driller: Bainbridge Brothers Ltd	GL (AOD):
Client: Fujifilm		Plant used: Dando 2000	Easting: 446506
Method: Cable Percussive		Started: 28/04/2022	Northing: 522876
		Ended: 28/04/2022	Logged: SM
		Backfilled: 28/04/2022	Status: FINAL


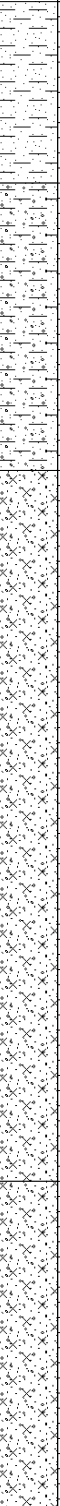
Backfill / Installation	Legend	Depth (m)	Level (m AOD)	Stratum Description	Samples and Insitu Testing		
					Depth (m)	Type	Results
		0.15		MADE GROUND: Grass over dark greyish black gravelly sand. Sand is medium to coarse grained. Gravel is angular to subrounded fine to coarse of ash and limestone.	0.30 - 0.40	B+ES	
				Firm thinly laminated light brown and brown sandy low to medium strength silty CLAY of high plasticity. Sand is medium to coarse grained. Gravel is subangular to subrounded fine to coarse of mudstone, sandstone and quartz.	0.70 - 0.80	B+ES	
					1.20 - 1.65	U	49 blows [450mm]
					1.65 - 1.70	B	
					2.00 - 2.45	SPT (S)	N=8 (1,1/1,2,2,3)
					2.00 - 2.45	B+D	
					3.00 - 3.45	SPT (S)	N=5 (1,1/0,1,2,2)
					3.00 - 3.45	B+D	
					4.00 - 4.45	U	66 blows [450mm]
					4.45 - 4.50	B	
					5.00 - 5.45	SPT (S)	N=9 (1,1/1,2,2,4)
					5.00 - 5.45	B+D	
					6.00 - 6.45	U	84 blows [450mm]
					6.45 - 6.50	B	
				7.20		Firm dark greyish brown slightly sandy slightly gravelly medium strength CLAY. Sand is fine to medium grained. Gravel is subangular to subrounded fine to coarse of mudstone, sandstone and quartz.	7.50 - 7.95
					7.50 - 7.95	B+D	
					9.00 - 9.45	U	138 blows [450mm]
					9.45 - 9.50	B	
		9.90					

Hole Diameter				Casing Depths				General Remarks			Chiselling			Ground Water				
Depth Base (m)	Diameter (mm)	Depth Base (m)	Diameter (mm)	From (m)	To (m)	Time (hr)	Depth Strike (m)	Depth Casing (m)	Depth Sealed (m)	Time Elapsed (min)	Water Level (m)							
20.00	150	19.50	150	1.2m hand excavated inspection pit dug Ground water encountered at 15.90m			15.90	15.90		20	15.50							

Borehole Log

BH10

Contract no: S220408	Site: Project Borealis, Fujifilm	Driller: Bainbridge Brothers Ltd	GL (AOD):
Client: Fujifilm		Plant used: Dando 2000	Easting: 446506
Method: Cable Percussive		Started: 28/04/2022	Northing: 522876
		Ended: 28/04/2022	Logged: SM
		Backfilled: 28/04/2022	Status: FINAL

Backfill / Installation	Legend	Depth (m)	Level (m AOD)	Stratum Description	Samples and Insitu Testing			
					Depth (m)	Type	Results	
		11.20		Firm occasionally thinly laminated brown sandy medium strength CLAY.	10.50 - 10.95	SPT (S) B+D	N=13 (2,2/3,3,4)	
				12.00 - 12.45	U	164 blows [450mm]		
		13.10		Stiff dark reddish brown slightly sandy slightly gravelly high strength CLAY of low plasticity. Sand is fine to medium grained. Gravel is angular to subrounded fine to coarse of mudstone, sandstone and quartz.	12.45 - 12.50	B		
				Dense reddish brown silty slightly gravelly SAND. Sand is medium to coarse grained. Gravel is subangular to subrounded fine to medium of mudstone and quartz.	13.50 - 13.95	SPT (S) B+D	N=48 (4,7/10,12,12,14)	
		15.00			15.00 - 15.45	SPT (S) B+D	N=49 (5,8/9,11,13,16)	
					16.50 - 16.95	SPT (S) B+D	N=31 (4,5/5,7,9,10)	
		17.80			Dense reddish brown slightly silty slightly gravelly SAND. Sand is medium to coarse grained. Gravel is subangular to subrounded fine to medium of coal and quartz.	18.00 - 18.45	SPT (S) B+D	N=23 (3,4/4,5,6,8)
					19.50 - 19.95	SPT (S) B+D	N=34 (4,6/7,7,9,11)	
		20.00			End of Borehole at 20.000m			

Hole Diameter				Casing Depths				General Remarks			Chiselling			Ground Water				
Depth Base (m)	Diameter (mm)	Depth Base (m)	Diameter (mm)	1.2m hand excavated inspection pit dug Ground water encountered at 15.90m			From (m)	To (m)	Time (hr)	Depth Strike (m)	Depth Casing (m)	Depth Sealed (m)	Time Elapsed (min)	Water Level (m)				
20.00	150	19.50	150							15.90	15.90		20	15.50				



SOLMEK

Solmek Ltd
12-16 Yarm Road
Stockton on Tees
TS18 3NA
Tel: 01642 607083
Email: info@solmek.com

Trial Pit Log

TrialPit No
TP01
Sheet 1 of 1

Project Name: Project Borealis, Fujifilm	Project No. S220408	Co-ords: 446527E - 522859N Level:	Date 27/04/2022
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Plant Used: JCB 3CX	Client: Fujifilm	Dimensions (m): Depth 2.50	Scale 1:26 Logged SM
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Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.20	B+ES		0.20			MADE GROUND: Dark brown slightly clayey. Slightly gravelly sand topsoil with some fine to medium plant rootlets. Sand is medium to coarse grained. Gravel is subangular to subrounded fine to coarse.
	0.40 - 0.60	B+ES		0.60			MADE GROUND: Dark brown slightly sandy gravelly CLAY. Sand is fine to medium grained. Gravel is subangular to subrounded, fine to coarse of red brick, plastic, concrete, mudstone and quartz.
	0.80 - 1.00 0.80	B+ES HV	74kPa	1.90			Firm becoming stiff dark reddish brown slightly sandy, slightly gravelly medium high strength CLAY. Gravel is angular to subrounded, fine to coarse of sandstone, siltstone, mudstone and quartz.
	1.80 2.00 - 2.20	HV B	97kPa	2.50			Firm brown and light brown sandy medium strength silty CLAY. Sand is medium to coarse grained.
	2.40	HV	58kPa				End of Pit at 2.500m

Remarks: No groundwater encountered.

Stability: Pit wall open and stable on completion.



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Solmek Ltd
 12-16 Yarm Road
 Stockton on Tees
 TS18 3NA
 Tel: 01642 607083
 Email: info@solmek.com

Trial Pit Log

Trial Pit No
TP02
 Sheet 1 of 1

Project Name: Project Borealis, Fujifilm	Project No. S220408	Co-ords: 446531E - 522883N Level:	Date 27/04/2022
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Plant Used: JCB 3CX	Dimensions (m): Depth 2.75	Scale 1:26
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Client: Fujifilm	Logged SM
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Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.20 - 0.30	B+ES		0.35			MADE GROUND: Dark grey sandy gravel, sand is medium coarse grained. Gravel is angular to subrounded, fine to coarse of limestone, wood chippings.
	0.60 - 0.65	B+ES		0.60			MADE GROUND: Reinforced concrete with approx 4mm rebar. No DPM observed
	0.75	HV	73kPa	0.70			MADE GROUND: Type 1 dolomite fill.
	0.80 - 1.00	B+ES					Firm/stiff light brown sandy slightly gravelly medium strength CLAY.
	1.60 - 1.80	B		1.60			Light brown and brown slightly clayey, slightly silty, slightly gravelly medium to coarse SAND. Gravel subangular to subrounded, fine to coarse of mudstone and quartz.
	2.00	HV	112kPa	2.00			Stiff dark reddish brown mottled grey slightly sandy slightly gravelly high strength CLAY. Sand is medium to coarse grained. Gravel is subangular to subrounded, fine to coarse of mudstone, sandstone and quartz.
	2.40 - 2.60	B					
	2.60	HV	124kPa	2.75			
	End of Pit at 2.750m						

Remarks: No groundwater encountered.
 No visual/olfactory contamination noted.

Stability: Pit wall open and stable on completion.



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Solmek Ltd
 12-16 Yarm Road
 Stockton on Tees
 TS18 3NA
 Tel: 01642 607083
 Email: info@solmek.com

Trial Pit Log

TrialPit No
TP03
 Sheet 1 of 1

Project Name: Project Borealis, Fujifilm	Project No. S220408	Co-ords: 446475E - 522889N Level:	Date 27/04/2022
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Plant Used: JCB 3CX	Dimensions (m):	Scale 1:26
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Client: Fujifilm	Depth 3.00	0.80	1.80	Logged SM
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Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.20 - 0.30	B+ES					MADE GROUND: Dark brown sand topsoil over dark purpleish black, sandy gravel. Sand is medium coarse grained. Gravel is subangular to subrounded, fine to coarse of ash, quartz, mudstone and sandstone.	
	0.30	HV	50kPa	0.30				
	0.50 - 0.60	B+ES					Firm becoming stiff brown and light brown slightly sandy, slightly gravelly medium strength CLAY. Sand is medium to coarse grained. Gravel is subangular to subrounded, fine to coarse of sandstone, mudstone, quartz.	
	1.00	HV	97kPa					
	1.20 - 1.40	B		1.20			Firm with areas of stiffness thinly laminated slightly sandy slightly gravelly medium strength silty CLAY. Sand is medium to coarse grained. Gravel is subangular to subrounded, fine to medium of sandstone and quartz.	1
	1.60	HV	82kPa					
	2.00	HV	70kPa				End of Pit at 3.000m	2
	2.20 - 2.40	B						
	3.00	HV	60kPa	3.00				3
								4
								5

Remarks: No groundwater encountered.

Stability: Pit wall open and stable on completion.



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Solmek Ltd
12-16 Yarm Road
Stockton on Tees
TS18 3NA
Tel: 01642 607083
Email: info@solmek.com

Trial Pit Log

TrialPit No
TP04
Sheet 1 of 1

Project Name: Project Borealis, Fujifilm	Project No. S220408	Co-ords: 446462E - 522876N Level:	Date 27/04/2022
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Plant Used: JCB 3CX	Dimensions (m):	Scale 1:26
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Client: Fujifilm	Depth 2.40	0.60	1.60	Logged SM
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Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.20 - 0.30	B+ES		0.10			MADE GROUND: Grass over brown gravelly sand topsoil with some fine to medium plant rootlets.
	0.40	HV	67kPa	0.30			MADE GROUND: Dark greyish black gravelly sand. Sand is medium to coarse grained. Gravel is subangular to subrounded, fine to coarse of ash, red brick, sandstone, concrete and quartz.
	0.50 - 0.60	B+ES					Firm becoming stiff light brown slightly sandy slightly gravelly medium high strength CLAY. Sand is medium to coarse grained. Gravel is subangular to subrounded, firm to medium of sandstone, siltstone, mudstone and quartz.
	1.40	HV	88kPa	1.70			Stiff dark brown sandy slightly gravelly high strength CLAY. Sand is medium to coarse grained. Gravel is subangular to subrounded, fine to medium of sandstone and mudstone.
	1.50 - 1.60	B					
	1.80 - 2.00	B					
	2.40	HV	90kPa	2.40			End of Pit at 2.400m

Remarks: No groundwater encountered.
No visual/olfactory contamination noted.

Stability: Pit wall open and stable on completion.



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Solmek Ltd
12-16 Yarm Road
Stockton on Tees
TS18 3NA
Tel: 01642 607083
Email: info@solmek.com

Trial Pit Log

TrialPit No
TP05
Sheet 1 of 1

Project Name: Project Borealis, Fujifilm	Project No. S220408	Co-ords: 446430E - 522878N Level:	Date 28/04/2022
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Plant Used:	Dimensions (m):	Scale 1:26
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Client: Fujifilm	Depth 2.90	Logged
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Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.10 - 0.20	ES					MADE GROUND: Grass over dark brown/black gravelly sand with some fine to medium plant rootlets. Sand is medium to coarse grained. Gravel is subangular to subrounded fine to coarse of ash, red brick, dolomite and quartz.
	0.30	HV	89kPa	0.30			
	0.50 - 0.60	B+ES					Stiff light reddish brown mottled grey slightly sandy, slightly gravelly CLAY. Sand is medium to coarse grained. Gravel is sub-angular to sub-rounded, fine to coarse of mudstone, sandstone and quartz.
	1.00	HV	90kPa				
	1.50 - 1.60	B					
	2.00	HV	59kPa	1.90			Firm thinly laminated light brown mottled grey slightly sandy slightly gravelly silty CLAY. Sand is medium to coarse grained. Gravel is subangular to subrounded, fine to coarse of mudstone, sandstone and quartz.
	2.50 - 2.60	B					
	2.80	HV	56kPa	2.90			
	End of Pit at 2.900m						

Remarks: No groundwater encountered
No visual/olfactory contamination noted.

Stability:



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Solmek Ltd
12-16 Yarm Road
Stockton on Tees
TS18 3NA
Tel: 01642 607083
Email: info@solmek.com

Trial Pit Log

TrialPit No
TP06
Sheet 1 of 1

Project Name: Project Borealis, Fujifilm	Project No. S220408	Co-ords: 446555E - 522946N Level:	Date 27/04/2022
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Plant Used: JCB 3CX	Dimensions (m): Depth 2.40	2.70 	Scale 1:26
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Client: Fujifilm	Logged SM
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Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.20 - 0.30	B+ES					MADE GROUND: Dark greyish brown sandy gravel. Sand is medium coarse grained. Gravel is subangular to subrounded, fine to coarse of limestone, wood chippings and quartz.
				0.50			MADE GROUND: Reinforced concrete with approx 6mm rebar present, DPM Observed.
	1.20 - 1.40 1.20	B+ES HV	38kPa	1.10			Firm dark orangish brown slightly sandy, slightly gravelly low to medium strength CLAY. Sand is medium coarse grained. Gravel is subangular to subrounded, fine to coarse of sandstone, mudstone and quartz.
	1.60	HV	32kPa				
	1.80	HV	44kPa				
				2.40			End of Pit at 2.400m

Remarks: No groundwater encountered.

Stability: Pit wall open and stable on completion.



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Solmek Ltd
12-16 Yarm Road
Stockton on Tees
TS18 3NA
Tel: 01642 607083
Email: info@solmek.com

Trial Pit Log

TrialPit No
TP07
Sheet 1 of 1

Project Name: Project Borealis, Fujifilm	Project No. S220408	Co-ords: 446564E - 522987N Level:	Date 27/04/2022
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Plant Used: JCB 3CX	Dimensions (m): Depth 1.50	2.20 	Scale 1:26
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Client: Fujifilm	Logged SM
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Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.50			MADE GROUND: Dark grey sandy gravel, sand is medium coarse grained. Gravel is subangular to subrounded fine to coarse of limestone and wood chippings. (14-20mm crushed stone.)
	1.00 - 1.20 1.00	B+ES HV	59kPa	1.00			MADE GROUND: Reinforced concrete with approx 6mm rebar, DPM observed.
				1.50			MADE GROUND: Orangish brown slightly sandy, slightly gravelly medium strength CLAY. Gravel is subangular to subrounded, fine to coarse of brick, concrete and quartz. (Re- worked)
							MADE GROUND: CONCRETE End of Pit at 1.500m

Remarks: No groundwater encountered.
Concrete Obstruction

Stability: Pit wall open and stable on completion.



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Solmek Ltd
12-16 Yarm Road
Stockton on Tees
TS18 3NA
Tel: 01642 607083
Email: info@solmek.com

Trial Pit Log

TrialPit No
TP08
Sheet 1 of 1

Project Name: Project Borealis, Fujifilm	Project No. S220408	Co-ords: 446574E - 523032N Level:	Date 27/04/2022
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Plant Used: JCB 3CX	Dimensions (m):	Scale 1:26
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Client: Fujifilm	Depth 2.80	0.60	1.90	Logged SM
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Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.20	B+ES		0.30			MADE GROUND: Light brown sandy gravel. Sand is medium to coarse grained. Gravel is subangular to subrounded, fine to coarse of limestone, dolostone and quartz. (type 1 hardcore)
	0.50	B+ES		0.40			MADE GROUND: Dark brownish grey sandy gravelly clay. Sand is fine to medium coarse grained. Gravel is subangular to subrounded, fine to coarse of dolostone, red brick, plastic, timber and quartz.
	0.50	HV	74kPa				Firm dark brown slightly sandy slightly gravelly medium high strength CLAY. Sand is medium to coarse grained. Gravel is subangular to subrounded, fine to coarse of sandstone, mudstone and quartz.
	0.90	B+ES		0.80			Stiff dark brown mottled grey slightly sandy, slightly gravelly medium to high strength CLAY. Sand is fine to medium grained. Gravel is subangular to subrounded, fine to coarse of sandstone and quartz.
	1.00	HV	90kPa				
	1.60	B		1.40			Firm brown and light brown slightly sandy, slightly gravelly medium strength CLAY. Sand is medium to coarse grained. Gravel is subangular to subrounded, fine to coarse of sandstone and quartz.
	2.60	B		2.80			End of Pit at 2.800m

Remarks: No groundwater encountered.

Stability: Pit wall open and stable on completion.



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Solmek Ltd
 12-16 Yarm Road
 Stockton on Tees
 TS18 3NA
 Tel: 01642 607083
 Email: info@solmek.com

Trial Pit Log

TrialPit No
TP09
 Sheet 1 of 1

Project Name: Project Borealis, Fujifilm	Project No. S220408	Co-ords: 446582E - 523061N Level:	Date 27/04/2022
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Plant Used: JCB 3CX	Dimensions (m):	Scale 1:26
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Client: Fujifilm	Depth 3.00	0.80	1.70	Logged SM
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Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description					
	Depth	Type	Results									
	0.20	B+ES		0.30			MADE GROUND: Dark brown sandy gravelly clay topsoil with some fine to medium plant rootlets. Gravel is subangular to subrounded, fine to coarse of red brick, sandstone, mudstone and quartz.					
	0.40 - 0.50 0.40	B+ES HV	58kPa							Firm light brown mottled grey slightly sandy slightly gravelly medium strength CLAY. Sand is medium to coarse grained. Gravel is subangular to subrounded, fine to coarse of sandstone, mudstone and quartz.		
	1.00	HV	64kPa	1.10			Stiff dark reddish brown mottled grey slightly sandy, slightly gravelly medium to high strength silty CLAY. Sand is medium to coarse grained. Gravel is subangular to subrounded, fine to coarse of sandstone, mudstone and quartz.	1				
	1.10 - 1.30	B+ES										
	1.20	HV	87kPa									
	2.20	HV	101kPa	3.00				2				
	2.40 - 2.50	B										
	End of Pit at 3.000m							3				
								4				
								5				

Remarks: No groundwater encountered.
 Position relocated due to dense vegetation

Stability: Pit wall open and stable on completion.

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Solmek Ltd
 12-16 Yarm Road
 Stockton on Tees
 TS18 3NA
 Tel: 01642 607083
 Email: info@solmek.com

Trial Pit Log

Trial Pit No
TP10
 Sheet 1 of 1

Project Name: Project Borealis, Fujifilm Project No. S220408 Co-ords: 446543E - 523055N Date: 27/04/2022

Plant Used: JCB 3CX Dimensions (m): 1.00 x 1.90 Scale: 1:26

Client: Fujifilm Depth: 3.00 Logged: SM

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.20 - 0.30	B+ES					MADE GROUND: Dark reddish brown gravelly clayey sand with some fine to medium plant rootlets and a low to medium cobble content. Sand is medium to coarse grained. Gravel is subangular to subrounded fine to coarse of red brick, concrete, ash, slag, mudstone, sandstone and quartz. Cobbles are subangular of red brick and slag.	
	0.40	HV	72kPa	0.35				
	0.60 - 0.70	B+ES					MADE GROUND: Dark greyish brown slightly sandy slightly gravelly clay. Sand is fine to medium grained. Gravel is subangular to subrounded fine to coarse of ash, sandstone, mudstone and quartz.	
	0.90 - 1.00	B+ES		0.80				
	1.00	HV	99kPa				Stiff light brown mottled grey slightly sandy slightly gravelly medium to high strength silty CLAY.	1
	1.80 - 2.00	B		1.65				
	2.00	HV	71kPa				Firm to stiff light brown slightly sandy slightly gravelly medium to high strength CLAY. Sand is medium to coarse grained. Gravel is subangular to subrounded fine to coarse of sandstone, mudstone and quartz.	2
	2.80 - 3.00	B		3.00				
							End of Pit at 3.000m	3
								4
								5

Remarks: Slight groundwater ingress at 2.40m.
 No visual/olfactory contamination noted.

Stability: Pit walls open and stable on completion.

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Solmek Ltd
 12-16 Yarm Road
 Stockton on Tees
 TS18 3NA
 Tel: 01642 607083
 Email: info@solmek.com

Trial Pit Log

Trial Pit No
TP11
 Sheet 1 of 1

Project Name: Project Borealis, Fujifilm	Project No. S220408	Co-ords: 446515E - 523045N Level:	Date 27/04/2022
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Plant Used: JCB 3CX	Dimensions (m):	Scale 1:26
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Client: Fujifilm	Depth 3.00	Logged SM
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Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.20 - 0.30	B+ES		0.30			MADE GROUND: Dark brown sandy slightly gravelly clay topsoil with some fine to medium plant rootlets. Sand is fine to medium grained. Gravel is subangular to subrounded fine to coarse of red brick, mudstone and quartz.
	0.30	HV	82kPa				
	0.50 - 0.60	B+ES		2.00			Stiff light brown mottled grey slightly sandy slightly gravelly medium to high strength CLAY. Sand is fine to medium grained. Gravel is subangular to subrounded of mudstone, sandstone and quartz.
	1.00	HV	79kPa				
	1.20 - 1.40	B					
	2.20 - 2.40	B		2.70			Stiff light brown mottled grey sand slightly gravelly medium strength silty CLAY. Sand is medium to coarse grained. Gravel is subangular to subrounded fine to coarse of sandstone, mudstone and quartz.
	2.80 - 3.00	B					
				3.00			End of Pit at 3.000m

Remarks: No groundwater encountered.
 No visual/olfactory contamination noted.

Stability: Pit walls open and stable on completion.



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Solmek Ltd
12-16 Yarm Road
Stockton on Tees
TS18 3NA
Tel: 01642 607083
Email: info@solmek.com

Trial Pit Log

TrialPit No
TP12
Sheet 1 of 1

Project Name: Project Borealis, Fujifilm	Project No. S220408	Co-ords: 446460E - 523020N Level:	Date 27/04/2022
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Plant Used: JCB 3CX	Dimensions (m):	Scale 1:26
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Client: Fujifilm	Depth 3.00	Logged SM
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Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.10 - 0.20	B+ES					MADE GROUND: Dark brown and black gravelly sand with some fine to medium plant rootlets. Sand is fine to coarse grained. Gravel is subangular to subrounded fine to coarse of red brick, ash, sandstone and quartz.	
	0.30	HV	77kPa	0.25				
	0.40 - 0.50	B+ES					MADE GROUND: Dark greyish brown slightly sandy slightly gravelly medium strength CLAY. Sand is medium to coarse grained. Gravel is subangular to subrounded fine to coarse of red brick, clay pipe (land drainage) sandstone, mudstone and quartz.	
	0.80 - 0.90	B+ES		0.75				
	1.00	HV	108kPa				Stiff light brown mottled grey slightly sandy slightly gravelly medium to high strength CLAY. Sand is fine to medium grained. Gravel is subangular to subrounded fine to coarse of sandstone, mudstone and quartz.	1
	1.80 - 1.90	B						
	2.20	HV	122kPa				Stiff light brown sandy slightly gravelly medium to high strength silty CLAY. Sand is medium to coarse grained. Gravel is subangular to subrounded fine to coarse of mudstone, sandstone and quartz.	2
	2.80 - 2.90	B		2.60				
				3.00			End of Pit at 3.000m	3
								4
								5

Remarks: No groundwater encountered.
No visual/olfactory contamination noted.

Stability: Pit walls open and stable on completion.



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Solmek Ltd
12-16 Yarm Road
Stockton on Tees
TS18 3NA
Tel: 01642 607083
Email: info@solmek.com

Trial Pit Log

Trial Pit No
TP13
Sheet 1 of 1

Project Name: Project Borealis, Fujifilm	Project No. S220408	Co-ords: 446459E - 522996N Level:	Date 27/04/2022
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Plant Used: JCB 3CX	Dimensions (m):	Scale 1:26
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Client: Fujifilm	Depth 3.00	Logged SM
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Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.20 - 0.30	B+ES					MADE GROUND: Dark brown sandy slightly gravelly clay topsoil with many fine to medium plant rootlets. Sand is medium to coarse grained. Gravel is subangular to subrounded fine to coarse of red brick, ash, sandstone and mudstone.	
	0.30 - 0.40	B+ES		0.30				
	0.40	HV	70kPa	0.40				
	0.50 - 0.60	B+ES					MADE GROUND: Dark brown/black sandy gravel. Sand is medium to coarse grained. Gravel is angular to subrounded fine to coarse of ash, red brick and quartz.	
							Firm light brown slightly sandy slightly gravelly medium strength CLAY. Sand is medium to coarse grained. Gravel is subangular to subrounded fine to coarse of mudstone, quartz and sandstone.	
	1.00	HV	82kPa					1
	1.50 - 1.60	B						
	2.00 - 2.10	B		1.95				
	2.00	HV	97kPa				Stiff thinly laminated light orangish brown mottled grey slightly sandy slightly gravelly medium to high strength silty CLAY. Sand is fine to medium grained. Gravel is subangular to subrounded fine to medium of sandstone and quartz.	2
	2.80 - 3.00	B						
				3.00			End of Pit at 3.000m	3
								4
								5

Remarks: No groundwater encountered.
No visual/olfactory contamination noted.

Stability: Pit walls open and stable on completion.

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Solmek Ltd
 12-16 Yarm Road
 Stockton on Tees
 TS18 3NA
 Tel: 01642 607083
 Email: info@solmek.com

Trial Pit Log

Trial Pit No
TP14
 Sheet 1 of 1

Project Name: Project Borealis, Fujifilm	Project No. S220408	Co-ords: 446527E - 522989N Level:	Date 27/04/2022
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Plant Used: JCB 3CX	Dimensions (m):	Scale 1:26
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Client: Fujifilm	Depth 3.00	Logged SM
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Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.20 - 0.30 0.30	B+ES HV	60kPa	0.30			MADE GROUND: Dark brown slightly clayey slightly gravelly sand topsoil with some fine to medium plant rootlets. Sand is medium to coarse grained. Gravel is subangular to subrounded, fine to coarse of sandstone and quartz.
	0.50 - 0.60	B+ES		0.60			MADE GROUND: Dark brown/black slightly sandy gravel. Sand is medium to coarse grained. Gravel is angular to subrounded, fine to coarse of ash, sandstone and quartz.
	1.00 - 1.20 1.00	B+ES HV	94kPa				Firm light brown, slightly sandy, slightly gravelly medium to high strength silty CLAY. Sand is medium coarse grained. Gravel is subangular to subrounded, fine to coarse of sandstone, mudstone and quartz.
	2.00 - 2.20 2.00	B HV	112kPa	2.00			Stiff dark reddish brown slightly sandy, slightly gravelly high strength silty CLAY.
	2.80 - 3.00	B		3.00			End of Pit at 3.000m

Remarks: No groundwater encountered.
 No visual/olfactory contamination noted.

Stability: Pit wall open and stable on completion.

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Solmek Ltd
 12-16 Yarm Road
 Stockton on Tees
 TS18 3NA
 Tel: 01642 607083
 Email: info@solmek.com

Trial Pit Log

TrialPit No
TP15
 Sheet 1 of 1

Project Name: Project Borealis, Fujifilm	Project No. S220408	Co-ords: 446526E - 523010N Level:	Date 27/04/2022
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Plant Used: JCB 3CX	Dimensions (m): 1.05 x 1.70	Scale 1:26
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Client: Fujifilm	Depth 3.00	Logged SM
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Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.20 - 0.30	B+ES		0.35			MADE GROUND: Dark brown sandy gravelly clay topsoil with some fine to medium plant rootlets. Sand is medium to coarse grained. Gravel is subangular to subrounded, fine to coarse of brick, quartz and ash.	
	0.50 - 0.60	B+ES		0.70			MADE GORUND: Dark purplish black sandy gravel. Sand is medium to coarse grained. Gravel is subangular to subrounded, fine to coarse of ash, mudstone and quartz.	
	0.80 - 1.00 0.80	B+ES HV	80kPa	1.60			Stiff light brown slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded, fine to coarse of sandstone, mudstone and quartz.	1
	1.80 - 2.00 1.80	B HV	62kPa	3.00			Firm brown and lightly brown slightly sandy, slightly gravelly silty CLAY. Sand is fine to medium grained. Gravel is subangular to subrounded, fine to coarse of sandstone, mudstone and quartz.	2
	2.80 - 3.00 2.80	B HV	59kPa				End of Pit at 3.000m	3
								4
								5

Remarks: No groundwater encountered.
 No visual/olfactory contamination noted.

Stability: Pit wall open and stable on completion.



SOLMEK

Solmek Ltd
12-16 Yarm Road
Stockton on Tees
TS18 3NA
Tel: 01642 607083
Email: info@solmek.com

Trial Pit Log

TrialPit No
TP16
Sheet 1 of 1

Project Name: Project Borealis, Fujifilm	Project No. S220408	Co-ords: 446481E - 522968N Level:	Date 27/04/2022
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Plant Used: JCB 3CX	Dimensions (m):	Scale 1:26
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Client: Fujifilm	Depth 3.00	0.90	1.60	Logged SM
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Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.20 - 0.30	B+ES					MADE GROUND: Dark brown slightly clayey, slightly gravelly sand topsoil with some fine to medium plant rootlets. Sand is medium to coarse grained. Gravel is subangular and subrounded, fine to coarse of quartz and sandstone.
	0.30	HV	67kPa	0.30			
	0.60 - 0.70	B+ES					Firm becoming stiff light brown and brown slightly sandy, slightly gravelly medium strength silty CLAY. Sand is medium to coarse grained. Gravel is subangular to subrounded, fine to coarse of sandstone and quartz.
	1.00	HV	118kPa				
	1.20 - 1.40	B		1.20			Stiff dark brown mottled grey slightly sandy, slightly gravelly medium to high strength CLAY. Sand is fine to medium grained. Gravel is subangular to subrounded, fine to coarse of sandstone, mudstone and quartz.
	2.00	HV	120kPa				
	2.20 - 2.40	B					
	3.00	HV	128kPa	3.00			End of Pit at 3.000m

Remarks: No groundwater encountered.
No visual/olfactory contamination noted.

Stability: Pit wall open and stable on completion.



SOLMEK

Solmek Ltd
 12-16 Yarm Road
 Stockton on Tees
 TS18 3NA
 Tel: 01642 607083
 Email: info@solmek.com

Trial Pit Log

TrialPit No
TP17
 Sheet 1 of 1

Project Name: Project Borealis, Fujifilm	Project No. S220408	Co-ords: 446531E - 522945N Level:	Date 27/04/2022
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Plant Used: JCB 3CX	Dimensions (m): Depth 3.00	2.40 0.70	Scale 1:26 Logged SM
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Client: Fujifilm			
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Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.10 - 0.15	B+ES		0.15			MADE GROUND: Dark brown slightly clayey slightly gravelly sand topsoil with some fine to medium plant rootlets. Gravel is subangular to subrounded, fine to coarse of ash and quartz.
	0.20 - 0.30	B+ES					
	0.30	HV	77kPa				
	0.70 - 0.80	B+ES		0.30			MADE GROUND: Dark greyish black sandy gravel sand is medium to coarse grained. Gravel is subangular to subrounded, fine to coarse of ash, brick and quartz. Stiff light brown slightly sandy slightly gravelly medium to high strength CLAY. Sand is medium to coarse grained. Gravel is subangular to subrounded fine to coarse of ask and brick.
	1.00	HV	92kPa				
	1.70 - 1.80	B		1.90			Stiff thinly laminated light brown slightly sandy slightly gravelly medium strength silty CLAY. Sand is medium to coarse grained. Gravel is subangular to subrounded, fine to coarse of sandstone, mudstone and quartz.
	2.00	HV	114kPa				
	2.70 - 2.80	B		3.00			End of Pit at 3.000m

Remarks: No groundwater encountered.

Stability: Pit wall open and stable on completion.



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Solmek Ltd
12-16 Yarm Road
Stockton on Tees
TS18 3NA
Tel: 01642 607083
Email: info@solmek.com







Trial Pit Log

Trial Pit No
TP18
Sheet 1 of 1

Project Name: Project Borealis, Fujifilm	Project No. S220408	Co-ords: 446441E - 522937N Level:	Date 27/04/2022
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Plant Used: JCB 3CX	Dimensions (m): Depth 3.00	1.05  1.90	Scale 1:26
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Client: Fujifilm	Logged SM
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Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.20 - 0.30 0.30	B+ES HV	80kPa	0.30			MADE GROUND: Dark brown slightly clayey, slightly gravelly medium to coarse of sand topsoil with some fine to medium plant rootlets.
	0.60 - 0.70	B+ES					Stiff light brown slightly sandy slightly gravelly medium high strength CLAY. Sand is medium to coarse grained. Gravel is subangular to subrounded, fine to coarse of mudstone, sandstone and quartz.
	1.00 - 1.20 1.00	B+ES HV	88kPa				
	1.70 1.80 - 2.00	HV B	69kPa	1.60			Firm thinly laminated light orangish brown slightly sandy slightly gravelly medium strength silty CLAY. Gravel is subangular to subrounded, fine to medium of sandstone, mudstone and quartz.
	2.40 - 2.60	B					
				3.00			
							End of Pit at 3.000m

Remarks: No groundwater encountered.
No visual/olfactory contamination noted.

Stability: Pit wall open and stable on completion.



SOLMEK

Solmek Ltd
12-16 Yarm Road
Stockton on Tees
TS18 3NA
Tel: 01642 607083
Email: info@solmek.com

Trial Pit Log

TrialPit No
TP19
Sheet 1 of 1

Project Name: Project Borealis, Fujifilm Project No. S220408 Co-ords: 446480E - 522916N Date: 28/04/2022

Plant Used: Dimensions (m): Scale: 1:26

Client: Fujifilm Depth: 2.90 Logged

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.20	ES		0.30			MADE GROUND: Grass over dark brown/black gravelly sand with some fine to medium plant rootlets. Sand is medium to coarse grained. Gravel is subangular to subrounded fine to coarse of ash, red brick, dolomite and quartz.
	0.30	HV	82kPa				
	0.50 - 0.60	B+ES		1.90			Stiff light reddish brown mottled grey slightly sandy, slightly gravelly CLAY. Sand is medium to coarse grained. Gravel is sub-angular to sub-rounded, fine to coarse of mudstone, sandstone and quartz.
	1.00	HV	76kPa				
	1.50 - 1.60	B		2.90			Firm occasionally thinly laminated light brown mottled grey slightly sandy slightly gravelly silty CLAY. Sand is medium to coarse grained. Gravel is subangular to subrounded, fine to coarse of mudstone, sandstone and quartz.
	2.00	HV	59kPa				
	2.50 - 2.60	B		2.90			End of Pit at 2.900m
	2.50	HV	63kPa				

Remarks: No groundwater encountered.
No visual/olfactory contamination noted.

Stability:



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Solmek Ltd
12-16 Yarm Road
Stockton on Tees
TS18 3NA
Tel: 01642 607083
Email: info@solmek.com

Trial Pit Log

TrialPit No
TP20
Sheet 1 of 1

Project Name: Project Borealis, Fujifilm	Project No. S220408	Co-ords: 446544E - 522909N Level:	Date 27/04/2022
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Plant Used: JCB 3CX	Dimensions (m): Depth 2.90	Scale 1:26
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Client: Fujifilm	Logged SM
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Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.20 - 0.30	B+ES		0.35			MADE GROUND: Dark greyish brown sandy gravel. Sand is medium to coarse of limestone, quartz and wood chippings. (14-20mm crushed stone)	
				0.80			MADE GROUND: Reinforced concrete with approx 6mm rebar present. No DPM observed.	
	0.90 - 1.00 1.00	B+ES HV	72kPa				Firm dark orangish brown slightly sandy slightly gravelly medium strength silty CLAY. Sand is medium to coarse grained. Gravel is subangular to subrounded, fine to coarse of sandstone, quartz and coal.	1
	1.40 - 1.60	B		1.65			Stiff dark brown mottled grey slightly sandy slightly gravelly high strength CLAY. Sand is medium to coarse grained. Gravel is subangular to subrounded, fine to medium of mudstone, sandstone and quartz.	2
	2.00 2.20 - 2.40	HV B	90kPa					
	2.80	HV	117kPa	2.90				
	End of Pit at 2.900m							3
								4
								5

Remarks: No groundwater encountered.

Stability: Pit wall open and stable on completion.



SOLMEK

Solmek Ltd
12-16 Yarm Road
Stockton on Tees
TS18 3NA
Tel: 01642 607083
Email: info@solmek.com

Trial Pit Log

Trial Pit No
TP21
Sheet 1 of 1

Project Name: Project Borealis, Fujifilm Project No. S220408 Co-ords: 446485E - 522861N Date: 27/04/2022

Plant Used: JCB 3CX Dimensions (m): 1.20 Scale: 1:26

Client: Fujifilm Depth: 2.60 Logged: SM

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
▼	0.20 - 0.30	B+ES		0.10			MADE GROUND: Grass over dark brown slightly clayey, slightly gravelly sand topsoil with some fine to medium plant rootlets. Gravel is subangular to subrounded, fine to coarse of ash, red brick and quartz.
	0.40	HV	92kPa	0.30			MADE GROUND: Dark greyish black sandy gravel. Sand is medium to coarse grained. Gravel is angular to subrounded, fine to coarse of ash, red brick, mudstone, sandstone, quartz and glass.
	0.50 - 0.60	B+ES					Stiff dark reddish brown mottled grey, slightly sandy, slightly gravelly high strength CLAY. Gravel is subangular to subrounded, fine to coarse of sandstone, mudstone and quartz.
	1.00	HV	117kPa				
	1.20 - 1.40	B		1.40			
	1.60 - 1.80 1.60	B HV	64kPa				Firm to stiff thinly laminated light brown mottled grey sand, slightly gravelly medium strength silty CLAY. Sand is medium to coarse grained. Gravel is subangular to subrounded, fine to coarse of sandstone and quartz.
	2.40 - 2.60	B		2.60			End of Pit at 2.600m

Remarks: Small Groundwater Seepage from 1.95mbgl.

Stability: Pit wall open and stable on completion.



SOLMEK

Solmek Ltd
12-16 Yarm Road
Stockton on Tees
TS18 3NA
Tel: 01642 607083
Email: info@solmek.com

Trial Pit Log

Trial Pit No
TP22
Sheet 1 of 1

Project Name: Project Borealis, Fujifilm	Project No. S220408	Co-ords: 446444E - 522892N Level:	Date 27/04/2022
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Plant Used: JCB 3CX	Dimensions (m):	Scale 1:26
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Client: Fujifilm	Depth 2.55	0.60	1.60	Logged SM
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Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.20 - 0.30	B+ES		0.10			MADE GROUND: Brown gravelly sand topsoil with some fine to medium plant rootlets.
	0.50 - 0.60	B+ES		0.30			MADE GROUND: Dark greyish black gravelly sand. Sand is medium to coarse grained. Gravel is angular to subrounded, fine to coarse of ash and redbrick.
	0.70	HV	66kPa				Firm becoming stiff dark brown and grey slightly sandy, slightly gravelly medium to high strength CLAY.
	1.00 - 1.20	B+ES					
	1.20	HV	80kPa				
	1.40 - 1.60	B		1.40			Firm light reddish brown sandy slightly gravelly medium strength silty CLAY with some coarse sand inclusions.
	1.80	HV	65kPa				
	2.40 - 2.50	B		2.55			End of Pit at 2.550m

Remarks: No groundwater encountered.

Stability: Pit wall open and stable on completion.



SOLMEK

Solmek Ltd
12-16 Yarm Road
Stockton on Tees
TS18 3NA
Tel: 01642 607083
Email: info@solmek.com

Trial Pit Log

TrialPit No
TP23
Sheet 1 of 1

Project Name: Project Borealis, Fujifilm	Project No. S220408	Co-ords: 446505E - 523057N Level:	Date 27/04/2022
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Plant Used: JCB 3CX	Dimensions (m):	Scale 1:26
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Client: Fujifilm	Depth 3.00	1.00	1.70	Logged SM
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Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.20	B+ES					MADE GROUND: Dark brown/black gravelly sand with a low cobble content. Sand is medium to coarse grained. Gravel is subangular to subrounded fine to coarse of ash, slag, red brick and concrete. Cobbles are subangular to subrounded of red brick and concrete.	
	0.40 - 0.50	B+ES		0.30			Firm light brown mottled grey slightly sandy slightly gravelly medium to high strength silty CLAY. Sand is medium to coarse grained. Gravel is subangular to subrounded fine to coarse of sandstone, mudstone and quartz.	
	0.40	HV	68kPa					
	0.50 - 0.60	B+ES						
	0.90 - 1.00	B+ES		0.75			Stiff light brown mottled grey slightly sandy slightly gravelly medium to high strength silty CLAY . Sand is fine to medium grained. Gravel is subangular to subrounded fine to coarse of sandstone, mudstone, coal quartz.	1
	1.00	HV	90kPa					
	1.20 - 1.40	B						
	2.00	HV	82kPa					2
	2.20 - 2.40	B						
	2.80 - 3.00	B		3.00				
	End of Pit at 3.000m							3
								4
								5

Remarks: No groundwater encountered.
No visual/olfactory contamination noted.

Stability: Pit walls open and stable on completion.



SOLMEK

Solmek Ltd
 12-16 Yarm Road
 Stockton on Tees
 TS18 3NA
 Tel: 01642 607083
 Email: info@solmek.com

Trial Pit Log

TrialPit No
TP24
 Sheet 1 of 1

Project Name: Project Borealis, Fujifilm	Project No. S220408	Co-ords: 446548E - 522970N Level:	Date 27/04/2022
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Plant Used: JVB 3CX	Dimensions (m):	Scale 1:26
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Client: Fujifilm	Depth 2.80	Logged SM
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Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.22			MADE GROUND: Compacted gravels and wood chippings.
				0.70			MADEGROUND: Reinforced concrete with approx 6mm rebar. No DPM observed.
	0.70 - 0.80	B+ES					
	0.80	HV	58kPa				
	1.00	HV	70kPa				Firm dark greenish grey slightly sandy slightly gravelly medium strength CLAY. Sand is medium to coarse grained. Gravel is subangular to subrounded, fine to coarse of sandstone, mudstone and quartz.
	1.50 - 1.60	B+ES		1.45			
	1.60	HV	74kPa				Firm becoming stiff light brown and brown sandy slightly gravelly CLAY. Sand is medium to coarse grained. Gravel is subangular to subrounded, fine to coarse of sandstone and quartz.
	2.00	HV	92kPa				
	2.20 - 2.30	B		2.20			Stiff dark reddish brown mottled grey slightly sandy slightly gravelly high strength silty CLAY. Sand is medium to coarse grained. Gravel is subangular to subrounded, fine to coarse of sandstone and quartz.
	2.60 - 2.80	B		2.80			
	2.60	HV	107kPa				
							End of Pit at 2.800m

Remarks: No groundwater encountered.
 No visual/olfactory contamination noted.

Stability: Pit wall open and stable on completion.

**APPENDIX C:
Contamination Laboratory Results**



Final Report

Report No.: 22-18319-1
Initial Date of Issue: 24-May-2022
Client: Solmek Ltd
Client Address: 12 Yarm Road
Stockton-on-Tees
TS18 3NA
Contact(s): Lab
Leo Cassidy
Office
Project: S220408 Project Borealis, Fujifilm

Quotation No.:		Date Received:	18-May-2022
Order No.:	SOL-6189	Date Instructed:	18-May-2022
No. of Samples:	20		
Turnaround (Wkdays):	5	Results Due:	24-May-2022
Date Approved:	24-May-2022		

Approved By:

Details: Stuart Henderson, Technical
Manager

Results - Soil

Project: S220408 Project Borealis, Fujifilm

Client: Solmek Ltd		Chemtest Job No.:		22-18319	22-18319	22-18319	22-18319	22-18319	22-18319	22-18319	22-18319	22-18319	22-18319
Quotation No.:		Chemtest Sample ID.:		1430474	1430475	1430476	1430477	1430478	1430479	1430480	1430481	1430482	
Sample Location:		TP01	TP02	TP03	TP04	TP06	TP07	TP08	TP10	TP11			
Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Top Depth (m):		0.20	0.20	0.20	0.20	0.20	1.00	0.50	0.60	0.20			
Bottom Depth (m):			0.30	0.30	0.30	0.30	1.20		0.70	0.30			
Date Sampled:		27-Apr-2022	27-Apr-2022	27-Apr-2022	27-Apr-2022	27-Apr-2022	27-Apr-2022	27-Apr-2022	27-Apr-2022	27-Apr-2022	27-Apr-2022	27-Apr-2022	27-Apr-2022
Asbestos Lab:		DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD									
ACM Type	U	2192		N/A	-	-	-	-	-	-	-	-	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	22	5.3	16	15	13	21	18	16	15
Soil Colour	N	2040		N/A	Brown	Brown	Black	Black	Black	Brown	Brown	Brown	Brown
Other Material	N	2040		N/A	Stones	Stones	Stones	Stones	Stones	None	Stones	None	None
Soil Texture	N	2040		N/A	Clay	Gravel	Gravel	Gravel	Gravel	Clay	Loam	Clay	Loam
pH	M	2010		4.0	8.3	8.5	8.3	8.4	8.4	8.8	8.6	8.3	8.5
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40	2.3	2.9	2.5	1.6	2.3	8.8	1.5	1.3	1.9
Sulphate (2:1 Water Soluble) as SO4	M	2120	mg/l	10	86	1600	< 10	< 10	< 10	77	< 10	19	< 10
Cyanide (Total)	M	2300	mg/kg	0.50	[B] 0.60	[B] < 0.50	[B] < 0.50	[B] 0.70	[B] 0.60	[B] 0.50	[B] < 0.50	[B] < 0.50	[B] < 0.50
Arsenic	M	2455	mg/kg	0.5	20	3.9	34	17	31	3.0	4.7	8.3	2.8
Cadmium	M	2455	mg/kg	0.10	0.40	0.21	0.39	0.28	0.46	< 0.10	0.19	0.19	< 0.10
Chromium	M	2455	mg/kg	0.5	18	25	17	14	20	8.6	6.5	13	5.5
Copper	M	2455	mg/kg	0.50	60	18	83	64	92	6.8	13	15	5.9
Mercury	M	2455	mg/kg	0.05	0.18	0.05	0.13	0.13	0.20	< 0.05	0.05	0.07	0.05
Nickel	M	2455	mg/kg	0.50	34	11	55	36	47	7.8	8.1	13	5.4
Lead	M	2455	mg/kg	0.50	110	25	96	100	180	18	23	42	16
Selenium	M	2455	mg/kg	0.25	1.6	1.8	2.5	1.5	2.3	0.93	0.61	0.98	0.27
Zinc	M	2455	mg/kg	0.50	280	87	150	150	240	26	41	54	23
Organic Matter	M	2625	%	0.40	14	11	36	24	24	1.7	3.5	7.9	3.1
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	[B] < 1.0		[B] < 1.0	[B] < 1.0		[B] < 1.0		[B] < 1.0	
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	[B] < 1.0		[B] < 1.0	[B] < 1.0		[B] < 1.0		[B] < 1.0	
Aliphatic TPH >C8-C10	M	2680	mg/kg	1.0	[B] < 1.0		[B] < 1.0	[B] < 1.0		[B] < 1.0		[B] < 1.0	
Aliphatic TPH >C10-C12	M	2680	mg/kg	1.0	[B] < 1.0		[B] < 1.0	[B] < 1.0		[B] < 1.0		[B] < 1.0	
Aliphatic TPH >C12-C16	M	2680	mg/kg	1.0	[B] < 1.0		[B] < 1.0	[B] < 1.0		[B] < 1.0		[B] < 1.0	
Aliphatic TPH >C16-C21	M	2680	mg/kg	1.0	[B] < 1.0		[B] < 1.0	[B] < 1.0		[B] < 1.0		[B] < 1.0	
Aliphatic TPH >C21-C35	M	2680	mg/kg	1.0	[B] < 1.0		[B] < 1.0	[B] < 1.0		[B] < 1.0		[B] < 1.0	
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	[B] < 1.0		[B] < 1.0	[B] < 1.0		[B] < 1.0		[B] < 1.0	
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	[B] < 5.0		[B] < 5.0	[B] < 5.0		[B] < 5.0		[B] < 5.0	
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	[B] < 1.0		[B] < 1.0	[B] < 1.0		[B] < 1.0		[B] < 1.0	
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	[B] < 1.0		[B] < 1.0	[B] < 1.0		[B] < 1.0		[B] < 1.0	
Aromatic TPH >C8-C10	M	2680	mg/kg	1.0	[B] < 1.0		[B] < 1.0	[B] < 1.0		[B] < 1.0		[B] < 1.0	
Aromatic TPH >C10-C12	M	2680	mg/kg	1.0	[B] < 1.0		[B] < 1.0	[B] < 1.0		[B] < 1.0		[B] < 1.0	
Aromatic TPH >C12-C16	M	2680	mg/kg	1.0	[B] < 1.0		[B] < 1.0	[B] < 1.0		[B] < 1.0		[B] < 1.0	
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	[B] < 1.0		[B] < 1.0	[B] < 1.0		[B] < 1.0		[B] < 1.0	
Aromatic TPH >C21-C35	M	2680	mg/kg	1.0	[B] 55		[B] 52	[B] < 1.0		[B] < 1.0		[B] < 1.0	

Results - Soil

Project: S220408 Project Borealis, Fujifilm

Client: Solmek Ltd		Chemtest Job No.:		22-18319	22-18319	22-18319	22-18319	22-18319	22-18319	22-18319	22-18319	22-18319	22-18319
Quotation No.:		Chemtest Sample ID.:		1430474	1430475	1430476	1430477	1430478	1430479	1430480	1430481	1430482	
Sample Location:		TP01	TP02	TP03	TP04	TP06	TP07	TP08	TP10	TP11			
Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Top Depth (m):		0.20	0.20	0.20	0.20	0.20	1.00	0.50	0.60	0.20			
Bottom Depth (m):			0.30	0.30	0.30	0.30	1.20		0.70	0.30			
Date Sampled:		27-Apr-2022	27-Apr-2022	27-Apr-2022	27-Apr-2022	27-Apr-2022	27-Apr-2022	27-Apr-2022	27-Apr-2022	27-Apr-2022	27-Apr-2022	27-Apr-2022	27-Apr-2022
Asbestos Lab:		DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD									
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	[B] < 1.0		[B] < 1.0	[B] < 1.0		[B] < 1.0		[B] < 1.0	
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	[B] 55		[B] 52	[B] < 5.0		[B] < 5.0		[B] < 5.0	
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	[B] 55		[B] 52	[B] < 10		[B] < 10		[B] < 10	
Naphthalene	M	2700	mg/kg	0.10	< 0.10	0.48	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	M	2700	mg/kg	0.10	< 0.10	1.2	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	M	2700	mg/kg	0.10	< 0.10	1.1	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	M	2700	mg/kg	0.10	< 0.10	1.3	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	M	2700	mg/kg	0.10	1.2	9.9	< 0.10	< 0.10	< 0.10	< 0.10	0.81	< 0.10	< 0.10
Anthracene	M	2700	mg/kg	0.10	0.47	3.5	< 0.10	< 0.10	< 0.10	< 0.10	0.51	< 0.10	< 0.10
Fluoranthene	M	2700	mg/kg	0.10	2.1	21	< 0.10	< 0.10	0.24	0.61	2.7	0.43	0.40
Pyrene	M	2700	mg/kg	0.10	2.1	20	< 0.10	< 0.10	0.37	0.52	2.8	0.47	0.37
Benzo[a]anthracene	M	2700	mg/kg	0.10	1.1	11	< 0.10	< 0.10	< 0.10	0.45	2.0	< 0.10	0.22
Chrysene	M	2700	mg/kg	0.10	1.5	12	< 0.10	< 0.10	< 0.10	0.81	2.3	< 0.10	0.38
Benzo[b]fluoranthene	M	2700	mg/kg	0.10	1.6	14	< 0.10	< 0.10	< 0.10	< 0.10	3.5	< 0.10	< 0.10
Benzo[k]fluoranthene	M	2700	mg/kg	0.10	0.60	4.8	< 0.10	< 0.10	< 0.10	< 0.10	1.7	< 0.10	< 0.10
Benzo[a]pyrene	M	2700	mg/kg	0.10	1.3	11	< 0.10	< 0.10	< 0.10	< 0.10	2.1	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.10	0.81	11	< 0.10	< 0.10	< 0.10	< 0.10	1.3	< 0.10	< 0.10
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.10	0.24	3.0	< 0.10	< 0.10	< 0.10	< 0.10	0.42	< 0.10	< 0.10
Benzo[g,h,i]perylene	M	2700	mg/kg	0.10	1.0	8.4	< 0.10	< 0.10	< 0.10	< 0.10	1.6	< 0.10	< 0.10
Total Of 16 PAH's	M	2700	mg/kg	2.0	14	130	< 2.0	< 2.0	< 2.0	2.4	22	< 2.0	< 2.0
Total Phenols	M	2920	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10

Results - Soil

Project: S220408 Project Borealis, Fujifilm

Client: Solmek Ltd	Chemtest Job No.:		22-18319	22-18319	22-18319	22-18319	22-18319	22-18319	22-18319	22-18319	22-18319	22-18319	22-18319
Quotation No.:	Chemtest Sample ID.:		1430483	1430484	1430485	1430486	1430487	1430488	1430489	1430490	1430491		
	Sample Location:		TP13	TP15	TP16	TP17	TP18	TP20	TP21	TP22	TP23		
	Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL		
	Top Depth (m):		0.30	0.50	0.20	0.20	0.60	0.20	0.20	0.20	0.20		
	Bottom Depth (m):		0.40	0.60	0.30	0.30	0.70	0.30	0.30	0.30	0.30		
	Date Sampled:		27-Apr-2022	27-Apr-2022	27-Apr-2022	27-Apr-2022	27-Apr-2022	27-Apr-2022	27-Apr-2022	27-Apr-2022	27-Apr-2022		
	Asbestos Lab:		DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM		
Determinand	Accred.	SOP	Units	LOD									
ACM Type	U	2192		N/A	-	-	-	-	-	-	-	-	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	16	11	18	7.1	19	11	16	12	11
Soil Colour	N	2040		N/A	Brown	Brown	Brown	Black	Brown	Brown	Black	Black	Black
Other Material	N	2040		N/A	None	Stones	Roots	Stones	None	Stones and Roots	Stones and Roots	Stones and Roots	Stones
Soil Texture	N	2040		N/A	Clay	Gravel	Loam	Gravel	Clay	Loam	Gravel	Gravel	Gravel
pH	M	2010		4.0	8.5	8.5	8.1	8.3	8.4	8.2	8.4	8.4	8.4
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40	1.4	3.1	< 0.40	1.1	1.1	5.4	2.8	1.3	1.3
Sulphate (2:1 Water Soluble) as SO4	M	2120	mg/l	10	< 10	< 10	< 10	< 10	< 10	1700	< 10	< 10	< 10
Cyanide (Total)	M	2300	mg/kg	0.50	[B] < 0.50	[B] < 0.50	[B] < 0.50	[B] < 0.50	[B] < 0.50	[B] < 0.50	[B] < 0.50	[B] < 0.50	[B] < 0.50
Arsenic	M	2455	mg/kg	0.5	6.0	2.8	2.0	10	4.3	3.5	52	41	16
Cadmium	M	2455	mg/kg	0.10	0.39	0.10	< 0.10	0.15	0.10	0.18	0.30	0.20	0.15
Chromium	M	2455	mg/kg	0.5	14	4.4	4.8	8.7	15	11	22	12	9.6
Copper	M	2455	mg/kg	0.50	25	16	4.5	39	9.4	14	92	69	68
Mercury	M	2455	mg/kg	0.05	0.06	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.07	0.06	0.38
Nickel	M	2455	mg/kg	0.50	20	7.2	4.1	24	18	7.1	50	28	32
Lead	M	2455	mg/kg	0.50	30	14	10	21	16	39	110	62	62
Selenium	M	2455	mg/kg	0.25	1.2	0.28	< 0.25	1.2	1.1	1.1	6.4	1.9	1.4
Zinc	M	2455	mg/kg	0.50	43	20	19	35	29	97	83	58	110
Organic Matter	M	2625	%	0.40	3.8	11	3.8	28	1.4	6.7	34	24	50
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0		[B] < 1.0		[B] < 1.0		[B] < 1.0		[B] < 1.0	[B] < 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0		[B] < 1.0		[B] < 1.0		[B] < 1.0		[B] < 1.0	[B] < 1.0
Aliphatic TPH >C8-C10	M	2680	mg/kg	1.0		[B] < 1.0		[B] < 1.0		[B] < 1.0		[B] < 1.0	[B] < 1.0
Aliphatic TPH >C10-C12	M	2680	mg/kg	1.0		[B] < 1.0		[B] < 1.0		[B] < 1.0		[B] 4.5	[B] < 1.0
Aliphatic TPH >C12-C16	M	2680	mg/kg	1.0		[B] 8.0		[B] < 1.0		[B] < 1.0		[B] 11	[B] < 1.0
Aliphatic TPH >C16-C21	M	2680	mg/kg	1.0		[B] < 1.0		[B] < 1.0		[B] < 1.0		[B] < 1.0	[B] < 1.0
Aliphatic TPH >C21-C35	M	2680	mg/kg	1.0		[B] 14		[B] < 1.0		[B] 190		[B] < 1.0	[B] < 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0		[B] < 1.0		[B] < 1.0		[B] < 1.0		[B] < 1.0	[B] < 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0		[B] 22		[B] < 5.0		[B] 190		[B] 15	[B] < 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0		[B] < 1.0		[B] < 1.0		[B] < 1.0		[B] < 1.0	[B] < 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0		[B] < 1.0		[B] < 1.0		[B] < 1.0		[B] < 1.0	[B] < 1.0
Aromatic TPH >C8-C10	M	2680	mg/kg	1.0		[B] < 1.0		[B] < 1.0		[B] < 1.0		[B] < 1.0	[B] < 1.0
Aromatic TPH >C10-C12	M	2680	mg/kg	1.0		[B] < 1.0		[B] < 1.0		[B] < 1.0		[B] < 1.0	[B] < 1.0
Aromatic TPH >C12-C16	M	2680	mg/kg	1.0		[B] < 1.0		[B] < 1.0		[B] < 1.0		[B] < 1.0	[B] < 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0		[B] < 1.0		[B] < 1.0		[B] 15		[B] < 1.0	[B] < 1.0
Aromatic TPH >C21-C35	M	2680	mg/kg	1.0		[B] 50		[B] < 1.0		[B] 1300		[B] 47	[B] < 1.0

Results - Soil

Project: S220408 Project Borealis, Fujifilm

Client: Solmek Ltd		Chemtest Job No.:		22-18319	22-18319	22-18319	22-18319	22-18319	22-18319	22-18319	22-18319	22-18319	22-18319
Quotation No.:		Chemtest Sample ID.:		1430483	1430484	1430485	1430486	1430487	1430488	1430489	1430490	1430491	
Sample Location:		TP13	TP15	TP16	TP17	TP18	TP20	TP21	TP22	TP23			
Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Top Depth (m):		0.30	0.50	0.20	0.20	0.60	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Bottom Depth (m):		0.40	0.60	0.30	0.30	0.70	0.30	0.30	0.30	0.30	0.30	0.30	0.30
Date Sampled:		27-Apr-2022	27-Apr-2022	27-Apr-2022	27-Apr-2022	27-Apr-2022	27-Apr-2022	27-Apr-2022	27-Apr-2022	27-Apr-2022	27-Apr-2022	27-Apr-2022	27-Apr-2022
Asbestos Lab:		DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD									
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0		[B] < 1.0		[B] < 1.0		[B] < 1.0		[B] < 1.0	[B] < 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0		[B] 50		[B] < 5.0		[B] 1300		[B] 47	[B] < 5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0		[B] 72		[B] < 10		[B] 1500		[B] 62	[B] < 10
Naphthalene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.24	< 0.10	< 0.10	< 0.10
Acenaphthylene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	1.6	< 0.10	< 0.10	< 0.10
Acenaphthene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.32	< 0.10	< 0.10	< 0.10
Fluorene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.45	< 0.10	< 0.10	< 0.10
Phenanthrene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	5.1	< 0.10	< 0.10	0.56
Anthracene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	1.8	< 0.10	< 0.10	0.31
Fluoranthene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.27	< 0.10	15	< 0.10	< 0.10	0.80
Pyrene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.17	< 0.10	15	< 0.10	< 0.10	0.91
Benzo[a]anthracene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	9.2	< 0.10	< 0.10	0.64
Chrysene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	10	< 0.10	< 0.10	0.56
Benzo[b]fluoranthene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	14	< 0.10	< 0.10	0.77
Benzo[k]fluoranthene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	5.2	< 0.10	< 0.10	0.34
Benzo[a]pyrene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	12	< 0.10	< 0.10	0.66
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	8.5	< 0.10	< 0.10	0.60
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	4.0	< 0.10	< 0.10	0.34
Benzo[g,h,i]perylene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	15	< 0.10	< 0.10	0.58
Total Of 16 PAH's	M	2700	mg/kg	2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	120	< 2.0	< 2.0	7.1
Total Phenols	M	2920	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10

Results - Soil

Project: S220408 Project Borealis, Fujifilm

Client: Solmek Ltd		Chemtest Job No.:		22-18319	22-18319	
Quotation No.:		Chemtest Sample ID.:		1430492	1430493	
		Sample Location:		TP24	BH09	
		Sample Type:		SOIL	SOIL	
		Top Depth (m):		0.70	0.60	
		Bottom Depth (m):		0.80	0.80	
		Date Sampled:		27-Apr-2022	05-May-2022	
		Asbestos Lab:		DURHAM	DURHAM	
Determinand	Accred.	SOP	Units	LOD		
ACM Type	U	2192		N/A	-	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	17	22
Soil Colour	N	2040		N/A	Brown	Brown
Other Material	N	2040		N/A	None	None
Soil Texture	N	2040		N/A	Loam	Clay
pH	M	2010		4.0	8.1	8.5
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40	1.4	11
Sulphate (2:1 Water Soluble) as SO4	M	2120	mg/l	10	210	< 10
Cyanide (Total)	M	2300	mg/kg	0.50	[B] < 0.50	8.3
Arsenic	M	2455	mg/kg	0.5	6.8	3.2
Cadmium	M	2455	mg/kg	0.10	0.18	< 0.10
Chromium	M	2455	mg/kg	0.5	13	10
Copper	M	2455	mg/kg	0.50	18	8.3
Mercury	M	2455	mg/kg	0.05	0.08	< 0.05
Nickel	M	2455	mg/kg	0.50	14	14
Lead	M	2455	mg/kg	0.50	37	12
Selenium	M	2455	mg/kg	0.25	0.92	0.66
Zinc	M	2455	mg/kg	0.50	53	29
Organic Matter	M	2625	%	0.40	5.0	3.1
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0		
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0		
Aliphatic TPH >C8-C10	M	2680	mg/kg	1.0		
Aliphatic TPH >C10-C12	M	2680	mg/kg	1.0		
Aliphatic TPH >C12-C16	M	2680	mg/kg	1.0		
Aliphatic TPH >C16-C21	M	2680	mg/kg	1.0		
Aliphatic TPH >C21-C35	M	2680	mg/kg	1.0		
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0		
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0		
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0		
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0		
Aromatic TPH >C8-C10	M	2680	mg/kg	1.0		
Aromatic TPH >C10-C12	M	2680	mg/kg	1.0		
Aromatic TPH >C12-C16	M	2680	mg/kg	1.0		
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0		
Aromatic TPH >C21-C35	M	2680	mg/kg	1.0		

Results - Soil

Project: S220408 Project Borealis, FujiFilm

Client: Solmek Ltd	Chemtest Job No.:		22-18319	22-18319		
Quotation No.:	Chemtest Sample ID.:		1430492	1430493		
	Sample Location:		TP24	BH09		
	Sample Type:		SOIL	SOIL		
	Top Depth (m):		0.70	0.60		
	Bottom Depth (m):		0.80	0.80		
	Date Sampled:		27-Apr-2022	05-May-2022		
	Asbestos Lab:		DURHAM	DURHAM		
Determinand	Accred.	SOP	Units	LOD		
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0		
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0		
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0		
Naphthalene	M	2700	mg/kg	0.10	< 0.10	< 0.10
Acenaphthylene	M	2700	mg/kg	0.10	< 0.10	< 0.10
Acenaphthene	M	2700	mg/kg	0.10	< 0.10	< 0.10
Fluorene	M	2700	mg/kg	0.10	< 0.10	< 0.10
Phenanthrene	M	2700	mg/kg	0.10	< 0.10	< 0.10
Anthracene	M	2700	mg/kg	0.10	< 0.10	< 0.10
Fluoranthene	M	2700	mg/kg	0.10	0.34	< 0.10
Pyrene	M	2700	mg/kg	0.10	0.29	< 0.10
Benzo[a]anthracene	M	2700	mg/kg	0.10	< 0.10	< 0.10
Chrysene	M	2700	mg/kg	0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	M	2700	mg/kg	0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	M	2700	mg/kg	0.10	< 0.10	< 0.10
Benzo[a]pyrene	M	2700	mg/kg	0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	M	2700	mg/kg	0.10	< 0.10	< 0.10
Total Of 16 PAH's	M	2700	mg/kg	2.0	< 2.0	< 2.0
Total Phenols	M	2920	mg/kg	0.10	< 0.10	< 0.10

Deviations

In accordance with UKAS Policy on Deviating Samples TPS 63. Chemtest have a procedure to ensure 'upon receipt of each sample a competent laboratory shall assess whether the sample is suitable with regard to the requested test(s)'. This policy and the respective holding times applied, can be supplied upon request. The reason a sample is declared as deviating is detailed below. Where applicable the analysis remains UKAS/MCERTs accredited but the results may be compromised.

Sample:	Sample Ref:	Sample ID:	Sample Location:	Sampled Date:	Deviation Code(s):	Containers Received:
1430474			TP01	27-Apr-2022	B	Amber Glass 250ml
1430474			TP01	27-Apr-2022	B	Plastic Tub 500g
1430475			TP02	27-Apr-2022	B	Amber Glass 250ml
1430475			TP02	27-Apr-2022	B	Plastic Tub 500g
1430476			TP03	27-Apr-2022	B	Amber Glass 250ml
1430476			TP03	27-Apr-2022	B	Plastic Tub 500g
1430477			TP04	27-Apr-2022	B	Amber Glass 250ml
1430477			TP04	27-Apr-2022	B	Plastic Tub 500g
1430478			TP06	27-Apr-2022	B	Amber Glass 250ml
1430478			TP06	27-Apr-2022	B	Plastic Tub 500g
1430479			TP07	27-Apr-2022	B	Amber Glass 250ml
1430479			TP07	27-Apr-2022	B	Plastic Tub 500g
1430480			TP08	27-Apr-2022	B	Amber Glass 250ml
1430480			TP08	27-Apr-2022	B	Plastic Tub 500g
1430481			TP10	27-Apr-2022	B	Amber Glass 250ml
1430481			TP10	27-Apr-2022	B	Plastic Tub 500g
1430482			TP11	27-Apr-2022	B	Amber Glass 250ml
1430482			TP11	27-Apr-2022	B	Plastic Tub 500g
1430483			TP13	27-Apr-2022	B	Amber Glass 250ml
1430483			TP13	27-Apr-2022	B	Plastic Tub 500g
1430484			TP15	27-Apr-2022	B	Amber Glass 250ml
1430484			TP15	27-Apr-2022	B	Plastic Tub 500g

Deviations

In accordance with UKAS Policy on Deviating Samples TPS 63. Chemtest have a procedure to ensure 'upon receipt of each sample a competent laboratory shall assess whether the sample is suitable with regard to the requested test(s)'. This policy and the respective holding times applied, can be supplied upon request. The reason a sample is declared as deviating is detailed below. Where applicable the analysis remains UKAS/MCERTs accredited but the results may be compromised.

Sample:	Sample Ref:	Sample ID:	Sample Location:	Sampled Date:	Deviation Code(s):	Containers Received:
1430485			TP16	27-Apr-2022	B	Amber Glass 250ml
1430485			TP16	27-Apr-2022	B	Plastic Tub 500g
1430486			TP17	27-Apr-2022	B	Amber Glass 250ml
1430486			TP17	27-Apr-2022	B	Plastic Tub 500g
1430487			TP18	27-Apr-2022	B	Amber Glass 250ml
1430487			TP18	27-Apr-2022	B	Plastic Tub 500g
1430488			TP20	27-Apr-2022	B	Amber Glass 250ml
1430488			TP20	27-Apr-2022	B	Plastic Tub 500g
1430489			TP21	27-Apr-2022	B	Amber Glass 250ml
1430489			TP21	27-Apr-2022	B	Plastic Tub 500g
1430490			TP22	27-Apr-2022	B	Amber Glass 250ml
1430490			TP22	27-Apr-2022	B	Plastic Tub 500g
1430491			TP23	27-Apr-2022	B	Amber Glass 250ml
1430491			TP23	27-Apr-2022	B	Plastic Tub 500g
1430492			TP24	27-Apr-2022	B	Amber Glass 250ml
1430492			TP24	27-Apr-2022	B	Plastic Tub 500g

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Alkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2680	TPH A/A Split	Aliphatics: >C5-C6, >C6-C8,>C8-C10, >C10-C12, >C12-C16, >C16-C21, >C21-C35, >C35- C44Aromatics: >C5-C7, >C7-C8, >C8- C10, >C10-C12, >C12-C16, >C16- C21, >C21- C35, >C35- C44	Dichloromethane extraction / GCxGC FID detection
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.

Report Information

Key

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

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

- A - Date of sampling not supplied
- B - Sample age exceeds stability time (sampling to extraction)
- C - Sample not received in appropriate containers
- D - Broken Container
- E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt

All water samples will be retained for 14 days from the date of receipt

Charges may apply to extended sample storage

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

customerservices@chemtest.com

**APPENDIX D:
Geotechnical Laboratory Results**

Laboratory Report Front Sheet

Solmek
12-16 Yarm Road,
Stockton on Tees,
TS18 3NA
01642 607083
lab@solmek.com



Site name	Job number
Project Borealis, Fujifilm	S220408

Client details:

Reference: S220408
Name: Solmek
Address: 12 Yarm Road,
Stockton-on-tees,
TS18 3NA

Telephone: 01642 607083
Email: lcassidy@solmek.com

FAO: Leo Cassidy


Date commenced:

Date reported: 27/05/2022

Observations and interpretations are outside of the UKAS Accreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced in full, without the prior written approval of the laboratory.

Samples will be held at the laboratory for a period of 4 weeks after the report date. After the above reporting date the samples will be disposed of. Should further testing be required then the office should be informed before the above date.

Signature: 	Approved Signatories: <input type="checkbox"/> D.Anderson (Associate Director) <input checked="" type="checkbox"/> J. Brischuk (Laboratory Manager) <input type="checkbox"/>
--	--

Summary of Classification Tests

Solmek
12-1b Yarm
Road,
Stockton on
Tees
01642 607083
lab@solmek.com



Site name	Job number
Project Borealis, Fujifilm	S220408

Hole	Depth		Type	w %	Oven temp. oc	wa %	Pa %	Pr %	wL %	wP %	IP %	IL	Plasticity class	Preparation method
	Top m	Base m												
BH01	1.20	1.65	U	24	105	24	100	0	40-s	27	13	-0.231	MI	Tested after >425µm removed by hand
BH01	16.50	16.95	B	24	105									
BH02	3.00	3.45	U	23	105	23	100	0	42-s	28	14	-0.357	MI	Tested after >425µm removed by hand
BH02	19.50	19.95	B	28	105									
BH03	3.00	3.45	U	29	105	29	100	0	47-s	28	19	0.053	MI	Tested after >425µm removed by hand
BH03	18.00	18.45	B	29	105									
BH04	3.00	3.45	U	27	105	27	99	1	48-s	24	24	0.125	CI	Tested after >425µm removed by hand
BH04	16.50	16.95	B	27	105									
BH05	2.00	2.45	U	22	105	22	100	0	44-s	21	23	0.043	CI	Tested after >425µm removed by hand
BH06	3.00	3.45	U	27	105	27	99	1	49-s	26	23	0.043	CI	Tested after >425µm removed by hand
BH06	15.00	15.45	B	26	105									
BH07	3.00	3.45	U	30	105	31	98	2	51-s	27	24	0.167	CH	Tested after >425µm removed by hand
BH07	10.50	10.95	U	17	105	18	95	5	37-s	15	22	0.136	CI	Tested after >425µm removed by hand
BH07	15.00	15.45	B	25	105									
BH08	5.00	5.45	U	32	105	32	99	1	52-s	29	23	0.130	MH	Tested after >425µm removed by hand
BH08	7.50	7.95	B	23	105	23	100	0	34-s	18	16	0.313	CL	Tested after >425µm removed by hand
BH08	15.00	15.45	B	28	105									
BH09	3.00	3.45	U	27	105	27	99	1	52-s	24	28	0.107	CH	Tested after >425µm removed by hand
BH09	5.00	5.45	U	30	105	30	100	0	48-s	25	23	0.217	CI	Tested after >425µm removed by hand
BH09	15.00	15.45	B	23	105									

All tests found in Solmek UKAS Schedule of Accreditation are tested to standard unless otherwise indicated

Key	Description	Category	BS Test Code
w	Moisture content		BS 1377:1990 Part 2 Clause 3.2
wa	Equivalent moisture content passing 425µm sieve		BS 1377:1990 Part 2 Clause 3.2
wL	Liquid limit	Single point	-s BS 1377:1990 Part 2 Clause 4.4
		Four point	-f BS 1377:1990 Part 2 Clause 4.3
wP	Plastic limit		BS 1377:1990 Part 2 Clause 5.2
Pa	Percentage passing 425µm sieve		
Pr	Percentage retained 425µm sieve		
IP	Plasticity index		BS 1377:1990 Part 2 Clause 5.4
IL	Liquidity index		BS 1377:1990 Part 2 Clause 5.4
	Suffix indicating test is "Not UKAS Accredited"	*	

Approved by	JBrischuk
Approval date	24/05/2022 13:23
Date report generated	
Report Number	

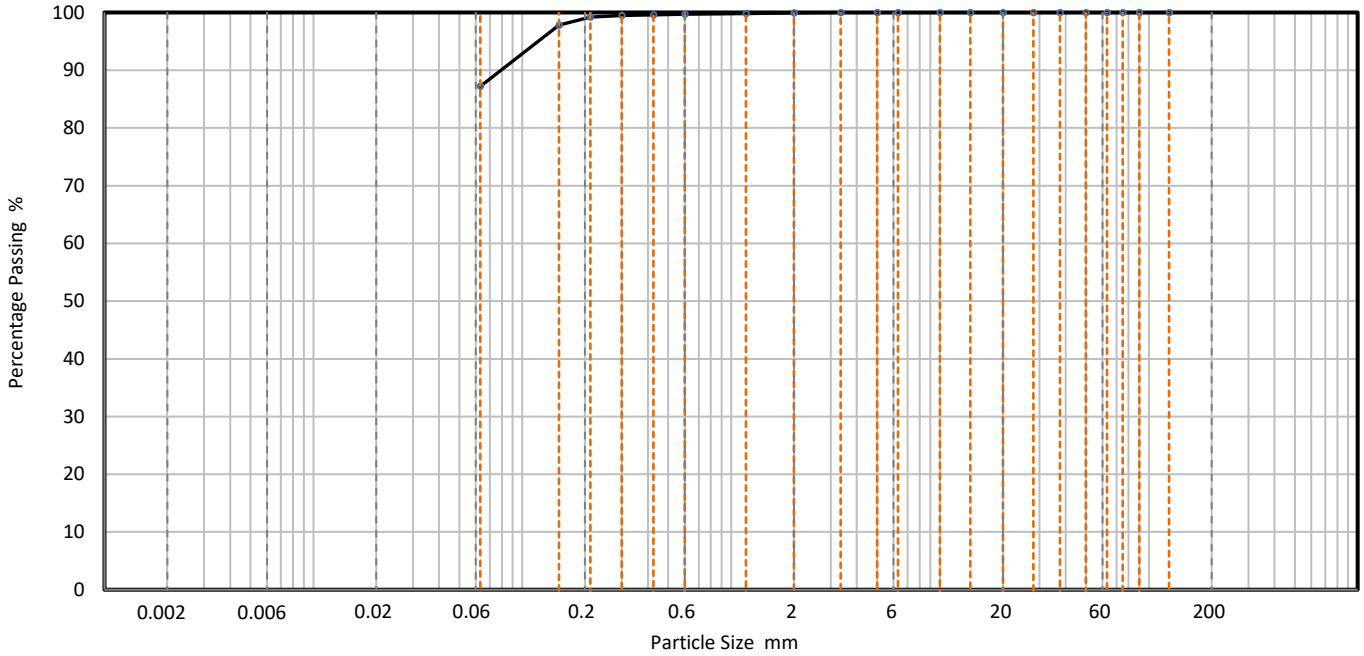
PARTICLE SIZE DISTRIBUTION

Solmek
12-16 Yarm Road,
Stockton on Tees,
TS18 3NA
01642 607083
lab@solmek.com



Site name	Job number
Project Borealis, Fujifilm	S220408

Hole	BH01	Lab sample ID	SLMK2022051217
Depth (Top)	m 16.50	Test Method	BS 1377 - 2 : 1990 Clause 9.2
Depth (Base)	m 16.95	Soil Description	Slightly Gravelly, Very Sandy CLAY
Sample type	B		



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

Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	100		
0.425	100		
0.3	100		
0.212	99		
0.15	98		
0.063	87		

Dry Mass of sample, g

796

Sample Proportions	% dry mass
Very coarse	0.0
Gravel	0.1
Sand	12.7
Fines <0.063mm	87.0

Grading Analysis	
D100	mm
D60	mm
D30	mm
D10	mm
Uniformity Coefficient	
Curvature Coefficient	

Remarks
Preparation and testing in accordance with test method unless noted below

Accreditation status

Hydrometer is the usual Sedimentation method carried out by Solmek and is part of the Solmek UKAS accreditation schedule.

Approved by	JBrischuk
Approval date	24/05/2022 13:37

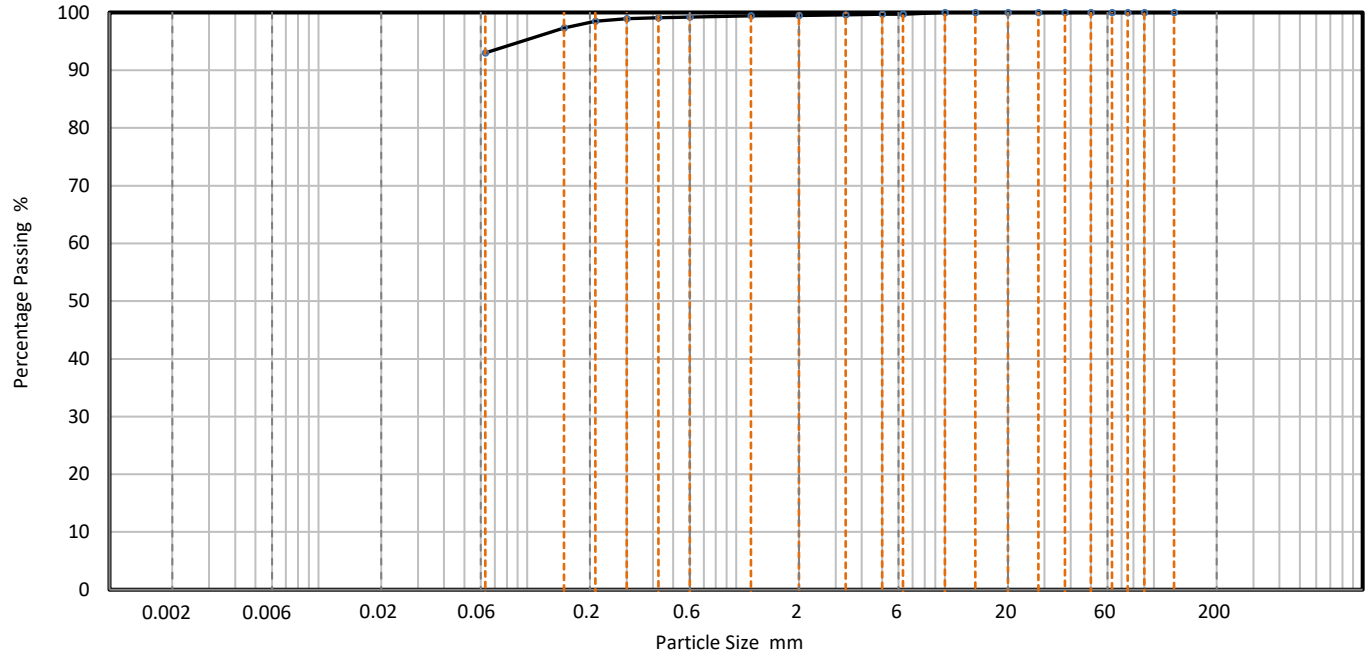
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12-16 Yarm Road,
Stockton on Tees,
TS18 3NA
01642 607083
lab@solmek.com



Site name	Job number
Project Borealis, Fujifilm	S220408

Hole	BH02	Lab sample ID	SLMK2022051220
Depth (Top)	m 19.50	Test Method	BS 1377 - 2 : 1990 Clause 9.2
Depth (Base)	m 19.95	Soil Description	Slightly Gravelly, Slightly Sandy CLAY
Sample type	B		



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

Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	99		
0.6	99		
0.425	99		
0.3	99		
0.212	99		
0.15	97		
0.063	93		

Dry Mass of sample, g

652

Sample Proportions	% dry mass
Very coarse	0.0
Gravel	0.5
Sand	6.5
Fines <0.063mm	93.0

Grading Analysis	
D100	mm
D60	mm
D30	mm
D10	mm
Uniformity Coefficient	
Curvature Coefficient	

Remarks
Preparation and testing in accordance with test method unless noted below

Accreditation status

Hydrometer is the usual Sedimentation method carried out by Solmek and is part of the Solmek UKAS accreditation schedule.

Approved by	JBrischuk
Approval date	24/05/2022 13:37

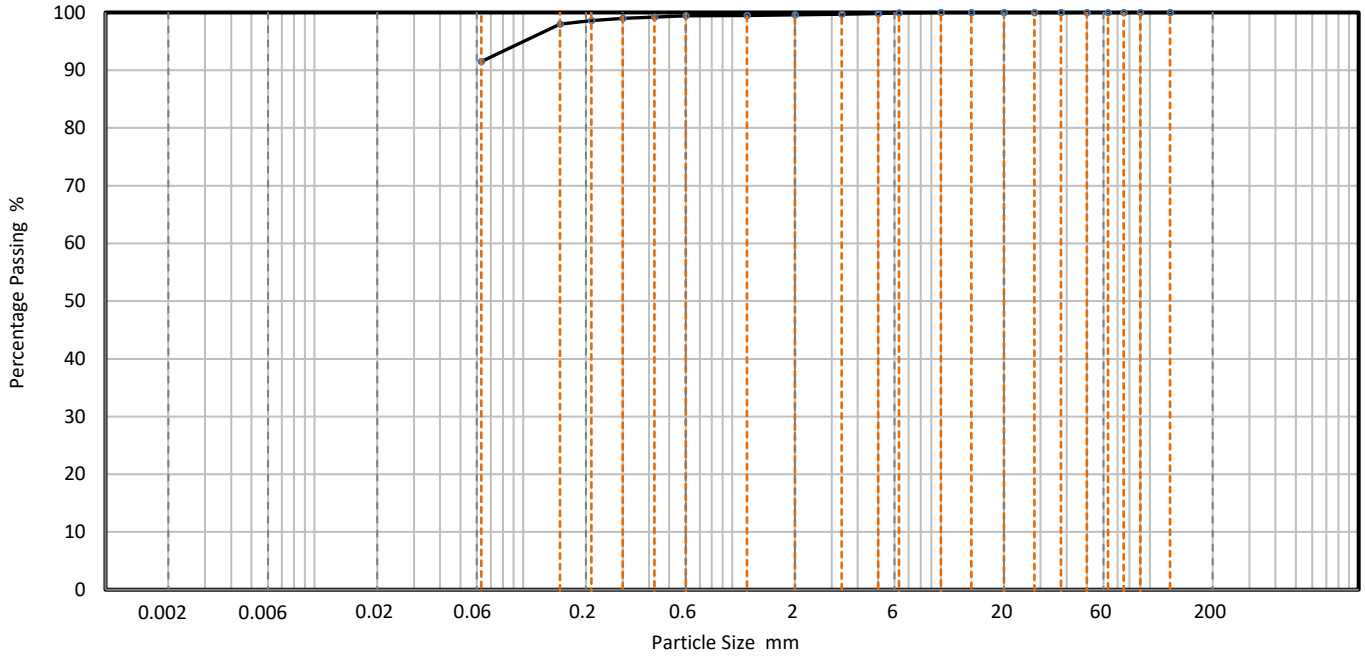
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12-16 Yarm Road,
Stockton on Tees,
TS18 3NA
01642 607083
lab@solmek.com



Site name	Job number
Project Borealis, Fujifilm	S220408

Hole	BH03	Lab sample ID	SLMK2022051223
Depth (Top)	m 18.00	Test Method	BS 1377 - 2 : 1990 Clause 9.2
Depth (Base)	m 18.45	Soil Description	Slightly Gravelly, Slightly Sandy CLAY
Sample type	B		



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

Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	99		
0.425	99		
0.3	99		
0.212	99		
0.15	98		
0.063	92		

Dry Mass of sample, g

733

Sample Proportions	% dry mass
Very coarse	0.0
Gravel	0.4
Sand	8.1
Fines <0.063mm	92.0

Grading Analysis	
D100	mm
D60	mm
D30	mm
D10	mm
Uniformity Coefficient	
Curvature Coefficient	

Remarks
Preparation and testing in accordance with test method unless noted below

Accreditation status

Hydrometer is the usual Sedimentation method carried out by Solmek and is part of the Solmek UKAS accreditation schedule.

Approved by	JBrischuk
Approval date	24/05/2022 13:37

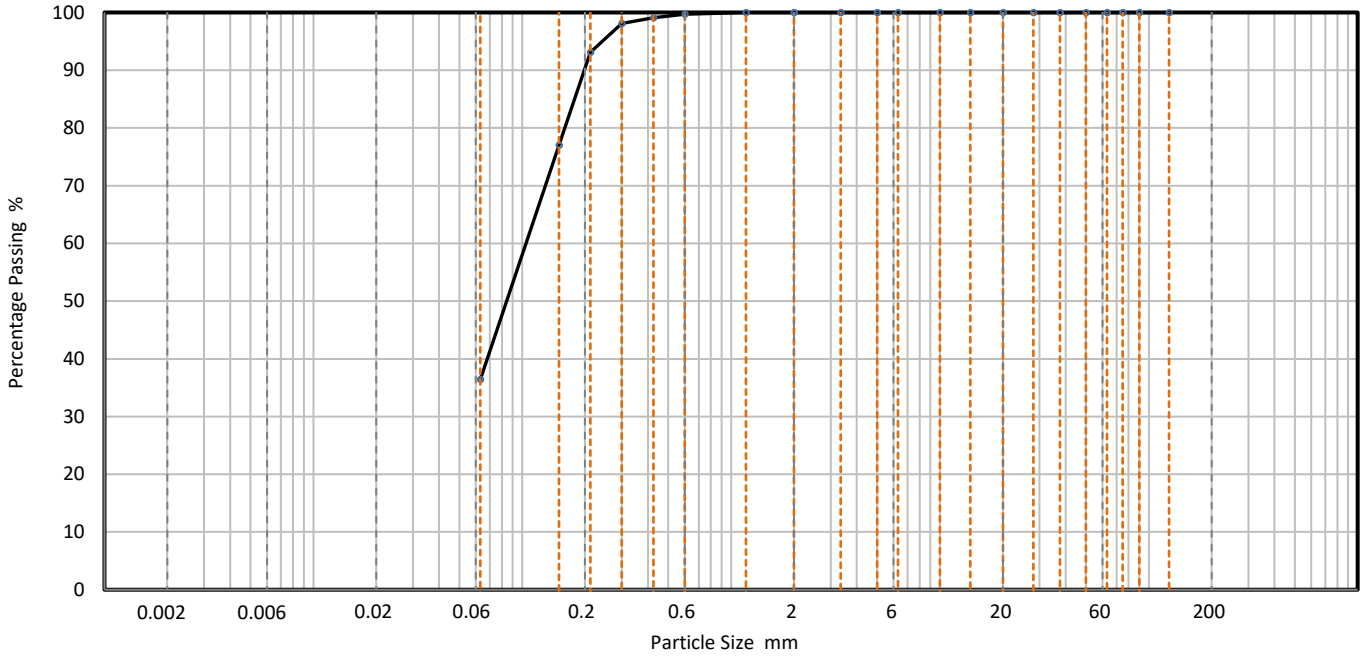
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12-16 Yarm Road,
Stockton on Tees,
TS18 3NA
01642 607083
lab@solmek.com



Site name	Job number
Project Borealis, Fujifilm	S220408

Hole	BH04	Lab sample ID	SLMK2022051226
Depth (Top)	m 16.50	Test Method	BS 1377 - 2 : 1990 Clause 9.2
Depth (Base)	m 16.95	Soil Description	Very Clayey SAND
Sample type	B		



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

Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	100		
0.425	99		
0.3	98		
0.212	93		
0.15	77		
0.063	36		

Dry Mass of sample, g

603

Sample Proportions	% dry mass
Very coarse	0.0
Gravel	0.0
Sand	63.6
Fines <0.063mm	36.0

Grading Analysis		
D100	mm	
D60	mm	0.104
D30	mm	
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks
Preparation and testing in accordance with test method unless noted below

Accreditation status

Hydrometer is the usual Sedimentation method carried out by Solmek and is part of the Solmek UKAS accreditation schedule.

Approved by	JBrischuk
Approval date	24/05/2022 13:37

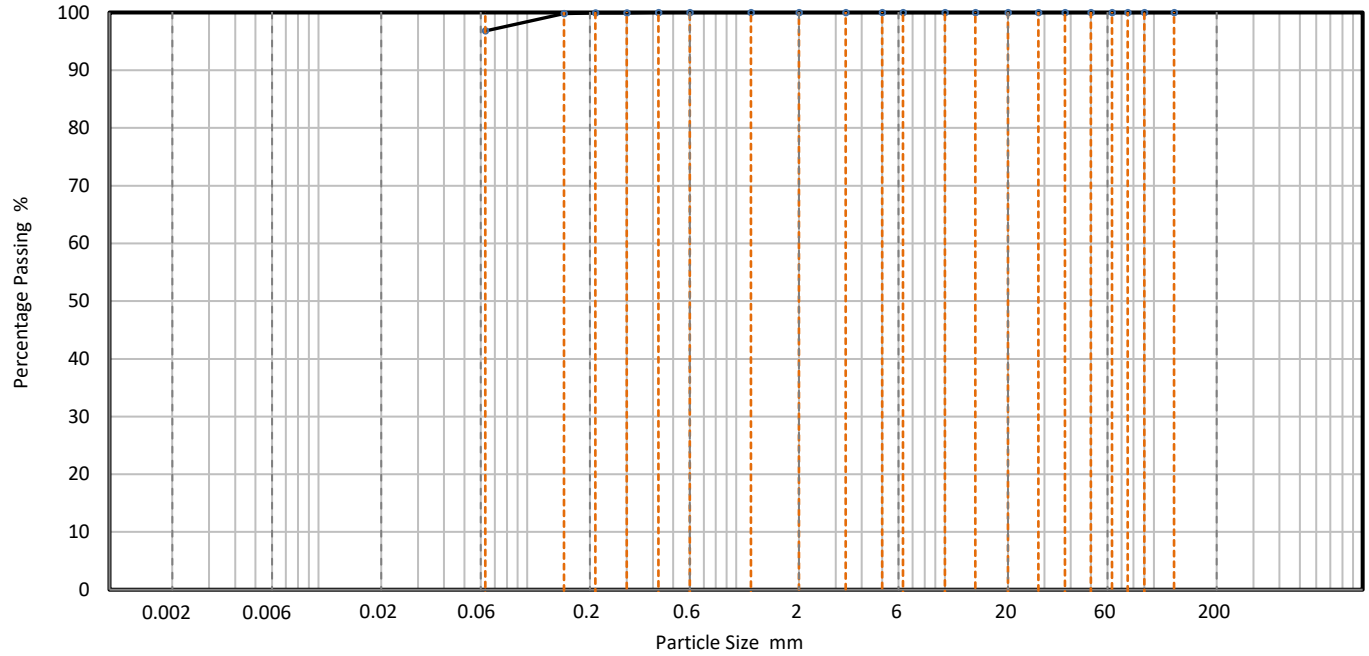
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12-16 Yarm Road,
Stockton on Tees,
TS18 3NA
01642 607083
lab@solmek.com



Site name	Job number
Project Borealis, Fujifilm	S220408

Hole	BH06	Lab sample ID	SLMK2022051233
Depth (Top)	m 15.00	Test Method	BS 1377 - 2 : 1990 Clause 9.2
Depth (Base)	m 15.45	Soil Description	Slightly Sandy CLAY
Sample type	B		



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

Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	100		
0.425	100		
0.3	100		
0.212	100		
0.15	100		
0.063	97		

Dry Mass of sample, g

871

Sample Proportions	% dry mass
Very coarse	0.0
Gravel	0.0
Sand	3.2
Fines <0.063mm	97.0

Grading Analysis	
D100	mm
D60	mm
D30	mm
D10	mm
Uniformity Coefficient	
Curvature Coefficient	

Remarks
Preparation and testing in accordance with test method unless noted below

Accreditation status

Hydrometer is the usual Sedimentation method carried out by Solmek and is part of the Solmek UKAS accreditation schedule.

Approved by	JBrischuk
Approval date	24/05/2022 13:37

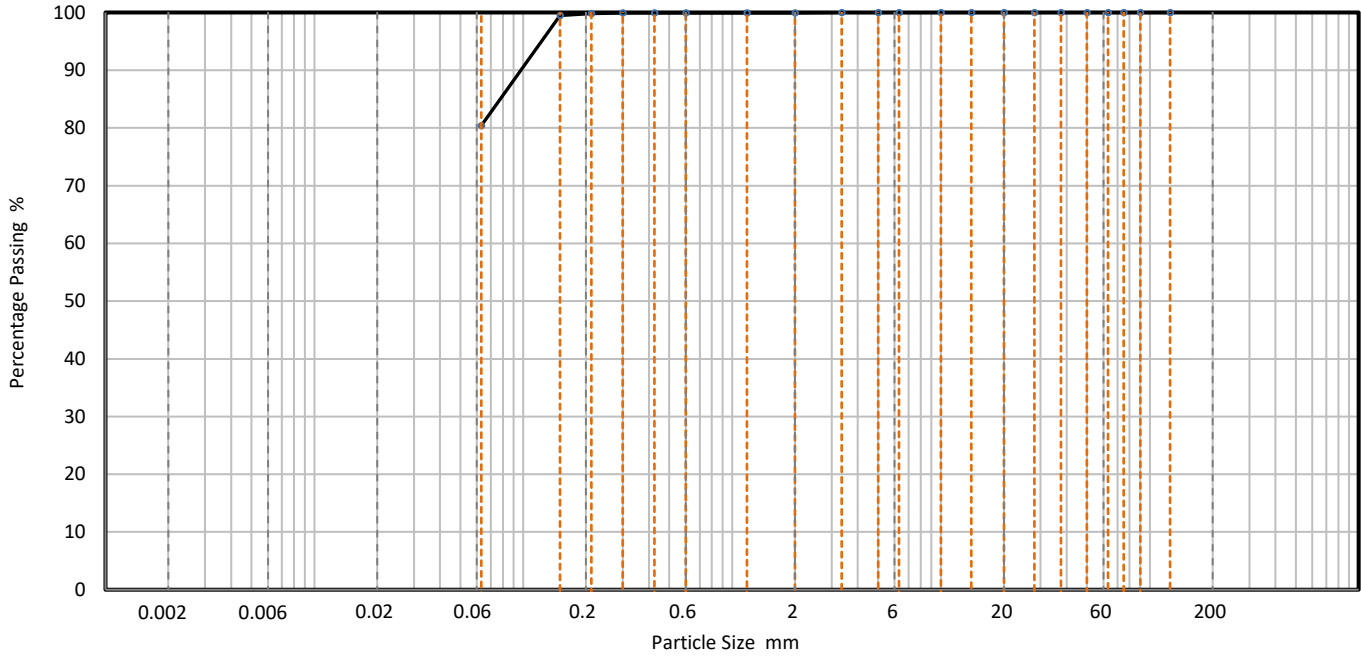
PARTICLE SIZE DISTRIBUTION

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12-16 Yarm Road,
Stockton on Tees,
TS18 3NA
01642 607083
lab@solmek.com



Site name	Job number
Project Borealis, Fujifilm	S220408

Hole	BH07	Lab sample ID	SLMK2022051236
Depth (Top)	m 15.00	Test Method	BS 1377 - 2 : 1990 Clause 9.2
Depth (Base)	m 15.45	Soil Description	Slightly Gravelly, Slightly Sandy CLAY
Sample type	B		



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

Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	100		
0.425	100		
0.3	100		
0.212	100		
0.15	100		
0.063	80		

Dry Mass of sample, g

675

Sample Proportions	% dry mass
Very coarse	0.0
Gravel	0.1
Sand	19.6
Fines <0.063mm	80.0

Grading Analysis	
D100	mm
D60	mm
D30	mm
D10	mm
Uniformity Coefficient	
Curvature Coefficient	

Remarks
Preparation and testing in accordance with test method unless noted below

Accreditation status

Hydrometer is the usual Sedimentation method carried out by Solmek and is part of the Solmek UKAS accreditation schedule.

Approved by	JBrischuk
Approval date	24/05/2022 13:37

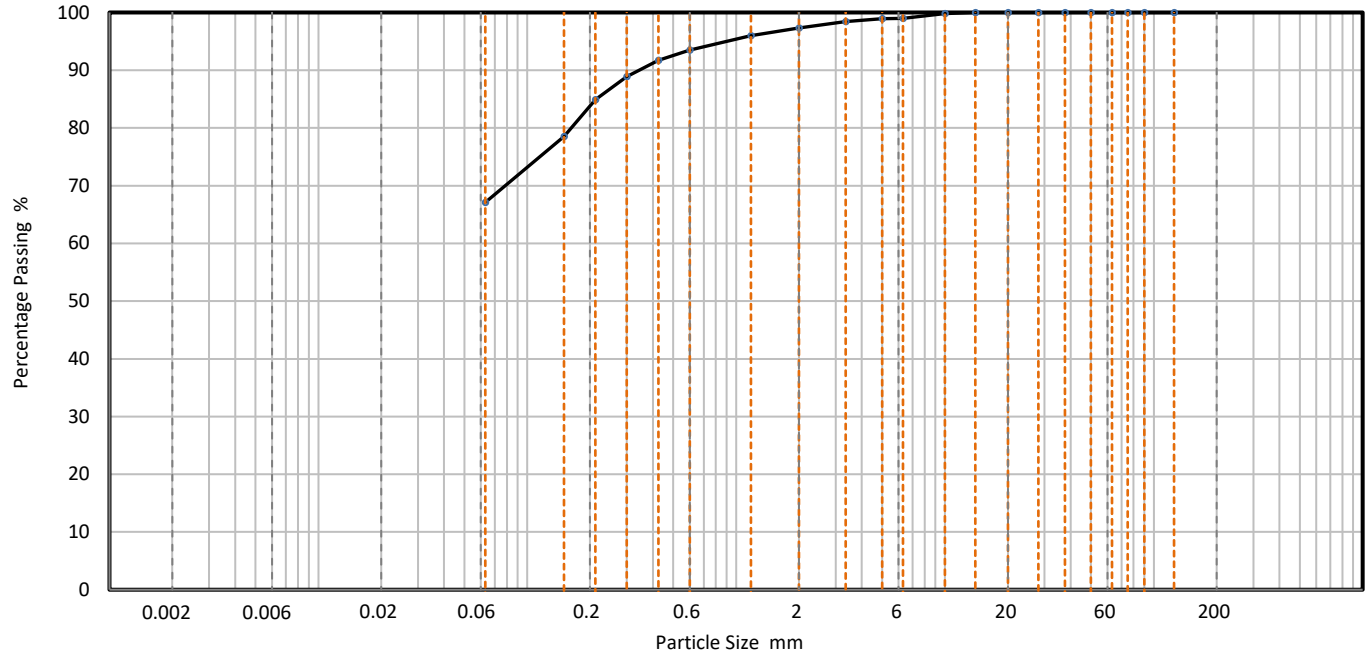
PARTICLE SIZE DISTRIBUTION

Solmek
12-16 Yarm Road,
Stockton on Tees,
TS18 3NA
01642 607083
lab@solmek.com



Site name	Job number
Project Borealis, Fujifilm	S220408

Hole	BH08	Lab sample ID	SLMK2022051238
Depth (Top)	m 7.50	Test Method	BS 1377 - 2 : 1990 Clause 9.2
Depth (Base)	m 7.95	Soil Description	Slightly Gravelly, Very Sandy CLAY
Sample type	B		



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

Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	99		
5	99		
3.35	98		
2	97		
1.18	96		
0.6	94		
0.425	92		
0.3	89		
0.212	85		
0.15	79		
0.063	67		

Dry Mass of sample, g

688

Sample Proportions	% dry mass
Very coarse	0.0
Gravel	2.7
Sand	30.2
Fines <0.063mm	67.0

Grading Analysis	
D100	mm
D60	mm
D30	mm
D10	mm
Uniformity Coefficient	
Curvature Coefficient	

Remarks
Preparation and testing in accordance with test method unless noted below

Accreditation status

Hydrometer is the usual Sedimentation method carried out by Solmek and is part of the Solmek UKAS accreditation schedule.

Approved by	JBrischuk
Approval date	24/05/2022 13:37

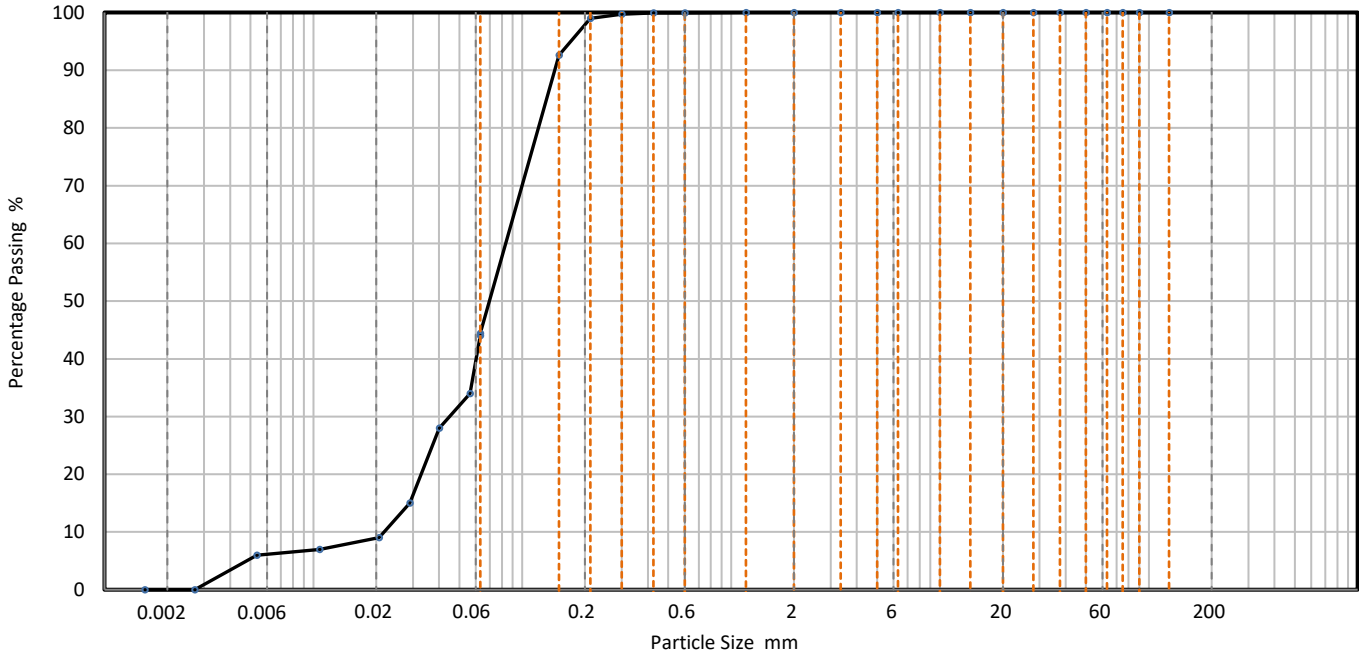
PARTICLE SIZE DISTRIBUTION

Solmek
12-16 Yarm Road,
Stockton on Tees,
TS18 3NA
01642 607083
lab@solmek.com



Site name	Job number
Project Borealis, Fujifilm	S220408

Hole	BH08	Lab sample ID	SLMK2022051239
Depth (Top)	m 15.00	Test Method	BS 1377 - 2 : 1990 Clauses 9.2 and 9.5
Depth (Base)	m 15.45	Soil Description	Very Silty SAND
Sample type	B		



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

Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	44
90	100	0.0562	34
75	100	0.0401	28
63	100	0.0289	15
50	100	0.0207	9
37.5	100	0.0107	7
28	100	0.0054	6
20	100	0.0027	0
14	100	0.0016	0
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	100	Particle density (assumed)	
0.425	100	2.65	Mg/m ³
0.3	100		
0.212	99		
0.15	93		
0.063	44		

Dry Mass of sample, g

556

Sample Proportions	% dry mass
Very coarse	0.0
Gravel	0.0
Sand	55.5
Silt	44.5
Clay	0.0

Grading Analysis		
D100	mm	
D60	mm	0.0834
D30	mm	0.0442
D10	mm	0.0213
Uniformity Coefficient		3.9
Curvature Coefficient		1.1

Remarks
Preparation and testing in accordance with test method unless noted below

Accreditation status

Hydrometer is the usual Sedimentation method carried out by Solmek and is part of the Solmek UKAS accreditation schedule.

Approved by	JBrischuk
Approval date	24/05/2022 13:34

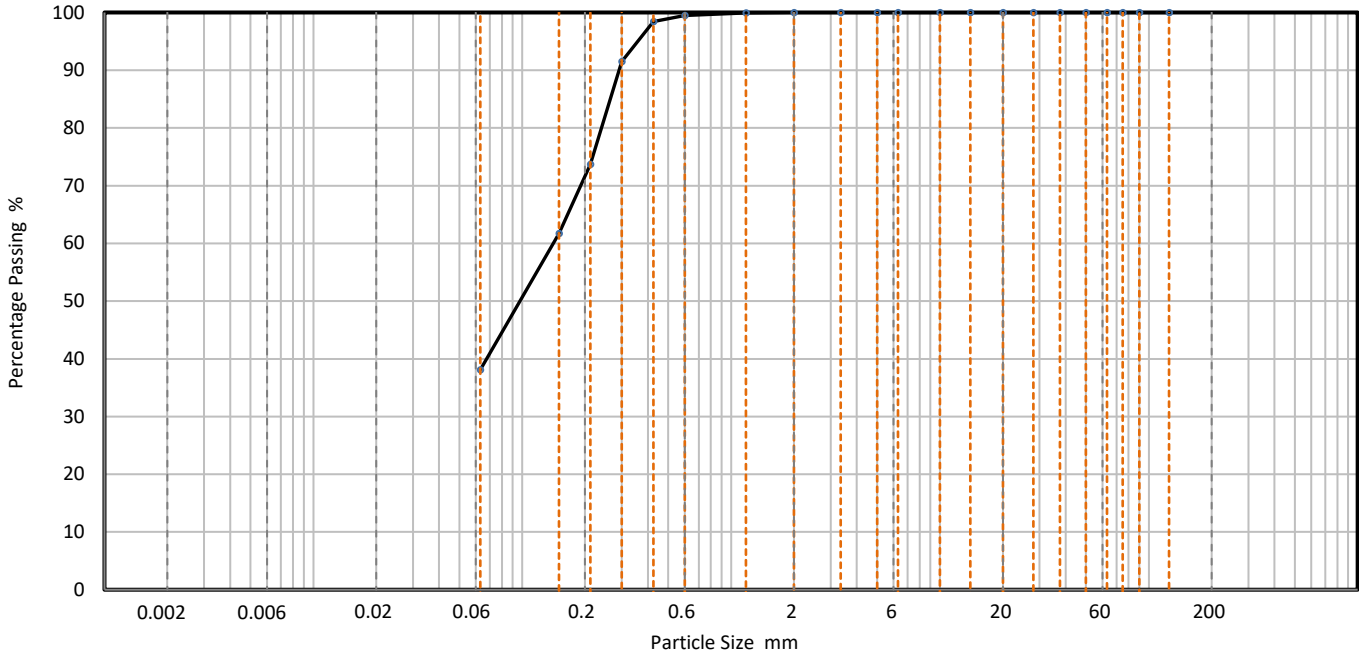
PARTICLE SIZE DISTRIBUTION

Solmek
12-16 Yarm Road,
Stockton on Tees,
TS18 3NA
01642 607083
lab@solmek.com



Site name	Job number
Project Borealis, Fujifilm	S220408

Hole	BH09	Lab sample ID	SLMK2022051242
Depth (Top)	m 15.00	Test Method	BS 1377 - 2 : 1990 Clause 9.2
Depth (Base)	m 15.45	Soil Description	Very Clayey SAND
Sample type	B		



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

Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	100		
0.425	98		
0.3	92		
0.212	74		
0.15	62		
0.063	38		

Dry Mass of sample, g 601

Sample Proportions	% dry mass
Very coarse	0.0
Gravel	0.0
Sand	61.9
Fines <0.063mm	38.0


Grading Analysis		
D100	mm	
D60	mm	0.141
D30	mm	
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks
Preparation and testing in accordance with test method unless noted below

Accreditation status

Hydrometer is the usual Sedimentation method carried out by Solmek and is part of the Solmek UKAS accreditation schedule.

Approved by	JBrischuk
Approval date	24/05/2022 13:37

	Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen		Job Ref	S220408	
			Borehole/Pit No.	BH01	
Site Name	Project Borealis, Fujifilm		Sample No.		
Soil Description			Depth	9.00	
Specimen Reference		Specimen Depth	m	Sample Type	U
Specimen Description	High strength CLAY		KeyLAB ID	SLMK2022051216	
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen		Date of test	18/05/2022	

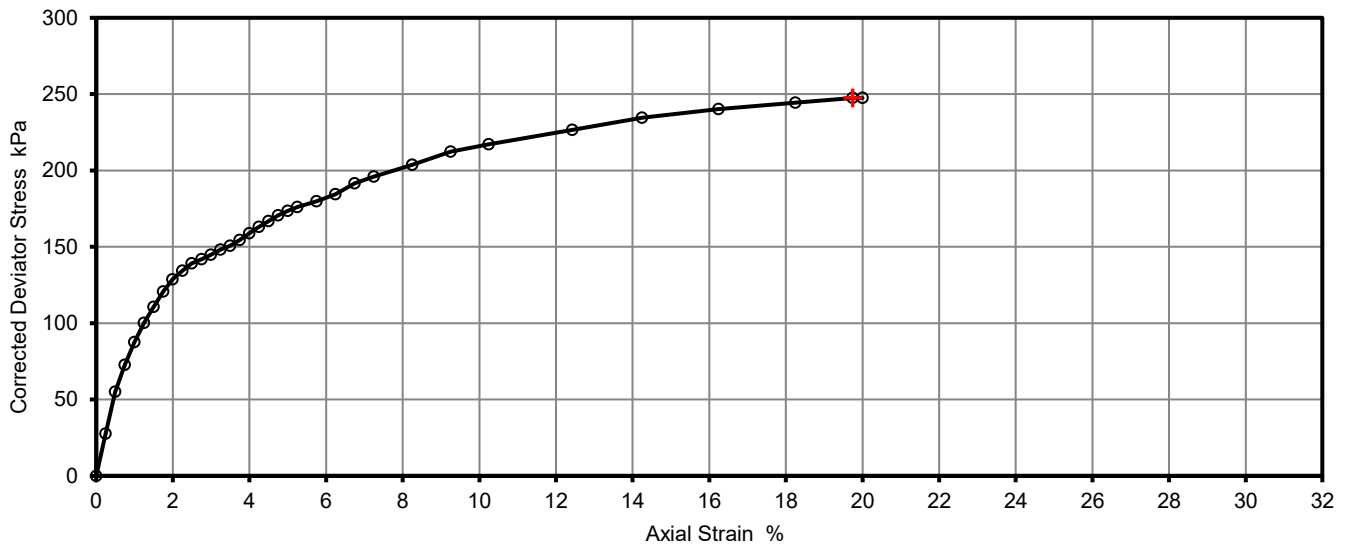
Test Number	1
Length	202.0 mm
Diameter	103.0 mm
Bulk Density	2.03 Mg/m3
Moisture Content	21.0 %
Dry Density	1.68 Mg/m3

Tracable Equipment Record

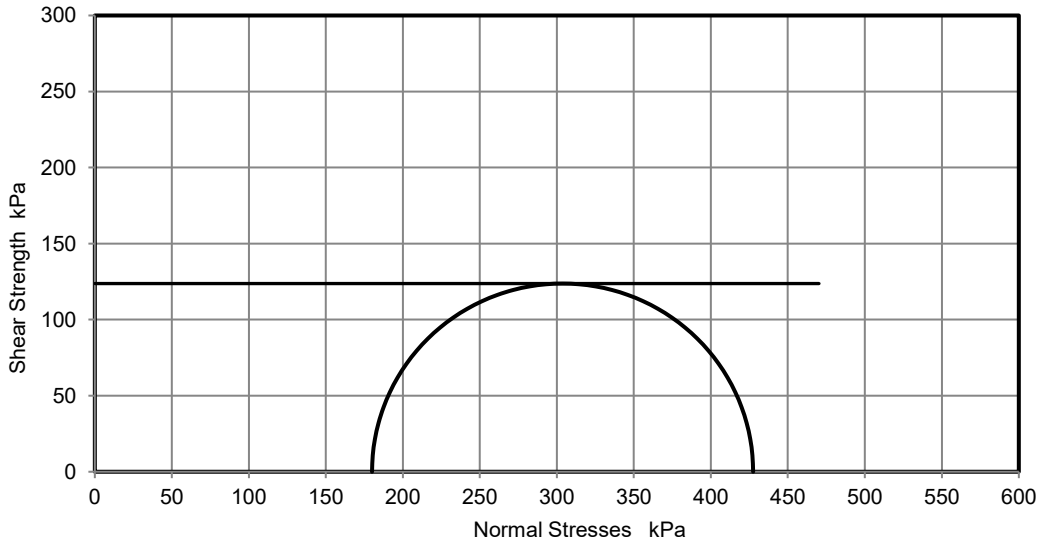
Test Frame	TRI 004
Load Ring	LOAD CELL 001
Pressure Gauge	PRE 006
Digital Caliper	CAL-005
Balance	BAL-007

Rate of Strain	1.0 %/min
Cell Pressure	180 kPa
At failure	
Axial Strain	19.7 %
Deviator Stress, ($\sigma_1 - \sigma_3$)f	247 kPa
Undrained Shear Strength, cu	124 kPa $\frac{1}{2}(\sigma_1 - \sigma_3)f$
Mode of Failure	Compound

Deviator Stress v Axial Strain




Mohr Circles



Deviator stress corrected for area change and membrane effects

Mohr circles and their interpretation is not covered by BS1377. This is provided for information only.

No of membranes used	1
Total thickness (mm)	0.25
Membrane Correction	
Membrane Type	

	Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen		Job Ref	S220408	
			Borehole/Pit No.	BH02	
Site Name	Project Borealis, Fujifilm		Sample No.		
Soil Description			Depth	5.00	
Specimen Reference		Specimen Depth	m	Sample Type	U
Specimen Description	Low strength CLAY		KeyLAB ID	SLMK2022051219	
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen		Date of test	17/05/2022	

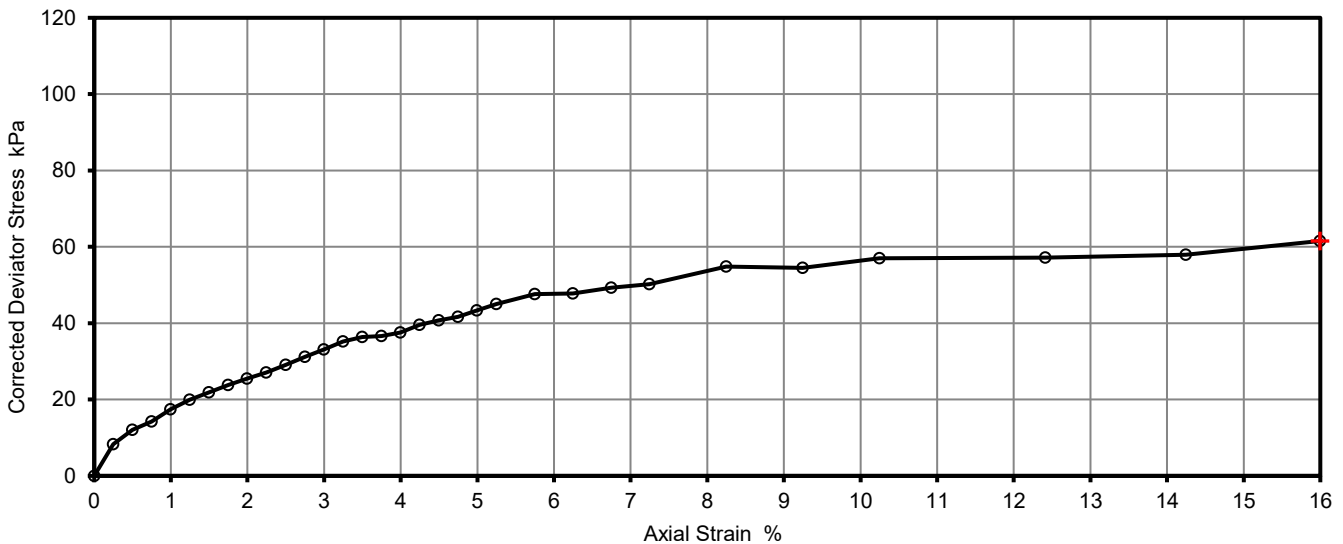
Test Number	1	
Length	203.0	mm
Diameter	103.0	mm
Bulk Density	1.97	Mg/m3
Moisture Content	27.4	%
Dry Density	1.54	Mg/m3

Tracable Equipment Record

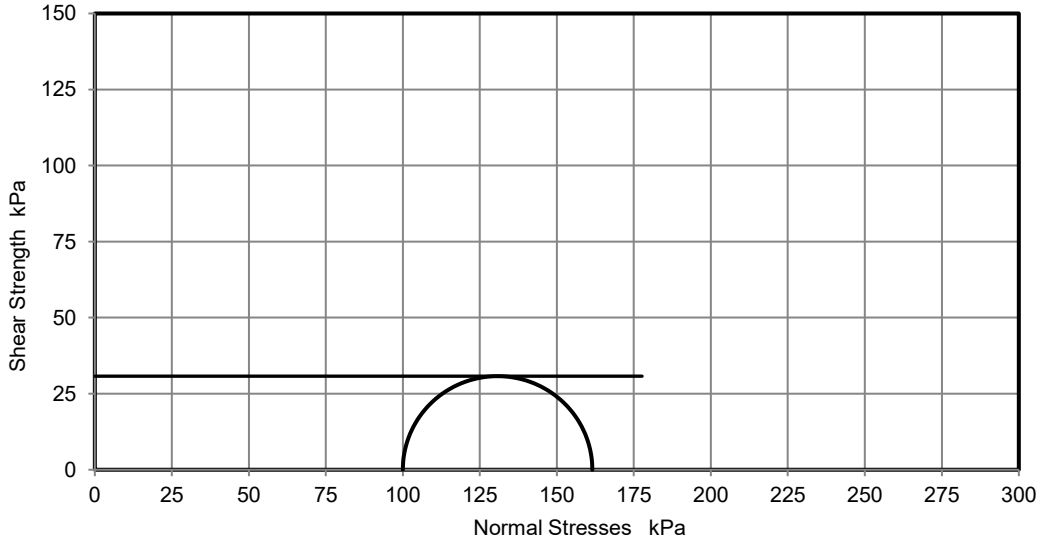
Test Frame	TRI 004
Load Ring	LOAD CELL 001
Pressure Gauge	PRE 006
Digital Caliper	CAL-005
Balance	BAL-007

Rate of Strain	1.0	%/min
Cell Pressure	100	kPa
At failure	16.0	%
Axial Strain	62	kPa
Deviator Stress, ($\sigma_1 - \sigma_3$) _f	31	kPa $\frac{1}{2}(\sigma_1 - \sigma_3)$ _f
Undrained Shear Strength, c_u	Compound	
Mode of Failure		

Deviator Stress v Axial Strain




Mohr Circles



Deviator stress corrected for area change and membrane effects

Mohr circles and their interpretation is not covered by BS1377. This is provided for information only.

No of membranes used	1
Total thickness (mm)	0.25
Membrane Correction	
Membrane Type	

	Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen		Job Ref	S220408	
			Borehole/Pit No.	BH03	
Site Name	Project Borealis, Fujifilm		Sample No.		
Soil Description			Depth	3.00	
Specimen Reference		Specimen Depth	m	Sample Type	U
Specimen Description	Medium strength CLAY		KeyLAB ID	SLMK2022051221	
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen		Date of test	18/05/2022	

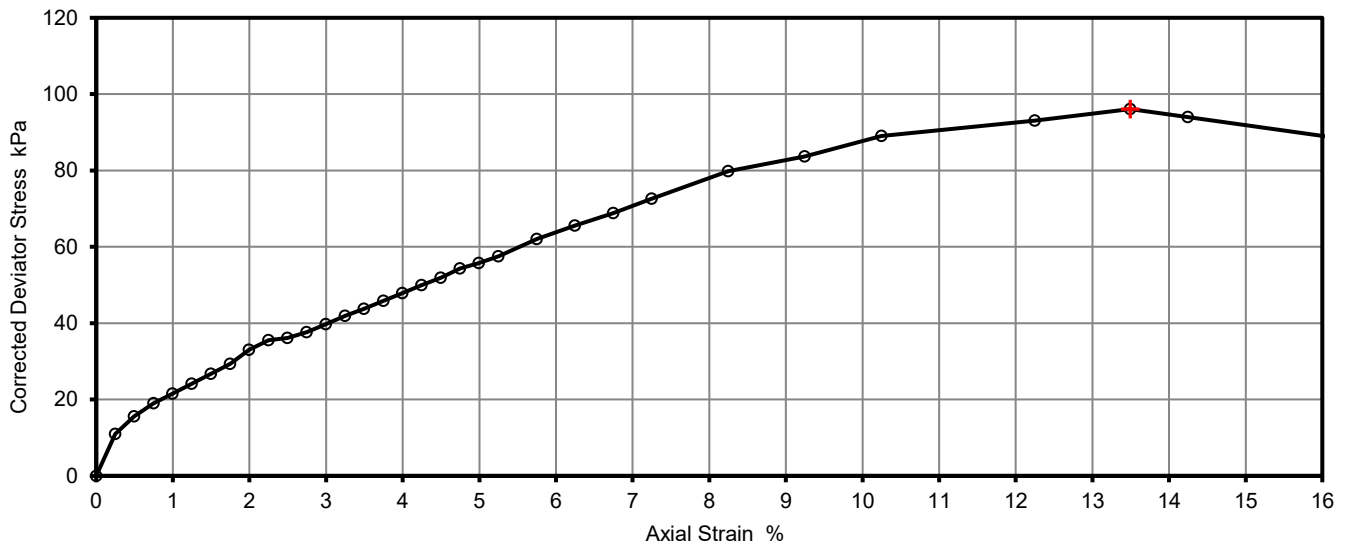
Test Number	1
Length	202.0 mm
Diameter	103.0 mm
Bulk Density	1.97 Mg/m3
Moisture Content	30.4 %
Dry Density	1.51 Mg/m3

Tracable Equipment Record

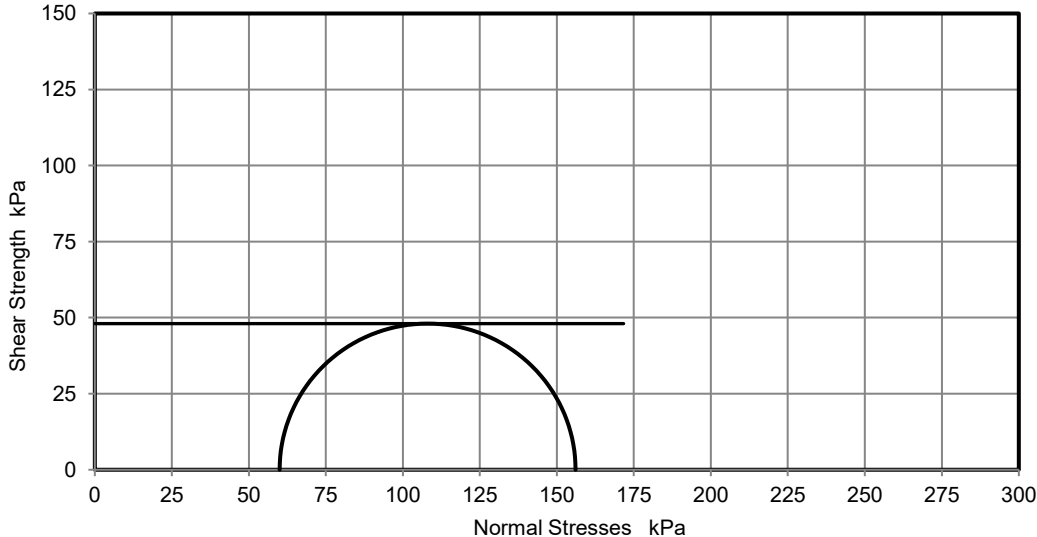
Test Frame	TRI 004
Load Ring	LOAD CELL 001
Pressure Gauge	PRE 006
Digital Caliper	CAL-005
Balance	BAL-007

Rate of Strain	1.0 %/min
Cell Pressure	60 kPa
At failure	
Axial Strain	13.5 %
Deviator Stress, ($\sigma_1 - \sigma_3$) _f	96 kPa
Undrained Shear Strength, c_u	48 kPa $\frac{1}{2}(\sigma_1 - \sigma_3)_f$
Mode of Failure	Compound

Deviator Stress v Axial Strain




Mohr Circles



Deviator stress corrected for area change and membrane effects

Mohr circles and their interpretation is not covered by BS1377. This is provided for information only.

No of membranes used	1
Total thickness (mm)	0.25
Membrane Correction	
Membrane Type	

	Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen		Job Ref	S220408	
			Borehole/Pit No.	BH03	
Site Name	Project Borealis, Fujifilm		Sample No.		
Soil Description			Depth	10.50	
Specimen Reference		Specimen Depth	m	Sample Type	U
Specimen Description	High strength CLAY		KeyLAB ID	SLMK2022051222	
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen		Date of test	20/05/2022	

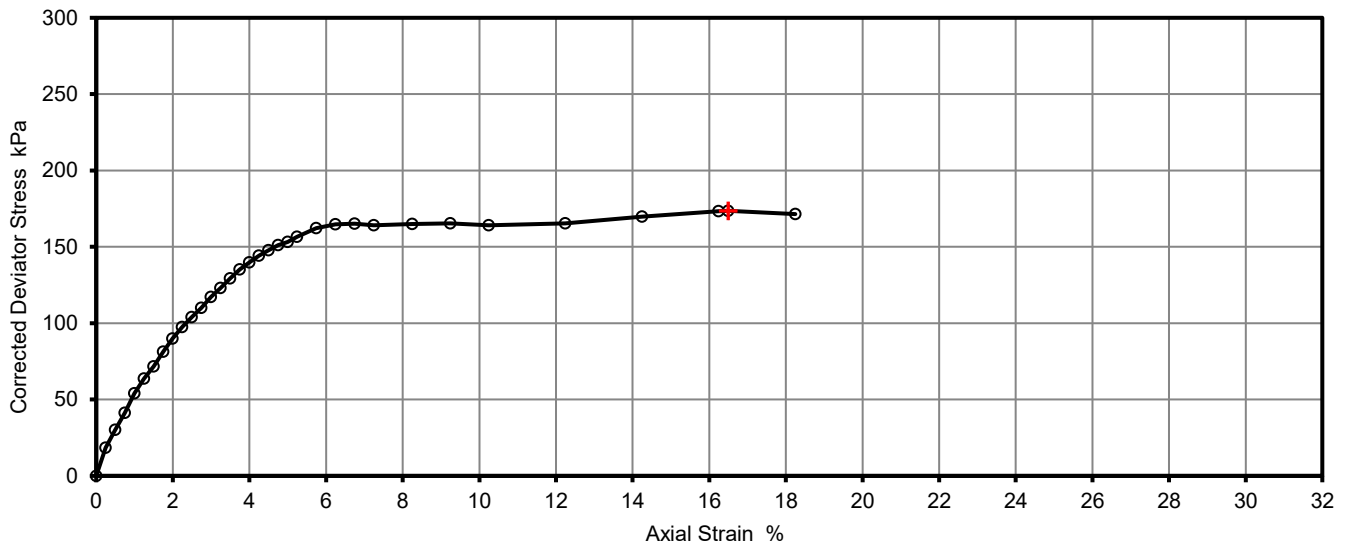
Test Number	1
Length	200.0 mm
Diameter	103.0 mm
Bulk Density	2.08 Mg/m3
Moisture Content	26.6 %
Dry Density	1.64 Mg/m3

Tracable Equipment Record

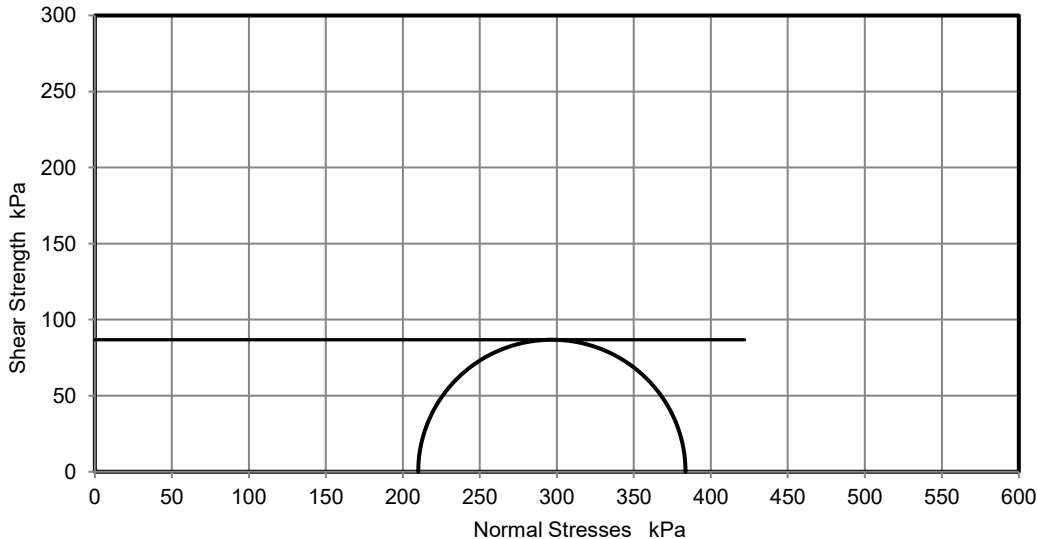
Test Frame	TRI 004
Load Ring	LOAD CELL 001
Pressure Gauge	PRE 006
Digital Caliper	CAL-005
Balance	BAL-007

Rate of Strain	1.0 %/min
Cell Pressure	210 kPa
At failure	
Axial Strain	16.5 %
Deviator Stress, ($\sigma_1 - \sigma_3$)f	174 kPa
Undrained Shear Strength, cu	87 kPa $\frac{1}{2}(\sigma_1 - \sigma_3)$ f
Mode of Failure	Compound

Deviator Stress v Axial Strain




Mohr Circles



Deviator stress corrected for area change and membrane effects

Mohr circles and their interpretation is not covered by BS1377. This is provided for information only.

No of membranes used	1
Total thickness (mm)	0.25
Membrane Correction	
Membrane Type	

	Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen		Job Ref	S220408	
			Borehole/Pit No.	BH04	
Site Name	Project Borealis, Fujifilm		Sample No.		
Soil Description			Depth	3.00	
Specimen Reference		Specimen Depth	m	Sample Type	U
Specimen Description	Low strength CLAY		KeyLAB ID	SLMK2022051224	
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen		Date of test	18/05/2022	

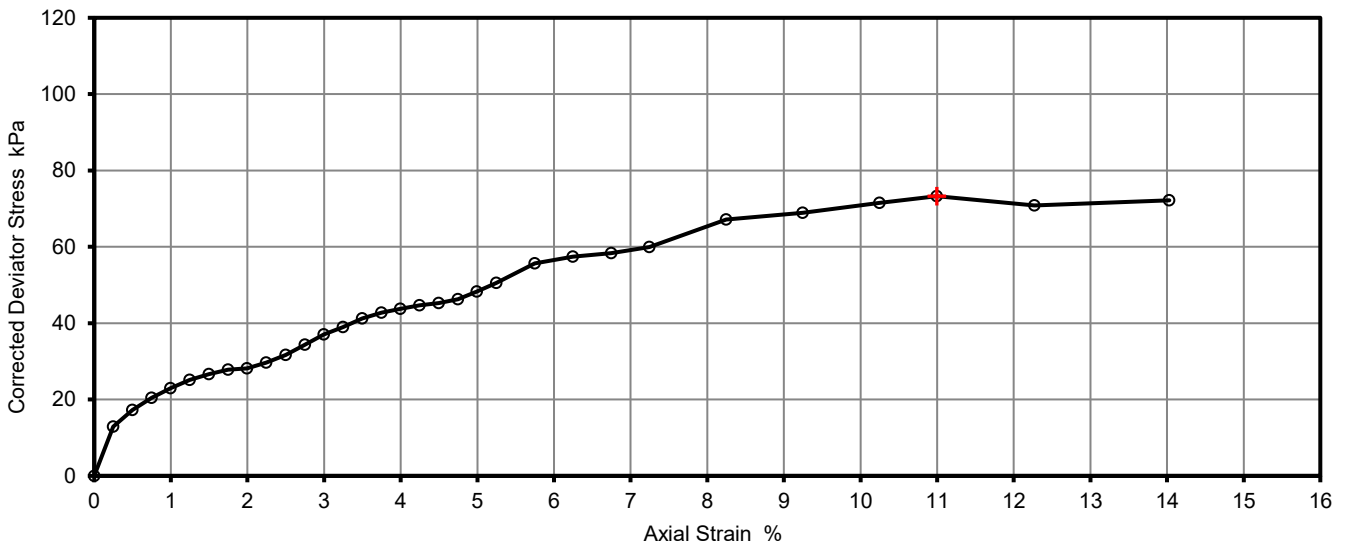
Test Number	1
Length	203.0 mm
Diameter	102.0 mm
Bulk Density	2.01 Mg/m3
Moisture Content	23.3 %
Dry Density	1.63 Mg/m3

Tracable Equipment Record

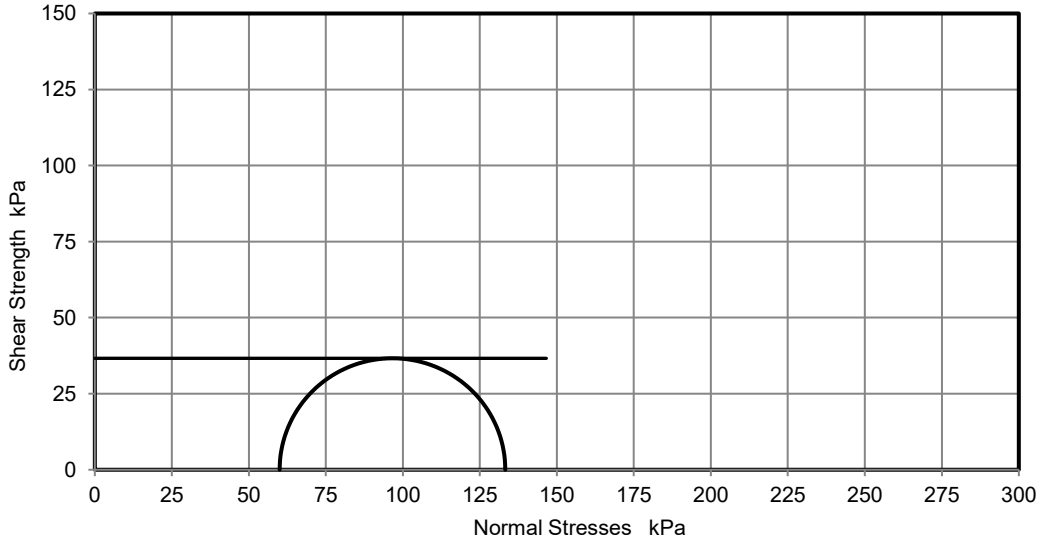
Test Frame	TRI 004
Load Ring	LOAD CELL 001
Pressure Gauge	PRE 006
Digital Caliper	CAL-005
Balance	BAL-007

Rate of Strain	1.0 %/min
Cell Pressure	60 kPa
At failure	
Axial Strain	11.0 %
Deviator Stress, ($\sigma_1 - \sigma_3$) _f	73 kPa
Undrained Shear Strength, c_u	37 kPa $\frac{1}{2}(\sigma_1 - \sigma_3)_f$
Mode of Failure	Compound

Deviator Stress v Axial Strain




Mohr Circles



Deviator stress corrected for area change and membrane effects

Mohr circles and their interpretation is not covered by BS1377. This is provided for information only.

No of membranes used	1
Total thickness (mm)	0.25
Membrane Correction	
Membrane Type	

	Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen		Job Ref	S220408	
			Borehole/Pit No.	BH04	
Site Name	Project Borealis, Fujifilm		Sample No.		
Soil Description			Depth	5.00	
Specimen Reference		Specimen Depth	m	Sample Type	U
Specimen Description	Low strength CLAY		KeyLAB ID	SLMK2022051225	
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen		Date of test	20/05/2022	

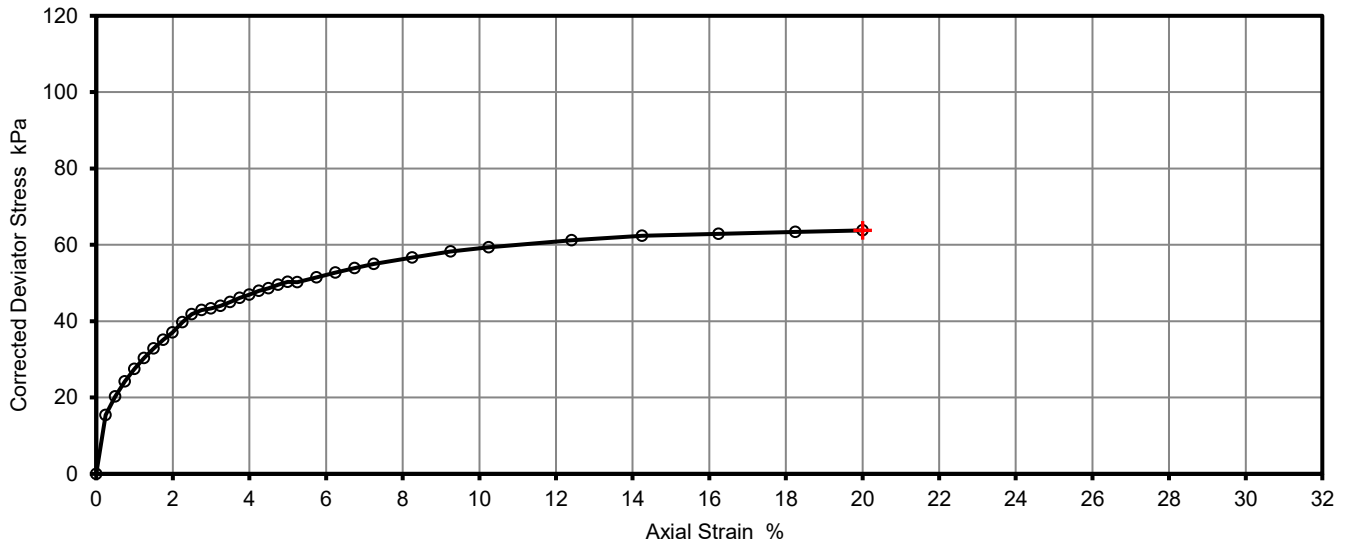
Test Number	1
Length	202.0 mm
Diameter	103.0 mm
Bulk Density	1.97 Mg/m3
Moisture Content	29.2 %
Dry Density	1.53 Mg/m3

Tracable Equipment Record

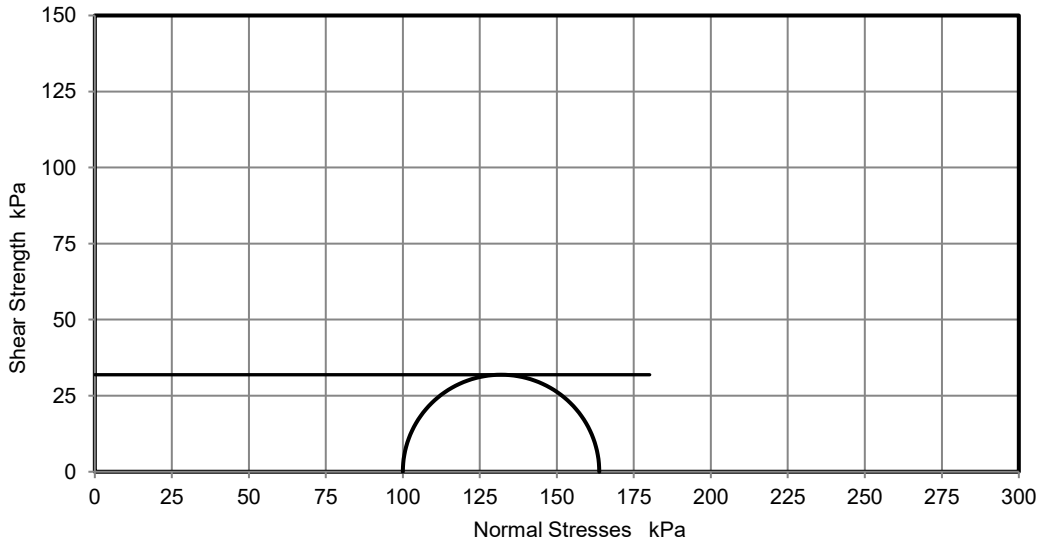
Test Frame	TRI 004
Load Ring	LOAD CELL 001
Pressure Gauge	PRE 006
Digital Caliper	CAL-005
Balance	BAL-007

Rate of Strain	1.0 %/min
Cell Pressure	100 kPa
At failure	
Axial Strain	20.0 %
Deviator Stress, $(\sigma_1 - \sigma_3)_f$	64 kPa
Undrained Shear Strength, c_u	32 kPa $\frac{1}{2}(\sigma_1 - \sigma_3)_f$
Mode of Failure	Compound

Deviator Stress v Axial Strain




Mohr Circles



Deviator stress corrected for area change and membrane effects

Mohr circles and their interpretation is not covered by BS1377. This is provided for information only.

No of membranes used	1
Total thickness (mm)	0.25
Membrane Correction	
Membrane Type	

	Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen		Job Ref	S220408	
			Borehole/Pit No.	BH05	
Site Name	Project Borealis, Fujifilm		Sample No.		
Soil Description			Depth	6.00	
Specimen Reference		Specimen Depth	m	Sample Type	U
Specimen Description	Medium strength CLAY		KeyLAB ID	SLMK2022051228	
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen		Date of test	18/05/2022	

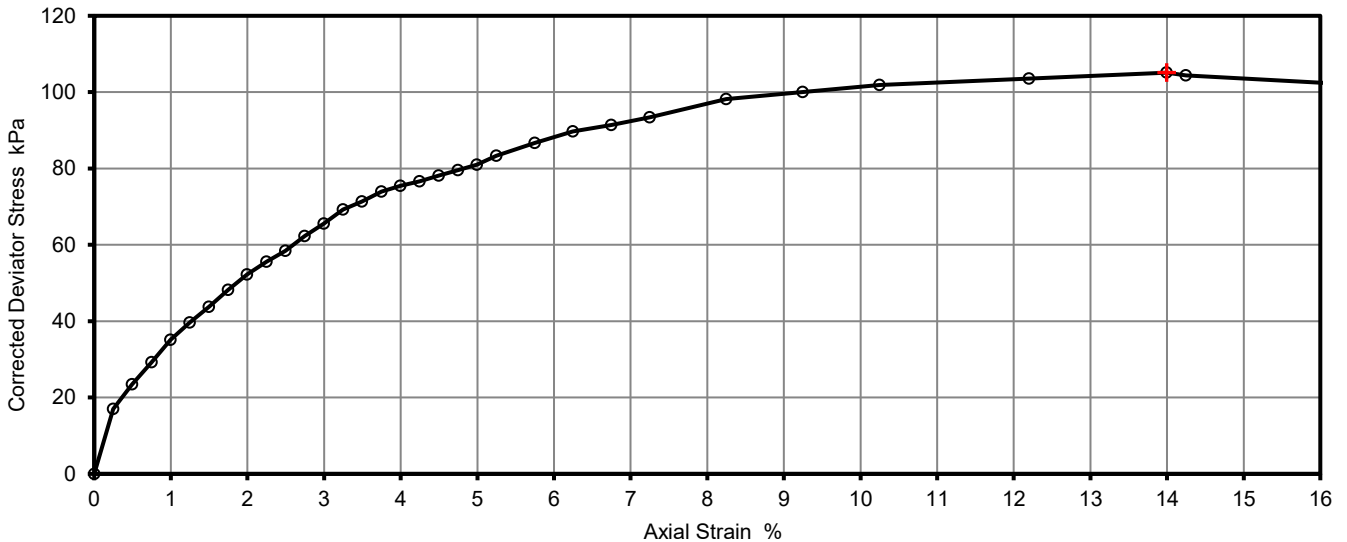
Test Number	1	
Length	202.0	mm
Diameter	103.0	mm
Bulk Density	1.92	Mg/m3
Moisture Content	29.5	%
Dry Density	1.48	Mg/m3

Tracable Equipment Record

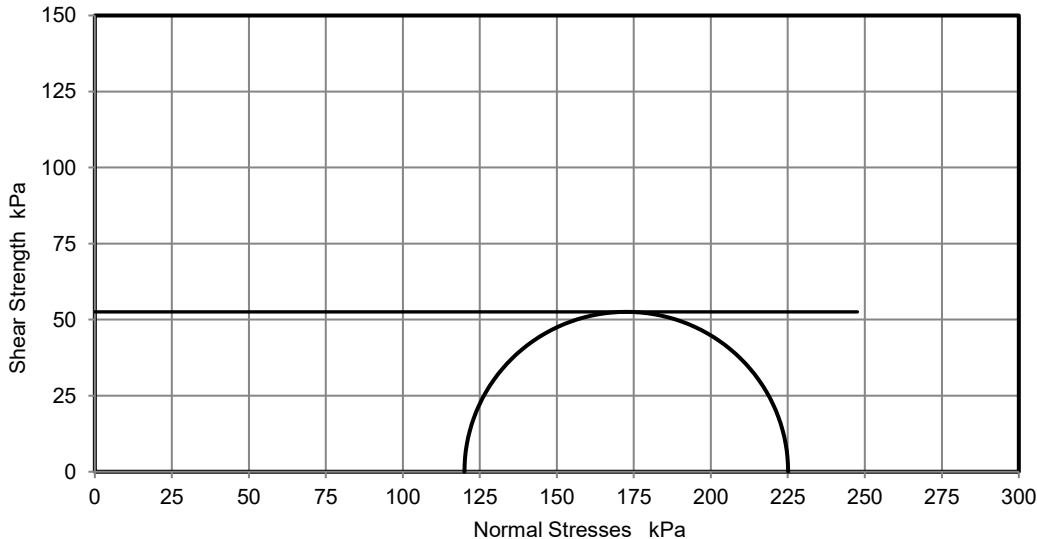
Test Frame	TRI 004
Load Ring	LOAD CELL 001
Pressure Gauge	PRE 006
Digital Caliper	CAL-005
Balance	BAL-007

Rate of Strain	1.0	%/min
Cell Pressure	120	kPa
At failure	14.0	%
Axial Strain	105	kPa
Deviator Stress, ($\sigma_1 - \sigma_3$) _f	53	kPa $\frac{1}{2}(\sigma_1 - \sigma_3)$ _f
Undrained Shear Strength, c_u	Compound	
Mode of Failure		

Deviator Stress v Axial Strain




Mohr Circles



Deviator stress corrected for area change and membrane effects

Mohr circles and their interpretation is not covered by BS1377. This is provided for information only.

No of membranes used	1
Total thickness (mm)	0.25
Membrane Correction	
Membrane Type	

	Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen		Job Ref	S220408	
			Borehole/Pit No.	BH05	
Site Name	Project Borealis, Fujifilm		Sample No.		
Soil Description			Depth	19.50	
Specimen Reference		Specimen Depth	m	Sample Type	U
Specimen Description	Very high strength CLAY		KeyLAB ID	SLMK2022051229	
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen		Date of test	18/05/2022	

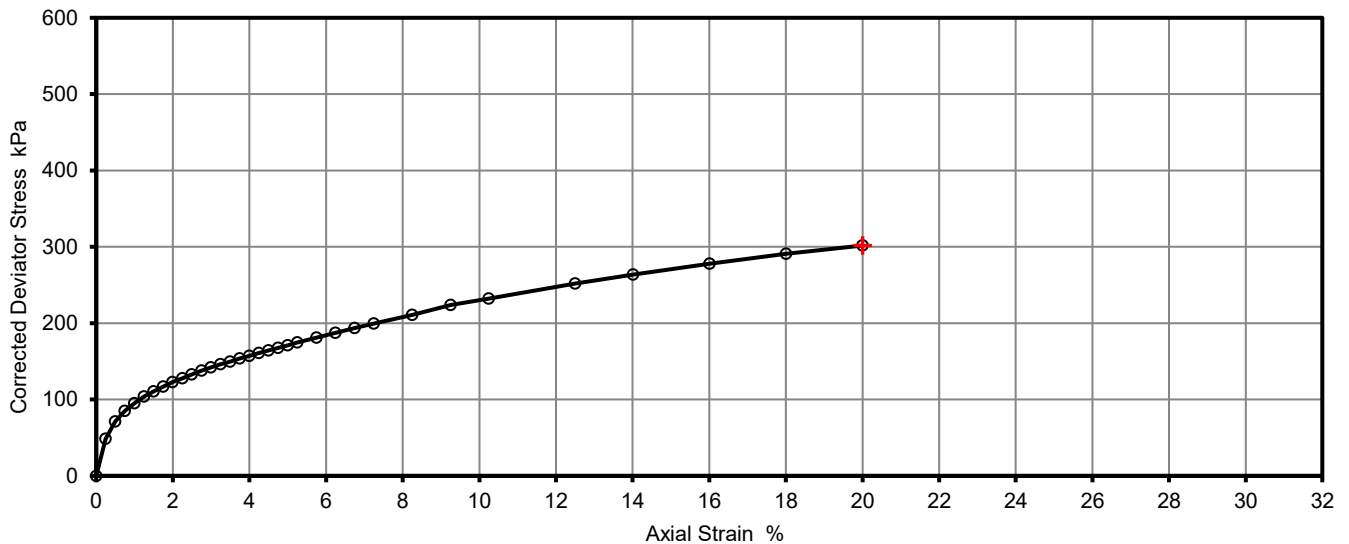
Test Number	1	
Length	202.0	mm
Diameter	103.0	mm
Bulk Density	2.20	Mg/m3
Moisture Content	15.8	%
Dry Density	1.90	Mg/m3

Tracable Equipment Record

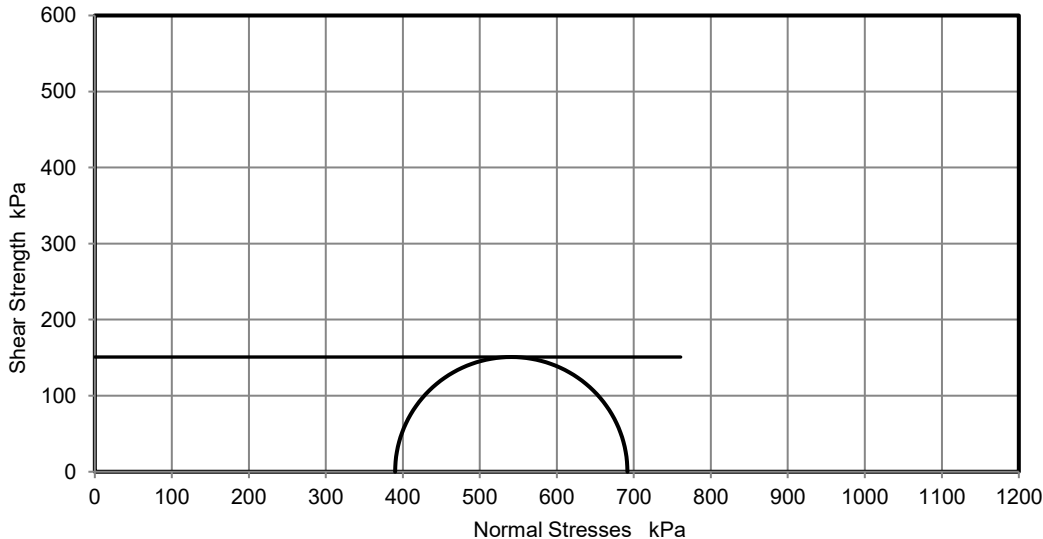
Test Frame	TRI 004
Load Ring	LOAD CELL 001
Pressure Gauge	PRE 006
Digital Caliper	CAL-005
Balance	BAL-007

Rate of Strain	1.0	%/min	
Cell Pressure	390	kPa	
At failure	Axial Strain	20.0	%
	Deviator Stress, $(\sigma_1 - \sigma_3)_f$	302	kPa
	Undrained Shear Strength, c_u	151	kPa $\frac{1}{2}(\sigma_1 - \sigma_3)_f$
	Mode of Failure	Plastic	

Deviator Stress v Axial Strain




Mohr Circles



Deviator stress corrected for area change and membrane effects

Mohr circles and their interpretation is not covered by BS1377. This is provided for information only.

No of membranes used	1
Total thickness (mm)	0.25
Membrane Correction	
Membrane Type	

	Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen		Job Ref	S220408	
			Borehole/Pit No.	BH06	
Site Name	Project Borealis, Fujifilm		Sample No.		
Soil Description			Depth	3.00	
Specimen Reference		Specimen Depth	m	Sample Type	U
Specimen Description	Medium strength CLAY		KeyLAB ID	SLMK2022051230	
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen		Date of test	17/05/2022	

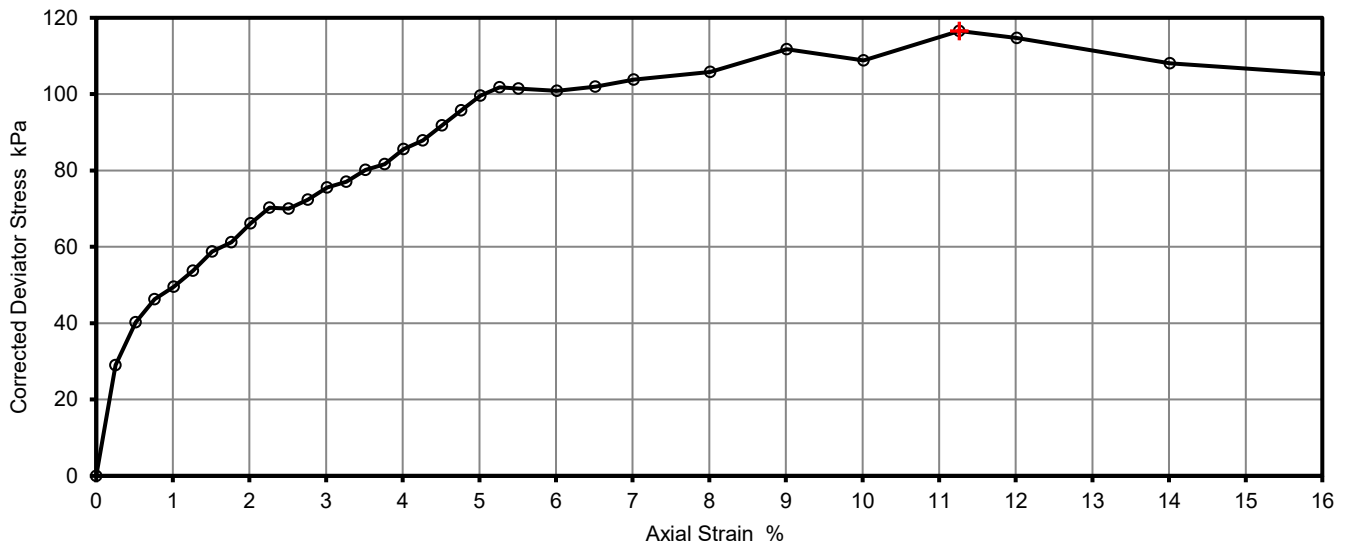
Test Number	1
Length	76.0 mm
Diameter	38.0 mm
Bulk Density	1.97 Mg/m3
Moisture Content	29.2 %
Dry Density	1.53 Mg/m3

Tracable Equipment Record

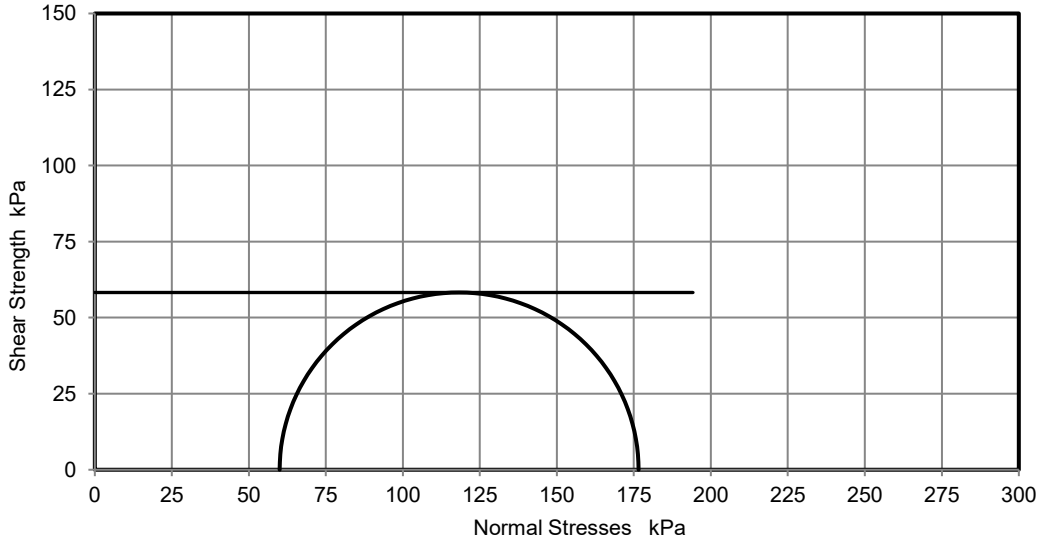
Test Frame	TRI 004
Load Ring	LOAD CELL 003
Pressure Gauge	PRE 006
Digital Caliper	CAL-005
Balance	BAL-007

Rate of Strain	1.0 %/min
Cell Pressure	60 kPa
At failure	
Axial Strain	11.3 %
Deviator Stress, ($\sigma_1 - \sigma_3$) f	117 kPa
Undrained Shear Strength, cu	58 kPa $\frac{1}{2}(\sigma_1 - \sigma_3) f$
Mode of Failure	Compound

Deviator Stress v Axial Strain




Mohr Circles



Deviator stress corrected for area change and membrane effects

Mohr circles and their interpretation is not covered by BS1377. This is provided for information only.

No of membranes used	1
Total thickness (mm)	0.25
Membrane Correction	
Membrane Type	

	Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen		Job Ref	S220408	
			Borehole/Pit No.	BH06	
Site Name	Project Borealis, Fujifilm		Sample No.		
Soil Description			Depth	7.50	
Specimen Reference		Specimen Depth	m	Sample Type	U
Specimen Description	High strength CLAY		KeyLAB ID	SLMK2022051231	
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen		Date of test	17/05/2022	

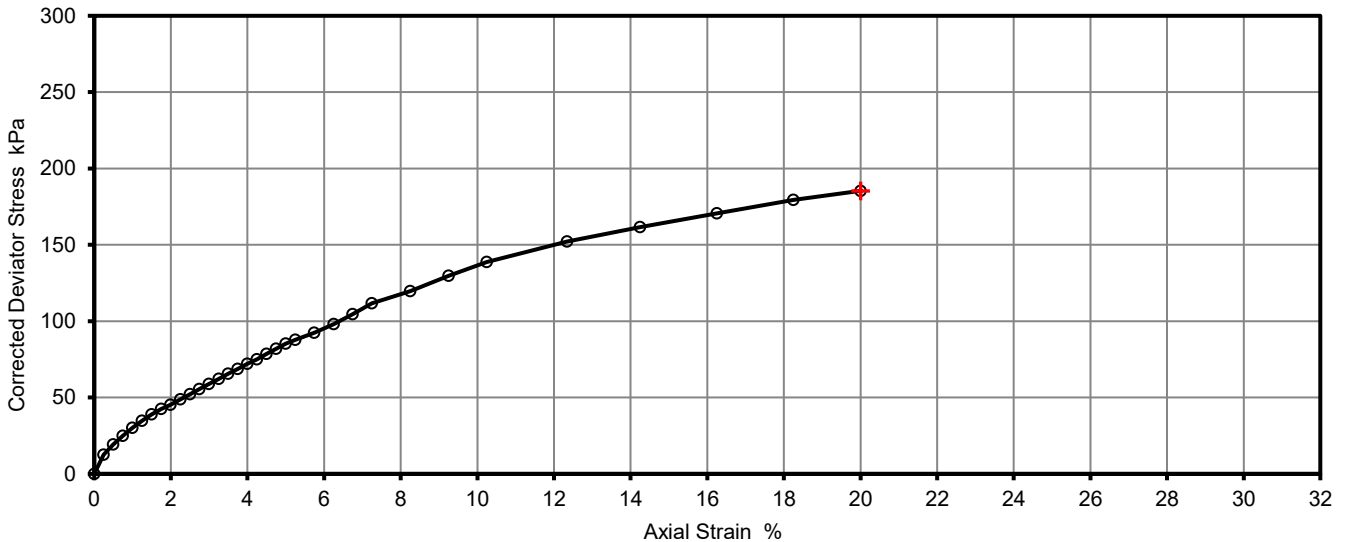
Test Number	1
Length	205.0 mm
Diameter	102.0 mm
Bulk Density	2.17 Mg/m3
Moisture Content	24.9 %
Dry Density	1.74 Mg/m3

Tracable Equipment Record

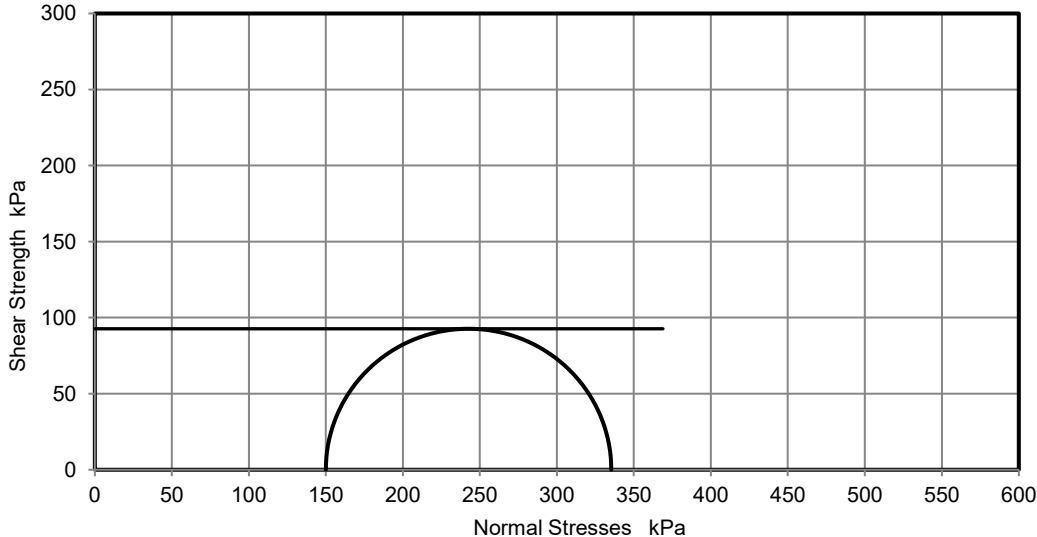
Test Frame	TRI 004
Load Ring	LOAD CELL 001
Pressure Gauge	PRE 006
Digital Caliper	CAL-005
Balance	BAL-007

Rate of Strain	1.0 %/min
Cell Pressure	150 kPa
At failure	
Axial Strain	20.0 %
Deviator Stress, ($\sigma_1 - \sigma_3$)f	185 kPa
Undrained Shear Strength, cu	93 kPa $\frac{1}{2}(\sigma_1 - \sigma_3)$ f
Mode of Failure	Plastic

Deviator Stress v Axial Strain




Mohr Circles



Deviator stress corrected for area change and membrane effects

Mohr circles and their interpretation is not covered by BS1377. This is provided for information only.

No of membranes used	1
Total thickness (mm)	0.25
Membrane Correction	
Membrane Type	

	Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen		Job Ref	S220408	
			Borehole/Pit No.	BH06	
Site Name	Project Borealis, Fujifilm		Sample No.		
Soil Description			Depth	10.50	
Specimen Reference		Specimen Depth	m	Sample Type	U
Specimen Description	Very high strength CLAY		KeyLAB ID	SLMK2022051232	
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen		Date of test	16/05/2022	

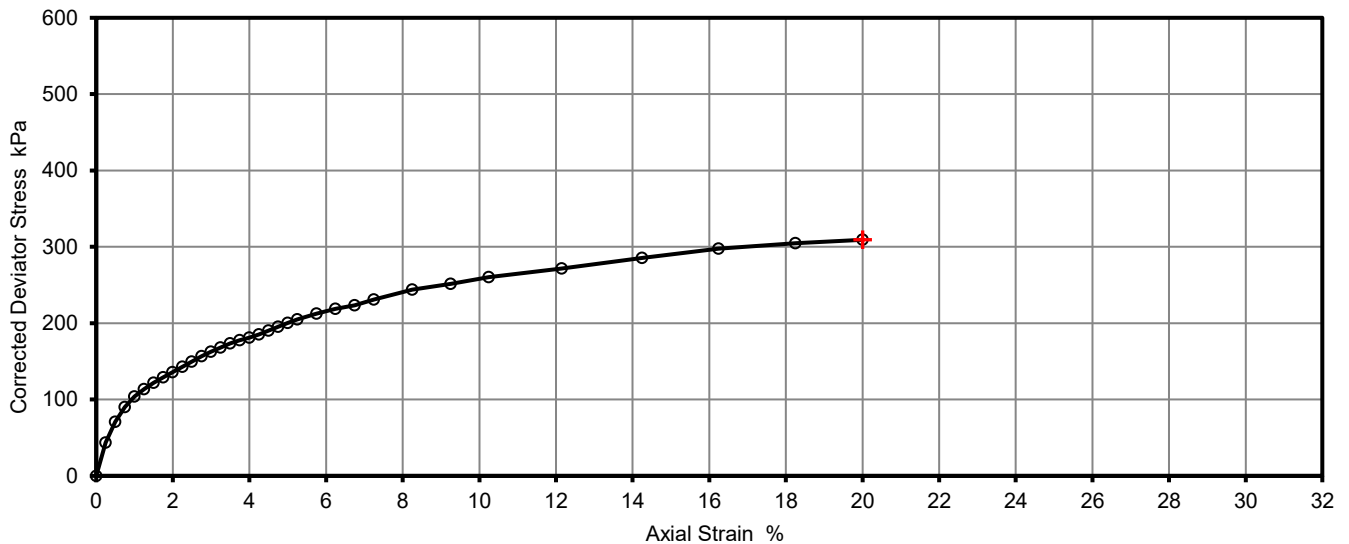
Test Number	1	
Length	202.0	mm
Diameter	103.0	mm
Bulk Density	2.21	Mg/m3
Moisture Content	15.8	%
Dry Density	1.91	Mg/m3

Tracable Equipment Record

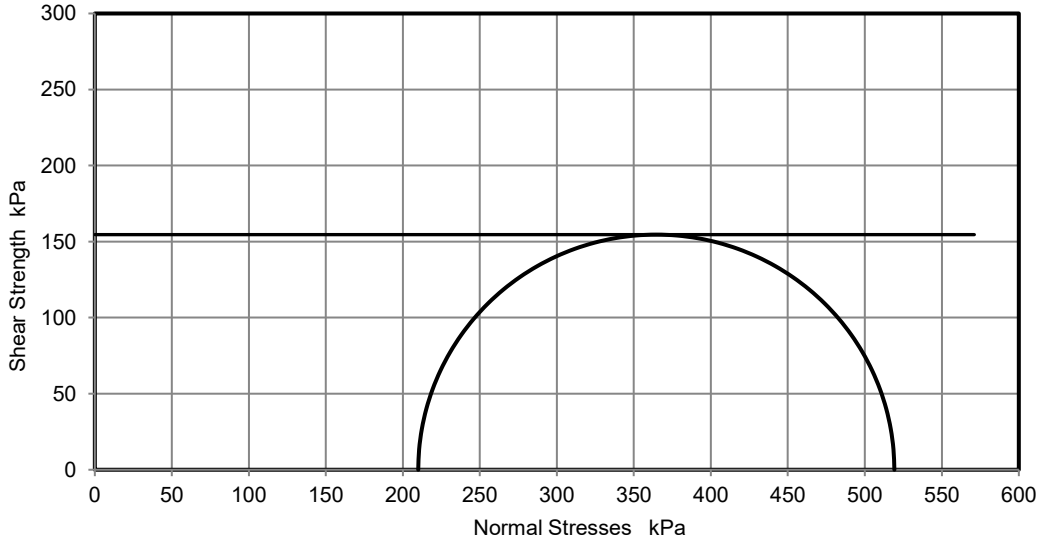
Test Frame	TRI 004
Load Ring	LOAD CELL 001
Pressure Gauge	PRE 006
Digital Caliper	CAL-005
Balance	BAL-007

Rate of Strain	1.0	%/min	
Cell Pressure	210	kPa	
At failure	Axial Strain	20.0	%
	Deviator Stress, $(\sigma_1 - \sigma_3)_f$	309	kPa
	Undrained Shear Strength, c_u	155	kPa $\frac{1}{2}(\sigma_1 - \sigma_3)_f$
	Mode of Failure	Plastic	

Deviator Stress v Axial Strain




Mohr Circles



Deviator stress corrected for area change and membrane effects

Mohr circles and their interpretation is not covered by BS1377. This is provided for information only.

No of membranes used	1
Total thickness (mm)	0.25
Membrane Correction	
Membrane Type	

	Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen		Job Ref	S220408	
			Borehole/Pit No.	BH07	
Site Name	Project Borealis, Fujifilm		Sample No.		
Soil Description			Depth	3.00	
Specimen Reference		Specimen Depth	m	Sample Type	U
Specimen Description	Low strength CLAY		KeyLAB ID	SLMK2022051234	
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen		Date of test	16/05/2022	

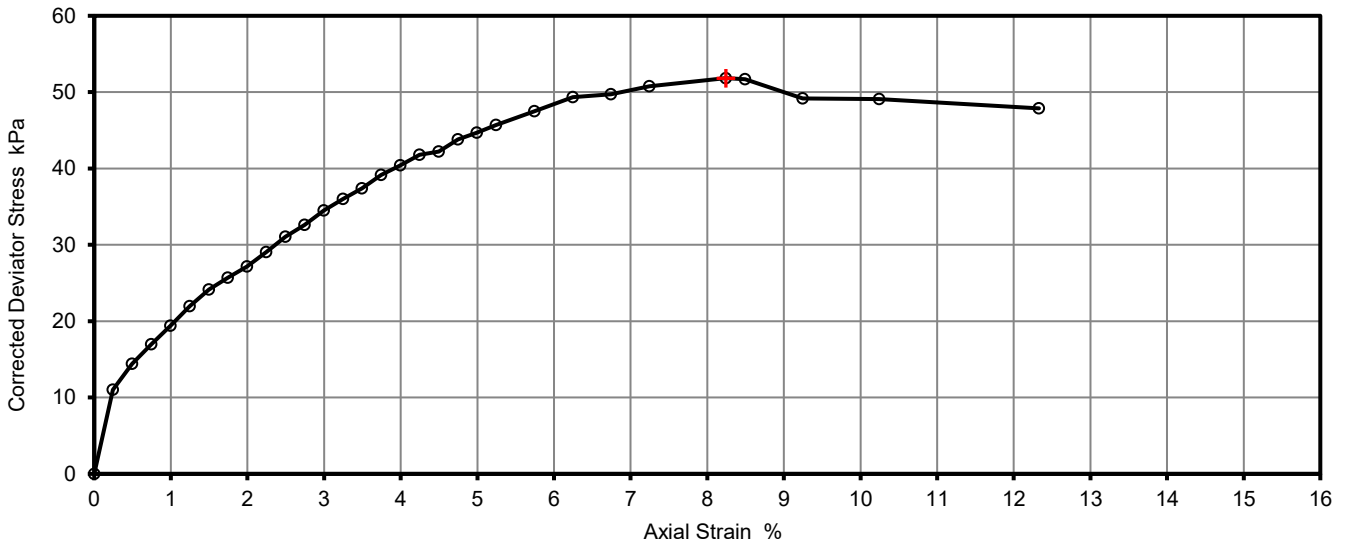
Test Number	1
Length	204.0 mm
Diameter	103.0 mm
Bulk Density	1.84 Mg/m3
Moisture Content	31.0 %
Dry Density	1.40 Mg/m3

Tracable Equipment Record

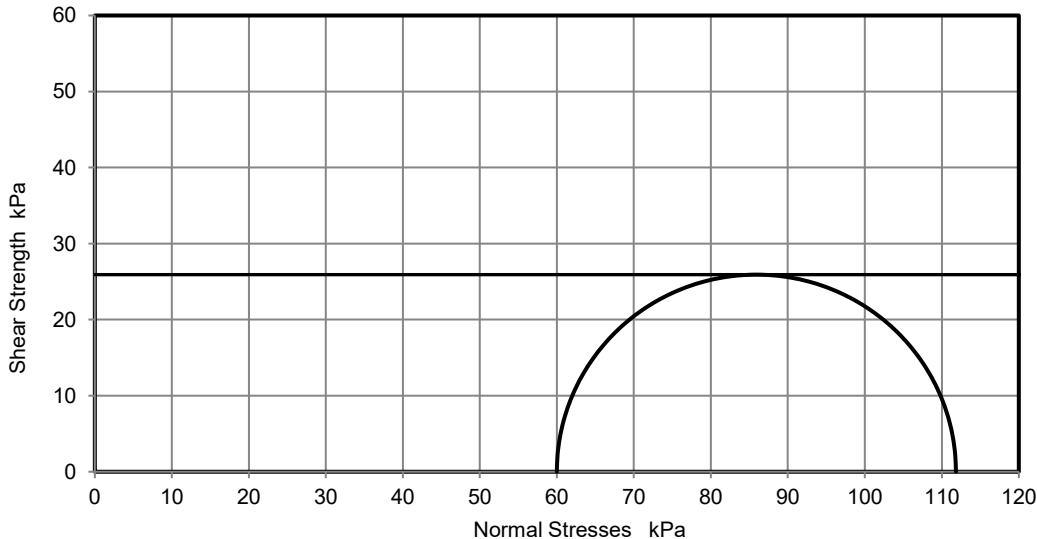
Test Frame	TRI 004
Load Ring	LOAD CELL 001
Pressure Gauge	PRE 006
Digital Caliper	CAL-005
Balance	BAL-007

Rate of Strain	1.0 %/min
Cell Pressure	60 kPa
At failure	
Axial Strain	8.2 %
Deviator Stress, ($\sigma_1 - \sigma_3$) _f	52 kPa
Undrained Shear Strength, c_u	26 kPa $\frac{1}{2}(\sigma_1 - \sigma_3)_f$
Mode of Failure	Compound

Deviator Stress v Axial Strain




Mohr Circles



Deviator stress corrected for area change and membrane effects

Mohr circles and their interpretation is not covered by BS1377. This is provided for information only.

No of membranes used	1
Total thickness (mm)	0.25
Membrane Correction	
Membrane Type	

	Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen		Job Ref	S220408	
			Borehole/Pit No.	BH07	
Site Name	Project Borealis, Fujifilm		Sample No.		
Soil Description			Depth	10.50	
Specimen Reference		Specimen Depth	m	Sample Type	U
Specimen Description	High strength CLAY		KeyLAB ID	SLMK2022051235	
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen		Date of test	17/05/2022	

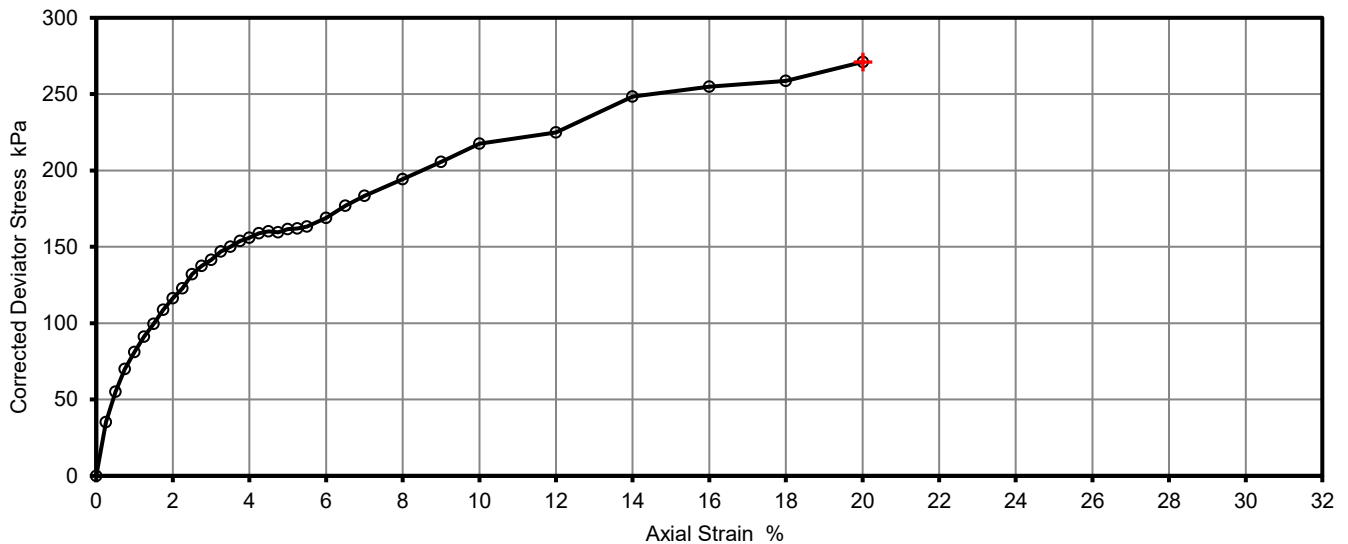
Test Number	1
Length	76.0 mm
Diameter	38.0 mm
Bulk Density	2.20 Mg/m3
Moisture Content	16.5 %
Dry Density	1.88 Mg/m3

Tracable Equipment Record

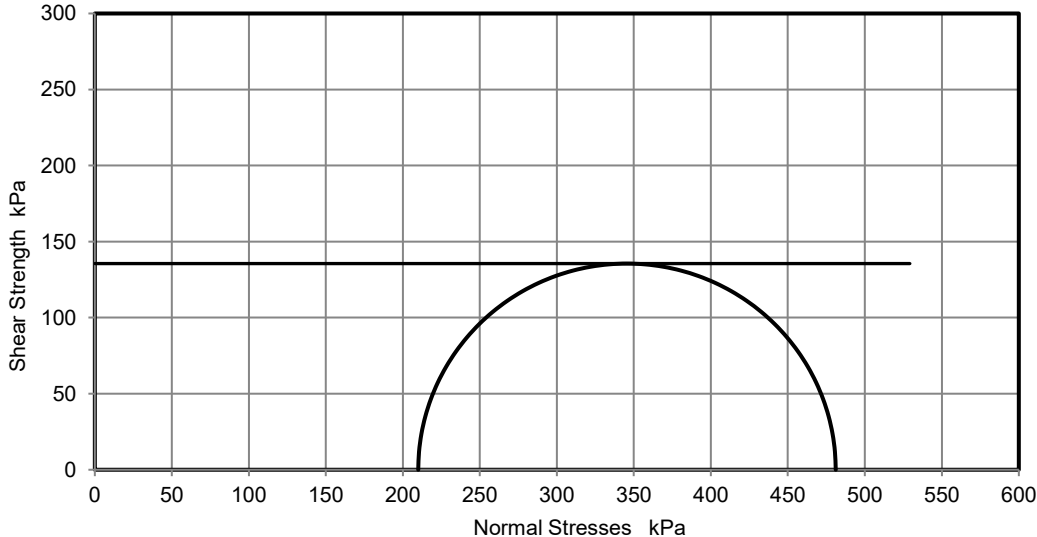
Test Frame	TRI 004
Load Ring	LOAD CELL 003
Pressure Gauge	PRE 006
Digital Caliper	CAL-005
Balance	BAL-007

Rate of Strain	1.0 %/min
Cell Pressure	210 kPa
At failure	
Axial Strain	20.0 %
Deviator Stress, ($\sigma_1 - \sigma_3$) _f	271 kPa
Undrained Shear Strength, c_u	136 kPa $\frac{1}{2}(\sigma_1 - \sigma_3)_f$
Mode of Failure	Plastic

Deviator Stress v Axial Strain




Mohr Circles



Deviator stress corrected for area change and membrane effects

Mohr circles and their interpretation is not covered by BS1377. This is provided for information only.

No of membranes used	1
Total thickness (mm)	0.25
Membrane Correction	
Membrane Type	

	Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen		Job Ref	S220408	
			Borehole/Pit No.	BH08	
Site Name	Project Borealis, Fujifilm		Sample No.		
Soil Description			Depth	5.00	
Specimen Reference		Specimen Depth	m	Sample Type	U
Specimen Description	Low strength CLAY		KeyLAB ID	SLMK2022051237	
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen		Date of test	16/05/2022	

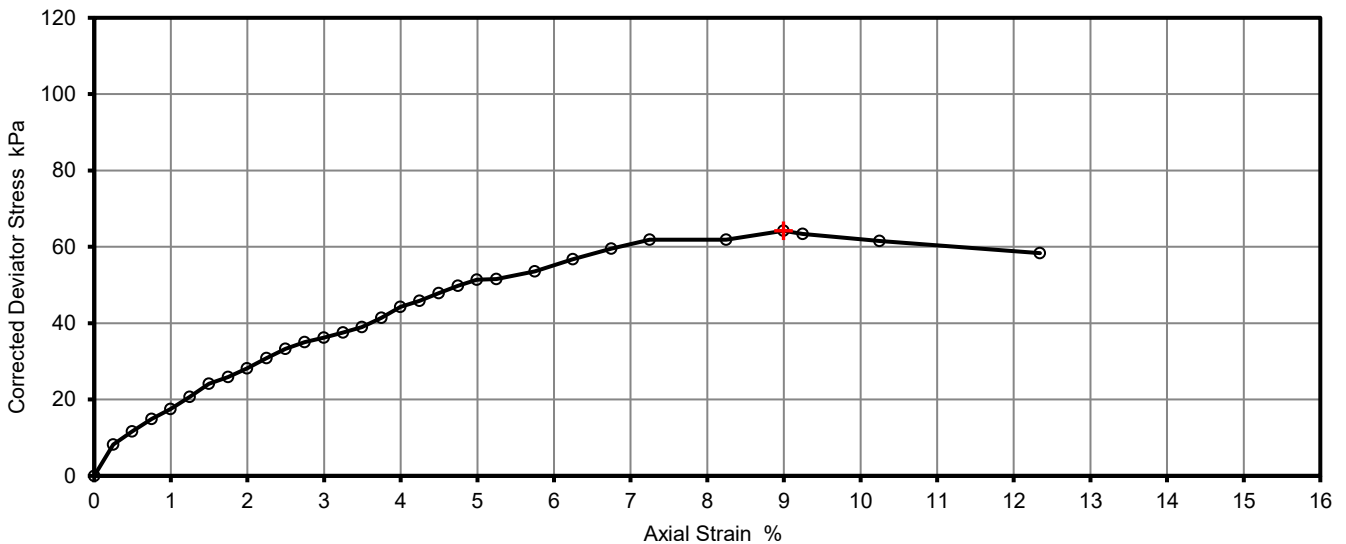
Test Number	1
Length	202.0 mm
Diameter	102.0 mm
Bulk Density	1.99 Mg/m3
Moisture Content	26.9 %
Dry Density	1.57 Mg/m3

Tracable Equipment Record

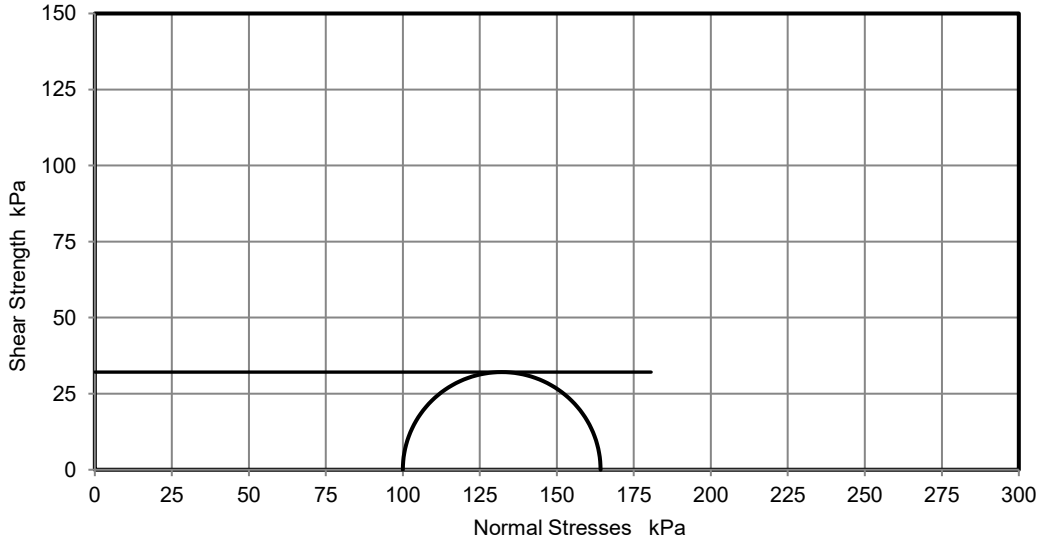
Test Frame	TRI 004
Load Ring	LOAD CELL 001
Pressure Gauge	PRE 006
Digital Caliper	CAL-005
Balance	BAL-007

Rate of Strain	1.0 %/min
Cell Pressure	100 kPa
At failure	
Axial Strain	9.0 %
Deviator Stress, ($\sigma_1 - \sigma_3$)f	64 kPa
Undrained Shear Strength, cu	32 kPa $\frac{1}{2}(\sigma_1 - \sigma_3)f$
Mode of Failure	Compound

Deviator Stress v Axial Strain




Mohr Circles



Deviator stress corrected for area change and membrane effects

Mohr circles and their interpretation is not covered by BS1377. This is provided for information only.

No of membranes used	1
Total thickness (mm)	0.25
Membrane Correction	
Membrane Type	

	Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen		Job Ref	S220408	
			Borehole/Pit No.	BH09	
Site Name	Project Borealis, Fujifilm		Sample No.		
Soil Description			Depth	3.00	
Specimen Reference		Specimen Depth	m	Sample Type	U
Specimen Description	Medium strength CLAY		KeyLAB ID	SLMK2022051240	
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen		Date of test	17/05/2022	

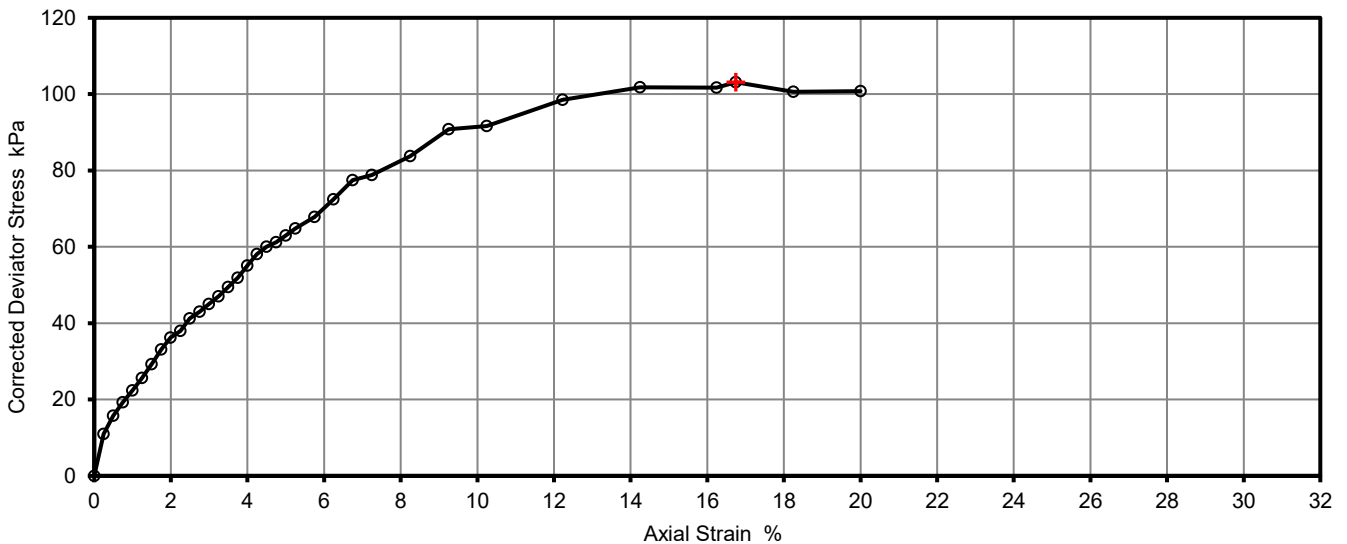
Test Number	1	
Length	202.0	mm
Diameter	103.0	mm
Bulk Density	1.98	Mg/m3
Moisture Content	28.4	%
Dry Density	1.54	Mg/m3

Tracable Equipment Record

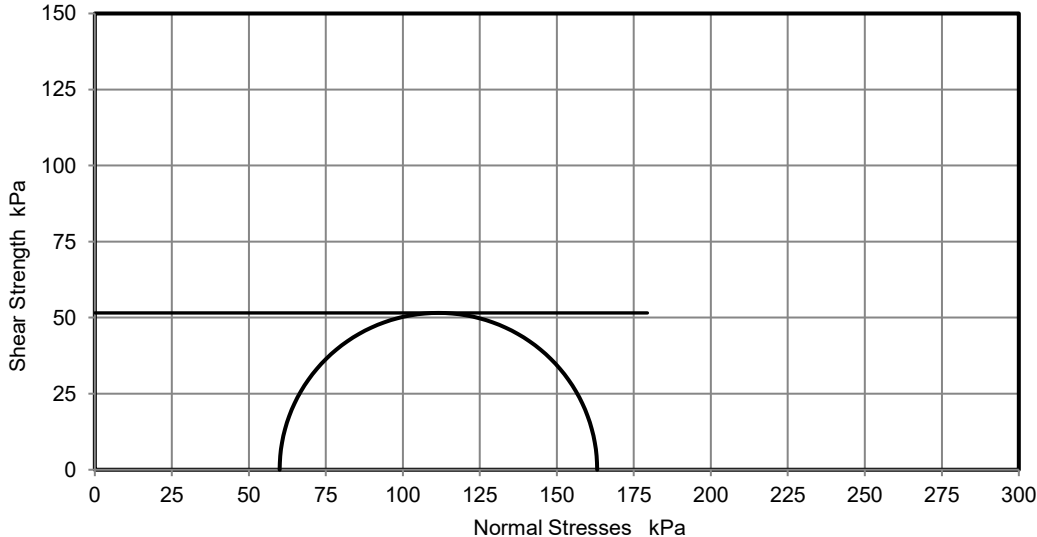
Test Frame	TRI 004
Load Ring	LOAD CELL 001
Pressure Gauge	PRE 006
Digital Caliper	CAL-005
Balance	BAL-007

Rate of Strain	1.0	%/min	
Cell Pressure	60	kPa	
At failure	Axial Strain	16.7	%
	Deviator Stress, ($\sigma_1 - \sigma_3$) _f	103	kPa
	Undrained Shear Strength, c_u	52	kPa $\frac{1}{2}(\sigma_1 - \sigma_3)_f$
	Mode of Failure	Compound	

Deviator Stress v Axial Strain




Mohr Circles



Deviator stress corrected for area change and membrane effects

Mohr circles and their interpretation is not covered by BS1377. This is provided for information only.

No of membranes used	1
Total thickness (mm)	0.25
Membrane Correction	
Membrane Type	

	Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen		Job Ref	S220408	
			Borehole/Pit No.	BH09	
Site Name	Project Borealis, Fujifilm		Sample No.		
Soil Description			Depth	5.00	
Specimen Reference		Specimen Depth	m	Sample Type	U
Specimen Description	Low strength CLAY		KeyLAB ID	SLMK2022051241	
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen		Date of test	17/05/2022	

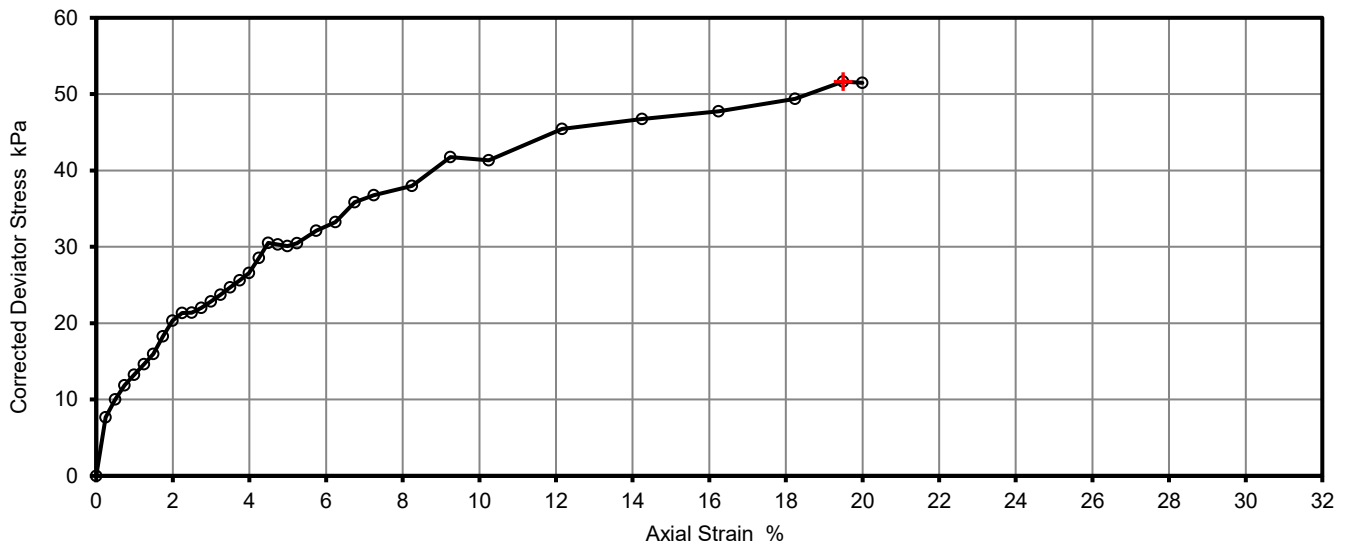
Test Number	1
Length	205.0 mm
Diameter	103.0 mm
Bulk Density	1.89 Mg/m3
Moisture Content	30.8 %
Dry Density	1.45 Mg/m3

Tracable Equipment Record

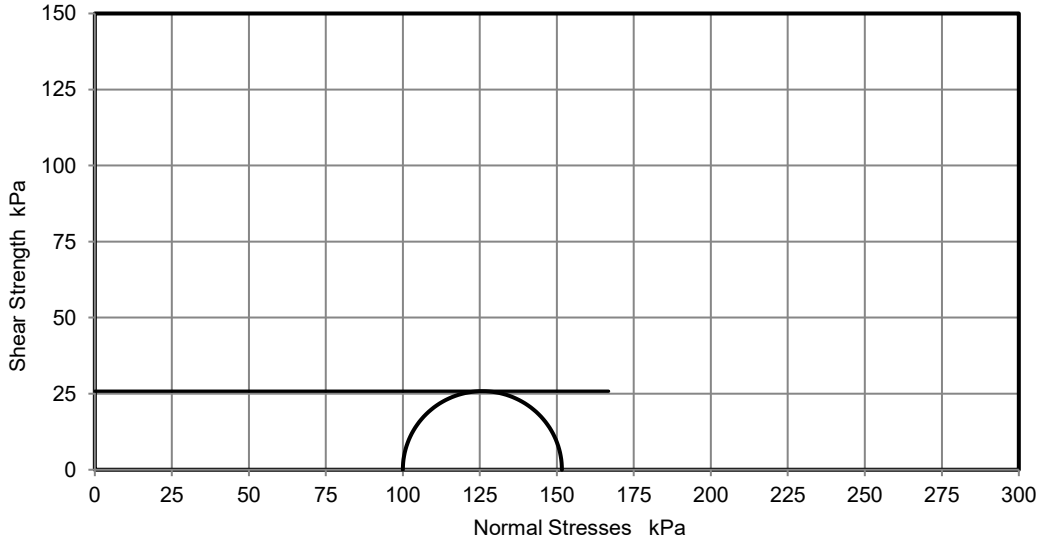
Test Frame	TRI 004
Load Ring	LOAD CELL 001
Pressure Gauge	PRE 006
Digital Caliper	CAL-005
Balance	BAL-007

Rate of Strain	1.0 %/min
Cell Pressure	100 kPa
At failure	
Axial Strain	19.5 %
Deviator Stress, ($\sigma_1 - \sigma_3$) _f	52 kPa
Undrained Shear Strength, c_u	26 kPa $\frac{1}{2}(\sigma_1 - \sigma_3)_f$
Mode of Failure	Compound

Deviator Stress v Axial Strain




Mohr Circles



Deviator stress corrected for area change and membrane effects

Mohr circles and their interpretation is not covered by BS1377. This is provided for information only.

No of membranes used	1
Total thickness (mm)	0.25
Membrane Correction	
Membrane Type	

	Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen		Job Ref	S220408	
			Borehole/Pit No.	BH10	
Site Name	Project Borealis, Fujifilm		Sample No.		
Soil Description			Depth	1.20	
Specimen Reference		Specimen Depth	m	Sample Type	U
Specimen Description	Medium strength CLAY		KeyLAB ID	SLMK2022051243	
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen		Date of test	17/05/2022	

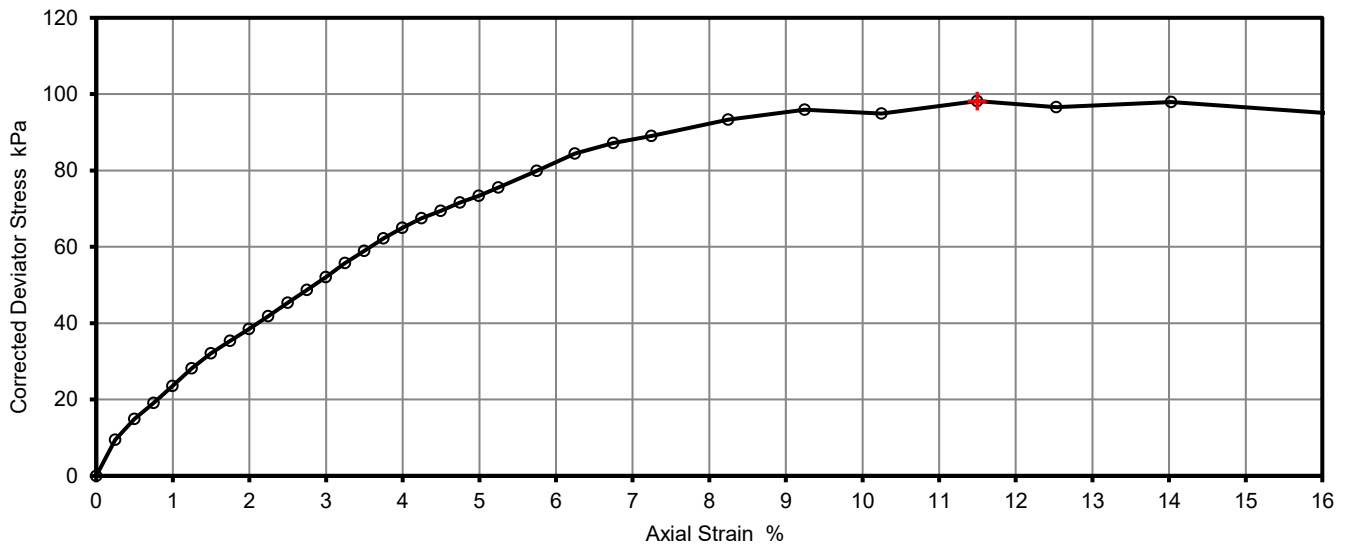
Test Number	1
Length	203.0 mm
Diameter	103.0 mm
Bulk Density	2.04 Mg/m3
Moisture Content	27.4 %
Dry Density	1.60 Mg/m3

Tracable Equipment Record

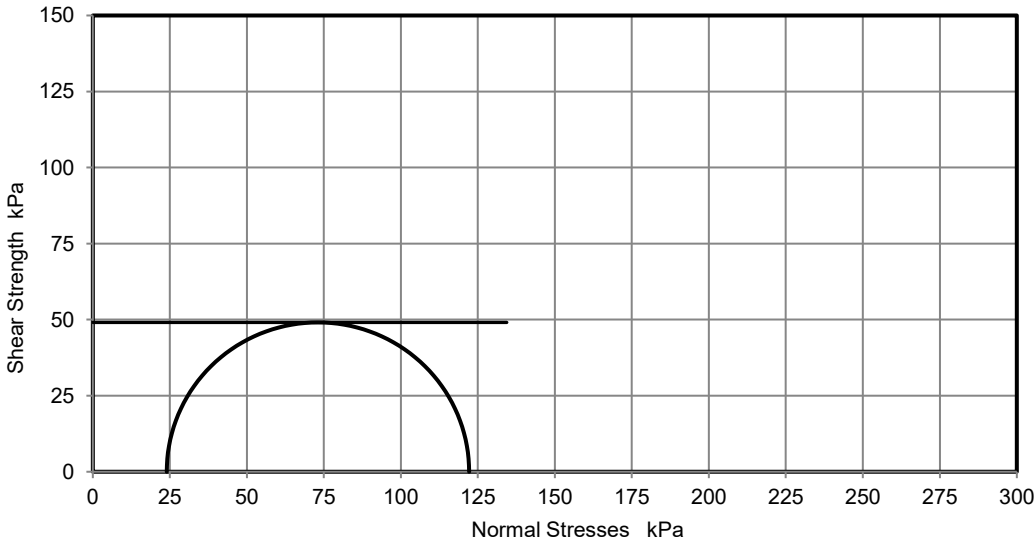
Test Frame	TRI 004
Load Ring	LOAD CELL 001
Pressure Gauge	PRE 006
Digital Caliper	CAL-005
Balance	BAL-007

Rate of Strain	1.0 %/min
Cell Pressure	24 kPa
At failure	
Axial Strain	11.5 %
Deviator Stress, ($\sigma_1 - \sigma_3$) _f	98 kPa
Undrained Shear Strength, c_u	49 kPa $\frac{1}{2}(\sigma_1 - \sigma_3)_f$
Mode of Failure	Compound

Deviator Stress v Axial Strain




Mohr Circles



Deviator stress corrected for area change and membrane effects

Mohr circles and their interpretation is not covered by BS1377. This is provided for information only.

No of membranes used	1
Total thickness (mm)	0.25
Membrane Correction	
Membrane Type	

	Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen		Job Ref	S220408	
			Borehole/Pit No.	BH10	
Site Name	Project Borealis, Fujifilm		Sample No.		
Soil Description			Depth	6.00	
Specimen Reference		Specimen Depth	m	Sample Type	U
Specimen Description	Medium strength CLAY		KeyLAB ID	SLMK2022051244	
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen		Date of test	17/05/2022	

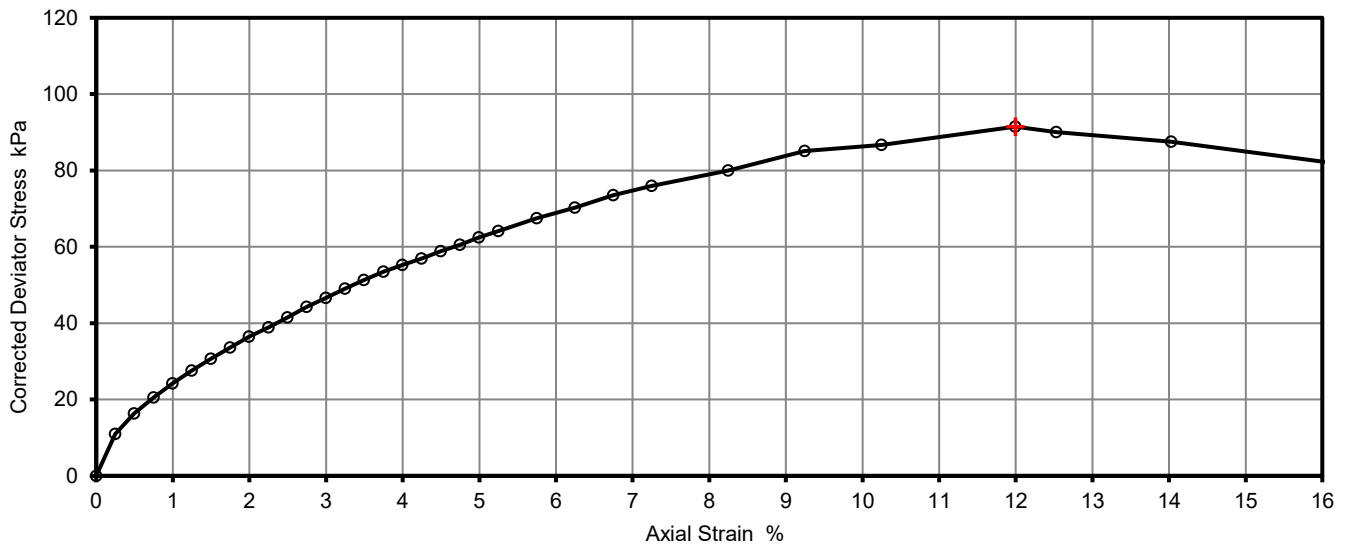
Test Number	1	
Length	202.0	mm
Diameter	103.0	mm
Bulk Density	1.94	Mg/m3
Moisture Content	29.6	%
Dry Density	1.49	Mg/m3

Tracable Equipment Record

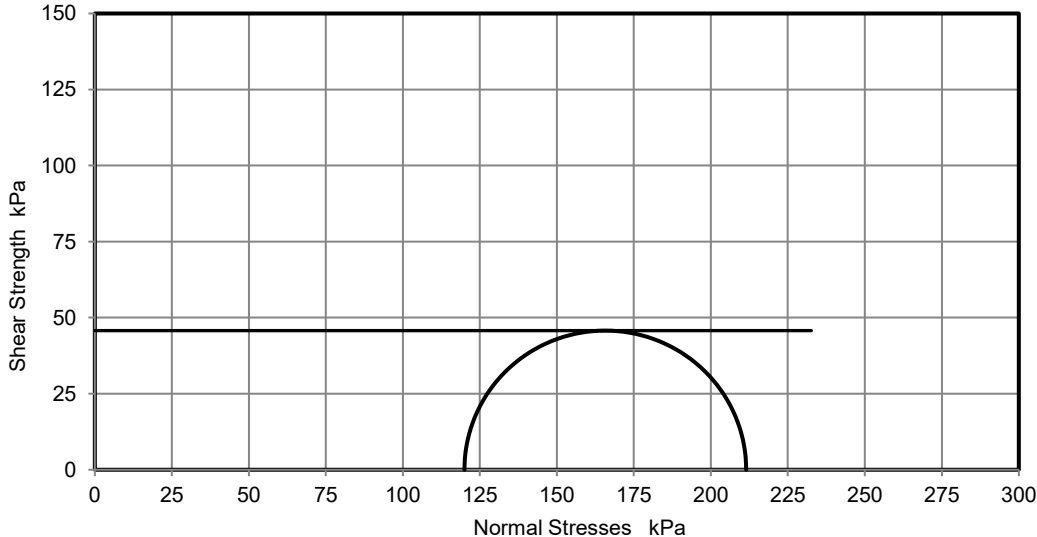
Test Frame	TRI 004
Load Ring	LOAD CELL 001
Pressure Gauge	PRE 006
Digital Caliper	CAL-005
Balance	BAL-007

Rate of Strain	1.0	%/min
Cell Pressure	120	kPa
At failure	12.0	%
Axial Strain	91	kPa
Deviator Stress, ($\sigma_1 - \sigma_3$) _f	46	kPa $\frac{1}{2}(\sigma_1 - \sigma_3)$ _f
Undrained Shear Strength, c_u	Compound	
Mode of Failure		

Deviator Stress v Axial Strain




Mohr Circles



Deviator stress corrected for area change and membrane effects

Mohr circles and their interpretation is not covered by BS1377. This is provided for information only.

No of membranes used	1
Total thickness (mm)	0.25
Membrane Correction	
Membrane Type	

	Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen		Job Ref	S220408	
			Borehole/Pit No.	BH10	
Site Name	Project Borealis, Fujifilm		Sample No.		
Soil Description			Depth	12.00	
Specimen Reference		Specimen Depth	m	Sample Type	U
Specimen Description	High strength CLAY		KeyLAB ID	SLMK2022051245	
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen		Date of test	17/05/2022	

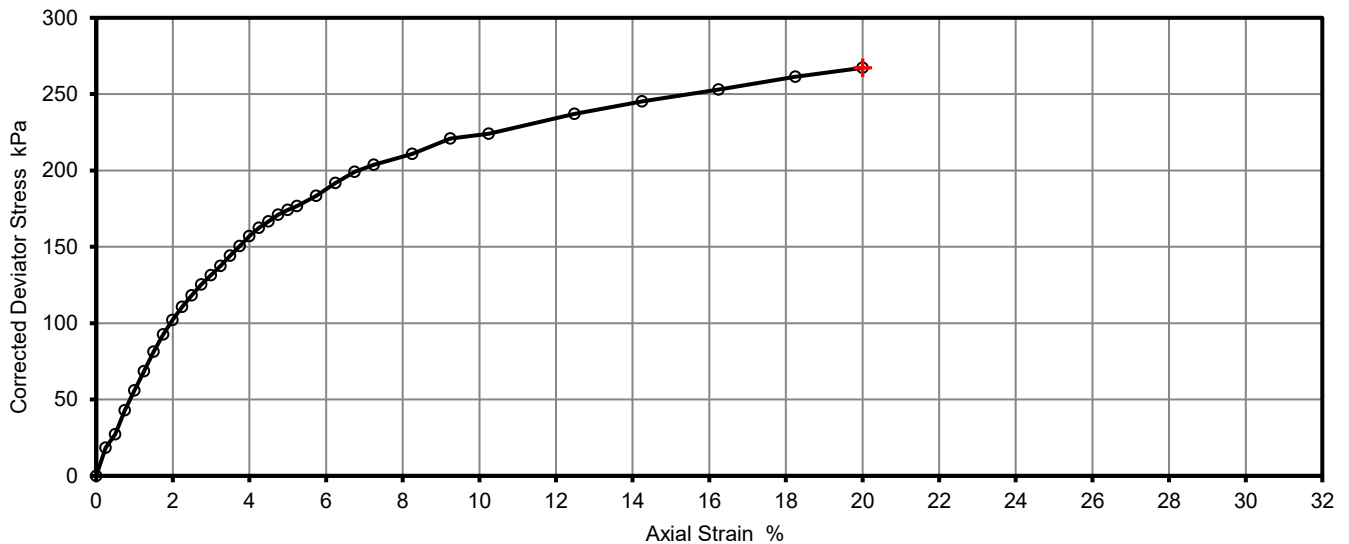
Test Number	1	
Length	204.0	mm
Diameter	103.0	mm
Bulk Density	2.21	Mg/m3
Moisture Content	15.9	%
Dry Density	1.91	Mg/m3

Tracable Equipment Record

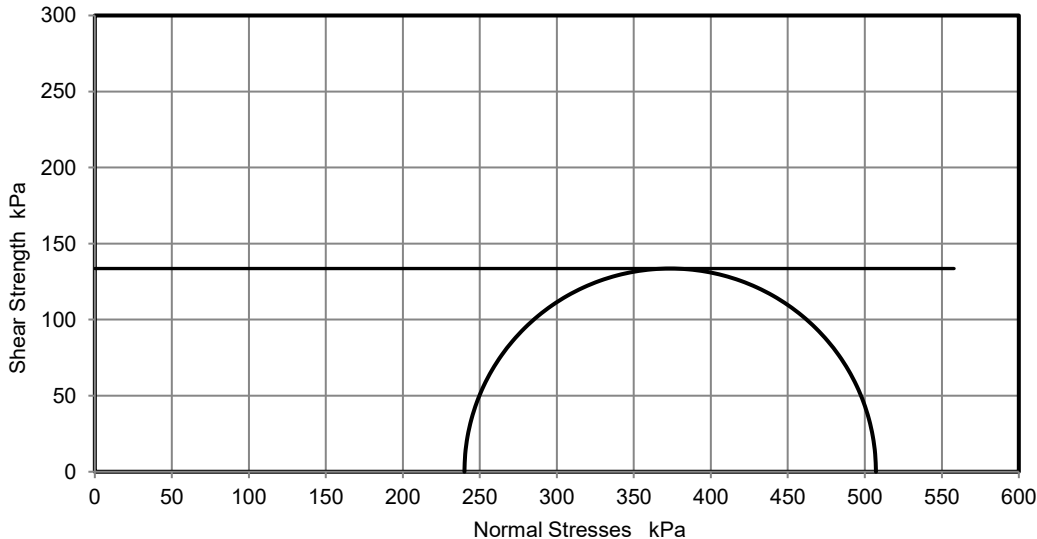
Test Frame	TRI 004
Load Ring	LOAD CELL 001
Pressure Gauge	PRE 006
Digital Caliper	CAL 006
Balance	BAL-007

Rate of Strain	1.0	%/min
Cell Pressure	240	kPa
At failure	20.0	%
Axial Strain	267	kPa
Deviator Stress, ($\sigma_1 - \sigma_3$) f	134	kPa $\frac{1}{2}(\sigma_1 - \sigma_3) f$
Undrained Shear Strength, cu	Plastic	
Mode of Failure		

Deviator Stress v Axial Strain



Mohr Circles



Deviator stress corrected for area change and membrane effects

Mohr circles and their interpretation is not covered by BS1377. This is provided for information only.

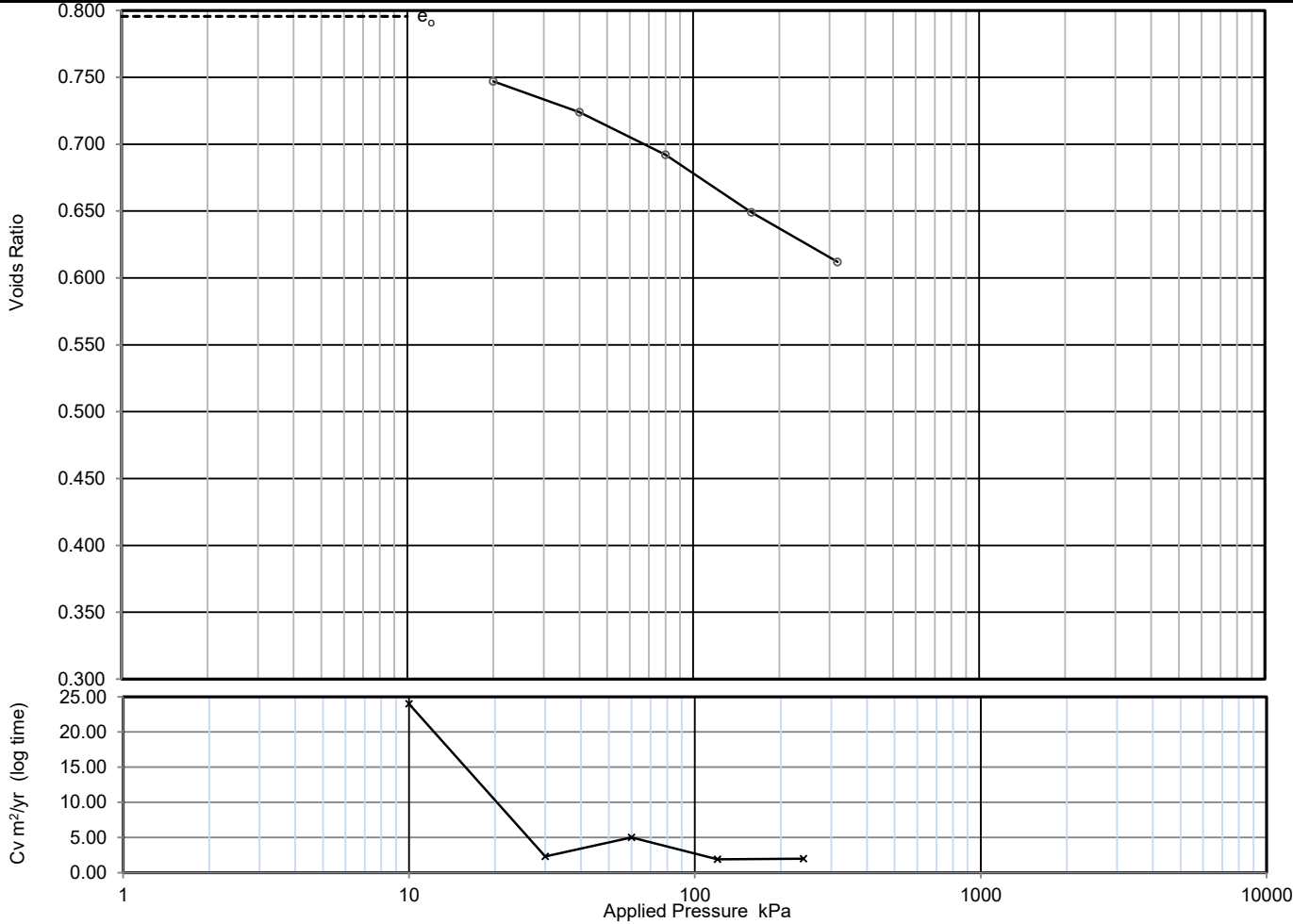
No of membranes used	1
Total thickness (mm)	0.25
Membrane Correction	
Membrane Type	



ONE DIMENSIONAL CONSOLIDATION TEST
BS1377:Part 5:1990, clause 3

Job Ref	S220408
Borehole/Pit No.	BH03
Sample No.	
Depth	3
Sample Type	U
KeyLAB ID	SLMK2022051221
Date started	17/05/2022

Site Name	Project Borealis, Fujifilm	
Soil Description		
Specimen Reference	Specimen Depth	m
Specimen Description		
Test Method	BS1377:Part 5:1990, clause 3	



Applied Pressure kPa	Voids ratio	Mv m2/MN	Cv (t50, log) m2/yr	Cv (t90, root) m2/yr	Csec
0.0	0.796	-	-	-	-
20	0.747	1.4	24	41	0.0006
40	0.724	0.64	2.3	7.7	0.00089
80	0.692	0.48	5	22	0.0013
160	0.649	0.32	1.9	4.1	0.0019
320	0.612	0.14	2	3.4	0.0022

Preparation			
Index tests	Liquid limit	%	Plastic limit %
Particle density	assumed	2.65	Mg/m3
Specimen details			
Diameter	74.98	-	mm
Height	20.08	18.03	mm
Moisture Content	27.8	28.4	%
Bulk density	1.89		Mg/m3
Dry density	1.48		Mg/m3
Voids Ratio	0.796		
Saturation	93		%
Average temperature for test	21.0		oC
Swelling Pressure			kPa
Settlement on saturation			%
Remarks			

Final values should be used with caution Cv plotted at mid point of load increments Cv corrected to 20oC	Tested	Checked	Approved	Printed : 27/05/2022 12:32	Fig. No 1
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Final Report

Report No.: 22-18336-1
Initial Date of Issue: 23-May-2022
Client: Solmek Ltd
Client Address: 12 Yarm Road
Stockton-on-Tees
TS18 3NA
Contact(s): B Atkinson
Joe Brischuk
Lab
Leo Cassidy
Office
Project: S220408 Project Borealis, Fujifilm
Quotation No.: **Date Received:** 18-May-2022
Order No.: LAB1454 **Date Instructed:** 18-May-2022
No. of Samples: 21
Turnaround (Wkdays): 5 **Results Due:** 24-May-2022
Date Approved: 23-May-2022

Approved By:

Details: Stuart Henderson, Technical
Manager

Results - Soil

Project: S220408 Project Borealis, Fujifilm

Client: Solmek Ltd		Chemtest Job No.:		22-18336	22-18336	22-18336	22-18336	22-18336	22-18336	22-18336	22-18336	
Quotation No.:		Chemtest Sample ID.:		1430574	1430575	1430576	1430577	1430578	1430579	1430580	1430581	
		Sample Location:		BH01	BH01	BH02	BH02	BH03	BH03	BH04	BH04	
		Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	
		Top Depth (m):		1.20	16.50	5.00	19.50	10.50	18.00	3.00	16.50	
		Bottom Depth (m):		1.65	16.95	5.45	19.95	10.95	18.45	3.45	16.95	
		Date Sampled:		05-May-2022	05-May-2022	05-May-2022	05-May-2022	05-May-2022	05-May-2022	05-May-2022	05-May-2022	
Determinand	Accred.	SOP	Units	LOD								
Moisture	N	2030	%	0.020	19	19	19	14	19	21	19	15
pH	U	2010		4.0	9.2	8.7	8.9	9.1	8.9	9.3	8.8	9.4
Sulphate (2:1 Water Soluble) as SO4	U	2120	mg/l	10	< 10	50	81	43	12	< 10	17	< 10

Results - Soil

Project: S220408 Project Borealis, Fujifilm

Client: Solmek Ltd		Chemtest Job No.:		22-18336	22-18336	22-18336	22-18336	22-18336	22-18336	22-18336	22-18336	
Quotation No.:		Chemtest Sample ID.:		1430582	1430583	1430584	1430585	1430586	1430587	1430588	1430589	
		Sample Location:		BH05	BH05	BH06	BH06	BH06	BH07	BH07	BH07	
		Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	
		Top Depth (m):		6.00	19.50	3.00	7.50	15.00	3.00	10.50	15.00	
		Bottom Depth (m):		6.45	19.95	3.45	7.95	15.45	3.45	10.95	15.45	
		Date Sampled:		05-May-2022	05-May-2022	05-May-2022	05-May-2022	05-May-2022	05-May-2022	05-May-2022	05-May-2022	
Determinand	Accred.	SOP	Units	LOD								
Moisture	N	2030	%	0.020	18	13	16	19	19	23	12	18
pH	U	2010		4.0	8.9	9.2	8.8	8.6	8.5	8.7	8.6	9.1
Sulphate (2:1 Water Soluble) as SO4	U	2120	mg/l	10	34	72	< 10	28	< 10	26	< 10	< 10

Results - Soil

Project: S220408 Project Borealis, Fujifilm

Client: Solmek Ltd		Chemtest Job No.:		22-18336	22-18336	22-18336	22-18336	22-18336	
Quotation No.:		Chemtest Sample ID.:		1430590	1430591	1430592	1430593	1430594	
		Sample Location:		BH08	BH09	BH09	BH09	BH10	
		Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	
		Top Depth (m):		15.00	3.00	5.00	15.00	12.00	
		Bottom Depth (m):		15.45	3.45	5.45	15.45	12.45	
		Date Sampled:		05-May-2022	05-May-2022	05-May-2022	05-May-2022	05-May-2022	
Determinand	Accred.	SOP	Units	LOD					
Moisture	N	2030	%	0.020	20	26	23	18	11
pH	U	2010		4.0	9.0	8.6	8.4	9.1	8.8
Sulphate (2:1 Water Soluble) as SO4	U	2120	mg/l	10	< 10	17	< 10	< 10	< 10

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES

Report Information

Key

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

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

- A - Date of sampling not supplied
- B - Sample age exceeds stability time (sampling to extraction)
- C - Sample not received in appropriate containers
- D - Broken Container
- E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt

All water samples will be retained for 14 days from the date of receipt

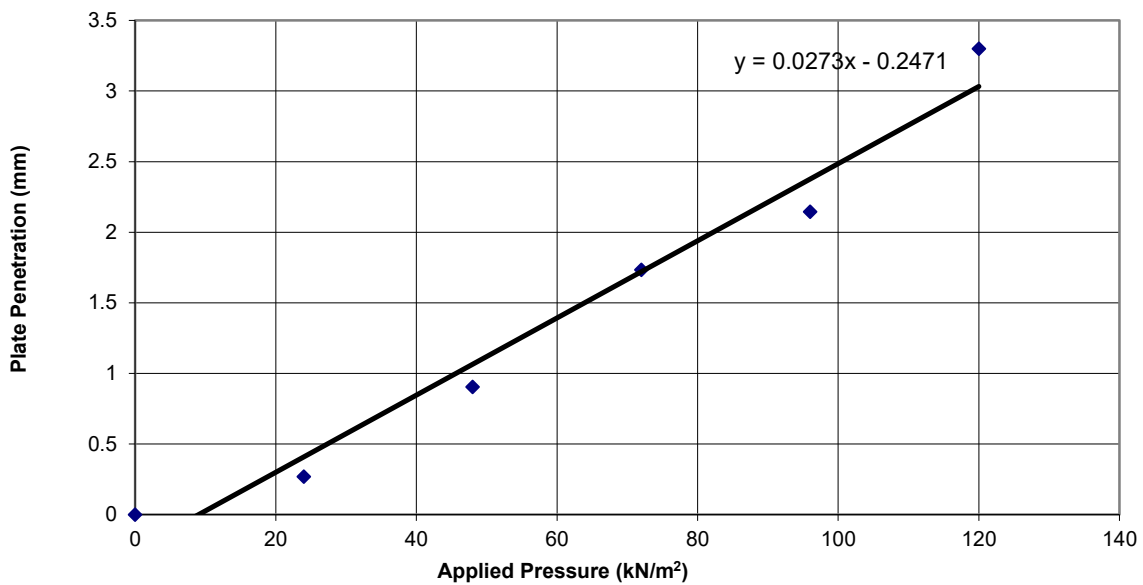
Charges may apply to extended sample storage

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


customerservices@chemtest.com

**SOLMEK
GEOTECHNICAL TESTING LABORATORY**

PLATE BEARING TEST			Date:	10/05/2022
Project Number:	S220408		Test No:	PBT01 TP01
Project Name:	Project Borealis, Fujifilm		Test Level:	0.60mbgl
Test Method: BS 1377 : Part 9 : 1990 (Incremental Method)			Weather:	Warm and Clear
Plate Diameter:	0.455 m		Load Applied:	120 kPa
Kentledge Type:	8.5T JCB 3CX		Remarks:	Firm light brown CLAY

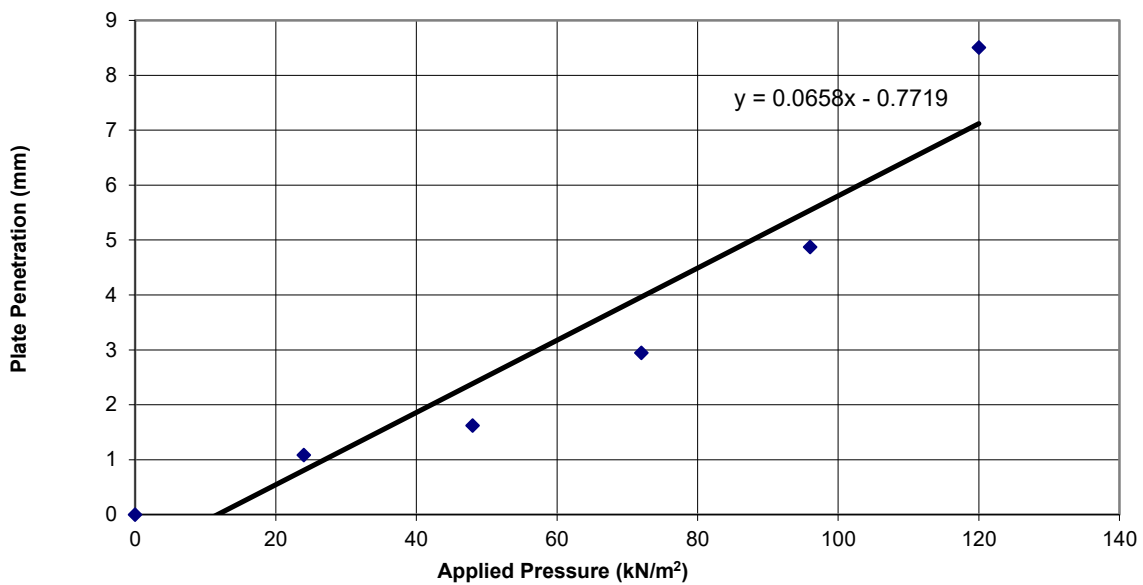


	Pressure (kN/m ²)	Plate Penetration (mm)
Initial	0	0
Stage 1	24	0.27
Stage 2	48	0.91
Stage 3	72	1.74
Stage 4	96	2.15
Stage 5	120	3.30
Stage 6		
Stage 7		
Stage 8		

Conversion Factor	0.63	Produced by: <i>D. m - n f f.</i>
Stress Applied @ 1.25mm	54.79 kN/m ²	
Total Plate Deflection	3.30 mm	Checked by: L. Cassidy
Plate Diameter	455 mm	
k455	43828	
k762	27572	
CBR	3.02 %	

**SOLMEK
GEOTECHNICAL TESTING LABORATORY**

PLATE BEARING TEST		Date:	10/05/2022
Project Number:	S220408	Test No:	PBT03 TP03
Project Name:	Project Borealis, Fujifilm	Test Level:	0.30mbgl
Test Method: BS 1377 : Part 9 : 1990 (Incremental Method)		Weather:	Warm and Clear
Plate Diameter:	0.455 m	Load Applied:	120 kPa
Kentledge Type:	8.5T JCB 3CX	Remarks:	Firm light brown CLAY

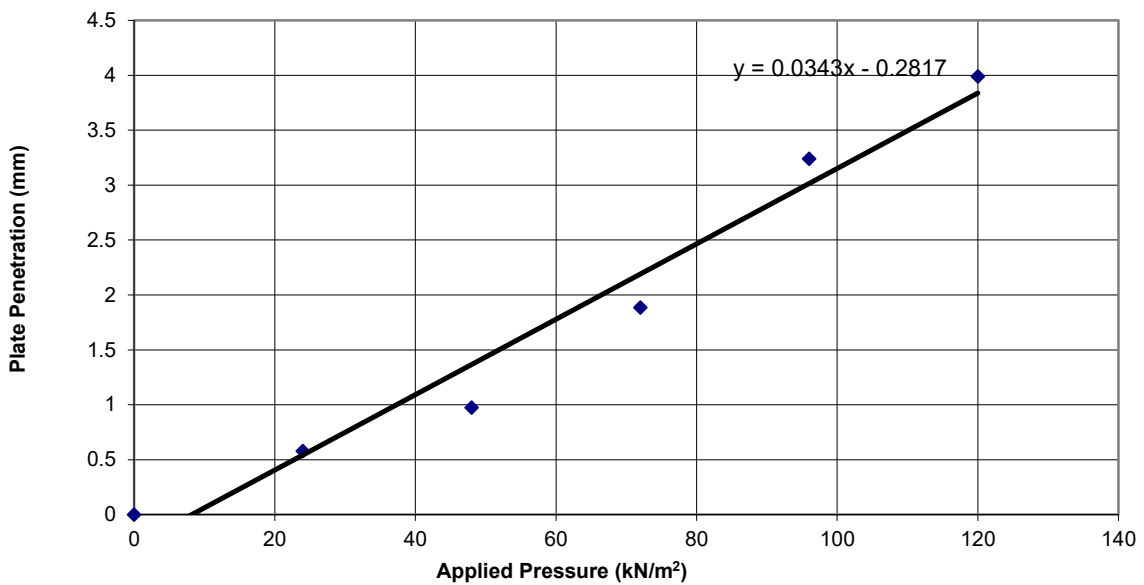


	Pressure (kN/m ²)	Plate Penetration (mm)
Initial	0	0
Stage 1	24	1.09
Stage 2	48	1.63
Stage 3	72	2.95
Stage 4	96	4.88
Stage 5	120	8.51
Stage 6		
Stage 7		
Stage 8		

Conversion Factor	0.63	Produced by: <i>D. m - n f f.</i>
Stress Applied @ 1.25mm	30.74 kN/m ²	
Total Plate Deflection	8.51 mm	Checked by: L. Cassidy
Plate Diameter	455 mm	
k455	24594	
k762	15472	
CBR	1.11 %	

**SOLMEK
GEOTECHNICAL TESTING LABORATORY**

PLATE BEARING TEST		Date:	10/05/2022
Project Number:	S220408	Test No:	PBT05 TP05
Project Name:	Project Borealis, Fujifilm	Test Level:	0.30mbgl
Test Method: BS 1377 : Part 9 : 1990 (Incremental Method)		Weather:	Warm and Clear
Plate Diameter:	0.455 m	Load Applied:	120 kPa
Kentledge Type:	8.5T JCB 3CX	Remarks:	Firm light brown CLAY

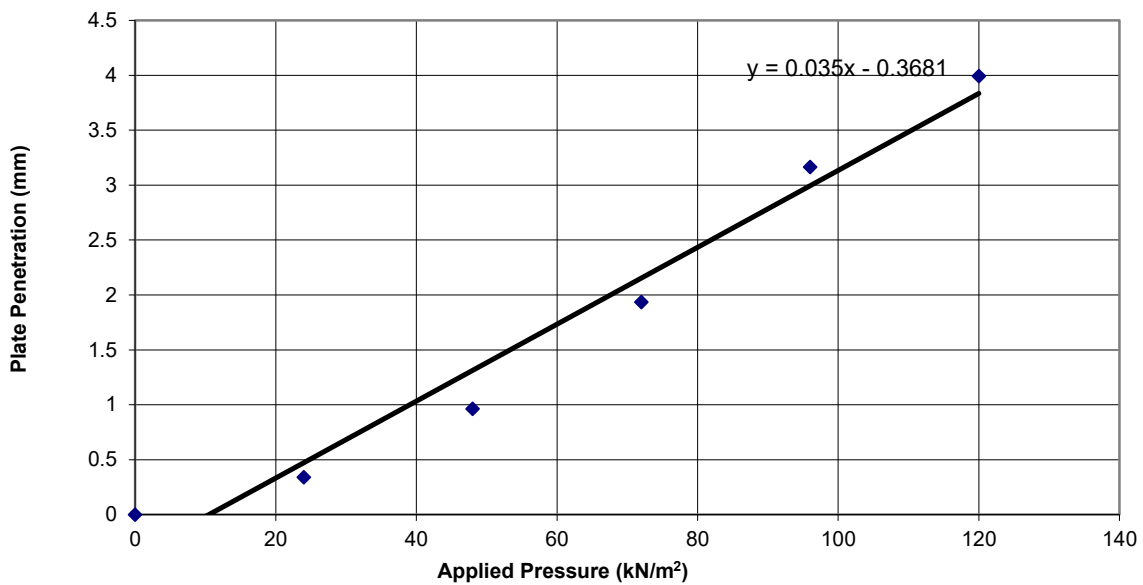


	Pressure (kN/m ²)	Plate Penetration (mm)
Initial	0	0
Stage 1	24	0.58
Stage 2	48	0.98
Stage 3	72	1.89
Stage 4	96	3.24
Stage 5	120	3.99
Stage 6		
Stage 7		
Stage 8		


Conversion Factor	0.63	Produced by:
Stress Applied @ 1.25mm	44.61 kN/m ²	
Total Plate Deflection	3.99 mm	Checked by: L. Cassidy
Plate Diameter	455 mm	
k455	35689	
k762	22452	
CBR	2.12 %	

**SOLMEK
GEOTECHNICAL TESTING LABORATORY**

PLATE BEARING TEST		Date:	10/05/2022
Project Number:	S220408	Test No:	PBT11 TP11
Project Name:	Project Borealis, Fujifilm	Test Level:	0.30mbgl
Test Method: BS 1377 : Part 9 : 1990 (Incremental Method)		Weather:	Warm and Clear
Plate Diameter:	0.455 m	Load Applied:	120 kPa
Kentledge Type:	8.5T JCB 3CX	Remarks:	Firm light brown CLAY

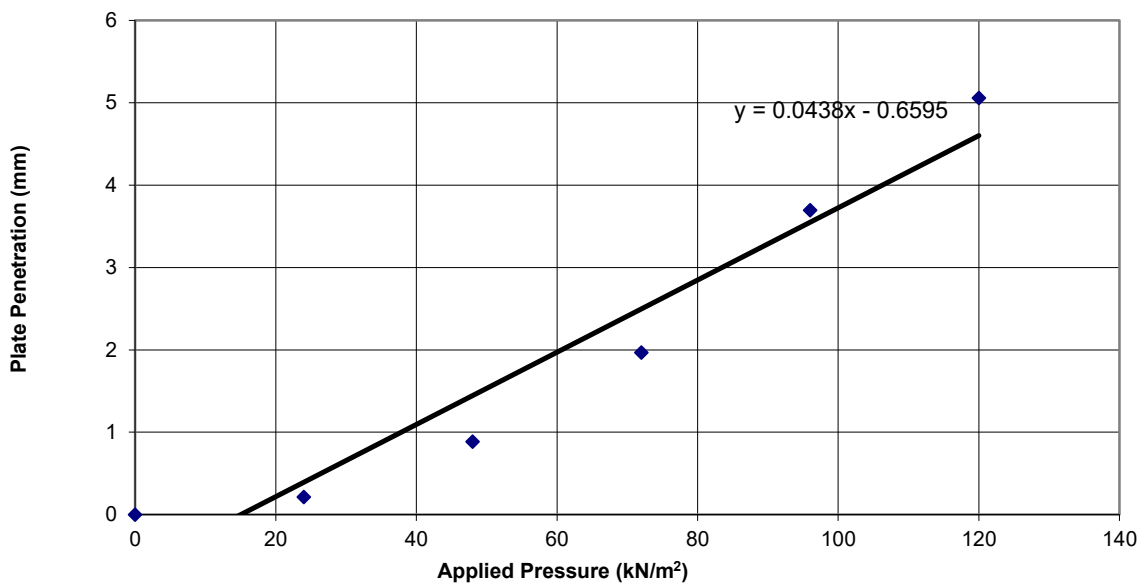


	Pressure (kN/m ²)	Plate Penetration (mm)
Initial	0	0
Stage 1	24	0.34
Stage 2	48	0.97
Stage 3	72	1.94
Stage 4	96	3.17
Stage 5	120	4.00
Stage 6		
Stage 7		
Stage 8		


Conversion Factor	0.63	Produced by: <i>D. m. n. f.</i>
Stress Applied @ 1.25mm	46.20 kN/m ²	
Total Plate Deflection	4.00 mm	Checked by: L. Cassidy
Plate Diameter	455 mm	
k455	36960	
k762	23251	
CBR	2.25 %	

**SOLMEK
GEOTECHNICAL TESTING LABORATORY**

PLATE BEARING TEST		Date:	10/05/2022
Project Number:	S220408	Test No:	PBT12 TP12
Project Name:	Project Borealis, Fujifilm	Test Level:	0.30mbgl
Test Method: BS 1377 : Part 9 : 1990 (Incremental Method)		Weather:	Warm and Clear
Plate Diameter:	0.455 m	Load Applied:	120 kPa
Kentledge Type:	8.5T JCB 3CX	Remarks:	Firm light brown CLAY

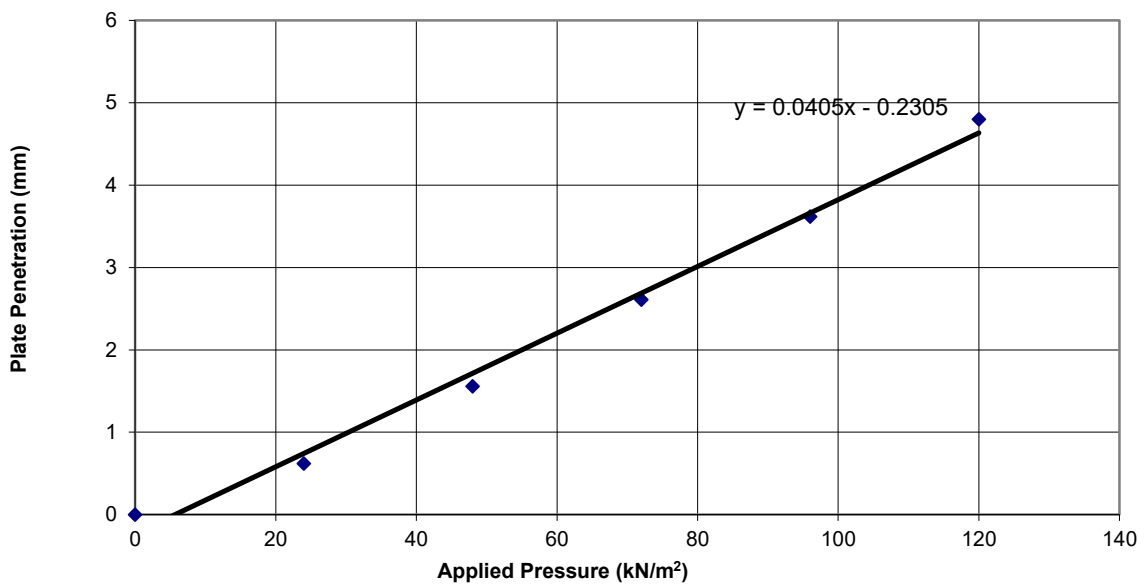


	Pressure (kN/m ²)	Plate Penetration (mm)
Initial	0	0
Stage 1	24	0.22
Stage 2	48	0.89
Stage 3	72	1.97
Stage 4	96	3.70
Stage 5	120	5.06
Stage 6		
Stage 7		
Stage 8		


Conversion Factor	0.63	Produced by: <i>D. m. n. f. f.</i>
Stress Applied @ 1.25mm	43.56 kN/m ²	
Total Plate Deflection	5.06 mm	Checked by: L. Cassidy
Plate Diameter	455 mm	
k455	34846	
k762	21921	
CBR	2.03 %	

**SOLMEK
GEOTECHNICAL TESTING LABORATORY**

PLATE BEARING TEST			Date:	10/05/2022
Project Number:	S220408		Test No:	PBT13 TP13
Project Name:	Project Borealis, Fujifilm		Test Level:	0.30mbgl
Test Method: BS 1377 : Part 9 : 1990 (Incremental Method)			Weather:	Warm and Clear
Plate Diameter:	0.455 m		Load Applied:	120 kPa
Kentledge Type:	8.5T JCB 3CX		Remarks:	Firm light brown CLAY

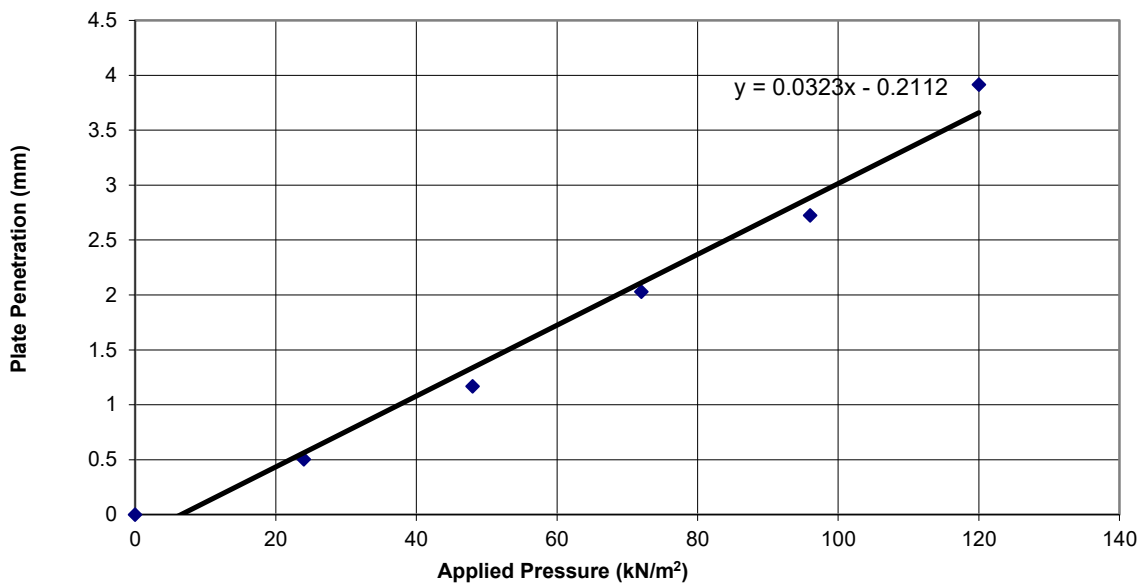


	Pressure (kN/m ²)	Plate Penetration (mm)
Initial	0	0
Stage 1	24	0.62
Stage 2	48	1.56
Stage 3	72	2.61
Stage 4	96	3.62
Stage 5	120	4.80
Stage 6		
Stage 7		
Stage 8		


Conversion Factor	0.63	Produced by: <i>D. m. n. f. f.</i>
Stress Applied @ 1.25mm	36.52 kN/m ²	
Total Plate Deflection	4.80 mm	Checked by: L. Cassidy
Plate Diameter	455 mm	
k455	29218	
k762	18381	
CBR	1.5 %	

**SOLMEK
GEOTECHNICAL TESTING LABORATORY**

PLATE BEARING TEST			Date:	10/05/2022
Project Number:	S220408		Test No:	PBT23 TP23
Project Name:	Project Borealis, Fujifilm		Test Level:	0.30mbgl
Test Method: BS 1377 : Part 9 : 1990 (Incremental Method)			Weather:	Warm and Clear
Plate Diameter:	0.455 m		Load Applied:	120 kPa
Kentledge Type:	8.5T JCB 3CX		Remarks:	Firm light brown CLAY

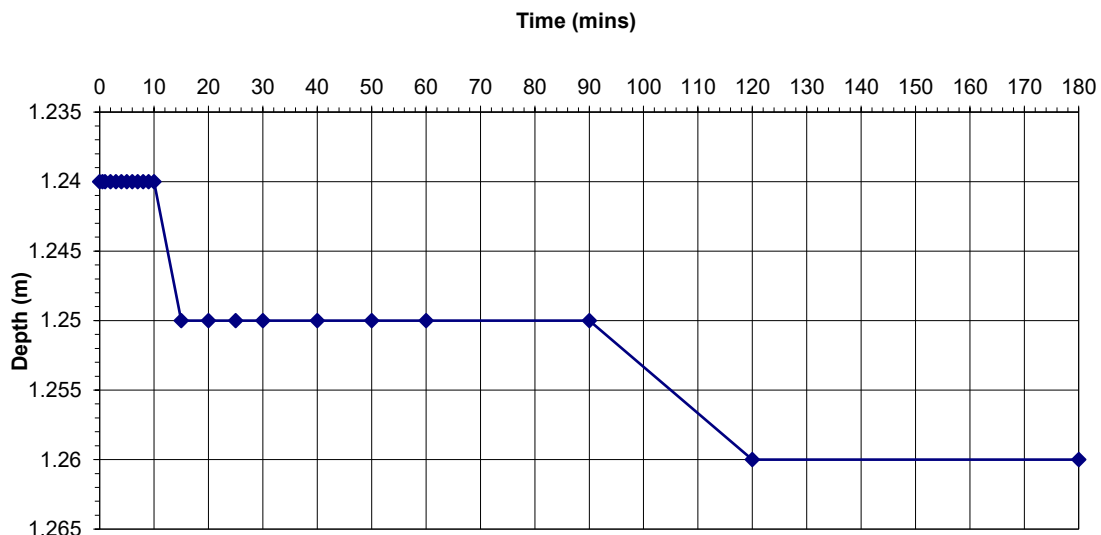


	Pressure (kN/m ²)	Plate Penetration (mm)
Initial	0	0
Stage 1	24	0.51
Stage 2	48	1.17
Stage 3	72	2.03
Stage 4	96	2.73
Stage 5	120	3.92
Stage 6		
Stage 7		
Stage 8		

Conversion Factor	0.63	Produced by: <i>D. m. n. f.</i>
Stress Applied @ 1.25mm	45.30 kN/m ²	
Total Plate Deflection	3.92 mm	Checked by: L. Cassidy
Plate Diameter	455 mm	
k455	36240	
k762	22798	
CBR	2.18 %	

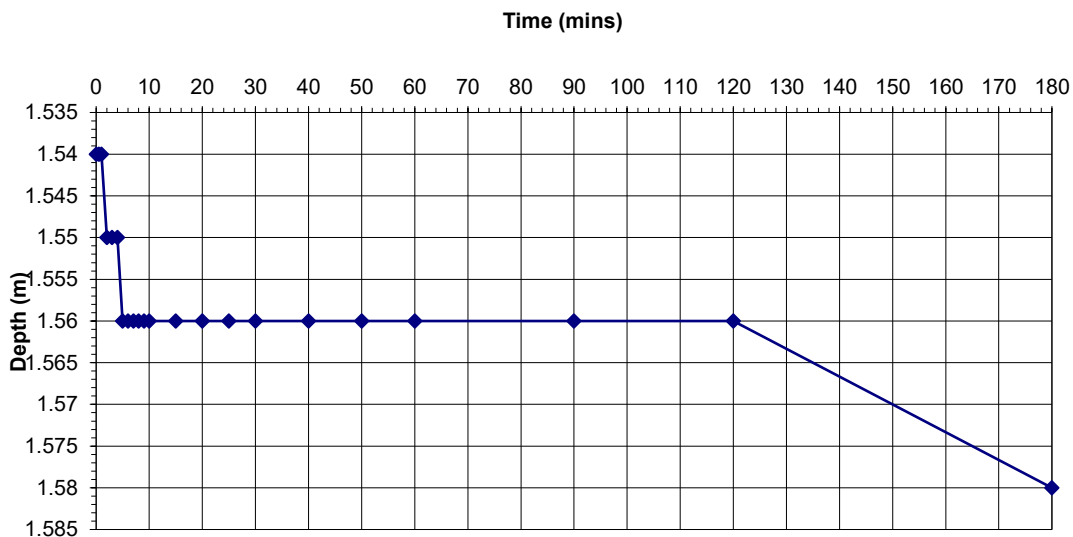
SOAKAWAY DESIGN IN ACCORDANCE WITH BRE DIGEST 365: 1991
BRE Digest 365, Figure 2, Page 5

Client: Fujifilm					
Site: Project Borealis, Fujifilm					
Job No: S220408					
Pit No: SA (TP04)		Test No: 1			
CALCULATION OF SOIL INFILTRATION RATE					
Time (min)	Depth (m)	Pit Dimensions	Length (m) =	1.60	
0	1.24		Width (m) =	0.60	
0.5	1.24		Depth (m) =	2.40	
1	1.24				
2	1.24	Depth at start of test (m) =		1.240	
3	1.24	Depth at end of test (m) =		1.260	
4	1.24	75% level (m) =		1.245	
5	1.24	50% Effective Depth		1.150	
6	1.24	25% level (m) =		1.255	
7	1.24				
8	1.24	Base area of pit (m ²) =		0.960	
9	1.24	V _{p75-25} (m ³) =		0.010	
10	1.24	a _{n50} (m ²) =		6.020	
15	1.25				
20	1.25				
25	1.25	From the graph:			
30	1.25	tp 75 (min) =		12.5	
40	1.25	tp 25 (min) =		105	
50	1.25	Soil infiltration rate, f, (m/s) =		2.87E-07 normal test	
60	1.25				
90	1.25				
120	1.26	Input by:	SM	Date:	19/05/2022
180	1.26	Checked by:	LC	Date:	19/05/2022



SOAKAWAY DESIGN IN ACCORDANCE WITH BRE DIGEST 365: 1991
BRE Digest 365, Figure 2, Page 5

Client: Fujifilm					
Site: Project Borealis, Fujifilm					
Job No: S220408					
Pit No: SA (TP21)		Test No:		1	
CALCULATION OF SOIL INFILTRATION RATE					
Time (min)	Depth (m)	Pit Dimensions		Length (m) =	1.60
0	1.54			Width (m) =	0.60
0.5	1.54			Depth (m) =	2.60
1	1.54				
2	1.55	Depth at start of test (m) = 1.540			
3	1.55	Depth at end of test (m) = 1.580			
4	1.55	75% level (m) = 1.550			
5	1.56	50% Effective Depth 1.040			
6	1.56	25% level (m) = 1.570			
7	1.56				
8	1.56	Base area of pit (m²) = 0.960			
9	1.56	V_{p75-25} (m³) = 0.019			
10	1.56	a_{n50} (m²) = 5.536			
15	1.56				
20	1.56				
25	1.56	From the graph:			
30	1.56	tp 75 (min) = 2			
40	1.56	tp 25 (min) = 150			
50	1.56	Soil infiltration rate, f, (m/s) =		3.91E-07	normal test
60	1.56				
90	1.56				
120	1.56	Input by:	SM	Date:	19/05/2022
180	1.58	Checked by:	LC	Date:	19/05/2022

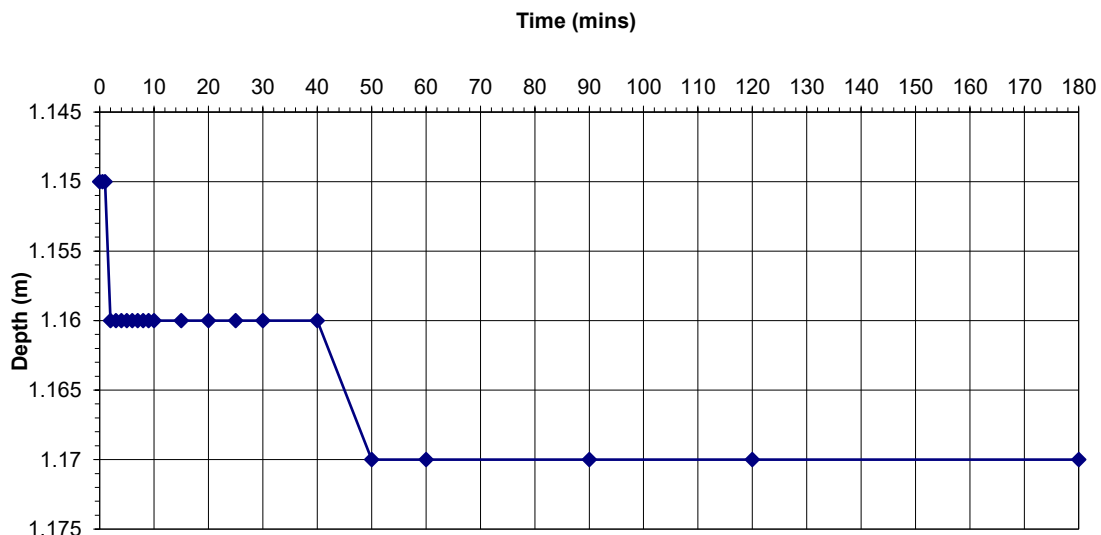


SOAKAWAY DESIGN IN ACCORDANCE WITH BRE DIGEST 365: 1991
BRE Digest 365, Figure 2, Page 5

Client:	Fujifilm		
Site:	Project Borealis, Fujifilm		
Job No:	S220408		
Pit No:	SA (TP22)	Test No:	1

CALCULATION OF SOIL INFILTRATION RATE

Time (min)	Depth (m)		Pit Dimensions	Length (m) =	1.60
0	1.15			Width (m) =	0.60
0.5	1.15			Depth (m) =	2.55
1	1.15				
2	1.16			Depth at start of test (m) =	1.150
3	1.16			Depth at end of test (m) =	1.170
4	1.16			75% level (m) =	1.155
5	1.16			50% Effective Depth	1.390
6	1.16			25% level (m) =	1.165
7	1.16				
8	1.16			Base area of pit (m²) =	0.960
9	1.16			V_{p75-25} (m³) =	0.010
10	1.16			a_{p50} (m²) =	7.076
15	1.16				
20	1.16			From the graph:	
25	1.16			tp 75 (min) =	1.5
30	1.16			tp 25 (min) =	45
40	1.16				
50	1.17			Soil infiltration rate, f, (m/s) =	5.20E-07 normal test
60	1.17				
90	1.17				
120	1.17	Input by:	SM	Date:	19/05/2022
180	1.17	Checked by:	LC	Date:	19/05/2022



APPENDIX E:
Notes on Limitations & Contamination Guidance

UK BACKGROUND

Environmental Protection Act 1990: Part 2A Revised Statutory Guidance (April 2012)

This revised document explains how the Local Authority should decide if land, based on a legal interpretation, is contaminated. The document replaces the previous guidance given in Annex 3 of DEFRA Circular 01/2006, issued in accordance with section 78YA of the 1990 Environmental Protection Act.

The main objectives of the Part 2A regime are to *“identify and remove unacceptable risks to human health and the environment”* and to *“seek to ensure that contaminated land is made suitable for its current use”*.

Part 2A uses a risk based approach to defining contaminated land whereby the “risk” is interpreted as *“the likelihood that harm, or pollution of water, will occur as a result of contaminants in, on or under the land”* and by *“the scale and seriousness of such harm or pollution if it did occur”*.

For a relevant risk to exist a contaminant, pathway and receptor linkage must be present before the land can be considered to be contaminated. The document explains that *“for a risk to exist there must be contaminants present in, on or under the land in a form and quantity that poses a hazard, and one or more pathways by which they might significantly harm people, the environment, or property; or significantly pollute controlled waters.”*

A conceptual model is used to develop and communicate the risks associated with a particular site.

To determine if land is contaminated the local authority use various categories from 1 to 4. Categories 1 and 2 include *“land which is capable of being determined as contaminated land on grounds of significant possibility of significant harm to human health.”*

Categories 3 and 4 *“encompass land which is not capable of being determined on such grounds”*.

PRELIMINARY CONCEPTUAL MODEL

Preliminary Conceptual Models are undertaken in accordance with CIRIA C552. The Preliminary Conceptual Model assesses the consequence and the likelihood of a risk being realised to provide a risk classification, using the tables detailed below.

CONSEQUENCE OF RISK BEING REALISED (Based on C552 CIRIA, 2001)

Classification	Definition	Example
Severe	Short-term (acute) risk to human health, the environment, an element of the development or other aspect with is likely to result in <i>significant harm</i> , damage or both.	High concentrations of cyanide on the surface of an informal recreational area. Major spills of contaminants from site into controlled water. High concentrations of explosive gas in the subsurface environment that have a clear unobstructed pathway into buildings.
Moderate	Chronic damage to human health, a plausible chance that an event will occur, although the timeline is not immediate to be in the short-term.	Appreciable concentration of contamination that over the longer-term will cause significant harm i.e. high lead concentration in topsoil. Shallow mine workings that are potentially unstable but may remain in a satisfactory or stable conditions for a number of years.
Mild	Low level pollution of non-sensitive water, a feasible hazardous scenario although the timeline of such occurring can probably be considered in 10's of years.	The effect of high sulphate concentrations on structural concrete. Pollution of non-classified groundwater.
Minor	Harm, although not necessarily significant to human health, or with respect to other aspects of the development, which are considered implausible in terms of occurrence, or will have little consequential impact.	The presence of contaminants at such low concentrations that protective equipment is required during site works. Any damage to structures is minimal and will not be structural in characteristics.

PROBABILITY OF RISK BEING REALISED (C552 CIRIA, 2001)

Classification	Definition
High Likelihood	There is a viable pollutant linkage and an event that either appears very likely in the short term and almost inevitable over the long term, or there is evidence that the receptor has been harmed or polluted.
Likely	There is a viable pollutant linkage and all elements are present and in the right place, which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short term and likely over the long term.
Low Likelihood	There is a viable pollutant linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a longer period such event would take place, and is less likely in the shorter term.
Unlikely	There is a viable pollutant linkage but circumstances are such that it is improbable that an event would occur even in the very long term.

RISK CLASSIFICATION MATRIX (C552 CIRIA, 2001)

Risk = Probability x Consequence		Consequence			
		Severe	Moderate	Mild	Minor
Probability	High likelihood	Very high risk	High risk	Moderate risk	Moderate/low risk
	Likely	High risk	Moderate risk	Moderate/low risk	Low risk
	Low likelihood	Moderate risk	Moderate/low risk	Low risk	Very low risk
	Unlikely	Moderate/low risk	Low risk	Very low risk	Very low risk

HUMAN RECEPTORS

Human exposure to contaminants present in soils can occur via several pathways. Direct exposure pathways include dermal absorption after contact with contaminated ground, inhalation of soil or dust, inhalation of volatilised compounds, and inadvertent soil ingestion (or deliberate soil ingestion in the case of some children). Other indirect pathways include human ingestion of plants grown in contaminated soil or contaminated ground or surface water. Contaminants associated with wind blown dust can affect humans on surrounding sites.

VEGETATION

Plants can be affected by soil contamination in a number of ways resulting in growth inhibition, nutrient deficiencies and yellowing of leaves. Contaminants are taken up by plants through the roots and through foliage. Contaminants identified as being highly phytotoxic include boron, cadmium, copper, lead, nickel, and zinc.

To establish if the levels of contaminants present on a site may pose a risk to vegetation the results of the contamination testing are compared to a series of threshold values published in 'Code of Good Agricultural Practice for the Protection of Soil'.

GROUNDWATER AND SURFACE WATER RECEPTORS

The principal pathway by which soil contamination may reach the water environment is through a slow seepage or leaching to groundwater or surface water. The potential for contaminants to migrate along such pathways is dependent on the chemical and physical characteristics of the contaminants and the local hydrogeology. Surface watercourses may also accumulate contamination as contaminated sediments are deposited within the water body.

Where the site investigated overlies major/principal aquifers (and in some cases minor/secondary aquifers depending on certain conditions), groundwater Source Protection Zones and areas in close proximity to groundwater abstractions, contamination test results have been compared with the Water Supply (Water Quality) Regulations 1989 and The Water Supply (Water Quality) Regulations 2000.

Should a surface water receptor, such as a fresh water environment (river, canal, stream, lake etc), or marine environment be considered sensitive in relation to a site, then test results are compared with DEFRA & SEPA Environmental Quality Standards (2004). Many of the Environmental Quality Standards are hardness (CaCO₃) depended. Where no hardness values are available, Solmek assume conservative values (of between 0 and 50mg/l).

In the absence of vulnerable ground and surface water environments, Solmek may compare any test results with the Environment Agency Leachate Quality Threshold Values.

DETAILED QUANTITATIVE RISK ASSESSMENT (DQRA)

In line with Environment Agency's guidance document Environment Agency *Land Contamination Risk Management*, which replaced the now-withdrawn *Contaminated Land Report 11 – Model Procedures for the Management of Land Contamination (2004)*, a DQRA for groundwater/human health may be required following a Phase 2 investigation and before the preparation of a Phase 3 Remediation Strategy. For human health DQRA, a site specific assessment criteria is undertaken using CLEA Software Version 1.06. For groundwater DQRA, the Environment Agency Remedial Targets Worksheet Version 3.1 is used.

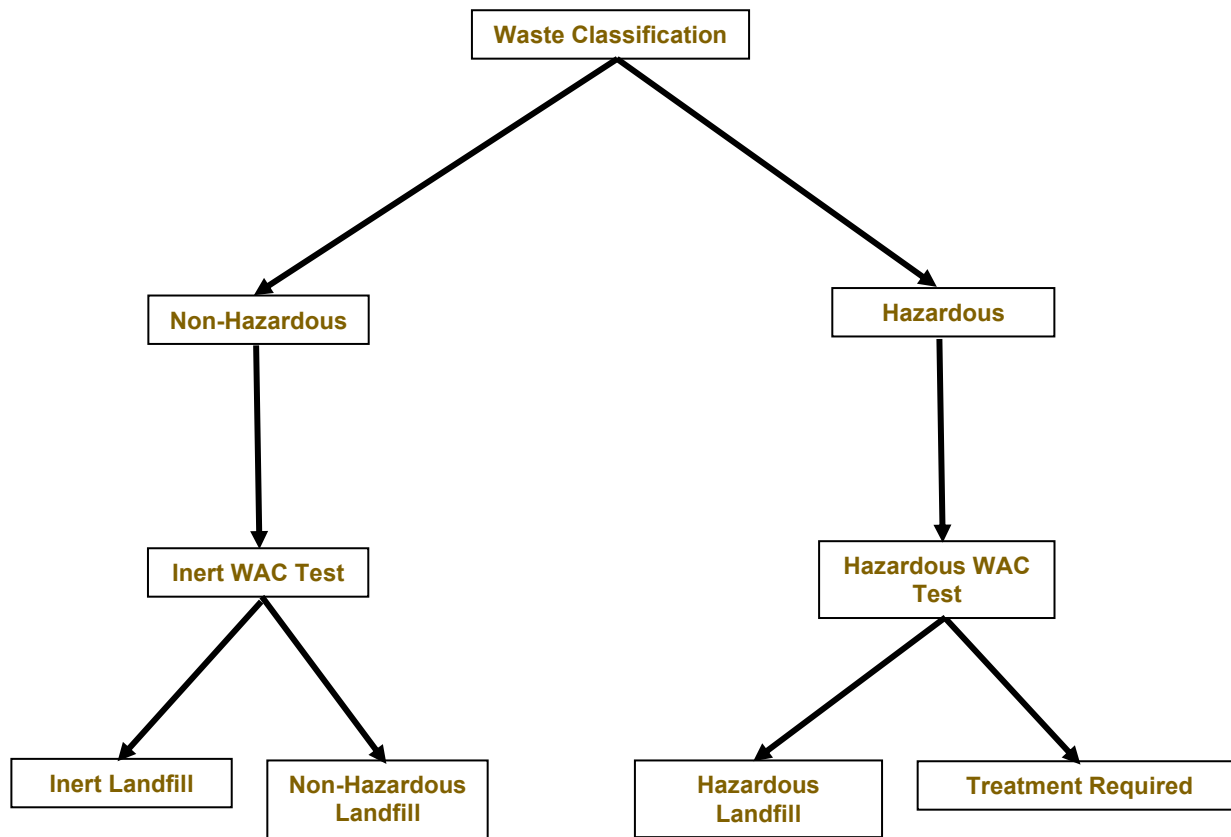
WASTE CLASSIFICATION AND WASTE ACCEPTANCE CRITERIA

During the site strip and construction activities, material may be required to be removed from site. Any such material would require classification, in line with Environment Agency Technical Guidance *Waste Classification: Guidance on the classification and assessment of waste (2015)*. This would classify the material as either Non-Hazardous or Hazardous Waste.

Once the material has been classified, determining the suitable landfill for disposal is governed by landfill directive Waste Acceptance Criteria (WAC) testing, with landfills categorized as Inert Waste, Stable Non-Reactive Hazardous Waste and Hazardous Waste. The WAC testing relates to materials that are to be exported from a site/development to landfill, and do not directly relate to human health specifically. The testing results are generally presented as certificates which can be used by site owners/contractors etc, which should be presented to the accepting waste facility or waste contractor.

If waste classification and/or WAC testing are not undertaken, material taken off site may be subject to WAC testing by the appropriate waste disposal company. The decision on whether or not to accept waste, or whether further testing is required, is at the discretion of the waste disposal company.

The below flow chart provides further information on the waste classification process.



CONSTRUCTION MATERIALS

Materials at risk from possible soil contaminants include inorganic matrices such as cement and concrete and also organic material such as plastics and rubbers. Acid ground conditions and high levels of sulphates can accelerate the corrosion of building materials. Where pH and soluble sulphate analysis has been undertaken, Solmek compare the test results with the guidelines presented within BRE Special Digest 1, 2005 (3rd Edition) 'Concrete in Aggressive Ground'. Plastics and rubbers are generally used for piping and service ducts and are potentially attacked by a range of chemicals, most of which are organic, particularly petroleum based substances. Drinking water supplies can be tainted by substances that can penetrate piping and water companies enforce stringent threshold values.

The levels of potential contaminants should be compared to thresholds supplied in the UK Water Industry Research (UKWIR) publication "Guidance for the selection of Water Supply Pipes to be used in Brownfield Sites" (January 2011). A Brownfield Site is defined in the document as "Land or premises that have not previously been used or developed that may be vacant or derelict". It should be noted that Brownfield sites may not be contaminated. The guidance does not apply to Greenfield Sites however water companies may have their own assessment criteria which should be checked by the developer. The table below outlines the pipe material selection threshold concentrations.

Parameter group	Pipe Material (Threshold concentrations in mg/kg)					
	PE	PVC	Barrier pipe (PE-AL-PE)	Wrapped Steel	Wrapped Ductile Iron	Copper
Extended VOC suite by purge and trap or head space and GC-MS with TIC	0.5	0.125	Pass	Pass	Pass	Pass
+ BTEX + MTBE	0.1	0.03	Pass	Pass	Pass	Pass
SVOCs TIC by purge and trap or head space and GC-MS with TIC (aliphatic and aromatic C5-C10)	2	1.4	Pass	Pass	Pass	Pass
+ Phenols	2	0.4	Pass	Pass	Pass	Pass
+ Cresols and chlorinated phenols	2	0.04	Pass	Pass	Pass	Pass
Mineral oil C11-C20	10	Pass	Pass	Pass	Pass	Pass
Mineral oil C21-C40	500	Pass	Pass	Pass	Pass	Pass
Corrosive (Conductivity, Redox and pH)	Pass	Pass	Pass	Corrosive if pH <7 and conductivity >400µS/cm	Corrosive if pH <5, Eh not neutral and conductivity >400µS/cm	Corrosive if pH <5 or >8 and Eh positive
Specific suite identified as relevant following site investigation						
Ethers	0.5	1	Pass	Pass	Pass	Pass
Nitrobenzene	0.5	0.4	Pass	Pass	Pass	Pass
Ketones	0.5	0.02	Pass	Pass	Pass	Pass
Aldehydes	0.5	0.02	Pass	Pass	Pass	Pass
Amines	Fail	Pass	Pass	Pass	Pass	Pass

REQUIREMENTS OF PARTIES WITHIN THE DEVELOPMENT PROCESS

Interested parties involved in the development process may use the data in different ways and there may be varying views and interpretation of the factual data. Local Authority staff may have a view on contamination and human health and the wider environment. The Environment Agency are concerned principally with the protection of Controlled waters. Building insurers, funders and purchasers may be primarily concerned with issues of potential commercial blight. Purchasers are also not always fully informed, and perceptions on issues associated with risk can affect the decision to purchase. Developers and construction organisations will focus on financial aspects of dealing with the contamination in the context of the development and construction programme.

RISKS & LIABILITIES FROM CONTAMINATION

In simple terms, risks associated with contamination may be considered in terms of 1) statutory risks and 2) development related risks. If contamination is severe or forms a potential hazard based on its potential to affect groundwater, surface water or human health, a statutory risk may be present, and as such, if the risk is not reduced, criminal proceedings may be instigated by a government body or local authority.

If the contamination is less severe or not considered to be mobile, it may be considered a commercial liability which could, in theory remain untreated, but which may at a later date affect the value of the property, or, with changing legislation, become a statutory risk. Commercial liabilities could give rise to civil proceedings by third parties if there are grounds for action.

♣Solmek conditions of offer, notes on limitations & basis for contract (ref: version1/2022)

These conditions accompany our tender and supercede any previous conditions issued. Solmek will prepare a report solely for the use of the Client (the party invoiced) and its agent(s). No reliance should be placed on the contents of this report, in whole or in part by 3rd parties. The report, its content and format and associated data are copyright, and the property of Solmek. Photocopying of part or all of the contents, transfer or reproduction of any kind is forbidden without written permission from Solmek. A charge may be levied against such approval, the same to be made at the discretion of Solmek.

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Site investigation is a process of sampling. The scope and size of an investigation may be considered proportional to levels of confidence regarding the ground and groundwater conditions. The exploratory holes undertaken investigate only a small volume of the ground in relation to the overall size of the site, and can only provide a general indication of site conditions. The opinions provided and recommendations given in this report are based on the ground conditions as encountered within each of the exploratory holes. There may be different ground conditions elsewhere on the site which have not been identified by this investigation and which therefore have not been taken into account in this report. Reports are generally subject to the comments of the local authority and Environment Agency. The comments made on groundwater conditions are based on observations made at the time that site work was carried out. It should be noted that mobile contamination, ground gas levels and groundwater levels may vary owing to seasonal, tidal and/or weather related effects. Solmek cannot be held liable for any unrecorded or unforeseen obstructions between exploratory boreholes and trial pits. This includes instances where previous structures on the site (buried man made structures) or the presence of boulder clay (cobbles and/or boulder obstructions) have been anticipated. All types of piling operations should make allowance for obstructions within the construction budget to accommodate this. Unrecorded ancient mining may occur anywhere where seams that have been worked and influence the rock and soil above. Dissolution cavities can occur where gypsum or chalk is present. Rotary drilling is the recommended technique to prove the integrity of the rock.

Where the scope of the investigation is limited via access to information, time constraints, equipment limitations, testing, interpretation or by the client or his agents budgetary constraints, elements not set out in the proposal and excluded from the report are deemed to be omitted from the scope of the investigation.

Desk studies are generally prepared in accordance with RICS guidelines. Environmental site investigations are generally undertaken as 'exploratory investigations' in accordance with the definitions provided in paragraph 5.4 of BS 10175:2011 in order to confirm the conceptual assumptions. You are advised to familiarize yourself with the typical scope of such an investigation. No pumping of water will be undertaken unless a licence or facilities/equipment have been arranged by others.

Where the type, number or/and depth of exploratory hole is specified by others, Solmek cannot and will not be responsible for any subsequent shortfall or inadequacy in data, and any consequent shortfall in interpretation of environmental and geotechnical aspects which may be required at a later date in order to facilitate the design of permanent or temporary works.

All information acquired by Solmek in the course of investigation is the property of Solmek, and, only also becomes the joint property of the Client only on the complete settlement of all invoices relating to the project. Solmek reserve the right to use the information in commercial tendering and marketing, unless the Client expressly wishes otherwise in writing. The quoted rates do not include VAT, and payment terms are 30 days from dispatch of invoice from our offices. Quotes are subject to a site visit.

We have allowed for 1 mobilisation and normal working hours unless otherwise stated. The scope of the investigation may be reviewed following the desk study and/or fieldwork. The presence or otherwise of Japanese Knotweed or other invasive plants can be difficult to identify especially during winter months. If Japanese Knotweed or other invasive species are suspect, it should be confirmed by an ecologist. We have not allowed for acquiring services information, and cannot be responsible for damage to underground services or pipes not shown to us or not clearly shown on plans. Costs incurred will be passed on to you, and in commissioning Solmek you understand and accept that you/your agent have a contractual relationship with Solmek & you accept this. Our rates assume unobstructed, reasonably level and firm access to the exploratory positions and adequate clear working areas and headroom. We have priced on the basis that you or your client have the necessary permissions, wayleaves and approvals to access land. All boreholes and pits are backfilled with arisings except where gas monitoring pipes are installed with stopcock covers. Solmek are not responsible for any uneven surfaces as a result of siteworks and rutting and backfilled excavations may require re-levelling and/or making good by others after fieldwork is complete, and Solmek has not allowed for this. No price has been provided or requested for a return visit to remove pipework and covers. Hourly rates apply to consultancy only and do not include expenses unless otherwise shown. If warranties are required, legal costs incurred will be passed on to you assuming Solmek agree to complete such warranties, modified or otherwise and you understand and agree to pay all costs.

We reserve the right to pursue full payment of the invoice prior to release of any information including reports. We advise you/your client that we may elect to pursue our statutory rights under late payment legislation, and will apply 8% to the base rate for unreasonably late payments. Solmek are exempt from the CIS Scheme. Solmek offer to undertake work only in strict accordance with conditions covered by our current insurances, which are available for inspection. Solmek are not responsible for acts, negligent or otherwise of subcontractors and as a matter of policy cannot indemnify any other parties. Professional indemnity Insurance is limited to ten times the invoice net total except where stated otherwise by Solmek. Solmek give notice that consequential loss as a direct or indirect result of Solmek's activities or omission of the same are excluded.