[redacted]

Document: Factual Report

Project: National AGI Renovation Campaig
Batch 2 (2018) Kings Lynn Compress
Station

Reference No.: GN21822_GI

Date: June 2018

Prepared for: [redacted] Limited

[redacted]

[redacted]

Document: Ground Investigation Factual Report

Project: National AGI Renovation Campaign Batch 2 (2018) Kings Lynn Compressor Station

Reference No.: GN21822_GI

Date: 25th June 2018

Prepared For: [redacted]

Engineer: [redacted]

REPORT STATUS:

Revision	Comments	Prepared By	Approved By	Issued By	Audited By
0	First issue	INIT JE SIGN COMMENTS DATE 22/06/18	INIT JA SIGN COMMENTS DATE 25/06/18	INIT JE SIGN COMMENTS DATE 25/06/18	INIT JA SIGN COMMENTS DATE 25/06/18
		INIT SIGN COMMENTS DATE	INIT SIGN COMMENTS DATE	INIT SIGN COMMENTS DATE	INIT SIGN COMMENTS DATE
		INIT SIGN COMMENTS DATE	INIT SIGN COMMENTS DATE	INIT SIGN COMMENTS DATE	INIT SIGN COMMENTS DATE
		INIT SIGN COMMENTS DATE	INIT SIGN COMMENTS DATE	INIT SIGN COMMENTS DATE	INIT SIGN COMMENTS DATE

[redacted]

CONTENTS

[redacted]

FOREWORD

General Conditions Relating To Site Investigation

This investigation has been devised to generally comply with the relevant principles and requirements of B.S.10175, 'Investigation of potentially contaminated sites - Code of practice'. The recommendations made and opinions expressed in this report are based on the information obtained from the sources described using a methodology intended to provide reasonable consistency and robustness.

The opinions expressed in this report are based on the ground conditions revealed by the site works, together with an assessment of the site and of laboratory test results. Whilst opinions may be expressed relating to sub-soil conditions in parts of the site not investigated, for example between exploratory positions, these are only for guidance and no liability can be accepted for their accuracy.

Boring and sampling procedures are undertaken in accordance with B.S.5930, 'Code of Practice for Ground Investigations'. Likewise in-situ and laboratory testing complies with B.S.1377, 'Methods of Tests for Soils for Civil Engineering Purposes', unless stated otherwise in the text. Chemical Testing has been undertaken by a UKAS/MCerts accredited laboratory using the methodologies quoted on the appended results sheets.

The groundwater conditions entered on the boring records are those observed at the time of investigation. The normal rate of boring usually does not permit the recording of an equilibrium water level for any one water strike. Moreover, groundwater levels are subject to seasonal variation or changes in local drainage conditions.

Some items of the investigation have been provided by third parties and whilst [redacted] have no reason to doubt the accuracy, the items relied on have not been verified. No responsibility can be accepted for errors within third party items presented in this report.

This report is produced in accordance with the scope of [redacted] appointment and is subject to the terms of appointment. [redacted] accepts no liability for any use of this document other than by its client and only for the purposes, for which it was designed and produced. No responsibility can be accepted for any consequences of this information being passed to a third party who may act upon its contents/recommendations.

Any advice, opinions, or recommendations within this document should be read and relied upon only in the context of the document as a whole. The contents of this document are not to be construed as providing legal, business or tax advice or opinion.

[redacted]

FACTUAL REPORT

FOR A

GROUND INVESTIGATION -

NATIONAL AGI RENOVATION CAMPAIGN BATCH 2 (2018)

KINGS LYNN COMPRESSOR STATION

1 TERMS OF REFERENCE & INTRODUCTION

The work covered by this report was undertaken on behalf of [redacted] The investigation is in accordance with a specification by [redacted] (reference [redacted] 322-SPC-7210-1000), dated 21st February 2018) and [redacted] Limited's (HGE) quotation (GN21822_Q2_MR) dated 8th March 2018 with an emailed instruction to proceed from [redacted] dated 8th April 2018 and purchase order MSU002050 dated 4th May 2018.

The purpose of the work was to undertake a ground investigation, focusing on geotechnical issues relating to the replacement of existing pipework with new arrangement at the Kings Lynn Compressor Station. We understand that the worked required of [redacted] will include the replacement of multiple ball valves and associated pipework, that the new ball valves will be supported by raft foundations with piling below if necessary.

The site location and the site boundary are shown on drawing GN21822-DR001. The centre of the area investigated can be identified by National Grid Reference 572125, 316225 and by examination of online resources, the elevation of the site is estimated at approximately 13-15m above Ordnance Datum (maOD).

2 BACKGROUND INFORMATION

2.1 Site Description

The area of investigation comprised the Kings Lynn Compressor Station with agricultural land surrounding the site. The site boundary is shown in the appended site plan GN21822-DR002. Access to the main site was gained via the main security gate towards the north of the site. The entrance to the Kings Lynn Compressor Station was accessed via Walton Road to the north.

The compressor station comprised a number of processing and administrative buildings clustered to the south of the site. Infrastructure associated to a gas compressor station was located centrally to the site. This consisted of existing scrubbers, bi-directional pipework compressors and the AGI area towards the west of the site. High security electrified fencing with associated security cameras bounded the gas compressor station.

2.2 Existing Geological/Hydrogeological/Hydrological Data

Table 2.2 below, gives background information from the reports listed where there is a relevance to geotechnical considerations, together with mapping, online and literature sources.

	Data Source	Data Summary
Geology	Geology from BGS 1:50,000 Scale, Sheet 146 'Fakenham'. BGS website.	Drift – **Nar Valley Formation – Clay and Silt**. Encompasses the fluvial, lacustrine organic and marine deposits of the Nar River. Floodplain alluvium comprises soft clay, silts and fine sands with bodies of peat overlying sands and gravels. River terrace deposits comprise sands, gravelly sands, and gravels, with angular and subrounded flint and chalk. Marine deposits comprise blue-grey shelly silty clay and the underlying freshwater beds comprise silty sands and silts and compressed wood peat.

	Data Source	Data Summary
Hydrology/ Hydrogeology	Geology from BGS 1:50,000 Scale, Sheet 146 'Fakenham'. BGS website.	Bedrock – the deeper geologies may include - **Gault Formation.** Pale to dark grey or blue-grey mudstone, glauconitic in parts. **Carstone Formation.** A greenish brown thick bedded, cross bedded, oolitic sandstone.
	Sheet 1 Regional Hydrogeological Map (Northern East Anglia) 1:125,000 scale.	Standing groundwater would be anticipated within the Carstone or the Sandringham Sand Formation, although perched water bodies have been encountered previously within the superficial deposits at approximately 1.5-2.5mbgl.

Table 2.2: Background Geological/Hydrogeological/Hydrological Information

2.3 Site Historical Data

There had been little, if any, development on the site prior to the development of the compressor station. Previously, the site was agricultural land. Additional historic (and contemporary) activities include a railway to the south west of the site. The 1981 map shows this railway as dismantled.

Reference to the historical mapping would suggest that the site has had very little activity over the past century, and the only use previously identified on site has been assumed pastoral farmland. Aerial/satellite imagery shows the national grid access covers and concrete hard standing surrounding them from 1980 onwards.

3 INTRUSIVE INVESTIGATION

3.1 General

The scope of the intrusive investigation was specified by [redacted] This comprised drilling rotary boreholes supplemented by hand excavated pits. Details of the site investigation methods employed have been presented on the appended data sheet and a brief summary of the fieldwork has been presented below with the exploratory locations indicated on appended drawing GN21822-DR002.

Prior to mobilisation to the working area all operatives were inducted by [redacted] with risk assessments and method statements read and signed and 'permits to dig' completed for each hole. Each hole was assessed as being clear of underground services by a sub-contract service clearance specialist in addition to National Grid identifying their own underground infrastructure and applying 10m standoff areas.

At each borehole location, a [redacted] engineer also used a CAT and Genny to clear the position from the presence of services. BH01 was moved accordingly as a low voltage power cable was found to be within 0.50m of the hole. BH01a was located approximately 1.0m to the east of BH01.

3.2 Rotary Boreholes

Three rotary boreholes (BH01a to BH03) were drilled between the 08/05/18 and 31/05/18, using wireline Geo-Bor S techniques to drill to a maximum depth of 51.0m in order to identify, sample and test the strata underlying the site. Dynamic sampling techniques with a diameter of 146mm were utilised to progress through the initial superficial deposits, generally to a depth of 6.0m. Generally, the boreholes were cased with 150mm casing to a depth of between 6.0 and 6.5m. Coring was then carried out utilising a 109mm diameter single barrel system and water flush to advance the boreholes to the required depths. Upon completion, BH02 and BH03 were backfilled with bentonite cement pellets.

A dual standpipe was installed in BH01a. The standpipes were installed to 50.0m and 6.0m respectively. Drilling advanced relatively smoothly with the exception of a work stoppage requested by [redacted] to change drilling fluids and also from a burst hydraulic pipe on the drilling rig.

At the completion of the works daily allocation sheets were completed to document the plant, personnel and progress of the works and to signify any standing time beyond our control.

Standard penetration testing was undertaken at regular depths until 'N' values were consistently found to be in excess of 50. A geotechnical engineer was present to oversee the work, briefly describe the soils, retrieve environmental soil and groundwater samples where necessary.

A detailed description of all the strata encountered, in-situ testing undertaken, position and types of samples taken, along with any groundwater observations made at the time of drilling are included on the rotary borehole records presented in the appendix.

During and immediately following completion of the fieldwork, geotechnical samples were transported to [redacted]s Laboratory in [redacted] via in-house transportation. An [redacted] engineer would then open the sample liners, photograph, sub-sample and produce a detailed description of each borehole. Once the samples were sub-sampled and described, a geotechnical schedule and borehole record was produced and forwarded to [redacted] and [redacted] for approval. Once the geotechnical schedule was amended or approved, this would then be forwarded onto the laboratory for their associated testing.

Environmental samples were scheduled by HGE, and were subsequently dispatched to the nominated chemical testing laboratory using cool boxes and refrigerant blocks. Chain of custody (CoC) sheets were prepared, copies of which accompanied the samples.

Details of the site investigation methods employed have been presented on the appended data sheet and a summary of the fieldwork and laboratory testing has been included below.

3.3 Monitoring Well Installations

A single rotary borehole was installed with standpipes for monitoring the groundwater within the soils encountered as per specification. Table 3.3 below summarises these installations.

Monitoring Point I.D	Diameter of Installation (mm)	Base Depth of Installation (mbgl)	Response Zone (mbgl)		Target Strata
			Top	Base	
BH01a	50	6.00	1.00	6.00	Shallow strata
	50	50.00	8.00	50.00	Deeper strata

Table 3.3: Summary of Groundwater Installations.

Detailed descriptions of the installations and their corresponding backfill materials are included on the relevant exploratory hole records presented in appendix B.

4 GROUND CONDITIONS ENCOUNTERED

4.1 Introduction

Reference should be made to the appended exploratory hole records for full details of the ground conditions recorded by this investigation. However, the relevant features with regard to the geology and hydrogeology of the site are summarised below.

4.2 Ground Conditions

The ground conditions broadly fit with those anticipated, based on the geological mapping of the area. A paleo-valley was expected to potentially be present across the site, in which superficial deposits are deeper than the surrounding area. Geological maps anticipated approximately 50m of superficial deposits. At BH03, historic concrete pad foundations were present from 400mm below ground level. Due to this, BH03 was moved 5.0m west of the original location. Initially, a thin surface layer of topsoil (0.35m at BH01 and 0.20m at BH03) was proved. No visual or olfactory evidence of contamination was identified.

Made ground was present at the surface of boreholes BH01a, BH02 and BH03. The base of the made ground was between 0.50m and 1.30mbgl. Across the three boreholes made ground consisted of a silty gravelly sand with angular to sub rounded flint gravel. At BH02, fine to coarse gravel sized concrete was noted between 0.05 and 0.90m.

The superficial deposits underlying the made ground (across the borehole drilled area) comprised of medium dense light brown and brown slightly clayey slightly gravelly to gravelly fine to coarse sand. This

was found to a maximum depth of 4.90m (BH02). The gravel was recovered as angular to subrounded fine to coarse flint and was likely to represent River Terrace Deposits – Sand and Gravel. A fine band of organic silt was proven between 4.90m and 5.0m in BH02.

Underlying the superficial deposits a soft dark silty clay was encountered, becoming firm to stiff with depth. Across the three boreholes this strata was encountered between 13.50m and 14.10m. With depth, fossil shell fragments became occasional to frequent and were recovered as a fine sand-sized shell up to coarse gravel-sized shell fragments. To the base of the strata, frequent fine to coarse gravel-sized fossil shell fragments were present. This strata is likely to represent the Nar Valley Formation - Clay as part of the marine depositional environment.

BH01a and BH02 proved lignite to a depth of 15.40m and 16.50m, respectively. Lignite is an extremely weak to weak brown naturally compressed peat. In some cases, traces of plant structure can be noted. This strata was absent at BH03. According to the British Geological Survey (BGS), compressed peat is associated with the freshwater beds of the Nar Valley Formation.

Very dense to medium dense grey silty gravelly fine to medium sand underlay the compressed peat beds. The gravel comprised fine to medium subrounded to rounded chalk and flint with occasional black speckling associated with possible glauconite. Recovery through this strata was very poor to no recovery at all. However, the SPT split spoon sampler was recovering enough strata to record appropriately. This material is associated with the Nar Valley Freshwater Beds.

Across the three boreholes a grey slightly sandy clayey silt was proved to between 26.80m and 26.90m, with bands of soft to firm grey silty clay. The sand was recovered as fine. Towards the base of this strata, thin laminations became evident. In BH02, rare chalk gravel was recorded, proving the strata as superficial deposits associated with glacial depositional events.

From 26.80m and 26.90m a stiff extremely closely spaced and closely spaced thin to thickly laminated silty clay was proved to the base of all three boreholes. In places, the laminations would increase or decrease in size and so would the strength of the strata. However, the strata was predominantly very stiff. The SPT N values were recorded between 38 and 50 (refusal), suggesting the strata is very stiff in strength.

The strata encountered during the intrusive works undertaken are summarised in table 4.2 below.

Depth (mbgl) encountered (upper boundary)	Thickness encountered (min/max in metres)	Geology
0.35	0.2 - 0.35	Topsoil
0.5 - 1.3	0.4/1.25	Made Ground
1.9 – 4.9	1.9/3.9	River Terrace Deposits
1.9 – 4.9	0.9/1.40	Head Deposits
13.50 – 14.10	9.2/11.9	Nar Valley Formation - Clay
13.80 – 15.00	9.80/13.10	Nar Valley Formation – Freshwater Beds
26.80 – 26.90	Base not encountered	Varved Clay

Table 4.2: Summary of Ground Conditions Encountered.

4.3 Groundwater

Groundwater levels were noted during drilling and a standpipe was installed in a single rotary borehole (BH02). These results are presented in appendix B.

5 GEOTECHNICAL TESTING

5.1 General

Use of the laboratory and field tests presented below to establish geotechnical parameters should be carried out in accordance with BS EN 1997-2 Eurocode Part 2.

5.2 Geotechnical In-situ Testing

In-situ testing was undertaken for geotechnical purposes and samples were obtained for appropriate laboratory analysis. Site based geotechnical testing is presented in the appendix B and summarised below (table 5.2).

Test Type and Reference	Stratum	Number of Results	Test Depth Range (mbgl)	Results (Range)	Corrected Results (Range)	Comments / Limitations
Standard penetration test (BS EN ISO 22476-3:2005)	Head Deposits	1	1.20	N= 9	N_{60} = 7	Field test results (raw N values) presented on the appended borehole records have been adjusted to standard "N_{60}" values which take into consideration the potential energy loss to and by the drive rods, by using the following equation provided in BS EN ISO 22476-3:2005+A1:2011. Where: N = N values from field tests. Er = Energy ratio of the hammer λ = Correction value for the rod length below the anvil (where in granular soils).
	River Terrace Deposits	6	1.20 - 5.00	N= 9 - 50	N_{60} = 9 - 44	
	Nar Valley Formation - Clay	14	2.00 - 13.50	N= 9 - 25	N_{60} = 9 - 26	
	Nar Valley Formation - Freshwater Beds	18	15.00 - 25.50	N= 25 - 50	N_{60} = 26 - 52	
	Varved Clay (Glacial)	25	25.50 - 51.00	N= 38 - 50	N_{60} = 39 - 52	

Table 5.2: Summary of Geotechnical In-situ Testing

5.3 Standard Penetration Testing

The N values reported directly from the blow counts of the equipment in the field standard penetration tests are presented on the appended borehole records. To adjust the field test results for potential energy loss to and by the drive rods, these have been converted to standardised N_{60} values by using the following equation provided in BS EN ISO 22476-3:2005+A1:2011.

$$N_{60} = \frac{E_r}{60} N\boldsymbol{\lambda}$$

Where:

N = N values from field tests.

$\mathbf{E_r}$ = Energy ratio of the hammer (64% for the cable percussive hammer utilised on this site).

$\boldsymbol{\lambda}$ = Correction value for the rod length below the anvil (where in granular soils).

Figure 5.3 below provides the relationship between depth and N_{60}.

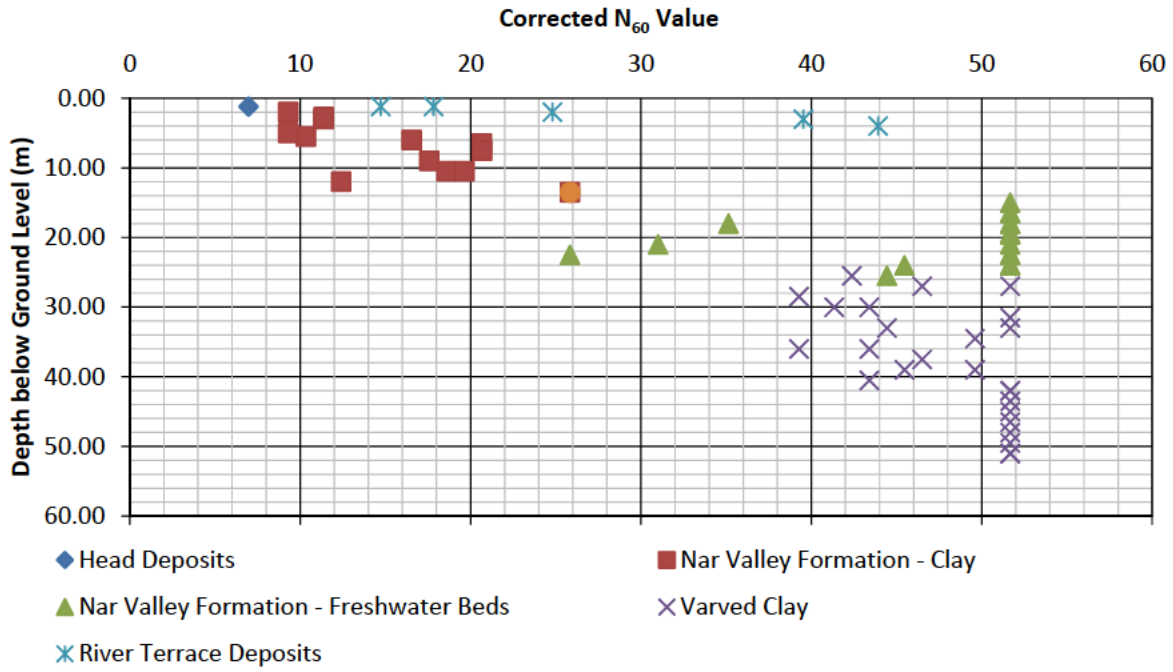


Figure 5.3: Corrected N_{60} Values vs. Depth Below Ground Level (m)

5.4 Geotechnical Laboratory Testing

The geotechnical laboratory testing that was scheduled by [redacted] and amended and approved by [redacted] is summarised in Table 5.3 and the results are provided in Appendix C.

Test Type and Reference (BS 1377: 1990 unless stated)	**Strata**	**Depth** (m)	**Number of Results**	**Results** (Range)	**Results** (Average)
Moisture content (Part 2:3.2)	River Terrace Deposits	0.7 - 3.00	3	14-21%	17.3%
	Made Ground	1.00	1	8.3%	8.3%
	Head Deposits	1.10	1	14%	14.0%
	Nar Valley Formation – Clay	2.0 - 12.0	14	19 - 49%	34.8%
	Nar Valley Formation – Freshwater Beds	23.0 - 26.4	2	25%	19.0%
	Varved Clay	24.9 - 50.50	18	22-25%	25.0%
Atterberg Limits (Part 2)	Nar Valley Formation - Clay	3.5 - 9.0	5	PL – 17 - 30% LL – 32 - 53% PI – 15 - 38% Modified PI - 15 - 38%	23.8%
	Nar Valley Formation – Freshwater Beds	23.00	N.P.	N.P.	N.P.
	Varved Clay	27.50 - 50.50	7	PL – 15 - 17% LL – 33 - 37% PI – 17 - 20% Modified PI - 17 - 20%	PL 16.1% LL 34.4% PI 18.3% Modified PI 18.3%

Test Type and Reference (BS 1377: 1990 unless stated)	Strata	Depth (m)	Number of Results	Results (Range)	Results (Average)
Particle size distribution - wet sieving (Part 2, clause 9 2) & **Sedimentation by pipette** (Part 2, clause 9.4)	Head Deposits	1.10	1	Gravel 18.4% Sand 68.4% Fines 13.1%	Cobbles 0.0% Gravel 18.4% Sand 68.4% Fines 13.1%
	River Terrace Deposits	2.0 - 3.0	2	Cobbles 0.0% Gravel 0.0% Sand 52.7 – 53.3% Fines 2.8 – 32.8%	Cobbles 0.0% Gravel 1.7% Sand 80.6% Fines 17.8%
	Nar Valley Formation – Freshwater Beds	20.50 – 22.90	2	Cobbles 0.0% Gravel 0.1% Sand 18 – 24.9% Silt 59.2 – 64.4% Clay 15.8 – 17.5%	Cobbles 0.0% Gravel 0.1% Sand 21.5% Silt 61.8% Clay 16.7%
	Varved Clay	26.60	1	Cobbles 0.0% Gravel 0.0% Sand 11.6% Fines 88.4%	Cobbles 0.0% Gravel 0.0% Sand 11.6% Fines 88.4%
Soil pH – geochemical testing (BRE SD1 2005)	Head Deposits	1.20	1	8.5	-
	River Terrace Deposits	1.0 - 5.0	5	8.2 - 8.7	-
	Nar Valley Formation - Clay	2.2 - 15.0	6	6.5 - 8.0	-
	Nar Valley Formation - Freshwater	14.5 - 26.0	4	6.5 - 8.4	-
	Varved Clay	31.4 - 45.5	5	8.1 – 8.3	-
Water soluble sulphate content 2:1 aqueous extract (BRE SD1 2005)	Head Deposits	1.20	1	0.072 g/l	-
	River Terrace Deposits	1.0 - 5.0	5	0.014 - 0.34 g/l	-
	Nar Valley Formation - Clay	2.2 - 15.0	6	2.2 - 3.2 g/l	-
	Nar Valley Formation - Freshwater	14.5 - 26.0	4	0.13 - 0.46 g/l	-
	Varved Clay	31.4 - 45.5	5	0.10 – 0.26 g/l	-
Single stage UU triaxial compression test (Part 7, clause 8)	Nar Valley Formation - Clay	4.00 - 13.60	16	39 – 226 kPa	91.3kPa
	Varved Clay	27.70 - 50.45	25	75 – 210 kPa	123.1kPa
Incremental loading oedometer test	Nar Valley Formation - Clay	4.00 - 13.05	4	-	
	Varved Clay	27.95 - 50.35	9	-	

Table 5.4: Summary of Geotechnical Laboratory Testing

[redacted]

6 ENVIRONMENTAL TESTING

6.1 Contamination Observations

Samples recovered from the exploratory holes have been examined for potential contamination. Olfactory and visual evidence of potential contamination is included on the records and screening values.

6.2 Environmental Laboratory Testing

Environmental laboratory testing was scheduled by HGE on selected soil samples recovered from the exploratory holes and was carried out to identify the chemical characteristics of the soils encountered. The results of this work are presented in appendix C and are summarised below (table 6.2).

Chemical Test Determinants	Number of Samples
HSS6 Suite (pH, TOC, Arsenic, Boron, Cadmium, total and hexavalent Chromium, Copper, Lead, Mercury, Nickel, Selenium and Zinc, Speciated PAH, BTEX, MTBE, TPH CWG).	11
Asbestos ID	11
Total Sulphur	15
Water Soluble Sulphate g/l	22
Water Soluble Sulphate mg/l	17
pH	22

Table 6.2: Summary of Environmental Testing

We trust that this information is sufficient for your present needs. We will develop an interpretation of the ground conditions in due course, but please contact us with any questions or comments.

Report Compiled by:

[redacted]

Report Checked by:

[redacted]

[redacted]

REFERENCES

BS 1377: 1990, *'Methods of Tests for Soils for Civil Engineering Purposes'.*

BS EN 1997-1: 2004 +A1:2013, *Eurocode 7: Geotechnical Design - Part 1 'General Rules'.*

BS EN 1997-2: 2007, *Eurocode 7: Geotechnical Design - Part 2, 'Ground Investigation and Testing'*.

BS 5930: 2015, *'Code of Practice for Ground Investigations'.*

BS EN 10175: 2011 + A2: 2017, *'Investigation of Potentially Contaminated Sites – Code of Practice'.*

BS EN ISO 14688-2:2004, 'Geotechnical investigation and testing – Identification and classification of Soil. Principles for a Classification'.

BS EN ISO 22475-1:2006 & 22475-2/3:2011, '*Geotechnical investigation and testing. Sampling methods and groundwater measurements'.*

Building Research Establishment, 2005. Special Digest 1:2005, *'Concrete in Aggressive Ground'*.

LIST OF APPENDICES

FM-HA-D-104 Rev B N:\Live\Projects\Jobs 21000s\21800\GN21822 Kings Lynn Compressor Station\Drawings\CAD files\GN21822 - DR001.dwg

Raes Farm

Home Farm

Lamb's Common

N

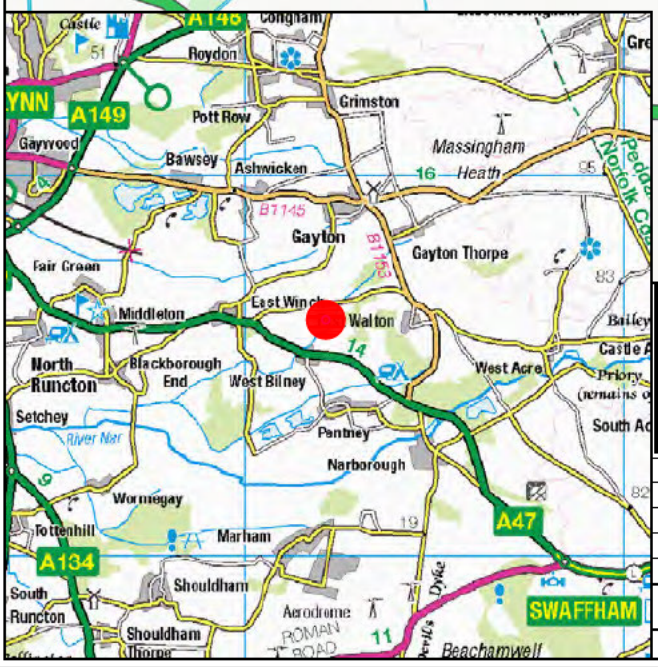
Site Location

Long Plantation

Holt Plantation

Oldlands Wood

A47



Job No : GN21822	Date : May 2018
Drawing No : GN21822 - DR001	
Scale : 1:10000 @ A4	
Drawn by : RW	Checked by : JE
Eastings : 572100	Northings : 316240

Reproduced by permission of Ordnance Survey on behalf of The Controller of Her Majesty's Stationery Office © Crown Copyright Harrison Group Environmental Ltd. Kimberley Street Norwich NR2 2RJ. AL100021199

THIS DRAWING IS THE PROPERTY OF HARRISON GROUP LIMITED AND NO REPRODUCTION MAY BE MADE IN WHOLE OR IN PART WITHOUT PERMISSION

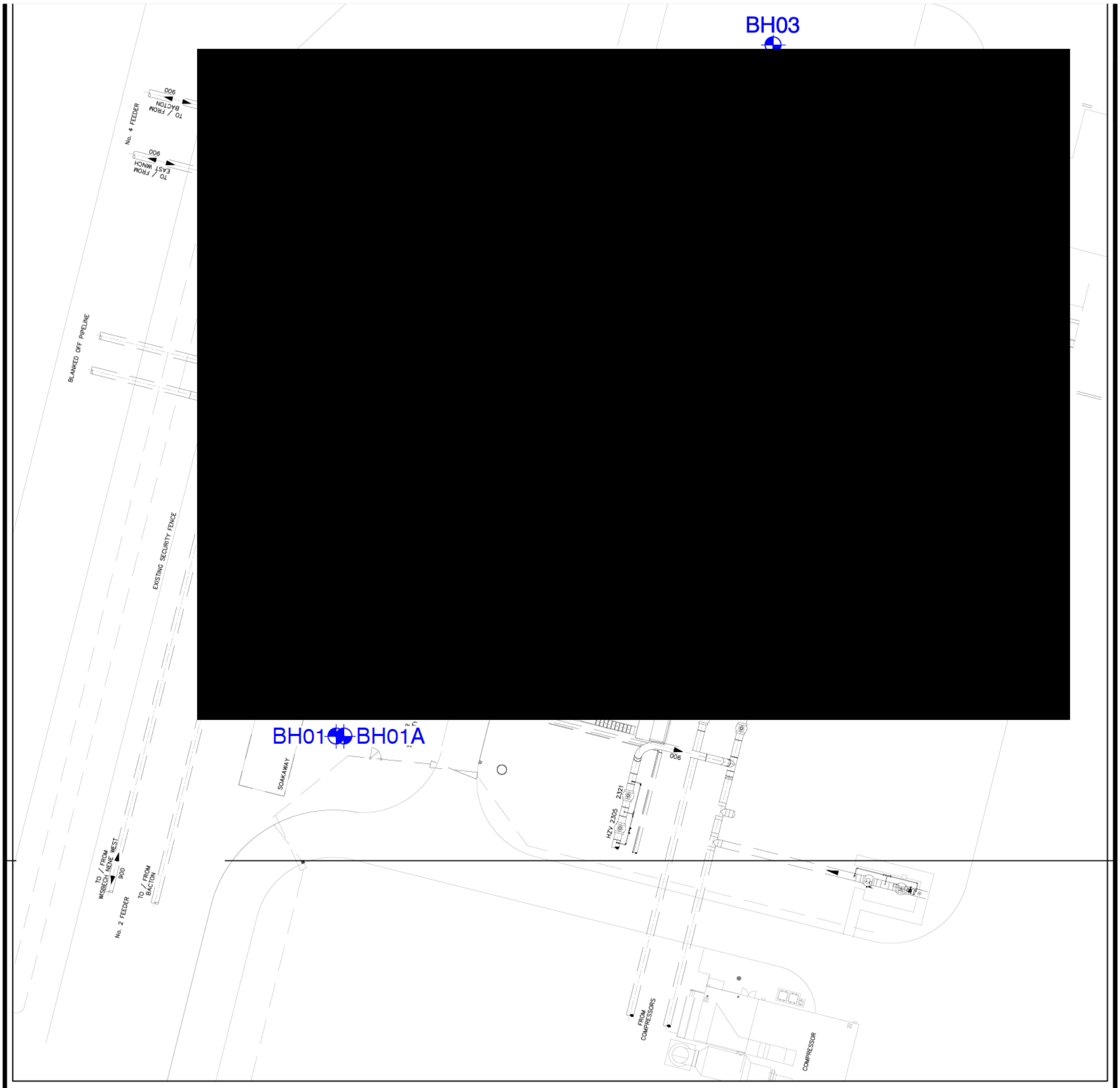
ISOQAR REGISTERED 0026

UKAS MANAGEMENT SYSTEMS

UKAS TESTING 4031

Certificate Number 5933
ISO 9001, ISO 14001

N:\Work\Projects\Jobs 21000s\21800\GN21822 Kings Lynn Compressor Station\Drawings\CAD files\GN21822 – DR002.dwg



[redacted]

Client : J Murphy & Sons Limited

Project : Kings Lynn Compressor Station

Job No : GN21822 Date : May 2018

Drawing Title : Fieldwork Location Plan

Drawing No : GN21822 - DR002

Scale : 1:300 @ A3

Drawn by : RW Checked by : JE

Eastings : 572100 Northings : 316240

Revision history

Rev	Date	Revision Data

Key :

BH01 Cable Percussive Borehole

Notes :

[redacted]

ISOQAR REGISTERED 0026

UKAS MANAGEMENT SYSTEMS

UKAS TESTING 4031

[redacted]

Reproduced by permission of Ordnance Survey on behalf of The Controller of Her Majesty's Stationery Office © Crown Copyright Harrison Group Environmental Ltd. Kimberley Street Norwich NR2 2RJ. AL100021199

THIS DRAWING IS THE PROPERTY OF HARRISON GROUP LIMITED AND NO REPRODUCTION MAY BE MADE IN WHOLE OR IN PART WITHOUT PERMISSION

DATA SHEET: SITE INVESTIGATION METHODS

This datasheet provides basic details of the methods employed during the undertaking of site investigations. Detailed method statements may be provided if requested or further information may be obtained from the relevant British Standards or other quoted publications. Investigations are generally carried out in accordance with BS 5930:2015, "Code of practice for ground investigations", BS 10175:2011+A2:2017, "Investigation of potentially contaminated sites – Code of Practice, and BS EN ISO 1997-2:2007, "Eurocode 7 – Geotechnical design – Part 2: Ground investigation and testing".

Prior to any excavation being undertaken, service plans are obtained and/or a service tracing team may be employed to locate and mark up service locations. A surface sweep using a cable avoidance tool (CAT) is undertaken, in order to avoid services and service inspection pits are generally hand excavated prior to commencing work with any mechanical plant.

ROTARY BOREHOLES

Rotary drilling is used in hard rock areas where cable percussive or auger methods are not suitable. Drilling fluid is generally used, which are passed from the surface through hollow drill rods to the face of the drill bit to cool and lubricate the bit and transport drill cuttings to the ground surface as well as stabilising the hole in certain circumstances. Drilling fluids used include water, mist, air and in some cases mud, polymers or foam.

There are two basic types of rotary drilling; open hole drilling, where the drill bit cuts all the material within the diameter of the borehole; and core drilling, where an annular bit, fixed to the bottom of the outer rotating tube of a core barrel, cuts a core, which is recovered within the innermost tube of the core barrel assembly and bought to the surface.

Open hole drilling is often used with casing to stabilise the drill hole and is generally used to form a rapid hole in soils or weak rock. The returns and the rate of penetration are the only means of recording information so the accuracy of rock descriptions and identification of the changes of strata are limited using this method. Rotary coring is used to recover good quality core samples of the materials being drilled with various methods and diameters available, depending upon anticipated strata and requirements.

Numerous rig types are available from small track mounted units able to work in limited access situations to large lorry mounted units requiring large operating areas.

MONITORING WELL INSTALLATIONS

All types of boreholes can be fitted with monitoring wells to enable subsequent sampling and monitoring of groundwater and ground gas levels. Monitoring wells are usually of UPVC or HDPE material, although steel may also be used in certain circumstances. Various diameters are available from 19mm upwards, depending upon the size of the borehole. 38mm or 50mm diameter wells are the most commonly used. Wells generally have slotted lower sections which may have a geomesh filter and then are surrounded with a filter medium such as single sized gravel. The upper sections are generally solid casing which is usually grouted to produce a seal with the surrounding ground. The top of the well is generally fitted with a removable cap that may include a gas valve to enable future gas monitoring. The installation is usually protected by a lockable cover set in a concrete base. Details of monitoring well installations and associated backfill are given on the relevant borehole records.

[redacted]

Rotary Borehole Record

BH01

Sheet 1 of 1

Project ID: **GN21822**	Client: [redacted]	E: 572075.00	N: 316205.00
Location: King's Lynn Compressor Station	Consultant: [redacted]	Date: 18/05/2018	
	Plant used: Hand Excavated	SPT Hammer Serial No:	

Geology Description	Legend	Depth (m)	Elevation (maOD)	T.C.R. (%)	S.C.R. (%)	R.Q.D. (%)	Sample / In-Situ Test Information: Type	Depth	Results / Remarks	Date - Depth (m) Casing (Water)	Installation & Backfill
TOPSOIL (Dark brown slightly silty gravelly fine to coarse SAND. Gravel is angular to subrounded fine to coarse flint).		0.35					B1	0.30			
Dark grey slightly silty slightly gravelly fine to medium SAND. Gravel is subangular to subrounded fine and medium flint.		1.00					ES1	0.30			
Light yellowish brown mottled dark grey slightly silty slightly gravelly fine to coarse SAND. Gravel is angular to subangular fine and medium flint.		1.25					B2	0.50			
Borehole terminated at 1.25m: Electrical cable reading							ES2	0.50			
							B3	1.10			

Hole Diameter by Depth		Drilling Flush Details		
Depth Base (m)	Diameter (mm)	Depth (m)	Type	Return (%)

Casing Diameter by Depth	
Depth Base (m)	Diameter (mm)

Water Strike						
Date	Strike Depth (m)	Depth Sealed (m)	Casing Depth (m)	Time Elapsed (mins)	Standing Level (m)	Remarks
18-05-2018	1.20					Seepage

Remarks:

1. Inspection pit GL to 1.25m.
2. Backfill: GL to 1.25m arisings.

[redacted]

Drilled by: [redacted]

Logged by: RK

Checked by: JA

Fm-Hn-R-3070-Rev D

[redacted]

Rotary Borehole Record

BH01A

Sheet 1 of 6

Project ID: **GN21822**	Client: [redacted]	E: 572076.00	N: 316205.00
Location: King's Lynn Compressor Station	Consultant: [redacted]	Date: 24/05/2018 - 31/05/2018	
	Plant used: Comacchio MC405	SPT Hammer Serial No: ADP04 (ER: 62%)	

Geology Description	Depth (m)	Elevation (maOD)	T.C.R. (%)	S.C.R. (%)	R.Q.D. (%)	Sample / In-Situ Test Information: Type	Depth	Results / Remarks	Date - Depth (m) Casing (Water)	Installation & Backfill
TOPSOIL (Dark brown slightly silty gravelly fine to coarse SAND. Gravel is angular to subrounded fine to coarse flint. Occasional rootlets present).						B1	0.10			
						ES1	0.10			
Dark grey clayey gravelly fine to coarse SAND. Gravel is angular to subrounded fine to coarse flint. Occasional pockets of black decaying organic matter with faint organic odour.	0.50					B2	0.60			
						ES2	0.60			
Light yellowish brown clayey gravelly fine to coarse SAND. Gravel is angular to subangular fine and medium flint.	1.25					B3	1.10			
						ES3	1.10			
						SPT(S)	1.20	N=9 (2,2/2,2,2,3)	- (Dry)	
						D1	1.20			
	1.90					D2	1.80			
Soft grey mottled brown sandy CLAY with rare gravel of subrounded fine and medium flint.	2.00					SPT(S)	2.00	N=9 (1,1/2,1,3,3)	2.00 (0.00)	
						B4	2.00 - 2.50			
Soft to firm black mottled dark grey silty CLAY with occasional gravel of subrounded fine flint. Slight organic odour present.						D3	2.20			
From 2.80m: Occasional fine to coarse gravel-sized fossil shell fragments and whole shells.						D4	2.80 - 3.00			
						SPT(S)	3.00	N=11 (2,1/2,3,3,3)	3.00 (0.00)	
At 3.70m: Rare coarse gravel-sized whole shell.						D5	3.50			
						U1	4.00 - 4.60			
From 4.60m to 5.00m: Locally frequent coarse sand-sized and fine gravel-sized shell and shell fragments.						D6	5.00			
From 5.50m: Becoming firm.						SPT(S)	5.50	N=10 (1,2/2,2,3,3)	5.50 (0.00)	
From 6.00m: Locally frequent fine and medium gravel-sized shell fragments.						B5	6.00 - 6.50			
						D7	6.00			
From 6.25m: Locally frequent fine to coarse gravel-sized fossil shell fragments.						SPT(S)	6.50	N=20 (3,3/4,5,5,6)	6.50 (0.00)	
			13	0	0					
From 7.50m: Becoming firm to stiff. Fossil shell fragments becoming rare.										
From 8.00m: Locally frequent fine and medium sand-sized fossil shell fragments.			50	50	0	U2	8.40 - 8.70			
						SPT(S)	9.00	N=17 (3,3/4,4,5,4)	6.50 (0.00)	
At 8.80m: 150mm open subhorizontal fracture. Drilling-induced.						D8	9.00			
At 9.10m: 100mm open subhorizontal fissure.			86	86	0					
						D9	10.00			

Hole Diameter by Depth

Depth Base (m)	Diameter (mm)
6.50	146
51.00	116

Casing Diameter by Depth

Depth Base (m)	Diameter (mm)
6.50	150

Drilling Flush Details

Depth (m)	Type	Return (%)
6.50 - 7.50	WATER	100
7.50 - 9.00	WATER	100
9.00 - 10.50	WATER	60

Water Strike

Date	Strike Depth (m)	Depth Sealed (m)	Casing Depth (m)	Time Elapsed (mins)	Standing Level (m)	Remarks
						No groundwater encountered

Remarks:

1. Inspection pit GL to 1.20m.
2. Installations: Pipe1: 50mm standpipe GL to 8.00m plain, 8.00m to 50.00m slotted, fitted with gas tap and bung. Pipe2: 50mm standpipe GL to 1 00m plain, 1 00m to 6.00m slotted, fitted with gas tap and bung. Both installed in flush cover.
3. Backfill: GL to 0.50m concrete, 0.50m to 1.00m bentonite, 1.00m to 6.00m gravel, 6.000m to 9.00m bentonite, 9.00m to 51.00m gravel.
4. 0.33hrs standing time: Waiting for Murphy's to clear hole. 24/05/18. 5. 0.75hrs dayworks: Additional set up time 24/05/18.
6. 0.83hrs dayworks: Mixing mud into tank 29/05/18. 7. 0 5hrs dayworks: Mixing mud into tank 29/05/18.
8. 1hr standing time: Waiting for permit 30/05/18. 9. 1hr dayworks: Cleaning out tanks and mixing mud 30/05/18.
10. 1hr dayworks: Cleaning out tanks 30/05/18. 11. 2 5hrs standing time: Waiting for installation details 31/05/18.
12. 1hr dayworks: Clearing spoil 31/05/18.

[redacted]

Drilled by: [redacted] | Logged by: JE | Checked by: JA | Fm-Hn-R-3070-Rev D

[redacted]

Rotary Borehole Record

BH01A

Sheet 2 of 6

Project ID: **GN21822**	Client: [redacted]	E: 572076.00	N: 316205.00
Location: King's Lynn Compressor Station	Consultant: [redacted]	Date: 24/05/2018 - 31/05/2018	
	Plant used: Comacchio MC405	SPT Hammer Serial No: ADP04 (ER: 62%)	

Geology Description	Depth (m)	Elevation (maOD)	T.C.R. (%)	S.C.R. (%)	R.Q.D. (%)	Sample / In-Situ Test Information: Type	Depth	Results / Remarks	Date - Depth (m) Casing (Water)	Installation & Backfill
Soft to firm black mottled dark grey silty CLAY with occasional gravel of subrounded fine flint. Slight organic odour present. *At 10.00m: Medium gravel-sized fossil shell.* *From 11.00m: Locally mottled black.* *From 12.00m: Becoming firm to stiff.* *From 13.30m: Becoming indistinctly fissured.* *From 15.50m: Frequent medium and coarse gravel-sized shell fragments.*			70	70	0	U3	10.05 - 10.35			
						D10	11.00			
						U4	11.70 - 12.00			
						SPT(S)	12.00	N=12 (2,3/3,2,3,4)	6.50 (0.00) 24/05/2018 - 12.00 6.50 (0.00) 25/05/2018 - 12.00 6.50 (0.00)	
			50	50	50	U5	13.05 - 13.30			
						U6	13.30 - 13.60			
						D11	13.50			
						D12	13.60 - 13.78			
	13.80									
Extremely weak to very weak black slightly clayey fibrous LIGNITE. Occasional fibrous plant remains. *From 13.80m to 14.00m: Locally clayey.*			100	100	12	B6	14.40 - 15.00			
						SPT(S)	15.00	50 (6,7/7,15,15,13 for 55mm)	6.50 (0.00)	
	15.40									
Medium dense to dense grey slightly gravelly fine and medium rarely coarse SAND. Gravel is subrounded to rounded fine and medium chalk.			13	0	0					
			0	0	0				25/05/2018 - 16.50 6.50 (0.00) 29/05/2018 - 16.50 6.50 (0.00)	
						SPT(S)	18.00	N=34 (5,6/4,8,10,12)	6.50 (0.00)	
			0	0	0					
From 19.50m: Becoming clayey.						SPT(S)	19.50	50 (9,11/15,25,10 for 20mm)	6.50 (0.00)	

Hole Diameter by Depth

Depth Base (m)	Diameter (mm)
6.50	146
51.00	116

Casing Diameter by Depth

Depth Base (m)	Diameter (mm)
6.50	150

Drilling Flush Details

Depth (m)	Type	Return (%)
10.50 - 12.00	WATER	80
12.00 - 13.50	WATER	80
13.50 - 15.00	WATER	60
15.00 - 16.50	WATER	30
16.50 - 18.00	WATER	20
18.00 - 19.50	WATER	20
19.50 - 21.00	WATER	10

Water Strike

Date	Strike Depth (m)	Depth Sealed (m)	Casing Depth (m)	Time Elapsed (mins)	Standing Level (m)	Remarks
						No groundwater encountered

Remarks:

1. Inspection pit GL to 1.20m.
2. Installations: Pipe1: 50mm standpipe GL to 8.00m plain, 8.00m to 50.00m slotted, fitted with gas tap and bung. Pipe2: 50mm standpipe GL to 1 00m plain, 1 00m to 6.00m slotted, fitted with gas tap and bung. Both installed in flush cover.
3. Backfill: GL to 0.50m concrete, 0.50m to 1.00m bentonite, 1.00m to 6.00m gravel, 6.000m to 9.00m bentonite, 9.00m to 51.00m gravel.
4. 0.33hrs standing time: Waiting for Murphy's to clear hole. 24/05/18. 5. 0.75hrs dayworks: Additional set up time 24/05/18.
6. 0.83hrs dayworks: Mixing mud into tank 29/05/18. 7. 0 5hrs dayworks: Mixing mud into tank 29/05/18.
8. 1hr standing time: Waiting for permit 30/05/18. 9. 1hr dayworks: Cleaning out tanks and mixing mud 30/05/18.
10. 1hr dayworks: Cleaning out tanks 30/05/18. 11. 2 5hrs standing time: Waiting for installation details 31/05/18.
12. 1hr dayworks: Clearing spoil 31/05/18.

[redacted]

Drilled by: [redacted] | Logged by: JE | Checked by: JA | Fm-Hn-R-3070-Rev D

[redacted]

Rotary Borehole Record

BH01A

Sheet 3 of 6

Project ID: **GN21822**	Client: [redacted]	E: 572076.00	N: 316205.00
Location: King's Lynn Compressor Station	Consultant: [redacted]	Date: 24/05/2018 - 31/05/2018	
	Plant used: Comacchio MC405	SPT Hammer Serial No: ADP04 (ER: 62%)	

Geology Description	Legend	Depth (m)	Elevation (maOD)	T.C.R. (%)	S.C.R. (%)	R.Q.D. (%)	Sample / In-Situ Test Information: Type	Depth	Results / Remarks	Date - Depth (m) Casing (Water)	Installation & Backfill
Medium dense to dense grey slightly gravelly fine and medium rarely coarse SAND. Gravel is subrounded to rounded fine and medium chalk.				0	0	0					
From 21.00m: Clay no longer present. Sand becoming fine to coarse.							SPT(S)	21.00	N=30 (4,4/5,7,8,10)	6.50 (0.00)	
				0	0	0					
Grey slightly clayey SILT with occasional gravel of rounded medium chalk.		22.50					SPT(S)	22.50	50 (5,9/10,10,15,15 for 55mm)	6.50 (0.00)	
From 22.50m: Becoming silty.				0	0	0					
							SPT(S)	24.00	50 (8,10/10,12,14,14 for 55mm)	6.50 (0.00)	
				70	70	0					
							B7	25.00			
							D13	25.30			
Firm closely spaced thinly laminated silty CLAY with occasional gravel of rounded fine and medium chalk. Laminations are interbedded silts and clays.		26.00		73	73	0					
From 26.40m: Locally slightly sandy, slightly gravelly and clayey.		26.50					D14	26.40			
Grey closely spaced thinly laminated clayey SILT.		26.90					B8	26.50 - 26.90			
							SPT(S)	27.00	50 (7,9/15,15,18,2 for 5mm)	6.50 (0.00)	
Grey closely spaced indistinctly thinly laminated silty CLAY with occasional gravel of rounded fine and medium chalk.				68	61	0					
							D15	28.20			
							U7	28.30 - 28.50			
Firm to stiff grey mottled light grey thinly laminated silty CLAY. Laminations are dark grey and light grey closely spaced to very closely spaced interbedded silts and clays.		28.50					D16	28.60			
From 29.35m to 29.40m: Locally silt.				93	88	0	U8	29.30 - 29.50			
							D17	29.70			
							SPT(S)	30.00	N=42 (10,10/10,10,10,12)	6.50 (0.00)	

Hole Diameter by Depth		Drilling Flush Details		
Depth Base (m)	Diameter (mm)	Depth (m)	Type	Return (%)
6.50	146	21.00 - 22.50	WATER	10
51.00	116	22.50 - 24.00	WATER	10
		24.00 - 25.50	WATER	50
		25.50 - 27.00	WATER	70
		27.00 - 28.50	WATER	70
Casing Diameter by Depth		28.50 - 30.00	WATER	80
Depth Base (m)	Diameter (mm)	30.00 - 31.50	WATER	70
6.50	150			

Water Strike

Date	Strike Depth (m)	Depth Sealed (m)	Casing Depth (m)	Time Elapsed (mins)	Standing Level (m)	Remarks
						No groundwater encountered

Remarks:

1. Inspection pit GL to 1.20m.
2. Installations: Pipe1: 50mm standpipe GL to 8.00m plain, 8.00m to 50.00m slotted, fitted with gas tap and bung. Pipe2: 50mm standpipe GL to 1 00m plain, 1 00m to 6.00m slotted, fitted with gas tap and bung. Both installed in flush cover.
3. Backfill: GL to 0.50m concrete, 0.50m to 1.00m bentonite, 1.00m to 6.00m gravel, 6.000m to 9.00m bentonite, 9.00m to 51.00m gravel.
4. 0.33hrs standing time: Waiting for Murphy's to clear hole. 24/05/18. 5. 0.75hrs dayworks: Additional set up time 24/05/18.
6. 0.83hrs dayworks: Mixing mud into tank 29/05/18. 7. 0 5hrs dayworks: Mixing mud into tank 29/05/18.
8. 1hr standing time: Waiting for permit 30/05/18. 9. 1hr dayworks: Cleaning out tanks and mixing mud 30/05/18.
10. 1hr dayworks: Cleaning out tanks 30/05/18. 11. 2 5hrs standing time: Waiting for installation details 31/05/18.
12. 1hr dayworks: Clearing spoil 31/05/18.

[redacted]

Drilled by: [redacted] | Logged by: JE | Checked by: JA | Fm-Hn-R-3070-Rev D

[redacted]

Rotary Borehole Record

BH01A

Sheet 4 of 6

Project ID: **GN21822**	Client: [redacted]	E: 572076.00	N: 316205.00
Location: King's Lynn Compressor Station	Consultant: [redacted]	Date: 24/05/2018 - 31/05/2018	
	Plant used: Comacchio MC405	SPT Hammer Serial No: ADP04 (ER: 62%)	

Geology Description	Legend	Depth (m)	Elevation (maOD)	T.C.R. (%)	S.C.R. (%)	R.Q.D. (%)	Sample / In-Situ Test Information: Type	Depth	Results / Remarks	Date - Depth (m) Casing (Water)	Installation & Backfill
Firm to stiff grey mottled light grey thinly laminated silty CLAY. Laminations are dark grey and light grey closely spaced to very closely spaced interbedded silts and clays.				100	100	0	U9	30.85 - 31.05			
From 30.00m: Becoming soft to very stiff with subhorizontal fractures and fissures.							D18	31.40			
At 30.82m: Fracture present.											
At 31.13m: Fracture present.											
From 31.40m: Becoming thickly laminated.											
At 31.43m: Fracture present.											
From 32.10m to 32.13m: Open fracture present.				83	81	0	U10	32.30 - 32.60			
							D19	32.90			
From 33.00m to 34.50m: Becoming closely spaced and thickly laminated.				77	77	0	SPT(S)	33.00	50 (8,8/12,12,15,11 for 35mm)	6.50 (0.00) 29/05/2018 - 33.00 6.50 (0.00) 30/05/2018 - 33.00 6.50 (0.00)	
							D20	34.40			
				100	100	0	U11	34.50 - 34.80			
From 35.20m: Becoming locally very silty with fine sand laminations. Locally laminated clayey silt.											
From 35.35m: Becoming closely spaced and thinly laminated.											
From 36.00m: Becoming very stiff.							D21	35.90			
				87	87	0	SPT(S)	36.00	N=42 (10,10/10,10,10,12)	6.50 (0.00)	
From 37.00m: Becoming closely spaced and thinly laminated with rare gravel of coarse sand-sized chalk and rounded fine chalk.							D22	37.40			
At 37.62m: Rare gravel of rounded fine chalk.							U12	37.60 - 37.90			
				89	89	0					
From 38.00m to 38.52m: Locally silt fracture.											
From 38.70m to 38.73m: Locally silt.							SPT(S)	39.00	N=48 (8,10/10,12,12,14)	6.50 (0.00)	
				58	48	0	D23	39.50			

Hole Diameter by Depth

Depth Base (m)	Diameter (mm)
6.50	146
51.00	116

Casing Diameter by Depth

Depth Base (m)	Diameter (mm)
6.50	150

Drilling Flush Details

Depth (m)	Type	Return (%)
31.50 - 33.00	WATER	70
33.00 - 34.50	WATER	70
34.50 - 36.00	WATER	80
36.00 - 37.50	WATER	80
37.50 - 39.00	WATER	80
39.00 - 40.50	WATER	80

Water Strike

Date	Strike Depth (m)	Depth Sealed (m)	Casing Depth (m)	Time Elapsed (mins)	Standing Level (m)	Remarks
						No groundwater encountered

Remarks:

1. Inspection pit GL to 1.20m.
2. Installations: Pipe1: 50mm standpipe GL to 8.00m plain, 8.00m to 50.00m slotted, fitted with gas tap and bung. Pipe2: 50mm standpipe GL to 1 00m plain, 1 00m to 6.00m slotted, fitted with gas tap and bung. Both installed in flush cover.
3. Backfill: GL to 0.50m concrete, 0.50m to 1.00m bentonite, 1.00m to 6.00m gravel, 6.000m to 9.00m bentonite, 9.00m to 51.00m gravel.
4. 0.33hrs standing time: Waiting for Murphy's to clear hole. 24/05/18. 5. 0.75hrs dayworks: Additional set up time 24/05/18.
6. 0.83hrs dayworks: Mixing mud into tank 29/05/18. 7. 0 5hrs dayworks: Mixing mud into tank 29/05/18.
8. 1hr standing time: Waiting for permit 30/05/18. 9. 1hr dayworks: Cleaning out tanks and mixing mud 30/05/18.
10. 1hr dayworks: Cleaning out tanks 30/05/18. 11. 2 5hrs standing time: Waiting for installation details 31/05/18.
12. 1hr dayworks: Clearing spoil 31/05/18.

[redacted]

Drilled by: [redacted] | Logged by: JE | Checked by: JA | Fm-Hn-R-3070-Rev D

[redacted]

Rotary Borehole Record

BH01A

Sheet 5 of 6

Project ID: **GN21822**	Client: [redacted]	E: 572076.00	N: 316205.00
Location: King's Lynn Compressor Station	Consultant: [redacted]	Date: 24/05/2018 - 31/05/2018	
	Plant used: Comacchio MC405	SPT Hammer Serial No: ADP04 (ER: 62%)	

Geology Description	Depth (m)	Elevation (maOD)	T.C.R. (%)	S.C.R. (%)	R.Q.D. (%)	Sample / In-Situ Test Information: Type	Depth	Results / Remarks	Date - Depth (m) Casing (Water)	Installation & Backfill
Firm to stiff grey mottled light grey thinly laminated silty CLAY. Laminations are dark grey and light grey closely spaced to very closely spaced interbedded silts and clays.						D24	40.40			
From 40.50m: Locally stiff.										
From 41.00m to 42.00m: Locally thinly laminated.			86	86	0	U13	41.11 - 41.41			
						D25	41.90			
			0	0	0	SPT(S)	42.00	50 (8,12/12,15,15,8 for 5mm)	6.50 (0.00)	
			93	93	0	D26	44.15			
From 45.00m: Rare gravel of rounded fine chalk.						D27	45.40			
			100	100	0	U14	45.73 - 46.03			
From 46.50m: Occasional gravel of coarse sand-sized chalk fragments.										
From 46.80m: Locally rare gravel of subrounded fine chalk.			90	90	0					
From 47.00m: Rare gravel of subrounded to rounded medium chalk.						U15	47.70 - 48.00			
						D28	47.80			
From 48.25m to 48.30m: Pocket of silt.			80	80	0					
						D29	49.30			
						D30	50.00			

Hole Diameter by Depth

Depth Base (m)	Diameter (mm)
6.50	146
51.00	116

Casing Diameter by Depth

Depth Base (m)	Diameter (mm)
6.50	150

Drilling Flush Details

Depth (m)	Type	Return (%)
40.50 - 42.00	WATER	80
42.00 - 43.50	WATER	80
43.50 - 45.00	WATER	80
45.00 - 46.50	WATER	80
46.50 - 48.00	WATER	80
48.00 - 49.50	WATER	80
49.50 - 51.00	WATER	80

Water Strike

Date	Strike Depth (m)	Depth Sealed (m)	Casing Depth (m)	Time Elapsed (mins)	Standing Level (m)	Remarks
						No groundwater encountered

Remarks:

1. Inspection pit GL to 1.20m.
2. Installations: Pipe1: 50mm standpipe GL to 8.00m plain, 8.00m to 50.00m slotted, fitted with gas tap and bung. Pipe2: 50mm standpipe GL to 1 00m plain, 1 00m to 6.00m slotted, fitted with gas tap and bung. Both installed in flush cover.
3. Backfill: GL to 0.50m concrete, 0.50m to 1.00m bentonite, 1.00m to 6.00m gravel, 6.000m to 9.00m bentonite, 9.00m to 51.00m gravel.
4. 0.33hrs standing time: Waiting for Murphy's to clear hole. 24/05/18. 5. 0.75hrs dayworks: Additional set up time 24/05/18.
6. 0.83hrs dayworks: Mixing mud into tank 29/05/18. 7. 0 5hrs dayworks: Mixing mud into tank 29/05/18.
8. 1hr standing time: Waiting for permit 30/05/18. 9. 1hr dayworks: Cleaning out tanks and mixing mud 30/05/18.
10. 1hr dayworks: Cleaning out tanks 30/05/18. 11. 2 5hrs standing time: Waiting for installation details 31/05/18.
12. 1hr dayworks: Clearing spoil 31/05/18.

[redacted]

Drilled by: [redacted] | Logged by: JE | Checked by: JA | Fm-Hn-R-3070-Rev D

[redacted]

Rotary Borehole Record

BH01A

Sheet 6 of 6

Project ID: **GN21822**	Client: [redacted]	E: 572076.00	N: 316205.00
Location: King's Lynn Compressor Station	Consultant: [redacted]	Date: 24/05/2018 - 31/05/2018	
	Plant used: Comacchio MC405	SPT Hammer Serial No: ADP04 (ER: 62%)	

Geology Description	Legend	Depth (m)	Elevation (maOD)	T.C.R. (%)	S.C.R. (%)	R.Q.D. (%)	Sample / In-Situ Test Information: Type	Sample / In-Situ Test Information: Depth	Sample / In-Situ Test Information: Results / Remarks	Date - Depth (m) Casing (Water)	Installation & Backfill
Firm to stiff grey mottled light grey thinly laminated silty CLAY. Laminations are dark grey and light grey closely spaced to very closely spaced interbedded silts and clays. *From 50.20m: Locally extremely closely spaced and very thinly laminated.*											
		51.00		100	100	0	U16 D31	50.35 - 50.55 50.50		30/05/2018 - 51.00 6.50 (0.00) 31/05/2018 - 51.00 6.50 (0.00)	
Borehole completed at 51.00m.											

Hole Diameter by Depth	
Depth Base (m)	Diameter (mm)
6.50	146
51.00	116

Casing Diameter by Depth	
Depth Base (m)	Diameter (mm)
6.50	150

Drilling Flush Details		
Depth (m)	Type	Return (%)

Water Strike						
Date	Strike Depth (m)	Depth Sealed (m)	Casing Depth (m)	Time Elapsed (mins)	Standing Level (m)	Remarks
						No groundwater encountered

Remarks:

1. Inspection pit GL to 1.20m.
2. Installations: Pipe1: 50mm standpipe GL to 8.00m plain, 8.00m to 50.00m slotted, fitted with gas tap and bung. Pipe2: 50mm standpipe GL to 1 00m plain, 1 00m to 6.00m slotted, fitted with gas tap and bung. Both installed in flush cover.
3. Backfill: GL to 0.50m concrete, 0.50m to 1.00m bentonite, 1.00m to 6.00m gravel, 6.000m to 9.00m bentonite, 9.00m to 51.00m gravel.
4. 0.33hrs standing time: Waiting for Murphy's to clear hole. 24/05/18. 5. 0.75hrs dayworks: Additional set up time 24/05/18.
6. 0.83hrs dayworks: Mixing mud into tank 29/05/18. 7. 0 5hrs dayworks: Mixing mud into tank 29/05/18.
8. 1hr standing time: Waiting for permit 30/05/18. 9. 1hr dayworks: Cleaning out tanks and mixing mud 30/05/18.
10. 1hr dayworks: Cleaning out tanks 30/05/18. 11. 2 5hrs standing time: Waiting for installation details 31/05/18.
12. 1hr dayworks: Clearing spoil 31/05/18.

[redacted]

Drilled by: [redacted] | Logged by: JE | Checked by: JA | Fm-Hn-R-3070-Rev D

[redacted]

Rotary Borehole Record

BH02

Sheet 1 of 6

Project ID: **GN21822**	Client: [redacted]	E: 572081.83	N: 316300.54
Location: King's Lynn Compressor Station	Consultant: [redacted]	Date: 17/05/2018 - 24/05/2018	
	Plant used: Comacchio MC405	SPT Hammer Serial No: ADP04 (ER: 62%)	

Geology Description	Depth (m)	Sample / In-Situ Test Information: Type	Depth	Results / Remarks	Date - Depth (m) Casing (Water)	Installation & Backfill
MADE GROUND (Multicoloured GRAVEL with high cobble content. Gravel is subangular to subrounded medium and coarse flint. Cobbles are flint).	0.05	B1	0.20			[redacted]
		ES1	0.20			
		B2	0.60			
MADE GROUND (Brown slightly silty slightly gravelly fine to coarse SAND. Gravel is subangular to subrounded fine to coarse flint and concrete).	0.90	ES2	0.90			
		B3	1.00			
MADE GROUND (Dark grey to dark brown slightly silty gravelly fine to coarse SAND with pockets of black fine to coarse sand. Gravel is angular to subrounded fine to coarse flint. Hydrocarbon odour present).	1.30	SPT(S)	1.20	N=23 (2,3/5,6,6,6)	- (Dry)	
		ES3	1.30			
From 1.20m to 1.50m: Drilling flush cuttings.	1.60	D1	1.40			
Light brown mottled brown slightly clayey fine to coarse SAND with rare gravel of subrounded fine and medium flint.		SPT(S)	2.00	N=32 (3,5/7,8,9,8)	2.00 (2.00)	
		B4	2.00 - 3.00			
		D2	2.00			
Medium dense becoming dense grey slightly silty fine to coarse SAND with occasional gravel of subrounded fine flint.		SPT(S)	3.00	N=45 (4,7/11,11,11,12)	3.00 (0.00)	
		B5	3.50 - 4.00			
From 1.80m to 1.90m: Sand becoming locally medium and coarse with rare gravel of subangular medium flint.		SPT(S)	4.00	N=50 (3,5/7,11,15,17)	4.00 (0.00)	
		D3	4.50			
From 4.50m: Becoming slightly gravelly .Gravel is black subangular to subrounded fine and medium flint.	4.90	D4	4.90 - 5.00			
Dark grey and brown slightly gravelly silty sandy CLAY. Gravel is subrounded fine and medium flint.	5.00	SPT(S)	5.00	N=9 (2,2/2,2,3,2)	5.00 (0.00)	
		B6	5.50 - 5.90			
Soft dark grey slightly sandy silty CLAY with occasional gravel of fine and medium fossil shell fragments. Slight organic odour present.		D5	5.90 - 6.00			
From 5.00m to 5.10m: Becoming locally very gravelly.	6.00	U1	6.00 - 6.60			
From 5.60m: Becoming locally silty fine and medium sand.						
From 5.90m: Becoming locally very sandy.		U2	7.00 - 7.30			
Firm to stiff grey silty CLAY with occasional gravel of fine to coarse fossil shell and fossil shell fragments.		HV01	7.40			
		SPT(S)	7.50	N=20 (3,2/5,4,5,6)	6.00 (0.00)	
		D6	7.50			
		HV02	8.00			
From 8.50m: Gravel becoming rare fossil shell fragments.		D7	8.60			
		U3	8.70 - 9.00			
From 9.00m: Becoming occasionally mottled black.		D8	9.00 - 9.10			
		HV03	10.00			

Core	T.C.R. (%)	S.C.R. (%)	R.Q.D. (%)
U2	100	80	0
U3	73	67	0
D8	76	76	0

Hole Diameter by Depth

Depth Base (m)	Diameter (mm)
6.00	146
51.00	116

Casing Diameter by Depth

Depth Base (m)	Diameter (mm)
6.00	150

Drilling Flush Details

Depth (m)	Type	Return (%)
6.60 - 7.50	WATER	100
7.50 - 9.00	WATER	90
9.00 - 10.50	WATER	40

Water Strike

Date	Strike Depth (m)	Depth Sealed (m)	Casing Depth (m)	Time Elapsed (mins)	Standing Level (m)	Remarks
17-05-2018	1.20					Seepage

Remarks:

1. Inspection pit GL to 1.20m.
2. Backfill: GL to 51.30m bentonite.
3. 1hr dayworks: Additional set up time 17/05/18.
4. 1hr dayworks: Pulled geobore and flushed more casing in 18/05/18.
5. 0.33hrs dayworks: Flush casing to 12.00m 21/05/18.
6. 0.67hrs dayworks: Flush geobore back to 12.00m 21/05/18.
7. 0.83hrs dayworks: Mixing mud into tank 21/05/18.
8. 1hr dayworks: Cleaning out tanks and mixing mud 22/05/18.

[redacted]

Drilled by: [redacted] | Logged by: JE | Checked by: JA | Fm-Hn-R-3070-Rev D

[redacted]

Rotary Borehole Record

BH02

Sheet 2 of 6

Project ID: **GN21822**	Client: [redacted]	E: 572081.83	N: 316300.54
Location: King's Lynn Compressor Station	Consultant: [redacted]	Date: 17/05/2018 - 24/05/2018	
	Plant used: Comacchio MC405	SPT Hammer Serial No: ADP04 (ER: 62%)	

Geology Description	Legend	Depth (m)	Elevation (maOD)	T.C.R. (%)	S.C.R. (%)	R.Q.D. (%)	Sample / In-Situ Test Information: Type	Depth	Results / Remarks	Date - Depth (m) Casing (Water)	Installation & Backfill
Firm to stiff grey silty CLAY with occasional gravel of fine to coarse fossil shell and fossil shell fragments. *From 10.10m to 10.20m: Becoming locally friable.*							U4	10.20 - 10.50			
				50	47	0	SPT(S)	10.50	N=18 (3,4/4,4,5,5)	6.00 (0.00)	
							HV04	11.00		17/05/2018 - 10.95 6.00 (0.00) 18/05/2018 - 10.95 6.00 (2.00)	
							U5	11.60 - 11.90			
							D9	11.90 - 12.00			
From 12.00m to 13.50m: Fossil shell fragments no longer present.				97	97	0	D10	12.70		18/05/2018 - 12.00 11.00 (6.00) 21/05/2018 - 12.00 11.00 (6.00)	
							U6	13.20 - 13.50			
							SPT(S)	13.50	N=25 (2,4/5,6,6,8)	12.00 (0.00)	
From 13.70m: Becoming with frequent gravel of fine to coarse fossil shell fragments.							D11	13.70			
		14.10					D12	14.10			
Extremely weak black and brown amorphous LIGNITE. Occasional fibrous plant remains present.				100	100	13	U7	14.30 - 14.49			
							B7	14.50 - 15.00			
							B8	15.00 - 16.50			
				40	13	0					
		16.50					SPT(S)	16.50	50 (2,6/7,8,14,21 for 55mm)	12.00 (0.00)	
Very dense grey slightly gravelly silty fine and medium SAND. Gravel is subrounded to rounded fine and medium chalk. Occasional black specks present.				0	0	0					
							SPT(C)	18.00	50 (6,17/18,24,8 for 40mm)	12.00 (0.00)	
				0	0	0					
							SPT(C)	19.50	50 (5,13/20,21,9 for 10mm)	12.00 (0.00)	
							B9	20.00 - 20.30			

Hole Diameter by Depth	
Depth Base (m)	Diameter (mm)
6.00	146
51.00	116

Casing Diameter by Depth	
Depth Base (m)	Diameter (mm)
6.00	150

Drilling Flush Details		
Depth (m)	Type	Return (%)
10.50 - 12.00	WATER	0
12.00 - 13.50	WATER	100
13.50 - 15.00	WATER	100
15.00 - 16.50	WATER	100
16.50 - 18.00	WATER	100
18.00 - 19.50	WATER	100
19.50 - 21.00	WATER	100

Water Strike

Date	Strike Depth (m)	Depth Sealed (m)	Casing Depth (m)	Time Elapsed (mins)	Standing Level (m)	Remarks
17-05-2018	1.20					Seepage

Remarks:

1. Inspection pit GL to 1.20m.
2. Backfill: GL to 51.30m bentonite.
3. 1hr dayworks: Additional set up time 17/05/18.
4. 1hr dayworks: Pulled geobore and flushed more casing in 18/05/18.
5. 0.33hrs dayworks: Flush casing to 12.00m 21/05/18.
6. 0.67hrs dayworks: Flush geobore back to 12.00m 21/05/18.
7. 0.83hrs dayworks: Mixing mud into tank 21/05/18.
8. 1hr dayworks: Cleaning out tanks and mixing mud 22/05/18.

[redacted]

Drilled by: [redacted] | Logged by: JE | Checked by: JA | Fm-Hn-R-3070-Rev D

[redacted]

Rotary Borehole Record

BH02

Project ID: **GN21822**	Client: [redacted]	E: 572081.83	N: 316300.54
Location: King's Lynn Compressor Station	Consultant: [redacted]	Date: 17/05/2018 - 24/05/2018	
	Plant used: Comacchio MC405	SPT Hammer Serial No: ADP04 (ER: 62%)	

Geology Description	Legend	Depth (m)	Elevation (maOD)	T.C.R. (%)	S.C.R. (%)	R.Q.D. (%)	Sample / In-Situ Test Information: Type	Depth	Results / Remarks	Date - Depth (m) Casing (Water)	Installation & Backfill
Very dense grey slightly gravelly silty fine and medium SAND. Gravel is subrounded to rounded fine and medium chalk. Occasional black specks present. *From 20.00m to 20.15m: Becoming locally slightly gravelly.* *From 20.15m: Gravel no longer present.*		20.30		67	67	0	B10	20.50 - 21.00			[redacted]
							SPT(S)	21.00	50 (7,15/15,20,15 for 20mm)	12.00 (0.00)	
Grey slightly sandy silty CLAY with occasional pockets of soft to firm silty clay up to 30mm and rare subrounded fine chalk.				20	16	0					
							D13	22.40			
Very dense grey slightly clayey silty fine SAND with occasional pockets of sandy silt. *From 22.50m to 22.90m: Locally dark grey silty slightly sandy clay.*		22.50		28	28	0	SPT(S)	22.50	50 (8,15/18,18,14 for 10mm)	12.00 (0.00)	
							B11	22.50 - 22.90		21/05/2018 - 22.81 12.00 (0.00) 22/05/2018 - 22.81 12.00 (0.00)	
							SPT(S)	24.00	50 (3,6/11,16,20,3 for 55mm)	12.00 (0.00)	
Grey slightly sandy clayey SILT with rare gravel of subrounded to rounded fine chalk.		24.30		83	84	0	B12	24.60 - 25.20			
							D14	24.80			
Thinly laminated grey slightly sandy clayey SILT. *From 26.00m: Laminations no longer present.*		25.20		88	86	0	SPT(S)	25.50	N=43 (8,10/11,9,11,12)	12.00 (0.00)	
							D15	26.00			
Stiff extremely closely spaced thinly laminated grey slightly sandy silty CLAY with frequent laminations of silt. *From 27.48m to 27.53m: Band of clayey silt.*		26.80		90	90	0	D16	26.90			
							U8	27.95 - 28.14			
							SPT(S)	28.50	N=38 (4,6/8,9,8,13)	12.00 (0.00)	
				0	0	0					

Hole Diameter by Depth

Depth Base (m)	Diameter (mm)
6.00	146
51.00	116

Casing Diameter by Depth

Depth Base (m)	Diameter (mm)
6.00	150

Drilling Flush Details

Depth (m)	Type	Return (%)
21.00 - 22.50	WATER	100
22.50 - 24.00	WATER	100
24.00 - 25.50	WATER	100
25.50 - 27.00	WATER	100
27.00 - 28.50	WATER	90
28.50 - 30.00	WATER	90
30.00 - 31.50	WATER	90

Water Strike

Date	Strike Depth (m)	Depth Sealed (m)	Casing Depth (m)	Time Elapsed (mins)	Standing Level (m)	Remarks
17-05-2018	1.20					Seepage

Remarks:

1. Inspection pit GL to 1.20m.
2. Backfill: GL to 51.30m bentonite.
3. 1hr dayworks: Additional set up time 17/05/18.
4. 1hr dayworks: Pulled geobore and flushed more casing in 18/05/18.
5. 0.33hrs dayworks: Flush casing to 12.00m 21/05/18.
6. 0.67hrs dayworks: Flush geobore back to 12.00m 21/05/18.
7. 0.83hrs dayworks: Mixing mud into tank 21/05/18.
8. 1hr dayworks: Cleaning out tanks and mixing mud 22/05/18.

[redacted]

Drilled by: [redacted] | Logged by: JE | Checked by: JA

[redacted]

Rotary Borehole Record

BH02

Project ID: **GN21822**	Client: [redacted]	E: 572081.83	N: 316300.54
Location: King's Lynn Compressor Station	Consultant: [redacted]	Date: 17/05/2018 - 24/05/2018	
	Plant used: Comacchio MC405	SPT Hammer Serial No: ADP04 (ER: 62%)	

Geology Description	Legend	Depth (m)	Elevation (maOD)	T.C.R. (%)	S.C.R. (%)	R.Q.D. (%)	Sample / In-Situ Test Information: Type	Depth	Results / Remarks	Date - Depth (m) Casing (Water)	Installation & Backfill
Stiff extremely closely spaced thinly laminated grey slightly sandy silty CLAY with frequent laminations of silt.				88	85	0	D17	30.10			[redacted]
From 30.00m: Becoming thickly laminated and dark grey to dark brown.							U9	30.25 - 30.43			
							U10	31.12 - 31.42			
				7	0	0	SPT(S)	31.50	N=50 (6,8/10,13,14,13)	12.00 (0.00)	
At 33.10m: Rare gravel of rounded fine chalk.				80	80	0	D18	33.00			
							U11	34.30 - 34.50			
Stiff to very stiff extremely closely spaced thinly laminated grey silty CLAY. Laminations are light grey and dark grey.		34.50		49	37	0	SPT(S)	34.50	N=48 (7,12/11,12,12,13)	12.00 (0.00)	
From 35.90m: Occasional thin laminations of light grey fine and medium sand with rare gravel of rounded fine chalk.							D19	35.90			
From 36.30m: Becoming dark grey.				86	86	0					
From 37.00m: Fissuring occurs along silt partings. Possibly drilling-induced.							U12	36.96 - 37.23			
From 37.23m to 27.25m: Parting of locally light grey silt.							D20	37.40			
				0	0	0	SPT(S)	37.50	N=45 (7,9/10,9,11,15)	12.00 (0.00)	
From 39.50m: Rare gravel of subrounded fine chalk.				63	63	0	D21	39.50			
							U13	39.60 - 39.90			

Hole Diameter by Depth	
Depth Base (m)	Diameter (mm)
6.00	146
51.00	116

Casing Diameter by Depth	
Depth Base (m)	Diameter (mm)
6.00	150

Drilling Flush Details		
Depth (m)	Type	Return (%)
31.50 - 33.00	WATER	90
33.00 - 34.50	WATER	90
34.50 - 36.00	WATER	90
36.00 - 37.50	WATER	90
37.50 - 39.00	WATER	90
39.00 - 40.50	WATER	90

Water Strike

Date	Strike Depth (m)	Depth Sealed (m)	Casing Depth (m)	Time Elapsed (mins)	Standing Level (m)	Remarks
17-05-2018	1.20					Seepage

Remarks:

1. Inspection pit GL to 1.20m.
2. Backfill: GL to 51.30m bentonite.
3. 1hr dayworks: Additional set up time 17/05/18.
4. 1hr dayworks: Pulled geobore and flushed more casing in 18/05/18.
5. 0.33hrs dayworks: Flush casing to 12.00m 21/05/18.
6. 0.67hrs dayworks: Flush geobore back to 12.00m 21/05/18.
7. 0.83hrs dayworks: Mixing mud into tank 21/05/18.
8. 1hr dayworks: Cleaning out tanks and mixing mud 22/05/18.

[redacted]

Drilled by: [redacted] | Logged by: JE | Checked by: JA

[redacted]

Rotary Borehole Record

BH02

Project ID: **GN21822**	Client: [redacted]	E: 572081.83	N: 316300.54
Location: King's Lynn Compressor Station	Consultant: [redacted]	Date: 17/05/2018 - 24/05/2018	
	Plant used: Comacchio MC405	SPT Hammer Serial No: ADP04 (ER: 62%)	

Geology Description	Legend	Depth (m)	Elevation (maOD)	T.C.R. (%)	S.C.R. (%)	R.Q.D. (%)	Sample / In-Situ Test Information: Type	Depth	Results / Remarks	Date - Depth (m) Casing (Water)	Installation & Backfill
Stiff to very stiff extremely closely spaced thinly laminated grey silty CLAY. Laminations are light grey and dark grey. *From 40.00m: Becoming very stiff and friable.* *At 40.50m: Rare gravel of subrounded fine chalk.*				6	0	0	SPT(S)	40.50	N=42 (7,9/9,10,11,12)	12.00 (0.00)	[redacted]
From 42.00m to 43.50m: Fissuring occurs along silt laminations. Possibly drilling-induced.				85	85	0	D22 U14	42.50 42.60 - 42.80		22/05/2018 - 42.00 12.00 (0.00) 23/05/2018 - 42.00 12.00 (0.00)	
				0	0	0	SPT(S)	43.50	50 (10,13/20,20,10 for 10mm)	12.00 (0.00)	
From 45.40m to 45.42m: Band of grey slightly sandy silt. *From 45.50m: Occasional gravel of subrounded to rounded fine chalk.*				80	73	0	D23 U15	45.50 46.22 - 46.46			
				80	73	0	SPT(S) D24 U16	46.50 47.00 47.30 - 47.60	50 (10,10/15,15,15,5 for 5mm)	12.00 (0.00)	
From 47.25m to 47.30m: Band of light grey silt.				77	77	0	D25 U17	48.50 49.20 - 49.40			
							SPT(S)	49.50	50 (12,13 for 25mm/17,25,8 for 20mm)	12.00 (0.00)	

Hole Diameter by Depth	
Depth Base (m)	Diameter (mm)
6.00	146
51.00	116

Drilling Flush Details		
Depth (m)	Type	Return (%)
40.50 - 42.00	WATER	90

Casing Diameter by Depth	
Depth Base (m)	Diameter (mm)
6.00	150

Water Strike

Date	Strike Depth (m)	Depth Sealed (m)	Casing Depth (m)	Time Elapsed (mins)	Standing Level (m)	Remarks
17-05-2018	1.20					Seepage

Remarks:

1. Inspection pit GL to 1.20m.
2. Backfill: GL to 51.30m bentonite.
3. 1hr dayworks: Additional set up time 17/05/18.
4. 1hr dayworks: Pulled geobore and flushed more casing in 18/05/18.
5. 0.33hrs dayworks: Flush casing to 12.00m 21/05/18.
6. 0.67hrs dayworks: Flush geobore back to 12.00m 21/05/18.
7. 0.83hrs dayworks: Mixing mud into tank 21/05/18.
8. 1hr dayworks: Cleaning out tanks and mixing mud 22/05/18.

[redacted]

Drilled by: [redacted] | Logged by: JE | Checked by: JA | Fm-Hn-R-3070-Rev D

[redacted]

Rotary Borehole Record

BH02

Sheet 6 of 6

Project ID: **GN21822**	Client: [redacted]	E: 572081.83	N: 316300.54
Location: King's Lynn Compressor Station	Consultant: [redacted]	Date: 17/05/2018 - 24/05/2018	
	Plant used: Comacchio MC405	SPT Hammer Serial No: ADP04 (ER: 62%)	

Geology Description	Legend	Depth (m)	Elevation (maOD)	T.C.R. (%)	S.C.R. (%)	R.Q.D. (%)	Sample / In-Situ Test Information: Type	Depth	Results / Remarks	Date - Depth (m) Casing (Water)	Installation & Backfill
Stiff to very stiff extremely closely spaced thinly laminated grey silty CLAY. Laminations are light grey and dark grey.				79	79	0	U18	50.15 - 50.35			[redacted]
From 51.00m: Becoming thinly laminated.							SPT(S)	51.00	50 (13,12 for 55mm/18,22,10 for 20mm)	12.00 (0.00)	
		51.30					D26	51.00			
Borehole completed at 51.30m.										23/05/2018 - 51.00 12.00 (0.00)	

Hole Diameter by Depth	
Depth Base (m)	Diameter (mm)
6.00	146
51.00	116

Casing Diameter by Depth	
Depth Base (m)	Diameter (mm)
6.00	150

Drilling Flush Details		
Depth (m)	Type	Return (%)

Water Strike						
Date	Strike Depth (m)	Depth Sealed (m)	Casing Depth (m)	Time Elapsed (mins)	Standing Level (m)	Remarks
17-05-2018	1.20					Seepage

Remarks:

1. Inspection pit GL to 1.20m.
2. Backfill: GL to 51.30m bentonite.
3. 1hr dayworks: Additional set up time 17/05/18.
4. 1hr dayworks: Pulled geobore and flushed more casing in 18/05/18.
5. 0.33hrs dayworks: Flush casing to 12.00m 21/05/18.
6. 0.67hrs dayworks: Flush geobore back to 12.00m 21/05/18.
7. 0.83hrs dayworks: Mixing mud into tank 21/05/18.
8. 1hr dayworks: Cleaning out tanks and mixing mud 22/05/18.

[redacted]

Drilled by: [redacted] | Logged by: JE | Checked by: JA | Fm-Hn-R-3070-Rev D

[redacted]

Rotary Borehole Record

BH03

Sheet 1 of 6

Project ID: **GN21822**	Client: [redacted]	E: 572130.02	N: 316292.03
Location: King's Lynn Compressor Station	Consultant: [redacted]	Date: 08/05/2018 - 16/05/2018	
	Plant used: Comacchio MC405	SPT Hammer Serial No: ADP04 (ER: 62%)	

Geology Description	Depth (m)	Elevation (maOD)	T.C.R. (%)	S.C.R. (%)	R.Q.D. (%)	Type	Depth	Results / Remarks	Date - Depth (m) Casing (Water)	Installation & Backfill
TOPSOIL (Dark brown slightly gravelly CLAY. Gravel is angular to subrounded fine to coarse flint).	0.20					B1	0.20 - 0.40			[redacted]
	0.40					ES1	0.30			
MADE GROUND (Dark brown mottled brown slightly sandy gravelly CLAY. Gravel is angular to rounded fine to coarse flint. Occasional cobbles of rounded flint).	0.60					B2	0.50 - 0.60			
						ES2	0.55			
						B3	0.70 - 1.00			
						ES3	0.80			
						D1	1.00			
MADE GROUND (Dark brown mottled brown and black slightly clayey gravelly fine to coarse SAND. Gravel is angular to subrounded fine to medium flint. Slight hydrocarbon odour present).	1.20					SPT(S)	1.20	N=19 (3,4/4,6,5,4)	- (1.00) 08/05/2018 - 1.20 - (1.20) 09/05/2018 - 1.20 - (1.00)	
Light brown mottled brown slightly clayey gravelly fine to coarse SAND. Gravel is angular to subrounded fine to medium flint.	1.80					B4	2.00 - 2.50			
						D2	2.00			
Medium dense brown slightly gravelly fine to coarse SAND. Gravel is subrounded fine flint.	2.50					SPT(S)	2.70	N=11 (1,1/2,3,3,3)	2.70 (1.00)	
From 1.60m: Becoming silty.						D3	3.00			
Grey very clayey fine to medium SAND.										
Firm black mottled grey silty CLAY with occasional medium sand-sized fossil shell fragments.						D4	3.50			
From 2.70m to 3.20m: Drilling flush cuttings.										
From 3.40m: Becoming firm to stiff.										
From 3.50m: Fossil shell fragments becoming frequent and fine to medium gravel-sized.						D5	4.20			
						U1	4.20 - 4.80			
From 3.80m to 3.90m: Band of locally grey silty fine to medium sand.										
From 4.10m: Rare coarse gravel-sized fossilised wood fragments.						D6	5.00			
From 4.20m: Rare grey silty fine to medium sand.										
						B5	5.50 - 6.00			
						SPT(S)	6.00	N=16 (2,2/3,4,4,5)	6.00 (0.00)	
From 6.00m: Becoming stiff and dark grey with occasional fine to medium gravel-sized fossil shell fragments.			40	40	40	D7	6.00		09/05/2018 - 6.00 6.00 (1.00) 10/05/2018 - 6.00 6.00 (1.00)	
						U2	7.30 - 7.50			
						SPT(S)	7.50	N=20 (2,2/4,5,5,6)	6.00 (1.00)	
From 7.75m to 7.80m: Open fissuring approx. 3mm and medium spaced.						D8	7.80			
From 8.00m: Becoming locally firm.			89	89	81	HV01	8.00			
From 8.50m: Fossil shell fragments becoming occasional.						HV02	8.80			
						D9	9.00			
From 9.00m: Rare coarse gravel-sized whole fossil shells.			100	100	100	U3	9.00 - 9.30			
						HV03	9.50			
						D10	10.00			

Hole Diameter by Depth	
Depth Base (m)	Diameter (mm)
6.00	146
51.00	116

Casing Diameter by Depth	
Depth Base (m)	Diameter (mm)
6.00	150

Drilling Flush Details		
Depth (m)	Type	Return (%)
6.00 - 7.50	WATER	100
7.50 - 9.00	WATER	100
9.00 - 10.50	WATER	100

Water Strike						
Date	Strike Depth (m)	Depth Sealed (m)	Casing Depth (m)	Time Elapsed (mins)	Standing Level (m)	Remarks
08-05-2018	1.00					Seepage

Remarks:

1. Inspection pit GL to 1.20m. 2. Backfill: GL to 51.38m bentonite.
3. 2.33hrs standing time: Inductions 08/05/18. 4. 2hrs dayworks: Additional set up time 08/05/18.
5. 1hrs standing time: Waiting to start drilling 09/05/18. 6. 0.5hrs dayworks: Collecting water 09/05/18.
7. 0.75hrs dayworks: Collecting water 09/05/18. 8. 2hrs standing time: Waiting for kit 09/05/18.
9. 1hr standing time: Waiting to start drilling 10/05/18.
10. 2.5hrs dayworks: Change flush in tanks and borehole and clean out tanks 10/05/18.
11. 1hr dayworks: Pumping water out of skip and IBC 11/05/18. 12. 1.5hrs dayworks: Mixing mud into tank 14/05/18.
13. 1hr dayworks: Mixing mud into tank 14/05/18. 14. 0.5hrs standing time: Waiting for permit 15/05/18.
15. 1hr standing time: Waiting to replacing hydraulic hose 15/05/18. 16. 1hr dayworks: Travel to Pirtek to fix hose 16/05/18.
17. 1.5hrs dayworks: Travel back to site to fit new hose 16/05/18. 18. 1hr standing time: Waiting for installation details 16/05/18.
19. 1hr dayworks: Moving kit to next position 16/05/18.

[redacted]

Drilled by: [redacted] | Logged by: JE | Checked by: JA | Fm-Hn-R-3070-Rev D

[redacted]

Rotary Borehole Record

BH03

Project ID: **GN21822**	Client: [redacted]	E: 572130.02	N: 316292.03
Location: King's Lynn Compressor Station	Consultant: [redacted]	Date: 08/05/2018 - 16/05/2018	
	Plant used: Comacchio MC405	SPT Hammer Serial No: ADP04 (ER: 62%)	

Geology Description	Legend	Depth (m)	Elevation (maOD)	T.C.R. (%)	S.C.R. (%)	R.Q.D. (%)	Sample / In-Situ Test Information: Type	Depth	Results / Remarks	Date - Depth (m) Casing (Water)	Installation & Backfill
Firm black mottled grey silty CLAY with occasional medium sand-sized fossil shell fragments.							HV04	10.20			[redacted]
							U4	10.20 - 10.50			
							SPT(S)	10.50	N=19 (2,4/4,4,6,5)	6.00 (1.00)	
From 11.00m: Indistinctly fissured.				93	93	89	HV05	11.00			
							D11	11.20			
From 11.80m to 12.00m: Becoming friable.							U5	12.00 - 12.30			
				100	100	100	HV06	12.50			
							D12	13.00			
							U6	13.05 - 13.35			
From 13.40m: Frequent fine to coarse fossil shell fragments.		13.50					SPT(S)	13.50	N=25 (5,5/5,6,6,8)	6.00 (1.00)	
No recovery. *From 13.50m: Locally rare coarse gravel-sized fossil bivalve shell.*				20	10	0					
							D13	14.80			
Very dense white and grey GRAVEL of fine and medium occasionally coarse subrounded to rounded chalk and flint.		15.00		0	0	0					
							SPT(S)	16.50	50 (3,16/30,20 for 15mm)	6.00 (1.50)	
				2	0	0	D14	16.50 - 18.00			
							SPT(C)	18.00	50 (10,15 for 45mm/35,15 for 0mm)	6.00 (1.80)	
				0	0	0					
Very dense grey silty gravelly fine and medium SAND with occasional black coarse sand-sized glauconitic		19.50					SPT(C)	19.50	50 (9,16 for 55mm/22,24,4 for 0mm)	6.00 (1.82)	
							D15	19.50 - 21.00			

Hole Diameter by Depth	
Depth Base (m)	Diameter (mm)
6.00	146
51.00	116

Casing Diameter by Depth	
Depth Base (m)	Diameter (mm)
6.00	150

Drilling Flush Details		
Depth (m)	Type	Return (%)
10.50 - 12.00	WATER	100
12.00 - 13.50	WATER	100
13.50 - 15.00	WATER	90
15.00 - 16.50	WATER	40
16.50 - 18.00	WATER	50
18.00 - 19.50	WATER	10
19.50 - 21.00	WATER	0

Water Strike

Date	Strike Depth (m)	Depth Sealed (m)	Casing Depth (m)	Time Elapsed (mins)	Standing Level (m)	Remarks
08-05-2018	1.00					Seepage

Remarks:

1. Inspection pit GL to 1.20m. 2. Backfill: GL to 51.38m bentonite.
3. 2.33hrs standing time: Inductions 08/05/18. 4. 2hrs dayworks: Additional set up time 08/05/18.
5. 1hrs standing time: Waiting to start drilling 09/05/18. 6. 0.5hrs dayworks: Collecting water 09/05/18.
7. 0.75hrs dayworks: Collecting water 09/05/18. 8. 2hrs standing time: Waiting for kit 09/05/18.
9. 1hr standing time: Waiting to start drilling 10/05/18.
10. 2.5hrs dayworks: Change flush in tanks and borehole and clean out tanks 10/05/18.
11. 1hr dayworks: Pumping water out of skip and IBC 11/05/18. 12. 1.5hrs dayworks: Mixing mud into tank 14/05/18.
13. 1hr dayworks: Mixing mud into tank 14/05/18. 14. 0.5hrs standing time: Waiting for permit 15/05/18.
15. 1hr standing time: Waiting to replacing hydraulic hose 15/05/18. 16. 1hr dayworks: Travel to Pirtek to fix hose 16/05/18.
17. 1.5hrs dayworks: Travel back to site to fit new hose 16/05/18. 18. 1hr standing time: Waiting for installation details 16/05/18.
19. 1hr dayworks: Moving kit to next position 16/05/18.

[redacted]

Drilled by: [redacted] | Logged by: JE | Checked by: JA

[redacted]

Rotary Borehole Record

BH03

Project ID: **GN21822**	Client: [redacted]	E: 572130.02	N: 316292.03
Location: King's Lynn Compressor Station	Consultant: [redacted]	Date: 08/05/2018 - 16/05/2018	
	Plant used: Comacchio MC405	SPT Hammer Serial No: ADP04 (ER: 62%)	

Geology Description	Legend	Depth (m)	Elevation (maOD)	T.C.R. (%)	S.C.R. (%)	R.Q.D. (%)	Sample / In-Situ Test Information: Type	Depth	Results / Remarks	Date - Depth (m) Casing (Water)	Installation & Backfill
Very dense grey silty gravelly fine and medium SAND with occasional black coarse sand-sized glauconitic speckling. Gravel is fine and medium subrounded to rounded chalk, flint and limestone.				1	0	0					[redacted]
		21.00					B6	21.00 - 22.50			
Medium dense grey silty fine to medium SAND with black medium to coarse glauconitic speckling.				43	43	0					
							SPT(C)	22.50	N=25 (6,8/4,4,5,12)	6.00 (1.00) 10/05/2018 - 22.50	
		22.80								6.00 (0.00)	
Grey slightly sandy clayey SILT. Sand is fine.				30	20	0	D16	23.00		14/05/2018 - 22.50 6.00 (1.00)	
							SPT(S)	24.00	N=44 (4,5/7,13,11,13)	6.00 (1.34)	
From 24.35m to 24.50m: Band of soft to firm grey silty clay.											
Grey clayey SILT with closely to extremely closely spaced thin laminations and occasional pockets of firm grey silty clay.		24.80		76	76	0	D17	24.90			
		25.50					SPT(S)	25.50	N=41 (5,6/7,9,10,15)	6.00 (2.08)	
Firm grey indistinctly thinly laminated silty CLAY.							D18	26.00			
		26.20		83	83	0	U7	26.30 - 26.47			
Grey clayey SILT with extremely closely spaced thin laminations and occasional pockets of firm grey silty clay.							D19	26.60			
From 26.50m: Laminations are dark grey silty clay.		26.80									
							SPT(C)	27.00	N=45 (8,7/10,12,11,12)	6.00 (2.30) 14/05/2018 - 27.00	
Firm to stiff grey thinly laminated silty CLAY. Laminations are closely spaced to very closely spaced dark grey and light grey.										6.00 (2.30)	
							D20	27.50		15/05/2018 - 27.00	
				83	82	0	U8	27.70 - 28.00		6.00 (2.30)	
							D21	28.50			
From 28.65m to 28.70m: Band of locally grey very clayey fine to medium sand.							U9	28.90 - 29.20			
				93	93	0					
From 29.50m: Becoming very stiff.							HV07	29.50			
							SPT(C)	30.00	N=40 (8,8/8,9,10,13)	6.00 (0.00)	

Hole Diameter by Depth	
Depth Base (m)	Diameter (mm)
6.00	146
51.00	116

Casing Diameter by Depth	
Depth Base (m)	Diameter (mm)
6.00	150

Drilling Flush Details		
Depth (m)	Type	Return (%)
21.00 - 22.50	WATER	20
22.50 - 24.00	WATER	90
24.00 - 25.50	WATER	90
25.50 - 27.00	WATER	90
27.00 - 28.50	WATER	90
28.50 - 30.00	WATER	90
30.00 - 31.50	WATER	90

Water Strike

Date	Strike Depth (m)	Depth Sealed (m)	Casing Depth (m)	Time Elapsed (mins)	Standing Level (m)	Remarks
08-05-2018	1.00					Seepage

Remarks:

1. Inspection pit GL to 1.20m. 2. Backfill: GL to 51.38m bentonite.
3. 2.33hrs standing time: Inductions 08/05/18. 4. 2hrs dayworks: Additional set up time 08/05/18.
5. 1hrs standing time: Waiting to start drilling 09/05/18. 6. 0.5hrs dayworks: Collecting water 09/05/18.
7. 0.75hrs dayworks: Collecting water 09/05/18. 8. 2hrs standing time: Waiting for kit 09/05/18.
9. 1hr standing time: Waiting to start drilling 10/05/18.
10. 2.5hrs dayworks: Change flush in tanks and borehole and clean out tanks 10/05/18.
11. 1hr dayworks: Pumping water out of skip and IBC 11/05/18. 12. 1.5hrs dayworks: Mixing mud into tank 14/05/18.
13. 1hr dayworks: Mixing mud into tank 14/05/18. 14. 0.5hrs standing time: Waiting for permit 15/05/18.
15. 1hr standing time: Waiting to replacing hydraulic hose 15/05/18. 16. 1hr dayworks: Travel to Pirtek to fix hose 16/05/18.
17. 1.5hrs dayworks: Travel back to site to fit new hose 16/05/18. 18. 1hr standing time: Waiting for installation details 16/05/18.
19. 1hr dayworks: Moving kit to next position 16/05/18.

[redacted]

Drilled by: [redacted] | Logged by: JE | Checked by: JA

[redacted]

Rotary Borehole Record

BH03

Project ID: **GN21822**	Client: [redacted]	E: 572130.02	N: 316292.03
Location: King's Lynn Compressor Station	Consultant: [redacted]	Date: 08/05/2018 - 16/05/2018	
	Plant used: Comacchio MC405	SPT Hammer Serial No: ADP04 (ER: 62%)	

Geology Description	Legend	Depth (m)	Elevation (maOD)	T.C.R. (%)	S.C.R. (%)	R.Q.D. (%)	Sample / In-Situ Test Information: Type	Depth	Results / Remarks	Date - Depth (m) Casing (Water)	Installation & Backfill
Firm to stiff grey thinly laminated silty CLAY. Laminations are closely spaced to very closely spaced dark grey and light grey. *From 30.00m: Locally clayey silt.*				91	91	0	D22	30.70			[redacted]
							U10	30.83 - 31.00			
							HV08	31.00			
At 31.20m: Rare medium rounded gravel-sized chalk. *From 31.50m: Becoming locally thickly laminated.* *At 31.72m: Rare medium subrounded gravel-sized chalk.*				89	89	0	U11	31.50 - 31.80			
From 32.50m: Becoming stiff to very stiff, extremely closely spaced with occasional thin laminations of grey fine sand. Laminations becoming very closely spaced. Occasional glauconitic speckling.							HV09	32.60			
							D23	32.90			
				63	56	0	SPT(C)	33.00	N=43 (6,7/9,12,13,9)	6.00 (0.00)	
							D24	34.50			
				94	94	0	U12	34.52 - 34.80			
							D25	35.80			
							SPT(S)	36.00	N=38 (9,8/9,10,9,10)	6.00 (0.00)	
At 36.40m: Rare medium subrounded chalk gravel.				90	66	0	D26	37.00 - 37.15			
From 37.00m to 37.15m: Becoming locally light grey silty sandy clayey silt.							U13	37.53 - 37.83			
				87	87	0	D27	38.00			
							U14	38.50			
							SPT(S)	39.00	N=44 (10,10/10,12,10,12)	6.00 (0.00)	
				9	5	0	D28	39.00			

Hole Diameter by Depth	
Depth Base (m)	Diameter (mm)
6.00	146
51.00	116

Casing Diameter by Depth	
Depth Base (m)	Diameter (mm)
6.00	150

Drilling Flush Details		
Depth (m)	Type	Return (%)
31.50 - 33.00	WATER	90
33.00 - 34.50	WATER	90
34.50 - 36.00	WATER	90
36.00 - 37.50	WATER	90
37.50 - 39.00	WATER	90
39.00 - 40.50	WATER	90

Water Strike

Date	Strike Depth (m)	Depth Sealed (m)	Casing Depth (m)	Time Elapsed (mins)	Standing Level (m)	Remarks
08-05-2018	1.00					Seepage

Remarks:

1. Inspection pit GL to 1.20m. 2. Backfill: GL to 51.38m bentonite.
3. 2.33hrs standing time: Inductions 08/05/18. 4. 2hrs dayworks: Additional set up time 08/05/18.
5. 1hrs standing time: Waiting to start drilling 09/05/18. 6. 0.5hrs dayworks: Collecting water 09/05/18.
7. 0.75hrs dayworks: Collecting water 09/05/18. 8. 2hrs standing time: Waiting for kit 09/05/18.
9. 1hr standing time: Waiting to start drilling 10/05/18.
10. 2.5hrs dayworks: Change flush in tanks and borehole and clean out tanks 10/05/18.
11. 1hr dayworks: Pumping water out of skip and IBC 11/05/18. 12. 1.5hrs dayworks: Mixing mud into tank 14/05/18.
13. 1hr dayworks: Mixing mud into tank 14/05/18. 14. 0.5hrs standing time: Waiting for permit 15/05/18.
15. 1hr standing time: Waiting to replacing hydraulic hose 15/05/18. 16. 1hr dayworks: Travel to Pirtek to fix hose 16/05/18.
17. 1.5hrs dayworks: Travel back to site to fit new hose 16/05/18. 18. 1hr standing time: Waiting for installation details 16/05/18.
19. 1hr dayworks: Moving kit to next position 16/05/18.

[redacted]

Drilled by: [redacted] | Logged by: JE | Checked by: JA

[redacted]

Rotary Borehole Record

BH03

Project ID: **GN21822**	Client: [redacted]	E: 572130.02	N: 316292.03
Location: King's Lynn Compressor Station	Consultant: [redacted]	Date: 08/05/2018 - 16/05/2018	
	Plant used: Comacchio MC405	SPT Hammer Serial No: ADP04 (ER: 62%)	

Geology Description	Legend	Depth (m)	Elevation (maOD)	T.C.R. (%)	S.C.R. (%)	R.Q.D. (%)	Sample / In-Situ Test Information: Type	Depth	Results / Remarks	Date - Depth (m) Casing (Water)	Installation & Backfill
Firm to stiff grey thinly laminated silty CLAY. Laminations are closely spaced to very closely spaced dark grey and light grey.											[redacted]
From 40.50m: Laminations no longer present. Becoming indistinctly fissured with rare gravel of fine to coarse subrounded chalk.							D29	40.50			
At 40.60m: Small lens of grey fine to medium sand <25mm.				93	93	0	D30	41.20			
From 40.70m: Becoming extremely closely spaced thinly laminated.							U15	41.73 - 42.00			
							SPT(S)	42.00	N=50 (12,11/12,12,14,12)	6.00 (0.00)	
At 42.30m: Rare medium rounded chalk gravel.				80	77	0					
							D31	43.00			
From 43.00m to 43.14m: Locally light grey slightly sandy clayey silt.							U16	43.20 - 43.50			
From 43.20m: Laminations no longer present.											
From 43.50m: Becoming locally grey slightly sandy clayey silt.							B7	44.10 - 44.20			
From 44.10m to 44.20m: Band of dark grey gravelly clay with occasional lenses of brown slightly silty clay. Gravel is fine to coarse subrounded to rounded chalk.				90	90	0	D32	44.50			
							U17	44.55 - 44.85			
At 44.30m: Small lens of fine to medium sand 20mm.							SPT(S)	45.00	50 (9,10/11,13,13,13 for 55mm)	6.00 (0.00)	
From 44.40m: Becoming thinly laminated.										15/05/2018 - 45.43 6.00 (0.00)	
From 44.50m: Becoming locally slightly gravelly.				67	67	0				16/05/2018 - 45.43 6.00 (0.00)	
From 46.00m to 46.10m: Becoming locally grey clayey silt.							D33	46.10			
At 47.00m: Rare medium rounded chalk gravel.							D34	47.00			
At 47.30m: Rare fine to medium rounded chalk gravel.				90	90	0					
							U18	47.60 - 47.90			
							SPT(S)	48.00	50 (11,13/15,15,18,2 for 0mm)	6.00 (0.00)	
				20	17	0					

Hole Diameter by Depth	
Depth Base (m)	Diameter (mm)
6.00	146
51.00	116

Casing Diameter by Depth	
Depth Base (m)	Diameter (mm)
6.00	150

Drilling Flush Details		
Depth (m)	Type	Return (%)
40.50 - 42.00	WATER	90
42.00 - 43.50	WATER	90
43.50 - 45.00	WATER	90
45.00 - 46.50	WATER	90
46.50 - 48.00	WATER	90
48.00 - 49.50	WATER	90
49.50 - 51.00	WATER	90

Water Strike

Date	Strike Depth (m)	Depth Sealed (m)	Casing Depth (m)	Time Elapsed (mins)	Standing Level (m)	Remarks
08-05-2018	1.00					Seepage

Remarks:

1. Inspection pit GL to 1.20m. 2. Backfill: GL to 51.38m bentonite.
3. 2.33hrs standing time: Inductions 08/05/18. 4. 2hrs dayworks: Additional set up time 08/05/18.
5. 1hrs standing time: Waiting to start drilling 09/05/18. 6. 0.5hrs dayworks: Collecting water 09/05/18.
7. 0.75hrs dayworks: Collecting water 09/05/18. 8. 2hrs standing time: Waiting for kit 09/05/18.
9. 1hr standing time: Waiting to start drilling 10/05/18.
10. 2.5hrs dayworks: Change flush in tanks and borehole and clean out tanks 10/05/18.
11. 1hr dayworks: Pumping water out of skip and IBC 11/05/18. 12. 1.5hrs dayworks: Mixing mud into tank 14/05/18.
13. 1hr dayworks: Mixing mud into tank 14/05/18. 14. 0.5hrs standing time: Waiting for permit 15/05/18.
15. 1hr standing time: Waiting to replacing hydraulic hose 15/05/18. 16. 1hr dayworks: Travel to Pirtek to fix hose 16/05/18.
17. 1.5hrs dayworks: Travel back to site to fit new hose 16/05/18. 18. 1hr standing time: Waiting for installation details 16/05/18.
19. 1hr dayworks: Moving kit to next position 16/05/18.

[redacted]

Drilled by: [redacted] | Logged by: JE | Checked by: JA

[redacted]

Rotary Borehole Record

BH03

Sheet 6 of 6

Project ID: **GN21822**	Client: [redacted]	E: 572130.02	N: 316292.03
Location: King's Lynn Compressor Station	Consultant: [redacted]	Date: 08/05/2018 - 16/05/2018	
	Plant used: Comacchio MC405	SPT Hammer Serial No: ADP04 (ER: 62%)	

Geology Description	Legend	Depth (m)	Elevation (maOD)	T.C.R. (%)	S.C.R. (%)	R.Q.D. (%)	Sample / In-Situ Test Information: Type	Depth	Results / Remarks	Date - Depth (m) Casing (Water)	Installation & Backfill
Firm to stiff grey thinly laminated silty CLAY. Laminations are closely spaced to very closely spaced dark grey and light grey.				67	60	0	U19	50.25 - 50.45			[redacted]
							D35	50.50			
From 51.00m: Becoming stiff with laminations of light grey silt.							SPT(S)	51.00	50 (13,10/14,16,20,0 for 0mm)	6.00 (0.00)	
		51.38								16/05/2018 - 51.38 6.00 (0.00)	
Borehole completed at 51.38m.											

Hole Diameter by Depth		Drilling Flush Details		
Depth Base (m)	Diameter (mm)	Depth (m)	Type	Return (%)
6.00	146			
51.00	116			

Casing Diameter by Depth	
Depth Base (m)	Diameter (mm)
6.00	150

Water Strike

Date	Strike Depth (m)	Depth Sealed (m)	Casing Depth (m)	Time Elapsed (mins)	Standing Level (m)	Remarks
08-05-2018	1.00					Seepage

Remarks:

1. Inspection pit GL to 1.20m. 2. Backfill: GL to 51.38m bentonite.
3. 2.33hrs standing time: Inductions 08/05/18. 4. 2hrs dayworks: Additional set up time 08/05/18.
5. 1hrs standing time: Waiting to start drilling 09/05/18. 6. 0.5hrs dayworks: Collecting water 09/05/18.
7. 0.75hrs dayworks: Collecting water 09/05/18. 8. 2hrs standing time: Waiting for kit 09/05/18.
9. 1hr standing time: Waiting to start drilling 10/05/18.
10. 2.5hrs dayworks: Change flush in tanks and borehole and clean out tanks 10/05/18.
11. 1hr dayworks: Pumping water out of skip and IBC 11/05/18. 12. 1.5hrs dayworks: Mixing mud into tank 14/05/18.
13. 1hr dayworks: Mixing mud into tank 14/05/18. 14. 0.5hrs standing time: Waiting for permit 15/05/18.
15. 1hr standing time: Waiting to replacing hydraulic hose 15/05/18. 16. 1hr dayworks: Travel to Pirtek to fix hose 16/05/18.
17. 1.5hrs dayworks: Travel back to site to fit new hose 16/05/18. 18. 1hr standing time: Waiting for installation details 16/05/18.
19. 1hr dayworks: Moving kit to next position 16/05/18.

[redacted]

Drilled by: [redacted] | Logged by: JE | Checked by: JA | Fm-Hn-R-3070-Rev D

[redacted]

Client: [redacted]

For the attention of: [redacted]

Date of Issue: 20/06/2018
Page Number: 1 of 17

TEST REPORT TRANSMITTAL

Project:	King's Lynn Compressor Station	Samples received:	06/06/2018
Report No:	GN21822-02	Instruction received:	06/06/2018
Your Ref:	GN21822	Testing commenced:	08/06/2018

Test Method and Description	Quantity	UKAS Accredited
BS1377: Part 2: 1990:3.2 Moisture Content	29	Yes
BS1377: Part 2: 1990:4.4/5.0 Liquid & Plastic Limits - Single Point Method	8	Yes
BS1377: Part 2: 1990:9.2 Particle Size Distribution - Wet Sieve Method	4	Yes
BS1377: Part 2: 1990:9.4 Particle Size Distribution - Pipette Sedimentation Method	2	Yes

Remarks:

Issued by: [redacted]

Approved Signatories:

M[redacted])

Unless we are notified to the contrary, samples will be disposed after a period of one month from this date

This report should not be reproduced except in full without the written approval of the laboratory

Only those results indicated in this report are UKAS accredited and any opinion or interpretations expressed are outside the scope of UKAS accreditation

[redacted]

[redacted]

DETERMINATION OF MOISTURE CONTENT

BS 1377 : Part 2 : 1990 : Clause 3.2

Project Name:	**King's Lynn Compressor Station**	Project Number:
Client Name:	[redacted]	**GN21822-02**

Location	Depth m	Sample Ref	Sample Description	Moisture Content %	Remarks
BH01A	1.10	B3	Dark grey brown clayey gravelly SAND. Gravel is of flint	14	
BH01A	2.00-2.50	B4	Dark grey CLAY	27	
BH01A	3.50	D5	Dark grey silty CLAY	29	
BH01A	5.00	D6	Dark grey CLAY with occasional shell fragments	40	
BH01A	9.00	D8	Dark grey CLAY with occasional shell fragments	35	
BH01A	26.40	D14	Grey slightly gravelly slightly sandy clayey SILT. Gravel is of flint	25	
BH01A	29.70	D17	Grey and grey brown silty CLAY	24	
BH01A	34.40	D20	Brown and grey CLAY	25	
BH01A	37.40	D22	Grey brown CLAY	25	

Remarks	Approved	Date	Sheet No.:
	MW	20/06/2018	1 of 3

[redacted]

[redacted]

DETERMINATION OF MOISTURE CONTENT

BS 1377 : Part 2 : 1990 : Clause 3.2

Project Name:	**King's Lynn Compressor Station**	Project Number:
Client Name:	[redacted]	**GN21822-02**

Location	Depth m	Sample Ref	Sample Description	Moisture Content %	Remarks
BH01A	40.40	D24	Grey brown and brown silty CLAY	25	
BH01A	44.15	D26	Grey and grey brown sandy silty CLAY	23	
BH01A	47.80	D28	Grey and grey brown sandy silty CLAY	24	
BH01A	50.50	D31	Grey and brown silty CLAY	25	
BH02	1.00	B3	Brown gravelly SAND. Gravel is of flint	8.3	
BH02	2.00-3.00	B4	Brown slightly silty slightly gravelly SAND. Gravel is of flint	14	
BH02	4.90-5.00	D4	Dark grey and brown slightly gravelly sandy silty CLAY. Gravel is of flint	19	
BH02	5.90-6.00	D5	Dark grey silty CLAY	25	
BH02	7.50	D6	Dark grey silty CLAY	36	
BH02	9.00-9.10	D8	Dark grey CLAY with occasional shell fragments	37	

Remarks	Approved	Date	Sheet No.:
	MW	20/06/2018	2 of 3

[redacted]

[redacted]

DETERMINATION OF MOISTURE CONTENT

BS 1377 : Part 2 : 1990 : Clause 3.2

Project Name:	**King's Lynn Compressor Station**	Project Number:
Client Name:	[redacted]	**GN21822-02**

Location	Depth m	Sample Ref	Sample Description	Moisture Content %	Remarks
BH02	11.90-12.00	D9	Dark grey silty CLAY	38	
BH02	26.90	D16	Grey silty CLAY	23	
BH02	30.10	D17	Grey silty CLAY	24	
BH02	33.00	D18	Brown silty CLAY	25	
BH02	35.90	D19	Grey and dark grey silty CLAY	23	
BH02	39.50	D21	Grey and dark grey silty CLAY	23	
BH02	42.50	D22	Grey and dark grey silty CLAY	23	
BH02	45.50	D23	Grey and dark grey silty CLAY	24	
BH02	47.00	D24	Grey brown slightly sandy silty CLAY	22	

Remarks	Approved	Date	Sheet No.:
	MW	20/06/2018	1 of 1

[redacted]

[redacted]

DETERMINATION OF LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX

BS1377 : Part 2 : 1990

Project Name:	**King's Lynn Compressor Station**	Project Number:
Client Name:	[redacted]	**GN21822-02**

Location	Depth m	Sample Ref	Moisture Content %	Liquid Limit %	Plastic Limit %	Plasticity Index	Percentage passing 425µm %	Classification	Sample Description
BH01A	3.50	D5	29	38	18	20	100	CI	Dark grey silty CLAY
BH01A	29.70	D17	24	33	16	17	100	CL	Grey and grey brown silty CLAY
BH01A	40.40	D24	25	35	17	18	100	CL	Grey brown and brown silty CLAY
BH01A	50.50	D31	25	33	16	17	100	CL	Grey and brown silty CLAY
BH02	5.90-6.00	D5	25	32	17	15	100	CL	Dark grey silty CLAY
BH02	7.50	D6	36	50	26	24	100	CI	Dark grey silty CLAY
BH02	33.00	D18	25	36	16	20	100	CI	Brown silty CLAY
BH02	47.00	D24	22	33	16	17	100	CL	Grey brown slightly sandy silty CLAY

Please note this summary sheet is provided for convenience and in no way replaces individual test result sheets which shall, without exception, be regarded as the definitive result. Please refer to the individual test result sheets for the respective methods used.

Remarks	Approved	Date	Sheet No.:
	MW	20/06/2018	1 of 1

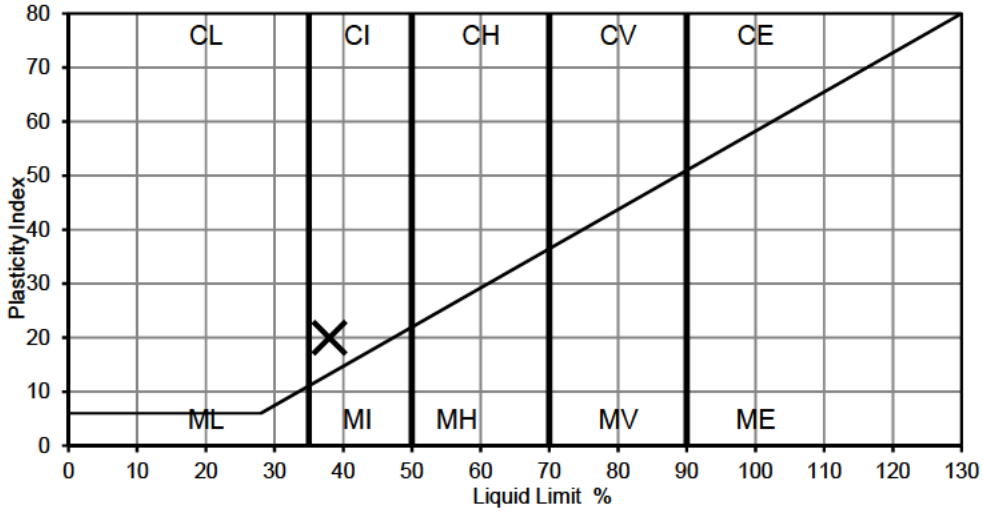
[redacted]

[redacted]

LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX, & LIQUIDITY INDEX

BS 1377 : Part 2 : 1990, clause 4.4 one point LL and 5

Project Name:	**King's Lynn Compressor Station**	Project Number:	**GN21822-02**
Client Name:	[redacted]	Sample Location:	BH01A
Sample Description:	Dark grey silty CLAY	Sample Depth (m)	3.50
		Sample Reference	D5



Preparation: Material was natural

Results:

As Received Moisture Content: (BS1377 : Part 2 : Clause 3 : 1990)	29 %
Percentage Passing 425µm sieve:	100 %
Liquid Limit:	38 %
Plastic Limit:	18 %
Plasticity Index:	20
Liquidity Index:	0.55
Modified Plasticity Index: (NHBC Standards Chapter 4.2)	20

Remarks	Approved	Date	Sheet No.:
	MW	20/06/2018	1 of 1

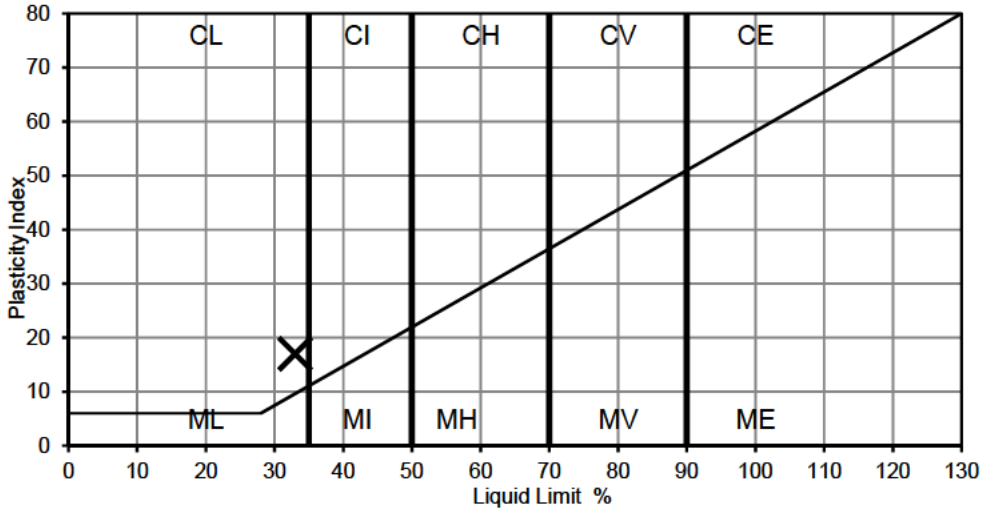
[redacted]

[redacted]

LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX, & LIQUIDITY INDEX

BS 1377 : Part 2 : 1990, clause 4.4 one point LL and 5

Project Name:	**King's Lynn Compressor Station**	Project Number:	**GN21822-02**
Client Name:	[redacted]	Sample Location:	BH01A
Sample Description:	Grey and grey brown silty CLAY	Sample Depth (m)	29.70
		Sample Reference	D17



Preparation: Material was natural

Results:

As Received Moisture Content: (BS1377 : Part 2 : Clause 3 : 1990)	24 %
Percentage Passing 425µm sieve:	100 %
Liquid Limit:	33 %
Plastic Limit:	16 %
Plasticity Index:	17
Liquidity Index:	0.47
Modified Plasticity Index: (NHBC Standards Chapter 4.2)	17

Remarks	Approved	Date	Sheet No.:
	MW	20/06/2018	1 of 1

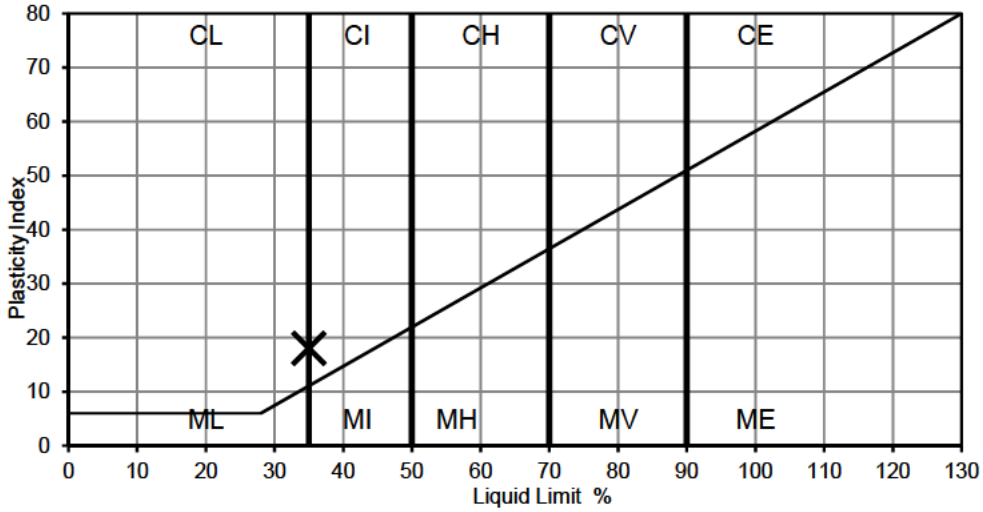
[redacted]

[redacted]

LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX, & LIQUIDITY INDEX

BS 1377 : Part 2 : 1990, clause 4.4 one point LL and 5

Project Name:	**King's Lynn Compressor Station**	Project Number:	**GN21822-02**
Client Name:	[redacted]	Sample Location:	BH01A
Sample Description:	Grey brown and brown silty CLAY	Sample Depth (m)	40.40
		Sample Reference	D24



Preparation: Material was natural

Results:

As Received Moisture Content: (BS1377 : Part 2 : Clause 3 : 1990)	25	%
Percentage Passing 425µm sieve:	100	%
Liquid Limit:	35	%
Plastic Limit:	17	%
Plasticity Index:	18	
Liquidity Index:	0.44	
Modified Plasticity Index: (NHBC Standards Chapter 4.2)	18	

Remarks	Approved	Date	Sheet No.:
	MW	20/06/2018	1 of 1

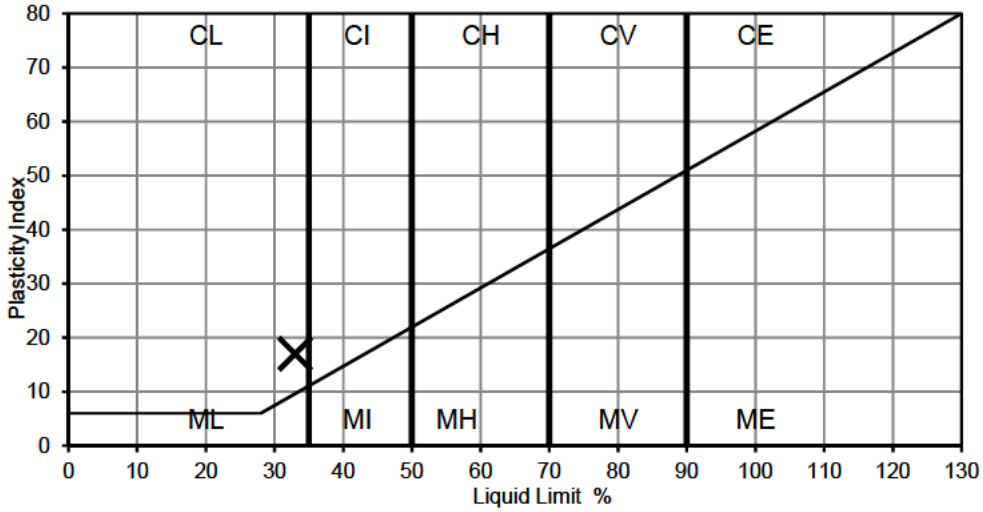
[redacted]

[redacted]

LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX, & LIQUIDITY INDEX

BS 1377 : Part 2 : 1990, clause 4.4 one point LL and 5

Project Name:	**King's Lynn Compressor Station**	Project Number:	**GN21822-02**
Client Name:	[redacted]	Sample Location:	BH01A
Sample Description:	Grey and brown silty CLAY	Sample Depth (m)	50.50
		Sample Reference	D31



Preparation: Material was natural

Results:

As Received Moisture Content: (BS1377 : Part 2 : Clause 3 : 1990)	25 %
Percentage Passing 425µm sieve:	100 %
Liquid Limit:	33 %
Plastic Limit:	16 %
Plasticity Index:	17
Liquidity Index:	0.53
Modified Plasticity Index: (NHBC Standards Chapter 4.2)	17

Remarks	Approved	Date	Sheet No.:
	MW	20/06/2018	1 of 1

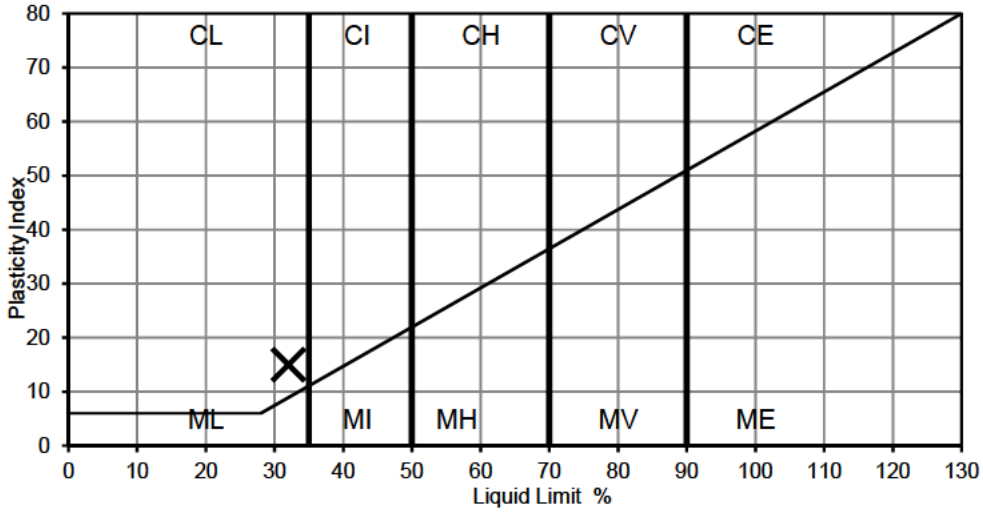
[redacted]

[redacted]

LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX, & LIQUIDITY INDEX

BS 1377 : Part 2 : 1990, clause 4.4 one point LL and 5

Project Name:	**King's Lynn Compressor Station**	Project Number:	**GN21822-02**
Client Name:	[redacted]	Sample Location:	BH02
Sample Description:	Dark grey silty CLAY	Sample Depth (m)	5.90
		Sample Reference	D5



Preparation: Material was natural

Results:

As Received Moisture Content: (BS1377 : Part 2 : Clause 3 : 1990)	25 %
Percentage Passing 425µm sieve:	100 %
Liquid Limit:	32 %
Plastic Limit:	17 %
Plasticity Index:	15
Liquidity Index:	0.53
Modified Plasticity Index: (NHBC Standards Chapter 4.2)	15

Remarks	Approved	Date	Sheet No.:
	MW	20/06/2018	1 of 1

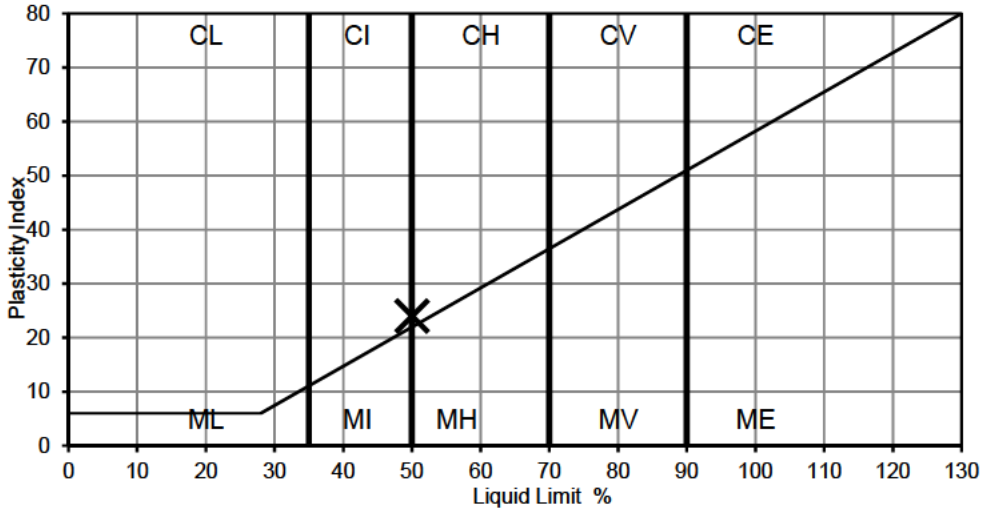
[redacted]

[redacted]

LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX, & LIQUIDITY INDEX

BS 1377 : Part 2 : 1990, clause 4.4 one point LL and 5

Project Name:	**King's Lynn Compressor Station**	Project Number:	**GN21822-02**
Client Name:	[redacted]	Sample Location:	BH02
Sample Description:	Dark grey silty CLAY	Sample Depth (m)	7.50
		Sample Reference	D6



Preparation: Material was natural

Results:

As Received Moisture Content: (BS1377 : Part 2 : Clause 3 : 1990)	36 %
Percentage Passing 425µm sieve:	100 %
Liquid Limit:	50 %
Plastic Limit:	26 %
Plasticity Index:	24
Liquidity Index:	0.42
Modified Plasticity Index: (NHBC Standards Chapter 4.2)	24

Remarks	Approved	Date	Sheet No.:
	MW	20/06/2018	1 of 1

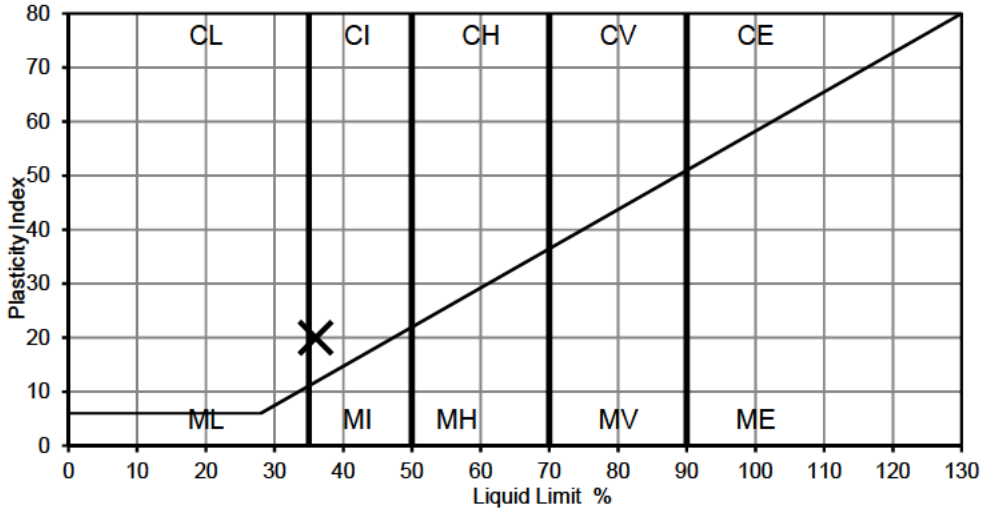
[redacted]

[redacted]

LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX, & LIQUIDITY INDEX

BS 1377 : Part 2 : 1990, clause 4.4 one point LL and 5

Project Name:	**King's Lynn Compressor Station**	Project Number:	**GN21822-02**
Client Name:	[redacted]	Sample Location:	BH02
Sample Description:	Brown silty CLAY	Sample Depth (m)	33.00
		Sample Reference	D18



Preparation: Material was natural

Results:

As Received Moisture Content: (BS1377 : Part 2 : Clause 3 : 1990)	25 %
Percentage Passing 425µm sieve:	100 %
Liquid Limit:	36 %
Plastic Limit:	16 %
Plasticity Index:	20
Liquidity Index:	0.45
Modified Plasticity Index: (NHBC Standards Chapter 4.2)	20

Remarks	Approved	Date	Sheet No.:
	MW	20/06/2018	1 of 1

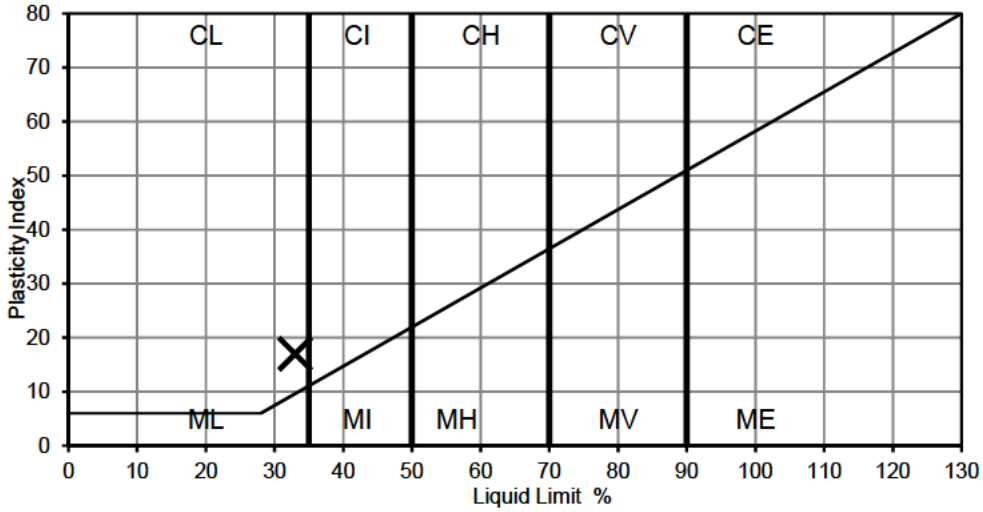
[redacted]

[redacted]

LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX, & LIQUIDITY INDEX

BS 1377 : Part 2 : 1990, clause 4.4 one point LL and 5

Project Name:	**King's Lynn Compressor Station**	Project Number:	**GN21822-02**
Client Name:	[redacted]	Sample Location:	BH02
Sample Description:	Grey brown slightly sandy silty CLAY	Sample Depth (m)	47.00
		Sample Reference	D24



Preparation: Material was natural

Results:

As Received Moisture Content: (BS1377 : Part 2 : Clause 3 : 1990)	22	%
Percentage Passing 425µm sieve:	100	%
Liquid Limit:	33	%
Plastic Limit:	16	%
Plasticity Index:	17	
Liquidity Index:	0.35	
Modified Plasticity Index: (NHBC Standards Chapter 4.2)	17	

Remarks	Approved	Date	Sheet No.:
			1 of 1

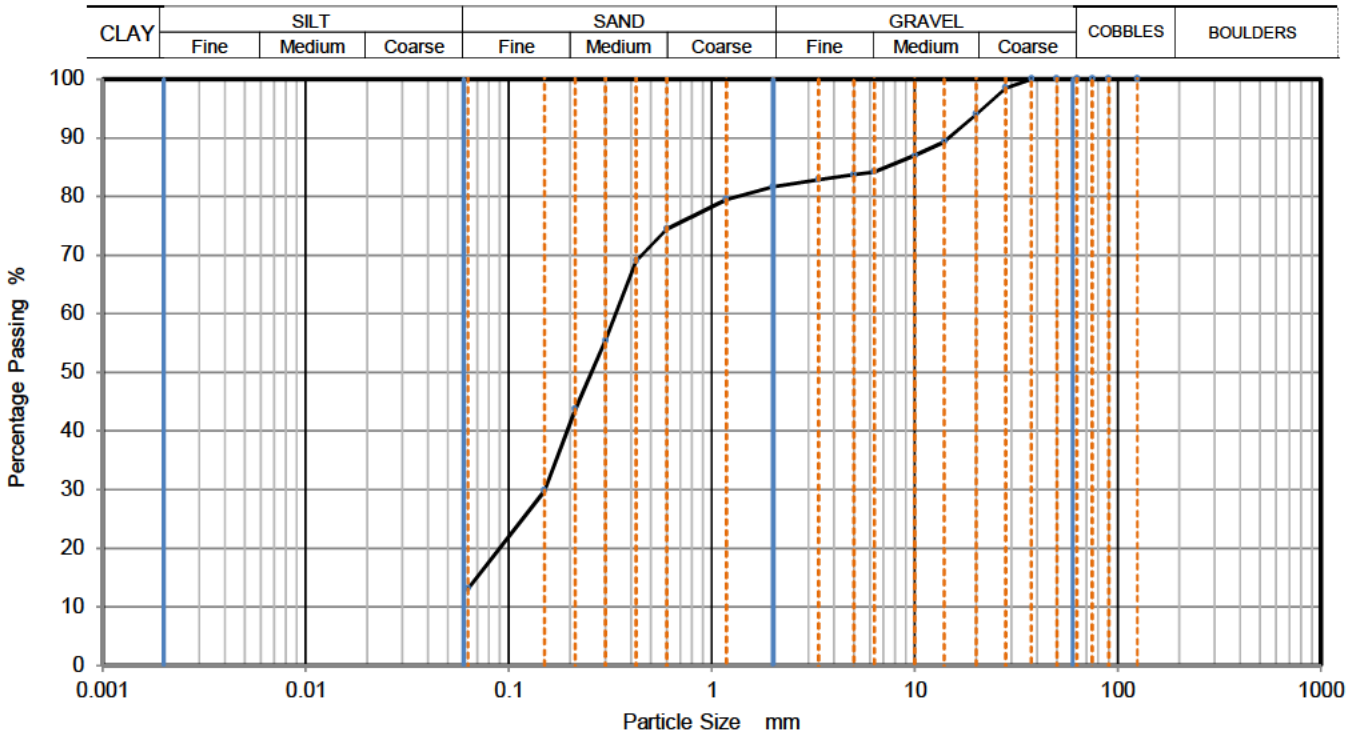
[redacted]

[redacted]

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	**King's Lynn Compressor Station**	Project Number:	**GN21822-02**
Client Name:	[redacted]	Sample Location:	BH01A
Sample Description:	Dark grey brown clayey gravelly SAND. Gravel is of flint	Sample Depth (m)	1.10
		Sample Reference	B3



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	99		
20	94		
14	89		
10	87		
6.3	84		
5	84		
3.35	83		
2	82		
1.18	80		
0.6	74		
0.425	69		
0.3	55		
0.212	44		
0.15	30		
0.063	13		

Sample Proportions	% dry mass
Very coarse	0
Gravel	18
Sand	68
Fines <0.063mm	13

Grading Analysis		
D100	mm	
D60	mm	0.337
D30	mm	0.151
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Approved	Date	Sheet No.:
MW	20/06/2018	1 of 1

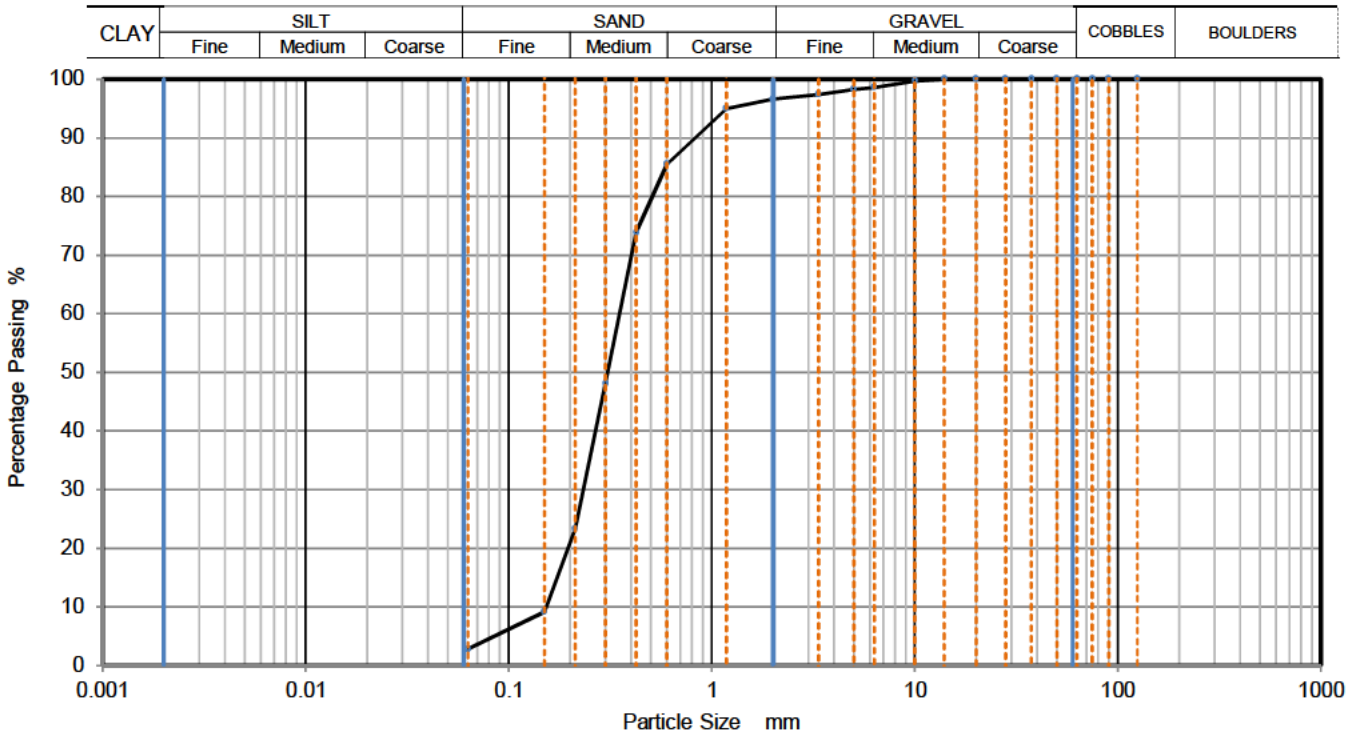
[redacted]

[redacted]

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	**King's Lynn Compressor Station**	Project Number:	**GN21822-02**
Client Name:	[redacted]	Sample Location:	BH02
Sample Description:	Brown slightly silty slightly gravelly SAND. Gravel is of flint	Sample Depth (m)	2.00
		Sample Reference	B4



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	98		
3.35	97		
2	97		
1.18	95		
0.6	86		
0.425	74		
0.3	48		
0.212	23		
0.15	9		
0.063	3		

Sample Proportions	% dry mass
Very coarse	0
Gravel	3
Sand	94
Fines <0.063mm	3

Grading Analysis		
D100	mm	
D60	mm	0.352
D30	mm	0.233
D10	mm	0.153
Uniformity Coefficient		2.3
Curvature Coefficient		1

Remarks

Approved	Date	Sheet No.:
MW	20/06/2018	1 of 1

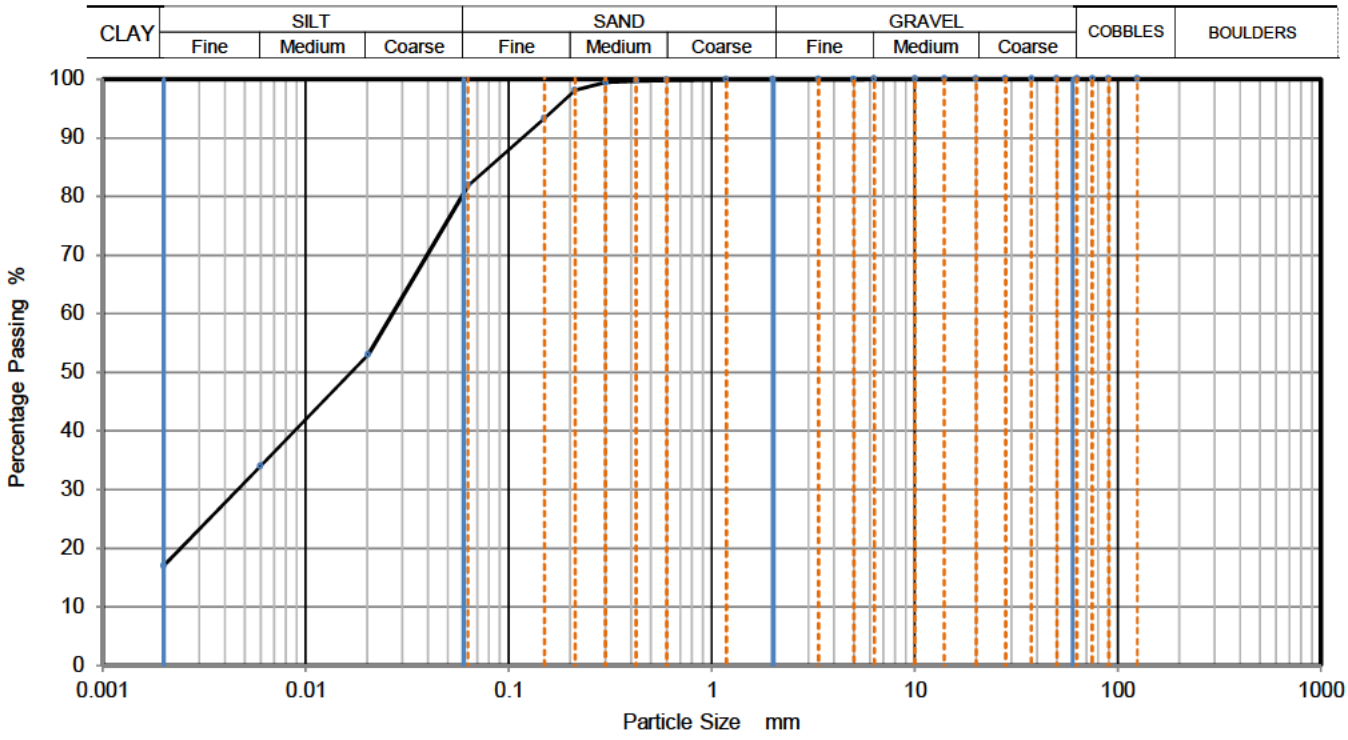
[redacted]

[redacted]

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	**King's Lynn Compressor Station**	Project Number:	**GN21822-02**
Client Name:	[redacted]	Sample Location:	BH02
Sample Description:	Grey slightly sandy silty CLAY. Gravel is of flint	Sample Depth (m)	20.50
		Sample Reference	B10



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	53
90	100	0.0060	34
75	100	0.0020	17
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	Particle density	(assumed)
0.425	100	2.65	Mg/m3
0.3	99		
0.212	98		
0.15	93		
0.063	82		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	18
Silt	64
Clay	18

Grading Analysis		
D100	mm	
D60	mm	0.026
D30	mm	0.005
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Approved	Date	Sheet No.:
MW	20/06/2018	1 of 1

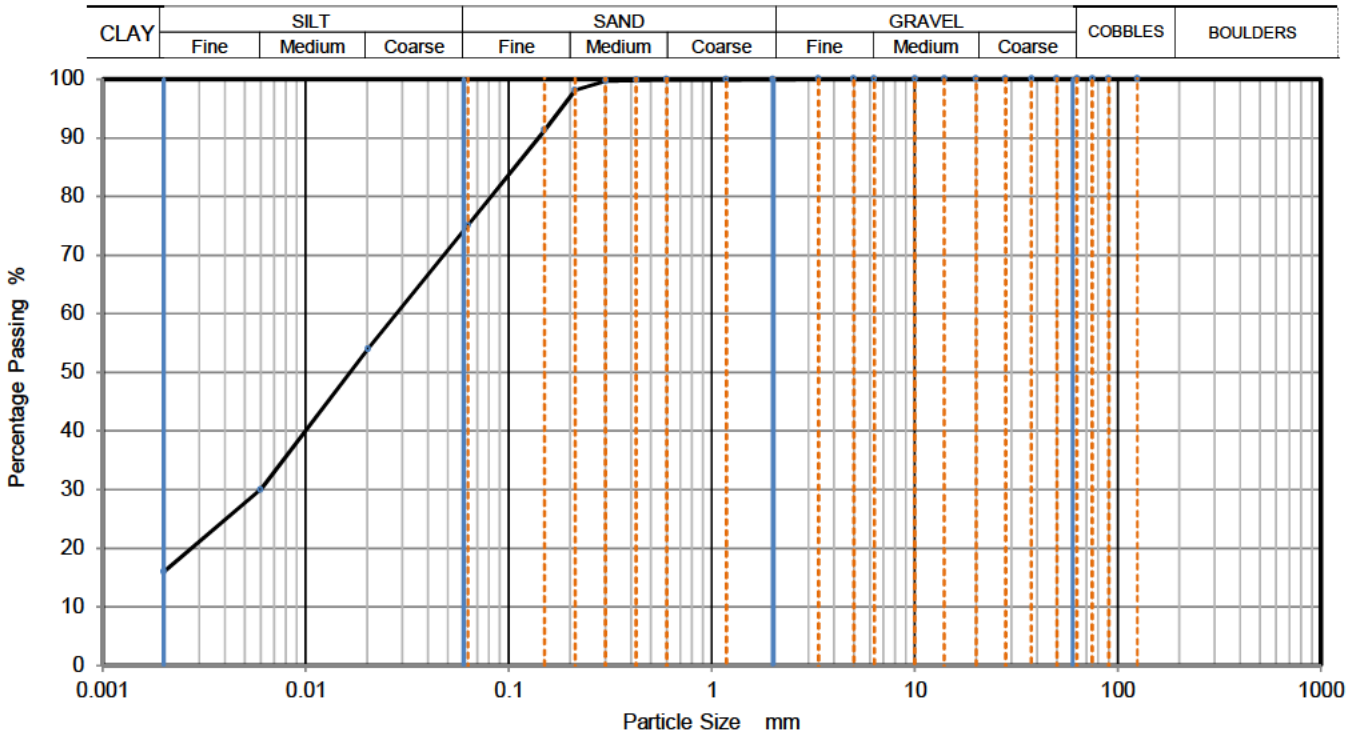
[redacted]

[redacted]

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	**King's Lynn Compressor Station**	Project Number:	**GN21822-02**
Client Name:	[redacted]	Sample Location:	BH02
Sample Description:	Dark grey slightly sandy silty CLAY	Sample Depth (m)	22.50
		Sample Reference	B11



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	54
90	100	0.0060	30
75	100	0.0020	16
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	Particle density	(assumed)
0.425	100	2.65	Mg/m3
0.3	100		
0.212	98		
0.15	91		
0.063	75		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	25
Silt	59
Clay	16

Grading Analysis		
D100	mm	
D60	mm	0.028
D30	mm	0.006
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Approved	Date	Sheet No.:
MW	20/06/2018	1 of 1

[redacted]

[redacted]

Client: [redacted]

For the attention of: [redacted]

Date of Issue: 20/06/2018
Page Number: 1 of 10

TEST REPORT TRANSMITTAL

Project:	King's Lynn Compressor Station	Samples received:	30/05/2018
Report No:	GN21822-01	Instruction received:	30/05/2018
Your Ref:	GN21822	Testing commenced:	04/06/2018

Test Method and Description	Quantity	UKAS Accredited
BS1377: Part 2: 1990:3.2 Moisture Content	11	Yes
BS1377: Part 2: 1990:4.4/5.0 Liquid & Plastic Limits - Single Point Method	5	Yes
BS1377: Part 2: 1990:9.2 Particle Size Distribution - Wet Sieve Method	2	Yes

Remarks:

Issued by: [redacted]

Approved Signatories:

[redacted]

Unless we are notified to the contrary, samples will be disposed after a period of one month from this date

This report should not be reproduced except in full without the written approval of the laboratory

Only those results indicated in this report are UKAS accredited and any opinion or interpretations expressed are outside the scope of UKAS accreditation

[redacted]

[redacted]

[redacted]

DETERMINATION OF MOISTURE CONTENT

BS 1377 : Part 2 : 1990 : Clause 3.2

Project Name:	**King's Lynn Compressor Station**	Project Number:
Client Name:	[redacted]	**GN21822**

Location	Depth m	Sample Ref	Sample Description	Moisture Content %	Remarks
BH03	0.70-1.00	B3	MADE GROUND (Orange brown slightly gravelly CLAY. Gravel is of flint and metal, wood and slate fragments)	17	
BH03	2.00-2.50	B4	Grey very clayey SAND	21	
BH03	3.00	D3	Dark grey CLAY	39	
BH03	3.50	D4	Dark grey CLAY	35	
BH03	4.20	D5	Grey slightly gravelly CLAY. Gravel is of shell fragments	26	
BH03	5.00	D6	Dark grey CLAY	49	
BH03	9.00	D9	Dark grey very silty CLAY	37	
BH03	23.00	D16	Light grey slightly sandy clayey SILT	25	
BH03	24.90	D17	Light grey clayey SILT	24	
BH03	27.50	D20	Light grey and dark grey slightly sandy very silty CLAY	24	

Remarks	Approved	Date	Sheet No.:
	MW	20/06/2018	1 of 2

[redacted]

[redacted]

DETERMINATION OF MOISTURE CONTENT

BS 1377 : Part 2 : 1990 : Clause 3.2

Project Name:	**King's Lynn Compressor Station**	Project Number:
Client Name:	[redacted]	**GN21822**

Location	Depth m	Sample Ref	Sample Description	Moisture Content %	Remarks
BH03	41.20	D30	Grey and dark grey very silty CLAY	23	

Remarks	Approved	Date	Sheet No.:
	MW	20/06/2018	2 of 2

[redacted]

[redacted]

DETERMINATION OF LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX

BS1377 : Part 2 : 1990

Project Name:	**King's Lynn Compressor Station**	Project Number:
Client Name:	[redacted]	**GN21822**

Location	Depth m	Sample Ref	Moisture Content %	Liquid Limit %	Plastic Limit %	Plasticity Index	Percentage passing 425µm %	Classification	Sample Description
BH03	3.50	D4	35	59	21	38	100	CH	Dark grey CLAY
BH03	9.00	D9	37	55	30	25	100	MH	Dark grey very silty CLAY
BH03	23.00	D16	25	Non-plastic	Non-plastic	Non-plastic	100	Non-plastic	Light grey slightly sandy clayey SILT
BH03	27.50	D20	24	34	15	19	100	CL	Light grey and dark grey slightly sandy very silty CLAY
BH03	41.20	D30	23	37	17	20	100	CI	Grey and dark grey very silty CLAY

Please note this summary sheet is provided for convenience and in no way replaces individual test result sheets which shall, without exception, be regarded as the definitive result. Please refer to the individual test result sheets for the respective methods used.

Remarks	Approved	Date	Sheet No.:
	MW	20/06/2018	1 of 1

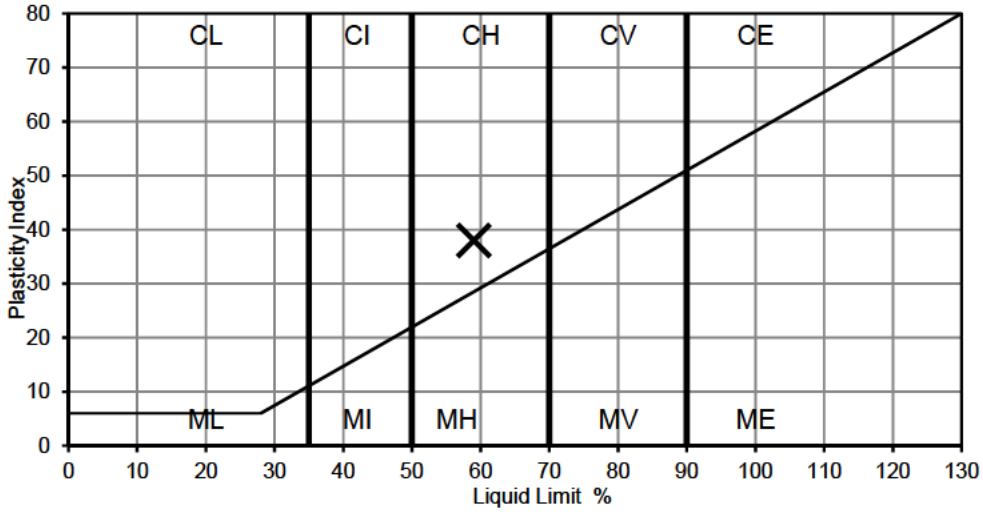
[redacted]

[redacted]

LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX, & LIQUIDITY INDEX

BS 1377 : Part 2 : 1990, clause 4.4 one point LL and 5

Project Name:	**King's Lynn Compressor Station**	Project Number:	**GN21822**
Client Name:	[redacted]	Sample Location:	BH03
Sample Description:	Dark grey CLAY	Sample Depth (m)	3.50
		Sample Reference	D4



Preparation: Material was natural

Results:

As Received Moisture Content: (BS1377 : Part 2 : Clause 3 : 1990)	35 %
Percentage Passing 425µm sieve:	100 %
Liquid Limit:	59 %
Plastic Limit:	21 %
Plasticity Index:	38
Liquidity Index:	0.37
Modified Plasticity Index: (NHBC Standards Chapter 4.2)	38

Remarks	Approved	Date	Sheet No.:
	MW	20/06/2018	1 of 1

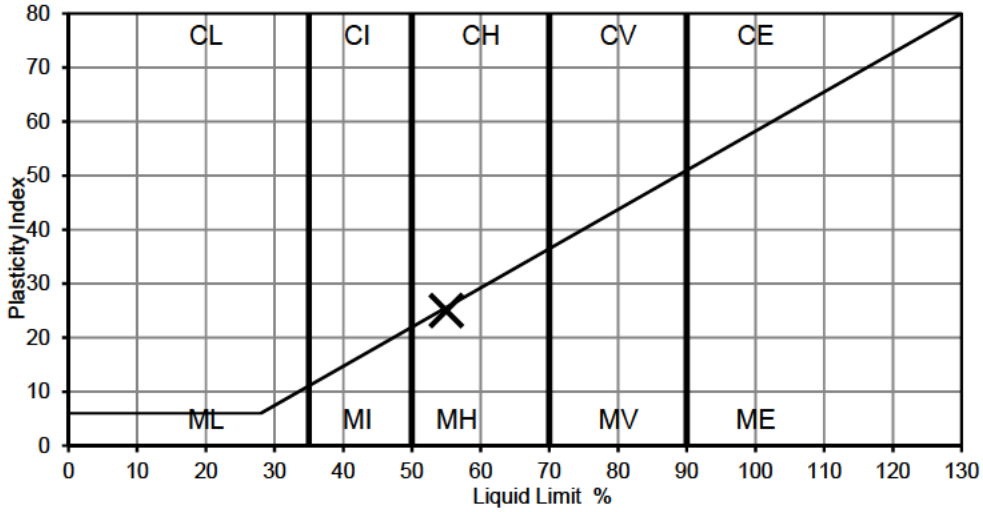
[redacted]

[redacted]

LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX, & LIQUIDITY INDEX

BS 1377 : Part 2 : 1990, clause 4.4 one point LL and 5

Project Name:	**King's Lynn Compressor Station**	Project Number:	**GN21822**
Client Name:	[redacted]	Sample Location:	BH03
Sample Description:	Dark grey very silty CLAY	Sample Depth (m)	9.00
		Sample Reference	D9



Preparation: Material was natural

Results:

As Received Moisture Content: (BS1377 : Part 2 : Clause 3 : 1990)	37 %
Percentage Passing 425µm sieve:	100 %
Liquid Limit:	55 %
Plastic Limit:	30 %
Plasticity Index:	25
Liquidity Index:	0.28
Modified Plasticity Index: (NHBC Standards Chapter 4.2)	25

Remarks	Approved	Date	Sheet No.:
	MW	20/06/2018	1 of 1

[redacted]

[redacted]

LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX, & LIQUIDITY INDEX

BS 1377 : Part 2 : 1990, clause 4.3 and 5

Project Name:	**King's Lynn Compressor Station**	Project Number:	**GN21822**
Client Name:	[redacted]	Sample Location:	BH03
Sample Description:	Light grey slightly sandy clayey SILT	Sample Depth (m)	23.00
		Sample Reference	D16

Preparation: Material was natural

Results:

As Received Moisture Content: (BS1377 : Part 2 : Clause 3 : 1990)	25 %
Percentage Passing 425µm sieve:	100 %
Liquid Limit:	Non-plastic %
Plastic Limit:	Non-plastic %
Plasticity Index:	Non-plastic
Liquidity Index:	Non-plastic
Modified Plasticity Index: (NHBC Standards Chapter 4.2)	Non-plastic

Remarks	Approved	Date	Sheet No.:
	MW	20/06/2018	1 of 1

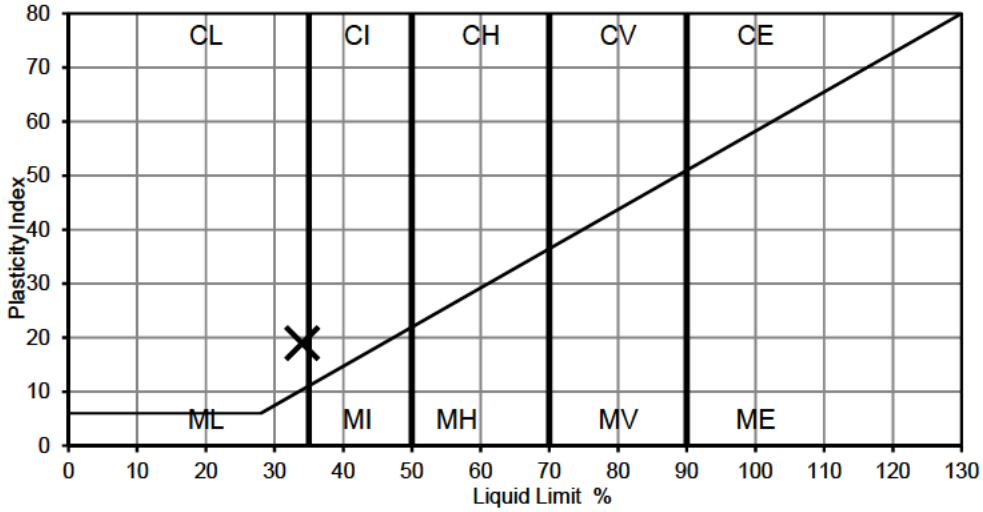
[redacted]

[redacted]

LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX, & LIQUIDITY INDEX

BS 1377 : Part 2 : 1990, clause 4.4 one point LL and 5

Project Name:	**King's Lynn Compressor Station**	Project Number:	**GN21822**
Client Name:	[redacted]	Sample Location:	BH03
Sample Description:	Light grey and dark grey slightly sandy very silty CLAY	Sample Depth (m)	27.50
		Sample Reference	D20



Preparation: Material was natural

Results:

As Received Moisture Content: (BS1377 : Part 2 : Clause 3 : 1990)	24 %
Percentage Passing 425µm sieve:	100 %
Liquid Limit:	34 %
Plastic Limit:	15 %
Plasticity Index:	19
Liquidity Index:	0.47
Modified Plasticity Index: (NHBC Standards Chapter 4.2)	19

Remarks	Approved	Date	Sheet No.:
	MW	20/06/2018	1 of 1

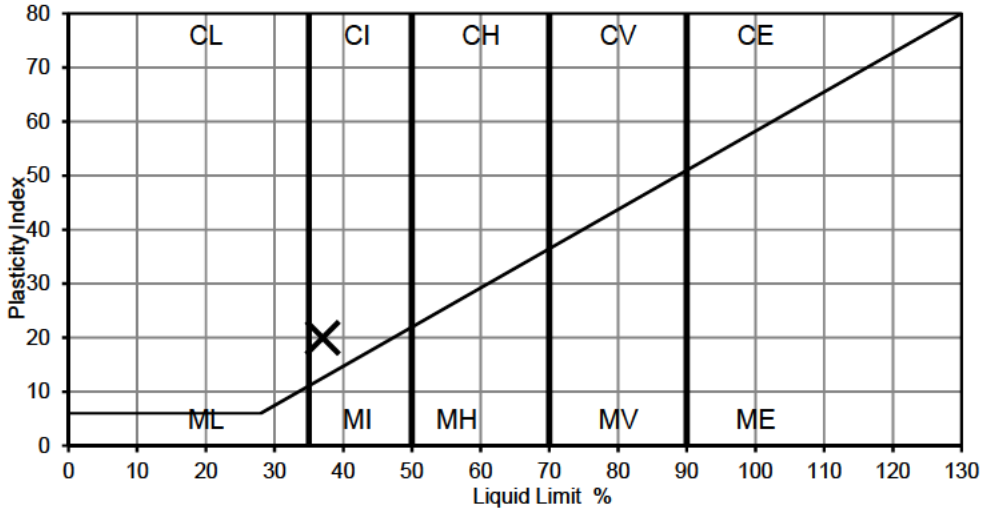
[redacted]

[redacted]

LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX, & LIQUIDITY INDEX

BS 1377 : Part 2 : 1990, clause 4.4 one point LL and 5

Project Name:	**King's Lynn Compressor Station**	Project Number:	**GN21822**
Client Name:	[redacted]	Sample Location:	BH03
Sample Description:	Grey and dark grey very silty CLAY	Sample Depth (m)	41.20
		Sample Reference	D30



Preparation: Material was natural

Results:

As Received Moisture Content: (BS1377 : Part 2 : Clause 3 : 1990)	23 %
Percentage Passing 425µm sieve:	100 %
Liquid Limit:	37 %
Plastic Limit:	17 %
Plasticity Index:	20
Liquidity Index:	0.30
Modified Plasticity Index: (NHBC Standards Chapter 4.2)	20

Remarks	Approved	Date	Sheet No.:
	MW	20/06/2018	1 of 1

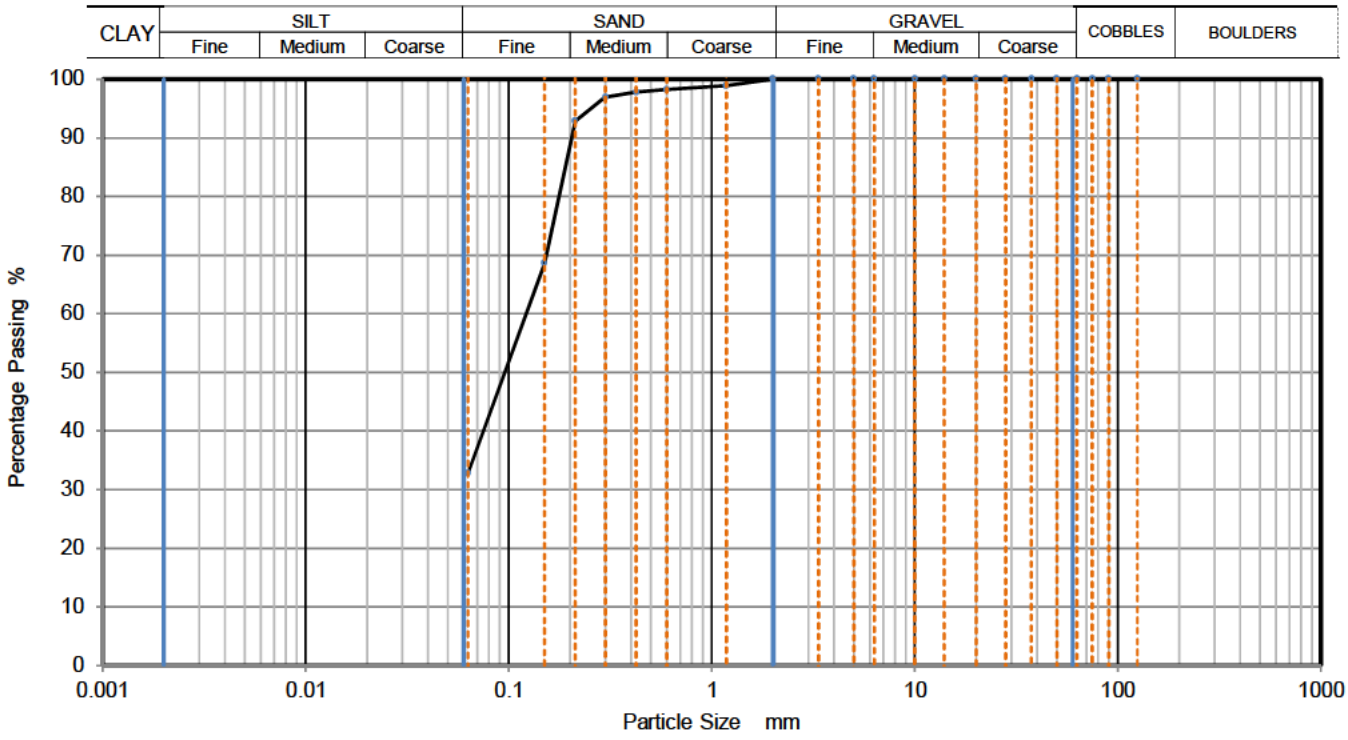
[redacted]

[redacted]

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	**King's Lynn Compressor Station**	Project Number:	**GN21822-01**
Client Name:	[redacted]	Sample Location:	BH03
Sample Description:	Grey very clayey SAND	Sample Depth (m)	2.00
		Sample Reference	B4



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	98		
0.425	98		
0.3	97		
0.212	93		
0.15	69		
0.063	33		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	67
Fines <0.063mm	33

Grading Analysis		
D100	mm	
D60	mm	0.122
D30	mm	
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

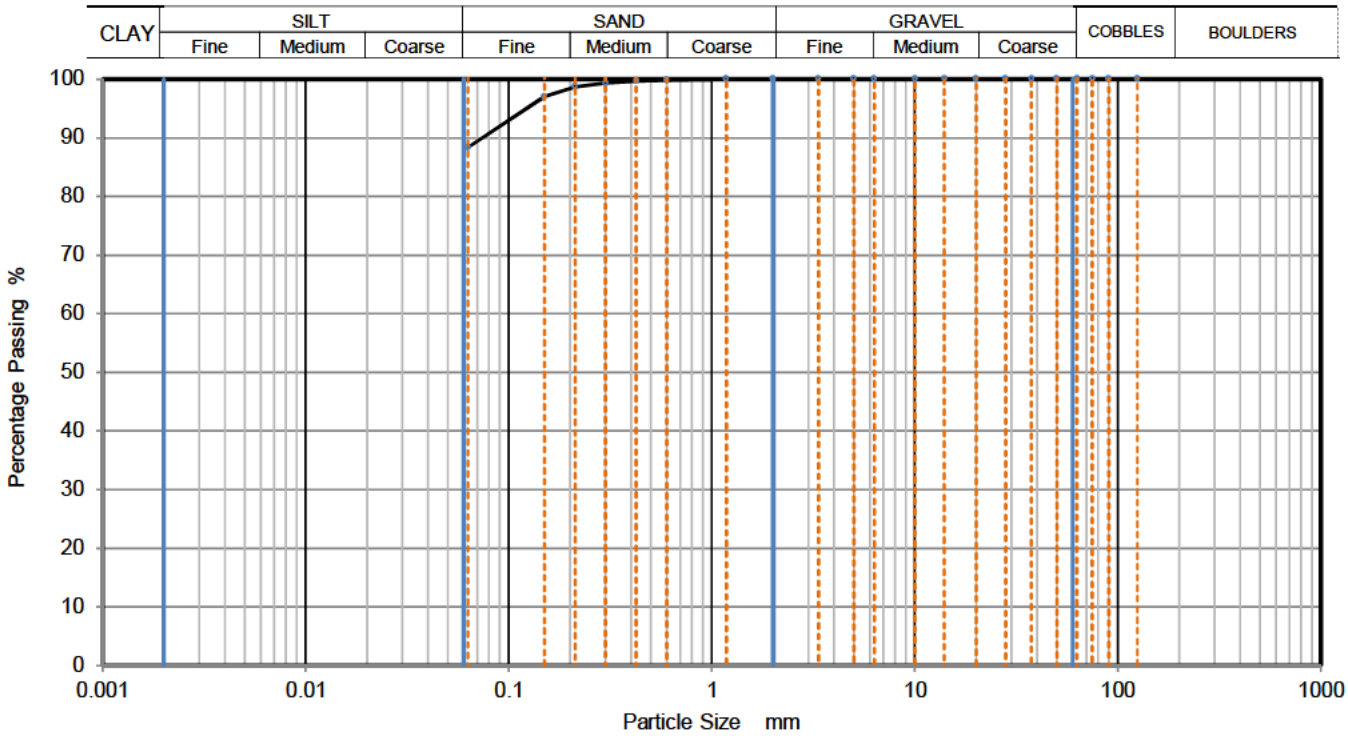
Approved	Date	Sheet No.:
MW	20/06/2018	1 of 1

[redacted]

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	**King's Lynn Compressor Station**	Project Number:	**GN21822-01**
Client Name:	[redacted]	Sample Location:	BH03
Sample Description:	Light grey slightly sandy CLAY	Sample Depth (m)	26.60
		Sample Reference	D19



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	99		
0.212	99		
0.15	97		
0.063	88		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	12
Fines <0.063mm	88

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

Remarks

Approved	Date	Sheet No.:
MW	20/06/2018	1 of 1

Ha [redacted]

SUMMARY OF GEOTECHNICAL TESTING

Sample details					Classification Tests					Density Tests		Undrained Triaxial Compression				Chemical Tests			Other tests and comments
Borehole / Trial Pit	Sample Ref	Depth (m)	Type	Description	WC (%)	LL (%)	PL (%)	PI (%)	<425 µm (%)	Bulk Mg/m³	Dry Mg/m³	Condition	Cell Pressure kPa	Deviator Stress kPa	Shear Stress kPa	pH	2:1 W/S SO4 (g/L)	W/S Mg (mg/L)	
BH01A	U1	4.00	U	Firm dark grey silty CLAY with rare shell fragments.	28.4					1.87	1.46	Undisturbed	80	110	55				One Dimensional Consolidation
BH01A	U2	8.40	C	Firm grey mottled dark grey CLAY with rare fine to medium shell fragments	39.3					1.87	1 34	Undisturbed	170	144	72				
BH01A	U3	10 05	C	Firm grey CLAY	42.3					1.76	1 24	Undisturbed	200	77	39				
BH01A	U4	11.70	C	Firm fissured grey CLAY	38.8					1.81	1 30	Undisturbed	230	93	47				
BH01A	U5	13 05	C	Firm fissured grey CLAY.															One Dimensional Consolidation
BH01A	U6	13 30	C	Firm fissured black well converted PEAT with rare shell fragments	89.5					1.40	0.74	Undisturbed	270	453	226				
BH01A	U7	28 30	C	Firm extremely thinly laminated pale grey layers of SILT interbedded with thick grey layers of CLAY.															One Dimensional Consolidation
BH01A	U8	29 30	C	Stiff laminated light brown and grey silty CLAY	23.9					2.04	1 64	Undisturbed	590	150	75				
BH01A	U9	30 85	C	Stiff laminated dark grey silty CLAY with rare pockets of fine sand	22.7					2.07	1 68	Undisturbed	620	269	134				
BH01A	U10	32 30	C	Stiff laminated brown and light grey silty CLAY	23.5					2.06	1 67	Undisturbed	650	225	113				

Sample type: B (Bulk disturb.) BLK (Block) C (Core) D (Disturbed) LB (Large Bulk dist.) U (Undisturbed)

[redacted]

Project Number:

GEO / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION
GN21822

[redacted]

[redacted]

SUMMARY OF GEOTECHNICAL TESTING

Sample details					Classification Tests					Density Tests		Undrained Triaxial Compression				Chemical Tests			Other tests and comments
Borehole / Trial Pit	Sample Ref	Depth (m)	Type	Description	WC (%)	LL (%)	PL (%)	PI (%)	<425 µm (%)	Bulk Mg/m³	Dry Mg/m³	Condition	Cell Pressure kPa	Deviator Stress kPa	Shear Stress kPa	pH	2:1 W/S SO4 (g/L)	W/S Mg (mg/L)	
BH01A	U11	34 50	C	Stiff laminated brown and light brown silty CLAY						2.08		Undisturbed	690	219	110				
BH01A	U12	37 60	C	Stiff laminated dark grey CLAY with rare fine gravel	23.5					2.08	1 68	Undisturbed	750	305	153				
BH01A	U13	41.11	C	Stiff laminated brown and light brown CLAY with rare fine gravel	19.0					2.10	1.76	Undisturbed	820	275	137				
BH01A	U14	45.73	C	Very stiff laminated brown and light grey silty CLAY	22.4					2.07	1 69	Undisturbed	920	328	164				
BH01A	U15	47.70	C	Stiff laminated brown and light brown silty CLAY	21.4					2.11	1.74	Undisturbed	950	223	112				
BH01A	U16	50 35	C	Stiff extremely thinly laminated pale grey SILT layers interbedded with thick grey layers of CLAY.															One Dimensional Consolidation
BH02	U1	6 00-6.45	U	Firm dark grey silty CLAY with rare shell fragments.	27.3					2.04	1 60	Undisturbed	120	122	61				One Dimensional Consolidation
BH02	U2	7.00	C	Firm grey CLAY with rare fine to medium gravel	37.2					1.86	1 35	Undisturbed	140	150	75				
BH02	U3	8.70	C	Firm grey CLAY with rare shell fragments	34.3					1.94	1.44	Undisturbed	175	180	90				
BH02	U4	10 20	C	Firm grey mottled dark grey CLAY with rare shell fragments	31.0					1.91	1.46	Undisturbed	205	154	77				

Sample type: B (Bulk disturb.) BLK (Block) C (Core) D (Disturbed) LB (Large Bulk dist.) U (Undisturbed)

[redacted]

Project Number:

GEO / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION
GN21822

[redacted]

[redacted]

SUMMARY OF GEOTECHNICAL TESTING

Sample details					Classification Tests					Density Tests		Undrained Triaxial Compression				Chemical Tests			Other tests and comments
Borehole / Trial Pit	Sample Ref	Depth (m)	Type	Description	WC (%)	LL (%)	PL (%)	PI (%)	<425 µm (%)	Bulk Mg/m³	Dry Mg/m³	Condition	Cell Pressure kPa	Deviator Stress kPa	Shear Stress kPa	pH	2:1 W/S SO4 (g/L)	W/S Mg (mg/L)	
BH02	U5	11 60	C	Stiff fissured grey mottled dark grey silty CLAY	35.5					1.82	1 35	Undisturbed	230	148	74				
BH02	U6	13 20	C	Stiff fissured grey mottled dark grey CLAY	28.6					1.95	1 52	Undisturbed	265	201	101				
BH02	U7	14 30	C	Very weak black PEAT SEDIMENTARY ROCK. Slightly weathered.															UCS, Point Load
BH02	U8	27 95	C	Firm extremely thinly laminated layers of pale grey SILT interbedded with thick layers of grey CLAY.															One Dimensional Consolidation
BH02	U9	30 25	C	Stiff laminated light brown silty CLAY	21.9					2.05	1 69	Undisturbed	605	290	145				
BH02	U10	31.12	C	Stiff laminated brown and grey silty CLAY	20.7					2.07	1.71	Undisturbed	620	270	135				
BH02	U11	34 30	C	Firm extremely thinly laminated pale grey SILT interbedded with thickly laminated greyish brown CLAY.															One Dimensional Consolidation
BH02	U12	36 96	C	Stiff laminated brown and grey silty CLAY with rare fine to medium gravel	23.6					2.04	1 65	Undisturbed	740	422	211				
BH02	U13	39 60	C	Stiff laminated brown and light brown silty CLAY	23.6					2.00	1 62	Undisturbed	790	277	139				
BH02	U14	42 60	C	Stiff extremely thinly laminated pale grey SILT interbedded with thickly laminated grey CLAY.															One Dimensional Consolidation

Sample type: B (Bulk disturb.) BLK (Block) C (Core) D (Disturbed) LB (Large Bulk dist.) U (Undisturbed)

[redacted]

Project Number:

GEO / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION
GN21822

[redacted]

[redacted]

SUMMARY OF GEOTECHNICAL TESTING

Sample details					Classification Tests					Density Tests		Undrained Triaxial Compression				Chemical Tests			Other tests and comments
Borehole / Trial Pit	Sample Ref	Depth (m)	Type	Description	WC (%)	LL (%)	PL (%)	PI (%)	<425 µm (%)	Bulk Mg/m³	Dry Mg/m³	Condition	Cell Pressure kPa	Deviator Stress kPa	Shear Stress kPa	pH	2:1 W/S SO4 (g/L)	W/S Mg (mg/L)	
BH02	U15	46 22	C	Firm laminated brown and grey silty CLAY	23.4					2.06	1 66	Undisturbed	925	292	146				
BH02	U16	47 30	C	Stiff laminated brown and grey silty CLAY	23.0					2.06	1 68	Undisturbed	950	305	153				
BH02	U17	49 20	C	Firm extremely thinly laminated pale grey SILT layers interbedded with thickly laminated grey CLAY layers.															One Dimensional Consolidation
BH02	U18	50.15	C	Stiff laminated brownish grey silty CLAY	23.5					2.04	1 65	Undisturbed	1000	191	95				
BH03	U1	4.20	U	Firm grey CLAY with rare shell fragments	36.2					1.86	1 36	Undisturbed	84	142	71				
BH03	U2	7.30	C	Firm grey CLAY.															One Dimensional Consolidation
BH03	U3	9.00	C	Stiff fissured grey CLAY with rare gypsum	35.3					1.91	1.41	Undisturbed	180	276	138				
BH03	U4	10 20	C	Stiff fissured dark grey CLAY with rare fine sand	38.4					1.83	1 32	Undisturbed	204	217	108				
BH03	U5	12 00	C	Stiff grey mottled dark grey CLAY with rare shell fragments	32.9					1.88	1.42	Undisturbed	240	215	107				
BH03	D6	13 05	C	Stiff fissured grey CLAY with rare she fragments and black organic matter	32.7					1.93	1.45	Undisturbed	261	220	110				

Sample type: B (Bulk disturb.) BLK (Block) C (Core) D (Disturbed) LB (Large Bulk dist.) U (Undisturbed)

[redacted]

Project Number:

GEO / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION
GN21822

[redacted]

[redacted]

SUMMARY OF GEOTECHNICAL TESTING

Sample details					Classification Tests					Density Tests		Undrained Triaxial Compression				Chemical Tests			Other tests and comments
Borehole / Trial Pit	Sample Ref	Depth (m)	Type	Description	WC (%)	LL (%)	PL (%)	PI (%)	<425 µm (%)	Bulk Mg/m³	Dry Mg/m³	Condition	Cell Pressure kPa	Deviator Stress kPa	Shear Stress kPa	pH	2:1 W/S SO4 (g/L)	W/S Mg (mg/L)	
BH03	U7	26 30	C	Firm extremely thin laminations of pale grey S LT interbedded with thick laminations of grey CLAY.															One Dimensional Consolidation
BH03	U8	27.70	C	Firm laminated brown and light grey silty CLAY	23.5					2.07	1 67	Undisturbed	554	161	80				
BH03	U9	28 90	C	Firm laminated light grey and brown silty CLAY	23.2					2.08	1 69	Undisturbed	578	218	109				
BH03	U10	30 83	C	Firm extremely thin laminations of pale grey S LT interbedded with thick laminations of grey CLAY.															One Dimensional Consolidation
BH03	U11	31 50	C	Stiff laminated brown and light grey silty CLAY	22.9					2.05	1 67	Undisturbed	630	347	174				
BH03	U12	34 52	C	Stiff laminated brown and light grey fine sandy CLAY	21.7					2.03	1 67	Undisturbed	690	152	76				
BH03	U13	37 53	C	Stiff laminated brown and rare light brown silty CLAY	21.2					2.09	1.72	Undisturbed	750	265	132				
BH03	U14	38 50	C	Stiff extremely thinly laminated pale grey SILT interbedded with thick laminations of grey CLAY.															One Dimensional Consolidation
BH03	U15	41.73	C	Stiff laminated brown and grey silty CLAY	24.2					2.05	1 65	Undisturbed	835	214	107				
BH03	U16	43 20	C	Stiff laminated brownish grey and brown fine sandy CLAY	22.5					2.09	1.70	Undisturbed	864	163	81				

Sample type: B (Bulk disturb.) BLK (Block) C (Core) D (Disturbed) LB (Large Bulk dist.) U (Undisturbed)

[redacted]

Project Number:

GEO / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION
GN21822

[redacted]

SUMMARY OF GEOTECHNICAL TESTING

Sample details					Classification Tests					Density Tests		Undrained Triaxial Compression				Chemical Tests			Other tests and comments
Borehole / Trial Pit	Sample Ref	Depth (m)	Type	Description	WC (%)	LL (%)	PL (%)	PI (%)	<425 µm (%)	Bulk Mg/m³	Dry Mg/m³	Condition	Cell Pressure kPa	Deviator Stress kPa	Shear Stress kPa	pH	2:1 W/S SO4 (g/L)	W/S Mg (mg/L)	
BH03	U17	44 55	C	Stiff laminated brownish grey and light grey fine sandy CLAY	22.4					2.07	1 69	Undisturbed	891	248	124				
BH03	U18	47 60	C	Stiff laminated brownish grey and light grey CLAY	24.1					2.05	1 65	Undisturbed	956	197	99				
BH03	U19	50 25	C	Stiff laminated brown and grey silty CLAY	23.9					2.04	1 65	Undisturbed	1005	156	78				

Sample type: B (Bulk disturb.) BLK (Block) C (Core) D (Disturbed) LB (Large Bulk dist.) U (Undisturbed)

[redacted]

Project Number:

GEO / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION
GN21822

[redacted]

Test Report By [redacted]

Client : [redacted]

(Ref 1529582138)

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH01A
Sample Ref	U1
Depth (m)	4.00
Sample Type	U

Description:

Firm dark grey silty CLAY with rare shell fragments.

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	202.5
Diameter	(mm)	104.0
Moisture Content	(%)	28.4
Bulk Density	(Mg/m³)	1.87
Dry Density	(Mg/m³)	1.46
Test Details		
Latex membrane thickness	(mm)	0.3
Membrane correction	(kPa)	1.1
Axial displacement rate	(%/min)	2.0
Cell pressure	(kPa)	80
Strain at failure	(%)	19.8
Maximum Deviator Stress	(kPa)	110
Shear Stress Cu	(kPa)	55

Mode of failure

Orientation of the sample	Vertical
Distance from top of tube mm	50

Checked and Approved by: [redacted]

Project Number:

GEO / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION

GN21822

UKAS TESTING 1982

Test Report By [redacted]

Client : [redacted]

(Ref 1529581473)

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH01A
Sample Ref	U2
Depth (m)	8.40
Sample Type	C

Description:

Firm grey mottled dark grey CLAY with rare fine to medium shell fragments

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	202.8
Diameter	(mm)	99.6
Moisture Content	(%)	39.3
Bulk Density	(Mg/m³)	1.87
Dry Density	(Mg/m³)	1.34
Test Details		
Latex membrane thickness	(mm)	0.3
Membrane correction	(kPa)	1.1
Axial displacement rate	(%/min)	2.0
Cell pressure	(kPa)	170
Strain at failure	(%)	19.2
Maximum Deviator Stress	(kPa)	144
Shear Stress Cu	(kPa)	72

Mode of failure

Orientation of the sample	Vertical
Distance from top of tube mm	90

Checked and Approved by:

[redacted]

21/06/2018

Project Number:

[redacted] / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION

GN21822

[redacted]

UKAS TESTING 1982

Test Report By [redacted]

Client : [redacted]

(Ref 1529581481)

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH01A
Sample Ref	U3
Depth (m)	10.05
Sample Type	C

Description:

Firm grey CLAY

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	202.5
Diameter	(mm)	101.8
Moisture Content	(%)	42.3
Bulk Density	(Mg/m³)	1.76
Dry Density	(Mg/m³)	1.24
Test Details		
Latex membrane thickness	(mm)	0.3
Membrane correction	(kPa)	1.1
Axial displacement rate	(%/min)	2.0
Cell pressure	(kPa)	200
Strain at failure	(%)	19.8
Maximum Deviator Stress	(kPa)	77
Shear Stress Cu	(kPa)	39

Mode of failure

Orientation of the sample	Vertical
Distance from top of tube mm	70

Checked and Approved by: [redacted]

Project Number: [redacted] / 27562

Project Name: KINGS LYNN COMPRESSOR STATION GN21822

UKAS TESTING 1982

Test Report By [redacted]

Client : [redacted]

(Ref 1529581487)

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH01A
Sample Ref	U4
Depth (m)	11.70
Sample Type	C

Description:

Firm fissured grey CLAY

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	203.3
Diameter	(mm)	99.8
Moisture Content	(%)	38.8
Bulk Density	(Mg/m³)	1.81
Dry Density	(Mg/m³)	1.30
Test Details		
Latex membrane thickness	(mm)	0.3
Membrane correction	(kPa)	1.1
Axial displacement rate	(%/min)	2.0
Cell pressure	(kPa)	230
Strain at failure	(%)	19.7
Maximum Deviator Stress	(kPa)	93
Shear Stress Cu	(kPa)	47

Mode of failure

Orientation of the sample	Vertical
Distance from top of tube mm	50

Checked and Approved by:

[redacted]

J Sturges - Operations Manager
21/06/2018

Project Number:

[redacted] / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION
GN21822

[redacted]
UKAS TESTING
1982

Test Report By [redacted]

Client : [redacted]

1731 - UUTXL BH01A 13.30 U6 C - 27562-301511.XLSM

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH01A
Sample Ref	U6
Depth (m)	13.30
Sample Type	C

Description:

Firm fissured black well converted PEAT with rare shell fragments

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	161.4
Diameter	(mm)	98.3
Moisture Content	(%)	89.5
Bulk Density	(Mg/m³)	1.40
Dry Density	(Mg/m³)	0.74
Test Details		
Latex membrane thickness	(mm)	0.3
Membrane correction	(kPa)	0.4
Axial displacement rate	(%/min)	2.5
Cell pressure	(kPa)	270
Strain at failure	(%)	5.3
Maximum Deviator Stress	(kPa)	453
Shear Stress Cu	(kPa)	226

Mode of failure

Orientation of the sample	Vertical
Distance from top of tube mm	50

Checked and Approved by:

[redacted]

J Sturges - Operations Manager
21/06/2018

Project Number:

[redacted] / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION
GN21822

[redacted]

UKAS TESTING 1982

Test Report By [redacted]

Client : [redacted]

(Ref 1529581501)

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH01A
Sample Ref	U8
Depth (m)	29.30
Sample Type	C

Description:

Stiff laminated light brown and grey silty CLAY

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	176.1
Diameter	(mm)	94.3
Moisture Content	(%)	23.9
Bulk Density	(Mg/m³)	2.04
Dry Density	(Mg/m³)	1.64
Test Details		
Latex membrane thickness	(mm)	0.3
Membrane correction	(kPa)	1.2
Axial displacement rate	(%/min)	2.3
Cell pressure	(kPa)	590
Strain at failure	(%)	19.9
Maximum Deviator Stress	(kPa)	150
Shear Stress Cu	(kPa)	75

Mode of failure

Orientation of the sample	Vertical
Distance from top of tube mm	20

Checked and Approved by:

[redacted]

J Sturges - Operations Manager
21/06/2018

Project Number:

[redacted] / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION
GN21822

[redacted]

UKAS TESTING 1982

Test Report By [redacted]

Client : [redacted]

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH01A
Sample Ref	U9
Depth (m)	30.85
Sample Type	C

Description:

Stiff laminated dark grey silty CLAY with rare pockets of fine sand

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	193.5
Diameter	(mm)	98.7
Moisture Content	(%)	22.7
Bulk Density	(Mg/m³)	2.07
Dry Density	(Mg/m³)	1.68
Test Details		
Latex membrane thickness	(mm)	0.3
Membrane correction	(kPa)	1.1
Axial displacement rate	(%/min)	2.1
Cell pressure	(kPa)	620
Strain at failure	(%)	17.6
Maximum Deviator Stress	(kPa)	269
Shear Stress Cu	(kPa)	134

Mode of failure

Orientation of the sample	Vertical
Distance from top of tube mm	5

Checked and Approved by:

[redacted]

J Sturges - Operations Manager
21/06/2018

Project Number:

[redacted] / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION
GN21822

[redacted]

UKAS TESTING 1982

Test Report By [redacted]

Client : [redacted]

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH01A
Sample Ref	U10
Depth (m)	32.30
Sample Type	C

Description:

Stiff laminated brown and light grey silty CLAY

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	202.0
Diameter	(mm)	100.1
Moisture Content	(%)	23.5
Bulk Density	(Mg/m³)	2.06
Dry Density	(Mg/m³)	1.67
Test Details		
Latex membrane thickness	(mm)	0.3
Membrane correction	(kPa)	1.1
Axial displacement rate	(%/min)	2.0
Cell pressure	(kPa)	650
Strain at failure	(%)	19.8
Maximum Deviator Stress	(kPa)	225
Shear Stress Cu	(kPa)	113

Mode of failure

Orientation of the sample	Vertical
Distance from top of tube mm	100

Checked and Approved by:

[redacted]

J Sturges - Operations Manager
21/06/2018

Project Number:

[redacted] / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION
GN21822

[redacted]

UKAS TESTING 1982

Test Report By [redacted]

Client : [redacted]

1731 - UUTXL BH01A 34.50 U11 C - 27562-301524.XLSM

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH01A
Sample Ref	U11
Depth (m)	34.50
Sample Type	C

Description:

Stiff laminated brown and light brown silty CLAY

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	192.2
Diameter	(mm)	99.5
Moisture Content	(%)	
Bulk Density	(Mg/m³)	2.08
Dry Density	(Mg/m³)	
Test Details		
Latex membrane thickness	(mm)	0.3
Membrane correction	(kPa)	1.2
Axial displacement rate	(%/min)	2.1
Cell pressure	(kPa)	690
Strain at failure	(%)	20.3
Maximum Deviator Stress	(kPa)	219
Shear Stress Cu	(kPa)	110

Mode of failure

Orientation of the sample	Vertical
Distance from top of tube mm	90

Checked and Approved by:

[redacted]

J Sturges - Operations Manager
21/06/2018

Project Number:

[redacted] / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION
GN21822

[redacted]

UKAS TESTING 1982

Test Report By [redacted]

Client : [redacted]

(Ref 1529581527)

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH01A
Sample Ref	U12
Depth (m)	37.60
Sample Type	C

Description:

Stiff laminated dark grey CLAY with rare fine gravel

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	204.1
Diameter	(mm)	95.1
Moisture Content	(%)	23.5
Bulk Density	(Mg/m³)	2.08
Dry Density	(Mg/m³)	1.68
Test Details		
Latex membrane thickness	(mm)	0.3
Membrane correction	(kPa)	0.2
Axial displacement rate	(%/min)	2.0
Cell pressure	(kPa)	750
Strain at failure	(%)	2.4
Maximum Deviator Stress	(kPa)	305
Shear Stress Cu	(kPa)	153

Mode of failure

Orientation of the sample	Vertical
Distance from top of tube mm	30

Checked and Approved by:

[redacted]

J Sturges - Operations Manager
21/06/2018

Project Number:

[redacted] / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION
GN21822

[redacted]

UKAS TESTING 1982

Test Report By [redacted]

Client : [redacted]

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH01A
Sample Ref	U13
Depth (m)	41.11
Sample Type	C

Description:

Stiff laminated brown and light brown CLAY with rare fine gravel

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	201.8
Diameter	(mm)	99.2
Moisture Content	(%)	19.0
Bulk Density	(Mg/m³)	2.10
Dry Density	(Mg/m³)	1.76
Test Details		
Latex membrane thickness	(mm)	0.3
Membrane correction	(kPa)	0.8
Axial displacement rate	(%/min)	2.0
Cell pressure	(kPa)	820
Strain at failure	(%)	11.9
Maximum Deviator Stress	(kPa)	275
Shear Stress Cu	(kPa)	137

Mode of failure

Orientation of the sample	Vertical
Distance from top of tube mm	95

Checked and Approved by:

[redacted]

J Sturges - Operations Manager
21/06/2018

Project Number:

[redacted] / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION
GN21822

[redacted]

UKAS TESTING 1982

Test Report By [redacted]

Client : [redacted]

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH01A
Sample Ref	U14
Depth (m)	45.73
Sample Type	C

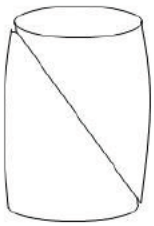
Description:

Very stiff laminated brown and light grey silty CLAY

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	192.5
Diameter	(mm)	98.6
Moisture Content	(%)	22.4
Bulk Density	(Mg/m³)	2.07
Dry Density	(Mg/m³)	1.69
Test Details		
Latex membrane thickness	(mm)	0.3
Membrane correction	(kPa)	0.2
Axial displacement rate	(%/min)	2.1
Cell pressure	(kPa)	920
Strain at failure	(%)	2.9
Maximum Deviator Stress	(kPa)	328
Shear Stress Cu	(kPa)	164

Mode of failure



Orientation of the sample	Vertical
Distance from top of tube mm	110

Checked and Approved by:

[redacted]

J Sturges - Operations Manager
21/06/2018

Project Number:

[redacted] / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION
GN21822

[redacted]

UKAS TESTING 1982

Test Report By [redacted]

Client : [redacted]

1731 - UUTXL BH01A 47.70 U15 C - 27562-301520.XLSM

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH01A
Sample Ref	U15
Depth (m)	47.70
Sample Type	C

Description:

Stiff laminated brown and light brown silty CLAY

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	202.0
Diameter	(mm)	95.9
Moisture Content	(%)	21.4
Bulk Density	(Mg/m³)	2.11
Dry Density	(Mg/m³)	1.74
Test Details		
Latex membrane thickness	(mm)	0.3
Membrane correction	(kPa)	1.2
Axial displacement rate	(%/min)	2.0
Cell pressure	(kPa)	950
Strain at failure	(%)	19.8
Maximum Deviator Stress	(kPa)	223
Shear Stress Cu	(kPa)	112

Mode of failure

Orientation of the sample	Vertical
Distance from top of tube mm	100

Checked and Approved by:

[redacted]

J Sturges - Operations Manager
21/06/2018

Project Number:

[redacted] / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION
GN21822

[redacted]

UKAS TESTING 1982

Test Report By [redacted]

Client : [redacted]

(Ref 1529581555)

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH02
Sample Ref	U1
Depth (m)	6.00-6.45
Sample Type	U

Description:

Firm dark grey silty CLAY with rare shell fragments.

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	203.1
Diameter	(mm)	103.3
Moisture Content	(%)	27.3
Bulk Density	(Mg/m³)	2.04
Dry Density	(Mg/m³)	1.60
Test Details		
Latex membrane thickness	(mm)	0.3
Membrane correction	(kPa)	1.1
Axial displacement rate	(%/min)	2.0
Cell pressure	(kPa)	120
Strain at failure	(%)	19.7
Maximum Deviator Stress	(kPa)	122
Shear Stress Cu	(kPa)	61

Mode of failure

Orientation of the sample	Vertical
Distance from top of tube mm	75

Checked and Approved by:

[redacted]

J Sturges - Operations Manager
21/06/2018

Project Number:

[redacted] / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION
GN21822

[redacted]

UKAS TESTING 1982

Test Report By [redacted]

Client : [redacted]

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH02
Sample Ref	U2
Depth (m)	7.00
Sample Type	C

Description:

Firm grey CLAY with rare fine to medium gravel

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	202.4
Diameter	(mm)	99.9
Moisture Content	(%)	37.2
Bulk Density	(Mg/m³)	1.86
Dry Density	(Mg/m³)	1.35
Test Details		
Latex membrane thickness	(mm)	0.3
Membrane correction	(kPa)	1.1
Axial displacement rate	(%/min)	2.0
Cell pressure	(kPa)	140
Strain at failure	(%)	19.8
Maximum Deviator Stress	(kPa)	150
Shear Stress Cu	(kPa)	75

Mode of failure

Orientation of the sample	Vertical
Distance from top of tube mm	75

Checked and Approved by:

[redacted]

J Sturges - Operations Manager
21/06/2018

Project Number:

[redacted] / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION
GN21822

[redacted]

UKAS TESTING
1982

Test Report By [redacted]

Client : [redacted]

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH02
Sample Ref	U3
Depth (m)	8.70
Sample Type	C

Description:

Firm grey CLAY with rare shell fragments

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	202.3
Diameter	(mm)	99.6
Moisture Content	(%)	34.3
Bulk Density	(Mg/m³)	1.94
Dry Density	(Mg/m³)	1.44
Test Details		
Latex membrane thickness	(mm)	0.3
Membrane correction	(kPa)	1.1
Axial displacement rate	(%/min)	2.0
Cell pressure	(kPa)	175
Strain at failure	(%)	19.8
Maximum Deviator Stress	(kPa)	180
Shear Stress Cu	(kPa)	90

Mode of failure

Orientation of the sample	Vertical
Distance from top of tube mm	85

Checked and Approved by:

[redacted]

J Sturges - Operations Manager
21/06/2018

Project Number:

[redacted] / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION
GN21822

[redacted]

UKAS TESTING 1982

Test Report By [redacted]

Client : [redacted]

1731 - UUTXL BH02 10.20 U4 C - 27562-301527.XLSM

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH02
Sample Ref	U4
Depth (m)	10.20
Sample Type	C

Description:

Firm grey mottled dark grey CLAY with rare shell fragments

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	202.9
Diameter	(mm)	99.9
Moisture Content	(%)	31.0
Bulk Density	(Mg/m³)	1.91
Dry Density	(Mg/m³)	1.46
Test Details		
Latex membrane thickness	(mm)	0.3
Membrane correction	(kPa)	1.0
Axial displacement rate	(%/min)	2.0
Cell pressure	(kPa)	205
Strain at failure	(%)	17.7
Maximum Deviator Stress	(kPa)	154
Shear Stress Cu	(kPa)	77

Mode of failure

Orientation of the sample	Vertical
Distance from top of tube mm	80

Checked and Approved by:

[redacted]

J Sturges - Operations Manager
21/06/2018

Project Number:

[redacted] / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION
GN21822

[redacted]

UKAS TESTING 1982

Test Report By [redacted]

Client : [redacted]

(Ref 1529581581)

1731 - UUTXL BH02 11.60 U5 C - 27562-301518.XLSM

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH02
Sample Ref	U5
Depth (m)	11.60
Sample Type	C

Description:

Stiff fissured grey mottled dark grey silty CLAY

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	202.5
Diameter	(mm)	101.5
Moisture Content	(%)	35.5
Bulk Density	(Mg/m³)	1.82
Dry Density	(Mg/m³)	1.35
Test Details		
Latex membrane thickness	(mm)	0.3
Membrane correction	(kPa)	1.1
Axial displacement rate	(%/min)	2.0
Cell pressure	(kPa)	230
Strain at failure	(%)	19.8
Maximum Deviator Stress	(kPa)	148
Shear Stress Cu	(kPa)	74

Mode of failure

Orientation of the sample	Vertical
Distance from top of tube mm	85

Checked and Approved by:

[redacted]

J Sturges - Operations Manager
21/06/2018

Project Number:

[redacted] / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION
GN21822

[redacted]

UKAS TESTING 1982

Test Report By [redacted]

Client : [redacted]

(Ref 1529581588)

1731 - UUTXL BH02 13.20 U6 C - 27562-301519.XLSM

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH02
Sample Ref	U6
Depth (m)	13.20
Sample Type	C

Description:

Stiff fissured grey mottled dark grey CLAY

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	202.6
Diameter	(mm)	99.9
Moisture Content	(%)	28.6
Bulk Density	(Mg/m³)	1.95
Dry Density	(Mg/m³)	1.52
Test Details		
Latex membrane thickness	(mm)	0.3
Membrane correction	(kPa)	1.1
Axial displacement rate	(%/min)	2.0
Cell pressure	(kPa)	265
Strain at failure	(%)	19.7
Maximum Deviator Stress	(kPa)	201
Shear Stress Cu	(kPa)	101

Mode of failure

Orientation of the sample	Vertical
Distance from top of tube mm	100

Checked and Approved by:

[redacted]

J Sturges - Operations Manager
21/06/2018

Project Number:

[redacted] / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION
GN21822

[redacted]

UKAS TESTING 1982

Test Report By [redacted]

Client : [redacted]

(Ref 1529581595)

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH02
Sample Ref	U9
Depth (m)	30.25
Sample Type	C

Description:

Stiff laminated light brown silty CLAY

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	158.2
Diameter	(mm)	100.3
Moisture Content	(%)	21.9
Bulk Density	(Mg/m³)	2.05
Dry Density	(Mg/m³)	1.69
Test Details		
Latex membrane thickness	(mm)	0.3
Membrane correction	(kPa)	0.9
Axial displacement rate	(%/min)	2.5
Cell pressure	(kPa)	605
Strain at failure	(%)	13.9
Maximum Deviator Stress	(kPa)	290
Shear Stress Cu	(kPa)	145

Mode of failure

Orientation of the sample	Vertical
Distance from top of tube mm	50

Checked and Approved by:

[redacted]

J Sturges - Operations Manager
21/06/2018

Project Number:

[redacted] / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION
GN21822

[redacted]

UKAS TESTING 1982

Test Report By [redacted]

Client : [redacted]

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH02
Sample Ref	U10
Depth (m)	31.12
Sample Type	C

Description:

Stiff laminated brown and grey silty CLAY

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	202.5
Diameter	(mm)	100.1
Moisture Content	(%)	20.7
Bulk Density	(Mg/m³)	2.07
Dry Density	(Mg/m³)	1.71
Test Details		
Latex membrane thickness	(mm)	0.3
Membrane correction	(kPa)	1.1
Axial displacement rate	(%/min)	2.0
Cell pressure	(kPa)	620
Strain at failure	(%)	18.3
Maximum Deviator Stress	(kPa)	270
Shear Stress Cu	(kPa)	135

Mode of failure

Orientation of the sample	Vertical
Distance from top of tube mm	80

Checked and Approved by:

[redacted]

J Sturges - Operations Manager
21/06/2018

Project Number:

[redacted] / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION
GN21822

[redacted]

UKAS TESTING 1982

Test Report By [redacted]

Client : [redacted]

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH02
Sample Ref	U12
Depth (m)	36.96
Sample Type	C

Description:

Stiff laminated brown and grey silty CLAY with rare fine to medium gravel

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	202.3
Diameter	(mm)	98.0
Moisture Content	(%)	23.6
Bulk Density	(Mg/m³)	2.04
Dry Density	(Mg/m³)	1.65
Test Details		
Latex membrane thickness	(mm)	0.3
Membrane correction	(kPa)	0.2
Axial displacement rate	(%/min)	2.0
Cell pressure	(kPa)	740
Strain at failure	(%)	2.5
Maximum Deviator Stress	(kPa)	422
Shear Stress Cu	(kPa)	211

Mode of failure

Orientation of the sample	Vertical
Distance from top of tube mm	55

Checked and Approved by:

[redacted]

J Sturges - Operations Manager
21/06/2018

Project Number:

[redacted] / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION
GN21822

[redacted]

UKAS TESTING 1982

Test Report By [redacted]

Client : [redacted]

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH02
Sample Ref	U13
Depth (m)	39.60
Sample Type	C

Description:

Stiff laminated brown and light brown silty CLAY

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	177.4
Diameter	(mm)	100.5
Moisture Content	(%)	23.6
Bulk Density	(Mg/m³)	2.00
Dry Density	(Mg/m³)	1.62
Test Details		
Latex membrane thickness	(mm)	0.3
Membrane correction	(kPa)	0.3
Axial displacement rate	(%/min)	2.3
Cell pressure	(kPa)	790
Strain at failure	(%)	3.1
Maximum Deviator Stress	(kPa)	277
Shear Stress Cu	(kPa)	139

Mode of failure

Orientation of the sample	Vertical
Distance from top of tube mm	110

Checked and Approved by:

[redacted]

J Sturges - Operations Manager
21/06/2018

Project Number:

[redacted] / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION
GN21822

[redacted]

UKAS TESTING 1982

Test Report By [redacted]

Client : [redacted]

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH02
Sample Ref	U15
Depth (m)	46.22
Sample Type	C

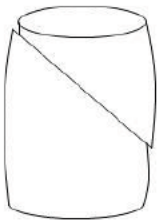
Description:

Firm laminated brown and grey silty CLAY

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	203.0
Diameter	(mm)	98.1
Moisture Content	(%)	23.4
Bulk Density	(Mg/m³)	2.06
Dry Density	(Mg/m³)	1.66
Test Details		
Latex membrane thickness	(mm)	0.3
Membrane correction	(kPa)	0.2
Axial displacement rate	(%/min)	2.0
Cell pressure	(kPa)	925
Strain at failure	(%)	2.7
Maximum Deviator Stress	(kPa)	292
Shear Stress Cu	(kPa)	146

Mode of failure



Orientation of the sample	Vertical
Distance from top of tube mm	25

Checked and Approved by:

[redacted]

J Sturges - Operations Manager
21/06/2018

Project Number:

[redacted] / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION
GN21822

[redacted]

UKAS TESTING 1982

Test Report By [redacted]

Client : [redacted]

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH02
Sample Ref	U16
Depth (m)	47.30
Sample Type	C

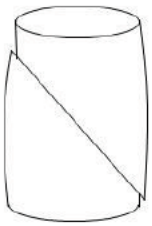
Description:

Stiff laminated brown and grey silty CLAY

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	202.0
Diameter	(mm)	99.2
Moisture Content	(%)	23.0
Bulk Density	(Mg/m³)	2.06
Dry Density	(Mg/m³)	1.68
Test Details		
Latex membrane thickness	(mm)	0.3
Membrane correction	(kPa)	0.4
Axial displacement rate	(%/min)	2.0
Cell pressure	(kPa)	950
Strain at failure	(%)	5.0
Maximum Deviator Stress	(kPa)	305
Shear Stress Cu	(kPa)	153

Mode of failure



Orientation of the sample	Vertical
Distance from top of tube mm	80

Checked and Approved by:

[redacted]

J Sturges - Operations Manager
21/06/2018

Project Number:

[redacted] / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION
GN21822

[redacted]

UKAS TESTING 1982

Test Report By [redacted]

Client : [redacted]

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH02
Sample Ref	U18
Depth (m)	50.15
Sample Type	C

Description:

Stiff laminated brownish grey silty CLAY

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	182.6
Diameter	(mm)	99.5
Moisture Content	(%)	23.5
Bulk Density	(Mg/m³)	2.04
Dry Density	(Mg/m³)	1.65
Test Details		
Latex membrane thickness	(mm)	0.3
Membrane correction	(kPa)	0.9
Axial displacement rate	(%/min)	2.2
Cell pressure	(kPa)	1000
Strain at failure	(%)	14.8
Maximum Deviator Stress	(kPa)	191
Shear Stress Cu	(kPa)	95

Mode of failure

Orientation of the sample	Vertical
Distance from top of tube mm	10

Checked and Approved by:

[redacted]

J Sturges - Operations Manager
21/06/2018

Project Number:

[redacted] / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION
GN21822

[redacted]

UKAS TESTING 1982

Test Report By [redacted]

Client : [redacted]

1731 - UUTXL BH03 04.20 U1 U - 27562-301399.XLSM

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH03
Sample Ref	U1
Depth (m)	4.20
Sample Type	U

Description:

Firm grey CLAY with rare shell fragments

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	202.7
Diameter	(mm)	103.7
Moisture Content	(%)	36.2
Bulk Density	(Mg/m³)	1.86
Dry Density	(Mg/m³)	1.36
Test Details		
Latex membrane thickness	(mm)	0.3
Membrane correction	(kPa)	1.0
Axial displacement rate	(%/min)	2.0
Cell pressure	(kPa)	84
Strain at failure	(%)	18.3
Maximum Deviator Stress	(kPa)	142
Shear Stress Cu	(kPa)	71

Mode of failure

Orientation of the sample	Vertical
Distance from top of tube mm	10

Checked and Approved by:

[redacted]

J Sturges - Operations Manager
21/06/2018

Project Number:

[redacted] / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION
GN21822

[redacted]

UKAS TESTING 1982

Test Report By [redacted]

Client : [redacted]

(Ref 1529581648)

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH03
Sample Ref	U3
Depth (m)	9.00
Sample Type	C

Description:

Stiff fissured grey CLAY with rare gypsum

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	203.1
Diameter	(mm)	99.1
Moisture Content	(%)	35.3
Bulk Density	(Mg/m³)	1.91
Dry Density	(Mg/m³)	1.41
Test Details		
Latex membrane thickness	(mm)	0.3
Membrane correction	(kPa)	1.1
Axial displacement rate	(%/min)	2.0
Cell pressure	(kPa)	180
Strain at failure	(%)	19.7
Maximum Deviator Stress	(kPa)	276
Shear Stress Cu	(kPa)	138

Mode of failure

Orientation of the sample	Vertical
Distance from top of tube mm	95

Checked and Approved by:

[redacted]

J Sturges - Operations Manager
21/06/2018

Project Number:

[redacted] / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION
GN21822

[redacted]

UKAS TESTING 1982

Test Report By [redacted]

Client : [redacted]

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH03
Sample Ref	U4
Depth (m)	10.20
Sample Type	C

Description:

Stiff fissured dark grey CLAY with rare fine sand

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	193.7
Diameter	(mm)	100.5
Moisture Content	(%)	38.4
Bulk Density	(Mg/m³)	1.83
Dry Density	(Mg/m³)	1.32
Test Details		
Latex membrane thickness	(mm)	0.3
Membrane correction	(kPa)	1.2
Axial displacement rate	(%/min)	2.1
Cell pressure	(kPa)	204
Strain at failure	(%)	20.6
Maximum Deviator Stress	(kPa)	217
Shear Stress Cu	(kPa)	108

Mode of failure

Orientation of the sample	Vertical
Distance from top of tube mm	20

Checked and Approved by:

[redacted]

J Sturges - Operations Manager
21/06/2018

Project Number:

[redacted] / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION
GN21822

[redacted]

UKAS TESTING 1982

Test Report By [redacted]

Client : [redacted]

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH03
Sample Ref	U5
Depth (m)	12.00
Sample Type	C

Description:

Stiff grey mottled dark grey CLAY with rare shell fragments

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	202.7
Diameter	(mm)	100.2
Moisture Content	(%)	32.9
Bulk Density	(Mg/m³)	1.88
Dry Density	(Mg/m³)	1.42
Test Details		
Latex membrane thickness	(mm)	0.3
Membrane correction	(kPa)	1.1
Axial displacement rate	(%/min)	2.0
Cell pressure	(kPa)	240
Strain at failure	(%)	19.7
Maximum Deviator Stress	(kPa)	215
Shear Stress Cu	(kPa)	107

Mode of failure

Orientation of the sample	Vertical
Distance from top of tube mm	25

Checked and Approved by:

[redacted]

J Sturges - Operations Manager
21/06/2018

Project Number:

[redacted] / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION
GN21822

[redacted]

UKAS TESTING 1982

Test Report By [redacted]

Client : [redacted]

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH03
Sample Ref	D6
Depth (m)	13.05
Sample Type	C

Description:

Stiff fissured grey CLAY with rare she fragments and black organic matter

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	202.8
Diameter	(mm)	101.8
Moisture Content	(%)	32.7
Bulk Density	(Mg/m³)	1.93
Dry Density	(Mg/m³)	1.45
Test Details		
Latex membrane thickness	(mm)	0.3
Membrane correction	(kPa)	1.1
Axial displacement rate	(%/min)	2.0
Cell pressure	(kPa)	261
Strain at failure	(%)	19.7
Maximum Deviator Stress	(kPa)	220
Shear Stress Cu	(kPa)	110

Mode of failure

Orientation of the sample	Vertical
Distance from top of tube mm	90

Checked and Approved by:

[redacted]

J Sturges - Operations Manager
21/06/2018

Project Number:

[redacted] / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION
GN21822

[redacted]

UKAS TESTING 1982

Test Report By [redacted]

Client : [redacted]

1731 - UUTXL BH03 27.70 U8 C - 27562-301398.XLSM

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH03
Sample Ref	U8
Depth (m)	27.70
Sample Type	C

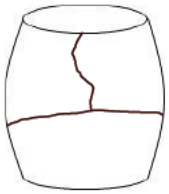
Description:

Firm laminated brown and light grey silty CLAY

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	202.6
Diameter	(mm)	99.5
Moisture Content	(%)	23.5
Bulk Density	(Mg/m³)	2.07
Dry Density	(Mg/m³)	1.67
Test Details		
Latex membrane thickness	(mm)	0.3
Membrane correction	(kPa)	1.1
Axial displacement rate	(%/min)	2.0
Cell pressure	(kPa)	554
Strain at failure	(%)	19.7
Maximum Deviator Stress	(kPa)	161
Shear Stress Cu	(kPa)	80

Mode of failure



Orientation of the sample	Vertical
Distance from top of tube mm	75

Checked and Approved by:

[redacted]

J Sturges - Operations Manager
21/06/2018

Project Number:

[redacted] / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION
GN21822

[redacted]

UKAS TESTING 1982

Test Report By [redacted]

Client : [redacted]

(Ref 1529581681)

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH03
Sample Ref	U9
Depth (m)	28.90
Sample Type	C

Description:

Firm laminated light grey and brown silty CLAY

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	202.7
Diameter	(mm)	99.8
Moisture Content	(%)	23.2
Bulk Density	(Mg/m³)	2.08
Dry Density	(Mg/m³)	1.69
Test Details		
Latex membrane thickness	(mm)	0.3
Membrane correction	(kPa)	1.1
Axial displacement rate	(%/min)	2.0
Cell pressure	(kPa)	578
Strain at failure	(%)	18.3
Maximum Deviator Stress	(kPa)	218
Shear Stress Cu	(kPa)	109

Mode of failure

Orientation of the sample	Vertical
Distance from top of tube mm	85

Checked and Approved by:

[redacted]

J Sturges - Operations Manager
21/06/2018

Project Number:

[redacted] / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION
GN21822

[redacted]

UKAS TESTING 1982

Test Report By [redacted]

Client : [redacted]

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH03
Sample Ref	U11
Depth (m)	31.50
Sample Type	C

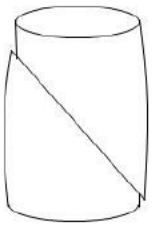
Description:

Stiff laminated brown and light grey silty CLAY

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	202.1
Diameter	(mm)	100.0
Moisture Content	(%)	22.9
Bulk Density	(Mg/m³)	2.05
Dry Density	(Mg/m³)	1.67
Test Details		
Latex membrane thickness	(mm)	0.3
Membrane correction	(kPa)	1.1
Axial displacement rate	(%/min)	2.0
Cell pressure	(kPa)	630
Strain at failure	(%)	19.8
Maximum Deviator Stress	(kPa)	347
Shear Stress Cu	(kPa)	174

Mode of failure



Orientation of the sample	Vertical
Distance from top of tube mm	90

Checked and Approved by:

[redacted]

J Sturges - Operations Manager
21/06/2018

Project Number:

[redacted] / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION
GN21822

[redacted]

UKAS TESTING 1982

Test Report By [redacted]

Client : [redacted]

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH03
Sample Ref	U12
Depth (m)	34.52
Sample Type	C

Description:

Stiff laminated brown and light grey fine sandy CLAY

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	202.3
Diameter	(mm)	100.1
Moisture Content	(%)	21.7
Bulk Density	(Mg/m³)	2.03
Dry Density	(Mg/m³)	1.67
Test Details		
Latex membrane thickness	(mm)	0.3
Membrane correction	(kPa)	0.2
Axial displacement rate	(%/min)	2.0
Cell pressure	(kPa)	690
Strain at failure	(%)	2.0
Maximum Deviator Stress	(kPa)	152
Shear Stress Cu	(kPa)	76

Mode of failure

Orientation of the sample	Vertical
Distance from top of tube mm	70

Checked and Approved by:

[redacted]

J Sturges - Operations Manager
21/06/2018

Project Number:

[redacted] / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION
GN21822

[redacted]

UKAS TESTING 1982

Test Report By [redacted]

Client : [redacted]

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH03
Sample Ref	U13
Depth (m)	37.53
Sample Type	C

Description:

Stiff laminated brown and rare light brown silty CLAY

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	202.3
Diameter	(mm)	98.2
Moisture Content	(%)	21.2
Bulk Density	(Mg/m³)	2.09
Dry Density	(Mg/m³)	1.72
Test Details		
Latex membrane thickness	(mm)	0.3
Membrane correction	(kPa)	1.1
Axial displacement rate	(%/min)	2.0
Cell pressure	(kPa)	750
Strain at failure	(%)	19.3
Maximum Deviator Stress	(kPa)	265
Shear Stress Cu	(kPa)	132

Mode of failure

Orientation of the sample	Vertical
Distance from top of tube mm	90

Checked and Approved by:

[redacted]

J Sturges - Operations Manager
21/06/2018

Project Number:

[redacted] / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION
GN21822

[redacted]

UKAS TESTING 1982

Test Report By [redacted]

Client : [redacted]

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH03
Sample Ref	U15
Depth (m)	41.73
Sample Type	C

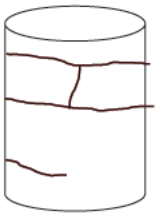
Description:

Stiff laminated brown and grey silty CLAY

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	202.5
Diameter	(mm)	98.3
Moisture Content	(%)	24.2
Bulk Density	(Mg/m³)	2.05
Dry Density	(Mg/m³)	1.65
Test Details		
Latex membrane thickness	(mm)	0.3
Membrane correction	(kPa)	0.2
Axial displacement rate	(%/min)	2.0
Cell pressure	(kPa)	835
Strain at failure	(%)	3.0
Maximum Deviator Stress	(kPa)	214
Shear Stress Cu	(kPa)	107

Mode of failure



Orientation of the sample	Vertical
Distance from top of tube mm	55

Checked and Approved by:

[redacted]

J Sturges - Operations Manager
21/06/2018

Project Number:

[redacted] / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION
GN21822

[redacted]

UKAS TESTING 1982

Test Report By [redacted]

Client : [redacted]

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH03
Sample Ref	U16
Depth (m)	43.20
Sample Type	C

Description:

Stiff laminated brownish grey and brown fine sandy CLAY

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	202.6
Diameter	(mm)	98.2
Moisture Content	(%)	22.5
Bulk Density	(Mg/m³)	2.09
Dry Density	(Mg/m³)	1.70
Test Details		
Latex membrane thickness	(mm)	0.3
Membrane correction	(kPa)	1.2
Axial displacement rate	(%/min)	2.0
Cell pressure	(kPa)	864
Strain at failure	(%)	19.7
Maximum Deviator Stress	(kPa)	163
Shear Stress Cu	(kPa)	81

Mode of failure

Orientation of the sample	Vertical
Distance from top of tube mm	60

Checked and Approved by:

[redacted]

J Sturges - Operations Manager
21/06/2018

Project Number:

[redacted] / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION
GN21822

[redacted]

UKAS TESTING 1982

Test Report By [redacted]

Client : [redacted]

1731 - UUTXL BH03 44.55 U17 C - 27562-301415.XLSM

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH03
Sample Ref	U17
Depth (m)	44.55
Sample Type	C

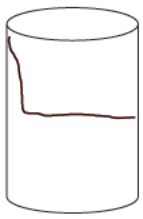
Description:

Stiff laminated brownish grey and light grey fine sandy CLAY

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	202.5
Diameter	(mm)	100.0
Moisture Content	(%)	22.4
Bulk Density	(Mg/m³)	2.07
Dry Density	(Mg/m³)	1.69
Test Details		
Latex membrane thickness	(mm)	0.3
Membrane correction	(kPa)	0.4
Axial displacement rate	(%/min)	2.0
Cell pressure	(kPa)	891
Strain at failure	(%)	4.9
Maximum Deviator Stress	(kPa)	248
Shear Stress Cu	(kPa)	124

Mode of failure



Orientation of the sample	Vertical
Distance from top of tube mm	80

Checked and Approved by:

[redacted]

J Sturges - Operations Manager
21/06/2018

Project Number:

[redacted] / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION
GN21822

[redacted]

UKAS TESTING 1982

Test Report By [redacted]

Client : [redacted]

(Ref 1529581727)

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH03
Sample Ref	U18
Depth (m)	47.60
Sample Type	C

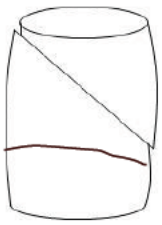
Description:

Stiff laminated brownish grey and light grey CLAY

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	201.9
Diameter	(mm)	100.0
Moisture Content	(%)	24.1
Bulk Density	(Mg/m³)	2.05
Dry Density	(Mg/m³)	1.65
Test Details		
Latex membrane thickness	(mm)	0.3
Membrane correction	(kPa)	0.5
Axial displacement rate	(%/min)	2.0
Cell pressure	(kPa)	956
Strain at failure	(%)	6.4
Maximum Deviator Stress	(kPa)	197
Shear Stress Cu	(kPa)	99

Mode of failure



Orientation of the sample	Vertical
Distance from top of tube mm	110

Checked and Approved by:

[redacted]

J Sturges - Operations Manager
21/06/2018

Project Number:

[redacted] / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION
GN21822

[redacted]

UKAS TESTING 1982

Test Report By [redacted]

Client : [redacted]

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH03
Sample Ref	U19
Depth (m)	50.25
Sample Type	C

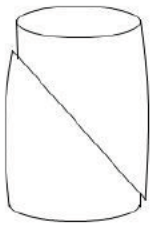
Description:

Stiff laminated brown and grey silty CLAY

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	192.4
Diameter	(mm)	99.0
Moisture Content	(%)	23.9
Bulk Density	(Mg/m³)	2.04
Dry Density	(Mg/m³)	1.65
Test Details		
Latex membrane thickness	(mm)	0.3
Membrane correction	(kPa)	0.9
Axial displacement rate	(%/min)	2.1
Cell pressure	(kPa)	1005
Strain at failure	(%)	13.5
Maximum Deviator Stress	(kPa)	156
Shear Stress Cu	(kPa)	78

Mode of failure



Orientation of the sample	Vertical
Distance from top of tube mm	10

Checked and Approved by:

[redacted]

J Sturges - Operations Manager
21/06/2018

Project Number:

[redacted] / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION
GN21822

[redacted]

UKAS TESTING 1982

Test Report By [redacted]

Client : [redacted]

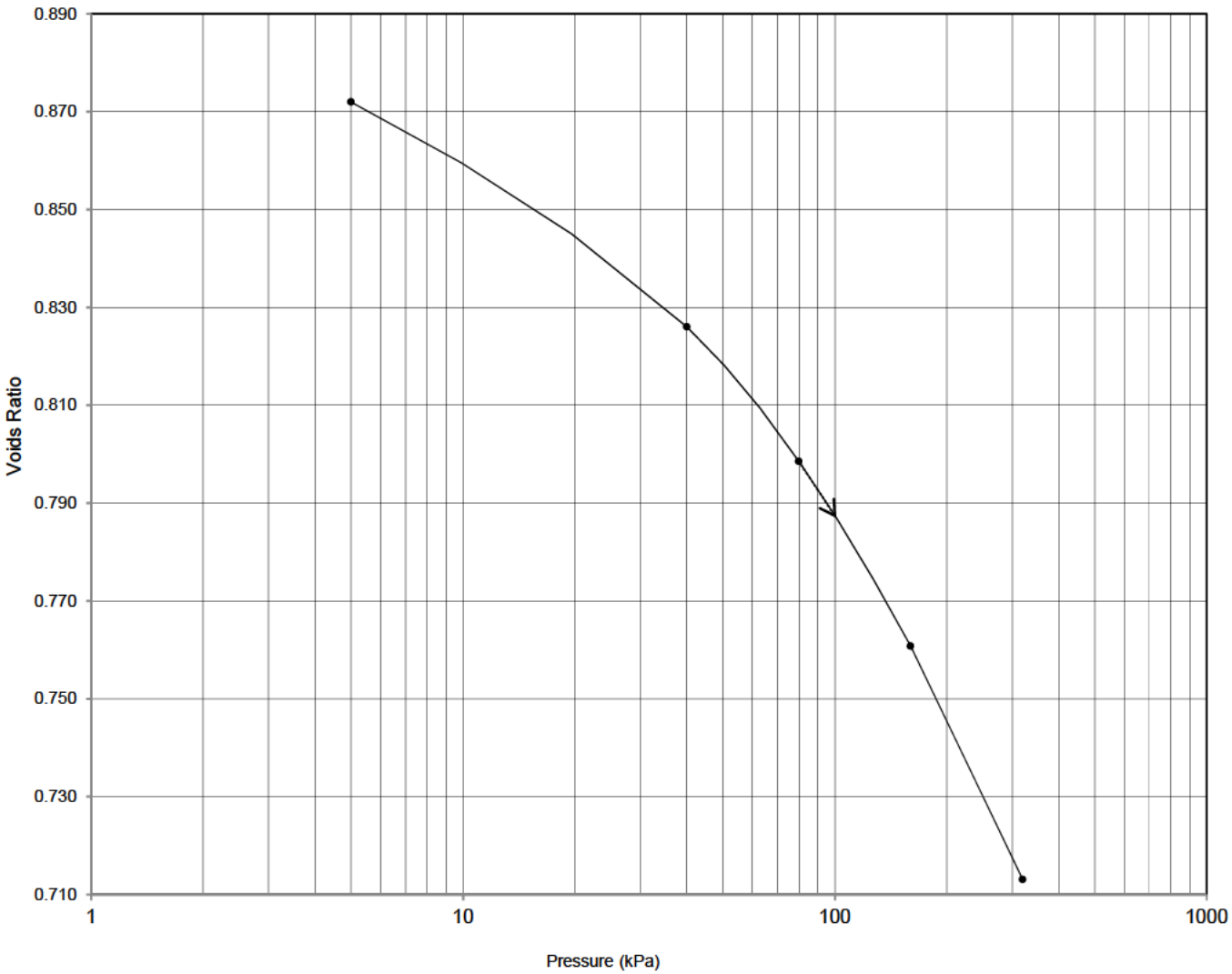
BS EN ISO 17892-5 : 2017

INCREMENTAL LOADING OEDOMETER TEST

BH / TP	BH01A
Sample Ref.	U1
Depth (m)	4.00
Sample Type	U
Depth within original (mm)	80
Orientation within original	Vertical
Specimen preparation	Undisturbed

Description:

Soft grey silty CLAY with rare shell fragments.



Initial Conditions:

Height	(mm)	18.45	Water Content	(%)	30.3	(from trimmings)
Diameter	(mm)	76.15	Voids Ratio		0.876	
Area	(mm²)	4554	Bulk Density	(Mg/m³)	1.89	
Volume	(cm³)	84.03	Dry Density	(Mg/m³)	1.45	
Laboratory Temperature	(ºC)	22.6	Particle density	(Mg/m³)	2.72	(Assumed)
			Degree of Saturation	(%)	94.0	

Results have been corrected for equipment deformation

Checked and Approved by

[redacted]

Project Number:

[redacted] / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION

GN21822

[redacted]

UKAS TESTING 1982

Test Report By [redacted]

Client : [redacted]

(Ref 7,272.4526)

BS EN ISO 17892-5 : 2017

INCREMENTAL LOADING OEDOMETER TEST

BH / TP	BH01A
Sample Ref.	U1
Depth (m)	4.00
Sample Type	U
Depth within original (mm)	80
Orientation within original	Vertical
Specimen preparation	Undisturbed

Description:

Soft grey silty CLAY with rare shell fragments.

Pressure Range (kPa)	m_v (m^2/MN)	c_v (m^2/year)	Time Fitting		Voids Ratio
			Method	minutes	
0 - 5	0.42	0.76	t50	11.6	0.872
5 - 40	0.70	3.9	t50	2.20	0.826
40 - 80	0.38	2.5	t50	3.36	0.799
80 - 160	0.26	2.9	t50	2.77	0.761
160 - 320	0.17	2.8	t50	2.73	0.713

Unable to determine Swelling Pressure - < 5 kPa

Checked and Approved by

[redacted]

Project Number:

[redacted] / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION

GN21822

[redacted]

UKAS TESTING 1982

Test Report By [redacted] d

Client : [redacted]

(Ref 7,272.4526)

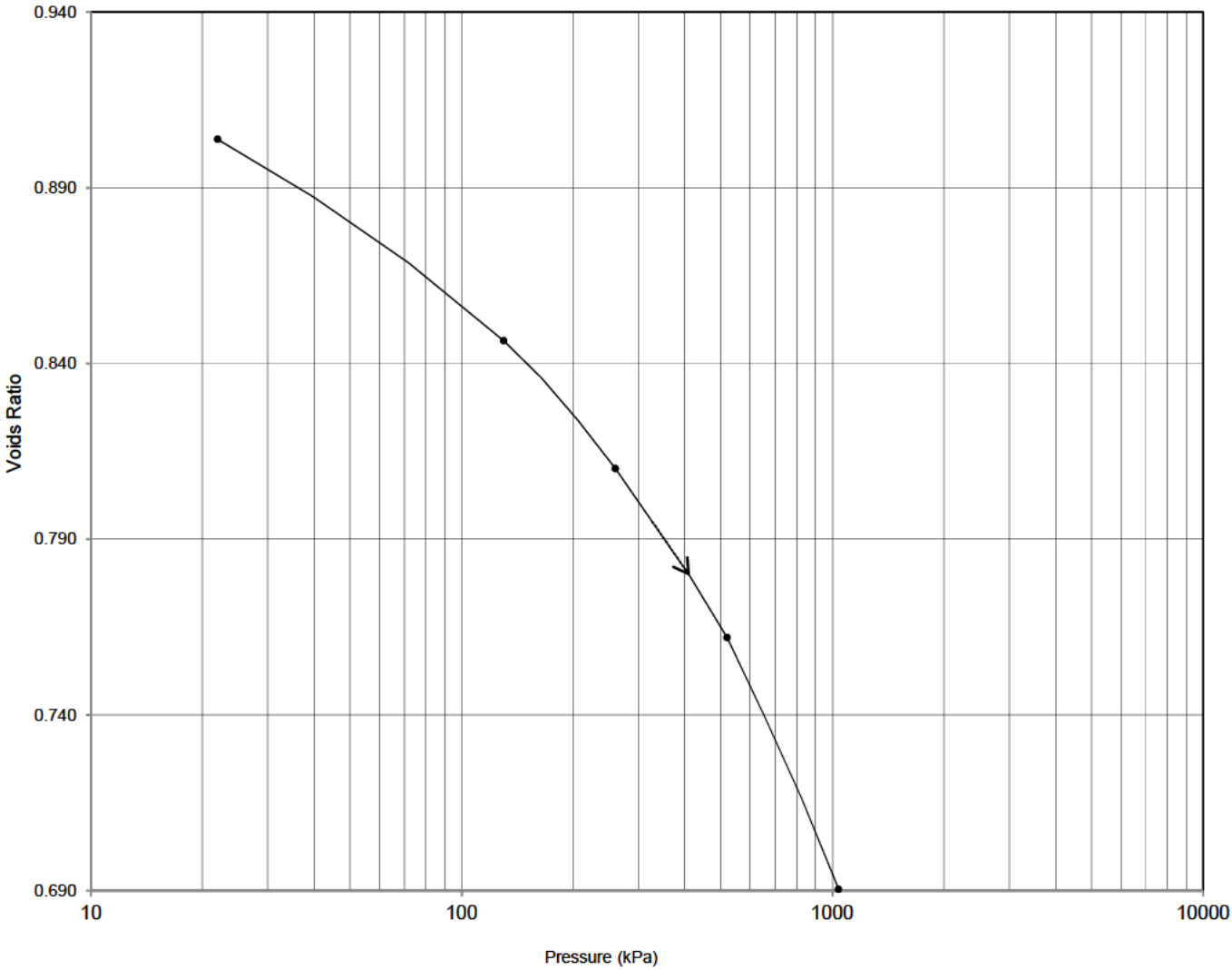
BS EN ISO 17892-5 : 2017

INCREMENTAL LOADING OEDOMETER TEST

BH / TP	BH01A
Sample Ref.	U5
Depth (m)	13.05
Sample Type	C
Depth within original (mm)	50
Orientation within original	Vertical
Specimen preparation	Undisturbed

Description:

Firm fissured grey CLAY.



Initial Conditions:

Height	(mm)	19.00	Water Content	(%)	32.6	(from trimmings)
Diameter	(mm)	74.87	Voids Ratio		0.904	
Area	(mm²)	4403	Bulk Density	(Mg/m³)	1.89	
Volume	(cm³)	83.65	Dry Density	(Mg/m³)	1.43	
Laboratory Temperature	(ºC)	23.2	Particle density	(Mg/m³)	2.72	(Assumed)
			Degree of Saturation	(%)	97.9	

Results have been corrected for equipment deformation

Checked and Approved by

[redacted]

Project Number:

[redacted] / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION

GN21822

[redacted]

UKAS TESTING 1982

Test Report By [redacted]

Client : [redacted]

(Ref 7,271.5919)

BS EN ISO 17892-5 : 2017

INCREMENTAL LOADING OEDOMETER TEST

BH / TP	BH01A
Sample Ref.	U5
Depth (m)	13.05
Sample Type	C
Depth within original (mm)	50
Orientation within original	Vertical
Specimen preparation	Undisturbed

Description:

Firm fissured grey CLAY.

Pressure Range (kPa)	m_v (m^2/MN)	c_v (m^2/year)	Time Fitting		Voids Ratio
			Method	minutes	
0 - 22	-	Swelling Pressure	-	-	0.904
22 - 130	0.28	5.1	t50	1.78	0.846
130 - 260	0.15	6.3	t50	1.37	0.810
260 - 520	0.10	5.9	t50	1.40	0.762
520 - 1040	0.078	4.7	t50	1.65	0.690

Checked and Approved by

[redacted]

Project Number:

[redacted] / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION

GN21822

[redacted]

UKAS TESTING 1982

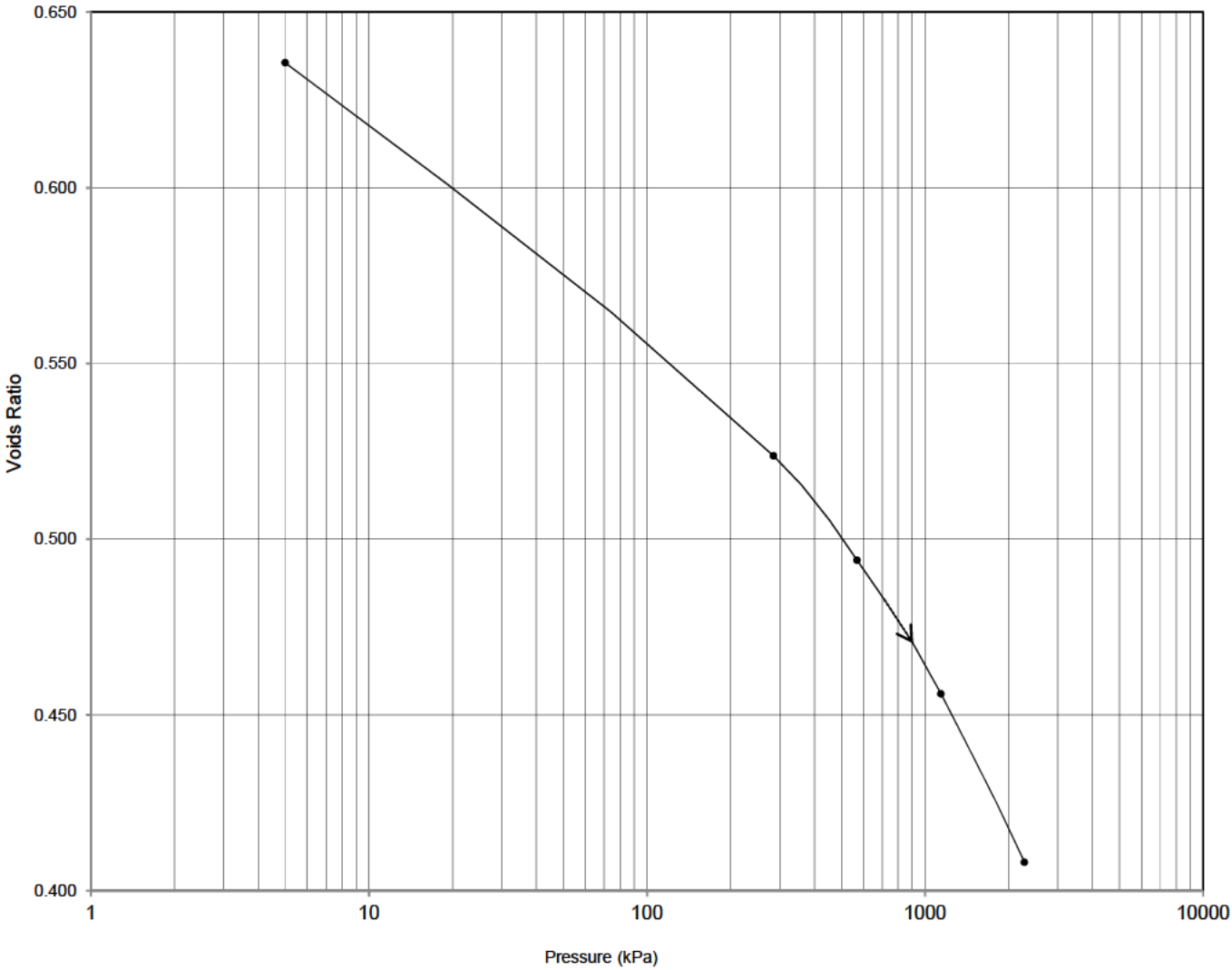
BS EN ISO 17892-5 : 2017

INCREMENTAL LOADING OEDOMETER TEST

BH / TP	BH01A
Sample Ref.	U7
Depth (m)	28.30
Sample Type	C
Depth within original (mm)	100
Orientation within original	Vertical
Specimen preparation	Undisturbed

Description:

Firm extremely thinly laminated pale grey layers of SILT interbedded with thick grey layers of CLAY.



Initial Conditions:

Height	(mm)	18.27	Water Content	(%)	23.0	(from trimmings)
Diameter	(mm)	76.25	Voids Ratio		0.640	
Area	(mm²)	4566	Bulk Density	(Mg/m³)	2.04	
Volume	(cm³)	83.43	Dry Density	(Mg/m³)	1.66	
Laboratory Temperature	(ºC)	22.5	Particle density	(Mg/m³)	2.72	(Assumed)
			Degree of Saturation	(%)	97.7	

Results have been corrected for equipment deformation

Checked and Approved by

[redacted]

Project Number:

[redacted] / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION

GN21822

[redacted]

UKAS TESTING 1982

Test Report By [redacted]

Client : [redacted]

(Ref 7,272.4512)

BS EN ISO 17892-5 : 2017

INCREMENTAL LOADING OEDOMETER TEST

BH / TP	BH01A
Sample Ref.	U7
Depth (m)	28.30
Sample Type	C
Depth within original (mm)	100
Orientation within original	Vertical
Specimen preparation	Undisturbed

Description:

Firm extremely thinly laminated pale grey layers of SILT interbedded with thick grey layers of CLAY.

Pressure Range (kPa)	m_v (m²/MN)	c_v (m²/year)	Time Fitting		Voids Ratio
			Method	minutes	
0 - 5	0.59	0.91	t50	9.47	0.636
5 - 285	0.24	10.1	t50	0.795	0.524
285 - 570	0.069	11	t50	0.650	0.494
570 - 1140	0.045	12	t50	0.580	0.456
1140 - 2280	0.029	14	t50	0.484	0.408

Unable to determine Swelling Pressure - < 5 kPa

Checked and Approved by

[redacted]

Project Number:

[redacted] / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION

GN21822

[redacted]

UKAS TESTING 1982

Test Report By [redacted] d

Client : [redacted]

(Ref 7,272.4512)

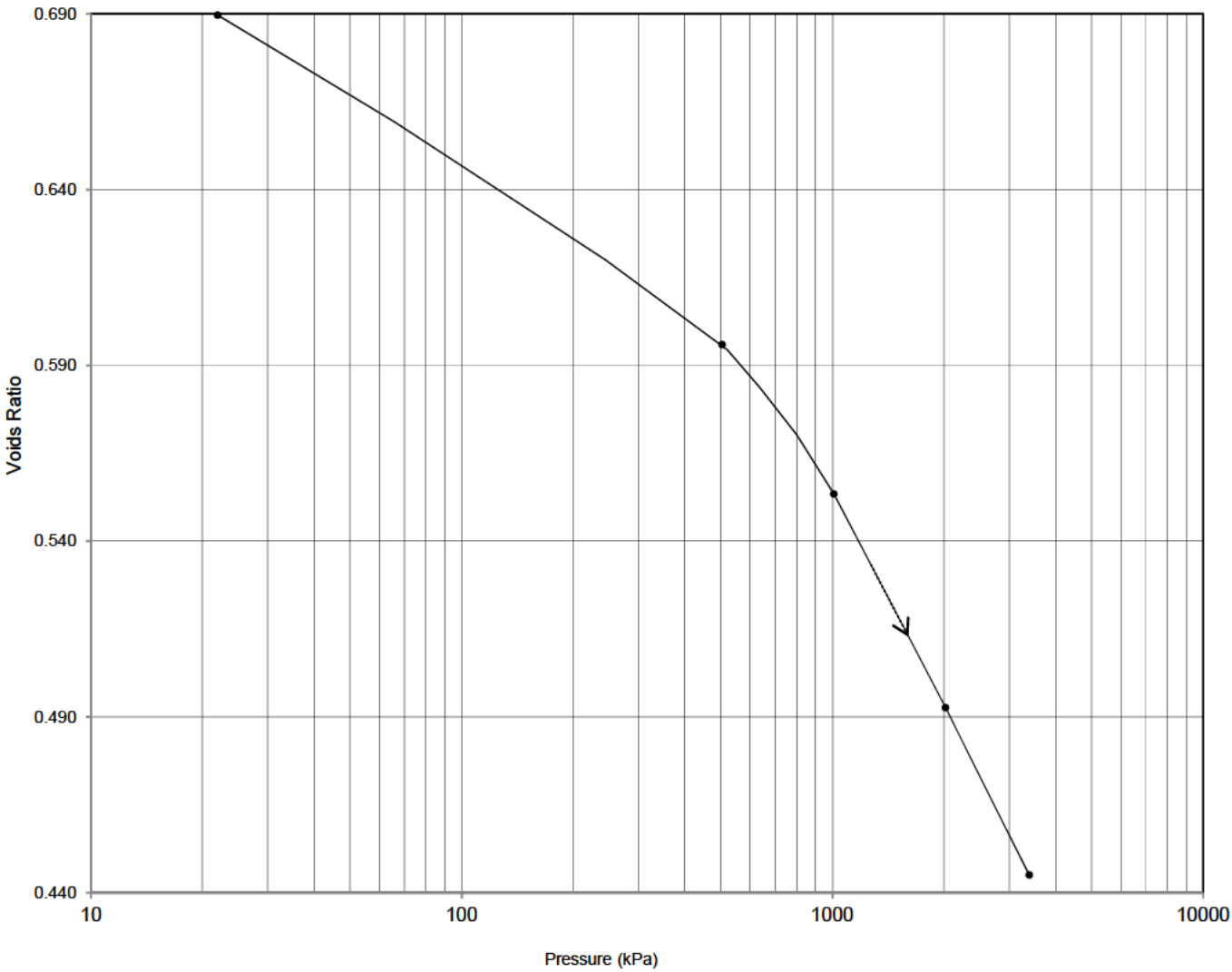
BS EN ISO 17892-5 : 2017

INCREMENTAL LOADING OEDOMETER TEST

BH / TP	BH01A
Sample Ref.	U16
Depth (m)	50.35
Sample Type	C
Depth within original (mm)	50
Orientation within original	Vertical
Specimen preparation	Undisturbed

Description:

Stiff extremely thinly laminated pale grey SILT layers interbedded with thick grey layers of CLAY.



Initial Conditions:

Height	(mm)	19.01	Water Content	(%)	24.3	(from trimmings)
Diameter	(mm)	74.98	Voids Ratio		0.693	
Area	(mm²)	4416	Bulk Density	(Mg/m³)	2.00	
Volume	(cm³)	83.94	Dry Density	(Mg/m³)	1.61	
Laboratory Temperature	(ºC)	22.3	Particle density	(Mg/m³)	2.72	(Assumed)
			Degree of Saturation	(%)	95.5	

Results have been corrected for equipment deformation

Checked and Approved by

[redacted]

Project Number:

[redacted] / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION

GN21822

[redacted]

UKAS TESTING 1982

Test Report By [redacted]

Client : [redacted]

(Ref 7,271.6028)

BS EN ISO 17892-5 : 2017

INCREMENTAL LOADING OEDOMETER TEST

BH / TP	BH01A
Sample Ref.	U16
Depth (m)	50.35
Sample Type	C
Depth within original (mm)	50
Orientation within original	Vertical
Specimen preparation	Undisturbed

Description:

Stiff extremely thinly laminated pale grey SILT layers interbedded with thick grey layers of CLAY.

Pressure Range (kPa)	m_v (m^2/MN)	c_v (m^2/year)	Time Fitting		Voids Ratio
			Method	minutes	
0 - 22	-	Swelling Pressure	-	-	0.690
22 - 505	0.11	14	t90	2.75	0.596
505 - 1010	0.053	11	t50	0.713	0.553
1010 - 2020	0.039	7.1	t50	1.06	0.493
2020 - 3400	0.023	4.7	t50	1.50	0.445

Checked and Approved by

[redacted]

Project Number:

[redacted] / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION

GN21822

[redacted]

UKAS TESTING 1982

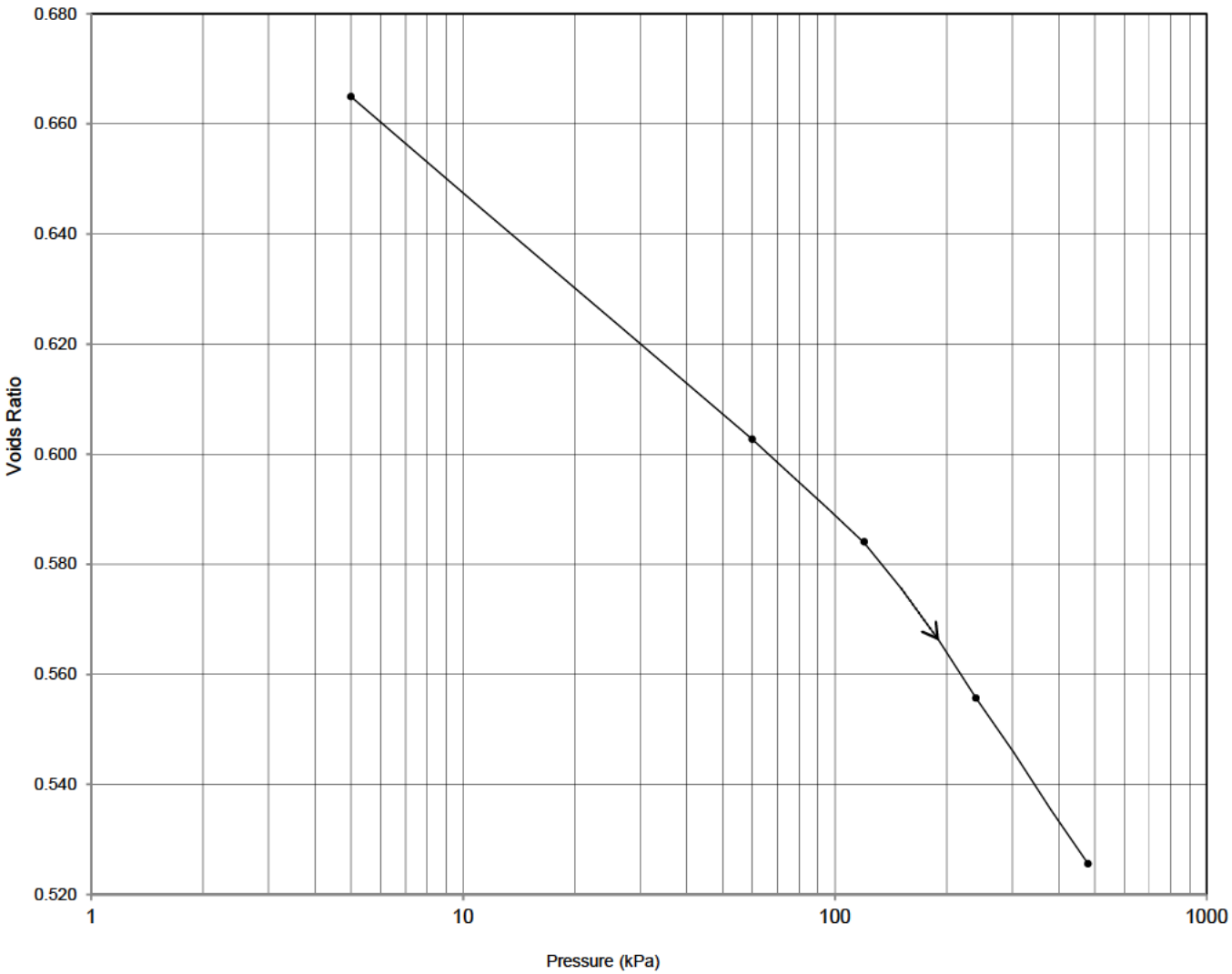
BS EN ISO 17892-5 : 2017

INCREMENTAL LOADING OEDOMETER TEST

BH / TP	BH02
Sample Ref.	U1
Depth (m)	6.00-6.45
Sample Type	U
Depth within original (mm)	150
Orientation within original	Vertical
Specimen preparation	Undisturbed

Description:

Soft grey CLAY with rare fine to medium gravel.



Initial Conditions:						
Height	(mm)	19.02	Water Content	(%)	25.0	(from trimmings)
Diameter	(mm)	74.95	Voids Ratio		0.693	
Area	(mm²)	4412	Bulk Density	(Mg/m³)	2.01	
Volume	(cm³)	83.92	Dry Density	(Mg/m³)	1.61	
Laboratory Temperature	(ºC)	23.4	Particle density	(Mg/m³)	2.72	(Assumed)
			Degree of Saturation	(%)	98.1	

Results have been corrected for equipment deformation

Checked and Approved by

[redacted]

Project Number:

[redacted] / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION

GN21822

[redacted]

UKAS TESTING 1982

Test Report By [redacted]

Client : [redacted]

(Ref 7,272.4545)

BS EN ISO 17892-5 : 2017

INCREMENTAL LOADING OEDOMETER TEST

BH / TP	BH02
Sample Ref.	U1
Depth (m)	6.00-6.45
Sample Type	U
Depth within original (mm)	150
Orientation within original	Vertical
Specimen preparation	Undisturbed

Description:

Soft grey CLAY with rare fine to medium gravel.

Pressure Range (kPa)	m_v (m^2/MN)	c_v (m^2/year)	Time Fitting		Voids Ratio
			Method	minutes	
0 - 5	3.3	1.3	t50	7.08	0.665
5 - 60	0.68	6.4	t50	1.37	0.603
60 - 120	0.19	4.7	t50	1.79	0.584
120 - 240	0.15	4.5	t50	1.78	0.556
240 - 480	0.081	7.6	t50	1.03	0.526

Unable to determine Swelling pressure - <5 kPa

Checked and Approved by

[redacted]

Project Number:

[redacted] / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION

GN21822

[redacted]

UKAS TESTING 1982

Test Report By [redacted] d

Client : [redacted]

(Ref 7,272.4545)

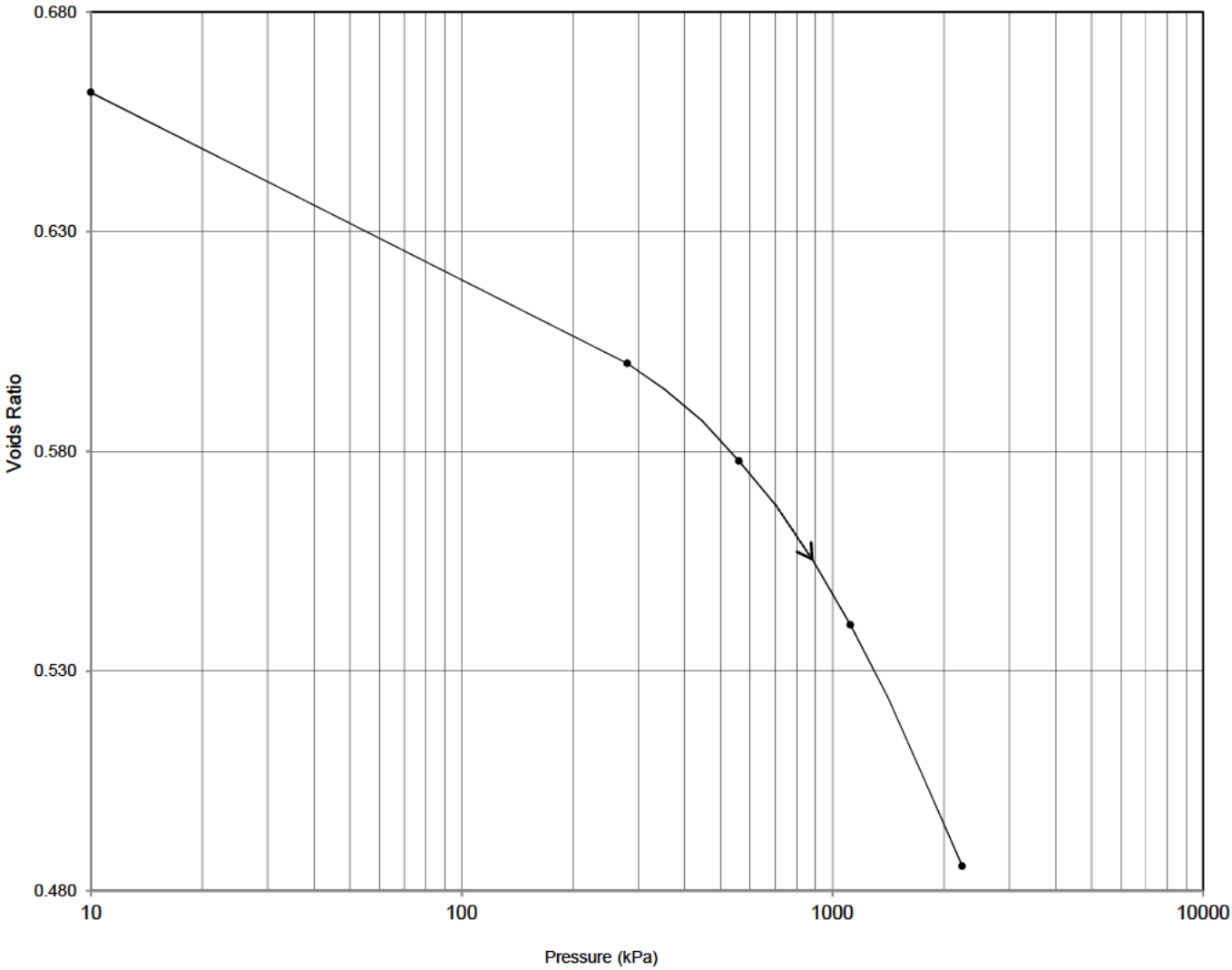
BS EN ISO 17892-5 : 2017

INCREMENTAL LOADING OEDOMETER TEST

BH / TP	BH02
Sample Ref.	U8
Depth (m)	27.95
Sample Type	C
Depth within original (mm)	120
Orientation within original	Vertical
Specimen preparation	Undisturbed

Description:

Firm extremely thinly laminated layers of pale grey SILT interbedded with thick layers of grey CLAY.



Initial Conditions:

Height	(mm)	19.03	Water Content	(%)	22.7	(from trimmings)
Diameter	(mm)	74.96	Voids Ratio		0.664	
Area	(mm²)	4413	Bulk Density	(Mg/m³)	2.01	
Volume	(cm³)	83.98	Dry Density	(Mg/m³)	1.63	
Laboratory Temperature	(ºC)	23.3	Particle density	(Mg/m³)	2.72	(Assumed)
			Degree of Saturation	(%)	92.9	

Results have been corrected for equipment deformation

Checked and Approved by

[redacted]

Project Number:

[redacted] / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION

GN21822

[redacted]

UKAS TESTING 1982

Test Report By [redacted]

Client : [redacted]

(Ref 7,272.4536)

BS EN ISO 17892-5 : 2017

INCREMENTAL LOADING OEDOMETER TEST

BH / TP	BH02
Sample Ref.	U8
Depth (m)	27.95
Sample Type	C
Depth within original (mm)	120
Orientation within original	Vertical
Specimen preparation	Undisturbed

Description:

Firm extremely thinly laminated layers of pale grey SILT interbedded with thick layers of grey CLAY.

Pressure Range (kPa)	m_v (m^2/MN)	c_v (m^2/year)	Time Fitting		Voids Ratio
			Method	minutes	
0 - 10	0.12	3.2	t90	12.6	0.662
10 - 280	0.14	22	t90	1.79	0.600
280 - 560	0.050	19	t90	1.97	0.578
560 - 1120	0.042	18	t90	1.98	0.540
1120 - 2240	0.032	17	t90	1.98	0.486

Unable to determine Swelling Pressure - < 10 kPa

Checked and Approved by

[redacted]

Project Number:

[redacted] / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION

GN21822

[redacted]

UKAS TESTING 1982

Test Report By [redacted]d

Client : [redacted]

(Ref 7,272.4536)

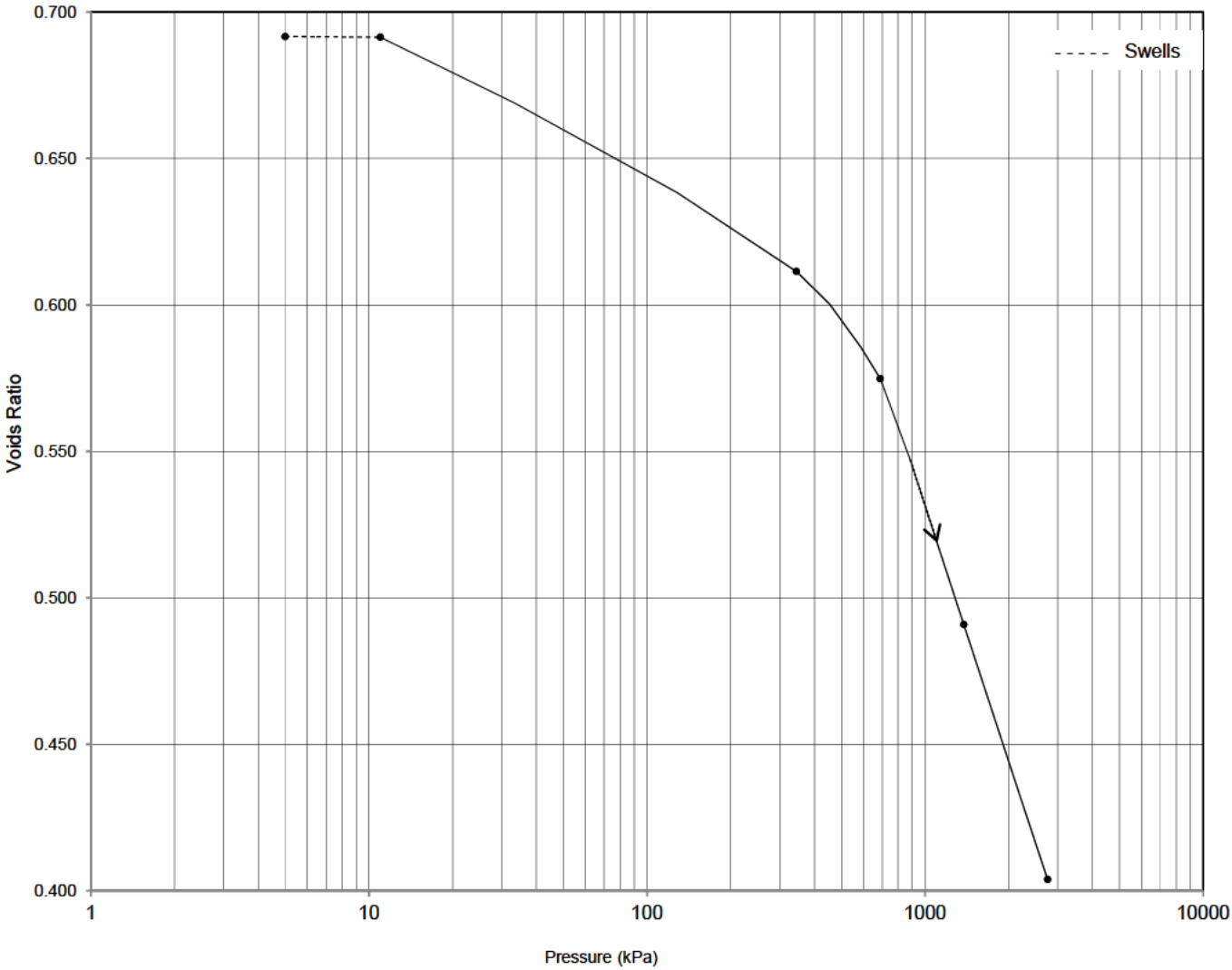
BS EN ISO 17892-5 : 2017

INCREMENTAL LOADING OEDOMETER TEST

BH / TP	BH02
Sample Ref.	U11
Depth (m)	34.30
Sample Type	C
Depth within original (mm)	130
Orientation within original	Vertical
Specimen preparation	Undisturbed

Description:

Firm extremely thinly laminated pale grey SILT interbedded with thickly laminated greyish brown CLAY.



Initial Conditions:

Height	(mm)	18.52	Water Content	(%)	24.7	(from trimmings)
Diameter	(mm)	76.22	Voids Ratio		0.689	
Area	(mm²)	4563	Bulk Density	(Mg/m³)	2.01	
Volume	(cm³)	84.50	Dry Density	(Mg/m³)	1.61	
Laboratory Temperature	(ºC)	23.6	Particle density	(Mg/m³)	2.72	(Assumed)
			Degree of Saturation	(%)	97.3	

Results have been corrected for equipment deformation

Checked and Approved by

[redacted]

Project Number:

[redacted] / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION

GN21822

[redacted]

UKAS TESTING 1982

Test Report By [redacted]

Client : [redacted]

(Ref 7,272.4628)

BS EN ISO 17892-5 : 2017

INCREMENTAL LOADING OEDOMETER TEST

BH / TP	BH02
Sample Ref.	U11
Depth (m)	34.30
Sample Type	C
Depth within original (mm)	130
Orientation within original	Vertical
Specimen preparation	Undisturbed

Description:

Firm extremely thinly laminated pale grey SILT interbedded with thickly laminated greyish brown CLAY.

Pressure Range (kPa)	m_v (m^2/MN)	c_v (m^2/year)	Time Fitting		Voids Ratio
			Method	minutes	
0 - 5	-	Specimen swelled	-	-	0.692
5 - 11	-	Swelling Pressure	-	-	0.691
11 - 345	0.14	18	t50	0.475	0.611
345 - 690	0.066	14	t50	0.567	0.575
690 - 1380	0.077	13	t50	0.572	0.491
1380 - 2760	0.042	12	t50	0.526	0.404

Swelling Pressure between 5 and 11 kPa

Checked and Approved by

[redacted]

Project Number:

[redacted] / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION

GN21822

[redacted]

UKAS TESTING 1982

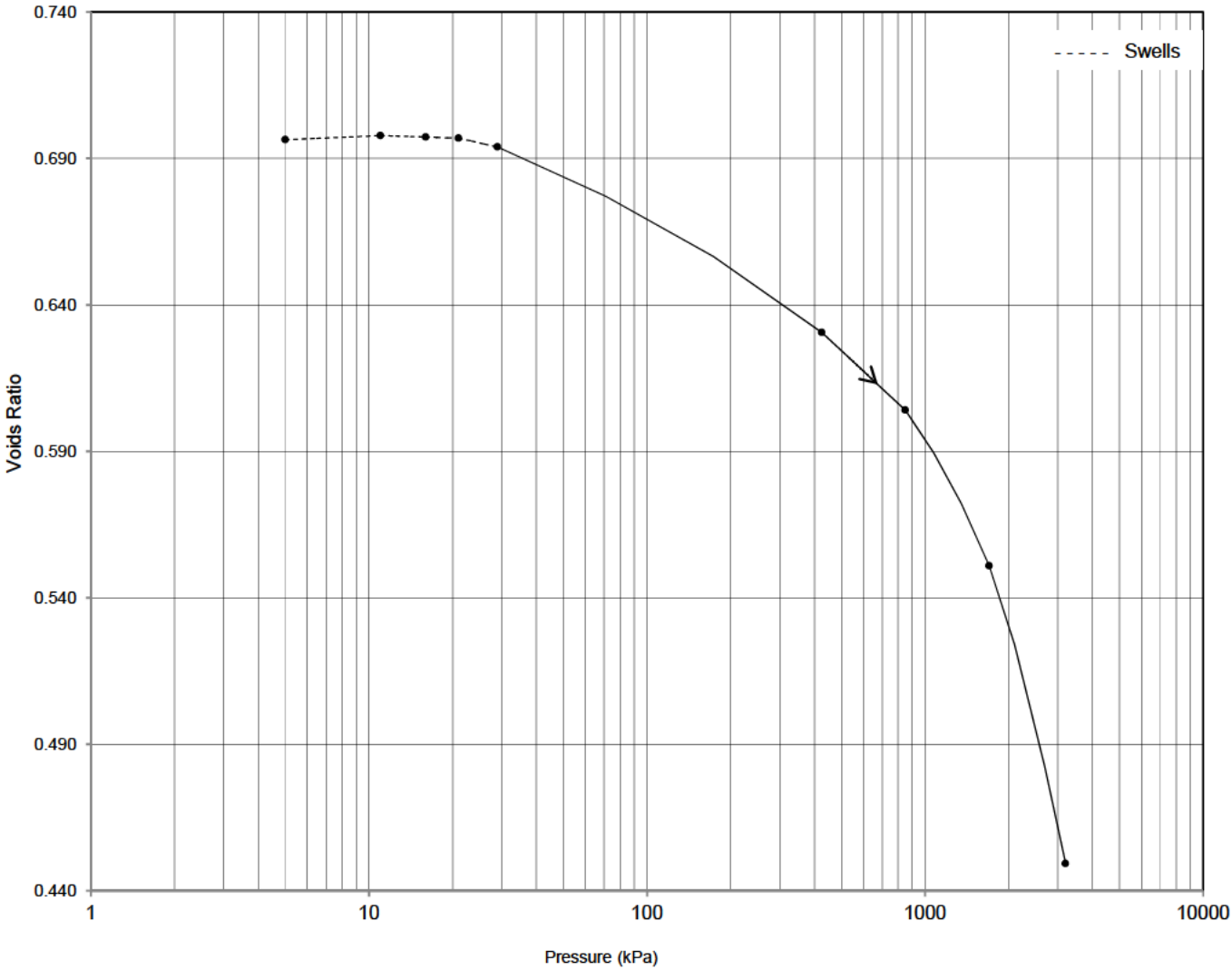
BS EN ISO 17892-5 : 2017

INCREMENTAL LOADING OEDOMETER TEST

BH / TP	BH02
Sample Ref.	U14
Depth (m)	42.60
Sample Type	C
Depth within original (mm)	100
Orientation within original	Vertical
Specimen preparation	Undisturbed

Description:

Stiff extremely thinly laminated pale grey SILT interbedded with thickly laminated grey CLAY.



Initial Conditions:

Height	(mm)	18.41	Water Content	(%)	23.2	(from trimmings)
Diameter	(mm)	76.12	Voids Ratio		0.695	
Area	(mm²)	4551	Bulk Density	(Mg/m³)	1.98	
Volume	(cm³)	83.78	Dry Density	(Mg/m³)	1.60	
Laboratory Temperature	(ºC)	23.6	Particle density	(Mg/m³)	2.72	(Assumed)
			Degree of Saturation	(%)	90.6	

Results have been corrected for equipment deformation

Checked and Approved by

[redacted]

Project Number:

[redacted] / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION

GN21822

[redacted]

UKAS TESTING 1982

Test Report By [redacted]

Client : [redacted]

(Ref 7,272.3460)

BS EN ISO 17892-5 : 2017

INCREMENTAL LOADING OEDOMETER TEST

BH / TP	BH02
Sample Ref.	U14
Depth (m)	42.60
Sample Type	C
Depth within original (mm)	100
Orientation within original	Vertical
Specimen preparation	Undisturbed

Description:

Stiff extremely thinly laminated pale grey SILT interbedded with thickly laminated grey CLAY.

Pressure Range (kPa)	m_v (m^2/MN)	c_v (m^2/year)	Time Fitting		Voids Ratio
			Method	minutes	
0 - 5	-	Specimen swelled	-	-	0.696
5 - 11	-	Specimen swelled	-	-	0.698
11 - 16	-	Specimen swelled	-	-	0.697
16 - 21	-	Specimen swelled	-	-	0.697
21 - 29	0.22	17	t90	2.24	0.694
29 - 425	0.094	18	t90	2.04	0.631
425 - 850	0.038	26	t90	1.32	0.604
850 - 1700	0.039	14	t90	2.35	0.551
1700 - 3200	0.044	9.7	t90	3.04	0.449

Swelling pressure between 22 and 28 kPa

Checked and Approved by

[redacted]

Project Number:

[redacted] / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION

GN21822

[redacted]

UKAS TESTING 1982

Test Report By [redacted]

Client : [redacted]

(Ref 7,272.3460)

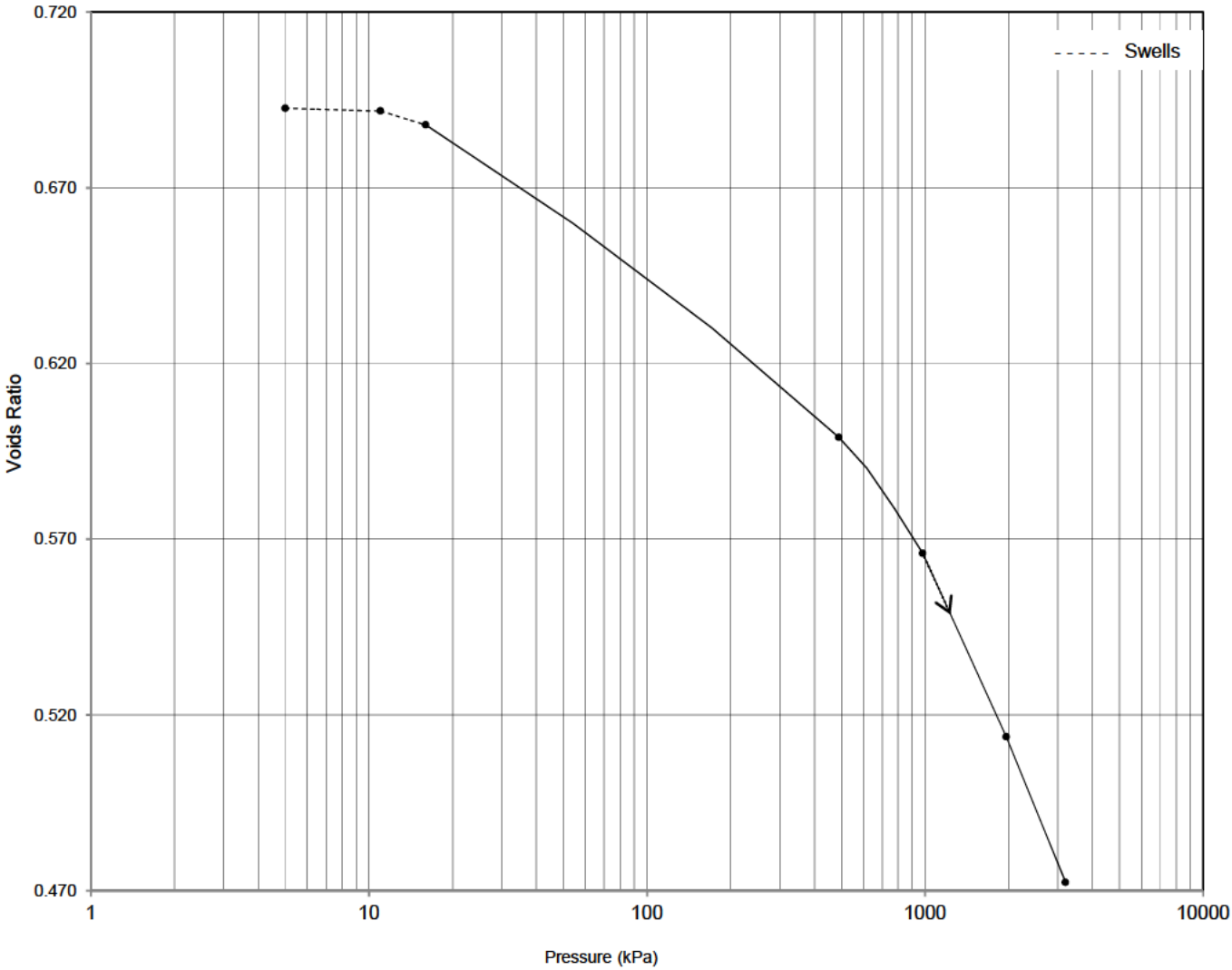
BS EN ISO 17892-5 : 2017

INCREMENTAL LOADING OEDOMETER TEST

BH / TP	BH02
Sample Ref.	U17
Depth (m)	49.20
Sample Type	C
Depth within original (mm)	100
Orientation within original	Vertical
Specimen preparation	Undisturbed

Description:

Firm extremely thinly laminated pale grey SILT layers interbedded with thickly laminated grey CLAY layers.



Initial Conditions:

Height	(mm)	19.13	Water Content	(%)	22.7	(from trimmings)
Diameter	(mm)	74.94	Voids Ratio		0.689	
Area	(mm²)	4411	Bulk Density	(Mg/m³)	1.98	
Volume	(cm³)	84.38	Dry Density	(Mg/m³)	1.61	
Laboratory Temperature	(ºC)	23.4	Particle density	(Mg/m³)	2.72	(Assumed)
			Degree of Saturation	(%)	89.5	

Results have been corrected for equipment deformation

Checked and Approved by

[redacted]

Project Number:

[redacted] / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION

GN21822

[redacted]

UKAS TESTING 1982

Test Report By [redacted]

Client : [redacted]

(Ref 7,272.3601)

BS EN ISO 17892-5 : 2017

INCREMENTAL LOADING OEDOMETER TEST

BH / TP	BH02
Sample Ref.	U17
Depth (m)	49.20
Sample Type	C
Depth within original (mm)	100
Orientation within original	Vertical
Specimen preparation	Undisturbed

Description:

Firm extremely thinly laminated pale grey SILT layers interbedded with thickly laminated grey CLAY layers.

Pressure Range (kPa)	m_v (m^2/MN)	c_v (m^2/year)	Time Fitting		Voids Ratio
			Method	minutes	
0 - 5	-	Specimen swelled	-	-	0.693
5 - 11	-	Specimen swelled	-	-	0.692
11 - 16	0.47	22	t90	1.84	0.688
16 - 490	0.11	25	t90	1.56	0.599
490 - 980	0.042	14	t50	0.599	0.566
980 - 1960	0.034	13	t50	0.604	0.514
1960 - 3200	0.022	6.2	t50	1.21	0.472

Swelling Pressure between 11 and 16 kPa

Checked and Approved by

[redacted]

Project Number:

[redacted] / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION

GN21822

[redacted]

UKAS TESTING 1982

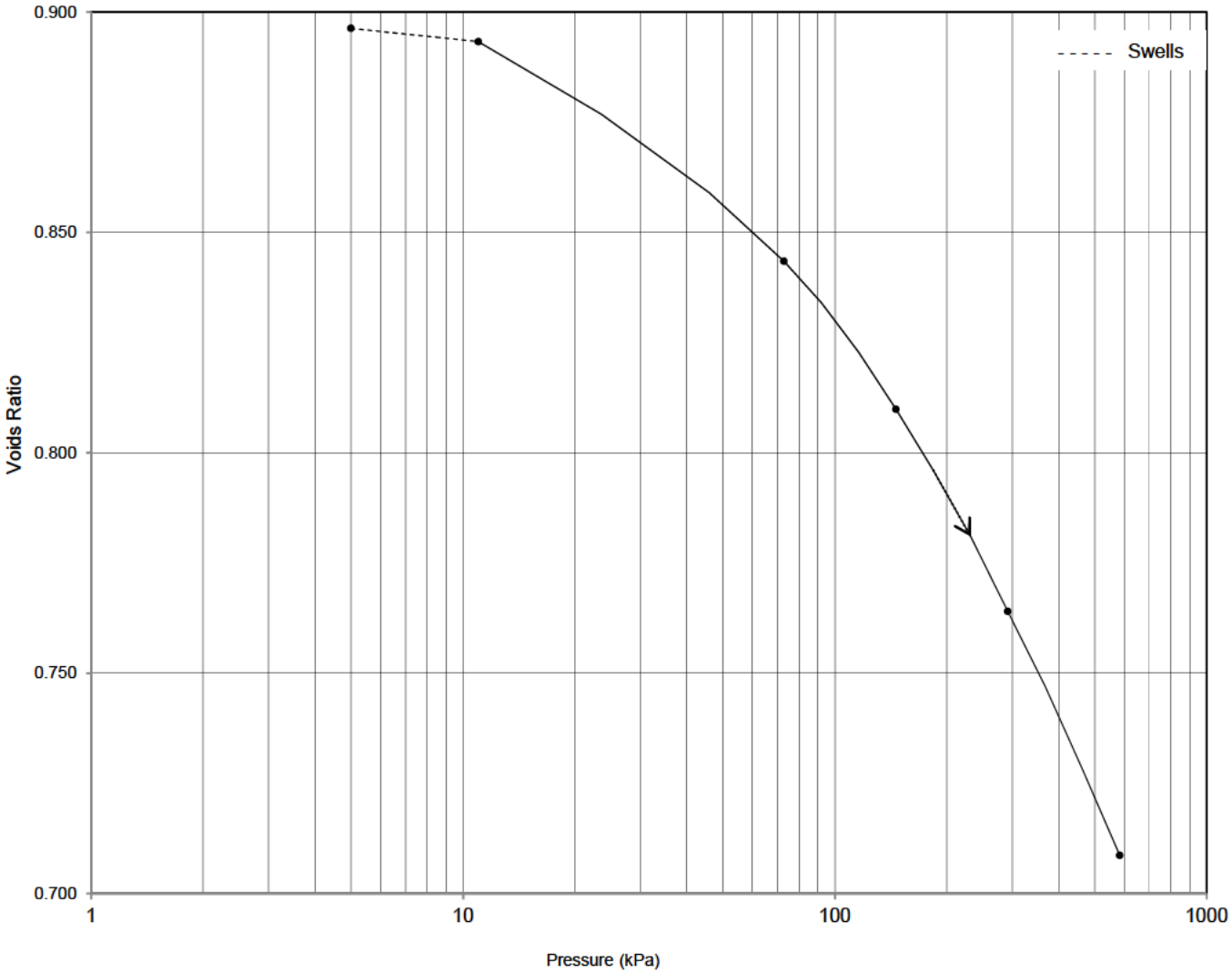
BS EN ISO 17892-5 : 2017

INCREMENTAL LOADING OEDOMETER TEST

BH / TP	BH03
Sample Ref.	U2
Depth (m)	7.30
Sample Type	C
Depth within original (mm)	160
Orientation within original	Vertical
Specimen preparation	Undisturbed

Description:

Firm grey CLAY.



Initial Conditions:

Height	(mm)	18.97	Water Content	(%)	32.8	(from trimmings)
Diameter	(mm)	74.97	Voids Ratio		0.896	
Area	(mm²)	4414	Bulk Density	(Mg/m³)	1.91	
Volume	(cm³)	83.74	Dry Density	(Mg/m³)	1.43	
Laboratory Temperature	(ºC)	23.4	Particle density	(Mg/m³)	2.72	(Assumed)
			Degree of Saturation	(%)	99.7	

Results have been corrected for equipment deformation

Checked and Approved by

[redacted]

Project Number:

[redacted] / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION

GN21822

[redacted]

UKAS TESTING 1982

Test Report By [redacted]

Client : [redacted]

(Ref 7,272.4617)

BS EN ISO 17892-5 : 2017

INCREMENTAL LOADING OEDOMETER TEST

BH / TP	BH03
Sample Ref.	U2
Depth (m)	7.30
Sample Type	C
Depth within original (mm)	160
Orientation within original	Vertical
Specimen preparation	Undisturbed

Description:

Firm grey CLAY.

Pressure Range (kPa)	m_v (m^2/MN)	c_v (m^2/year)	Time Fitting		Voids Ratio
			Method	minutes	
0 - 5	-	Specimen swelled	-	-	0.896
5 - 11	0.26	11	t90	3.76	0.893
11 - 73	0.42	3.4	t50	2.69	0.843
73 - 146	0.25	3.3	t50	2.65	0.810
146 - 292	0.17	4.2	t50	2.00	0.764
292 - 584	0.11	4.6	t50	1.70	0.709

Swelling Pressure between 5 and 11 kPa

Checked and Approved by

[redacted]

Project Number:

[redacted] / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION

GN21822

[redacted]

UKAS TESTING 1982

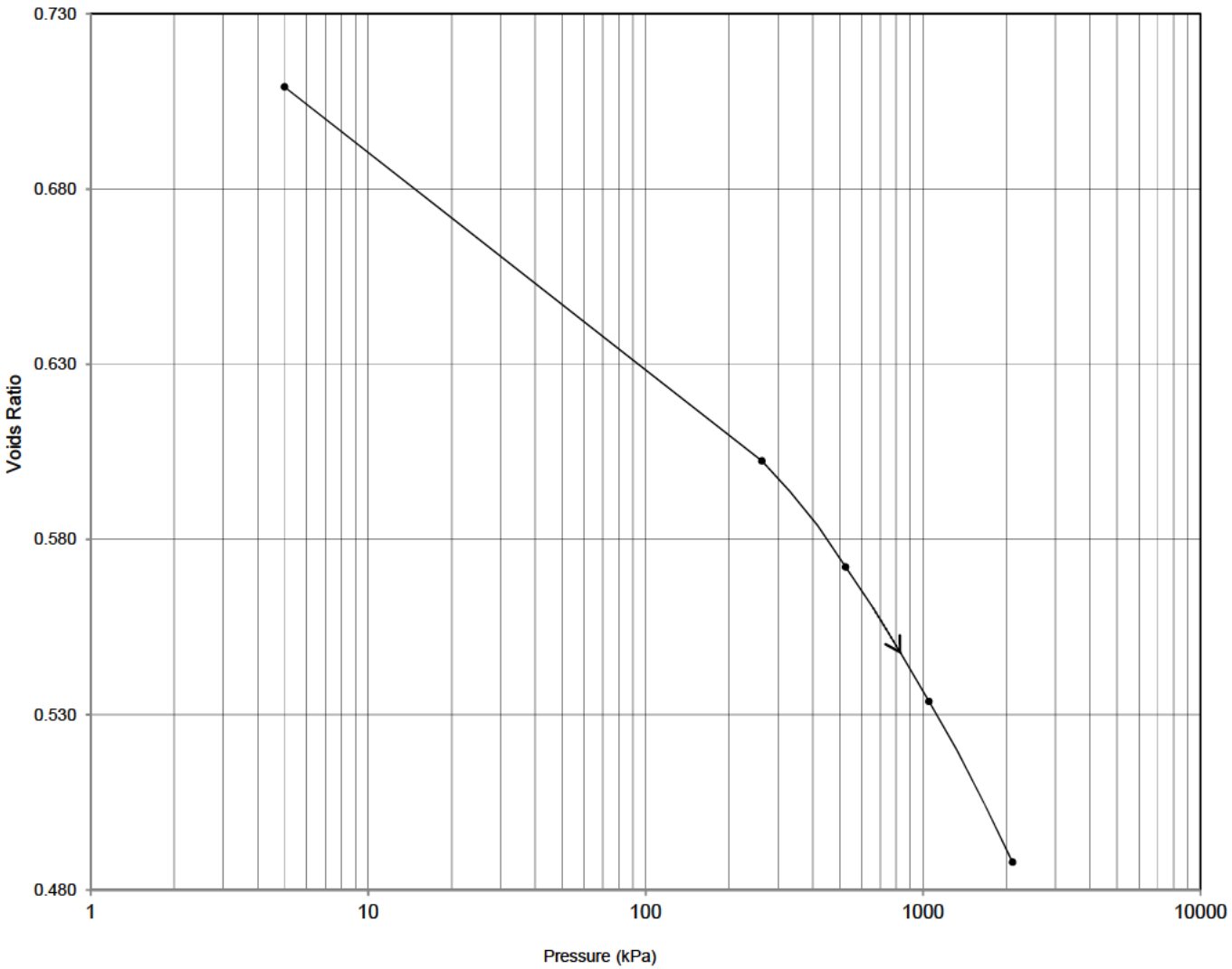
BS EN ISO 17892-5 : 2017

INCREMENTAL LOADING OEDOMETER TEST

BH / TP	BH03
Sample Ref.	U7
Depth (m)	26.30
Sample Type	C
Depth within original (mm)	120
Orientation within original	Vertical
Specimen preparation	Undisturbed

Description:

Firm extremely thin laminations of pale grey SILT interbedded with thick laminations of grey CLAY.



Initial Conditions:

Height	(mm)	19.00	Water Content	(%)	24.3	(from trimmings)
Diameter	(mm)	75.00	Voids Ratio		0.714	
Area	(mm²)	4418	Bulk Density	(Mg/m³)	1.97	
Volume	(cm³)	83.94	Dry Density	(Mg/m³)	1.59	
Laboratory Temperature	(ºC)	22.6	Particle density	(Mg/m³)	2.72	(Assumed)
			Degree of Saturation	(%)	92.7	

Results have been corrected for equipment deformation

Checked and Approved by

[redacted]

Project Number:

[redacted] / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION

GN21822

[redacted]

UKAS TESTING 1982

Test Report By [redacted]

Client : [redacted]

(Ref 7,272.4660)

BS EN ISO 17892-5 : 2017

INCREMENTAL LOADING OEDOMETER TEST

BH / TP	BH03
Sample Ref.	U7
Depth (m)	26.30
Sample Type	C
Depth within original (mm)	120
Orientation within original	Vertical
Specimen preparation	Undisturbed

Description:

Firm extremely thin laminations of pale grey SILT interbedded with thick laminations of grey CLAY.

Pressure Range (kPa)	m_v (m^2/MN)	c_v (m^2/year)	Time Fitting		Voids Ratio
			Method	minutes	
0 - 5	0.56	6.4	t90	6.26	0.709
5 - 263	0.24	20	t90	1.84	0.602
263 - 526	0.072	17	t90	2.01	0.572
526 - 1052	0.046	16	t90	2.00	0.534
1052 - 2104	0.028	16	t90	1.90	0.488

Swelling Pressure < 5 kPa

Checked and Approved by

[redacted]

Project Number:

[redacted] / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION

GN21822

[redacted]

UKAS TESTING 1982

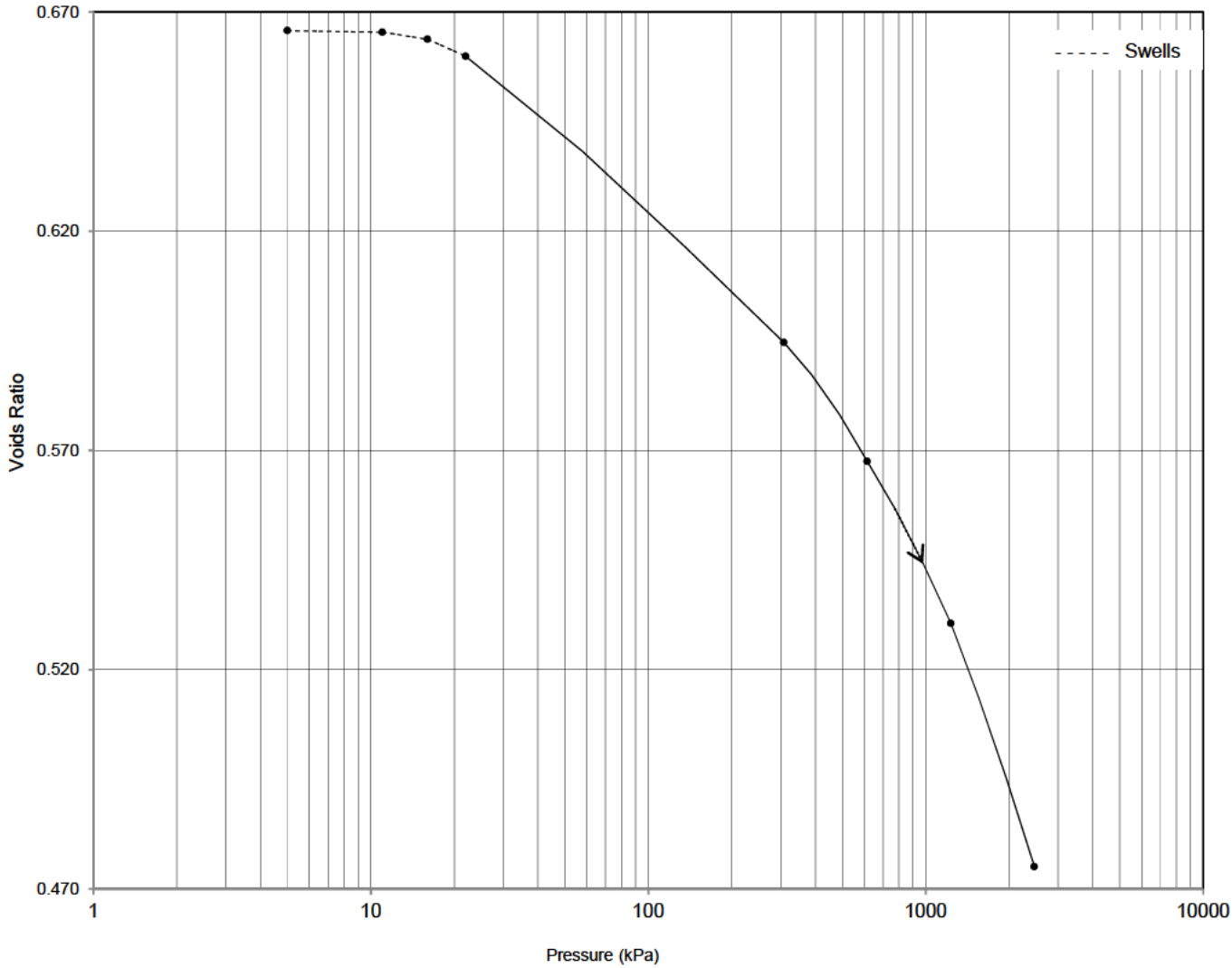
BS EN ISO 17892-5 : 2017

INCREMENTAL LOADING OEDOMETER TEST

BH / TP	BH03
Sample Ref.	U10
Depth (m)	30.83
Sample Type	C
Depth within original (mm)	100
Orientation within original	Vertical
Specimen preparation	Undisturbed

Description:

Firm extremely thin laminations of pale grey SILT interbedded with thick laminations of grey CLAY.



Initial Conditions:

Height	(mm)	19.00	Water Content	(%)	23.7	(from trimmings)
Diameter	(mm)	75.00	Voids Ratio		0.664	
Area	(mm²)	4418	Bulk Density	(Mg/m³)	2.02	
Volume	(cm³)	83.94	Dry Density	(Mg/m³)	1.63	
Laboratory Temperature	(ºC)	22.8	Particle density	(Mg/m³)	2.72	(Assumed)
			Degree of Saturation	(%)	96.9	

Results have been corrected for equipment deformation

Checked and Approved by

[redacted]

Project Number:

[redacted] / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION

GN21822

[redacted]

UKAS TESTING 1982

Test Report By [redacted]

Client : [redacted]

(Ref 7,272.4703)

BS EN ISO 17892-5 : 2017

INCREMENTAL LOADING OEDOMETER TEST

BH / TP	BH03
Sample Ref.	U10
Depth (m)	30.83
Sample Type	C
Depth within original (mm)	100
Orientation within original	Vertical
Specimen preparation	Undisturbed

Description:

Firm extremely thin laminations of pale grey SILT interbedded with thick laminations of grey CLAY.

Pressure Range (kPa)	m_v (m^2/MN)	c_v (m^2/year)	Time Fitting		Voids Ratio
			Method	minutes	
0 - 5	-	Specimen swelled	-	-	0.666
5 - 11	-	Specimen swelled	-	-	0.665
11 - 16	-	Specimen swelled	-	-	0.664
16 - 22	0.39	3.2	t50	2.88	0.660
22 - 308	0.14	12	t50	0.762	0.595
308 - 616	0.055	8.9	t50	0.951	0.567
616 - 1232	0.038	7.4	t50	1.09	0.531
1232 - 2464	0.029	4.9	t50	1.58	0.475

Swelling Pressure between 16 and 22 kPa

Checked and Approved by

[redacted]

Project Number:

[redacted] / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION
GN21822

[redacted]

UKAS TESTING 1982

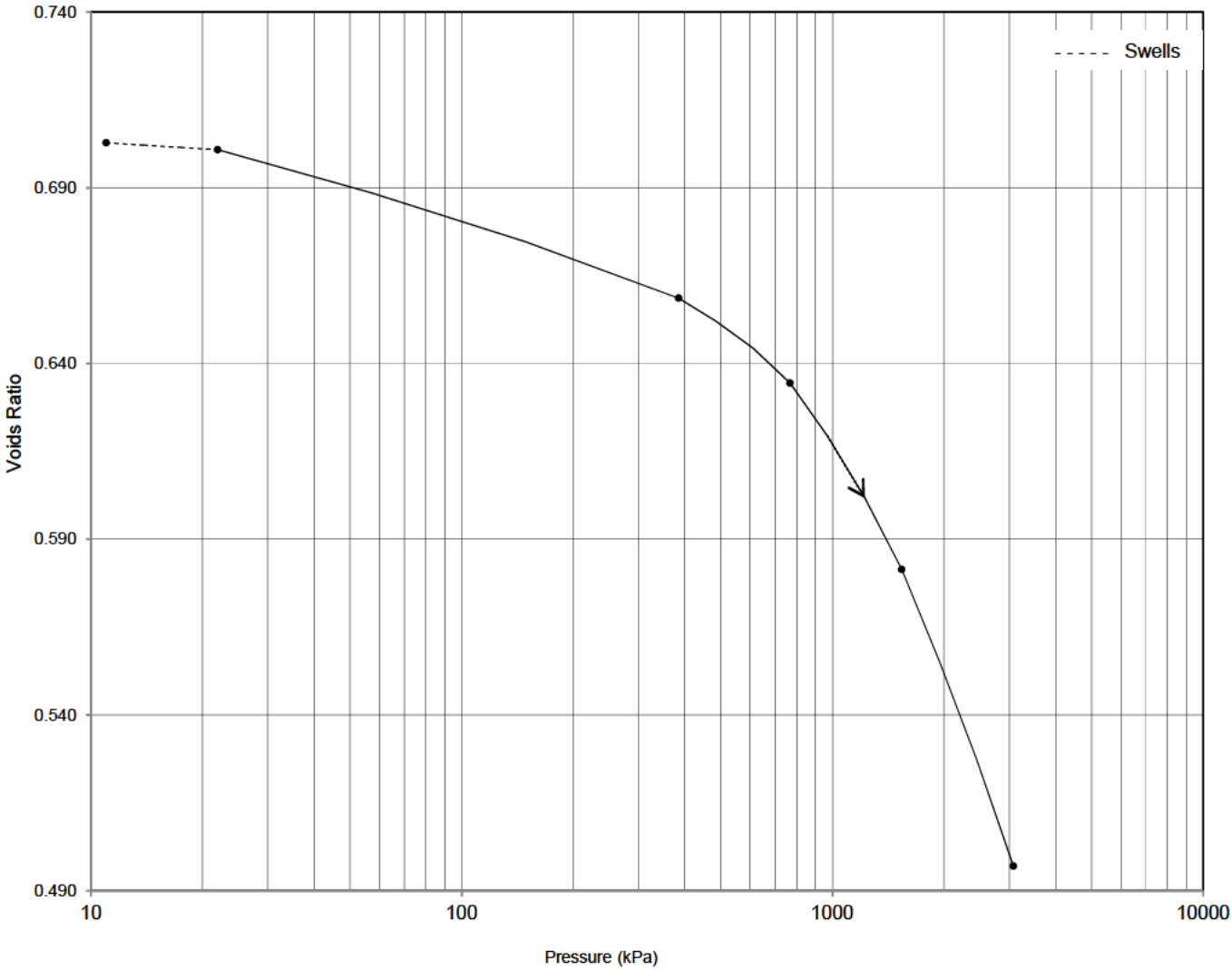
BS EN ISO 17892-5 : 2017

INCREMENTAL LOADING OEDOMETER TEST

BH / TP	BH03
Sample Ref.	U14
Depth (m)	38.50
Sample Type	C
Depth within original (mm)	120
Orientation within original	Vertical
Specimen preparation	Undisturbed

Description:

Stiff extremely thinly laminated pale grey SILT interbedded with thick laminations of grey CLAY.



Initial Conditions:

Height	(mm)	19.00	Water Content	(%)	23.8	(from trimmings)
Diameter	(mm)	74.92	Voids Ratio		0.699	
Area	(mm²)	4408	Bulk Density	(Mg/m³)	1.98	
Volume	(cm³)	83.76	Dry Density	(Mg/m³)	1.60	
Laboratory Temperature	(ºC)	22.6	Particle density	(Mg/m³)	2.72	(Assumed)
			Degree of Saturation	(%)	92.4	

Results have been corrected for equipment deformation

Checked and Approved by

[redacted]

Project Number:

[redacted] / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION
GN21822

[redacted]

UKAS TESTING 1982

Test Report By [redacted]

Client : [redacted]

(Ref 7,272.4756)

BS EN ISO 17892-5 : 2017

INCREMENTAL LOADING OEDOMETER TEST

BH / TP	BH03
Sample Ref.	U14
Depth (m)	38.50
Sample Type	C
Depth within original (mm)	120
Orientation within original	Vertical
Specimen preparation	Undisturbed

Description:

Stiff extremely thinly laminated pale grey SILT interbedded with thick laminations of grey CLAY.

Pressure Range (kPa)	m_v (m^2/MN)	c_v (m^2/year)	Time Fitting		Voids Ratio
			Method	minutes	
0 - 11	-	Specimen swelled	-	-	0.703
11 - 22	-	Swelling Pressure	-	-	0.701
22 - 385	0.068	25	t90	1.54	0.659
385 - 770	0.038	15	t90	2.53	0.634
770 - 1540	0.042	19	t90	1.94	0.581
1540 - 3080	0.035	16	t90	2.04	0.497

Checked and Approved by

[redacted]

Project Number:

[redacted] / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION

GN21822

[redacted]

UKAS TESTING 1982

ISRM : 2007 : Suggested Methods - Uniaxial Compressive Strength of Rock Materials

SUMMARY OF ROCK TESTING

Sample details						Density		Uniaxial Compression Test (LF0879C (1000kN) compression frame used)							
								Mean after prep.							
Borehole Ref.	Sample Ref.	Depth (m)	Description	MC (%)	Degree of Saturation (%)	Bulk (Mg/m³)	Dry (Mg/m³)	Diameter (mm)	Height (mm)	H/D Ratio	Load at Failure (kN)	UCS (MPa) 3 sig. fig.	Failure Sketch	D. Tested	Remarks
BH02	U7	14.30-14.49	Very weak black PEAT SEDIMENTARY ROCK. Sligh ly weathered	11	19.3	1.18	1.06	101.40	232.40	2.3	12.6	1.57		14/06/18	

Note: The dimensional requirements of flatness (<0.02 mm), perpendicularity (<0.05 / 50 mm) and straightness (0.3 mm deviation) are all met. Specific Gravity used for Degree of Saturation is assumed unless specified by the client.

[redacted]

CC

[redacted]

Date: 18/06/2018

Project Number: [redacted] / 27562

Project Name: KINGS LYNN COMPRESSOR STATION
GN21822

UKAS TESTING 1982

Test Report By [redacted]

Client : [redacted]

(Ref 7,269.461212)

ISRM - Suggested Methods : 2007 & In-house Technical Procedure TP35

DETERMINATION OF POINT LOAD STRENGTH ON ROCK

Sample details				Point Load test											
Borehole Ref.	Sample Ref.	Depth (m)	Description	D. Tested	Test type & Direction		Sample width W (m)	Platen separation (mm)		Water Content (%)	Equiv. Diameter D_e (mm)	Failure Load P (kN)	I_s P/De^2 (MPa)	Correction Factor F	Point Load Index $I_{s(50)}$ (MPa)
								Start D	End D'						
BH02	U7	14.30-14.49	Very weak black PEAT SEDIMENTARY ROCK. Slightly weathered	14/06/18	A	Pd	101.1	75.1	52.3	11	82.1	0.44	0.07	1.25	0.09

Test type and direction: **D** - Diametral **A** - Axial **B** - Block **L** - Irregular lump **Pd** - Perpendicular to planes of weakness **R** - Random or unknown orientation **Pl** - Parallel to planes of weakness

Checked and Approved by

CC

[redacted]

Date: 18/06/2018

Project Number:

GEO / 27562

Project Name:

KINGS LYNN COMPRESSOR STATION

GN21822

[redacted]

UKAS TESTING 1982

Test Report By [redacted]

Client : [redacted]

(Ref 7,269.461660)

[redacted]

[redacted]

[redacted]

t: 0[redacted]

e:

[redacted]

t: [redacted]

e: reception[redacted]

Analytical Report Number : 18-87996

Project / Site name:	Kings Lynn Compressor Station	**Samples received on:**	07/06/2018
Your job number:	GN21822	**Samples instructed on:**	07/06/2018
Your order number:	PO-31699-GB	**Analysis completed by:**	13/06/2018
Report Issue Number:	1	**Report issued on:**	13/06/2018
Samples Analysed:	6 soil samples		

[redacted]

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

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

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

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

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

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

[redacted]

[redacted]

Analytical Report Number: 18-87996

Project / Site name: Kings Lynn Compressor Station
Your Order No: PO-31699-GB

Lab Sample Number				975601	975602	975603	975604	975605
Sample Reference				BH03	BH03	BH03	BH03	BH03
Sample Number				D1	D2	D3	D10	D16
Depth (m)				1.00-1.00	2.00-2.00	3.00-3 00	10.00-10.00	23.00-23.00
Date Sampled				04/06/2018	04/06/2018	04/06/2018	04/06/2018	04/06/2018
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	11	16	26	23	18
Total mass of sample received	kg	0.001	NONE	0.73	1.5	0.53	0.84	0.61
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	8.7	8.6	7.3	8.0	8.2
Total Sulphate as SO_4	%	0.005	MCERTS	-	-	0.924	0.113	0.069
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.017	0.062	3.2	0.33	0.20
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1 25	MCERTS	17.1	62.4	3220	328	205
Total Sulphur	%	0.005	MCERTS	-	-	3.64	0.406	0.250

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

[redacted]

[redacted]

Analytical Report Number: 18-87996

Project / Site name: Kings Lynn Compressor Station
Your Order No: PO-31699-GB

Lab Sample Number				975606				
Sample Reference				BH03				
Sample Number				D29				
Depth (m)				40.50-40.50				
Date Sampled				04/06/2018				
Time Taken				None Supplied				
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1				
Moisture Content	%	N/A	NONE	16				
Total mass of sample received	kg	0.001	NONE	1.0				
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	8.3				
Total Sulphate as SO_4	%	0.005	MCERTS	0.074				
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.26				
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1 25	MCERTS	260				
Total Sulphur	%	0.005	MCERTS	0.318				

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

[redacted]

[redacted]

Analytical Report Number : 18-87996

Project / Site name: Kings Lynn Compressor Station

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

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

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
975601	BH03	D1	1.00-1.00	Light brown sand with gravel.
975602	BH03	D2	2.00-2.00	Light grey sandy clay.
975603	BH03	D3	3.00-3.00	Grey clay and sand.
975604	BH03	D10	10.00-10.00	Grey clay.
975605	BH03	D16	23.00-23.00	Brown clay.
975606	BH03	D29	40.50-40.50	Brown clay.

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

[redacted]

[redacted]

Analytical Report Number : 18-87996

Project / Site name: Kings Lynn Compressor Station

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests, 2:1 water:soil extraction, analysis by ICP-OES.	L038-PL	D	MCERTS
Total Sulphate in soil as %	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests""	L038	D	MCERTS
Total Sulphur in soil as %	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In-house method based on BS1377 Part 3, 1990, and MEWAM 2006 Methods for the Determination of Metals in Soil	L038	W	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

[redacted]

[redacted]

[redacted]

t: [redacted]

e: [redacted]

[redacted]

t: [redacted]

e: reception[redacted]

Analytical Report Number : 18-88252

Project / Site name:	Kings Lynn Compressor Station	**Samples received on:**	08/06/2018
Your job number:	GN21822	**Samples instructed on:**	08/06/2018
Your order number:	PO-31699-GB	**Analysis completed by:**	14/06/2018
Report Issue Number:	1	**Report issued on:**	14/06/2018
Samples Analysed:	16 soil samples		

[redacted]

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

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

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

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

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

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

[redacted]

[redacted]

Analytical Report Number: 18-88252

Project / Site name: Kings Lynn Compressor Station
Your Order No: PO-31699-GB

Lab Sample Number				977072	977073	977074	977075	977076
Sample Reference				BH01A	BH01A	BH01A	BH01A	BH01A
Sample Number				D1	D3	D4	D7	B6
Depth (m)				1.20-1.20	2.20-2.20	2.80-3 00	6.00-6.00	14.40-15.00
Date Sampled				06/06/2018	06/06/2018	06/06/2018	06/06/2018	06/06/2018
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	16	18	28	31	51
Total mass of sample received	kg	0.001	NONE	1.7	1.1	0.82	0.84	0.45
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	8.5	6.8	7.2	7.3	6.5
Total Sulphate as SO_4	%	0.005	MCERTS	-	0.376	-	0 605	-
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.072	2.2	2.6	2.1	0.24
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1 25	MCERTS	-	2250	-	2120	-
Total Sulphur	%	0.005	MCERTS	-	2.00	-	2.43	-

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

[redacted]

[redacted]

Analytical Report Number: 18-88252

Project / Site name: Kings Lynn Compressor Station
Your Order No: PO-31699-GB

Lab Sample Number				977077	977078	977079	977080	977081
Sample Reference				BH01A	BH01A	BH01A	BH02	BH02
Sample Number				D13	D18	D22	D1	D2
Depth (m)				25.30-25.30	31.40-31.40	37.40-37.40	1.40-1.40	2.00-2.00
Date Sampled				06/06/2018	06/06/2018	06/06/2018	06/06/2018	06/06/2018
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	17	17	18	14	14
Total mass of sample received	kg	0.001	NONE	1.1	0.80	0.30	1.2	1.5
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	8.3	8.3	8.1	8.5	8.7
Total Sulphate as SO_4	%	0.005	MCERTS	0.059	0.053	0.057	-	0.015
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.13	0.10	0.13	0 014	0.015
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1 25	MCERTS	127	100	130	-	15.2
Total Sulphur	%	0.005	MCERTS	0.682	0.206	0.227	-	0.014

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

[redacted]

[redacted]

Analytical Report Number: 18-88252

Project / Site name: Kings Lynn Compressor Station
Your Order No: PO-31699-GB

Lab Sample Number				977082	977083	977084	977085	977086
Sample Reference				BH02	BH02	BH02	BH02	BH02
Sample Number				D3	D11	B7	D15	D21
Depth (m)				4.50-4.50	13.70-13.70	14.50-14.50	26.00-26.00	39.50-39.50
Date Sampled				06/06/2018	06/06/2018	06/06/2018	06/06/2018	06/06/2018
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	16	23	32	18	17
Total mass of sample received	kg	0.001	NONE	1.2	1.5	0.31	1.2	0.39
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	8.2	7.6	6.5	8.4	8.3
Total Sulphate as SO_4	%	0.005	MCERTS	-	0.479	0.284	0 074	0.073
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.34	2.2	0.46	0.20	0.17
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1 25	MCERTS	-	2250	463	200	169
Total Sulphur	%	0.005	MCERTS	-	3.38	2.88	0.498	0.258

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

[redacted]

[redacted]

Analytical Report Number: 18-88252

Project / Site name: Kings Lynn Compressor Station
Your Order No: PO-31699-GB

Lab Sample Number				977087				
Sample Reference				BH02				
Sample Number				D23				
Depth (m)				45.50-45.50				
Date Sampled				06/06/2018				
Time Taken				None Supplied				
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1				
Moisture Content	%	N/A	NONE	17				
Total mass of sample received	kg	0.001	NONE	0.42				
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	8.1				
Total Sulphate as SO_4	%	0.005	MCERTS	0.072				
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.20				
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1 25	MCERTS	202				
Total Sulphur	%	0.005	MCERTS	0.220				

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

[redacted]

[redacted]

Analytical Report Number : 18-88252

Project / Site name: Kings Lynn Compressor Station

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

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

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
977072	BH01A	D1	1.20-1.20	Light brown sandy clay.
977073	BH01A	D3	2.20-2.20	Grey clay.
977074	BH01A	D4	2.80-3.00	Grey clay with gravel.
977075	BH01A	D7	6.00-6.00	Light grey clay with gravel.
977076	BH01A	B6	14.40-15.00	Brown loam with peat and vegetation.
977077	BH01A	D13	25.30-25.30	Light brown clay and sand with gravel.
977078	BH01A	D18	31.40-31.40	Light brown clay.
977079	BH01A	D22	37.40-37.40	Light brown clay.
977080	BH02	D1	1.40-1.40	Light brown sand.
977081	BH02	D2	2.00-2.00	Light brown sand.
977082	BH02	D3	4.50-4.50	Light brown sandy clay.
977083	BH02	D11	13.70-13.70	Light grey clay with gravel.
977084	BH02	B7	14.50-14.50	Brown loam with peat and vegetation.
977085	BH02	D15	26.00-26.00	Light brown clay and sand.
977086	BH02	D21	39.50-39.50	Light brown clay.
977087	BH02	D23	45.50-45.50	Light brown clay.

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

[redacted]

[redacted]

Analytical Report Number : 18-88252

Project / Site name: Kings Lynn Compressor Station

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests, 2:1 water:soil extraction, analysis by ICP-OES.	L038-PL	D	MCERTS
Total Sulphate in soil as %	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests""	L038	D	MCERTS
Total Sulphur in soil as %	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In-house method based on BS1377 Part 3, 1990, and MEWAM 2006 Methods for the Determination of Metals in Soil	L038	W	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

[redacted]

[redacted]

[redacted]

Analytical Report Number : 18-86368

Project / Site name:	Kings Lynn Compressor Station	**Samples received on:**	21/05/2018
Your job number:	GN21822	**Samples instructed on:**	23/05/2018
Your order number:		**Analysis completed by:**	29/05/2018
Report Issue Number:	1	**Report issued on:**	30/05/2018
Samples Analysed:	3 soil samples		

[redacted]

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

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

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

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

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

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

[redacted]

[redacted]

Analytical Report Number: 18-86368

Project / Site name: Kings Lynn Compressor Station

Lab Sample Number				965809	965810	965811		
Sample Reference				BH02	BH02	BH02		
Sample Number				ES1	ES2	ES3		
Depth (m)				0 20	0.90	1.30		
Date Sampled				17/05/2018	17/05/2018	17/05/2018		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1		
Moisture Content	%	N/A	NONE	8.9	9.5	13		
Total mass of sample received	kg	0.001	NONE	0.52	0.58	0.57		
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected		
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	8.2	7.9	8.1		
Total Organic Carbon (TOC)	%	0.1	MCERTS	0.2	0.5	0.2		
Speciated PAHs								
Naphthalene	mg/kg	0 05	MCERTS	< 0.05	< 0.05	< 0.05		
Acenaphthylene	mg/kg	0 05	MCERTS	< 0.05	< 0.05	< 0.05		
Acenaphthene	mg/kg	0 05	MCERTS	< 0.05	< 0.05	< 0.05		
Fluorene	mg/kg	0 05	MCERTS	< 0.05	< 0.05	< 0.05		
Phenanthrene	mg/kg	0 05	MCERTS	< 0.05	< 0.05	< 0.05		
Anthracene	mg/kg	0 05	MCERTS	< 0.05	< 0.05	< 0.05		
Fluoranthene	mg/kg	0 05	MCERTS	< 0.05	< 0.05	< 0.05		
Pyrene	mg/kg	0 05	MCERTS	< 0.05	< 0.05	< 0.05		
Benzo(a)anthracene	mg/kg	0 05	MCERTS	< 0.05	< 0.05	< 0.05		
Chrysene	mg/kg	0 05	MCERTS	< 0.05	< 0.05	< 0.05		
Benzo(b)fluoranthene	mg/kg	0 05	MCERTS	< 0.05	< 0.05	< 0.05		
Benzo(k)fluoranthene	mg/kg	0 05	MCERTS	< 0.05	< 0.05	< 0.05		
Benzo(a)pyrene	mg/kg	0 05	MCERTS	< 0.05	< 0.05	< 0.05		
Indeno(1,2,3-cd)pyrene	mg/kg	0 05	MCERTS	< 0.05	< 0.05	< 0.05		
Dibenz(a h)anthracene	mg/kg	0 05	MCERTS	< 0.05	< 0.05	< 0.05		
Benzo(ghi)perylene	mg/kg	0 05	MCERTS	< 0.05	< 0.05	< 0.05		
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	< 0.80	< 0.80		

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

[redacted]

[redacted]

Analytical Report Number: 18-86368

Project / Site name: Kings Lynn Compressor Station

Lab Sample Number				965809	965810	965811		
Sample Reference				BH02	BH02	BH02		
Sample Number				ES1	ES2	ES3		
Depth (m)				0 20	0.90	1.30		
Date Sampled				17/05/2018	17/05/2018	17/05/2018		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	24	10	12		
Boron (water soluble)	mg/kg	0.2	MCERTS	0.7	0.5	0.5		
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0 2	< 0.2		
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4 0	< 4.0		
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	85	29	12		
Copper (aqua regia extractable)	mg/kg	1	MCERTS	2.6	3.8	3.7		
Lead (aqua regia extractable)	mg/kg	1	MCERTS	14	7.9	4.7		
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0 3	< 0.3		
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	47	21	5.6		
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	2.1	< 1 0	< 1.0		
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	90	34	11		
Monoaromatics								
Benzene	ug/kg	1	MCERTS	< 1.0	< 1 0	< 1.0		
Toluene	µg/kg	1	MCERTS	< 1.0	< 1 0	< 1.0		
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1 0	< 1.0		
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1 0	< 1.0		
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1 0	< 1.0		
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1 0	< 1.0		
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1 0	< 1.0		
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2 0	< 2.0		
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8 0	< 8.0		
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8 0	< 8.0		
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10		
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1 0	< 1.0		
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2 0	< 2.0		
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	< 10	< 10		
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	< 10	< 10		
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10		

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

[redacted]

[redacted]

Analytical Report Number : 18-86368

Project / Site name: Kings Lynn Compressor Station

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

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

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
965809	BH02	ES1	0 20	Brown sand with gravel.
965810	BH02	ES2	0.90	Brown sand with gravel.
965811	BH02	ES3	1 30	Light brown sand with gravel.

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

[redacted]

[redacted]

Analytical Report Number : 18-86368

Project / Site name: Kings Lynn Compressor Station

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	D	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests""	L009-PL	D	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method	L088/76-PL	W	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

[redacted]

[redacted]

[redacted]

[redacted]

Analytical Report Number : 18-86264

Project / Site name:	Kings Lynn Compressor Station	**Samples received on:**	22/05/2018
Your job number:	GN21822	**Samples instructed on:**	22/05/2018
Your order number:		**Analysis completed by:**	29/05/2018
Report Issue Number:	1	**Report issued on:**	29/05/2018
Samples Analysed:	2 soil samples		

[redacted]

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

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

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

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

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

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

[redacted]

[redacted]

Analytical Report Number: 18-86264

Project / Site name: Kings Lynn Compressor Station

Lab Sample Number				965233	965234			
Sample Reference				BH01	BH01			
Sample Number				ES1	ES2			
Depth (m)				0 30	0.50			
Date Sampled				18/05/2018	18/05/2018			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1			
Moisture Content	%	N/A	NONE	8.4	9.2			
Total mass of sample received	kg	0.001	NONE	0.56	0.53			
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected			
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	7.6	7.7			
Total Organic Carbon (TOC)	%	0.1	MCERTS	0.7	0.6			
Speciated PAHs								
Naphthalene	mg/kg	0 05	MCERTS	< 0.05	< 0.05			
Acenaphthylene	mg/kg	0 05	MCERTS	< 0.05	< 0.05			
Acenaphthene	mg/kg	0 05	MCERTS	< 0.05	< 0.05			
Fluorene	mg/kg	0 05	MCERTS	< 0.05	< 0.05			
Phenanthrene	mg/kg	0 05	MCERTS	< 0.05	< 0.05			
Anthracene	mg/kg	0 05	MCERTS	< 0.05	< 0.05			
Fluoranthene	mg/kg	0 05	MCERTS	< 0.05	< 0.05			
Pyrene	mg/kg	0 05	MCERTS	< 0.05	< 0.05			
Benzo(a)anthracene	mg/kg	0 05	MCERTS	< 0.05	< 0.05			
Chrysene	mg/kg	0 05	MCERTS	< 0.05	< 0.05			
Benzo(b)fluoranthene	mg/kg	0 05	MCERTS	< 0.05	< 0.05			
Benzo(k)fluoranthene	mg/kg	0 05	MCERTS	< 0.05	< 0.05			
Benzo(a)pyrene	mg/kg	0 05	MCERTS	< 0.05	< 0.05			
Indeno(1,2,3-cd)pyrene	mg/kg	0 05	MCERTS	< 0.05	< 0.05			
Dibenz(a h)anthracene	mg/kg	0 05	MCERTS	< 0.05	< 0.05			
Benzo(ghi)perylene	mg/kg	0 05	MCERTS	< 0.05	< 0.05			
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	< 0.80			
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	16	5.9			
Boron (water soluble)	mg/kg	0.2	MCERTS	0.6	0.6			
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.3	< 0 2			
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4 0			
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	21	11			
Copper (aqua regia extractable)	mg/kg	1	MCERTS	40	9.0			
Lead (aqua regia extractable)	mg/kg	1	MCERTS	290	6.4			
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.4	< 0 3			
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	18	8.4			
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1 0			
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	230	19			

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

[redacted]

[redacted]

Analytical Report Number: 18-86264

Project / Site name: Kings Lynn Compressor Station

Lab Sample Number				965233	965234			
Sample Reference				BH01	BH01			
Sample Number				ES1	ES2			
Depth (m)				0 30	0.50			
Date Sampled				18/05/2018	18/05/2018			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Monoaromatics								
Benzene	ug/kg	1	MCERTS	< 1.0	< 1 0			
Toluene	µg/kg	1	MCERTS	< 1.0	< 1 0			
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1 0			
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1 0			
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1 0			
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1 0			
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001			
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001			
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001			
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1 0			
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2 0			
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8 0			
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8 0			
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10			
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001			
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001			
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001			
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1 0			
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2 0			
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	< 10			
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	< 10			
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10			

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

[redacted]

[redacted]

Analytical Report Number : 18-86264

Project / Site name: Kings Lynn Compressor Station

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

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

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
965233	BH01	ES1	0 30	Brown sand.
965234	BH01	ES2	0 50	Brown sand.

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

[redacted]

[redacted]

Analytical Report Number : 18-86264

Project / Site name: Kings Lynn Compressor Station

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	D	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests""	L009-PL	D	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method	L088/76-PL	W	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

[redacted]

[redacted]

[redacted]

[redacted]

Analytical Report Number : 18-85009

Replaces Analytical Report Number : 18-85009, issue no. 1

Project / Site name:	Kingslynn Compressor	**Samples received on:**	11/05/2018
Your job number:	GN21822	**Samples instructed on:**	11/05/2018
Your order number:		**Analysis completed by:**	20/06/2018
Report Issue Number:	2	**Report issued on:**	20/06/2018
Samples Analysed:	3 soil samples		

[redacted]

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

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

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

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

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

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

[redacted]

[redacted]

Analytical Report Number: 18-85009

Project / Site name: Kingslynn Compressor

Lab Sample Number				958719	958720	958721		
Sample Reference				BH03	BH03	BH03		
Sample Number				ES1	ES2	ES3		
Depth (m)				0 30	0.55	0.80		
Date Sampled				09/05/2018	09/05/2018	09/05/2018		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1		
Moisture Content	%	N/A	NONE	14	13	14		
Total mass of sample received	kg	0.001	NONE	0.57	0.62	0.61		
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected		
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	7.0	7.3	7.6		
Total Organic Carbon (TOC)	%	0.1	MCERTS	0.3	0.6	0.3		
Speciated PAHs								
Naphthalene	mg/kg	0 05	MCERTS	< 0.05	0.56	< 0.05		
Acenaphthylene	mg/kg	0 05	MCERTS	< 0.05	< 0.05	< 0.05		
Acenaphthene	mg/kg	0 05	MCERTS	< 0.05	2.7	< 0.05		
Fluorene	mg/kg	0 05	MCERTS	< 0.05	2.9	< 0.05		
Phenanthrene	mg/kg	0 05	MCERTS	< 0.05	19	0.93		
Anthracene	mg/kg	0 05	MCERTS	< 0.05	4.1	0.19		
Fluoranthene	mg/kg	0 05	MCERTS	< 0.05	18	1.1		
Pyrene	mg/kg	0 05	MCERTS	< 0.05	14	0.84		
Benzo(a)anthracene	mg/kg	0 05	MCERTS	< 0.05	5.4	0.31		
Chrysene	mg/kg	0 05	MCERTS	< 0.05	4.4	0.25		
Benzo(b)fluoranthene	mg/kg	0 05	MCERTS	< 0.05	4.8	0.18		
Benzo(k)fluoranthene	mg/kg	0 05	MCERTS	< 0.05	0.93	0.14		
Benzo(a)pyrene	mg/kg	0 05	MCERTS	< 0.05	3.2	0.19		
Indeno(1,2,3-cd)pyrene	mg/kg	0 05	MCERTS	< 0.05	1.6	< 0.05		
Dibenz(a h)anthracene	mg/kg	0 05	MCERTS	< 0.05	0.40	< 0.05		
Benzo(ghi)perylene	mg/kg	0 05	MCERTS	< 0.05	1.9	< 0.05		
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	83.7	4.08		
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	4.0	5.7	2.4		
Boron (water soluble)	mg/kg	0.2	MCERTS	0.6	0.7	0.5		
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0 2	< 0.2		
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4 0	< 4.0		
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	27	21	6.8		
Copper (aqua regia extractable)	mg/kg	1	MCERTS	9.9	5.1	14		
Lead (aqua regia extractable)	mg/kg	1	MCERTS	11	9.7	5.3		
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	0.3	< 0.3		
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	12	14	4.9		
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	1.3	< 1 0	< 1.0		
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	29	30	11		

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

[redacted]

[redacted]

Analytical Report Number: 18-85009

Project / Site name: Kingslynn Compressor

Lab Sample Number				958719	958720	958721		
Sample Reference				BH03	BH03	BH03		
Sample Number				ES1	ES2	ES3		
Depth (m)				0 30	0.55	0.80		
Date Sampled				09/05/2018	09/05/2018	09/05/2018		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Monoaromatics								
Benzene	ug/kg	1	MCERTS	< 1.0	< 1 0	< 1.0		
Toluene	µg/kg	1	MCERTS	< 1.0	< 1 0	< 1.0		
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1 0	< 1.0		
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1 0	< 1.0		
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1 0	< 1.0		
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1 0	< 1.0		
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1 0	< 1.0		
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	5.1	< 2.0		
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	13	< 8.0		
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	16	< 8.0		
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	35	< 10		
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	3.4	< 1.0		
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	34	< 2.0		
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	200	13		
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	170	13		
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	410	27		

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

[redacted]

[redacted]

Analytical Report Number : 18-85009

Project / Site name: Kingslynn Compressor

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

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

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
958719	BH03	ES1	0 30	Brown clay and sand.
958720	BH03	ES2	0 55	Brown sandy clay.
958721	BH03	ES3	0 80	Brown sandy clay.

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

[redacted]

[redacted]

Analytical Report Number : 18-85009

Project / Site name: Kingslynn Compressor

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	D	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests""	L009-PL	D	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method	L088/76-PL	W	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

[redacted]

[redacted]

[redacted]

[redacted]

Analytical Report Number : 18-86821

Project / Site name:	Kings Lynn Compressor Station	**Samples received on:**	29/05/2018
Your job number:	GN21822	**Samples instructed on:**	29/05/2018
Your order number:		**Analysis completed by:**	04/06/2018
Report Issue Number:	1	**Report issued on:**	04/06/2018
Samples Analysed:	3 soil samples		

[redacted]

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

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

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

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

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

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

[redacted]

[redacted]

Analytical Report Number: 18-86821

Project / Site name: Kings Lynn Compressor Station

Lab Sample Number				968878	968879	968880		
Sample Reference				BH01a	BH01a	BH01a		
Sample Number				ES1	ES2	ES3		
Depth (m)				0.10	0.60	1.10		
Date Sampled				24/05/2018	24/05/2018	24/05/2018		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	19	7.5	6.8		
Moisture Content	%	N/A	NONE	6.1	8.0	9.4		
Total mass of sample received	kg	0.001	NONE	0.48	0.51	0.44		
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected		
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	8.2	8.2	8.2		
Total Organic Carbon (TOC)	%	0.1	MCERTS	0.9	0.7	0.7		
Speciated PAHs								
Naphthalene	mg/kg	0 05	MCERTS	< 0.05	< 0.05	< 0.05		
Acenaphthylene	mg/kg	0 05	MCERTS	< 0.05	< 0.05	< 0.05		
Acenaphthene	mg/kg	0 05	MCERTS	< 0.05	< 0.05	< 0.05		
Fluorene	mg/kg	0 05	MCERTS	< 0.05	< 0.05	< 0.05		
Phenanthrene	mg/kg	0 05	MCERTS	< 0.05	< 0.05	< 0.05		
Anthracene	mg/kg	0 05	MCERTS	< 0.05	< 0.05	< 0.05		
Fluoranthene	mg/kg	0 05	MCERTS	< 0.05	< 0.05	< 0.05		
Pyrene	mg/kg	0 05	MCERTS	< 0.05	< 0.05	< 0.05		
Benzo(a)anthracene	mg/kg	0 05	MCERTS	< 0.05	< 0.05	< 0.05		
Chrysene	mg/kg	0 05	MCERTS	< 0.05	< 0.05	< 0.05		
Benzo(b)fluoranthene	mg/kg	0 05	MCERTS	< 0.05	< 0.05	< 0.05		
Benzo(k)fluoranthene	mg/kg	0 05	MCERTS	< 0.05	< 0.05	< 0.05		
Benzo(a)pyrene	mg/kg	0 05	MCERTS	< 0.05	< 0.05	< 0.05		
Indeno(1,2,3-cd)pyrene	mg/kg	0 05	MCERTS	< 0.05	< 0.05	< 0.05		
Dibenz(a h)anthracene	mg/kg	0 05	MCERTS	< 0.05	< 0.05	< 0.05		
Benzo(ghi)perylene	mg/kg	0 05	MCERTS	< 0.05	< 0.05	< 0.05		
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	< 0.80	< 0.80		
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	9.5	6.4	6.3		
Boron (water soluble)	mg/kg	0.2	MCERTS	0.7	0.5	0.5		
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0 2	< 0.2		
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4 0	< 4.0		
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	14	9.5	9.3		
Copper (aqua regia extractable)	mg/kg	1	MCERTS	11	9.4	8.2		
Lead (aqua regia extractable)	mg/kg	1	MCERTS	6.9	5.3	5.6		
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0 3	< 0.3		
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	12	7.2	8.4		
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	1.4	< 1 0	< 1.0		
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	24	16	17		

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

[redacted]

[redacted]

Analytical Report Number: 18-86821

Project / Site name: Kings Lynn Compressor Station

Lab Sample Number				968878	968879	968880		
Sample Reference				BH01a	BH01a	BH01a		
Sample Number				ES1	ES2	ES3		
Depth (m)				0.10	0.60	1.10		
Date Sampled				24/05/2018	24/05/2018	24/05/2018		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Monoaromatics								
Benzene	ug/kg	1	MCERTS	< 1.0	< 1 0	< 1.0		
Toluene	µg/kg	1	MCERTS	< 1.0	< 1 0	< 1.0		
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1 0	< 1.0		
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1 0	< 1.0		
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1 0	< 1.0		
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1 0	< 1.0		
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1 0	< 1.0		
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2 0	< 2.0		
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8 0	< 8.0		
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8 0	< 8.0		
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10		
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1 0	< 1.0		
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2 0	< 2.0		
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	< 10	< 10		
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	< 10	< 10		
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10		

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

[redacted]

[redacted]

Analytical Report Number : 18-86821

Project / Site name: Kings Lynn Compressor Station

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

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

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
968878	BH01a	ES1	0.10	Brown sandy loam with vegetation and stones.
968879	BH01a	ES2	0 60	Brown loam and sand with gravel and stones.
968880	BH01a	ES3	1.10	Brown loam and sand with gravel and stones.

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

[redacted]

[redacted]

Analytical Report Number : 18-86821

Project / Site name: Kings Lynn Compressor Station

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	D	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests""	L009-PL	D	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method	L088/76-PL	W	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

SPT Hammer Energy Test Repor

in accordance with BSEN ISO 22476-3:20

[redacted]

SPT Hammer Ref:	ADP04
Test Date:	04/01/2018
Report Date:	04/01/2018
File Name:	ADP04.spt
Test Operator:	SH

Instrumented Rod Data

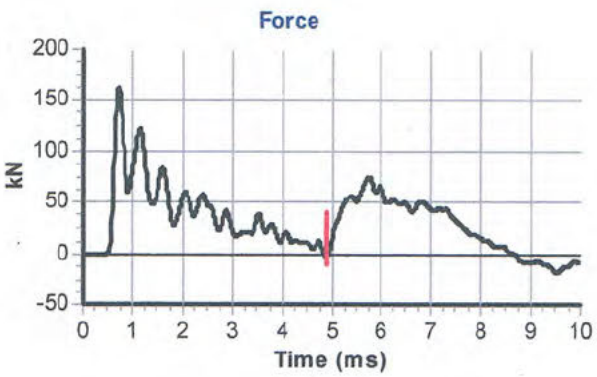
Diameter d_r (mm):	54
Wall Thickness t_r (mm):	6.0
Assumed Modulus E_a (GPa):	200
Accelerometer No.1:	7080
Accelerometer No.2:	11609

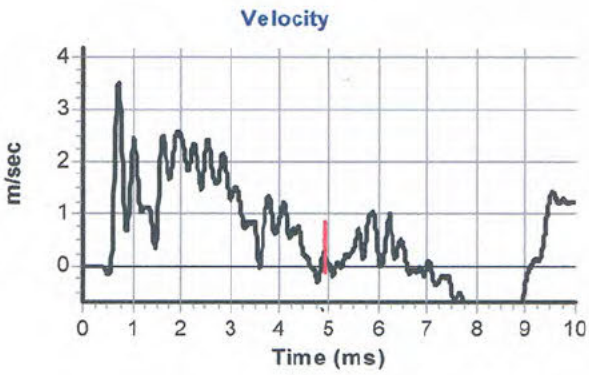
SPT Hammer Information

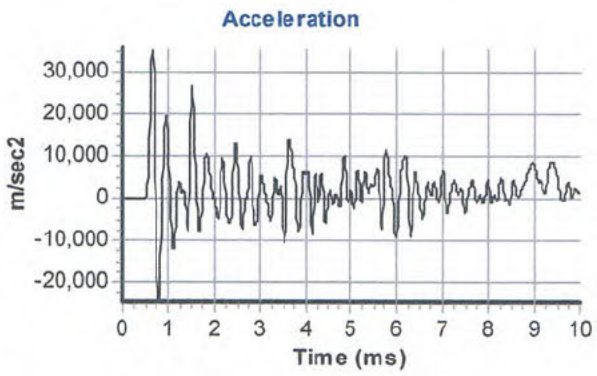
Hammer Mass m (kg):	63.5
Falling Height h (mm):	760
SPT String Length L (m):	10.0

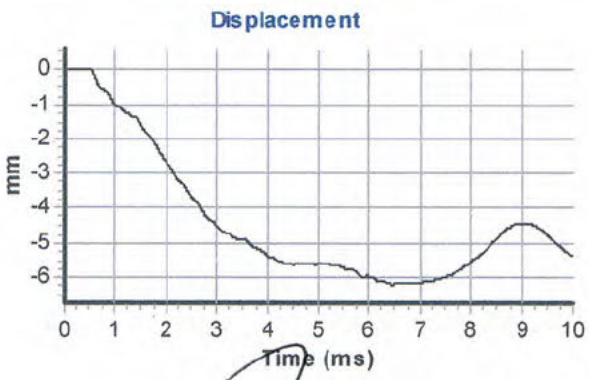
Comments / Location

CALIBRATION









Calculations

Area of Rod A (mm2):	905
Theoretical Energy E_{theor} (J):	473
Measured Energy E_{meas} (J):	291

Energy Ratio E_r (%): **62**

The recommended calibration interval is 12 months

Signed: S. HOWARTH

Title: FITTER

SPTMAN ver.1.93 All rights reserved, Testconsult ©20