



**PHASE II GEOENVIRONMENTAL SITE INVESTIGATION
AND INTERPRETATIVE REPORT
OF LAND AT
DEANSGATE 325
MANCHESTER**

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**March 2023
Ref: GSI 1813 HH GI Report V1**

Quality Assurance	
Project ID	GSI 1813
Project Name	Deansgate 325, Manchester
Report Type	Ground Investigation
Report Reference	GSI 1813 HH GI Report V1
Appointed by	Eckersley O'Callaghan Ltd
On Behalf of	Jedi Deansgate Ltd
Version	Version 2
Status	Final
Date of First Issue	March 2023
Revision Date	May 2023
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Table of Contents

1.0	INTRODUCTION	1
1.1	Instruction	1
1.2	Scope of Works	1
1.3	Reliance and Limitations	1
2.0	SITE LOCATION AND DESCRIPTION	3
2.1	Site Location.....	3
2.2	Site Reconnaissance.....	3
2.3	Site Description	3
2.4	Surrounding Area	3
2.5	Future Site Usage	3
3.0	GROUND INVESTIGATION.....	5
3.1	General.....	5
3.2	Cable Percussion Boreholes	6
3.3	Cable Percussion and Rotary Cored Follow On Boreholes	6
3.4	Combined Dynamic Sample and Rotary Cored Follow on Boreholes	6
3.5	Dynamic Sample Boreholes	6
3.6	Dynamic Probing	7
3.7	Hand Pitting	7
3.9	Sampling and Insitu Testing	7
3.10	Installations and Backfill	8
3.11	Groundwater.....	8
3.12	Groundwater Monitoring.....	8
3.13	Laboratory Testing	9
3.14	Restrictions	9
4.0	GROUND CONDITIONS	10
4.1	Geology	10
4.2	General.....	10
4.3	Made Ground	11
4.4	Superficial Deposits.....	11
4.5	Bedrock	11
4.6	Groundwater.....	12
4.7	Groundwater Monitoring.....	12
4.8	Obstructions.....	12
4.9	Contamination	12
5.0	GEOTECHNICAL TESTING AND RESULTS	13
5.1	In-situ Testing.....	13
5.2	Laboratory Testing	13
6.0	GEOTECHNICAL ASSESSMENT	15
6.1	General.....	15
6.2	Geotechnical Model.....	15
6.3	Foundations	16
6.4	Floor Slabs.....	16
6.5	Concrete.....	16
6.6	Groundwater and Excavations.....	16
6.7	Sustainable Drainage	17
6.8	Existing structures.....	17

6.9	Material Re-Use	17
7.0	CHEMICAL TESTING AND RESULTS	18
7.1	General.....	18
7.2	Chemical Results	18
7.3	Groundwater Testing	19
8.0	GENERIC QUANTITATIVE RISK ASSESSMENT	20
8.1	Criteria for Interpretation	20
8.2	Human Health Receptors	20
8.3	Risk to Human Health	20
8.4	Risk to Controlled Waters	21
8.5	Ground Gas Risk Assessment	22
8.6	Plants and Native Grasses	22
8.7	Buried Services and Utilities	24
8.8	Updated Conceptual Site Model.....	24
8.9	Further Work.....	27
9.0	OTHER POTENTIAL DEVELOPMENT CONSIDERATIONS.....	28
9.1	Waste Soils Characterisation	28
9.2	Imported Fill	28
9.3	Construction Activities	28
9.4	Previously Unidentified Contamination.....	28
10.0	REFERENCES	29

List of Tables

TABLE 2.1: SITE SURFACE COVERING	3
TABLE 3.1: SUPER HEAVY DYNAMIC PROBE PARAMETERS	7
TABLE 3.3: GAS AND GROUNDWATER MONITORING INSTALLATIONS	8
TABLE 4.1: PUBLISHED GEOLOGY.....	10
TABLE 4.2: SUMMARY OF GROUND CONDITIONS.....	10
TABLE 4.3: SUMMARY OF CORE RECOVERY.....	11
TABLE 5.1: INSITU GEOTECHNICAL TESTING	13
TABLE 5.2: GEOTECHNICAL LABORATORY ANALYSIS.....	13
TABLE 5.4: SUMMARY OF BRE SD 1 RESULTS.....	13
TABLE 5.6: POINT LOAD TESTING	14
TABLE 5.7: UCS TESTING.....	14
TABLE 8.1: SUMMARY OF GROUND CONDITIONS.....	15
TABLE 7.1: SUMMARY OF CHEMICAL TESTING SUITE	18
TABLE 7.2: SUMMARY OF SOIL CHEMICAL TESTING RESULTS.....	19
TABLE 7.3: SUMMARY OF GROUNDWATER CHEMICAL TESTING RESULTS	19
TABLE 8.1: CHEMICAL DETERMINANDS EXCEEDING SCREENING CRITERIA	21
TABLE 8.2: CHEMICAL DETERMINANDS EXCEEDING DETECTION LIMIT WHERE NO SCREENING CRITERIA AVAILABLE	21
TABLE 8.3: UPDATED CONCEPTUAL SITE MODEL	25

APPENDICES

Appendix	Information
A	Drawings
B	Cable Percussion Borehole Logs
C	Cable Percussion and Rotary Cored Follow-On Borehole Logs
D	Dynamic Sample and Rotary Cored Follow-On Borehole Logs
E	Rock Core Photographs
F	Dynamic Sample Borehole Logs
G	Dynamic Probe Logs
H	Hand Pit Logs
I	Hand Pit Sketches and Photographs
J	Geotechnical Testing Results
K	Chemical Testing Results
L	Gas and Groundwater Monitoring Results

LIST OF ACRONYMS

Acronym	Meaning
BGS	British Geological Survey
BH	Borehole
CDM	Construction Design and Management
CL:AIRE	Contaminated Land: Applications In Real Environments
CLR	Contaminated Land Report
COSHH	Control Of Substances Hazardous to Health
CSM	Conceptual Site Model
DCP	Dynamic Cone Penetrometer
DEFRA	Department for Environment Foods and Rural Affairs
DP	Dynamic Probe
DoE	Department of Environment
DDS	Drinking Water Standard
EA	Environment Agency
EQS	Environmental Quality Standard
GAC	Generic Acceptance Criteria
HP	Hand Pit
HA	Hand Auger
LPA	Local Planning Authority
LQM	Land Quality Management
mbgl	Metres Below Ground Level
MP	Mackintosh Probe
NPPF	National Planning Policy Framework
NGR	National Grid Reference
OS	Ordnance Survey
SGV	Soil Guideline Value
SSV	Soil Screening Value
DSV	Water Screening Value
SPOSH	Significant Possibility of Significant Harm
SPZ	Source Protection Zone
SSSI	Site of Special Scientific Interest
TP	Trial Pit
TT	Trial Trench
DS	Dynamic Sample / Window Sample

1.0 INTRODUCTION

1.1 Instruction

- 1.1.1 GeoCon Site Investigations Ltd (GeoCon) have been commissioned by Eckersley O'Callaghan on behalf of Jedi Deansgate Ltd to undertake a geotechnical ground investigation on land at 325 Deansgate, Manchester.
- 1.1.2 It is understood that a ground investigation is required to provide environmental and geotechnical information relating to the proposed development.
- 1.1.3 This report is provided to establish the presence type and nature of any contamination at the site, and to identify the ground conditions and provide details of their engineering properties in order to facilitate foundation design for the proposed development.
- 1.1.4 GeoCon have been provided with a third party Phase 1 Preliminary Risk Assessment, conducted by Groundtech Consulting, referenced '18060/383_1.1'.
- 1.1.5 This ground investigation has been designed by the Client in accordance with their ground investigation specification Referenced: 325 Deansgate, Manchester Scope of Services Geoenvironmental Investigation Works.

1.2 Scope of Works

- 1.2.1 Prior to commencing the site works the proposed scope of investigation was as follows, however the proposed scope will be subject to change dependent upon site conditions, access, restrictions and obstructions. The actual works undertaken following the completion of the site works and any on site amendments are detailed in section 3.0.
 - Two cable percussion boreholes to rockhead.
 - Three cable percussion boreholes to rockhead with rotary cored follow-on boreholes to a nominal depth of 20.00mbgl.
 - Seven hand excavated trial pits to a maximum depth of 1.20mbgl or refusal.
 - Insitu environmental and geotechnical sampling, and insitu geotechnical testing.
 - Full supervision of all works by engineering geologist including sampling and detailed geotechnical descriptions to BS5930, EN ISO 14688-1 EN ISO 14688-2 and EN ISO 14689 of all strata types encountered within the exploratory holes.
 - The installation of three gas and groundwater monitoring wells to a nominal depth of 3.00mbgl, and two deeper groundwater monitoring standpipes to a nominal depth of 20.00mbgl.
 - Subsequent groundwater monitoring on six occasions over a three month period in accordance with CIRIA 665 commencing approximately one week after the completion of the ground investigation.
 - A suite of chemical laboratory analysis.
 - A suite of geotechnical laboratory analysis.
 - Production of an interpretative report.

1.3 Reliance and Limitations

- 1.3.1 This report has been prepared using published information and information provided by the Client and their professional advisers which has been made available to GeoCon at the time of writing only. GeoCon accepts no liability for any changes resulting from new information which has become available since this time.

- 1.3.2 This report is provided for the sole use of the client and their professional advisors and is confidential to them unless agreed otherwise in writing. This report may only be used and relied on once the work has been paid for in full.
- 1.3.3 GeoCon owes no duty of care and has no liability to any third party who is not authorised by GeoCon to use this report. Any unauthorised third parties using information contained in this report do so at their own risk.
- 1.3.4 This assessment has been carried out to determine the potential risks posed to future end users, along with other key receptors, resulting from potential contamination at the site, based on the proposed development. Should any revisions in the development proposals result in a change any assessment parameters detailed in this report, a re-assessment of the risk should be carried out.
- 1.3.5 Whilst this report may reference observations made regarding the presence of features/ issues such as invasive species, ACM, site drainage and evidence of structural abnormalities, this report does not constitute specialist surveys on these matters. Should further specialist surveys be carried out in this regard, the findings of these should be reported to GeoCon so that we may determine if this has any impact on the findings of this report.
- 1.3.6 The assessment and interpretation of the factual data obtained as part of this Ground Investigation has been undertaken in accordance with standard consulting practise and with current national and international guidance.
- 1.3.7 This report presents the observations made during the Ground Investigation and the factual data obtained. The conclusions and recommendations in this report are limited to those which can be made based on the findings of the survey and information provided by third parties. GeoCon assumes all third party data to be true and correct. No responsibility can be accepted by GeoCon for inaccuracies in the information provided by any other party.
- 1.3.8 This report is written in the context of an agreed scope of works and should not be used in a different context. Furthermore, new information, improved practises, and changes in legislation may require the reinterpretation of the report in whole or in part after its original issue. GeoCon reserve the right to alter their conclusions and recommendations in the light of further information that may become available. This report is provided for the sole use of the client and their professional advisors and is confidential to them unless agreed otherwise in writing.
- 1.3.9 Ground conditions can be variable and change rapidly, especially in areas of Made Ground, however it is assumed that the ground conditions encountered and observed are typical and representative of the site as a whole. Most specifically with regard to this limited investigation, the ground conditions have been determined from a limited number of exploratory holes formed across the site, therefore only a small percentage of the total area of the site has been investigated. Interpolation between exploratory holes has enabled a general picture of the subsurface conditions to be produced. Conclusions drawn from the ground investigation should be read in this context. GeoCon cannot accept responsibility for any situations resulting from locally unforeseen ground conditions occurring between exploratory holes.
- 1.3.10 In addition, subsurface conditions including contaminant concentrations and groundwater levels may vary spatially with time. This factor should be given due consideration in the event that the information contained within this report is used after any significant period of time has elapsed.

2.0 SITE LOCATION AND DESCRIPTION

2.1 Site Location

2.1.1 The site is located at land off Deansgate, Manchester, at approximate National Grid Reference NGR: 383434:397622 (centre of the site).

2.1.2 A site location plan is presented as Drawing No. GSI 1813/01 in Appendix A.

2.2 Site Reconnaissance

2.2.1 A site reconnaissance was carried out on the 18th January 2023. All details from the site walkover are included in the site description below.

2.3 Site Description

2.3.1 The site is a roughly rectangular shaped piece of land with an approximate area of 0.11Ha.

2.3.2 The topography of the site is generally flat with the southwest segment of the site falling down a shallow access ramp to the associated units, with a change in topography of roughly 2 metres.

2.3.3 The site is currently occupied by a public house and accompanying car park, with an industrial unit attached to the southern side of the pub. South of the car park and industrial unit are archways associated with the Manchester Metrolink, Deansgate-Castlefield station.

2.3.4 An approximate distribution of the surface covering is given below in Table 2.1: Site Surface Covering.

Table 2.1: Site Surface Covering

Type of Surface Cover	Distribution (%)
Soft Ground (grassed and landscaped areas)	0
Hardstanding	75
Roadways	0
Buildings	25
Water (ponds, streams)	0

2.3.5 The site boundary is defined by a roadways to the north and east, whilst the western side is bound by the unit front. To the south the site extremity falls under the archways of the Manchester Metrolink.

2.3.6 The site is bound by Trafford Street to the north, Century Street to the east, walls related to the on site unit to the west, beyond the unit is Deansgate, and to the south the aforementioned archways.

2.3.7 Access to the site is via Trafford Street from the north or Century Street from the east.

2.4 Surrounding Area

2.4.1 The current surrounding land use to the site has mixed land use. On site there is a public house, whilst to the north lies Beetham Tower, northeast there is a new multi storey unit under construction. South of the Deansgate-Castlefield tram station is the Rochdale canal, with Deansgate Locks lying beneath the tramway. To the west of the site are car parks, as well as a restaurants and offices.

2.4.2 The topography of the surrounding area is generally flat.

2.5 Future Site Usage

2.5.1 It is currently proposed to construct a new 22 to 25 storey development at the site, as shown on Eckersley O'Callaghan drawing (ref: 325 Deansgate, Manchester Borehole and Trial Pit Locations) and contained with Appendix A.

- 2.5.2 This assessment has been carried out with reference to this proposed development plan as provided by the client, any changes to the proposed development may result in this assessment requirement updating

3.0 GROUND INVESTIGATION

3.1 General

- 3.1.1 The intrusive investigation was carried out between the 31st January and 13th February 2023.
- 3.1.2 The specification and scope of works for the ground investigation has been provided by Eckersley O'Callaghan in line with their ground investigation specification referenced: 325 Deansgate, Manchester Scope of Services Geoenvironmental Investigation Works.
- 3.1.3 The ground investigation has been carried out in accordance with BS5930 and the UK Specification for Ground Investigation Second Edition 2012.
- 3.1.4 All strata descriptions were undertaken in accordance with BS5930 Amendment 2; EN ISO 14688 -1; EN ISO 14688 -2; and EN ISO 14689.
- 3.1.5 The actual ground investigation comprised the formation of:
- Three cable percussion boreholes.
 - Two cable percussion boreholes with rotary cored follow-on boreholes.
 - One dynamic sampling borehole with a rotary cored follow-on borehole.
 - One dynamic sampling borehole.
 - One day dynamic probing.
 - Five hand excavated trial pits.
 - Insitu geotechnical and geoenvironmental testing and sampling.
 - Full supervision of all works by engineering geologist including sampling and detailed geotechnical descriptions to BS5930, EN ISO 14688-1 EN ISO 14688-2 and EN ISO 14689 of all strata types encountered within the exploratory holes.
 - The installation of three gas and groundwater monitoring wells, and two deeper groundwater monitoring wells.
 - Subsequent groundwater monitoring on six occasions over a three month period in accordance with CIRIA 665 commencing approximately one week after the completion of the ground investigation.
 - A suite of geotechnical laboratory analysis.
 - A suite of chemical laboratory analysis.
 - Production of an interpretative report.
- 3.1.6 The ground investigation was carried out to determine the geotechnical and geoenvironmental properties of the soils and rock beneath the site for a proposed residential development at the site.
- 3.1.7 The locations of the exploratory holes were specified by GeoCon and were positioned to gain key information beneath the site in relation to the proposed development.
- 3.1.8 All locations were checked against buried service location plans and then scanned with a Cable Avoidance Tool (CAT) and Genny prior to excavation, and a permit to dig was then issued. Each location was then continued by hand down to a minimum of 1.20mbgl to clear any buried services or other subsurface obstructions. All locations were then checked again with a CAT at the base of the hand excavated inspection pit by GeoCon prior to commencement of drilling.
- 3.1.9 All access permissions were arranged by Eckersley O'Callaghan prior to the ground investigation commencing.
- 3.1.10 An exploratory hole location plan is presented in Appendix A as drawing number GSI 1813/02.

3.2 Cable Percussion Boreholes

- 3.2.1 Three cable percussion boreholes referenced BH01, BH02 and BH02a were drilled at the site to depths of between 0.30 and 4.52mbgl.
- 3.2.2 The cable percussion boreholes were drilled in order to facilitate geoenvironmental sampling and to gain an understanding of the environmental and geotechnical properties of the soils and rock beneath the site, and to facilitate the installation of combined gas and groundwater monitoring standpipes.
- 3.2.3 The cable percussion boreholes were commenced in 150mm diameter drilling string to achieve the target depths.
- 3.2.4 The cable percussion follow on borehole logs are presented in Appendix B.

3.3 Cable Percussion and Rotary Cored Follow On Boreholes

- 3.3.1 Two cable percussion and rotary cored follow on boreholes referenced BH01a to BH03 were drilled at the site to depths of between 20.00 and 20.50mbgl
- 3.3.2 The boreholes were drilled in order to facilitate geoenvironmental sampling and to gain an understanding of the environmental and geotechnical properties of the soils and rock beneath the site, and to facilitate the installation of groundwater monitoring standpipes.
- 3.3.3 The cable percussion boreholes were commenced in 150mm diameter drilling string to the top of the bedrock in each borehole. The boreholes were then continued by rotary cored follow on in 100mm diameter drill string
- 3.3.4 The rotary cored follow on boreholes were drilled using an water flush technique.
- 3.3.5 Rock was generally cored in 1.50m lengths and transferred into wooden core boxes to facilitate rock logging and subsequent geotechnical analysis.
- 3.3.6 Drilling was undertaken using a PWF lined barrel producing a core diameter of 92mm.
- 3.3.7 The cable percussion and rotary cored follow on borehole logs are presented in Appendix C.

3.4 Combined Dynamic Sample and Rotary Cored Follow on Boreholes

- 3.4.1 One rotary cored follow on borehole was drilled using a tracked Teredo 2.8 rotary drilling rig.
- 3.4.2 The borehole was commenced using dynamic sample drive in techniques from ground level until refusal of the sampler at approximately 5.00mbgl. From this depth the borehole was continued utilising rotary cored techniques to a depth of 20.00mbgl.
- 3.4.3 The rotary follow on borehole was drilled using a water flush technique.
- 3.4.4 Rock was generally cored in 1.50m lengths and transferred into wooden core boxes to facilitate rock logging and subsequent geotechnical analysis.
- 3.4.5 Drilling was undertaken using a PWF lined barrel producing a core diameter of 92mm.
- 3.4.6 The combined dynamic sample and rotary follow on borehole log is presented in Appendix D.
- 3.4.7 Colour photographs of all rock core runs are presented as Drawings numbers GSI 1813/04 to GSI 1813/18 in Appendix E

3.5 Dynamic Sample Boreholes

- 3.5.1 One dynamic sample borehole was drilled at the site referenced BH05 and was drilled at the site to depth of 4.10mbgl.
- 3.5.2 The dynamic sample boreholes were drilled using a tracked dynamic sample rig in order to facilitate geoenvironmental sampling and to gain an understanding of the environmental and geotechnical

properties of the soils and rock beneath the site, and to facilitate the installation of combined gas and groundwater monitoring standpipes.

3.5.3 The dynamic sample boreholes were drilled using 100mm diameter barrel reducing in size with depth, to achieve the target depths.

3.5.4 All dynamic sample borehole logs are presented in Appendix F.

3.6 Dynamic Probing

3.6.1 Dynamic probe holes were formed across the site to attempt to determine existing foundations details of the viaduct foundations within the site boundary. Dynamic probe holes were advanced from ground level to depths of between 4.60 and 4.80mbgl.

3.6.2 All dynamic probes were terminated on refusal.

3.6.3 Dynamic probing was carried out using a super heavy dynamic probe machine.

3.6.4 All dynamic probe holes were terminated at refusal which is defined as 50 or greater blows over the 100mm increment length.

3.6.5 Blow counts are recorded for every 100mm of advancement with the rods.

3.6.6 Details of the super heavy dynamic probe are given below in Table 3.1: Super Heavy Dynamic Probe Parameters.

Table 3.1: Super Heavy Dynamic Probe Parameters

Parameter	Detail
Hammer Weight (kg)	63.5
Weight Drop (mm)	750
Rod Width (mm)	22
Cone Width (mm)	33
Cone Angle (°)	90

3.6.7 The Dynamic Probe logs are presented in Appendix G.

3.7 Hand Pitting

3.7.1 Five hand excavated trial pits were excavated at the site in locations specified by the client referenced TP01 to TP05, in an attempt to expose the existing foundations used at the site.

3.7.2 The hand pits were excavated to depths of between 0.15 and 1.25mbgl.

3.7.3 All dimension of the exposed foundation were recorded and photographed.

3.7.4 Hand pit logs are presented in Appendix H.

3.8 Hand pit sketches and photographs are presented as drawings GSI1813/19 to GSI1813/23 in Appendix I.

3.9 Sampling and Insitu Testing

3.9.1 The environmental and geotechnical sampling regime and insitu testing regime included the following:

- Environmental samples for subsequent chemical analysis were taken from each strata type, with a minimum of three samples taken from the upper 1.00 m, then at 1.00 m intervals in made ground with a minimum of one sample from the natural strata.
- Small disturbed samples taken from each strata type and then at 1.00 m intervals thereafter.

- Bulk disturbed samples taken at 1.00 m intervals to a depth of 5.00 mbgl, then 1.50 m intervals thereafter
- Insitu Standard Penetration Tests (SPTs) were carried out at 1.00 m intervals down to 5.00 mbgl to collate insitu strength information (relative density) for the soils beneath the site.
- Groundwater samples for subsequent chemical analysis were taken retrospectively from BH01a and BH03, after purging the boreholes.

- 3.9.2 Soil samples were collected for environmental and geotechnical analysis by the engineering geologist on site based on physical and visual inspection in addition to standard sampling.
- 3.9.3 All samples were stored in pre-chilled cool-boxes prior to immediate dispatch to laboratory. Where there has been a delay in transporting the samples to the laboratory, samples have been kept in a cool dark storage unit inside cool boxes packed with ice, which is regularly replaced to maintain sample quality.
- 3.9.4 The environmental samples were subsequently transported to a chemical laboratory in plastic tubs, glass jars and soils vials. The geotechnical samples were subsequently transported to a geotechnical laboratory in prepared bulk bags and plastic tubs.
- 3.9.5 Groundwater samples were collected in a range of glass jars and plastic bottles with all necessary preservatives where required and were subsequently transported to a chemical laboratory.

3.10 Installations and Backfill

- 3.10.1 Five of the boreholes were installed with both combined and separate gas and ground water monitoring standpipes. The details of the gas and ground water monitoring standpipes are summarised below in Table 3.2: Gas and Groundwater Monitoring Installations.

Table 3.2: Gas and Groundwater Monitoring Installations

BH ID	Installation Depth (mbgl)	Response Zone (mbgl)	Installation Date	Strata	Comments
BH01a	20.00	5.00 – 20.00	01/02/23	Chester Formation	N/A
BH02a	3.00	1.00 – 3.00	01/02/23	Glaciofluvial Deposits	N/A
BH03	20.00	5.00 – 20.00	03/02/23	Chester Formation	N/A
BH04	3.00	1.00 – 3.00	02/02/23	Glaciofluvial Deposits	N/A
BH05	3.00	1.00 – 3.00	01/02/23	Made Ground/Glaciofluvial Deposits	N/A

- 3.10.2 Full details of the installations and backfill are presented on the relevant exploratory hole logs.
- 3.10.3 All monitoring standpipes are constructed using 50mm slotted pipe with a Geosock filter and gravel surround medium within the response zone, and 50mm plain pipe with a bentonite seal above the response zone (minimum 0.50m thick).
- 3.10.4 All remaining exploratory holes were backfilled with bentonite and arisings and made level at the surface to a similar condition as prior to the work.

3.11 Groundwater

- 3.11.1 Where groundwater was encountered a waiting period of 20 minutes was allowed to monitor any change (rise or fall) in the levels of each groundwater strike.

3.12 Groundwater Monitoring

- 3.12.1 Groundwater monitoring has been carried out across the site on three occasions in conjunction with the gas monitoring regime, to establish the standing water levels beneath the site, and facilitate groundwater sampling.

3.13 Laboratory Testing

- 3.13.1 Geotechnical laboratory testing was subsequently carried out on selected samples of soil. Further details of the geotechnical laboratory testing are given within Section 5.0 – Geotechnical Testing and Results.
- 3.13.2 All geotechnical laboratory testing was scheduled by GeoCon.
- 3.13.3 Chemical laboratory testing was subsequently carried out on selected samples of soil. Further details of the chemical laboratory testing are given within Section 7.0 – Chemical Testing and Results.
- 3.13.4 All chemical laboratory testing was scheduled by GeoCon.

3.14 Restrictions

- 3.14.1 It should be noted that inside boreholes could not be commenced as cable percussion boreholes due to height restriction. Therefore dynamic sampling drilling method was commenced in these locations.

4.0 GROUND CONDITIONS

4.1 Geology

- 4.1.1 The British Geological Survey shows the site to be underlain by the geological succession outlined below
Table 4.1: Published Geology.

Table 4.1: Published Geology

Geology	Description /strata	BGS General Description
Artificial	The site is on the boundary of recorded Made Ground deposits.	<i>'Made Ground is an area where the pre-existing (natural or artificial) land surface is raised by artificial deposits. The purpose of the made ground is unspecified.'</i>
Superficial	Glaciofluvial Deposits	<i>'Sand and gravel, locally with lenses of silt, clay or organic material.'</i>
Bedrock	Chester Formation	<i>'Cheshire...the formation comprises conglomerates and reddish brown, cross-bedded, pebbly sandstones with subordinate beds of red-brown mudstone. The conglomerates have a reddish brown sandy matrix and consist mainly of pebbles of brown or purple quartzite, with quartz conglomerate and vein quartz. In these areas the formation generally fines upwards, from dominantly conglomerates at the base, to interbedded conglomerates and sandstones, with sandstone and pebbly sandstone predominant in the upper part, and rare mudstones.'</i>

4.2 General

- 4.2.1 A generalised summary of the ground conditions encountered, depths to base, and thickness recorded from the exploratory borehole records is presented below in Table 4.2: Summary of Ground Conditions.

Table 4.2: Summary of Ground Conditions

Geology / Strata	Depth (mbgl)				Thickness (m)		Locations encountered
	Top		Base		Min	Max	
	Min	Max	Min	Max			
Made Ground	0.00	-	0.30	1.50	0.30	1.50	All Locations
Glaciofluvial Deposits	1.00	1.50	3.50	4.50	2.40	3.40	BH01a, BH02a, BH03, BH04 & BH05
Chester Formation	3.50	4.50	4.10	20.50	0.25	16.60	BH01a, BH02a, BH03, BH04 & BH05
Groundwater	Strike depth (mbgl)		Rest Level (mbgl)		Locations encountered		
	Min	Max	Min	Max			
Seepage	-	-	-	-	All holes drilled with water flush, therefore not possible to observe groundwater entries.		
Strike	-	-	-	-	All holes drilled with water flush, therefore not possible to observe groundwater entries.		
SWL only (no obvious strike)	-	-	-	-	All holes drilled with water flush, therefore not possible to observe groundwater entries.		

- 4.2.2 The general ground conditions encountered have been summarised below.

4.2.3 Detailed strata descriptions are presented on the cable percussion borehole logs; cable percussion and rotary cored follow-on logs; dynamic sample and rotary cored follow-on logs; dynamic sample borehole logs and trial pit logs, presented in Appendix B, C, D, E and G respectively.

4.2.4 The actual ground conditions encountered across the site were generally uniform and comprised Made Ground overlying Glaciofluvial Deposits, overlying Chester Formation deposits.

4.3 Made Ground

4.3.1 Made ground was encountered in all exploratory hole locations from ground level to depths of between, 0.15 and 1.50mbgl. The made ground generally comprised hardstanding overlying layers of granular and cohesive made ground materials.

Hardstanding:

4.3.3 Hardstanding was encountered in all locations from ground level to depths of between 0.15 and 0.30mbgl, and generally comprised asphalt and concrete.

Granular Made Ground:

4.3.4 Granular made ground materials were encountered in BH02, BH03, BH04, BH05, TP01, TP03, TP04 and TP05 beneath the hardstanding to depths of between 0.80 and 1.50mbgl, and generally comprised sandy gravel and gravelly sands with cobble contents of brick and concrete.

Cohesive Made Ground:

4.3.5 Cohesive made ground materials were encountered BH01, BH01a, BH02, BH02a, from beneath the hardstanding to depths of between 0.30 and 1.10mbgl, and generally comprised sandy gravelly clay with fragments of concrete and brick.

4.4 Superficial Deposits

4.4.1 Soils considered to represent Glaciofluvial Deposits were encountered in BH01a, BH02a, BH03, BH04 and BH05 directly beneath the Made Ground and were proven to depths of between 3.50 and 4.50mbgl.

4.4.2 The Glaciofluvial Deposits generally comprised medium dense to very dense gravelly sand.

4.5 Bedrock

4.5.1 Deposits considered to represent the Chester Formation were encountered in BH01a, BH02a, BH03, BH04 and BH05 directly beneath the Glaciofluvial Deposits and were proven to depths of between 4.10 and 20.50mbgl.

4.5.2 The Chester Formation deposits generally comprised extremely weak to weak red-brown medium grained moderately to completely weathered sandstone.

4.5.3 Core recovery within the Chester Formation is summarised below in Table 4.3: Summary of Core Recovery.

Table 4.3: Summary of Core Recovery

Parameter	Range
Total Core Recovery (%)	0 – 100
Solid Core Recovery (%)	0 – 100
RQD (%)	0 – 91

4.5.4 The strength of the rock core was described as extremely weak to weak from the field tests.

4.5.5 Colour photographs of all rock core runs are presented as Drawings numbers GSI 1813/09 to GSI 1813/23 in Appendix I.

4.6 Groundwater

- 4.6.1 All rotary cored follow-on holes were drilled using water flush method. There was no significant water strike noticed.
- 4.6.2 Cable percussion boreholes were drilled with water and kept full once water was added. No significant water strike noticed.
- 4.6.3 There was no water strike in the dynamic sample borehole.

4.7 Groundwater Monitoring

- 4.7.1 A groundwater monitoring regime is being carried out at the site in conjunction with the gas monitoring regime.
- 4.7.2 Samples of groundwater have been taken from selected boreholes for subsequent chemical analysis.
- 4.7.3 This report will be updated and reissued on completion of the gas and groundwater monitoring period.

4.8 Obstructions

- 4.8.1 No obstructions were encountered during this ground investigation.

4.9 Contamination

- 4.9.1 No visual or olfactory evidence of contamination was encountered or observed during this ground investigation, in particular no obvious visual or olfactory evidence of mobile contamination was observed during the ground investigation.

5.0 GEOTECHNICAL TESTING AND RESULTS

5.1 In-situ Testing

- 5.1.1 In-situ Standard Penetration Tests (SPTs) were undertaken in accordance with BS1377 (1990) within the window sample boreholes. A summary of the insitu testing is given below in Table 5.1: Insitu Geotechnical Testing.

Table 5.1: Insitu Geotechnical Testing

Strata	SPT N Value vs Depth Range	Locations Encountered
Glaciofluvial Deposits	1.20: N = 28 – 41 2.00: N = 18 – 50+ 3.00: N = 19 – 50+ 4.00: N = 50+ 4.40: N = 50+ 4.70: N = 50+ 4.50: N = 50+ 5.10: N = 50+	BH01a, BH02a, BH03, BH04 & BH05

5.2 Laboratory Testing

- 5.2.1 A programme of geotechnical laboratory testing was undertaken in accordance with BS1377 (1990) 'Methods of tests for soils for civil engineering purposes. The geotechnical testing regime has been summarised below in Table 5.2: Geotechnical Laboratory Analysis.

Table 5.2: Geotechnical Laboratory Analysis

BS 1377 Test Number	Test Description	Quantity Analysed
BS 1377 1990: Part 3. Clause 5.3 & BRE CP2/79	BRE SD 1	5
BS 1377 Part 2:1990 Wet Sieve, Clause 9.2	Particle Size Distribution (Wet Sieve)	5
ISRM Suggested Method for UCS Testing	Uniaxial Compressive Strength Test	9
ISRM Suggested Method for Point Load Testing	Point Load Test	15

- 5.2.2 The results of the geotechnical testing are presented in Appendix J.

BRE SD 1

- 5.2.3 Three soil samples and two rock samples were analysed for BRE SD 1 reduced suite to assess the risk to buried concrete at the site, which includes total sulphate, water soluble sulphate, pH and total sulphur. The results of the testing are summarised below in Table 5.3: Summary of BRE SD 1 Results.

Table 5.3: Summary of BRE SD 1 Results

Test	Soil Test - Results Range
Total sulphate (%)	<0.01 – 0.09
Water soluble sulphate (mg/l)	<10 – 366
Total sulphur (%)	<0.01 – 0.05
pH	7.4 – 9.2
Total Potential Sulphate (%)	0.03 – 0.15
Potential amount of Oxidisable Sulphate Present (%)	0.02 – 0.06

- 5.2.4 Design/mix of buried concrete should be undertaken in accordance with the “Aggressive Chemical Environment for Concrete” (ACEC) classification, of BRE Special Digest 1:2005 (Concrete in Aggressive Ground).

5.2.5 The above results indicate that pyrite is unlikely to be present within the soils beneath the site.

Point Load Testing

5.2.6 Point load test was conducted on a total of fifteen samples. The results of the point load tests, along with the correlation into UCS and strength readings are given below in Table 5.4: Point Load Testing.

Table 5.4: Point Load Testing

BH ID	Test Depth	Test Type (Axial, Irregular, Diametral)	I _{s50} (MPa)	Equivalent USC (MPa)	Comments / Strength
BH01a	5.20 – 5.26	Axial	0.25	5	Very weak
BH01a	9.00 – 9.17	Diametral	0.16	3.2	Very weak
BH01a	12.60 – 12.75	Diametral	0.13	2.6	Very weak
BH01a	15.60 – 15.73	Diametral	0.15	3	Very weak
BH01a	20.00 – 20.16	Diametral	0.19	3.8	Very weak
BH03	7.00 – 7.08	Irregular	3.62	72.4	Strong
BH03	10.20 – 10.29	Axial	0.15	3	Very weak
BH03	12.50 – 12.61	Diametral	0.10	2	Very weak
BH03	13.20 – 13.31	Diametral	0.08	1.6	Very weak
BH03	19.40 – 19.50	Diametral	0.05	1	Extremely weak
BH04	7.10 – 7.18	Axial	0.15	3	Very weak
BH04	9.50 – 9.58	Diametral	0.12	2.4	Very weak
BH04	13.00 – 13.10	Diametral	0.09	1.8	Very weak
BH04	16.50 – 16.70	Diametral	0.13	2.6	Very weak
BH04	18.70 – 18.95	Diametral	0.15	3	Very weak

Uniaxial Compressive Strength Testing (UCS)

5.2.7 A total of nine Unconfined Compressive Strength (UCS) test were carried out on selected samples of rock from beneath the site. The results are summarised below in Table 5.5: UCS Testing.

Table 5.5: UCS Testing

BH ID	Test Depth	USC (MPa)	Strength	Comments / Type of Failure
BH01A	10.50 – 10.70	5.3	Weak	Axial Splitting
BH01A	16.70 – 16.92	15.6	Moderately Weak	Axial Splitting
BH01A	17.55 – 17.77	15.2	Moderately Weak	Single Shear
BH03	14.50 – 14.72	12.6	Moderately Weak	Single Shear
BH03	17.22 – 17.44	12.7	Moderately Weak	Single Shear
BH03	20.28 – 20.50	4.6	Very Weak	Multiple Fracture
BH04	9.80 – 10.00	7.8	Weak	Single Shear
BH04	17.55 – 17.77	1.7	Very Weak	Multiple Fracture
BH04	19.51 – 19.73	5.5	Weak	Single Shear

6.0 GEOTECHNICAL ASSESSMENT

6.1 General

- 6.1.1 It is understood that the proposed development will comprise the construction of multistorey high rise residential development.
- 6.1.2 At this stage GeoCon have not been provided with any loadings for the proposed development.
- 6.1.3 The recommendations given below assume that ground levels intended for the redevelopment will be similar to those existing at present. If ground levels are subject to significant change as part of the proposed development, then the recommendations in this report may require reinterpretation.

6.2 Geotechnical Model

- 6.2.1 One dynamic sample, one cable percussion, two cable percussion with rotary cored follow on, one dynamic sample with rotary cored follow on boreholes; five trial pits and two dynamic probe locations were advanced across the site on a basis of targeting proposed structures and as a general coverage assessment of the site as a whole.
- 6.2.2 The ground conditions encountered within the exploratory holes are summarised below in Table 6.1: Summary of Ground Conditions.

Table 6.1: Summary of Ground Conditions

Stratum	Depth Range to Base of Stratum (mbgl) (Thickness Range)	Relative Density / Undrained Shear Strength	Notes
Made Ground and Topsoil			
Made Ground	0.15 to 1.50m (0.15 to 1.50m)	Not recorded.	Made Ground was encountered in all locations, with asphalt/concrete overlying a typically gravelly sand with a medium cobble content. Cobbles were of concrete and brick. Hardstanding was typically ~0.20m thick, with a maximum thickness of 0.30m.
Natural Strata			
Glaciofluvial Deposits	3.50 to 4.50m (2.40 to 3.40m)	<u>Strength from Field Description</u> Medium dense to very dense <u>Strength from In-situ Field Testing</u> SPT 'N' values recorded: 1.20: N = 28 – 41 2.00: N = 18 – 50+ 3.00: N = 19 – 50 4.00: N = 50+	Glaciofluvial Deposits we encountered in BH01a, BH02a, BH03, BH04 and BH05 directly beneath the Made Ground comprising medium dense to very dense gravelly sand. Cobbles: 0% Gravels: 53 – 83% Sands: 16 – 44% Silts/Clays: 1 – 7%
Chester Formation	4.10 to 20.50m+ (0.25 to 16.60m+)	<u>Strength from Field Description</u> <u>Strength from In-situ Field Testing</u> 4.00: N = 50+ 4.40: N = 50+ 4.50: N = 50+ 4.70: N = 50+ 5.10: N = 50+	Chester Formation deposits were encountered in BH01a, BH02a, BH03, BH04 and BH05. The Chester Formation deposits typically consisted of extremely weak to weak sandstone. In BH03 and BH04, the top 2-3m included gravel beds, consisting of angular to rounded, medium to coarse grained gravels. It is likely these were bound by a sand matrix, which were not recovered due to drilling. Lab testing shows the rock strength ranges from extremely weak to strong.
* - Corrected for fines content in accordance with NHBC Chapter 4.2.			

- 6.2.3 All rotary cored follow-on holes were drilled using water flush method. There was no significant water strike noticed.

- 6.2.4 Cable percussion boreholes were drilled with water and kept full once water was added. No significant water strike noticed.
- 6.2.5 There was no water strike in the dynamic sample borehole.

6.3 Foundations

Piled Foundations.

- 6.3.1 Given the proposed structure, and number of storeys it is recommended that a piled foundation solution should be adopted for the construction of the new development at this site to transfer the foundation loads through the Made Ground and shallow natural soils to more competent strata at depth. In order to formulate a suitable design, it is recommended that the advice of specialist piling contractors be sought. In addition, the pile design should include provision for negative skin friction within the made ground soils as these deposits may be subject to collapse compression if not treated.
- 6.3.2 In view of the relatively weak near surface soils, it will be necessary to construct a working platform for the piling rig and any other plant required during the works. Such a design should be undertaken in accordance with the procedures given in the BRE publication: Working platforms for tracked plant.

General Advice

- 6.3.3 All foundations should be designed by a suitably competent structural engineer or specialist piling contractor in line with current guidance and good practise.
- 6.3.4 Interactions between new and existing foundations would need to be considered, as would the potential for differential settlement between new and existing structures. A construction joint should be incorporated at the interface between any new and existing structures. Particular care will be required to ensure that the new basement does not adversely impact the existing foundations.

6.4 Floor Slabs

- 6.4.1 Suspended floorslabs should be used at this site in conjunction with the piled foundation solution.

6.5 Concrete

- 6.5.1 A review of the pH and sulphate concentrations indicates that all concrete used in the foundations at this site should be designed to “Design Sulphate Class” DS-1, and the “Aggressive Chemical Environment for Concrete” (ACEC) class AC-1.

6.6 Groundwater and Excavations

- 6.6.1 Groundwater is unlikely to represent a particular problem to the construction of the proposed development at this site given the proposed piled solution. However, it should be recognized that slight seepages and minor water entries may combine in any long trench excavations to create a significant volume of water which may cause local problems during the construction phase. Any minor groundwater seepages or significant standing water within excavations made upon this site may be removed by using a simple form of de-watering. Such a system could include the excavation of sumps from which the water could be pumped. Advice on Groundwater Control is given in CIRIA Report No 515 – Groundwater Control Design and Practice.
- 6.6.2 It is recommended that the borehole installations are grouted up during the construction works to prevent it from acting as a future conduit for potential artesian water.
- 6.6.3 Foundation excavations should be feasible using conventional plant.
- 6.6.4 The stability of the excavation faces cannot be guaranteed, thus temporary support to the excavation faces may become necessary. Alternatively, subject to space constraints, excavations could be battered back to a suitable angle of repose. However, if there is a requirement to protect nearby structures or

services, appropriate supports may still be required. Advice on excavation support is given in CIRIA Report No 97 – Trenching Practice.

6.7 Sustainable Drainage

- 6.7.1 In accordance with National Planning and Policy Framework (NPPF) the Planning Authority are likely to insist that surface water drainage from any new-build or redevelopment complies with current design practices for Sustainable Urban Drainage (SUD's) construction of separate drainage systems for foul and surface water. Surface water shall be required to be attenuated reducing the discharge of water from the site requiring treatment and disposal. A 20% reduction in surface water discharge rates off the site is to be expected – allowing for the 1 in 100 year storm event and allowing for climate change.
- 6.7.2 Based on the ground conditions encountered likely that sustainable drainage would be suitable at the site, however due to the thickness of made ground overlying the natural deposits, it may not be practical or feasible. If sustainable drainage is to be considered, it is recommended that soak-away testing is carried out in accordance with BRE 365 at the site to establish the sites suitability for sustainable drainage.

6.8 Existing structures

- 6.8.1 Any existing structures and foundations if found should be grubbed up and replaced with a suitable engineered granular backfill and should be compacted in layers.

6.9 Material Re-Use

Any site won soils / materials may be available for reuse across the site subject to the appropriate classification, analysis and engineered solution.

6.9.1

7.0 CHEMICAL TESTING AND RESULTS

7.1 General

- 7.1.1 All samples were sent to a UKAS accredited chemical testing laboratory, and MCERTS were used where available. The analytical strategy focussed on a general suite of potential contaminants and the analytical suites are summarised in Table 7.1: Summary of Chemical Testing Suite.

Table 7.1: Summary of Chemical Testing Suite

Testing	Comment	No. of soil samples analysed	No. of groundwater samples analysed
General metals suite including: Arsenic, cadmium, chromium, copper, cyanide, lead, mercury, nickel, phenol, selenium, zinc, pH, and water soluble sulphate	General analysis of soils beneath the site to achieve general site coverage, and targeting former uses on site and off site within influencing distance	8	3
Speciated PAH	General analysis of soils beneath the site to achieve general site coverage, and targeting former uses on site and off site within influencing distance	8	3
TPH CWG	General analysis of soils beneath the site to achieve general site coverage, and targeting former uses on site and off site within influencing distance	8	3
VOC's	General analysis of soils beneath the site to achieve general site coverage, and targeting former uses on site and off site within influencing distance	8	3
SVOC's	General analysis of soils beneath the site to achieve general site coverage, and targeting former uses on site and off site within influencing distance	8	3
PCB's	General analysis of soils beneath the site to achieve general site coverage, and targeting former uses on site and off site within influencing distance	8	3
Asbestos Screen	General analysis of soils beneath the site to achieve general site coverage, and targeting former uses on site and off site within influencing distance	5	-

- 7.1.2 All chemical testing results are presented in Appendix K.

7.2 Chemical Results

- 7.2.1 All chemical results have initially been compared against screening criteria for a residential end use without plant uptake end use.
- 7.2.2 Total Organic Carbon (TOC) was analysed in all three samples from the site. The results of the TOC recorded values between 0.40 and 2.25%. From this Soil Organic Matter (SOM) has been calculated at values of between 0.69 and 3.88. Therefore, a worst case scenario of 1% SOM has been used where appropriate in the chemical assessment overleaf.

- 7.2.3 Only detectable concentrations of contaminants reported above screening criteria are presented below in Table 7.2: Summary of Soil Chemical Testing Results.

Table 7.2: Summary of Soil Chemical Testing Results

Determinand	No. Of samples analysed	Screening value (mg/kg) (where applicable)	Determinand concentration range (mg/kg)		No of Samples exceeding screening value
			Min	Max	
Arsenic	5	40	3	48	1
Lead	5	330	41	699	2
Mercury	5	1.2	0.37	2.79	3

BD = Below Detection

NL = No Limit

NGV = No Guideline Screening Value Available

- 7.2.4 Five samples were analysed for asbestos screen. No fibres were detected in any of the samples.

7.3 Groundwater Testing

- 7.3.1 Only detectable concentrations of contaminants reported above the screening criteria are presented overleaf in Table 7.3: Summary of Groundwater Chemical Testing Results.

- 7.3.2 All groundwater chemical results have initially been compared to Drinking Water Standards (DDS) and Environmental Quality Standards (EQS) to assess risk to controlled waters, and against Water Screening Values to assess risk to human health. Any compound concentrations which exceed the DDS screening value are highlighted in bold and any compound concentrations which exceed the EQS screening value are underlined. Any compound which exceeded the DSV is highlighted in bold and italic. All other chemicals analysed not listed in the table recorded levels below the limits of detection.

Table 7.3: Summary of Groundwater Chemical Testing Results

Determinand	No. Of samples analysed	Screening value (where applicable) (µg/l)			Determinand concentration range above detection (µg/l)	Location of highest concentration
Summary of Groundwater results		DDS	EQS	DSV		
Copper	3	2000	1	NSV	<4 – <u>9</u>	BH01a
Chromium	3	50	3.4	NSV	2 – <u>28</u>	BH03
Lead	3	10	14	NSV	12 – <u>31</u>	BH05

NSV = No Screening Value Available

** = Hardness Dependent*

8.0 GENERIC QUANTITATIVE RISK ASSESSMENT

8.1 Criteria for Interpretation

- 8.1.1 The regime for contaminated land was set out in Part IIA of the Environmental Protection Act (EPA) 1990, as inserted by S.57 of The Environment Act 1995 and came into effect in England on 1st April 2000 as The Contaminated Land (England) Regulations 2000 (SI 2000/227). These regulations were subsequently updated with the provision of The Contaminated Land (England) Regulations 2006 (SI 2006/1380), which consolidated the previous regulations and amendments and added in provisions regarding radioactive contaminated land. These regulations came into force on 4th August 2006. This modified the wording for “Contaminated Land” under Part IIA of the EPA. Section 78A (2) defines contaminated land as “land which appears to be in such a condition, by reason of substances in, on or under the land, that:

- significant harm is being caused, or there is a significant possibility of significant harm being caused (SPOSH).

8.2 Human Health Receptors

- 8.2.1 An initial Generic Quantitative Risk Assessment (GQRA) for human health has been undertaken by comparison of the soil analytical results with published guidance criteria. These can be classified as Generic Assessment Criteria (GAC) and are widely referred to by consultants, Regulatory Authorities and other professionals within the industry and include the following:

- Current published Soil Guideline Values (SGVs) published by the Environmental Agency (EA).
- Land Quality Management (LQM) have published a series of GACs via the CLEA v1.04 software which are applicable to the UK for common Determinands. The GAC’s can be applied to a wide range of land contamination problems, which can be used as initial screening criteria in order to assess potentially contaminated land.
- ATRISK Soil SSV’s (Soil Screening Values) at 1% SOM for a sand soil derived by Atkins in line with the Environment Agency 2009 guidance (SR2, SR3, SR4, SR7) using the CLEA v1.04 and CLEA v1.06 software; and DSV’s (Water Screening Values) for Human Health using the RBCA v2.5 software. The modelling inputs were made compliant with the SR3 residential conceptual site model and follow the guidance provided within SR3 where possible.
- Contaminated Land: Applications in Real Environments (CL:aire) ‘The Soil Generic Assessment Criteria for Human Health Risk Assessment’ GAC’s via the CLEA v1.06 software (updated version of the v1.04 update after the release of LQM GAC’s).
- Defra C4SL’s: Development of Category 4 Screening Levels for assessment of land affected by contamination.

- 8.2.2 It should be noted that the above guidance criteria are generally restricted with depth i.e., the values quoted with reference to human health are generally only applicable in the top 1.00m of soil and do not (dependant on the conceptual site model and conditions identified on site) necessarily identify significant harm. Further detailed quantitative risk assessment (DQRA) may be required.

8.3 Risk to Human Health

- 8.3.1 The majority of the chemical determinands analysed recorded levels below the relevant screening criteria for a residential end use without plant uptake with the exception of arsenic, lead and mercury.
- 8.3.2 In addition, elevated levels of Perylene were recorded above detection limits where no screening criteria is currently available.
- 8.3.3 Elevated concentrations of the above Determinands are listed below in Table 8.1: Chemical Determinands Exceeding Screening Criteria and Table 8.2: Chemical Determinands Exceeding Detection Limit Where No Screening Criteria Available.

Table 8.1: Chemical Determinands Exceeding Screening Criteria

Location ID	Depth Range (mbgl)	Determinand Concentration Result (mg/kg)
Arsenic - Screening Criteria = 40mg/kg		
BH01a	0.25	48
Lead - Screening Criteria = 330mg/kg		
BH04	0.50	515
BH05	0.40	699
Mercury - Screening Criteria = 1.2mg/kg		
BH03	0.35	2.43
BH04	0.50	1.51
BH05	0.40	2.79

Table 8.2: Chemical Determinands Exceeding Detection Limit Where No Screening Criteria Available

Location ID	Depth Range (mbgl)	Determinand Concentration Result (mg/kg)
Determinand = Perylene– Detection Limit = 100mg/kg		
BH05	0.40	204

- 8.3.4 Based on the above, contamination is present beneath parts of the site within the Made Ground. The elevated levels of contamination may represent either localised hotspots of contamination or could be representative of the site as a whole. At this stage it is not possible to determine the full extent of the soil contamination.
- 8.3.5 It is understood that the proposed development comprises a multistorey residential apartment block and the entire site will be covered by hardstanding / buildings.
- 8.3.6 Therefore, given the proposed end use and the fact the site will be completely covered by hardstanding / buildings, thus breaking the pathway, a pollutant linkage is not considered to be present and the risk to human end users is considered to be **very low** at this stage.
- 8.3.7 Risks to construction workers are considered to be **low to moderate**. All construction workers should wear appropriate Personal Protective Equipment (PPE) including latex gloves and dust masks. Provisions should be made for water on site to 'damp down' any dust in dry conditions.
- 8.3.8 Should any erroneous materials or previously unidentified contamination be encountered during construction then further sampling and analysis may be required.
- 8.3.9 The above recommendations should be agreed in principle with the LPA prior to development to avoid any delays or complications at a later stage.

8.4 Risk to Controlled Waters

Groundwater

- 8.4.1 The Environmental Agency aquifer classification scheme indicates that the superficial aquifer designation for the site is classed as Secondary A and the bedrock aquifer designation for the site is classed as Principal Aquifer.
- 8.4.2 There is one licenced groundwater abstraction point within 1000m of the site located approximately 562m to the north for commercial purposes. There are no public drinking water abstractions within 2000m of the site.
- 8.4.3 The site is not located within a Source Protection Zones (SPZ). The nearest Source Protection Zone, Zone III total catchment, lies 248m to the west.
- 8.4.4 Therefore, based on the above information, the results of the soil and groundwater testing, and considering that natural attenuation, dilution and dispersion will take place, the risks to groundwater and drinking waters are considered to be **very low** at this stage.

Surface Water

- 8.4.5 The nearest surface watercourse to the site is the Rochdale Canal located approximately 18m to the south.
- 8.4.6 Therefore, based on the above information, the results of the soil and groundwater testing, the distance to nearest surface water feature and considering that natural attenuation, dilution and dispersion will take place, the risks to surface waters are considered to be **very low** at this stage.

8.5 Ground Gas Risk Assessment

General

- 8.5.1 There is one Landfill and Waste Treatment site within 250m of the site, located approximately 234m to the west. There are no landfill sites or other waste associated sites within 250m of the site boundary. Made Ground is also sown to underlie the site and neighbouring area to the west.
- 8.5.2 Made ground was also encountered beneath the site and was proven to depths of up to 3.20mbgl.
- 8.5.3 Gas monitoring has been carried out at the above site on six occasions over a three month period to assess the risks to the proposed commercial development from potential hazardous ground gasses.
- 8.5.4 Ground gas monitoring standpipes have been installed at a depth of 3.00mbgl with response zones placed within the Made Ground and natural deposits (where the made ground was less than 3.00m thick) beneath the site.
- 8.5.5 It is considered that hazardous ground gasses if present would migrate vertically upwards through the permeable sands beneath the site into the proposed development.

Results

- 8.5.6 The monitoring period has been carried between 8th February 2023 and 21st April 2023.
- 8.5.7 The following ground gas risk assessment was carried out in accordance with CIRIA 665, CIRIA 149 and BS 8485.
- 8.5.8 The full results of the gas monitoring regime are presented Appendix L and are summarised below.
- 8.5.9 It should be noted that BH02 could not be monitored on two occasions due the location being submerged in surface water.
- 8.5.10 Where possible, monitoring has been carried out under a minimum of two occasions where low and falling atmospheric pressure were present together.
- 8.5.11 Methane concentrations were recorded at 0.0% v/v; Carbon dioxide concentrations ranged between 0.0 and 0.7% v/v; oxygen concentrations ranged between 16.2 and 20.9% v/v; and flows were recorded between -0.4 and 0.4l/hr during the monitoring period.
- 8.5.12 Gas concentrations recorded were fairly consistent with respect to each monitoring location during the monitoring period.
- 8.5.13 In the case of any negative flows, it should be assumed that any negative flows can become positive and therefore the any negative GSV's should be taken as positive.
- 8.5.14 Hydrogen sulphide concentrations were recorded at 0 ppm.
- 8.5.15 Carbon monoxide concentrations were recorded at 0 ppm.
- 8.5.16 Based on these recorded values a maximum Gas Screening Values (GSVs) for methane were calculated at 0.0000l/hr; and a maximum GSV for carbon dioxide were calculated at -0.0006/hr.

Conclusions and Recommendations

- 8.5.17 Based on the above information to date, this site has been categorised as falling under Characteristic Situation (CS) 1 – **very low risk**.
- 8.5.18 Therefore, in line with BS 8485 2015 no special precautions are necessary in the construction of any new developments.
- 8.5.19 It is recommended that the above conclusions should be agreed with the local Planning Authority to gain their approval prior to commencing with the construction of the new development.
- 8.5.20 Following the installation of any gas resistant membranes the local authority may require verification to prove the membrane has been installed correctly.
- 8.5.21 With regards carbon monoxide: Information provided by the World Health Organisation (WHO) provides air quality guidelines for Europe 2000, which provides time weighted average exposures that have been determined in such a way that the carboxyhaemoglobin (COHb) level of 2.5% is not exceeded. These are as follows:
- 87ppm for 15 minutes
 - 52ppm for 30 minutes
 - 26ppm for one hour
 - 9ppm for eight hours
- 8.5.22 In addition, recommended WHO European guidelines for indoor air quality is as follow:
- 6ppm for twenty four hours so as not to exceed 2% COHb for chronic exposure.
- 8.5.23 CIRIA 665 provides occupational exposures limits for carbon monoxide of 200ppm for short term exposure and 30ppm for long term exposure.
- 8.5.24 Based on the above, the risks from carbon monoxide are considered to be **very low**.
- 8.5.25 Therefore, based on the above results, no protection is considered necessary against carbon monoxide.
- 8.5.26 With regards hydrogen sulphide: Information taken directly from the HSE (Health & Safety Executive) Online provides the following:
- 0.0047 ppm is the recognition threshold of human smell, the concentration at which 50% of humans can detect the characteristic odour of hydrogen sulphide.
 - 10-20 ppm is the borderline concentration for eye irritation.
 - 50-100 ppm leads to eye damage.
 - At 150-250 ppm the olfactory nerve is paralyzed after a few inhalations, and the sense of smell disappears, often together with awareness of danger.
 - 320-530 ppm leads to pulmonary edema with the possibility of death.
 - 530-1000 ppm causes strong stimulation of the central nervous system and rapid breathing, leading to loss of breathing.
 - Concentrations over 1000 ppm cause immediate collapse with loss of breathing, even after inhalation of a single breath.
- 8.5.27 CIRIA 665 provides occupational exposures limits for hydrogen sulphide of 10ppm for short term exposure and 5ppm for long term exposure.
- 8.5.28 Based on the above, the risks from hydrogen sulphide are considered to be **very low**.
- 8.5.29 Therefore, based on the above results, no protection is considered necessary against hydrogen sulphide.

8.6 Plants and Native Grasses

- 8.6.1 Any plants that may be grown at the site in areas of landscaping may potentially be at risk from phytotoxic elements in any artificial soils beneath the site. Guideline screening values are currently available for copper, nickel and zinc which are considered to be the most harmful to plant life.
- 8.6.2 Elevated levels of copper and zinc were recorded above the relevant phytotoxic screening criteria. However, the proposed site end use means that no plants or landscaping is proposed and therefore the risks to plants and native grasses are considered to be **very low**.

8.7 Buried Services and Utilities

- 8.7.1 Any organic contamination present in the soils or groundwater beneath the site would pose a risk of premature failure to below ground services via chemical reaction. Based on the chemical analysis carried out during this ground investigation, the risks to buried services and pipelines are considered to be **low**.
- 8.7.2 It is the responsibility of the utility providers to confirm the risk status and determine what materials should be used in the provision of any newly proposed buried services and utilities based on the results of the chemical analysis with this report. A copy of this report should therefore be provided to the utility contractors.
- 8.7.3 It is recommended that prior to the placement of any newly proposed buried services, that adequate testing of the soils of which the pipes / cables will be laid in is carried out to determine the suitability of those soils for the utility provider's equipment.

8.8 Updated Conceptual Site Model

- 8.8.1 Following the results of the site investigation and above assessment, an updated CSM has been produced overleaf as Table 8.3: Updated Conceptual Site Model.

Table 8.3: Updated Conceptual Site Model

Potential Sources	Contaminants of Concern	Potential Pathway	Potential Receptor	Potential Pollutant Linkage	Probability	Consequence	Risk Classification	Action / Mitigation / Justification
Made Ground both on site and within influencing distance of the site Current and former land uses both on site and within influencing distance of the site	Heavy metals, sulphates and inorganics PAH's Asbestos Mobile organic contamination SVOC's and VOC's PCB's Leachable contamination	Ingestion Inhalation Dermal Contact	Human health Including current site users, future site users	Considered inactive	-	-	-	Site to be completely covered by hardstanding, thus breaking the pollutant linkage. No further action required.
			Human health Construction workers	Considered potentially active	Low likelihood	Medium	Low to Moderate	Construction personnel to adhere to standard PPE guidelines and hygienic site practices to control risk. Damp down of soils on site during construction.
			Human health Neighbouring residents	Considered inactive	-	-	-	Damp down of soils on site during construction.
Landfill sites Potentially infilled Land (ponds, quarries, reservoirs etc) Made Ground Natural organic soils Coal mining Fuel Stations (on and off-site sources)	Hazardous ground gases including CO₂, CH₄ CO, H₂S Vapours	Inhalation Explosion	Human health Including current site users, future site users, neighbouring residents and constructions workers	TBC	TBC	TBC	Very Low	No special precautions necessary
		Explosion	Buildings	TBC	TBC	TBC	Very Low	No special precautions necessary

Potential Sources	Contaminants of Concern	Potential Pathway	Potential Receptor	Potential Pollutant Linkage	Probability	Consequence	Risk Classification	Action / Mitigation / Justification
Made Ground on site Current and former land uses on site	Heavy metals, sulphates and inorganics PAH's Mobile organic contamination SVOC's and VOC's PCB's Leachable contamination	Lateral and vertical migration and leaching of contaminants into local groundwater	Underlying Aquifer (Potable water)	Considered potentially active	Unlikely	Medium	Very low	No further action required.
Made Ground on site Current and former land uses on site	Heavy metals, sulphates and inorganics PAH's Mobile organic contamination SVOC's and VOC's PCB's Leachable contamination	Lateral and vertical migration and leaching of contaminants into surface water bodies via permeable strata and features.	Local water courses and associated flora and fauna	Considered potentially active	Unlikely	Medium	Very low	No further action required.
Made Ground beneath the site Current and former site uses	Phytotoxic elements	Plant uptake	Plants and vegetation	Considered inactive	-	-	-	No further action required.

8.9 Further Work

- 8.9.1 Given the Conceptual Site Model and the absence of a pollutant linkage towards future site users, it is unlikely that the LPA will require a Remediation Strategy, as no remediation is required.
- 8.9.2 No further work required.

9.0 OTHER POTENTIAL DEVELOPMENT CONSIDERATIONS

9.1 Waste Soils Characterisation

- 9.1.1 Any excavation works may potentially produce waste soils for which appropriate waste management will be required. Any soils requiring removal and disposal from site would require appropriate classification testing prior to disposal and the results would need to be confirmed with the landfill operator. Isolated hotspots if encountered may need to be taken off as Non-Hazardous or Hazardous waste. Any off-site disposal of soil requires careful management and due consideration of appropriate legislation, guidance and Duty of Care responsibilities.
- 9.1.2 A Hazardous Waste Assessment should be carried out on any materials requiring removal and disposal from site. Waste Acceptance Criteria (WAC) testing may also be required, and the results of the Hazardous Waste Assessment and WAC testing (if appropriate) should be presented to the landfill operator for their confirmation of waste category.

9.2 Imported Fill

- 9.2.1 Any imported fill will be subject to specific quality requirements, particularly in any proposed areas of landscaping. Allowance should be made for the testing of imported fill materials prior to emplacement to ensure suitability should the materials be delivered with no testing certification.

9.3 Construction Activities

- 9.3.1 Due consideration should be given to the suppression of noise, dust and vibration emissions from the site during construction.

9.4 Previously Unidentified Contamination

- 9.4.1 If, during the course of the groundworks phase of the construction, previously unidentified contamination is encountered or suspected to have been encountered, samples of the potentially contaminated material should be tested and if appropriate a Remediation Strategy provided to advise on how to remediate this material.
- 9.4.2 The LPA should be informed that potentially contaminated material has been encountered and should be kept informed at all times with respect to work relating to previously unidentified contamination.

10.0 REFERENCES

- AGS: *A clients guides and tool kit*
- Atkins: *AtRisk Soil Screening Values and Water Screening Values*
- British Geological Survey (BGS): *1:50'000 geological maps of the area*
- British Geological Survey (BGS): *Open geoscience online mapping tool*
- BS 5930: *code of Practise for Site Investigation Amendment 2*
- BS 10175: *Code of Practise for the Investigation of Potentially Contaminated Sites*
- BRE 211 Radon: *Guidance on protective measures for new buildings*
- CIRIA 552: *Contaminated Land Risk Assessment; A Guide to Good Practise 2001*
- CIRIA 665: *Assessing the Risks Posed by Hazardous Ground Gases for Buildings 2007*
- Coal Authority: *Coal authority mining report and Cheshire brine subsidence report*
- *Contaminated Land: Applications in Real Environments (CL:AIRE): 'The Soil Generic Assessment Criteria for Human Health Risk Assessment' GAC's.*
- David Norbury: *Soil and Rock Descriptions in Engineering Practise*
- Department of the Environment: *DOE industry profiles*
- EN ISO 14688-1: *Geotechnical investigation and testing -- Identification and classification of soil -- Part 1: Identification and description*
- EN ISO 14688-2: *Geotechnical investigation and testing -- Identification and classification of soil -- Part 2: Principles for a classification*
- EN ISO 14689: *Geotechnical investigation and testing -- Identification and classification of rock -- Part 1: Identification and description*
- Environment Agency (EA): *EA Online & What's in my back yard*
- Environment Agency (EA): *Soil Guideline Values (SGVs)*
- Land Quality Management (LQM): *Generic Screening Criteria (GACs)*
- Landmark: *Envirocheck report and Envirocheck analysis online historical mapping tool.*
- Ordnance survey: *OS Landranger map for the area; OS open data online mapping tool*
- Planning Policy 23: *Planning and Pollution Control, Office of The Deputy Prime Minister 2004*
- R&D Publication CLR 8: *Assessment of risks to human health from land contamination.*
- R&D Publication CLR 10: *The Contaminated Land Exposure Model (CLEA)*
- R&D Publication CLR 11: *Model Procedure for the Management of Contaminated Land DEFRA 2004*
- UK Specification for Ground Investigation Second Edition 2012

APPENDIX A

DRAWINGS



GeoCon Site Investigations Ltd
 Suite 2 Marple House,
 39 Stockport Road,
 Marple,
 Stockport,
 SK6 6BD.
 Tel: 0844 504 3901, Fax: 0844 504 3902,
 Email: info@geoconsiteinvestigations.com
 Web: www.geoconsiteinvestigations.com

PROJECT ID

GSI 1813 Deansgate 325

TITLE

Site Location Plan

DRAWING NUMBER

GSI 1813/01

DATE

February 2023

SCALE

N.T.S

DRAWN BY

HH



GeoCon Site Investigations Ltd
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39 Stockport Road,
Marple,
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SK6 6BD.
Tel: 0844 504 3901, Fax: 0844 504 3902,
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Web: www.geoconsiteinvestigations.com

PROJECT ID

GSI 1813 Deansgate 325

DRAWING NUMBER

GSI 1813/02

SCALE

N.T.S

TITLE

Exploratory Hole Location Plan

DATE

February 2023

DRAWN BY

HH



Legend:

Foundation Inspection Pit

Dynamic Probe Location



GeoCon Site Investigations Ltd
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PROJECT ID

GSI 1813 Deansgate 325

DRAWING NUMBER

GSI 1813/03

SCALE

N.T.S

TITLE

Exploratory Hole Location Plan

DATE

February 2023

DRAWN BY

HH

APPENDIX B

**CABLE PERCUSSION
BOREHOLE LOGS**

		GeoCon Site Investigations Ltd Suite 2 Marple House, 39 Stockport Road, Marple, Stockport. SK6 6BD Tel: 0161 713 0174 Email: info@geoconsiteinvestigations.com Web: www.geoconsiteinvestigations.com					Borehole ID	
		CABLE PERCUSSION BOREHOLE LOG					BH02	
Project No: GSI 1813			Easting:			Start Date: 31/01/2023		
Project Name: 325 Deansgate, Manchester			Northing:			End Date: 31/01/2023		
Client Jedi Deansgate Ltd		Hole Type CP		Level		Logged By HH		Scale 1:50
								Page Number Page 1 of 1
	Sampling & Insitu Testing			Depth	Legend	Strata Description	Well	
	Depth (m)	Type	Results					
0.30 ES1	0.24					MADE GROUND: Grey CONCRETE. MADE GROUND: Brown sandy gravelly CLAY. Gravel is angular to subrounded fine to coarse of brick and sandstone. MADE GROUND: Red brown angular brick COBBLES.		
1.00								
2.00								
3.00								
4.00								
5.00								
6.00								
7.00								
8.00								
9.00								
Boring Progress and Water Observations				Casing		Chiselling		
Date Time	Depth	Depth Casing	Depth Water	Diameter	Depth Base	Depth Top	Depth Base	Duration
Remarks: Service inspection pit excavated to 0.45mbgl. Location terminated at 0.45mbgl due to relict brick wall. Borehole relocated and redrilled as BH02a.								



Tel: 0161 713 0174 Email: info@geoconsiteinvestigations.com Web: www.geoconsiteinvestigations.com

Borehole ID

BH02a

CABLE PERCUSSION BOREHOLE LOG

Project No: GSI 1813

Easting:

Start Date: 31/01/2023

Project Name: 325 Deansgate, Manchester

Nothing:

End Date: 01/02/2023

Client

Hole Type

Level

Logged By

Scale

Page Number

Jedi Deansgate Ltd

CP

HH

1.5

Page 1 of 1

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Key Terms

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	Sampling & Insitu Testing			Depth	Legend	Strata Description	Well
	Depth (m)	Type	Results				
				0.22		MADE GROUND: Grey CONCRETE.	
	0.50 - 0.80	B1					
	0.60	ES2				MADE GROUND: Brown sandy gravelly CLAY with a medium cobble content.	
1.00	1.10	ES3		1.00			
	1.20 - 1.65	B4		1.20		Brown slightly clayey fine to coarse SAND.	
	1.20	SPT	N = 28			(GLACIOFLUVIAL DEPOSITS)	
						Medium dense brown gravelly fine to coarse SAND with a medium cobble content. Gravel is angular to rounded fine to coarse of sandstone, quartzite and granite. Cobbles are angular to rounded of sandstone, quartzite and granite.	
2.00	2.00 - 2.45	B5				(GLACIOFLUVIAL DEPOSITS)	
	2.00	SPT	N = 47			<i>Dense below 2.00mbgl.</i>	
3.00	3.00 - 3.45	B6					
	3.00	SPT	N = 21			<i>Medium dense below 3.00mbgl.</i>	
4.00	4.00 - 4.10	B7		3.90			
	4.00	SPT	N = 50 for 15mm			Very dense reddish brown slightly gravelly fine to coarse SAND. Gravel is angular fine to medium of sandstone.	
	4.50	SPT	N = 50 for 20mm	4.52			
5.00							
6.00							
7.00							
8.00							
9.00							

Boring Progress and Water Observations				Casing		Chiselling		
Date Time	Depth	Depth Casing	Depth Water	Diameter	Depth Base	Depth Top	Depth Base	Duration
				150	4.52	4.40	4.50	01:00

Remarks: Service inspection pit excavated to 1.20mbgl prior to drilling. Groundwater was not encountered.

APPENDIX C

CABLE PERCUSSION AND ROTARY CORED FOLLOW-ON BOREHOLES LOGS



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Marple, Stockport. SK6 6BD

Tel: 0161 713 0174 Email: info@geoconsiteinvestigations.com Web: www.geoconsiteinvestigations.com

Borehole ID

BH01a

CABLE PERCUSSION BOREHOLE LOG

Project No: GSI 1813

Easting:

Start Date: 31/01/2023

Project Name: 325 Deansgate, Manchester

Northing:

End Date: 01/02/2023

Client
Jedi Deansgate Ltd

Hole Type
CP+RC

Level

Logged By
HH

Scale
1:50

Page Number
Page 1 of 4

	Sampling & Insitu Testing			Depth	Legend	Strata Description	Well
	Depth (m)	Type	Results				
1.00	0.25	ES1	N = 41	0.21		MADE GROUND: Grey CONCRETE.	
	0.40 - 0.70	B2				MADE GROUND: Dark brown sandy gravelly CLAY with a medium cobble content. Gravel is angular to subangular fine to coarse of slate and brick. Cobbles are angular of brick.	
	0.80	ES3					
	1.20	ES4				Soft brown sandy CLAY.	
	1.20 - 1.65	B5					
2.00	1.20	SPT	N = 53	1.30		Dense brown gravelly fine to coarse SAND with a medium cobble content. Gravel is angular to rounded fine to coarse of sandstone, quartzite and granite. Cobbles are angular to rounded of sandstone, quartzite and granite. (GLACIOFLUVIAL DEPOSITS) <i>Very dense below 2.00mbgl.</i>	
	2.00 - 2.45	B6					
	2.00	SPT					
3.00	3.00 - 3.45	B7	N = 50			Very dense reddish brown gravelly fine to coarse SAND. Gravel is angular to subangular fine to coarse of sandstone.	
	3.00	SPT					
4.00	4.00 - 4.45	B8	N = 50 for 220mm	4.50			
	4.00	SPT					
	4.50	B9					
5.00	4.70	SPT	N = 50 for 40mm	5.10			
	5.10	D10					
	5.10	SPT					
6.00			N = 50 for 25mm				
7.00							
8.00							
9.00							

Continued on next page

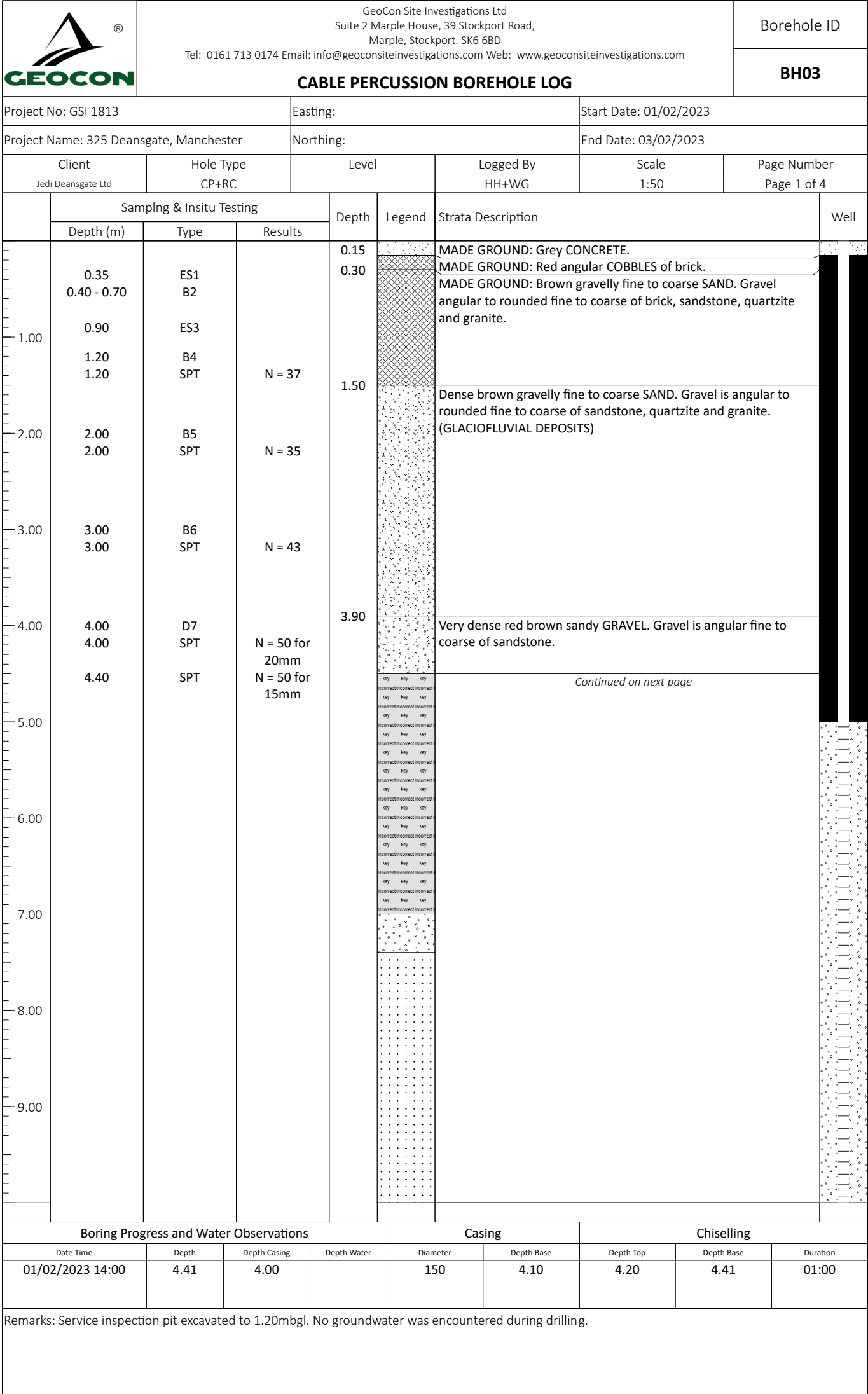
Boring Progress and Water Observations				Casing		Chiselling		
Date Time	Depth	Depth Casing	Depth Water	Diameter	Depth Base	Depth Top	Depth Base	Duration
01/02/2023 15:00	20.00			150	5.00	5.00	5.10	01:00

Remarks: Service inspection pit excavated to 1.20mbgl. No groundwater encountered during drilling.

		GeoCon Site Investigations Ltd Suite 2 Marple House, 39 Stockport Road, Marple, Stockport. SK6 6BD Tel: 0161 713 0174 Email: info@geoconsiteinvestigations.com Web: www.geoconsiteinvestigations.com						BOREHOLE ID		
		ROTARY CORED BOREHOLE LOG						BH01a		
GSI 1813				Easting:			Start Date: 31/012023			
325 Deansgate, Manchester				Northing:			End Date: 01/02/2023			
Client Jedi Deansgate Ltd		Hole Type CP+RC		Level		Logged By HH		Scale 1:50		Page Number Page 2 of 4
	Coring Data			Depth	Legend	Strata Description	Weathering & Discontinuities		Well	
	TCR % SCR % ROD %	IF min average max	SPT							
1.00										
2.00										
3.00										
4.00										
5.00										
6.00	91 56 0	20		8.10 8.27		Weak red brown medium grained moderately weathered SANDSTONE.	Discontinuities: 0 degrees extremely closely to closely spaced planar rough with fine to medium sand infilling. Weathering: Moderately disintegrated.			
7.00	87 65 37	14					Discontinuities: 0 to 10 degrees extremely closely to medium spaced planar rough with fine sand infilling.			
8.00							Discontinuities: 0 to 10 degrees close to medium spaced planar rough with fine to medium sand infilling. Weathering: Slightly disintegrated.			
9.00	100 81 59	8				Completely weathered SANDSTONE recovered as a red brown gravelly fine to coarse sand. Gravel is angular fine to medium of sandstone. Weak red brown medium grained moderately weathered SANDSTONE.	Discontinuities: 0 to 10 degrees very close to medium spaced planar rough with fine sand infilling.			
Boring Progress and Water Observations					Casing Diameter by Depth			Flush Details		
Date Time	Depth	Depth Casing	Depth Water	Diameter	Depth Base	Depth Top	Depth Base	Flush Type	Flush Return (%)	
01/02/2023 15:00	20.00			150	5.00	5.10	20.00	Water Flush	100	
Remarks: Service inspection pit excavated to 1.20mbgl. No groundwater encountered during drilling.										

		GeoCon Site Investigations Ltd Suite 2 Marple House, 39 Stockport Road, Marple, Stockport. SK6 6BD Tel: 0161 713 0174 Email: info@geoconsiteinvestigations.com Web: www.geoconsiteinvestigations.com						BOREHOLE ID		
		ROTARY CORED BOREHOLE LOG						BH01a		
GSI 1813				Easting:			Start Date: 31/012023			
325 Deansgate, Manchester				Northing:			End Date: 01/02/2023			
Client Jedi Deansgate Ltd		Hole Type CP+RC		Level		Logged By HH		Scale 1:50		Page Number Page 3 of 4
Coring Data		Depth	Legend	Strata Description	Weathering & Discontinuities	Well				
TCR %	IF min average max						SPT			
100 93 36	12	14.00 14.18		Weak red brown medium grained moderately weathered SANDSTONE.						
100 79 21	16									
76 64 28	10									
100 66 11	15									
100 100 59	10									
100 98 91	8	16.60		Weak red brown medium grained slightly weathered SANDSTONE.	Weathering: Slightly disintegrated.					
		20.00								
Boring Progress and Water Observations				Casing Diameter by Depth			Flush Details			
Date Time	Depth	Depth Casing	Depth Water	Diameter	Depth Base	Depth Top	Depth Base	Flush Type	Flush Return (%)	
01/02/2023 15:00	20.00			150	5.00	5.10	20.00	Water Flush	100	
Remarks: Service inspection pit excavated to 1.20mbgl. No groundwater encountered during drilling.										

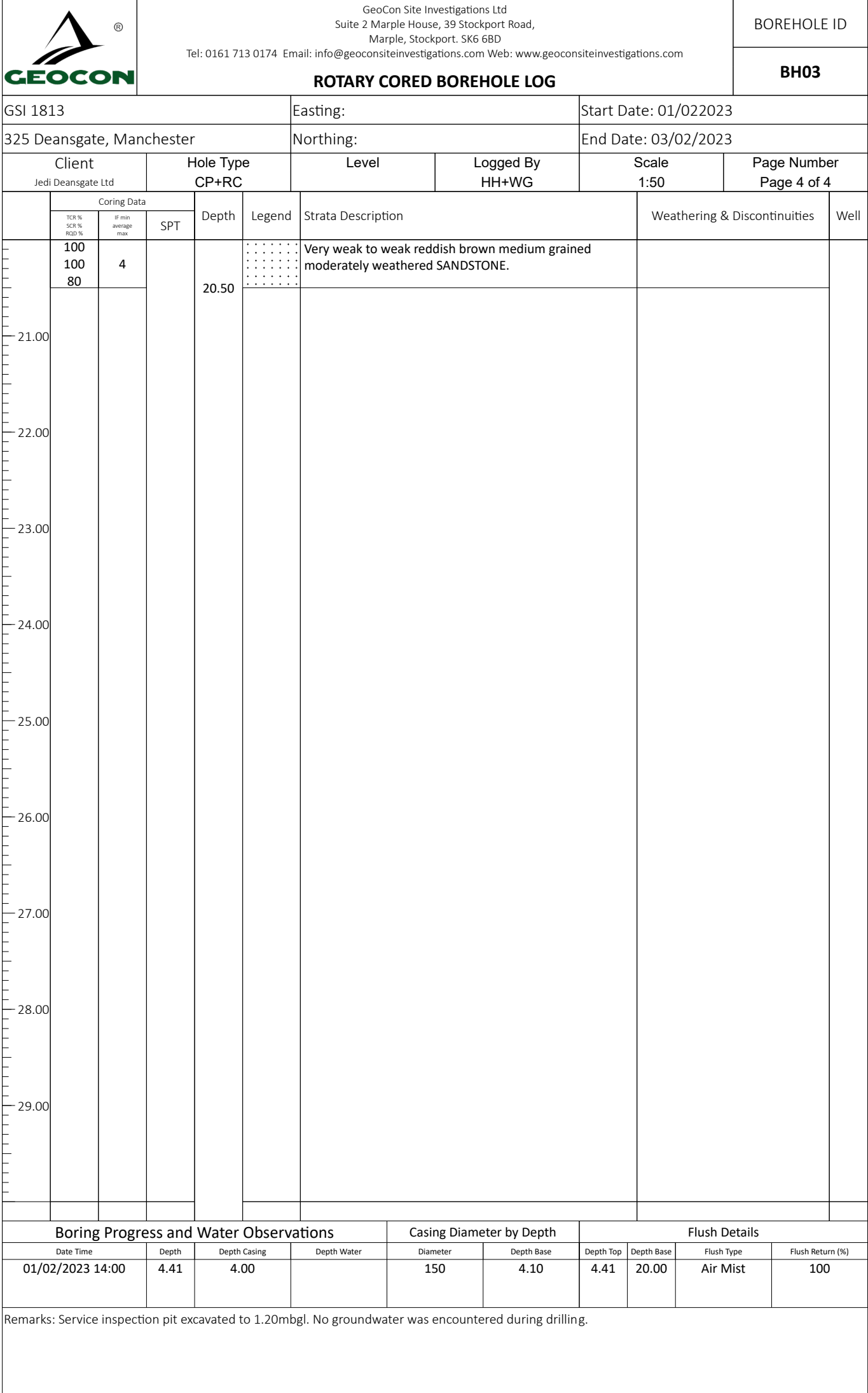
		GeoCon Site Investigations Ltd Suite 2 Marple House, 39 Stockport Road, Marple, Stockport. SK6 6BD Tel: 0161 713 0174 Email: info@geoconsiteinvestigations.com Web: www.geoconsiteinvestigations.com						BOREHOLE ID		
		ROTARY CORED BOREHOLE LOG						BH01a		
GSI 1813				Easting:			Start Date: 31/012023			
325 Deansgate, Manchester				Northing:			End Date: 01/02/2023			
Client Jedi Deansgate Ltd		Hole Type CP+RC		Level		Logged By HH		Scale 1:50		Page Number Page 4 of 4
		Coring Data		Depth	Legend	Strata Description	Weathering & Discontinuities		Well	
		TCR % SCR % ROD %	IF min average max							SPT
21.00										
22.00										
23.00										
24.00										
25.00										
26.00										
27.00										
28.00										
29.00										
Boring Progress and Water Observations					Casing Diameter by Depth			Flush Details		
Date Time	Depth	Depth Casing	Depth Water	Diameter	Depth Base	Depth Top	Depth Base	Flush Type	Flush Return (%)	
01/02/2023 15:00	20.00			150	5.00	5.10	20.00	Water Flush	100	
Remarks: Service inspection pit excavated to 1.20mbgl. No groundwater encountered during drilling.										



ROTARY CORED BOREHOLE LOG

GSI 1813				Easting:				Start Date: 01/022023			
325 Deansgate, Manchester				Northing:				End Date: 03/02/2023			
Client Jedi Deansgate Ltd		Hole Type CP+RC		Level		Logged By HH+WG		Scale 1:50		Page Number Page 2 of 4	
	Coring Data			Depth	Legend	Strata Description	Weathering & Discontinuities	Well			
	TCR % SCR % RQD %	IF min average max	SPT								
1.00											
2.00											
3.00											
4.00						Very dense red brown sandy GRAVEL. Gravel is angular fine to coarse of sandstone.					
4.50						No recovery.	Discontinuities: No recovery.				
5.00	0 0 0	N/R									
6.00							Discontinuities: 10 degrees closely spaced planar rough with fine to medium sand infilling.				
7.00	40 5 0	2					Discontinuities: 0-10 degrees extremely closely to medium spaced planar rough with fine sand infilling observed. Weathering: Wholly disintegrated. Weathering: Fresh. Weathering: Slightly disintegrated.				
7.40						Greyish brown medium to coarse GRAVEL. Gravel is subangular to subrounded medium to coarse of sandstone.					
8.00	93 57 28	14				Weak to extremely weak reddish brown medium grained highly to completely weathered SANDSTONE. Completely weathered material recovered as a sandy gravel. Gravel is angular to surrounded medium to coarse of sandstone.	Discontinuities: 0-30 degrees closely to medium spaced planar rough with fine sand and gravel infilling observed. Weathering: Wholly disintegrated. Weathering: Slightly disintegrated.				
9.00						No recovery.					
	67 45 26	4									
Boring Progress and Water Observations						Casing Diameter by Depth		Flush Details			
Date Time		Depth	Depth Casing	Depth Water		Diameter	Depth Base	Depth Top	Depth Base	Flush Type	Flush Return (%)
01/02/2023 14:00		4.41	4.00			150	4.10	4.41	20.00	Air Mist	100

		GeoCon Site Investigations Ltd Suite 2 Marple House, 39 Stockport Road, Marple, Stockport. SK6 6BD Tel: 0161 713 0174 Email: info@geoconsiteinvestigations.com Web: www.geoconsiteinvestigations.com						BOREHOLE ID		
		ROTARY CORED BOREHOLE LOG						BH03		
GSI 1813				Easting:			Start Date: 01/022023			
325 Deansgate, Manchester				Northing:			End Date: 03/02/2023			
Client Jedi Deansgate Ltd		Hole Type CP+RC		Level		Logged By HH+WG		Scale 1:50		Page Number Page 3 of 4
Coring Data		Depth	Legend	Strata Description	Weathering & Discontinuities		Well			
TCR %	IF min average max								SPT	
11.00	45 17 9	3	12.00	Weak to extremely weak reddish brown medium grained highly to completely weathered SANDSTONE. Completely weathered material recovered as a sandy gravel. Gravel is angular to surrounded medium to coarse of sandstone. <i>No recovery.</i>	Weathering: Wholly disintegrated. Discontinuities: 0-20 degrees closely spaced planar rough with fine sand and gravel infilling observed.					
12.00	100 70 33	9			Discontinuities: 0-20 degrees closely spaced planar rough with fine sand and gravel infilling observed. Weathering: Partially disintegrated.					
13.00	100 79 67	8			Discontinuities: 0-10 degrees very closely to medium spaced planar rough with fine gravel infilling observed. Weathering: Fresh.					
14.00	89 59 53	6			Weathering: Wholly disintegrated. Discontinuities: 0-40 degrees very closely to closely planar planar rough with fine sand and gravel infilling observed. Weathering: Partially disintegrated.					
15.00	93 83 83	2			Discontinuities: 0 degrees very closely to widely spaced planar rough with fine slight gravel infilling observed. Weathering: Fresh.					
16.00	100 80 43	13			Discontinuities: 0-30 degrees very closely to closely spaced planar rough with fine sand and gravel infilling observed. Weathering: Slightly disintegrated.					
17.00					Discontinuities: 0-20 degrees very closely to medium spaced planar rough with no infilling observed.					
18.00										
Boring Progress and Water Observations				Casing Diameter by Depth		Flush Details				
Date Time	Depth	Depth Casing	Depth Water	Diameter	Depth Base	Depth Top	Depth Base	Flush Type	Flush Return (%)	
01/02/2023 14:00	4.41	4.00		150	4.10	4.41	20.00	Air Mist	100	
Remarks: Service inspection pit excavated to 1.20mbgl. No groundwater was encountered during drilling.										



	GeoCon Site Investigations Ltd Suite 2 Marple House, 39 Stockport Road, Marple, Stockport. SK6 6BD Tel: 0161 713 0174 Email: info@geoconsiteinvestigations.com Web: www.geoconsiteinvestigations.com					Borehole ID		
	CABLE PERCUSSION BOREHOLE LOG					BH01		
Project No: GSI 1813			Easting:			Start Date: 31/01/2023		
Project Name: 325 Deansgate, Manchester			Northing:			End Date: 31/01/2023		
Client Jedi Deansgate Ltd		Hole Type CP		Level		Logged By HH		Scale 1:50 Page Number Page 1 of 1
	Sampling & Insitu Testing			Depth	Legend	Strata Description	Well	
	Depth (m)	Type	Results					
				0.21		MADE GROUND: Grey CONCRETE.		
				0.30		MADE GROUND: Dark brown sandy gravelly CLAY with a medium cobble content. Gravel is angular to subangular fine to coarse of slate and brick. Cobbles are angular of brick.		
1.00								
2.00								
3.00								
4.00								
5.00								
6.00								
7.00								
8.00								
9.00								
Boring Progress and Water Observations				Casing		Chiselling		
Date Time	Depth	Depth Casing	Depth Water	Diameter	Depth Base	Depth Top	Depth Base	Duration
Remarks: Service inspection pit excavated to 0.30mbgl. Location terminated at 0.30mbgl due to clay pipe within service inspection pit. BH relocated and redrilled as BH01a.								

APPENDIX D

DYNAMIC SAMPLE AND
ROTARY CORED FOLLOW-ON
BOREHOLE LOGS



Tel: 0161 713 0174 Email: info@geoconsiteinvestigations.com Web: www.geoconsiteinvestigations.com

Borehole ID

BH04

DYNAMIC SAMPLE BOREHOLE LOG

Project No: GSI 1813

Easting:

Start Date: 01/02/2023

Project Name: 325 Deansgate, Manchester

Nothing:

End Date: 02/02/2023

Client

Hole Type

Level

Logged By

Scale

Page Number

Jedi Deansgate Ltd

DS+RC

HH

1:30

Page1 of 5

Page1 of 5

	Sampling & Insitu Testing			Depth	Legend	Strata Description	Well
	Depth (m)	Type	Results				
						MADE GROUND: Grey CONCRETE.	
	0.50	ES1		0.30		MADE GROUND: Brown gravelly fine to coarse SAND. Gravel is angular to rounded fine to coarse of granite, sandstone and brick.	
1.00	0.90	ES2		1.00			
	1.20 - 1.65 1.20	B3 SPT	N = 35			Medium dense brown gravelly fine to coarse SAND. Gravel is angular to rounded fine to coarse of sandstone, granite and quartzite. (GLACIOFLUVIAL DEPOSITS)	
2.00	2.00	SPT	N = 25				
	2.40 - 2.70	B4					
3.00	3.00 - 3.20 3.00	B5 SPT	N = 16				
	3.50	SPT	N = 50 for 35mm	3.50		Very dense red brown sandy angular fine to coarse GRAVEL of sandstone.	
4.00							
				5.00			
						Continued on next page	

Dynamic Sample Run Details

Remarks: Service inspection pit excavated to 1.20mbgl. Groundwater was not encountered.

Top	Base	Diameter	Recovery
1.20	2.00	102	100
2.00	3.50	102	100
2.00	3.00	102	100

		GeoCon Site Investigations Ltd Suite 2 Marple House, 39 Stockport Road, Marple, Stockport. SK6 6BD Tel: 0161 713 0174 Email: info@geoconsiteinvestigations.com Web: www.geoconsiteinvestigations.com						BOREHOLE ID		
		ROTARY CORED BOREHOLE LOG						BH04		
GSI 1813				Easting:			Start Date: 01/022023			
325 Deansgate, Manchester				Northing:			End Date: 02/02/2023			
Client Jedi Deansgate Ltd		Hole Type DS+RC		Level		Logged By HH		Scale 1:30		Page Number Page 2 of 5
	Coring Data			Depth	Legend	Strata Description	Weathering & Discontinuities	Well		
	TCR % SCR % ROD %	IF min average max	SPT							
1.00										
2.00										
3.00										
4.00										
5.00										
	93 54 0	12		5.58	 Multicoloured angular to subrounded medium to coarse GRAVEL of sandstone and quartzite.	Discontinuities: 0 to 10 degrees extremely close to very close spacing planar rough with fine sand infilling.				
					 Weak red brown medium grained moderately weathered SANDSTONE.	Weathering: Slightly disintegrated.				
				6.00						
Boring Progress and Water Observations					Casing Diameter by Depth		Flush Details			
Date Time	Depth	Depth Casing	Depth Water	Diameter	Depth Base	Depth Top	Depth Base	Flush Type	Flush Return (%)	
01/02/2023 15:00 02/02/2023 15:00	5.00 20.00	5.00 10.50		150	10.50	5.00	20.00	Water Flush	100	
Remarks: Service inspection pit excavated to 1.20mbgl. Groundwater was not encountered.										



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BOREHOLE ID

BH04

ROTARY CORED BOREHOLE LOG

GSI 1813

325 Deansgate, Manchester

Easting:

Northing:

Start Date: 01/022023

End Date: 02/02/2023

Client

Hole Type

Level

Logged By

Scale

Page Number

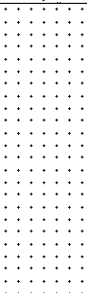
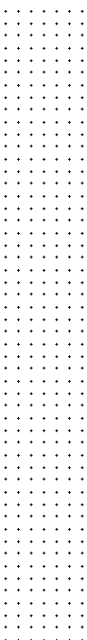
Jedi Deansgate Ltd

DS+RC

HH

1:30

Page 3 of 5

	Coring Data			Depth	Legend	Strata Description	Weathering & Discontinuities	Well
	TCR % SCR % ROD %	IF min average max	SPT					
7.00	60 41 9	8		6.30		Multicoloured angular to rounded medium to coarse GRAVEL of sandstone and quartzite. Weak red brown medium grained moderately weathered SANDSTONE.	Discontinuities: 0 to 10 degrees extremely close to close spacing planar rough with fine sand infilling. Weathering: Slightly disintegrated.	
								
8.00	0 0 0	0		7.50		No Recovery.	Discontinuities: No Recovery.	
9.00	100 83 60	12		9.00		Multicoloured angular to subrounded medium to coarse GRAVEL of sandstone and quartzite. Very weak red brown fine to medium highly weathered SANDSTONE. Weak red brown medium grained moderately weathered SANDSTONE.	Discontinuities: 0 to 10 degrees extremely close to medium spacing planar rough with fine sand infilling. Weathering: Slightly decomposed. Weathering: Slightly disintegrated.	
9.10								
9.25								
11.00	100 83 52	12					Discontinuities: 0 to 10 degrees extremely close to close spacing planar rough with fine sand infilling.	

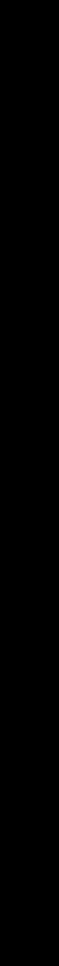
Boring Progress and Water Observations

Casing Diameter by Depth

Flush Details

Date Time	Depth	Depth Casing	Depth Water	Diameter	Depth Base	Depth Top	Depth Base	Flush Type	Flush Return (%)
01/02/2023 15:00	5.00	5.00		150	10.50	5.00	20.00	Water Flush	100
02/02/2023 15:00	20.00	10.50							

Remarks: Service inspection pit excavated to 1.20mbgl. Groundwater was not encountered.

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		ROTARY CORED BOREHOLE LOG						BH04		
GSI 1813				Easting:			Start Date: 01/022023			
325 Deansgate, Manchester				Northing:			End Date: 02/02/2023			
Client Jedi Deansgate Ltd		Hole Type DS+RC		Level		Logged By HH		Scale 1:30		Page Number Page 4 of 5
		Coring Data		Depth	Legend	Strata Description	Weathering & Discontinuities		Well	
		TCR % SCR % ROD %	IF min average max							SPT
13.00		100 83 29	14	15.90 16.10		Weak red brown medium grained moderately weathered SANDSTONE.	Discontinuities: 0 to 20 degrees very close to close spacing planar rough with fine sand infilling.			
14.00		91 79 51	13			Black staining present on fracture surface.	Discontinuities: 0 to 10 degrees very close to close spacing planar rough with fine sand infilling.			
15.00		80 59 35	10			Discontinuities: 0 and 25 to 10 degrees very close to close spacing planar rough with fine sand infilling.				
16.00		90 90 61	9			Weak red brown medium grained highly weathered SANDSTONE.	Weathering: Fresh.			
17.00						Weak red brown medium grained slightly weathered SANDSTONE.	Discontinuities: 0 and 25 to 35 degrees very close to medium spacing planar rough with fine sand infilling.			
Boring Progress and Water Observations						Casing Diameter by Depth		Flush Details		
Date Time		Depth	Depth Casing	Depth Water	Diameter	Depth Base	Depth Top	Depth Base	Flush Type	Flush Return (%)
01/02/2023 15:00 02/02/2023 15:00		5.00 20.00	5.00 10.50		150	10.50	5.00	20.00	Water Flush	100
Remarks: Service inspection pit excavated to 1.20mbgl. Groundwater was not encountered.										

		GeoCon Site Investigations Ltd Suite 2 Marple House, 39 Stockport Road, Marple, Stockport. SK6 6BD Tel: 0161 713 0174 Email: info@geoconsiteinvestigations.com Web: www.geoconsiteinvestigations.com						BOREHOLE ID		
		ROTARY CORED BOREHOLE LOG						BH04		
GSI 1813				Easting:			Start Date: 01/022023			
325 Deansgate, Manchester				Northing:			End Date: 02/02/2023			
Client Jedi Deansgate Ltd		Hole Type DS+RC		Level		Logged By HH		Scale 1:30		Page Number Page 5 of 5
	Coring Data			Depth	Legend	Strata Description	Weathering & Discontinuities		Well	
	TCR % SCR % ROD %	IF min average max	SPT							
19.00	100 95 51	10		20.00		Weak red brown medium grained slightly weathered SANDSTONE. <i>Black staining present on fracture surface.</i>	Discontinuities: 0 and 40 degrees very close to medium spacing planar rough with fine sand infilling.			
20.00	90 80 80	2					Discontinuities: 0 to 10 degrees close to medium spacing planar rough with fine sand infilling.			
21.00										
22.00										
23.00										
Boring Progress and Water Observations					Casing Diameter by Depth			Flush Details		
Date Time	Depth	Depth Casing	Depth Water	Diameter	Depth Base	Depth Top	Depth Base	Flush Type	Flush Return (%)	
01/02/2023 15:00 02/02/2023 15:00	5.00 20.00	5.00 10.50		150	10.50	5.00	20.00	Water Flush	100	
Remarks: Service inspection pit excavated to 1.20mbgl. Groundwater was not encountered.										

APPENDIX E

ROCK CORE PHOTOGRAPHS



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PROJECT ID
GSI 1813 Deansgate 325

TITLE
Rock Core Photograph
BH01A Box 01: 5.00 – 8.00 mbgl

DRAWING NUMBER
GSI 1813/04

DATE
February 2023

SCALE
N.T.S

DRAWN BY
HH



 GeoCon Site Investigations Ltd Suite 2 Marple House, 39 Stockport Road Marple, Stockport, SK6 6BD info@geoconsiteinvestigations.com www.geoconsiteinvestigations.com +44 (0) 161 3 0174	PROJECT NAME	Deansgate (325)	CLIENT	
	PROJECT NO.	GSI 1813	DATE	01/02/23
	HOLE NO.	BH01A	BOX NO.	02
	DEPTH FROM	8.00 m TO 11.00 m	ENGINEER	HH

ROCK CORE PHOTOGRAPH BOARD

0.0m 0.1m 0.2m 0.3m 0.4m 0.5m 0.6m 0.7m 0.8m 0.9m 1.0m

Grey Scale

Colour Control Patches



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PROJECT ID
 GSI 1813 Deansgate 325

TITLE
 Rock Core Photograph
 BH01A Box 02: 8.00 – 11.00 mbgl

DRAWING NUMBER
 GSI 1813/05

DATE
 February 2023

SCALE
 N.T.S

DRAWN BY
 HH



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 Fax: 0844 504 3902,
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 Web: www.geoconsiteinvestigations.com

PROJECT ID
 GSI 1813 Deansgate 325

TITLE
 Rock Core Photograph
 BH01A Box 03: 11.00 – 14.00 mbgl

DRAWING NUMBER
 GSI 1813/06

DATE
 February 2023

SCALE
 N.T.S

DRAWN BY
 HH



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PROJECT ID
GSI 1813 Deansgate 325

TITLE
Rock Core Photograph
BH01A Box 04: from – to mbgl

DRAWING NUMBER
GSI 1813/07

DATE
February 2023

SCALE
N.T.S

DRAWN BY
HH



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PROJECT ID
GSI 1813 Deansgate 325

TITLE
Rock Core Photograph
BH01A Box 05: 17.00 – 20.00 mbgl

DRAWING NUMBER
GSI 1813/08

DATE
February 2023

SCALE
N.T.S

DRAWN BY
HH



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Web: www.geoconsiteinvestigations.com

PROJECT ID
GSI 1813 Deansgate 325

TITLE
Rock Core Photograph
BH03 Box 01: 4.50 – 8.50 mbgl

DRAWING NUMBER
GSI 1813/09

DATE
February 2023

SCALE
N.T.S

DRAWN BY
HH



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Fax: 0844 504 3902,
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Web: www.geoconsiteinvestigations.com

PROJECT ID
GSI 1813 Deansgate 325

TITLE
Rock Core Photograph
BH03 Box 02: 8.50 – 11.50 mbgl

DRAWING NUMBER
GSI 1813/10

DATE
February 2023

SCALE
N.T.S

DRAWN BY
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Web: www.geoconsiteinvestigations.com

PROJECT ID
GSI 1813 Deansgate 325

TITLE
Rock Core Photograph
BH03 Box 03: 11.50 – 14.50 mbgl

DRAWING NUMBER
GSI 1813/11

DATE
February 2023

SCALE
N.T.S

DRAWN BY
HH



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PROJECT ID
GSI 1813 Deansgate 325

TITLE
Rock Core Photograph
BH03 Box 04: 14.50 – 17.50 mbgl

DRAWING NUMBER
GSI 1813/12

DATE
February 2023

SCALE
N.T.S

DRAWN BY
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Fax: 0844 504 3902,
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Web: www.geoconsiteinvestigations.com

PROJECT ID
GSI 1813 Deansgate 325

TITLE
Rock Core Photograph
BH03 Box 05: 17.50 – 20.50 mbgl

DRAWING NUMBER
GSI 1813/13

DATE
February 2023

SCALE
N.T.S

DRAWN BY
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Fax: 0844 504 3902,
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Web: www.geoconsiteinvestigations.com

PROJECT ID
GSI 1813 Deansgate 325

TITLE
Rock Core Photograph
BH04 Box 01: 5.00 – 9.00 mbgl

DRAWING NUMBER
GSI 1813/14

DATE
February 2023

SCALE
N.T.S

DRAWN BY
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PROJECT ID
GSI 1813 Deansgate 325

TITLE
Rock Core Photograph
BH04 Box 02: 9.00 – 12.00 mbgl

DRAWING NUMBER
GSI 1813/15

DATE
February 2023

SCALE
N.T.S

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Web: www.geoconsiteinvestigations.com

PROJECT ID
GSI 1813 Deansgate 325

TITLE
Rock Core Photograph
BH04 Box 03: 12.00 – 15.00 mbgl

DRAWING NUMBER
GSI 1813/16

DATE
February 2023

SCALE
N.T.S

DRAWN BY
HH



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39 Stockport Road,
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Fax: 0844 504 3902,
Email: info@geoconsiteinvestigations.com
Web: www.geoconsiteinvestigations.com

PROJECT ID
GSI 1813 Deansgate 325

TITLE
Rock Core Photograph
BH04 Box 04: 15.00 – 18.00 mbgl

DRAWING NUMBER
GSI 1813/17

DATE
February 2023

SCALE
N.T.S

DRAWN BY
HH



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Suite 2 Marple House,
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Fax: 0844 504 3902,
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Web: www.geoconsiteinvestigations.com

PROJECT ID
GSI 1813 Deansgate 325

TITLE
Rock Core Photograph
BH04 Box 05: 18.00 – 20.00 mbgl

DRAWING NUMBER
GSI 1813/18

DATE
February 2023

SCALE
N.T.S

DRAWN BY
HH

APPENDIX F

DYNAMIC SAMPLE BOREHOLE
LOGS

APPENDIX G
DYNAMIC PROBE LOGS



Probe Test Log

Project Name: 325 Deansgate, Manchester				Client: Jedi Deansgate Ltd				Date: 13/02/2023			
Location: 325 Deansgate, Manchester				Contractor: Jedi Deansgate Ltd							
Project No. : GSI 1813				Crew Name:				Drilling Equipment:			
Borehole Number DP01		Hole Type DP		Level		Logged By		Scale 1:50		Page Number Sheet 1 of 1	

Depth	Legend	Stratum Description	Blows Increments										
			0	10	20	30	40	50	60	70	80	90	100
0.5			1										
1.0													
1.5			1										
2.0			1										
2.5			1										
3.0			1										
3.5			1										
4.0			1										
4.5			2										
			3										
			3										
			3										
5.0													
5.5													
6.0													
6.5													
7.0													
7.5													
8.0													
8.5													
9.0													
9.5													

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation				Drilling Flush					
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation	Depth Top	Depth Base	Type	Colour	Min (%)	Max (%)

Remarks

Dynamic probe advanced through TP05 to locate foundation.



Probe Test Log

Project Name: 325 Deansgate, Manchester		Client: Jedi Deansgate Ltd		Date: 13/02/2023	
Location: 325 Deansgate, Manchester		Contractor: Jedi Deansgate Ltd			
Project No. : GSI 1813		Crew Name:		Drilling Equipment:	
Borehole Number DP02	Hole Type DP	Level	Logged By	Scale 1:50	Page Number Sheet 1 of 1

Depth	Legend	Stratum Description	Blows Increments										
			0	10	20	30	40	50	60	70	80	90	100
0.5													
1.0			1	2									
1.5			1	2									
2.0			1	2									
2.5			1	2									
3.0			1	2									
3.5			1	2	3								
4.0			7	7									
4.5			9	14	20								
5.0			11	20									
5.5			9	30									
6.0													
6.5													
7.0													
7.5													
8.0													
8.5													
9.0													
9.5													

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation				Drilling Flush					
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation	Depth Top	Depth Base	Type	Colour	Min (%)	Max (%)
Remarks																	
Dynamic probe advanced through TP04 to locate foundation.																	

APPENDIX H
HAND PIT LOGS

		GeoCon Site Investigations Ltd Suite 2 Marple House, 39 Stockport Road, Marple, Stockport. SK6 6BD Tel: 0161 713 0174 Email: info@geoconsiteinvestigations.com Web: www.geoconsiteinvestigations.com					Borehole ID	
		HAND PIT LOG					TP01	
Project No: GSI 1813			Easting:			Start Date: 07/02/2023		
Project Name: 325 Deansgate, Manchester			Northing:			End Date: 07/02/2023		
Client Jedi Deansgate Ltd		Hole Type HP		Level		Logged By WG		Scale 1:10
								Page Number Page1 of 1
	Sampling & Insitu Testing			Depth	Legend	Strata Description	Water Strike	Well
	Depth (m)	Type	Results					
				0.30		MADE GROUND: Dark grey ASPHALT.		
				0.80		MADE GROUND: Light brown very sandy GRAVEL with an occasional cobble content. Gravel is angular to subangular fine to coarse of sandstone and brick. Cobbles are angular of brick.		
1.00								
Hand Pit Details								
Plant Used		Pit Length		Pit Width		Pit Stability		Shoring Used
Breaker		0.78		0.80				
Hand Tools		0.78		0.80				
Remarks: Location broken out. Location hand excavated to 0.80mbgl where concrete observed.								



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Tel: 0161 713 0174 Email: info@geoconsiteinvestigations.com Web: www.geoconsiteinvestigations.com

Borehole ID

TP02

HAND PIT LOG

Project No: GSI 1813

Easting:

Start Date: 07/02/2023

Project Name: 325 Deansgate, Manchester

Nothing:

End Date: 07/02/2023

Client

Hole Type

Level

Logged By

Scale

Page Number

Jedi Deansgate Ltd

HP

WG

1:10

Page1 of 1

Sampling & Insitu Testing			Depth	Legend	Strata Description	Water Strike	Well
Depth (m)	Type	Results					
			0.15		MADE GROUND: Grey CONCRETE.		

Hand Pit Details

Plant Used

Pit Length

Pit Width

Pit Stability

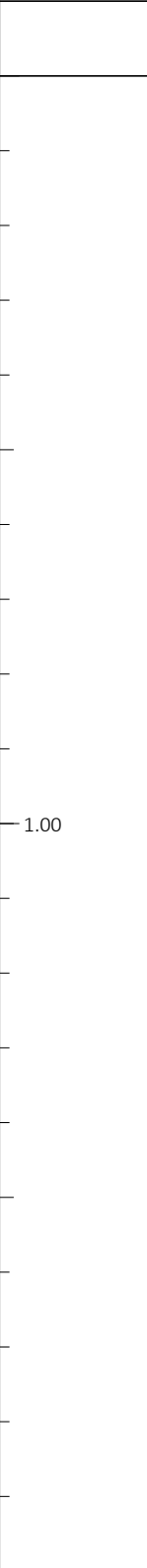
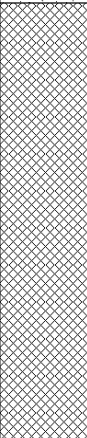
Shoring Used

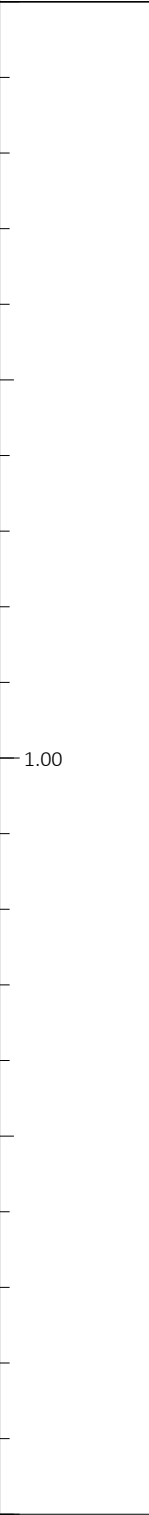
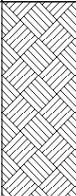
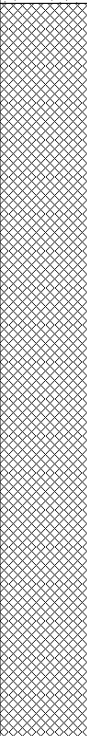
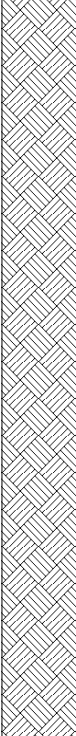
Concrete Corer.

0.30

0.30

Remarks: Location concrete cored. Drain immediately under concrete. Hole terminated.

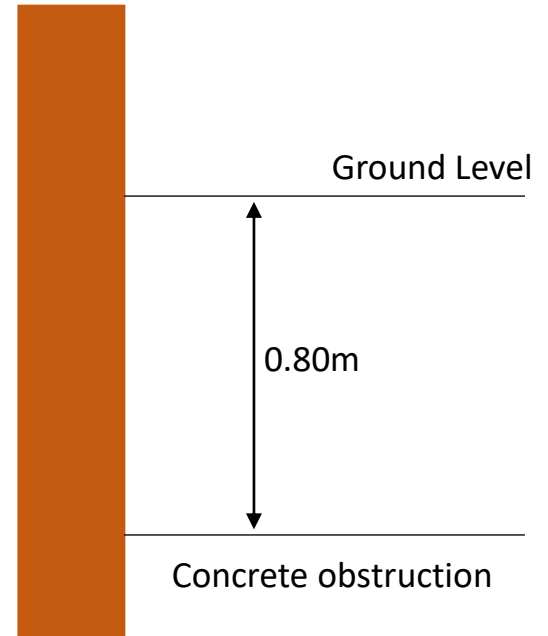
		GeoCon Site Investigations Ltd Suite 2 Marple House, 39 Stockport Road, Marple, Stockport. SK6 6BD Tel: 0161 713 0174 Email: info@geoconsiteinvestigations.com Web: www.geoconsiteinvestigations.com					Borehole ID	
		HAND PIT LOG					TP03	
Project No: GSI 1813			Easting:			Start Date: 08/02/2023		
Project Name: 325 Deansgate, Manchester			Northing:			End Date: 08/02/2023		
Client Jedi Deansgate Ltd		Hole Type HP		Level		Logged By HH		Scale 1:10
								Page Number Page1 of 1
	Sampling & Insitu Testing			Depth	Legend	Strata Description	Water Strike	Well
	Depth (m)	Type	Results					
				0.29		MADE GROUND: Grey CONCRETE.		
				0.87		MADE GROUND: Brown clayey gravelly fine to coarse SAND with a medium cobble content. Gravel is angular to subangular fine to coarse of brick and concrete. Cobbles are angular of concrete and brick.		
				1.25		MADE GROUND: Grey CONCRETE.		
Hand Pit Details								
Plant Used		Pit Length		Pit Width		Pit Stability		Shoring Used
Concrete Corer		0.90		0.60				
Hand Digging Tools		0.90		0.60				
Remarks: Location concrete cored. Location hand excavated to 0.87mbgl where concrete observed. Hand excavated down the side of the concrete to 1.25mbgl, from this depth probing carried out to 1.50mbgl where concrete still present. No step out of concrete.								

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	HAND PIT LOG					TP04		
Project No: GSI 1813			Easting:		Start Date: 07/02/2023			
Project Name: 325 Deansgate, Manchester			Northing:		End Date: 08/02/2023			
Client Jedi Deansgate Ltd	Hole Type HP	Level	Logged By HH	Scale 1:10	Page Number Page1 of 1			
	Sampling & Insitu Testing			Depth	Legend	Strata Description	Water Strike	Well
	Depth (m)	Type	Results					
				0.26		MADE GROUND: Grey CONCRETE.		
				1.23		MADE GROUND: Dark brown clayey gravelly fine to coarse SAND with a medium cobble content. Gravel is angular to subrounded fine to coarse of brick and sandstone. Cobbles are angular of brick.		
Hand Pit Details								
Plant Used		Pit Length	Pit Width	Pit Stability		Shoring Used		
Concrete Corer Hand Tools		0.30 0.30	0.30 0.30					
Remarks: Location concrete cored. Location hand excavated to 1.23mbgl, from this depth probing carried out to 1.50mbgl where no concrete observed.								

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		HAND PIT LOG					TP05	
Project No: GSI 1813			Easting:			Start Date: 07/02/2023		
Project Name: 325 Deansgate, Manchester			Northing:			End Date: 07/02/2023		
Client Jedi Deansgate Ltd		Hole Type HP		Level		Logged By WG		Scale 1:10
								Page Number Page1 of 1
	Sampling & Insitu Testing			Depth	Legend	Strata Description	Water Strike	Well
	Depth (m)	Type	Results					
1.00				0.18		MADE GROUND: Grey CONCRETE.		
						MADE GROUND: Brown slightly clayey gravelly fine to coarse SAND with an occasional cobble content. Gravel is angular to subangular fine to coarse of sandstone, brick, concrete and glass. Cobbles are angular of brick.		
				1.20				
Hand Pit Details								
Plant Used		Pit Length		Pit Width		Pit Stability		Shoring Used
Concrete corer.		0.30		0.30				
Hand tools.		0.30		0.30				
Remarks: Location concrete cored. Location hand excavated to 1.20mbgl with no foundation discovered. Location probed to 1.80mbgl with no obstruction recorded.								

APPENDIX I

**HAND PIT SKETCHES AND
PHOTOGRAPHS**



TP01: 0.00 – 0.80mbgl



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PROJECT ID
GSI 1813, 325 Deansgate

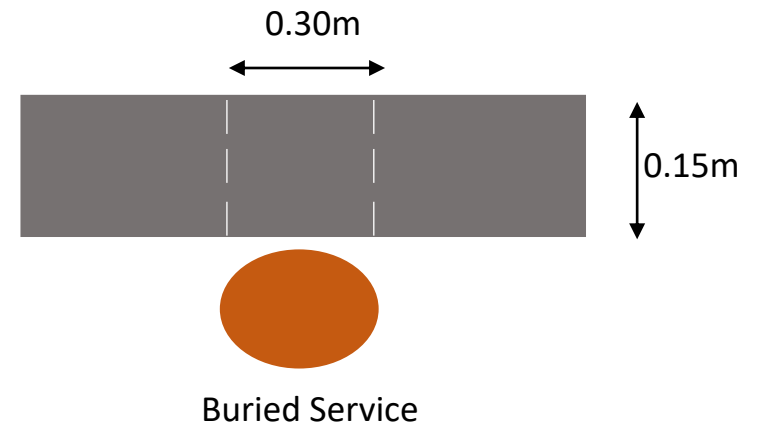
TITLE
Foundation Pit Photographs and Sketches

DRAWING NUMBER
GSI 1813/19

DATE
March 2023

SCALE
N.T.S

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TP02: 0.00 – 0.15mbgl



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GSI 1813, 325 Deansgate

DRAWING NUMBER

GSI 1813/20

SCALE

N.T.S

TITLE

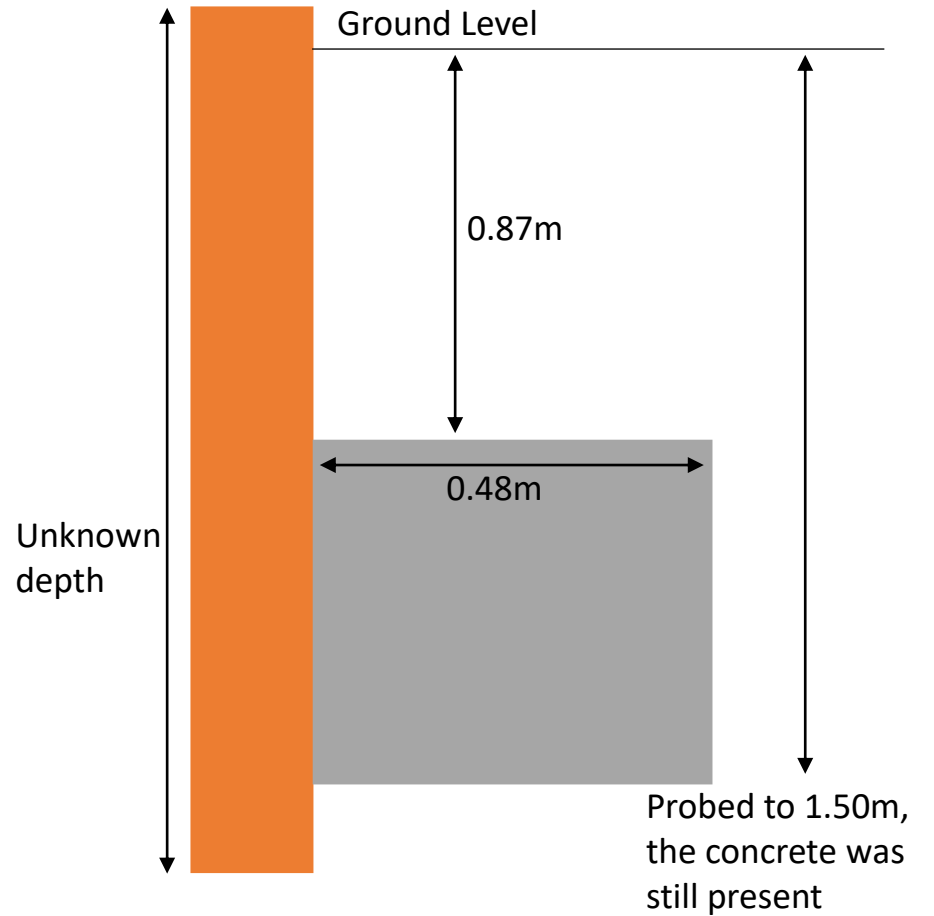
Foundation Pit Photographs and Sketches

DATE

March 2023

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TP03: 0.00 – 1.25mbgl



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PROJECT ID
 GSI 1813, 325 Deansgate

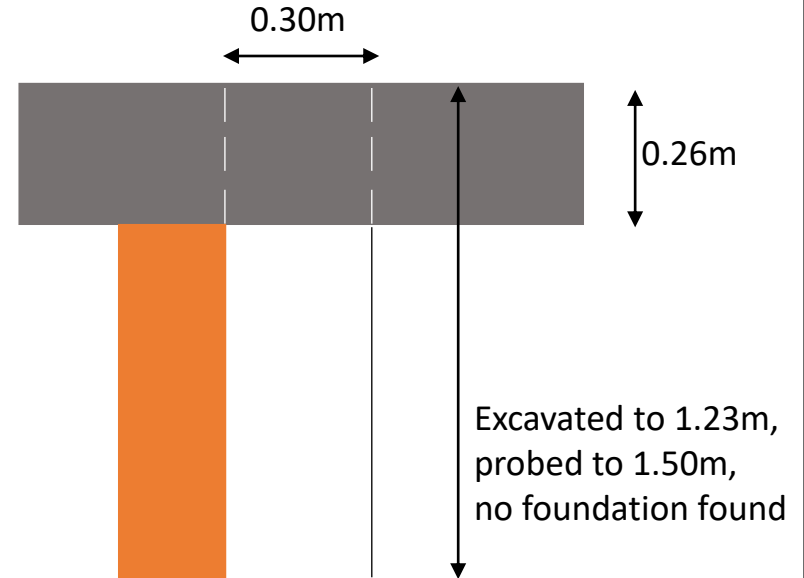
TITLE
 Foundation Pit Photographs and Sketches

DRAWING NUMBER
 GSI 1813/21

DATE
 March 2023

SCALE
 N.T.S

DRAWN BY
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TP04: 0.00 – 1.23mbgl



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DRAWING NUMBER

GSI 1813/22

SCALE

N.T.S

TITLE

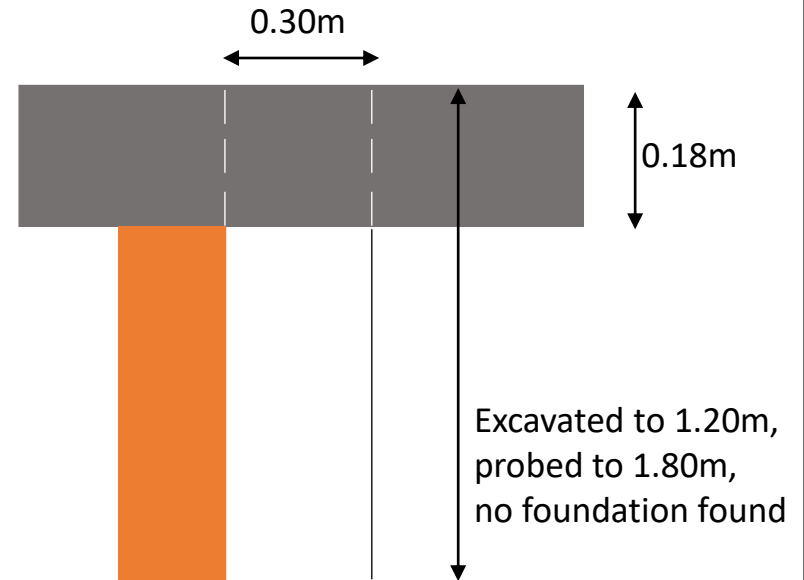
Foundation Pit Photographs and Sketches

DATE

March 2023

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TP05: 0.00 – 1.20mbgl



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PROJECT ID
 GSI 1813, 325 Deansgate

TITLE
 Foundation Pit Photographs and Sketches

DRAWING NUMBER
 GSI 1813/23

DATE
 March 2023

SCALE
 N.T.S

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APPENDIX J

GEOTECHNICAL TESTING

RESULTS