



Design & Access Statement

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APPENDIX B-2

Land Survey:

6671 - Ranikhet GIR (Final Rev 02)

GROUND INVESTIGATION REPORT

**Proposed Educational Development
Ranikhet Academy, Spey Road, Tilehurst, Reading**

Prepared for: Hampshire County Council

Date: October 2020

Report No: 6671/GIR/Rev02



Consulting Geo-Technical &
Geo-Environmental Engineers
Site Investigation Contractors

The Slate Barn, Lower Lowley, Dunsford, Devon, EX6 7BP

Tel: 01647 252414

Email: info@terrafirmasouth.co.uk

Web: www.terrafirmasouth.co.uk

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Proposed Educational Development
Ranikhet Academy, Spey Road, Tilehurst, Reading

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PREPARED BY :



Kevin Scanlon B.Eng.(Hons), M.Sc.
kevin@terrafirmasouth.co.uk

REVIEWED BY :



Paul Standish B.Sc.(Hons), FGS

APPROVED BY :



Steven Hill B.Sc.(Hons), M.Sc., CGeol, EurGeol, FGS

EXECUTIVE SUMMARY

Proposals		Reading Borough Council is proposing the construction of a new school within land at Ranikhet Academy, Spey Road, Tilehurst, Reading. The proposed development will include demolition of the existing school and construction of a new school together with associated infrastructure including retaining walls.
Geology		The Geological Map of the area shows the site to be underlain by two different solid geologies. The northern half of the site comprises the Seaford & Newhaven Chalk Formation, described by the BGS as soft to medium hard, smooth white chalks with nodular and tabular flint seams. The southern half of the site comprises the Lambeth Group, described by the BGS as sequences of clay with some sands and gravels, minor limestones and lignites, and occasional sandstone and conglomerate. A Fault lies approximately 150m to the east of the site. No Superficial deposits are shown to overlie the bedrock geology of the area.
Field Investigation		A field investigation, undertaken during August 2020, comprised 3no. cable percussive boreholes, 9no. mini percussive boreholes, 10no. hand excavated trial pits, 2no. hand excavated pits with in-situ CBR testing and 1no. dynamic probe. The ground conditions encountered by the investigation generally comprised Made Ground underlain by the Lambeth Group and/or Seaford and Newhaven Chalk Formations. The Made Ground was variable and extended to depths ranging from 0.23m to 2.40m bgl. The Lambeth Group comprised firm to stiff clays and loose to dense sands that extended to depths ranging from 0.15m to 14.30m bgl. The deeper Lambeth deposits from BH03 are potentially associated with an infilled solution feature at the site. The Seaford and Newhaven Chalk Formations comprised structureless chalks of Grade Dm that became structured with depth that extend to the maximum investigated depth of 20m bgl. Groundwater was encountered at a depth of between 17.90 and 18.00m bgl.
Contamination Risk Assessment	Chemical Testing & Evaluation	12 samples of soil collected from the site were tested for a site-specific suite of contaminants. The soil chemical testing has revealed elevated levels of dibenzo(ah)anthracene from the area of TP9 and WS3 and the presence of asbestos within TP2. Statistical analysis indicates that the elevations are localised and should be treated as hotspots when considering remediation.
	Remediation: Human Health	A cover system will likely be the most appropriate form of hotspot remediation comprising the building footprint, areas of hard standing and 600mm of inert suitable materials within proposed soft-landscaped areas. Alternatively, the made ground material can be removed.
	Aquatic Environment	Risk assessment has confirmed a low risk to the aquatic environs based on the levels of contaminants encountered and environmental setting of the site.
	Gas Migration	Due to consistent elevations of CO ₂ >5% encountered in post investigation monitoring 'Gas Characteristic Situation 2' should be adopted for the site.
Engineering Recommendations	Foundation and Floor Slab Solution	Due to the anticipated loadings of the new school, it is recommended a piled foundation solution be adopted. Piles should extend into the underlying Chalk Group. Preliminary pile design parameters are given in Section 8. Due to the plastic nature of the underlying shallow clay and Made Ground deposits, floor slabs should be designed as suspended.
	Earthworks	A Class 2A/2B classification should be adopted for general cohesive fill materials of the shallow clay and Made Ground deposits proposed for any earthworks at the site. Class 3 should be adopted for the Chalk deposits.
	Highways	Based on the data available and using equilibrium values taken from guidance issued by the Highways Interim Advice Note 73/06 (IAN) and PI Test results it is recommended a CBR value of 3% is adopted within the Lambeth Group deposits. A conservative value of 5% can be used within the Chalk deposits and a reduced value of 1% should be adopted for any formations within the made Ground deposits.
	Buried Concrete	All buried concrete should, as a minimum, conform to Class AC-1s of BRE Special Digest 1 for foundations within the Made Ground, Lambeth Group or Chalk Group.
Recommended Additional Investigation		It is recommended further investigation comprising boreholes, a geophysical survey, CPT Boreholes or a combination of all three is undertaken across the site to confirm the absence/presence of further solution features and to confirm their depth and geotechnical properties of any infill.

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SECTION 1 Introduction and Proposed Development

Reading Borough Council is proposing the construction of a new school within land at Ranikhet Academy, Spey Road, Tilehurst, Reading. The proposed development will include demolition of the existing school and construction of a new school together with associated infrastructure including new retaining walls.

Hampshire County Council are the Consulting Engineers for the proposed development.

Terra Firma (South) have been commissioned as geotechnical and geo-environmental engineers to carry out a ground investigation at the site and present the findings in a Ground Investigation Report (GIR).

The main objectives of the geo-technical assessment were to:

- Determine the type, strength and bearing characteristics of the near surface soils and underlying solid geology.
- Provide recommendations for a suitable and economic foundation/floor slab solution for the development.
- Provide recommendations with regard to any other geo-technical aspects pertaining to the development.

The main objectives of the geo-environmental assessment programme were to:

- Identify the potential environmental liabilities at the site associated with any soil and groundwater contamination from past site uses.
- Provide a summary of the environmental conditions at the site, together with any necessary remediation works to render the site fit for its intended use.
- Provide recommendations with regard to any other geo-environmental aspects pertaining to the development.

The ground investigation has been undertaken in general accordance with the following advisory guidance:

- Code of Practice for Site Investigations - (BS 5930): 2015 + A1:2020
- Investigation of Potentially Contaminated Sites - CoP (BS 10175): 2011 + A2 2017
- Methods of test for soils for civil engineering purposes - In-situ tests (BS 1377-9): 1999

In order to achieve the above objectives, Terra Firma (South) carried out an assessment programme including a review of existing data, followed by a field investigation to determine the prevailing ground conditions and also to collect and analyse soil samples from selected locations around the site.

The scope of the works including the schedule for in-situ and laboratory testing was determined by Hampshire County Council.

1.1 Limitations and Exceptions of Investigation

Hampshire County Council has requested that a Ground Investigation Report (GIR) be produced to establish the ground conditions at the site in order to inform design of the proposed development.

The GIR has been prepared for the sole internal reliance of Hampshire County Council and their design and construction team. This report shall not be relied upon or transferred to any other parties without the express written authorisation of Terra Firma (South). If an unauthorised third party comes into possession of this report, they rely on it at their peril and the authors owe them no duty of care and skill.

The report represents the findings and opinions of experienced geo-environmental and geo-technical consultants. Terra Firma (South) does not provide legal advice and the advice of lawyers may also be required.

The subsurface geological profiles, any contamination and other plots are generalised by necessity and have been based on the information found at the locations of the exploratory holes and depths sampled and tested.

The ground investigation was limited by the following site constraints:

- The presence of underground services and utilities,
- The presence of existing buildings, structures and/or hard standing,
- The presence of access restrictions in the form of narrow gate ways to the required locations, and
- The presence of underground obstructions.

SECTION 2 Site Setting

2.1 Physical Setting

The proposed development is to be located within the existing property boundaries of Ranikhet Academy, Reading, Berkshire, RG30 4ED.

The site is centred approximately on National Grid Reference (NGR) SU 68377 73603. The site location is presented in **Drawing 2.1** below.



Drawing 2.1: Site Location Plan

The site is rectangular in shape with a plan area of some 1.81 hectares.

The topography of the region comprises gently sloping ground that falls to the north east. Topography of the site itself comprises a flat northern half and a gently sloping southern half that falls to the north east. In addition, flat terraces have been locally formed on the sloping southern half of the site. Levels within the site range from 53 to 60 m AOD.

2.1.1 Current Use and Site Conditions

At the time of the ground investigation the site was occupied by the existing school buildings and associated hard and soft landscaping that form Ranikhet Academy.

The school buildings occupied the northern half of the site and included external areas of hardstanding for parking of vehicles and soft landscaping. The southern half of the site was occupied by an all-weather sports pitch, an asphalt covered court and areas of soft landscaping with playground furniture. Some trees up to 5m in height were present within the site.

Cut and fill appears to have been undertaken on the sloping ground in the southern half of the site in order to form the flat profiles of the all-weather sports pitch and asphalt court. This includes several retaining walls up to 4m in height that support resulting step changes in elevation.

2.2 Phase 1 Risk Assessment

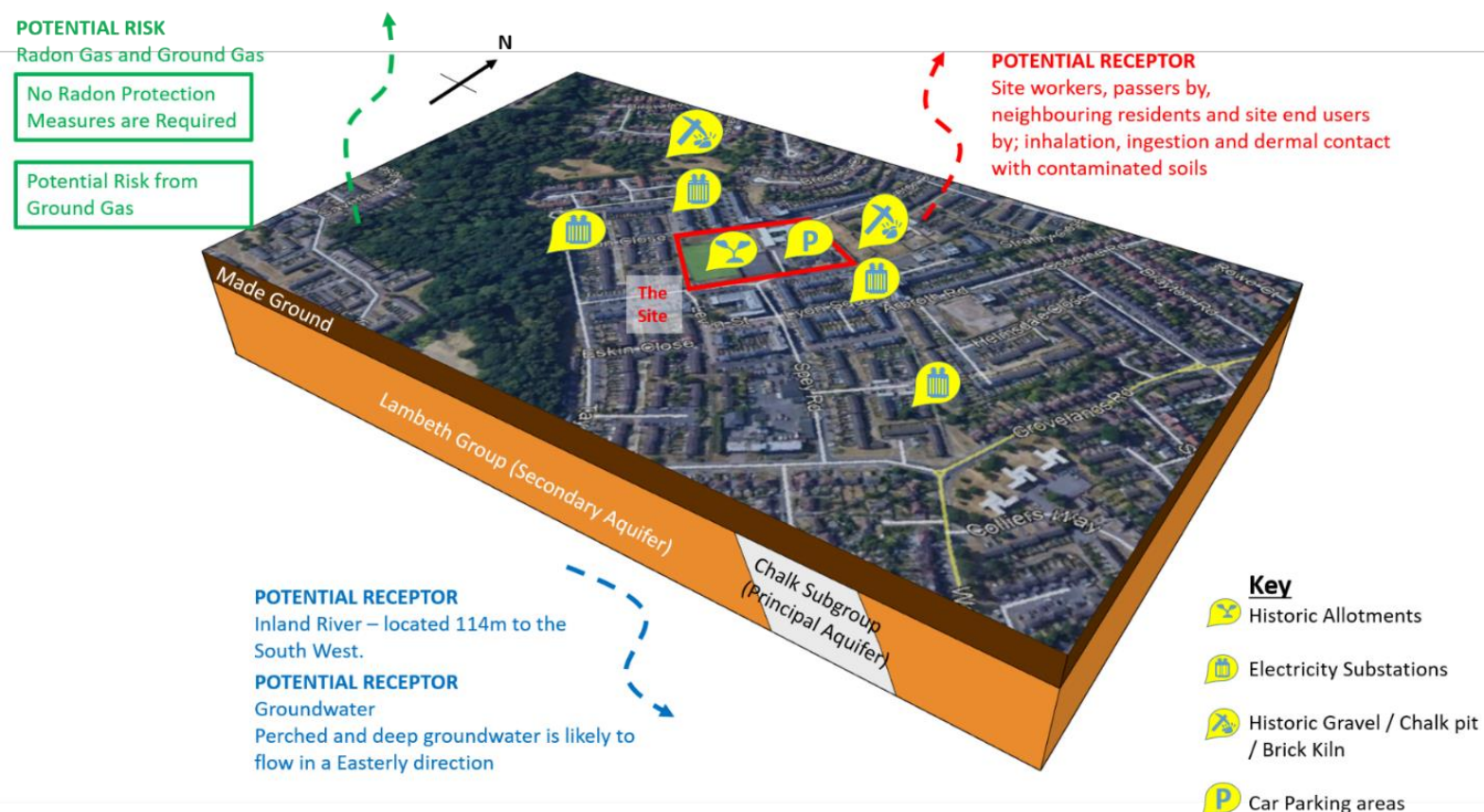
A Phase 1 Contaminated Land Risk Assessment was undertaken by Terra Firma (South) in April 2020 (Report number 6671) and should be read in conjunction with this report. A summary of the report is detailed below:

Geology		The Geological Map of the area shows the northern half of the site to be underlain by the Seaford and Newhaven Chalk Formation. The BGS describes the formation as typically comprising of soft to medium hard, smooth white chalks with conspicuous semi-continuous nodular and tabular flint seams. The Southern half of the site comprises the Lambeth Group, which typically comprises sequences mainly of clay, some silty or sandy, with some sands and gravels, minor limestones and lignites and occasional sandstone and conglomerate. A Fault lies approximately 150m to the east of the site. No Superficial deposits are shown to overlie the bedrock geology of the area. However, Head deposits and Winter Hill Gravel deposits outcrop to the north and south ~174m and 185m respectively. The Winter Hill Gravel deposits typically comprise of Gravel, variably clayey and sandy. The Head deposits contain variable amounts of clay, silt, sand or gravel. Due to the nature and history of the site the presence of significant Made Ground is expected due to the cut and fill across the site.
Mining		In summary, the risk from underground and/or surface mining activity is likely to be Moderate due to localised chalk, clay and gravel pits in the surrounding area.
Preliminary Geotechnical Risk Assessment		The preliminary geotechnical risk assessment has revealed that a Moderate risk is present from geotechnical aspects, with particular risk specifically associated with the potential for historic mining, dissolution features within the Chalk subgroup, significant made ground, frost heave from underlying shallow deposits and variable geology.
Recommendations		In order to confirm the above preliminary geotechnical risk assessment, it was recommended that a Phase 2 Intrusive Site Investigation was undertaken in order to determine the ground conditions and confirm relevant geotechnical aspects/contamination.
Potential Sources of Contamination	On-site	Historically, the site has comprised farmland until the early 1910s. In the 1910's a golf course was present until the early 1930's, allotment gardens from early 1930s until 1970. In 1970, Dee Side Primary School was established, the school had a name change in the mid 1970's to Ranikhet Academy, which is still present to this day. Present day and historical uses of the site have a number of potential contamination sources including Allotments, Car Parking areas and Potential made ground.
	Off-site	Historically, the surrounding area (<250m) has comprised allotment gardens, woodland, and localised surface gravel pits. From the early 1930s to the 1970s large

		residential developments and associated infrastructure were constructed in the surrounding area.
		Present day and historical uses of the surrounding area have a number of potential contamination sources including Brick and Tile Works.
	Gas Migration	Due to the presence of potential influencing significant Made Ground based on retaining wall and fill features present, the presence of ground gas cannot be ruled out.
Preliminary Human Health & Environmental Risk Assessment		The preliminary human health and environmental risk assessment has revealed that due to the sites and surrounding areas current and past land uses that a Moderate risk is present from contamination present beneath the site, with particular risk specifically associated with the Allotments, Car Parking areas and Potential made ground. In addition, a Low risk is present from the migration of radon gas, a Low risk from the migration of landfill gas and a Low to Moderate risk from the migration of ground gas.

2.2.1 Preliminary Illustrative Site Conceptual Model

The following illustration represents a theorised model through the site. The drawing is generalised and not to scale.



Drawing 2.2: Preliminary Conceptual Site Model

SECTION 3 Field Investigation

3.1 General

The site works were scoped by Hampshire County Council and comprised the following:

- 3no. cable percussive boreholes (BH1, BH2 and BH3),
- 9no. mini percussive boreholes (WS1-WS9),
- 10no. hand excavated trial pits (TP1, TP2, TP2a and TP3-TP9),
- 2no. hand excavated pits with in-situ CBR testing (CBR1 & CBR2),
- 1no. dynamic probe (BH1a), and
- PAK marker spray testing.

The site works were carried out on site from the 3rd to the 7th August 2020.

Prior to the site works, the following Health and Safety measures were undertaken:

- Risk Assessment & Method Statement (RAMS) was issued and approved beforehand,
- Underground utility plans were obtained from the relevant statutory undertakers,
- Before any excavation, all exploratory hole locations were scanned using a Cable Avoidance Tool (CAT), and
- Before any drilling, a 1.20m deep inspection pit was excavated at each borehole location.

The exploratory holes were set out at locations provided by Hampshire County Council and adjusted where necessary to take account of the site constraints detailed in Section 1.1.

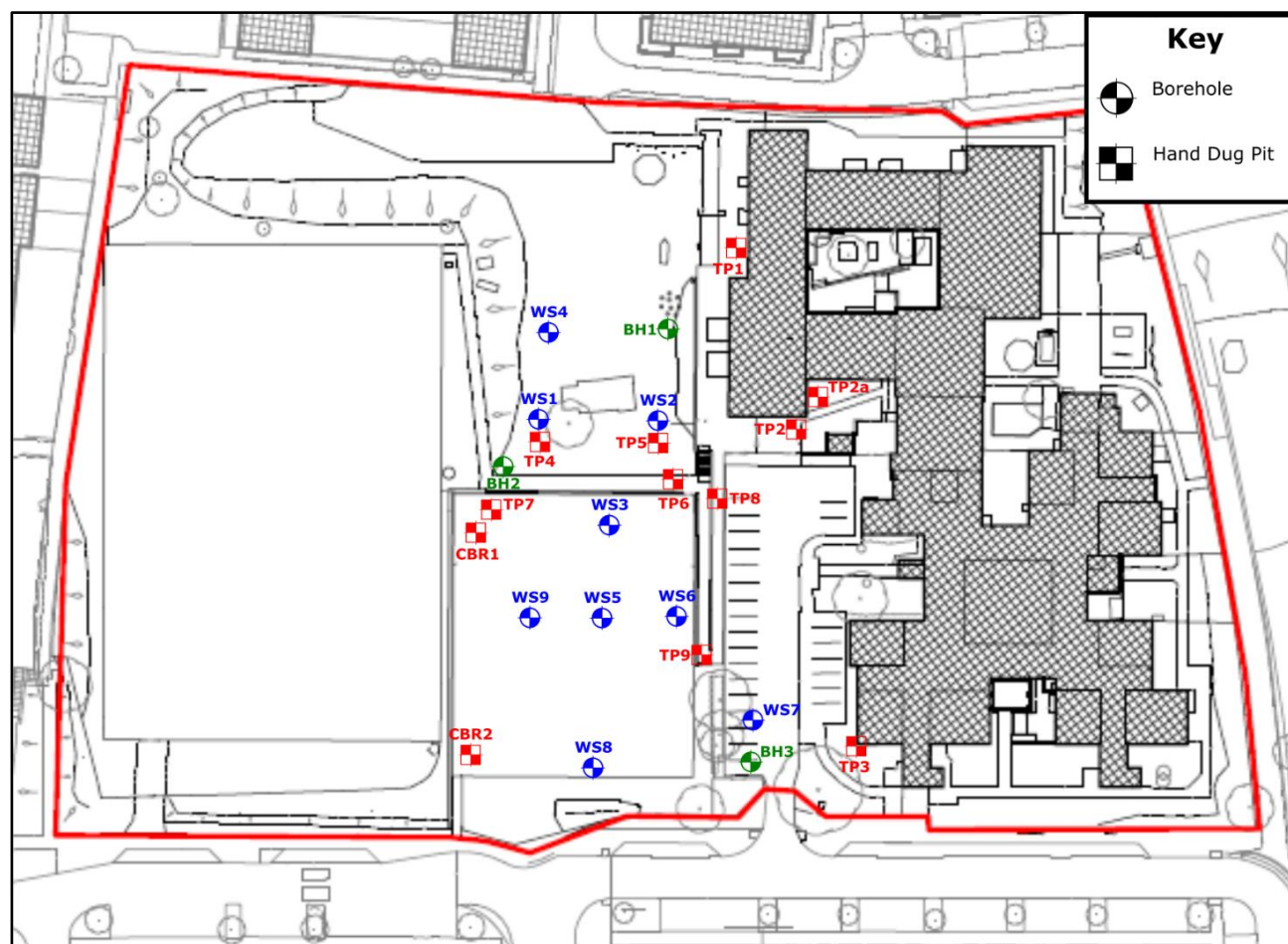
Approximate exploratory hole co-ordinates were measured using a hand-held GPS signal receiver. Levels have been interpolated from a site topographic survey and should be used with caution.

Table 3.1: Exploratory Hole Co-ordinates			
Exploratory Hole	Easting	Northing	Height AOD (m)
BH1	468329	173590	55.2
BH2	468336	173553	58.0
BH3	468391	173555	55.6
CBR1	468342	173548	57.0
CBR2	468367	173528	57.0
TP1	468353	173567	54.8
TP2	468359	173593	54.6
TP2a	468355	173597	54.5
TP3	468400	173570	55.0
TP4	468337	173561	57.6
TP5	468347	173574	56.5
TP6	468354	173571	56.7
TP7	468341	173550	57.0
TP8	468359	173576	54.7
TP9	468375	173562	55.5
WS1	468333	173563	57.6
WS2	468345	173576	56.0
WS3	4683542	173563	56.8
WS4	468318	173578	56.5

WS5	468364	173550	56.8
WS6	468370	173561	56.7
WS7	468386	173561	55.4
WS8	468376	173539	56.8
WS9	468357	173542	56.9

The site works were supervised by Terra Firma (South), who also logged the exploratory holes to the general requirements of BS5930:2015 + A1-2020 and CIRIA C574:2002.

The exploratory hole logs are presented in **Annex A** and their locations shown on **Drawing 3.1** below.



Drawing 3.1: Exploratory Hole Location Plan

3.2 Exploratory Holes

3.2.1 Cable Percussive Boreholes

The cable percussive boreholes (150mm diameter) were sunk using a Pilcon 1-ton drilling rig.

Due to the presence of surface hard standing a hydraulic breaker was used to progress drilling at BH3.

Standard Penetration Tests using either a split spoon or solid cone (SPT(S/C)) were undertaken at regular depths during the drilling in accordance with BS EN ISO 22476-3. Typically, tests were undertaken at the base of an inspection pit and every metre for the first 5m, and then every 1.5m thereafter, a final test was undertaken at the base of each borehole.

Undisturbed (U100) and disturbed soil samples were taken at regular depths during the drilling.

Borehole BH1 was backfilled with gravel and bentonite and reinstated at surface with arisings.

Boreholes BH2 and BH3 were installed with a gas and groundwater monitoring pipe, the details of which are summarised in the section below.

3.2.2 Mini Percussive Boreholes

The windowless sampling boreholes were bored using a Dando Terrier drilling rig.

Due to the presence of surface hard standing a hydraulic breaker was used where necessary to progress drilling.

The windowless boreholes were used to recover soil samples. Standard Penetration Tests using either a split spoon or solid cone (SPT(S/C)) were undertaken at regular depths during the drilling in accordance with BS EN ISO 22476-3. Typically, tests were undertaken at the base of an inspection pit and every metre, a final test was undertaken at the base of each borehole.

Dynamic probing was also undertaken at BH1a using the tracked mini percussive drilling rig with a super heavy weight (DPSH). This hole was undertaken to obtain further in-situ information in lieu of where U100 samples were taken in place of SPT's within BH01.

Boreholes WS1, WS3 to WS5, WS7 and WS8 were backfilled using gravel and bentonite and reinstated using either arisings or cold lay asphalt.

Boreholes WS2, WS6 and WS9 were installed with a gas and ground water monitoring pipe, the details of which are summarised in the section below.

3.2.3 Borehole Installations

Groundwater and/or gas monitoring systems were installed in boreholes BH2, BH3, WS2, WS6 and WS9.

The standpipe installation details for the boreholes are as follows:

Table 3.2: Standpipe Installation Details			
Borehole No.	Top of Response Zone (m bgl)	Bottom of Response Zone (m bgl)	Pipe Detail
BH2	2.00	4.00	Lockable flush cover set in concrete surround
BH3	1.00	12.00	
WS2	0.50	1.50	Plain (50mm) to top of Response Zone with gas valve.
WS6	1.00	2.00	
WS9	1.00	3.00	Slotted (50mm) Response Zone with geotextile sock and gravel surround

3.2.4 Hand Excavated Trial Pits

The hand excavated trial pits were sunk using conventional digging tools, limited to a maximum investigated depth of 1.20m and used to obtain shallow soil samples, expose existing foundations or to enable in-situ CBR testing.

Sketches of the foundations exposed in the trial pits are presented in **Annex B**.

Following completion of soil logging, in-situ testing and sampling, the hand excavated trial pits were backfilled using arisings and re-compacted as best as practicably possible using hand tools.

3.3 In-situ Testing

3.3.1 Strength Testing

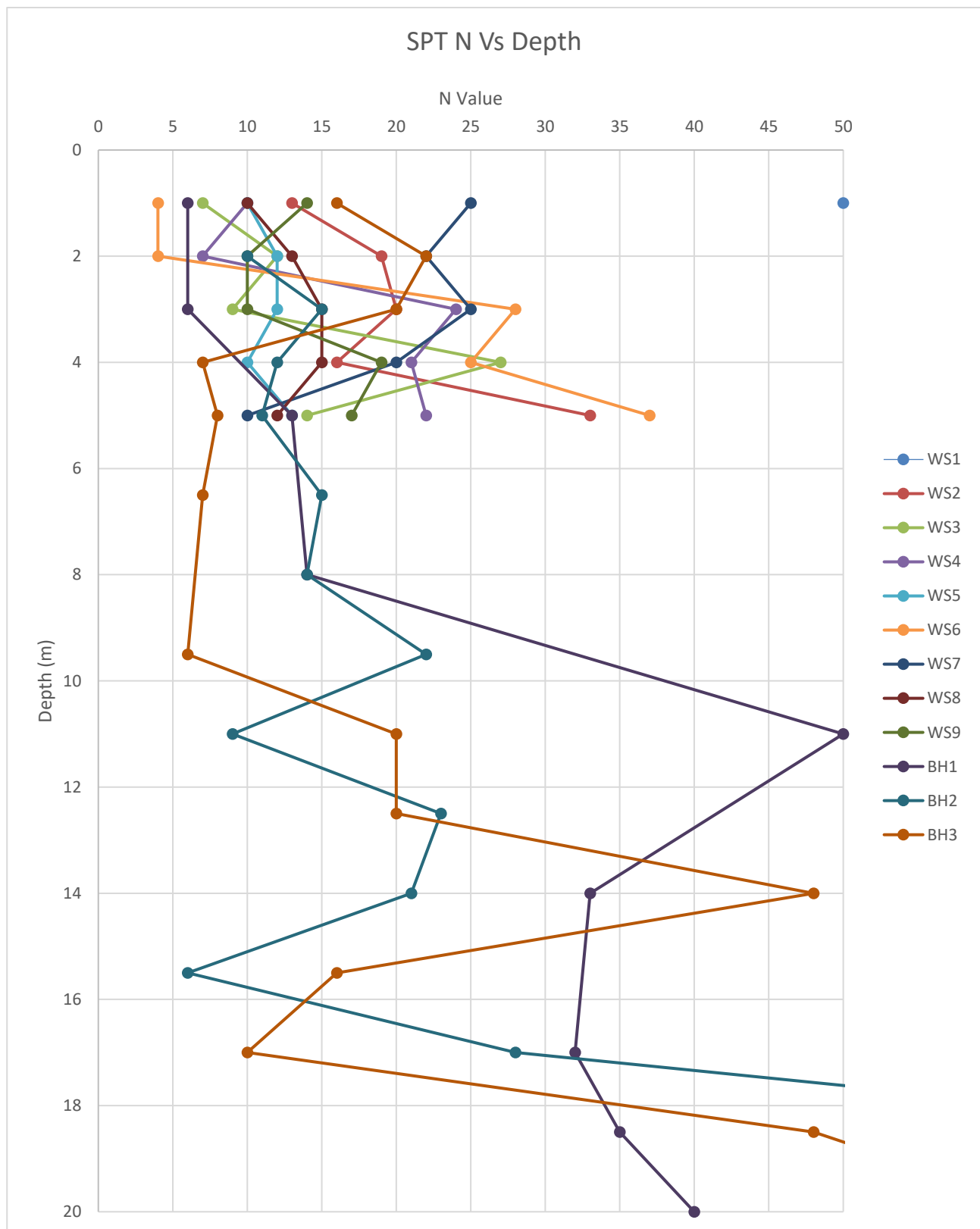
Standard Penetration Testing (SPT)

A total of 5No. SPTs were carried out within the Made Ground. SPT N Values recorded by this testing ranged from 4 to in excess of 50.

25No. SPTs were carried out in the Lambeth Group. N Values recorded by this testing ranged from 6 to 48.

48No. SPTs were carried out in the Seaford and Newhaven Chalk Formation (undifferentiated). N Values recorded by this testing ranged from 9 to in excess of 50.

Drawing 3.2 below presents the distribution of SPT N values against depth (mbgl).



Drawing 3.2: SPT vs Depth

3.3.2 California Bearing Ratio (CBR) Testing

Hand excavated inspection pits and in-situ CBR tests were carried out at locations CBR-1 and CBR-2 using a MEXE Cone Penetrometer. The probes were typically sunk to a depth of <0.50m from below ground level, targeting the proposed formation layer.

The in-situ CBR test results are presented on the relevant trial pit logs and presented in the table below:

Table 3.3: Average CBR Test Results				
Location	Test No.	Depth (mbgl)	CBR Value (%)	Strata
CBR1	1	0.25 – 0.32	8	Chalk
		>0.32	Refusal (>15)	
CBR2	1	0.30 – 0.37	3	Chalk
		0.37 – 0.45	7	
		>0.45	Refusal (>15)	

3.4 Sampling

3.4.1 Sampling Quality Assurance

Care was taken to ensure that sampling quality assurance occurred during site works. This included the following measures:

- The use of nitrile gloves at each sampling point.
- Stainless steel shovels were used to collect soil samples. The tool was cleaned with distilled water between each sample point.
- Soil samples were stored at a temperature below 4 degrees.
- Soil samples were stored within sample containers according to the chemical testing required.
- No head space was left in sample containers.

3.4.2 Soil Chemical Test Sampling Regime

During the intrusive investigation small disturbed soil and/or water samples were collected for chemical testing. The sample locations and depths are illustrated in the table below:

Table 3.4: Chemical Test Sample Descriptions - Soil			
Sample No.		Sample Type	Description
TP1	0.30	LG	Orange slightly sandy silty CLAY
TP2	0.50	MG	Orange very clayey very sandy GRAVEL
TP3	0.50	MG	Yellowish brown very sandy very clayey GRAVEL.
TP4	0.30	MG	Stiff orange locally white slightly sandy gravelly silty CLAY
TP5	0.50	MG	White sandy silty GRAVEL
TP9	0.50	MG	Orange silty very gravelly SAND.
WS3	1.00	MG	Stiff greyish brown slightly sandy gravelly CLAY.
WS4	1.00	MG	Stiff greyish brown mottled orange slightly gravelly sandy CLAY.
WS5	0.20	MG	Dark grey very sandy GRAVEL
WS6	0.50	MG	Stiff greyish green slightly sandy gravelly CLAY.
WS9	0.30	SNCF	White slightly sandy silty GRAVEL

Notes

- Sample Type: MG (Made Ground), LG (Lambeth Group), SNCF (Seaford and Newhaven Chalk Formations)

3.4.3 Asphalt Chemical Test Sampling Regime

During the intrusive investigation samples of the existing asphalt were collected for chemical testing. The sample locations and depths are illustrated in the table below:

Table 3.5: Chemical Test Sample Descriptions - Asphalt

Sample No.		Sample Type	Description
BH3	0.05	HS	Black ASPHALT
WS7	0.05	HS	Black ASPHALT.

Notes

- Sample Type: HS (Hardstanding)

3.4.4 Soil Property Test Sampling Regime

During the intrusive investigation bulk soil samples were collected for soil property testing.

The sample locations and depths are illustrated in the following table:

Table 3.6: Soil Property Test Sample Descriptions

Sample No.		Sample Type	Description
BH1	1.00	LG	Brown fine sandy silty CLAY with rare gravel
BH1	1.50	LG	Brown very sandy silty CLAY with rare gravel
BH1	2.00	LG	Soft to firm brown very sandy very gravelly silty CLAY
BH1	3.00	LG	Brown fine sandy silty CLAY with rare chalk gravel and flint gravel
BH1	4.00	SNCF	Light brown and white CHALK and CLAY
BH1	4.50	SNCF	-
BH1	6.00	SNCF	Brown fine sandy silty CLAY with rare chalk and flint gravel
BH1	7.00	SNCF	-
BH1	9.00	SNCF	White CHALK with rare flint gravel
BH2	1.20	LG	Very stiff dark brown sandy gravelly silty CLAY
BH2	2.00	SNCF	-
BH2	2.50	SNCF	Light brown and white Gravelly CHALK and CLAY
BH2	4.00	SNCF	White slightly gravelly structureless CHALK
BH2	4.50	SNCF	-
BH2	6.00	SNCF	White structureless CHALK
BH2	8.00	SNCF	White CHALK
BH2	13.00	SNCF	White CHALK with rare flint gravel
BH2	16.00	SNCF	-
BH2	17.00	SNCF	White CHALK with rare flint gravel
BH3	2.00	LG	Orange brown silty clayey SAND
BH3	8.00	LG	Loose orangish brown fine to medium SAND
BH3	11.00	LG	Brown silty clayey SAND
BH3	16.00	SNCF	White structureless CHALK
BH3	17.00	SNCF	-
BH3	18.00	SNCF	White CHALK with rare flint gravel
CBR-1	0.30	SNCF	White and brown CHALK with rare flint gravel
CBR-2	0.30	LG	Dark brown clayey SAND
TP7	1.00	SNCF	White CHALK with rare flint gravel
WS2	1.00	LG	Light brown fine sandy silty CLAY with rare chalk gravel
WS2	0.90	LG	Brown mottled dark brown fine sandy silty CLAY with rare gravel
WS3	1.50	SNCF	White structureless CHALK
WS3	1.80	SNCF	-
WS3	2.50	SNCF	-
WS4	1.50	LG	Stiff grey mottled orange with black speckles slightly sandy CLAY
WS4	2.00	LG	Brown mottled dark brow fine sandy silty CLAY with rare gravel

WS4	3.00	LG	Brown fine sandy silty CLAY with rare gravel
WS4	3.20	LG	Orangish brown clayey SAND with rare fine to medium gravel
WS4	4.50	LG	Greyish brown and brown fine sandy silty CLAY with rare gravel
WS5	1.00	SNCF	White mottled brown CHALK with rare flint gravel
WS5	1.50	SNCF	-
WS5	2.50	SNCF	White CHALK
WS6	2.50	LG	Orange brown silty clayey SAND
WS6	4.00	LG	Brown fine sandy silty CLAY with rare chalk gravel
WS7	0.50	LG	Brown fine sandy silty CLAY with rare chalk gravel
WS7	1.30	LG	Orangish brown slightly clayey slightly silty SAND with rare sandstone gravel

Notes

- Sample Type: HS (Hardstanding), MG (Made Ground), LG (Lambeth Group), SNCF (Seaford and Newhaven Chalk Formations)

3.5 Groundwater and Gas Monitoring

Groundwater and gas monitoring wells were installed within BH2, BH3, WS2, WS6 and WS9. These installations have been monitored on six occasions to measure groundwater depths and concentrations of methane including lower explosive limit, carbon dioxide, oxygen, hydrogen sulphide and carbon monoxide.

Records from the monitoring are included in **Annex E**. Details of the groundwater depths are also included in the table below

Table 3.7: Summary of Groundwater Monitoring						
	GWL in metres BGL (Base Depth of installation)					
Date	10/08/20	27/08/20	03/09/20	27/10/20	26/11/20	09/12/20
Time of Monitoring (GMT)	12:00	12:00	11:15	13:30	15:30	
BH2	Dry (4.05)	Dry (4.00)	Dry (4.02)	Dry (4.05)	Dry (4.05)	Dry (4.00)
BH3	Dry (11.85)	Dry (11.85)	Dry (11.85)	Dry (11.80)	Dry (11.80)	Dry (11.80)
WS2	Dry (1.62)	Dry (1.60)	Dry (1.59)	Dry (1.45)	Dry (1.45)	Dry (1.60)
WS6	Dry (2.00)	Dry (1.95)	Dry (1.97)	Dry (1.95)	Dry (1.95)	Dry (2.00)
WS9	Dry (2.90)	Dry (2.85)	1.87 (2.28)	Dry (2.20)	Dry (2.20)	Dry (2.30)

Notes:

- GWL (BGL) – Groundwater Level (Below Ground Level)

SECTION 4 Ground Conditions

4.1 Summary

The ground conditions encountered by the exploratory holes were variable across the site but can in general be summarised as shown in the following table:

Table 4.1: Summary of Ground Conditions					
Depth (mbgl)		Thickness (m)		Stratum	
From	To	Min	Max		
0.00	0.09 / 0.30	0.09	0.30	Black ASPHALT with subbase of grey and orange slightly silty very sandy GRAVEL. Grass covered stiff brown sandy CLAY. Grass covered firm to stiff brown slightly gravelly to gravelly slightly sandy to sandy SILT.	<i>Made Ground (at surface)</i>
0.09 / 0.30	0.23 / 2.40	0.04	2.27	Firm to very stiff brown, orange and yellow slightly sandy to sandy slightly gravelly to gravelly CLAY. Grey, orange and yellowish brown very clayey very sandy GRAVEL.	<i>Made Ground (below surface)</i>
0.23 / 2.40	0.45 / 14.30	0.15	14.00	Firm to stiff blue, brown, orange and grey slightly sandy slightly gravelly to gravelly silty CLAY. Loose to dense brown and orange silty to very silty occasionally clayey SAND. <i>(Possible infilled solution feature)</i>	<i>Lambeth Group</i>
0.19 / 14.30	>20.00	Unproven		White structureless CHALK that becomes structured with depth.	<i>Seaford and Newhaven Chalk Formations (Undifferentiated)</i>

Within the trial pits, the estimated strength of granular deposits was determined from visual assessment only (ease/difficulty of excavation and pit stability).

4.2 Stability

The sides of the trial pits and boreholes were typically found to be stable.

4.3 Strata Details

4.3.1 Made Ground

Made Ground was encountered at all exploratory hole locations.

The Made Ground consisted of a surface covering of either asphalt hardstanding with subbase or grass covered silts and clays. These surface materials were generally underlain by further Made Ground comprising gravels and firm to very stiff clays.

The Made Ground was generally of limited thickness extending to depths of less than 1.00m bgl. The exceptions to this were WS3, WS4 and WS6 where the Made Ground was present to depths of 1.20m, 1.50m, and 2.40m bgl respectively.

4.3.2 Lambeth Group

Soils considered to be deposits of the Lambeth Group were encountered at locations BH1 to BH3, CBR2, TP1 to TP3, WS2, WS4 and WS6 to WS8.

The Lambeth Group comprised firm to stiff clays and loose to dense sands.

The base of the Lambeth Group was proven at locations BH1 to BH3, WS2 and WS8 where it was recorded at significantly varying depths ranging from 0.45m to 14.30m bgl.

The deeper sand deposits (14.30m) were encountered within BH3 only. It is considered that this deeper depth of deposits is potentially associated with an infilled solution feature at the site. Further works within this area, and across the wider site, may be required to confirm the presence of solution features.

4.3.3 Seaford and Newhaven Chalk Formations (Undifferentiated)

The Seaford and Newhaven Chalk Formations were encountered at locations BH1 to BH3, CBR1, TP7, WS2, WS3, WS5, WS8 and WS9.

The Seaford and Newhaven Chalk was generally recorded as a white structureless CHALK that graded to “possible” structured chalk with depth. The structureless chalks generally comprised a Grade Dc material in the form of a sandy very silty gravel. The structured chalks were largely recovered as slightly sandy silty gravels, although at some locations they were also recovered as a slightly sandy gravelly silt.

4.4 Water Strikes

Groundwater strikes were recorded at BH1 and BH3. Details regarding these strikes are given in the table below.

Table 4.2: Summary of Groundwater

Hole Location	Groundwater Strike Depth (mbgl)	Groundwater Depth (mbgl) after 20 mins	Comments	Water Bearing Strata
BH1	17.90	17.50	Slight rise	SNCF
BH3	18.00	17.80	Slight rise	SNCF

Notes

- Sample Type: SNCF (Seaford and Newhaven Chalk Formations)

SECTION 5 Laboratory Chemical Testing

5.1 General

A total of twelve soil samples were collected and despatched to the laboratories of Eurofins Chemtest Limited for laboratory chemical analysis.

The following chemical testing was undertaken:

Table 5.1: Summary of Chemical Testing Suites		
Inorganics	Metals	Arsenic (As), Cadmium (Cd), Chromium (Cr), Hexavalent Chromium (CrVI), Copper (Cu), Lead (Pb), Mercury (Hg), Nickel (Ni), Selenium (Se), Zinc (Zn)
	General	pH (acidity), Cyanide (CN ⁻), Thiocyanate (SCN ⁻), Ammoniacal Nitrogen (NH ₄ -N), Sulphide (S ²⁻), Sulphur (S), Sulphate (SO ₄ ²⁻), Organic Matter (OM)
Organics		Phenol Poly-Aromatic Hydrocarbons (PAH) Petroleum Hydrocarbons (PH): TPH-CWG
Miscellaneous		Asbestos ID / Quantification

The results of the above chemical tests are presented in **Annex C** and evaluated below.

5.2 Risk Assessment

5.2.1 Introduction

The results obtained from the investigation, which are discussed in detail in Section 5.3, were used to conduct an environmental risk assessment for the site. The risk assessment aimed to:

- Identify sensitive receptors
- Determine pathways for contaminant migration to the receptors
- Estimate contaminant impact on receptors
- Establish whether remedial action is required
- Calculate remediation target levels if required

The future use of the site i.e. whether it is to be used for residential or commercial has an impact on any risk assessment. As the development is expected to comprise a school with areas of soft landscaping, the soil guidance values (SGV) for a public open space – residential scenario have been adopted.

5.2.2 Methodology

Soils

Environmental risk assessment evaluates the risk to receptors via an analysis of the 'source-pathway-target' linkage. In order for a risk to be present, there must be a contaminant source capable of causing a health risk, a vulnerable receptor, and a pathway linking the two.

This sort of risk assessment is usually conducted using a tiered approach. Tier 1 consists of a comparison of the analytical results obtained from the site investigation with Soil Guideline Values (SGV's) specific to the type of development obtained from The Environment Agency Contaminated Land Exposure Assessment (CLEA) Guidelines.

The CLEA model, technical guidance and Soil Guideline Values are currently under review, as a direct result of the publication published by DEFRA (2006) 'Soil Guideline Values: The Way Forward'. The technical guidance CLR 9 and CLR 10 have been superseded by Science Reports (SR) 2 and SR3.

Whilst the toxicological and risk assessment framework is under review, the laboratory soil chemical test results have been evaluated by comparison with published Generic Assessment Criteria (GAC), with preference in the following order:

1. Category 4 Screening Levels (C4SLs) - Department for Environment, Food and Rural Affairs (DEFRA, 2014),
2. Suitable for Use Levels (S4ULs) - Land Quality Management & Chartered Institute of Environmental Health (LQM & CIEH, 2015),
3. Soil Guideline Values (SGVs) - EA / DEFRA, 2002-2009,
4. Generic Assessment Criteria (GAC) - Contaminated Land: Applications in Real Environments (CL:AIRE, 2010), and
5. Generic Assessment Criteria (GAC) derived by Terra Firma (South).

In the absence of a GAC, the laboratory Limit of Detection (LoD) has been used for comparison in order to establish the presence/absence of determinants and for initial screening purposes.

The above sources typically have derived GAC with reference to the EA's Contaminated Land Exposure Assessment (CLEA) model and using the CLEA software.

All receptor profiles, source inputs and toxicological parameters comply with both peer reviewed literature and CLR 7 to CLR 10. As with SGV's the SSV's and CIEH GAC are not yet updated to SR2 and SR3.

Should Tier 1 levels be exceeded, a choice is made either to remediate the site to conservative Tier 1 levels, or proceed to Tier 2.

Tier 2 makes use of site-specific data to evaluate acceptable concentrations of chemicals for the particular conditions present at the site.

At each tier, the amount and detail of investigation work increases as more site-specific data are needed to refine the characterisation of the site. Conversely, as site conditions are better understood, a more site-specific remediation strategy can be determined.

Controlled Waters

In the case of groundwater and/or leachate, the acceptable concentrations are sourced from the Environment Agency Chemical Standards Report for each individual substance. The report presents a variety of target concentrations specific to protection goals and environmental media in which the standard applies. The most applicable protection goal and environmental media for this project is the protection of aquatic life in a freshwater environment.

Where there is no standard for a freshwater environment, the target concentrations are derived from UK standards for drinking water (for human consumption). In the absence of any published guideline, a conservative threshold is suggested.

5.2.3 Sources

The sources of contamination considered in the risk assessment are taken to be concentrations of chemicals beneath the site.

5.2.4 Pathways

The various pathways considered in the risk assessment are given below:

- Direct contact/inhalation/ingestion of affected superficial soils, up to 1.0m in depth
- Wind born dust from affected superficial soils
- Leaching from soils to groundwater
- Groundwater transport

5.2.5 Potential Receptors

Potential receptors include site workers, future residents, future workers, future visitors, residents in the area surrounding the site, persons who may come into contact with water in the vicinity of the site, the underlying minor aquifer and nearby surface waters and aquatic life in these waters.

5.3 Evaluation of Analytical Results

5.3.1 Soils

A summary of the Inorganic (Metals) soil chemical test results are shown in the table below.

Table 5.2: Soil Chemical Test Results – Inorganics (Metals)					
Substance	Land Use / Guideline Values	Measured Levels of Substances (mg/kg)		Number of exceedances	95% UCL
	POS-R	Min	Max		
Arsenic	79	11	34	0	-
Cadmium	220	0.15	0.56	0	-
Chromium	1500	9.3	27	0	-
Chromium VI	21	0.5	0.5	0	-
Copper	12000	5.2	220	0	-
Lead	630	12	68	0	-
Mercury (Total)	120	0.1	0.13	0	-
Nickel	230	11	26	0	-
Selenium	1100	0.2	0.38	0	-
Zinc	81000	36	220	0	-

Notes

- C4SL - Provisional Category 4 Screening Levels
- S4UL - Suitable for Use Levels
- POS-R (Public Open Space- Residential)
- A total of ten soil samples were tested for these substances

A summary of the Inorganic (General) soil chemical test results are shown in the table below.

Table 5.3: Soil Chemical Test Results – Inorganics (General)					
Substance	Land Use / Guideline Values (mg/kg)	Measured Levels of Substances (mg/kg)		Number of exceedances	95% UCL
	POS-R	Min	Max		
pH (pH Units)	Considered in BRE SD1, BS3882, BS8601 and/or UKWIR	8.9	10.2	0	-
Cyanide (Total)	0.5 (LoD)	0.5	0.5	0	-
Cyanide (Free)	0.5 (LoD)	0.5	0.5	0	-
Thiocyanate	5 (LoD)	5	5	0	-
Organic Matter	Considered in Organic Contaminant Guideline Value Assessment, BS3882 and/or BS8601	0.41	1.7	0	-
Ammoniacal Nitrogen	-	0.5	4	0	-
Sulphate (2:1) (g/l)	Considered in BRE SD1	0.01	0.026	0	-
Sulphide	Considered in BRE SD1	0.5	7.8	0	-
Sulphur (%)	-	0.019	0.26	0	-
Sulphate (Total) (%)	Considered in BRE SD1	0.016	0.75	0	-

Notes

- BRE SD1: 2005 - Concrete in Aggressive Ground
- BS 3882: 2015 - Specification for Topsoil
- BS 8601: 2013 - Specification for Subsoil and requirements for use
- UKWIR – Guidance for the Selection of Water Supply Pipe to be used in Brownfield Sites: 2010
- POS-R (Public Open Space- Residential)
- LoD - Limit of Detection
- - No comparable Guideline Value
- A total of ten soil samples were tested for these substances.

A summary of the Organic (General) soil chemical test results are shown in the table below.

Table 5.4: Soil Chemical Test Results – Organics (General)						
Substance		Land Use / Guideline Values (mg/kg)	Measured Levels of Substances (mg/kg)		Number of exceedances	95% UCL
		POS-R	Min	Max		
SOM						
Total Phenol	1	440	0.3	0.3	0	-
	2.5	690			0	
	6	1300			0	
Total PAH*		-	2	48	-	-
Total EPH (C10-C40)	1	3800**	230	410	0	-
	2.5	3800**			0	
	6	3800**			0	

Notes

- **S4UL** - Suitable for Use Levels
- POS-R (Public Open Space- Residential)
- * Total PAH - Poly-Aromatic Hydrocarbons, EPA 16 (See Speciated PAH Results Table)
- ** Based on worse-case Aromatic C₁₆-C₂₁ fraction
- A total of ten soil samples were tested for these substances

In order to accurately assess the risk from Total PAH, speciation was undertaken, which splits the total PAH concentration into its sixteen components.

A summary of the Organic (Speciated PAH) soil chemical test results are shown in the table below.

Table 5.5: Soil Chemical Test Results – Organics (Speciated PAH)						
Substance	SOM	Land Use / Guideline Values (mg/kg)	Measured Levels of Substances (mg/kg)		Number of exceedances	95% UCL
		POS-R	Min	Max		
Naphthalene	1	4900	0.1	0.19	0	-
	2.5	4900			0	
	6	4900			0	
Acenaphthylene	1	15000	0.1	0.37	0	-
	2.5	15000			0	
	6	15000			0	
Acenaphthene	1	15000	0.1	0.16	0	-
	2.5	15000			0	
	6	15000			0	
Fluorene	1	9900	0.1	0.15	0	-
	2.5	9900			0	
	6	9900			0	
Phenanthrene	1	3100	0.1	2.4	0	-
	2.5	3100			0	
	6	3100			0	
Anthracene	1	74000	0.1	1.1	0	-
	2.5	74000			0	
	6	74000			0	
Fluoranthene	1	3100	0.1	7	0	-
	2.5	3100			0	
	6	3100			0	
Pyrene	1	7400	0.1	7	0	-
	2.5	7400			0	
	6	7400			0	
Benzo(a)anthracene	1	29	0.1	3.8	0	-
	2.5	29			0	
	6	29			0	
Chrysene	1	57	0.1	3.7	0	-
	2.5	57			0	
	6	57			0	
Benzo(b)fluoranthene	1	7.1	0.1	6.3	0	-
	2.5	7.2			0	
	6	7.2			0	
Benzo(k)fluoranthene	1	190	0.1	2.2	0	-
	2.5	190			0	
	6	190			0	
Benzo(a)pyrene		10	0.1	4.9	0	-
Indeno(1,2,3-cd)pyrene	1	82	0.1	3.9	0	-

	2.5	82			0	
	6	82			0	
Dibenzo(a,h)anthracene	1	0.57	0.1	0.98	2	0.4
	2.5	0.57			0	
	6	0.58			0	
Benzo(g,h,i)perylene	1	640	0.1	3.7	0	-
	2.5	640			0	
	6	640			0	

Notes

- C4SL - Provisional Category 4 Screening Levels
- S4UL - Suitable for Use Levels
- POS-R (Public Open Space- Residential)
- SOM - Soil Organic Matter
- A total of twelve soil samples were tested for these substances

A summary of the Miscellaneous (Asbestos) soil chemical test results are shown in the table below.

Table 5.6: Soil Chemical Test Results – Miscellaneous (Asbestos)				
Sample No.		ID Result	Comments	Total Mass (%)
TP1	0.30	NAD	-	-
TP2	0.50	Chrysotile Crocidolite	Lagging	0.16%
TP3	0.50	NAD	-	-
TP4	0.30	NAD	-	-
TP5	0.50	NAD	-	-
TP9	0.50	NAD	-	-
WS3	1.00	NAD	-	-
WS4	1.00	NAD	-	-
WS5	0.20	NAD	-	-
WS9	0.30	NAD	-	-

Notes:

- NAD – No Asbestos Detected
- Total Mass (%) is based on Gravimetric Quantification

5.4 Contaminants of Concern

It can be seen from Tables 5.2 to 5.6 that the measured concentrations for most soil analytes were below the threshold guideline for the Public Open Space – Residential land usage scenario. The exception to this was dibenzo(ah)anthracene. Exceedances of the criteria for this PAH compound were found in the samples of the Made Ground taken from TP9 at 0.50m bgl and WS3 at 1.00m bgl. TP9 was located within the asphalt covered basketball court and WS3 was located on the ramp along its northern boundary that provides access to the court. Therefore, the cause of the elevated level of dibenzo(ah)anthracene is likely due to accidental inclusion of asphalt within the sample and cannot be inhaled or ingested.

The calculated the 95% upper confidence level for dibenzo(ah)anthracene was below the relevant soil guidance value. However, using the Maximum Value Test the 'T No' for the pollutant is above the T Critical (10%) value and therefore the areas where elevated levels of dibenzo(ah)anthracene were encountered are considered as contamination hotspots where appropriate mitigation measures will need to be adopted.

Most of the samples were found to be absent of asbestos fibres, with the only exception being the sample taken from TP2 at 0.50m bgl. This sample was taken from the Made Ground found in a foundation inspection located next to the existing school building, close to the boiler house.

SECTION 6 Quantitative Risk Assessment/Mitigation Measures

A quantitative risk assessment has been carried out incorporating the findings from the ground investigation and laboratory testing.

6.1 Site Summary

Historical mapping shows that the site comprised open farmland up until the 1930s when the site was then occupied by a golf course and allotments. The site then took its current form as a school in the 1970s with some modifications undertaken afterwards.

The ground conditions encountered by the investigation generally comprised Made Ground underlain by either the Lambeth Group or Chalk Subgroup in the northern and central areas of the site. To the south of the site, deeper Lambeth Group deposits were encountered to 14.0m bgl that were then underlain by the Chalk subgroup. The Made Ground comprised a surface covering of either hardstanding or grass covered silts and clays that were underlain by further Made Ground consisting of clays and gravels. The Made Ground was found to extend to depths ranging from 0.04m to 2.27m bgl. The Lambeth Group comprised firm to stiff clays and loose to dense sands that extended to depths ranging from 0.15m to 14.30m bgl. The Seaford and Newhaven Chalk Formations comprised structureless chalks of Grade Dm that became structured with depth. These chalks were found to extend to the maximum investigated depth of 20m bgl.

The deeper Lambeth deposits (14.30m) from BH03 are potentially associated with an infilled solution feature at the site.

Groundwater was encountered at two locations where it was struck at depths of 17.90m and 18.00m bgl

The underlying Lambeth Group and Chalk subgroup are designated as a Secondary A and Principal aquifer respectively. The nearest surface water is some 100m to the west. There are no groundwater, surface water or potable water abstraction licenses located within 250m of the site according to the Groundsure report, undertaken as part of the Phase 1 Desk Study report.

6.2 Potential Contaminants

Asbestos lagging and elevated concentrations of dibenzo(ah)anthracene have been found at the site. However, they are locally present rather than widespread with the asbestos fibres found at TP2 only and raised dibenzo(ah)anthracene levels at TP9 and WS3, and as such are considered to be contamination hotspots. The impacts associated with these hotspots are considered in the following section.

6.3 Potential Receptors

During Construction

- Construction workers
- Neighbouring site users
- Passers-by
- The Aquatic Environment - Surface waters, perched groundwater, groundwater

Following Construction

- Site End Users – Workers, visitors, maintenance contractors
- The Aquatic Environment - Surface waters, perched groundwater, groundwater
- Building Materials – these are potentially at risk from aggressive ground conditions

- Vegetation upon the site is potentially at risk from phytotoxic contaminants

6.4 Potential Pathways

The proposed development will comprise the erection of a new school followed by demolition of the existing school building.

Potential risks are present during and following construction of the development to potential receptors from ingestion, inhalation, dermal contact, surface water run-off, leaching and groundwater transport. By adhering to the following protection measures any risks associated with any liabilities such as this can be considered very low.

Ingestion of soil/soil dust and dermal contact

Any combustible materials found during excavations should be removed and replaced with suitable materials. The combustible materials should be suitably disposed of.

If materials are imported, which are not a natural quarry product with British Standard Certification, or are not sourced from a builder's merchant, DIY store or retail outlet in bagged bulk form, analytical validation testing will be required, to ensure that imported materials is suitable and will not cause pollution to the site, and pose a risk to human health.

Any materials to be removed from site should be subject to the Waste Acceptance Procedure (WAP) in order to appropriately classify the waste for the correct type of landfill.

All service runs should be backfilled with inert materials to ensure that future maintenance workers / contractual workers do not come into contact with contaminated soils.

If during the development materials or abnormal ground conditions are encountered that are significantly different to those encountered in the investigation, the occurrence should be reported to the Engineer and appropriate action taken prior to continuing with the works.

The appointed contractor(s) should as a minimum;

1. Comply with all current Health and Safety regulations
2. Provide Method Statements and Risk Assessments in place to deal with measures set out in this section
3. Comply with Control of Substances Hazardous to Health (COSHH) Assessment
4. Maintain a good level of Personal Protection Equipment (PPE)
5. Maintain a good level of hygiene by site workers
6. Put in place dust suppression measures when necessary

The contractor(s) must also strictly adhere to the relevant Pollution Prevention Guidelines which aim to minimise detrimental harm to the environment and health.

Within the documentation prepared by the contractor(s), the following information should be provided, but not limited to:

1. Project Description
2. Key participants/contractor(s)
3. Technical procedures
4. Phasing of works and approximate timescales

5. Site plans to scale
6. Details of consents or license needed
7. Health and Safety, COSHH Assessment, Method Statements and Risk Assessments
8. Emergency contingencies

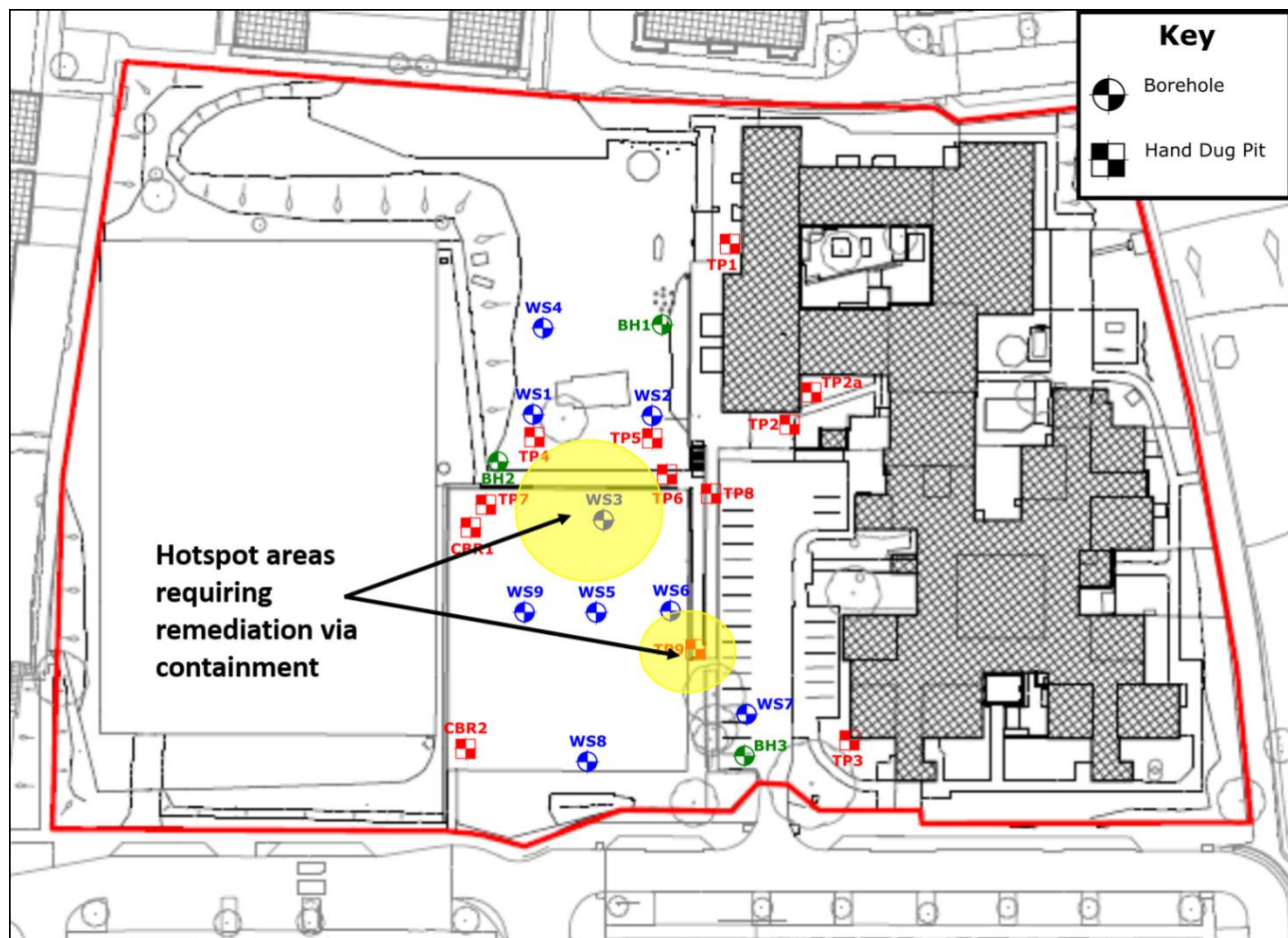
In addition, the following precautions should also be taken.

1. All potential chemicals and associated risks and emergency procedures for spills/leaks should be considered in a site risk assessment and the details provided to all site employees
2. Any potential pollutant materials or chemicals/detergents used on site should be adequately stored in suitable containers, with clear labelling.
3. Any oil or hazardous substance containers and associated pipe works should be enclosed within a bund.
4. Care taken during delivery of materials, with correct supervision and labelling detailing the substance and its quantities.
5. All delivery drivers should be informed of procedures and restrictions
6. Any materials on delivery should be covered to ensure no spillage from the vehicle.
7. Any detergents, paints, chemicals etc. should not be allowed to be discharged into surface drains or water courses
8. Washing out and cleaning of concrete/cement plant should be carried out in a contained area with adequate measures to collect all run-off water.
9. Security and prevention of vandalism, especially of oil drums/containers.

It is considered that the site will be sufficiently fenced off during development and that dust suppression measures will be adopted if required, meaning there will be no risk to neighbouring site occupants and passers-by.

The results of the chemical testing have revealed elevated levels of dibenzo(ah)anthracene at TP9 and WS3 as well as asbestos fibres at TP2. Therefore, some form of remediation will be required at these locations to control the risks to site users. Given the nature of the development and levels of contaminants encountered, a cover system will likely be the most appropriate form of remediation. The cover system should comprise capping of the site with the building footprint, areas of hard standing and 600mm of inert suitable materials within proposed soft-landscaped areas. Alternatively, the made ground material can be removed to an appropriate landfill facility.

A drawing highlighting the hotspot areas requiring remediation is shown below.



Drawing 6.1: Hotspot areas of contamination that require remediation

Inhalation of soil dust /ground gas/radon

Asbestos fibres have been found locally in the near surface soils. These fibres are considered a risk to human health receptors. To control this risk during the construction phase, the following precautions should be adopted when handling soils and demolition waste from the area of TP2 and the nearby boiler room:

1. A watching brief by a suitably qualified asbestos analyst should take place during the construction phase of the works. If there is deemed a significant risk to employees or the general public then activities should be suspended pending a specific Asbestos Survey and risk assessment undertaken in accordance with the 2012 Control of Asbestos Regulations (CAR 2012).
2. No stockpiling of material from HP01 and within a 5m radius of this location should take place so as to avoid the airborne spread of potential asbestos containing materials.
3. Any material due to be removed from site should be immediately placed within suitable covered/lockable skips so as to prevent the airborne spread of asbestos containing material.
4. Due to the potential risk to contractors, employees are required, as a minimum, to use appropriate PPE and Respiratory Protective Equipment (RPE). These can include:
 - a. Disposable Respirators to standard EN149 (Type FFP3) or EN1827 (Type FMP3)
 - b. Half Mask Respirators to standard EN140 with P3 filter
 - c. Semi Disposable Respirators to standards EN405 with P3 filter

It is also recommended that dust suppression measures are adopted to prevent the fibres becoming airborne and thus impacting existing site users and neighbours.

The asbestos fibres were found at TP2 where there is an existing school building and site proposals show that this building will be demolished. It is assumed the asbestos containing soils will be removed as part of the demolition works and disposed at a suitable facility. If this is the case then there will be no risk to future site users. If the soils are to remain in-situ then they will need to be capped by some 600mm of inert material in order to break the pathway to future site users.

It is considered that site end users are highly unlikely to be at risk from soil dust/vapours.

The site is indicated to be located within an area where radon protection measures are not required.

A total of six monitoring events have been undertaken to date in order to determine the ground gas regime beneath the site. Ground gas concentrations and flow rates recorded during these visits have been low. Using this data combined with guidance in CIRIA report C665 (2007), titled 'Assessing risks posed by hazardous ground gases to buildings', a provisional conservative Gas Screening Value (GSV) of 0.009 l/hr has been derived using the highest ground gas concentration (CO₂ at 9.0%) and the highest flow rate recorded (+0.1l/h). A GSV of 0.009 l/hr classifies the site as 'very low risk' and as 'Characteristic Gas Situation 1' in accordance with CIRIA guidance C665 (2007). However, this guidance also states that consideration should be given to raising this classification if CO₂ concentrations of 5% or greater are found. CO₂ concentrations in excess of this were continually found at WS06 and therefore a higher classification of "Characteristic Gas Situation 2" is deemed more appropriate for the site.

The above gas risk assessment is in accordance with the following guidance:

- CIRIA guidance C665 (2007), 'Assessing risks posed by hazardous ground gases to buildings'
- BS8485:2015+A1 2019, 'Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings'

Surface water run-off/leaching into the groundwater/groundwater transport

1. Short-term

In respect of physical effects of the site works during the construction period, there is a negligible risk to the environment/adjacent land and water bodies from digging foundations, moving contaminated soil, runoff from construction materials and/or exposed ground, wheel washings and oil or chemical spills.

All adverse effects should however be preventable by due diligence to good construction practise and housekeeping in preventing surface runoff and the spillage of materials. The basic measures that should be taken are as follows:

- Prepare a drainage plan
- Carry out any activities that could cause pollution in a designated, bunded area, away from rivers or boreholes
- Use settlement tanks or ponds to remove silty water
- Store all oils and chemicals in a fully bunded area to prevent leaks or spills

It should be noted that the appointed contractor should provide Method Statements and Risk Assessments to deal with these matters.

2. Long-term

The chemical analysis of soil beneath the site constitutes a Level 2 assessment in terms of Remedial Targets Methodology, where the primary receptor/compliance point is the groundwater.

No leachate or groundwater chemical testing has been undertaken. However, it is considered that the risk to the aquatic environment is near zero due to the following:

1. Contaminant concentrations within the site's near surface soils were largely low and leachates derived from these soils are likely to contain even lower contaminant concentrations. Therefore, if leachates did migrate to controlled waters the effect is likely to be negligible.
2. The contaminant that was found at raised concentrations was dibenzo(ah)anthracene. This pollutant is of low water solubility and as such will have limited leaching potential.
3. Groundwater was not encountered during the investigation so is likely to be present at depth. As such groundwater is unlikely to come into direct contact with any impacted near surface soils within the site.
4. There are no groundwater abstraction licences within the area so human receptors would not be impacted by any decrease in groundwater quality.
5. The effect of natural attenuation, dilution and absorption will reduce contaminant concentrations with groundwater.

Based upon the above it is considered that the next level of assessment (Level 3) is not required.

Permeation of Water Pipes

If water pipes are to be laid beneath the site an assessment should be made, by the water provider, of soils along the route of the pipe with reference to the material selection criteria using the UKWIR methodology.

6.5 Human Health Risks

A Qualitative Risk Assessment on the potential human health effects is detailed in Table 6.1 below:

Table 6.1: Human Health Risk Assessment				
Source	Pathway	Target	Risk Assessment	Mitigation Measures
Made Ground	Dermal contact with soil/dust. Inhalation and ingestion of soil/soil dust	Construction workers	Low with protection measures	COSHH assessment and good level of PPE / hygiene by site workers, adopting RPE where necessary Watching brief during groundworks. Any unexpected ground conditions reported.
Made Ground	Dermal contact with soil/dust. Inhalation and ingestion of soil/soil dust	Neighbouring site occupants, Passers-by	Low during excavation phase of development and on completion	Site screening and dust suppression measures if required
Made Ground	Dermal contact with soil/dust. Inhalation and ingestion of soil/soil dust.	Site end users	Low with remediation	By capping locally impacted soils with the proposed building footprint, hard standing and 600mm of inert materials in soft landscaped areas. Alternatively, disposing offsite.

Landfill and Ground Gas	Inhalation	Site end users	Low locally Moderate	Due to locally elevated CO ₂ levels at WS06.
Radon Gas	Inhalation	Site end users	Near Zero	Site is within an area where radon protection measures are not required
Made Ground	Permeation of water pipes	Site end users	Low with mitigation measures	All chemical lab results to be forwarded to the water provider to assess pipe specification. Made Ground within service trenches should be removed and replaced with clean fill.

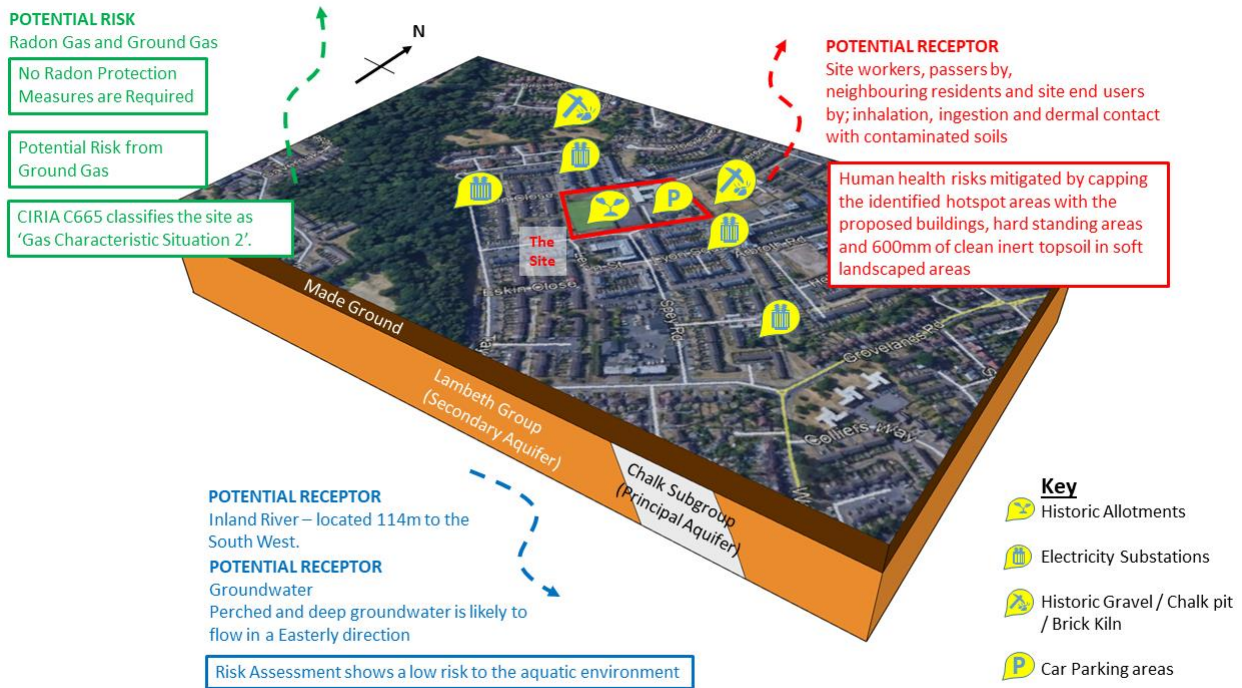
6.6 Risks to the Aquatic Environment

A Qualitative Risk Assessment on the potential effects to the aquatic environment is detailed in Table 6.2 below:

Table 6.2: Risks to the Aquatic Environment				
Source	Pathway	Target	Risk Assessment	Mitigation Measures
Made Ground / Natural Soils	Surface water run-off	Surface Water	Low due to the environmental setting and low concentrations identified.	Not Applicable
	Leaching into Groundwater	Groundwater	Reduced risk of contaminant migration and deep transmission is due to the installation of drainage systems and the effect of natural dilution and attenuation.	
Made Ground / Natural Soils	Leaching into Groundwater	Groundwater	Low during construction and excavation phase of development	Measures to avoid accidental spillage of materials during earthmoving activities, and to control surface run off

6.7 Site Conceptual Model

A schematic cross-section of the site is presented below. The cross section is based on the information available from the recent desk study and site investigation. The model is schematic and not to scale.



Drawing 6.2: Revised Site Conceptual Model

6.8 Limitations of the Site Conceptual Model

The areas of uncertainty within the conceptual site model are:

- Presence of and composition of the groundwater beneath the site
- Direction of groundwater flow

SECTION 7 Geotechnical Laboratory Testing Results

7.1 General

A number of bulk and undisturbed samples were collected, and dispatched to the UKAS accredited laboratories of Geolabs and GSTL for soil property testing, in accordance with the following:

1. Methods of test for soils for civil engineering purposes – Parts 1 to 8 (BS 1377): 1999.

The results of the below property tests are presented in **Annex D** and discussed below.

7.1.1 Classification Testing

In order to assess the classification characteristics underlying the site, bulk samples were collected, and dispatched to the laboratory for the following soil property tests:

- 25No. Moisture Content (MC)
- 14No. Plasticity Index (P.I)
- 8No. Particle Size Distribution (PSD)
- 6No. Sedimentation Analysis (SA)
- 3No. Particle Density (PD)
- 3No. Intact Dry Density (IDD) / Saturation Moisture Content (SMC) of Chalk

In addition, in order to assess the aggressiveness of the underlying the site, bulk samples were collected and dispatched to the laboratory for the following soil chemical tests:

- 11No. BRE SD1 Suite B

A summary of the soil classification test results are shown in the table below.

Table 7.1: Summary of Soil Classification Test Results								
Test		Stratum	MG		LG		SNCF	
			Min	Max	Min	Max	Min	Max
Moisture Content		%	4.8	17	5.8	34.2	21.2	31
Saturation MC ^(Chalk)		%	-	-	-	-	23	33
Intact Dry Density ^(Chalk)		Mg/m ³	-	-	-	-	1.42	1.66
Plasticity	Liquid Limit	%	-	-	26	77	-	-
	Plastic Limit	%	-	-	14	27	-	-
	Plasticity Index	%	-	-	12	50	-	-
	% <425µm	%	-	-	53	99	-	-
	Modified PI	%	-	-	10	51	-	-
Particle Size Distribution	Cobbles	%	-	-	0.0	0.0	-	-
	Gravels	%	-	-	0.1	4.3	-	-
	Sands	%	-	-	41.3	89.3	-	-
	Silt & Clay	%	-	-	13.0	19.3	-	-
	Silt	%	-	-	6.1	39.6	-	-
	Clay	%	-	-	3.9	14.8	-	-
Particle Density		Mg/m ³	-	-	2.59	2.67	-	-
Bulk Density		Mg/m ³	-	-	-	-	1.87	2.03
BRE	pH	-	8.9	9.2	8.5	9.1	8.6	9.1
	Sulphate ^(Acid Sol)	%	0.034	0.060	<0.010	0.032	<0.010	0.037
	Sulphate ^(Water sol)	g/l	<0.010	0.026	<0.010	<0.010	<0.010	<0.010
	Sulphur ^(Total)	%	0.019	0.030	<0.010	0.019	0.014	0.050

Notes

- Unit: mg (Made Ground), LG (Lambeth Group), SNCF (Seaford and Newhaven Chalk Formation)

7.1.2 Compaction Testing

In order to assess the compaction characteristics underlying the site for proposed earthworks, bulk samples were collected and dispatched to the laboratory for the following soil property tests:

- 2No. Compaction Test (2.5kg Rammer)

Compaction tests were limited due to insufficient quantities of soils required for the tests.

A summary of the soil compaction test results are shown in the table below.

Table 7.2: Summary of Soil Compaction Test Results				
Test		Location	BH1	BH3
		Depth (m)	1.50	1.50
		Unit	LG	LG
2.5kg	Max Dry Density	Mg/m ³	1.94	2.10
	Optimum MC	%	12.6	9

Notes:

Unit: LG (Lambeth Group)

Los Angeles abrasion tests were scheduled on selected chalk samples from across the site. However due to the destructured recovery of the chalk, no samples were suitable for this test.

7.1.3 Shear Strength Testing

In order to assess the shear strength characteristics underlying the site, undisturbed samples were collected and dispatched to the laboratory for the following soil property tests:

- 2No. Unconsolidated Undrained Tri-axial (UU)

A summary of the Unconsolidated Undrained Triaxial test results are shown in the table below.

Table 7.3: Summary of Undrained Unconsolidated Triaxial Test Results			
Unconsolidated Undrained (UU)	Location	BH1	BH2
	Depth (m)	2.50	1.20
	Unit	LG	LG
Cell Pressure (kPa)		40	20
Undrained Shear Strength (kPa)		39	102

Notes

- Unit: LG (Lambeth Group)

SECTION 8 Preliminary Engineering Recommendations

8.1 Preparation of Site

Prior to the main site works, any buildings to be demolished should be subject to a full asbestos survey.

A structural survey should be undertaken of the adjacent buildings and structures (road and pavement structures) including pictorial records. This should be updated throughout the site development phases.

Any existing buildings, foundations, floor slabs, concrete/tarmac hard standings beneath the proposed buildings should be broken up and removed from site and disposed of at a suitable landfill facility.

Alternatively, the crushed site won materials may be re-used as structural fill, subject to laboratory chemical testing and compliance with site soil guidance values.

Significant allowances should be made for dealing with the historic foundations, floor slabs, basement structures and other buried obstructions.

The existing grass and scrub vegetation, including all roots and any trees to be removed (and not subject to preservation orders) should be grubbed up and removed from beneath the proposed buildings and roadways.

The reduced levels should be brought up to the required levels with well, compacted imported granular materials. Department of Transport (DoT) Type 2 sub-base or similar may be used and should be compacted in layers, in accordance with the Specification for Highway Works. Alternatively, appropriate selected inert imported fill could be used.

Allowances should be made for removing any 'soft spots/area' and their replacement with well compacted granular materials as previously described. The excavated materials will be unacceptable as structural fill and should be removed from site and taken to an appropriately licensed tip.

Due to the sloping nature of the site it may be necessary to undertake a cut and fill exercise in some areas in order to create level plateaux for the development and to facilitate the construction of access roads. Increasing the steepness of the existing slopes is not recommended. Retaining walls may, therefore, be required.

On placing any fill onto the existing ground, the existing ground should be cut and benched to avoid slippage at the interface of the existing ground and fill material. Appropriate drainage measures should be incorporated at the top and bottom of any slopes. Such drainage measures should be positively connected to an appropriate source.

All materials to be removed from site should be subject to the appropriate Waste Acceptance Protocol (WAP) and taken to an appropriately licensed tip.

Contingencies should be made for the protection/diversion of any underground services present beneath the site, brought about as a result of the proposed works.

Contingencies should also be made for the protection and any necessary temporary/permanent support of nearby walls.

8.2 Foundation Solution

It is understood that foundations for the proposed new school would be required to take loads between 500kN and 1000kN. For these types of loads a piled foundation would therefore likely be required.

We therefore recommend that a piled foundation solution be founded within the Chalk Group comprising the Seaford and Newhaven Chalk Formation.

Due to the nature of the ground, the piles are likely to be combination of skin friction (friction piles) and end-bearing piles.

Due to the relatively urban nature of the site a Continuous Flight Auger (CFA) pile should be considered.

Pile depths will be a function of the required loads and pile diameters. However, it is anticipated that average pile lengths will be between 17m and 20m. Variations in the given pile lengths should also be expected.

The following table gives initial calculations for a 0.30m and 0.45m diameter circular augured/bored piles 17.00m into the Chalk Group, to be used for preliminary estimation only.

Table 8.1 Preliminary Pile Capacity Values						
Ground Conditions			Ultimate Pile Capacity			
Stratum	Depth Encountered (mbgl)		Skin Friction (kN)		End Bearing (kN)	
	From	To	0.30m	0.45m	0.30m	0.45m
Made Ground	GL	<2.40	N/A ¹	N/A ¹	-	-
Lambeth Group	0.09	2.70/2.90	97	134	-	-
Chalk Group	2.70 / 2.90	>20.00	1057	1521	112	385

Table 8.1 Notes:

1. The Made Ground encountered should not be relied upon for pile capacity calculations due to low confidence in composition and density of the material.
2. Foundation Design and Construction, MJ Tomlinson, 1986 using adhesion factor of 0.5 in the Lambeth Group.

Based on Table 8.2, for a 300mm CFA pile, extending 17.00m into the Chalk, a Safe Working Load (SWL) of approximately 422kN is expected, based on a FOS of 3. Increasing the pile to 450mm will provide a SWL of approximately 680kN.

It should be noted the above working loads do not use data obtained from BH3. Given the nature of the geology within this area it is very likely the deep sand deposits are associated with an infilled solution feature within the underlying Chalk Group. These types of features are common in the area and it is recommended further work comprising a geophysical survey and/or CPT is undertaken across the remaining site to confirm the absence of further solution features in the area.

It should be noted that while disturbance will be reduced using bored piles the load carrying capacity will also be reduced due to the effect of a loosening annulus around the pile. Casting concrete in situ will produce rough surfaces but this effect is diminished by the loosening of the surrounding material.

To counteract the reduction in load carrying capacity the diameter of the bored pile can be increased.

For the size and type of pile recommended founded within the competent chalk or Lambeth Group, the total settlements should not exceed 10mm, with differential movements between adjacent piles being less than half this value.

The above estimated working loads, type and length of piles should be confirmed by the specialist piling contractor. It may also be prudent to drive a number of test piles at selected locations to confirm their drivability, anticipated lengths and safe working loads.

Allowances should be made for an element of pre-excavation and/or re drilling of piles where obstructions are encountered in the made ground.

All foundation formations should be inspected by a suitably qualified Engineer before being concreted.

8.2.1 Floor Slabs

Based on Plasticity testing outlined in Section 7.1.1, the underlying shallow clay deposits of the Lambeth Group exhibit a Modified Plasticity Index of >10%. Therefore, in accordance with NHBC guidelines, floor slabs should be designed as suspended.

8.3 Excavations and Formations

Most shallow excavations should be possible with normal soil excavating machinery, although significant allowances should be made for a hydraulic breaker when excavating out any historic foundations, concrete floor slabs and other buried obstructions.

Groundwater was struck at a depth of some 18m during ground investigation and post field monitoring of the borehole installations did not generally encounter water. As such it is unlikely that groundwater will be encountered within any shallow excavations at the site. However, if inflows are encountered then they could most likely be dealt with using conventional pumping techniques.

It should also be noted that during times of high rainfall a higher groundwater table may be encountered.

The sides of any excavations deeper than 1.00m, especially within the granular deposits, should be supported by planking and strutting or other proprietary means.

The sub-formations/formations will be susceptible to loosening, softening and deterioration by exposure to weather (rain, frost and drying conditions), the action of water (flood water or removal of groundwater) and site traffic.

Formations should never be left unprotected and continuously exposed to rain causing degradation, or left exposed/uncovered overnight, unless permitted by a qualified engineer.

Construction plant and other vehicular traffic should not be operated on unprotected formations. As a minimum the formation/excavation surfaces must be protected by a minimum thickness of 200mm of hard cover immediately after exposure.

Allowances should be made for trimming, re-trimming and re-compaction if necessary and for the removal of soft spots and their replacement with well compacted granular materials.

It is also recommended that if concerns still remain then a number of plate loading tests are carried out at formation level to confirm the suitability of the formations.

Allowances should be made for special precautions to prevent formation deterioration in addition to the above.

It is recommended that approval be gained from a qualified engineer of the formation condition before covering them with any subsequent construction.

8.4 Earthworks

Soil property testing comprising Plasticity (PI) and Particle Size Distribution (PSD) testing was undertaken on samples from the shallow deposits.

Based on the above testing, the following classes should be adopted for any proposed earthworks:

Table 8.2: Earthworks Classification		
Stratum	Earthworks Class	Compaction Method*
Lambeth Group	2A / 2B	Table 6/4 Method 1 (2A) or Method 2 (2B)
Chalk Group	3	Table 6/4 Method 1

Notes:

- * - Compaction method in accordance with Volume 1 Specification For Highway Works

With reference to the classification schemes proposed in CIRIA C574, and the results of the IDD and SMC testing outlined in Section 5.1, the SMC value is >26% in the majority of cases. Therefore, the chalk can be classified as Class 3 material. Using Figure 5.5 of CIRIA C574 and an average moisture content of 27.7% returns a chalk earthwork class of 'CBs'. Therefore, the recommended compaction method should be Method 1 in accordance with Table 6/4 of the Specification for Highway Works.

It is likely that the in-situ materials can be used as structural fill. This material should be placed at or close to its optimum moisture content/maximum dry density and compacted in layers as per the requirements of the Specification for Highway Works.

Compaction testing on the Lambeth Group confirmed this material is 'wet of optimum' for re-compaction purposes. Therefore, allowances should be made for drying the material prior to placement.

These requirements should be compiled in an earthworks specification and followed by the appointed groundwork's contractor.

In order to ensure that the materials are being placed at or near to their maximum dry density, in-situ density tests should be undertaken during the earthworks. Following completion of the earthworks plate loading tests should be undertaken on the finished plateau.

On placing any fill onto the existing ground, to avoid slippage at this interface the existing ground should be cut and benched. Appropriate drainage measures should be incorporated at the top and bottom of any slopes. Such drainage measures should be positively connected to an appropriate source.

8.5 New Access Road and Car Parking Areas

The in-situ CBR tests (2No) were carried out using a MEXE within the area of the proposed roads and parking areas. The tests were typically undertaken at the base of the topsoil material.

A summary of the CBR test results is given below:

Table 8.3: CBR Test Results

Location	Depth (mbgl)	MEXE Result
CBR1	0.25 – 0.32	8
CBR2	0.30 – 0.37	3

Based on the data available and using equilibrium values taken from guidance issued by the Highways Interim Advice Note 73/06 (IAN) and PI Test results it is recommended a CBR value of 3% is adopted within the Lambeth Group deposits. A conservative value of 5% can be used within the Chalk deposits and a reduced value of 1% should be adopted for any formations within the made Ground deposits.

Allowances should be made for the removal of any soft spots and their replacement with well-compacted imported granular materials as previously described.

8.6 Protection of Buried Concrete

The results of the BRE testing are given in Table 7.1 and the concrete design is class is summarised in the table below:

Table 8.4: Summary of Concrete Design Class

	Stratum	MG		LG		SNCF	
		Min	Max	Min	Max	Min	Max
Sulphate (Acid Sol)	%	0.034	0.060	<0.010	0.032	<0.010	0.037
Sulphate (Water sol)	g/l	<0.010	0.026	<0.010	<0.010	<0.010	<0.010
pH	-	8.9	9.2	8.5	9.1	8.6	9.1
Chloride	g/l	-		-		-	
Total Sulphur	%	0.019	0.030	<0.010	0.019	0.014	0.050
Magnesium	g/l	-		-		-	
Nitrate	g/l	-		-		-	
Total Potential Sulphate	%	0.012	0.037	-	0.057	0.042	0.15
Oxidisable Sulphates >0.3%?	No		No		No		
Design Sulphate Class	DS-1		DS-1		DS-1		
ACEC Class	AC-1s		AC-1s		AC-1s		

No groundwater was encountered at the site and is therefore considered to be static.

Based on the above and using guidance within BRE Special Digest 1 (2005) it is recommended that any buried concrete within the site conforms to class DS-1 and AC-1s.

8.7 Evaluation of In-situ Gas Monitoring Results

As previously discussed, 5No. gas-monitoring wells were installed to enable monitoring for the presence of methane, carbon dioxide, oxygen, carbon monoxide, hydrogen sulphide and methane lower explosive limit following completion of the fieldworks.

A total of six monitoring events have been undertaken in order to determine the ground gas regime beneath the site.

Ground gas concentrations and flow rates recorded during these visits have been low.

Using this data combined with guidance in CIRIA report C665 (2007), titled 'Assessing risks posed by hazardous ground gases to buildings', a provisional conservative Gas Screening Value (GSV) of 0.009 l/hr has been derived using the highest ground gas concentration (CO₂ at 9.0%) and the highest flow rate recorded (+0.1 l/h).

A GSV of 0.009 l/hr would classify the site as 'very low risk' and as 'Gas Characteristic Situation 1' in accordance with CIRIA guidance C665 (2007). However, consideration should be given to implementing 'Gas Characteristic Situation 2' as CO₂ levels were found to be locally elevated (>5%).

Based upon the above it is deemed that the ground gases beneath the site is a potential risk to human health receptors.

Table 8.6 of the CIRIA guidance recommends that the following gas protection measures are incorporated into developments.

- All joints and penetrations through the floor slab or membrane must be sealed.
- Reinforced concrete cast in situ floor slab (suspended, non-suspended or raft) with at least 1200 g DPM². Or,
- Beam and block or pre-cast concrete slab and 2000 g DPM²/ reinforced gas membrane and underfloor venting

The gas monitoring results are presented in **Annex E**.

SECTION 9 Recommended Additional Investigation

Foundation Solution

Given the variable nature and depth of the deposits encountered within BH3 it is considered that these are associated with a potentially infilled solution feature. The local area and underlying geology are susceptible to solution features and it is possible further features may exist across the site.

Therefore, it is recommended further investigation is carried out across the site comprising either additional boreholes, a geophysical survey, CPT Boreholes or a combination of the three. This will confirm the presence of further potential solution features and to confirm their depth and geotechnical properties of any infill.

Annex A: Exploratory Hole Logs

Project Name					Project No.		Date		Hole Type		
Ranikhet Academy					6671		03/08/2020 to 04/08/2020		CP		
Client					Co-ords		Water Strike Details			Logged By	
Hampshire County Council					E: 468329.00		Depth Strike	Time Elapsed	Rose To	KS	
Contractor			Plant Used		N: 173590.00		17.90	20	17.50	Approved By	
Paddy Brine Drilling			Pilcon 1 ton		L: 55.20					PS	
										Scale 1:50	
Samples and Results					Depth, (Thickness)	Level	Stratum Description			Legend	Well
Results	Type	Depth	Casing	Water							
N=6 (1,1/1,1,2,2)	B SPT(S) B	0.50	1.20	Dry	1	0.10	MADE GROUND: Grass over stiff yellowish brown sandy clayey SILT.				
							MADE GROUND: Stiff brownish yellow slightly sandy slightly gravelly silty CLAY with rootlets. Gravel subangular and subrounded fine to coarse limestone, flint, brick and chalk.				
							Stiff brownish orange slightly sandy slightly gravelly silty CLAY. Gravel is subrounded fine to coarse flint. (LAMBETH GROUP)				
blows=30 recovery=90%	B U D B	2.00 2.00 - 2.45 2.45 2.50			2	(2.20)	2.00 to 2.50m - becoming sandy				
							2.50 to 3.00m - slightly sandy and gravelly. Includes chalk gavaels.				
N=6 (1,1/2,2,1,1)	B D SPT(S) B	3.00 3.00 3.00 3.50	3.00	Dry	3	3.00	52.20				
							Firm to stiff brownish orange and white slightly sandy gravelly CLAY. Gravel is subrounded fine to coarse chalk. (LAMBETH GROUP)				
blows=40 recovery=80%	B U D	4.00 4.00 - 4.45 4.45			4	3.70	51.50				
							CHALK recovered as white slightly sandy gravelly SILT. Gravel is extremely weak, low density, white subrounded chalk. (SEAFORD AND NEWHAVEN CHALK FORMATIONS (Undifferentiated)) (Grade C or better)				
							4.50 to 14.00m - slightly gravelly and rare flint gavaels				
N=13 (2,2/3,3,3,4)	B D SPT(S) B	5.00 5.00 5.00 5.50	4.50	Dry	5						
blows=70 recovery=80%	U D B	6.50 - 6.95 6.95 7.00			6						
N=14 (3,2/2,2,4,6)	B D SPT(S) B	8.00 8.00 - 8.45 8.00 9.00	4.50	Dry	8						
	B	10.00			9						

Chiselling Details			Remarks	Borehole Diameter		
Depth Top	To (m)	Duration		Base Depth	Diameter	Remarks
			Borehole terminated at target depth	20.00	150	
			Notes: For all symbols and abbreviations please see key sheet. All depths and measurements in metres. Stratum thicknesses given in brackets.			

Project Name Ranikhet Academy			Project No. 6671		Date 03/08/2020 to 04/08/2020			Hole Type CP	
Client Hampshire County Council			Co-ords E: 468329.00 N: 173590.00 L: 55.20		Water Strike Details			Logged By KS	
					Depth Strike	Time Elapsed	Rose To	Approved By PS	
Contractor Paddy Brine Drilling			Plant Used Pilcon 1 ton		17.90	20	17.50	Scale 1:50	

Samples and Results					Depth, (Thickness)	Level	Stratum Description	Legend	Well
Results	Type	Depth	Casing	Water					
N=58 (5,8/58 for 115mm)	B	11.00	4.50	Dry	11	CHALK recovered as white slightly sandy gravelly SILT. Gravel is extremely weak, low density, white subrounded chalk. (SEAFORD AND NEWHAVEN CHALK FORMATIONS (Undifferentiated)) (Grade C or better)			
	D	11.00 - 11.45							
	SPT(S)	11.00							
blows=90 recovery=100%	B	12.00	4.50	Dry	12				
	U	12.50 - 12.95							
	D	12.95							
N=33 (5,4/3,6,12,12)	B	14.00	4.50	Dry	14				
	D	14.00 - 14.45							
	SPT(S)	14.00							
	B	15.00	4.50	Dry	15				
	U	15.50 - 15.95							
	D	15.95							
N=32 (5,6/7,7,9,9)	B	17.00	4.50	Dry	17				
	D	17.00 - 17.45							
	SPT(S)	17.00							
N=35 (5,7/7,9,9,10)	B	18.00	4.50	17.5	18				
	D	18.50 - 18.95							
	SPT(S)	18.50							
	B	19.00	4.50		19				
N=40 (6,8/8,10,10,12)	B	20.00	4.50	18.5	20.00	35.20			

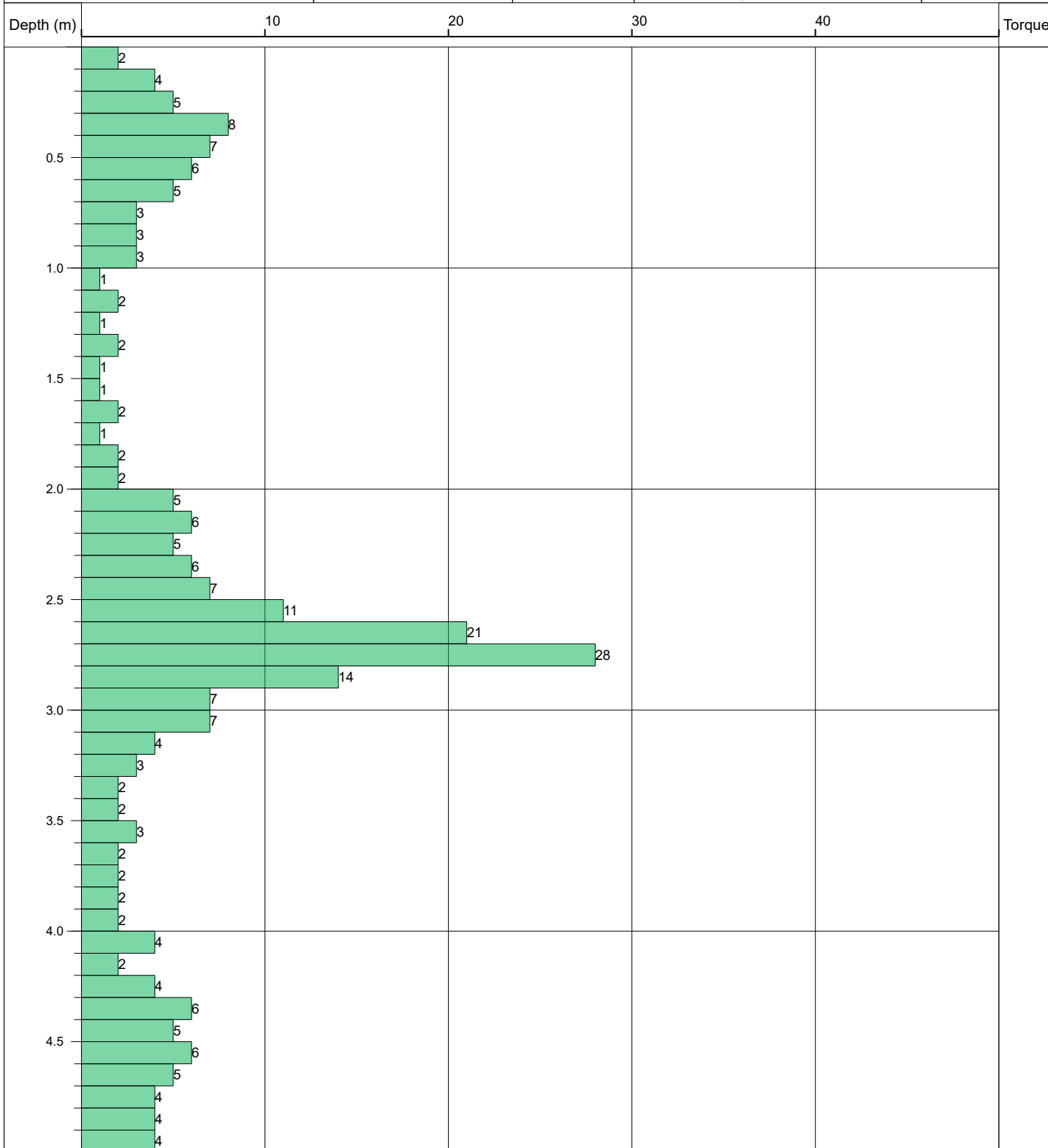
15.95 to 20.00m - gravels are extremely weak to weak

Chiselling Details			Remarks	Borehole Diameter		
Depth Top	To (m)	Duration		Base Depth	Diameter	Remarks
			Borehole terminated at target depth	20.00	150	
			Notes: For all symbols and abbreviations please see key sheet. All depths and measurements in metres. Stratum thicknesses given in brackets.			

[illegible]

Chiselling Details			Remarks	Borehole Diameter		
Depth Top	To (m)	Duration		Base Depth	Diameter	Remarks
			Borehole terminated at target depth	20.00	150	
			Notes: For all symbols and abbreviations please see key sheet. All depths and measurements in metres. Stratum thicknesses given in brackets.			

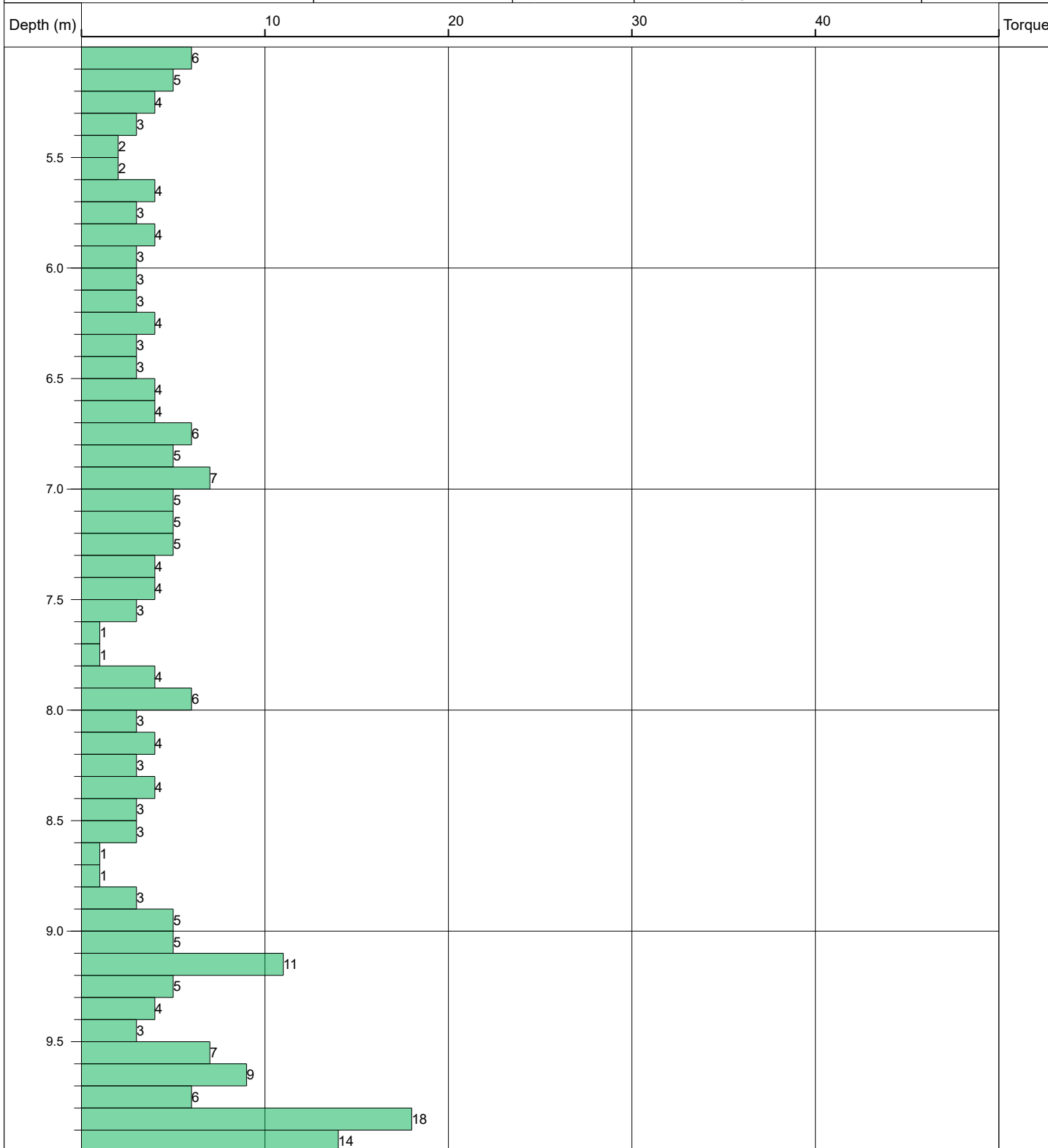
Project Name Ranikhet Academy		Project No. 6671	Date 04/08/2020 to 04/08/2020		Hole Type DCP
Client Hampshire County Council		Co-ords E: 468329.00 N: 173590.00 L: 55.20	Probe Type DPSH		Logged By KS
			Fall Height 750mm		
Contractor 360 Drilling Limited			Hammer Weight 63.5Kg		Approved By PS
Plant Used Dando Terrier			Cone Area 50.5mm		
			Final Depth 10.00		Scale 1:50



Remarks

Hole located next to BH1

Project Name Ranikhet Academy		Project No. 6671	Date 04/08/2020 to 04/08/2020		Hole Type DCP
Client Hampshire County Council		Co-ords E: 468329.00 N: 173590.00 L: 55.20	Probe Type DPSH		Logged By KS
			Fall Height 750mm		
Contractor 360 Drilling Limited			Hammer Weight 63.5Kg		Approved By PS
Plant Used Dando Terrier			Cone Area 50.5mm		
			Final Depth 10.00		Scale 1:50



Remarks

Hole located next to BH1

Project Name Ranikhet Academy		Project No. 6671	Date 04/08/2020 to 04/08/2020		Hole Type DCP
Client Hampshire County Council		Co-ords E: 468329.00 N: 173590.00 L: 55.20	Probe Type DPSH		Logged By KS
			Fall Height 750mm		
Contractor 360 Drilling Limited			Hammer Weight 63.5Kg		Approved By PS
Plant Used Dando Terrier			Cone Area 50.5mm		
		Final Depth 10.00		Scale 1:50	

Depth (m)	10	20	30	40	Torque
10.5					
11.0					
11.5					
12.0					
12.5					
13.0					
13.5					
14.0					
14.5					

Remarks

Hole located next to BH1

Project Name Ranikhet Academy		Project No. 6671	Date 04/08/2020 to 05/08/2020			Hole Type CP
Client Hampshire County Council		Co-ords E: 468336.00 N: 173553.00 L: 58.00	Water Strike Details			Logged By KS
			Depth Strike	Time Elapsed	Rose To	Approved By PS Scale 1:50
Contractor	Plant Used					

Samples and Results				Depth, (Thickness)	Level	Stratum Description	Legend	Well
Results	Type	Depth	Casing Water					
blows=50 recovery=80%	B	0.50		(0.20)	57.80	MADE GROUND: Grass over firm brown slightly gravelly sandy SILT. Gravel is subrounded fine to medium flint.		
	ES	0.70		0.20		MADE GROUND: Stiff orangish brown slightly sandy gravelly CLAY. Gravel is subangular and subrounded fine to coarse flint, chalk and brick.		
	B	1.00		(1.00)				
	U	1.20		1	56.80	Stiff brownish orange slightly sandy slightly gravelly to gravelly CLAY. Gravel is subrounded fine to coarse chalk. (LAMBETH GROUP)		
	B	1.50		(0.50)				
	ES	1.50		1.70	56.30	Structureless CHALK recovered as sandy very silty subrounded fine to coarse GRAVEL. Clasts are extremely weak, low density and white. Matrix is white locally orange. Some rare flint gravels also present. (SEAFORD AND NEWHAVEN CHALK FORMATIONS (Undifferentiated) - Grade Dc))		
	D	1.65						
	B	2.00	2.00 Dry	2				
	D	2.00 - 2.45						
	SPT(S)	2.00						
N=10 (2,2/2,2,3,3)	B	2.50		(1.80)				
	B	3.00	3.00 Dry	3	54.50	Possible structured CHALK. Recovered as white with some orange mottling slightly sandy gravelly to very gravelly SILT. Gravels are extremely weak, low density, subrounded, fine to coarse and white. Rare flint gravels also present. (SEAFORD AND NEWHAVEN CHALK FORMATIONS (Undifferentiated))		
	D	3.00 - 3.45						
N=15 (2,2/5,4,3,3)	SPT(S)	3.00						
	B	3.50		3.50				
N=12 (2,2/2,3,3,4)	B	4.00	4.00 Dry	4				
	D	4.00 - 4.45						
	SPT(S)	4.00						
N=11 (4,3/3,3,3,2)	B	4.50						
	B	5.00	4.50 Dry	5				
	D	5.00 - 5.45						
N=15 (3,5/5,2,4,4)	SPT(S)	5.00						
	B	5.50						
	B	6.00		6				
N=14 (4,5/3,2,4,5)	D	6.50 - 6.95	4.50 Dry	7				
	SPT(S)	6.50						
	B	7.00		7				
N=22 (3,3/5,7,6,4)	B	8.00						
	D	8.00 - 8.45	4.50 Dry	8				
	SPT(S)	8.00						
	B	9.00		9				
	D	9.50 - 9.95	4.50 Dry					
	SPT(S)	9.50						
	B	10.00						

Chiselling Details			Remarks	Borehole Diameter		
Depth Top	To (m)	Duration		Base Depth	Diameter	Remarks
			Borehole terminated at target depth	20.00	150	
			Notes: For all symbols and abbreviations please see key sheet. All depths and measurements in metres. Stratum thicknesses given in brackets.			

Project Name Ranikhet Academy		Project No. 6671	Date 04/08/2020 to 05/08/2020			Hole Type CP
Client Hampshire County Council		Co-ords E: 468336.00 N: 173553.00 L: 58.00	Water Strike Details			Logged By KS
Contractor Plant Used			Depth Strike	Time Elapsed	Rose To	Approved By PS Scale 1:50

Samples and Results					Depth, (Thickness)	Level	Stratum Description	Legend	Well
Results	Type	Depth	Casing	Water					
N=9 (5,4/3,2,2,2)	B D SPT(S)	11.00 11.00 - 11.45 11.00	4.50	Dry	11		Possible structured CHALK. Recovered as white with some orange mottling slightly sandy gravelly to very gravelly SILT. Gravels are extremely weak, low density, subrounded, fine to coarse and white. Rare flint gravels also present. (SEAFORD AND NEWHAVEN CHALK FORMATIONS (Undifferentiated))		
					(16.50)				
	B	12.00			12		12.00 to 14.00m - increasing gravel content		
N=23 (2,3/4,5,6,8)	D SPT(S)	12.50 - 12.95 12.50	6.00	Dry					
	B	13.00			13				
N=21 (2,3/4,4,6,7)	B D SPT(S)	14.00 14.00 - 14.45 14.00	6.00	Dry	14				
	B	15.00			15				
N=6 (2,2/1,1,2,2)	D SPT(S)	15.50 - 15.95 15.50	6.00	Dry					
	B	16.00			16				
N=28 (4,4/5,5,9,9)	B D SPT(S)	17.00 17.00 - 17.45 17.00	6.00	Dry	17		17.00 to 20.00m - increasing gravel content		
	B	18.00			18				
N=81 (10,15/81 for 150mm)	D SPT(S)	18.50 - 18.90 18.50	6.00	dry					
	B	19.00			19				
	B	20.00	6.00	Dry	20.00	38.00			

Chiselling Details			Remarks	Borehole Diameter		
Depth Top	To (m)	Duration		Base Depth	Diameter	Remarks
			Borehole terminated at target depth	20.00	150	
			Notes: For all symbols and abbreviations please see key sheet. All depths and measurements in metres. Stratum thicknesses given in brackets.			

Project Name Ranikhet Academy	Project No. 6671	Date 04/08/2020 to 07/08/2020	Hole Type CP
Client Hampshire County Council	Co-ords E: 468391.00 N: 173555.00 L: 55.60	Water Strike Details Depth Strike: 18.00 Time Elapsed: 20 Rose To: 17.80	Logged By KS
Contractor Paddy Brine Drilling	Plant Used Pilcon 1 ton		Approved By PS
			Scale 1:50

Samples and Results				Depth, (Thickness)	Level	Stratum Description	Legend	Well
Results	Type	Depth	Casing Water					
N=16 (2,3/3,3,5,5)	ES	0.20		(0.07)	55.53	Black ASPHALT.		
	D	0.25		0.07	55.43	MADE GROUND: Dark grey very sandy subangular fine to coarse limestone GRAVEL.		
	B	0.50		(0.10)	55.37	(Subbase)		
	ES	0.70		0.17	55.30	MADE GROUND: Orange very clayey very sandy flint and rare brick GRAVEL.		
				(0.06)		Stiff greenish grey becoming orange slightly sandy silty CLAY with rare fine and medium subrounded chalk gravel.		
N=22 (2,4/4,6,6,6)	SPT(S)	1.20	1.20 Dry	(0.07)		(LAMBETH GROUP)		
	B	1.50		0.23		Orange silty fine to coarse SAND with some white speckles. (Possible LAMBETH GROUP)		
				(0.07)		Medium dense orange silty to very silty SAND interbedded with layers of firm green, orange and white sandy CLAY. (Possible LAMBETH GROUP)		
N=20 (2,3/4,4,6,6)	SPT(S)	2.00	2.00 Dry	0.30	54.20			
	B	2.50		(1.10)				
N=7 (2,2/2,1,2,2)	SPT(S)	3.00	3.00 Dry	(2.60)				
	B	3.50						
N=8 (1,1/2,2,2,2)	SPT(S)	4.00	4.00 Dry		51.60	Loose orange silty to very silty SAND interbedded with layers of firm green, orange and white sandy CLAY. (Possible LAMBETH GROUP)		
	B	4.50						
N=7 (1,1/1,2,2,2)	SPT(S)	5.00	5.00 Dry					
	B	5.50						
N=6 (1,1/1,1,2,2)	SPT(S)	6.50	6.50 Dry					
	B	7.00						
N=6 (1,1/1,1,2,2)	SPT(S)	8.00	8.00 Dry					
	B	8.00 - 8.45						
N=6 (1,1/1,1,2,2)	SPT(S)	9.50	9.00 Dry					
	B	10.00						

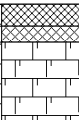
Chiselling Details			Remarks	Borehole Diameter		
Depth Top	To (m)	Duration		Base Depth	Diameter	Remarks
			Borehole terminated at target depth. Slight discolouration of PAK spray indicating possible elevated levels of PAHs.	20.00	150	
			Notes: For all symbols and abbreviations please see key sheet. All depths and measurements in metres. Stratum thicknesses given in brackets.			

Project Name Ranikhet Academy	Project No. 6671	Date 04/08/2020 to 07/08/2020	Hole Type CP
Client Hampshire County Council	Co-ords E: 468391.00 N: 173555.00 L: 55.60	Water Strike Details Depth Strike: 18.00 Time Elapsed: 20 Rose To: 17.80	Logged By KS
Contractor Paddy Brine Drilling	Plant Used Pilcon 1 ton		Approved By PS
			Scale 1:50

Samples and Results					Depth, (Thickness)	Level	Stratum Description	Legend	Well
Results	Type	Depth	Casing	Water					
N=20 (2,3/4,4,6,6)	B D SPT(S)	11.00 11.00 11.00	9.00	Dry	11	11.00	44.60		
	B	12.00			12				
N=20 (3,3/4,4,6,6)	D SPT(S)	12.50 12.50	9.00	Dry					
	B	13.00			13				
N=48 (6,8/8,12,12,16)	B D SPT(S)	14.00 14.00 14.00	9.00	Dry	14				
	B	15.00			15				
N=16 (7,10/8,4,2,2)	D SPT(S)	15.50 15.50	9.00	Dry		(2.70)			
	B	16.00			16				
N=10 (4,6/4,2,2,2)	B D SPT(S)	17.00 17.00 - 17.45 17.00	9.00	Dry	17	17.00	38.60		
	B	18.00			18				
N=48 (8,8/10,10,12,16)	D SPT(S)	18.50 - 18.95 18.50	9.00	17.8		(3.00)			
	B	19.00			19				
	B	20.00	9.00	18.5		20.00	35.60		

Chiselling Details			Remarks	Borehole Diameter		
Depth Top	To (m)	Duration		Base Depth	Diameter	Remarks
			Borehole terminated at target depth. Slight discolouration of PAK spray indicating possible elevated levels of PAHs.	20.00	150	
			Notes: For all symbols and abbreviations please see key sheet. All depths and measurements in metres. Stratum thicknesses given in brackets.			

Project Name Ranikhet Academy		Project No. 6671	Date 06/08/2020 to 06/08/2020		Hole Type TP
Client Hampshire County Council		Co-ords E: 468342.00 N: 173548.00 L: 57.00	Water Strike Details		Logged By KS
			Depth Strike	Remarks	
Contractor Terra Firma (South)	Plant Used Hand tools				Approved By PS
				Scale 1:50	

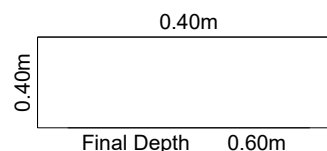
Samples and Results			Depth, (Thickness)	Level	Stratum Description	Legend
Results	Type	Depth				
	B ES	0.30 0.30 - 0.60	(0.11) 0.11 (0.08) 0.19 (0.41) 0.60	56.89 56.81 56.40	Black ASPHALT MADE GROUND: Pinkish grey slightly silty very sandy subangular fine to coarse limestone GRAVEL with geotextile mesh at base. Structureless CHALK recovered as slightly sandy silty subangular and subrounded fine to coarse GRAVEL. Clasts are extremely weak, low density and white. Matrix is white and orange (SEAFORD AND NEWHAVEN CHALK FORMATIONS (Undifferentiated) - Grade Dc) End of Trial Pit at 0.60m	
			1			
			2			
			3			
			4			

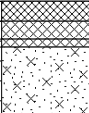
Remarks

CBR test undertaken at 0.25m bgl. CBR value of 8% recorded at 0.32m bgl. Refusal encountered at 0.35m bgl. Pit backfilled with arisings and reinstated with cold lay asphalt.

Pit Stability:	Stable
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Notes: For all symbols and abbreviations please see key sheet. All depths and measurements in metres. Stratum thicknesses given in brackets.



 Consulting Geo-Technical & Geo-Environmental Engineers Site Investigation Contractors The Slate Barn, Lower Lowley, Dunsford, Exeter, EX6 7BP 01647 252414 www.terrafirmasouth.co.uk				Borehole No. CBR2 Sheet 1 of 1			
Project Name Ranikhet Academy			Project No. 6671	Date 06/08/2020 to 06/08/2020		Hole Type TP	
Client Hampshire County Council			Co-ords E: 468367.00 N: 173528.00 L: 57.00	Water Strike Details		Logged By KS	
Contractor Terra Firma (South)		Plant Used Hand tools		Depth Strike	Remarks	Approved By PS	
							Scale 1:50
Samples and Results			Depth, (Thickness)	Level	Stratum Description		Legend
Results	Type	Depth					
	ES B	0.20 0.30 - 0.60	(0.10) 0.10 (0.09) 0.19 (0.04) 0.23 (0.37) 0.60	56.90 56.81 56.77 56.40	Black ASPHALT. MADE GROUND: Pinkish grey slightly silty very sandy subangular fine to coarse limestone GRAVEL with geotextile mesh at base. MADE GROUND: Firm white and brown slightly sandy slightly gravelly CLAY. Gravel is subrounded fine and medium chalk Brown very silty SAND. (Possible LAMBETH GROUP) End of Trial Pit at 0.60m		
1 2 3 4							
Remarks CBR test undertaken at 0.30m bgl. CBR values of 3% at 0.37m bgl, and 7% at 0.45m bgl were recorded. Refusal encountered at 0.50m bgl. Pit backfilled with arisings and reinstated with cold lay asphalt. Pit Stability: Stable Notes: For all symbols and abbreviations please see key sheet. All depths and measurements in metres. Stratum thicknesses given in brackets.							
0.40m 0.40m Final Depth 0.60m							

Project Name Ranikhet Academy		Project No. 6671	Date 05/08/2020 to 05/08/2020		Hole Type TP
Client Hampshire County Council		Co-ords E: 468353.00 N: 173567.00 L: 54.80	Water Strike Details		Logged By KS
			Depth Strike	Remarks	
Contractor Terra Firma (South)	Plant Used Hand tools				Approved By PS
					Scale 1:50

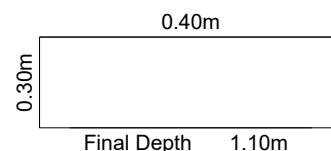
Samples and Results			Depth, (Thickness)	Level	Stratum Description	Legend	
Results	Type	Depth					
	ES	0.30	(0.08)	54.72	Black ASPHALT	  	
			0.08	54.55	MADE GROUND: Dark grey very sandy subangular and subrounded fine to coarse limestone GRAVEL.		
			(0.17)		Stiff orange slightly sandy silty CLAY with rare medium and coarse rounded flint.		
			0.25		(LAMBETH GROUP)		
			(0.85)				
			1	1.10	53.70		End of Trial Pit at 1.10m
			2				
			3				
			4				

Remarks

Hole terminated once base of foundation proven. See separate sketch for foundation details. Hole backfilled with arisings upon completion.

Pit Stability:	Stable
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Notes: For all symbols and abbreviations please see key sheet. All depths and measurements in metres. Stratum thicknesses given in brackets.



Project Name Ranikhet Academy		Project No. 6671	Date 05/08/2020 to 05/08/2020		Hole Type TP
Client Hampshire County Council		Co-ords E: 468359.00 N: 173593.00 L: 54.60	Water Strike Details		Logged By KS
			Depth Strike	Remarks	
Contractor Terra Firma (South)	Plant Used Hand tools				Approved By PS
					Scale 1:50

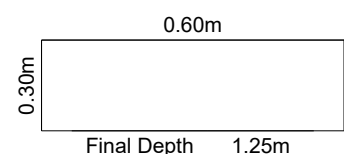
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Remarks

Hole terminated once base of foundation proven. See separate sketch for foundation details. Hole backfilled with arisings upon completion.

Pit Stability:	Stable
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Notes: For all symbols and abbreviations please see key sheet. All depths and measurements in metres. Stratum thicknesses given in brackets.



Project Name Ranikhet Academy		Project No. 6671	Date 05/08/2020 to 05/08/2020		Hole Type TP
Client Hampshire County Council		Co-ords E: 468355.00 N: 173597.00 L: 54.50	Water Strike Details		Logged By KS
			Depth Strike	Remarks	
Contractor Terra Firma (South)	Plant Used Hand tools				Approved By PS
				Scale 1:50	

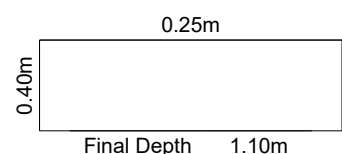
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Remarks

Hole terminated due limit of reach of tools. Foundation base proven by probing with rod at surface. See separate sketch for foundation details. Hole backfilled with arisings upon completion.

Pit Stability:	Stable
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Notes: For all symbols and abbreviations please see key sheet. All depths and measurements in metres. Stratum thicknesses given in brackets.



Project Name Ranikhet Academy	Project No. 6671	Date 03/08/2020 to 03/08/2020	Hole Type TP
Client Hampshire County Council	Co-ords E: 468400.00 N: 173570.00 L: 55.00	Water Strike Details Depth Strike Remarks	Logged By KS
Contractor Terra Firma (South)	Plant Used hand tools		Approved By PS
			Scale 1:50

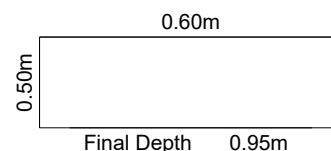
Samples and Results			Depth, (Thickness)	Level	Stratum Description	Legend
Results	Type	Depth				
			(0.10) 0.10	54.90	MADE GROUND: Grass over firm slightly gravelly sandy SILT. Gravel is subrounded fine to coarse flint	
			(0.65)		MADE GROUND: Yellowish brown very sandy very clayey subangular and angular fine to coarse brick, flint, concrete and slate GRAVEL. Rare wood fragments.	
	B ES	0.50 0.50				
			0.75 (0.20) 0.95	54.25 54.05	Firm bluish grey mottled orange silty CLAY with rootlets. (LAMBETH GROUP)	
	D	0.80				
					0.60 to 0.75m - locally grading to stiff slightly sandy gravelly CLAY	
					End of Trial Pit at 0.95m	

Remarks

Hole terminated once base of foundation proven. See separate sketch for foundation details. Hole backfilled with arisings upon completion.

Pit Stability: Stable

Notes: For all symbols and abbreviations please see key sheet. All depths and measurements in metres. Stratum thicknesses given in brackets.



Project Name Ranikhet Academy		Project No. 6671	Date 07/08/2020 to 07/08/2020		Hole Type TP
Client Hampshire County Council		Co-ords E: 468337.00 N: 173561.00 L: 57.60	Water Strike Details		Logged By KS
			Depth Strike	Remarks	
Contractor Terra Firma (South)	Plant Used hand tools				Approved By PS
					Scale 1:50

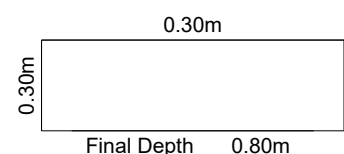
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Remarks

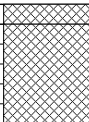
Hole terminated due to obstruction. Hole drilled from base of pit using SDS drill with 1m long drill bit. Drilling resistance and residues on bit suggest brick present 1.05m bgl followed by clay to maximum drilled depth of 1.35m bgl.

Pit Stability:	Stable
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Notes: For all symbols and abbreviations please see key sheet. All depths and measurements in metres. Stratum thicknesses given in brackets.



Project Name Ranikhet Academy		Project No. 6671	Date 07/08/2020 to 07/08/2020		Hole Type TP
Client Hampshire County Council		Co-ords E: 468347.00 N: 173574.00 L: 56.50	Water Strike Details		Logged By KS
			Depth Strike	Remarks	
Contractor Terra Firma (South)	Plant Used Hand tools				Approved By PS
					Scale 1:50

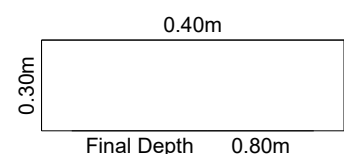
Samples and Results			Depth, (Thickness)	Level	Stratum Description	Legend
Results	Type	Depth				
	B ES ES		(0.10) 0.10	56.40	MADE GROUND: Grass over stiff brown slightly sandy gravelly SILT. Gravel is subangular and subrounded fine to coarse concrete, brick and flint.	
			(0.50)		MADE GROUND: White sandy silty subangular and subrounded fine to coarse chalk and rare brick GRAVEL	
		0.50				
		0.50	0.60	55.90	MADE GROUND: Brownish grey and white very silty very sandy subangular fine to coarse	
		0.70	(0.20) 0.80	55.70	concrete, flint and chalk GRAVEL.	
End of Trial Pit at 0.80m						
			1			
			2			
			3			
			4			

Remarks

Hole terminated due to obstruction. Hole drilled from base of pit using SDS drill with 1m long drill bit. Drilling resistance and residues on bit suggest that natural clays are present from 1.30m bgl

Pit Stability:	
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Notes: For all symbols and abbreviations please see key sheet. All depths and measurements in metres. Stratum thicknesses given in brackets.



Project Name Ranikhet Academy		Project No. 6671	Date 05/08/2020 to 05/08/2020		Hole Type TP
Client Hampshire County Council		Co-ords E: 468354.00 N: 173571.00 L: 56.70	Water Strike Details		Logged By KS
			Depth Strike	Remarks	
Contractor Terra Firma (South)	Plant Used Hand tools				Approved By PS
				Scale 1:50	

[illegible]

Remarks

Hole terminated as plastic shuttering along foundation face restricted further digging. Suspected base of foundation proven by drilling vertically down through foundation using SDS drill with 1m long drill bit. See separate sketch for details of foundation exposed.

Pit Stability:	
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Notes: For all symbols and abbreviations please see key sheet. All depths and measurements in metres. Stratum thicknesses given in brackets.

m

3

Final Depth	0.95m
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Project Name Ranikhet Academy		Project No. 6671	Date 06/08/2020 to 06/08/2020		Hole Type TP
Client Hampshire County Council		Co-ords E: 468341.00 N: 173550.00 L: 57.00	Water Strike Details		Logged By KS
			Depth Strike	Remarks	
Contractor Terra Firma (South)	Plant Used Hand tools				Approved By PS
				Scale 1:50	

[illegible]

Remarks

Pit terminated due to limited penetration through chalks.

Pit Stability:	Stable
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Notes: For all symbols and abbreviations please see key sheet. All depths and measurements in metres. Stratum thicknesses given in brackets.

0.30m

0.30m

Final Depth	1.00m
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Project Name Ranikhet Academy		Project No. 6671	Date 06/08/2020 to 06/08/2020		Hole Type TP
Client Hampshire County Council		Co-ords E: 468359.00 N: 173576.00 L: 54.70	Water Strike Details		Logged By KS
			Depth Strike	Remarks	
Contractor Terra Firma (South)	Plant Used Hand tools				Approved By PS
					Scale 1:50

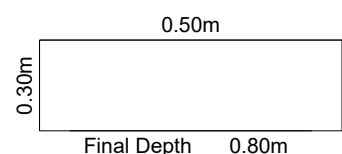
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Remarks

Hole terminated as plastic shuttering along foundation face restricted further digging. Suspected base of foundation proven by drilling vertically down through foundation using SDS drill with 1m long drill bit. See separate sketch for details of foundation exposed.

Pit Stability:	Stable
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Notes: For all symbols and abbreviations please see key sheet. All depths and measurements in metres. Stratum thicknesses given in brackets.



Project Name Ranikhet Academy		Project No. 6671	Date 06/08/2020 to 06/08/2020		Hole Type TP
Client Hampshire County Council		Co-ords E: 468375.00 N: 173562.00 L: 55.50	Water Strike Details		Logged By KS
			Depth Strike	Remarks	
Contractor Terra Firma (South)	Plant Used Hand tools				Approved By PS
				Scale 1:50	

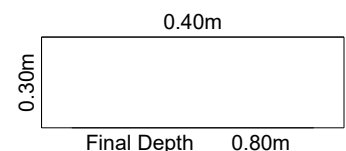
Samples and Results			Depth, (Thickness)	Level	Stratum Description	Legend
Results	Type	Depth				
	ES B	0.50	(0.09) 0.09	55.41	Black ASPHALT	
			(0.11) 0.20	55.30	MADE GROUND: Pinkish grey very sandy subangular fine to coarse limestone GRAVEL with rare rootlets	
			(0.60)		MADE GROUND: Orange silty very gravelly SAND. Gravel is subangular and subrounded flint, brick and macadam.	
		0.80	0.80	54.70	End of Trial Pit at 0.80m	

Remarks

Pit terminated due to obstruction at base, possibly large concrete cobble. Hole drilled from base of pit using SDS drill with 1m long drill bit. Drilling resistance suggests that top of foundation footing is present 1.25m bgl with footing still present to maximum drilled depth of 1.60m bgl.

Pit Stability:	
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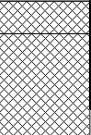
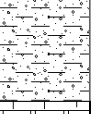
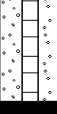
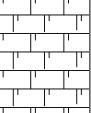
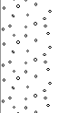
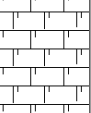
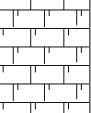
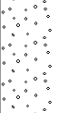
Notes: For all symbols and abbreviations please see key sheet. All depths and measurements in metres. Stratum thicknesses given in brackets.



[illegible]

Remarks	Borehole Diameter		
	Base Depth	Diameter	Remarks
Borehole terminated due to refusal on possible pool base			
Notes: For all symbols and abbreviations please see key sheet. All depths and measurements in metres. Stratum thicknesses given in brackets.			

Project Name Ranikhet Academy	Project No. 6671	Date 04/08/2020 to 04/08/2020	Hole Type WLS
Client Hampshire County Council	Co-ords E: 468345.00 N: 173576.00 L: 56.00	Water Strike Details Depth Strike Time Elapsed Rose To	Logged By KS
Contractor 360 Drilling Limited	Plant Used Dando Terrier		Approved By PS
			Scale 1:50

Samples and Results			Depth, (Thickness)	Level	Stratum Description	Legend	Well
Results	Type	Depth					
N=13 (2,1/2,3,4,4)	ES	0.10	(0.15)	55.85	MADE GROUND: Grass over stiff brown slightly gravelly sandy SILT. Gravel is subrounded fine and medium chalk		
	B	0.50	(0.55)		MADE GROUND: Stiff brown slightly sandy gravelly CLAY. Gravel is subangular and subrounded fine to coarse flint, brick, limestone and chalk.		
	ES	0.50					
	D	0.90	(0.70)		Stiff brownish orange slightly sandy CLAY with relict rootlets. (LAMBETH GROUP)		
	D	1.00	(0.30)		Stiff brownish orange and white slightly sandy slightly gravelly becoming gravelly CLAY. Gravel is subrounded fine and medium chalk. (LAMBETH GROUP)		
N=19 (4,5/5,4,5,5)	SPT(C)	1.00	(0.50)	54.50			
	B	1.50 - 2.00	1.50		Structureless CHALK recovered silty sandy subangular and subrounded fine and medium GRAVEL. Clasts are extremely weak, low density and white. Matrix is white with some orange mottling. (SEAFORD AND NEWHAVEN CHALK FORMATIONS (Undifferentiated) - Grade Dc)		
	SPT(C)	2.00	(1.20)				
N=20 (3,5/5,4,5,6)	D	2.50		53.30			
	B	2.70 - 3.00	2.70		Possible structured CHALK recovered as slightly sandy very silty subangular and subrounded fine and medium GRAVEL. Clasts are extremely weak, low density and white with occasional black speckles. Matrix is white with some orange mottling. (SEAFORD AND NEWHAVEN CHALK FORMATIONS (Undifferentiated)) (Grade C or better)		
	SPT(C)	3.00	(2.30)				
N=16 (4,2/4,4,4,4)	B	3.50 - 4.00		51.00			
	SPT(C)	4.00					
	D	4.50					
N=33 (5,7/8,8,9,8)	D	5.00		51.00			
	SPT(C)	5.00					
					End of Borehole at 5.00m		

Remarks Borehole terminated at target depth	Borehole Diameter		
	Base Depth	Diameter	Remarks

Notes: For all symbols and abbreviations please see key sheet. All depths and measurements in metres. Stratum thicknesses given in brackets.



Consulting Geo-Technical & Geo-Environmental Engineers
Site Investigation Contractors

The Slate Barn, Lower Lowley,
Dunsford, Exeter, EX6 7BP
01647 252414
www.terrafirmasouth.co.uk

Borehole No.
WS3
Sheet 1 of 1

Project Name Ranikhet Academy				Project No. 6671		Date 04/08/2020 to 04/08/2020			Hole Type WLS	
Client Hampshire County Council				Co-ords E: 468542.00 N: 173563.00 L: 56.80		Water Strike Details Depth Strike Time Elapsed Rose To			Logged By KS	
Contractor 360 Drilling Limited				Plant Used Dando Terrier					Approved By PS Scale 1:50	

Samples and Results			Depth, (Thickness)	Level	Stratum Description	Legend	Well
Results	Type	Depth					
N=7 (1,1/1,2,2,2)	D ES SPT(C)	0.50 0.50 1.00 1.00 1.00	(0.09)	56.71	Black ASPHALT.		
			0.09	56.71	MADE GROUND: Orange and grey very sandy subangular and subrounded fine to coarse limestone and flint GRAVEL.		
			(0.16)	56.55	(Subbase)		
			0.25	56.55	MADE GROUND: Stiff brownish orange slightly sandy gravelly CLAY. Gravel is subangular and subrounded fine to coarse limestone and chalk.		
N=12 (3,3/2,3,3,4)	D ES SPT(C)	1.50 1.80 - 2.00 2.00 2.50 - 3.00	(0.55)	56.00	MADE GROUND: Stiff greyish brown slightly sandy gravelly CLAY. Gravel is subangular and subrounded fine to coarse brick, chalk and limestone.		
			0.80	56.00	1.00 to 1.20m - grey and white, and includes concrete gravel and plastic fragments.		
			(0.40)	55.60	Structureless CHALK recovered as sandy very silty subangular and subrounded fine to coarse GRAVEL. Clasts are extremely weak, low density and white. Matrix is white. (SEAFORD AND NEWHAVEN CHALK FORMATIONS (Undifferentiated) - Grade Dc)		
			1.20	55.60	Possible structured CHALK recovered as slightly sandy silty subangular fine and medium GRAVEL. Clasts are extremely weak, low density and white. Some rare flint gravels. Matrix is white with some orange mottling. (SEAFORD AND NEWHAVEN CHALK FORMATIONS (Undifferentiated)) (Grade C or better)		
N=9 (2,1/2,2,2,3)	SPT(C)	3.00 3.50 - 4.00 4.00 4.50	(0.60)	55.00	2.50 to 5.00m - chalks include black speckles.		
			1.80	55.00	3.00 to 5.00m - recovered as slightly sandy gravelly SILT		
			(3.20)	55.00			
			4.00	55.00			
N=27 (2,2/5,7,8,7)	D SPT(C)	5.00 5.00	5	51.80	End of Borehole at 5.00m		
			6	51.80			
				51.80			
				51.80			

Remarks
Borehole terminated at target depth

Borehole Diameter

Base Depth	Diameter	Remarks

Notes: For all symbols and abbreviations please see key sheet. All depths and measurements in metres. Stratum thicknesses given in brackets.

Project Name Ranikhet Academy		Project No. 6671	Date 04/08/2020 to 04/08/2020			Hole Type WLS
Client Hampshire County Council		Co-ords E: 468318.00 N: 173578.00 L: 56.50	Water Strike Details			Logged By KS
			Depth Strike	Time Elapsed	Rose To	
Contractor 360 Drilling Limited	Plant Used Dando Terrier					Approved By PS
					Scale 1:50	

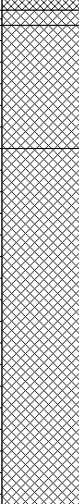
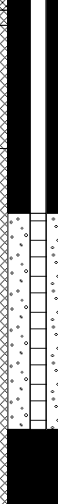
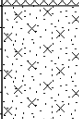
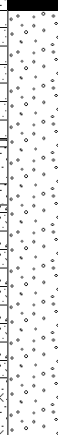
Samples and Results			Depth, (Thickness)	Level	Stratum Description	Legend	Well
Results	Type	Depth					
N=10 (1,1/2,2,3,3)			(0.15)		MADE GROUND: Grass over stiff brown slightly gravelly sandy SILT. Gravel is subrounded fine and medium flint.		
	ES	0.30	0.15	56.35	MADE GROUND: Stiff greyish brown slightly sandy gravelly silty CLAY. Gravel is subangular fine to coarse brick, flint, concrete and tile. Rare tile fragments.		
	B	0.50	(0.45)				
			0.60	55.90	MADE GROUND: Stiff greyish brown mottled orange slightly gravelly sandy CLAY. Gravel is subrounded and rounded fine to coarse flint, brick and chalk. Occasional fragments of charcoal type material.		
N=7 (2,2/1,2,2,2)	ES SPT(S)	1.00 1.00	1	(0.90)			
	D	1.50	1.50	55.00	Stiff greenish grey mottled orange with black speckles slightly sandy CLAY with rare fine and medium subrounded flint. (LAMBETH GROUP)		
	D SPT(S)	2.00 2.00	2	1.90	54.60	Firm to stiff brownish orange slightly sandy silty CLAY. (LAMBETH GROUP)	
	D	2.50	(1.00)				
N=24 (3,5/5,5,7,7)	D SPT(C)	3.00 3.00	3	2.90	53.60	Stiff dark green slightly sandy silty CLAY with rare shells. (LAMBETH GROUP)	
	B	3.20 - 4.00	3.20	53.30	Orange silty fine and medium SAND with rare gravel sized inclusions of sandy clay. (LAMBETH GROUP)		
			(0.90)				
	SPT(C)	4.00	4	4.10	52.40	Stiff dark grey slightly sandy silty CLAY. Sand is fine and medium. (LAMBETH GROUP)	
N=22 (5,4/4,6,6,6)	D	4.50	(0.90)				
	D SPT(C)	5.00 5.00	5	5.00	51.50	End of Borehole at 5.00m	
			6				

Remarks	Borehole Diameter		
	Base Depth	Diameter	Remarks
Borehole terminated at target depth			
Notes: For all symbols and abbreviations please see key sheet. All depths and measurements in metres. Stratum thicknesses given in brackets.			

Project Name Ranikhet Academy				Project No. 6671		Date 04/08/2020 to 04/08/2020			Hole Type WLS		
Client Hampshire County Council				Co-ords E: 468364.00 N: 173550.00 L: 56.80		Water Strike Details			Logged By KS		
						Depth Strike	Time Elapsed	Rose To	Approved By PS Scale 1:50		
Contractor 360 Drilling Limited				Plant Used Dando Terrier							
Samples and Results			Depth, (Thickness)	Level	Stratum Description				Legend	Well	
Results	Type	Depth									
N=10 (2,2/3,2,2,3)	ES	0.20	(0.09)	56.71	Black ASPHALT						
			0.09	MADE GROUND: Dark grey very sandy subangular fine to coarse limestone and brick GRAVEL with with geotextile mesh at base.							
	D	0.50	(0.21)	56.50	Structureless CHALK recovered as slightly sandy silty angular to subangular fine to coarse GRAVEL. Clasts are extremely weak, low density and white. Matrix is white. (SEAFORD AND NEWHAVEN CHALK FORMATIONS (Undifferentiated) - Grade Dc)						
			0.30								
N=10 (2,2/3,2,2,3)	B SPT(C)	1.00 1.00	(0.40)	56.10	Possible structured CHALK recovered as slightly sandy silty subangular fine and medium GRAVEL. Clasts are extremely weak, low density and white. Some rare flint gravels. Matrix is white with some thin (<5mm) orange sandy clay bands. (SEAFORD AND NEWHAVEN CHALK FORMATIONS (Undifferentiated)) (Grade C or better)						
			0.70								
			B	1.50 - 2.00							
N=12 (2,2/3,3,3,3)	SPT(C)	2.00	2		2.00 to 5.00m - orange clay bands absent and becoming very silty						
											B
N=12 (2,3/3,3,3,3)	SPT(C)	3.00	3	(4.30)							
											B
N=10 (1,4/3,2,2,3)	SPT(C)	4.00	4								
											B
N=13 (2,4/3,3,3,4)	SPT(C)	5.00	5	5.00	51.80	End of Borehole at 5.00m					
			6								

Remarks	Borehole Diameter		
	Base Depth	Diameter	Remarks
Borehole terminated at target depth.			
Notes: For all symbols and abbreviations please see key sheet. All depths and measurements in metres. Stratum thicknesses given in brackets.			

Project Name Ranikhet Academy		Project No. 6671	Date 04/08/2020 to 04/08/2020			Hole Type WLS
Client Hampshire County Council		Co-ords E: 468370.00 N: 173561.00 L: 56.70	Water Strike Details			Logged By KS
			Depth Strike	Time Elapsed	Rose To	Approved By PS Scale 1:50
Contractor 360 Drilling Limited						
Plant Used Dando Terrier						

Samples and Results			Depth, (Thickness)	Level	Stratum Description	Legend	Well		
Results	Type	Depth							
N=4 (1,0/1,1,1,1)	B ES	0.50 0.50	(0.06)	56.64	Black ASPHALT				
			0.06	56.57	MADE GROUND: Pinkish grey silty very sandy subangular and subrounded fine to coarse limestone GRAVEL.				
			(0.07)		(Subbase)				
			(0.13)		MADE GROUND: Stiff greyish green slightly sandy gravelly CLAY. Gravel is subangular and subrounded fine to coarse chalk, brick and flint.				
	B SPT(S)	1.00 1.00	(0.57)						
			0.70	56.00	MADE GROUND: Stiff orangish brown slightly sandy gravelly CLAY. Gravel is subangular and subrounded fine to coarse brick, chalk and flint.				
			1						
	D ES	1.50 1.50	(1.70)						
			2						
N=28 (3,4/5,6,8,9)	B ES	2.50 2.50 - 3.00		2.40	54.30	Orange slightly silty SAND with occasional bands of stiff white and grey slightly gravelly sandy CLAY. Gravels are subrounded fine to coarse flint. (LAMBETH GROUP)			
			(0.60)						
			3	3.00	53.70	Stiff orange and greenish grey slightly sandy silty CLAY. (LAMBETH GROUP)			
			(0.60)						
	D SPT(C)	3.00 3.00							
	D B	3.50 3.60 - 3.90		3.60	53.10	Orange clayey SAND. (LAMBETH GROUP)			
			(0.30)						
D SPT(C)	4.00 4.00		3.90	52.80	Stiff orange slightly sandy slightly gravelly CLAY with shells. Gravel is angular and subrounded fine and medium flint. (LAMBETH GROUP)				
		(0.80)							
B	4.60 - 5.00		4.70	52.00	Dense yellow silty fine and medium SAND. (LAMBETH GROUP)				
		(0.30)							
N=37 (7,8/8,8,9,12)	SPT(C)	5.00	5	5.00	51.70	End of Borehole at 5.00m			

Remarks

Borehole terminated at target depth

Borehole Diameter

Base Depth	Diameter	Remarks

Notes: For all symbols and abbreviations please see key sheet. All depths and measurements in metres. Stratum thicknesses given in brackets.

 Consulting Geo-Technical & Geo-Environmental Engineers Site Investigation Contractors The Slate Barn, Lower Lowley, Dunsford, Exeter, EX6 7BP 01647 252414 www.terrafirmasouth.co.uk				Borehole No. WS7 Sheet 1 of 1							
Project Name Ranikhet Academy			Project No. 6671	Date 05/08/2020 to 05/08/2020		Hole Type WS					
Client Hampshire County Council			Co-ords E: 468386.00 N: 143561.00 L: 55.40	Water Strike Details Depth StrikeTime ElapsedRose To			Logged By KS				
Contractor 360 Drilling Limited		Plant Used Dando Terrier					Approved By PS				
							Scale 1:50				
Samples and Results			Depth, (Thickness)	Level	Stratum Description			Legend	Well		
Results	Type	Depth									
N=25 (2,3/4,6,7,8)	ES	0.30	(0.07)	55.33	Black ASPHALT.						
			0.07	55.23	MADE GROUND - Subbase - Dark grey very sandy subangular fine to coarse						
			(0.10)		Limestone GRAVEL						
			0.17		MADE GROUND: Orange clayey sandy subangular and subrounded fine to coarse						
			(0.23)	55.00	flint, brick and rare chalk GRAVEL.						
	B ES	0.50 0.50		0.40	Firm orange very sandy silty CLAY with rare rounded medium flint gravel. (LAMBETH GROUP)						
			(0.70)								
			D	1.00	1						
			SPT(C)	1.00	1.10	54.30	Medium dense orange silty fine to coarse SAND. (LAMBETH GROUP)				
N=22 (4,4/5,5,6,6)	B	1.30 - 1.80	(0.80)		1.50 to 1.80m - yellow and black bands						
	D SPT(C)	2.00 2.00	1.90	53.50	Firm to stiff sandy yellow mottled orange CLAY. (LAMBETH GROUP)						
			(0.20)								
			2.10	53.30	Medium dense orangish yellow silty fine to coarse SAND. (LAMBETH GROUP)						
N=25 (3,5/5,5,7,8)	B	2.50 - 3.00	(0.90)		2.80 to 3.00m - locally black and subangular and subrounded fine to coarse flint gravels						
	D SPT(C)	3.00 3.00	3	3.00	52.40	Stiff grey, yellow and orange slightly gravelly sandy CLAY. Gravel is subrounded fine flint. (LAMBETH GROUP)					
			(0.40)								
N=20 (4,5/4,5,5,6)	B SPT(C)	4.00 - 5.00 4.00			Medium dense orange with yellow bands silty fine to coarse SAND. (LAMBETH GROUP)						
			(1.60)								
	N=10 (2,2/2,3,2,3)	SPT(C)	5.00	5	5.00	50.40	End of Borehole at 5.00m				
				6							

Remarks			Borehole Diameter		
Base Depth	Diameter	Remarks			
20.00	150				

Notes: For all symbols and abbreviations please see key sheet. All depths and measurements in metres. Stratum thicknesses given in brackets.

Remarks Borehole terminated at target depth. Slight discolouration of PAK spray indicating possible elevated levels of PAHs.	Borehole Diameter		
	Base Depth	Diameter	Remarks
	20.00	150	
Notes: For all symbols and abbreviations please see key sheet. All depths and measurements in metres. Stratum thicknesses given in brackets.			

Project Name Ranikhet Academy	Project No. 6671	Date 04/08/2020 to 04/08/2020	Hole Type WLS
Client Hampshire County Council	Co-ords E: 468376.00 N: 173539.00 L: 56.80	Water Strike Details Depth Strike Time Elapsed Rose To	Logged By KS
Contractor 360 Drilling Limited	Plant Used Dando Terrier		Approved By PS
			Scale 1:50

Samples and Results			Depth, (Thickness)	Level	Stratum Description	Legend	Well
Results	Type	Depth					
			(0.07) 0.07 (0.23) 0.30 (0.15) 0.45	56.73 56.50 56.35	Black ASPHALT. MADE GROUND: Dark grey clayey very sandy subangular and subrounded fine to coarse limestone GRAVEL with geotextile mesh at base. (Subbase) Stiff orange mottled greenish grey slightly sandy CLAY. (LAMBETH GROUP) Structureless CHALK recovered as slightly sandy silty subangular and subrounded fine to medium GRAVEL. Clasts are extremely weak, low density and white. Matrix is white and orange. (SEAFORD AND NEWHAVEN CHALK FORMATIONS (Undifferentiated)) - Grade Dc <i>0.80 to 1.50m - very silty</i>		
N=10 (3,2/2,3,2,3)	B D ES D SPT(C)	0.50 0.50 0.50 - 1.00 1.00 1.00		1 (1.05)			
	B	1.50 - 2.00		1.50	55.30		
N=13 (3,5/3,3,3,4)	SPT(C)	2.00		2			
	B	2.50 - 3.00					
N=15 (4,5/3,3,4,5)	SPT(C)	3.00		3			
	D	3.50		(3.50)			
N=15 (6,4/3,3,4,5)	D SPT(C)	4.00 4.00		4			
	D	4.50					
N=12 (3,3/3,3,3,3)	D SPT(C)	5.00 5.00		5	5.00		
					51.80		
					End of Borehole at 5.00m		
				6			

Remarks

Borehole terminated at target depth.

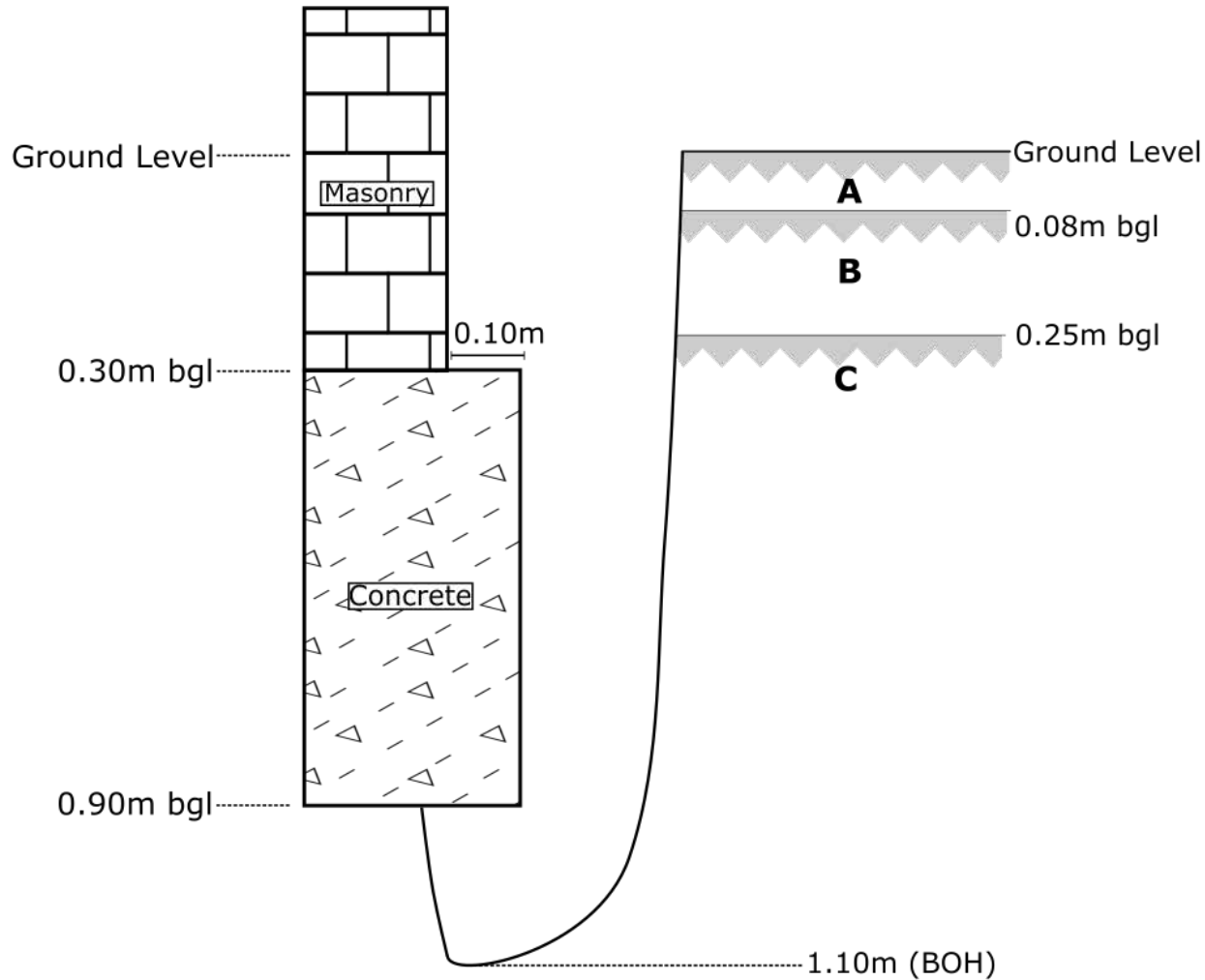
Borehole Diameter

Base Depth	Diameter	Remarks

terrafirma(south) Consulting Geo-Technical & Geo-Environmental Engineers Site Investigation Contractors				The Slate Barn, Lower Lowley, Dunsford, Exeter, EX6 7BP 01647 252414 www.terrafirmasouth.co.uk				Borehole No. WS9 Sheet 1 of 1			
Project Name Ranikhet Academy					Project No. 6671	Date 04/08/2020 to 04/08/2020		Hole Type WLS			
Client Hampshire County Council					Co-ords E: 468357.00 N: 173542.00 L: 56.90	Water Strike Details			Logged By KS		
Contractor 360 Drilling Limited						Depth Strike	Time Elapsed	Rose To	Approved By PS		
					Plant Used Dando Terrier						
Samples and Results			Depth, (Thickness)	Level	Stratum Description				Legend	Well	
Results	Type	Depth									
N=14 (2,3/3,3,4,4)	ES	0.30	(0.09)	56.81	Black ASPHALT						
			0.09		MADE GROUND: Dark grey very sandy subangular fine to coarse limestone and brick GRAVEL with with geotextile mesh at base.						
	B	0.50	(0.16)	56.65	MADE GROUND: Stiff grey and yellow slightly sandy slightly gravelly to gravelly CLAY. Gravel is subangular and subrounded fine to coarse limestone and chalk. Structureless CHALK recovered as slightly sandy silty angular to subangular fine to coarse GRAVEL. Clasts are extremely weak, low density and white. Matrix is white. (SEAFORD AND NEWHAVEN CHALK FORMATIONS (Undifferentiated) - Grade Dc)						
			0.25								
			(0.05)								
			0.30								
	B	1.00	(0.50)	56.10	Possible structured CHALK recovered as slightly sandy silty subangular fine and medium GRAVEL. Clasts are extremely weak, low density and white. Matrix is white with some thin (<5mm) orange sandy clay bands. (SEAFORD AND NEWHAVEN CHALK FORMATIONS (Undifferentiated)) (Grade C or better)						
	N=10 (3,3/3,2,3,2)	SPT(C)	2.00		2						
B		2.50 - 3.00		3							
N=10 (2,2/3,2,2,3)	SPT(C)	3.00	(4.20)	3							
	B	3.50 - 4.00		4							
N=19 (3,3/3,6,5,5)	SPT(C)	4.00		4							
	B	4.50 - 5.00		5							
N=17 (4,3/4,5,4,4)	SPT(C)	5.00		5	End of Borehole at 5.00m						

Annex B: Foundation Exposure Schematics

Section A - A'



Notes:

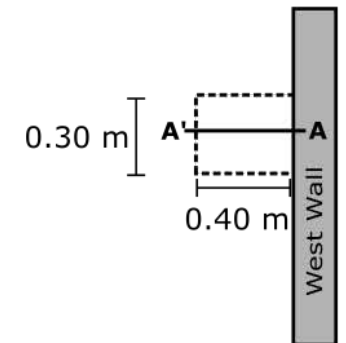
A - Black ASPHALT.

B - Grey very sandy GRAVEL. (MADE GROUND)

C - Stiff orange sandy CLAY

Drawing not to scale.

Plan Profile



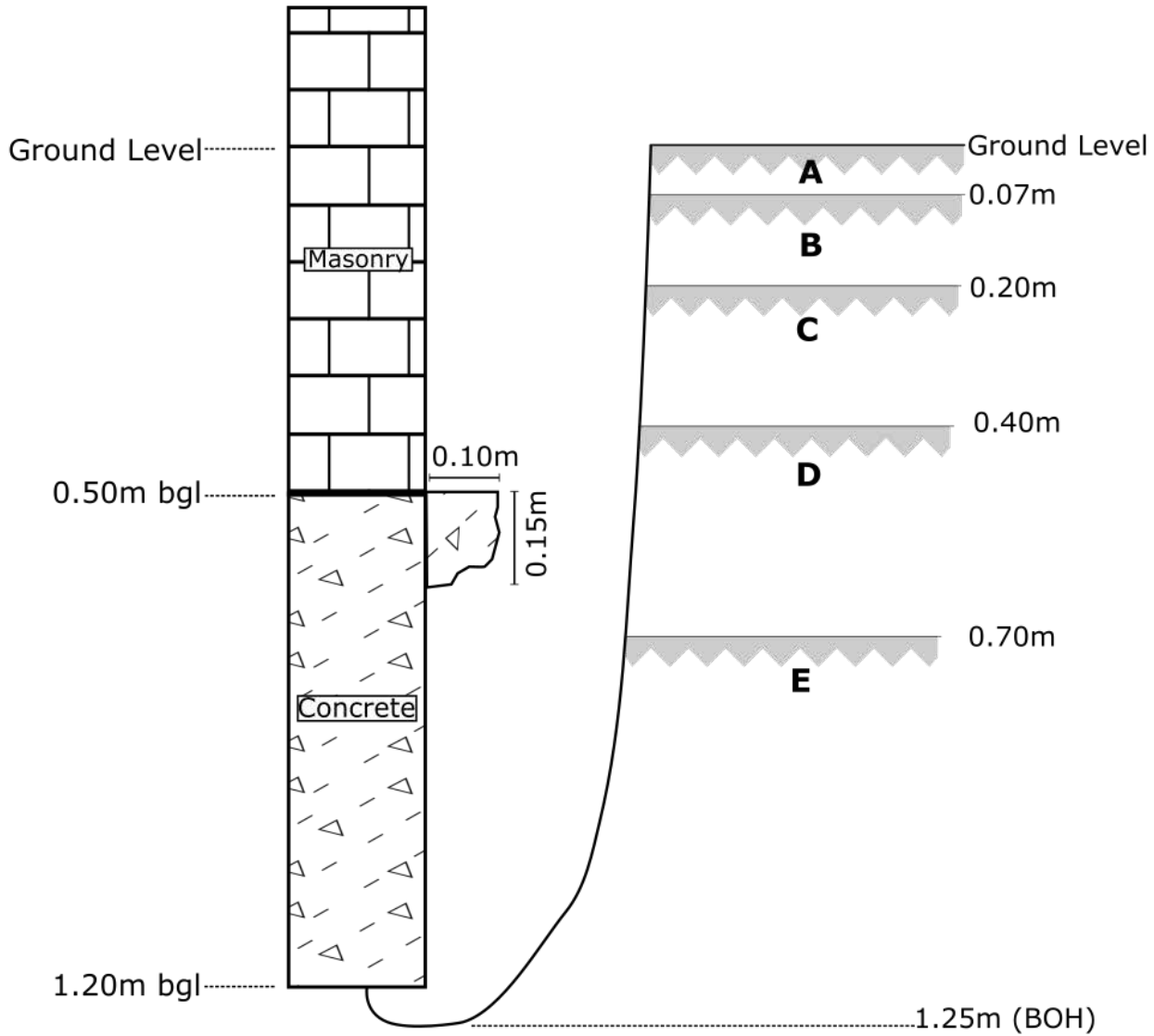
Project

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Reading

Sheet Name

TP1 - Foundation Sketch

Section A - A'

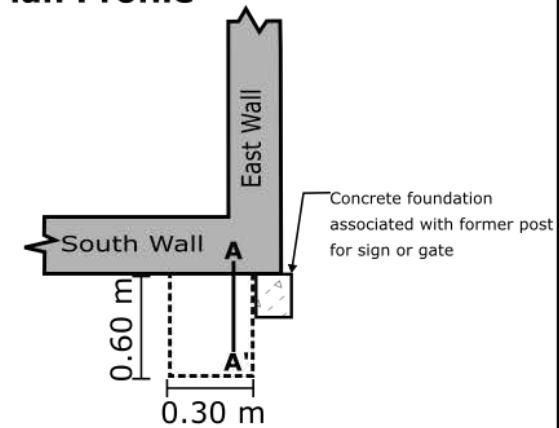


Notes:

A -Black ASPHALT.
B - Grey very sandy GRAVEL. (MADE GROUND)
C - Grey lean mix CONCRETE.
D - Orange very clayey very sandy GRAVEL. (MADE GROUND)
E - Firm to stiff orangish brown sandy CLAY

Drawing not to scale.

Plan Profile



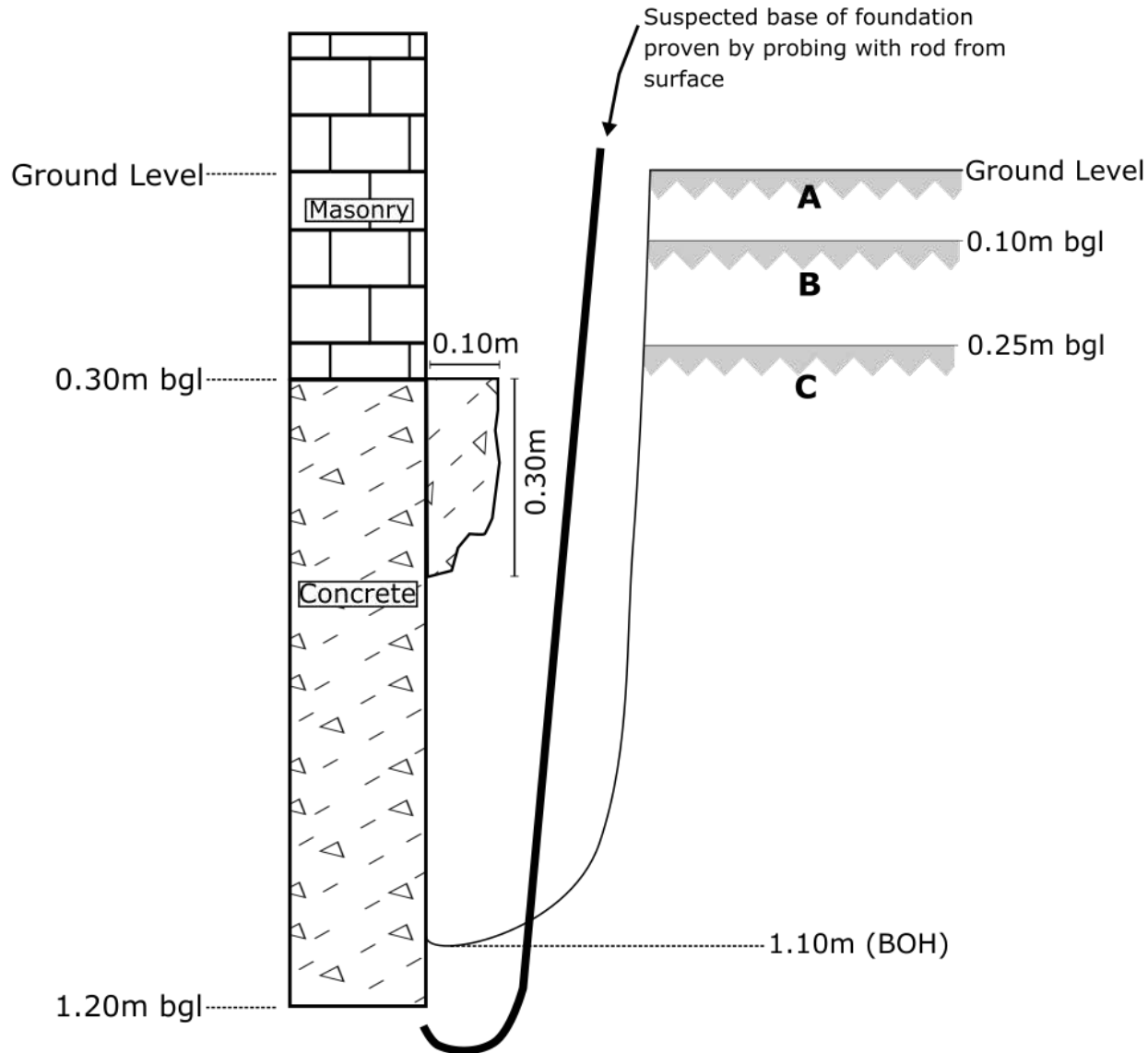
Project

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Reading

Sheet Name

TP2 - Foundation Sketch

Section A - A'



Notes:

A - Black ASPHALT.

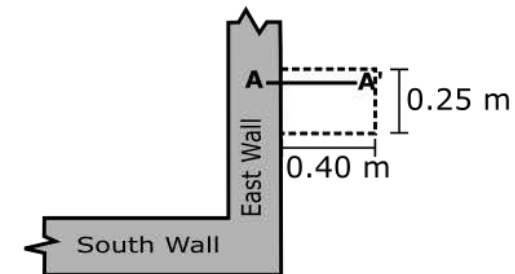
B - Grey very sandy GRAVEL. (MADE GROUND)

C - Stiff orange sandy CLAY

Pit terminated at 1.10 at limited of reach of tools. Base of foundation proven by probing from surface with rod. Depth of foundation should therefore be treated with caution

Drawing not to scale.

Plan Profile



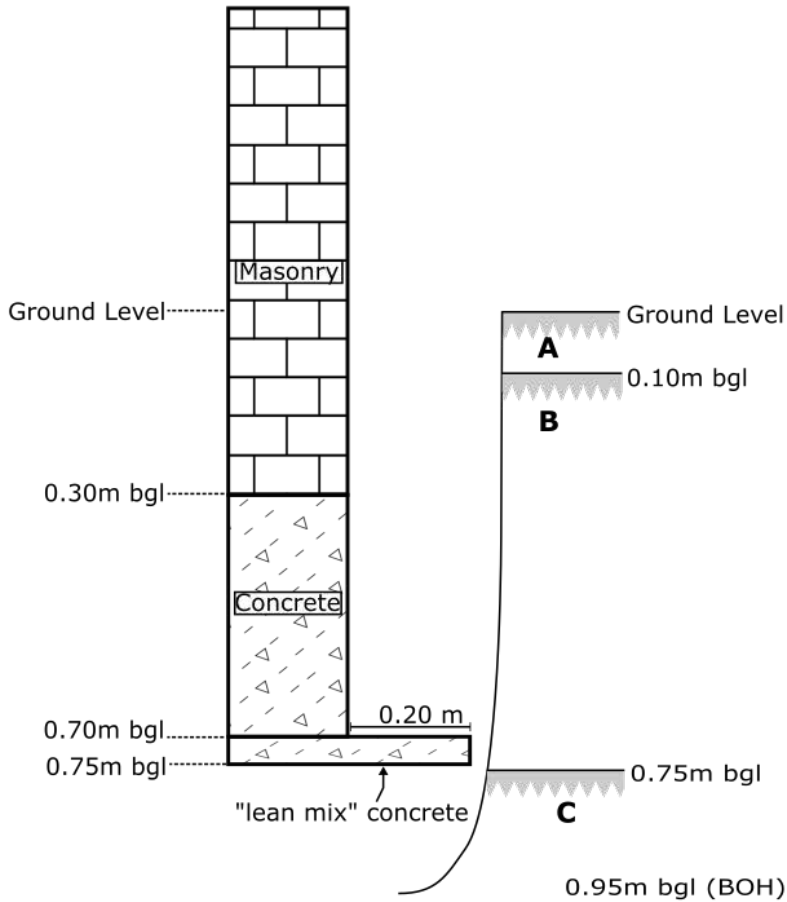
Project

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Reading

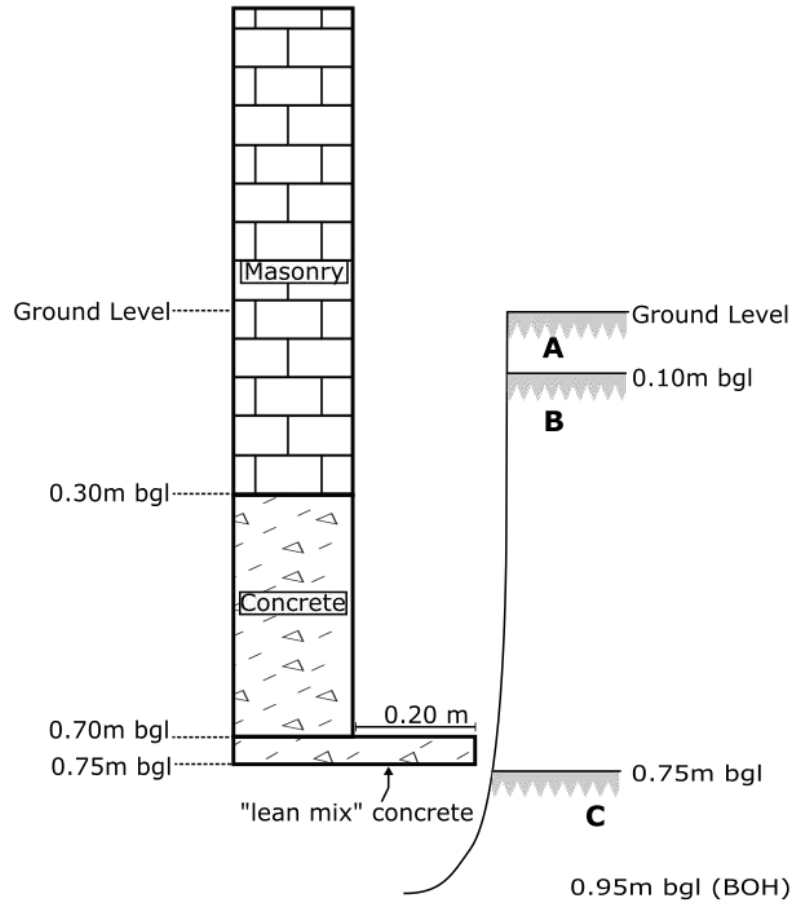
Sheet Name

TP2a - Foundation Sketch

Section A - A'



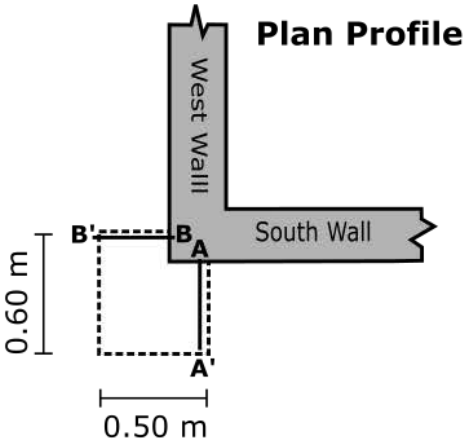
Section B - B'



Notes:

- A - Grass over firm brown slightly gravelly sandy SILT (MADE GROUND)
- B - Yellowish brown very sandy very clayey GRAVEL (MADE GROUND)
- C - Firm bluish grey silty CLAY

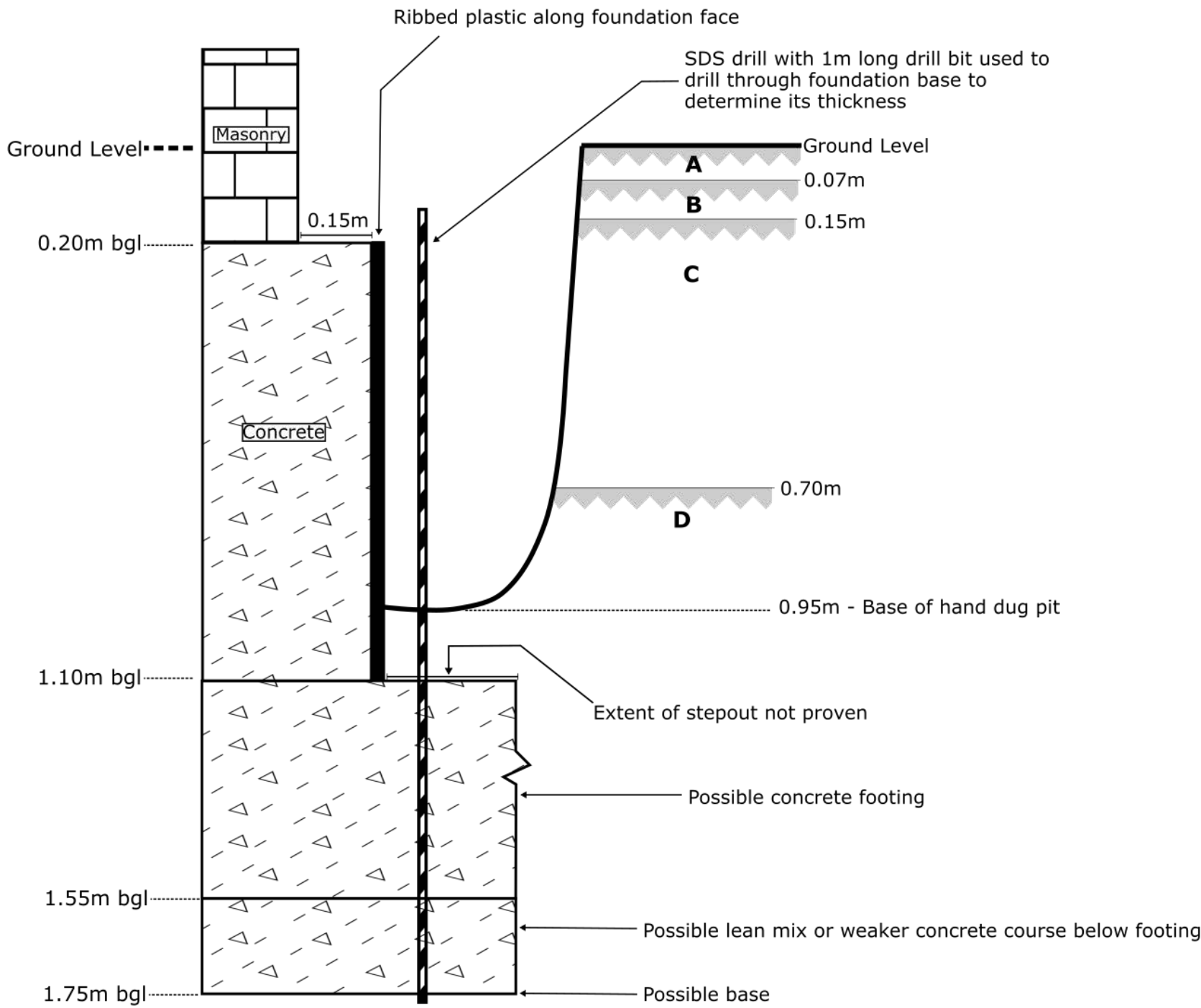
Drawing not to scale.



Project
Ranikhet Academy,
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Sheet Name
TP3 - Foundation Sketch

Section A - A'



Notes:

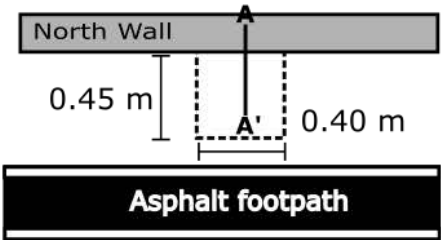
A -Black ASPHALT.
B - Light grey very sandy GRAVEL. (MADE GROUND)
C - Firm brown slightly sandy slightly gravelly CLAY (MADE GROUND).
D - Grey very sandy GRAVEL. (MADE GROUND)

Hole drilled vertically from base of hole at 0.95m bgl using SDS drill with masonry drill bit to find and determine thickness of underlying retaining wall footing. Thickness and composition of footing is based upon resistance encountered during drilling.

Depths and descriptions stated below 0.95m bgl are indicative only

Drawing not to scale.

Plan Profile

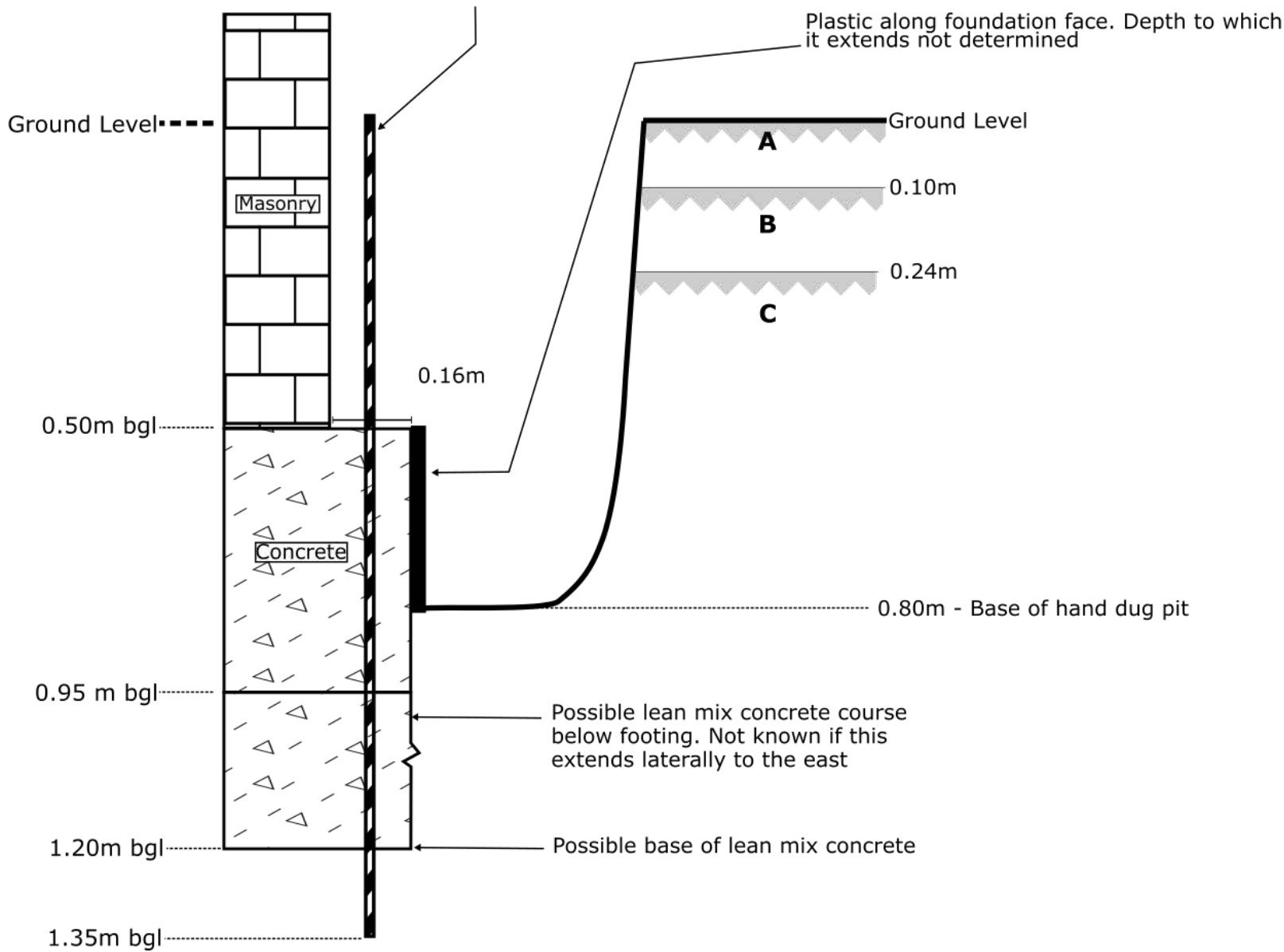


Project
Ranikhet Academy,
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Sheet Name
TP6 - Foundation Sketch

Section A - A'

SDS drill with 1m long drill bit used to drill through foundation base to determine its thickness. Drill extended to 1.35m bgl



Notes:

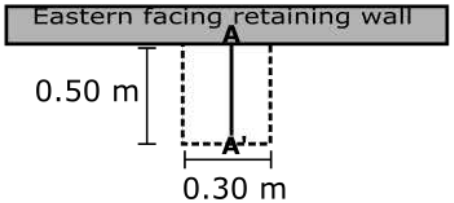
- A -Black ASPHALT.
- B - Grey clayey very sandy GRAVEL. (MADE GROUND)
- C - Orangis brown very clayey very sandy GRAVEL (MADE GROUND).

Hole drilled vertically through wall step out at 0.50m bgl using SDS drill with masonry bit to determine thickness of concrete footing. Thickness and composition of footing is based upon resistance encountered during drilling.

Depths and descriptions stated below 0.80m bgl are indicative only

Drawing not to scale.

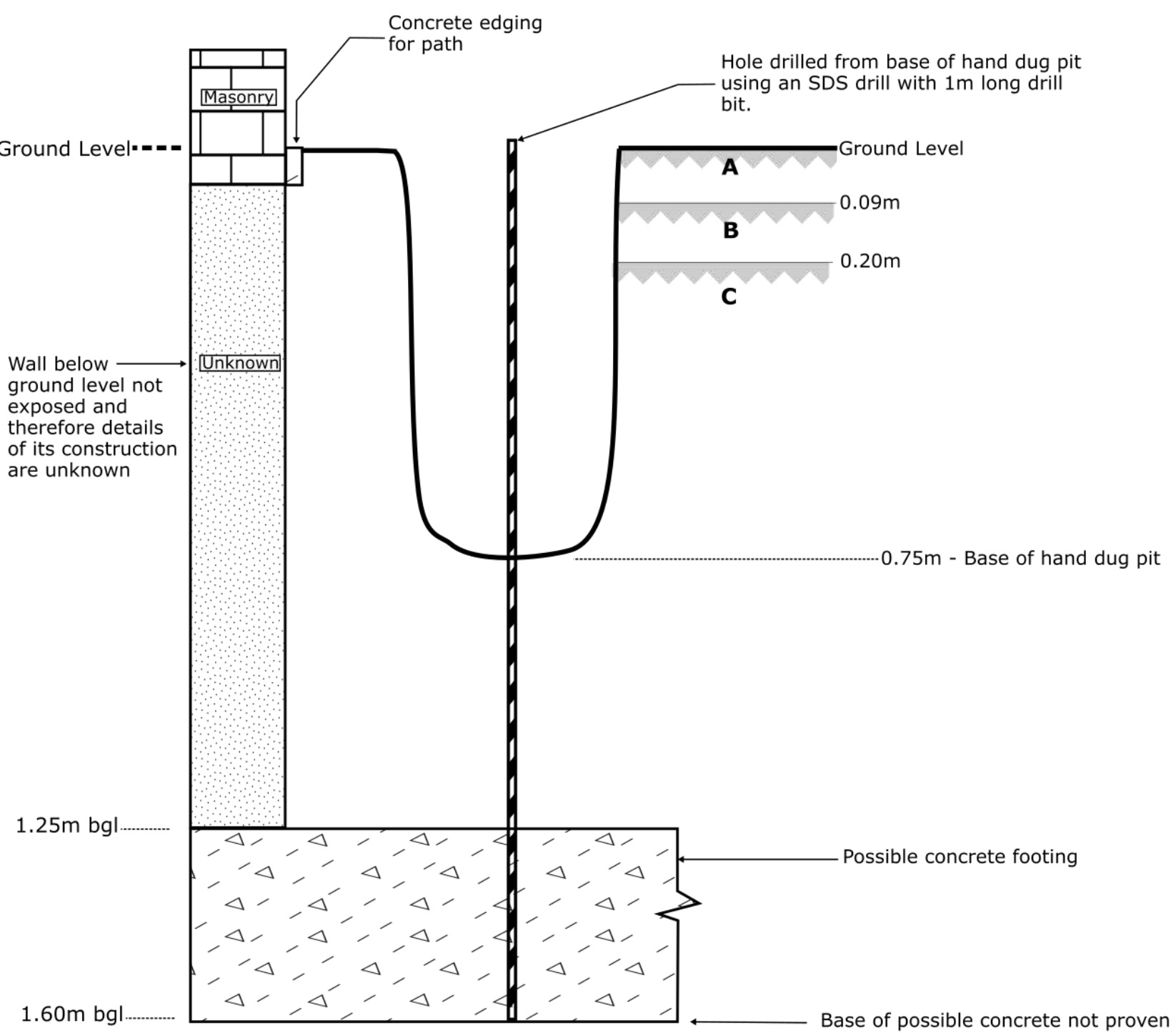
Plan Profile



Project
Ranikhet Academy,
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Sheet Name
TP8 - Foundation Sketch

Section A - A'



Notes:

A -Black ASPHALT.
B - LPinkish grey very sandy GRAVEL.
(MADE GROUND)
C - Orange silty very gravelly SAND
(MADE GROUND).

Hand dug pit terminated at 0.75m bgl due to possible concrete boulder obstruction

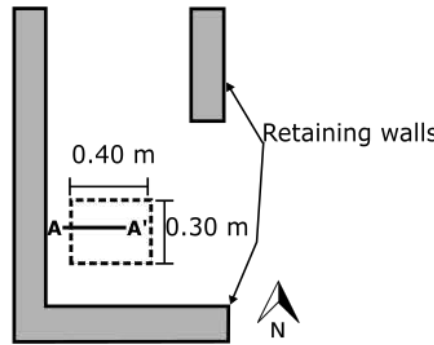
Hole drilled vertically from base of hole at using SDS drill with masonry drill bit to find and determine thickness of underlying retaining wall footing.

Thickness and composition of footing is based upon resistance encountered during drilling.

Depths and descriptions stated below 0.75m bgl are indicative only

Drawing not to scale.

Plan Profile



Project
Ranikhet Academy,
Reading

Sheet Name
TP9 - Foundation Sketch

terrafirma(south)

Annex C: Chemical Test Results



2183

Amended Report

Report No.:	20-21788-4		
Initial Date of Issue:	26-Aug-2020	Date of Re-Issue:	11-Sep-2020
Client	Terra Firma		
Client Address:	The Slate Barn Lower Lowley Dunsford Devon EX6 7BP		
Contact(s):	Info		
Project	6671 Ranikhet Academy		
Quotation No.:	Q18-13119	Date Received:	18-Aug-2020
Order No.:	6671	Date Instructed:	18-Aug-2020
No. of Samples:	13		
Turnaround (Wkdays):	19	Results Due:	14-Sep-2020
Date Approved:	11-Sep-2020		

Approved By:



Details: Glynn Harvey, Technical Manager

Results - Soil

Project: 6671 Ranikhet Academy

Client: Terra Firma	Chemtest Job No.:				20-21788	20-21788	20-21788	20-21788	20-21788	20-21788	20-21788	20-21788
Quotation No.: Q18-13119	Chemtest Sample ID.:				1050084	1050085	1050086	1050087	1050088	1050089	1050090	1050091
	Sample Location:				TP1	TP2	TP3	TP4	TP5	TP9	WS3	WS4
	Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				0.30	0.50	0.50	0.30	0.50	0.50	1.00	1.00
	Date Sampled:				05-Aug-2020	05-Aug-2020	03-Aug-2020	07-Aug-2020	07-Aug-2020	06-Aug-2020	04-Aug-2020	06-Aug-2020
	Asbestos Lab:				COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	Accred.	SOP	Units	LOD								
ACM Type	U	2192		N/A	-	Lagging	-	-	-	-	-	-
Asbestos Identification	U	2192	%	0.001	No Asbestos Detected	Chrysotile Crocidolite	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
ACM Detection Stage	U	2192		N/A	-	Stereo Microscopy	-	-	-	-	-	-
Asbestos by Gravimetry	U	2192	%	0.001		0.16						
Total Asbestos	U	2192	%	0.001		0.16						
Moisture	N	2030	%	0.020	12	7.8	8.0	4.8	9.0	7.1	13	9.3
pH	U	2010		4.0	9.3	10.2	9.1	9.0	9.0	9.2	10.1	9.2
pH (2.5:1)	N	2010		4.0				9.0				9.1
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010				< 0.010				0.026
Total Sulphur	U	2175	%	0.010	0.022	0.079	0.028	0.030	0.019	0.047	0.26	0.019
Cyanide (Free)	U	2300	mg/kg	0.50	< 0.50	< 0.50	[B] < 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Cyanide (Total)	U	2300	mg/kg	0.50	< 0.50	< 0.50	[B] < 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Thiocyanate	U	2300	mg/kg	5.0	< 5.0	< 5.0	[B] < 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50	1.3	2.8	0.92	0.91	0.57	0.50	7.8	0.79
Ammoniacal Nitrogen	U	2425	mg/kg	0.50	1.0	1.2	4.0	2.9	1.6	0.68	< 0.50	2.1
Sulphate (Total)	U	2430	%	0.010	0.016	0.18	0.063	0.051	0.034	0.070	0.75	0.052
Arsenic	U	2450	mg/kg	1.0	13	26	14	16	31	21	21	11
Cadmium	U	2450	mg/kg	0.10	0.16	0.41	0.56	0.31	0.26	0.29	0.27	0.15
Chromium	U	2450	mg/kg	1.0	21	20	18	24	27	12	20	16
Copper	U	2450	mg/kg	0.50	11	16	220	15	10	7.8	17	9.7
Mercury	U	2450	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.13	< 0.10	< 0.10	0.10	< 0.10
Nickel	U	2450	mg/kg	0.50	19	18	16	17	26	12	20	15
Lead	U	2450	mg/kg	0.50	14	34	68	36	19	17	45	17
Selenium	U	2450	mg/kg	0.20	< 0.20	< 0.20	0.22	0.36	< 0.20	< 0.20	< 0.20	0.38
Zinc	U	2450	mg/kg	0.50	45	72	220	96	54	36	92	42
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Organic Matter	U	2625	%	0.40	0.66	0.67	1.3	1.6	0.62	1.7	0.93	0.98
Total TPH >C6-C40	U	2670	mg/kg	10	< 10	89	[B] < 10	< 10	< 10	240	340	25
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0						< 1.0	< 1.0	
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0						< 1.0	< 1.0	
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0						< 1.0	< 1.0	
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0						< 1.0	< 1.0	
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0						< 1.0	< 1.0	
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0						< 1.0	< 1.0	
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0						74	64	
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0						< 1.0	< 1.0	
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0						74	64	

Results - Soil

Project: 6671 Ranikhet Academy

Client: Terra Firma	Chemtest Job No.:				20-21788	20-21788	20-21788	20-21788	20-21788	20-21788	20-21788	20-21788
Quotation No.: Q18-13119	Chemtest Sample ID.:				1050084	1050085	1050086	1050087	1050088	1050089	1050090	1050091
	Sample Location:				TP1	TP2	TP3	TP4	TP5	TP9	WS3	WS4
	Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				0.30	0.50	0.50	0.30	0.50	0.50	1.00	1.00
	Date Sampled:				05-Aug-2020	05-Aug-2020	03-Aug-2020	07-Aug-2020	07-Aug-2020	06-Aug-2020	04-Aug-2020	06-Aug-2020
	Asbestos Lab:				COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	Accred.	SOP	Units	LOD								
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0						< 1.0	< 1.0	
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0						< 1.0	< 1.0	
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0						< 1.0	< 1.0	
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0						< 1.0	< 1.0	
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0						< 1.0	< 1.0	
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0						< 1.0	< 1.0	
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0						340	160	
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0						< 1.0	< 1.0	
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0						340	160	
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0						410	230	
Naphthalene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.19	< 0.10	< 0.10
Acenaphthylene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.37	< 0.10	< 0.10
Acenaphthene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.16	< 0.10	< 0.10
Fluorene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.15	< 0.10	< 0.10
Phenanthrene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.25	< 0.10	2.4	0.96	< 0.10
Anthracene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.16	< 0.10	1.1	0.35	< 0.10
Fluoranthene	U	2700	mg/kg	0.10	< 0.10	0.42	0.33	0.91	< 0.10	7.0	2.3	< 0.10
Pyrene	U	2700	mg/kg	0.10	< 0.10	0.37	0.31	0.93	< 0.10	7.0	2.4	< 0.10
Benzo[a]anthracene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.91	< 0.10	3.8	1.5	< 0.10
Chrysene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.67	< 0.10	3.7	1.7	< 0.10
Benzo[b]fluoranthene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	6.3	1.7	< 0.10
Benzo[k]fluoranthene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	2.2	1.0	< 0.10
Benzo[a]pyrene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	4.9	1.3	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	3.9	1.1	< 0.10
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.98	0.78	< 0.10
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	3.7	1.3	< 0.10
Total Of 16 PAH's	U	2700	mg/kg	2.0	< 2.0	< 2.0	< 2.0	3.8	< 2.0	48	16	< 2.0
Total Phenols	U	2920	mg/kg	0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30

Results - Soil

Project: 6671 Ranikhet Academy

Client: Terra Firma	Chemtest Job No.:				20-21788	20-21788	20-21788	20-21788	20-21788
Quotation No.: Q18-13119	Chemtest Sample ID.:				1050092	1050093	1050094	1050095	1050096
	Sample Location:				WS5	WS6	WS9	BH3	WS7
	Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				0.20	0.50	0.30	0.05	0.05
	Date Sampled:				06-Aug-2020	06-Aug-2020	04-Aug-2020	07-Aug-2020	05-Aug-2020
	Asbestos Lab:				COVENTRY		COVENTRY		
Determinand	Accred.	SOP	Units	LOD					
ACM Type	U	2192		N/A	-		-		
Asbestos Identification	U	2192	%	0.001	No Asbestos Detected		No Asbestos Detected		
ACM Detection Stage	U	2192		N/A	-		-		
Asbestos by Gravimetry	U	2192	%	0.001					
Total Asbestos	U	2192	%	0.001					
Moisture	N	2030	%	0.020	2.2	17	9.1	0.62	< 0.020
pH	U	2010		4.0	9.7		8.9		
pH (2.5:1)	N	2010		4.0		8.9	8.9		
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010		< 0.010	< 0.010		
Total Sulphur	U	2175	%	0.010	0.18	0.023	0.022		
Cyanide (Free)	U	2300	mg/kg	0.50	< 0.50		< 0.50		
Cyanide (Total)	U	2300	mg/kg	0.50	< 0.50		< 0.50		
Thiocyanate	U	2300	mg/kg	5.0	< 5.0		< 5.0		
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50	4.5		0.78		
Ammoniacal Nitrogen	U	2425	mg/kg	0.50	1.1		2.3		
Sulphate (Total)	U	2430	%	0.010	0.22	0.060	0.034		
Arsenic	U	2450	mg/kg	1.0	34		31		
Cadmium	U	2450	mg/kg	0.10	0.42		0.23		
Chromium	U	2450	mg/kg	1.0	9.3		18		
Copper	U	2450	mg/kg	0.50	5.2		5.8		
Mercury	U	2450	mg/kg	0.10	< 0.10		< 0.10		
Nickel	U	2450	mg/kg	0.50	11		18		
Lead	U	2450	mg/kg	0.50	15		12		
Selenium	U	2450	mg/kg	0.20	< 0.20		< 0.20		
Zinc	U	2450	mg/kg	0.50	46		40		
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50		< 0.50		
Organic Matter	U	2625	%	0.40	0.41		0.41		
Total TPH >C6-C40	U	2670	mg/kg	10	< 10		< 10		
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0					
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0					
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0					
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0					
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0					
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0					
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0					
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0					
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0					

Results - Soil

Project: 6671 Ranikhet Academy

Client: Terra Firma	Chemtest Job No.:				20-21788	20-21788	20-21788	20-21788	20-21788
Quotation No.: Q18-13119	Chemtest Sample ID.:				1050092	1050093	1050094	1050095	1050096
	Sample Location:				WS5	WS6	WS9	BH3	WS7
	Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				0.20	0.50	0.30	0.05	0.05
	Date Sampled:				06-Aug-2020	06-Aug-2020	04-Aug-2020	07-Aug-2020	05-Aug-2020
	Asbestos Lab:				COVENTRY		COVENTRY		
Determinand	Accred.	SOP	Units	LOD					
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0					
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0					
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0					
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0					
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0					
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0					
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0					
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0					
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0					
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0					
Naphthalene	U	2700	mg/kg	0.10	< 0.10		< 0.10	< 0.10	< 0.10
Acenaphthylene	U	2700	mg/kg	0.10	< 0.10		< 0.10	< 0.10	< 0.10
Acenaphthene	U	2700	mg/kg	0.10	< 0.10		< 0.10	< 0.10	< 0.10
Fluorene	U	2700	mg/kg	0.10	< 0.10		< 0.10	< 0.10	< 0.10
Phenanthrene	U	2700	mg/kg	0.10	< 0.10		< 0.10	< 0.10	< 0.10
Anthracene	U	2700	mg/kg	0.10	< 0.10		< 0.10	< 0.10	< 0.10
Fluoranthene	U	2700	mg/kg	0.10	< 0.10		< 0.10	< 0.10	< 0.10
Pyrene	U	2700	mg/kg	0.10	< 0.10		< 0.10	< 0.10	< 0.10
Benzo[a]anthracene	U	2700	mg/kg	0.10	< 0.10		< 0.10	< 0.10	< 0.10
Chrysene	U	2700	mg/kg	0.10	< 0.10		< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	U	2700	mg/kg	0.10	< 0.10		< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	U	2700	mg/kg	0.10	< 0.10		< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	U	2700	mg/kg	0.10	< 0.10		< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10	< 0.10		< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10	< 0.10		< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10	< 0.10		< 0.10	< 0.10	< 0.10
Total Of 16 PAH's	U	2700	mg/kg	2.0	< 2.0		< 2.0	< 2.0	< 2.0
Total Phenols	U	2920	mg/kg	0.30	< 0.30		< 0.30		

Deviations

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

Sample:	Sample Ref:	Sample ID:	Sample Location:	Sampled Date:	Deviation Code(s):	Containers Received:
1050086			TP3	03-Aug-2020	B	Amber Glass 250ml
1050086			TP3	03-Aug-2020	B	Amber Glass 60ml
1050086			TP3	03-Aug-2020	B	Plastic Tub 500g
1050089			TP9	06-Aug-2020	B	Amber Glass 250ml
1050089			TP9	06-Aug-2020	B	Amber Glass 60ml
1050089			TP9	06-Aug-2020	B	Plastic Tub 500g
1050090			WS3	04-Aug-2020	B	Amber Glass 250ml
1050090			WS3	04-Aug-2020	B	Amber Glass 60ml
1050090			WS3	04-Aug-2020	B	Plastic Tub 500g

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Alkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2325	Sulphide in Soils	Sulphide	Steam distillation with sulphuric acid / analysis by 'Aquakem 600' Discrete Analyser, using N,N-dimethyl-p-phenylenediamine.
2425	Extractable Ammonium in soils	Ammonium	Extraction with potassium chloride solution / analysis by 'Aquakem 600' Discrete Analyser using sodium salicylate and sodium dichloroisocyanurate.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazine.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / GCxGC FID detection
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenzo[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.

Report Information

Key

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

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

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

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

All Asbestos testing is performed at the indicated laboratory

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

Sample Deviation Codes

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

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt

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

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

Annex D: Soil Property Test Results

SUMMARY OF GEOTECHNICAL TESTING

Sample details					Classification Tests					Density Tests		Undrained Triaxial Compression				Chemical Tests			Other tests and comments
Location	Depth (m)	Sample Ref	Type	Description	WC	LL	PL	PI	<425 µm	Bulk	Dry	Condition	Cell Pressure	Deviator Stress	Shear Stress	pH	2:1 W/S SO4	W/S Mg	
					%	%	%	%	%	Mg/m³	Mg/m³		kPa	kPa	kPa		g/L	mg/L	
BH1	1.00		B	Brown fine sandy silty CLAY with rare gravel.	9.3	26	14	12	80										
BH1	1.50		B	Brown very sandy silty CLAY with rare gravel.	16.0	27	13	14	90							8.7	< 0.010		Particle Density = 2.60 Mg/m³ Particle Size Distribution Compaction Chemical
BH1	2.00-2.45		U	Soft to firm brown very sandy very gravelly silty CLAY.	15.7	42	18	24	53	1.96	1.70	Undisturbed	40	79	39				
BH1	3.00		B	Brown fine sandy silty CLAY with rare chalk gravel and flint gravel.	29.5	67	26	41	96							8.8	< 0.010		Chemical
BH1	4.00		B	Light brown and white CHALK and CLAY.												8.6	< 0.010		
BH1	6.00		B	Brown fine sandy silty CLAY with rare chalk gravel and flint gravel.	27.1											9.1	< 0.010		Chemical
BH1	9.00		B	White CHALK with rare flint gravel.	28.1														
BH2	1.20-1.85		U	Very stiff dark brown sandy gravelly silty CLAY.	34.2	77	27	50	99	2.01	1.50	Undisturbed	20	205	102				
BH2	2.50		B	Light brown and white Gravelly CHALK and CLAY.	27.2														
BH2	4.00		B	White slightly gravelly structureless CHALK.	28.7														

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

Checked and Approved by  S Burke - Senior Technician 21/09/2020	Project Number:	GEO / 31598 RANIKHET ACADEMY 6671	
	Project Name:		

SUMMARY OF GEOTECHNICAL TESTING

Sample details					Classification Tests					Density Tests		Undrained Triaxial Compression				Chemical Tests			Other tests and comments
Location	Depth (m)	Sample Ref	Type	Description	WC	LL	PL	PI	<425 µm	Bulk	Dry	Condition	Cell Pressure	Deviator Stress	Shear Stress	pH	2:1 W/S SO4	W/S Mg	
					%	%	%	%	%	Mg/m³	Mg/m³		kPa	kPa	kPa		g/L	mg/L	
BH2	6.00		B	White structureless CHALK	29.2														
BH2	8.00		B	White CHALK.	26.5														
BH2	13.00		B	White CHALK with rare flint gravel.	24.1														
BH2	17.00		B	White CHALK with rare flint gravel.	26.2														
BH3	2.00		B	Orange brown silty clayey SAND.	8.8	51	21	30	61							8.8	< 0.010		Particle Density = 2.67 Mg/m³ Particle Size Distribution
BH3	8.00-8.45		U	Loose orangish brown fine to medium SAND.															Particle Size Distribution
BH3	11.00		B	Brown silty clayey SAND.												8.8	< 0.010		Particle Size Distribution Chemical
BH3	16.00		B													8.7	< 0.010		Chemical
BH3	18.00		B	White CHALK with rare flint gravel.	27.6														
CBR1	0.30-0.60		B	White and brown CHALK with rare flint gravel.	29.5														

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

Checked and Approved by  S Burke - Senior Technician 21/09/2020	Project Number: Project Name: GEO / 31598 RANIKHET ACADEMY 6671	
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SUMMARY OF GEOTECHNICAL TESTING

Sample details					Classification Tests					Density Tests		Undrained Triaxial Compression				Chemical Tests			Other tests and comments
Location	Depth (m)	Sample Ref	Type	Description	WC	LL	PL	PI	<425 µm	Bulk	Dry	Condition	Cell Pressure	Deviator Stress	Shear Stress	pH	2:1 W/S SO4	W/S Mg	
					%	%	%	%	%	Mg/m³	Mg/m³		kPa	kPa	kPa		g/L	mg/L	
CBR2	0.30-0.60		B	Dark brown clayey SAND.															Particle Size Distribution
TP7	1.00		B	White CHALK with rare flint gravel.	21.2														
WS02	1.00		D	Light brown fine sandy silty CLAY with rare chalk gravel.	26.9	75	27	48	97										
WS2	0.90		D	Brown mottled dark brow fine sandy silty CLAY with rare fine gravel.	23.4	72	21	51	99										
WS3	1.50		D	White structureless CHALK	24.0														
WS4	1.50		D																Chemical
WS4	2.00		D	Brown mottled dark brow fine sandy silty CLAY with rare fine gravel.	14.7	30	14	16	98										
WS4	3.00		D	Brown, greyish brown and reddish brown fine sandy silty CLAY with rare gravel.	18.4	46	21	25	99										
WS4	3.20-4.00		B	Orangish brown clayey SAND with rare fine to medium gravel..															Particle Size Distribution
WS4	4.50		D	Greyish brown and brown fine sandy silty CLAY with rare fine gravel.	19.2	42	21	21	99										

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

Checked and Approved by  S Burke - Senior Technician 21/09/2020	Project Number: GEO / 31598 Project Name: RANIKHET ACADEMY 6671	
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SUMMARY OF GEOTECHNICAL TESTING

Sample details					Classification Tests					Density Tests		Undrained Triaxial Compression				Chemical Tests			Other tests and comments
Location	Depth (m)	Sample Ref	Type	Description	WC	LL	PL	PI	<425 µm	Bulk	Dry	Condition	Cell Pressure	Deviator Stress	Shear Stress	pH	2:1 W/S SO4	W/S Mg	
					%	%	%	%	%	Mg/m³	Mg/m³		kPa	kPa	kPa		g/L	mg/L	
WS5	1.00		B	White mottled brown CHALK with rare flint gravel.	26.4											8.7	< 0.010		Chemical
WS5	2.50-3.00		D	White CHALK.	22.4											8.9	< 0.010		Chemical
WS6	2.50-3.00		D	Orange brown silty clayey SAND.	5.8	46	18	28	68							9.1	< 0.010		Particle Density = 2.65 Mg/m³ Particle Size Distribution Chemical
WS6	4.00		D	Brown fine sandy silty CLAY with rare chalk gravel.	9.6	28	14	14	99										
WS7	0.50		B	Light brown and orangish brown mottled reddish brown fine sandy silty CLAY with rare fine chalk gravel.	17.2	46	12	34	99							8.5	< 0.010		Chemical
WS7	1.30-1.80		B	Orangish brown slightly clayey slightly silty SAND with rare weakly cemented sandstone gravel.															Particle Size Distribution

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

Checked and Approved by S Burke - Senior Technician 21/09/2020	Project Number: Project Name: GEO / 31598 RANIKHET ACADEMY 6671	
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Notes

S Burke - Senior Technician
17/09/2020

Project Name:

RANIKHET ACADEMY
6671



SUMMARY OF CHEMICAL TESTS ON SOIL

Location	Depth m	Sample Ref	Sample Type	pH Value	Total Acid Soluble Sulphate as SO ₄ %	Water Soluble Sulphate as SO ₄ 2:1 Water:Soil Extract g/l	Total Sulphur %	Water Soluble Chloride g/l	Water Soluble Nitrate g/l	Magnesium g/l	Organic Content %	Mass Loss on Ignition %	Carbonate Content %
BH1	1.50		B	8.7	0.011	< 0.010	< 0.010	-	-	-	-	-	-
BH1	3.00		B	8.8	0.032	< 0.010	0.019	-	-	-	-	-	-
BH1	4.00		B	8.6	0.021	< 0.010	0.023	-	-	-	-	-	-
BH1	6.00		B	9.1	< 0.010	< 0.010	0.050	-	-	-	-	-	-
BH3	2.00		B	8.8	< 0.010	< 0.010	0.013	-	-	-	-	-	-
BH3	11.00		B	8.8	< 0.010	< 0.010	< 0.010	-	-	-	-	-	-
BH3	16.00		B	8.7	< 0.010	< 0.010	0.017	-	-	-	-	-	-
WS4	1.50		D	-	-	-	-	-	-	-	0.74	-	-
WS5	1.00		B	8.7	0.037	< 0.010	0.017	-	-	-	-	-	-
WS5	2.50-3.00		D	8.9	0.021	< 0.010	0.014	-	-	-	-	-	-
WS6	2.50-3.00		D	9.1	< 0.010	< 0.010	0.011	-	-	-	-	-	-
WS7	0.50		B	8.5	< 0.010	< 0.010	< 0.010	-	-	-	-	-	-

Tested by Chemtest Ltd : MCERTS / UKAS No 2183

Checked and Approved by:


S Burke - Senior Technician
21/09/2020

Project Number:

GEO / 31598

Project Name:

RANIKHET ACADEMY
6671


PARTICLE SIZE DISTRIBUTION

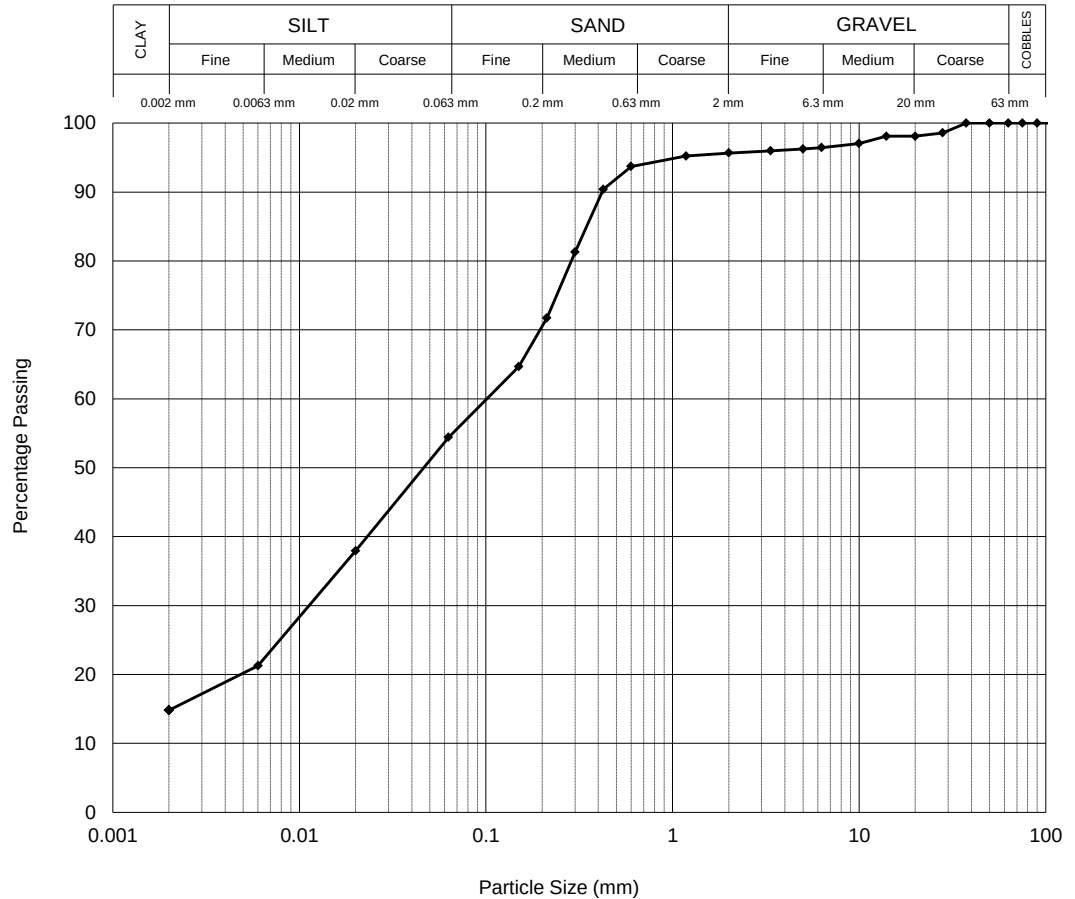
Location BH1
Depth (m) 1.50
Sample Type B

Description

Brown very sandy silty CLAY with rare gravel.

BS EN ISO 17892-4 : 2016 : Clause 5.2 - Wet Sieve
BS EN ISO 17892-4 : 2016 : Clause 5.4 - Sedimentation by Pipette

Sieve	
Size	% Pass
200.0 mm	100
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	99
20.0 mm	98
14.0 mm	98
10.0 mm	97
6.30 mm	96
5.00 mm	96
3.35 mm	96
2.00 mm	96
1.18 mm	95
600 µm	94
425 µm	90
300 µm	81
212 µm	72
150 µm	65
63 µm	54



Sedimentation	
Pre-treatment used	
Temp (°C)	25
Size	% Pass
20 µm	38
6 µm	21
2 µm	15

Particle Density 2.70(A) Mg/m³

Particle Proportions	
Cobbles	0.0
Gravel	4.3
Sand	41.3
Silt	39.6
Clay	14.8

Processed by CC
Checked and Approved by

S Burke

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GEOLABS

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(Ref 1600351194)

PARTICLE SIZE DISTRIBUTION

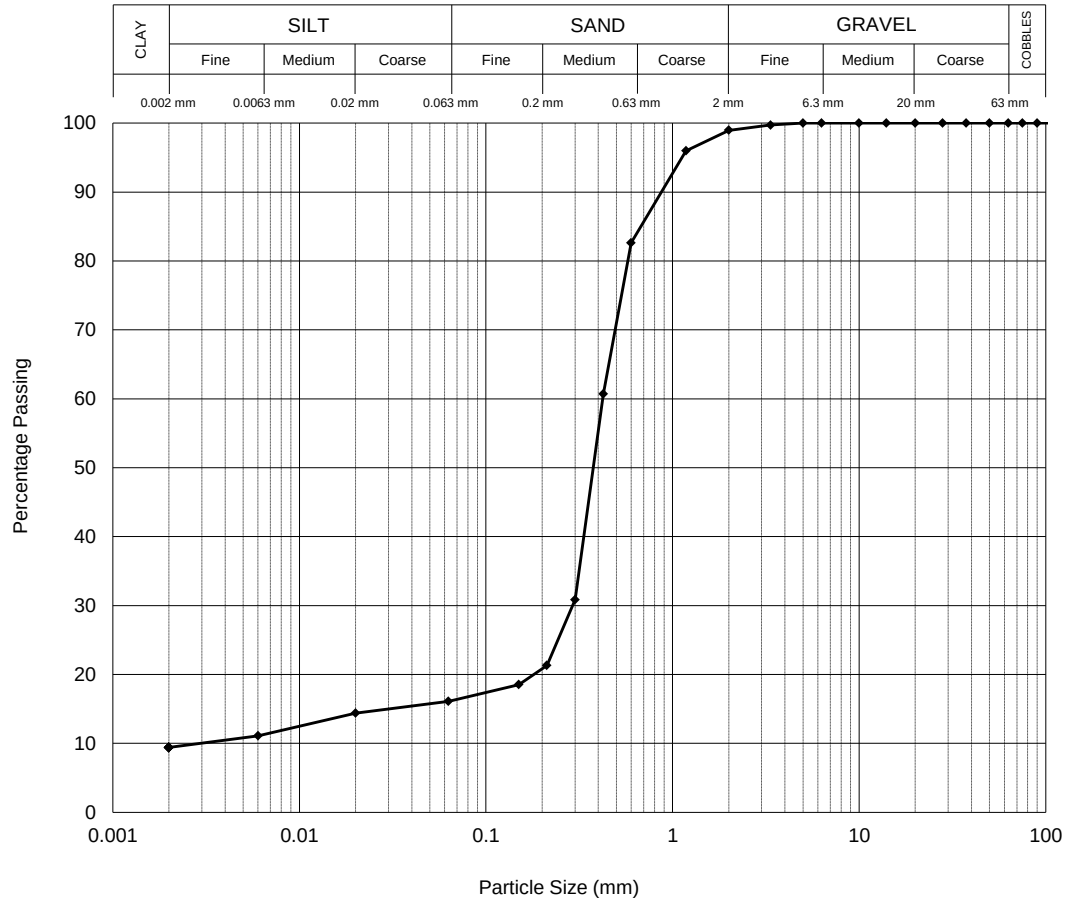
Location BH3
Depth (m) 2.00
Sample Type B

Description

Orange brown silty clayey SAND.

BS EN ISO 17892-4 : 2016 : Clause 5.2 - Wet Sieve
BS EN ISO 17892-4 : 2016 : Clause 5.4 - Sedimentation by Pipette

Sieve	
Size	% Pass
200.0 mm	100
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	99
1.18 mm	96
600 µm	83
425 µm	61
300 µm	31
212 µm	21
150 µm	19
63 µm	16



Sedimentation	
Pre-treatment used	
Temp (°C)	25
Size	% Pass
20 µm	14
6 µm	11
2 µm	9

Particle Density 2.70(A) Mg/m³

Particle Proportions	
Cobbles	0.0
Gravel	1.0
Sand	82.9
Silt	6.7
Clay	9.4

Processed by CC
Checked and Approved by

S Burke

S Burke - Senior Technician
17/09/2020

Project Number:

GEO / 31598

Project Name:

RANIKHET ACADEMY
6671

GEOLABS

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(Ref 1600351196)

PARTICLE SIZE DISTRIBUTION

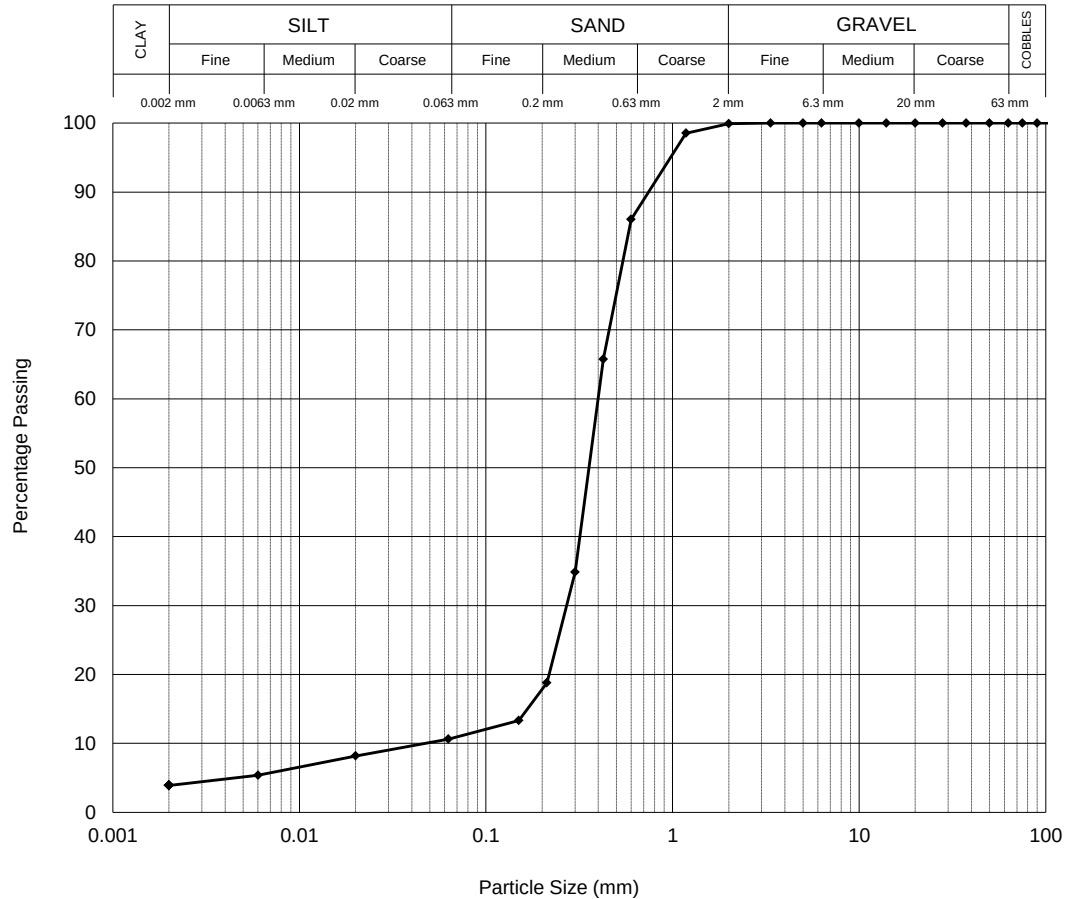
Location BH3
Depth (m) 8.00-8.45
Sample Type U

Description

Loose orangish brown fine to medium SAND.

BS EN ISO 17892-4 : 2016 : Clause 5.2 - Wet Sieve
BS EN ISO 17892-4 : 2016 : Clause 5.4 - Sedimentation by Pipette

Sieve	
Size	% Pass
200.0 mm	100
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	99
600 µm	86
425 µm	66
300 µm	35
212 µm	19
150 µm	13
63 µm	11



Sedimentation	
Pre-treatment used	
Temp (°C)	25
Size	% Pass
20 µm	8
6 µm	5
2 µm	4

Particle Density 2.70(A) Mg/m³

Particle Proportions	
Cobbles	0.0
Gravel	0.1
Sand	89.3
Silt	6.7
Clay	3.9

Processed by CC
Checked and Approved by

S Burke

S Burke - Senior Technician
17/09/2020

Project Number:

GEO / 31598

Project Name:

RANIKHET ACADEMY
6671

GEOLABS

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(Ref 1600351199)

PARTICLE SIZE DISTRIBUTION

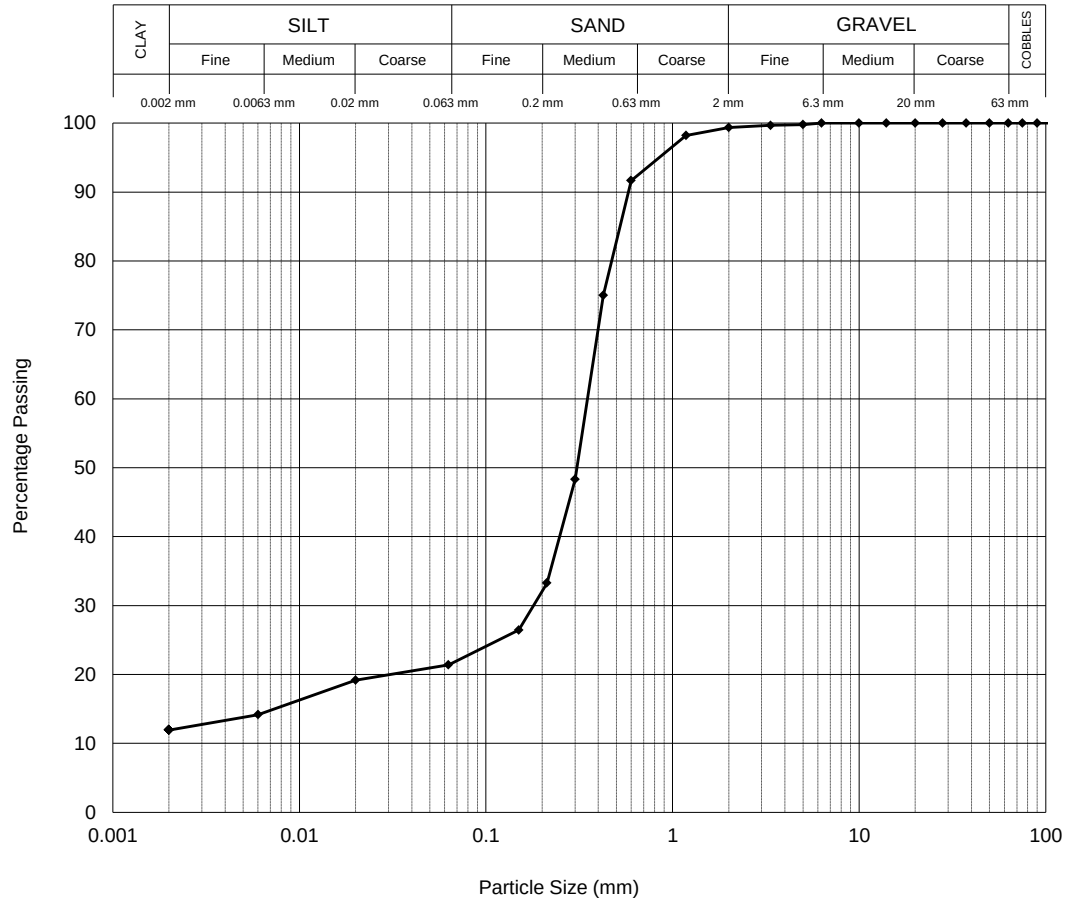
Location BH3
Depth (m) 11.00
Sample Type B

Description

Brown silty clayey SAND.

BS EN ISO 17892-4 : 2016 : Clause 5.2 - Wet Sieve
BS EN ISO 17892-4 : 2016 : Clause 5.4 - Sedimentation by Pipette

Sieve	
Size	% Pass
200.0 mm	100
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	99
1.18 mm	98
600 µm	92
425 µm	75
300 µm	48
212 µm	33
150 µm	26
63 µm	21



Sedimentation	
Pre-treatment used	
Temp (°C)	25
Size	% Pass
20 µm	19
6 µm	14
2 µm	12

Particle Density 2.70(A) Mg/m³

Particle Proportions	
Cobbles	0.0
Gravel	0.6
Sand	77.9
Silt	9.5
Clay	12.0

Processed by CC
Checked and Approved by

S Burke

S Burke - Senior Technician
17/09/2020

Project Number:

GEO / 31598

Project Name:

RANIKHET ACADEMY
6671

GEOLABS

Page 1 of 1

(Ref 1600351202)

PARTICLE SIZE DISTRIBUTION

Location
Depth (m)
Sample Type

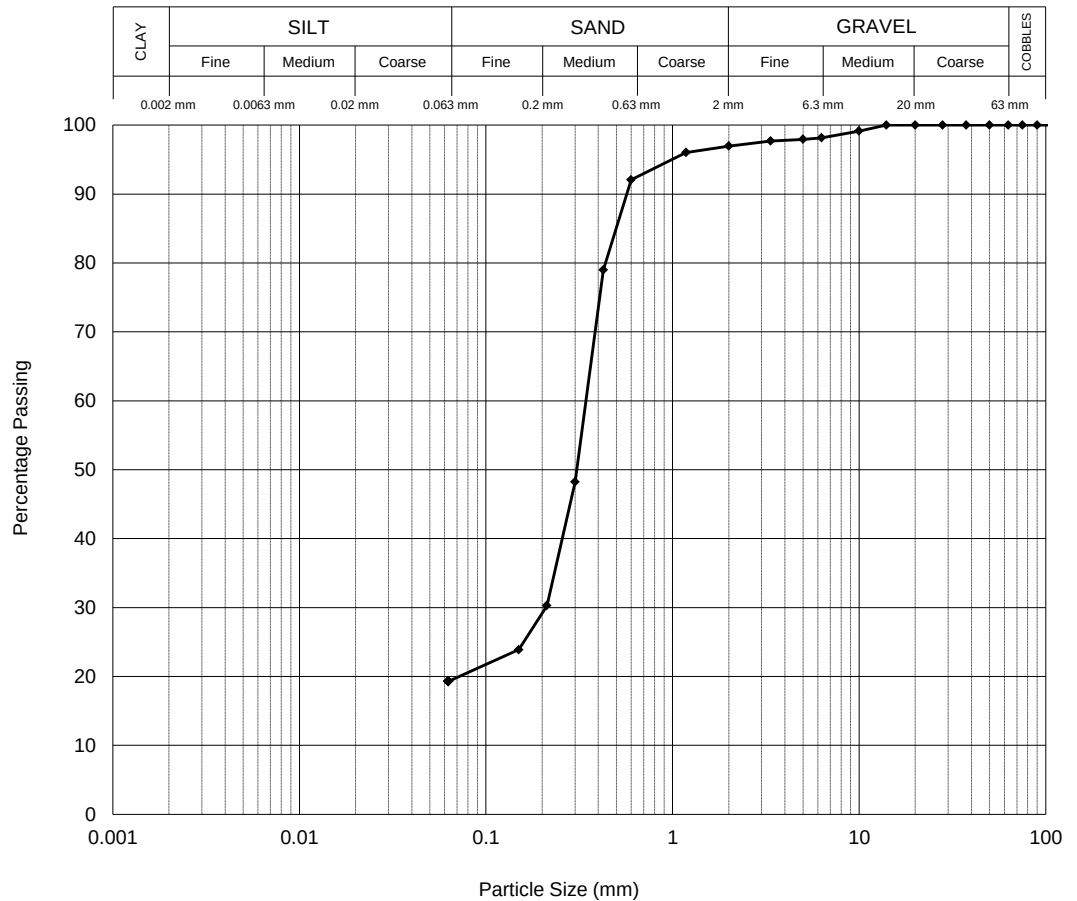
CBR2
0.30-0.60
B

Description

Dark brown clayey SAND.

BS EN ISO 17892-4 : 2016 : Clause 5.2 - Wet Sieve

Sieve	
Size	% Pass
200.0 mm	100
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	99
6.30 mm	98
5.00 mm	98
3.35 mm	98
2.00 mm	97
1.18 mm	96
600 µm	92
425 µm	79
300 µm	48
212 µm	30
150 µm	24
63 µm	19



Particle Proportions	
Cobbles	0.0
Gravel	3.0
Sand	77.7
Silt & Clay	19.3

Processed by CC
Checked and Approved by

S Burke

S Burke - Senior Technician
17/09/2020

Project Number:

GEO / 31598

Project Name:

**RANIKHET ACADEMY
6671**

GEOLABS



Page 1 of 1

(Ref 1600351205)

PARTICLE SIZE DISTRIBUTION

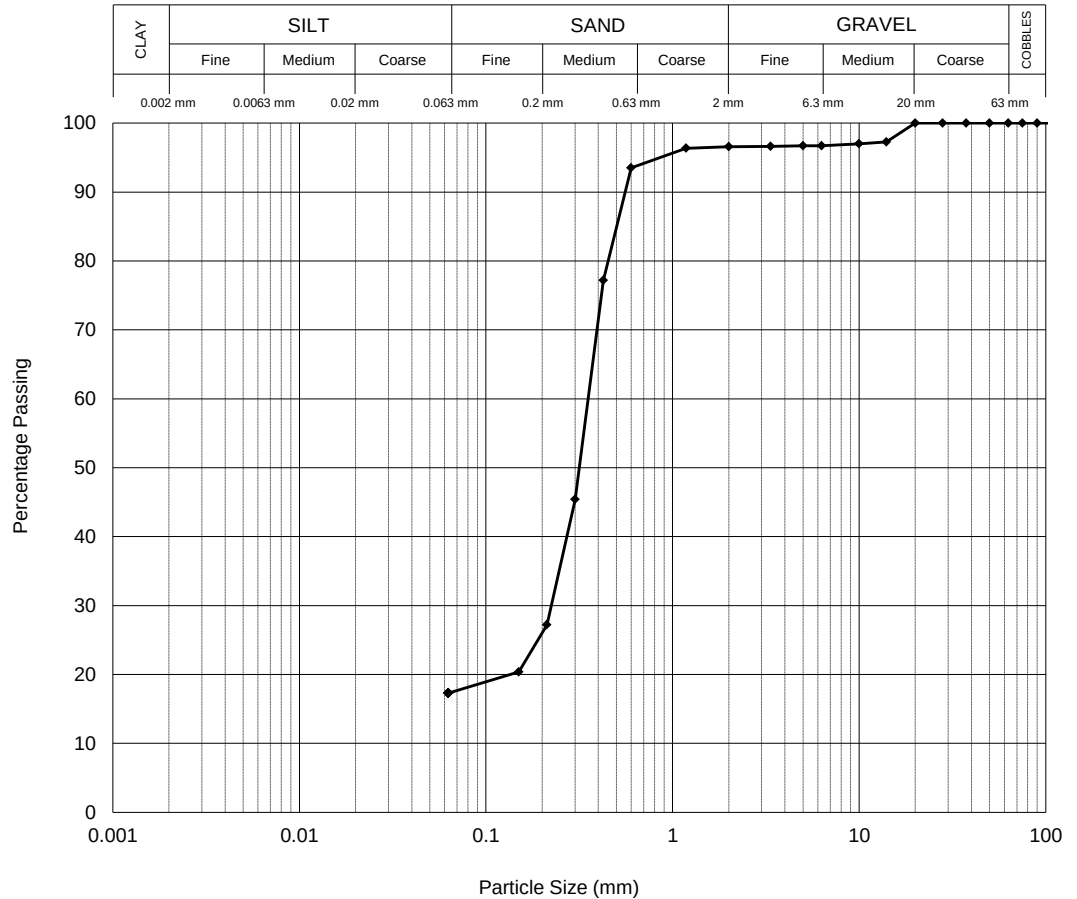
Location WS4
 Depth (m) 3.20-4.00
 Sample Type B

Description

Orangish brown clayey SAND with rare fine to medium gravel..

BS EN ISO 17892-4 : 2016 : Clause 5.2 - Wet Sieve

Sieve	
Size	% Pass
200.0 mm	100
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	97
10.0 mm	97
6.30 mm	97
5.00 mm	97
3.35 mm	97
2.00 mm	97
1.18 mm	96
600 µm	94
425 µm	77
300 µm	45
212 µm	27
150 µm	20
63 µm	17



Particle Proportions	
Cobbles	0.0
Gravel	3.4
Sand	79.3
Silt & Clay	17.3

Processed by CC
 Checked and Approved by

S Burke

S Burke - Senior Technician
 17/09/2020

Project Number:

GEO / 31598

Project Name:

**RANIKHET ACADEMY
 6671**

GEOLABS



PARTICLE SIZE DISTRIBUTION

Location
Depth (m)
Sample Type

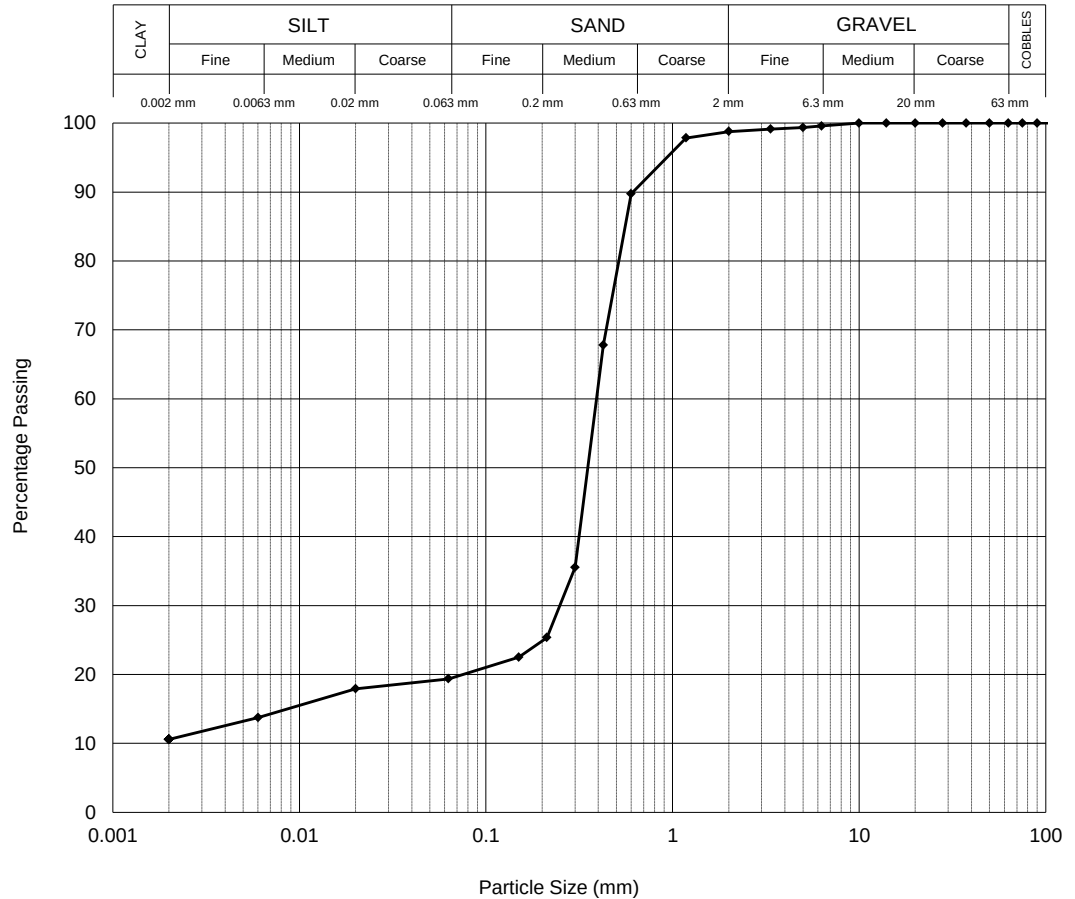
WS6
2.50-3.00
D

Description

Orange brown silty clayey SAND.

BS EN ISO 17892-4 : 2016 : Clause 5.2 - Wet Sieve
BS EN ISO 17892-4 : 2016 : Clause 5.4 - Sedimentation by Pipette

Sieve	
Size	% Pass
200.0 mm	100
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	99
3.35 mm	99
2.00 mm	99
1.18 mm	98
600 µm	90
425 µm	68
300 µm	36
212 µm	25
150 µm	23
63 µm	19



Sedimentation	
Pre-treatment used	
Temp (°C)	25
Size	% Pass
20 µm	18
6 µm	14
2 µm	11

Particle Density 2.70(A) Mg/m³

Particle Proportions	
Cobbles	0.0
Gravel	1.2
Sand	79.4
Silt	8.8
Clay	10.6

Processed by CC
Checked and Approved by

S Burke

S Burke - Senior Technician
17/09/2020

Project Number:

GEO / 31598

Project Name:

RANIKHET ACADEMY
6671

GEOLABS



PARTICLE SIZE DISTRIBUTION

Location
Depth (m)
Sample Type

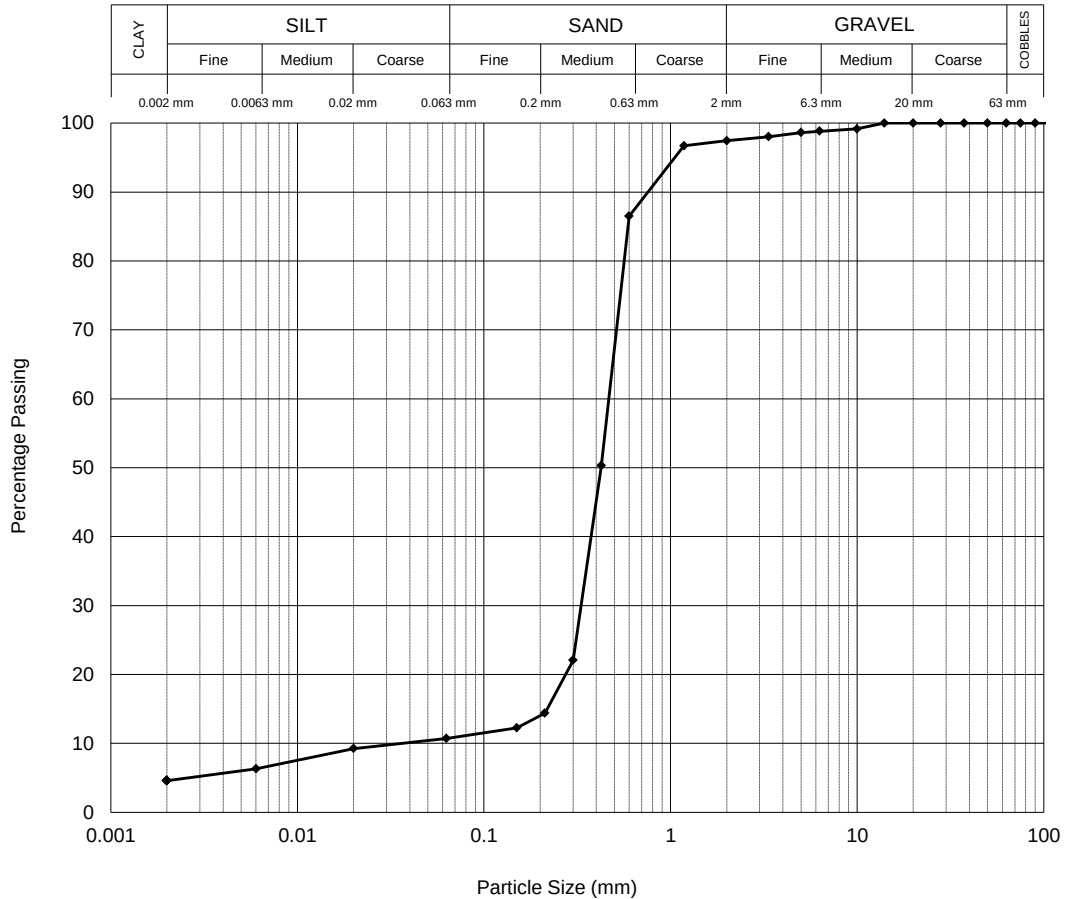
WS7
1.30-1.80
B

Description

Orangish brown slightly clayey slightly silty SAND with rare weakly cemented sandstone gravel.

BS EN ISO 17892-4 : 2016 : Clause 5.2 - Wet Sieve
BS EN ISO 17892-4 : 2016 : Clause 5.4 - Sedimentation by Pipette

Sieve	
Size	% Pass
200.0 mm	100
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	99
6.30 mm	99
5.00 mm	99
3.35 mm	98
2.00 mm	97
1.18 mm	97
600 µm	86
425 µm	50
300 µm	22
212 µm	14
150 µm	12
63 µm	11



Sedimentation	
Pre-treatment used	
Temp (°C)	25
Size	% Pass
20 µm	9
6 µm	6
2 µm	5

Particle Density 2.70(A) Mg/m³

Particle Proportions	
Cobbles	0.0
Gravel	2.6
Sand	86.8
Silt	6.1
Clay	4.5

Processed by CC
Checked and Approved by

S Burke

S Burke - Senior Technician
17/09/2020

Project Number:

GEO / 31598

Project Name:

**RANIKHET ACADEMY
6671**

GEOLABS



MOISTURE CONTENT / DRY DENSITY RELATIONSHIP

Location BH1
Depth (m) 1.50
Sample Type B

Description:

Brown very sandy slightly gravelly CLAY

Preparation

Test Method

Samples Used

Mass Retained on 37.5 mm Sieve

%

Mass Retained on 20.0 mm Sieve

%

Particle Density - Assumed

Mg/m³

Maximum Dry Density

Mg/m³

Optimum Moisture Content

%

Oven dried

2.5kg Rammer for soils with particles up to medium-gravel size

Single

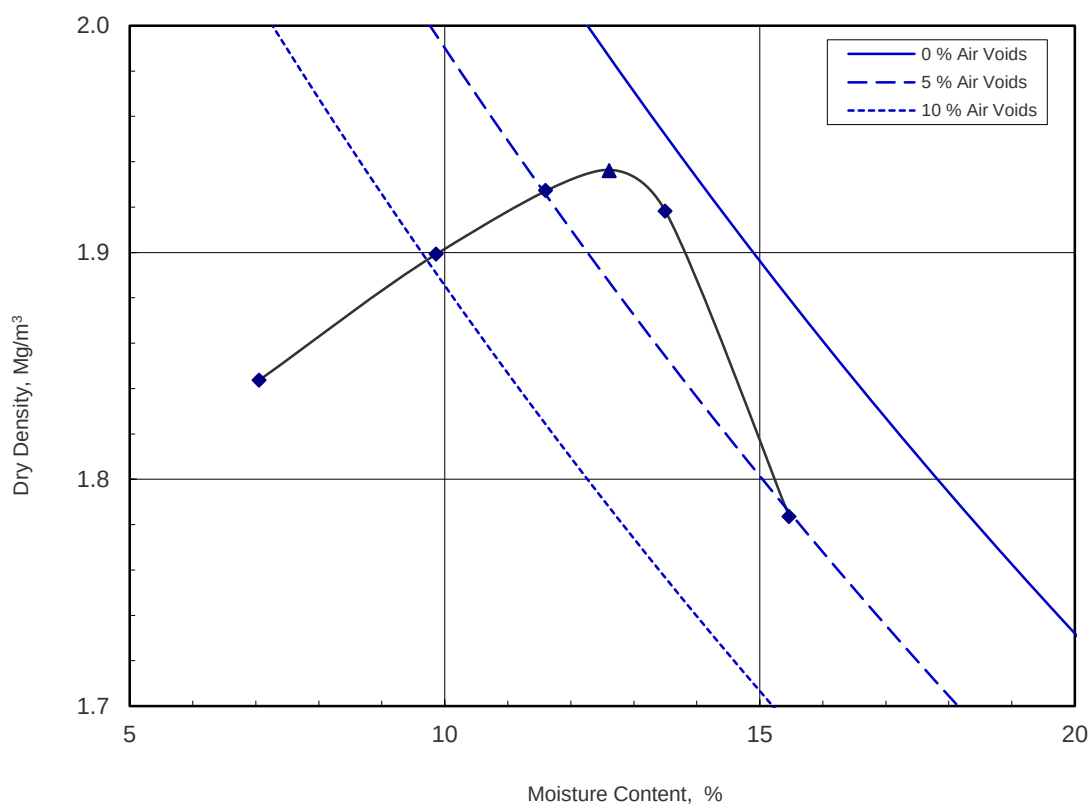
-

2

2.65

1.94

12.6



Determination	1	2	3	4	5
Moisture Content %	7.1	9.9	11.6	13.5	15.5
Dry Density Mg/m ³	1.84	1.90	1.93	1.92	1.78

Checked and Approved by:

S Burke - Senior Technician
17/09/2020

Project Number:

GEO / 31598

Project Name:

RANIKHET ACADEMY
6671



UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION

Location BH1
Depth (m) 2.00-2.45
Sample Type U

Description:

Soft to firm brown very sandy very gravelly silty CLAY.

Specimen Details

Specimen conditions	Undisturbed
Length (mm)	202.1
Diameter (mm)	101.9
Moisture content (%)	15.7
Bulk density (Mg/m ³)	1.96
Dry density (Mg/m ³)	1.70
Test Details	
Latex membrane thickness (mm)	0.3
Specimen height prior to shearing (mm)	201.4
Membrane correction (kPa)	0.4
Mean rate of shear (%/min)	2.0
Cell pressure (kPa)	40
Strain at failure (%)	5.4
Maximum deviator stress (kPa)	79
Shear Stress Cu (kPa)	39

Mode of failure

Orientation of the sample

Vertical

Distance from top of tube mm

135

Processed by SB

Checked and Approved by

S Burke - Senior Technician
17/09/2020

Project Number:

GEO / 31598

Project Name:

RANIKHET ACADEMY
6671

GEOLABS

UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION

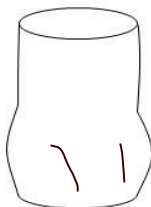
Location BH2
 Depth (m) 1.20-1.85
 Sample Type U

Description:

Very stiff dark brown sandy gravelly silty CLAY.

Specimen Details

Specimen conditions	Undisturbed
Length (mm)	202.1
Diameter (mm)	100.9
Moisture content (%)	34.2
Bulk density (Mg/m ³)	2.01
Dry density (Mg/m ³)	1.50
Test Details	
Latex membrane thickness (mm)	0.3
Specimen height prior to shearing (mm)	201.8
Membrane correction (kPa)	0.5
Mean rate of shear (%/min)	2.0
Cell pressure (kPa)	20
Strain at failure (%)	6.9
Maximum deviator stress (kPa)	205
Shear Stress Cu (kPa)	102

Mode of failure

Orientation of the sample

Vertical

Distance from top of tube mm

115

Processed by SB

Checked and Approved by

S Burke - Senior Technician
 17/09/2020

Project Number:

GEO / 31598

Project Name:

RANIKHET ACADEMY
6671

GEOLABS

		Client		Terra Firma (South)					TEST RESTRICTION	
		Project No.		31598						
		Project Name		RANIKHET ACADEMY						
The following tests have been scheduled on the above project and <u>CANNOT</u> be performed for the reason stated. If alternative samples are available for the restricted tests, please supply details.										
Laboratory ID	BH / TP No.	Sample Ref.	Depth (m)		Type	Test(s) Scheduled			Reason for Restriction	Description
368736	BH3		8.00	8.45	U		QUTXL		Unsuitable material for test. Loose sand collapsed on extrusion	Loose orangish brown fine to medium SAND.
Comments / remarks										Test restriction raised by 

		Client		Terra Firma (South)					TEST RESTRICTION	
		Project No.		31598						
		Project Name		RANIKHET ACADEMY						
The following tests have been scheduled on the above project and <u>CANNOT</u> be performed for the reason stated. If alternative samples are available for the restricted tests, please supply details.										
Laboratory ID	BH / TP No.	Sample Ref.	Depth (m)		Type	Test(s) Scheduled			Reason for Restriction	Description
368702	BH1		4.00		B	Compaction			Insufficient sample	Light brown and white chalky CLAY
368718	BH2		4.00		B	Compaction			Insufficient sample	Light brown and white chalky CLAY
382669	BH03	B5	2.00		B	Compaction			Insufficient sample	Orange brown clayey SAND
368735	WS6		2.50	3.00	D	Compaction			Insufficient sample	Orange brown clayey SAND
Comments / remarks										Test restriction raised by 

		Client		Terra Firma (South)				TEST RESTRICTION		
		Project No.		31598						
		Project Name		RANIKHET ACADEMY						
The following tests have been scheduled on the above project and <u>CANNOT</u> be performed for the reason stated. If alternative samples are available for the restricted tests, please supply details.										
Laboratory ID	BH / TP No.	Sample Ref.	Depth (m)		Type	Test(s) Scheduled			Reason for Restriction	Description
382666	WS5		1.00		B	SMC			No Suitable lumps	White structureless CHALK
368698	BH2		13.00		B	SMC			No Suitable lumps	White structureless CHALK
368715	BH1		9.00		B	SMC			No Suitable lumps	White structureless CHALK
368704	BH2		17.00		B	SMC			No Suitable lumps	White structureless CHALK
368701	BH2		6.00		B	SMC			No Suitable lumps	White structureless CHALK
368714	BH2		8.00		B	SMC			No Suitable lumps	White structureless CHALK
Comments / remarks		Test restriction raised by 								

		Client		Terra Firma (South)					TEST RESTRICTION	
		Project No.		31598						
		Project Name		RANIKHET ACADEMY						
The following tests have been scheduled on the above project and <u>CANNOT</u> be performed for the reason stated. If alternative samples are available for the restricted tests, please supply details.										
Laboratory ID	BH / TP No.	Sample Ref.	Depth (m)		Type	Test(s) Scheduled			Reason for Restriction	Description
368700	BH1		6.00		B	SMC			No suitable lumps	White structureless CHALK
368719	BH3		18.00		B	SMC			No suitable lumps	White structureless CHALK
382671	WS3		1.50		D	SMC			No suitable lumps	White structureless CHALK
Comments / remarks										Test restriction raised by 

		Client		Terra Firma (South)					TEST RESTRICTION	
		Project No.		31598						
		Project Name		RANIKHET ACADEMY						
The following tests have been scheduled on the above project and <u>CANNOT</u> be performed for the reason stated. If alternative samples are available for the restricted tests, please supply details.										
Laboratory ID	BH / TP No.	Sample Ref.	Depth (m)		Type	Test(s) Scheduled			Reason for Restriction	Description
368702	BH1		4.00		B	SMC			No suitable lumps	Light brown and white CHALK and CLAY.
368700	BH1		6.00		B	SMC			No suitable lumps	Brown fine sandy silty CLAY with rare chalk gravel and flint gravel.
368716	BH2		2.50		B	SMC			No suitable lumps	Light brown and white Gravelly CHALK and CLAY.
368718	BH2		4.00		B	SMC			No suitable lumps	White slightly gravelly structureless CHALK.
Comments / remarks										Test restriction raised by 



Contract Number: 50028

Client Ref:

Report Date: **14-10-2020**

Client PO: **6671**

Client **Terrafirma South**
The Slate Barn
Lower Lowley
Dunsford
Exeter
EX6 7BP

Contract Title: **Ranikhet Academy**
For the attention of: **kevin**

Date Received: **15-09-2020**

Date Completed: **14-10-2020**

Test Description	Qty
PSD Wet Sieve method BS 1377:1990 - Part 2 : 9.2 - * UKAS	1
Particle Density (Gas Jar) BS 1377:1990 - Part 2 : 8.2 - * UKAS	1
Saturated Moisture Content of chalk (SMC) BS 1377:1990 - Part 2 : 3.3 - * UKAS	9
Dry Den/MC (2.5kg Rammer Method 1 Litre Mould) BS 1377:1990 - Part 4 : 3.3 - * UKAS	2
Disposal of samples for job	1

Notes: Observations and Interpretations are outside the UKAS Accreditation

* - denotes test included in laboratory scope of accreditation

- denotes test carried out by approved contractor

@ - denotes non accredited tests

This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved Signatories:

Emma Sharp (Office Manager/Director) - Paul Evans (Quality/Technical Manager) - Richard John (Advanced Testing Manager)

Sean Penn (Administrative/Accounts Assistant) - Shaun Jones (Laboratory manager) - Wayne Honey (Administrative/Quality Assistant)

Saturation Moisture Content of Chalk
BS 1377 : Part 2 : 1990 Section 3.3

Contract Number	50028	
Site Name	Ranikhet Academy	
Date Tested	07/10/2020	

[illegible]

Key	Reported As	Clause
-----	-------------	--------

Moisture Content	%	3.2
Bulk Density	Mg/m ³	7.2
Dry Density	Mg/m ³	7.2
SMC	%	3.3.6

If there is a NON-STANDARD in the remarks next to the reported SMC result this means there was no lump of chalk of sufficient volume (300mL-500mL) present in the samples received to meet the testing requirements of the stated standard.

Operators	Checked	13/10/2020	Emma Sharp	
CJ	Approved	14/10/2020	Paul Evans	



PARTICLE SIZE DISTRIBUTION
BS 1377 Part 2:1990
Wet Sieve, Clause 9.2

Contract Number

50028

Borehole/Pit No.

BH3

Site Name

Ranikhet Academy

Sample No.

Soil Description

Brown silty clayey fine to coarse SAND.

Depth Top

2.50

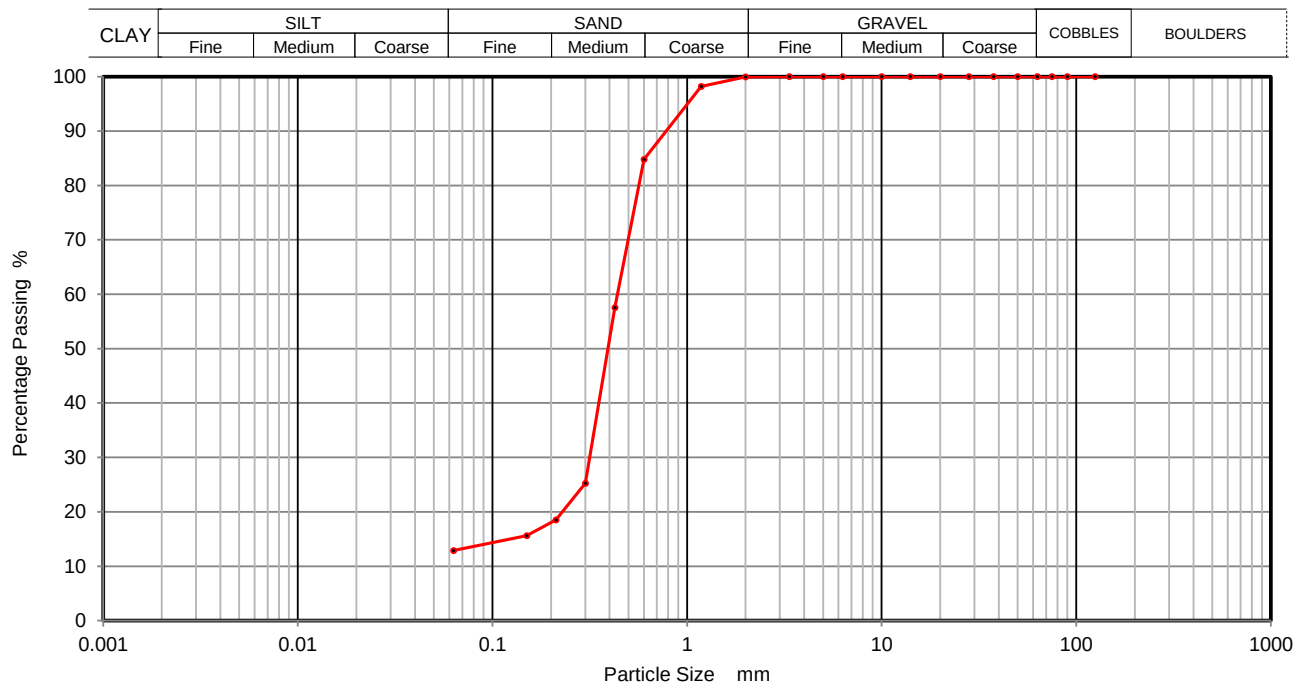
Depth Base

Date Tested

07/10/2020

Sample Type

B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	98		
0.6	85		
0.425	58		
0.3	25		
0.212	19		
0.15	16		
0.063	13		

Sample Proportions

% dry mass

Cobbles	0
Gravel	0
Sand	87
Silt and Clay	13

Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operators	Checked	13/10/2020	Wayne Honey	<i>W. Honey</i>
RO/MH	Approved	14/10/2020	Paul Evans	<i>P. Evans</i>



2788

Dry Density / Moisture Content Relationship BS 1377:Part 4:1990

Contract Number

50028

Borehole / Pit No

BH3

Project Location

Ranikhet Academy

Sample No

Date Tested

01/05/2019

Depth Top

1.50

Compaction Method

2.5 Kg Rammer

Depth Base

Compaction Clause

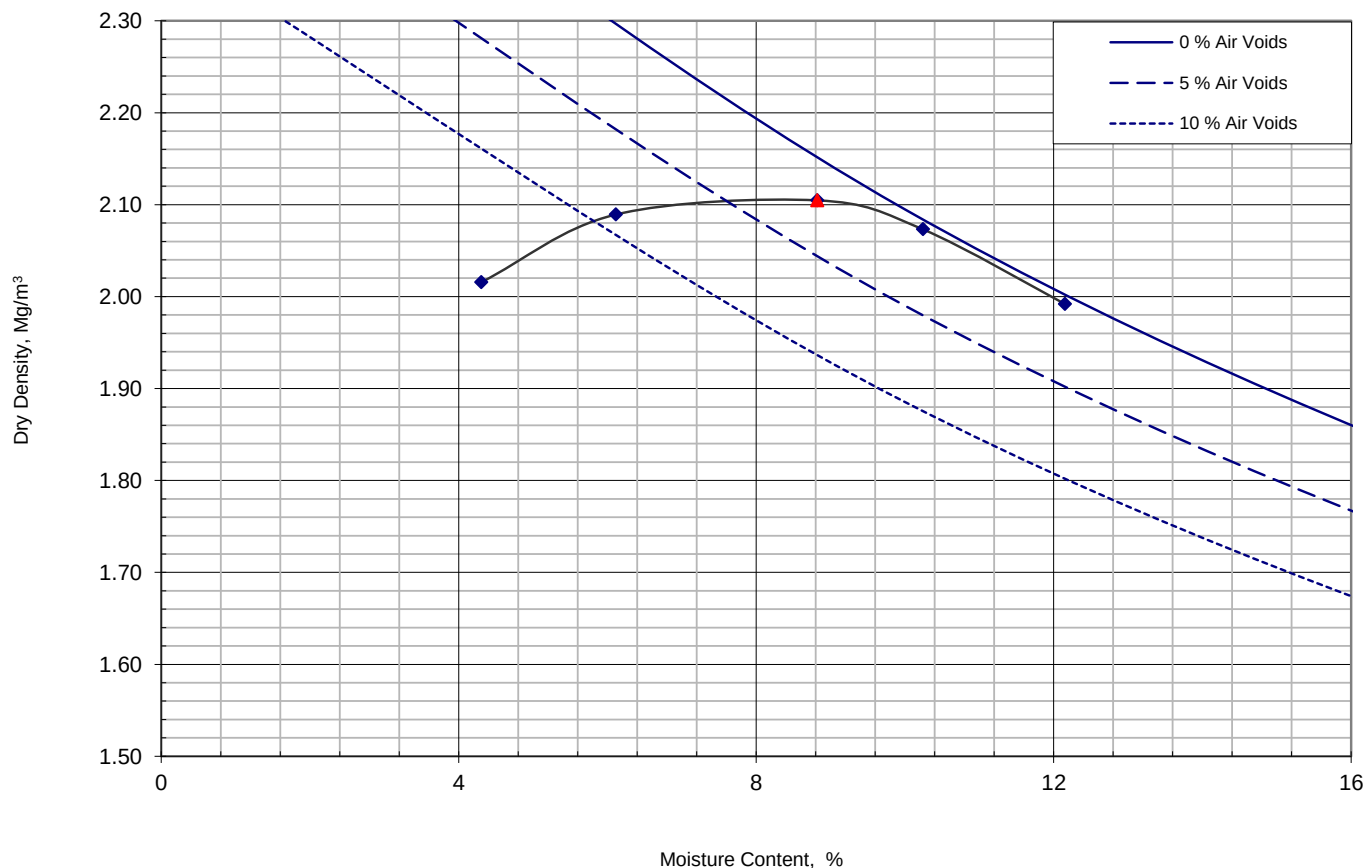
BS1377:Part 4:1990, Clause 3.3

Sample Type

B

Sample Description

Brown fine gravelly silty clayey fine to medium SAND.



Compaction Point	1	2	3	4	5						
Moisture Content	4.3	6.1	8.8	10	12						
Bulk Density	2.10	2.22	2.29	2.29	2.23						
Dry Density	2.02	2.09	2.10	2.07	1.99						

Initial Moisture Content	8.8	%
Maximum Dry Density	2.10	Mg/m3
Optimum Moisture Content	9	%
Particle Density	2.65 Assumed	Mg/m3
Material Retained 37.5mm	0	%
Material Retained 20mm	0	%

Operators	Checked	13/10/2020	Emma Sharp	
CA	Approved	14/10/2020	Paul Evans	

Dry Density / Moisture Content Relationship BS 1377:Part 4:1990

Contract Number

50028

Borehole / Pit No

BH3

Project Location

Ranikhet Academy

Sample No

Date Tested

01/05/2019

Depth Top

2.50

Compaction Method

2.5 Kg Rammer

Depth Base

3.00

Compaction Clause

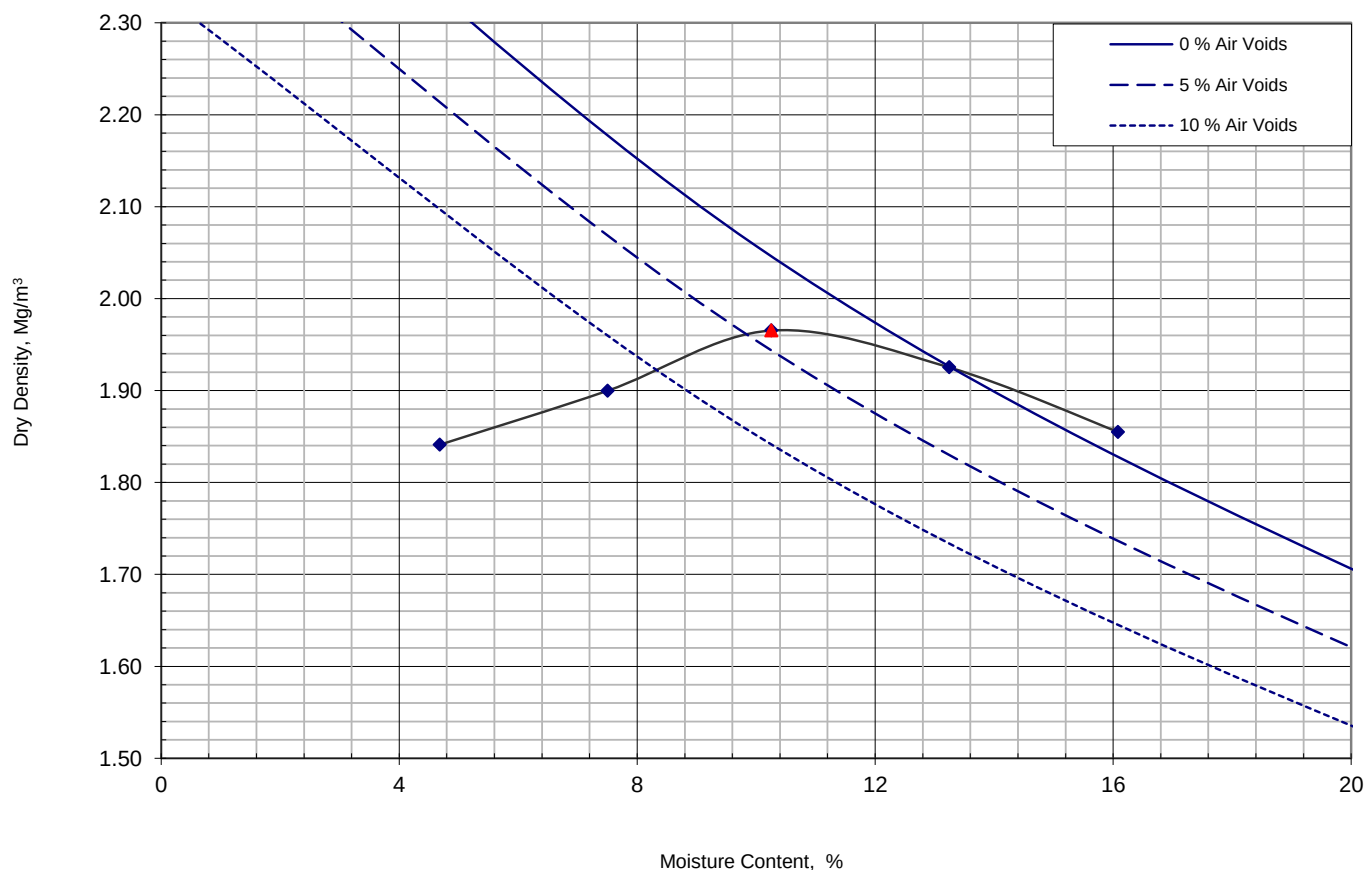
BS1377:Part 4:1990, Clause 3.3

Sample Type

B

Sample Description

Brown fine gravelly silty clayey fine to medium SAND.



Compaction Point	1	2	3	4	5						
Moisture Content	4.7	7.5	10	13	16						
Bulk Density	1.93	2.04	2.17	2.18	2.15						
Dry Density	1.84	1.90	1.97	1.93	1.86						

Initial Moisture Content	10	%
Maximum Dry Density	1.97	Mg/m3
Optimum Moisture Content	10	%
Particle Density	2.59 Measured	Mg/m3
Material Retained 37.5mm	0	%
Material Retained 20mm	0	%

Operators	Checked	13/10/2020	Emma Sharp	
CA	Approved	14/10/2020	Paul Evans	



Annex E: Gas Monitoring Results

In Situ Gas Monitoring Pro Forma



Site:	Ranikhet Academy					
Job No:	6671					
Date/Time of Visit:	10/08/2020 @ 12:00					
Atmospheric Pressure (mb):	Trend	Finish	Start	- 24 Hrs	- 48 Hrs	- 72 Hrs
	Falling	1009	1009	1017	1017	1019
Weather Conditions:	During Visit	Clear				
	- 24 Hrs	Dry / Warm / Light breeze				
Ground Conditions:	Dry					
Technician:						
Instrument:	Geotechnical Instruments Gas Analyser (GA5000) – Serial No. GS01105 Calibrated 27 th June 2019 (Certificate GS01105 2/23457)					

BH / WS No.	Flow l/hr		Methane (CH ₄) % V/V			Carbon Dioxide (CO ₂) % V/V		Oxygen (O ₂) % V/V			Water Level (mbgl)	Well Depth (mbgl)	Other Gases (ppm)			
			Peak	Steady (mins)		Peak	Steady (mins)	Min	Steady (mins)				H2S	CO	VOC	
BH02	1	0.0	0.0	1	0.0	0.5	1	0.5	19.9	1	19.9	Dry	4.05	ND	ND	ND
	2	0.0		2	0.5		2	19.9								
	3	0.0		3	0.5		3	19.9								
				5	0.5		5	19.9								
BH03	1	0.1	0.0	1	0.0	0.7	1	0.7	20.2	1	20.2	Dry	11.85	ND	ND	ND
	2	0.0		2	0.7		2	20.2								
	3	0.0		3	0.7		3	20.2								
	5			5	0.7		5	20.2								
WS02	1	0.0	0.0	1	0.0	1.0	1	1.0	19.6	1	19.6	Dry	1.62	ND	ND	ND
	2	0.0		2	1.0		2	19.6								
	3	0.0		3	1.0		3	19.6								
				5	1.0		5	19.6								
WS06	1	0.0	0.0	1	0.0	3.9	1	3.8	14.6	1	14.9	Dry	2.00	ND	ND	ND
	2	0.0		2	3.9		2	14.6								
	3	0.0		3	3.9		3	14.6								
				5	3.9		5	14.6								
WS09	1	0.0	0.0	1	0.0	1.5	1	1.5	16.8	1	16.8	Dry	2.90	ND	ND	ND
	2	0.0		2	1.5		2	16.8								
	3	0.0		3	1.5		3	16.8								
				5	1.5		5	16.8								

Notes: ND – None Detected

In Situ Gas Monitoring Pro Forma



Site:	Ranikhet Academy					
Job No:	6671					
Date/Time of Visit:	27/08/2020 @ 12:00					
Atmospheric Pressure (mb):	Trend	Finish	Start	- 24 Hrs	- 48 Hrs	- 72 Hrs
	Falling/Variable	1005	1005	1015	1002	1015
Weather Conditions:	During Visit	Cloudy				
	- 24 Hrs					
Ground Conditions:	Dry					
Technician:						
Instrument:	Geotechnical Instruments Gas Analyser (GA5000) – Serial No. GS01105 Calibrated 27 th June 2019 (Certificate GS01105_2/23457)					

BH / WS No.	Flow l/hr		Methane (CH4) % V/V		Carbon Dioxide (CO2) % V/V		Oxygen (O2) % V/V		Water Level (mbgl)	Well Depth (mbgl)	Other Gases (ppm)					
			Peak	Steady (mins)	Peak	Steady (mins)	Min	Steady (mins)			H2S	CO	VOC			
BH02	1	0.0	0.0	1	0.0	0.6	1	0.6	20.2	1	20.2	Dry	4.00	ND	ND	ND
	2	0.0		2	0.6		2	20.2								
	3	0.0		3	0.6		3	20.2								
	10			10			10									
BH03	1	-0.0	0.0	1	0.0	2.3	1	1.6	18.8	1	19.6	Dry	11.85	ND	ND	ND
	2	-0.0		2	1.9		2	19.3								
	3	-0.0		3	2.2		3	18.9								
	10			4	2.3		4	18.8								
WS02	1	0.0	0.0	1	0.0	1.1	1	1.1	19.8	1	19.8	Dry	1.60	ND	ND	ND
	2	0.0		2	1.1		2	19.8								
	3	0.0		3	1.1		3	19.8								
	10			10			10									
WS06	1	0.0	0.0	1	0.0	9.0	1	8.8	9.2	1	9.5	Dry	1.95	ND	ND	ND
	2	0.0		2	9.0		2	9.2								
	3	0.0		3	8.9		3	9.4								
	10			10			10									
WS09	1	0.1	0.0	1	0.0	1.3	1	0.5	16.7	1	17.5	Dry	2.85	ND	ND	ND
	2	0.1		2	0.7		2	17.3								
	3	0.1		3	1.0		3	16.9								
	10			5	1.3		5	16.7								

Notes: ND – None Detected

In Situ Gas Monitoring Pro Forma



Site:	Ranikhet Academy					
Job No:	6671					
Date/Time of Visit:	03/09/2020 @11.15am					
Atmospheric Pressure (mb):	Trend	Finish	Start	- 24 Hrs	- 48 Hrs	- 72 Hrs
	Falling	1007	1007	1020	1021	1022
Weather Conditions:	During Visit	Partly cloudy/ sun				
	- 24 Hrs	Partly cloudy/ sun 17 °c				
Ground Conditions:	Dry					
Technician:						
Instrument:	Geotechnical Instruments Gas Analyser (GA5000) – Serial No. GS01105 Calibrated 27 th June 2019 (Certificate GS01105 2/23457)					

BH / WS No.	Flow l/hr		Methane (CH ₄) % V/V			Carbon Dioxide (CO ₂) % V/V			Oxygen (O ₂) % V/V			Water Level (mbgl)	Well Depth (mbgl)	Other Gases (ppm)		
			Peak	Steady (mins)		Peak	Steady (mins)		Min	Steady (mins)				H2S	CO	VOC
BH02	1	0.0	0.0	1	0.0	1.3	1	1.3	18.7	1	18.7	Dry	4.02	ND	ND	ND
	2	0.0		2	1.3		2	18.8								
	3	0.0		3	1.3		3	18.8								
	10	-		5	1.3		5	18.8								
BH03	1	-0.1	0.1	1	0.1	1.2	1	0.5	19.6	1	20.4	Dry	11.85	ND	ND	ND
	2	-0.1		2	0.7		2	20.1								
	3	-0.1		3	1.2		3	19.7								
	10			5	1.2		5	19.6								
WS02	1	0.0	0.0	1	0.0	0.4	1	0.4	20.0	1	20.0	Dry	1.59	ND	ND	ND
	2	0.0		2	0.2		2	20.2								
	3	0.0		3	0.1		3	20.4								
	10	-		5	0.1		5	20.4								
WS06	1	0.0	0.0	1	0.0	8.8	1	8.7	9.4	1	9.8	Dry	1.97	ND	ND	ND
	2	0.0		2	8.8		2	9.4								
	3	0.0		3	8.8		3	9.4								
	10	-		5	8.8		5	9.4								
WS09	1	-0.0	0.0	1	0.0	2.0	1	2.0	16.4	1	16.4	1.87	2.28	ND	ND	ND
	2	-0.0		2	2.0		2	16.4								
	3	-0.0		3	2.0		3	16.4								
	10			5	2.0		5	16.4								

Notes: ND – None Detected

In Situ Gas Monitoring Pro Forma



Site:	Ranikhet Academy					
Job No:	6671					
Date/Time of Visit:	27/10/2020 @1.30pm					
Atmospheric Pressure (mb):	Trend	Finish	Start	- 24 Hrs	- 48 Hrs	- 72 Hrs
	Falling	993	993	998	995	997
Weather Conditions:	During Visit	Rain/14°c				
	- 24 Hrs	Cloud/13°c				
Ground Conditions:	Wet					
Technician:	JC					
Instrument:	Geotechnical Instruments Gas Analyser (GA5000) – Serial No. GS01105 Calibrated 27 th June 2019 (Certificate GS01105 2/23457)					

BH / WS No.	Flow l/hr		Methane (CH ₄) % V/V			Carbon Dioxide (CO ₂) % V/V			Oxygen (O ₂) % V/V			Water Level (mbgl)	Well Depth (mbgl)	Other Gases (ppm)		
			Peak	Steady (mins)		Peak	Steady (mins)		Min	Steady (mins)				H2S	CO	VOC
BH02	1	0.0	0.0	1	0.0	2	1	1.8	19.1	1	20.3	Dry	4.05	ND	ND	ND
	2	0.0		2	0.0		2	2		2	19.5					
	3	0.0		3	0.0		3	2		3	19.1					
	10	-		5	-		5	-		5	-					
BH03	1	-0.1	0.1	1	0.0	0.7	1	0.7	20.3	1	21.2	Dry	11.8	ND	ND	ND
	2	-0.1		2	0.0		2	0.7		2	21.2					
	3	-0.0		3	0.0		3	0.6		3	20.3					
	10			5	-		5	-		5	-					
WS02	1	0.0	0.0	1	0.0	2	1	1.8	18	1	18.3	Dry	1.45	ND	ND	ND
	2	0.0		2	0.0		2	2		2	18.1					
	3	0.0		3	0.0		3	2		3	18					
	10	-		5	-		5	-		5	-					
WS06	1	-0.1	0.0	1	0.0	6.7	1	6.7	13.2	1	13.2	Dry	1.95	ND	ND	ND
	2	-0.1		2	0.0		2	6.7		2	13.2					
	3	-0.1		3	0.0		3	6.7		3	13.2					
	10	-		5	-		5	-		5	-					
WS09	1	-0.0	0.0	1	0.0	1.6	1	1.4	17.3	1	17.8	Dry	2.2	ND	ND	ND
	2	-0.0		2	0.0		2	1.5		2	17.7					
	3	-0.0		3	0.0		3	1.6		3	17.3					
	10	-		5	-		5	-		5	-					

Notes: ND – None Detected

In Situ Gas Monitoring Pro Forma



Site:	Ranikhet Academy					
Job No:	6671					
Date/Time of Visit:	26/11/2020 @3.30pm					
Atmospheric Pressure (mb):	Trend	Finish	Start	- 24 Hrs	- 48 Hrs	- 72 Hrs
	Rising	1012	1012	1010	1027	1027
Weather Conditions:	During Visit	Cloud/1°c				
	- 24 Hrs	Cloud/12°c				
Ground Conditions:	Wet					
Technician:	JC					
Instrument:	Geotechnical Instruments Gas Analyser (GA5000) – Serial No. GS01105 Calibrated 27 th June 2019 (Certificate GS01105 2/23457)					

BH / WS No.	Flow l/hr		Methane (CH ₄) % V/V			Carbon Dioxide (CO ₂) % V/V			Oxygen (O ₂) % V/V			Water Level (mbgl)	Well Depth (mbgl)	Other Gases (ppm)		
			Peak	Steady (mins)		Peak	Steady (mins)		Min	Steady (mins)				H2S	CO	VOC
BH02	1	-0.1	0.2	1	0.2	1.3	1	1.3	19.9	1	19.9	Dry	4.05	ND	ND	ND
	2	-0.1		2	0.1		2	19.9								
	3	-0.1		3	0.1		3	19.9								
	10	-		5	-		5	-								
BH03	1	-0.1	0.0	1	0.0	2.2	1	2.2	19	1	19	Dry	11.8	ND	ND	ND
	2	-0.0		2	0.0		2	19.1								
	3	-0.0		3	0.0		3	19.1								
	10			5	-		5	-								
WS02	1	-0.1	0.0	1	0.0	0.2	1	0.2	21.2	1	21.2	Dry	1.45	ND	ND	ND
	2	-0.1		2	0.0		2	21.2								
	3	-0.1		3	0.0		3	21.2								
	10	-		5	-		5	-								
WS06	1	+0.0	0.0	1	0.0	5.9	1	5.9	16	1	16.1	Dry	1.95	ND	ND	ND
	2	+0.0		2	0.0		2	16								
	3	+0.0		3	0.0		3	16								
	10	-		5	-		5	-								
WS09	1	+0.0	0.0	1	0.0	0.5	1	0.5	21	1	21	Dry	2.2	ND	ND	ND
	2	+0.0		2	0.0		2	21								
	3	+0.0		3	0.0		3	21								
	10	-		5	-		5	-								

Notes: ND – None Detected

In Situ Gas Monitoring Pro Forma



Site:	Ranikhet Academy					
Job No:	6671					
Date/Time of Visit:	09/12/2020 @3.30pm					
Atmospheric Pressure (mb):	Trend	Finish	Start	- 24 Hrs	- 48 Hrs	- 72 Hrs
	Rising	1007	1007	1002	998	1002
Weather Conditions:	During Visit	Cloud/6°C				
	- 24 Hrs	Cloud/3°C				
Ground Conditions:	Wet					
Technician:	JC					
Instrument:	Geotechnical Instruments Gas Analyser (GA5000) – Serial No. GS01105 Calibrated 27 th June 2019 (Certificate GS01105 2/23457)					

BH / WS No.	Flow l/hr		Methane (CH ₄) % V/V		Carbon Dioxide (CO ₂) % V/V		Oxygen (O ₂) % V/V		Water Level (mbgl)	Well Depth (mbgl)	Other Gases (ppm)		
			Peak	Steady (mins)	Peak	Steady (mins)	Min	Steady (mins)			H2S	CO	VOC
BH02	1	+0.0	0	1 0.0	1.4	1 1.4	20.3	1 20.3	DRY	4.00	ND	ND	ND
	2	+0.0		2 0.0		2 1.4		2 20.3					
	3	+0.0		3 0.0		3 1.4		3 20.3					
	10	-		5 -		5 -		5 -					
BH03	1	-0.0	0	1 0.0	0.7	1 0.7	20	1 20.2	DRY	11.80	ND	ND	ND
	2	-0.0		2 0.0		2 0.7		2 20.2					
	3	-0.0		3 0.0		3 0.6		3 20					
	10	-		5 -		5 -		5 -					
WS02	1	+0.0	0	1 0.0	0.2	1 0.2	20.9	1 21	DRY	1.45	ND	ND	ND
	2	+0.0		2 0.0		2 0.2		2 20.9					
	3	+0.1		3 0.0		3 0.2		3 20.9					
	10	-		5 -		5 -		5 -					
WS06	1	+0.0	0	1 0.0	5.3	1 5.3	16.6	1 16.7	DRY	1.95	ND	ND	ND
	2	+0.0		2 0.0		2 5.3		2 16.6					
	3	+0.0		3 0.0		3 5.3		3 16.6					
	10	-		5 -		5 -		5 -					
WS09	1	+0.0	0	1 0.0	0.8	1 0.8	19.2	1 19.2	DRY	2.20	ND	ND	ND
	2	+0.1		2 0.0		2 0.8		2 19.4					
	3	+0.1		3 0.0		3 0.7		3 19.5					
	10	-		5 -		5 -		5 -					

Notes: ND – None Detected