

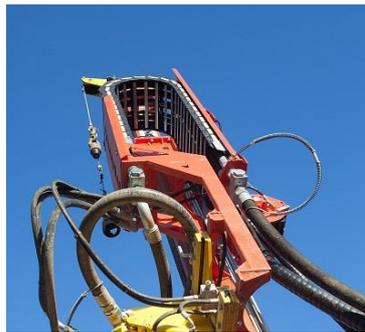


REPORT NO: D9148

**GEOENVIRONMENTAL APPRAISAL FOR LAND AT
QUEEN ELIZABETH HIGH SCHOOL, HEXHAM**

PREPARED FOR:

FAITHFUL+GOULD



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Contract No.	D9148
Job Name	Queen Elizabeth High School, Hexham

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QUEEN ELIZABETH HIGH SCHOOL, HEXHAM – EXECUTIVE SUMMARY
SUMMARY OF GEOENVIRONMENTAL ISSUES

Issue	Remarks
Grid Reference	392380, 563970.
Proposed Development	New school buildings with associated areas of car parking, access roads and soft landscaping.
Former Uses	Initially a large country house and estate (Westfield House), which was converted to a hydropathic therapy centre in the late 19 th century, then a training college in the 1960s, a hotel, and then most recently as a wedding venue. School buildings have also been present in the east of the site since the 1980s.
Present Uses	Existing school complex with a large five-storey main building, connected buildings and associated outbuildings, large lawned areas and sports pitches, artificial turf areas, a wedding venue, an educational garden, and mixed woodland.
Topsoil	Topsoil present to between 0.3 and 0.7m bgl, locally reworked/disturbed in MBH4.
Made Ground	Absent.
Natural Ground	Firm and stiff sandy gravelly clays.
Contamination	No significant contamination identified during this investigation.
Mining & Quarrying	The site does not lie within an area affected by shallow coal workings. The site has not been affected by quarrying.
Foundation Solution	Strip foundations.
Groundwater & Excavations	No major groundwater flows encountered. The site has been previously developed and buried obstructions may be present on the site. A cobbled roadway was encountered at shallow depths in the northeast of the site.
Highways	A CBR of at least 3% should be achievable within natural clay.
Remediation and Preparatory Works	Excavation and removal of topsoil.
Recommendations for Further SI Works	Further ground investigation is recommended once the layout and extent of the proposed development scheme is known.

The executive summary is intended as a synopsis only. Further detail and limitations of the assessment is provided within the main body of the Report

CONTENTS

1	INTRODUCTION.....	1
1.1	SCOPE OF INVESTIGATION	1
2	SITE RECONNAISSANCE	1
2.1	GENERAL	1
2.2	TOPOGRAPHY AND SITE FEATURES	1
3	PREVIOUS PHASE 1 DESK STUDY (SOLMEK).....	2
3.1	REVIEW OF PHASE 1 DESK STUDY	2
3.2	PRELIMINARY CONCEPTUAL SITE MODEL	2
4	SITE WORKS AND LABORATORY TESTING	3
4.1	CONCEPTUAL SITE MODEL	3
4.2	SUMMARY OF INVESTIGATION	4
4.3	CHEMICAL TESTING	4
4.4	GEOTECHNICAL TESTING	4
5	GROUND CONDITIONS & MATERIAL PROPERTIES.....	4
5.1	GENERAL	4
5.2	TOPSOIL	4
5.3	MADE GROUND	4
5.4	HARDSTANDING.....	4
5.5	BURIED OBSTRUCTIONS	4
5.6	NATURAL SOILS	5
5.7	ROCK HEAD	5
5.8	GROUNDWATER	5
5.9	HYDROCARBON CONTAMINATION.....	5
5.10	CONCRETE IN AGGRESSIVE GROUND	5
5.11	SOAKAWAY TESTS	5
6	CHEMICAL TESTING RESULTS.....	5
6.1	SELECTION OF CHEMICAL TESTING.....	5
6.2	GENERIC ASSESSMENT CRITERIA FOR INORGANIC CONTAMINATION	6
6.3	TOPSOIL	6
6.4	ASBESTOS TESTING	7
6.5	ORGANIC CONTAMINATION	7
7	ASSESSMENT OF CONTAMINATION RISKS	8
7.1	SUMMARY OF CONTAMINATION SOURCES.....	8
7.2	HAZARD ASSESSMENT	8
8	FOUNDATIONS AND GEOTECHNICAL ISSUES.....	9
8.1	INTRODUCTION.....	9
8.2	MINING.....	9
8.3	FOUNDATIONS	9
8.4	FLOOR SLABS	10
8.5	BURIED OBSTRUCTIONS	10
8.6	EXCAVATIONS.....	10
8.7	ROAD PAVEMENT DESIGN	10
8.8	FURTHER INVESTIGATION WORKS.....	11

LIST OF APPENDICES

APPENDIX A - Drawings

Drawing Number Drawing Title

D9148/01 Site Location Plan

D9148/02 Exploratory Hole Location Plan

APPENDIX B - Exploratory Hole Records

APPENDIX C - Chemical Testing Results

APPENDIX D - Geotechnical Testing Results (including Soakaway Test Results)

APPENDIX E - Dunelm Conditions of Offer, Notes on Limitations & Basis for Contract



1 INTRODUCTION

1.1 SCOPE OF INVESTIGATION

Dunelm Geotechnical and Environmental Limited (Dunelm) were instructed by Faithful+Gould to undertake a Geoenvironmental Appraisal of land at Queen Elizabeth High School in Hexham, Northumberland.

It is proposed to develop the site with new school buildings with associated areas of car parking, access roads and soft landscaping; the layout and extent of the proposed development scheme was not available to Dunelm at the time of the investigation.

A Phase 1 desk study has previously been produced for the site by Solmek (ref. S181019, dated October 2018) which has been reviewed as part of these works. Reference should be made to this report for details of the site's history and environmental setting.

The objectives of this exploratory phase of investigation were as follows:

- To review the previous desk study report for the site.
- To determine ground conditions underlying the site.
- To determine soil infiltration rates.
- To assess risks from ground contamination.
- To provide recommendations for foundations.

This report may be regarded as providing a Preliminary Risk Assessment and Generic Quantitative Risk Assessment in accordance with the Environment Agency's guidance document Model Procedures for the Management of Land Contamination (Contaminated Land Report 11, 2004).

Conditions of offer and notes on limitations relevant to all Dunelm geoenvironmental investigations are described in Appendix E and should be read in conjunction with this report.

2 SITE RECONNAISSANCE

2.1 GENERAL

The site is located at the Winter Gardens in Hexham, approximately 1km to the west of the town centre on the north side of Allendale Road, and covers an area of c.9.88ha. The Ordnance Survey Grid Reference for the site is 392380, 563970. The site location is shown on Drawing No. D9148/01 presented in Appendix A to this report.

A site inspection was undertaken on 1st November 2018 and existing site features are shown on Drawing No. D9148/02 presented in Appendix A to this report.

2.2 TOPOGRAPHY AND SITE FEATURES

The site comprises a school complex with a large five-storey main building, connected buildings and associated outbuildings, large lawned areas and sports pitches, artificial turf areas, a wedding venue, a former tennis court now used as an educational garden, and areas of mixed woodland. The site perimeter is mostly wooded.

The site is raised bound by Allendale Road to the south, Wetstone Road to the east, residential property to the north and agricultural fields to the west. The site is gently undulating and generally slopes west to east. Large areas have been landscaped for use as sports pitches, but undeveloped areas of woodland are located to the north and south of the Winter Gardens.

An electrical substation is present in the southeast of the site.

3 PREVIOUS PHASE 1 DESK STUDY (SOLMEK)

3.1 REVIEW OF PHASE 1 DESK STUDY

A Phase 1 desk study has previously been produced for the site by Solmek (dated October 2018), a copy of which was made available to Dunelm for review. A summary of the pertinent details from this report is presented below, however, reference should be made to the Solmek report for full details of the site's history and environmental setting.

SUMMARY OF PHASE 1 DESK STUDY

Subject	Details
Site History	The earliest plans show that the site was mostly undeveloped, with a large country house and estate occupying the centre of the site (Westfield House). This was converted to a hydropathic therapy centre in the late 19 th century, a training college in the 1960s, a hotel, and most recently as a wedding venue. School buildings have been present in the east of the site since the 1980s. The surrounding area was predominantly agricultural and wooded, prior to the development of Hexham to the west generally comprising residential dwellings.
Geology	The site is shown to be underlain by Carboniferous Stainmore Formation comprising sandstone, siltstone, mudstone and thin limestones and some coals, and Lower Coal Measures sandstones. The drift deposits on site are likely to comprise glacial deposits of sandy, gravelly (boulder) clay with some lenses of sand and gravel, and glaciofluvial deposits of sand and gravel.
Mining and Quarrying	The site lies within Coal Mining Affected Area, however, no seams are recorded to have been worked within the likely zone of physical influence on the surface. A sandstone quarry is mapped 342m to the southwest at Woodley Field.
Hydrogeology	The underlying Carboniferous Stainmore Formation is classified as a Secondary (A) Aquifer. The site does not lie within a groundwater Source Protection Zone. There are four groundwater abstractions located within 1km of the site, the nearest being 150m to the east and listed as production of hydroelectric power generation.
Hydrology	The nearest surface water feature is an unnamed tertiary river located immediately to the north and west of the site. There are seven discharge consents within 500m of the site, the nearest being located 33m to the northeast and registered to Northumbrian Water Ltd in 1973.
Flooding	The site is not at risk of flooding from river or seas.
Radon	No radon protection measures are required in new buildings or extensions on the site.
Landfill and Waste	There are no recorded landfills or waste management facilities within 500m of the site.

3.2 PRELIMINARY CONCEPTUAL SITE MODEL

As part of the Phase 1 desk study, Solmek produced a Preliminary Conceptual Site Model.

Likely ground conditions were anticipated to comprise made ground comprising or hardstanding and topsoil, underlain by boulder clay deposits overlying sandstone, siltstone and mudstone bedrock. Buried obstructions may be present on the site, potentially comprising relict foundations, bricks and stone blocks.

A copy of the Preliminary Conceptual Site Model as determined by Solmek is reproduced overleaf:

CONCEPTUAL SITE MODEL AS DETERMINED BY SOLMEK

Source		Pathway		Receptor	
Ground gas <ul style="list-style-type: none"> Made ground No landfills within 250m <p>The site is not in a Radon Affected area</p>	→	Ground gas migration Through underlying soils and ingress into structures Underlying rock strata	→	Users of the site after development is complete <ul style="list-style-type: none"> Adult and infant house-holders 	
Contamination from historic land use <ul style="list-style-type: none"> Construction and demolition waste PCBs from electrical substations on site 	→	Dermal absorption Inhalation of soils Soil ingestion Contaminated water contact Wind-blown dust contact	→	Users of the site after development is complete <ul style="list-style-type: none"> Adult and infant house-holders 	
	→		→	Users of the site during development <ul style="list-style-type: none"> Construction workforce Nearby residents 	
	→		→	Users of surrounding sites <ul style="list-style-type: none"> Residential housing adjacent to site boundary 	
	→	Uptake via roots and leaf surfaces	→	Vegetation <ul style="list-style-type: none"> Trees present on site Trees possible as part of soft landscaping No garden areas proposed 	
	→	Slow seepage/leaching contaminants (soils of high leaching potential)	→	Groundwater <ul style="list-style-type: none"> Bedrock is Secondary (A) Aquifer Superficial deposits are Secondary Aquifer (undifferentiated) Site is not within a Source Protection Zone 	
	→	Slow seepage/leaching contaminants (soils of high leaching potential) Accumulation of contaminated sediments	→	Surface Water <ul style="list-style-type: none"> None on site Rivers located immediately north and west of the site 	
	→	Direct contact	→	Construction Materials <ul style="list-style-type: none"> Concrete Service fabric 	
Risk Classification					
Very High	High	Moderate	Moderate/Low	Low	Very Low

4 SITE WORKS AND LABORATORY TESTING

4.1 CONCEPTUAL SITE MODEL

A preliminary conceptual site model, including an assessment of potential pollutant linkages, has been determined by Solmek as part of a previous desk study for the site.

The site has been occupied previously and it is possible that contamination is present associated with the

site's previous commercial and educational uses.

No specific potential contaminants have been identified associated with the former uses, although contamination associated with construction and demolition wastes, and possibly oils or fuels from vehicle spills, may be present.

The main receptors include future site users and Controlled Water receptors.

4.2 SUMMARY OF INVESTIGATION

The exploratory holes listed below, as specified by Faithful+Gould, were advanced on 1st November 2018. Records for each of the exploratory holes noted are included in Appendix B and the locations are shown on Drawing No. D9148/02 presented in Appendix A to this report.

- Hand-dug trial pits: HDPs 1 and 2.
- Soakaway tests: HDP 2 only.
- Mini percussion boreholes: WS1 to 4.

4.3 CHEMICAL TESTING

Appropriate samples were delivered to a suitably accredited laboratory with a schedule of testing drawn up by Dunelm. The laboratory test results are presented in Appendix C to this report and discussed in section 6.

4.4 GEOTECHNICAL TESTING

Samples of natural soil were delivered to a geotechnical laboratory with a schedule of testing drawn up by Dunelm. The geotechnical laboratory test results are presented in Appendix D to this report. Material properties assessed using the results are considered further in the following section.

5 GROUND CONDITIONS & MATERIAL PROPERTIES

5.1 GENERAL

Strata encountered were generally similar beneath all parts of the site. Ground conditions are described in the following sections.

5.2 TOPSOIL

Topsoil was encountered in all six exploratory holes formed by Dunelm during this investigation to depths of between 0.3 and 0.7m bgl and was typically noted to be a brown variably gravelly clayey sand/clayey sand with rootlets. The topsoil was noted to be disturbed/reworked around MBH4 with ash, coal, sandstone, concrete and wood present.

5.3 MADE GROUND

A suspected former cobbled roadway was encountered in five hand-dug inspection pits excavated in the vicinity of MBH4 at a depth of 0.4m bgl. No further made ground was encountered in the exploratory holes formed.

5.4 HARDSTANDING

Hardstanding was not encountered in the exploratory holes formed.

5.5 BURIED OBSTRUCTIONS

A suspected former cobbled roadway was encountered in several hand-dug inspection pits in the vicinity of MBH4 at a depth of 0.4m bgl.

Cobbles were encountered within the glacial till within the window sample boreholes drilled at which point boreholes were terminated.

5.6 NATURAL SOILS

The natural soils at the site consisted of firm and stiff sandy gravelly clays to depths of at least 3.42m bgl, with gravel of fine to coarse sandstone, mudstone and coal, and occasional cobbles.

SPT N values of between 9 and 50+ were recorded in the four boreholes drilled by Dunelm, indicating the soils to be firm and stiff in nature. Where a SPT of 50+ was recorded in MBH1 at 3.0m bgl this was suspected to be on a cobble and the borehole was terminated.

Geotechnical testing undertaken on eight samples of the natural clay reported moisture contents of between 10% and 16%, and plasticity indices of between 8 and 21, indicating the natural clay to be of typically low, occasionally intermediate, plasticity, and of low volume change potential based upon a modified plasticity index.

An assessment of the liquidity index for the eight samples indicate them to be stiff and very stiff in nature.

5.7 ROCK HEAD

Rock head was not encountered during this investigation.

5.8 GROUNDWATER

Groundwater was not encountered during this investigation.

5.9 HYDROCARBON CONTAMINATION

No visual or olfactory evidence of hydrocarbon contamination was noted during the investigation.

5.10 CONCRETE IN AGGRESSIVE GROUND

To enable buried concrete to be designed to resist sulfate attack, samples of topsoil and natural strata from depths corresponding to the anticipated foundation depth have been tested for water-soluble sulfate and pH.

The maximum water-soluble sulfate concentration is 230mg/l and the lowest recorded pH value is 7.0.

Based on the above results, Design Sulfate Class DS-1 and ACEC Classification AC-1s would be appropriate for buried concrete at the site.

5.11 SOAKAWAY TESTS

A soakaway test was performed in HDP 1 in accordance with the methods outlined in BRE Digest 365. The test results are presented in Appendix D to this report. The water did not fully soakaway, and an inferred infiltration rate of 2.16E-06m/s has been calculated.

6 CHEMICAL TESTING RESULTS

6.1 SELECTION OF CHEMICAL TESTING

This section represents the 'Hazard Identification' process required in accordance with CLR11.

The site's former usage is not considered likely to have given rise to significant ground contamination.

No significant made ground was encountered during this investigation.

Appropriate chemical testing has been undertaken taking into account potential contaminants identified and evidence of contamination recorded during the ground investigation.

Laboratory test certificates are presented in Appendix C to this report. The test results are presented in the following sections.

6.2 GENERIC ASSESSMENT CRITERIA FOR INORGANIC CONTAMINATION

Generic Assessment Criteria (GAC) appropriate to current UK practice for the assessment of inorganic contamination are shown in the table below. These criteria are dependent on the nature of the proposed development. In addition, some contaminants depend on other soil parameters as shown.

GENERIC ASSESSMENT CRITERIA FOR HUMAN HEALTH

	Residential (based on 6% SOM)	Residential without homegrown produce (based on 6% SOM)	Commercial (based on 6% SOM)	Allotments (based on 6% SOM)	Public Open space (resi) (based on 6% SOM)
<i>All values in mg/kg</i>					
Arsenic	37	40	640	43	79
Cadmium	11	85	190	1.9	120
Chromium (Total)	910	910	8,600	18,000	1,500
Chromium (VI)	6	6	33	1.8	7.7
Copper	2,400	7,100	68,000	520	12,000
Lead	200*	310*	2,330*	80*	No SSV
Mercury	40	56	1,100	19	120
Nickel	130	180	980	53	230
Selenium	250	430	12,000	88	1,100
Zinc	3,700	40,000	730,000	620	81,000

Soil Screening Values from The LQM/CIEH S4ULs for human Health Risk Assessment (2015). *taken from DEFRA C4SL database.

6.3 TOPSOIL

A summary of the results of inorganic testing on three samples of topsoil is shown in the table below.

INORGANIC TEST RESULTS - TOPSOIL

Contaminant	Units	No. of topsoil samples tested	No. of samples exceeding GAC	Generic Assessment Criteria	Max concentration
pH	-	3	0	<5 and >9	7.0 to 7.5
Arsenic	mg/kg	3	0	640	12
Cadmium	mg/kg	3	0	190	0.62
Chromium (Total)	mg/kg	3	0	8,600	17
Chromium (VI)	mg/kg	3	0	33	<0.5
Lead*	mg/kg	3	0	2,330	340
Mercury	mg/kg	3	0	1,100	0.33
Nickel	mg/kg	3	0	980	36
Selenium	mg/kg	3	0	21,000	1.2
Copper	mg/kg	3	0	68,000	49
Zinc	mg/kg	3	0	730,000	290
Asbestos	-	3	0	Present	NAD

Soil Screening Values from The LQM/CIEH S4ULs for human Health Risk Assessment (2015) for a commercial end use. *taken from DEFRA C4SL database.

The results of testing of three samples of topsoil showed no exceedances of GAC values for a commercial end use.

Three samples of topsoil tested for total cyanide were all below the laboratory's limit of detection (0.5mg/kg).

6.4 ASBESTOS TESTING

Asbestos was not detected in the three samples of topsoil tested.

6.5 ORGANIC CONTAMINATION

The selection of hydrocarbon (organic) testing was based on the conceptual model devised by Solmek and the assessment of potential contamination sources.

Analysis for organic determinands has been carried out in general accordance with the EA Report: *The UK Approach for Evaluating Human Health Risks from Petroleum Hydrocarbons in Soils* (2005). Consequently, selected samples of topsoil were tested for the following:

- 13 petroleum hydrocarbon fractions based on the methodology of the United States Total Petroleum Hydrocarbon Criteria Working Group (TPH CWG).
- Polycyclic aromatic hydrocarbon (PAH) compounds.
- Polychlorinated biphenyls (PCBs).

Results for the 13 petroleum hydrocarbon fractions are presented in the table below together with appropriate generic assessment criteria.

SUMMARY OF RESULTS FOR PETROLEUM HYDROCARBON FRACTIONS

EC bands	Aromatic fractions							Aliphatic fractions					
	5-7	7-8	8-10	10-12	12-16	16-21	21-35	5-6	6-8	8-10	10-12	12-16	16-35
GAC (residential with plant uptake) mg/kg	140	290	83	180	330	540	1500	78	230	65	330	2,400	92,000
GAC (residential without plant uptake) mg/kg	690	1,800	110	590	2,300	1,900	1,900	78	230	65	330	2,400	92,000
GAC (allot) mg/kg	27	51	21	31	57	110	820	1,700	5,600	770	4,400	13,000	270,000
GAC (comm) mg/kg	46,000	110,000	8,100	28,000	37,000	28,000	28,000	5,900	17,000	4,800	23,000	82,000	1,700,000
GAC (Public Open Space)	56,000	56,000	5,000	5,000	5,100	3,800	3,800	590,000	610,000	13,000	13,000	13,000	250,000
Sample location & depth (m bgl)	Recorded concentrations (mg/kg) - exceedances in bold												
MBH3 0.1m	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

Soil Screening Values from the LQM/CIEH S4ULs for Human Health Risk Assessment (2015) for a 2.5% SOM soil, for a commercial end use.

The above assessment of the 13 petroleum hydrocarbon fractions indicates that no significant TPH concentrations have been recorded in the one sample of topsoil tested during this investigation.

Appropriate samples were tested for Fraction of Organic Carbon and the results ranged from 4.7% to 26%.

Three samples of topsoil were tested for selected polycyclic aromatic hydrocarbon (PAH) compounds.

An assessment of selected PAH compounds is shown in the following table together with Generic Assessment Criteria (GAC) from the LQM guidance.

SUMMARY OF RESULTS FOR POLYCYCLIC AROMATIC HYDROCARBONS

Contaminant	Generic Assessment Criteria (mg/kg)					No. of samples tested	No. of samples with value greater than GAC	Max concentration (mg/kg)
	Resi with plant uptake	Residential without home grown produce	Allotments	Comm / industrial	Public Open Space			
Naphthalene	5.6	5.6	10	460	4,900	3	0	0.12
Acenaphthylene	420	4,600	69	97,000	15,000	3	0	0.17
Acenaphthene	510	4,700	85	97,000	15,000	3	0	0.37
Fluorene	400	3,800	67	68,000	9,900	3	0	0.36
Phenanthrene	220	1,500	38	22,000	3,100	3	0	3.4
Anthracene	5400	35,000	950	540,000	74,000	3	0	0.73
Fluoranthene	560	1,600	130	23,000	3,100	3	0	6.4
Pyrene	1,200	3,800	270	54,000	7,400	3	0	5.7
Benz(a)anthracene	11	14	6.5	170	29	3	0	3.3
Chrysene	22	31	9.4	350	57	3	0	3.5
Benzo(b)fluoranthene	3.3	4	2.1	44	7.2	3	0	4.5
Benzo(k)fluoranthene	93	110	75	1200	190	3	0	2.2
Benzo(a)pyrene	2.7	3.2	2	35	5.7	3	0	3.0
Indeno(1,2,3,-cd)pyrene	36	46	21	510	82	3	0	2.1
Dibenz(a,h)anthracene	0.28	0.32	0.27	3.6	0.57	3	0	1.4
Benzo(g,h,i)perylene	340	360	470	4000	640	3	0	2.0

Soil Screening Values from the LQM/CIEH S4ULs for Human Health Risk Assessment (2015) for 2.5% SOM soil, for a commercial end use.

All three samples of topsoil tested for PAHs fall below the relevant guideline values.

One sample of topsoil from MBH1, located closest to the existing electrical substation, was tested for PCBs (seven congeners), however, each of the seven congeners was below the laboratory's limit of detection (0.01mg/kg).

Three samples of topsoil tested for total phenols were all below the laboratory's limit of detection (0.3mg/kg).

7 ASSESSMENT OF CONTAMINATION RISKS

7.1 SUMMARY OF CONTAMINATION SOURCES

TOPSOIL

Topsoil of between 0.3 and 0.7m thickness is present around the existing buildings. Testing has indicated that this material does not contain elevated concentrations of the determinands tested.

MADE GROUND

No made ground was identified in the holes formed by Dunelm during this investigation.

HYDROCARBON CONTAMINATION

No significant hydrocarbon contamination, including PCBs, was encountered during this investigation.

7.2 HAZARD ASSESSMENT

No sources of contamination have been encountered during this limited investigation and consequently no unacceptable risks have been identified to date. The exact development proposals are not known at this stage and therefore it may be required to undertake further investigation works once these are known.

Although no contamination has been identified during this investigation, the site has been previously developed and contamination may be present elsewhere on the site. Should it be proposed to demolish existing buildings as part of the proposed development scheme, then further investigation should be undertaken.

Although asbestos was absent from the soil samples in the exploratory holes, the possibility exists that asbestos may lie presently undetected at the site. It is therefore advised that a 'watching brief' is undertaken during the construction works and advice sought if asbestos is found or suspected.

8 FOUNDATIONS AND GEOTECHNICAL ISSUES

8.1 INTRODUCTION

It is proposed to develop the site with new school buildings with associated areas of car parking, access roads and soft landscaping, although the layout and extent of the proposed development scheme was not available to Dunelm at the time of the investigation.

Ground conditions encountered during this investigation comprised topsoil to 0.7m bgl underlain by firm and stiff sandy gravelly clays to depths of at least 3.42m bgl, with gravel and occasional cobbles. Made ground was absent in the exploratory holes formed by Dunelm.

Rock was not encountered during this investigation.

8.2 MINING

No evidence has been found to indicate that the site is underlain by coal workings at shallow depth.

No evidence has been found to indicate that the site has been affected by quarrying.

8.3 FOUNDATIONS

Due to the heterogeneous nature of the topsoil and any made ground present, unacceptable total and differential settlements may occur if foundations are placed on topsoil and any made ground present. Therefore, foundations should be taken through topsoil and any made ground present onto underlying natural ground of adequate bearing capacity.

It is considered that conventional strip foundations should be suitable for the proposed structures based upon a ground conditions encountered during this investigation. Depending on proposed development proposals, further investigation works may be required.

Sub-surface concrete should be Design Sulphate Class DS-1, with the site allocated an ACEC Classification of AC-1s.

Based on the visual description of the soils, in situ geotechnical testing and laboratory geotechnical testing undertaken as part of this limited investigation, a safe bearing capacity of 100kN/m² has been determined for strip foundations 0.6m wide founding on the natural clay at depths of at least 0.75m bgl. At this width of foundation and bearing pressure settlements should be less than 25mm. This should be confirmed as part of any further ground investigation works undertaken once the proposed development scheme is known.

Based on plasticity index results, all cohesive soils at the site should be regarded as being of low volume change potential. Foundations should therefore be placed at a minimum depth of 0.75m below original or finished ground level, whichever is the lower.

Foundations near existing trees should be deepened and provided with appropriate heave precautions in accordance with current guidance. Dependent on the trees present, and once the proposed development scheme is finalised, then a piled foundation solution may be considered to be more appropriate.

Relict foundations are anticipated in the vicinity of the former buildings. Foundations in areas of former structures may need to be deepened to found within suitable strata.

Overdeepened foundations should be stepped in accordance with current guidance.

Where existing trees are to be felled, it is recommended that a tree survey be undertaken prior to felling. This would enable detailed foundation recommendations to be provided.

Foundations should be taken below a line drawn up at 45° from the base of existing or proposed services or foundations.

It should be recognised that clay rich soils can deteriorate fairly rapidly on exposure, particularly in periods of wet weather and frost. It would be prudent to protect all exposed soils in foundation excavations with a concrete blinding layer, particularly if they are likely to remain open for extended period of time.

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

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

8.4 FLOOR SLABS

In accordance with NHBC guidelines, suspended floor slabs should be adopted where made ground exceeds 0.6m in thickness. Therefore, on this site ground bearing floor slabs should be appropriate.

Where significantly desiccated soil is present, or where foundation depths are to be increased to more than 1.5m due to the presence of trees, a suspended ground floor slab construction should be adopted. The suspended slab should have a minimum void height in accordance with NHBC Standards Chapter 4.2.

8.5 BURIED OBSTRUCTIONS

The site has been previously developed and buried obstructions may be present on the site.

A cobbled roadway was encountered at shallow depths in the northeast of the site.

Occasional cobbles were noted to be present in the firm and stiff sandy gravelly clay.

8.6 EXCAVATIONS

Observations made during the fieldwork indicate that minor groundwater flows may be anticipated in shallow excavations. However, the rapid rate of advancement of the exploratory holes may mask minor seepages and it should be borne in mind that water levels fluctuate with a number of influences including season, rainfall, dewatering and pumping activities. Therefore, water levels significantly higher than those found during this investigation may be encountered.

Excavation sides should be designed, constructed and supported in accordance with the recommendations given in CIRIA Report No. 97.

It is recommended that an adequate drainage system for surface water be installed by a competent contractor in order to prevent surface water ponding or collecting during and post construction, which may in turn lead to deterioration of the founding stratum.

Based on the nature of the ground conditions encountered, excavations should be within the capacity of normal earthworks plant although breaking out of relict foundations and other obstructions should be anticipated.

8.7 ROAD PAVEMENT DESIGN

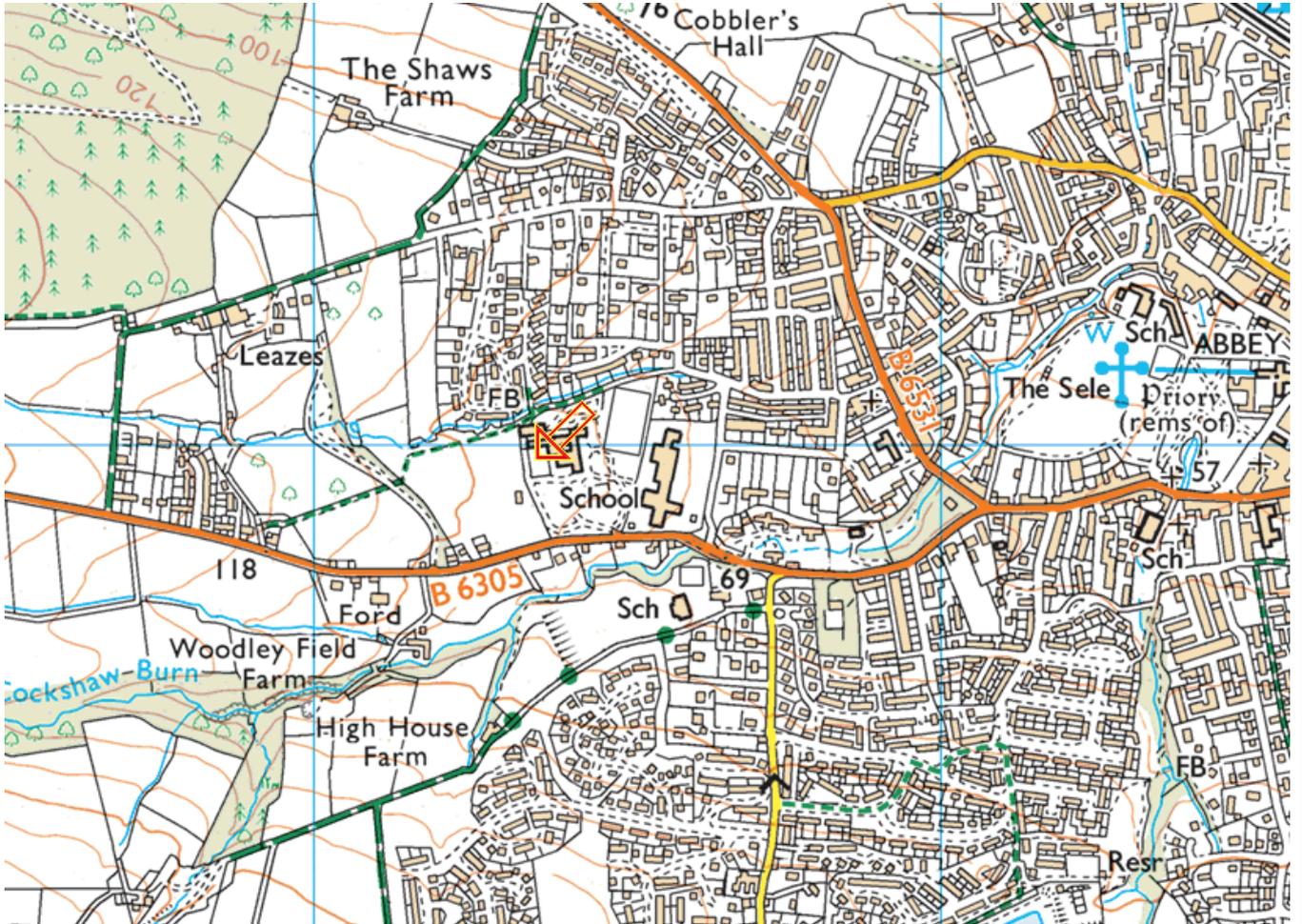
A CBR value of 3% should be assumed for highway construction within natural clays. This is based on a visual inspection of the soils, the results of plasticity index testing and published tables (Design Manual for Roads and Bridges – Volume 7, Section 2 – January 1999).

8.8 FURTHER INVESTIGATION WORKS

Further ground investigation is recommended once the layout and extent of the proposed development scheme is known, including within the footprint of any existing buildings which are to be demolished as part of the development scheme.

Appendix A
Drawings





Ordnance Survey © Crown copyright 2012 All rights reserved. Licence number 100048410.

	Contract: Queen Elizabeth High School, Hexham		Contract No: D9148	
	Client: Faithful+Gould			
TEL: 0191 378 3151 FAX: 0191 378 3157	Drawing Title: Site Location Plan			
Drawing No: D9148/01	Date: November 2018	Scale: NTS	Status: Final	Drawn by: RS



-  Hand Dug Pits
-  Mini Rig Boreholes

	Contract: Queen Elizabeth High School, Hexham		
	Drawing Title: Exploratory Hole Location Plan		
Drawing No: D9148/02	Date: November 2018	Scale: NTS	Drawn by: MO

Appendix B
Exploratory Hole Records



INFORMATION GENERALLY RELATING TO ALL EXPLORATORY HOLE RECORDS

GENERAL

Borehole/Trial Pit No

The exploratory hole identity number used throughout the report.

Site

The ground investigation project name.

Client

Client's name responsible for funding the ground investigation project.

Ground Level and Location

The precise ground level in meters above Ordnance Datum at the exploratory hole location from which the reduced level for each stratigraphic boundary is calculated. The exploratory hole position is given as either national grid-coordinates or local grid as specified.

ABBREVIATIONS

Samples

- B** Bulk disturbed sample generally representative of the soil type for cohesive and fine granular soils.
- D** Small disturbed tub sample normally taken at intermediate depth between other sampling or testing operations. The sample is stored in an airtight container.
- BRE** Sample taken for electrochemical testing
- ES** Sample of potentially contaminated materials.
- C** Core sample.
- SB** Bulk disturbed sample subsampled from a liner sample
- SD** Small disturbed tub sample subsampled from a liner sample.
- U** 100mm diameter undisturbed thick walled sample (OS-TK/W)
- UT** 100mm diameter undisturbed thin walled sample (OS-T/W)
- UF** An attempted but failed 100mm undisturbed sample.
- W** Water sample.

In-situ Testing

- CBR** California Bearing Ratio mould sample or test.
- SPT** Standard Penetration Test (SPT) using the split barrel sampler (shoe). The corresponding 'N' value is given in the test result column.

Rock Quality and Core Recovery

- TCR** Total core recovery - The length of the recovered core expressed as a percentage of the length of core run.
- SCR** Solid Core Recovery - The sum length of all core pieces (measured along the centre of the core), expressed as a percentage of the length core run.

- RQD** Rock Quality Designation- The sum length of all core pieces that are 100mm or longer (measured along the centre of the core), expressed as a percentage of the length of core run.
- FI** Fracture Index- The number of fractures per 1000mm length of solid core.
- NI** Non-intact- The material recovered in a non-intact state.
- NR** No recovery from the core run.
- AZCL** Assessed Zone of Core Loss.

COBBLE CONTENT

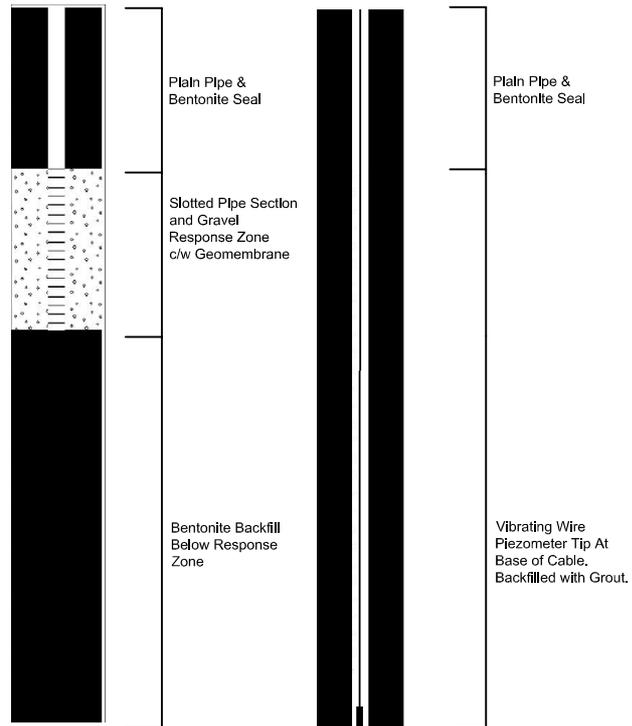
Low <10%, medium 10 – 20%, high >20%

Exploratory Hole Log Legend

BOREHOLE LEGEND:

TOPSOIL	
MADE GROUND	
SILT	
CLAY	
SAND	
GRAVEL	
PEAT	
MUDSTONE	
SILTSTONE	
SANDSTONE	
LIMESTONE	
CHALK	
COAL	
BENTONITE/ GROUT	

MONITORING INSTALLATION LEGEND:



NB Where strata consists of material of more than one soil or rock type the legends are appropriately combined.



Dunelm Geotechnical & Environmental Ltd
 Foundation House, St John's Road, Meadowfield
 Durham, DH78TZ
 Tel: 0191 378 3151
 Fax: 0191 378 3157
 e-mail: admin@dunelm.co.uk
 web: www.dunelm.co.uk



BOREHOLE RECORD

Borehole HDP1

Contract No: D9148

Site: Queen Elizabeth High School, Hexham

GL (m AOD) - Scale 1:50
Easting: -
Northing: -

Client: Faithful+Gould

Driller: RB

Logged By: MO

Sheet 1 of 1

Method: Hand Dug Pit

Checked By: RS

Dates: 01/11/2018

SAMPLE DETAILS			(Casing) Groundwater	STRATA RECORD Description	Depth (m)	Level (m AOD)	Legend	Well/ Backfill
Type	Depth From-To (m)	Insitu Testing						
				TOPSOIL: Brown slightly clayey gravelly SAND with abundant rootlets. Brown slightly clayey gravelly SAND with low cobble content.	0.30 0.30 0.70			
				End of Borehole at 1.00 m	1.00			
					2			
					3			
					4			
					5			
					6			
					7			
					8			
					9			
					10			

Ground Water (m)					Chiselling / Hard Strata			Casing Depths		Hole Diameter		General Remarks
Depth Struck (m)	Casing Depth (m)	Water Level	Minutes	Water sealed (m)	From (m)	To (m)	Time (hr)	Diameter (mm)	Depth (m)	Diameter (mm)	Depth (m)	
												1. No groundwater encountered. 2. Soakaway pit performed.

Log last updated 08/11/2018



BOREHOLE RECORD

Borehole HDP2

Contract No: D9148

Site: Queen Elizabeth High School, Hexham

GL (m AOD) Scale 1:50
 -
 Easting: Northing:
 -

Client: Faithful+Gould

Driller: RB

Logged By: MO

Sheet 1 of 1

Method: Hand Dug Pit

Checked By: RS

Dates: 01/11/2018

SAMPLE DETAILS			Casing Groundwater	STRATA RECORD Description	Depth (m)	Level (m AOD)	Legend	Well/ Backfill
Type	Depth From-To (m)	Insitu Testing						
D	0.20			TOPSOIL: Brown clayey gravelly sand. Gravel is subrounded to rounded, fine to coarse of sandstone.	(0.30)			
D	0.50			Stiff brown mottled grey gravelly CLAY with occasional cobbles. Gravel is subangular to subrounded, fine to coarse of sandstone and limestone. (Glacial Till)	0.30 (0.70)			
			1	End of Borehole at 1.00 m	1.00			
			2					
			3					
			4					
			5					
			6					
			7					
			8					
			9					
			10					

Ground Water (m)					Chiselling / Hard Strata			Casing Depths		Hole Diameter		General Remarks
Depth Struck (m)	Casing Depth (m)	Water Level	Minutes	Water sealed (m)	From (m)	To (m)	Time (hr)	Diameter (mm)	Depth (m)	Diameter (mm)	Depth (m)	
												1. No groundwater encountered

Log last updated 08/11/2018



BOREHOLE RECORD

Borehole MBH4

Contract No: D9148

Site: Queen Elizabeth High School, Hexham

GL (m AOD) - Scale 1:50
 Easting: -
 Northing: -

Client: Faithful+Gould

Driller: RC

Logged By: MO

Sheet 1 of 1

Method: Windowless Sampling

Checked By: RS

Dates: 01/11/2018

SAMPLE DETAILS			Casing Groundwater	STRATA RECORD Description	Depth (m)	Level (m AOD)	Legend	Well/ Backfill
Type	Depth From-To (m)	Insitu Testing						
ES ES D	0.20 0.20 0.30			TOPSOIL: Black gravelly sand. Gravel is ash, coal, sandstone with occasional wood.	(0.70)			
D SPT (S)	1.20 1.20 - 1.65	N=15 (3,2/2,3,4,6)	1 (1.20) Dry	Stiff brown sandy gravelly CLAY. Gravel is angular to subrounded, fine to coarse of sandstone, mudstone and coal. (Glacial Till)	0.70			
D	1.60				(2.15)			
D SPT (S) D	2.00 2.00 - 2.45 2.20	N=35 (15,6/5,8,10,12)	2 (2.00) Dry					
D SPT (S)	2.40 2.40 - 2.85	N=44 (7,9/10,10,11,13)	(2.40) Dry					
			3	End of Borehole at 2.85 m	2.85			
			4					
			5					
			6					
			7					
			8					
			9					
			10					

Ground Water (m)					Chiselling / Hard Strata			Casing Depths		Hole Diameter		General Remarks
Depth Struck (m)	Casing Depth (m)	Water Level	Minutes	Water sealed (m)	From (m)	To (m)	Time (hr)	Diameter (mm)	Depth (m)	Diameter (mm)	Depth (m)	
												1. Hand dug inspection pit to 1.20m. 2. No groundwater encountered. 3. Borehole terminated at 2.85m due to barrel refusal.

Log last updated 08/11/2018

Appendix C
Chemical Testing Records





Final Report

Report No.: 18-34381-1

Initial Date of Issue: 14-Nov-2018

Client: Dunelm Geotechnical and Environmental

Client Address: Foundation House
St Johns Road
Meadowfield
County Durham
DH78TZ

Contact(s): Rob Schofield

Project: D9148

Quotation No.: **Date Received:** 06-Nov-2018

Order No.: 15673/RS/D9184 **Date Instructed:** 06-Nov-2018

No. of Samples: 3

Turnaround (Wkdays): 6 **Results Due:** 13-Nov-2018

Date Approved: 14-Nov-2018

Approved By:



Details: Martin Dyer, Laboratory Manager

Project: **D9148**

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:				18-34381	18-34381	18-34381
Quotation No.:	Chemtest Sample ID.:				719134	720338	720340
	Sample Location:				MBH1	MBH3	MBH4
	Sample Type:				SOIL	SOIL	SOIL
	Top Depth (m):				0.10	0.10	0.20
	Date Sampled:				01-Nov-2018	01-Nov-2018	01-Nov-2018
	Asbestos Lab:				COVENTRY	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	No Asbestos Detected
Moisture	N	2030	%	0.020	21	12	9.6
pH	U	2010		N/A	7.0	7.5	7.5
Sulphate (2:1 Water Soluble) as SO4	U	2120	mg/l	10.000	< 10	80	230
Cyanide (Total)	U	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Arsenic	U	2450	mg/kg	1.0	7.8	9.2	12
Cadmium	U	2450	mg/kg	0.10	0.45	0.62	0.46
Chromium	U	2450	mg/kg	1.0	17	15	17
Copper	U	2450	mg/kg	0.50	24	36	49
Mercury	U	2450	mg/kg	0.10	0.33	0.14	0.19
Nickel	U	2450	mg/kg	0.50	18	20	36
Lead	U	2450	mg/kg	0.50	170	190	340
Selenium	U	2450	mg/kg	0.20	0.73	0.70	1.2
Zinc	U	2450	mg/kg	0.50	120	170	290
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Organic Matter	U	2625	%	0.40	4.7	6.7	26
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0		< 1.0	
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0		< 1.0	
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0		< 1.0	
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0		< 1.0	
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0		< 1.0	
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0		< 1.0	
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0		< 1.0	
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0		< 1.0	
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0		< 5.0	
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0		< 1.0	
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0		< 1.0	
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0		< 1.0	
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0		< 1.0	
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0		< 1.0	
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0		< 1.0	
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0		< 1.0	
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0		< 1.0	
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0		< 5.0	
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0		< 10	
Naphthalene	U	2700	mg/kg	0.10	< 0.10	< 0.10	0.12

Project: D9148

Client: Dunelm Geotechnical and Environmental	Chemtest Job No.:				18-34381	18-34381	18-34381
Quotation No.:	Chemtest Sample ID.:				719134	720338	720340
	Sample Location:				MBH1	MBH3	MBH4
	Sample Type:				SOIL	SOIL	SOIL
	Top Depth (m):				0.10	0.10	0.20
	Date Sampled:				01-Nov-2018	01-Nov-2018	01-Nov-2018
	Asbestos Lab:				COVENTRY	COVENTRY	COVENTRY
Determinand	Accred.	SOP	Units	LOD			
Acenaphthylene	U	2700	mg/kg	0.10	< 0.10	< 0.10	0.17
Acenaphthene	U	2700	mg/kg	0.10	< 0.10	< 0.10	0.37
Fluorene	U	2700	mg/kg	0.10	< 0.10	< 0.10	0.36
Phenanthrene	U	2700	mg/kg	0.10	0.55	< 0.10	3.4
Anthracene	U	2700	mg/kg	0.10	< 0.10	< 0.10	0.73
Fluoranthene	U	2700	mg/kg	0.10	0.39	0.46	6.4
Pyrene	U	2700	mg/kg	0.10	0.48	0.45	5.7
Benzo[a]anthracene	U	2700	mg/kg	0.10	0.16	0.26	3.3
Chrysene	U	2700	mg/kg	0.10	0.43	0.49	3.5
Benzo[b]fluoranthene	U	2700	mg/kg	0.10	< 0.10	< 0.10	4.5
Benzo[k]fluoranthene	U	2700	mg/kg	0.10	< 0.10	< 0.10	2.2
Benzo[a]pyrene	U	2700	mg/kg	0.10	< 0.10	< 0.10	3.0
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10	< 0.10	< 0.10	2.1
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10	< 0.10	< 0.10	1.4
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10	< 0.10	< 0.10	2.0
Total Of 16 PAH's	U	2700	mg/kg	2.0	2.0	< 2.0	39
PCB 28	U	2815	mg/kg	0.010	< 0.010		
PCB 52	U	2815	mg/kg	0.010	< 0.010		
PCB 90+101	U	2815	mg/kg	0.010	< 0.010		
PCB 118	U	2815	mg/kg	0.010	< 0.010		
PCB 153	U	2815	mg/kg	0.010	< 0.010		
PCB 138	U	2815	mg/kg	0.010	< 0.010		
PCB 180	U	2815	mg/kg	0.010	< 0.010		
Total PCBs (7 Congeners)	N	2815	mg/kg	0.10	< 0.10		
Total Phenols	U	2920	mg/kg	0.30	< 0.30	< 0.30	< 0.30

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.
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Alkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
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-diphenylcarbazide.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2680	TPH A/A Split	Aliphatics: >C5-C6, >C6-C8,>C8-C10, >C10-C12, >C12-C16, >C16-C21, >C21-C35, >C35- C44Aromatics: >C5-C7, >C7-C8, >C8- C10, >C10-C12, >C12-C16, >C16- C21, >C21- C35, >C35- C44	Dichloromethane extraction / GCxGC FID detection
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID
2815	Polychlorinated Biphenyls (PCB) ICES7Congeners in Soils by GC-MS	ICES7 PCB congeners	Acetone/Hexane extraction / GC-MS
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

Appendix D

Geotechnical Testing Results (including Soakaway Test Results)



Laboratory Report Front Sheet

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



Site name	Job number
QEHS, Hexham	D9148

Client details:

Reference: D9148
Name: Dunelm
Address: Foundation House,
St John's Road,
Meadowfield,
County Durham,
DH7 8TZ

Telephone: 0191 3783151
Email: rschofield@dunelm.co.uk

FAO: R Schofield

Date commenced: 06/11/2018

Date reported: 22/11/2018

Observations and interpretations are outside of the UKAS Accreditation

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

Samples will be held at the laboratory for a period of 4 weeks after the report date. After the 22-12-2018 all samples will be disposed of. Should further testing be required then the office should be informed before the above date.

Signature:	Approved Signatories:
	<input checked="" type="checkbox"/> K Watkin (Lab Manager) <input type="checkbox"/> U Mazhar (Assistant Lab Manager) <input type="checkbox"/> I Nicholson (Technical Manager)



Final Report

Report No.: 18-35530-1

Initial Date of Issue: 21-Nov-2018

Client: Solmek Ltd

Client Address: 12 Yarm Road □
Stockton-on-Tees □
TS18 3NA

Contact(s): Kathryn Watkin □
Office

Project: D9148 QEHS, Hexham

Quotation No.: **Date Received:** 13-Nov-2018

Order No.: **Date Instructed:** 13-Nov-2018

No. of Samples: 7

Turnaround (Wkdays): 5 **Results Due:** 19-Nov-2018

Date Approved: 21-Nov-2018

Approved By:



Details: Robert Monk, Technical Manager □

Project: D9148 QEHS, Hexham

Client: Solmek Ltd		Chemtest Job No.:									
		Chemtest Sample ID.:									
Quotation No.:		18-35530	18-35530	18-35530	18-35530	18-35530	18-35530	18-35530	18-35530	18-35530	18-35530
		723939	723940	723941	723942	723943	723944	723945			
		Sample Location:									
		HDP2	MBH1	MBH1	MBH2	MBH3	MBH3	MBH4			
		Sample Type:									
		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL			
		Top Depth (m):									
		0.50	0.60	1.70	1.20	0.80	1.60	1.20			
Determinand	Accred.	SOP	Units	LOD							
Moisture	N	2030	%	0.020	10	8.5	7.5	7.5	8.5	10	11
pH	U	2010		N/A	[A] 7.4	[A] 7.3	[A] 8.4	[A] 7.9	[A] 7.9	[A] 7.8	[A] 7.6
Sulphate (2:1 Water Soluble) as SO4	U	2120	mg/l	10.000	< 10	< 10	< 10	< 10	12	12	< 10

Deviations

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

Sample:	Sample Ref:	Sample ID:	Sample Location:	Sampled Date:	Deviation Code(s):	Containers Received:
723939			HDP2		A	Plastic Tub 500g
723940			MBH1		A	Plastic Tub 500g
723941			MBH1		A	Plastic Tub 500g
723942			MBH2		A	Plastic Tub 500g
723943			MBH3		A	Plastic Tub 500g
723944			MBH3		A	Plastic Tub 500g
723945			MBH4		A	Plastic Tub 500g

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.
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES

Report Information

Key

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

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:

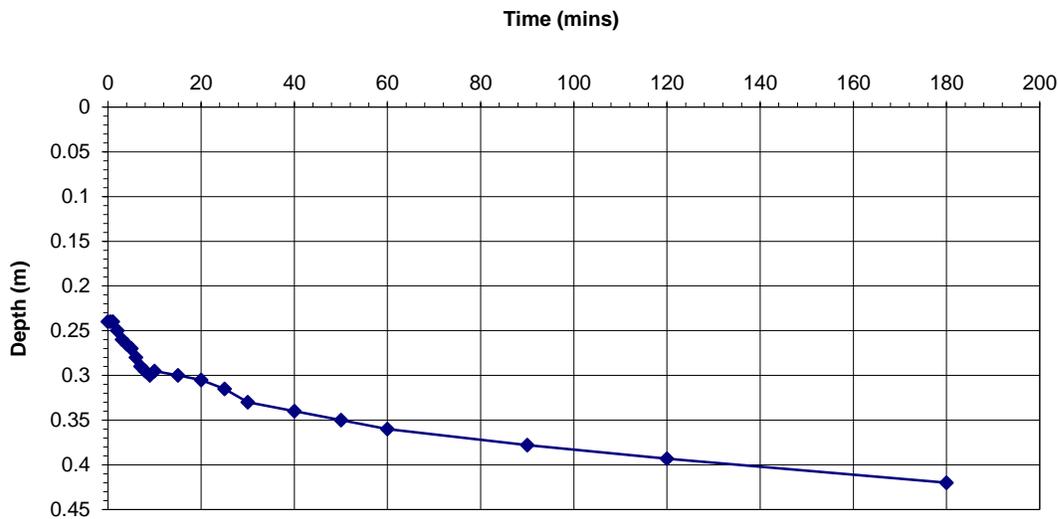
customerservices@chemtest.com

SOAKAWAY DESIGN IN ACCORDANCE WITH BRE DIGEST 365: 2016
BRE Digest 365, Figure 2, Page 5

Client:	Faithful+Gould		
Site:	Queen Elizabeth High School, Hexham		
Job No:	D9148		
Pit No:	HDP1	Test No:	1

CALCULATION OF SOIL INFILTRATION RATE

Time (min)	Depth (m)	Pit Dimensions	
0	0.24	Length (m) =	0.40
0.5	0.24	Width (m) =	0.40
1	0.24	Depth (m) =	1.00
2	0.25	Depth at start of test (m) =	0.240
3	0.26	Depth at end of test (m) =	0.420
4	0.265	75% level (m) =	N/A
5	0.27	50% Effective Depth	0.67
6	0.28	25% level (m) =	N/A
7	0.29		
8	0.295	Base area of pit (m ²) =	0.160
9	0.3	V _{p75-25} (m ³) =	N/A
10	0.295	α _{p50} (m ²) =	1.232
15	0.3		
20	0.305		
25	0.315	V	0.0288
30	0.33	T	10800
40	0.34		
50	0.35	Soil infiltration rate, f, (m/s) =	2.16E-06 Inferred value
60	0.36		
90	0.378		
120	0.393	Input by:	MO Date: 07/11/2018
180	0.42	Checked by:	RS Date: 07/11/2018



Notes:

Appendix E

Dunelm Conditions of Offer, Notes on Limitations & Basis for Contract



Dunelm Conditions of Offer, Notes on Limitations & Basis for Contract

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

Site investigation is a process of sampling. The scope and size of an investigation may be considered proportional to levels of confidence regarding the ground and groundwater conditions. The exploratory holes undertaken investigate only a small volume of the ground in relation to the overall size of the site, and can only provide a general indication of site conditions. The opinions provided and recommendations given in this report are based on the ground conditions as encountered within each of the exploratory holes. There may be different ground conditions elsewhere on the site which have not been identified by this investigation and which therefore have not been taken into account in this report. Reports are generally subject to the comments of the local authority and Environment Agency. The comments made on groundwater conditions are based on observations made at the time that site work was carried out. It should be noted that mobile contamination, soil gas levels and groundwater levels may vary owing to seasonal, tidal and/or weather related effects. Unrecorded ancient mining may occur anywhere where seams that have been worked and influence the rock and soil above. Dissolution cavities can occur where gypsum or chalk is present. Rotary drilling is the recommended technique to prove the integrity of the rock.

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

The firm cannot be held liable and do not warrant, or otherwise guarantee the validity of information provided by third parties and subsequently used in our reports. The firm are not responsible for the action negligent or otherwise of subcontractors or third parties.

Desk studies are generally prepared in accordance with RICS guidelines. Environmental site investigations are generally undertaken as 'exploratory investigations' in accordance with the definitions provided in paragraph 5.4 of BS 10175:2001 in order to confirm the conceptual assumptions. You are advised to familiarize yourself with the typical scope of such an investigation. No pumping of water will be undertaken unless a licence or facilities/equipment have been arranged by others.

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

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

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

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