

**REPORT: D7064  
December 2015**

**GEOENVIRONMENTAL APPRAISAL  
for  
CHURCH LANE, WHITBURN  
Prepared for  
STELLA PROPERTY INVESTMENTS**

Revision No	Written by	Date	Checked By	Date
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## CHURCH LANE, WHITBURN – EXECUTIVE SUMMARY

### Summary of Geoenvironmental Issues

Issue	Remarks
<b>Grid Reference</b>	440659, 561605
<b>Proposed Development</b>	Two 2-storey residential properties.
<b>Former Uses</b>	Gardens and buildings.
<b>Present Uses</b>	Vacant land, partially wooded.
<b>Made Ground</b>	Localised made ground up to 0.7m in MBH 1.
<b>Natural Ground</b>	Firm and stiff clays, locally soft.
<b>Contamination</b>	Asbestos in on site stockpile.
<b>Foundation Solution</b>	Strip foundations at 1.0m. Trench fill to depths upto 2.4m where soft ground present.
<b>Groundwater &amp; Excavations</b>	Groundwater encountered at 3m in MBH 4.
<b>Highways</b>	A CBR of at least 3% should be achievable within natural clay.
<b>Remediation and Preparatory Works</b>	Removal of stockpile off site. Remove topsoil or alternatively screen and test to determine suitability for re-use
<b>Recommendations for Further SI Works</b>	None identified.

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## APPENDICES

**Appendix A - Drawings**

**Drawing Number      Drawing Title**

D7064/01              Site Location Plan

D7064/02              Exploratory Hole Location Plan

D7064/03              Conceptual Site Model

**Appendix B - Photographic Survey**

**Appendix C - Exploratory Hole Records**

**Appendix D - Chemical Testing Results**

**Appendix E - Geotechnical Testing Results (Including Falling Head Test Results)**

**Appendix F - Dunelm Conditions of Offer, Notes on Limitations & Basis for Contract**

**1 INTRODUCTION**

**1.1 Scope of Investigation**

Dunelm Geotechnical and Environmental Limited (Dunelm) carried out a Geoenvironmental Appraisal of land at Church Street, Whitburn on behalf of Stella Property Investments.

It is proposed to develop the site with five residential properties with associated car parking and gardens.

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

- 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 F and should be read in conjunction with this report.

**2 SITE RECONNAISSANCE**

**2.1 General**

The centre of the site is located at OS Grid Ref 440659, 561605. The site is situated approximately 5km north of Sunderland city centre. The site location is shown in Drawing Number D7064/01 in Appendix A to this report.

Existing site features are shown on Drawing Number D7064/02 in Appendix A to this report. Site photographs are presented in Appendix B.

**2.2 Topography and Site Features**

Boundaries consisted of stone walls on all sides, a park lies to the south, a house, garden and woodland to the north. The cricket club to the east and Church Lane to the west.

Mature trees border the site on all sides and there are approximately 6 to 7 mature tree stumps on the site itself.

A tarmac drive runs from the entrance to the site in the west around the northern edge. There are some existing foundations/brick structures to the north of the site. The rest of the site was covered by mud, no grass. A stockpile was present in the north next to the foundation structure. The site is relatively flat.

**3 PREVIOUS INVESTIGATION**

Dunelm have examined the following reports: Phase 1: Desk Top Study Report Proposed Residential Development produced by Arc Environmental Ltd. dated 3<sup>rd</sup> February 2014. The report covered a larger site area but included the site under investigation by Dunelm. A summary of the works undertaken is shown in the Table below together with the main findings.

Item	Scope of works	Main findings
Review of desk study information	Historical plans / Landmark / Sitescope	Publish geology comprised glacial clay overlying Upper Magnesian Limestone. The report anticipated made ground associated with former buildings on the site. The report advised the site is not at risk from potential future instability from shallow coal mining activities. The solid geology is identified as a Principle Aquifer. No radon protective measures are required for the site. The historical maps indicates the site has formerly been gardens and occupied by buildings in the southern part of the site. The report assigned a low geotechnical risk setting, a low ground contamination risk setting for human health and



		controlled waters.
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## 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 based on the desk study information presented above.

No specific potential contaminants have been identified associated with the former uses.

The Arc report advises that samples are tested for heavy metals, PAHs, asbestos and TPH if evidence of fuel or oils are present in the ground.

The main receptors include future site residents and the Principle Aquifer.

### 4.2 Summary of Investigation

The exploratory holes listed below were advanced during October 2015. Records for each of the exploratory holes noted are included in Appendix C and the locations are shown on Drawing Number D7064/02 in Appendix A.

- Mini percussion boreholes designated MBH 1 to MBH 5 to depths of 5.45m to enable the made ground and natural soils to be examined.
- Falling head permeability tests in selected boreholes.

### 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 D 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 E 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 Stockpile

Made ground was noted in the stockpile and based on visual inspection comprised predominantly wood, topsoil with some natural blockstone masonry.

### 5.3 Topsoil

Topsoil in the range 0.2m to 0.25m thick was encountered in all of the exploratory positions. The topsoil contained fragments of glass and brick.

### 5.4 Made Ground

Made ground was encountered in the northern and western part of the site. The made ground generally consisted of granular material including brick, clinker, dolomite, ash and sandstone.

### 5.5 Natural Soils

All the exploratory holes encountered natural glacial deposits at the site consisting of firm and stiff, but locally

soft at shallow depth, clays to depths of at least 5.45m bgl.

In addition, pockets of medium dense sand were encountered in MBH 3.

SPT 'N' values in the cohesive soils were in the range 6 to 37 suggesting soft to very stiff conditions. A single SPT in the granular soils recorded an 'N' value of 26 indicating medium dense conditions.

Hand shear vane tests recorded undrained shear strengths in the range 41 to 130kPa indicating generally firm and stiff conditions.

Nine natural moisture content determinations recorded values in the range 13 to 28%.

Liquid and plastic limits (9 No.) lie in the range 33 to 52% and 16 to 23% respectively, with corresponding plasticity index values in the range 16 to 31. These mean results indicate a variably low to high plasticity soil and a low to medium volume change potential soil.

## 5.6 Groundwater

Groundwater was encountered at a depth of 3m in borehole MBH 4.

## 5.7 Hydrocarbon Contamination

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

## 5.8 Concrete in Aggressive Ground

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

The mean of the highest 20% water-soluble sulfate concentrations is 125mg/l and the mean of the lowest 20% recorded pH values is 7.8.

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

## 5.9 Falling Head Tests

Two falling head tests have been carried out in MBH3 in the granular soils. The test results are presented in Appendix E and relate to the granular deposits in MBH 3 only. Elsewhere on site the natural cohesive deposits are not considered suitable for soakaways.

# 6 CHEMICAL TESTING RESULTS

## 6.1 Selection of Chemical Testing

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

Made ground was encountered in some of the exploratory locations during the ground 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 D 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.

### Generic Assessment Criteria for Phytotoxic Effects on Plants

Contaminant	Maximum Permissible Concentration from MAFF <i>The Soil Code</i> (1998) (mg/kg)
Copper (soil pH 5.0-5.5)	80
Copper (soil pH 5.5-6.0)	100
Copper (soil pH 6.0-7.0)	135
Copper (soil pH >7.0 & CaCO <sub>3</sub> > 5%)	200
Zinc (soil pH 5.0-7.0)	200
Zinc (soil pH >7.0 & CaCO <sub>3</sub> > 5%)	300

### 6.3 Stockpile sample

A summary of the results of inorganic testing on stockpile sample is shown in the table below.

#### Inorganic Test Results - Stockpile

Contaminant	Units	No. of topsoil samples tested	No. of samples exceeding GAC	Generic Assessment Criteria	Max concentration
pH	-	1	0	<5	7.9
Arsenic	mg/kg	1	0	37	9.5
Cadmium	mg/kg	1	0	11	0.5
Chromium (Total)	mg/kg	1	0	910	20
Chromium (VI)	mg/kg	1	0	6	<1.0
Lead	mg/kg	1	0	200	110
Mercury	mg/kg	1	0	40	0.27
Nickel	mg/kg	1	0	130	20
Selenium	mg/kg	1	0	250	<0.5
Copper (GAC from MAFF)	mg/kg	1	0	200	30
Zinc (GAC from MAFF)	mg/kg	1	0	300	95
Asbestos	-	1	1	Present	

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

Asbestos was detected in the sample taken from the stockpile. The asbestos was chrysotile present as a fibre bundle. Asbestos quantification has indicated <0.001% fibres by mass in the sample.

### 6.4 Organic Contamination - Stockpile

The selection of hydrocarbon (organic) testing was based on the conceptual model and the assessment of potential contamination sources presented in earlier sections of this report.



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, samples of made ground were tested for the following:

- Polynuclear aromatic hydrocarbon compounds.
- 13 petroleum hydrocarbon fractions based on the methodology of the United States Total Petroleum Hydrocarbon Criteria Working Group (TPHCWG).

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	300	660	190	380	660	930	1,700	160	530	150	760	4300	110,000
GAC (allotment) mg/kg	57	120	51	74	130	260	1,600	3,900	13,000	1,700	7,300	13,000	270,000
GAC (commercial) mg/kg	86,000	180,000	17,000	34,000	38,000	28,000	28,000	12,000	40,000	11,000	47,000	90,000	180,000
GAC (Public Open Space)	56,000	56,000	5,000	5,000	5,000	3,800	3,800	600,000	620,000	13,000	13,000	13,000	250,000
<b>Sample location &amp; depth (m bgl)</b>	<b>Recorded concentrations (mg/kg) - exceedances in bold</b>												
Surface Sample	<0.01	<0.01	<0.01	<0.9	<0.5	<0.6	<1.4	<0.01	<0.01	<0.01	<1.5	<1.2	<3.4

Soil Screening Values from the LQM/CIEH S4ULs for Human Health Risk Assessment (2015) for a 6% SOM soil, for a residential after use.

All the results were below the screening levels.

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 Polynuclear 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	Allotments	Comm / industrial	Public Open Space			
Acenaphthene	1,100	200	100,000	15,000	1	0	<0.1
Acenaphthylene	920	160	100,000	15,000	1	0	<0.1
Anthracene	2,400	2,200	540,000	74,000	1	0	<0.1
Benzo(a)anthracene	13	13	180	29	1	0	<0.1
Benzo(a)pyrene	3	3.5	36	5.7	1	0	<0.1
Benzo(b)fluoranthene	3.7	3.9	45	7.2	1	0	<0.1
Benzo(g,h,i)perylene	350	640	4,000	640	1	0	<0.1
Benzo(k)fluoranthene	100	130	1,200	190	1	0	<0.1
Chrysene	27	19	350	57	1	0	<0.1
Dibenz(a,h)anthracene	0.3	0.43	3.6	0.58	1	0	<0.1
Fluoranthene	890	290	23,000	3,100	1	0	<0.1
Fluorene	860	160	71,000	9,900	1	0	<0.1
Indeno(1,2,3,-cd)pyrene	41	39	510	82	1	0	<0.1
Napthalene	13	24	1,100	4,900	1	0	<0.1
Phenanthrene	440	90	23,000	3,100	1	0	<0.1

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Pyrene	2,000	620	54,000	7,400	1	0	<0.1
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Soil Screening Values from the LQM/CIEH S4ULs for Human Health Risk Assessment (2015) for 6% SOM soil, for a residential after use.

All the results were below the screening levels.

### 6.5 Topsoil

A summary of the results of inorganic testing on topsoil sample 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	-	2	0	<5	7.9-8.5
Arsenic	mg/kg	2	0	37	18
Cadmium	mg/kg	2	0	11	0.6
Chromium (Total)	mg/kg	2	0	910	22
Chromium (VI)	mg/kg	2	0	6	<1.0
Lead	mg/kg	2	0	200	80
Mercury	mg/kg	2	0	40	0.47
Nickel	mg/kg	2	0	180	27
Selenium	mg/kg	2	0	250	0.6
Copper (GAC from MAFF)	mg/kg	2	0	200	41
Zinc (GAC from MAFF)	mg/kg	2	0	300	110
Asbestos	-	2	0	Present	-

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

All the results were below the screening levels.

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	300	660	190	380	660	930	1,700	160	530	150	760	4300	110,000
GAC (allotment) mg/kg	57	120	51	74	130	260	1,600	3,900	13,000	1,700	7,300	13,000	270,000
GAC (commercial) mg/kg	86,000	180,000	17,000	34,000	38,000	28,000	28,000	12,000	40,000	11,000	47,000	90,000	180,000
GAC (Public Open Space)	56,000	56,000	5,000	5,000	5,000	3,800	3,800	600,000	620,000	13,000	13,000	13,000	250,000
<b>Sample location &amp; depth (m bgl)</b>	<b>Recorded concentrations (mg/kg) - exceedances in bold</b>												
MBH 1 0.20	<0.01	<0.01	<0.01	<0.9	<0.5	<0.6	<1.4	<0.01	<0.01	<0.01	<1.5	<1.2	<3.4
MBH 3 0.20	<0.01	<0.01	<0.01	<0.9	<0.5	<0.6	<1.4	<0.01	<0.01	<0.01	<1.5	<1.2	<3.4

Soil Screening Values from the LQM/CIEH S4ULs for Human Health Risk Assessment (2015) for a 6% SOM soil, for a residential after use.

All the results were below the screening levels.

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 Polynuclear 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	Allotments	Comm / industrial	Public Open Space			
Acenaphthene	1,100	200	100,000	15,000	2	0	<0.1
Acenaphthylene	920	160	100,000	15,000	2	0	<0.1
Anthracene	2,400	2,200	540,000	74,000	2	0	<0.1
Benzo(a)anthracene	13	13	180	29	2	0	<0.1
Benzo(a)pyrene	3	3.5	36	5.7	2	0	<0.1
Benzo(b)fluoranthene	3.7	3.9	45	7.2	2	0	<0.1
Benzo(g,h,i)perylene	350	640	4,000	640	2	0	<0.1
Benzo(k)fluoranthene	100	130	1,200	190	2	0	<0.1
Chrysene	27	19	350	57	2	0	<0.1
Dibenz(a,h)anthracene	0.3	0.43	3.6	0.58	2	0	<0.1
Fluoranthene	890	290	23,000	3,100	2	0	0.4
Fluorene	860	160	71,000	9,900	2	0	<0.1
Indeno(1,2,3,-cd)pyrene	41	39	510	82	2	0	<0.1
Napthalene	13	24	1,100	4,900	2	0	<0.1
Phenanthrene	440	90	23,000	3,100	2	0	0.2
Pyrene	2,000	620	54,000	7,400	2	0	0.4

Soil Screening Values from the LQM/CIEH S4ULs for Human Health Risk Assessment (2015) for 6% SOM soil, for a residential after use.

All the results were below the screening levels.

**6.6 Made Ground (Inorganic Contaminants)**

A summary of the results of inorganic testing on made ground samples is shown in the table below.

**Inorganic Test Results – Made Ground**

Contaminant	Units	No. of topsoil samples tested	No. of samples exceeding GAC	Generic Assessment Criteria	Max concentration
pH	-	2	0	<5	8.1-9
Arsenic	mg/kg	2	0	37	9.8
Cadmium	mg/kg	2	0	11	0.4
Chromium (Total)	mg/kg	2	0	910	22
Chromium (VI)	mg/kg	2	0	6	<1.0
Lead	mg/kg	2	0	200	50
Mercury	mg/kg	2	0	40	0.17
Nickel	mg/kg	2	0	130	36
Selenium	mg/kg	2	0	250	<0.5
Copper (GAC from MAFF)	mg/kg	2	0	200	41
Zinc (GAC from MAFF)	mg/kg	2	0	300	79
Asbestos	-	2	0	Present	

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

Based on the above analysis for the made ground, all the results are below the threshold value.

**6.7 Asbestos Testing**

Asbestos was not detected in the samples where tested.

## 6.8 Organic Contamination

Samples of made ground were tested for selected polynuclear 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 Polynuclear 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	Allotments	Comm / industrial	Public Open Space			
Acenaphthene	1,100	200	100,000	15,000	2	0	<0.1
Acenaphthylene	920	160	100,000	15,000	2	0	<0.1
Anthracene	2,400	2,200	540,000	74,000	2	0	<0.1
Benzo(a)anthracene	13	13	180	29	2	0	<0.1
Benzo(a)pyrene	3	3.5	36	5.7	2	0	<0.1
Benzo(b)fluoranthene	3.7	3.9	45	7.2	2	0	<0.1
Benzo(g,h,i)perylene	350	640	4,000	640	2	0	<0.1
Benzo(k)fluoranthene	100	130	1,200	190	2	0	<0.1
Chrysene	27	19	350	57	2	0	<0.1
Dibenz(a,h)anthracene	0.3	0.43	3.6	0.58	2	0	<0.1
Fluoranthene	890	290	23,000	3,100	2	0	0.3
Fluorene	860	160	71,000	9,900	2	0	<0.1
Indeno(1,2,3,-cd)pyrene	41	39	510	82	2	0	<0.1
Napthalene	13	24	1,100	4,900	2	0	0.3
Phenanthrene	440	90	23,000	3,100	2	0	0.2
Pyrene	2,000	620	54,000	7,400	2	0	0.3

Soil Screening Values from the LQM/CIEH S4ULs for Human Health Risk Assessment (2015) for 6% SOM soil, for a residential after use.

All samples tested fall below the relevant guideline values.

## 7 ASSESSMENT OF CONTAMINATION RISKS

### 7.1 Summary of Contamination Sources

#### Stockpile

A stockpile was located on the site. The stockpile contains asbestos.

#### Topsoil

Topsoil upto 0.25m thick is present in the site. Testing has indicated that this material does not contain elevated concentrations of the determinands tested. The topsoil was found to contain materials such as glass and brick.

#### Made Ground

Parts of the site is underlain by a layer of granular made ground up to 0.7m thick.

Testing has indicated that this made ground does not contain elevated concentrations of inorganic contaminants.

The made ground also contains materials such as clinker and ash which are unsuitable to remain in garden areas as a near-surface material.

#### Hydrocarbon Contamination

No significant hydrocarbon contamination was encountered during this investigation.

## 7.2 Hazard Assessment

Asbestos was detected in the onsite stockpile. 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.

The results of the 'Hazard Identification' process for significant sources of contamination in accordance with CLR11 are summarised above. The following section describes the results of the 'Hazard Assessment' process in which unacceptable risks are identified. Pathways and receptors are considered below. Contamination sources and pollutant linkages are shown in the revised Conceptual Site Model presented as Drawing No. D7064/03 in Appendix A.

### Pathways

The proposed end use of the development is residential. Potential contaminant pathways to humans therefore include:

- Inhalation of dust (outdoors and indoors).

### Receptors

Significant potential receptors are as follows:

- end users of the site (residents).

Transient risks to construction workers will be addressed by the adoption of appropriate health and safety measures and consequently this receptor group has not been considered further.

Based on the revised Conceptual Site Model, unacceptable risks have been identified and further action will be required as discussed in the following section.

## 7.3 Preliminary Options Appraisal

This section identifies feasible remediation options for each relevant pollutant linkage; it does not represent a detailed evaluation of all possible remedial options. In practice, as noted in CLR11, "there may be a number of ways to reduce or control unacceptable risks, all of which have advantages and limitations in particular cases".

### Stockpile

The stockpile has been found to contain asbestos; due to the site's intended use for residential development it is recommended that the stockpile should be removed from the site.

### Topsoil

The topsoil contains a significant proportion of materials such as glass and brick which are generally considered undesirable as a near-surface material in garden areas. Therefore it is recommended that the topsoil should be removed from site. Alternatively, the topsoil could be stockpiled following a site strip, screened and examined to remove deleterious materials and re-tested to ensure it is suitable for re use.

### Inorganic Contamination - Made Ground

The made ground contains materials such as wire, glass, metal, which are considered undesirable as a near-surface material in garden areas.

Areas of proposed landscaping or tree planting should be provided with an appropriate thickness of clean soils that will provide a suitable growing medium.

It is recommended that further advice be sought from all statutory service bodies with respect to the ground conditions within which they will lay services.

## Hydrocarbon Contamination

Report: D7064 Church Lane, Whitburn

Prepared For: Stella Property Investments



No areas of significant hydrocarbon contamination have been encountered during this investigation.

If during redevelopment works on site any noxious, brightly coloured, drummed, liquid, etc. waste is encountered, works should cease in these areas and further advice should be sought from a suitably qualified consultant.

#### **7.4 Waste Acceptance Criteria**

Waste Acceptance Criteria testing was carried out on a sample taken from the on site stockpile. The results suggest the materials could be accepted at land fill as stable non-reactive hazardous waste. The laboratory certificates should be forwarded on to the landfill operator.

#### **7.5 Remediation Strategy**

A Remediation Strategy may be required by the regulatory authorities prior to site redevelopment. The Remediation Strategy document would describe the objectives of the proposed remedial works; a Method Statement is normally required from the Contractor undertaking the works, describing how these objectives are to be met. Validation of the remediation works should be undertaken by a suitably qualified engineer.

### **8 FOUNDATIONS AND GEOTECHNICAL ISSUES**

#### **8.1 Introduction**

The proposed development is understood to consist of five residential properties with associated car parking and gardens.

Ground conditions encountered during this investigation comprised thin topsoil deposits overlying localised areas of made ground typically upto 0.7m thick consisting of granular soils. The underlying natural ground consisted of firm and stiff clays with an area of medium dense sands in MBH 3. Localised area of soft or firm locally soft clays were noted around MBH1 and MBH 5 at shallow depth.

#### **8.2 Mining**

The Arc report states that the site is not at risk from potential future instability issue from shallow coal mining activities.

#### **8.3 Foundations**

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

It is considered that strip or trench fill foundations should be suitable for the proposed structures.

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

A safe bearing capacity of 110 kN/m<sup>2</sup> has been determined for strip foundations 0.6m wide founding on the firm or better natural clay at depths of around 1.0m bgl. At this width of foundation and bearing pressure settlements should be less than 25mm.

Based on plasticity index results, all cohesive soils at the site should be regarded as being of medium volume change potential. Foundations should therefore be placed at a minimum depth of 0.9m below original or finished ground level, whichever is the lower.

However, MBH 5 encountered firm locally soft clays to a depth of 2.4m bgl, with an estimated safe bearing capacity of 75kN/m<sup>2</sup> at depths of around 1.5m. Therefore, foundations in this part of the site should be deepened to found on the underlying firm and stiff clays.

Foundations near existing or proposed trees should be deepened and provided with appropriate heave precautions in accordance with NHBC Standards Chapter 4.2.

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. Alternatively all existing backfill could be excavated and replaced with engineered fill of even thickness extending 1m beyond the footprint of the proposed development.

Overdeepened foundations should be stepped in accordance with NHBC Standards, Chapter 4.4.

Given the presence of numerous trees, a detailed foundation schedule will be required for the proposed development. The foundation schedule should provide plot-specific recommendations of foundation type together with the minimum founding depth, taking into account relevant factors including tree influence and founding strata.

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.

If the founding stratum is found to be variable, and particularly if it is found to consist both of clay and sand, the foundations should be reinforced to limit differential settlement. For a standard 600mm wide, 225mm thick footing, a suitable reinforcement would be one layer of A193 mesh placed 50mm above the base of the footing. For other footing dimensions advice should be sought from a qualified structural engineer.

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.

Alternatively, in order to utilise ground bearing slabs, made ground could be removed from beneath the footprint of the buildings and a blanket of compacted granular fill placed in accordance with an engineering specification.

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 Excavations**

Observations made during the fieldwork indicate that significant groundwater flows would not 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.

Shallow excavations should remain stable in the short term but if left open for a significant period of time will require shoring. 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.

**8.6 Road Pavement Design**

A CBR value of 3% should be assumed for highway construction within natural clays. This is based on visual inspection

Where the granular made ground is re-engineered it is considered that a CBR value of 5% should be achievable, however, this should be verified by insitu CBR testing on site and confirmed with the adopting authority.




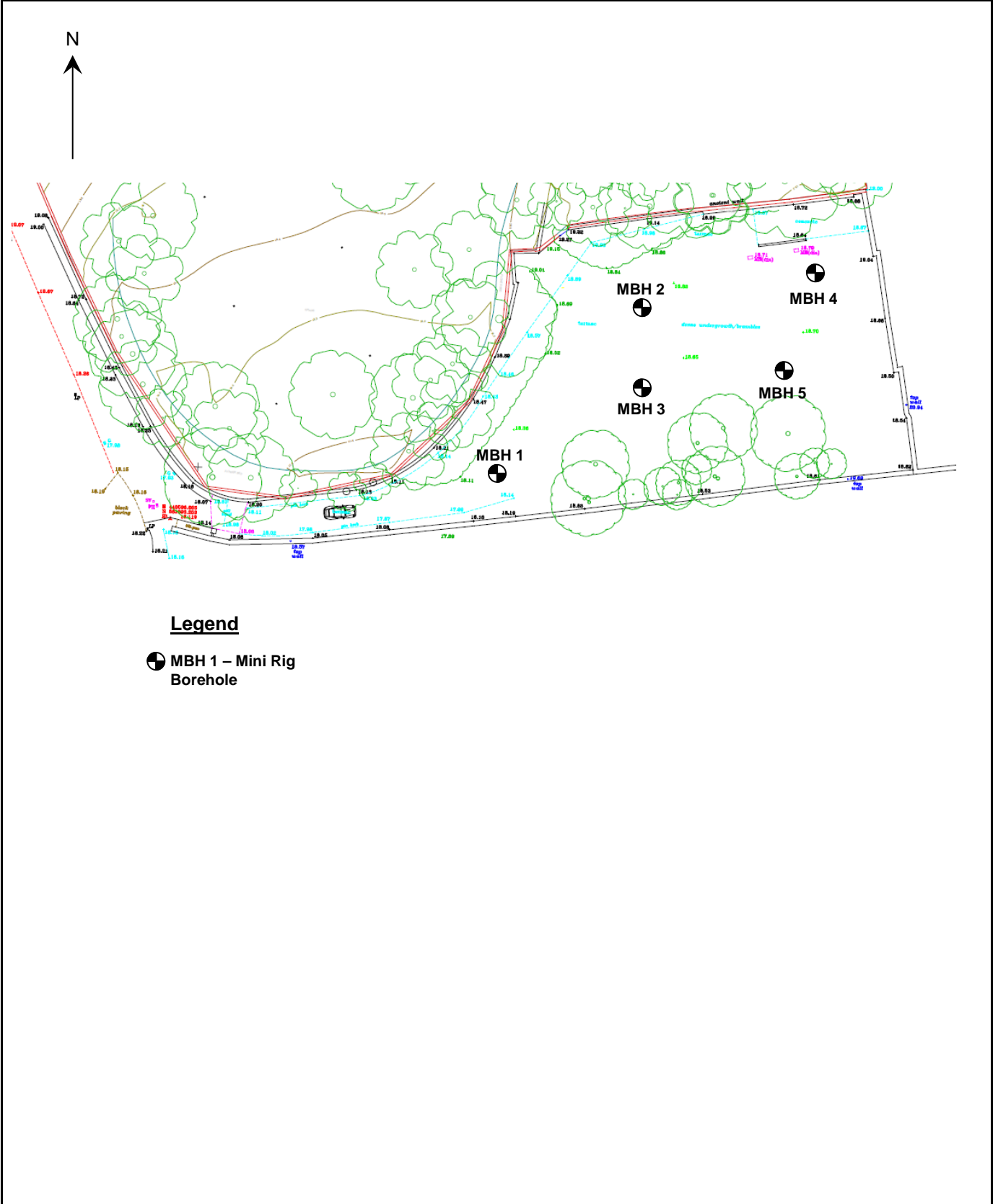


## Appendix A - Drawings






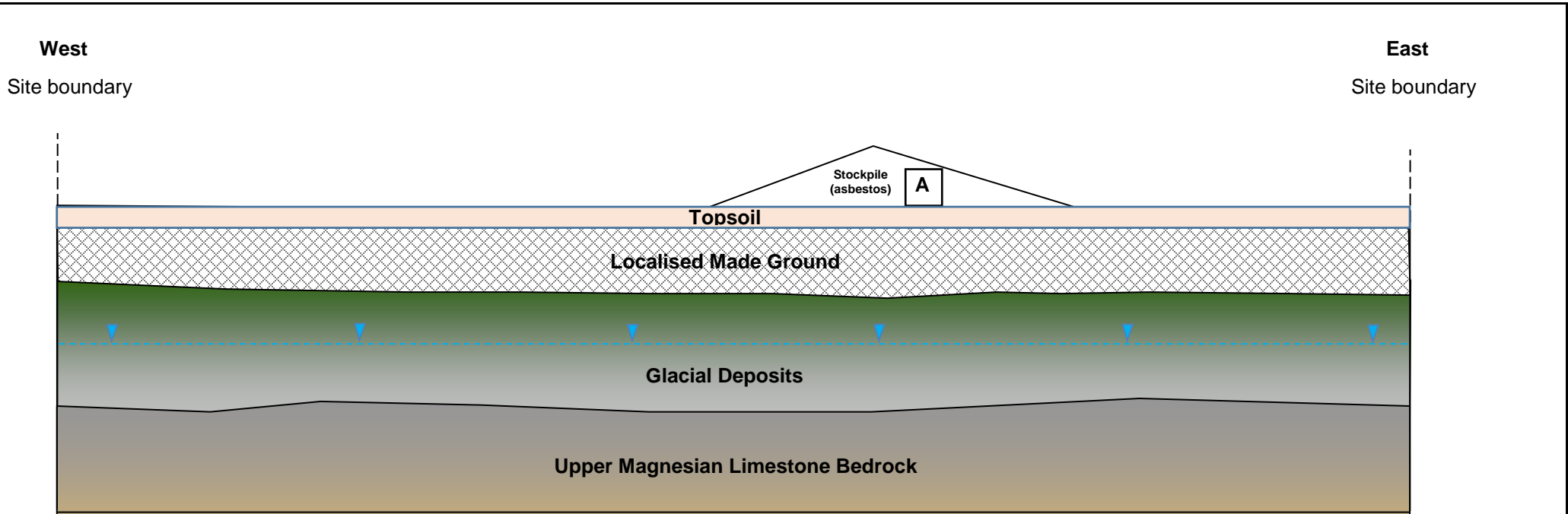
	<b>Contract:</b> Church Lane, Whitburn		<b>Contract No:</b> D7064	
	<b>Client:</b> Stella Property Investments			
TEL: 0191 378 3151 FAX: 0191 378 3157		<b>Drawing Title:</b> Site Location Plan		
<b>Drawing No:</b> D7064/01	<b>Date:</b> November 2015	<b>Scale:</b> NTS	<b>Status:</b> Final	<b>Drawn by:</b> MD




**Legend**

⊕ MBH 1 – Mini Rig Borehole

	<b>Contract:</b> Church Lane, Whitburn		<b>Contract No:</b> D7064	
	<b>Client:</b> Stella Property Investments			
TEL: 0191 378 3151 FAX: 0191 378 3157	<b>Drawing Title:</b> Exploratory Hole location Plan			
<b>Drawing No:</b> D7064/02	<b>Date:</b> November 2013	<b>Scale:</b> NTS	<b>Status:</b> Final	<b>Drawn by:</b> MD



Potential Contamination linkages:  
 A. Inhalation of contamination within stockpile. Removal offsite advised.

	<b>Contract:</b> D7064 Church Lane, Whitburn			
	<b>Client:</b> Stella Property Investments			
TEL: 0191 3783151 FAX: 0191 3783157	<b>Drawing Title:</b> Conceptual Site Model			
<b>Drawing No:</b> D7064/03	<b>Date:</b> December 2015	<b>Scale:</b> NTS	<b>Status:</b> Prelim	<b>Drawn by:</b> MD

## Appendix B - Photographic Survey








Photograph 1: View of site with retained and removed trees noted.



Photograph 2: View of on site stockpile

	<b>Contract:</b> Church Lane, Whitburn		<b>Contract No:</b> D7064
	<b>Client:</b> Haslam		
TEL: 0191 378 3151 FAX: 0191 378 3157	<b>Site Photographs</b>	<b>Date: December 2015</b>	<b>Sheet 1 of 1</b>



## Appendix C - Exploratory Hole Records





# BOREHOLE RECORD

## Borehole MBH1

**Contract No:** D7064

**Site:** Church Lane, Whitburn

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

**Client:** Fitz Architects

Driller: AC / KD

Logged By: FM

Sheet 1 of 1

**Method:** Cable Percussion

Checked By: MD

Dates: 29/10/2015

SAMPLE DETAILS			Casing Groundwater	STRATA RECORD Description	Depth (m)	Level (m AOD)	Legend	Well/ Backfill
Type	Depth From-To (m)	In situ Testing						
D ES B	0.20 0.20 0.30 - 0.70 0.50	HVP=40 kPa	1	MADE GROUND: Brown, sandy, slightly gravelly topsoil. Sand is fine to coarse. Gravel is angular to subrounded, fine to coarse of brick, sandstone and mudstone. Fragments of glass noted.  Soft, brown, sandy, slightly gravelly CLAY. Sand is fine to coarse. Gravel is angular to subrounded, fine to coarse of sandstone and mudstone. (GLACIAL TILL).	0.20		1	
D SPT	1.20 1.20 - 1.65	N=6 (1,1/1,1,2,2)		Firm, brown, slightly sandy, slightly gravelly CLAY. Sand is fine to coarse. Gravel is angular to subrounded, fine to coarse of sandstone, mudstone and coal. (GLACIAL TILL).	1.00			
D	1.50 1.50	HVP=78 kPa	2				2	
D SPT	2.00 2.00 - 2.45	N=19 (1,2/3,5,5,6)						
D	2.50 2.50	HVP=89 kPa	3				3	
D SPT	3.00 3.00 - 3.45	N=22 (2,3/4,7,5,6)		Becoming stiff at 3.0m.				
D	3.50 3.50	HVP=130 kPa	4				4	
D SPT	4.00 4.00 - 4.45	N=28 (2,4/7,6,8,7)						
D	4.50		5				5	
D SPT	5.00 5.00 - 5.45	N=32 (4,5/7,8,9,8)		End of Borehole at 5.45 m	5.45			
			6				6	
			7				7	
			8				8	
			9				9	
			10				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. An inspection pit was excavated by hand to a depth of 1.20m.





# BOREHOLE RECORD

## Borehole MBH2

**Contract No:** D7064

**Site:** Church Lane, Whitburn

GL (m AOD) -  
Easting: -  
Northing: -

Scale 1:50

**Client:** Fitz Architects

Driller: AC / KD

Logged By: FM

Sheet 1 of 1

**Method:** Cable Percussion

Checked By: MD

Dates: 29/10/2015

SAMPLE DETAILS			Casing Groundwater	STRATA RECORD Description	Depth (m)	Level (m AOD)	Legend	Well/ Backfill
Type	Depth From-To (m)	In situ Testing						
D ES B D ES	0.20 0.20 0.30 - 0.70 0.50 0.50			MADE GROUND: Brown, sandy, slightly gravelly topsoil. Sand is fine to coarse. Gravel is angular to subrounded, fine to coarse of brick, sandstone and mudstone. Fragments of glass noted.	0.20			
D SPT	1.20 1.20 - 1.65	N=10 (3,2/1,3,3,3)	1	MADE GROUND: Brown, slightly clayey, slightly gravelly sand. Sand is fine to coarse. Gravel is angular to subrounded, fine to coarse of clinker, dolomite, ash, sandstone and brick.	0.90			
D	1.50 1.50	HVP=72 kPa		Firm, brown, slightly sandy, slightly gravelly CLAY. Sand is fine to coarse. Gravel is angular to subrounded, fine to coarse of sandstone, mudstone and coal. (GLACIAL TILL).				
D SPT	2.00 2.00 - 2.45	N=13 (1,2/2,3,4,4)	2					
D	2.50 2.50	HVP=79 kPa						
D SPT	3.00 3.00 - 3.45	N=25 (2,4/4,7,8,6)	3	Becoming stiff from 3.00m.				
D	3.50 3.50	HVP=101 kPa						
D SPT	4.00 4.00 - 4.45	N=25 (4,5/4,6,8,7)	4					
D	4.50 4.50	HVP=130 kPa						
D SPT	5.00 5.00 - 5.45	N=26 (5,7/5,6,7,8)	5					
				End of Borehole at 5.45 m	5.45			
				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. An inspection pit was excavated by hand to a depth of 1.20m.





# BOREHOLE RECORD

## Borehole MBH4

**Contract No:** D7064

**Site:** Church Lane, Whitburn

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

**Client:** Fitz Architects

Driller: AC / KD

Logged By: FM

Sheet 1 of 1

**Method:** Cable Percussion

Checked By: MD

Dates: 29/10/2015

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		1	MADE GROUND: Brown, sandy, slightly gravelly topsoil. Sand is fine to coarse. Gravel is angular to subrounded, fine to coarse of brick, sandstone and mudstone. Fragments of glass noted.	0.20		[Cross-hatch pattern]		
ES	0.20				MADE GROUND: Brown, slightly clayey, slightly gravelly sand. Sand is fine to coarse. Gravel is angular to subrounded, fine to coarse of clinker, dolomite, ash, sandstone and brick.	0.55			
B	0.30 - 0.50			2	Firm, brown, slightly sandy, slightly gravelly CLAY. Sand is fine to coarse. Gravel is angular to subrounded, fine to coarse of sandstone, mudstone and coal. (GLACIAL TILL).			[Dotted pattern]	
D	0.50								
D	1.20			3				[Horizontal lines]	
SPT	1.20 - 1.65	N=14 (12,8/4,3,4,3)							
D	1.50	HVP=70 kPa		4				[Vertical lines]	
D	1.50								
D	2.00			5				[Diagonal lines]	
SPT	2.00 - 2.45	N=17 (3,3/4,4,4,5)							
D	2.50	HVP=72 kPa	6				[Stippled pattern]		
D	2.50								
D	3.00		7				[Horizontal dashed lines]		
SPT	3.00 - 3.45	N=19 (5,5/4,5,5,5)							
D	3.50	HVP=101 kPa	8				[Vertical dashed lines]		
D	3.50								
D	4.00		9				[Diagonal dashed lines]		
SPT	4.00 - 4.45	N=29 (3,4/5,8,8,8)							
D	4.50	HVP=121 kPa	10				[Horizontal solid lines]		
D	4.50								
D	5.00						[Vertical solid lines]		
SPT	5.00 - 5.45	N=32 (5,5/6,9,9,8)							
				End of Borehole at 5.45 m		5.45			

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)	
3.10												1. An inspection pit was excavated by hand to a depth of 1.20m.



# BOREHOLE RECORD

## Borehole MBH5

**Contract No:** D7064

**Site:** Church Lane, Whitburn

GL (m AOD) -  
Easting: -  
Northing: -

Scale 1:50

**Client:** Fitz Architects

Driller: AC / KD

Logged By: FM

Sheet 1 of 1

**Method:** Cable Percussion

Checked By: MD

Dates: 29/10/2015

SAMPLE DETAILS			(Casing) Groundwater	STRATA RECORD Description	Depth (m)	Level (m AOD)	Legend	Well/ Backfill		
Type	Depth From-To (m)	In situ Testing								
D	0.20		1	<p>MADE GROUND: Brown, sandy, slightly gravelly topsoil. Sand is fine to coarse. Gravel is angular to subrounded, fine to coarse of brick, sandstone and mudstone. Fragments of glass noted.</p> <p>MADE GROUND: Brown, slightly clayey, slightly gravelly sand. Sand is fine to coarse. Gravel is angular to subrounded, fine to coarse of clinker, dolomite, ash, sandstone and brick.</p> <p>Firm locally soft, brown sandy, slightly gravelly CLAY. Sand is fine to coarse. Gravel is angular to subrounded, fine to coarse of sandstone and mudstone. (GLACIAL TILL).</p>	0.20					
B	0.30 - 0.50				0.80					
ES	0.50									
D	1.20									
SPT	1.20 - 1.65	N=6 (1,1/1,1,2,2)								
D	1.50	HVP=41 kPa								
D	1.50									
D	2.00				2	<p>Firm, brown, slightly sandy, slightly gravelly CLAY. Sand is fine to coarse. Gravel is angular to subrounded, fine to coarse of sandstone, mudstone and coal. (GLACIAL TILL).</p>		2.40		
SPT	2.00 - 2.45	N=12 (1,1/3,3,3,3)								
D	2.50	HVP=98 kPa								
D	2.50									
D	3.00		3	<p>_____</p> <p>Becoming stiff at 3.00m.</p>						
SPT	3.00 - 3.45	N=27 (6,6/6,6,7,8)								
D	3.50	HVP=101 kPa								
D	3.50									
D	4.00						4	<p>_____</p>		
SPT	4.00 - 4.45	N=18 (2,3/4,4,5,5)								
D	4.50	HVP=121 kPa								
D	4.50									
D	5.00				5	<p>_____</p>				
SPT	5.00 - 5.45	N=37 (6,8/8,9,9,11)								
End of Borehole at 5.45 m				5.45						
End of Borehole at 5.45 m										
End of Borehole at 5.45 m										
End of Borehole at 5.45 m										
End of Borehole at 5.45 m										
End of Borehole at 5.45 m										
End of Borehole at 5.45 m										
End of Borehole at 5.45 m										

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. An inspection pit was excavated by hand to a depth of 1.20m.

## Appendix D - Chemical Testing Results





## Certificate of Analysis

Certificate Number 15-49289-1

20-Nov-15

*Client* Dunelm Geotechnical & Environmental Ltd  
Foundation House  
St. John's Road  
Meadowfield  
Durham  
DH7 8TZ

*Our Reference* 15-49289-1

*Client Reference* D7064

*Order No* 7014

*Contract Title* Church Lane, Whitburn

*Description* 5 Soil samples, 2 Leachate samples.

*Date Received* 04-Nov-15

*Date Started* 04-Nov-15

*Date Completed* 20-Nov-15

*Test Procedures* Identified by prefix DETSn (details on request).

*Notes* **This report supersedes 15-49289. Extra testing**

Opinions and interpretations are outside the scope of UKAS accreditation. 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. Observations and interpretations are outside the scope of ISO 17025. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

*Approved By*

A handwritten signature in black ink, appearing to read 'Rob Brown'.

Rob Brown  
Business Manager



2139

# Summary of Chemical Analysis

## Soil Samples

Our Ref 15-49289-1

Client Ref D7064

Contract Title Church Lane, Whitburn

Lab No	894213	894214	894215	894216	894217
Sample ID	MBH1	MBH2	MBH3	MBH5	SURFACE
Depth	0.20	0.50	0.20	0.50	
Other ID					
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL
Sampling Date	29/10/15	29/10/15	29/10/15	29/10/15	n/s
Sampling Time	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units					
Asbestos Quantification OHR	DETSC 1102	0						Y
<b>Metals</b>								
Arsenic	DETSC 2301#	0.2	mg/kg	18	9.6	12	9.8	9.5
Cadmium	DETSC 2301#	0.1	mg/kg	0.6	0.4	0.5	0.4	0.5
Chromium	DETSC 2301#	0.15	mg/kg	22	22	18	14	20
Hexavalent Chromium	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	41	41	41	27	30
Lead	DETSC 2301#	0.3	mg/kg	80	40	68	50	110
Mercury	DETSC 2325#	0.05	mg/kg	0.47	0.17	0.20	0.12	0.27
Nickel	DETSC 2301#	1	mg/kg	27	36	19	21	20
Selenium	DETSC 2301#	0.5	mg/kg	0.6	< 0.5	0.6	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	110	67	99	79	95
<b>Inorganics</b>								
pH	DETSC 2008#			8.5	9.0	7.9	8.1	7.9
Organic matter	DETSC 2002#	0.1	%	6.0	6.7	7.4	5.5	7.5
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	66	110	45	56	29
<b>Petroleum Hydrocarbons</b>								
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01		< 0.01		< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01		< 0.01		< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01		< 0.01		< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5		< 1.5		< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2		< 1.2		< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5		< 1.5		< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4		< 3.4		< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10		< 10		< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01		< 0.01		< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01		< 0.01		< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01		< 0.01		< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9		< 0.9		< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5		< 0.5		< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6		< 0.6		< 0.6
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4		< 1.4		< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10		< 10		< 10
TPH Ali/Aro	DETSC 3072*	10	mg/kg	< 10		< 10		< 10
<b>PAHs</b>								
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.1	0.3	< 0.1	0.1	< 0.1
Acenaphthylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	DETSC 3301	0.1	mg/kg	0.2	0.1	< 0.1	0.2	< 0.1
Anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1

## Summary of Chemical Analysis Soil Samples

Our Ref 15-49289-1

Client Ref D7064

Contract Title Church Lane, Whitburn

<b>Lab No</b>	894213	894214	894215	894216	894217
<b>Sample ID</b>	MBH1	MBH2	MBH3	MBH5	SURFACE SAMPLE
<b>Depth</b>	0.20	0.50	0.20	0.50	
<b>Other ID</b>					
<b>Sample Type</b>	SOIL	SOIL	SOIL	SOIL	SOIL
<b>Sampling Date</b>	29/10/15	29/10/15	29/10/15	29/10/15	n/s
<b>Sampling Time</b>	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units					
Fluoranthene	DETSC 3301	0.1	mg/kg	0.4	0.3	< 0.1	0.3	< 0.1
Pyrene	DETSC 3301	0.1	mg/kg	0.4	0.2	< 0.1	0.3	< 0.1
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Chrysene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
PAH	DETSC 3301	1.6	mg/kg	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6



## Summary of Asbestos Analysis

### Soil Samples

Our Ref 15-49289-1

Client Ref D7064

Contract Title Church Lane, Whitburn

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
894213	MBH1 0.20	SOIL	NAD	none	D Wilkinson
894214	MBH2 0.50	SOIL	NAD	none	D Wilkinson
894215	MBH3 0.20	SOIL	NAD	none	D Wilkinson
894217	SURFACE SAMPLE 1	SOIL	Chrysotile	Chrysotile present as fibre bundle	D Wilkinson

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: \* -not included in laboratory scope of accreditation.

# Summary of Asbestos Quantification Analysis

## Soil Samples

Our Ref 15-49289-1

Client Ref D7064

Contract Title Church Lane, Whitburn

Lab No	894217
Sample ID	SURFACE
Depth	
Other ID	
Sample Type	SOIL
Sampling Date	n/s
Sampling Time	

Test	Method	Units	
Total Mass% Asbestos (a+b+c)	DETSC 1102	Mass %	0.001
Gravimetric Quantification (a)	DETSC 1102	Mass %	na
Detailed Gravimetric Quantification (b)	DETSC 1102	Mass %	0.001
Quantification by PCOM (c)	DETSC 1102	Mass %	na
Potentially Respirable Fibres (d)	DETSC 1102	Fibres/g	na

### Breakdown of Gravimetric Analysis (a)

Mass of Sample		g	29.72
ACMs present*		type	
Mass of ACM in sample		g	
% ACM by mass		%	
% asbestos in ACM		%	
% asbestos in sample		%	

### Breakdown of Detailed Gravimetric Analysis (b)

% Amphibole bundles in sample		Mass %	na
% Serpentine bundles in sample		Mass %	0.001

### Breakdown of PCOM Analysis (c)

% Amphibole fibres in sample		Mass %	na
% Serpentine fibres in sample		Mass %	na

### Breakdown of Potentially Respirable Fibre Analysis (d)

Amphibole fibres		Fibres/g	na
Chrysotile fibres		Fibres/g	na

\* Denotes test or material description outside of UKAS accreditation.  
 % asbestos in Asbestos Containing Materials (ACMs) is determined by  
 by reference to HSG 264.  
 Recommended sample size for quantification is approximately 1kg  
 # denotes deviating sample

# WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 15-49289  
 Client Ref D7064  
 Contract Title Church Lane, Whitburn  
 Sample Id SURFACE SAMPLE 1

Sample Numbers 894217 900404 900405  
 Date Analysed 20/11/2015

Test Results On Waste		
Determinand and Method Reference	Units	Result
DETSC 2084* Total Organic Carbon	%	4.3
DETSC 2003# Loss On Ignition	%	8.4
DETSC 3321# BTEX	mg/kg	< 0.04
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01
DETSC 3311# TPH (C10 - C40)	mg/kg	< 10
DETSC 3301 PAHs	mg/kg	< 1.6
DETSC 2008# pH	pH Units	7.9
DETS073* Acid Neutralisation Capacity (pH4)	mol/kg	
DETS073* Acid Neutralisation Capacity (pH7)	mol/kg	

WAC Limit Values		
Inert Waste	SNRHW	Hazardous Waste
3	5	6
n/a	n/a	10
6	n/a	n/a
1	n/a	n/a
500	n/a	n/a
100	n/a	n/a
n/a	>6	n/a
n/a	TBE	TBE
n/a	TBE	TBE

Test Results On Leachate				
Determinand and Method Reference	Conc in Eluate ug/l		Amount Leached mg/kg	
	2:1	8:1	LS2	LS10
DETSC 2306 Arsenic as As	2.5	1.3	0.005	0.015
DETSC 2306 Barium as Ba	20	5.7	0.04	< 0.1
DETSC 2306 Cadmium as Cd	< 0.03	< 0.03	< 0.004	< 0.02
DETSC 2306 Chromium as Cr	0.47	< 0.25	< 0.02	< 0.1
DETSC 2306 Copper as Cu	2.5	0.6	0.005	< 0.02
DETSC 2306 Mercury as Hg	0.02	< 0.01	< 0.0004	< 0.002
DETSC 2306 Molybdenum as Mo	2.4	1.3	< 0.02	< 0.1
DETSC 2306 Nickel as Ni	0.6	< 0.5	< 0.02	< 0.1
DETSC 2306 Lead as Pb	0.39	< 0.09	< 0.01	< 0.05
DETSC 2306 Antimony as Sb	2	1.1	< 0.01	< 0.05
DETSC 2306 Selenium as Se	0.4	< 0.25	< 0.006	< 0.03
DETSC 2306 Zinc as Zn	2.96	2.61	0.006	0.027
DETSC 2055 Chloride as Cl	6300	2200	< 20	< 100
DETSC 2055* Fluoride as F	250	160	0.5	1.72
DETSC 2055 Sulphate as SO4	3000	2200	< 20	< 100
DETSC 2009* Total Dissolved Solids	60000	34000	120	373.9
DETSC 2130 Phenol Index	< 100	< 100	< 0.2	< 1
* Dissolved Organic Carbon	6000	2400	12	< 50

WAC Limit Values		
Limit values for LS10 Leachate		
Inert Waste	SNRHW	Hazardous Waste
0.5	2	25
20	100	300
0.04	1	5
0.5	10	70
2	50	100
0.01	0.2	2
0.5	10	30
0.4	10	40
0.5	10	50
0.06	0.7	5
0.1	0.5	7
4	50	200
800	15,000	25,000
10	150	500
1000	20,000	50,000
4000	60,000	100,000
1	n/a	n/a
500	800	1000

TBE - To Be Evaluated  
 SNRHW - Stable Non-Reactive  
 Hazardous Waste

Additional Information		
DETSC 2008 pH	8.3	8.1
DETSC 2009 Conductivity uS/cm	85.9	48.2
* Temperature*	6.9	18

Mass of Sample Kg	0.140
Mass of dry Sample Kg	0.122

Stage 1	
Volume of Leachant L2	0.226
Volume of Eluate VE1	0.159

Stage 2	
Volume of Leachant L8	0.976
Volume of Eluate VE2	0.73

Disclaimer: The WAC limit values are provided for guidance only. DETS does not accept responsibility for errors or omissions. Values are correct at time of issue.

## Information in Support of the Analytical Results

Our Ref 15-49289-1  
Client Ref D7064  
Contract Church Lane, Whitburn

### Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
894213	MBH1 0.20 SOIL	29/10/15	GJ 250ml, GV, PT 1L		
894214	MBH2 0.50 SOIL	29/10/15	GJ 250ml, GV, PT 1L		
894215	MBH3 0.20 SOIL	29/10/15	GJ 250ml, GV, PT 1L		
894216	MBH5 0.50 SOIL	29/10/15	GJ 250ml, GV, PT 1L		
894217	SURFACE SAMPLE 1 SOIL		PT 1L		
900404	SURFACE SAMPLE 1 LEACHATE		GJ 1L (1L)		
900405	SURFACE SAMPLE 1 LEACHATE		GJ 1L (1L)		

Key: G-Glass P-Plastic J-Jar V-Vial T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time and/or inappropriate containers are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

### Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

### Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

## Appendix E - Geotechnical Testing



# Laboratory Report Front Sheet

Site name

Job number

Church Lane, Whitburn

D7064

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



## Client details:

Reference: D7064  
Name: Dunelm  
Address: Foundation House,  
St John's Road,  
Meadowfield,  
County Durham,  
DH7 8TZ  
Telephone: 0191 3783151  
Email: mdavidson@solmek.com  
FAO: M. Davidson

Date commenced: 20/11/2015

Date reported: 04/12/2015

## 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 8 weeks after the report date. After the 04-02-2016 all samples will be disposed of. Should further testing be required then the office should be informed before the above date.

Signature:

A handwritten signature in black ink that reads 'N Bland'.

Approved Signatories:

- N Bland (Lab Manager)
- U Mazhar (Assistant Lab Manager)
- I Nicholson (Technical Manager)



## **▲Solmek conditions of offer, notes on limitations & basis for contract (ref. version1/2015)**

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

Solmek 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. Solmek are not responsible for the action negligent of otherwise of subcontractors or third parties.

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

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

Desk studies are generally prepared in accordance with RICS guidelines. Environmental site investigations are generally undertaken as 'exploratory investigations' in accordance with the definitions provided in paragraph 5.4 of BS 10175:2001 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, Solmek cannot and will not be responsible for any subsequent shortfall or inadequacy in data, and any consequent shortfall in interpretation of environmental and geotechnical aspects which may be required at a later date in order to facilitate the design of permanent or temporary works.

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

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

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





## Certificate of Analysis

Certificate Number 15-52514

10-Dec-15

*Client* SOLMEK  
12 Yarm Road  
Stockton On Tees  
Cleveland  
TS18 3NA

*Our Reference* 15-52514

*Client Reference* D7064

*Order No* (not supplied)

*Contract Title* CHURCH LANE, WHITBURN

*Description* 7 Soil samples.

*Date Received* 05-Dec-15

*Date Started* 05-Dec-15

*Date Completed* 10-Dec-15

*Test Procedures* Identified by prefix DETSn (details on request).

*Notes* Opinions and interpretations are outside the scope of UKAS accreditation. 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. Observations and interpretations are outside the scope of ISO 17025. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

*Approved By*

A handwritten signature in black ink, appearing to read "Rob Brown".

Rob Brown  
Business Manager



## Summary of Chemical Analysis

### Soil Samples

Our Ref 15-52514

Client Ref D7064

Contract Title CHURCH LANE, WHITBURN

<b>Lab No</b>	911071	911072	911073	911074	911075	911076	911077
<b>Sample ID</b>	MBH1	MBH1	MBH2	MBH3	MBH3	MBH4	MBH5
<b>Depth</b>	1.20	2.00	1.20	0.30	1.20	1.20	1.20
<b>Other ID</b>							
<b>Sample Type</b>	D	D	D	B	D	D	D
<b>Sampling Date</b>	n/s	n/s	n/s	n/s	n/s	n/s	n/s
<b>Sampling Time</b>	n/s	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units							
<b>Inorganics</b>										
pH	DETSC 2008#			7.8	8.2	8.1	7.9	7.9	8.2	8.0
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	50	140	32	20	17	61	10

## Information in Support of the Analytical Results

Our Ref 15-52514  
 Client Ref D7064  
 Contract CHURCH LANE, WHITBURN

### Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
911071	MBH1 1.20 SOIL		PT 1L	Sample date not supplied	
911072	MBH1 2.00 SOIL		PT 1L	Sample date not supplied	
911073	MBH2 1.20 SOIL		PT 1L	Sample date not supplied	
911074	MBH3 0.30 SOIL		PT 1L	Sample date not supplied	
911075	MBH3 1.20 SOIL		PT 1L	Sample date not supplied	
911076	MBH4 1.20 SOIL		PT 1L	Sample date not supplied	
911077	MBH5 1.20 SOIL		PT 1L	Sample date not supplied	

Key: P-Plastic T-Tub

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### Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

### Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

**Appendix F - 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 3<sup>rd</sup> 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.